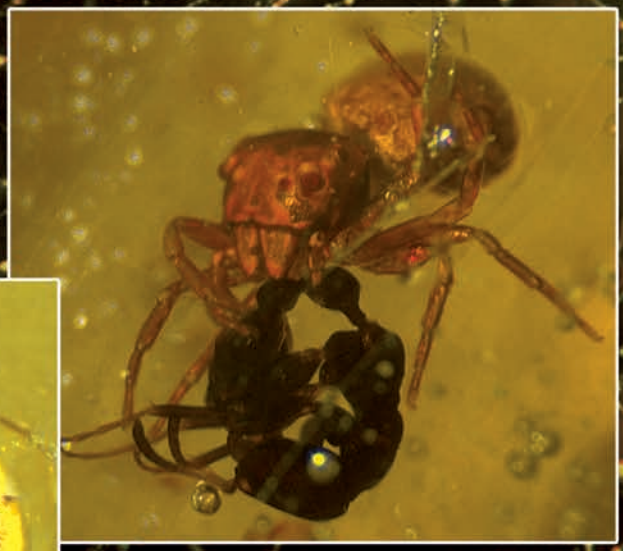
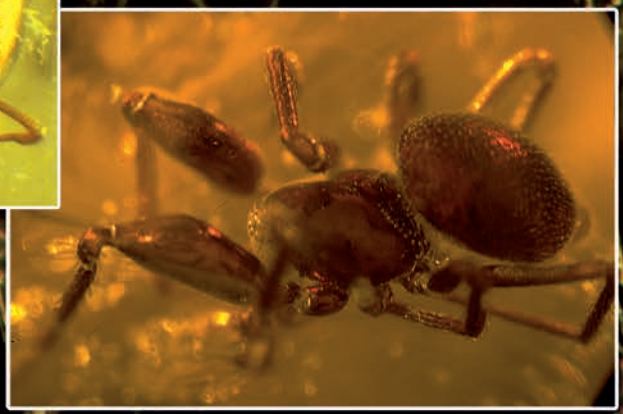
BEITR. ARANEOL., 3 B (2004)

Jörg Wunderlich

FOSSIL SPIDERS IN AMBER AND COPAL

FOSSILE SPINNEN IN BERNSTEIN UND KOPAL





Photos on the book cover:

Above: Non-adult male of the family Archaeidae (genus *Myrmecarchaea*) in Baltic amber, body length 2mm, see the photos 77-78. These very long-legged spiders had an extremely long petiolus and were probably ant-shaped.

On the left: Female of the Archaeid spider *Eriauchenius gracilicollis* in copal from Madagascar, body length about 3mm, see the photos 81-83. These spiders have very long chelicerae, a very long "neck" and a head-shaped part of the prosoma.

In the middle: A male Crab Spider (Thomisidae) of the genus *Apyretina* in copal from Madagascar, body length 4.5mm, with its prey under it, an ant, see the photo 438.

Below: Male Anapid spider (*Balticoroma serafinorum*) in Baltic amber, body length ca. 1.2mm, see photo 150. Males of this species had unusually thick femora of the anterior legs which probably played a role in their mating behaviour.

In the background: Part of a spider's capture web (of the superfamily Araneoidea) in Baltic amber, see the photos 577-578. The threads bear numerous remains of sticky droplets.

Fotos auf dem Buchdeckel:

Oben: Nicht geschlechtsreifes Männchen der Familie Urspinnen (Gattung *Myrmecarchaea*) im Baltischen Bernstein, Körper-Länge 2mm, siehe die Fotos 77-78. Diese sehr langbeinigen Spinnen besaßen einen extrem langen Stiel zwischen Vorder- und Hinterkörper (Petiolus) und waren vermutlich ameisen-ähnlich.

Links: Weibliche Urspinne (*Eriauchenius gracilicollis*) in Kopal aus Madagaskar, Körper-Länge etwa 3mm, siehe die Fotos 81-83. Diese Spinnen besitzen sehr lange Kiefer, einen sehr langen "Hals" und einen kopf-artigen Teil des Vorderkörpers.

Mitte: Eine männliche Krabbenspinne in Kopal aus Madagaskar, Körper-Länge 4.5mm, mit einer erbeuteten Ameise unter sich, siehe Foto 438.

Unten: Männliche Zwerg-Kugelspinne im Baltischen Bernstein, Körper-Länge 1.2mm, siehe Foto 150. Männchen dieser Art besaßen ungewöhnlich dicke Schenkel (Femora) der Vorderbeine, die vermutlich bei der Paarung eine Rolle spielten.

Im Hintergrund: Teil des Fangnetzes einer Spinne (Vertreter einer Radnetzspinnen-Verwandten) im Baltischen Bernstein, siehe die Fotos 577-578. Die Spinnfäden tragen zahlreiche Reste von Klebtröpfchen.

BEITR. ARANEOL., 3 (2004)

In continuation of part III of vol. 3A:

DESCRIPTIONS OF THE REMAINING FOSSIL SPIDER TAXA IN AMBER AND COPAL / BESCHREIBUNGEN DER ÜBRIGEN FOSSILEN SPINNEN-GRUPPEN IN BERNSTEIN UND KOPAL

During printing of these volumes the address of the editor - JOERG WUNDERLICH - and the Publishing House Joerg Wunderlich changed from 75334 Straubenhardt to 69493 Hirschberg-Leutershausen, Oberer Häuselbergweg 24 in Germany.

Orders for these volumes please directly to the editor, J. Wunderlich!

Während der Drucklegung dieser Bände wechselte die Anschrift des Herausgebers - JOERG WUNDERLICH - und des Joerg Wunderlich Verlags von D-75334 Straubenhard zu D-69493 Hirschberg-Leutershausen, Oberer Häuselbergweg 24.

Bestellungen für diese Bände bitte direkt an den Herausgeber J. Wunderlich!

BEITR. ARANEOL., 3 (2004)

FOSSIL SPIDERS IN AMBER AND COPAL. Conclusions, revisions, new taxa and family diagnoses of fossil and extant taxa. Vol. 3B

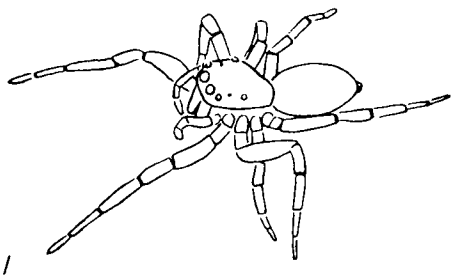
FOSSILE SPINNEN IN BERNSTEIN UND KOPAL. Rückschlüsse, Revisionen, Neubeschreibungen und Familien-Diagnosen fossiler und heutiger Spinnen. Band IIIB

PART IIIb / Teil IIIb

JOERG WUNDERLICH:

DESCRIPTIONS OF THE REMAINING FOSSIL SPIDER TAXA (excl. Mygalomorpha, Dysderoidea, Eresoidea and Oecobioidea) / BESCHREIBUNG DER ÜBRIGEN FOSSILEN SPINNEN-GRUPPEN (excl. Längskieferspinnen, Sechsaugenspinnen-Verwandten, Röhrenspinnen-Verwandten und Scheibennetzspinnen-Verwandten)

Editor: J. WUNDERLICH, 69493 Hirschberg-Leutershausen, Germany.



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Inversions in spiders' relationships

Out of the blue the Mimetidae
changed their position in the Araneoidea
to the superfamily Palpimanoidea.
Surprisingly the Nephilinae
found itself in Tetragnathidae.
Micropholcommatidae from "Down Under"
are Palpimanoid' now - what a wonder!
In the 19th century however
SIMON's placings
have been much more clever;
fortunately he has never
been confused by simple statistics
or proud computer cladistics!

J. Wunderlich

BEITR. ARANEOL., 3 (2004)

FOSSIL SPIDERS OF THE FAMILY ULOBORIDAE (ARANEAE) IN BALTIC AND DOMINICAN AMBER

JOERG WUNDERLICH, 75334 Straubenhardt, Germany.

ABSTRACT: Fossil Uloboridae in Baltic and Dominican amber are described, *Hyptiotes triqueter* (KOCH & BERENDT 1854) in Baltic amber is revised. The following taxa are described: (1) in Baltic amber: *Eomiagrammopes* **n. gen.**, *E. singularis* **n. sp.**, *E. spinipes* **n. sp.**, *E. maior* **n.sp.**, *E.* sp. and ?*E.* sp., *Hyptiomopes* **n. gen.**, *H. bitterfeldensis* **n. sp.**, *Hyptiotes convexus* **n. sp.**, *H. glaber* **n. sp.**, *H. saetosus* **n. sp.** and *H. stellatus* **n. sp.**, *Opellianus* **n. gen.**, *O. excellens* **n. sp.**, *O. kazimierasi* **n. sp.** and *O. ludwigi* **n. sp.**, *Ulobomopes* **n. gen.**, *U. unicus* **n. sp.**; (2) in Dominican amber: *Miagrammopes dominicanus* **n. sp.** - Uloboridae in Baltic amber are much more diverse than in Dominican amber. - Fossil links to extant and more specialized taxa are discussed. - Notes on the Cretaceous genera *Palaeouloborus* SELDEN 1990 and *Macryphantes* SELDEN 1990 are given; *Macryphantes* is probably not a member of the Tetragnathidae but of an undescribed extinct spider family.

Material: If not otherwise stated the spiders are kept in the collection of J. WUNDERLICH (CJW). BB = Baltic amber, DB = Dominican amber.

INTRODUCTION

Uloboridae (German name: Kräusel-Radnetzspinnen) are very rare in Dominican amber but not so rare in Baltic amber; in Baltic amber I saw about 100 specimens of this family, most spiders are members of the genera *Hyptiotes* and *Opellianus*. Besides *Hyptiotes* the authors KOCH, BERENDT, MENGE and PETRUNKEVITCH apparently never recognized a member of this family in Baltic amber.
Members of the family Uloboridae are much more diverse in Baltic amber (at least 5 genera) than in Dominican amber (only one species of the extant genus *Miagrammopes* is known). To my knowledge all Baltic amber genera besides *Hyptiotes* are extinct.

Fossil "links" to more specialized extant forms

In my opinion plesiomorphic features - fossil "links" to derived extant taxa - are present in some taxa of the family Uloboridae in Baltic amber:

(1) In the genus *Hyptiotes* WALCKENAER I know two species groups, see the revision of this genus below: In contrast to the plesiomorphis Baltic amber *triqueter*-group (figs. 9-10) a large and plate-shaped conductor (fig. 2; see OPELL (1979: Plate 4)) and humps of the sternum have been evolved in the extant *paradoxus*-group.

(2) In the four-eyed extant and fossil Dominican amber genus *Miagrammopes* O. PICKARD-CAMBRIDGE the eyes of the anterior row have been lost completely (fig. 50). In the related fossil Baltic amber genus *Eomiagrammopes* n. gen. the eyes of the anterior row are still present but strongly reduced (fig. 13). Thus in this structure *Eomiagrammopes* may be the fossil "link" - at least a model of it - between an unknown extinct taxon and the genus *Miagrammopes*.

(3) Furthermore an apical position of the cymbial bristles is present in *Ulobomopes* n. gen. as well as in the extant genus *Octonoba* OPELL 1979 and few other extant genera, see below. In most extant genera of the Uloboridae the more hidden cymbial bristles are situated in a prodistal position. In my opinion the hidden and prodistal position of the cymbial bristles is a derived character and the apical position is ple-

siomorphic as in various other families of spiders. - Similar apical cymbial bristles are (e.g.) present in the superfamily Oecobioidea, and this feature may well be a synapomorphic structure of Oecobioidea + Araneoidea s.l. (including the cribellate Deinopidae and Uloboridae) but lost in the ecribellate branch of the Araneoidea.

Characters of the family Uloboridae: There are at least two apomorphies: Poison glands are lost (not observable in fossils) and trichobothria of the femora are present (e. g. figs. 7,12,17) at least on III-IV in two rows, and best observable on these femora. In derived genera the eye field is very wide and the posterior lateral eyes are widely spaced, the posterior lateral eyes are usually sitting on humps (figs. 5,13,36) (not so in *Polenecia* LEHTINEN, *Sybota* SIMON, probably *Siratoba* OPELL 1979 and some *Uloborus*-species) and the chelicerae are small (e. g. figs. 8, 35). - Further characters: Presence of: A cribellum (e.g. fig. 37), usually a calamistrum (fig. 22) but see below, often (basicly) - e. g. in *Hyptiotes* and *Eomiagrammopes* - feathery hairs (fig. 26) (best observable at the margin of the prosoma and on the femora), short ventral spines at least on metatarsus and tarsus III-IV (e.g. figs.18,40), two or three prodistal or apical cymbial bristles (figs. 41-42, 49) and an orb web, which may be similar to the typical Araneidae orb web or modified - e.g. in *Hyptiotes* - or strongly reduced, e.g. in *Miagrammopes*. The female genital area - not a sclerotized epigyne - usually is hairy and divided, the vulva may be entelegyne or - secondary - haplogyne, accessory glands may be present, see OPELL (1979).
Remarks: The cribellum (fig. 37) and especially the calamistrum are reduced in the males of some taxa, see the key. Feathery hairs - a plesiomorphic pattern - are also present e.g. in the related cribellate Deinopidae but not in the ecribellate branch of the Araneoidea s.l. (= Araneoidea s.str.). Trichobothria of the femora are also present in some extant taxa of the family Tetragnathidae as well as in fossil Tetragnathidae in Dominican but not in Baltic amber taxa (see also below: The Cretaceous genus *Macryphantes* and a gen. indet. in Baltic amber); Tetragnathidae are ecribellate spiders, have large chelicerae and a paracymbium, feathery hairs are absent in all taxa, the anterior spinnerets are not unusually large and not widely spaced as in Uloboridae. - Apical cymbial bristles are present e. g. in Oecobioidea (see below), too, and - apomorphic each in my opinion - e.g. in most Zodariidae and Lycosidae genera. - Furthermore in many Uloboridae leg I is modified, e. g. thickened or bearing long/dense hairs or numerous bristles (figs. 51, 53), in some taxa the body is long and slender (e.g. figs. 12-14 but compare figs. 5, 35-36), frequently the clypeus is long (fig. 35 but see fig. 45), the sternum of several taxa is modified, for example it is divided in *Miagrammopes* (fig. 56), there are humps in extant but not in fossil *Hyptiotes* species and the cymbium - except basally - is often very slender but compare fig. 21. Stridulatory files of the coxa of the ♂-pedipalpus are present in some extant genera but have not been observed in fossil taxa up to now.

Subfamilies: Perhaps there are no subfamilies. The relationships of some genera sensu OPELL (1984) are quite different compared with the opinion of OPELL (1979). See DIPPENAAR-SCHOEMAN & JOCQUE (1997: 321); but these subfamilies are not natural taxa in my opinion.

Relationships: Deinopidae is also cribellate, and erect ventral tarsus IV macrosetae are present (as e.g. in the Oecobioidea, so this may be a plesiomorphic character),

but trichobothria of the femora are absent, poison glands are present, eye position and capture web are quite different. Deinopidae and Uloboridae are usually united to the superfamily Deinopoidea, and Deinopoidea with Araneoidea to the "Orbiculariae". In my opinion the term "Orbiculariae" is superfluous; if one combines Deinopoidea and Araneoidea one should better use the taxon name "Araneoidea" in a wide sense (s. l.) including the "cribellate branch of the Araneoidea" - Deinopidae and Uloboridae - and the "ecribellate branch of the Araneoidea", the remaining families = Araneoidea s. str.

Distribution: Uloboridae are distributed cosmopolitical but mainly tropical and subtropical. Baltic amber fossils: Five known genera; *Opellianus* which I do not know from Bitterfeld, *Hyptiomopes* (2 specimens) which I only know from Bitterfeld. Dominican amber fossils: Only the "modern" four-eyed genus *Miagrammops* has been found.

Remarks on two Cretaceous taxa which were NOT described in amber

(1) *Palaeouloborus* SELDEN 1990: In contrast to the genera described in Baltic amber after SELDEN ventral macrosetae (bristles) of tarsus IV are - ?really - absent in *Palaeouloborus*. This feature is quite unusual in Uloboridae. The only known specimen is a juvenile or adult female; therefore bulbus structures are unknown and the intrafamiliar relationships are unclear, the given diagnostic characters give no important hints.

(2) *Macryphantes* SELDEN 1990: The described holotype is an adult male, described sub Tetragnathidae. Regarding the ventral tarsal bristles as well as ventral metatarsal bristles IV (plate 3) - which are similar (e.g.) in the Uloboridae - and the bulbus structures - embolus and conductor are not in a distal position - in my opinion *Macryphantes* is not a member of the family Tetragnathidae but it may be the member of an undescribed family. A pair of bent and serrated accessory hairs near the claws IV, see SELDEN (1990: 263) - which are known from the Araneoidea - may also occur in the Uloboridae, pers. obs. in *Hyptiotes*. Feathery hairs - and probably plumose hairs - may be absent in Uloboridae, e.g. in *Opellianus* n. gen. In *Macryphantes* a calamistrum may be absent - but see plate 3 in the paper of Selden! A calamistrum may be absent in Uloboridae, e. g. in *Opellianus*. Probably a retrobasal paracymbium is present in *Macryphantes*, see SELDEN (1990: Fig. 3)! This structure indicates relationships to the ecribellate branch of the superfamily Araneoidea. - A male of my private collection in Baltic amber - F1017/BB/AR/CJW - may be con-familiar; a description is in preparation.

(1) Uloboridae in Baltic amber

(= Mithraeidae sensu KOCH & BERENDT 1854, vgl. WUNDERLICH (1986: 27))

Key to the genera of the family Uloboridae in Baltic amber:

Remark: The body length is only noted for males.

1 Position of the posterior lateral eyes in the middle of the length of the prosoma (fig. 5), patellae longer than tarsi, pedipalpus very large (figs. 9-10, photos). Body length 2.2-2.8mm. Photos 98-102 . . . . . *Hyptiotes*

- position of the posterior lateral eyes distinctly in the anterior half of the prosoma (figs. 13, 36), patellae shorter than tarsi, pedipalpus not very large. 2

2(1) At least femora II-IV without bristles, body very long and slender (figs. 12-13), anterior lateral eyes reduced (fig. 13), tibia of the ♂-pedipalpus with a dorsal-distal outgrowth (fig. 25), body length about 5mm. Photos 106-109 . . . . *Eomiagrammopes*

- similar but prosoma widest in or behind the middle, and anterior lateral eyes not reduced (fig. 34), juvenile. . . . . ?*Eomiagrammopes* sp.

- femoral bristles present on all legs (figs. 7, 35), body more compact (fig. 35), body length 1.4-3mm. 3

3(2) body length 1.4-1.9mm, clypeus very long (fig. 35), calamistrum absent at least in the male (fig. 40). Photos 103-105 . . . . . *Opellianus*

- body lenth 2.2-3mm, clypeus shorter (fig. 45), calamistrum absent (*Hyptiomopes*-♂) or present (*Ulobomopes*). 4

4(3) body length 2.2-2.7mm, calamistrum present, compare fig. 22. ♂-pedipalpus: Fig. 46. . . . . *Hyptiomopes*

- body length 3mm, calamistrum absent at least in the male, very long apical cymbial bristles present (fig. 49). . . . . *Ulobomopes*

character	*Hyptiotes*	*Eomia-grammopes*	*Opellianus*	*Hyptiomopes*	*Ulobomopes*
photos	98-102	106-109	1o1-105		
body shape	compact (figs.1,5)	long (fig.12)	compact	compact	compact
♂-calamistrum	present	present (fig.22)	absent	present	absent
posterior position of poster. lateral eyes	+ (fig.5)	-- (fig.13)	-- (fig.36)	--	--
strongly reduced ant. lat. eyes	-- (fig.5)	+ (fig.13)	--	--	--
size of the bulbus	very large	medium	medium (see the photos)	medium	small
body length of ad. ♂ (mm)	2.2-2.8	+/- 5.0	1.4-1.9	2.2-2.7	3.0

Comparison of selected characters in the fossil Baltic amber genera of the family Uloboridae

Hyptiotes WALCKENAER 1837

Synonym : *Androgeus* KOCH & BERENDT 1854, see WUNDERLICH (1986).

Type species: *A. triqueter* KOCH & BERENDT 1854. The second nominal fossil species of this genus - *A. militaris* KOCH & BERENDT 1854 - is a member of *Eomysmena* PETRUNKEVITCH 1942 (Theridiidae), see WUNDERLICH (1986: 27); (b) *Uptiotes* WALCKENAER 1837, see OPELL (1979: 485).

Diagnosis: See the tab. above. Typical are the compact body with patellae longer than the tarsi, the long clypeus similar to *Opellianus*, the posterior position of the posterior lateral eyes (figs. 1, 5, 8), the very large bulbus with a divided median apophysis and a very long embolus (figs. 2, 10). The position of the spinnerets is in front of the tip of the opisthosoma, see the photos. The modified and triangular capture web of this genus is of special interest, see SAUER & WUNDERLICH (1997: 44-45, 254-255); thus the German name of these spiders is "Dreiecksspinnen".

Species groups: Extant and fossil species are members of separate species groups, the plesiomorphic fossil *triqueter*-group and the derived *paradoxus*-group: The anterior sternal humps - which are present e.g. in the extant *H. paradoxus* (C.L. KOCH 1837) - are apparently absent in the fossil species, a large, plate-shaped and translucent part of the conductor (P in fig. 2, see OPELL (1979: Plate 4)) is absent in the fossil species (figs. 9-10) and the shape of the median apophysis is different in both groups.

Remarks: (1) Because of the partly hidden bulbi - they may be covered by a white emulsion, e. g. in *triqueter* - the conspecifity of some males is not sure. (2) *Hyptiotes triqueter* sensu WUNDERLICH (1986: Fig. 289) is not *triqueter* but sp. indet., preserved together with an indet. male of the family Theridiidae, F83/BB/AR/THE/CJW. (3) there seem to be some more undescribed fossil species of this genus; I select here for descriptions specimens with best preserved/observable bulbi.

Distribution: Widely distributed, but not known from South America and Australia; Tertiary Baltic amber forest.

Key to the fossil species of the genus *Hyptiotes* (males):

1 Dorsal branch of the median apophysis wide (arrow in fig. 6), cymbium strongly convex. Photos 100-101 . . . . . *stellatus*

- dorsal branch of the median apophysis slender, e. g. D in fig. 9. 2

2(1) position of the retrolateral part of the embolus vertical (figs. 3-4). . . . . *triqueter*

- position of the retrolateral part of the embolus oblique (e. g. fig. 10). 3

3(2) cymbium with numerous long hairs, retrolateral part of the embolus about 1.1mm long, embolus position more horizontal (fig. 10). . . . . *saetosus*

- cymbium with fewer hairs, retrolateral part of the embolus about 0.8mm long. 4

4(3) cymbium more convex and hairy (fig. 9). . . . . *convexus*

- cymbium less convex and less hairy (photo 99) . . . . . *glaber*

Hyptiotes triqueter (KOCH & BERENDT 1854) (sub *Androgeus*) (figs. 3-4)

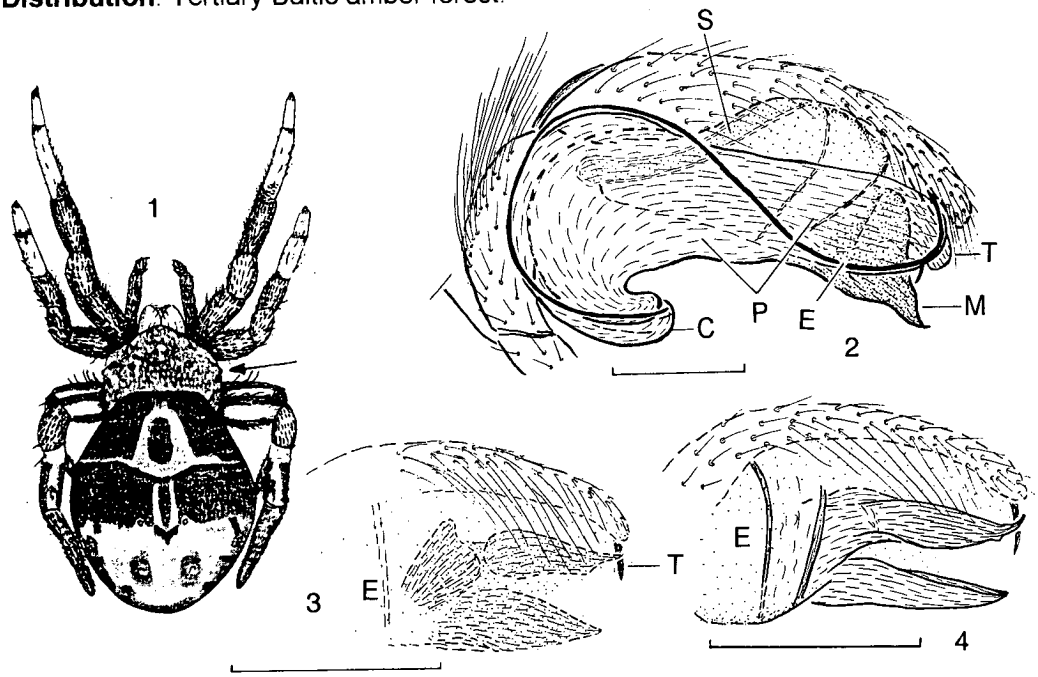
Material in Baltic amber: Holotypus ♂, Zool. Mus. Humboldt University Berlin; a questionable ♂ with a separated amber piece F78/BB/AR/ULO/CJW.

Diagnosis (♂; ♀ unknown): Retrolateral part of the embolus in a vertical position, apical part of the dorsal branch of the median apophysis slender, cymbium fairly hairy, figs. 2-3.

Description: Body and legs as in other species - compare OPELL (1979) - body length 2.6-2.8mm, prosoma length 1.1mm (questionable ♂), tibia I 0.8mm (questionable ♂).

Relationships: *H. glaber* and *saetosus* are related, see the key.

Distribution: Tertiary Baltic amber forest.



Figs. 1-2: ***Hyptiotes paradoxus*** (C. L. KOCH 1834), extant, Europe; 1) ♀, body dorsally, length = 5mm; the arrow indicates to the posterior lateral eyes; taken from WIEHLE (1953: Fig. 252); 2) r. ♂-pedipalpus retrolaterally; M = 0.5;

fig. 3) ***Hyptiotes triqueter*** (KOCH & BERENDT 1854), ♂ holotype, r. pedipalpus retrolaterally, partly hidden by an emulsion; T = tooth of the terminal apophysis; M = 0.5;

fig. 4) ***Hyptiotes ?triqueter*** (KOCH & BERENDT 1854), r. ♂-pedipalpus retrolaterally; M = 0.5;

***Hyptiotes glaber* n. sp.** (fig. 7) photo 99

Material: Holotypus ♂ in Baltic amber, F80/BB/AR/ULO/CJW.

Preservation and syninclusions: The spider is beautiful and completely pre-served but the right and partly the dorsal side are covered by a thick white emulsion. The left and ventral sides have been cleared by the sun, the right sides of the legs - which appearently positioned in the shaddow - are not cleared. - In the 3cm long amber piece 2 beetles (Coleoptera: Mordellidae and Elateridae), 2 ants, 1 1/2 Diptera, the rest of a Collembola, 1 Acari as well as numerous stellate hairs, detritus particles and excrement balls are preserved.

Diagnosis (♂; ♀ unknown): Position of the retrolateral part of the embolus oblique (photo), its length +/-0.8mm, distal branch of the dorsal part of the median apophysis slender.

Description (♂):
Measure ments (in mm): Body length 2.5, prosoma length 1.1, leg I: Femur 1.2, patella 0.45, tibia 0.9, metatarsus 1.05, tarsus 0.4, tibia II 0.5, tibia III 0.3, tibia IV 0.6.
Colour dark orange brown (unusual!), legs not annulated.
Prosoma, legs and opisthosoma as in the genus, prosoma with indistinct hairs only. Femur III with a row of 6 prodorsal trichobothria (fig.7). The gnathocoxa - which partly are covered by a white emulsion - probably have a lateral out-growth which builds a longitudinal furrow near the middle. - Pedipalpus: See the photo; patella and tibia each with a long dorsal-distal bristle.

Relationships: In *H. convexus* the cymbium is more convex and more hairy.

Distribution: Tertiary Baltic amber forest.

***Hyptiotes convexus* n.sp.** (figs. 8-9)

Material in Baltic amber: Holotypus and a separated amber piece F81/BB/AR/ULO/CJW; 1 probably conspecific ♂ in the coll. F. KERNEGGER in Hamburg.

Preservation and Syninclusions: The holotype is completely and well preserved; few parts are covered by an emulsion.- Two insect (?beetles) leg parts, an excrement ballet and some stellate hairs are also preserved in the amber piece with the spider.

Diagnosis (♂; ♀ unknown): Cymbium strongly convex (fig. 9), distal part of the dorsal branch of the median apophysis slender, position of the retrolateral part of the embolus oblique, its length about 0.8mm.

Description (♂):
Measurements (in mm): Body length 2.2, prosoma length 1.2, leg I: Femur 1.25, patella 0.4, tibia 0.85, metatarsus 1.0, tarsus 0.35, tibia IV 0.6.
Colour grey brown, legs not annulated.
Prosoma (fig.8), legs and opisthosoma as in the genus, prosoma with indistinct hairs only. - A tibial bristle of the ♂-pedipalpus (fig.9) is probably absent.

Relationships: See *H. glaber* and the key.

Distribution: Tertiary Baltic amber forest.

***Hyptiotes saetosus* n. sp.** (figs. 10-11)

Material: Holotypus ♂ in Baltic amber, F82/BB/AR/ULO/CJW.

Preservation and syninclusions: The spider is incompletely preserved, most parts are thickly covered by a white emulsion, the right pedipalpus is an exception and well observable; the distal part of the opisthosoma and the distal articles of all legs are cut off. - A tiny excrement ball and several stellate hairs are preserved in front of the spider.

Diagnosis (♂; ♀ unknown): Cymbium with numerous long hairs (fig. 10), retrolateral part of the embolus long (1.1mm), its position oblique and nearly horizontally, distal branch of the dorsal part of the median apophysis slender.

Description (♂):
Measurements (in mm): Body length 2.8, femur I 1.3.
Colour grey brown, legs not annulated.
Prosoma, opisthosoma and legs as in the genus but prosoma with numerous hairs. - Pedipalpus (figs.10-11): Tibial bristle probably absent; the tip of the terminal apophysis is strongly bent.

Relationships: See the key.

Distribution: Tertiary Baltic amber forest.

***Hyptiotes stellatus* n.sp.** (figs.5-6) Photos 100-101

Material: Holotypus ♂ in Baltic amber, F79/BB/AR/ULO/CJW.

Preservation and syninclusions: The spider is excellently and nearly completely preserved, the dorsal part of the right tibia I is cut off, very small parts of the left body side are covered by a white emulsion. - Two thin threads are preserved beneath the pedipalpi, few stellate hairs behind the spider.

Diagnosis (♂; ♀ unknown): Position of the retrolateral part of the embolus oblique, apical branch of the dorsal branch of the median apophysis wide and slightly divided (arrow in fig.6), cymbium strongly convex, bearing long hairs.

Description (♂):
Measurements (in mm): Body length 2.6, prosoma: Length 1.1, width 0.95, leg I: Femur 1.2, tibia 0.8.
Colour brown, legs indistinct annulated.
Prosoma (fig.4), legs and opisthosoma as in the genus; prosoma with numerous distinct hairs.

Relationships: See the key.

Distribution: Tertiary Baltic amber forest.

***Eomiagrammopes* n. gen.**

Diagnosis: 8 eyes, eyes of the anterior row reduced, lenses of the anterior lateral eyes indistinct and probably absent in some species, depressions behind the posterior median eyes usually present (fig.13), body and legs long and slender (figs. 12-14, photos), sternum not divided, tibia and metatarsus I straight and not thickened, at least femora II-IV without bristles. ♂-pedipalpus (figs. 19-21, 29-31): No basal outgrowth of the femur, tibia distally with an outgrowth and frequently with long bristles (not in *minor* and *maior*), embolus long and slender, median apophysis long and bent.

Two **species groups** - see the key - which probably are not congeneric.

Relationships: Acording to the long body, the depression behind the posterior median eyes and the distal tibial outgrowth of the male pedipalpus in *E. singularis* and *spinipes*) *Miagrammopes* O. PICKARD-CAMBRIDGE 1869 (extant, cosmotropical and fossil in Dominican amber, see below) may be related to *Eomiagrammopes*. In the younger and more derived genus *Miagrammopes* the eyes of the anterior row - which are present but tiny in *Eomiagrammopes* - are totally absent, the sternum is usually divided, metatarsi I and IV are more distinctly flattened laterally and long distal tibial bristles of the ♂-pedipalpus are absent. - In *Sybota* SIMON 1892 also a tibial outgrowth of the male pedipalpus is present but the body is more compact, de-

pressions behind the posterior median eyes are absent and the eyes of the anterior row are not reduced.

Type species: *Eomiagrammopes singularis* n.sp.

Distribution: Tertiary Baltic amber forest including the Bitterfeld locality.

Key to the species of *Eomiagrammopes* (males):

1 Femur I bristleless, metatarsus I bears about 20 or more than 40 bristles (figs.15,23). Depressions behind the posterior median eyes present (fig.13). Tibia of the ♂-pedipalpus elongated (figs.19,25). *Singularis*-group. 2

femur I bears few prolateral bristles, metatarsus I bears less than 10 bristles (fig.27). Depressions behind the posterior median eyes absent. Tibia of the ♂-pedipalpus (fig.30) not elongated. *Minor*-group. 3

2(1) metatarsus I thickened, bearing more than 40 bristles (fig.23). . . . . *spinipes*

- metatarsus I not thickened, bearing about 20 bristles (fig.15). . . . . *singularis*

3(1) body length about 4mm, tibia I about 2.5mm long,, tibia of the pedipalpus with two long bristles (fig.30). . . . . *minor*

- body length about 5mm, tibia I about 3mm long, tibia of the pedipalpus with one long dorsal bristle. . . . . *maior*

***Eomiagrammopes singularis* n.gen.n.sp**. (figs. 12-22)

Material: Holotypus ♂ and paratypus ?adult ♀ in Baltic amber, Bayerische Staatssammlung München, Paleontology, coll. SCHEELE. Both have been embedded in artificial resin by me.

Remark: The conspecifity of the female is unsure.

Holotypus (♂):

Preservation and syninclusions: The spider is completely preserved; opisthosoma and the anterior part of the prosoma dorsally and ventrally are covered by a white emulsion, the structures of the bulbus are partly hidden. - Beneath the spider some ?cribellate threads with insect rests and some stellate hairs are preserved. Furthermore 5 Diptera, 1 Coleoptera, half of an insect, 2 long insect legs and the part of an antenna are preserved in the amber piece.

Diagnosis: Femur I bristleless, metatarsus I with about 20 bristles, metatarsus I not thickened (fig.15), ♂-pedipalpus: Figs. 19-21.

Description:
Measurements (in mm): Body length 5.3, prosoma: Length 2.15, width 1.4, opisthosoma: Length 3.6, width 1.2, hight 1.0, leg I: Femur 2.7 (diameter 0.35), patella 0.7, tibia 1.9, metatarsus 2.3, tarsus 0.9, tibia II 0.8, femur III 0.8, leg IV: Femur 1.5, patella 0.4, tibia 1.6, metatarsus 1.0, tarsus 0.55.

Prosoma (figs. 12-13) covered with numerous short hairs, sides parallel. Anterior eye row most probably procurved, anterior median eyes small, lenses of the anterior lateral eyes indistinct (or even wanting?), posterior lateral eyes situated on humps, a depression is present behind the posterior median eyes, fovea small, chelicerae also small, protruding. Sternum long and slender, with a deep furrow between coxae III and IV but no sternal plates are observable. - Legs (figs. 12, 15-18) long and slender, I distinctly the longest, III distinctly the shortest, order I/IV/II/III. Femoral trichobothria: I few basally-retrodorsally, II a row retrolaterally, III a row prolaterally, IV a row prolaterally and 1 dorsally. Trochanter IV bears a trichobothrium in a prolateral position. Bristles: Absent on the femora, numerous on tibia and metatarsus I, metatarsus III 1 ventrally-distally, metatarsus and tarsus IV with a row of short ventral bristles. Short tarsal claws, the paired claws bear long teeth. Calamistrum distinct. - Opisthosoma (figs. 12,14) long and slender, closely covered with short hairs. Anterior spinerets large and widely spaced, cribellum well developed. - ♂-pedipalpus (figs. 19-21): Femora hidden, tibia with 3 long bristles on an outgrowth, bulbus with a bent median apophysis and probably a long embolus.

Paratypus (?ad. ♀):

Preservation and syninclusions: The spider is nearly completely preserved, only the right leg I is cut off through the tibia, and partly covered by a white emulsion. - Two thin threads and numerous bubbles are also preserved in the amber piece.

Description:
Measurements (in mm): Body length 5.7, prosoma length 1.4, opisthosoma: Length 4.15, hight 1.0, leg I: Femur 2.7, patella 0.7, tibia 1.9, metatarsus 2.0, tarsus 0.8.
Shape of the body similar to the holotype, the two distal articles of the pedipalpus are slightly thickened, the palpal tarsus bears a claw which is bent in a right angle. Anterior lateral eyes not visible. No femoral bristles, femoral trichobothria difficult to observe, calamistrum with 31 hairs in the basal 2/3 (fig. 22), cribellum wide.

Relationships: See the key.

Distribution: Tertiary Baltic amber forest.

***Eomiagrammopes spinipes* n.gen.n.sp.** (figs. 23-25) Photo 108

Material: 3♂ in Baltic amber, holotypus coll. M. GLINK; paratypus a) coll. J. DAMZEN in Vilnius/Lithunia, no. 15; paratypus b) coll. C. GRÖHN.

Remark: The bulbus structures of the paratypes are only partly observable, therefore the conspecifity is not quite sure.

Preservation and syninclusions: The holotype is well but not completely preserved, the tip of the right tarsus I and most articles of all left legs are cut off or broken off before the spider has been embedded in the resin. The spider is deformed, mainly the right side is covered by a white emulsion. - Near the right leg IV a small beetle (Coleoptera: Ptiliidae) is preserved, on the right femur I a small detritus particle is included and furthermore Acari, some thin threads, a small excrement ball and stellate hairs. - The paratype a) is well and nearly completely preserved, the left patella I is cut off, the distal part of the left tarsus I is broken off, the body is ventrally partly covered by an emulsion. - In the same amber piece some stellate hairs, numerous detritus particles and - in front of the spider - some pyrite chrystals are preserved. - The paratype b) is well and completely preserved, the right side is covered by a white emulsion.

Diagnosis (♂ ; ad. ♀ unknown): All femora bristleless, metatarsus I thickened and bearing more than 40 bristles (fig. 23). Pedipalpus (fig. 25): Conductor straight, basally thick, median apophysis slender and slightly bent, embolus thin.

Description (♂):
Measurements (in mm): Holotypus: Body length +/- 4.0, prosoma length 1.5, femur I 2.3, hight 0.32, metatarsus I 2.15, hight 0.32; paratype a): Body length +/- 4.4, prosoma: Length 1.6, width 1.1, opisthosoma: Length 3.1, hight 0.7, leg I: Femur 2.6, patella 0.6, tibia 1.7, metatarsus 2.1, tarsus 0.9, tibia II 0.8, tibia III 0.48, tibia IV 1.4; paratype b): Body length 5.3, prosomal length 1.7.
Prosoma similar to *E.* sp. 1 (fig. 32) but no rests of anterior lateral eye lenses and with only indistinct depressions behing the posterior median eyes. Prosoma flat, 1.45 times longer than wide, with very fine dorsal wrinkles and only few short and indistindt hairs. Posterior lateral eyes on large tubercles, fovea small. - Legs (figs. 23-24) long and slender, hairs short and indistinct, order I/IV/II/III, I distinctly the largest, III distinctly the smallest. Bristles: Femora and patellae none, leg I with numerous bristles, tibia about 8 dorsally and laterally, metatarsus more than 40; leg II with several metatarsal bristles, legs III-IV none besides ventrally. Femoral trichobothria: Base of I with 5 in ?two rows, IV with at least one row of at least a dozen long prodorsal trichobothria. Metatarsus IV (paratype) nearly straight, calamistrum with distinct bent short hairs up to 0.6 of the length of the article. - Opisthosoma 4.4 times longer than wide, nearly cylindrical, only slightly bent, with indistinct short hairs. Position of the spinnerets at the end of the prosoma, anterior ones large, cribellum hid-

den. - Pedipalpus (fig.25): Patella short, tibia protuding and with 3 longer distal bristles and 3 long hairs; see the diagnosis.

Relationships: In the remaining species of the genus metatarsus I is slender; only in *singularis* femur I is bristleless, too, see the key.

Distribution: Tertiary Baltic amber forest.

***Eomiagrammopes maior* n. gen. n. sp.** (figs. 26-29) Photo 106

Material: 2♂ in Baltic amber, holotypus, F88/BB/AR/ULO/CJW; paratypus Mus. Nat. Hist. Nat. Paris no. 511.

Preservation and syninclusions: Holotypus: The spider is well and nearly completely preserved, only the tip of the right tarsus I and parts of the tibia and metatarsus are cut off. The right half of the spider is covered by a white emulsion. - The size of the amber piece is 5.5x2.5x1cm and consists of numerous layers. A beetle, two Diptera, few stellate hairs and numerous tiny bubbles are also preserved in the amber piece; the part of a ?bark piece is situated in front of the spider. - Paratypus: The spider is completely but only fairly well preserved between two amber layers and partly hidden; few parts are covered by a white emulsion, e.g. cribellum and calamistrum. Few stellate hairs.

Diagnosis (♂; ♀ unknown): Femur I bears prolateral bristles (fig. 27), tibia and metatarsus I slender and with some bristles. Pedipalpus: Fig.29, tibia not elon-gated.

Description (♂):
Measurements (in mm): Body length 5.3, prosoma: Length 1.7, hight 1.0, leg I: Femur +/- 3.3, tibia +/- 3.0, metatarsus 4.1, tarsus 1.3, tibia II 1.5.
Prosoma flat, with numerous normal and feathery hairs (fig.26), fovea distinct, clypeus not protruding, probybly only 6 eyes, posterior lateral eyes on large tubercles, no depression behind the posterior eyes. - Legs (fig.26-28) long and slender, order I/IV/II/III, I distinctly the largest, III the smallest. Bristles: Femur I 6 prolateral, other femora none, few on the patellae, at least 8 on tibia I, about 8 on metatarsus I. 17 trichobothria on femur III in 3 rows. Calamistrum indistinct. - Opisthosoma 3 times longer than high, covered densely with short hairs; cribellum hidden. - Pedipalpus: Fig. 29; most structures are hidden.

Relationships: *E. minor* n.sp. is smaller, tibia I is only 2.5mm long and the pedipalpus is different.

Distribution: Tertiary Baltic amber forest.

***Eomiagrammopes minor* n. gen. n. sp.** (figs. 30-31) Photo 107

Material: Holotypus ♂ in Baltic amber, coll. J. DAMZEN no. 16.

Preservation and syninclusions: The spider is well but incompletely preserved, the left legs III and IV are wanting after the base, the right pedipalpus is partly cut off, the distal parts of all legs are cut off, the left leg I is broken between femur and patella - by autotomy? - and preserved in a position near the femur. Only few ventral parts are covered by an emulsion.

Diagnosis (♂; ♀ unknown): Femur I bears prolateral bristles similar to *E. maior*, tibia and metatarsus I slender and with several bristles similar to *maior*. Pedipalpus (figs. 30-31): Tibia with two long dorsal bristles, not elongated.

Description (♂):
Measurements (in mm): Body length 3.9, prosoma length 1.65. leg I: Femur +/- 3.2, patella 0.85, tibia 2.4, metatarsus 3.2, tarsus +/- 1.2.
Prosoma flat, with short indistinct hairs, fovea distinct, clypeus not protruding. Most probably only 6 eyes (the anterior lateral eyes may be absent), posterior lateral eyes on large tubercles; no depression behind the posterior lateral eyes. Sternum long and undivided. - Legs similar to *E. maior* but shorter and femur I bears only 4 prolateral bristles (remaining femoral bristles absent), metatarsus I bears about 10 bristles. Femora with several trichobothria which are difficult to observe. - Opisthosoma 3.6 times longer than wide, covered with short hairs; anterior spinnerets large, cribellum wide. - Pedipalpus: See above.

Relationships: See *E. maior* and the key.

Distribution: Tertiary Baltic amber forest.

***Eomiagrammopes* sp. 1** (fig. 32-33)

Material: 1 subad. ♂ in Baltic amber, coll. HERRLING no. 54.

Preservation: The spider is completely preserved; most parts of the body are covered by a white emulsion.

Description (subad. ♂):

Measurements (in mm): Body length 4.5, prosoma: Length 1.4, width 1.1, opisthosoma: Length 3.1, width 1.1, leg I: Femur 2.7, patella 0.6, tibia 1.75, metatarsus 2.05, tarsus 0.85.
Prosoma (fig. 32) smaller posteriorly, fovea low, depressions behind the posterior median eyes distinct. Lenses (?) of the anterior lateral eyes indistinct, posterior median eyes widely spaced, with distinct dark central spots (remains of the retina?). Last articles of the pedipalpus pear-shaped, with a short apical claw. Calamistrum well developed. Bristles on leg I absent. Femoral trichobothria: I: prolateral 13, dorsally-basally 2.

The **relationships** are unclear.

Distribution: Tertiary Baltic amber forest.

***Eomiagrammopes* sp. 2**

Material: 1 subad. ♂ in Baltic amber, F84/BB/AR/ULO/CJW.

Description (subad. ♂):
Measurements (in mm): Body length 5.0, prosoma length +/- 1.3, tibia I 1.6, metatarsus I 1.9.
Body slender, opisthosoma 2.75 times longer than wide, metatarsus I thickened in the basal half, similar to *spinipes* but hairy and not spiny.

Relationships: According to the thickened metatarsus I the spider may be a juvenile of *E. spinipes* n.sp.

Distribution: Tertiary Baltic amber forest.

Further material of selected *Eomiagrammopes* sp. indet. in Baltic amber: 1 juv., Mus. Ziemi no. 21691; 2juv., F192/CJW (photo 109) and F193/CJW; 1 ?juv. ♀, F389/BB/CJW (body length 4.0mm); 1 juv. from the Bitterfeld deposit, coll. GRABENHORST.

?***Eomiagrammopes*** sp.

Material in Baltic amber: 1 juv. ♀, F929/BB/AR/ULO/CJW; 1 juv. ♂, Geol.-Paleontol. Inst. Univ. Hamburg.

Preservation: The juv. ♀ is well and completely preserved, the opisthosoma is covered by a white emulsion. The juv. ♂ is nearly completely preserved, only the left tarsi I and IV are cut off, a white emulsion is absent.

Description (juv. ♂):
Measurements (in mm): Juv. ♂: Body length 2.1, prosoma: Length 0.75, width 0.7, opisthosoma: Length 1.45, width 0.8, hight 0.7, leg I: Femur 1.1, patella 0.35, tibia 0.8, metatarsus 0.95, tarsus 0.55. Juv. ♀: Body length 3.7, prosomal length 1.2, femur I 1.9, tibia I 1.35. - Prosoma widest behind (!) the middle (fig. 34), fovea distinct. 8 eyes, both rows recurved, anterior eyes well developed, anterior median eyes smallest. Chelicerae oblique protruding. Sternum undivided. No femoral bristles. Calamistrum well developed. Opisthosoma long, hairs short. Apical article of the ♂-pedipalpus fairly thickened.

The **Relationships** are unclear: In (the other) *Eomiagrammopes*-species the prosoma is oval and widest in front of the middle, and the anterior eye lenses are tiny or absent. These specimens may be members of an undescribed genus.

Distribution: Tertiary Baltic amber forest.

***Opellianus* n. gen.**

Derivatio nominis: The genus is named after B. OPELL who revised the family Uloboridae in 1979.

Diagnosis (♂; ♀ unknown): Calamistrum absent (fig. 40), cribellum reduced or probably substituted by a colulus (fig. 37), 8 eyes in a frontal position (fig. 36), body length 1.4-1.9mm, body compact, clypeus very long, protuding (fig. 35) similar to *Hyptiotes* (tibia I in the frequent *O. excellens* with a distinct dorsal-distal depression, arrow in fig. 35); pedipalpus (figs. 41-44): Femur with a basal tubercle (fig. 40a), median apophysis long, divided and outstanding, terminal apophysis thin (a patellar bristle absent is in some species).

Relationships: 20 years ago B. OPELL studied some *Opellianus* males from my collection; the genus was unknown to him and he supposed relationships to *Orinomana* STRAND 1934 and *Sybota* SIMON 1892 (extant, S-America). The male of *Orinomana* is unknown, in *Orinomana* females the clypeus is short and the shape of the opisthosoma is different; in *Sybota* - as in *Hyptiotes* and *Polenecia* LEHTINEN 1967 - the opisthosoma is distinctly extending beyond the spinnerets, in *Hyptiotes* and *Polenecia* the eye position is quite different to *Opellianus*. - A pedipalpal femoral tubercle is also known from *Zosis* WALCKENAER 1837 (extant) but *Zosis* has a short clypeus.

Type species: *Opellianus excellens* n.sp.

Distribution: Tertiary Baltic amber forest; not known to me from Bitterfeld.

Key to the species of the genus Opellianus (males):

1 Patellar bristle of the pedipalpus present (fig. 44a). . . . . *kazimierasi*

- patellar bristle of the pedipalpus absent (fig. 43). 2

2(1) dorsal-distal depression of tibia I distinct (arrow in fig. 35), position of the embolus as in fig. 41. . . . . *excellens*

- dorsal- distal depression of tibia I indistinct, position of the embolus as in fig. 44. . . . . *ludwigi*

***Opellianus excellens* n. gen. n. sp.** (figs. 35-43) Photos 103-105

Material: More than a dozen males in Baltic amber; holotypus F93/BB/AR/ULO/CJW; paratypes a) to e) F94... to F98/BB/AR/ULO/CJW; paratypus f) F949/BB/AR/ULO/CJW; selected probably conspecific males: F99 to F100/BB/AR/ULOB/CJW and Zool. Mus. Humboldt-Univ., coll. BERENDT MB.A.195.

Preservation and syninclusions: Holotype: The spider is excellently and completely preserved, there is no emulsion except the mouth parts ventrally and between prosoma and opisthosoma. All legs are bent under the body as usual in dead spiders. - No stellate hairs. - Other material: Separated amber pieces are preserved with the paratypes c) and d) and with the questionable male no. 100/CJW. Paratype a) and the questionable male no. 99/CJW may be darke-ned by heating, the questionable male from the BERENDT coll. has been darkened by aging. Completely preserved are the paratypes a), c), d), f) and the questionable male 100/CJW; parts of the legs are cut off in paratypes b) and c) as well as the male 99/CJW. - Syninclusions: Paratype b): a Diptera and few stellate hairs, paratye c): A beetle, paratype d): About a dozen Diptera, a juv. spider, several stellate hairs, paratype e): Acari, stellate hairs and some excrement balls, f): Some stellate hairs.

Diagnosis (♂; ♀ unknown): Embolus distinctly bent in the thin basal part (figs. 41, 43).

Description (♂):
Measurements (in mm): Body length 1.7 (holotypus) - 1.9; holotypus: Prosoma: Length 0.85, width 0.77, hight above coxae +/- 0.45, leg I: Femur 1.25, patella 0.33, tibia 1.1, metatarsus +/- 1.0, tarsus 0.4, tibia II 0.6, tibia III 0.45, tibia IV 0.65. Longest dorsal-basal bristle of tibia I 0.52.
Colour: Prosoma and legs light to medium brown, opisthosoma yellow brown. The spider and the amber piece of the questionable male of the old BERENDT collection are strongly darkened.
Prosoma (figs. 35-36) high and wide, fovea a distinct grove, with few hairs, clypeus longer than the chelicerae, 8 not reduced eyes in two recurved rows, posterior row wide, posterior median eyes separated by 2 diameters, posterior lateral eyes on distinct humps. Sternum wide, separating the coxae IV by nearly one diameter. Labium wider than long, gnathocoxae wide, nearly parallel. - Legs (figs. 35, 38-40): Order I/IV/II/III, I by far the largest, tibia and metatarsus I quite variable bent, strongly bent e.g. in paratypus d). Tibia I with a distinct dorsal-distal depression (arrow in fig. 35). Calamistrum absent, metatarsus IV straight. Bristles numerous and long, on nearly all articles after trochantera and besides tarsi I-II and often on metatarsus I (e.g. in the holotype); number in the holotype femur I: 1 dorsally in the basal half, 2 retrolaterally and 3 prolaterally in the distal half; 1 short and hair-shaped basally and 1 long distally dorsally on the patellae; 2 long dorsally, 2 prolaterally and 1 retrolaterally long bristles in the basal half of the tibia, 3 prodistally basally of the depression; usually tarsus and metatarsus IV with few short ventral bristles. Femoral trichobothria long, 2 basally-retrodorsally on I (fig. 35), about 8 retrodorsally on II, 8 prodorsally on III, about a dozen prodorsally on IV. Trochanter IV with 2 long prolateral trichobothria. - Opisthosoma (fig. 35, 37) high, nearly ovoid, covered with short hairs; anterior spinnerets large, and widely spaced; a reduced cribellum - or a colulus? - present. - Pedipalpus (figs. 41-43): Femur with 5-6 strong dorsal bristles (not drawn) and a probasal tubercle (fig. 40a), cymbium with a strong prodistal bristle (arrow in fig. 41) which is bent distally and with a low longitudinal retrolateral furrow (fig. 42); see the dignosis.

Relationships: In *O. ludwigi* n.sp. the tibial I depression is only indistinct, the embolus is more slender basally and in a more distal position, the shape of the median apophysis is different.

Distribution: Tertiary Baltic amber forest.

***Opellianus ludwigi* n. gen. n. sp.** (fig. 44)

Derivatio nominis: This species is named after the collector of the paratypus, Mr. WALTER LUDWIG in Berlin, who made numerous fossil spiders available for my research.

Material: 3 males in Baltic amber, holotypus F99/BB/AR/ULO/CJW; paratypus F92/ BB/AR/ULO/CJW; questionable ♂ coll. HOFFEINS no. 87.

Preservation and syninclusions: Holotype: The spider is well preserved in a small piece of amber which has been perforated as a link and probably darkened by heating. Body and legs are translucent, in the prosoma is a large ?air bubble preserved. The left leg I is cut off through femur and tibia, the left patella II is cut off. - Some detritus particles and fungus threads are preserved in the amber piece but no stellate hairs. - Paratype: It is well and completely preserved, larger ?air bubbles are preserved in the pro- and opisthosoma. - Ventrally a thin - not cribellate - thread is running through the small amber piece near the spider. No stellate hairs but several detritus particles. - In the questionable ♂ most parts of the body and the pedipalpi are covered by a white emulsion.

Diagnosis (♂; ♀ unknown): Tibial I depresion indistinct, pedipalpus (fig. 44): Patellar bristle absent, embolus only slightly bent in the thin basal part, median apophysis with a distal inclination.

Description (♂):
Measurements (in mm) similar to *excellens*: Body length 1.7, prosoma length 0.9, femur I 1.2, tibia I 1.1.
Colour light brown.
Body and legs very similar to *excellens* n.sp., see the figs., but tibia I different, compare the diagnosis. In the holotypus the spinnerets are well observable; cribellar spinules appearently are absent, so this structure well may be a colulus. - Pedipalpus: See the diagnosis.

Relationships: See *O. excellens* n. sp.

Distribution: Tertiary Baltic amber forest.

***Opellianus kazimierasi* n. gen. n. sp.** (fig. 44a)

Derivatio nominis: The species is named after Dr. KAZIMIERAS VYSNIAUSKAS in Vilnius/Lithunia, who selected a large number of fossil spiders for my research.

Material: Holotypus ♂, F109/BB/AR/ULO/CJW.

Preservation and syninclusions: The spider is completely and well preserved, there is no emulsion. - Large bubbles are preserved behind the opisthosoma and beneath the right femora I and II. Furthermore preserved are 1 Trichoptera, numerous stellate hairs and several detritus particles.

Diagnosis (♂; ♀ unknown): Tibial I depression indistinct, patella of the pedipal-pus with a bristle, bulbus: Fig. 44a. Smallest known species of the genus.

Description (♂):
Measurements (in mm): Body length 1.4, prosoma length 0.7, femur I 0.9, tibia IV 0.5. - Colour medium brown.
Prosoma as in *excellens* n. sp. Legs similar to *ludwigi* n. sp., with long bristles and an indistinct tibial I depression. The femoral trichobothria are hard to observe. Pedipal-pus: See above.

Relationships: See the key; in the other congeneric species a patellar bristle of the pedipalpus is absent.

Distribution: Tertiary Baltic amber forest.

***Hyptiomopes* n. gen.**

Diagnosis (♂; ♀ unknown): Body length 2.2-2.7mm, clypeus of medium length (fig. 45), calamistrum present, 8 large eyes in a frontal position (fig. 45). Pedipalpus (fig. 46): Origin of the mediam apophysis basally, embolus in a ventral position, not outstanding. The identity to some bulbus sclerites is not clear to me.

Relationships: See the tab. above.

Type species: *Hyptiomopes bitterfeldensis* n.gen.n.sp.

Distribution: Tertiary Baltic amber forest, Bitterfeld locality.

***Hyptiomopes bitterfeldensis* n.gen.n.sp.** (figs. 45-46) Photo 98

Material: 2 ♂ in Baltic amber from Bitterfeld: Holotypus with a separated amber piece: Zolog. Mus. Humboldt Univ. Berlin MB.A. 593; paratypus: Coll. M. KUTSCHER.

Preservation and syninclusions: Holotype: The spider is completely and well preserved, the ventral side is covered by a white emulsion. - Ventrally a small Acari larva is preserved. Few stellate hairs. - Paratype: The dorsal part of the opithosoma is cut off, also parts of the right legs I and IV. The left femur I and its surrounding is partly hidden by an amber layer. - Small detritus particles and small parts of stellate hairs are also preserved in the small amber piece.

Diagnosis (♂; ♀ unknown): See the diagnosis of the genus.

Description (♂):
Measurements (in mm): Body length 2.2-2.7, prosoma: Length 1.0, width 0.9, hight 0.4, leg I (holotypus): Femur 1.5, patella 0.47, tibia 1.35, metatarsus 1.25, tarsus 0.65, tibia IV 0.67. Longest bristle of tibia I (paratypus) 0.35.
Colour: Prosoma and legs medium to dark brown, opisthosoma yellow brown.
Prosoma (fig. 45) nearly wide as long, with short hairs and a distinct fovea. Clypeus of medium length. 8 large eyes in a similar position as in *Opellianus* (fig. 36) but posterior median eyes separated by only 1 1/2 diameters. - Legs robust, order I/IV/II/III, I distinctly the largest, tibia I nearly straight, metatarsus I distinctly bent in the basal half. Bristles: Leg I: Femur 7-10, patella 2, tibia about a dozen, metatarsus about 8; tarsus IV with a row of 6 short ventral bristles. Calamistrum long, indistinct in the distal quarter. Femoral trichobothria: I probably only 1 dorsally, II 4 retrodorsally and 1 prodorsally. - Opisthosoma (fig. 45) ovally, covered with short hairs. Pedipalpus: Fig. 46, cymbium with a long and bent retrodistal bristle (not drawn).

Relationships: In ?*Hyptiomopes* sp. the ventral part of the median apophysis is strongly outstanding.

Distribution: Tertiary Baltic amber forest, Bitterfeld locality.

?*Hyptiomopes* sp.

Material: 1♂ in Baltic amber from Bitterfeld with two separated amber pieces in Baltic amber from Bitterfeld, coll. HOFFEINS no. 801 a). One of the separated amber piecs contains a juv. Araneae: Theridiidae, coll. HOFFEINS no. 801b).

Preservation and syninclusions: The spider is completely and well preserved but the ventral side and the bulbi are covered by an emulsion. - Syninclusion: see above.

The body length is 2.2mm, a calamistrum is present, legs, prosoma and eyes are as in *Hyptiomopes* n.gen. In contrast to *H. bitterfeldensis* n.sp. the ventral part of the large and u-shaped median apophysis is strongly outstanding.

Distribution: Tertiary Baltic amber forest, Bitterfeld locality.

Ulobomopes n.gen.

Diagnosis (♂ ; ♀ unknown): Body length about 3mm, prosoma flat, calamistrum absent, legs long and slender, femoral bristles present, 8 large eyes in a frontal posi-

tion similar to fig. 45; pedipalpus (fig. 49): Basal-ventral outgrowth of the pedipalpal femur absent, cymbium with 2 very long apical bristles, bulbus small, median apophysis with 2 or probably 3 parts.

Relationships: In *Opellianus* - see the diagnosis and the tab. above - a calamitrum is absent, too, but the legs are not long and slender, very long apical cymbial bristles are absent, the patellar bristle of the ♂-pedipalpus is absent or small. - In the extant genus *Octonoba* OPELL 1979 - and several other extant genera, see OPELL (1979: 456) - also long apical cymbial bristles are present, see OPELL (1979: Fig. 177) but in *Octonoba* - in contrast to *Ulobomopes* - two ventral-basal outgrowths of the pedipalpal femur are present.

Type species: *Ulobomopes unicus* n. gen. n. sp.

Distribution: Tertiary Baltic amber forest.

***Ulobomopes unicus* n. gen. n. sp.** (figs. 47-49)

Material: Holotypus ♂ in Baltic amber and 2 separated pieces of amber, F101/BB/AR/ULO/CJW.

Preservation and syninclusions: The amber piece has probably been heated, therefore the bulbus structures may be somewhat deformed. The spider is nearly completely preserved, the right tarsus IV and most parts of the metatarsus are cut off. The opisthosoma and parts of prosoma and legs are covered by a white emulsion. - Thin threads and a Collembola are present beneath the spi-der. Furthermore an Acari, few Diptera, some Arthropod legs and stellate hairs are preserved in the same piece of amber.

Diagnosis (♂; ♀ unknown): See above.

Description (♂):
Measurements (in mm): Body length 3.0, prosoma length 1.2, leg I: Femur 2.9, patella 0.6, tibia 2.4, metatarsus 2.5, tarsus 0.9, tibia II 1.1, tibia III 0.7, tibia IV 1.3.
Colour: Prosoma and legs light brown, opisthosoma yellow brown.
Prosoma flat, with a deep and long fovea. 8 large eyes which are partly covered by a white emulsion and difficult to observe, anterior median eyes protruding and large, posterior row recurved, posterior lateral eyes on humps, posterior median eyes large and separated by about 1 1/4 diameters. Clypeus of medium length, chelicerae about as long as the hight of the prosoma. - Legs (fig. 47) long and slender, with numerous partly long bristles: Most femora 1 dorsally, I additionally 1 retrolaterally and 8 prolaterally, tibia I 11, metatarsus I 8, tarsus IV 5 short ventral bristles. Tibia and metatarsus I as well as metatarsus IV straight, calamistrum absent. Feathery hairs appa - rently absent. Femoral trichobothria: I about 2 basally, II unknown, III about 15 prodorsally, IV about 20. - Opisthosoma 1.7 times longer than wide, most parts of the

spinnerets are hidden; anterior spinnerets large and widely spaced. - Pedipalpus: See above; patella with a strong bristle, embolus long.

Relationships: See above.

Distribution: Tertiary Baltic amber forest.

(2) Uloboridae in Dominican amber

Remark: In my opinion most probably specimens in Dominican amber which I know are conspecific. The bulbus structures are best observable in the paratype a).

Miagrammopes O. PICKARD-CAMBRIDGE 1869 (figs. 50-57)

Diagnosis: Anterior eye row absent (fig. 50), prosomal depressions present usually behind the posterior median eyes (fig. 50), tibia and metatarsus I dorsally with long hairs/bristles, bristles on femur I usually absent - OPELL (1979) - but present in the fossil species, metatarsi I and IV flattened laterally (figs. 51, 53), body long and slender (photos), calamistrum well developed in both sexes (fig. 52). Sternum modified, divided in many species (fig. 56). ♂-pedipalpus (figs. 54, 57): Tibia - not the patella as written by OPELL (1979: 492) - with a large outgrowth, haematodocha absent according to OPELL, median apophysis large and in a distal position.

Relationships: See *Eomiagrammopes* n. gen.

Natural History: According to OPELL (1979: 493) "Members of this genus are known to produce either a single horizontal capture thread with cribellar silk along its center or a horizontal resting thread to which one or several vertical or diagonal cribellate capture threads are attached."

Distribution: Cosmotropical.

***Miagrammopes dominicanus* n.sp.** (figs. 53-55) Photos 110-112

1982 *Miagrammopes* sp., --SCHAWALLER, Stuttgarter Beitr. Naturk., Ser. B, **89**: 11-

16, figs. 10-20 (juv.).

1988 *Miagrammopes* sp., --WUNDERLICH, Beitr. Araneol., **2**: 93-95, figs. 176-180) (juv.).

1999 *Miagrammopes* sp., --POINAR & POINAR (1999: 75, Fig.74).

Material in amber from the Dominican Republic, localities unknown: Holotypus ♂ F104/DB/AR/ULO/CJW; 1♂ paratypus a) and 3 separated amber pieces Museum für Naturkunde Karlsruhe no. A 66; 1♂ paratypus b) GPIUHamburg; 1 juv. paratypus c) F105/BB/AR/ULO/CJW; 1♀ paratypus d) Museum für Naturkunde Stuttgart.

Preservation and syninclusions: Holotype: The spider is completely and well preserved. - In the same amber piece numerous detritus particles, 4 ants and a Blattaria larva are preserved. - Paratype a) is also completely and well preserved, the right tibia I is broken in the amber. - In the same amber piece 2 Diptera and 2 Hymenoptera are preserved, one is a Dryinidae. In one of the separated pieces another Diptera is present. - Paratype b): The amber piece probably has been heated. The spider is fairly well and incompletely preserved: The right femur I is cut off distally, the left leg I is cut off through the patella. - Paratype c): The amber piece is broken in three parts, the spider is fairly well preserved. - Paratype d): See WUNDERLICH (1988: 94).

Diagnosis: Male: Leg I: Fig. 53, pedipalpus: Figs. 54-55. ♀: The probably adult female has been briefly described by WUNDERLICH (1988: 94) sub *Miagrammopes* sp.; leg I and the genital area are quite hairy, body length 4.5, prosoma: Length 1.5, width 1.1, tibia I 1.25.

Description (♂):
Measurements (in mm): Body length 3.4-4.1, prosoma length 1.15-1.25, legs (paratypus a): Leg I: Femur 2.0, patella 0.55, tibia 1.55, metatarsus 1.7, tarsus 0.4, tibia II 06, tibia III 0.45, tibia IV 1.0.
Colour light to medium brown.
Prosoma (fig. 50) long and flat, hairs indistinct, fovea small but distinct, depressions behind the posterior medium eyes present. Four eyes in a wide and recurved row, eyes of the anterior row absent as in all species of this genus, posterior lateral eyes on humps. Chelicerae small, sternum divided, probably similar to fig. 56. - Legs long, I by far the largest, order I/IV/II/III, tibia and metatarsus I covered with numerous hairs (fig. 53), metatarsi I and IV flattened laterally, I thickened. Bristles numerous only on leg I (best observable in paratypus a): Femora: Only I with 1 prodistally and 2 retrolaterally, patellae: Only I with 2 pairs prolaterally, tibia I 9, metatarsus I 6 prolaterally, metatarsus IV about 9 short ventral bristles, tarsus IV about 6 short ventral bristles. Femoral trichobothria (best observable in paratypus a): I with 2 or 3(?) retrodorsally, II few retrodorsally, III 8 prodorsally, IV few prodorsally. - Opisthosoma 4.5 times longer than high, cylindrically, abruptly raised above spinnerets, covered with short hairs, ventrally-distally with special thickened, flattened and curved hairs, dorsally-distally with more dense hairs. Anterior spinnerets thick and widely spaced, posterior spinnerets long, cribellum wide.

Relationships: In : *M. latens* BRYANT 1936 (extant, Cuba and Hispaniola) (figs. 56-57) the bulbus structures are different, e.g. the median apophysis id divided apically.

Distribution: Tertiary Dominican amber forest.

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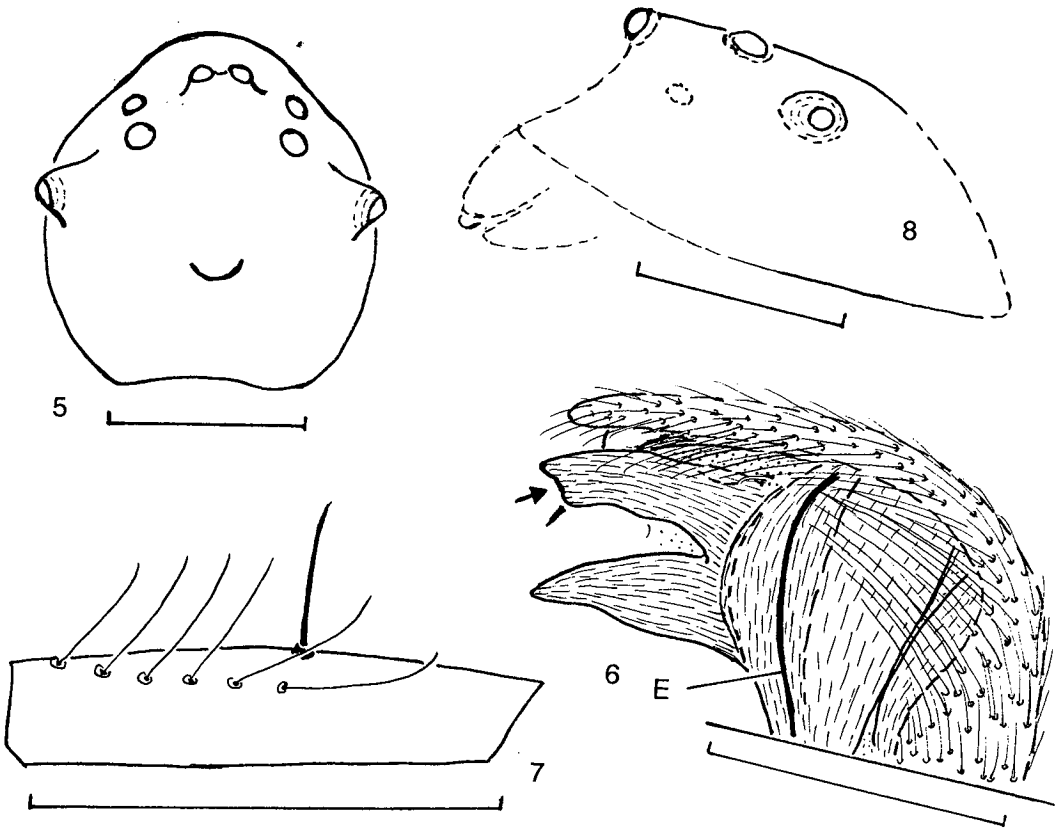
Abbreviations to the figs. (M in mm):

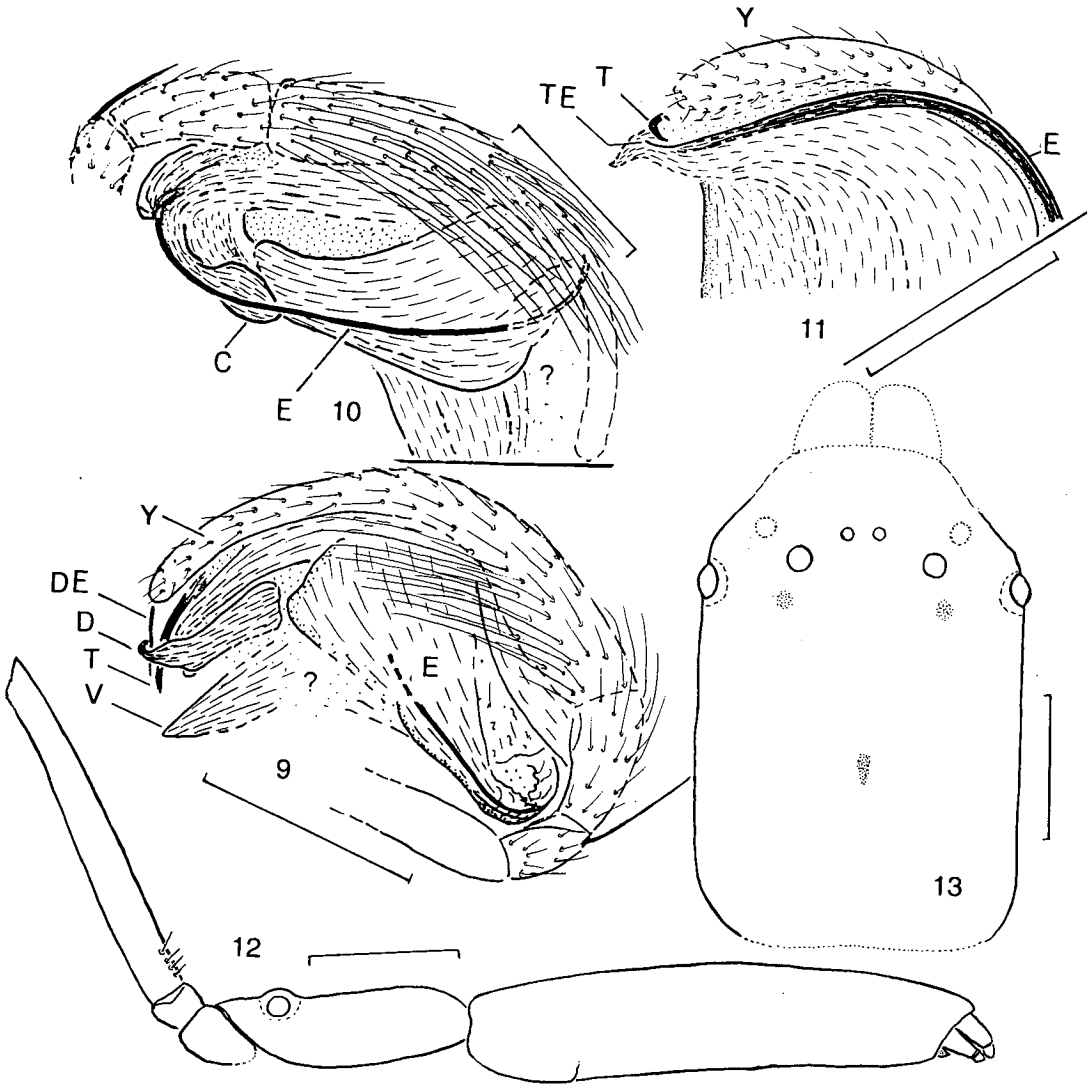
B = cymbial bristles, C = conductor, CR = cribellum, D = tip of the dorsal branch of the median apophysis, DE = distal part of the embolus, E = embolus, M = median apophysis, P = plate-shaped part of the conductor, PA = patella, R = radix, S = sperm duct, T = terminal apophysis, TE = tip of the embolus, TI = tibia, V = (tip of the) ventral branch of the median apophysis, Y = cymbium.



figs. 5-6: ***Hyptiotes stellatus* n. sp.**, ♂; 5) prosoma dorsally, hairs not drawn; 6) l. pedipalpus retrolaterally; M = 0.5;

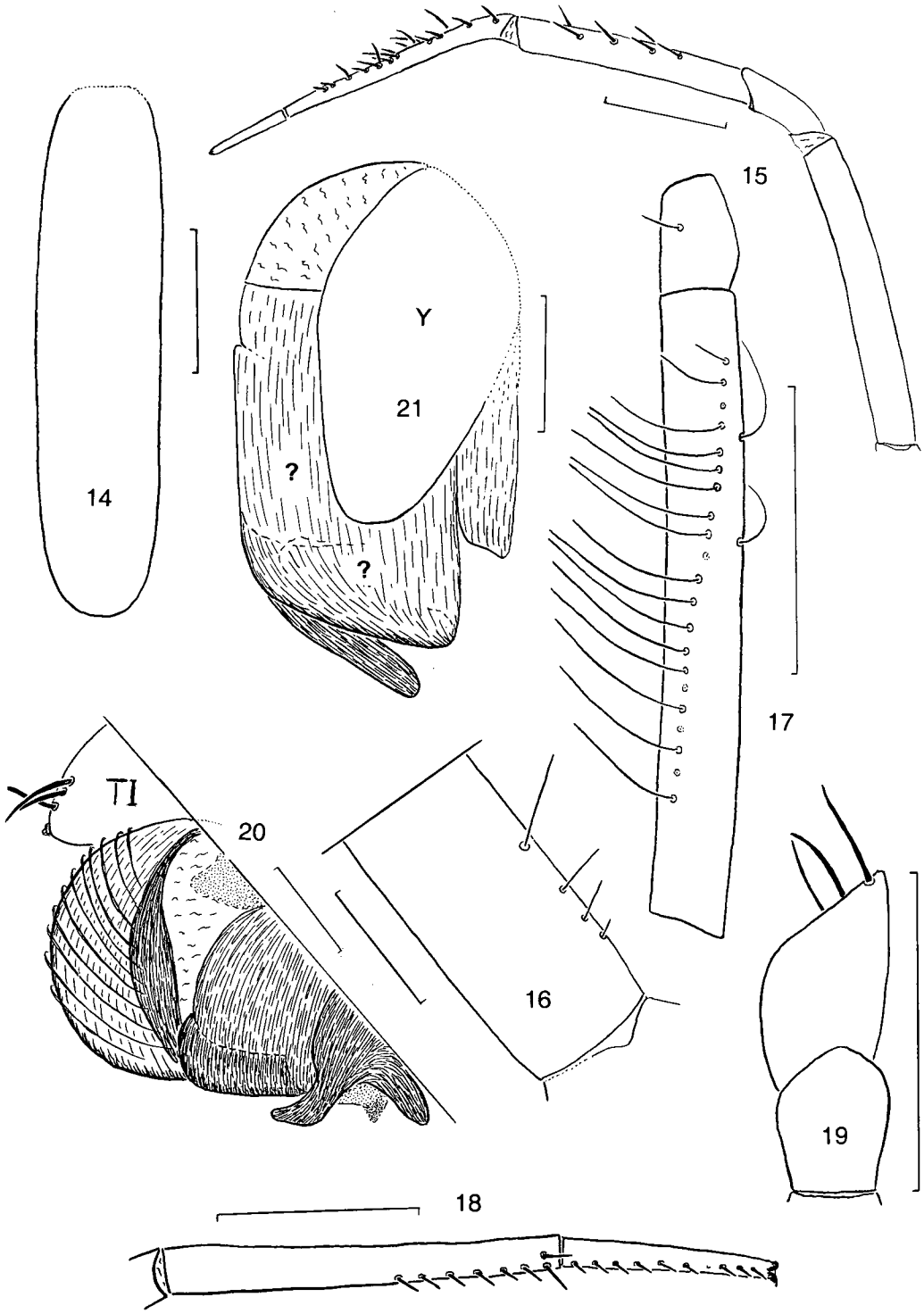
fig. 7) ***Hyptiotes glaber* n. sp.**, ♂, l. femur III prolaterally with bristle and trichobothria; M = 0.5;

figs. 8-9: ***Hyptiotes convexus* n. sp.**, ♂; 8) prosoma laterally; 9) l. pedipalpus retrolaterally; M = 0.5;



figs. 10-11: ***Hyptiotes saetosus* n. sp.**, ♂; 10) r. pedipalpus retrolaterally; the apical parts are hidden; 11) distal part of the r. pedipalpus prolaterally-distally; M = 0.5;

figs. 12-21: ***Eomiagrammopes singularis* n. gen. n. sp.**, ♂, holotype; 12) body and basal part of the left leg I laterally; only the left posterior lateral eye has been drawn; 13) prosoma dorsally, hairs not drawn; 14) outline of the opisthosoma dorsally, hairs not drawn; 15) left leg I retrolaterally, hairs and trichobothria not drawn; 16) base of the l. femur I retrolaterally with trichobothria; 17) l. femur and trochanter IV with trichobothria; 18) r. tarsus and metatarsus IV retroventrally, calamistrum and hairs not drawn; 19) patella and tibia of the l. pedipalpus dorsally; 20) l. pedipalpus retrolaterally; basal-dorsal part hidden by femur I; 21) r. pedipalpus dorsally; most distal structures hidden by a white emulsion; M = 1.0 in figs.12, 14-15,17-19, 0.5 in figs. 13, 0.2 in figs. 16, 20-21;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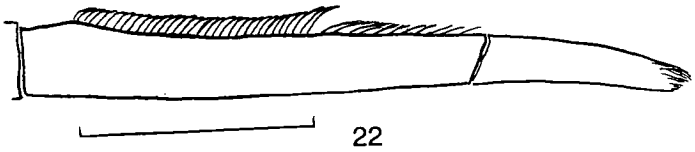

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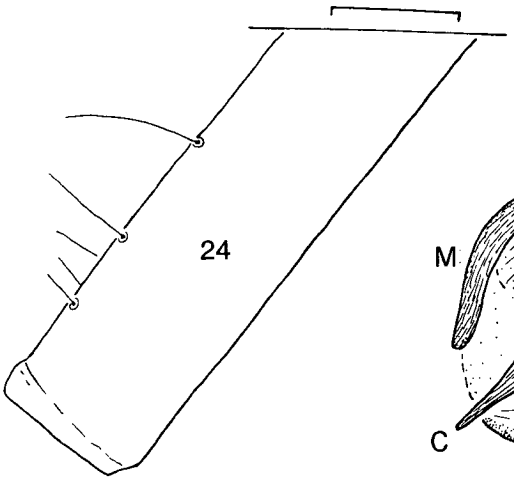

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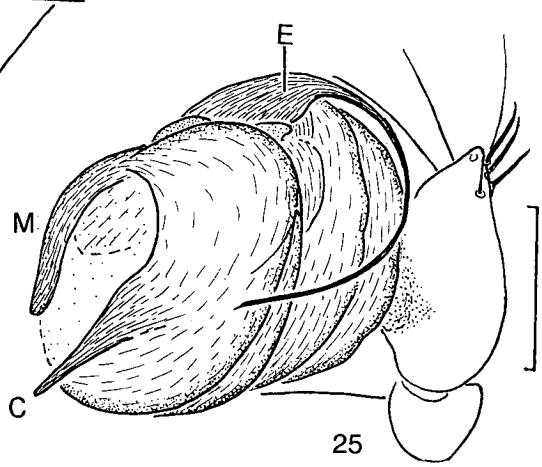

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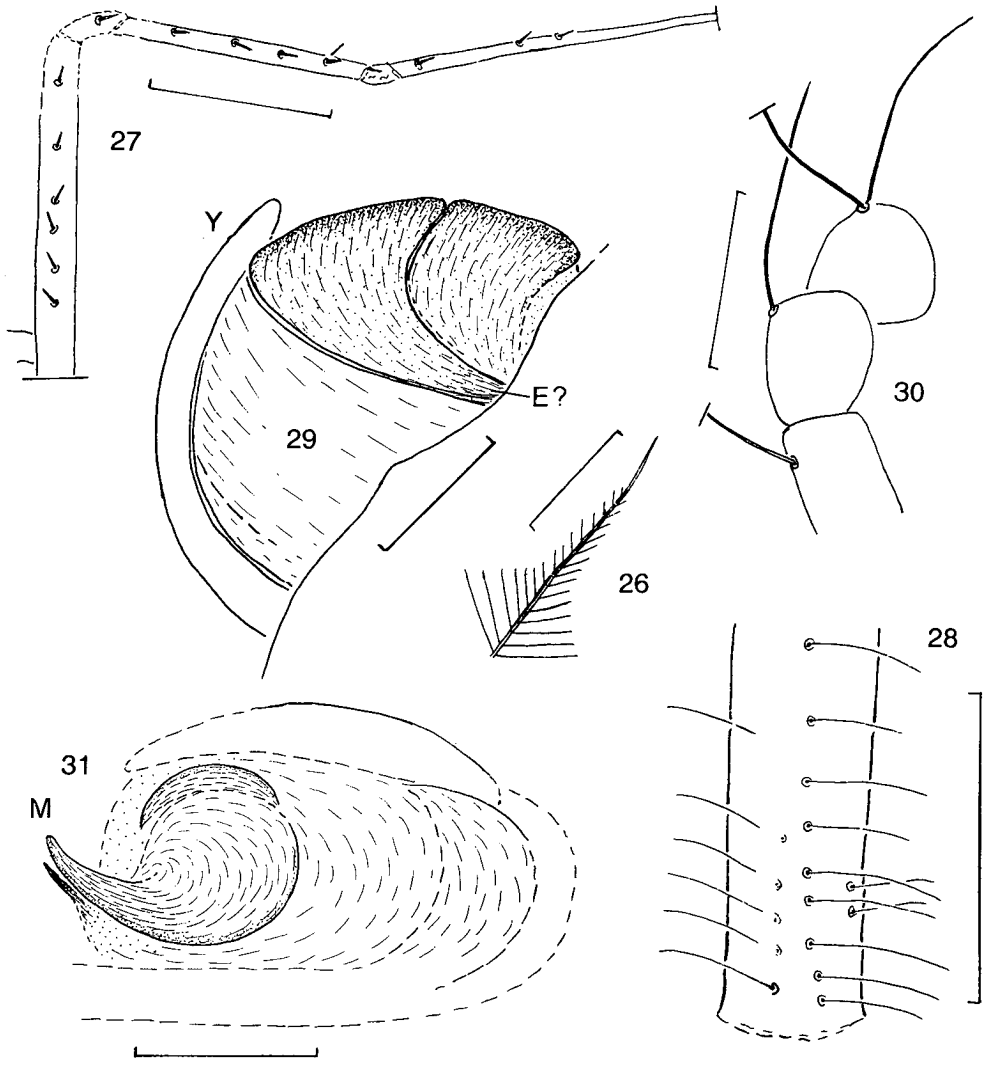
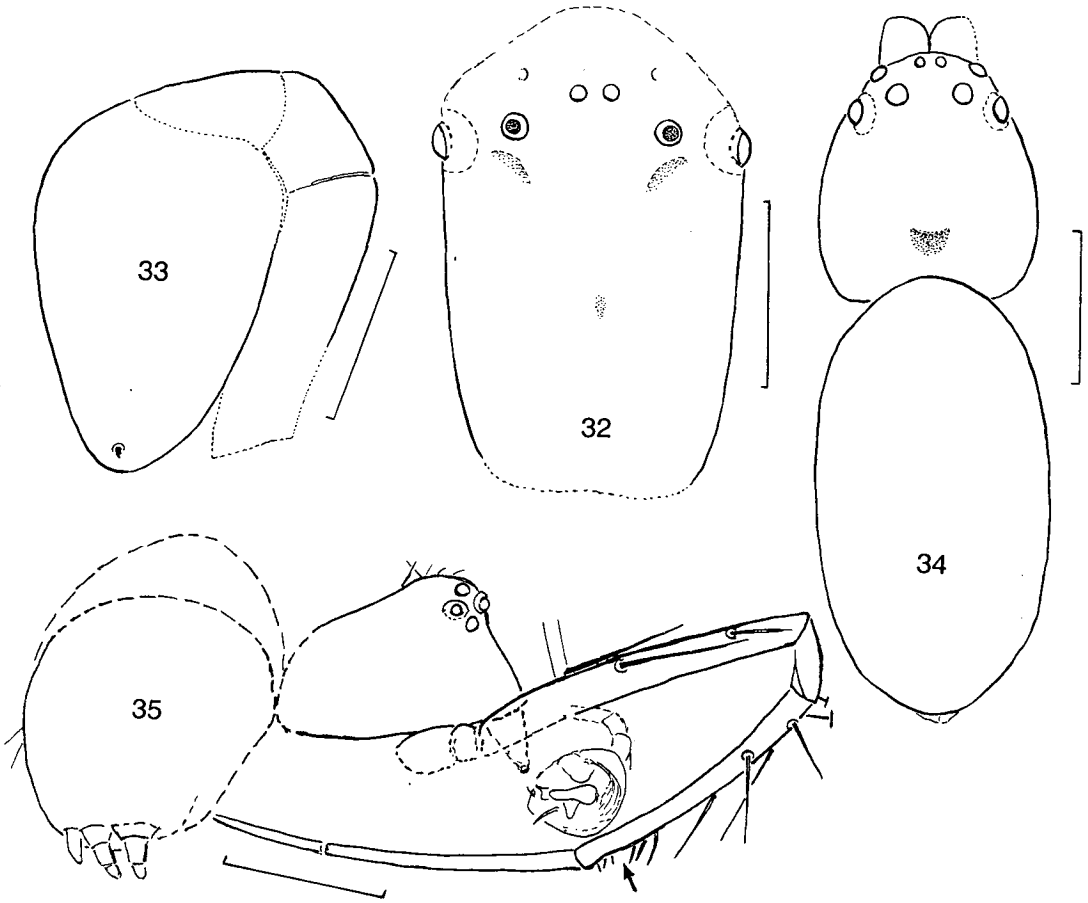
fig. 22) ***Eomiagrammopes singularis*** **n. gen. n. sp.**, paratype, probably adult ♀; l. tarsus and metatarsus IV with calamistrum prolaterally; M = 0.5;

figs. 23-25: ***Eomiagrammopes spinipes*** **n. gen. n. sp.**, ♂; 23) l. metatarsus and part of the tarsus I retrodorsally; nearly all bristles have been drawn; 24) base of the left femur I prodorsally; notice the position of the trichobothria in more than one row; 25) l. pedipalpus retrolaterally, bulbus retroventrally; M = 0.5 in fig. 23, 0.2 in figs. 24-25;



figs. 26-29: ***Eomiagrammopes maior* n. gen. n. sp.**, ♂; 26) feathery hair from the margin of the prosoma; 27) l. leg I (part) prolaterally; 28) basal part of the r. femur II with three rows of trichobothria; most prolateral trichobothria are broken; 29) r. pedipalpus (partly hidden) retrolaterally; the long cymbial hairs are not drawn; M = 0.2 in fig. 29, 0.5 in the remaining figs.;

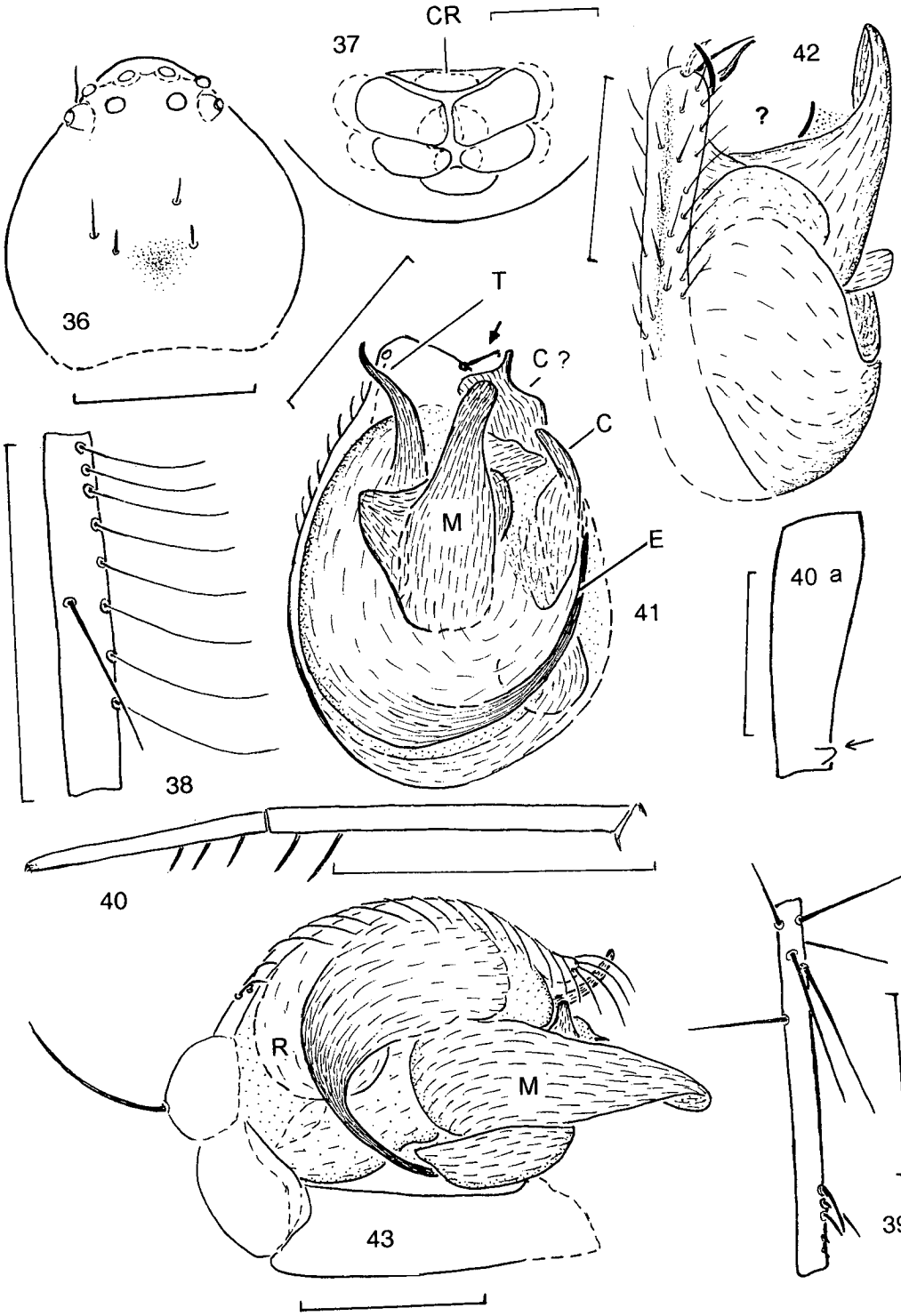
figs. 30-31: ***Eomiagrammopes minor* n. gen. n. sp.**, ♂; 30) tibia, patella and basal part of the femur of the r. pedipalpus dorsally-basally; 31) l. pedipalpus retrolaterally; M = 0.2;



figs. 32-33: ***Eomiagrammopes* sp. 1**, subad. ♂; 32) prosoma dorsally; frontal part hidden, hairs not drawn; 33) r. pedipalpus prolaterally; M = 0.5 and 1.0;

fig. 34) ***?Eomiagrammopes* sp.**, juv. ♂, body dorsally; M = 0.5;

figs. 35-43: ***Opellianus excellens* n. gen. n. sp.**, ♂; holotype: Figs. 35-36, 38, 39-42; paratype a: Figs. 37 and 43; paratype f: Fig. 40a; 35) body and r. leg I laterally. The opisthosoma is deformed/ blown up by decomposition gas; 36) prosoma dorsally; position of the spinnerets with the questionable cribellum ventrally; 38) r. femur III dorsally; 39) r. tibia I dorsally; hairs and trichobothria not drawn; 40) l. tarsus and metatarsus IV; hairs not drawn; 40a) r. pedipalpal femur ventrally; the arrow indicates to the probasal tubercle; 41) r. pedipalpus retrolaterally-apically; 42) r. pedipalpus retrodorsally; 43) r. pedipalpus retrolaterally; M = 0.5 in figs. 35-36, 38-39, 0.2 in the remaining figs.;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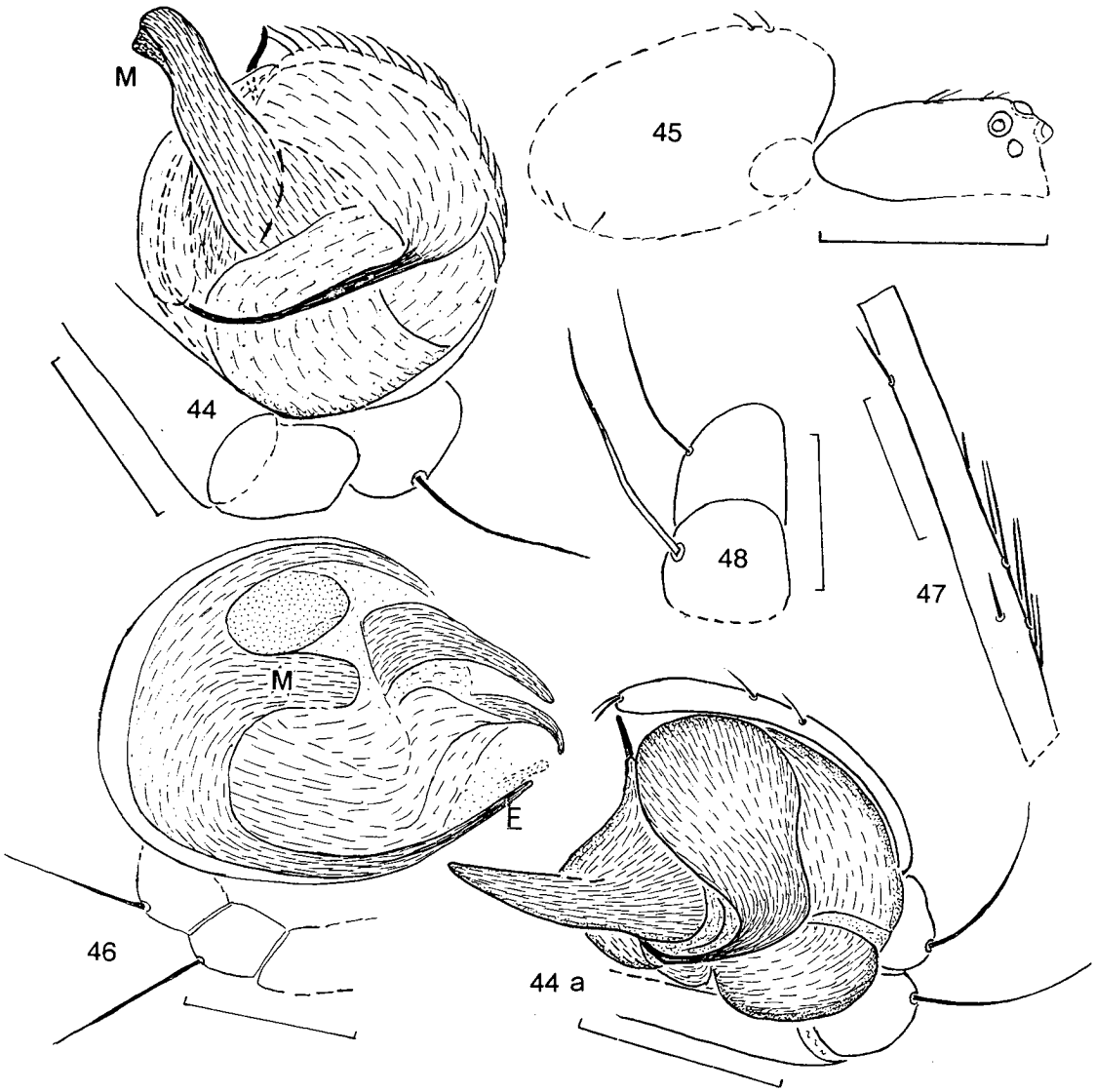
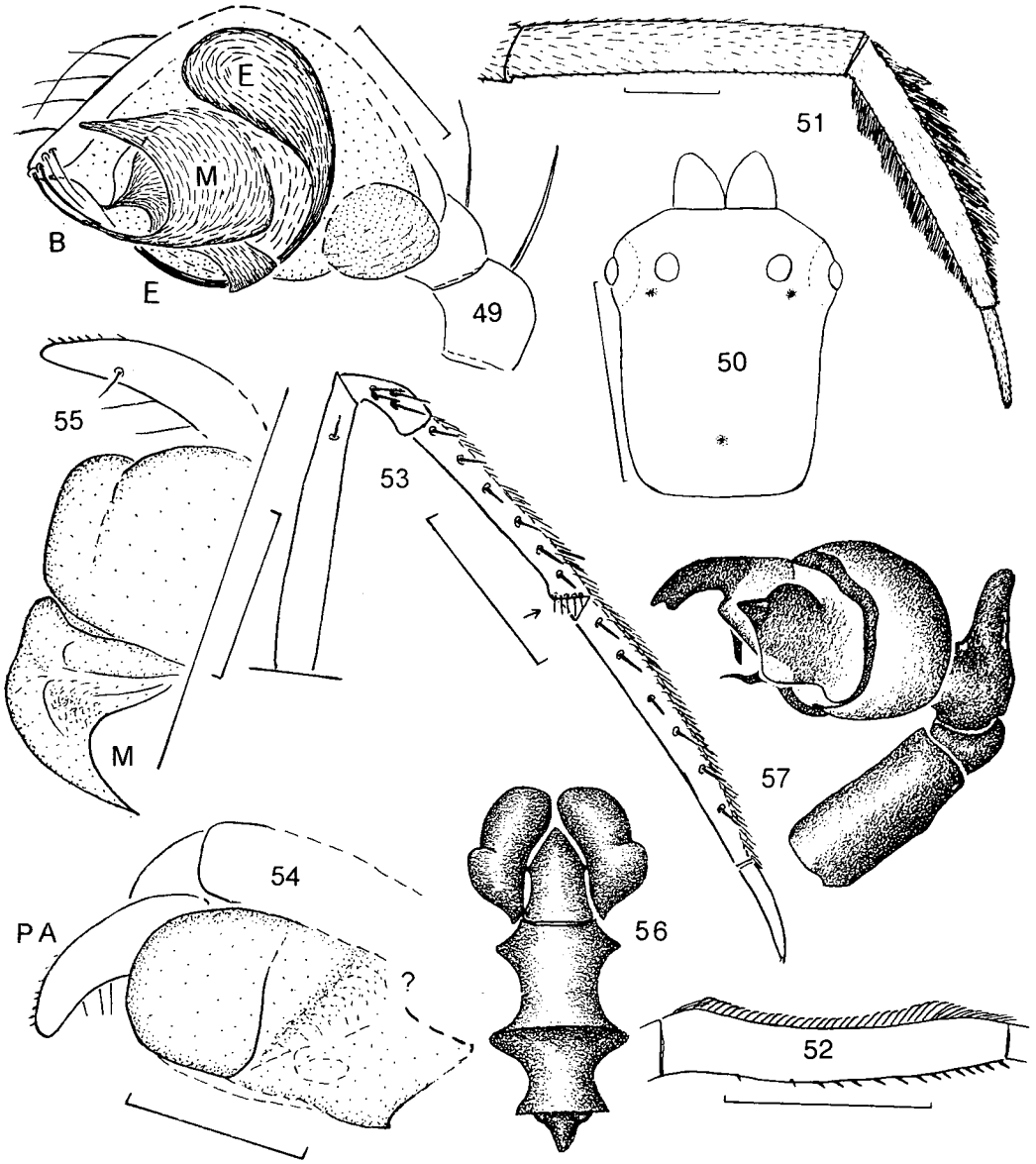


fig. 44) ***Opellianus ludwigi* n. gen. n. sp.**, ♂, l. pedipalpus ventrally; M = 0.2;

fig. 44a) ***Opellianus kazimierasi* n. gen. n. sp.**, ♂; l. pedipalpus retroventrally; M = 0.2;

figs. 45-46: ***Hyptiomopes bitterfeldensis* n. gen. n. sp.**, ♂; 45) body laterally; 46) r. pedipalpus retrolaterally; M = 1.0 and 0.2;

figs. 47-49: ***Ulobomopes unicus* n. gen. n. sp.,** ♂; 47) l. femur I dorsally; trichobothria not drawn; 48) patella and tibia of the r. pedipalpus retrobasally; 49) l. pedipalpus retrolaterally; M = 1.0 in fig. 47, 0.2 in 48-49; ⟶



figs. 50-55: ***Miagrammopes dominicanus* n. sp.**; 50) juv. ♂, prosoma dorsally; 51) ♀, l. leg I prolaterally; 52) ♀, r. metatarsus IV with calamistrum; figs. 53-55) ♂, paratype a); 53) l. leg I prolaterally; only dorsal hairs are drawn; 54) l. pedipalpus retrolaterally; parts are hidden; 55) r. pedipalpus prolaterally, partly hidden; M = 1.0 in fig. 53, 0.2 in figs. 54-55, 0.5 in the remaining figs.;

figs. 56-57: ***Miagrammopes latens*** BRYANT 1936, ♂, extant, Dominican Republic; 56) sternum, labium and gnathocoxae ventrally; 57) l. pedipalpus retrolaterally; taken from OPELL (1979: Figs. 90, 93); no M.

BEITR. ARANEOL., 3 (2004)

THE FOSSIL SPIDERS (ARANEAE) OF THE FAMILY DEINOPIDAE IN BALTIC AND DOMINICAN AMBER

J. WUNDERLICH, 75334 Straubenhardt, Straubenhardt.

Abstract: Fossil members of the tropical spider family Deinopidae (Araneae: Araneoidea s. l.) are reported from Baltic and Dominican amber, ?*Menneus pietrzeniukae* **n.sp.** - based on a probably adult female - is described from Baltic amber, some questionable juveniles of the genus *Menneus* SIMON 1876 are shortly described.

Material: CJW = private collection of the author; these fossils will probably be deposited in the Senckenberg-Museum Frankfurt a. M.

INTRODUCTION: Distribution, relationships, behaviour and characters of the family Deinopidae

The cibellate members - cribellum fig. 8, calamistrum fig. 5 - of the Ogre-faced Spiders

(Deinopidae (= Dinopidae)) are mainly distributed in the tropics. They are easily to recognize from the unique position of their 8 eyes (figs. 1-2, 9): The posterior median eyes of the nocturnal spiders are enormously large and very intensive to light, directed foreward like headlights on the vertically sloping prosoma. (In contrast to the Deinopidae the anterior median eyes are very large in the members of the day-active Salticidae). On the anterior-lateral margin a pair of small eyes is situated on humps which are difficult to observe and which are directed obliquely laterally-ventrally. The posterior lateral eyes are directed oblique backwards, and so a nearly alaround view originates which is important for the nocturnal capturing, see below. - Further typical family characters are the absence of basal patellar bristles (the distal bristle is present, figs. 1, 3, 7) and the unique capture web, see below.

Deinopidae are fairly related to the ecribellate family Araneidae which build orbwebs, too, but they are more closely related to the family Uloboridae, see the paper on the Uloboridae in this volume. Like most other spiders the Deinopidae lack femoral trichobothria in contrast to the Uloboridae.

Deinopidae live in higher strata of the vegetation and "sweep" their prey from the air with the help of an unusual capture web - a modified orb web -, see figs. 11-12 and WUNDERLICH (1986: 251). The spiders hang down on threads at the posterior legs e.g. on a tree's branch. The essential part of the capture web has a rectangular shape and consists - in contrast to the remaining part of the web - of "sticky" cribellate threads. When some prey approaches the cribellate part is spread out and then quickly folded with the peye in it. In this way flying insects are actively swept out of the air - a unique capture behaviour which is impressively documented by KULLMANN & STERN in their German book and movie picture "Living by a silken thread" ("Leben am seidenen Faden"). Fossil ecribellate threads are preserved with two members of the Deinopidae in Baltic amber: With the juvenile spider of ?*M.* sp. 1 (F959) and with a juvenile spider from the Palaeont. Inst. Moskau (sp. indet.2). - Finally the "shackled" prey is bitten and sucked out.

Up to now I studied one dozen fossil Deinopidae in Baltic amber, among them is only a single spider which probably is adult, a female, the holotype of ?*Menneus pietrzeniukae* n. sp. but unfortunately no male which would have been quite important to determine the genus. Adult Deinopidae are large spiders and therefore rarely to expect in amber. - A Deinopid specimen from the Bitterfeld deposit could not again be found in the Palaeont. Mus. of the Humboldt University Berlin.

According to differences in the chaetotaxy and in the shape of the opisthosoma a greater diversity in the fossil Deinopidae may exist, different species or even different genera.

In Dominican amber a single fossil member of the family Deinopidae has been seen by an American arachnologist in a dealer's collection; since it was sold it has been missing.

EINLEITUNG: Verbreitung, Verwandtschaft, Verhalten und Merkmale der Käscherspinnen (Deinopidae)

Die cribellaten Vertreter - Cribellum Abb. 8, Calamistrum Abb.5 - der ganz überwiegend in den Tropen verbreiteten Familie Käscherspinnen (= Kätscherspinnen, Kescherspinnen) sind leicht an der einzigartigen Position der 8 Augen zu erkennen (Abb. 1-2, 9): Die hinteren Mittelaugen der nachtaktiven Spinnen sind ungewöhnlich groß, äußerst lichtempfinglich und auf dem senkrecht abfallenden Vorderkörper scheinwerferartig nach vorn gerichtet. (Im Gegensatz zu den Käscherspinnen sind bei den tagaktiven Springspinnen (Salticidae - siehe den Beitrag in diesem Band) die vorderen Mittelaugen enorm groß und nach vorn gerichtet). An der Außenkante vorn sitzt jederseits ein - oft schwer erkennbares - kleines Auge auf einer Erhebung, das schräg nach außen-unten gerichtet ist. Die hinteren Seitenaugen sind schräg nach hinten gerichtet, und so entsteht nahezu eine "Rundum-Sicht", die für den aktiven Beutefang wichtig sein dürfte, siehe unten. - Weitere familien-typische Merkmale sind das Fehlen der basalen Borste der Patellen (die distale Borste ist vorhanden, Abb. 1, 3, 7) und das einzigartige Fangnetz, siehe unten.

Die Käscherspinnen stehen den ebenfalls Radnetze bauenden, aber ecribellaten Radnetzspinnen (Araneidae) nahe; sie sind allerdings näher verwandt mit den cribellaten Kräusel-Radnetzspinnen (Uloboridae) (siehe die Bearbeitung dieser Familie in diesem Band). Im Gegensatz zu den Kräusel-Radnetzspinnen fehlen den Käscherspinnen - wie den meisten Spinnen - Becherhaare der Femora.

Käscherspinnen leben in höheren Vegetations-Schichten und käschern mit Hilfe eines ganz ungewöhnlichen Fangnetzes - es handelt sich um ein abgewandelten Radnetz - Beutetiere aus der Luft, vgl. Abb.11-12 und WUNDERLICH (1986: 251). Dabei hängen die Spinnen mit den Hinderbeinen an Fäden z.B. an einem Zweig. Der eigentlich "fängige" Netzteil ist rechteckig und wird - im Gegensatz zum übrigen Netzteil - von "klebrigen" cribellaten Fäden gebildet. Bei der Annäherung einer Beute wird der cribellate Netzteil mit Hilfe der ersten beiden Beinpaare ausgespannt und anschließend rasch "zusammengefaltet" mit dem Fang eingeholt. Auf diese Weise werden fliegende Insekten aktiv aus der Luft heraus gekäschert - ein einzigartiges Fangverhalten, wie es in Buch und Film "Leben am seidenen Faden" von KULLMANN & STERN eindrucksvoll dokumentiert wird! Fossile nicht-cribellate Fäden sind bei zwei Spinnen im Baltischen Bernstein erhalten: Beim juv. ?*M.* sp. 1 (F959) und bei der Jungspinne vom Paläontologischen Institut Moskau (sp. indet. 2). - Schließlich wird die "gefesselte" Beute gebissen und ausgesaugt.

Bisher liegt mir ein Dutzend Exemplare fossiler Käscherspinnen vor, alle im Baltischen Bernstein, darunter lediglich ein einziges (tatsächlich?) geschlechtsreifes Exemplar, der Holotypus (♀) von ?*Menneus pietrzeniukae* n. sp., bedauerlicherweise aber kein ♂, das zur Bestimmung der Gattung besonders wichtig gewesen wäre. Geschlechtsreife Dei-

nopidae sind große Spinnen und daher nur selten im Bernstein zu erwarten. - Ein im Bitterfelder Bernstein konserviertes Exemplar konnte im Paläontologischen Museum der Humboldt-Universität vor einigen Jahren allerdings nicht (wieder)gefunden werden.

Die vorliegenden Spinnen deuten auf eine größere Diversität der Familie im Baltischen Bernstein hin; sie könnten nach der unterschiedlichen Beborstung der Beine und der variablen Opisthosoma-Form nicht nur verschiedenen Arten, sondern sogar verschiedenen Gattungen angehören.

Im **Dominikanischen Bernstein** ist ein einziges fossiles Exemplar der Familie von einem amerikanischen Araneologen bei einem Händler gesehen worden; seit dem Verkauf ist es verschollen.

Determination of the taxa of the Deinopidae in Baltic amber

The determination of the fossil Deinopidae is not totally certain as only juvenile spiders are known to me, except one specimen which probably is adult (a female), and as the number of leg bristles in younger spiderlings is possibly less than in adults. Also the opisthosomal humps in ?*M. pietrzeniukae* could be missing in younger stadies of the same species. The long patellar bristles existing in small specimens suggest the existance of several species. In conspecific specimens the opisthosoma of larger juvenile spiders could be relatively longer than in smaller ones, similar to extant spiders (allometric growth); the relation of length to width in fossils known to me varying 1.2 (prosomal length 0.7mm) to 2.0 (prosomal length 1.0).

Bestimmung der Käscherspinnen im Baltischen Bernstein

Bei der Bestimmung der fossilen Käscherspinnen besteht einige Unsicherheit, da - bis auf ein möglicherweise ad. ♀ - nur Jungspinnen vorliegen und da möglicherweise die Anzahl der Bein-Borsten bei jüngeren Entwicklungs-Stadien geringer ist als bei adulten. Auch die bei ?*M. pietrzeniukae* vorkommenden Höcker des Hinterkörpers könnten bei jüngeren Stadien derselben Art fehlen. Die bei kleinen Exemplaren langen Borsten der Patellen deuten auf die Existenz mehrerer Arten hin. Bei artgleichen Exemplaren könnte - ähnlich wie bei rezenten Spinnen - der Hinterkörper bei größeren Jungspinnen relativ länger sein als bei kleineren (allometrisches Wachstum), das Verhältnis von Länge zu Breite variiert bei vorliegenden Fossilien von 1.2 (Prosoma-Länge 0.7mm) bis 2.0 (Prosoma-Länge 1.0mm).

Diagnosis of the family Deinopidae: Unique eye position (figs. 1-2, 9) (see the remark below): A pair of huge posterior median eyes are directed foreward, the remaining eyes are small, the anterior lateral eyes are situated on humps on the prosomal margin and are directed obliquely downwards, no basal patellar bristle, active prey capture behaviour with a unique capture web (figs. 11-12): A modified orb web, see above. - Further characters: Cribellate, three-clawed and usually larger spiders, feathery leg hairs present, legs I(-II) distinctly larger than III-IV, the tarsi III-IV bear ventral spines, the opisthosoma may bear humps.

Genera: *Avella* O. PICKARD-CAMBRIDGE 1877, *Avellopsis* PURCELL 1904, *Deinopis* MACLEAY 1839, *Menneus* SIMON 1876 (Africa and probably fossil in Baltic amber), *Palaeomicromenneus* PENNEY 2003 (see the remark below); extinct in Europe today.

Relationships: See the paper on the Uloboridae in this volume.

Distribution: Mainly tropical; fossil in Baltic, Dominican and Lebanese amber.

Remark: PENNEY (2003), Acta Palaeontol. Pol., 48 (4): 569-574, described recently *Palaeomicromenneus lebanensis*. In this taxon exists a plesiomorphic eye position with small posterior median eyes and the anterior lateral eyes not situated on distinct humps.

Comparison and Determination of the Baltic amber Deinopidae studied in this paper (questionable members of the genus *Menneus*):

character	sp. 3	*pietr-zeniukae*	sp. 1	sp. 2
metatarsal bristles	---	**numerous**, fig.1	**+** (few)	---
femoral bristles	---	numerous, figs.1,4	3-4 prodors. on fem.I	1 prodors. on fem.I
bristle on the patellae	**long**, fig.7	short, fig.3	short, fig.3	short, fig.3
humps of the opisthosoma	---	**+** fig. 2	---	---
length to width of the opisthosoma	+/-1.2	1.8, fig.2	+/-1.4	**4.0**, fig.10
prosomal length	+/- 0.7	3.1	1.5-1.6	1.8

Menneus SIMON 1876

According to the shape of the prosoma and the position of the eyes I regard the fossil taxa in Baltic amber only provisionally as members of the genus *Menneus* SIMON 1876, see DIPPENAAR-SCHOEMAN & JOCQUE (1997: Figs. 69d). In *Menneus* exists conspicuous long femoral hairs (as in some other extant genera and in *Palaeomicromenneus* PENNEY 2003) in contrast to the fossil spiders in Baltic amber. The find of a fossil male in Baltic amber could confirm the determination. *Menneus* is distributed today in Africa.
18 years ago I erroneously regarded the fossil Deinopidae in Baltic amber as being members of the genus *Deinopis* MACLEAY 1839, and the fossil genus *Linoptes* MENGE in KOCH & BERENDT 1854 as a junior synonym of *Deinopis*, see WUNDERLICH (1986). But - according to MENGE - leg IV is as long as leg I or even longer in *Linoptes* in contrast to the members of the family Deinopidae; I do not want to exclude that *Linoptes* is a member of the family Pisauridae.

?***Menneus pietrzeniukae*** **n.sp.** (Fig.1-6), Photo 113

Derivatio nominis: The species is dedicated to Dr. E. PIETRZENIUK at the Palaeontological Museum of the Humboldt-Universität Berlin, who found the remarkable spider among the old collection of SIMON which now is the holotype of the new described species.

Material: Holotype, ?ad. ♀ in Baltic amber, Palaeontological Museum of the Humboldt-University Berlin No. MB.A 114, coll. SIMON (originally labelled as "Theridiidae").

Preservation and syninclusions: The spider is well and nearly completely preserved in a piece of amber which is partly redbrown, embedded in a larger block within a substance which is unknown to me, and enclosed in glass (object slides); the slide left of the spider has a fissure. Body and legs are darkened and ventrally partly covered by a white emulsion, the eyes are partly covered by bubbles. The left tibia and patella III and the left patella IV are partly cut off, the right tarsi and metatarsi III-IV are cut off. A small member of Diptera: Nematocera is preserved above the spider, threads and stellate hairs are absent.

Diagnosis (?ad. ♀): Legs with numerous short bristles (figs. 1, 3-5), no conspicuous long femoral hairs, opisthosoma 1.8 times longer than wide, with a pair of humps behind the middle (fig. 2), genital area (fig. 6) wide, with a pair of dark structures which may be remains of the receptacula seminis, and with a pair of low lateral depressions.

Description (?ad. ♀):
Measurements (in mm): Body length 7.3, prosoma: Length 3.1, width 2.1, opisthosoma: Length 5.0, width 2.8, hight 1.7; leg I: Femur 6.1, hight in the middle 0.47, patella 1.3, tibia 5.3, metatarsus 6.0, tarsus 1.9, tibia II 4.4, tibia III 2.5, tibia IV 2.5, diameter of a posterior median eye about 0.32, diameter of an anterior median eye 0.17, diameter of a posterior lateral eye 0.2, length of a dorsal-basal bristle of tibia I 0.12.
Colour mainly medium brown, partly darkened.
Prosoma (figs. 1-2) distinctly longer than wide, covered with short hairs, posterior median eyes distinctly the largest, anterior lateral eyes on humps and directed obliquely ventrally-posteriorly, posterior lateral eyes on humps, directed obliquely posteriorly. Chelicerae large, teeth not observable, fangs long, sternum, labium and gnathocoxae longer than wide, coxae IV nearly contiguous. - The pedipalpal articles are slender, the tarsus bears prolateral bristles and a toothed claw. - Legs (figs. 1, 3-5) long and slender, order I/II/IV/III, III slightly shorter than IV, covered with short hairs and numerous short bristles which all are shorter than the diameter of the leg article; patellae without a basal bristle, distal bristle very short; the tibiae bear dorsal, ventral, pro- and retrolateral bristles, metatarsal bristles present. Small tarsal claws. Metatarsus IV slightly bent, calamistrum shorter than the half metatarsal length. Position of the metatarsal IV trichobothrium in 0.8; on this article a feathery hair is well observable. - The opisthosoma (fig. 2) is slightly deformed (depressed), 1.8 times longer than wide, covered with short hairs, bearing a pair of humps behind the middle. Spinnerets short; the cribellum is hidden by an emulsion. - According to the slightly prominent genital area (fig. 6; see the diagnosis) the spider is more likely adult than juvenile/subadult.

The **relationships** are unsure; in the other spiders/taxa - all are juveniles! - in Baltic amber distinct opisthosomal humps are absent. Short leg bristles and metatarsal bristles are present in ?*Menneus* sp. indet. 1, too, see the tab. above.

Distribution: Tertiary Baltic amber forest.

?*Menneus* sp. indet. 1 (fig. 8) Photo 114

Material (in Baltic amber): Juv. ♀ and 2 separated pieces of amber, F959/BB/AR/DEI/CJW; 1 juv. F966/BB/AR/DEI/CJW. Photo 114.

In these spiders the legs bear short bristles and metatarsal bristles are present similar to ?*M. pietrzeniukae*; the opisthosoma is 1.4 times longer than wide, humps are absent, femur I bears 3-4 prolateral bristles, the prosoma is 1.5-1.6mm long. With F966 some ecribellate threads are preserved.

Relationships: See the tab. above.

Distribution: Tertiary Baltic amber forest.

?*Menneus* sp. indet. 2 (figs. 9-10)

Material: Juv. in Baltic amber, Palaeontological Institute Moscow No. 364/27 (K. ESKOV 1983 det. "Dinopidae gen. et sp. indet.").

The legs bear short bristles, the opisthosoma is 4 times longer than wide, without humps. The prosomal length is 1.8mm. Few ecribellate threads are preserved partly in contact with the spider.

Relationships. See the tab. above.

Distribution: Tertiary Baltic amber forest.

?*Menneus* sp. indet. 3 (fig. 7)

Material (in Baltic amber): Two juveniles in the same piece of amber, F962/BB/AR/DEI/CJW; 1 juv. and a separated piece of amber, F963/BB/AR/DEI/CJW; 1 juv. near the male of *Orchestina* sp. indet. (Oonopidae), F665/BB/AR/DEI/CJW.

Dorsal-distal patellar bristles distinctly longer than the diameter of the article (fig. 7), metatarsi without bristles, see the tab. above. The prosomal length of the juvenile spiders is only about 0.7mm. - In the juv. F665 the left leg I is distinctly shorter than the right leg I, probably a regenerate.

Relationships: In the other fossil Deinopidae in Baltic amber - see the tab above - the leg bristles are usually shorter than the diameter of the article (fig. 3), ?*M.* sp. indet. F964/CJW is an exception, see below.

Distribution: Tertiary Baltic amber forest.

Further material in Baltic amber :

Most often small juvenile spiders are kept in the private collections of SCHIPPLICK in

Braunschweig (D) (Bitterfeld deposit), ERNST in Skagen (DK) and the collection of the author: F964/CJW. The juv. F964 is 2.2mm long, the opisthosoma is twice as long as wide, the patellar bristles are about as long as the patellar diameter.

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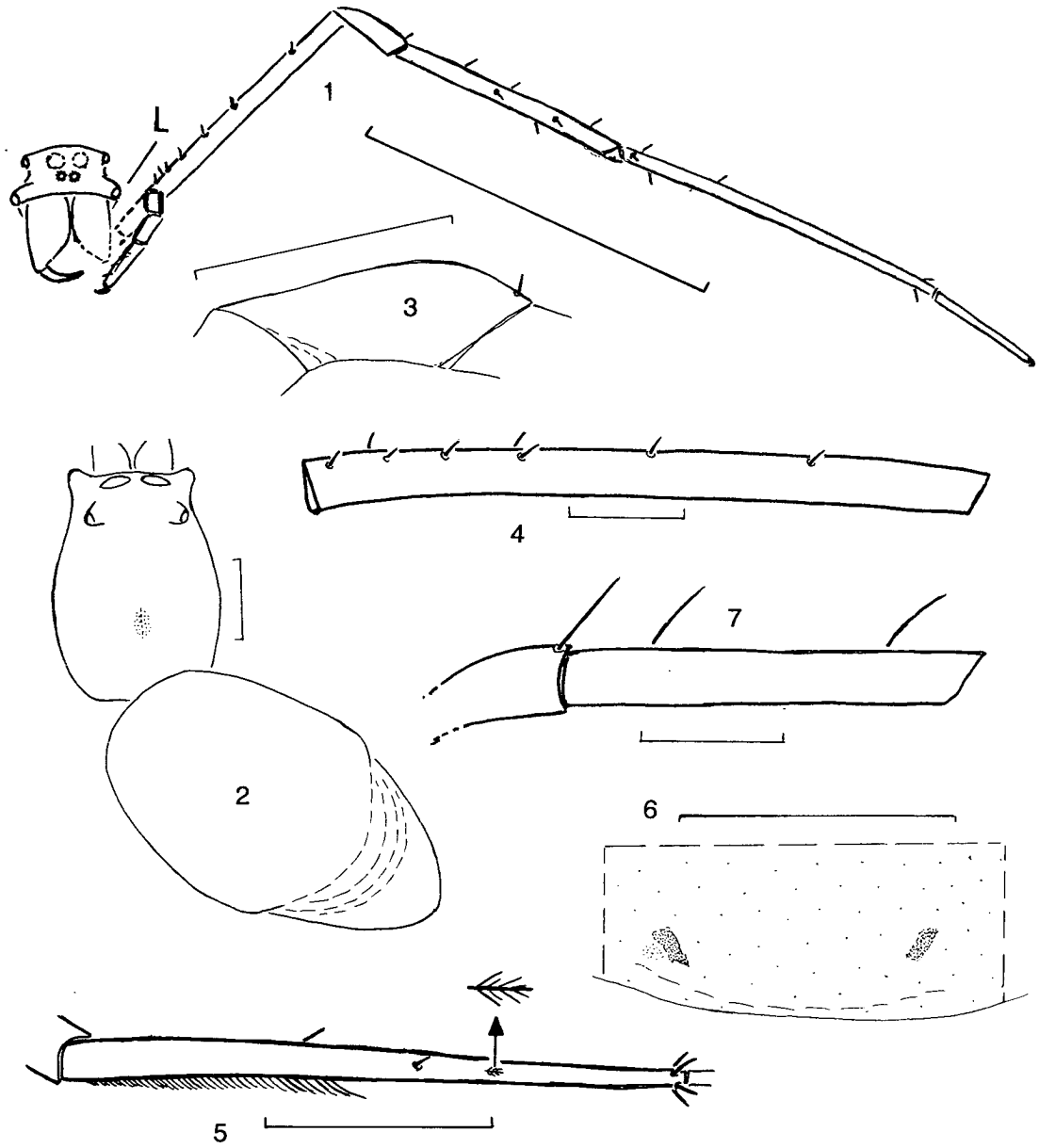

Figs. 1-6: ?***Menneus pietrzeniukae* n.sp.**, ?ad. ♀; 1) prosoma, l. pedipalpus and l. leg I frontally; the leg articles are in reality a bit more slender (L = left anterior lateral eye); 2) body dorsally (the opisthosoma is dorsally slightly compressed); 3) r. patella I prolaterally; 4) l. femur I prolaterally; 5) r. metatarsus IV frontally-dorsally with bristles, calamistrum and one enlarged feathery hair; 6) genital area. - M = 5mm in fig.1, 1.0 in figs. 2-5), 0.1 in fig. 6);

fig. 7) ?*Menneus* sp. indet. 3, juv., tibia and patella of the l. leg I prolaterally. - M = 0.2;

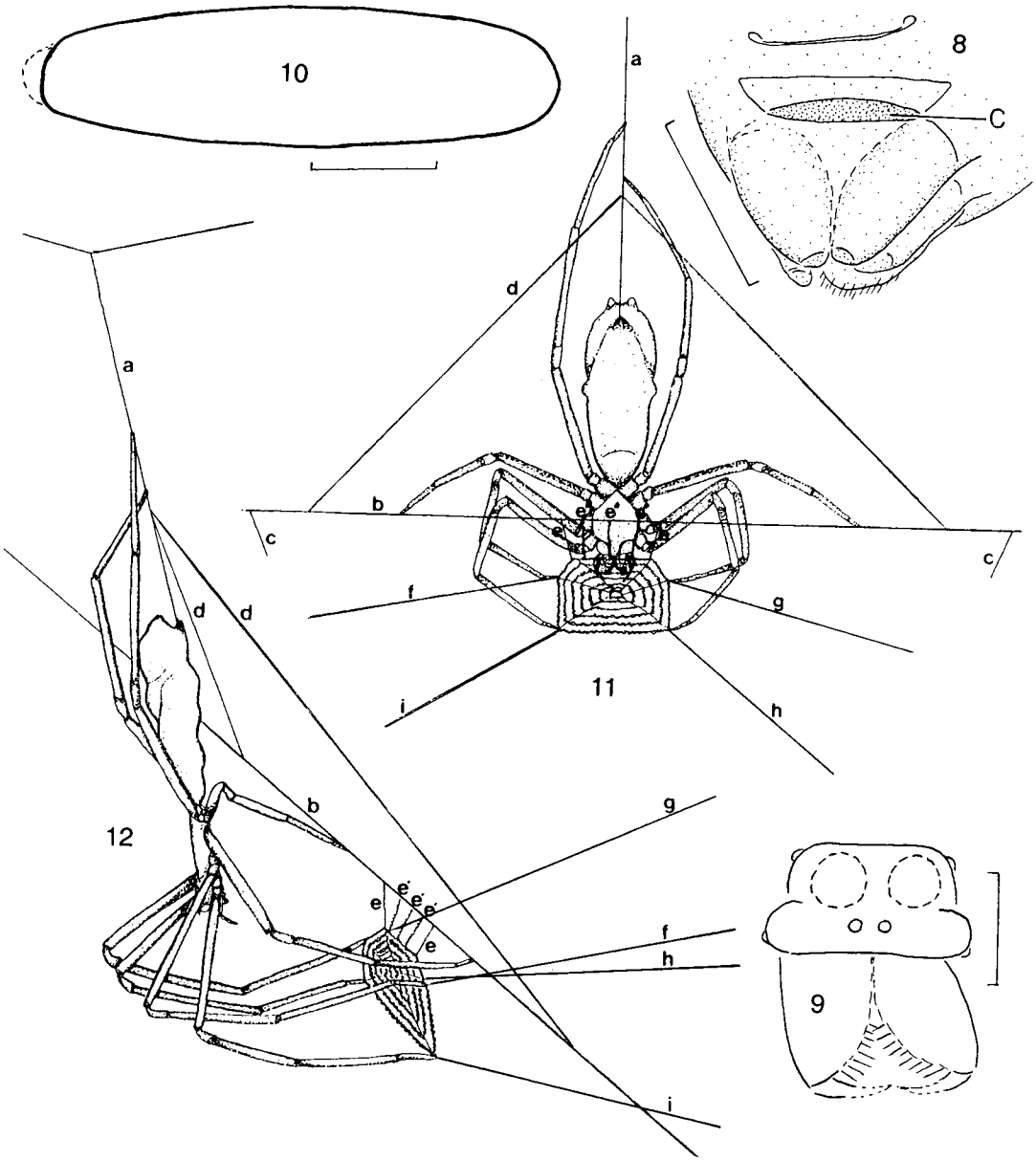

fig. 8) ?*Menneus* sp. indet. 1, juv., spiracle, spinnerets and cribellum (C) ventrally. - M = 0.5;

figs. 9-10: ?*Menneus* sp. indet. 2, juv., prosoma fontally and opisthosoma dorsally. - M = 0.5;

figs. 11-12: *Deinopis schoutedeni* GILTAY 1929, extant, Africa, ♀ with web ventrally and laterally; taken from PENNEY & WHITEHEAD (1995).

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THE FOSSIL SPIDERS (ARANEAE) OF THE FAMILIES TETRAGNATHIDAE AND ZYGIELLIDAE N. STAT. IN BALTIC AND DOMINICAN AMBER, WITH NOTES ON HIGHER EXTANT AND FOSSIL TAXA

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ABSTRACT: The fossil and some extant spiders (Araneae) of the families Tetragnathidae in Baltic and Dominican amber and Zygiellidae (**n. stat.**, upgraded from Zygiellеae SIMON 1929) in Baltic amber are listed and partly revised, keys to the taxa are given. - Tetragnathidae and Zygiellidae are regarded as probable sister groups. - (1) Tetragnathidae: With some hesitation all taxa in Baltic amber are regarded as members of the subfamily Diphyinae (5 extinct genera). In the younger Dominican amber spiders of three subfamilies have been found: Aziliinae, Leucauginae and Tetragnathinae, members of 4 extant genera. Diphyinae is believed to be an "old" branch; at least Leucauginae and Tetragnathinae but perhaps also Metinae s. str. may be „young" subfamilies which originated probably not before the Early Tertiary. - Only 2 of the 5 spider genera which were published in Baltic amber by PETRUNKEVITCH (1958) are true Tetragnathidae: *Eometa* and *Priscometa*; both are revised. - The following taxa are described from Baltic amber: *Anameta* **n.gen.**, *A. distenda* **n.sp.** (from the Bitterfeld deposit), *Corneometa* **n. gen.**, *C. baltica* **n.sp.**, *C. pilosipes* **n.sp.**, *Eometa calefacta*, *E. occulta* **n.sp.**, *E. perfecta* **n.sp.**, *Praetermeta* **n. gen.**, *P. velans* **n.sp.**, *Priscometa capta* **n.sp.** and *P. minor* **n.sp.** - Selected characters of the Tetragnathidae and its subfamilies are listed. Aziliinae is regarded as a questional taxon of the Tetragnathidae. Nanometinae (**n. stat.**) is down-graded from family level. Dyschiriognathini (**n. stat.**) ZHU et al. 2003 is downgraded from subfamily level. A provisional cladogram to most subfamilies is given. - (2) Zygiellidae includes the subfamilies Zygiellinae O. PICKARD-CAMBRIDGE 1902 (extant and fossil in Baltic amber) and Chrysometinae **n. subfam.** (extant). *Eustaloides* PETRUNKEVITCH 1942 is regarded as a junior synonym of *Graea* THORELL 1869, *Chrysometa* SIMON 1895 is transferred with some hesitation from the

Tetragnathidae to the Zygiellidae; the following taxa of the Zygiellinae are described: (a) fossil in Baltic amber: *Eozygiella* **n. gen.**, *E. compacta* **n.sp.**, *Graea aberrans* **n.sp.**, *G. bitterfeldensis* **n.sp.**, *G. breviembolus* **n. sp.**, *G. brevis* **n. sp.** *G. impudica* **n. sp.** and *G. lingula* **n. sp.**; (b) extant: *Leviellus* **n. gen.**, *Parazygiella* **n. gen.** and *Stroemiellus* **n. gen.**. *Chrysometata* **n. gen.** with its type species *C. palaearctica* **n. sp.** in Baltic amber are questionable taxa of the Zygiellidae but probably of the family Tetragnathidae. Guizygiellinae ZHU et al. 2003 is synonymized with Zygiellinae SIMON 1929 (**n. syn.**).

Material: AMNH = American Museum of Natural History, New York (Prof. N. I. PLATNICK), CJW = private collection of J. WUNDERLICH, GPIH = collection of the Geological-Paleontological Institute of the University Hamburg (Dr. W. WEITSCHAT).

INTRODUCTION

Fossil Tetragnathidae are diverse but not frequent – all the 9 newly described species in Baltic amber are known from a single specimen only! 2 genera were described by PETRUNKEVITCH (1958) from Baltic amber, in this paper I add 3 new genera; all the 5 genera in Baltic amber are extinct. The questionably Zygiellidae *Chrysometata* n. gen. may be a further genus of the family Tetragnathidae. Most Tetragnathidae in Baltic amber are members of the genus *Eometa*. Members of 4 extant genera are known from Dominican amber, see WUNDERLICH (1988) and below.

Most Tetragnathidae are orb weavers in higher strata and are waiting in a stretched leg position. In contrast to members of the Araneidae – in which the males often are „dwarf males" and the females large – Tetragnathidae are mostly larger spiders in both sexes (small males are known e.g. in *Phonognatha*).

The record of the tropical Leucauginae and especially the cosmopolitical Tetragnathinae in Baltic amber has been expected by me but both are absent in this kind of amber in contrast to Dominican amber. This finding is surprising: I have seen more than ten times as many spiders in the old Tertiary Baltic amber than in the about 30 million years younger Dominican amber. Therefore I suppose that the subfamilies **Tetragnathinae and probably Leucauguinae** (see the addendum!) **evolved after the end of the Baltic amber forest period, not before the Oligocene**. Neither the strongly modified male chelicerae of the Tetragnathinae (fig. 35) nor the femoral trichobothria of Tetragnathinae and Leucauginae existed in members of the Early Tertiary

Tetragnathidae which are known from Baltic amber. According to the plesiomorphic strong dorsal cymbial outgrowth and the absence of femoral tricho-bothria Diphyinae may be the most plesiomorphic/oldest branch of the Tetragnathidae, see the cladogram. The family Zygiellidae is known in Baltic amber from two or three extinct genera, no taxon is known from Dominican amber. The spiders are orb weavers in higher strata; in contrast to the Teragnathidae there is a free sector in their web (fig. 36), a signal line is present, and the spiders are waiting in a retreat which may be placed under bark. Compared to the Tetragnathidae the chelicerae are smaller in the Zygiellidae, their clypeus is shorter, and their genital structures are more complicated, mostly a tegular apophysis is present, leg autotomy is frequent.

EINLEITUNG

Fossile Streckerspinnen (Tetragnathidae) im Bernstein sind zwar nicht häufig - alle 9 neu beschriebenen Arten im Baltischen Bernstein liegen in nur einem einzigen Exemplar vor! -, sie sind aber doch divers erhalten: Vertreter von 4 Gattungen wurden vom Dominikanischen Bernstein beschrieben, alle Gattungen existieren noch heute, vgl. WUNDERLICH (1988). 2 Gattungen hat PETRUNKEVITCH (1958) vom Baltischen Bernstein beschrieben, 3 füge ich in dieser Arbeit hinzu, alle 5 Gattungen im Baltischen Bernstein sind meines Wissens ausgestorben. Die fragliche Zygiellidae Gattung *Chrysometata* n. gen. könnte eine weitere Gattung der Familie Tetragnathidae sein. Die Vertreter der Gattung *Eometa* sind die häufigsten Streckerspinnen im Baltischen Bernstein.

Die meisten Streckerspinnen legen ihre Fangnetze in höheren Vegetations-Schichten an, vor allem in der Kraut- und Strauch-Schicht belichteter Standorte. So waren sie im Bernstein durchaus zu erwarten. PETRUNKEVITCH (1958) führte explizit keine Vertreter der Streckerspinnen im Baltischen Bernstein auf und stellte seine Gattung *Eometa* irrtümlich zur Familie Radnetzspinnen (Araneidae). Im Gegensatz zu den meisten Radnetzspinnen - bei ihnen sind die Männchen ("Zwergmännchen") oft wesentlich kleiner als die oft besonders großen Weibchen - sind die meisten Streckerspinnen in beiden Geschlechtern größere Spinnen; *Phonognatha* ist eine Ausnahme.

Während vom Dominikanischen Bernstein Vertreter von 3 Unterfamilien bekannt sind - Leucauginae, Aziliinae und Tetragnathinae - kenne ich vom Baltischen Bernstein bisher nur Vertreter der Unterfamilie Diphyinae. Einen Nachweis der kosmopolitisch verbreiteten und vom Dominikanischen Bernstein bekannten Unterfamilie Eigentliche Streckerspinnen (Tetragnathinae) hätte ich auch im Baltischen Bernstein erwartet. Aber auch das Vorkommen der ganz überwiegend in den Tropen verbreiteten Perlmutt-Streckerspinnen (Leucauginae) - den deutschen Namen schlage ich hiermit für diese Unterfa-

milie vor - wäre im Baltischen Bernstein-Wald zu erwarten. Weder die stark modifizierten Cheliceren der Tetragnathinae (Abb. 35), noch die Trichobothrien der Femora der Tetragnathinae und Leucauginae sind von Vertretern im Baltischen Bernstein bekannt. Nach dem offenbaren **Fehlen der Leucauginae** (siehe den Anhang!) **und Tetragnathinae** im Baltischen Bernstein – mir lagen mehr als zehnmal so viele Spinnen im Baltischen Bernstein vor als im Dominikanischen Bernstein - und andererseits ihrem Vorkommen im etwa 30 Millionen Jahre jüngeren Dominikanischen Bernstein vermute ich, dass diese Unterfamilien **erst im frühen oder mittleren Tertiär evolviert** sind, frühestens **nach** dem Ende der Existenz des Baltischen Bernsteinwaldes zu Beginn des Oligozäns. Nach dem dorsalen Auswuchs des Cymbiums und dem Fehlen von Trichobothrien auf den Femora könnten die Diphyinae die ursprünglichste/älteste Unterfamilie der Tetragnathidae sein, siehe das Cladogram.
Fossile Vertreter der Familie Zygiellidae - zwei oder drei ausgestorbene Gattungen - sind vom Baltischen Bernstein bekannt, keine vom Dominikanischen Bernstein. Die Spinnen legen Radnetze in höheren Vegetations-Schichten an; im Gegensatz zu den Streckerspinnen besitzt ihr Netz einen freien Sektor (Abb. 36), es existiert ein Signalfaden, und die Spinnen lauern in einem Versteck, das sich unter Baumrinde befinden kann. Die Cheliceren der Zygiellidae sind kleiner als diejenigen der Tetragnathidae, ihr Clypeus ist kürzer, ihre Genital-Strukturen sind komplizierter, meist existiert eine Tegularapophyse, Autotomie der Beine ist häufig.

TAXONOMY

A. Tetragnathidae

Selected characters of the family Tetragnathidae and related families

Tetragnathidae is similar and probably closely related to the families Araneidae and Zygiellidae, see below and the paper on the Araneidae in this volume. Members of the families Araneidae, Tetragnathidae and Zygiellidae build orb webs; in Tetragnathidae and some Zygiellidae (*Chrysometa*) exist a hub bite-out behaviour. The clypeus is

usually short (fig. 29) but compare figs.1and 24 (*Anameta* and *Priscometa*). Auxiliary hairs: Compare the arrow in fig. 5. I found no sustentaculum in the fossil Tetragnathidae but in the extant genus *Meta* I found it. In most Araneidae (not e. g. in some Nephilinae) the median eyes are more close together than in the Tetragnathidae. In the Tetragnathidae are the gnathocoxae mostly longer than wide, the labium is usually about as long as wide (wider than long in most Leucauginae, hidden in most fossil spiders, observable - about long as wide - e. g. in *Priscometa minor* n.sp.) and the chelicerae are larger (fig.1). In numerous extant Tetragnathidae and in all fossil taxa of the Early Tertiary Baltic amber forest the cymbium bears a dorsal-basal outgrowth (it is small in *Priscometa*); such an outgrowth is absent in the Araneidae. I suppose that this outgrowth - which occur e. g. in the "primitive" fossil taxa - is an autapomorphy of the family Tetragnathidae or even of a larger branch. The paracymbium is usually small and simple in the Araneidae, complicated and sclerotized in the Zygiellidae; it may be large, complicated/ divided and usually weakly sclerotized and hairy in the Tetragnathidae. The bulbus structures are simple, a median apophysis is absent as in some Zygiellidae (e. g. *Chrysometa*) and in some Araneidae (some Nephilinae), embolus and conductor are twisted in a distal position (figs. 3,12,17-18,26) (similar in Araneidae: Nephilinae); in the Zygiellidae is the position of the terminal apophysis close to the embolus. The vulva is secondarily haplogyne in the Tetragnathinae. The subtegulum is often large in Tetragnathidae and rarely large in Araneidae. The opisthosoma is soft in the Tetragnathidae and in the probably strongly related Zygiellidae but often hardened or bearing a scutum in male Araneidae. In contrast to the Tetragnathidae a scapus of the epigyne is present in most Zygiellidae and Araneidae (a scapus is absent e. g. in the Nephilinae). Usually a coxa-trochanter autotomy is present in Araneidae and Zygiellidae but absent in all extant and fossil Tetragnathidae which are known to me. Stridulatory organs are rare in the Tetragnathidae and known to me in the extant taxa Nanometinae FORSTER & FORSTER, *Zygiometella* WUNDERLICH and *Meta stridulans* WUNDERLICH.

Remarks on selected higher taxa of the Tetragnathiidae

The higher taxa of the family Tetragnathidae are not well studied. I regard the restricted Nephilinae as a subfamily of the Araneidae, compare the paper on the Araneidae and on the Araneoidea in this volume. The „typic" extant members of the Tetragnathidae – Leucauginae, Tetragnathinae and Metinae s.str. – are highly derived taxa which are surely not basal branches. The relationships of several fossil genera and some higher taxa are not clear and some subfamilies are only weakly diagnosed, see below. In my opinion are the Metinae most probably not monophyletic, and several genera, e. g.

Azilia - which apparently simply does not fit in another subfamily - usually are regarded as members of the Metinae. I regard Aziliinae as a family or subfamily (really of the Tetragnathidae?) of its own and Diphyinae - in contrast e.g. to the opinion of DIPPENAAR & JOCQUE (1997) - as a subfamily different to the Dolichognathinae. The widely spaced lateral eyes may have been evolved two times in these taxa and are furthermore known in the Araneoidea e. g. in *Clytaetra* SIMON 1888 (Araneidae: Nephilinae).
I do not believe that the „metinae resting position" exists only in *Meta* and the Tetragnathinae, see GRISWOLD et al. (1998), FORSTER & FORSTER (2000: Fig. 11.30b) (Nanometinae!).
In contrast to the publications of various authors I found in Tetragnathinae and most Leucauginae trichobothria on **all** femora and not only on femur III.
On the sustentaculum in *Meta* compare the paper on extinct Araneoidea in this volume.
According to my investigations is a sustentaculum most probably absent in the fossil Tetragnathidae.
Autotomy is absent in all fossil and extant genera of the Tetragnathidae which are known to me.
The shape of the labium is quite variable in Tetragnathidae, from wider than long in Leucauginae to longer than wide e.g. in Metinae and Tetragnathinae.
I found a distinct condylus in Dolichognathinae and in some Leucauginae.

On the Cretaceous genus *Macryphantes* SELDEN 1990: See p. 858.

Selected characters of the Tetragnathidae and its subfamilies, a provisional list

Compare the provisoric cladogram in which Nanometinae is excluded. Nephilinae: See the paper on the family Araneidae in this volume.

Tetragnathidae:Presence of hub bite out behaviour (absent in Aziliinae; rarely also present in the Araneidae (*Kaira* O. PICKARD-CAMBRIDGE) and in the Zygiellidae (*Chrysometa* SIMON), stretched resting position, large chelicerae (which may be modified in the male sex, most distinct in the Tetragnathinae, fig. 35), in many taxa are numerous ventral hairs present at leg articles I and II (figs. 9, 31) which may distally be bent and with erect hairs, epigyne usually weakly sclerotized, scapus usually absent, pedipalpal tibia often with apophysis or apophyses, basicly presence of a dorsal cymbial outgrowth (which may be a plesiomorphic structure of a larger branch), a weakly sclerotized, larg(er) and usually hairy paracymbium (figs. 28, 33) which may be a free sclerite (Tetragnathinae), twisted embolus/conductor in a distal position, no tegular/median apophysis, opisthosoma frequently with silver spots; (plesiomorphic: No autoto-

my, numerous long and slender leg bristles, dorsal cymbial outgrowth?).

Diphyinae s.l.: Diagnosis and limit of the subfamily are unclear; the taxon may be polyphyletic or paraphyletic. Included here are - with some hesitation - all the fossil genera in Baltic amber, see also *Chrysometata* n. gen., and the extant genera *Leucognatha* WUNDERLICH 1992 (Acores) and *Zygiometella* WUNDERLICH 1995 (Israel). - ♂-pedipalpus usually with a dorsal cymbial outgrowth (figs. 2,7,13,33) and a tibial apophysis. (In *Diphya* and some related genera: Lateral eyes often widely spaced - similar to Aziliinae, Dolichognathinae and Nanometinae: *Eryciniola* - and posterior eye row distinctly recurved). ZHU et al. (2003) include Diphyinae in Leucauginae.

Metinae s.l.: Diagnosis and limit of the subfamily sensu recent authors are unclear; the taxon should be polyphyletic or paraphyletic. *Homalometa* SIMON is provisionally included here, *Chrysometa* SIMON: See the Zygiellidae below. - *Meta* - all Metinae s. str.? - possess a large, fixed and divided paracymbium; compare the Tetragnathinae. - Remark: According to PLATNICK's Catalogue of Araneae (1998: 451) is Metidae preoccupied in the Copepoda.

Nanometinae FORSTER & FORSTER 2000 (extant; according to their bulbus structures downgraded here from family rank): Branched opisthosomal tracheal system, sclerotized epigyne, fertilization ducts and male stridulating organ between a coxal spur and lung cover ridges - similar to some Linyphiidae: Erigoninae - are present.

Tetragnathinae: Strongly enlarged and modified ♂-chelicerae with outgrowths (clasping spurs) (fig. 35), haplogyne ♀-genitalia, narrow and constricted cymbium, large paracymbium which is a free sclerite, no dorsal outgrowth of the cymbium and no tapetum, insertion of embolus and conductor while copulation, see LEVI (1986:95).

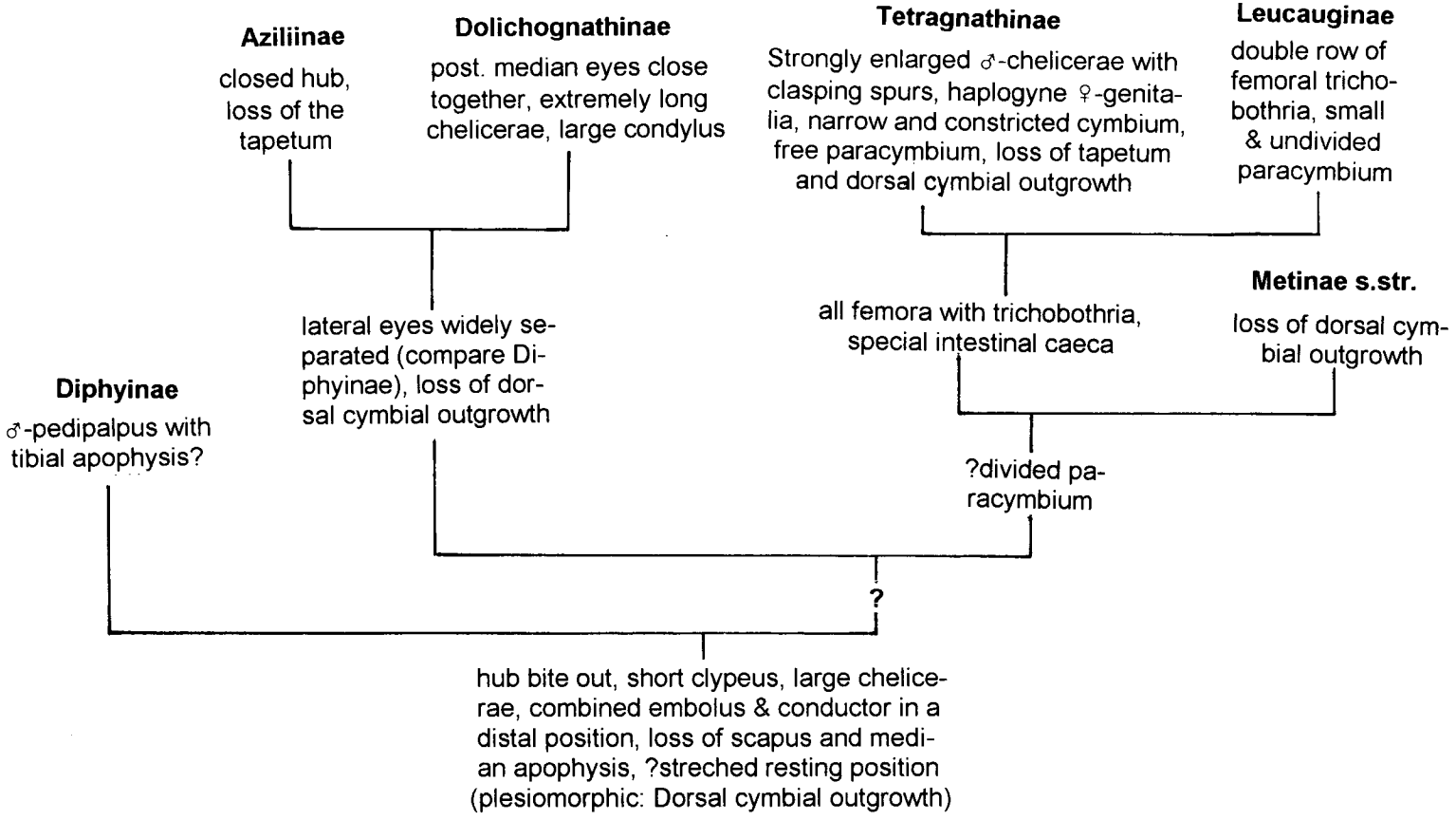
Leucauginae: Usually with a double row of femoral trichobothria which may be feathery - see WUNDERLICH (1988: Fig. 184) - and probably rarely absent, small paracymbium; often is the labium wider than long. (A probable insertion of the conductor is not known to me, see the Tetragnathinae).

Leucauginae + Tetragnathinae furthermore: Special intestinal caeca.

Aziliinae: Closed hub, no tapetum (compare the Tetragnathinae); fossils: See WUNDERLICH (1988). Araneidae-like (!) caeca: See PALMGREN (1980).

Dolichognathinae: Posterior median eyes close together, stiff prolateral hairs of leg I, very long chelicerae with a distinct condylus.

Aziliinae + Dolichognathinae furthermore: Widely spaced lateral eyes, no dorsal cymbial outgrowth.



Provisional cladogram of the subfamilies of the TETRAGNATHIDAE
including the fossil genera in Baltic and Dominican amber

Synonymy and relationships of selected genera

The genera which were regarded by PETRUNKEVITCH (1958: 124-125) as Metinae - in that time Metinae usually has been regarded as a subfamily of the Araneidae - belong really to three different families: *Acrometa, Theridiometa* (?= *Acrometa*) and *Elucus* (a junior synonym of *Anandrus*) are members of the Synotaxidae, *Memoratrix* is a member of Linyphiidae or Pimoidae; see the papers on these families in this volume. *Eometa* PETRUNKEVITCH and *Priscometa* PETRUNKEVITCH are true members of the Tetragnathidae. - *Macryphantes* SELDEN 1990 - not preserved in amber -: See the paper on the family Uloboridae in this volume. On the extant genera *Phonognatha* and *Chrysometa*: See the paper on Araneidae and Zygiellidae and below. - Based on their large and modified male chelicerae and their genital organs Dyschiriognathini ZHU et al. (**n. stat.**) is down-graded from family to tribe level of the subfamily Tetragnathinae. Remark: In the cladogram of ZHU et al. (2003: 25) *Dyschiriognatha* keys out in the Tetragnathinae.

List of the taxa of the family Tetragnathidae in Dominican and Baltic amber

a) Taxa in Dominican amber:

Azilia hispaniolensis WUNDERLICH 1988, Aziliinae,
Azilia muellenmeisteri WUNDERLICH 1988, Aziliinae,
Azilia sp. sensu WUNDERLICH 1988, Aziliinae,
Cyrtognatha weitschati WUNDERLICH 1988, Tetragnathinae,
Tetragnatha pristina SCHAWALLER 1982, Tetragnathinae,
?*Leucauge* sp. sensu WUNDERLICH 1988, Leucauginae,

b) Taxa in Baltic amber:

Eometa aberrans PETRUNKEVITCH 1958 and *E. robusta* PETRUNKEVITCH 1958: See the remarks below, *Eometa*. Compare *Chrysometata* n. gen. (Zygiellidae).

Anameta distenda n.gen.n.sp., Diphyinae, Bitterfeld locality,

Corneometa baltica n.gen.n.sp., Diphyinae,
Corneometa pilosipes n.gen.n.sp., Diphyinae,
Eometa calefacta n.sp., Diphyinae,
Eometa longipes PETRUNKEVITCH 1958, Diphyinae,
Eometa occulta n.sp., Diphyinae,
Eometa perfecta n.sp., Diphyinae,
Eometa samlandica PETRUNKEVITCH 1958, Diphyinae,
Praetermeta velans n.gen.n.sp., Diphyinae,
Priscometa tenuipes PETRUNKEVITCH 1958, Diphyinae,
Priscometa capta n.sp., Diphyinae,
Priscometa minor n.sp., Diphyinae.

The above listed fossil Tetragnathidae show:

(1) Probably all taxa of the family Tetragnathidae in Baltic amber are members of the "plesiomorphic" subfamily Diphyinae;
(2) "Modern" subfamilies as pantropic members of the Leucauginae and cosmopolitic members of the Tetragnathinae – both known from Dominican amber - are wanting in the older Baltic amber; compare the introduction. Also Metinae s. str. are absent;
(3) No subfamily or genus is common to both kinds of amber;
(4) the Dominican amber genera are all extant, the Baltic amber genera are extinct;
(5) *Anameta* is known from the Bitterfeld deposit, *Eometa*, *Corneometa, Praetermeta* and *Priscometa* from non-Bitterfeld deposits.

Baltic amber	Dominican amber
Diphyinae	Aziliinae
Leucauginae?	Leucauginae
Metinae?	Tetragnathinae

Subfamilies of the family Tetragnathidae in Baltic and Dominican amber

The taxa in Dominican amber: Compare the list above; see WUNDERLICH (1988).

Additional material: *Cyrtognatha* sp. indet., 1♂, Staatl. Mus. Naturk. Stuttgart, Do-3755.

The taxa in Baltic amber

Chaetotaxy (part.) of the Tetragnathidae in Baltic amber:

Genus	dorsal-basal bristle(s) on metatarsus I-II (fig.10)	thorns or ventral spines of leg I/II
Anameta	?	—
Corneometa	2	variable, e.g. fig.11
Eometa	2	—
Praetermeta	1	—
Priscometa	1	on tibia I

Bestimmungs-Tabelle für die Gattungen der Streckerspinnen im Baltischen Bernstein (♂):

Anmerkungen: Die nach Jungspinnen beschriebenen ?*Eometa aberrans* und ?*E. robusta* wurden nicht berücksichtigt, siehe unten. Vgl. *Chrysometata* n. gen., Zygiellidae.

1 Seitenaugen weit voneinander getrennt (Abb. 1). Tibia des ♂-Pedipalpus kurz (z.B. Abb.3,21). 2

- Seitenaugen nahe beisammen (z.B. Abb.14). Tibia des ♂-Pedipalpus lang (z.B. Abb. 7, 26). 3

2(1) ♂-Pedipalpus (Abb.2-3): Cymbium mit Stachel-tragenden Auswüchsen, Paracymbium abstehend und kompliziert, Conductor sehr lang. . . . . ***Anameta***

- ♂-Pedipalpus (Abb. 12,17-18): Cymbium ohne Stacheln, Paracymbium einfach, schmal und dem Bulbus anliegend, Coductor kurz . . . . . ***Eometa***

3(1) ♂-Pedipalpus (Abb.26-28): Tibia am Ende mit großer Apophyse . . . . . ***Priscometa***

- ♂-Pedipalpus: Tibia am Ende ohne große Apophyse 4

4(3) Metatarsus I-II dorsal-basal mit 1 Paar Borsten (Abb. 4), wenigstens Tibia und/ oder Metatarsus I oder II unten mit zwei Reihen kurzer Stacheln (z.B.Abb.10), Cymbium mit aufrechtem, dorsalem Horn (Abb. 6-7). . . . . ***Corneometa***

- Metatarsus I-II dorsal-basal mit einer einzelnen Borste (Abb.31); Beine I-II ohne kurze ventrale Stacheln, Cymbium mit mehrteiligem dorsalem Auswuchs (Abb. 32-33) . . . . . ***Praetermeta***

Key to the genera of the Tetragnathidae in Baltic amber (♂):

Remarks: Not included are two taxa which are described after juveniles only: ?*Eometa aberrans* and ?*E. robusta*, see below. Compare *Chrysometata* n. gen, Zygiellidae.

1 Lateral eyes widely spaced (fig. 1). Tibia of the ♂-pedipalpus short (e.g. figs. 3,21). . 2

- Lateral eyes close together (e.g. fig.14). Tibia of the ♂-pedipalpus long (e.g. figs. 7, 26). 3

2(1) ♂-pedipalpus (figs. 2-3): Cymbium with dorsal cuspule-bearing outgrowths, paracymbium outstanding and complicated, conductor very long. . . . . ***Anameta***

- ♂-pedipalpus (figs. 12, 17-18): Cymbium without cuspules, paracymbium simple, slender and close to the cymbium, conductor short . . . . . ***Eometa***

3(1) ♂-pedipalpus (figs.26-28): Tibia with a large proapical apophysis. . . . . ***Priscometa***

- ♂-pedipalpus: Tibia without a large proapical apophysis. 4

4(3) Metatarsus I-II with a pair of dorsal-basal bristles (fig. 4), at least tibia and/or metatarsus I or II ventrally with two rows of short spines (fig. 10), cymbium with a simple erect dorsal outgrowth (figs. 6-7). . . . . ***Corneometa***

- Metatarsus I-II with a single dorsal-basal bristle (fig. 31), legs I-II without short spines, cymbium with a divided dorsal otgrowth (figs. 32-33). . . . . ***Praetermeta***

DESCRIPTION OF THE NEW TAXA

Anameta n.gen.

Diagnosis(♂; ♀ unknown): Clypeus long; lateral eyes widely spaced (fig.1), ♂-pedipalpus (figs. 2-3): Cymbium with a dorsal outgrowth and some hooks, paracymbium large, outstanding and complicated, probably a free sclerite, conductor large, divided and with a broad apophysis, embolus long and thin.

The **relationships** are unsure: In contrast to the other fossil taxa of the Tetragnathidae the clypeus is longer and long erect ventral hairs of the articles of the anterior legs are absent. *Eometa* has a similar eye position but in *Eometa* the structures of the pedipalpus are quite different. - Similar cymbial cuspules are present in the family Pimoidae, compare the paper on this family in this volume.

Type species: *Anameta distenda* n.gen.n.sp. (the only known species of the genus).

Distribution: Tertiary Baltic amber forest, Bitterfeld locality.

***Anameta distenda* n.gen.n.sp.** (Figs.1-3)

Material: Holotype (♂) in Baltic amber from the Bitterfeld locality, F39/BB/AR/TET/CJW.

Preservation and syninclusions: The spider is fairly well preserved and not covered by an emulsion. Cut off are the distal part of the opisthosoma, the left legs I, II and IV at the end of the tibia as well as the right leg II at the end of the femur; partly cut off are the right leg I and the left leg III. A muddiness is laying between the right femora III and IV, a lightning area is laying right of the spider. Some stellate hairs near the spider.

Diagnosis (♂; ♀unknown): Opisthosoma 1.7 times longer than wide. ♂-pedipalpus (figs. 2-3): Cymbium with a high outgrowth which bears some cuspules dorsally, and a isolated retrolateral cuspule on a small outgrowth.

Description (♂):
Measurments (in mm): Body lenght about 4.0, prosoma lenght 2.0, femur I 2.4, metatarsus IV 1.45.
Colour yellow brown, legs partly dark brown.
Prosoma (fig.1) longer than wde, nearly hairless, with a deep fovea. Clypeus distinctly concave, nearly as long as the field of the median eyes. Posterior eye row recurved, lateral eyes widely spaced, posterior median eyes largest, anterior median eyes smallest. Chelicerae long, divergent distally, anterior margin of the furrow bearing 2 or 3 long teeth. Sternum small prolongated between coxae IV. – Legs – most parts are cut off – long, its order I/II/IV/III, bearing numerous bristles, femora dorsally and laterally, femur I 2 thin bristles dorsally in the basal half, 3 retrolateral and 1 prolateral, tibia I 2 dorsally and at least 3 pairs laterally, all are long. Patellae dorsally 1 short basally and 1 long distally. Metatarsi III-IV 1 dorsally-basally and 1 prolaterally. Coxa I strongly protuding ventrally (similar to other Tetragnathidae). Unpaired tarsal claw long and strongly bent. – Opisthosoma – it is cut off distally - 1.7 times longer than wide, with short hairs. – ♂-pedipalpus (figs.2-3, compare above): Femur with a ventral-apical outgrowth similar to *Eometa* (fig.27), patella about long as wide, distally a thin bristle, tibia distinctly longer than wide, probably apophyses are present which are not observable in this position. Paracymbium large, probably a free sclerite, outstanding, subtegulum large, embolus long and thin, partly in contact with the divided conductor.

Relationships: See above.

Distribution: Tertiary Baltic amber forest, Bitterfeld deposit.

***Corneometa* n.gen**

(Remark: A female was found during the press, F1339/CJW, body length 6.2mm, leg thorns are absent).

Diagnosis (♂; ♀ unknown): Femur/tibia/metatarsus I(II) with ventral/prolateral thorns and long ventral hairs (e.g. fig.10), all leg articles except tarsi and basal articles with bristles, metatarsi I-II with a pair of bristles dorsally-basally, femur and tibia I bent, posterior eye row +/- straight. ♂-pedipalpus (figs. 6-7, 11-12): Cymbium dorsally with a long horn similar to the Leucauginae, paracymbium long. Largest known Tetragnathidae in Baltic amber: Length of the ♂-body +/- 5.6mm.

Relationships: According to the ventral thorns of the ♂-leg I there are relationships to *Priscometa* PETRUNKEVITCH 1958. In Priscometa a horn of the cymbium is absent and the bulbus structures are distinctly different. – Also in *Diphya* NICOLET 1849 (extant) there are prolateral thorns on the anterior legs but the eye position and the bulbus structures are different.

Type species: *Corneometa baltica* n.gen.n.sp.

Distribution: Tertiary Baltic amber forest.

***Corneometa baltica* n.gen.n.sp.** (Figs.10-13)

Material: Holotype ♂ in Baltic amber, F231/BB/AR/TET/ CJW.

Preservation and syninclusions: The spider is fairly well preserved, the left side with the legs is partly covered by an emulsion. The right third of the opisthosoma and most articles of the right legs are missing in the amber, also the left tarsus I is missing; the opisthosoma has probably been excavated by feeding. – An ant without its head is preserved in front of the spider, dorsally of the spider 2 large parts of an insect leg. Numerous stellate hairs and small bubbles.

Diagnosis (♂; ♀ unknown): Femur I 2.4 times longer than the prosoma, pedipalpus (figs.6-7): Tibia 3 times longer than high.

Description (♂):
Measurements (in mm): Body length 5.5, prosoma length 2.5, opisthosoma: Length 2.7, hight 1.2; leg I: Femur 6.0, patella 1.75, tibia 5.9, metatarsus 4.3, tibia III 1.5, chelicerae 1.15; pedipalpus: Femur 1.9, tibia 0.95, horn of the cymbium 0.8.
Colour medium- to dark brown, legs not annulated.
Prosoma distinctly longer than wide, few hairs. Eyes – largely hidden – fairly large,

posterior row +/- straight. Clypeus slightly longer than the diameter of the anterior median eyes. Chelicerae large. – Legs (figs. 4-5) long, especially I; III distinctly the shortest. Femur and tibia I distinctly bent, tibia I especially ventrally with numerous long hairs. Ventral spines of legs I-II not well visible; at least tibia I in the middle proventrally 3 short spines, compare fig.10; probably more spines are present under tibia and metatarsus I which are covered by an emulsion. Thin bristles are present on all articles except tarsi – very long on III and IV -, tibia I-II with dorsal, ventral and lateral bristles, metatarsi with several dorsal and lateral bristles. Tarsal claws I (fig. 5): Unpaired claw +/- long as the paired claws, bent in a right angle. – Opisthosoma 2.4 times longer than wide, few short hairs. – ♂-pedipalpus (figs. 6-7): Femur 6.3 times longer than high, patella and tibia with a thin dorsal-distal bristle each, tibia 3 times longer than high, cymbium high, with a long, slender and erect horn basally-dorsally which is bent retrolaterally. Paracymbium large and strongly bent, embolus fairly long.

Relationships: In *pilosipes* the opisthosoma is only 1.6 times longer than high, femur I is only 1.65 times longer than the prosoma and the tibia of the ♂-pedipalpus is only 1.6 times longer than high. Furthermore there may be differences regarding the short spines of legs I-II.

Distribution: Tertiary Baltic amber forest.

***Corneometa pilosipes* n.gen.n.sp.** (Figs. 8-11)

Material: Holotype ♂ in Baltic amber and 2 separated amber pieces, Mus. Nat. d'Hist. Nat. Paris, Lab. d'Entom. Nr. 482.

Preservation and syninclusions: The spider is completely and well preserved but – especially ventrally – strongly covered by an emulsion. The legs are curved under the body, the pedipalpi are bend under the chelicerae. – In the same amber piece are also preserved a larva of a Cicadina, 1 Collembola, 1 Nematocera, 1 Acari, stellate hairs and small bubbles. In the separated amber piece are 1 Hymenoptera, some Diptera, numerous stellate hairs and small bubles preserved.

Diagnosis (♂; ♀ unknown): Opisthosoma 1.6 times longer than high, femur I 1.65 times longer than the prosoma, tibia of the ♂-pedipalpus 1.6 times longer than high (fig.11).

Description (♂):
Measurements (in mm): Body length 5.7, prosoma: Length 2.65, width 2.0, opisthosoma: length 3.5, width 2.2, hight 2.0; leg I: Femur 4.4, patella +/-1.1, tibia 3.8, metatarsus 5.6, tarsus 1.1, tibia II 2.65, tibia III 1.3, tibia IV 2.2.
Colour dark brown, legs not annulated.

Prosoma (fig. 8) distinctly longer than wide, with a lerge fovea, few hairs. Eyes fairly large, field fairly wide, posterior row +/- straight, posterior median eyes separated nearly by its radius. Chelicerae apparently large. – Legs (figs. 9-10) long, especially I, III clearly the shortest, femur and tibia I distinctly bent, femur I prolaterally and tibia I – especially ventrally – covered with numerous long hairs. At least metatarsus I (fig.10) with short spines. Bristles on all articles except tarsi; long especially on III-IV. Tibiae and metatarsi with dorsal and lateral bristles. – Opisthosoma 1.6 times longer than high, few and short hairs only. – ♂-pedipalpus (fig.11): Femur long, tibia about 1.6 times longer than high, cymbium dorsally-basally with a long, slender and erect horn, paracymbium long (outgrowths are not observable), bulbus fairly small, conductor large.

Relationships: See *C. baltica*.

Distribution: Tertiary Baltic amber forest.

Eometa PETRUNKEVITCH 1958

Diagnosis (♂; ♀ unknown): Metatarsi I-II dorsally-basally with a pair of bristles (fig.19), III-IV additionally with a bristle retrolaterally in the distal half. Eyes (fig.22): Posterior row distinctly recurved, lateral eyes widely spaced. Clypeus about as long as the field of the median eyes. ♂-pedipalpus (figs.12,17-18,21): Femur ventrally-apically with an outgrowth, tibia at least in some species with a ventral outgrowth (fig.21), cymbium with a large dorsal outgrowth, paracymbium used to the cymbium, without outgrowth, embolus short and thick.

Relationships: According to the widely spaced lateral eyes and the ♂ genital structures there are relationships to *Anameta*, compare above. After the eye position there are also relationships to the extant genus *Diphya* (Diphyinae, S-America, SE-Asia), compare TANIKAWA (1995). In *Diphya* the anterior median eyes are distinctly smaller than the other eyes, tibia and metatarsus I-II bear prolateral bristles or spines/"thorns" and the shape of the paracymbium is different. In *Corneometa* and *Priscometa* the anterior median eyes are larger, the lateral eyes are close together, there are prolateral spines on leg I and the bulbus structures are clearly different; in *Priscometa* a large prodistal tibial apophysis of the ♂-pedipalpus is present.

Type species: *Eometa samlandica* PETRUNKEVITCH 1958.

Distribution: Tertiary Baltic amber forest.

Remarks on two nominal species of *Eometa*: *E. aberrans* PETRUNKEVITCH 1958 and *E. robusta* PETRUNKEVITCH 1958 were described after juveniles. After its poste-

rior eye row which is not recurved are these nominal *Eometa* species not members of this genus. Its relationships are quite unsure (?Araneidae, ?Tetragnathidae), and I regard the two as dubious species of the superfamily Araneoidea.

Provisoric key to the species of the genus *Eometa* (♂):

1 Pedipalpus as in fig.23, dorsal outgrowth of the cymbium distinctly divided. . . . . ***samlandica***

- pedipalpus as in fig.13, dorsal outgrowth of the cymbium distinctly divided. . . ***longipes***

- dorsal outgrowth of the cymbium indistinctly divided (e.g. fig.12). 2

2(1) dorsal outgrowth of the cymbium very high (fig.12). . . . . ***calefacta***

- dorsal outgrowth of the cymbium lower and longer (figs.16,21). 3

3(2) dorsal outgrowth of the cymbium moderately high, very long (figs.20-21). . ***perfecta***

- dorsal outgrowth of the cymbium low (fig.16). . . . . ***occulta***

***Eometa calefacta* n.sp.** (Fig.12)

Material: Holotype ♂ in Baltic amber and 5 separated amber pieces, F232/BB/AR/TET/CJW.

Preservation and syninclusions: The spider is fairly well and completely preserved. The amber piece has probably been heated in an autoclave. There is no emulsion on the body, the right legs II and III are broken off with a part of the amber, and some free pyrite crystals are observable. The right femur IV is cut off at the end. – In front of the

left tarsus I a small Nematocera is preserved, ventrally a second Nematocera. Two of the separated amber pieces contain 1 further Nematocera each; no stellate hairs.

Diagnosis (♂; ♀ unknown): Dorsal outgrowth of the cymbium unusually high (fig.12).

Description (♂):
Measurements (in mm): Body length 3.0, prosoma length 1.35; leg I: Femur 2.1, patella 0.6, tibia 1.75, metatarsus 2.0, tarsus 0.9, tibia II 1.3; length of the median prolateral bristle of tibia I 0.45.
Colour (compare above) mainly dark brown, opisthosoma ventrally medium brown.
Prosoma and legs similar to *perfecta* (compare below). Femur I bears 8 bristle (the same as in other conspecific specimens?). – Opisthosoma 1.65 times longer than high, very few hairs, dorsally hardened? - ♂-pedipalpus (fig.12): Compare above (it is not well preserved).

Relationships: In the related species the cymbial outgrowth is lower.

Distribution: Tertiary Baltic amber forest.

Eometa longipes PETRUNKEVITCH 1958 (Fig.13)

Material: Not studied.

According to PETRUNKEVITCH leg I is 7 times longer than the prosoma, the tarsal claw III is unusually long and the prosoma is slightly wider than long. I doubt at least the last statement because in the *Eometa* specimens known to me the prosoma is at least as long as wide, usually longer. Furthermore after PETRUNKEVITCH there is only one – probasal – bristle on metatarsus I but in all *Eometa* specimens known to me there is a pair of basal metatarsal bristles (fig.19). ♂-pedipalpus: Fig. 13.

Distribution: Tertiary Baltic amber forest.

***Eometa occulta* n.sp.** (Figs. 14-18) Photo 118

Material: Holotype ♂ in Baltic amber and 1 separated amber piece, F61/BB/AR/TET/

CJW.

Preservation and syninclusions: The spider is well and completely preserved, the left side is fairly covered by an emulsion, especially the cymbia. A bubble each is preserved between the left femur I and the prosoma and between prosoma and the left side of the opisthosoma. The first leg pair is streched foreward. – One small excrement ball and some stellate hairs.

Diagnosis (♂; ♀ unknown): Dorsal outgrowth of the cymbium low (fig.16), paracymbium small, bulbus: Figs.16-18.

Description (♂):
Measurements (in mm): Body length 2.1, prosoma length 1.0; leg I: Femur 1.45, patella 0.5, tibia 1.4, metatarsus 1.5, tarsus 0.75, tibia II 1.0, tibia III about 0.65, tibia IV 0.85.
Colour mainly light brown, opisthosoma yellow brown.
Prosoma – most parts are hidden -: Clypeus slightly longer than the diameter of an anterior median eye, eyes of the anterior row fairly large, close together, anterior median eyes not protuding. Chelicerae large and robust, gnathocoxae wide also apically, sternum wide, separating coxae IV by half of its width. – Legs (figs.14-15) robust, hairs indistinct, its order I/II/IV/III; I distinctly the largest. Bristles numerous and fairly long, the median prolateral bristle on tibia I nearly twice the diameter of the tibia. Femora: I 4 prolateral bristles, 2 retrolaterally, II 1 prolaterally and 2 retrolaterally, left additionally 1 dorsal in the middle; III and IV similar, patellae 2 dorsally, tibiae 2 dorsally as well some laterally, metatarsi 1 dorsal-lateral pair near the base, III and IV additional 1 retrolaterally distal of the middle. Metatarsal trichobothria short and indistinct, its position in about 0.17. – Opisthosoma weakly covered with very short hairs, a bit more than 1 ½ times longer than wide; spinnerets short (mainly hidden). – ♂-pedipalpus (figs. 16-18) (compare above): Patella and tibia short. The wide sperm duct of the embolus well observable; seemingly with a sperm rest at the tip of the embolus.

Relationships: In E. perfecte the tibial bristles are longer – compare the figs. – and the outgrowth of the cymbium is longer.

Distribution: Tertiary Baltic amber forest.

***Eometa perfecta* n.sp.** (Figs. 19-21) Photos 116-117

Material: Holotype ♂ in Baltic amber and 3 separated amber pieces, F233/BB/AR/TET/CJW.

Preservation and syninclusions: The spider is completely and well preserved, the

pedipalpi perfectly. The ventral side is strongly covered by an emulsion, the opisthosoma is dorsally somewhat compressed. – In front of the left tibia I a larger „lightening" area is preserved, dorsally of the spider numerous bubbles. Numerous stellate hairs. A thin thread is running from the right femur II distally to the right femur IV, it bears no droplets but some stellate hairs. In one of the separated amber pieces is a small Nematocera preserved.

Diagnosis (♂; ♀ unknown): Tibial bristles (fig.19) long, ♂-pedipalpus (figs. 20-21) with a long outgrowth of the cymbium.

Description (♂):
Measurements (in mm): Body length 2.8, prosoma: Length 1.3, width 1.22, hight about the coxae 0.45; leg I: Femur 2.05, patella 0.6, tibia 1.6, metatarsus 2.0, tarsus 0.9, tibia II 1.25, tibia III 0.65, tibia IV 1.05, length of the median prolateral bristle on tibia I 0.41, length of the chelicerae 0.52.
Colour: Prosoma and legs dark brown, opisthosoma dorsally medium brown, seemingly legs not annulated.
Prosoma about as long as wide, smooth and hairless, with a deep and nearly circular fovea. Clypeus slightly longer than the diameter of the anterior median eyes. Eyes similar to fig. 22, posterior median eyes the largest, anterior median eyes slightly prominent, posterior row distinctly recurved, lateral eyes widely spaced. – Legs (fig.19) fairly long and robust, its order I/II/IV/III. Long and numerous bristles, the median prolateral bristle on tibia I 3 times longer than the tibial diameter. Femur I with 8 bristles, tibia I with 10, 2 of it ventrally, metatarsus I 1 basal pair. Tarsal claws small. – Opithosoma 1.37 times longer than wide, dorsally stronger sclerotized and with very few short hairs. – ♂-pedipalpus (figs.20-21, compare above): Tibia and patella short, patella with 1 dorsal bristle in the distal half. Femur and tibia apically-ventrally protuding.

Relationships: See *E. occulta* n.sp.

Distribution: Tertiary Baltic amber forest.

Eometa samlandica PETRUNKEVITCH 1958 (Figs.22-23)

Material: Holotype ♂ in Baltic amber, Mineral.-Geolog. Museum Kopenhagen; not seen.

Diagnosis (♂; ♀ unknown): Pedipalpus (fig.23): Cymbium dorsally with two outgrowths which are distinctly separated, paracymbium small, embolus large (bulbus structures not well observable).

Measurements (in mm): Body length 3.0, prosoma: Length 1.5, width 1.3, leg I (after

PETRUNKEVITCH (1958: 232): Femur 2.0, patella + tibia 2.4, metatarsus 2.3, tarsus 0.9

Relationships: In *perfecta* the dorsal cymbial outgrowths is only slightly divided.

Distribution: Tertiary Baltic amber forest.

Eometa sp. indet.1

Material: 1♂ in Baltic amber, F234/BB/AR/TET/CJW.

Opisthosoma and pedipalpi are partly covered by an emulsion. Probably there are relationships to *E. calefacta* n.sp.

Distribution: Tertiary Baltic amber forest.

Eometa sp. indet. 2 Photo 119

Material: 1♂ in Baltic amber, GPIH, coll. HERRLING.

The spider is well preserved and nearly complete; the opisthosoma is dorsally partly empty, the body is dorsally partly covered with an emulsion. The length of the prosoma is 1.6mm, the dorsal outgrowth of the cymbium is long. Under the left femur I a small ant is preserved.

Distribution: Tertiary Baltic amber forest.

Priscometa PETRUNKEVITCH 1958

Diagnosis (♂; ♀ unknown): Clypeus about as long as 2 diameters of the anterior median eyes (fig.24), tibia I with two rows of ventral thorns (*tenuipes*) or basally thickened hairs. ♂-pedipalpus (figs. 25-26): Tibia apically with a retrolateral hump and a large proapical apophysis which bears a tooth a its base, cymbium raised retrobasally (fig.28), paracymbium short and hairy, it may be a free sclerite, embolus/conductor large and bent.- Remark: PETRUNKEVITCH (1958) mistook the paracymbium as a tibial

apophysis.

Relationships: In *Eometa* ventral leg thorns are present as in *P. tenuipes* but in *Eometa* a large prodistal tibial apophysis of the ♂-pedipalpus is absent.

Type species: *Priscometa tenuipes* PETRUNKEVITCH 1958.

Ecology: Together with the holotype of *P. capta* n. sp. three Trichoptera are preserved. Therefore I suppose that at least members of this species preferred humid localities near a water in the Baltic amber forest.

Distribution: Tertiary Baltic amber forest.

***Priscometa tenuipes* PETRUNKEVITCH 1958** (figs. 24-26)

Material: Holotype ♂ in Baltic amber, Mineralogical and Geological Museum Copenhagen.

Diagnosis (♂; ♀ unknown): Ventral tibial thorns present, embolus/conductor directed foreward (fig.26) but some bulbus structures are not clear observable.

Measurements (in mm): Body length 3.43, prosoma length 1.43, width 1.4, femur I 3.3. Prosoma: Fig. 24.

Relationships: In the other fossil species ventral tibial thorns are absent (thickened hairs are present).

Distribution: Tertiary Baltic amber forest.

***Priscometa minor* n.sp.** (fig. 27) Photo 120

Material: Holotypus in Baltic amber, F226/BB/AR/TET/CJW.

Preservation and syninclusions: The spider is well but incompletely preserved, a weak emulsion covers the opisthosoma, the left side of the spider lays on an oxidated amber layer, only the left leg III and the right legs I, III and IV are complete. - Stellate hairs are absent in the amber piece.

Diagnosis (♂; ♀ unknown): Thickened ventral tibial I hairs present, pedipalpus: Fig. 27, femur ventrally-distally distinctly enlarged.

Description (♂):
Measurements (in mm): Body length 3.1, prosoma length 1.5, leg I: Femur 2.5, patella 0.75, tibia 2.3, metatarsus 2.6, tarsus 1.15, femur of the pedipalpus 1.1.
Colour: Prosoma and legs dark brown, opisthosoma grey brown.
Prosoma with short hairs, posterior eye row procurved, clypues about as long as 1 1/2 diameters of the anterior median eyes, fovea deep, chelicerae as long as the hight of the prosoma, basally thick and frontally convex, in the distal half slender, not diverging, teeth not observable, fang long. Gnathocoxae longer than wide, labium wider than long, distinctly rebordered, coxae IV separated by the sternum by less of 1/2 of its diameter. - Legs long and slender, tibia I with long ventral hairs and 2 rows of basally thickened ventral hairs. Bristles numerous, long and thin, femora 1-2 dorsally and a lateral pair distally, patellae 2 dorsally, tibia I 2 dorsally and 3 lateral pairs, metatarsus I 1 dorsal and 1 prolateral bristle near the base and a retrolateral one more distally. - Opisthosoma 1.7 times longer than high, covered with very short and indistinct hairs; spinnerets short. - Pedipalpus (fig.27): Femur long and slender, ventrally-distally distinctly enlarged, patella short, with a thin dorsal bristle, tibia long, with a thin dorsal-distal bristle and a large prolateral apophysis which bears a tooth at its base, paracymbium short, probably a free sclerite, tip of embolus/conductor directed prolaterally.

Relationships: In *P. capta* n.sp. paracymbium and distal bulbus sclerites are different, the femus of the ♂-pedipalpus is ventrally-apically not enlarged.

Distribution: Tertiary Baltic amber forest.

***Priscometa capta* n.sp.** (fig.28)

Material: Holotypus ♂ in Baltic amber and a separated amber piece, F227/BB/AR/TET/CJW.

Preservation and syninclusions: The spider is fairly well preserved, the left pedipalpus is well observable, a weak emulsion is preserved on the right side of body and legs. Only parts of the right leg IV and of the left tarsus II are cut off. - Furthermore are 3 Trichoptera and 6 Diptera: Nematocera as well as few stellate hairs and numerous nematoda-shaped Fungi preserved in the two amber pieces; some of the Fungi are in contact to legs of the spider and of a midge.

Diagnosis (♂; ♀ unknown): Thickened ventral tibial I hairs present, pedipalpus: Fig.28,

femur not thickned.

Description (♂):
Measurements (in mm): Body length 4.0, prosoma length about 2.1, leg I: Femur 3.0, patella 0.85, tibia 2.9, metatarsus 3.25, tarsus 1.25, tibia II 2.2, tibia III 1.1, tibia IV 1.4.
Colour light brown.
Prosoma similar to *P. minor* n.sp. but chelicerae not so slender in the distal half. - Legs, opisthosoma and pedipalpus also similar to *P. minor* but femur of the pedipalpus and distal bulbus structures are different.

Relationships: Compare the smaller *P. minor*.

Distribution: Tertiary Baltic amber forest.

***Praetermeta* n. gen.**

Diagnosis (♂; ♀ unknown): Femora and tibiae with numerous bristles (figs. 30-31), metatarsus I-II with a single dorsal-basal bristle, chelicerae with slender teeth on both margins and an oblique frontal-distal tooth (arrow in fig. 29); pedipalpus (figs. 32-34): Tibia short and with a retroapical apophysis, cymbium turned to a medial position, with a large and divided dorsal outgrowth, paracymbium long and hairy, embolus long and slender, its position in a wide circle, a terminal apophysis is not observable.

Relationships: I do not know a closely related genus; the position of the embolus is unusual in the Tetragnathidae. According to the tibial apophysis of the male pedipalpus and the cymbial outgrowths - which are similar to *Meta* C. L. KOCH - *Praetermeta* is probably a member of the subfamilies Metinae or Diphyinae.

Type species: *Praetermeta velans* n.sp.

Distribution: Tertiary Baltic amber forest.

***Praetermeta velans* n.gen.n.sp.** (figs. 29-34)

Material: Holotypus ♂ in Baltic amber, F341/BB/AR/TET/CJW.

Preservation and syninclusions: A bubble and an emulsion cover most parts of the prosoma, the opisthosoma and several leg articles are cut off, completely or nearly

completely preserved are the left legs I-III and the right legs I-II. Parts of the pedipalpi are covered by a white emulsion. - No stellate hairs.

Diagnosis: See the genus diagnosis.

Description (♂):
Measurements (in mm): Prosoma length about 2mm, leg I: Femur 0.33, patella 0.1, tibia 0.35, metatarsus 0.35, tarsus 0.15, tibia II 0.25, tarsus + metatarsus III 0.2, tarsus + metatarsus IV 0.21.
Colour light brown.
Prosoma (fig. 29, most parts are hidden): Eyes in two rows, lateral eyes close together, clypeus short; cheliceral teeth: See the genus diagnosis. - Legs (figs. 30-31) hairy and with numerous long bristles, femur I 11, patellae only a dorsal-apical bristle and a dorsal-basal hair, tibia I with 3 pairs of lateral bristles and a dorsal bristle near the middle, metatarsi with a single dorsal-basal bristle. Metatarsal trichobothria short, its position near the base of the article. Paired tarsal claws toothed, unpaired claw bent in a right angle. - Opisthosoma cut off. - Pedipalpus (figs. 32-34; see the diagnosis): Patella short and with a weak dorsal-distal bristle, tibia with at least 3 trichobothria and several long retrodistal hairs, cymbium distally with an irregular row of tiny and strongly curved hairs.

Relationships: See above.

Distribution: Tertiary Baltic amber forest.

B. Zygiellidae (n. stat.) (Missing Sector Orbweavers; German: "Sektor-Spinnen")

Zygielleae SIMON 1929

Diagnosis: Capture web with a free sector (fig. 36) (few exceptions), paracymbium stronger sclerotized and a +/- free sclerite (figs. 38, 50), (in Chrysometinae a free sclerite), embolus and terminal apophysis in a distal and usually close position.

Further characters: No distinct sexual size dimorphism, eye field narrow; ♂: opisthosoma soft, leg I not modified, no outgrowth of the gnathocoxa except in *Leviellus,* no outgrowth of coxa I, pedipalpal patellar bristle usually unpaired; scapus of the

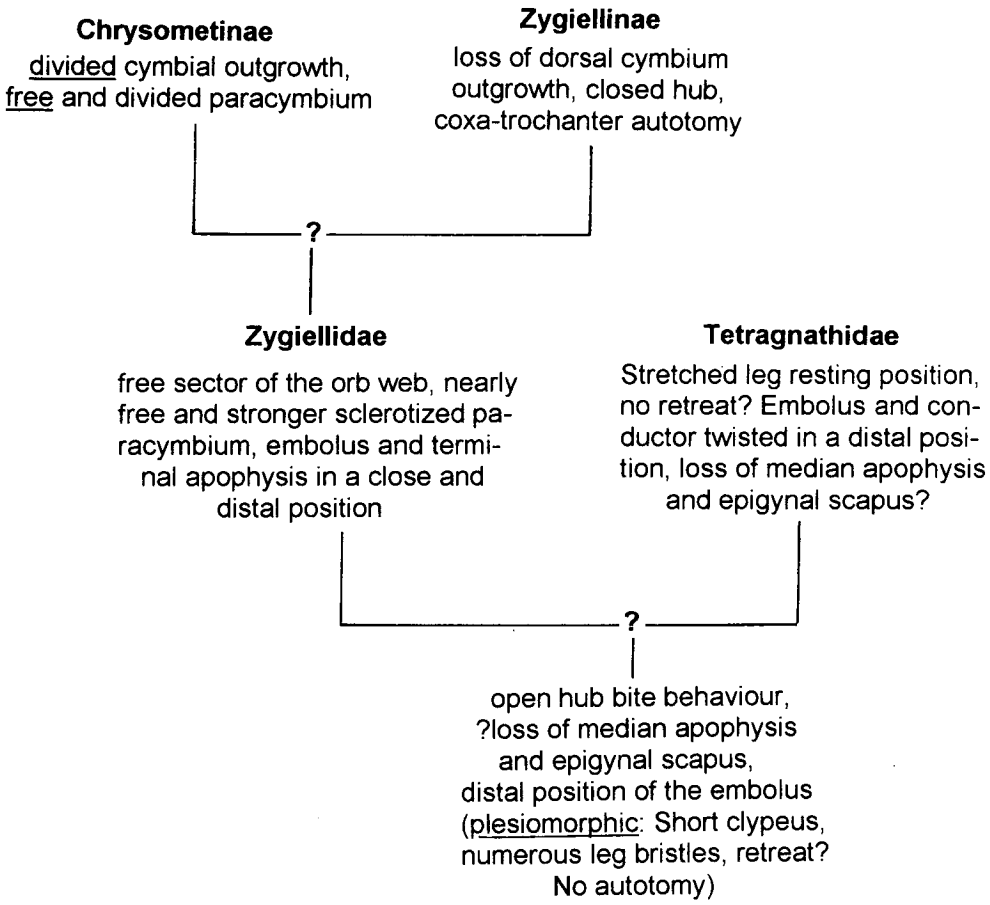
epigyne, tegular/median apophysis and terminal apophysis present or absent, bulbus and cymbium not turned. Leg autotomy between coxa and trochanter frequent except in *Chrysometa*, in about 60% of the fossil Zygiellinae which were studied by me. Sustentaculum - e.g. in *Zygiella x-notata* (CLERCK) - with a distinctly bent tip as in most Araneidae. Weak furrows of the lung covers may be present, e. g. in *Zygiella x-notata*. Position of the triad spigots according to K. SCHÜTT, pers. commun. as in other Araneoidea in contrast to the Araneidae, retreat and signal line of the capture web present, no stretched leg resting position.

Relationships: According to the presence of an orb web and the short clypeus there are relationships to the Araneidae and the Tetragnathidae. According to the distal position of the embolus with the terminal apophysis as well as the open hub and the dorsal outgrowth of the cymbium in the Chrysometinae exist relationships to the Tetragnathidae. In contrast to Araneidae and Tetragnathidae there is an free sector in the capture web of the Zygiellidae. In contrast to most Araneidae Zygiellidae possesses furthermore an unpaired patellar bristle of the male pedipalpus (rarely so in Araneidae, e. g. in *Mangora*), a +/- free paracymbium, a soft male opisthosoma, a different position of the triad spigots (similar in *Mangora*), a sexual size dimorphism is absent as e. g. in *Mangora* and *Singa* bulbus abd cymbium are not turned. In contrast to the Tetragnathidae there is no stretched leg resting position in the Zygiellidae but a retreat is present, the chelicerae are only of medium size, a coxa-trochanter autotomy is present, a tegular/median apophysis is basicly present, and the embolus is not twisted with the conductor. In the fossil Protheridiidae n. fam. - see the paper on the superfamily Araneoidea in this volume - the eye field is wide, the paracymbium is completely fixed to the cymbium and the bulbus structures are quite different.
Zygiella s. l. has traditionally been regarded as a member of the family Araneidae, e. g. by WIEHLE and PIEL & NUTT (1997), but LEVI (1980: 8) regarded it as a member of the Metinae of his Araneidae in a wide sense; see also the papers of GRISWOLD et al. (1998), SCHARFF & CODDINGTON (1997) and the catalogues of Araneae of PLATNICK. LEHTINEN et al. (1979: 41) regarded "*Zygiella" stroemi* THORELL as a member of the Araneidae but *Zygiella atrica* (C. L. KOCH) as a member of "Metidae". I know no other taxa than *Chrysometa* and Zygiellinae which construct a capture web with such an unique free sector. *Zygiella* and related taxa fit neither in the Araneidae nor in the Tetragnathidae; therefore I upgrade the Zygiellini SIMON 1929 (= Zygielleae) from tribus to family level. According to the free sector of the capture web, the free paracymbium and the distal position of embolus + terminal apophysis and occasionally the presence of a tegular/"median" apophysis I regard *Chrysometa*/Chrysometinae as the possible sister group of the Zygiellinae. Zygiellidae may be the sister group of the Tetragnathidae, see the cladogram. The sister group of Tetragnathidae + Zygiellidae is unknown, it may be the Araneidae (+ related families?) or Linyphiidae + Pimoidae (?+ Mimetidae).

According to the bad preservation of the material the relationships of the family Juraraneidae ESKOV 1984 - Siberian Jurassic - are quite unsure, see WUNDERLICH (1986: 95).

Subfamilies: Chrysometinae n. subfam. (monotypic) and the nominate subfamily Zygiellinae SIMON 1929.

Distribution: Nearly cosmopolitic; see below (the subfamilies).



Probable relationships of the Chrysometinae and the Zygiellinae

(1) Zygiellinae (n. stat.)

Zygielleae SIMON 1929

Diagnosis (compare the family diagnosis): Distinct coxa-trochanter autotomy and denticles in the cheliceral furrow present, no dorsal cymbial outgrowth, usually two tegular apophyses present; closed hub of the capture web.

Relationships: In the probably related Chrysometinae a free (moovable) paracymbium and a divided dorsal cymbial outgrowth are present, the cymbium is apically +/- excavate, denticles in the cheliceral furrow and a distinct coxa-trochanter autotomy are absent, the hub of the capture web is open; one tegular apophysis may be present.

Genera: Extant: *Leviellus* n. gen., *Parazygiella* n. gen., *Stroemiellus* and *Zygiella* F. O. PICKARD-CAMBRIDGE 1902; fossil and extinct (Baltic amber forest probably the deposit "Grube Messel" in SW-Germany, see WUNDERLICH (1986a)): *Eozygiella* n. gen. and *Graea* THORELL 1969 (= *Eustaloides* PETRUNKEVITCH 1942). - Unclear are the relationships of such species in which only the female is known and which may be members of the family Araneidae - see LEVI (1974) -: *Calyptrata* (WORKMAN 1894) and *melanocrania* (THORELL 1887) from SE-Asia, *poriensis* LEVY 1987 from Israel.
Aranea (Zilla) sia STRAND 1906 is a member of *Yaginumia* ARCHER 1960 (?Araneidae). - Synonym: Guizygiellinae ZHU et al. 2003 (**n. syn.**) from China. According to ZHU et al. (2003: 332) *Guizygiella* ZHU et a. 2003 is related to *Zygiella*. The genus fits well in the Zygiellinae, the paired patellar bristle is different to the remaining genera (as in *Yaginumia*); the relationships of *Guizygiella* and *Yaginumia* have to clear up.

Distribution: Extant: Holarctic (but compare the questionable species); *Zygiella x-notata* is nowadays nearly cosmopolitical distributed. Fossil/extinct: Early Tertiary Baltic amber forest and probably Early Tertiary deposit of the "Grube Messel" in SW-Germany, see WUNDERLICH (1986a), and probably in Cretaceous Lebanese amber, see fig. 69 and the paper on the family Linyphiidae in these volumes.

The **body size** of the fossil Zygiellinae in the male sex is 3-4mm; in the extant species the body is twice as large and there are no small spiders with the only exception of *Zygiella minima* from the Canary Islands which is very variable and may be smaller. Probably there was increase in the body size during the Tertiary.

Selected characters of the genera of the Zygiellinae excl. *Eozygiella* and *Guizygiella* (see also *Yaginumia*):

Character	*Zygiella*	†*Graea*	*Parazygiella*	*Leviellus*	*Stroemiellus*
hook of the ♂-gnathocoxa	-	-	-	+ (fig.58)	-

epigynal scapus	-	- (fig.47)	-	+	long
terminal apophysis	-	+?	+	+	+
small bulbus	+	-	-	-	-
apically strongly widened embolus	-	-	-	-	+ (fig.40)
very large conductor	-	+ (fig.43)	-	-	-
species	*atrica, keyserlingi, minima, x-notata*	fossil species in Baltic amber	*carpenteri, dispar, montana*	*caspica, inconveniens, kochi thorelli*	*stroemi*
distribution	palearctic	w-palearctic	holarctic	w-palearctic	palearctic

Graea THORELL 1869

Synonym: *Eustaloides* PETRUNKEVITCH 1942 **n. syn**.

Synonymy: I studied the holotype (♂), of the type species of *Graea*, *Gaea epeiroidea* KOCH & BERENDT 1854, which is preserved in Baltic amber and is kept in the Museum für Naturkunde in Berlin, MB.A 1048. According to the pedipalpus *Graea* - type species *Eustaloides setosus* PETRUNKEVITCH 1942 in Baltic amber, see figs. 44-45, 67-68 - and is an older synonym of *Eustaloides* PETRUNKEVITCH 1942. I do not want to exclude that *setosus* is a junior synonym of *epeiroidea* but most parts of the bulbus structures of the holotype of *epeiroidea* are hidden by a white emulsion, and the conspecifity is therefore quite unsure. - Remark: The male which has been published by PETRUNKEVITCH (1950: Fig. 82) sub *Eustaloides setosus* has a short tibia of the pedipalpus and is surely not conspecific with the holotype.

Diagnosis: ♂-pedipalpus (e.g. figs. 43-44): Tibia with several bristle-shaped hairs, patella with a long bristle in a dorsal-distal position and a short to long basal bristle, conductor very large, terminal apophysis probably present (fig. 43-44), scapus of the epigyne absent (fig. 47).

Relationships: See the tab.; *Zygiella* and *Eozygiella* may be the closest relatives.

Type species: *Gaea epeiroidea* KOCH & BERENDT 1854, fossil in Baltic amber.

Further species: All fossil species in Baltic amber sub *Gea* sensu KOCH & BERENDT, *Eustaloides* sensu PETRUNKEVITCH and probably unnamed species from the deposit "Grube Messel" in SW-Germany, see WUNDERLICH (1986a).
Remark: According to MENGE in KOCH & BERENDT (1854) *Zilla porrecta, gracilis* and *veteranica* KOCH & BERENDT (1854) are members of the family Theridiidae.
Nomina nuda of fossil species in Baltic amber are *Zilla cornumana* MENGE in KOCH & BERENDT 1854 and *Zilla spinipalpa* MENGE in KOCH & BERENDT 1854.

Distribution: Early Tertiary Baltic amber forest, probably Early Tertiary deposit "Grube Messel" near Darmstadt, see WUNDERLICH (1986a), and most probably Cretaceous Lebanese amber, see the paper on the family Linyphiidae in these volumes.

Key to the species of the genus *Graea* which are dealt with in this paper:

1 Metatarsus IV bears 4 bristles in a (retro)dorsal position. Tibia of the ♂-pedipalpus (fig. 60) as wide as long, not longer than the patella. . . . . *aberrans*

- Metatarsus IV bears 2 bristles in a redrodorsal position. Tibia of the ♂-pedipalpus longer than wide and distinctly longer than the patella, e.g. fig. 64. 2

2(1) Tibia of the male pedipalpus about 1.5 times longer than wide (fig. 44-45, 67-68); the ventral aspect of the bulbus of the holotype is unknown. . . . . *setosa*

- Tibia of the male pedipalpus shorter (fig. 64). 3

3(2) Embolus long (figs. 43, 65-66). 4

- Embolus short and thick (figs. 62-63). 6

4(3) Embolus apically tongue-shaped (figs. 65-66). 5

- Embolus apically thin (fig. 43). . . . . *impudica*

5(4) Conductor very large, embolus longer (fig. 66). . . . . *lingula*

- conductor smaller, embolus shorter (fig. 65). . . . . *brevis*

6(3) Embolus as in fig. 62, conductor large and denticulate. . . . . *bitterfeldensis*

- Embolus as in fig. 63, conductor smaller, not denticulate. . . . . *breviembolus*

?***Graea aberrans* n. sp**. (figs. 59-60)

Material: Holotypus ♂ in Baltic amber, F552/BB/AR/ZYG/CJW.

Preservation and syninclusions: The spider is fairly well but incompletely preserved, the right leg III is broken off behind the coxa (autotomy), the right legs I, II and IV are cut off through the femora, tarsi and metatarsi I and II are present; the opisthosoma is dorsally slightly cut off, the right side is injured - probably an insect has feeded on it at the resin - and the opisthosoma is centrally covered by a white emulsion. Parts of legs, mouth parts and pedipalpi are also covered by a white emulsion. - A stellate hair is preserved right of the right pedipalpus.

Diagnosis (♂; ♀ unknown): Metatarsus IV bears 4 bristles. Pedipalpus (figs. 59-60): Tibia as long as wide, patella with two long bristles, embolus long and thin (not observable in the figs.).

Description (♂):
Measurements (in mm): Body length 3.5, prosoma length 1.8, tibia II 1.6.
Colour: Prosoma and legs medium brown, opisthosoma yellow brown.
Body and legs similar to *impudica*, eyes as in fig. 59. The opisthosoma bears at least 3 pairs of sigillae, metatarsus IV bears 4 bristles in a retrodorsal position.

Relationships: See the key. In the other fossil species of the genus *Graea* metatarsus IV bears only two retrodorsal bristles and the tibia of the ♂-pedipalpus is longer.

Distribution: Tertiary Baltic amber forest.

***Graea bitterfeldensis* n. sp**. (figs. 61-62) Photo 124

Material: Holotypus ♂ in Baltic amber from Bitterfeld, coll. H. GRABENHORST no. AR-56, Geolog.-Palaeontol. Institute University Hamburg.

Preservation and syninclusions: The spider is well and nearly completely preserved, only the dorsal surface of the opisthosoma and the right tarsus I are cut off; ventral parts of the opisthosoma are covered by a white emulsion, two bubbles cover the mouth parts. - Few stellate hairs.

Diagnosis (♂; ♀ unknown): Pedipalpus (figs. 61-62): The patella bears only one large bristle in a dorsal-distal position. Tibia short, conductor large and denticulate, embolus short and slightly bent.

Description (♂):
Measurements (in mm): Body length 3.1, prosoma: Length 1.75, width 1.4, femur I 1.9, tibia I 1.0, metatarsus II 1.55, tarsus II 0.52.
Colour medium to dark brown, legs probably annulated.
Body and legs similar to *impudica*. Metatarsus IV bears 2 retrodorsal bristles. Pedipalpus: See above.

Relationships: See the key and *G. breviembolus* n. sp.

Distribution: Tertiary Baltic amber forest, the Bitterfeld deposit.

***Graea breviembolus* n. sp.** (fig. 63)

Material: Holotypus ♂ in Baltic amber from Bitterfeld, F551/BB/AR/ZYG/CJW.

Preservation and syninclusions: The spider is excellently preserved, both legs II are broken off behind the coxa (autotomy) and lost, the dorsal-distal surface of the right tibia I is cut off. - Some stellate hairs.

Diagnosis (♂; ♀ unknown): Pedipalpus (fig. 63): The patella bears only one long bristle in a distal position (the basal bristle is distinctly shorter). Tibia relatively short, conductor only fairly large and not denticulate.

Description (♂):
Measurements (in mm): Body length 3.0, prosoma length 1.6, tibia I 1.6.
Colour yellow to dark brown.
Body and legs similar to *impudica*, the opisthosoma bears 4 pairs of sigillae, metatarsus IV bears 2 retrodorsal bristles.

Relationships: See the key. According to the short and thick embolus *G. bitterfeldensis* is most related.

Distribution: Tertiary Baltic amber forest, the Bitterfeld deposit.

***Graea brevis* n. sp.** (figs. 64-65)

Material: Holotypus ♂ in Baltic amber, F548/BB/AR/ZYG/CJW.

Preservation and syninclusions: The amber piece was probably heated. The spider is well and nearly completely preserved, only the apical part of the right femur I is cut off; the ventral side of body and legs is covered by a white emulsion. - Three long and slender legs of a Diptera, numerous stellate hairs and several questionable mammal's hairs are preserved in the same amber piece.

Diagnosis (♂; ♀ unknown): Pedipalpus (figs. 64-65): Tibia of medium length, embolus of medium length and apically tongue-shaped.

Description (♂):
Measurements (in mm): Body length 3.4, prosoma length 1.65,femur I 2.2,tibia I 1.9.
Colour: Prosoma and legs dark brown, opisthosoma yellow brown.
Body and legs similar to *impudica*; metatarsus IV bears 1-2 retrodorsal bristles.
Pedipalpus: See above. There are 3 left and 2 right patellar bristles.

Relationships: See the key and *G. lingula* n. sp.

Distribution: Tertiary Baltic amber forest.

***Graea impudica* n. sp.** (figs. 41-43)

Material: Holotypus ♂ in Baltic amber and a separated amber piece, F244/BB/AR/ZYG/CJW.

Preservation and syninclusions: The spider is incompletely preserved, the prodorsal part of the opisthosoma and several distal leg articles are cut off, the leg pairs III and IV are complete, a white emulsion covers frontal and ventral parts of the spider, the bulbus structures are well preserved and best observable. - A bubble is present on the left dorsal side of the opisthosoma; few stellate hairs.

Diagnosis (♂;♀ unknown): Pedipalpus (figs. 42-43): Embolus very long, conductor very large, with a retrolateral hook; a skinny outgrowth may be the terminal apophysis; tegular (?median) apophysis divided.

Description (♂):
Measurements (in mm): Body length 3.5, prosoma: Length 1.8, width 1.4, femur I 2.0, tibia II 1.3, tibia III 0.6, tibia IV 1.05.
Colour yellow brown.
Prosoma 1.3 times longer than wide, covered with few longer hairs, with a large thoracal groove and a short clypeus. 8 eyes in a compact group, anterior median eyes largest and protuding, posterior median eyes separated by about their diameter, posterior row slightly procurved as in fig. 59. - Legs (fig. 41) robust, covered with short

hairs and strong bristles, its order I/II/IV/III. Bristles: Right femur I 2 prodorsally, 2 prolaterally and a pair distally; left femur I 2 prodorsal bristles in the basal half and 2 prolateral bristles in the distal half; tibia I: A ventral pair in the basal half, 2 dorsally, few laterally and apically. Metatarsus IV bears 2 retrodorsal bristles. - Opisthosoma 1.4 times longer than wide, scarcely covered with hairs. - Pedipalpus (figs. 42-43): Patella short, with a dorsal bristle, tibia of medium length, with long dorsal hairs and two apical apophyses, cymbium with a small basal rim, paracymbium longer than wide, strongly sclerotized, with longitudinal folds.

Relationships: See the key.

Distribution: Early Tertiary Baltic amber forest.

***Graea lingula* n. sp.** (fig. 66)

Material: Holotypus ♂ in Baltic amber, F549/BB/AR/ZYG/CJW.

Preservation and syninclusions: The spider is nearly completely preserved, only the distal half of the right tarsus IV is cut off. Body and legs are heavily covered by a white emulsion, the bulbi are ventrally nearly free, a bubble is preserved on the thoracal part. - A Diptera, some stellate hairs and numerous particles of detritus are preserved, too.

Diagnosis (♂; ♀ unknown): Pedipalpus (fig. 66) Tibia of medium length, conductor very large, embolus long and apically tongue-shaped.

Description (♂):
Measurements (in mm): Body length 4.2, prosoma length 2.2, tibia I 2.2.
Colour: The spider is nearly completely covered by a white emulsion.
Body and legs similar to *impudica*, metatarsus IV baers 2 retrodorsal bristles.

Relationships: See the key. According to the tongue-shaped tip of the embolus *G. brevis* is most related.

Distribution: Tertiary Baltic amber forest.

Selected material of *Graea*-species in Baltic amber of the private collection of JW:

G. ?*succini* PETRUNKEVITCH, ♂, F46/BB/AR/ZYG/CJW, photo 123,
G. ?*setosa* PETRUNKEVITCH, ♂, F283/BB/AR/ZYG/CJW, fig. 44, F547, figs.67-68,

G. sp. indet. a), ♀, F284/BB/AR/ZYG/CJW, figs. 46-47,
G. sp. indet. b), ♀, F285/BB/AR/ZYG/CJW,
G. sp. indet., ♂, F286/BB/AR/ZYG/CJW,
G. sp. indet., ♂ with parts of a capture web, F45/BB/AR/ZYG/CJW.

***Eozygiella* n. gen.**

Diagnosis (♂; ♀ unknown): Legs slender, leg bristles thin (fig. 49), pedipalpus (figs. 50-52): Paracymbium divided and probably a free sclerite, with a slender and stronger sclerotized lateral branch, bulbus large and ventrally outstanding, embolus long and in a distal position (fig. 52), terminal and tegular apophyses unknown. See also the diagnosis of the Zygiellinae above.

Relationships: After the long tibia of the male pedipalpus, the narrow eye field, the absence of a dorsal opisthosomal scutum and the position of the embolus I regard *Eozygiella* as a member of the subfamily Zygiellinae. In the other genera of the Zygiellinae are the leg bristles stronger, the legs are more robust, the paracymbium and the bulbus structures are different; in *Graea* the tibia of the ♂-pedipalpus bears two apical apophyses. See the tab. above.

Type species: *Eozygiella compacta* n. sp. - Further species: *Eozygiella calceata* (PETRUNKEVITCH 1950) (**n. comb.**) and sp. indet., see below.

Distribution: Early Tertiary Baltic amber forest.

***Eozygiella compacta* n.gen.n.sp.** (figs. 48-51)

Material: Holotypus ♂ in Baltic amber and 2 separated amber pieces F41/BB/AR/ZYG/CJW.

Preservation and **syninclusions**: The spider is well and nearly completely preserved, only the left leg II is wanting beyond the coxa by autotomy. Dorsally the body is partly covered by a white emulsion, the ventral bulbus structures are hidden, the legs IV are stretched backward, the fangs are spread. - Dorsally between pro- and opisthosoma a bubble is situated, right in front of the spider lies the leg of an arthropoda and a small Diptera: Nematocera, right behind the spider lies another midge.

In one of the separated amber pieces a third Nematocera is preserved. Stellate hairs are frequent.

Diagnosis: See above.

Description (♂):
Measurements (in mm): Body length 3.7, prosoma: Length 1.8, width 1.7, opisthosoma: Length 2.05, width 1.8, leg I: Femur 4.0, patella 0.8, tibia 3.2, metatarsus 3.6, tarsus 0.9, tibia II 2.0, tibia III 1.0, tibia IV 1.6.
Colour: Body light brown, legs medium brown.
Prosoma nearly as wide as long, smooth, scarcely hairy, fovea hidden. Eyes (fig. 48) fairly large, frontal median eyes the largest, posterior row straight, posterior median eyes separated by more than its diameter, lateral eyes close together. Clypeus short, fangs fairly long and bent. Basal articles of the chelicerae robust, teeth of the margins not clearly observable, anterior margin probably with a small tooth. Labium and gnathocoxae hidden, coxae IV separated by half of its diameter. - Legs (fig. 49) slender, order I/II/IV/III, I distinctly the longest and not modified, hairs indistinct and short. Bristles numerous and thin: Femur I at least 3, patellae 2 dorsally and 1 retrolaterally, tibia 2 dorsally, at least I additionally 1 pro- and 1 retrolaterally, ventrally none, all metatarsi dorsally 1. Trichobothria of the metatarsi short and indistinct, teeth of the paired tarsal claws I indistinct, unpaired claw large and strongly bent. - Opisthosoma 1.18 times longer than wide, soft, widest in front of the middle, covered with very few and short hairs. Spinnerets hidden. - Pedipalpus (figs. 50-51; see also above): Patella and tibia with a long dorsal bristle, tibia distinctly longer than wide, tegulum and subtegulum large, embolus hidden, median apophysis probably present and small.

Relationships: Legs and paracambium are similar to a male of *Eozygiella* sp. indet. which is kept in the Paleontological Museum Moscow. In contrast to *compacta* there are numerous long ventral hairs of the anterior legs, the long embolus is similar to fig. 52 but its distal part is hidden by a large conductor. *Eozygiella calceata* (PETRUNKEVITCH 1950) (**n. comb**., sub *Eustaloides calceatus*) (fig. 52) has a slightly different paracymbium and also a long embolus which is free visible in its whole length; the thickness of the leg bristles is unknown to me. This species is surely a member of *Eozygiella*.

Distribution: Tertiary Baltic amber forest.

EXTANT GENERA: ***Guizygiella*** ZHU et al. 2003: In contrast to all the other genera of the Zygiellinae the male pedipalpus bears a pair of patellar bristles.- **Distribution**: Cina.

***Leviellus* n. gen.**

Derivatio nominis: This genus name is dedicated to Prof. H. W. LEVI, who revised numerous taxa, e. g. of the Araneidae, *Zygiella* s. l., Tetragnathidae and Theridiidae.

Diagnosis (see the tab.): Male: Gnathocoxa with a retrodistal hook (fig. 58), terminal apophysis close to the embolus, see fig. 38) and LEVI (1974, figs. 73, 85); female: Scapus of the epigyne present, see e. g. LEVI (1974: Figs. 71, 89).

Relationships: See the tab. According to the presence of an epigynal scapus *Stroemiellus* may be the closest relative.

Type species: *Zilla kochii* THORELL 1870; further species: See the tab.

Distribution: Western Palearctic.

***Parazygiella* n. gen.**

Diagnosis: Terminal apophysis present and distinctly apart from the embolus, no scapus of the epigyne; see the tab.

Relationships: See the tab. *Graea* and *Zygiella* may be most related.

Type species: *Zilla montana* C. L. KOCH 1839; further species: See the tab.

Distribution: Holarctic.

***Stroemiellus* n. gen.**

Diagnosis: Male: Embolus apically widened and flattened (fig. 40),terminal apophysis (= subterminal apophysis sensu LEVI (1974)) present, tegular apophysis protuding and very large, a further blunt - ?median - apophysis far away; female: Scapus of the epigyne present, very long and with parallel sides, see LEVI (1974: Fig. 104).

Relationships: See the tab.; according to the presence of a scapus of the epigyne *Leviellus* may be the closest genus.

Type species: *Zilla stroemi* THORELL 1870; the only known species of the genus.

Distribution: Palearctic.

Zygiella O. PICKARD-CAMBRIDGE 1902 (= *Zilla* auct.)

Remark: The habitus of the spiders of the former genus *Zygiella* (s. l.) is uniform but the genital organs of both sexes are quite variable, see the tab. "*Zygiella* comprises rather diverse species....The splitting of *Zygiella* in the future seems inevitable." LEVI (1987: 247).

Diagnosis: Bulbus small, not longer or distinctly shorter than patella + tibia of the pedipalpus, see e. g. LEVI (1974: Figs. 5, 19), terminal apophysis (fig. 6) and scapus of the epigyne absent, base of the embolus skinny and widened (fig. 6).

Relationships: A terminal apophysis is most probably present in all other genera of the Zygiellinae; *Graea* may be closest related, see the tab.

Type species: *Eucharia atrica* C. L. KOCH 1843.

Further species: See the tab.

Distribution: Palearctic.

(2) Chrysometinae n. subfam.

Diagnosis: ♂-pedipalpus - compare LEVI (1986) -: Cymbium with a divided dorsal outgrowth and apically +/- excavate, paracymbium a free sclerite.

Further characters: See the diagnosis of the family Zygiellidae. A tegular apophysis and a scapus (?) of the epigyne may be present. Probably the open hub and the free secor of the capture web are basic characters, compare LEVI (1986). Autotomy: I found only very few examples of leg brakes betweeen coxa and trochanter or patella and tibia within alcohol material of *Chrysometa zelotypa* (KEYSERLING).

Relationships: See the subfamily Zygiellinae above, which is probably related. In the Zygiellinae a distinct dorsal cymbial outgrowth, an excavate cymbial tip and a free hub of the capture web are absent, the paracymbium is only a nearly free sclerite. Remark: Probably *Chrysometa* is not strongly related to the Zygiellinae and the free sector in the capture web of both taxa is simply a convergence.

Type genus: *Chrysometa* SIMON 1895 (extant).

Further genera: Probably *Chrysometata* n. gen. (fossil, in Baltic amber), see below. I regard *Homalometa* SIMON 1895 (extant) as a taxon of the Tetragnathidae. The relation- ships of *Araneometa* WUNDERLICH 1988 (fossil, in Dominican amber) remain unsure; the wide eye field is similar in most Araneidae, a median apophysis of the male pedipalpus is probably absent. - Probably the genus *Chrysometa* has to split up: *C. zelotypa* and related genera have a short embolus only and may be members of an undescribed genus.

Distribution: The Americas (extant); compare *Chrysometata* n. gen. below.

(3) *Chrysometata* n. gen.

Diagnosis (♂; ♀ unknown): Pedipalpus (figs. 55-57): Cymbium with a retrodorsal outgrowth, paracymbium stronger sclerotized, not outstanding, complicated (I don't want to exclude that it is a free sclerite), bulbus with a large conductor and a protuding terminal apophysis, median apophysis absent, embolus probably not coiled.

The **relationships** are unsure; according to the structures of the pedipalpus - no median apophysis, paracymbium probably a free scletite - *Chrysometata* could be a member of the Zygiellidae and Chrysometinae? but I will not exclude the membership of the Tetragnathidae. In *Chrysometa* SIMON (extant, the Americas) exist a divided dorsal outgrowth of the cymbium which is apically excavate, the paracymbium is larger, complicated and divided, and a protuding terminal apophysis is absent.

Type species: *Chrysometata palaearctica* n. sp.

Distribution: Tertiary Baltic amber forest.

***Chrysometata palaearctica* n.gen.n.sp.** (Figs. 75-79)

Material: Holotype (♂) in Baltic amber and 2 separated amber pieces, F58/BB/AR/?ZYG/CJW.

Preservation and syninclusions: The spider is excellently and nearly completely preserved, the opisthosoma is completely covered by an emulsion, the left leg I is cut through the patella and the rest is wanting. – Thin threads are running through the

amber piece which not are bearing droplets, one thread is going from the spinnerets to the left leg IV. In the larger of the separated pieces 2 Nematocera and a larger plant inclusion (3.3cm) with 2 lateral outgrowths are preserved, also several stellate hairs.

Diagnosis (♂; ♀ unknown): Pedipalpus (fig.77-79): outgrowth of the cymbium small, paracymbium with a tooth; conductor large, terminal apophysis enlarged at its end, embolus slender, probably not coilled.

Description (♂):
Measurements (in mm): Body length 2.6, prosoma length 1.4, leg I: Femur 2.5, patella 0.6, tibia 2.45, metatarsus 2.65, tarsus 0.9, tibia IV 1.35.
Colour: Prosoma and legs medium- to dark brown, opisthosoma covered by a white emulsion.
Prosoma (fig.75) covered with short hairs, fovea absent or indistinct, clypeus short. Eyes fairly large, median eyes slightly more separated from the lateral yes than from each other, lateral eyes close together, posterior row weakly procurved, posterior median eyes separated by slightly more than its diameter. Chelicerae fairly large, anterior margin of the furrow with ?3 large teeth which are distinctly separated, fangs long. Labium rebordered, sternum small prolongated between coxae IV, gnathocoxae large, longer than wide. – Legs (fig.76) long and slender, its order I/II/IV/III, tibia and metatarsus I-II with numerous long hairs. Bristles long: Femora usually 2 dorsally, I and II additionally a distal pair, I additionally a distal-prolateral bristle. Patella 2 dorsal bristles, tibiae dorsally 2/2/1/1, furthermore lateral: 1 retrolaterally-basally and 1 (on II) or 2 prolaterally. All metatarsi 1 dorsal-basal bristle. Coxa I ventrally distinctly protuding. Tarsal claws fairly large, the unpaired bent in a right angle. – Opisthosoma – it is covered by an emulsion – covered with very short hairs, 1.5 times longer than wide. – ♂-pedipalpus (figs.77-79; see above) with slender articles, a large bristle on the patella dorsally-distally, cymbium slender.

Relationships: See above.

Distribution: Tertiary Baltic amber forest.

Addendum

After this manuscript was finished I got some more undescribed Tetragnathidae in Baltic amber. Among them is a male which bears trichobothria with small bothria on its femora. This taxon may well be a member of the subfamily Leucauginae which never has been recorded from fossils in Baltic amber. Also a questionable male of the Metinae (CJW) has been found in Baltic amber.

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See also the references in my papers on Araneidae and on the superfamily Araneoidea in this volume!

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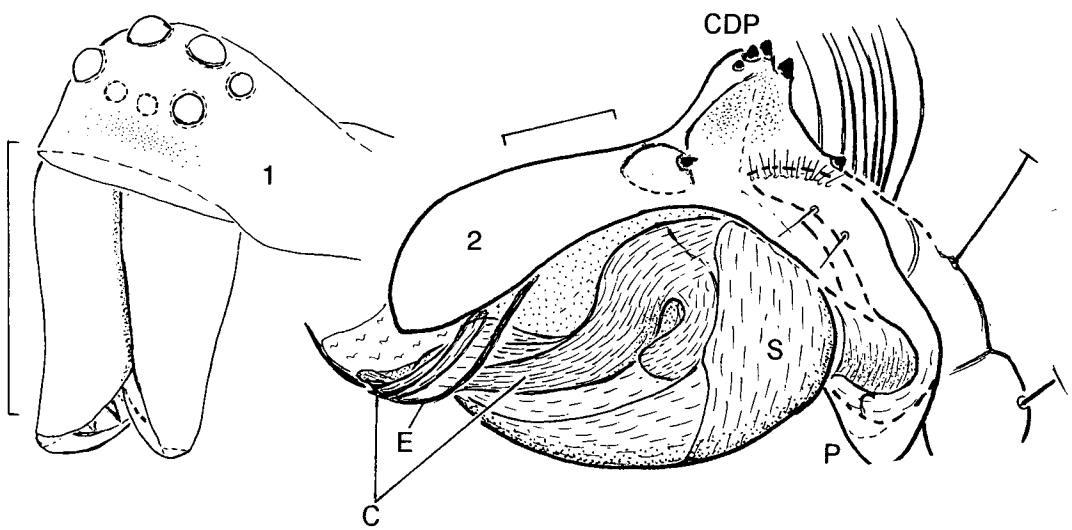
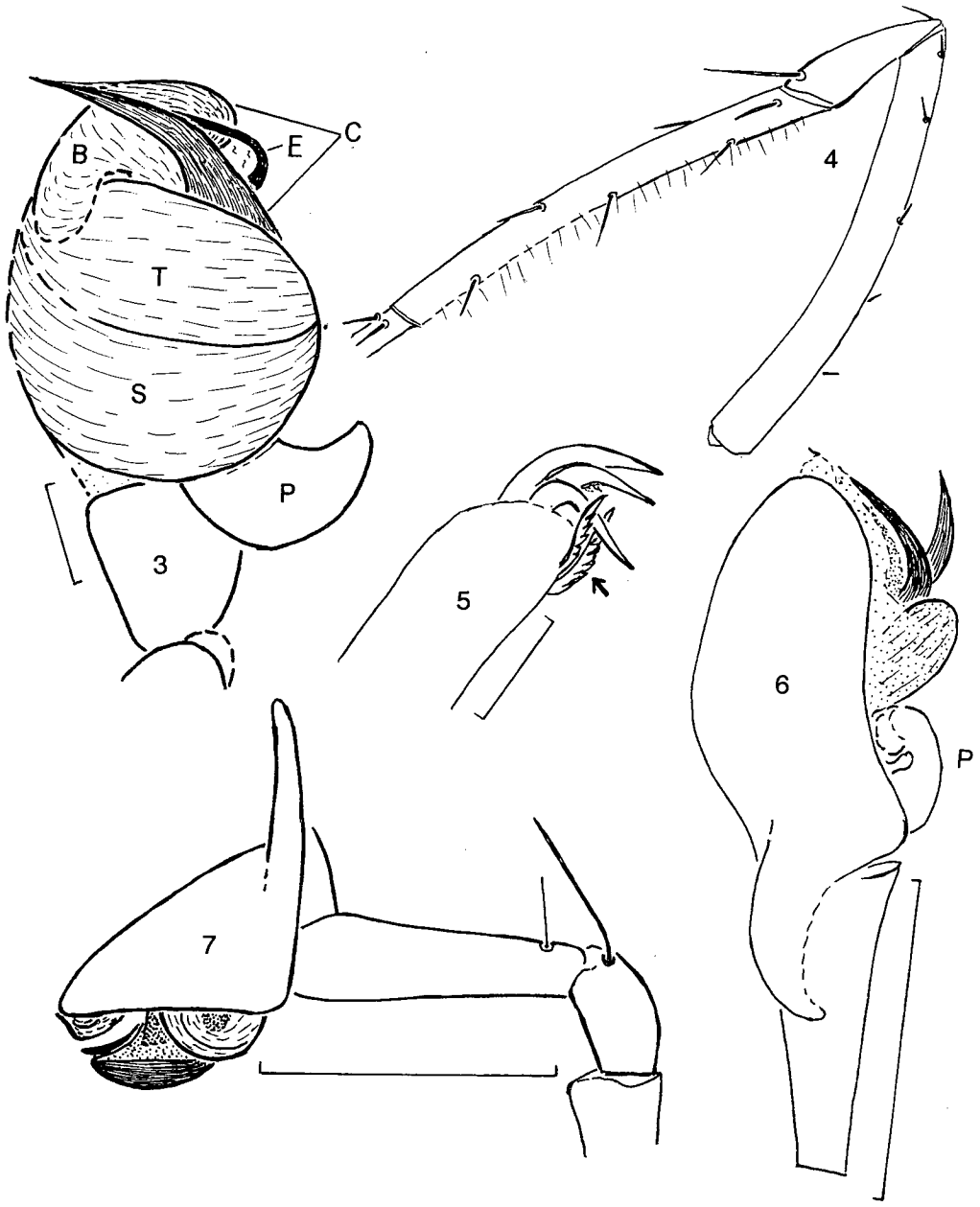
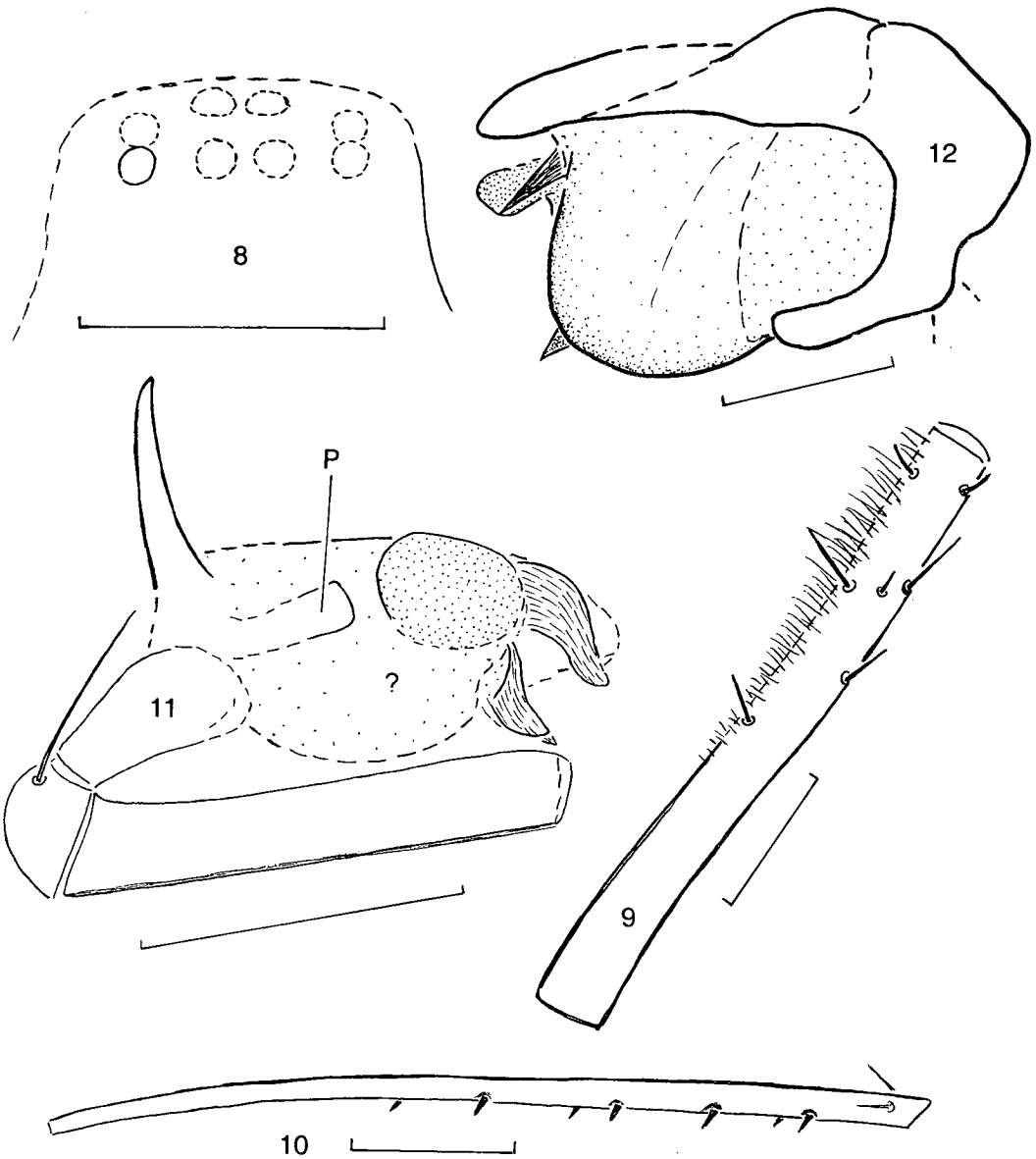
ZHU MINGSHENG, SONG DAXIANG & ZHANG JUNXIA (2003): Tetragnathidae.--Fauna Sinica, Invertebrata, **35**. 403pp + 16 tab.



Figs.1-3: ***Anameta distenda*** **n.gen.n.sp.**, ♂; 1) prosoma frontally-left; 2-3) l. pedipalpus retrolaterally (and slightly apically) and ventrally. B = bubble, C = conductor, E = embolus, L = lamella, P = paracymbium, S = subtegulum, T = tegulum. M = 1.0mm in fig.1, 0.2 in figs. 2-3;



figs. 4-7: ***Corneometa baltica*** **n. gen. n. sp.**, ♂; 4) l. femur, patella, tibia and basal part of the metatarsus of leg I retrolaterally; 5) tip of tarsus I (normal hairs not drawn); 6-7) r. pedipalpus retrodorsally and prolaterally. P = paracymbium. M = 0.1 in fig. 5, 1.0 in the remaining figs.;



figs.8-11: ***Corneometa pilosipes* n.gen.n.sp.**, ♂; 8) eyes dorsally; 9) l. femur I dorsally (some dorsal bristles broken off?); 10) r. metatarsus I prodorsally with ventral thorns; 11) r. pedipalpus retrolaterally, bulbus more ventrally. P = paracymbium. M = 1.0;

figs.12: ***Eometa calefacta* n.sp.**, l. ♂-pedipalpus retrolaterally. M = 0.2;

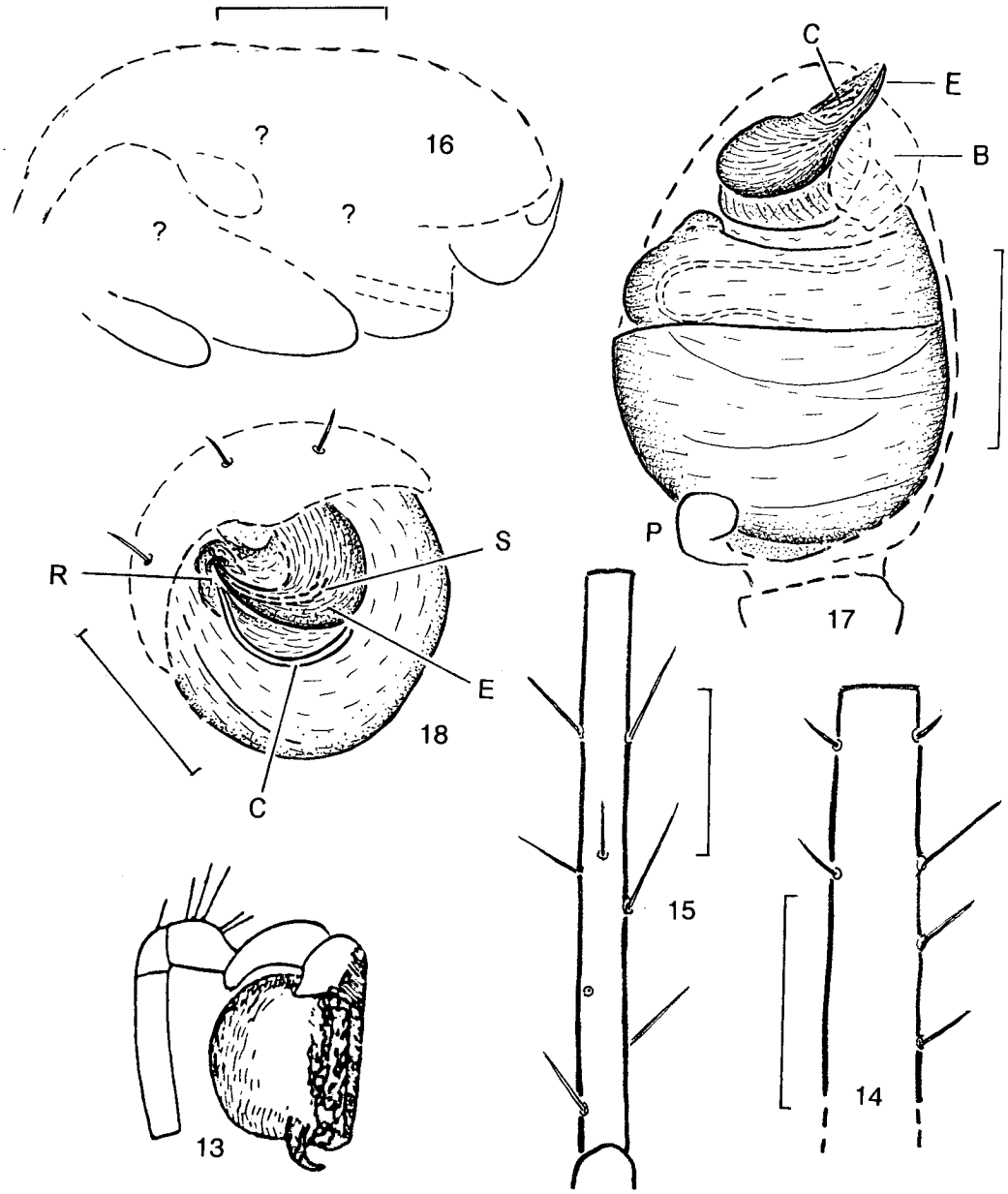
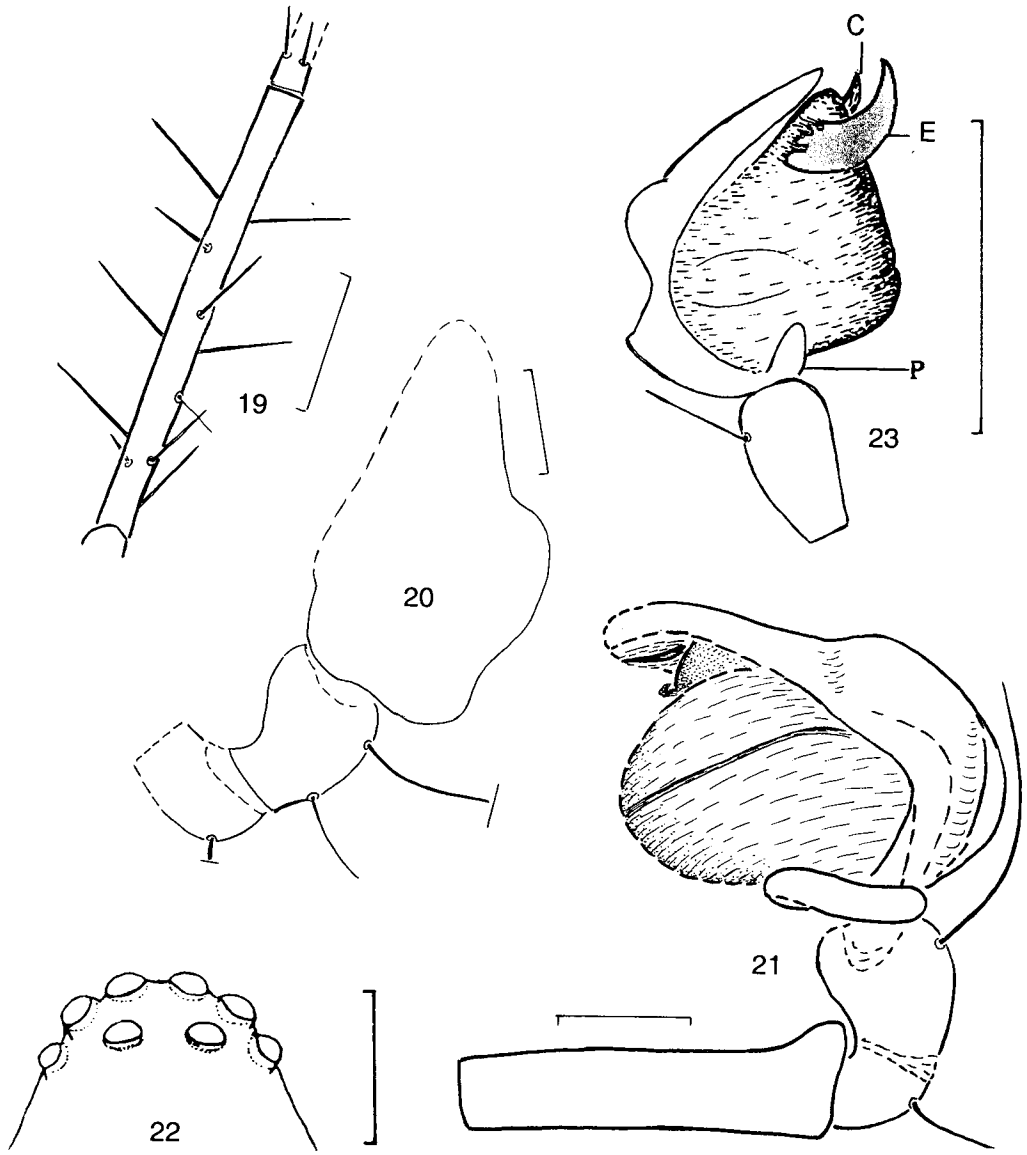


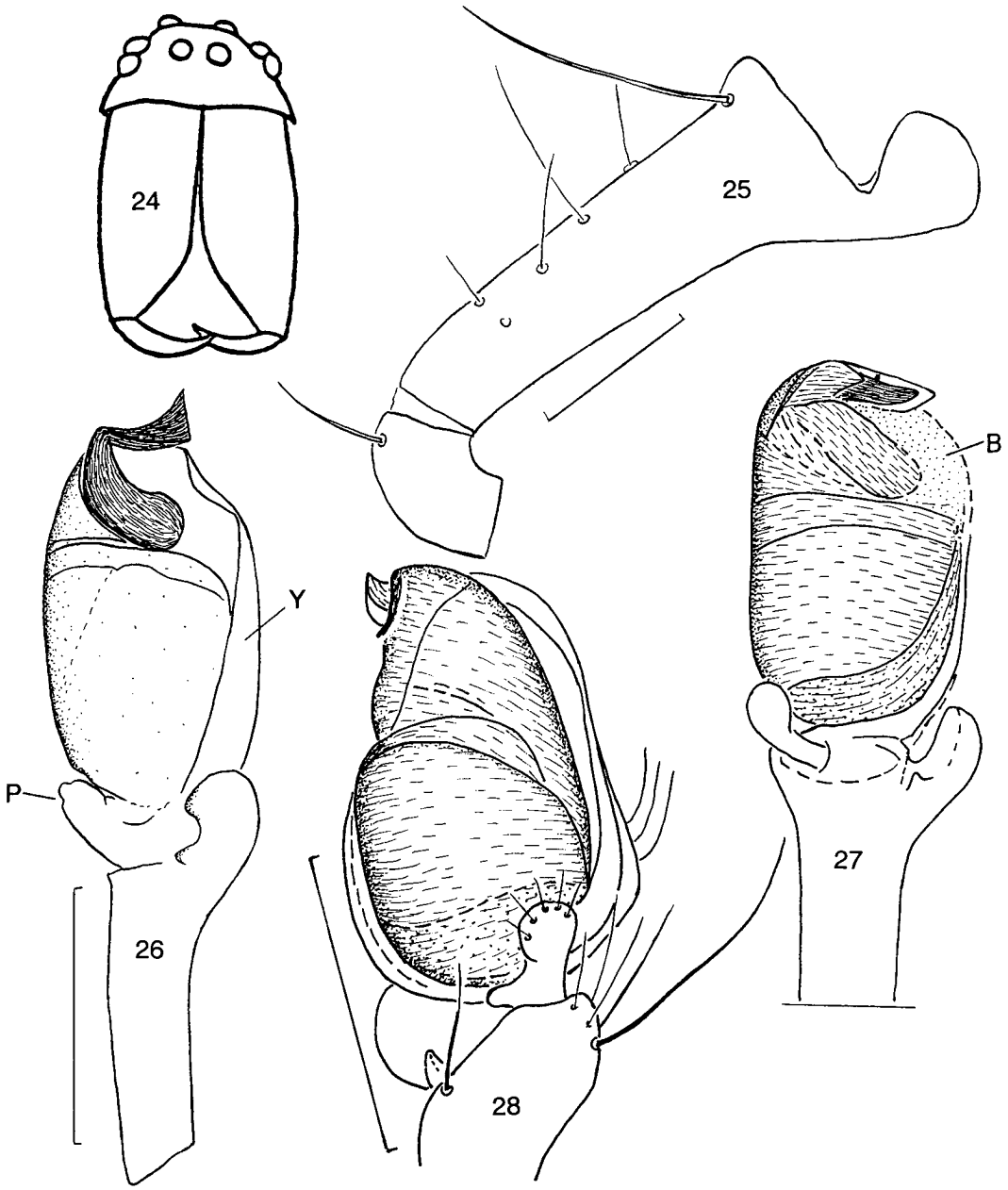
fig.13: ***Eometa longipes*** PETRUNKEVITCH 1958, r. ♂-pedipalpus retrolaterally; after PETRUNKEVITCH (1958: Fig. 280);

figs.14-18: ***Eometa occulta*** **n.sp.**, ♂; 14) l. femur I dorsally; 15) l. tibia I dorsally (the dorsal-basal bristle is probably lost); 16) outline of the r. pedipalpus retrolaterally (partly covered with an emulsion); 17) r. pedipalpus ventrally; 18) l. pedipalpus apically. B = bubble, C = conductor, E = embolus, P = paracymbium, R ?= sperm, S = sperm duct. M = 0.5 in figs. 14-15, 0.2 in the other figs.;



figs.19-21: ***Eometa perfecta* n.sp.**, ♂; 19) r. tibia I and basal part of the metatarsus dorsally; 20) r. pedipalpus prodorsally; 21) l. pedipalpus retrolaterally. M = 0.5 in fig.19, 0.2 in the other figs.;

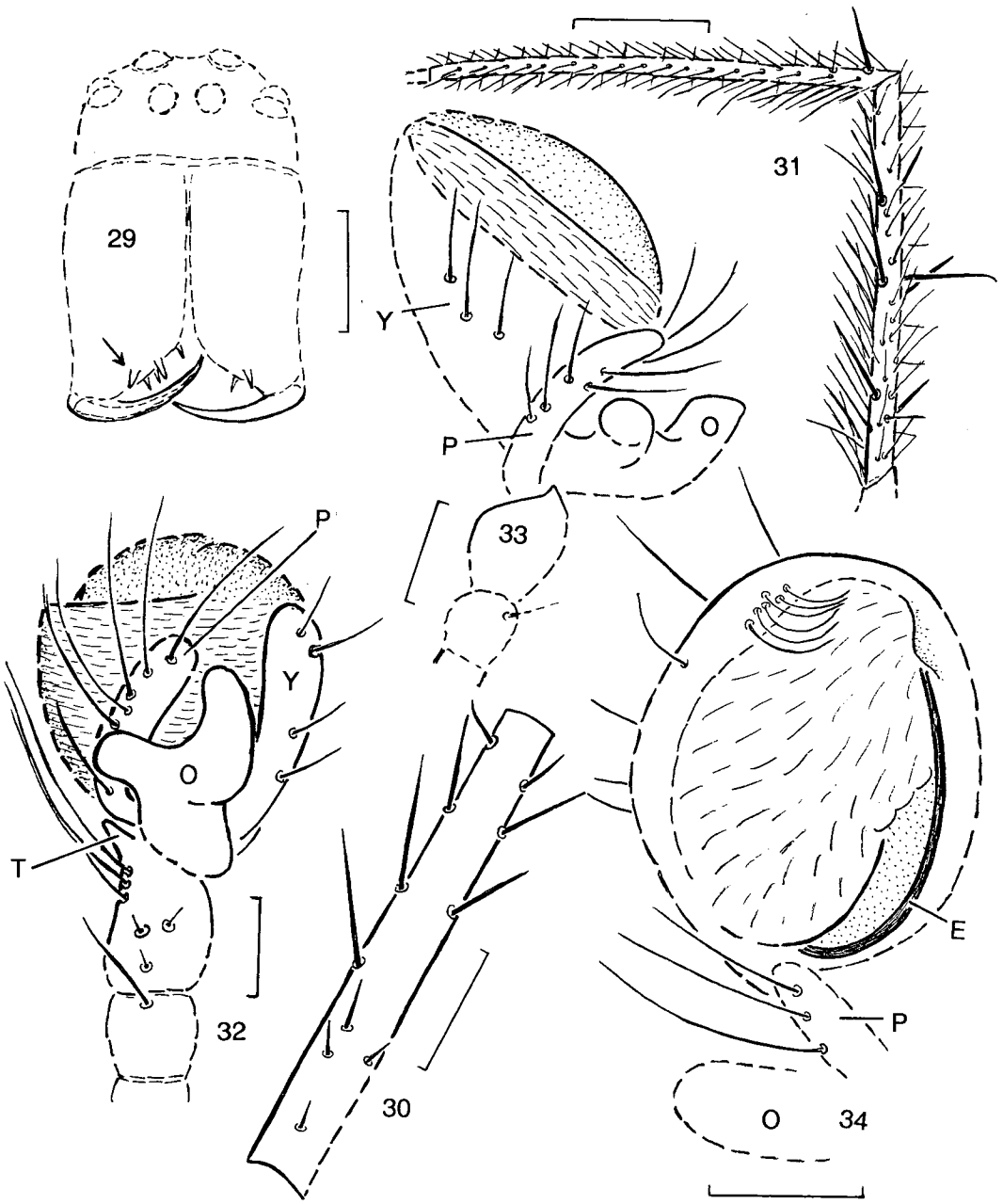
figs.22-23: ***Eometa samlandica*** PETRUNKEVITCH 1958, ♂; 22) eyes dorsally; 23) r. pedipalpus retrolaterally. C = conductor, E = embolus, P = paracymbium. M = 0.5;



figs.24-26: ***Priscometa tenuipes*** PETRUNKEVITCH 1958, ♂, holotype; 24) prosoma frontally (no M); 25) patella and tibia of the l. pedipalpus prolaterally; 26) r. pedipalpus retroventrally. Y = cymbium, P = paracymbium. M = 0.2 in fig.25, 0.5 in fig.26;

fig.27) ***Priscometa minor*** **n.sp.**, r.♂-pedipalpus ventrally. B = position of a bubble which has not been drawn. M = 0.5;

fig.28) ***Priscometa capta*** **n.sp.**, l.♂-pedipalpus ventrally, bulbus slightly expanded; only few hairs are drawn. M = 0.5.



figs. 29-34: ***Praetermeta velans*** **n.gen.n.sp.**, ♂; 29) prosoma in frontal view (most parts are hidden by an emulsion). The arrow indicates to the oblique right tooth near the anterior cheliceral furrow margin; 30) r. femur I dorsally; 31) tibia and metatarsus of the l. leg I retrolaterally; not all hairs are drawn; 32-33) l. pedipalpus dorsally and retrolaterally; only few hairs are drawn; 34) r. pedipalpus retrodistally; only few hairs are drawn, several structures are partly hidden by an emulsion. - Y = cymbium, O = dorsal outgrowth of the cymbium, P = paracymbium, T = tibial apophysis. M = 1.0 in figs. 30-31, 0.5 in fig. 29, 0.2 in the remaining figs.;

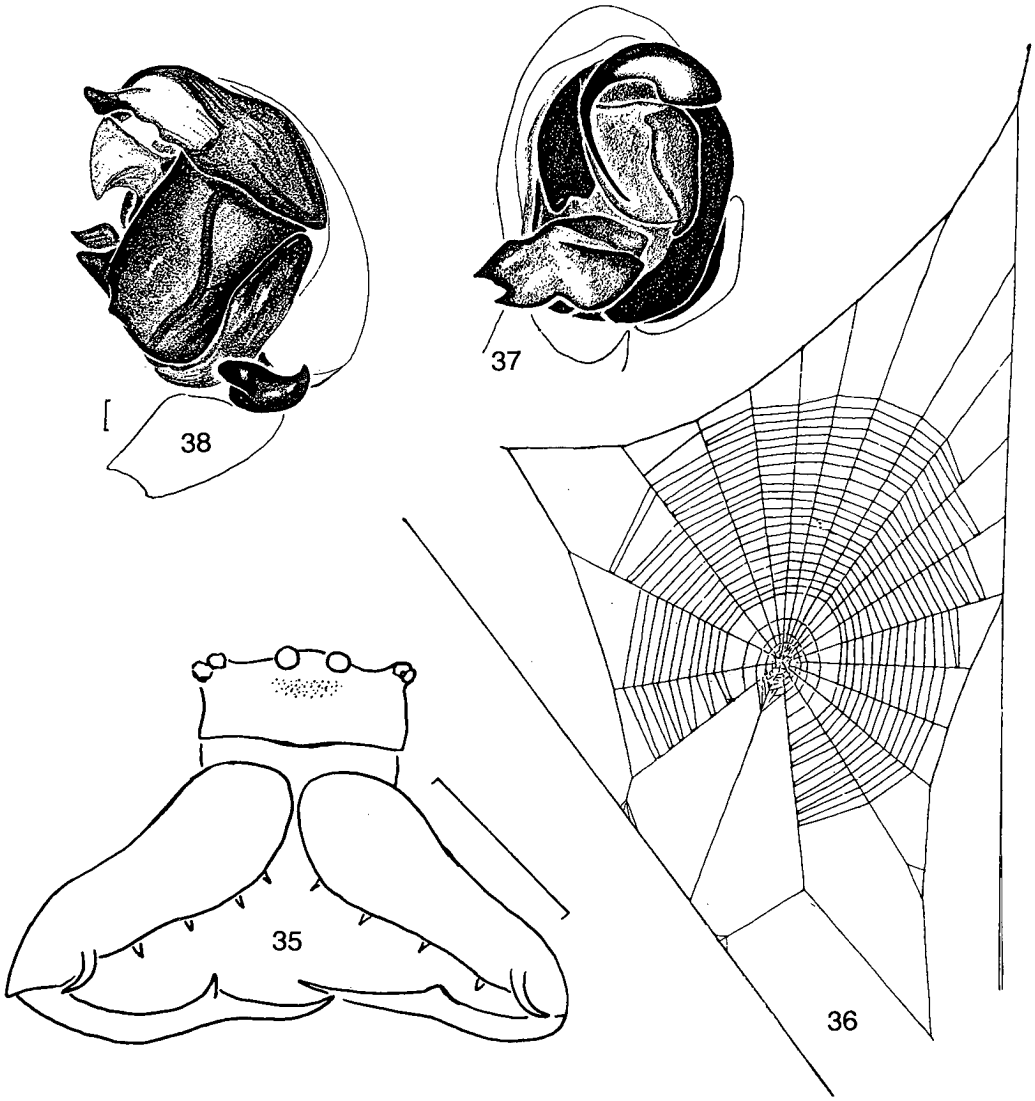
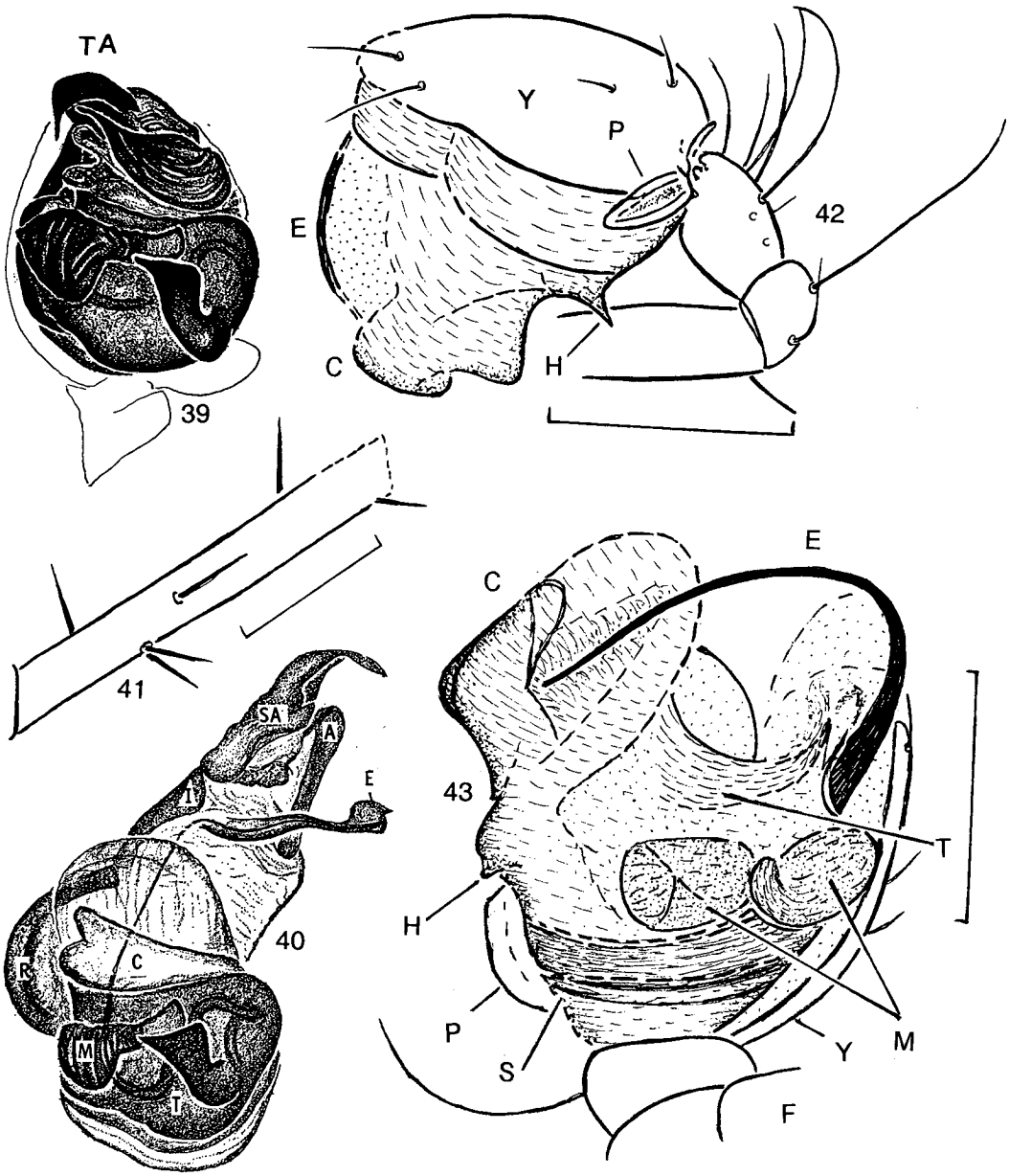


fig. 35) ***Cyrtognatha weitschati*** WUNDERLICH 1988, holotypus ♂, fossil in Dominican amber, prosoma in frontal view. Note the giant and diverging chelicerae (a sexual dimorphism) which are known from extant spiders fixing the female "face to face" during copulation. - This is an example for a complicated and derived copulatory behaviour in extant and Mid Tertiary spiders but not known - and probably not yet evolved - from/in the Early Tertiary Baltic amber spiders. M = 0.5;

Fig. 36) Capture web of ***Zygiella*** sp.; note the free sector;

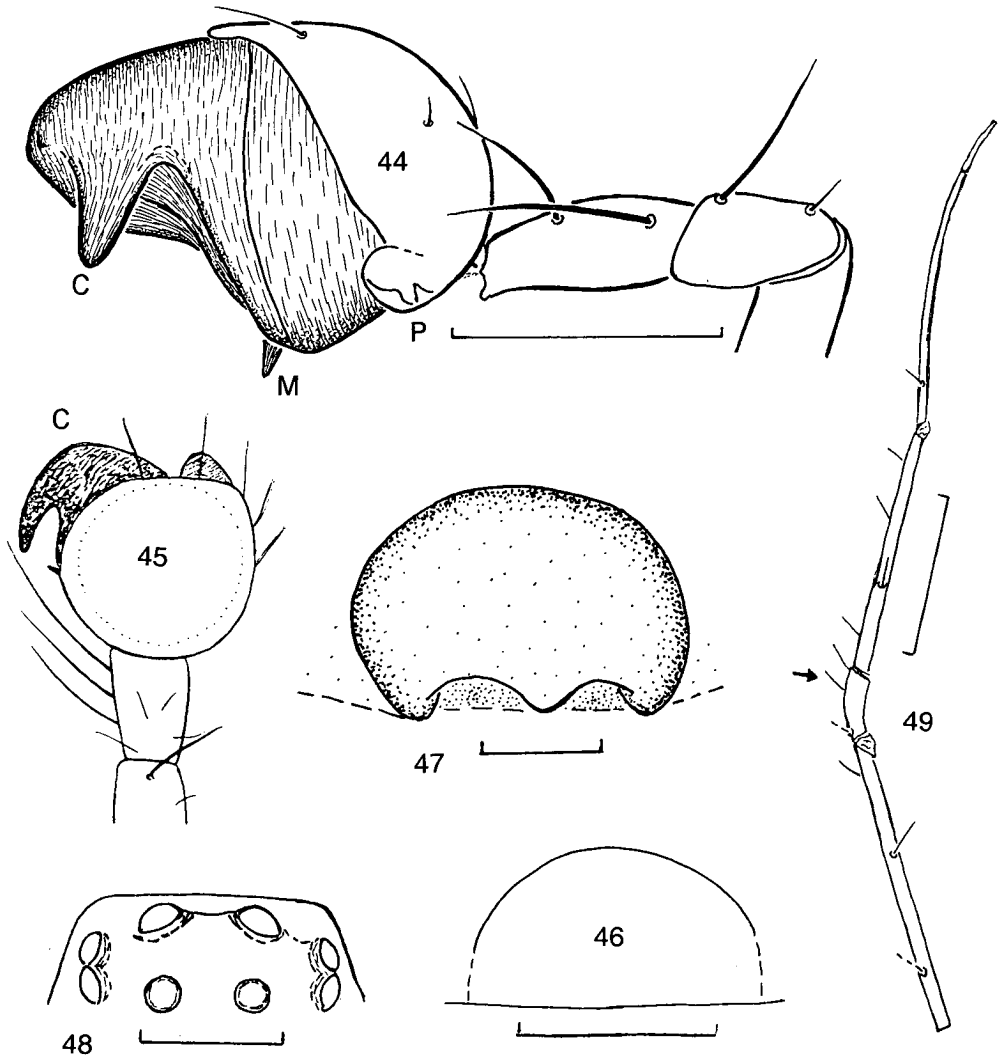
Fig. 37) ***Zygiella atrica*** (C. L. KOCH 1843), l.♂-pedipalpus ventrally.

Fig. 38) ***Leviellus kochi*** (THORELL 1870), l.♂-pedipalpus retrolaterally;



Figs. 39-40: ***Stroemiellus stroemi*** (THORELL 1870), l.♂-pedipalpus ventrally and expanded l. pedipalpus. - Figs. 37-40) are taken from LEVI (1974).

Figs 41-43: ***Graea impudica* n. sp.**,♂; 41) r. tibia I retrolaterally; 42) l. pedipalpus retrolaterally; 43) r. pedipalpus ventrally; M = 1.0 in fig. 41, 0.5 in figs. 42-43. C = conductor, E = embolus, F = femur, H = retrolateral hook of the conductor, M = median apophysis, P = paracymbium, S = subtegulum, T = questionable terminal apophysis, Y = cymbium.



Figs. 44-45: ***Graea setosa*** PETRUNKEVITCH 1942, ♂; 44) questionable ♂, F283, l. pedipalpus retrolaterally; note the long tibia; M = 0.5. - M = median apophysis, P = paracymbium; 45) r. pedipalpus of the holotype dorsally; fig. 45) taken from PETRUNKEVITCH (1942: Fig. 282).

Figs. 46-47: ***Graea*** sp. indet. a), ♀; 46) outline of the labium ventrally and slightly from the right side; 47) epigyne ventrally; M = 0.2.

Figs. 48-51: ***Eozygiella compacta*** **n.gen.n.sp.**, ♂; 48) position of the eyes dorsally; 49) l. leg I polaterally; 50) r. pedipalpus dorsally; 51) l. pedipalpus retrolaterally but the bulbus retroventrally; M = 0.5 in fig. 48, 0.2 in the remaining figs. - P = paracymbium.

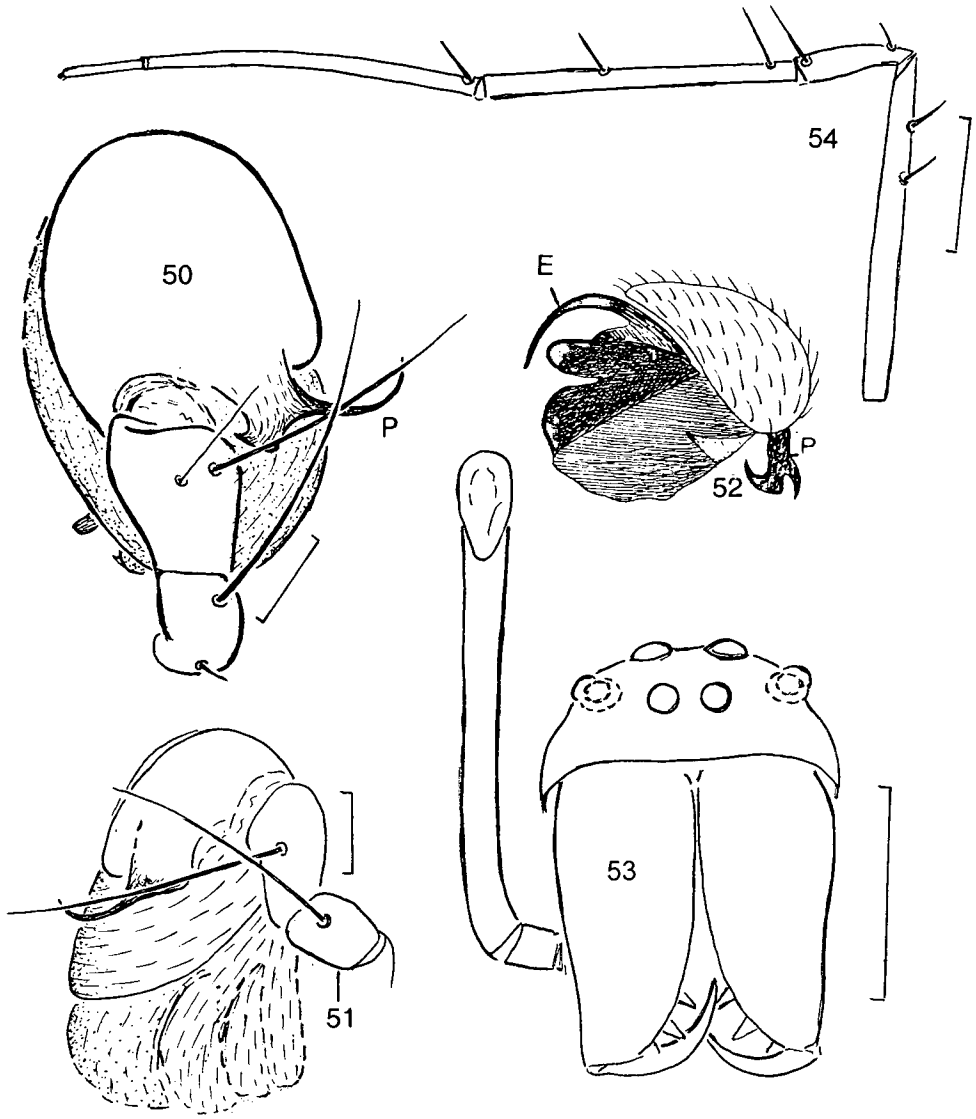


Fig. 52) ***Eozygiella calceata*** (PETRUNKEVITCH 1950), ♂, l. paratypus retrolaterally; taken from PETRUNKEVITCH (1950: Fig. 78). - E = embolus, P = paracymbium. No M.

Figs. 53-57: ***Chrysometata palaearctica* n. gen. n. sp.**, ♂; 53) prosoma and femur of the r. pedipalpus frontally; 54) r. leg I prolaterally (a dorsal bristle of the femur and 2 prolateral bristles of the tibia are probably broken off; hairs are not drawn); 55) l. pedipalpus, patella and tibia dorsally, cymbium and bulbus retrolaterally; 56) l. pedipalpus ventrally (basal part hidden, hairs of the cymbium not drawn); 57) l. pedipalpus retroapically. E ?= embolus, O = outgrowth of the cymbium, P = paracymbium.- M = 0.5 in fig. 52, 1.0 in fig. 54, 0.2 in fig. 55, 0.1 in figs. 56-57.

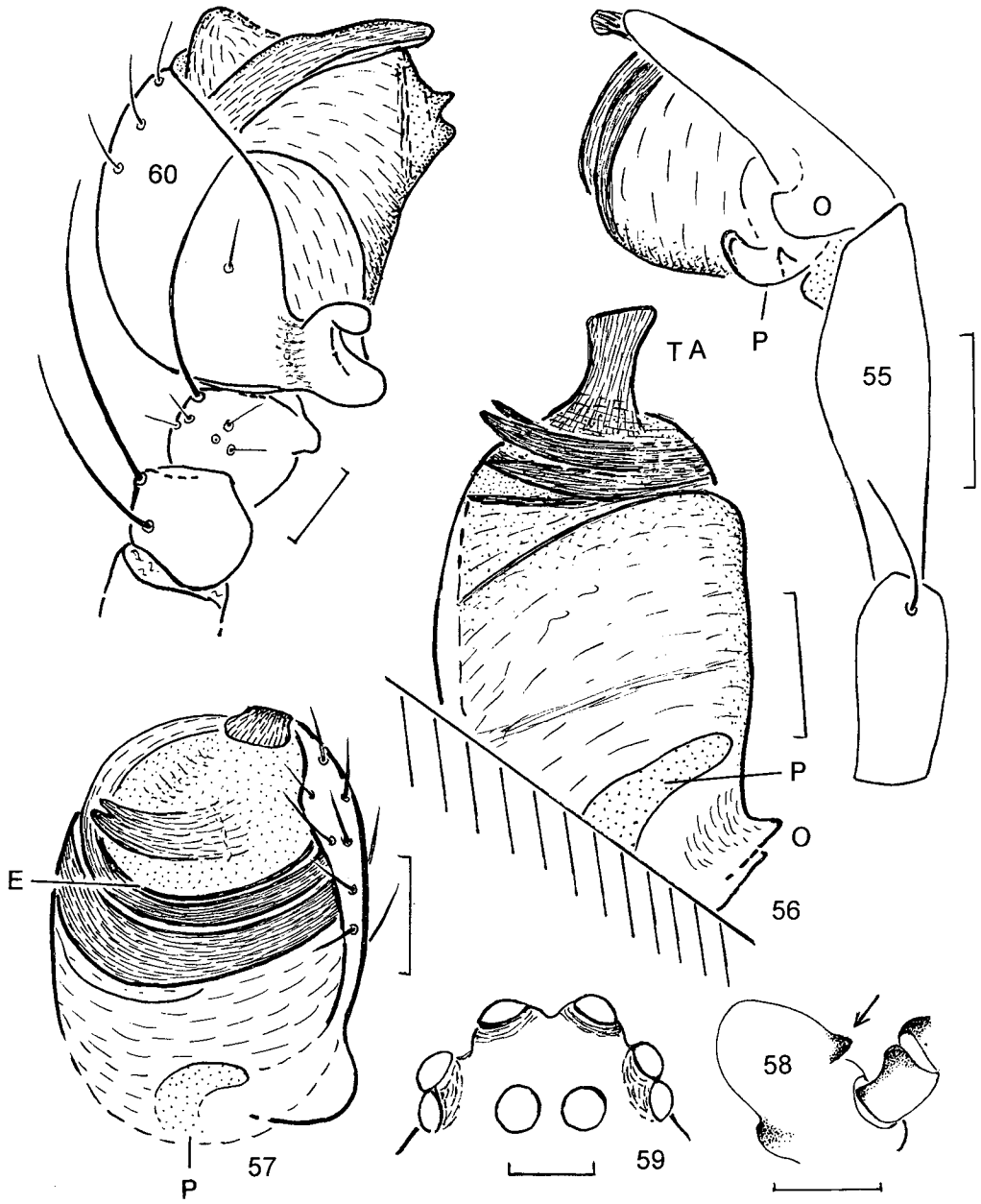
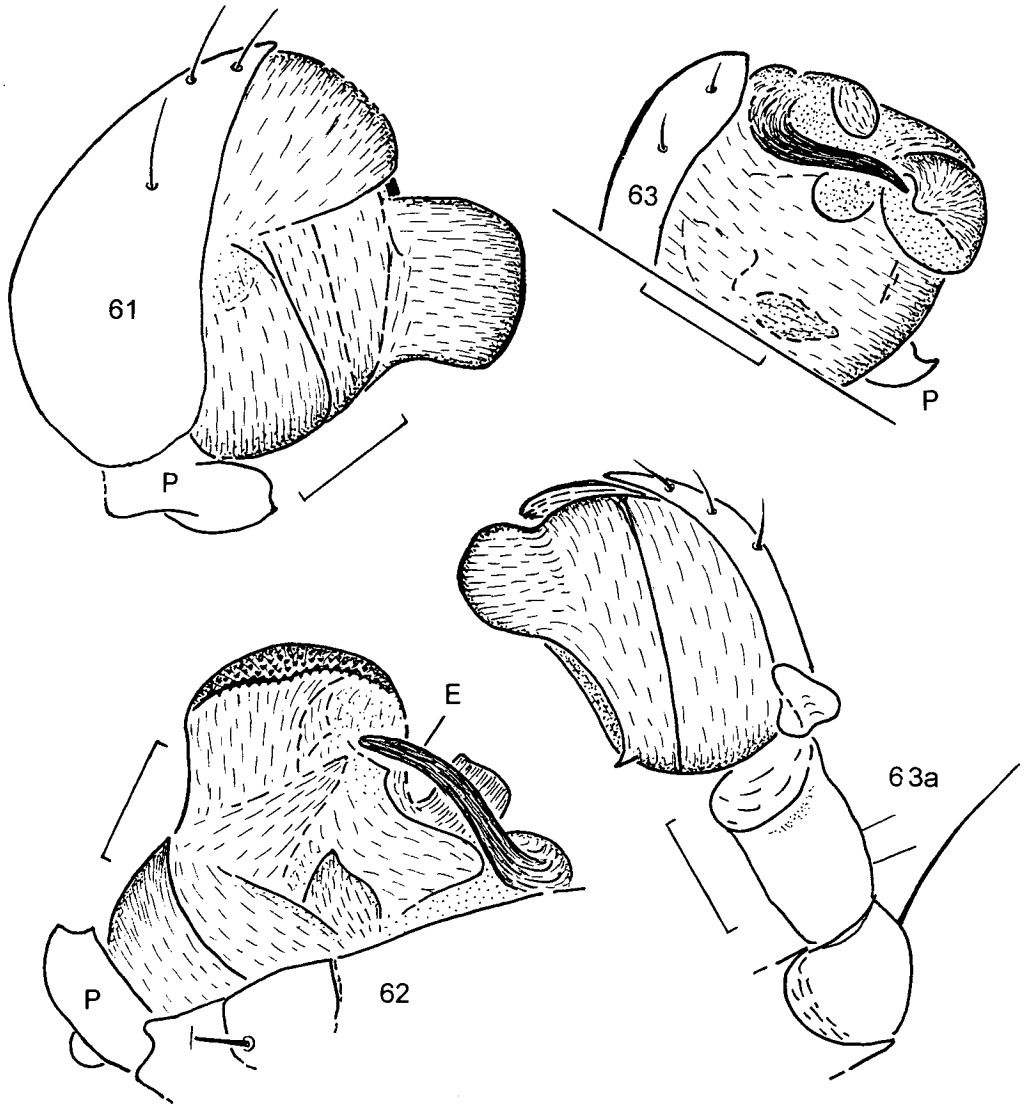


Fig. 58) ***Leviellus inconveniens*** (O. PICKARD-CAMBRIDGE 1872), ♂, extant, l. gnathocoxa with hook (arrow) ventrally. - M = 0.5.

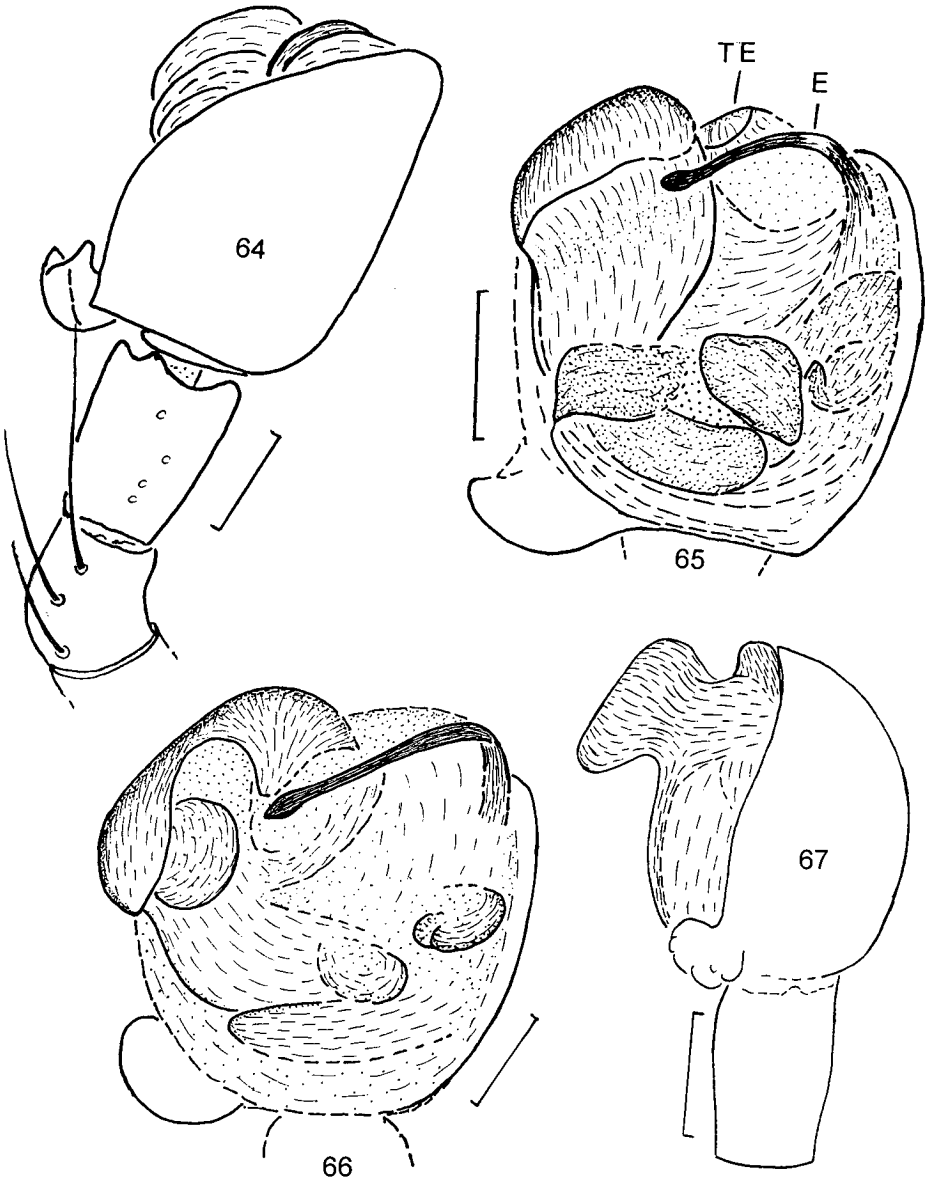
figs. 59-60: ***Graea aberrans* n. sp.**, ♂; 59) eyes dorsally; 60) r. pedipalpus retrolaterally, bulbus slightly ventrally, tibia and patella retrodorsally; only the largest bristle-shaped tibial hair is drawn. M = 0.2;



figs. 61-62: ***Graea bitterfeldensis* n. sp.**, ♂; 61) r. pedipalpus retrolaterally; 62) r. pedipalpus ventrally (parts are covered by pedipalpal articles). E = embolus, P = paracymbium. M = 0.2;

fig. 63) ***Graea breviembolus* n. sp.**, ♂, l. pedipalpus ventrally (the basal parts are hidden). P = paracymbium. M = 0.1;

fig. 63a) ***Graea breviembolus* n. sp.**, ♂, l. pedipalpus retrolaterally (the long tibial hairs are not drawn). M = 0.1;



figs. 64-65: ***Graea brevis* n. sp.**, ♂; 64) l. pedipalpus dorsally (hairs are not drawn); 65) r. pedipalpus ventrally. E = embolus, TE = terminal apophysis. M = 0.2;

fig. 66) ***Graea lingula* n. sp.**, ♂, r. pedipalpus ventrally. M = 0.1;

figs. 67-68: ***Graea ?setosa*** (PETRUNKEVITCH 1942), ♂ F547; 67) l. pedipalpus dorsally and slightly distally; 68) r. pedipalpus retroapically. E = embolus. M = 0.2;

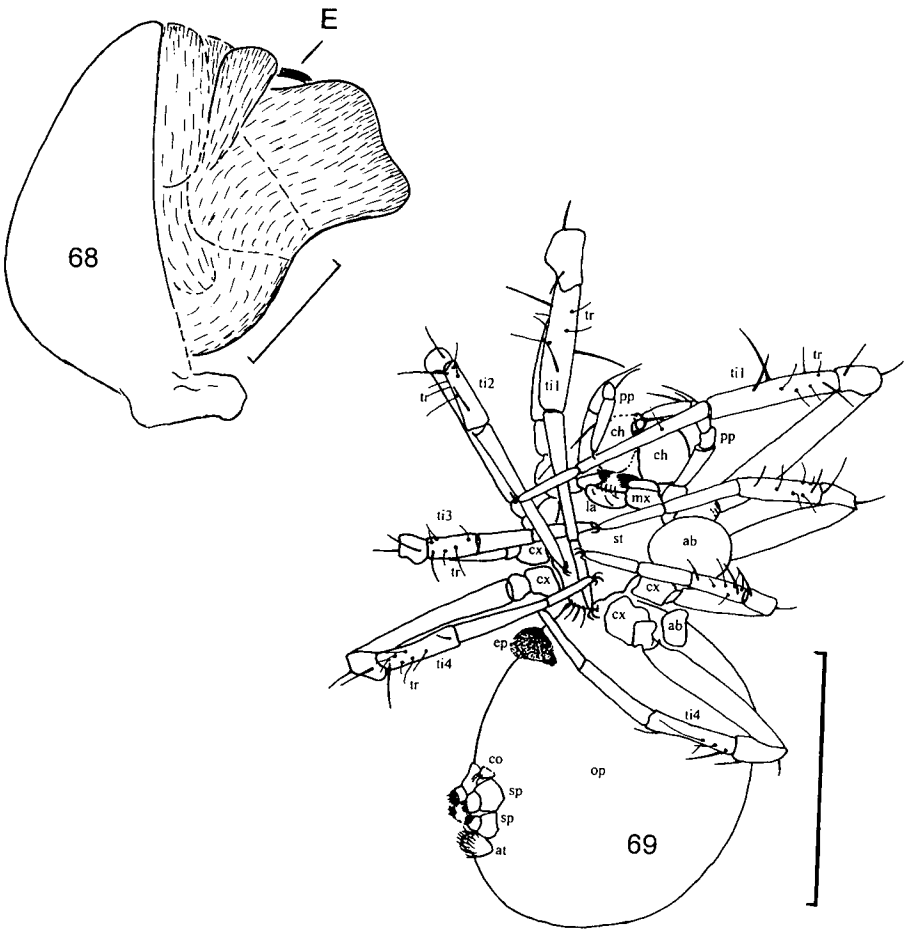


fig. 69) ?**Zygiellidae gen. & sp. indet.**, ♀, fossil in Lebanese amber, oblique ventral aspect of the body. Taken from PENNEY (2002: Fig. 3) (sub Linyphiidae indet.). M = 1.0.

BEITR. ARANEOL., 3 (2004)

FOSSIL TAXA OF THE FAMILY ARANEIDAE (ARANEAE) INCLUSIVELY NEPHILINAE IN BALTIC AND DOMINICAN AMBER, WITH THE DESCRIPTION OF A NEW EXTINCT SUBFAMILY AND NOTES ON SELECTED EXTANT TAXA

JOERG WUNDERLICH, Hindenburgstr. 94, D-75334 Straubenhardt.

ABSTRACT: Fossil and some extant members of the family Araneidae incl. Nephilinae (Araneae) in Baltic amber are revised; remarks are given on fossil Araneidae in Dominican amber. Araneidae is not regarded as the sister group of the Tetragnathidae. The relationships of selected subfamilies of the Araneidae are discussed, Nephilinae are revised and regarded as taxon of the family Araneidae but not of the Tetragnathidae. - The following fossil new taxa are described from Baltic amber: (a) Miraraneinae **n. subfam.**, *Miraraneus* **n. gen.** and *M. peregrinus* **n.sp.**, (b) Nephilinae: Palaeonephilini **n. trib.**, *Palaeonephila* **n. gen.**, *P. brevis* **n.sp.**, *P. curvata* **n. sp.**, *P. dilitans* **n.sp.**, *P. fibula* **n.sp.** and *P. longipes* **n.sp.**, *Eonephila* **n. gen.**, *E. bitterfeldensis* **n.sp.**, *E. excellens* **n.sp.** and *E. longembolus* **n.sp.**, *Luxurionephila* **n. gen.** and *L. spinifera* **n.sp.**; (c) ?Araneinae: *Anepeira* **n. gen.**, *A. complicata* **n.sp.**, *Bararaneus* **n. gen.**, *B. evolvens* **n. sp.** and *?B. annulatus* **n. sp.**, *Eoararaneus* **n. gen.**, *E. complexus* **n. sp.** - The Cretaceous genus *Cretaraneus* SELDEN 1990 - unplaced within the superfamily Araneoidea by SELDEN, preserved in limestone of Spain and probably Brazil - is regarded as a possible member of the Araneidae: Nephilinae. - For the first time a stridulating organ is described from a member of the Araneidae: Nephilinae, *Palaeonephila dilitans* n.sp.

Most of the **material** is kept in the private collection of J. WUNDERLICH (CJW).

INTRODUCTION

Usually fossil members of the orb weaver familiy Araneidae are of medium or larger size but there are also tiny spiders, e.g. the extinct genus *Eonephila* n. gen. In most extant taxa - and in all fossils which are known in Baltic and Dominican amber - the clypeus is shorter than the field of the median eyes (fig. 10), the distance of the medium eyes to each other usually is distinctly smaller than to the lateral eyes and the eye field is wide - e. g. figs. 10, 26, 38 -; some Nephilinae are exceptions. In most taxa there are numerous leg bristles but in some genera - e.g. in several Gasteracanthinae and in *Eonephila* - femora and metatarsi are bristleless, in *Pycnosinga* WUNDERLICH 1988 (Dominican amber) all femora are bristleless. In numerous taxa of the Araneidae is the male opisthosoma dorsally hardened or even covered with a scutum (e.g. fig. 1, 8, photos). Usually there is a distinct sexual size dimorphism at least in larger Araneidae - small males and/or large females; there may be even dwarf males and giant females, *Mangora, Hypsosinga* and *Singa* are some of the exceptions. Often the patella of the male palpus bears a pair of dorsal bristles but there may be one (e. g. in *Mangora*), three bristles or none in few Araneidae; in the Tetragnathidae and the Zygiellidae exist one patellar bristle only. In the Araneidae - as in most other taxa of the superfamily Araneoidea - the cymbium bears a paracymbium (e.g. figs. 5-6, 27, 37, 45-46); the metatarsus bears only one trichobothrium (this is usually short and indistinct), and the tarsus has none. In the Araneidae the autotomy is frequent as in most Zygiellidae - in contrast to the Tetragnathidae - and occurs between coxa and trochanter, compare the photos. The web is usually an orb web, except in *Micrathena* it has a closed hub; it may be modified, e. g. the tent-like web in the Cyrtophorinae in which a sticky spiral is absent or the strongly reduced "web" in the Mastophorinae. A part of a fossil orb web in Dominican amber including the sticky spiral is shown by POINAR (1999: Fig.70).
Members of the Araneidae are usually dwellers of higher strata, there are few exceptions, e. g. members of the extant genus *Cercidia* THORELL 1869 which live on the ground. - The distribution of the family Araneidae is cosmopolitical; most taxa are known from the tropics, e. g. Nephilinae is a tropical subfamily. - At least three of six genera in Dominican amber may be extinct: *Araneometa* WUNDERLICH 1988, *Fossilaraneus* WUNDERLICH 1988 and *Pycnosinga* WUNDERLICH 1988; extant genera are *Enacrosoma* MELLO-LEITAO 1932 (= *Cyclosa* sensu WUNDERLICH (1988), according to PENNEY (2001), Palaeontology, 44(5)), *Nephila* LEACH 1815 (sub Tetragnathidae, fig. 49), and probably *Araneus* LINNAEUS 1756, see WUNDERLICH (1988). All the genera in Baltic amber are extinct. Most of the specimens in Baltic amber are members of the "old" subfamily Nephilinae - see the genus *Cretaraneus* SELDEN below -; I found only very few doubtful members of the advanced subfamily Araneinae or its relatives. The genital structures (figs. 4-7) of some spiders in Baltic amber are so unusual that I create the new subfamiliy Miraraneinae. I am not quite sure about the relationships of some fossil members of the subfamily Nephilinae. If my hypothesis is correct the fossils of this subfamily in Baltic amber may well be somewhat like "links" beween the extant taxa which possess simple bulbus structures and their ancestors which still had complicated bulbi including a terminal and a median apophysis.

Synonymy, nominal species and nomina nuda of the fossils in Baltic amber

Several genera which were regarded as Araneidae by PETRUNKEVITCH (1958: 370-372) are members of different other families, see WUNDERLICH (1986) and the papers on these families in this volume:

Acrometa PETRUNKEVITCH 1942 = Synotaxidae,
Cyclosoma PETRUNKEVITCH 1958 ??= Cyatholipidae,
Elucus PETRUNKEVITCH 1942 = Synotaxidae,
Eometa PETRUNKEVITCH 1958 = Tetragnathidae,
Eustaloides PETRUNKEVITCH 1942 = Zygiellidae,
Memoratrix PETRUNKEVITCH 1942 = Linyphiidae or Pimoidae,
Theridiometa PETRUNKEVITCH 1942 = Synotaxidae (*Acrometa* PETRUNKEVITCH 1942).

Further synonyms and nov. comb.:
Siga MENGE in KOCH & BERENDT 1854 ?= Acrometa PETRUNKEVITCH 1942.
Gea militaris KOCH & BERENDT 1854 = *Hyptiotes militaris* (KOCH & BERENDT 1854), see the paper on the family Uloboridae in this volume.

Questionable members of the subfamily Argiopinae: According to PETRUNKEVITCH (1958) the two species of *Gea* sensu KOCH & BERENDT (1854) are members of the subfamily Argiopinae. I found not a single member of this subfamily in Baltic amber; *Graea* THORELL 1869 is a member of the family Zygiellidae. *Antopia* MENGE in KOCH & BERENDT (type species *Gea obscura* KOCH & BERENDT 1854) in my opinion is probably a member of the Theridiidae (type most probably lost).

Nomina nuda: *Epeira eogena* MENGE in KOCH & BERENDT 1854, *Epeiridion* MENGE in KOCH & BERENDT 1854 with the type species *E. femoratum*, *Onca* MENGE in KOCH & BERENDT 1854 with *O. lepida* and *O. pumila*.
Gea pubescens MENGE in KOCH & BERENDT 1854, *Zilla cornumana* MENGE in KOCH & BERENDT 1854, *Zilla spinipalpa* MENGE in KOCH & BERENDT 1854: See the paper on the Tetragnathidae and Zygiellidae in this volume.

Provisional revised diagnosis of the family Araneidae: Close contact of the triad spigots in adult females, a distinct sexual size dimorphism (absent e. g. in *Cercidia*, *Hypsosinga, Mangora* and *Singa* - reversals mainly in small spiders?), a wide eye field (?) - see below - and a coxa-trochanter autotomy are usually present, male opisthosoma frequently hardened or even with a distinct dorsal scutum (fig. 1, 8) (absent e. g. in *Mangora*; probably an autapomorphy of the family). Modified canoe-shaped tapetum of the pm eyes: See LEVI (1983: Fig.10) ♂-pedipalpus: Paired patellar bristles usually present (absent - as probable reversals - e. g. in *Anepeira* n. gen., *Mangora* O. PICKARD-CAMBRIDGE, *Miraraneus* n. gen. and some Nephilinae), dorsal cymbial outgrowth absent, cymbium and bulbus usually turned, with the cymbium in a medial position (figs. 42, 45-46); retreat present with a signal line.
Remark: The diagnosis of the Araneidae (as the Tetragnathidae) depends on the relationships of Nephilinae and Zygiellidae, and I am not at all sure about several "true" apomorphic characters - e. g. the wide exe field - of this family!
Further (most probably plesiomorphic) **characters**: Orb web with a closed hub - a free (open) hub present in *Micrathena* -, no free sector (as in the Zygiellidae), clypeus usually short (caput low) as in Tetragnathidae and Zygiellidae, wide eye field with the lateral eyes usually widely spaced from the median eyes (figs. 8-10, 26) (with few exceptions, e. g. some Nephilinae) and an "araneid sustentaculum" which is usually bent at its tip present. Labium usually wider than long, in Nephilinae about as long as wide. Usually numerous leg bristles. A scutate male opisthosoma is probably more frequent in tiny species. Epigynal scapus usually present, absent e. g. in Nephilinae. No streched leg resting position.

Relationships: According to the short clypeus, the presence of a sustentaculum and - in numerous taxa - depressions of the lung covers as well as the presence of an orb web there are similarities to the family Tetragnathidae but in Tetragnathidae the position of the triad spigots is different, any kind of autotomy, a scapus of the epigyne and usually a sexual size dimorphism (except in *Phonognatha*) are absent, the eye field is usually more compact, a hub bite out behaviour and a streched resting position are usually present, a retreat and a signal line are absent, the bulbus structures are more simple (but compare the extant Nephilinae), the chelicerae as well as tegulum and subtegulum are usually larger, compare below. Furthermore in most Tetragnathidae - more distinct in the males - the legs are longer and more hairy than in most Araneidae, especially I-II ventrally may have very long hairs. In my opinion Araneidae and Tetragnathidae are most likely not sister groups, see alternative relationships (4). - In the fossil Protheridiidae the clypeus is long, the structures of the bulbus and its position are quite different, see the paper on the superfamily Araneoidea in this volume. In the Zygiellidae the short clypeus and the leg autotomy are similar to the Araneidae but the position of the triad spigots is different, a free secor of the orb web is present, a scutum of the male opisthosoma and a sexual size dimorphism are absent, the eye field is more compact, the structures of the bulbus and its position are different, the canoe-shaped tapetum of the pm eyes is unmodified, see the paper on the Tetragnathidae and Zygiellidae in this volume.

Subfamilies: See below.

Distribution: Cosmopolitical.

The subfamilies of the Araneidae and their relationships

There are more than six or even ten subfamilies but the exact number is unknown, compare e. g. the Nephilinae which are regarded by some authors as member of the family Tetragnathidae - according to my hypothesis it is the most basal branch of the Araneidae -, the Miraraneinae (another basal branch) and the Zygiellidae.
During the evolution of the Araneidae there might have been many convergently evolved structures and reversals. In contrast e. g. to the Nephilinae the bulbus may have been twisted by a "functional reason": If a large bulbus is present. If - according to my hypothesis, see the paper on the superfamily Araneoidea in this volume - the dorsal cymbial outgrowth is an autapomorphy of a large branch of the Araneoidea s. str., this outgrowth is lost in the Araneidae (probably there are very few reversals).

The taxa in Baltic amber

Key to the genera of the family Araneidae in Baltic amber

1 Tiny spiders, length of the male body 1.3-1.9mm, femoral and metatarsal bristles absent, dorsal scutum of the ♂-opisthosoma present and distinct (fig. 8). ***Eonephila*** Photo 126

- Length of the male body > 2.5mm, at least one femoral bristle present, dorsal scutum of the ♂-opisthosoma present or absent (*Baraneus, Eoaraneus*) 2

2(1) ♂: Opisthosoma soft, not flattened. 6

- ♂: Opisthosoma distinctly flattened, dorsal scutum present (figs. 1,8). 3

3(2) Paracymbium extremely long (fig. 37a), eye field wide, pedipalpal patella with a single dorsal bristle, ♀ unknown. Photo 131. . . . . ***Luxurionephila***

- Paracymbium short, e.g. figs. 5, 23, 27. 4

4(3) Eye field fairly compact (fig. 26), patella of the pedipalpus with a pair of dorsal bristles (fig. 27), bulbus as in figs. 24-25, 27. Photo 129. . . . . ***Palaeonephila***

- Eye field very wide (fig. 38), patella of the pedipalpus with a single dorsal bristle (fig. 7), bulbus structures as in figs. 5-7, 41-42 5

5(4) Tibia I with long lateral bristles (fig.2), pedipalpus (figs. 4-7): Cymbium a large and nearly spherical sclerite, paracymbium thin, bulbus distinctly longer than wide, a large toothed tegular apophysis present. Photo 137 . . . . . ***Miraraneus***

- Lateral bristles of tibia I short (fig. 39), pedipalpus (figs. 40-42): Cymbium flat, bulbus about as long as wide, paracymbium different, no toothed tegular apophysis. . . Photo 132 . . . . . ***Anepeira***

6(2) Paracymbium T-shaped (fig. 53). . . . . ***Eoaraneus***

- Paracymbium not T-shaped (figs. 45, 52). Photo 133. . . . . ***Bararaneus***

1. Miraraneinae n. subfam.

Diagnosis (♂; ♀ unknown): Opisthosomal scutum present (fig. 1), prosoma profile distinctly convex, eye field wide, numerous thin leg bristles present, ♂-pedipalpus (figs. 3-7): Tibia short, basal part of the cymbium short, with a prolateral and a dorsal part, dorsal part nearly spherical, paracymbium with a bristle-shaped distal branch, a large retroventral tegular apophysis present, embolus long, with a seam and distally laying in a furrow of the cymbium, a questionable median apophysis present, bulbus with a washboard-shaped structure in a depression.

Further characters: Posterior eye row fairly recurved, clypeus short, legs with numerous long and slender bristles (fig. 2); condylus, sustentaculum (most probably), furrows of the lung covers, a stridulating organ, dorsal metatarsal bristles, tarsal comb, (gnatho)coxal hooks and paramedian apophysis absent, autotomy unknown; embolus laying in a furrow of the conductor, fig. 7. Sexual size dimorphism unknown, according to the small size of the male more likely present.

Type genus: *Miraraneus* n. gen.

Relationships: According to the short clypeus, the wide eye field and the prolateral part of the cymbium I regard the Miraraneinae as a taxon of the family Araneidae but a special sustentaculum is probably absent and the male genital organs are quite special: A unique dorsal part of the paracymbium and a large toothed retroventral apophysis are present.- According to the shape of the prosoma and the large retroventral tegular apophysis there are similarities to the Protheridiidae but in the Protheridiidae the shape of

the cymbium and paracymbium as well as the structures of the bulbus are quite different.

Distribution: Tertiary Baltic amber forest.

***Miraraneus* n. gen.**

Diagnosis (♂; ♀ unknown): Pedipalpus (figs. 22-25): One patellar bristle only, tegular apophysis basally with several teeth, embolus fairly bent.

Type species: *Miraraneus peregrinus* n. sp.

Relationships: Compare above.

Distribution: Tertiary Baltic amber forest.

***Miraraneus peregrinus* n.gen.n.sp.** (figs. 19-25) Photo 137

Material: Holotypus ♂ in Baltic amber and two separated amber pieces, F259/BB/AR/ARA/CJW; paratypus ♂ in Baltic amber F245/BB/AR/ARA/CJW; a questionable conspecific ♂ in Baltic amber, Zool. Mus. Copenha-gen, coll. ANDERSEN.

Diagnosis (♂; ♀ unknown): Tibia of the pedipalpus with very long hairs (fig. 22); see also the genus diagnosis.

Preservation and syninclusions: The holotypus is completely and fairly well preserved, the right side is partly covered by a white emulsion. Bubbles are preserved in contact to the right cymbium and to the right side of the prosoma. In the separated amber pieces are some stellate hairs present. - The paratypus is nearly completely preserved, only the dorsal half of the right patella I is cut off; dorsally the spider is covered by a white emulsion, the bulbus structures are partly hidden. - The questionable male is badly preserved, the small amber piece is broken in three parts and now preserved in glycerine.

Description (holotypus ♂):
Measurements (in mm): Body length 2.5, prosoma length 1.5, leg I: Femur 1.25, patella 0.55, tibia 1.1, metatarsus 1.15, tarsus 0.45, tibia II 0.95, tibia III 0.55, tibia IV 0.7.

Colour mainly dark brown, opisthosoma ventrally yellow brown.
Prosoma profile convex and similar to the Baltaraneinae, clypeus shorter than the field of the median eyes, eye field wide as in Baltaraneinae, anterior median eyes largest, posterior row fairly recurved, chelicerae robust, condylus absent, labium fairly wider than long, no gnathocoxal hook, sternum longer than wide, scarcely prolongated posteriorly. - Legs (fig. 20-21) fairly robust, order I/II/IV/III, short hairs and numerous slender bristles are present which are very long on tibia I: Femora 1-2 dorsally in the basal half, patellae 2 dorsally and 1 retrolaterally, tibia I 2 dorsally, 2 pairs laterally which are up to 3 tibial diameters long, few ventrally and apically, metatarsi I-II none, metatarsus III ventrally a single and 2 pairs, metatarsus IV 3 proventrally. No coxal hook. Sustentaculum most probably absent. Paired tarsal claws with long teeth, the retrolateral claw I bears at least 4 teeth. Position of the long trichobothrium IV in 0.87. Autotomy unknown. - Opisthosoma (fig. 19) distinctly longer than wide, nearly hairless, dorsally covered with a large scutum, no sclerotized ring around the spinnerets but epigaster hardened. Lung covers smooth. Anterior spinnerets large, colulus small. - Pedipalpus (figs. 22-25; see also above): Patella short, with 1 dorsal bristle, tibia short, with 1 dorsal bristle and several long hairs, the questionable median apophysis small and divided (fig. 25), retrolateral tegular apophysis long, posteriorly toothed and directed retrolaterally.

Relationships: See above.

Distribution: Tertiary Baltic amber forest.

2. Nephilinae

Nephilinae (German name "Seidenspinnen") are cosmotropical distributed spiders which build large orb webs in higher strata. Fossil members of an extant genus - *Nephila* LEACH 1815 - are frequent in Dominican amber, compare WUNDERLICH (1982, 1988). An extant female and the closed hub of its web as well as the distinct sexual size dimorphism are shown in the figs. 325-326 of the book of WUNDERLICH (1986). In Baltic amber I report three genera - *Eonephila* n.gen., *Luxurionephila* and *Palaeonephila* n.gen. - which may well be members of this subfamily but its bulbus structures are more complicated as in the extant genera.

Taxonomy

Nephilinae as traditionally been regarded as a taxon of the family Araneidae, compare e. g. DAVIES (1980), LEVI (1980) and WUNDERLICH (1986). Recently some authors regard Nephilinae as a primitive subfamily of the Tetragnathidae, compare e. g. SCHARFF & CODDINGTON (1997), GRISWOLD et al. (1998).
After my investigations Nephilinae sensu SCHARFF & CODDINGTON (1997) is not a monophyletic taxon; in my opinion at least three extant genera - *Herennia, Nephila, Nephilengys* and probably *Clitaetra* but not *Phonognatha* SIMON 1894 and other genera - as well as most probably the fossil genera *Cretaraneus* SELDEN 1990, *Eonephila* n. gen. and *Palaeonephila* n. gen. are true members of the Nephilinae, see the discussion below. The type species of the Cretaceous genus *Cretaraneus* - Spain and probably Brazil: See MESEQUITA (1996); not preserved in amber - shows a prolongated and ?fused embolus/conductor in a distal position (figs.50-51) which is an apomorphic character of the Nephilinae. A dorsal outgrowth of the cymbium is absent, the presence of a scutum of the male opisthosoma is unknown, the eye field is most likely narrow. In my opinion are the seemingly forwardly directed chelicerae in an unnatural position in this compressed fossil. I regard *Cretaraneus* as a member of the Nephilinae mainly because of the structures of the male pedipalpus and also because of the narrow eye field. SELDEN described this genus unplaced within the superfamily Araneoidea.

Revised diagnosis of the Nephilinae: Special web building behaviour, compare EBERHARD (1982), labium nearly as long as wide (see below), it may be +/- triangular (figs. 19-20), no scapus of the epigyne, embolus wrapped, fused with or guided by a long and protruding conductor and in a distal position (figs. 16, 30), terminal and median apophyses basicly present (e. g. in the fossil taxa in Baltic amber), in the extant taxa a terminal apophysis, a paramedian and usually a median apophysis are absent (a terminal apophysis is convergently lost e. g. in the Argiopinae).

Further characters: Eye field often narrow (fig. 26) but wide e. g. in *Luxurionephila* and *Eonephila* (figs. 27, 52) as well as some females of *Nephila*, ♂-opisthosoma with a large dorsal scutum (e.g. fig.26) but no sclerotized ring around spinnerets, furrows/ depressions of the lung covers often distinct in larger spiders, sustentaculum reduced or +/- straight, condylus present or absent (in the fossils), autotomy between coxa and trochanter frequent, present in at least 40% of the fossils of *Nephila* and other genera; patella of the ♂-pedipalpus probably basicly with paired dorsal bristles, in such a manner in *Palaeonephila* n. gen. (fig. 27) but a single bristle occurs e. g. in *Eonephila* n. gen. (fig. 17) and in the extant genus *Nephila* LEACH 1815, paracymbium usually small and weakly sclerotized, e.g. figs. 15, 23, 27, but comp. fig. 37a!, median apophysis often reduced or even absent in the extant taxa but present in *Herennia*; hub closed in the extant genera, not known in the fossils. The labium (figs. 19-20) may be +/- triangular and is not rebordered, according to my observations it is usually 1.2 to 1.3 times wider than long in extant and fossil Nephilinae in contrast to other Araneidae, as well as extant and fossil Zygiellidae in

which the labium usually is 1.5 to 1.6 times wider than long. In the extant genera a distinct sexual size dimorphism is present - male prosoma usually half the size of the female or less. Position of the triad spigots: See below.

Genera: See above. *Perilla* THORELL (extant, Araneinae): See KUNTNER (2002:281), J. Arachnol., 30.

The **relationships** are unclear, see the branches in the section "Possible relationships of the subfamilies...". According to the characters of other Araneidae subfamilies and the family Tetragnathidae - see the table below - Nephilinae is more likely a member of the Araneidae than of the Tetragnathidae. According to the absence of derived characters of the Araneidae - e. g. a twisted bulbus, sexual dimorphisms like a modified male leg I and a hook of the male coxa and/or gnathocoxa - Nephilinae is one of the most "primitive" subfamilies of the Araneidae. Surely the simple bulbus structures of *Nephila* are not plesiomorphic but reduced; see SCHULT & SELLENSCHLO (1983), compare the extant genus *Herennia* in which a "tegular" (?= median) apophysis is present as well as the new fossil genera *Eonephila* and *Palaeonephila*. The homology of bulbus structures like "median apophysis", "tegular apophysis" and "terminal apophyses" in Araneidae are partly unsure to me.

Distribution: Extant: Cosmotropic, mainly in the southern hemisphere; fossil: Cretaceous: Spain and probably Brazil (not in amber, compare above); Tertiary: Baltic amber (three extinct genera), Dominican amber (the extant genus *Nephila* LEACH).

Selected characters of the families Araneidae, Zygiellidae and Tetragnathidae compared with characters of the subfamily Nephilinae, with a discussion on the relationships of *Phonognatha* and the limit of the subfamily Nephilinae (see also above):

Character	Araneidae excl. Nephilinae	Araneidae: Nephilinae	Zygiellidae	Tetragnathidae
triade complex in cose functional contact (1)	+ (1)	+	—	—
coxa-trochanter autotomy	frequent	frequent	frequent	absent
suppressed regeneration of legs	- (2)	+	+	+
canoe-shaped tapetum of the pm eyes	modified		unmodified	—

type of caeca (2)	araneid	araneid	?	tetragnathid
distinct size dimorphism (prosoma)	usually present	usually present	absent	usually absent
hub bite out behaviour	- (4)	-	-(+)	+ (4)
streched resting position or retreat/signal line (r)	(s) r	r	r	s
hardened/scutate ♂-opisthosoma	+/-	+	-	-
long erect ventral hairs of the anterior leg articles	-(+)	-	-	+ (-)
dorsal cymbial outgrowth	-	-	+/-	+/-
median apophysis	+	+/- (5)	+/-	-
scapus of the epigyne (5)	+ (-)	-	+/-	-

Remarks: (a) Several characters as the type of the caeca, the position of the triade complex and the behaviour are not known in the fossils (and in the extant genus *Chrysometa*) and are taken from extant taxa; (b) when studying the relationships of a higher taxon one has to focus on the type taxon - *Nephila* in the Nephilinae -, not on a genus of a questionable higher taxon like *Phonognatha*.

(1) BLEHER (2000: 281) writes: "In adult females of Nephilinae and Araneidae the three triad spigots are in close functional contact,..., whereas in all other groups they stand apart from each other (HORMIGA et al., 1995)." According to HORMIGA et al. in this respect *Phonognatha* is an exception (!) within the Nephilinae. - In the fossil spiders the position of the triad spigots is unknown.

(2) According to VOLLRATH (1990).

(3) Compare PALMGREN (1980). According to PALMGREN also *Meta* C. L. KOCH 1836 has an araneid type of the caeca but after other characters *Meta* is doubtless a member of the family Tetragnathidae.

(4) In this respect the genus *Phonognatha* SIMON 1894 is of special interest: I found a distinct sexual size dimorphism in *P. melania* (L. KOCH) (CJW); according to HORMIGA et al. (1995) the hub of the web is closed. Because of the position of the spigots of the triad - compare remark (1) above -, the large chelicerae, the soft male opisthosoma and finally the simple bulbus structures, the absence of a median apophysis and the position of embolus with conductor I regard *Phonognatha* as a member of the Tetragnathidae (subfamily?) and not of the Araneidae: Nephilinae. In contrast to the opinion of HORMIGA et al. (1995) I regard the Nephilinae - in the traditional sense - not as monophyletic. According to my hypothesis the hub bite out behaviour has been lost in *Phonognatha*; compare the Aziliinae. On the other hand also in the Araneidae (*Micrathena*) an open hub may be present, see CODDINGTON (1986: Fig. 12.1). Furthermore an open hub is present in *Chrysometa*, see the paper on Tetragnathidae and Zygiellidae in this volume.

(5) According to my hypothesis - see SCHULT & SELLENSCHLO (1983) and compare LEVI & EICKSTEDT (1989) - the simple bulbus structures (and the absence of a scapus, too) in the Nephilinae and other taxa are reductions of plesiomorphic characters, compare the fig. of the relationships of subfamilies above. "Die Untersuchung der Kopulationsorgane von *Nephila* zeigt, daß sie denen der übrigen Araneidae im Prinzip entsprechen. Die von GERHARDT (1933) angenommene sekundäre Vereinfachung der Bulbi ist - wie ihr Einführungsmodus zeigt - eine Spezialisierung, funktionell bedingt durch den enormen Größenunterschied zwischen Männchen und Weibchen." SCHULT & SELLENSCHLO (1983: 228).

Conclusions: There are several important family characters which are shared by Nephilinae and Araneinae (and other Araneidae). The bulbus of the extant genus *Nephila* - absence of radix, median, terminal and tegular apophyses, fig. 49 - is surely secondarily simplified. The position of *Nephila* is at the end of reductions; the plesiomorphic bulbi of the extinct Early Tertiary genera *Eonephila* and *Palaeonephila* (tribus Palaeonephilini, figs. 17-18, 27) possess the most complicated structures in the subfamily Nephilinae. The extant genera *Herennia* and *Nephilengys* possess bulbus apophyses - compare LEVI & EICKSTEDT (1989: Fig. 16-17) with a ?median apophysis in *Nephilengys*) and DAVIES (1988: Fig. 18, "tegular apophysis" in *Herennia* sp.) and are "steps" between the extinct genera and the secondary simple condition in *Nephila*. According to my hypothesis - regarding the bulbus structures - the extinct tribus Palaeonephilini is somewhat like a "link" between extinct plesiomorphic Araneidae and todays Nephilinae.

Palaeonephilini n. trib.

Diagnosis (♂; ♀ unknown; compare the diagnosis of the subfamily Nephilinae): Median apophysis, a further tegular apophysis (?= "paramedian") apophysis and terminal apophysis of the bulbus are present, figs. 16-18, 27).

Further characters (compare the subfamily characters above): Eye field wide (e. g. fig. 9) or narrow (e. g. fig. 26), labium long (figs. 19-20), condylus absent, sustentaculum straight (fig. 36), a large male opisthosomal scutum present (e. g. fig. 8) but no sclerotized ring around spinnerets, a pedipalpal-cheliceral stridulating organ may be present (*Palaeonephila*, figs. 32-33), 1-2 patellar bristles of the ♂-pedipalpus present.

Relationships: In the extant genera of the Nephilini - *Nephila* and related genera, compare above - the bulbus is more simple, at least a terminal apophysis is absent.

Type genus: *Palaeonephila* n. gen. Further genera: At least *Eonephila* n. gen. and *Luxurionephila* n. gen.

Distribution: Tertiary Baltic amber forest.

***Eonephila* n. gen.**

Diagnosis (♂; ♀ unknown): Cuticula of the prosoma rugose (fig.8), eye field wide (fig. 9), no leg bristles on femora and metatarsi; pedipalpus (figs. 14-18): A single patellar bristle, median and tegular apophyses present, terminal apophysis absent.

Further characters: All eyes of about the same size, patella + tibia about the same length as tarsus + metatarsus, at least metatarsus I-III with a trichobothrium, position metatarsus III in *E.* sp. indet. (no. F255) in 0.27, paracymbium outstanding, origin of embolus/conductor prodistally; compare the diagnoses of tribus and subfamily above.

Relationships: According to the long, +/- triangular and not rebordered labium, the not modified leg I and gnathocoxae, the absence of a terminal apophysis and the connected embolus + conductor I regard *Eonephila* as a member of the subfamily Nephilinae. The prodistal origin of embolus + conductor is similar in the extant genus *Nephila* LEACH 1815; in *Nephila* there are numerous leg bristles, a median apophysis as well as a tegular apophysis are absent. In *Anepeira* (see below) and

Palaeonephila (see below) is a terminal apophysis present; compare the key of the fossil genera.

Type species: *Eonephila excellens* n. sp.

Distribution: Tertiary Baltic amber forest incl. Bitterfeld locality.

Key to the species of the genus *Eonephila* (♂):

Remark: Only in *E. bitterfeldensis* (fig. 16) the tibial and patellar bristles of the pedipalpus are distinct but hair-shaped in the other species.

1 Embolus and conductor long (figs. 15-16), body length 1.3mm. . . . . ***longembolus***

- Embolus and conductor short (figs. 14, 17), body length 1.5 or 1.9mm. 2

2(1) Bulbus fig. 14, body length 1.9mm. . . . . ***excellens***

- Bulbus figs. 17-18, body length about 1.5mm. . . . . ***bitterfeldensis***

***Eonephila excellens* n.gen.n.sp.** (figs. 8-14) Photo 126

Material: Holotypus ♂ in Baltic amber and a separated amber piece, F256/BB/AR/ARA/CJW.

Preservation and syninclusions: The spider is completely and excellently preserved, a white emulsion covers partly the mouth parts, the left legs II and III are lost by autotomy; one of the most beautiful preserved fossil spider I ever saw. - No stellate hairs. Remains of a ?sperm secretion: See below.

Diagnosis (♂; ♀ unknown): Body length 1.9mm, embolus short (fig. 14).

Description (♂):
Measurements (in mm): Body length 1.9, prosoma: length 1.0, width 0.85, leg I: Femur 0.8, patella 0.32, tibia 0.55, metatarsus 0.57, tarsus 0.38, tibia IV 0.47.
Colour: Prosoma and legs dark brown, opisthosoma red brown.

Prosoma (figs. 8-10): 1.2 times longer than wide, fine rugose, covered with very few short hairs. Caput convex, with a depression to the thorax, groove hidden. Eyes small, field wide, posterior row distinctly recurved, posterior median eyes separated by more than a diameter, separated by more than four diameters from the lateral eyes. Anterior median eyes separated by 1 1/2 diameters from the margin of the clypeus. Chelicerae long, fairly slender, no condylus. Labium somewhat triangular, nearly as long as wide, similar to fig. 19. Gnathocoxae wide and with a fine serrula, sternum as long as wide, rugose, separating the coxae IV by more than half of its diameter. - Legs (fig. 11) robust, order I/II/IV/III, III distinctly the shortest, few hairs of medium length, trichobothria short, paired claws toothed. Bristles slender, long on the tibiae, absent on femora, metatarsi and tarsi. Patella I with 2 dorsal and a pair of lateral bristles, tibiae with dorsal and lateral bristles, order of dorsal bristles 2/2/1/1, I with a pair of lateral and 1 or 2 prolateral bristles, other bristles not noted. - Opisthosoma (fig. 8) flat, pointed frontally, 1.6 times longer than wide, completely covered with a dorsal scutum, only few mostly short hairs. Epigaster scutate, no sclerotized ring about spinnerets. Colulus of medium size, anterior spinnerets very thick. - ♂-pedipalpus (figs. 12-14: Patella and tibia short, patella with one dorsal hair-shaped bristle, tibia with several bristle-shaped hairs similar to *bitterfeldensis*, embolus/conductor short, near the tip of both emboli a tiny droplet of secretion (S in fig. 14), less than 0.05mm in diameter, which probably contains remains of sperm.

Relationships: see the key; largest known species of the genus.

Destribution: Tertiary Baltic amber forest.

***Eonephila longembolus* n.gen.n.sp.** (figs. 15-16)

Material: Holotypus ♂ in Baltic amber and a separated amber piece, F257/BB/AR/ARA/CJW.

Preservation and syninclusions: The spider is fairly well and completely preserved but darkened most probably by heating in an autoclave. The left leg II is covered and thickened by a ?liquid emulsion, dorsal parts of the opisthosoma are covered by a white emulsion. - No stellate hairs.

Diagnosis (♂;♀ unknown): Body length 1.3mm, embolus/conductor about as long as the bulbus (figs. 15-16).

Description (♂):
Measurements (in mm): Body length 1.3, prosoma length about 0.75, leg I: Femur ca 0.6, patella 0.22, tibia 0.37, metatarsus 0.35, tarsus ca 0.25, tibia IV ca 0.25.
Colour dark brown.

Prosoma, legs and opisthosoma similar to *E. excellens* but smaller and the legs shorter. Pedipalpus (figs. 15-16): Patella with a hair-shaped bristle, the bulbus structures are partly hidden, the paracymbium is slender.

Relationships: The other known species are larger and its embolus is shorter.

Distribution: Tertiary Baltic amber forest.

***Eonephila bitterfeldensis* n.gen.n.sp.** (figs. 17-18)

Material: Holotypus (♂) in Baltic amber from Bitterfeld, coll. M. KUTSCHER in Sassnitz; 1 questionable ♂ Mus. Ziemi Warsaw no. 18815; 1 questionable ♂ coll. F. EICHMANN in Hannover no. AE19.

Preservation and syninclusions: Holotypus: The spider is fairly well and completely preserved but darkened probably by heating in an autoclave. An amber layer covers the spider dorsally. A white emulsion is absent, a larger bubble is preserved beneath the body. - No stellate hairs. - The questionable ♂ from the coll. EICHMANN is completely and well preserved; in the ♂ from the Muzeum Ziemi the right leg II is lost by autotomy.

Diagnosis (♂; ♀ unknown): Body length 1.5mm, pedipalpus: Patellar bristle strong (fig. 17), embolus short, median apophysis as in figs. 17-18.

Description (♂):
Measurements (in mm): Body length 1.5, leg I: Tibia 0.5, metatarsus 0.46, tarsus 0.37, tibia IV 0.37.
Colour dark brown.
Prosoma, legs and opisthosoma similar to *E. excellens* but smaller.
♂-pedipalpus (figs. 17-18): Patella with one thin dorsal bristle, tibia with several dorsal macrosetae, both articles short. In the questionable male from the coll. EICHMANN (fig. 18, ventral view) is the tegular apophysis distinctly separated from the median apophysis.

Relationships: See the key.

Distribution: Tertiary Baltic amber forest, Bitterfeld deposit and probably also from not-Bitterfeld localities (questionable males).

Indet. material of *Eonephila* in Baltic amber:
1♂, F254/BB/AR/ARA/CJW; 1♂, F255/BB/AR/ARA/CJW; 1♂, F258/BB/AR/ARA/CJW; 1 ♂, F259/BB/AR/ARA/CJW; 1♂, Geolog.-Paleontol. Inst. Univ. Hamburg no. B17167.

***Palaeonephila* n. gen.**

Diagnosis (♂; ♀ unknown): Pedipalpal-cheliceral stridulating organ present at least in *P. dilitans* (figs. 49-50; best observable in this species), eye field compact (fig. 43); pedipalpus: Tibia with an apical apophysis (fig. 39), patella with a pair of dorsal bristles (fig. 44), median apophysis, tegular (?= paramedian) apophysis and a large terminal apophysis present, tegulum with a basal hook.

Further characters: Posterior eye row slightly procurved to slightly recurved (figs. 43, 48), a large dorsal scutum present, at least in *P. brevis* metatarsus IV bears a trichobothrium. The legs may be annulated. Embolus partly fused to the long conductor (figs. 41, 44, 47). Compare the diagnoses of tribus and subfamily above.

Relationships: The terminal apophysis is larger than in all other Nephilinae except *Luxurionephila* and a stridulating organ is absent in other genera of the subfamily (unknown in *Luxurionephila*). Acording to the bulbus structures *Luxurionephila* and *Anepeira* n. gen. may be related; in these genera the eye field is distinctly wider, the patella of the pedipalpus bears only one bristle, a tibial apophysis of the male pedipalpus is absent, and a stridulating organ is absent, too.

Type species: *Palaeonephila curvata* n. sp.

Distribution: Tertiary Baltic amber forest.

Key to the species of Palaeonephila (males):

1 Median apophysis long (figs. 24, 27). 2

- Median apophysis short (e. g. fig. 30). 3

2(1) Embolus/conductor slightly bent, conductor apically hook-shaped (figs. 27-28). . . . . ***fibula***

- Embolus/conductor strongly bent, conductor apically not hook-shaped (fig. 25). . . . . ***curvata***

3(1) Tibia I 2.5mm long, pedipalpus figs. 36-37. . . . . ***longipes***

- Tibia I 1.4-1.5mm long. 4

4(3) Median apophysis apically widened (fig. 35). . . . . ***dilitans***

- Median apophysis apically not widened, largest hook of the tegulum (fig. 30). . . . . ***brevis***

Material indet.: 1 ♂ Mus. Paris no. 4446; 1 ♂ (two parts), F279/BB/AR/ARA/CJW.

***Palaeonephila curvata* n.gen.n.sp.** (figs. 20-25) Photo 129

Material: Holotypus ♂ in Baltic amber, F282/BB/AR/ARA/CJW; 1♂ paratypus and two separated amber pieces F278/BB/AR/ARA/CJW; questionable material: 1♂ F281/BB/AR/ARA/CJW; 1 ♂ coll. LIEDTKE no. 597.

Remark: The length of tibia I is quite variable in the material - compare below - and a closer study of the bulbus structures is impossible; therefore the questionable males may be not conspecific with the holotypus.

Preservation and syninclusions: The holotypus is fairly well preserved, ventrally it is covered by a thick white emulsion, the right legs I, II and IV and the left legs I and II are lost by autotomy. - Near the right side of the opisthosoma a parasitic mite (Acari) preserved is which may have come from the spider; behind the spider a Diptera: Nematocera and numerous stellate hairs are present. - Paratypus: The spider is fairly well preserved, the left patella II and III and distal parts of the left leg IV are cut off, parts of the opisthosoma are covered by a white emulsion. - Few stellate hairs and a tiny Nematoda are preserved in the larger of the separated amber pieces. - The male F281 is well and nearly completely preserved, the left leg I is lost after the coxa by autotomy. - The male no. 597 of the coll. LIEDTKE is well and completely preserved.

Diagnosis (♂; ♀ unknown): Tibia I (paratypus; lost in the holotype) 2.15mm long, tibia IV 1.1-1.3mm long, pedipalpus (figs. 21-25): Paracymbium with a large distal branch, terminal apophysis strongly bent and with a distinct dorsal margin, median apophysis long, most parts of the embolus are hidden.

Description (♂):
Measurements (in mm): Body length 3.3 (holotypus) - 4.0 (paratypus); paratypus: Prosoma length 1.9, leg I: Femur 2.7, patella 0.8, tibia 2.15, metatarsus 2.5, tibia IV 1.4; F281: Prosoma length 1.2, width 1.1, tibia I 1.3; tibia I of the ♂ of the coll. LIEDTKE 1.8.

Colour: Prosoma dark brown, legs and opisthosoma medium brown, legs dark annulated as in *brevis*.
Prosoma (fig. 20, photo) with numerous hairs and a distinct thoracal ridge. Posterior eye row +/- straight, its size similar to fig. 26. Clypeus about as long as a diameter of the large anterior median eyes, chelicerae short and robust, partly hidden, gnathocoxae wide, no hook. Labium (fig. 20) wider than long. - Legs (I-II are lost in the holotypus) long (paratypus) or of medium length, see above; metatarsus I of the paratypus is bent. Bristles long and strong: Femora dorsally 1/1/1 and 3 near the end, I-II additionally a lateral pair distally of the middle, I additionally a prolateral bristle in the basal half. Patellae dorsally 1/1 and 1 retrolaterally, tibiae besides the apical bristles 1 dorsal bristle in the distal half, I additionally 1 in the basal half and a lateral pair in the distal half, I-II an additional bristle in the middle, I (-II) with 2 ventral pairs. Metatarsi with 2-5 bristles, III-IV additionally a short ventral-apical bristle. Metatarsal trichobothria short and indistinct, position on I in 0.15 (F278, fig. 21). Tarsus IV with a straight sustentaculum, paired claws with long teeth, unpaired claw long and bent in a right angle. - Opisthosoma long ovally, dorsally completely covered with a scutum which bears short hairs. Colulus distinct, anterior spinnerets thick. - ♂-pedipalpus (figs. 21-25; compare the diagnosis): Patella with a pair of dorsal bristles, tibia with 1 dorsal bristle and an apical outgrowth.

Relationships: In *P. fibula* n. sp. the terminal apophysis is only slightly bent and the tip of the conductor is hook-shaped.

Distribution: Tertiary Baltic amber forest.

***Palaeonephila fibula* n.gen.n.sp.** (figs. 26-28)

Material: Holotypus ♂ in Baltic amber, F277/BB/AR/ARA/CJW.

Preservation and syninclusions: The spider is completely and well preserved, the ventral side is partly covered by a white emulsion. The legs of the spider are streched out on an amber layer on which also few silk thread lines without droplets are preserved in a longitudinal position, one originates on the spinnerets. - Several stellate hairs.

Diagnosis (♂; ♀ unknown): Tibia I 1.7mm long, pedipalpus (figs. 27-28): Terminal apophysis slightly bent, conductor apicylly hook-shaped, median apophysis and embolus long.

Description (♂):
Measurements (in mm): Body length 3.3, prosoma length 1.65, leg I: Femur 2.4, patella 0.75, tibia 1.7, metatarsus 2.5, tarsus 1.15, tibia II 1.5, tibia III 0.75, tibia IV 1.15.

Colour similar to *P. brevis* but leg annulation indistinct.
Prosoma, legs and opisthosoma similar to *P. curvata* n. sp. but posterior eye row slightly recurved (fig. 26). - ♂-pedipalpus: See above; tibia with long hairs, the basal tegular hook is probably small.

Relationshops: See *P. curvata*.

Distributions: Tertiary Baltic amber forest.

***Palaeonephila brevis* n.gen.n.sp.** (figs. 29-30)

Material: Holotypus ♂ in Baltic amber and a separated amber piece, coll. F. KERN-EGGER in Hamburg no. 85/95.

Preservation and syninclusions: The spider is well and nearly completely preserved, only the left leg II is lost after the coxa by autotomy, ventral parts are covered by a white emulsion, the left terminal apophysis is covered by a thin emulsion. - On the left patella IV prodorsally there is a bunch of thin silk threads, its diameter is 0.5mm, a thread is going to one of the spinnerets. Several silk threads are running through the amber piece near the spider; this bunch looks like threads which were collected again by the spider which failed to build a "bridge line".

Diagnosis (♂; ♀ unknown): Tibia I 1.4mm long; pedipalpus (figs. 29-30): Distal branch of the paracymbium, median apophysis and embolus short, terminal apophysis strongly bent.

Description (♂):
Measurements (in mm): Body length about 3.1, prosoma length about 1.2, tibia I 1.4, tibia IV 1.0.
Colour: Prosoma and opisthosoma dark brown, legs brown and annulated: Femora darkened in the distal half, tibiae darkened basally and distally.
Prosoma, legs and opisthosoma similar to *P. curvata* n. sp. Trichobothrium of metatarsus IV present, its position in 0.15, its length nearly a diameter of the article. - Pedipalpus: See above.

Relationships: See *P. longipes* n. sp. In *P. dilitans* n. sp. is the median apophysis apically widened and the embolus is longer, its tip is hidden by the terminal apophysis.

Distribution: Tertiary Baltic amber forest.

***Palaeonephila dilitans* n.gen.n.sp.** (figs. 31-35) Photo 130

Material: Holotypus ♂ in Baltic amber and a separated amber piece, F276/BB/AR/ARA/CJW.

Preservation and syninclusions: The body of the spider is well preserved, the right pedipalpus very well; the right leg I and the left legs I, II and IV are lost after the coxa by autotomy. Mainly the dorsal part of the opisthosoma is covered by a white emulsion. - No stellate hairs but numerous detritus particles are furthermore preserved.

Diagnosis (♂; ♀ unknown): Tibia I 1.3mm long; pedipalpus (fig. 35): Median apophysis short and apically widened, terminal apophysis strongly bent, embolus long, the tip is hidden by the terminal apophysis.

Description (♂):
Measurements (in mm): Body length about 3.3, prosoma length 1.6, leg I: Femur 2.15, patella 0.85, tibia 1.3, metatarsus 2.5, tarsus 1.1, tibia IV 1.0.
Colour similar to *P. brevis* but leg annulation indistinct.
Prosoma (figs. 31-32) similar to *P. curvata* n. sp. but retrolateral rugose field of the chelicerae (fig. 32) well observable and probably more distinct than in the related species. - Legs and opisthosoma similar to *P. curvata*. Colulus about long as wide, of medium size, apically rounded. Sustentaculum (fig. 34) only slightly bent. - Pedipalpus (figs. 33-35; see above): Femur prodorsally in the distally half with some hairy stridulating teeth (fig. 33). Because of their position such teeth are not observable in the other species.

Relationships: In the other known species of the genus the median apophysis is apically not widened.

Distribution: Tertiary Baltic amber forest.

***Palaeonephila longipes* n.gen.n.sp.** (figs. 36-37)

Material: Holotypus in Baltic amber, F280/BB/AR/ARA/CJW.

Preservation and syninclusions: The spider is well and completely preserved, parts of body and legs are covered by a white emulsion. - Also preserved are a tiny mite (Acari), remains of a tiny Arthropoda and numerous stellate hairs.

Diagnosis (♂; ♀ unknown): Tibia I 2.5mm long; pedipalpus (figs. 36-37): Median apophysis short and strongly bent, terminal apophysis fairly bent, embolus long and guided in its length by the conductor.

Description (♂):
Measurements (in mm): Body length about 3.5, leg I: Femur 3.3, patella 1.15, tibia I 2.5, metatarsus 3.85, tarsus 1.6, tibia il 2.3, tibia III 1.2, tibia IV 1.8.
Colour as in *P. brevis* n.sp.
Prosoma, legs and opisthosoma similar to *P. curvata* n.sp. but legs longer.
Pedipalpus (figs. 36-37; see above) with a short distal branch of the paracymbium.

Relationships: The shape of the median apophysis is as in *brevis* but *brevis* is short-legged and conductor/embolus are different.

Distribution: Tertiary Baltic amber forest.

***Luxurionephila* n. gen.**

Diagnosis (♂; ♀ unknown): Eye field wide. ♂-pedipalpus (fig. 37a): Patella with one dorsal-distal bristle, paracymbium extremely long and slender, basally divided, terminal apophysis very large, divided.

Type species: *P. spinifera* n. sp.

Relationships: See *Palaeonephila*.

Distribution: Tertiary Baltic amber forest.

***Luxurionephila spinifera* n. gen. n. sp.** (fig. 37a) Photo 131

Material: Holotypus ♂ in Baltic amber, coll. F. EICHMANN no. 381; later on most probably Palaeontological Institute of the University Hamburg.

Preservation and syninclusions: The spider is situated near the margin of the amber piece; it is well preserved, the right legs I and III are lost by autotomy, the dorsal side of the spider has no emulsion, the ventral side is not observable in the large amber piece of 8x4.5x2.5cm which consists of numerous resin flows. - 1 1/2 Diptera, an ant and several stellate hairs are preserved in the same amber piece.

Diagnosis (♂; ♀ unknown): Tibia I about 1mm long; pedipalpus as in fig. 37a).

Description (♂):

Measurements (in mm): Body length about 2.6, prosoma: Length 1.5, width 1.2, tibia I about 1.0. - Colour: Prosoma and legs dark brown, opisthosoma light grey. - Prosoma distinctly longer than wide, fine rugose, covered with short and - anteriorly - long hairs, thoracal fissure of medium length, eye field wide, most eyes are hidden, anterior median eyes protruding, posterior row straight, median eyes separated by about 3/4 diameters. - Legs only fairly long, with numerous long bristles, femora 2 dorsally, 3 apically and 2 prodistally on I, patellae 2 dorsally, 1 retrolaterally on I, a lateral pair on IV, tibiae as in *Palaeonephila curvata*, the metatarsi bear at least 1 dorsal bristle in the basal half and apical bristles. Paired tarsal claws with long teeth - Opisthosoma nearly as wide as long, distinctly flattened, dorsally completely covered by a large scutum which bears indistinct short hairs. - Pedipalpus (fig. 37a; see above): Patella short; only a short part of the embolus is observable near the tip of the cymbium.

Relationships: See above.

Distribution: Tertiary Baltic amber forest.

3. ?Araneinae

Remark: The relationships of the following taxa are unsure, they may be members of the subfamily Araneinae.

Anepeira n. gen.

Diagnosis (♂; ♀ unknown): Eye field wide, eyes very small (fig. 38); pedipalpus (figs. 40-42): One patellat bristle only, bulbus large and not turned outwards, terminal, median and ?paramedian apophyses present, embolus/conductor most probably in a distal position.

Further characters: Opisthosomal scutum present, (gnatho)coxal hook absent, labium about as long as wide, paracymbium not outstanding.

The **relationships** are quite unsure. I don't want to exclude relationships to the Nephilinae.

Type species: *Anepeira complicata* n.sp.

Distribution: Tertiary Baltic amber forest.

***Anepeira complicata* n.gen.n.sp.** (figs. 38-42) Photo 132

Material: Holotypus ♂ in Baltic amber and 2 separated amber pieces, F274/BB/AR/ARA/CJW.

Preservation and syninclusions: The amber piece has been heated in an autoclave. The spider is completely and well preserved, body and legs are partly covered by remains of a white emulsion, the opisthosoma is turned downwards. - Ventrally near the right side of the spider's body is a silk thread preserved. - Several stellate hairs are present in the larger separated amber piece.

Diagnosis (♂; ♀ unknown; see above): Pedipalpus as in figs. 39-42.

Description (♂):
Measurements (in mm): Body length about 3.3, prosoma: Length 1.45, width 1.35, opisthosoma: length 2.0, width 1.8, leg I: Femur 1.5, patella 0.65, tibia 1.2, metatarsus 1.35, tarsus 0.8, tibia IV 0.8.
Colour: Prosoma and legs dark brown, opisthosoma light brown; the legs were probably annulated.
Prosoma (fig. 38) nearly as wide as long, covered with few short hairs. Fovea hidden, eye field wide, eyes very small, posterior row slightly procurved, clypeus short, chelicerae robust, fangs thick, labium about as long as wide, gnathocoxae wide, hook absent, sternum longer than wide, not prolongated between the coxae IV. - Legs robust, order I/II/IV/III, III distinctly the shortest, no coxal hook. Position of the trichobothrium on metatarsus I-II in about 0.3, its length not more than the diameter of the article. Unpaired tarsal claws with very few teeth, unpaired claw long and bent in a right angle. Sustentaculum hidden or absent. - Opisthosoma nearly as wide as long, dorsally totally covered with a scutum and with few indistinct hairs. Anterior spinnerets thick and conical, colulus large. Right lung cover with few indistinct furrows. - Pedipalpus (figs. 40-42): Patella and tibia short and each with a dorsal bristle, paracymbium short and simple, median and paramedian apophyses present, embolus/conductor probably fused and in a distal position but I am not sure about this sclerite.

Relationships: Compare above.

Distribution: Tertiary Baltic amber forest.

***Bararaneus* n. gen.**

Diagnosis (♂; ♀ unknown): Opisthosomal scutum absent; pedipalpus (figs. 43, 45-46, 52-52): Gnathocoxal hook present, paracymbium large, median apophysis in the type species long and rugose (arrow), terminal apophysis and embolus hidden.

Relationships: After the presence of a gnathocoxal hook (arrow in fig. 43), the wide eye filed and the outwards turned position of the bulbus *Bararaneus* may be a member of the subfamily Araneinae. A gnathocoxal hook is also present in the genus *Leviellus* n. gen. (Zygiellidae). The bulbus structures are partly hidden. I do not know a strongly related genus. I will not exclude that the indet. female - see below - is congeneric; a sexual dimorphism in the shape of the opisthosoma is not unusual in the subfamily Araneinae. See the remark above and *Eoararaneus*.

Type species: *Bararaneus evolvens* n.sp.

Distribution: Tertiaray Baltic amber forest.

***Bararaneus evolvens* n. gen. n. sp.** (figs. 43-46) Photos 133-134

Material: Holotypus ♂ in Baltic amber, F273/BB/AR/ARA/CJW.

Preservation and syninclusions: The spider is well and completely preserved, some parts of body and legs are covered by a white emulsion. - No stellate hairs but some thin silk threads are present in front of the left leg II.

Diagnosis (♂; ♀ unknown; compare above): Prosoma hairy, paracymbium long (figs. 45-46).

Description (♂):
Measurements (in mm): Body length 3.2, prosoma: length 1.8, width 1.6, leg I: Femur 2.15, patella 0.8, tibia 1.8, metatarsus 1.9, tarsus 0.7, tibia II 1.35, tibia III 0.65, tibia IV 1.1, prosoma incl. chelicerae in frontal view 1.0, chelicerae 0.7.
Colour: Prosoma dark brown, legs medium brown, not annulated, opisthosoma light brown.
Prosoma slightly longer than wide, fairly hairy. Fovea distinct. Eyes of medium size, field (photo) wide as in Araneus and similar to *Anepeira* (fig. 38) but eyes larger, posterior row slightly recurved, anterior eyes slightly the largest, posterior median eyes separated by about their radius. Length of the clypeus about 1 1/3 of the diameter of an anterior median eye. Gnathocoxae with a distinct retrodistal hook (arrow in fig. 43), chelicerae robust, fangs thick. Most parts of the labium are hidden, it seems to be clearly wider than long. Sternum slightly prolongated posteriorly. - Legs (fig. 44) fairly robust, hairs indistinct, order I/II/IV/III, I not modified, with numerous strong bristles; leg I: Femur (fig. 44) 3 long and a short dorsal-apical bristle(s), 3 prolaterally, 2 retrolaterally and 3 retroventrally in the distal half in a row, patella 2 dorsally, 2 prolaterally and 1 retrolaterally, tibia - besides apical bristles - 2 dorsally, 2 pairs laterally and 1 proventrally in the middle; metatarsus none. Other metatarsi: II 1 retroventrally in the basal half; few on III and IV. Sustentaculum long and slightly bent. Most of the tarsal claws are totally hidden. Position of the small trichobothrium on metatasus II in 0.17. - Opisthosoma somewhat longer than wide, soft, dorsally covered with longer hairs; spinnerets short, colulus hidden. - Pedipalpus (figs. 45-

46, see above): Patella and tibia short and each with one long dorsal-distal bristle, gnathocoxal hook (arrow in fig. 43) distinct, cymbium in a medial position, bulbus structures strongly turned outwards.

Relationships: The prosoma is less hairy than in the female Araneidae: Araneinae sp. indet., see below, and opisthosomal humps are absent. In ?*B. annulatus* n. sp. the prosomal hairs are indistinct, the legs bear fewer bristles, the paracymbium is shorter and bears a spine.

Distribution: Tertiary Baltic amber forest.

?***Bararaneus annulatus* n. gen**. (fig. 52)

Material: Holotypus ♂ in Baltic amber, F545/BB/AR/ARA/CJW.

Preservation and syninclusions: The spider is well and nearly completely preserved, the right patella I is cut off and the retrodorsal surface of the right femur I is cut off within the amber on a layer; a large fissure hides parts of the body, few ventral parts are covered by a white emulsion. - The branch of a stellate hair is present in the amber piece, too.

Diagnosis (♂; ♀ unknown): Pedipalpus (fig. 52) with short patellar bristles and a large paracymbium which bears distally a thick and blunt spine.

Description (♂):
Measurements (in mm): Body length about 3.0, prosoma length 1.3, tibia II 1.33.
Colour: Prosoma dark brown, legs mainly dark brown, annulated, femora light brown in the basal third, tibiae light brown near the base and near the middle, opisthosoma yellow brown.
Prosoma similar to *B. evolvens* but hairs indistinct. Gnathocoxae and mouth parts are hidden. - Legs similar to *evolvens* but there are less bristles: Femur I 2 dorsally, 1 prolaterally, 3 apically, none ventrally, tibia I bears 9 bristles, metatarsus I-II none, metatarsus III-IV few. - Opisthosoma ovally, soft, covered with long hairs, around the pedicel dorsally distinctly rugose; paired sigillae are present but partly hidden. - Pedipalpus (fig. 52) with a short patella which bears 2 short dorsal bristles, a wide tibia which bears a long dorsal-distal bristle, a large paracymbium which bears distally a thick and blunt spine; cymbium unmodified, bulbus of medium size, embolus hidden, a rugose median apophysis is not observable.

Relationships: See *Bararaneus evolvens* n. sp. According to the different shape of the paracymbium and the probably absent rugose median apophysis *annulatus* may be the member of an unnamed genus.

Distribution: Tertiary Baltic amber forest.

***Eoararaneus* n. gen.**

Diagnosis (♂; ♀ unknown): Opisthosomal scutum absent, gnathocoxal hook unknown, pedipalpus (figs. 53-54): only one dorsal-distal patellar bristle is present, paracymbium large and T-shaped, bulbus complex and strongly outstanding, median apophysis not rugose, conductor large.

Type species: *Eoararaneus complexus* n. sp.

Relationships (see the key): Probably a member of the Araneinae; a gnathocoxal hook is absent. In *Bararaneus* an opisthosomal scutum is absent, too but the paracymbium is not T-shaped, the bulbus structures are less complex and a rugose median apophysis is present at least in the type species.

Distribution: Tertiary Baltic amber forest.

***Eoararaneus complexus* n. gen. n. sp.** (figs. 53-54)

Material: Holotypus ♂ in Baltic amber, F546/BB/AR/ARA/CJW.

Preservation and syninclusions: The spider is fairly well preserved, the left patella I is cut off, a large bubble covers the prosoma. - Several thin threads without droplets and remains of few stellate hairs are present in the same amber piece.

Diagnosis (♂; ♀ unknown): See above.

Description (♂):
Measurements (in mm): Body length 5.0, prosoma length 2.7, leg I: Femur 2.9, patella 1.1, tibia 1.9 (left) to 2.3 (right side), metatarsus 2.2, tarsus 0.7, tibia IV 1.45.
Colour: Prosoma dark brown, legs mainly dark brown, distinctly annulated, femora light brown in the basal half, tibiae light brown near the base and near the middle, opisthosoma yellow brown.
Prosoma wide and hairy, margin covered with longer hairs, fovea large, clypeus short, eye field wide, as in *Bararaneus*. Chelicerae robust, fangs long, anterior cheliceral margin with 3 large teeth. - Legs robust, order I/II/IV/III, fairly hairy, with long bristles, leg I: Femur 4 retroventrally in the distal half, 2 dorsally, a lateral pair in the distal half and 3 apically, patella 2 prolaterally, 1 retrolaterally and 2 dorsally, tibia 3 proventrally, 2 retroventrally, 3 dorsally, 1 prolaterally, 2 retrolaterally and 4 apically, metatarsus none, metatarsus II 1 retrobasally, metatarsi III-IV several. - Opisthoso-

ma soft, covered with long hairs; 4 pairs of sigillae. - Pedipalpus (figs. 53-54, see above): No gnathocoxal hook, patella short, dorsally with a short basal and a short (broken off?) distal bristle, tibia wide, with a long dorsal-distal bristle.

Relationships: See above.

Distribution: Tertiary Baltic amber forest.

?**Araneinae sp. indet**. (figs. 47-48) Photo 135

Material: 1 ♀ in Baltic amber, F275/BB/AR/ARA/CJW.

Preservation and syninclusions: The colour of the amber piece is yellow-orange, apparently the piece has been heated in an autoclave. The spider is well preserved, opisthosoma and mouth parts are covered by a white emulsion, the left legs III and IV are lost after the coxa by autotomy, the right leg IV is cut off through the patella, the sternum and parts of the legs are oxidated. - A thin thread of silk is running beneath the spider from the spinnerets forewards, a small Diptera: Nematocera is situated between the left legs I and II. Few stellate hairs and unbranched plant hairs are also preserved.

Diagnosis (♀): Opisthosoma with a pair of humps (fig. 47), epigyne (fig. 48) without a scapus.

Description (♀):
Measurements (in mm): Body length 4.5, prosoma length 2.1, opisthosoma length 3.0, tibia I 1.9.

Colour of prosoma and legs dark brown, legs probably not annulated.
Prosoma slightly longer than wide, hairy, fovea hidden. Eye field wide, similar to *Bararaneus*, eyes fairly large, posterior row straight, clypeus about as long as 1 1/4 diameters of an anterior median eye. Chelicerae robust, labium and gnathocoxae hidden, sternum not prolongated posteriorly. - Legs fairly hairy, robust, with numerous strong bristles; leg I: Femur at least 6, patella 2 dorsally, 2 prolaterally and 1 retrolaterally, tibia 2 dorsally, 2 pairs laterally and 4 pairs ventrally, metatarsus bristleless. Metatarsal trichobothria in a basal position. Paired tarsal claws with long teeth, unpaired claw strongly bent. Sustentaculum unknown (the tarsi IV are cut off). - Opisthosoma (fig. 47) fairly longer than wide, with short hairs and a pair of humps in the anterior half; spinnerets short. - Epigyne (fig. 48) a strongly sclerotized plate, longer than wide, with a longitudinal depression. Scapus absent; no indication of a scapus which has been broken off.

Relationships: See *Bararaneus* n. gen. and *Eoaraneus* n. gen. Opisthosomal humps are not unusual in members of the Araneinae; in conspecific males such humps may be absent. Unusual in this subfamily is the absence of a scapus as in the Tetragnathidae and in some Zygiellidae.

Distribution: Tertiary Baltic amber forest.

Taxa in Domi nican amber

The following taxa are known (see WUNDERLICH (1988: 104-113):

1. Araneinae:

Araneometa WUNDERLICH 1988
A. excelsa WUNDERLICH 1988
A. herrlingi WUNDERLICH 1988
A. spirembolus WUNDERLICH 1988
A. sp. indet. sensu WUNDERLICH (1988)
?*Araneus nanus* WUNDERLICH 1988
Enacrosoma verrucosa (WUNDERLICH 1988) (= *Cyclosa verrucosa* WUNDERLICH 1988, see PENNEY (2001), Palaeontology, 44 (5)).
Pycnosinga WUNDERLICH 1988
P. fossilis WUNDERLICH 1988

2. Questionably subfamily:

Fossilaraneus WUNDERLICH 1988
F. incertus WUNDERLICH 1988

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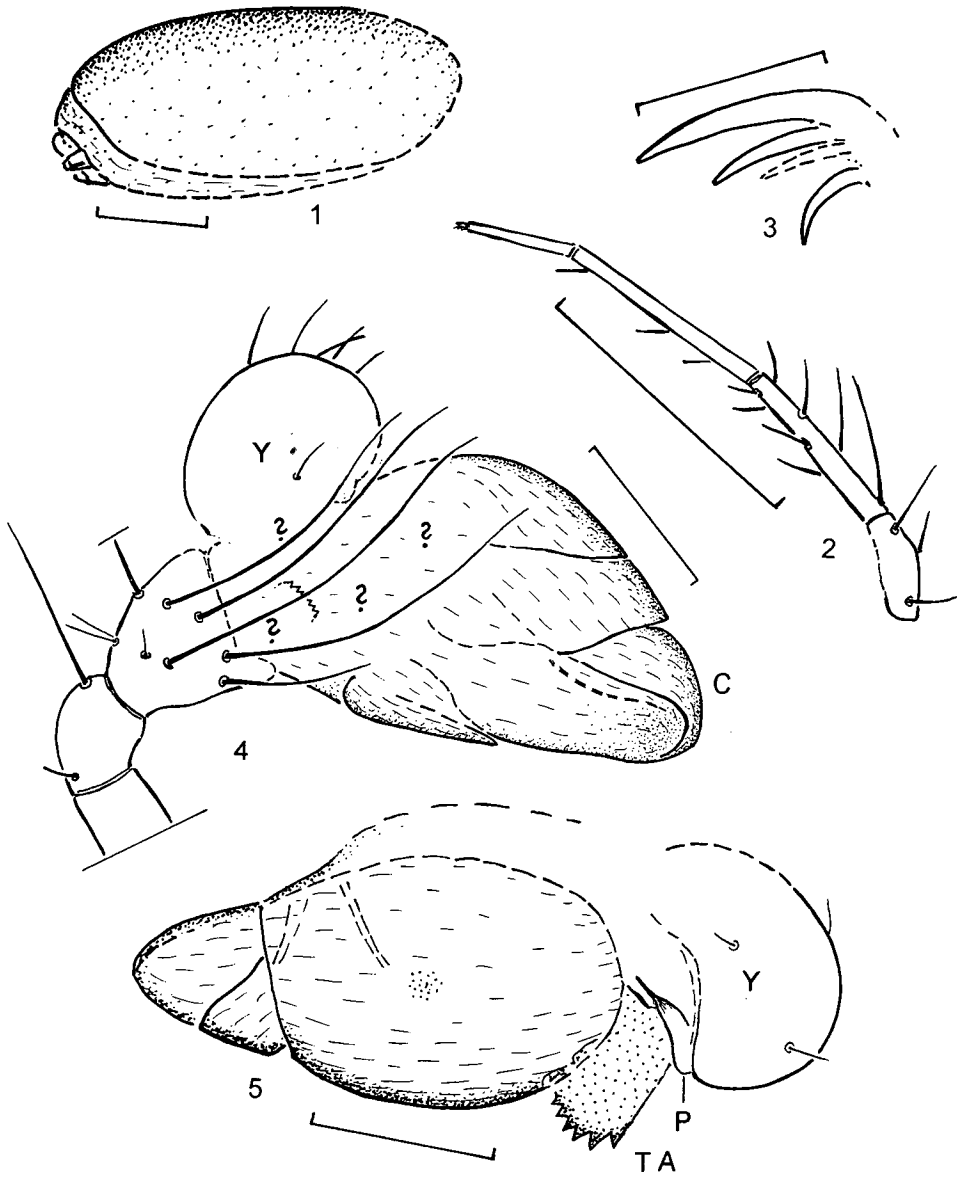
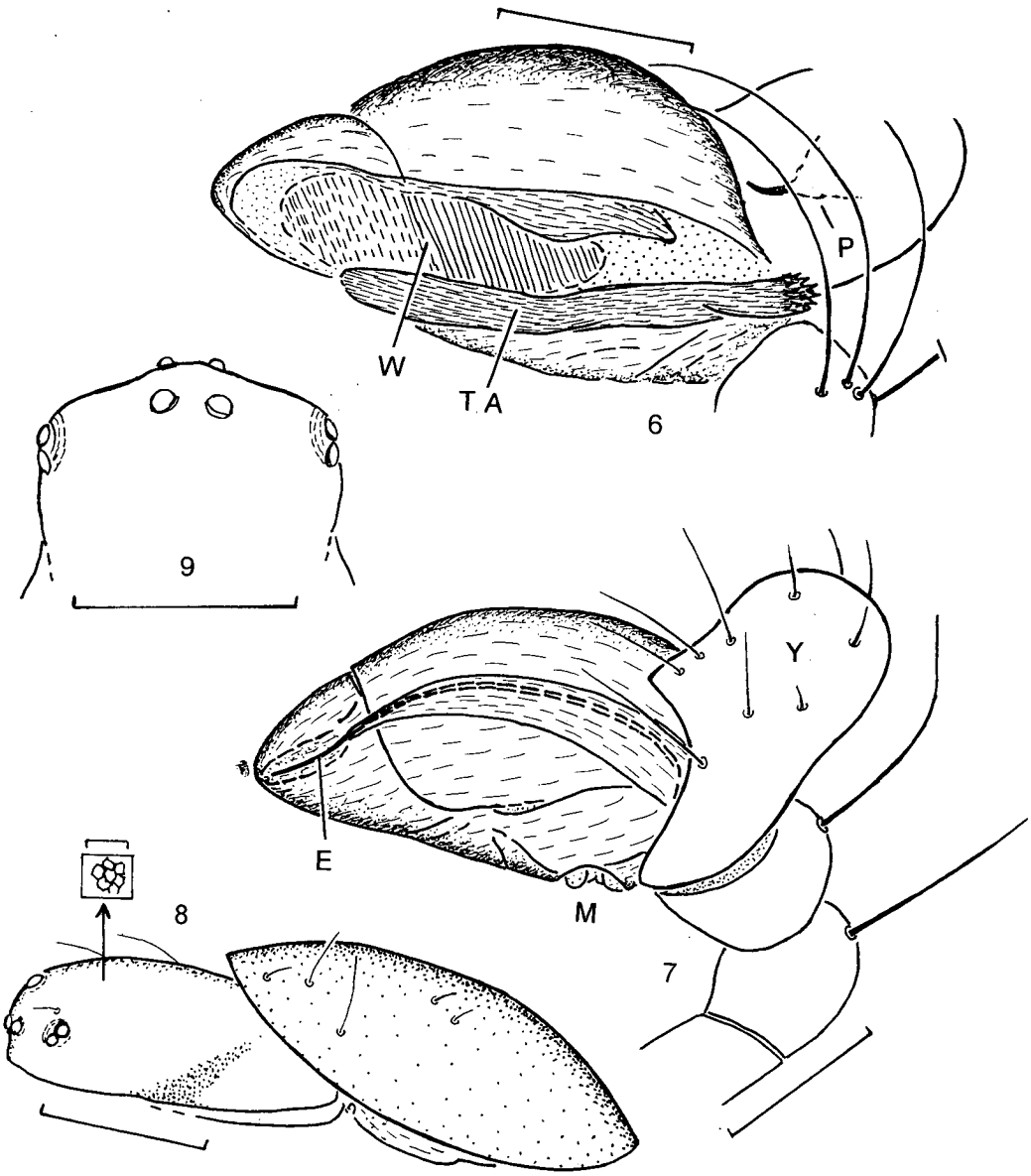
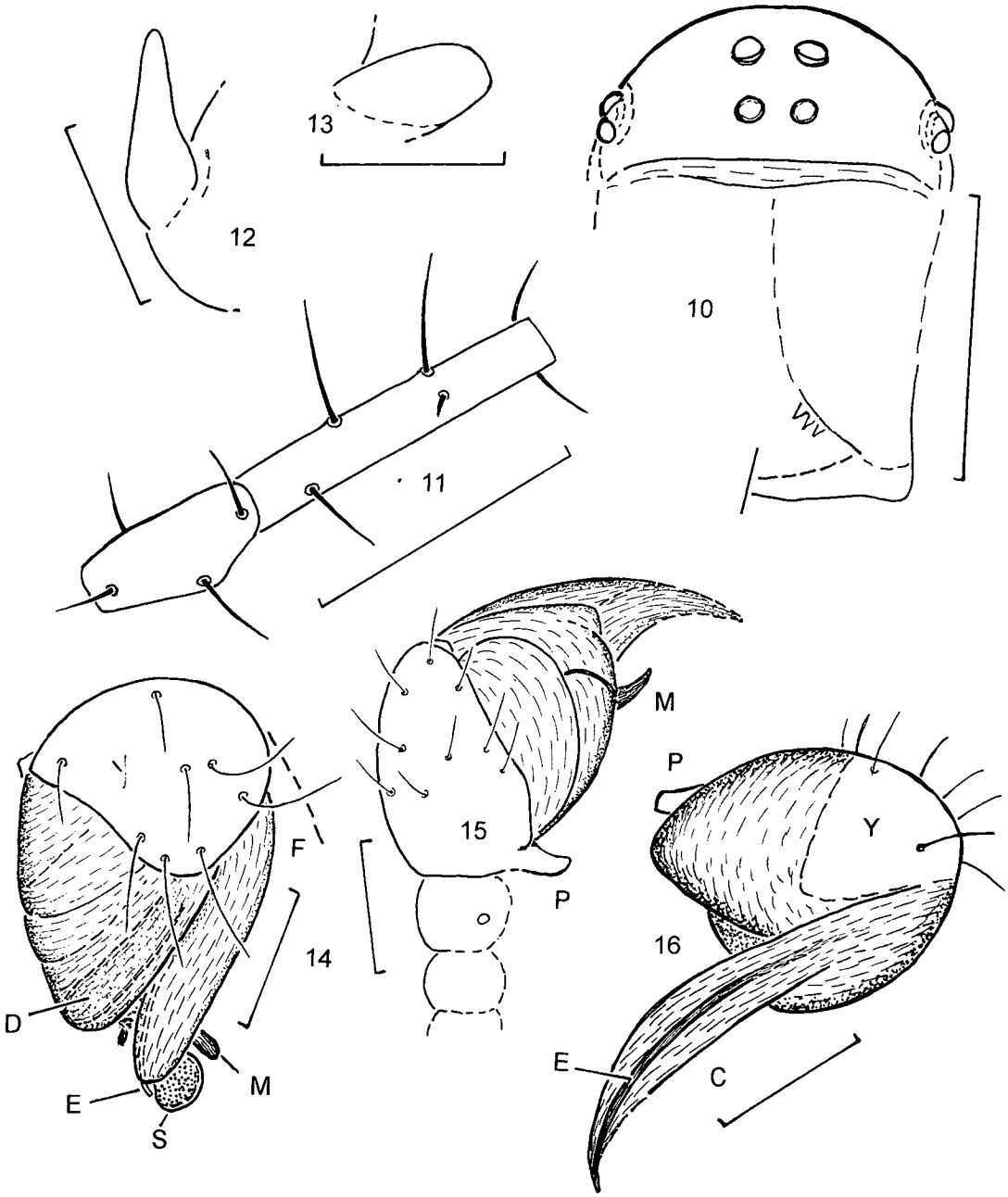


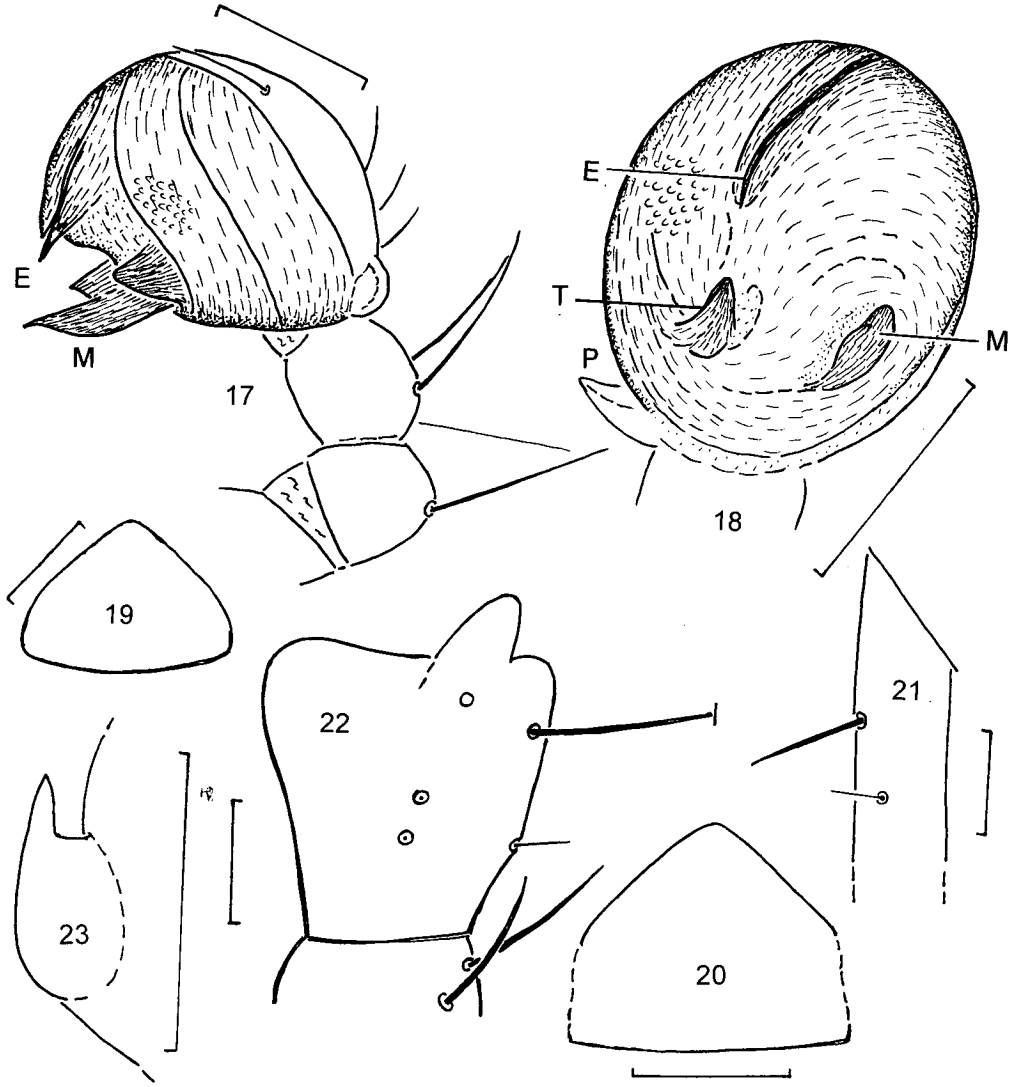
Figs. 1-7: ***Miraraneus peregrinus*** **n.gen.n.sp.**, ♂, holotypus; 1) opisthosoma with scutum dorsally-laterally; 2) distal articles of the r. leg IV prodorsally; 3) unpaired and part of the paired retrolateral claws of the l. tarsus III retrolaterally; 4) r. pedipalpus retrolaterally, partly covered with an emulsion. Teeth of the tegular apophysis are observable between the two lowest question marks; 5) l. pedipalpus retrodorsally; 6) l. pedipalpus retroventrally; 7) l. pedipalpus prolaterally; M = 1.0 in fig. 2, 0.5 in fig. 1, 0.05 in fig. 3, 0.2 in the remaining figs. - E = embolus, M = median apophysis, P = paracymbium, TA = retrolateral tegular apophysis, W = washboard-shaped structure, Y = cymbium.



Figs. 8-14: ***Eonephila excellens*** **n.gen.n.sp**. ♂, holotypus; 8) body laterally with enlarged rugose prosomal cuticula; only few hairs are drawn; 9) anterior part of the prosoma dorsally; 10) prosoma frontally; 11) r. patella and tibia dorsally; 12) l. paracymbium dorsally; 13) r. paracymbium dorsally-basally; 14) r. pedipalpus apically; M = 0.1 in figs. 12-14, 0.5 in the remaining figs., 0.03 in the enlarged prosomal cuticula structure in fig. 8). - D = sperm duct in the tegulum, E = embolus, F = femur, M = median apophysis, S = probable remains of sperm near the tip of the embolus, TA = retrolateral tegular apophysis, W = washboard-shaped structure, Y = cymbium.



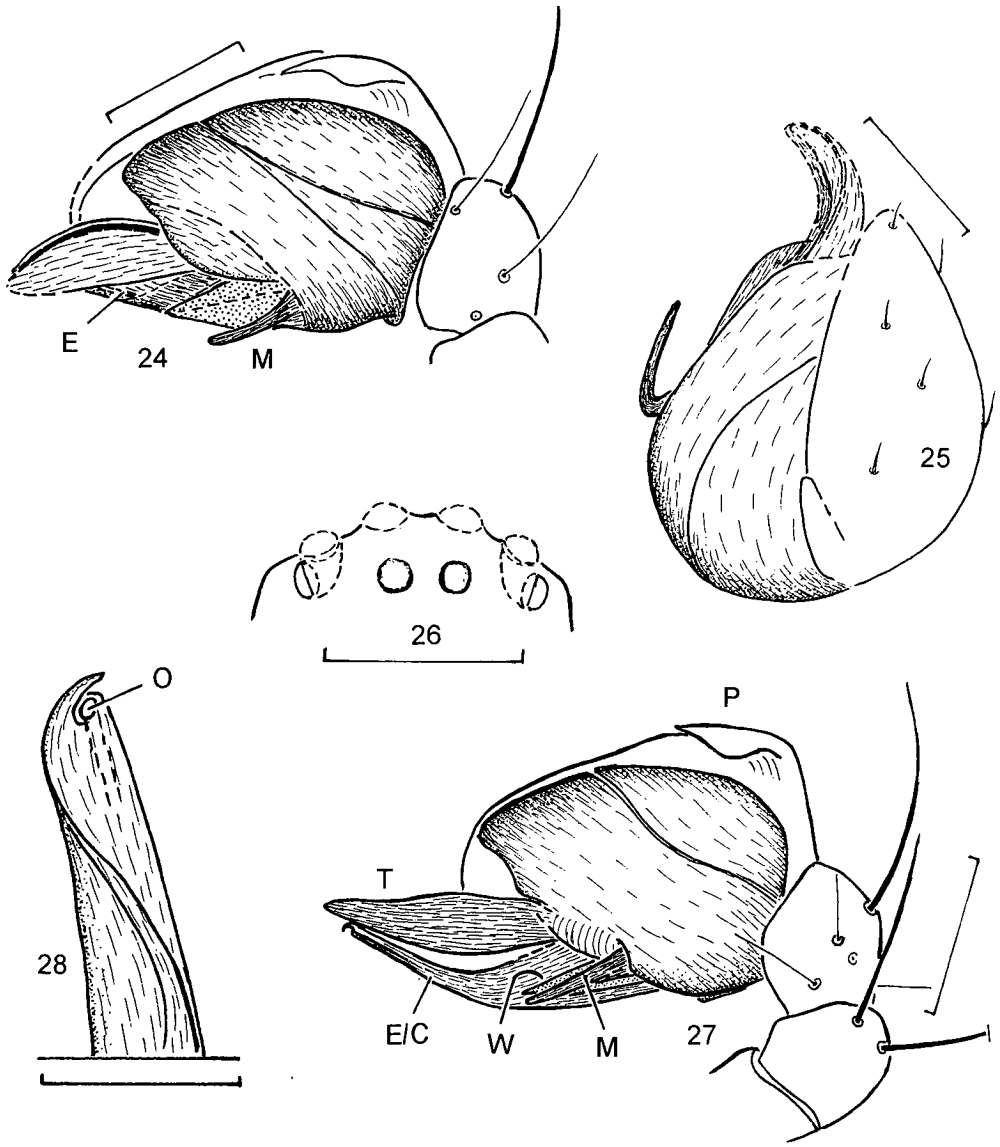
Figs. 15-16: ***Eonephila longembolus*** **n.gen.n.sp.**, ♂, r. pedipalpus retrodorsally and apically; M = 0.1. - C = conductor, E = embolus, M = median apophysis, P = paracymbium, Y = cymbium.



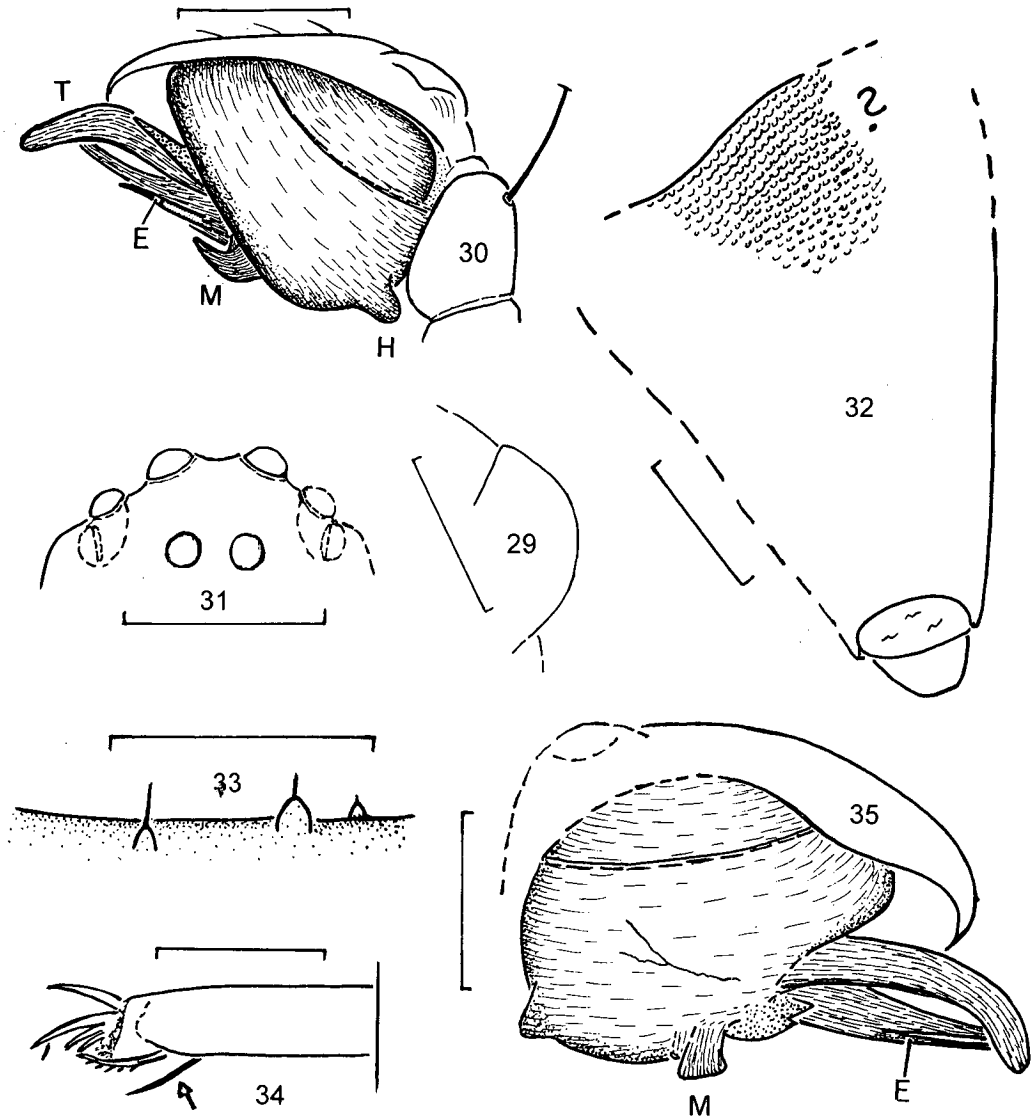
Figs. 17-18: ***Eonephila bitterfeldensis* n.gen.n.sp.**, ♂; 17) holotypus, l. pedipalpus retrolaterally; 18) coll. EICHMANN, r. pedipalpus retroventrally; M = 0.1. - E = embolus, M = median apophysis, P = paracymbium, T = tegular apophysis.

Fig. 19) ***Eonephila*** sp., ♂, F254/BB/AR/ARA/CJW, labium; M = 0.1.

Figs. 20-25: ***Palaeonephila curvate* n.gen.n.sp.**; 20) questionable ♂, coll. LIEDTKE, labium in ventral and slightly frontal view; 21) ♂ paratypus, basal part of the l. metatarsus I retrolaterally, with bristle and trichobothrium; 22) questionable ♂, F281, tibia and distal part of the patella of the r. pedipalpus dorsally; 23) paratypus, l. paracymbium dorsally; 24) holotypus ♂, l. pedipalpus retrolaterally; 25) holotypus, l. pedipalpus retrolaterally and slightly distally; the terminal apophysis is hidden, only few hairs of the cymbium are drawn; M = 0.2. - E = embolus, M = median apophysis

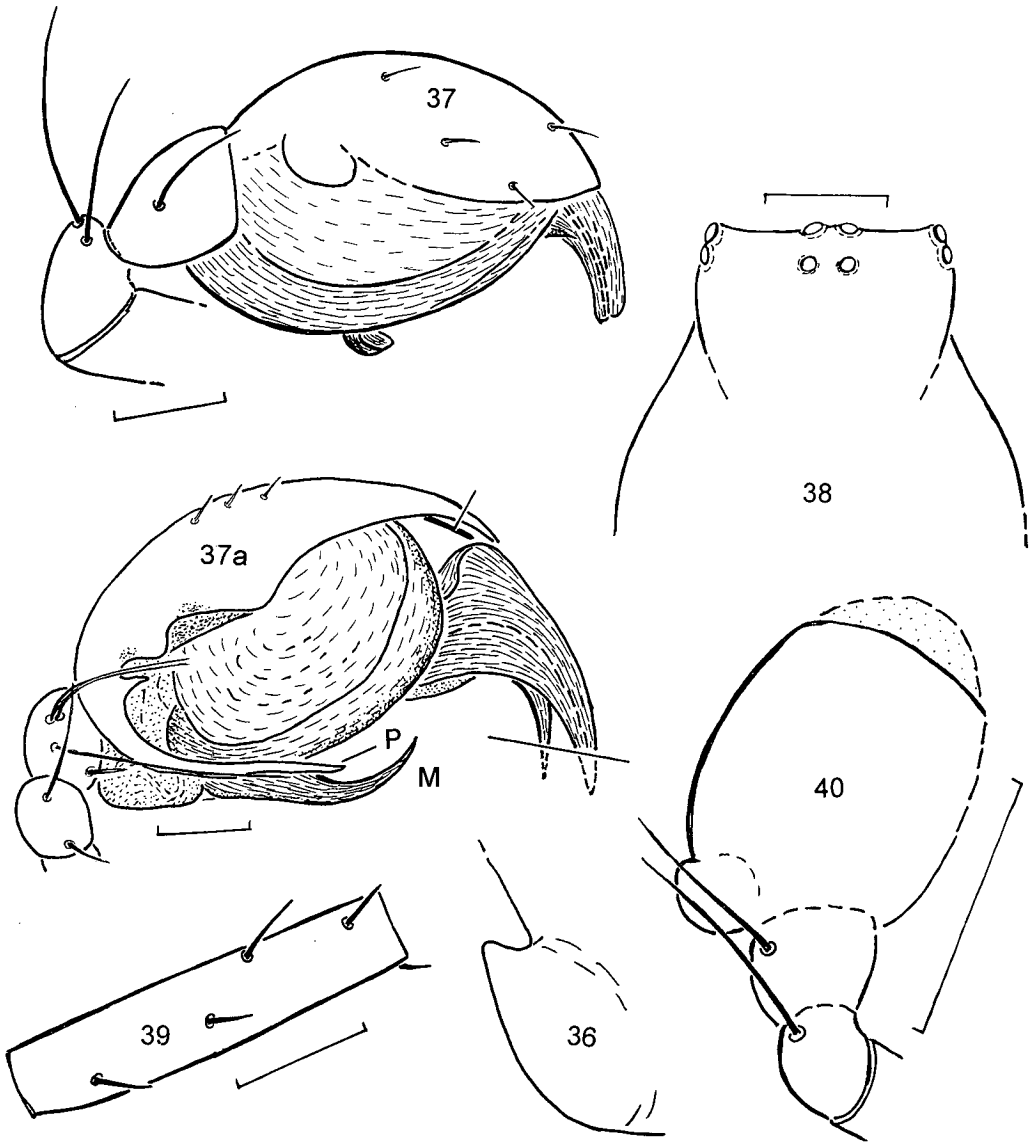


Figs. 26-28: ***Palaeonephila fibula*** **n.gen.n.sp.**, ♂; 26) position of the eyes dorsally; 27) l. pedipalpus retrolaterally and slightly basally, hairs not drawn. The weakly sclerotized tegular apophysis (W; punctated) is partly hidden by the median apophysis (M); 28) embolus with conductor prolaterally; M = 0.5 in fig. 26, 0.2 in fig. 27, 0.1 in fig. 28. - E + C = embolus with conductor, M = median apophysis, O = opening of the ductus ejaculatorius, P = paracymbium, T = terminal apophysis, W = weakly scletotized tegular apophysis.



Figs. 29-30: ***Palaeonephila brevis*** **n.gen.n.sp.**, ♂; 29) paracymbium of the r. pedipalpus dorsally; 30) l. pedipalpus retrolaterally; M = 0.1 and 0.2. - E = embolus, H = basal hook of the tegulum, M = median apophysis, T = terminal apophysis.

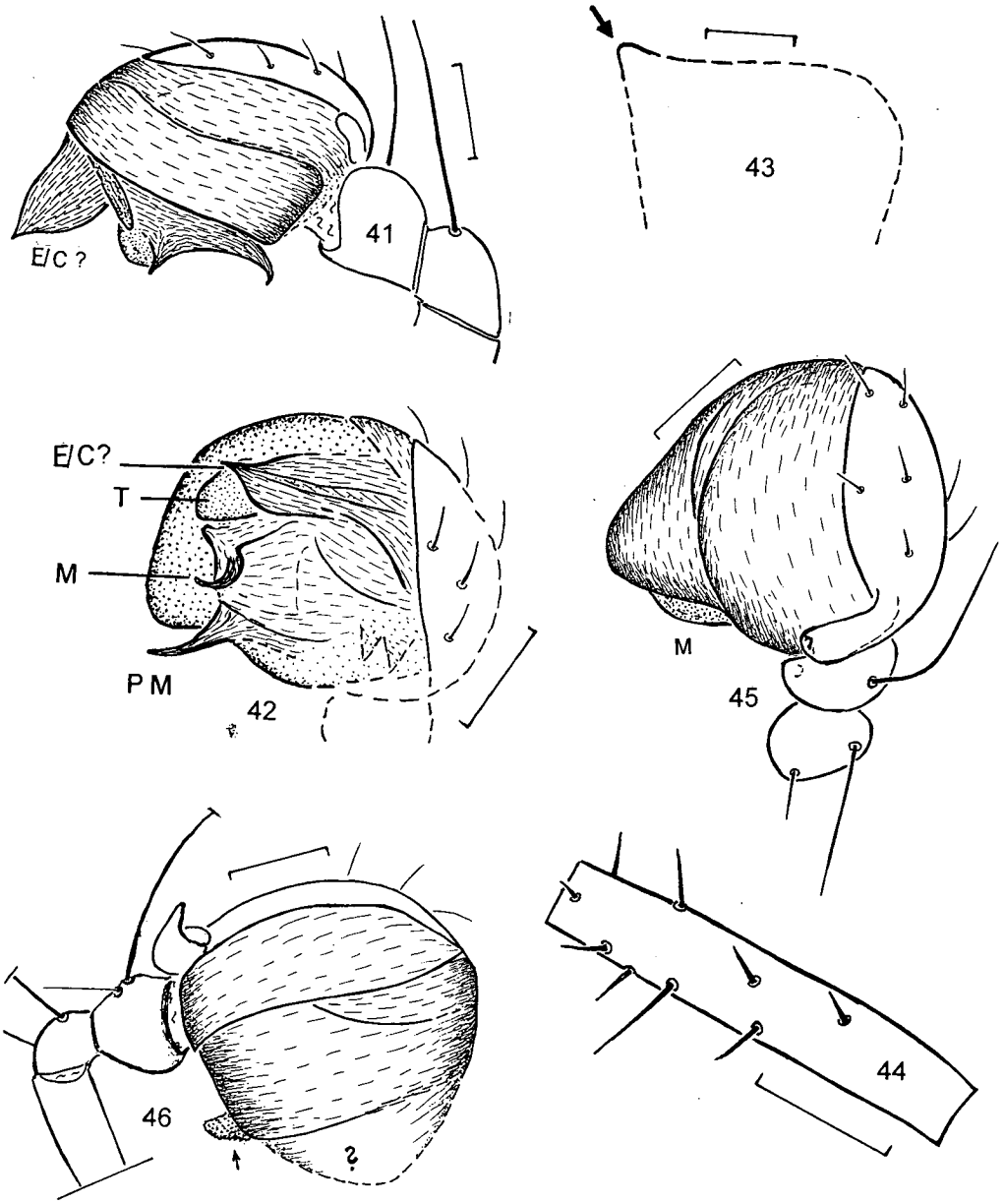
Figs. 31-35: ***Palaeonephia dilitans*** **n.gen.n.sp.**, ♂; 31) position of the eyes dorsally; 32) r. chelicera with basal rugose field retrolaterally; 33) femur of the l. pedipalpus prodistally, prodorsal margin with three hairy stridulating teeth; 34) distal part of the r. tarsus IV with the nearly straight sustentaculum (arrow) retrolaterally, hairs nor drawn; 35) r. pedipalpus retrolaterally and slightly ventrally; M = 0.5 in fig. 31, 0.2 in figs. 32 and 35, 0.1 in figs. 33 and 34. - E = embolus, M = median apophysis.



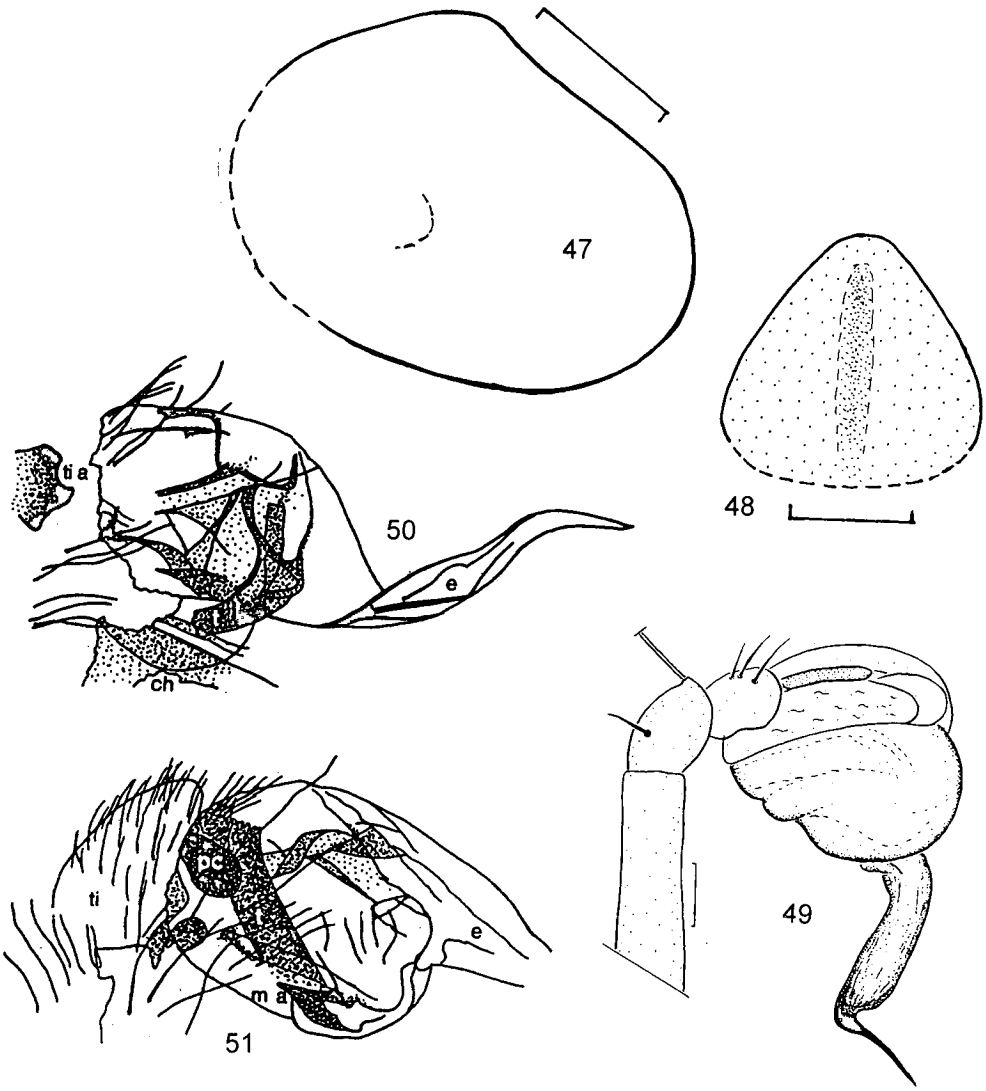
Figs. 36-37: ***Palaeonephila longipes*** **n.gen.n.sp.**, ♂ ; 51a) paracymbium of the l. pedipalpus dorsally; 51b) r. pedipalpus retrodorsally; M = 0.1 and 0.2.

fig. 37a) ***Luxurionephila spinifera*** **n. gen. n. sp.**, ♂, r. pedipalpus retrolaterally (the apical parts are hidden), only three of the cymbial hairs are drawn). E = embolus, M = median apophysis, P = paracymbium. M = 0.2;

Figs. 38-42: ***Anepeira complicata*** **n.gen.n.sp.**, ♂; 38) anterior part of the prosoma dorsally; 39) r. femur I dorsally; 40-41) l. pedipalpus dorsally and retrolaterally; 42) r. pedipalpus proventrally-apically; M = 0.5 in figs. 38-40, 0.2 in figs. 41-42. - EC ?= embolus with conductor, M = median apophysis, PM = paramedian apophysis.



Figs. 43-46: ***Bararaneus evolvens*** **n.gen.n.sp.**, ♂; 43) r. gnathocoxa (partly hidden) retroventrally, with retroapical hook (arrow); 44) r. femur I prodorsally; 45-46) l. pedipalpus retrodorsally and r. pedipalpus retroventrally (only few hairs are drawn); M = 0.5 in fig. 44, 0.2 in figs. 45-46, 0.1 in fig. 43. - M = median apophysis.



Figs. 47-48: **Araneidae: ?Araneinae** sp. indet., ♀; 47) outline of the opisthosoma, seen from the left side and slightly dorsally; note the humps; 48) epigyne; M = 1.0 and 0.2.

Fig. 49) ***Nephila dommeli*** WUNDERLICH 1982, ♂ in amber from the Dominican Republic, r. pedipalpus retrolaterally; M = 0.1.

Figs. 50-51) ***Cretaraneus vialtae*** SELDEN 1990, ♂, holotypus, Lower Cretaceous limestone from Spain; l. pedipalpus prolaterally and r. pedipalpus retrolaterally; M = 0.1. - ch = chelicera, e = embolus, ma = median apophysis, pc = paracymbium, ti = tibia, ti a = tibial apophysis.

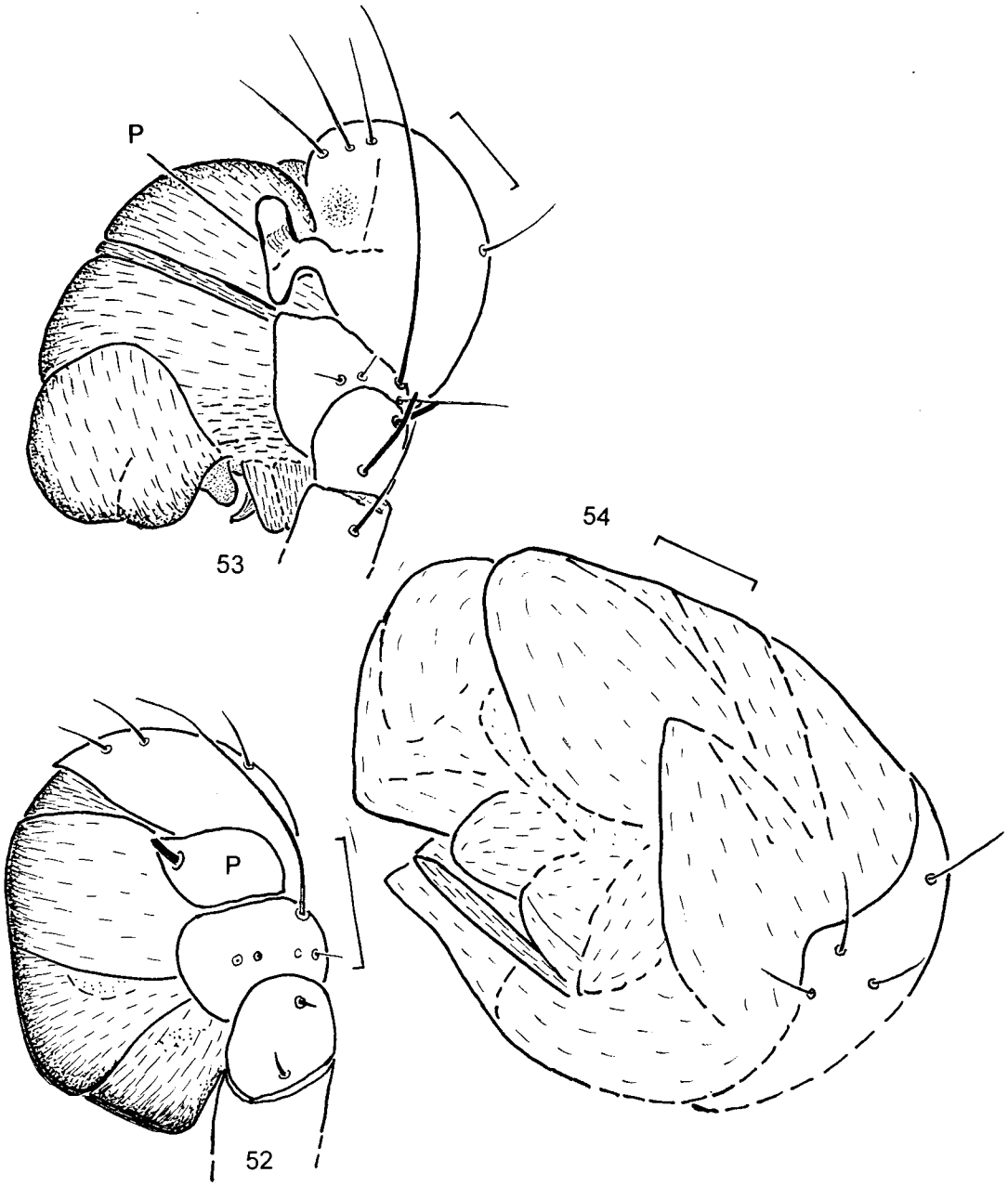


Fig. 52) ?***Bararaneus annulatus*** **n. gen. n. sp.**, ♂, l. pedipalpus retrodorsally (only few hairs are drawn); M = 0.1. - P = paracymbium.

Figs. 53-54: ***Eoararaneus complexus*** **n. gen. n. sp.**, ♂; 53) l. pedipalpus retrodorsally-basally; 54) r. pedipalpus medioventrally (only few hairs are drawn). M = 0.2. P = paracymbium.

BEITR. ARANEOL., 3 (2004)

THE FOSSIL THERIDIOSOMATIDAE (ARANEAE) IN BALTIC AND DOMINICAN AMBER

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Abstract: The first fossil taxa of the family Theridiosomatidae (Araneae) in Baltic amber are described: *Eoepeirotypus* **n.gen**. with its type species *retrobulbus* **n.sp.**, *Eotheridiosoma* **n.gen**., including *tuber* **n.sp**. and *volutum* **n.sp**., *Spinitheridiosoma* **n.gen**. including *balticum* **n.sp**., *bispinosum* **n.sp**. and *rima* n.sp., *Umerosoma* **n. gen**. with ist type species *multispina* **n. sp**. and gen. sp. indet. All specimens of *Eotheridiosoma* come from the Bitterfeld deposit. A key is given to the fossil genera in Baltic amber, remarks on apomorphic characters of the family Theridiosomatidae and on paleoecology. The fossil taxa of the family Theridiosomatidae in Dominican amber are only mentioned.

Material: CJW = collection of JOERG WUNDERLICH.

INTRODUCTION

Fossils in amber: Up to now no species of the family Theridiosomatidae has been reported from *Baltic amber* but one fossil species of the genus *Theridiosoma* O. PIKKARD-CAMBRIDGE 1879 - *incompletum* WUNDERLICH 1988 - and two species of *Palaeoepeirotypus* WUNDERLICH 1988 - *iuvenis* WUNDERLICH 1988 and *iuvenoides* WUNDERLICH 1988 - were described from Dominican amber, see WUNDERLICH (1988).
With some hesitation PETRUNKEVITCH (1958) regarded a juvenile spider as a member of the family Theridiosomatidae in Baltic amber: *Cyclosoma succini* PETRUNKEVITCH 1958 but this specimen is not a member of this family, see WUNDERLICH (1986: 26).

Rareness and distribution of the fossils: Theridiosomatidae in amber are rare, I studied closely only 21 specimens in Baltic amber, 7 of these come from the Bitterfeld deposit. One third of the specimens belongs to only one species: *Eoepeirotypus retrobulbus* and it is remarkable that none of these come from the Bitterfeld deposit. No species is known from both, from Bitterfeld and from non-Bitterfeld deposits. 6 of the 7 species which are described in this paper are known only in a single specimen. All 5 members of the genus *Eotheridiosoma* (one quarter of all Theridiosomatidae specimens) which are determined with certainty come from the Bitterfeld deposit which is a remarkable fact. The composition of this fossil spider fauna may hint at the existence of an independent former Bitterfeld amber forest; see the chapter on the Bitterfeld deposit in part 1 of these papers.

Distribution of the extant Theridiosomatidae: According to today's knowledge the family is not diverse and distributed mainly in the tropics and subtropics. The only European member - *Theridiosoma gemmosum* (C. L. KOCH 1837) is figured in the book of WUNDERLICH (1986: Fig. 320).

Ecology, capture webs, prey of extant spiders: The extant members of the Theridiosomatidae are dwellers of higher strata, and usually they live in humid and shaddowish localities, most often in forests. The rareness of Theridiosomatidae in amber hint at the possibility that these spiders did not or only rarely live on the amber producing needle trees.

A plesiomorphic character? Such a strong spination of the legs as in the fossils of the genera *Umerosoma* and *Spinitheridiosoma* is unknown to me in extant members of the family, and may be a plesiomorphic character. A reduction of leg bristles may have happened in the other fossil and most of the extant genera. Unfortunately CODDINGTON (1986) largely neglected the chaetotaxy of the taxa of the Theridiosomatidae in his

important revision of the family.

Remains of fossil capture webs and prey:
Material: (1) *Eoepeirotypus* sp. indet., ♂ with remains of a capture web, F405/BB/AR/THR/CJW; (2) *Eotheridiosoma* sp. indet., ♂ from Bitterfeld with remains of a capture web, a beetle and two flies, F406/BB/AR/THR/CJW.
F405: The body length of the spider is 1.3mm. Four spider's threads (one with small droplets) are running through the small amber piece. The spider and a tiny mite - body length 0.35mm - are preserved hanging on a thread, the position of the mite is only 0.15mm in front of the left tibia I of the spider which was apparently the owner of the capture web. The mite's body is deformed but not covered by threads; probably it has just been captured in the spider's web before both animals were preserved in the resin.
F406: The body length of the spider is about 1.3mm, of the beetle 3mm, of the flies about 1.7mm and 3.4mm. One mm above the spider's body a spider's thread without droplets is running across being in contact with the beetle and the larger fly which were apparently not the prey of the spider.

Diagnosis of the family Theridiosomatidae: Members of this family can be distinguished from all other spiders by the presence of sternal pits (openings of paired sternal glands) on the prolateral margin of the sternum in both sexes and also in juveniles (fig. 4), the antennuate and recurved unpaired tarsal claw which is longer than the paired claws, a group of long tibial III and IV trichobothria (e.g. fig. 29), a very large bulbus, connate receptacula seminis, the absence of a trichobothrium on metatarsus IV as well as a second dorsal bristle on the tibiae III-IV and a claw of the female pedipalpus. - **Further characters**: Clypeus long (figs. 1-2), opisthosoma soft, colulus distinct, legs usually robust, order usually I/II/IV/III, only in *Ogulnius* IV/I/II/III (♀) or I and IV subequal (♂), tarsi distinctly shorter than metatarsi, trichobothria long (fig. 5), usually numerous very long and thin leg bristles (fig. 5), order of the dorsal tibial bristles 2/2/1/1, lateral bristles on the anterior tibia present, bristles also usually present on the femora (figs. 5, 22) (absent in *Eotheridiosoma*) and occasionally on metatarsi (*Spinitheridiosoma*, fig. 19, *Umerosoma*, fig. 28), male metatarsus I usually with a prolateral row of strong hairs, male tibia I in some taxa narrow at the end (fossil genera *Eotheridiosoma* and *Spinitheridiosoma*, fig. 5), tarsal organ in a basal position (fig. 19). Male pedipalpus (figs. 6, 8, 14, 30) with a small and not outstanding paracymbium. The capture web is a modified orb web. Small spiders. The spiders prefer shaddowish and humid localities.

Subfamilies according to CODDINGTON (1986): (1) Ogulniinae (order of legs I/II/IV/III in the female or I and IV subequal in some males; *Ogulnius*), (2) Platoninae (paracymbium a T-shaped lobe; *Chthonos* and *Plato*), (3) Epeirotypinae ("shoulders" lateral to the fovea, see CODDINGTON (1986: Fig. 52), median apophysis roung with a distal notch; *Epeirotypus* and *Naatlo*) and (4) Theridiosomatinae (with a row of short bristles on the cymbial margin near the paracymbium, see CODDINGTON (1986: Fig. 153), epigynum usually with lateral pits; four extant genera). The fossils (a) in Dominican amber are members of the Theridiosomatinae, see WUNDERLICH (1988); (b) at least some gene-

ra in Baltic amber are members of the Epeirotypinae; unfortunately the bulbus structures in these fossils are partly hidden, I did not find the typical Theridiosomatinae short cymbial bristles, the identification of the bulbus sclerites is difficult, and low or distinct (*Umerosoma*) "shoulders" of the prosoma may be present, see e. g. figs. 1, 27.

Relationships of the family: Also in the Anapidae s. l. a claw of the female pedipalpus is absent, the web construction is basicly similar and the clypeus is long but in the Anapidae s. l. sternal pits are absent, the tarsi are usually longer than the metatarsi (or of equal length), femoral bristles are absent (in some Theridiosomatidae, too), the lungs and the paracymbium are strongly reduced or even absent, the receptacula seminis are not connate, the cymbium is usually strongly modified. In the orb-weaving Araneidae and Zygiellidae sternal pits are absent, too, a claw of the ♀-pedipalpus is present, in the Araneidae median and lateral eyes are usually widely spaced and the ♂-opisthosoma is frequently hardened or scutate, see the tab. and the cladogram.

Distribution: Extant: Cosmopolitical, mainly tropic and subtropic; fossils in amber: Tertiary Dominican and Baltic amber forests. — See the paper on Ukrainean amber.

EINLEITUNG

Fossilien im Bernstein: Bisher war vom Baltischen Bernstein noch keine Art der Familie Zwerg-Radnetzspinnen (Theridiosomatidae) beschrieben worden, wohl aber eine fossile Art der Gattungen *Theridiosoma* O. PICKARD-CAMBRIDGE 1879 - *incompletum* WUNDERLICH 1988 - und zwei Arten von *Palaeoepeirotypus* WUNDERLICH 1988 - *iuvenus* WUNDERLICH 1988 und *iuvenoides* WUNDERLICH 1988 - vom Dominikanischen Bernstein, siehe WUNDERLICH (1988).
PETRUNKEVITCH (1958) hat mit Vorbehalt eine Jungspinne im Baltischen Bernstein zur Familie Theridiosomatidae gestellt: *Cyclosoma succini* PETRUNKEVITCH 1958. Bei dieser Spinne handelt es sich allerdings um keinen Vertreter dieser Familie, siehe WUNDERLICH (1986: 26).
Seltenheit und Verbreitung der Fossilien: Zwerg-Radnetzspinnen im Bernstein sind selten; im Baltischen Bernstein habe ich lediglich 21 Exemplare näher untersucht, von denen 7 vom Fundort Bitterfeld stammen. Ein Drittel der Exemplare gehört zu nur einer Art: *Eoepeirotypus retrobulbus*. Auffälligerweise stammt keines der 7 Exemplare dieser Art vom Fundort Bitterfeld. Keine Art ist sowohl dem Fundort Bitterfeld als auch nicht-Bitterfelder Fundorten gemeinsam. 6 der 7 beschriebenen Arten liegen in nur einem

einzigen Exemplar vorl. Alle 5 sicher bestimmten Exemplare der Gattung *Eotheridioso-ma* (= ein Viertel der vorliegenden Theridiosomatidae) stammen bemerkenswertweise vom Fundort Bitterfeld. Die Zusammensetzung dieser fossilen Spinnenfauna könnte ein Hinweis auf die Existenz eines eigenständigen ehemaligen Bitterfelder Bernstein-Waldes sein; siehe den Abschnitt über den Bitterfelder Fundort im Band 3A.
Verbreitung der rezenten Zwerg-Radnetzspinnen: Die nach heutiger Kenntnis arten-arme Familie ist heute ganz überwiegend in den Tropen und Subtropen verbreitet. Der einzige rezente europäische Vertreter - *Theridiosoma gemmosum* (C. L. KOCH 1837) - ist im Buch von WUNDERLICH (1986: Abb. 320) abgebildet.
Ökologie: Die heutigen Vertreter Zwerg-Radnetzspinnen legen ihre abgewandelten Radnetze in höheren Vegetations-Schichten an, fast alle an feuchten und schattigen Standorten, meist in Wäldern; Reste fossiler Fangnetze und von Beutetieren: Siehe oben ("Remains of capture webs..."). Die Seltenheit der Vertreter dieser Familie im Baltischen Bernstein deutet darauf hin, daß fängige Harze in den optimalen Lebens-räumen dieser Spinnen selten waren oder sogar fehlten.

Kennzeichen der Zwerg-Radnetzspinnen: Die Theridiosomatidae sind kleine Spinnen, deren Körper-Länge zwischen 0.5 und 5mm liegt; die fossilen Spinnen sind zwischen 1.3 und 1.9mm lang. Die Beine der Spinnen tragen lange und dünne Borsten (z.B. Abb.5,16,22), deren Abfolge auf den Tibien 2/2/1/1 ist, wenigstens Tibia I trägt außer-dem mindestens 1 seitliche Borste und fast immer trägt wenigstens Femur I mindestens 1 Borste prodistal (Abb. 5); bei *Eotheridiosoma* sind die Femora borstenlos. Bei den fossilen Spinnen sind - wie bei fast allen heutigen Spinnen dieser Familie - die Beine I und II deutlich länger und kräftiger als III und IV. Die Pedipalpen sind enorm groß, siehe Abb. 25 und die Fotos, das Paracymbium ist klein, unscheinbar und liegt dem Bulbus/ dem Cymbium eng an (z.B. Abb. 6); bei vielen fossilen Spinnen ist es nur schwer zu identifizieren. Ein sicheres Erkennungs-Merkmal der Familie sind die Öffnungen der Sternal-Drüsen am vorderen Rand des Sternums nahe dem Labium (Abb. 4), die bei den fossilen Spinnen im Baltischen Bernstein allerdings selten klar beobachtbar sind. Der Hinterkörper der Spinnen ist nicht gepanzert und meist hochgewölbt, der Clypeus sehr lang (z.B. Abb. 1-2); damit besteht große habituelle Ähnlichkeit mit verschiedenen Vertretern der Familien Kugelspinnen (Theridiidae) und Zwerg-Kugelspinnen im weiteren Sinne (Anapidae s.l.), siehe die Arbeiten in diesem Band. Im Gegensatz zu den meisten Anapidae sind die Tarsen I-II deutlich kürzer als die Metatarsen und/oder die Femora tragen fast immer Borsten; diese Femur-Borsten fehlen auch bei den Theridii-dae, ebenso seitliche Borsten der Tibien.
Weitere abgeleitete (autapomorphe) Merkmale der Theridiosomatidae sind die basale Position des Tarsal-Organs (Abb. 19) (bei fossilen Spinnen schwer erkennbar), vermut-lich der Verlust der distalen Borste auf den Tibien IV und IV (Abfolge der dorsalen Tibia-Borsten daher 2/2/1/1), die miteinander verwachsenen Receptacula seminis und wahr-scheinlich auch die in einer Reihe stehenden starken prolateralen Haare auf Metatarsus I (nicht abgebildet) sowie die langen Trichobothrien auf den Tibien (Abb. 5,16, 29).
Bei 5 der 6 in dieser Arbeit beschriebenen fossilen Arten, bei 3 Gattungen, ist die ♂-Tibia I am Ende verschmälert und davor verdickt (Abb.5), bei *Eotheridiosoma volutum* n.sp. ist die Tibia I zwar gebogen, aber ebensowenig verschmälert wie bei dem re-

zenten *Theridiosoma gemmosum* (L. KOCH 1877).

Ein ursprüngliches Merkmal? Eine so starke Beborstung der Beine, wie sie bei den fossilen Vertretern der Gattungen *Spinitheridiosoma* n. gen. und *Umerosoma* n. gen. vorkommt, ist mir von rezenten Gattungen nicht bekannt und könnte ein ursprüngliches Merkmal der Familie sein - Reduktion bei anderen fossilen Gattungen und den Rezenten? Leider hat CODDINGTON (1986) in seiner wichtigen Revision der Familie und der Gattungen die Chaetotaxie kaum behandelt.

List of the taxa in Baltic amber (Bitt. = Bitterfeld deposit, BB = not from Bitterfeld):

Eoepeirotypus n. gen. (BB, Bitt.)
  retrobulbus n. sp. (7 ♂ and a questionable ♂) (BB)
  sp. indet. (4 ♂) (BB, Bitt.)
Eotheridiosoma n. gen. (Bitt.)
  tuber n. sp. (Bitt.)
  volutum n. sp. (Bitt.)
  sp. indet. (3 ♂ and a questionable ♂) (Bitt.)
Spinitheridiosoma n. gen. (BB, Bitt.)
  balticum n. sp. (BB)
  bispinosum n. sp. (Bitt.)
  rima n. sp. (BB)
Umerosoma n. gen. (BB)
  multispinosa n. sp. (BB)
Gen. sp. indet. (BB)

Key to the fossil genera of the Theridiosomatidae in Baltic amber:

1 Femoral bristles absent. Bulbus somewhat globular (figs. 14, 17). - Up to now only Bitterfeld deposit. Photos 139-140 ..... *Eotheridiosoma*

- At least femur I with at least one prodorsal bristle (figs. 5, 22). Bulbus somewhat globular or distinctly outstanding (figs. 6-11). 2

2(1) Metatarsus III bears 1-4 long bristles (figs. 19, 29). 3

- Metatarsal III bristles absent. 4

3(2) Legs with numerous bristles, e.g. femur I with 3 distally (fig. 28) and metatarsus III 4 basally as in fig. 29. Male tibia I not narrow distally (fig. 28), distinct thoracal "shoulders" present (fig. 27), paracymbium bipartite (fig. 30). Photo 142 . . . . . .*Umerosoma*

- Femur I bears 2 distal bristles (fig. 22), metatarsus III bears 1 dorsal bristle (fig. 19), male tibia I narrow distally as in fig. 5, thoracal "shoulders" weak. . . . .*Spinitheridiosoma*

4(2) Only femur I bears a single prodistal bristle (fig. 5). Bulbus strongly outstanding, not globular (figs. 6-11). Photo 138 . . . . . *Eoepeirotypus*

- At least femur I-II bear a dorsal bristle. Bulbus somewhat globular (fig. 33)...Gen. indet.

DESCRIPTION OF THE NEW TAXA

Eoepeirotypus n. gen.

Diagnosis (♂; ♀ unknown): Femora without dorsal bristles, posterior median eyes closely together (fig. 3); ♂-pedipalpus (figs. 6-11): Paracymbium simple and pointed, bulbus large and distinctly outstanding retrolaterally.

Relationships: As in *Spinitheridiosoma* tibia I is narrow at the end (fig. 5).

Typus species: *Eoepeirotypus retrobulbus* n. sp.

Distribution: Tertiary Baltic amber forest incl. Bitterfeld deposit.

Material *Eoepeirotypus* sp. indet.: 1 ♂ Mus. Ziemi no. 14125; 1♂ coll. F. EICHMANN; 1♂ embedded in artificial resin and a separated amber piece from the Bitterfeld deposit, F404/BB/AR/THR/CJW; 1♂ with a part of a capture web and a mite (Acari) as a prey on a thread (see above), F405/BB/AR/THR/CJW.

***Eoepeirotypus retrobulbus* n. gen. n. sp.** (Figs. 1-11) Photo 138

Acknowledgement: I thank F. KERNEGGER in Hamburg for the loan of the paratypes d) and e).

Material (in Baltic amber): Holotypus ♂ and 4 separated amber pieces, F399/BB/AR/THR/CJW; 3♂ paratypes a), CJW; b) (with 3 separated amber pieces), F421/BB/AR/THR/CJW and f) F390/BB/AR/THR/CJW; 1♂ paratypus c) Museum Ziemi in Warsaw no. 8260; paratypes d) and e) coll. F. KERNEGGER in Hamburg, no. 324/95 and 140/93; 1 questionable ♂ CJW.

Remark: Because of the partly hidden genital structures the conspecifity of the paratypes is not quite sure.

Preservation and syninclusions: Holotypus: The spider is completely and excellently preserved (slightly covered by a white emulsion) in a small amber piece which now is kept in glycerine. In the same amber piece a small plant remain is present, in the separated pieces 1/2 Nematocera and a stellate hair. - Paratypus a) is well and completely preserved, dorsally and frontally a weak emulsion is present. Above the spider lie an ant, some stellate hairs and an amber drop. - Paratypus b) is also completely preserved, covered ventrally with some emulsion, a bubble is situated between the right femora III and IV, the opisthosoma is deformed dorsally. - In the separated amber pieces are 4 1/2 beetles, some Nematocera, a juv. spider, detritus particles and some stellate hairs preserved. - Paratypus c) is well preserved but few parts are cut off, e. g. the right femur I. Furthermore remains of ?spider's threads and a stellate hair are preserved. - Paratypus d) is completely preserved and dorsally fairly covered by a white emulsion. Also preserved are some spider's legs, mites, Diptera and stellate hairs. - Paratypus e) is also completely preserved, dorsally covered by a white emulsion, beneath the spider detritus particles are present, right of the spider a small Collembola; no stellate hairs. - Paratypus f) is completely and well preserved, the dorsal side is covered by a white emulsion. - The questionable specimen is badly preserved.

Diagnosis and relationships: See above.

Description (♂; ♀ unknown):
Measurements (in mm): Body length 1.2, prosoma: Length 0.6-0.65, width about 0.55, hight 0.3, length of the basal articles of the chelicerae 0.3; leg I: Femur 0.7, patella 0.28, tibia 0.42, metatarsus 0.4, tarsus 0.3, tibia IV 0.32; height of femur I 0.18.
Colour: Holotype dark brown, body and legs of the other males light to dark brown.

Prosoma (figs. 1-4) fairly high, covered with few hairs, the fovea is a low cavity. Eyes large, anterior median eye region protruding, posterior row procurved, posterior median eyes separated by about 3/4 of its diameter. Chelicerae about as long as the height of the prosoma, cheliceral teeth and openings of the sternal glands are hidden. Sternum wide, coxae IV separated by about its diameter. - Legs (fig. 5) robust, order I/II/IV/III, I and II distinctly larger than III and IV. Bristles long: Femur I 1 prodistally, patellae 2 dorsally, tibiae dorsally 2/2/1/1, I additionally a lateral pair, tibia II 1 retrolaterally. Metatarsi I-III bear a trichobothrium, its position on I in 0.18-0.21. - Opisthosoma higher than long, dorsally scarcely covered with long hairs, spinnerets short, anterior spinnerets thick, colulus distinct. - Pedipalpus: See above, embolus apophyses probably hidden by the conductor (fig. 8).

Distribution: Tertiary Baltic amber forest.

***Eotheridiosoma* n.gen.**

Diagnosis (♂;♀ unknown): Chelicerae basally usually bulging (fig.12), posterior eye row recurved, femora without prolateral or dorsal bristles; ♂-pedipalpus (figs.13-14): Paracymbium short, embolus and embolus-apophyses in retrolateral position, covered partly by the conductor.

Relationships: In the other fossil genera at least femur I bears a bristle and distinct embolus apophyses are probably absent.

Type species: *Eotheridiosoma tuber* n. sp.

Distribution: Tertiary Baltic amber forest, Bitterfeld deposit.

***Eotheridiosoma* sp. indet.** (all specimens from the Bitterfeld deposit): 1♂ coll. H. GRABENHORST in Celle, 1♂ coll. W. LUDWIG in Berlin (photo 140), 2♂ F404/CJW and F406/CJW, 1 questionable ♂ F407/CJW.

***Eotheridiosoma tuber* n. gen. n. sp.** (Figs.12-14) Photo 139

Material: Holotypus (♂) in Baltic amber, Bitterfeld deposit, F195/BB/AR/THR/CJW.

Preservation and syninclusions: The spider is nearly completely and well preserved in a clear orange amber piece, there is no emulsion. The opisthosoma is deformed, turned to the left and slightly cut off, the right leg IV is cut off through the patella and the right tarsus II is completely cut off. A thin spider's thread without droplets is running backwards from the left tarsus IV. Three stellate hairs are also preserved in the amber piece.

Diagnosis (♂;♀ unknown): Tibia I with a pair of lateral bristles, tibia II bears only a retrolateral bristle in the middle. Pedipalpus (figs. 13-14) with a lamellar median apophysis in a ventral-basal position, embolus in a retrolateral position, bearing two longer apophyses and partly hidden by the conductor.

Description (♂):
Measurements (in mm): Body length 1.3, length of the prosoma (it is partly hidden) about 0.6, leg I: Femur 0.62, tibia about 0.51, metatarsus 0.41, tarsus 0.24, length of the bristle on Tibia IV 0.21.
Colour dark brown.
Prosoma high, with a long clypeus, basal articles of the chelicerae basally bulging (fig. 12), eyes large, posterior row recurved, anterior median eye region protruding, posterior median eyes (they are partly hidden) separated probably by its diameter. - Legs fairly short, order I/II/IV/III, tibia I thickened and distinctly narrow near the end (similar to fig. 21). Bristles long, see above. Position of the trichobothrium on metatarsus I in 0.26. - Opisthosoma higher than long, scarcely covered with longer hairs.

Relationships: In *E. volutum* n. sp. tibia I is not narrow apically and the metatarsal trichobothrium I is in a more basal position.

Distribution: Tertiary Baltic amber forest, Bitterfeld deposit.

***Eotheridiosoma volutum* n. gen. n. sp.** (Figs. 15-17)

Material: Holotypus ♂ in Baltic amber, F402/BB/AR/THR/CJW..

Preservation and syninclusions: The spider is well and completely preserved in a clear orange amber piece (the fresh resin was apparently rolled) and is dorsally covered by a white emulsion. The left and dorsal aspect of the spider's body is partly hidden by an amber layer. - A stellate hair is preserved right of the spider.

Diagnosis (♂; ♀ unknown): Posterior median eyes separated by nearly one diameter, retrolateral tibial I-II bristle absent, tibia I slightly bent and not narrow apically (fig. 16). Pedipalpus (most parts are hidden): No outstanding retrolateral bulbus apophysis (fig. 17).

Description (♂):
Measurements (in mm): Body length 1.4, prosoma: Length nearly 0.7(?), height 0.4, leg I: Femur 0.6, patella 0.25, tibia about 0.4, metatarsus about 0.4, tarsus 0.23, tibia IV 0.33.
Colour: Body and legs dark brown, opisthosoma covered by a white emulsion.
Prosoma (fig. 15) high, with few hairs, clypeus long and protruding. Eyes large, posterior row somewhat straight, posterior median eyes separated nearly by their diameter. Fangs long, sternum wide, separating the coxae IV by nearly their diameter. The opening of the right sternal gland is indistinctly observable. - Legs short and robust. Bristles long: Femora dorsally 1, I additionally 1 prodistally, tibiae dorsally 2/2/1/1, tibia I additionally 1 prolaterally, tibia II no lateral bristles. Tibia I bent and not narrow apically. Position of the metatarsal I trichobothrium in 0.18. - Opisthosoma higher than long, with some longer dorsal hairs. - Pedipalpus: See above.

Relationships: See *E. tuber* n. sp.

Distribution: Tertiary Baltic amber forest, Bitterfeld deposit.

***Spinitheridiosoma* n. gen.**

Diagnosis (♂; ♀ unknown): Legs with numerous bristles, the anterior femora bear dorsal and lateral bristles (fig. 22), metatarsus III with a dorsal bristle (fig. 19), posterior eye row straight or recurved (fig. 18); bulbus (figs. 24-26) nearly globular.

Relationships: See the key.

Typusart: *Spinitheridiosoma volutum* n.sp.

Verbreitung: Tertiary Baltic amber forest incl. Bitterfeld deposit.

***Spinitheridiosoma balticum* n.gen.n.sp.** (Figs. 18-20)

Material: Holotypus ♂ in Baltic amber, F401/BB/AR/THR/CJW.

Preservation and syninclusions: The position of the spider is at the margin of a yellow amber piece. It is completely but only fairly well preserved, mainly the opisthosoma is covered by a white emulsion, the pedipalpi are free. Fissures in the amber hide parts of the spider. - Some remains of plants incl. stellate hairs are also preserved in the amber piece.

Diagnosis (♂; ♀ unknown): Posterior median eyes separated by about 2/3 of their diameter (fig. 18), tibia I bears 2 pairs of lateral bristles. Pedipalpus: Fig. 20.

Description (♂):
Measurements (in mm): Body length 1.5, prosoma: Length 0.7, width 0.68, height 0.4, leg I: Femur 0.75, tibia about 0.45, metatarsus about 0.55, tibia IV 0.35.
Colour: Body and legs dark brown; the opisthosoma is covered by a white emulsion.
Prosoma nearly as wide as long, with some longer dorsal hairs and a low fovea. Eyes large, posterior row slightly recurved (fig. 18), posterior median eyes separated by about 2/3 of their diameter. - Legs robust, bristles long: Femora 1 dorsally, I additionally 1 prodistally, tibiae dorsally 2/2/1/1, I additionally 2 lateral pairs, II 1 pair distally and 1 probasally, III-IV a lateral-distal pair, metatarsus III a dorsal bristle in the basal half (fig. 19), tibia I similar to fig. 21, thickened distally and narrow at the end. Tarsal organ (fig. 19) near the base of the article. - Opisthosoma high, with some long dorsal hairs. - Pedipalpus (fig. 20; most structures are hidden) with a long patellar bristle.

Relationships: In the related species exist differences in the position of the posterior median eyes and in the chaetotaxy.

Distribution: Tertiary Baltic amber forest.

***Spinitheridiosoma bispinosum* n.gen.n.sp.** (Figs. 21-24)

Material: Holotypus ♂ in Baltic amber from the Bitterfeld deposit, F403/BB/AR/THR/

CJW.

Preservation and syninlusions: The spider is very well preserved and not covered by an emulsion. The opisthosoma is partly cut off dorsally. Beneath the fangs and between pro- and opisthosoma are two bubbles preserved. - The spider is situated near an amber drop; few stellate hairs are also present.

Diagnosis (♂; ♀ unknown): Posterior median eyes separated by only 1/4 to 1/5 diameter, tibia I bears two prolateral bristles (fig. 21), femur I bears a distal pair of lateral bristles (fig. 22). Pedipalpus : Fig. 24.

Description (♂):
Measurements (in mm): Body length 1.6, prosoma: Length 0.85, width 0.8, height 0.42, leg I: Femur 0.9, patella 0.35, tibia 0.52, metatarsus 0.58, tarsus 0.3.
Colour: Body and legs dark brown, opisthosoma grey brown.
Prosoma high, with few longer dorsal hairs, fovea low, eyes large, posterior row distinctly recurved, posterior median eyes separated by 1/4 to 1/5 diameter. Chelicerae and sternum are hidden. - Legs robust, densily covered with long hairs, order I/II/IV/III. Bristles long (figs. 21-23): Femora 1 dorsally, at least the left femur IV with 2 dorsal bristles, sequence of the dorsal tibial bristles 2/2/1/1, I additionally with a distal pair and 1 retrobasally, tibia II a distal-lateral pair, tibia III-IV 1 prodistally. - Opisthosoma higher than long, with few longer dorsal hairs. - Pedipalpus (fig. 24) with a long patellar bristle, a wide tibia, an indistinct paracymbium and a large bulbus.

Relationships: See *S. balticum* and *S. rima*.

Distribution: Tertiary Baltic amber forest, Bitterfeld deposit.

***Spinitheridiosoma rima* n. gen. n. sp.** (figs. 25-26) Photo 141

Material: Holotypus in Baltic amber, F400/BB/AR/THR/CJW.

Preservation and syninclusions: The spider is completely and very well preserved in a clear yellow amber piece, lying on an amber layer behind numerous tiny questionable spores. The tarsi are bent under the sternum. - There is no emulsion. Two larger fissures are situated above the left body side, a larger gas bubble above the left side of the prosoma. Two Nematocera and a tiny Arthropod are preserved in the same amber piece.

Diagnosis (♂;♀ unknown): Posterior median eyes separated by their diameter, tibia I with only 1 pair of lateral bristles, femur IV bears 2 dorsal bristles (in other conspecific specimens, too?). Pedipalpus: Cymbium distally divided (fig. 26).

Description (♂):
Measurements (in mm): Body length 1.6, prosoma: Length 0.8, width 0.75, leg I: Femur 0.8, patella 0.3, tibia 0.5, metatarsus 0.65, tarsus 0.3, longest bristle on tibia I 0.25.
Colour: Prosoma and legs dark brown, opisthosoma light brown.
Prosoma high, nearly as wide as long, with few long dorsal hairs, chelicerae hidden, posterior eye row straight, posterior median eyes separated by their diameter, anterior median eyes largest. - Legs short and robust, order I/II/IV/III, with long bristles: Femora I-III 1 dorsally, IV 2, I additionally a lateral pair in the distal half, II with a retrolateral bristle, patellae with 2 dorsal bristles, tibiae dorsally 2/2/1/1, anterior tibiae with a distal pair of laterals, metatarsus III with a dorsal-basal bristle, position of the long trichobothrium on metatarsus III in 0.8 (?), tibia III with some very long trichobothria. Tibia I narrow apically. - Opisthosoma high, with ?4 pairs of small sigillae and longer dorsal hairs, spinnerets short, colulus distinct. - Pedipalpus (figs. 25-26): Patella high and with a long dorsal bristle, tibia wide and with long hairs, with a medio-apical outgrowth (x in fig. 25), cymbium apically divided, paracymbium small, bulbus large and nearly globular.

Relationships: In the other congeneric species are the posterior median eyes less separated, the chaetotaxy and the shape of the cymbium are different. (A pedipalpal tibial outgrowth is not observable but probably also present).

Distribution: Tertiary Baltic amber forest.

***Umerosoma* n. gen.**

Diagnosis (♂; ♀ unknown): Distinct thoracal shoulders (fig. 27) and numerous leg bristles (figs. 28-29) present, tibia I not narrow distally; pedipalpus (figs. 30-31): Paracymbium bipartite, a long outstanding median apophysis is present.

Type species: *Umerosoma multispina* n. sp.

Relationships: See the key. According to the absence of short cymbial bristles and the presence of distinct thoracal "shoulders" the genus is a member of the Epeirotypinae.

Distribution: Tertiary Baltic amber forest.

***Umerosoma multispina* n. gen. n. sp.** (figs. 27-31)

Material: Holotypus in Baltic amber, F544/BB/AR/THR/CJW.

Preservation and syninclusions: The amber piece was probably heated in an autoclave. The spider is well and nearly completely preserved, patella II with parts of femur and tibia are cut off, the opisthosoma and ventral parts of the prosoma are covered by a white emulsion, the opisthosoma is slightly twisted (fig. 27). - Some stellate hairs and oxidated parts of 4 spider's legs are preserved in the same amber piece.

Diagnosis (♂; ♀ unknown): Pedipalpus figs. 30-31. Largest Theridiosomatidae in Baltic amber.

Description (♂):
Measurements (in mm): Body length 1.9, prosoma length 1.0, leg I: Femur 1.0, patella 0.4, tibia 0.6, metatarsus 0.58, tarsus 0.3, tibia IV 0.43.
Colour of body and legs dark brown.
Prosoma (fig. 27) with distinct thoracal "shoulders", a deep fovea and some longer hairs; clypeus long, 8 large eyes which are difficult to observe on the darkened prosoma; mouth parts hidden. - Legs (figs. 28-29) stout, order I/II/IV/III, tibia I fairly thick. Numerous long bristles, femora 2 dorsally and a distal pair, patellae 2 dorsally, tibia I bears 7, metatarsus I 3 bristles; trichobothria of tibia IV: Fig. 29. - The opisthosoma (fig. 27) is slightly twisted, high, covered with short hairs; the spinnerets are partly observable. - Pedipalpus (figs. 30-31): Patella short and with a long dorsal bristle, tibia wide and with long hairs, cymbium large, paracymbium bipartite and with a pointed ventral branch, bulbus fairly large, median apophysis slender and outstanding.

Relationships: See above.

Distribution: Tertiary Baltic amber forest.

Gen. et sp. indet. (Figs. 32-33) Photo 142

Material: 1♂ in Baltic amber from a gravel mine in Hamburg-Harburg, Neuland, F. KERNEGGER leg., coll. F. KERNEGGER, Geolog.-Palaeontol. Inst. Hamburg no. 2556.

Preservation: The spider is completely preserved in a clear yellow amber piece; except the sternum, the ventral leg articles and around the eyes it is covered by a white emul-

sion; fissures hide parts of the body. The opisthosoma is wrinkled laterally.

Diagnosis (♂; ♀ unknown): Prosoma length about 0.6mm, posterior eye row somewhat straight, posterior median eyes separated by their diameter, at least femora I-II bear a dorsal bristle, tibiae I-II (fig. 32) bear a retrolateral and dorsal bristles, a dorsal metatarsal III bristle is absent; the bulbus (fig. 33) is very large and nearly globular, most structures are hidden, the tibia is only fairly wide and bears 6 strong hairs, the paracymbium is long and slender.

Description (♂):
Measurements (in mm): Body length 1.3, prosoma length about 0.6, metatarsus I 0.34, metatarsus IV 0.23, tarsus IV 0.21.
Colour: Body and legs dark brown, opisthosoma covered by a white emulsion.
Prosoma high and with few long hairs, eyes large, posterior row somewhat straight, posterior median eyes separated by about their diameter. Legs robust, I longest, bristles long (fig. 32): Femora 1 dorsally, I additionally 1 prodistally, tibiae dorsally 2/2/1/1, I-II additionally 2 retrolateral bristles in the basal half and a prolateral bristle in the middle. Tibia I apically probably narrow. Opisthosoma higher than long, dorsally with few long hairs. Pedipalpus: See above; the patella bears a dorsal bristle.

The **relationships** are unknown.

Distribution: Tertiary Baltic amber forest, deposit Hamburg-Harburg.

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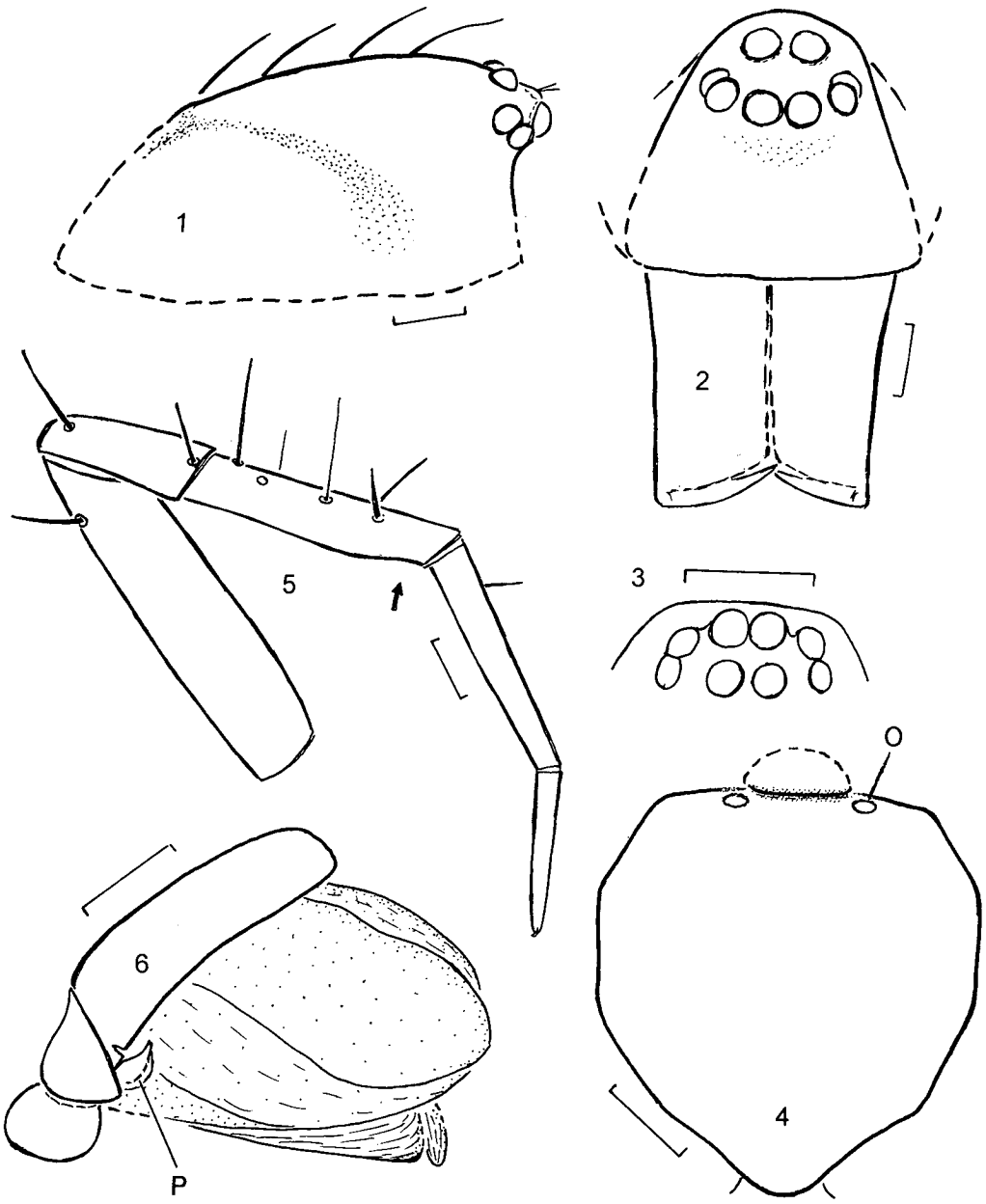
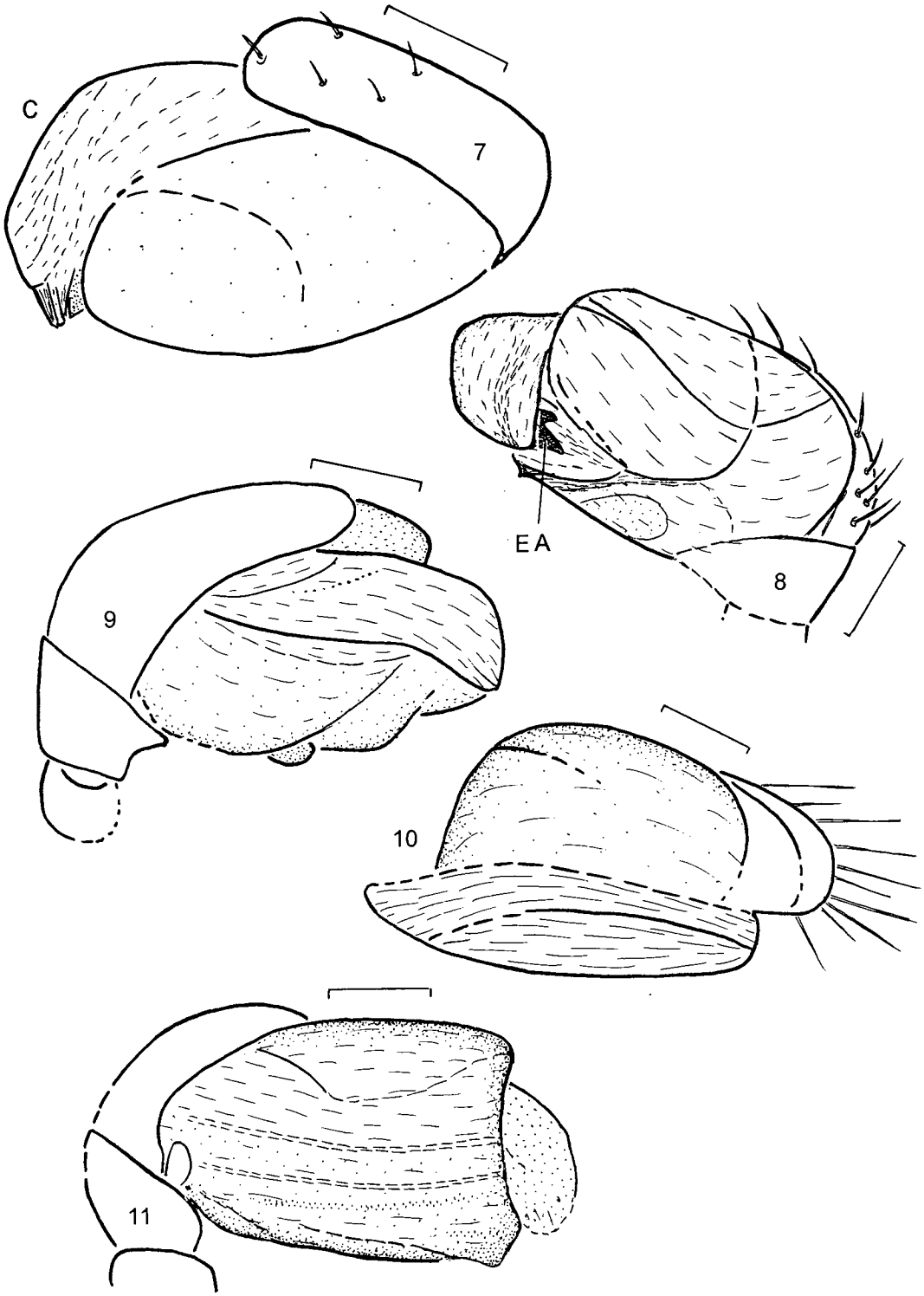
WUNDERLICH, J. (1988): Die fossilen Spinnen im Dominikanischen Bernstein.--Beitr. Araneol., 2, 378p.--Publishing House Joerg Wunderlich, D-75334 Straubenhardt.



Figs.1-11: ***Eoepeirotypus retrobulbus* n. gen. n. sp.**, ♂; 1-2) paratypus a), prosoma laterally and frontally; 3) holotypus, eyes dorsally; 4) paratypus c) sternum with opening (O) of the left sternal gland; 5) paratypus a), left leg I prodorsally. The arrow points at the slender distal part of the tibia; 6-9: holotypus; 6) r. pedipalpus retrolaterally (P = paracymbium), 7-9) l. pedipalpus; 7) retrolaterally; 8) retroldistally; 9) prolaterally; 10-11) paratypus a), r. pedipalpus distally and retrolaterally-ventrally (C = cymbium, EA ?= embolus-apophysis. - M = 0.1mm;


C
7
EA
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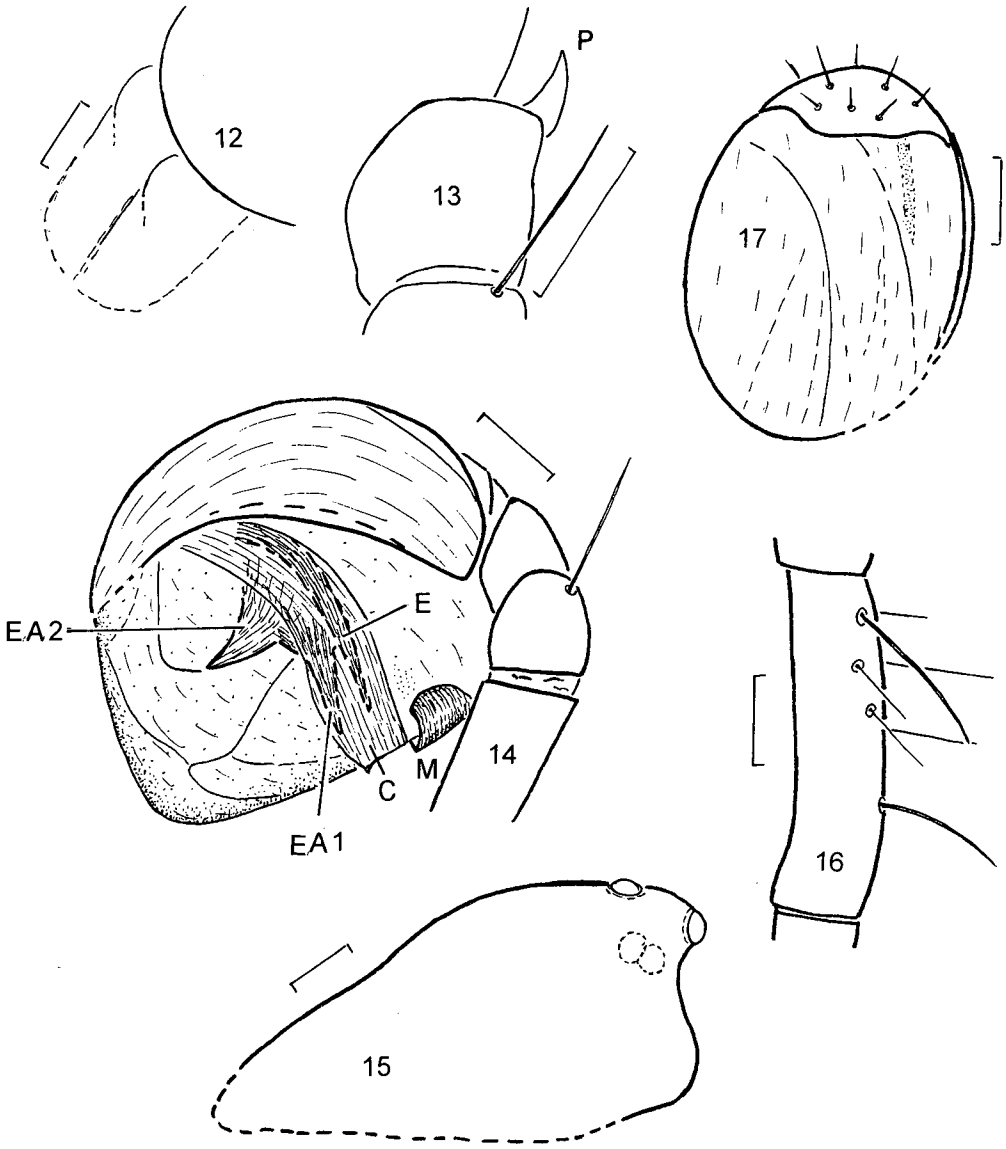
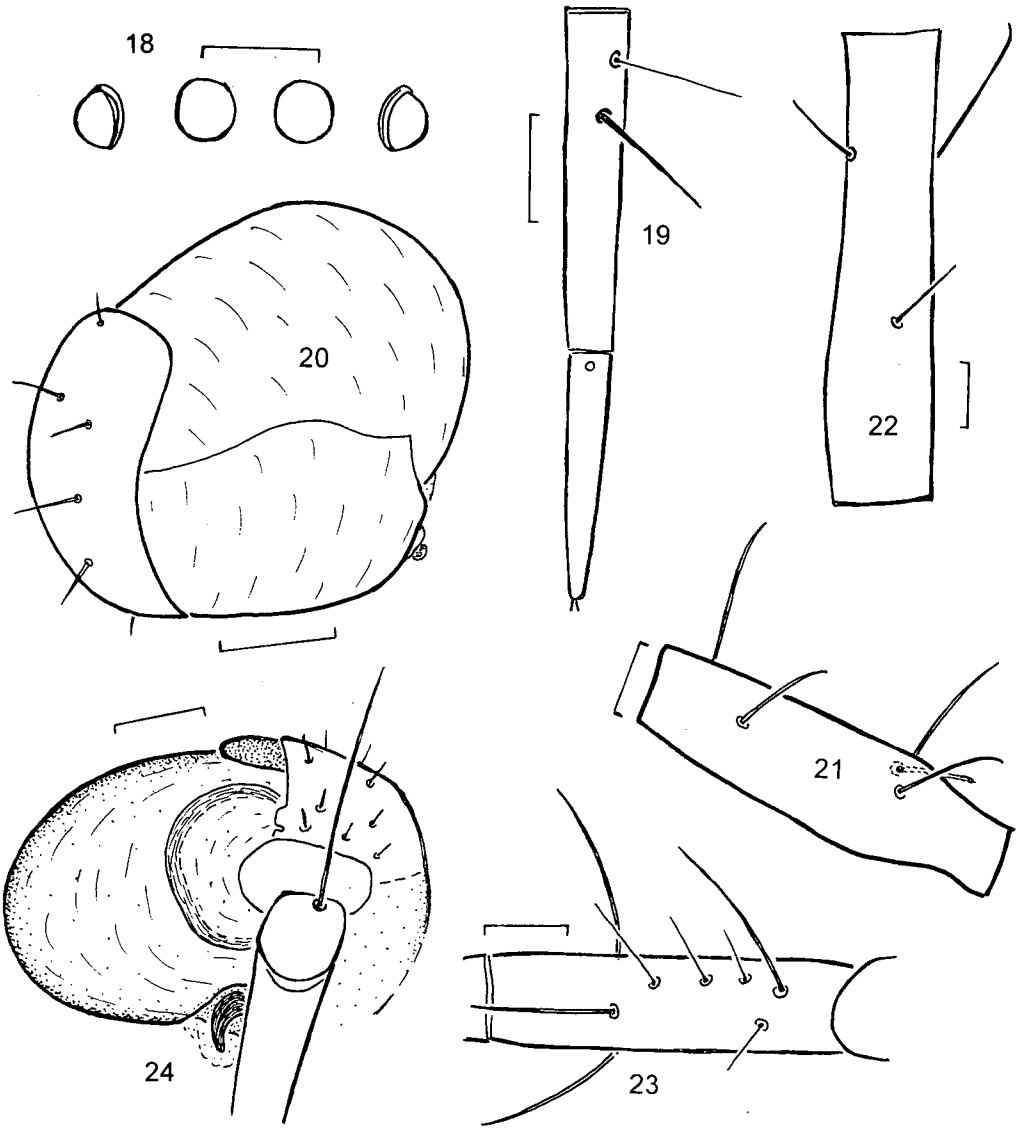


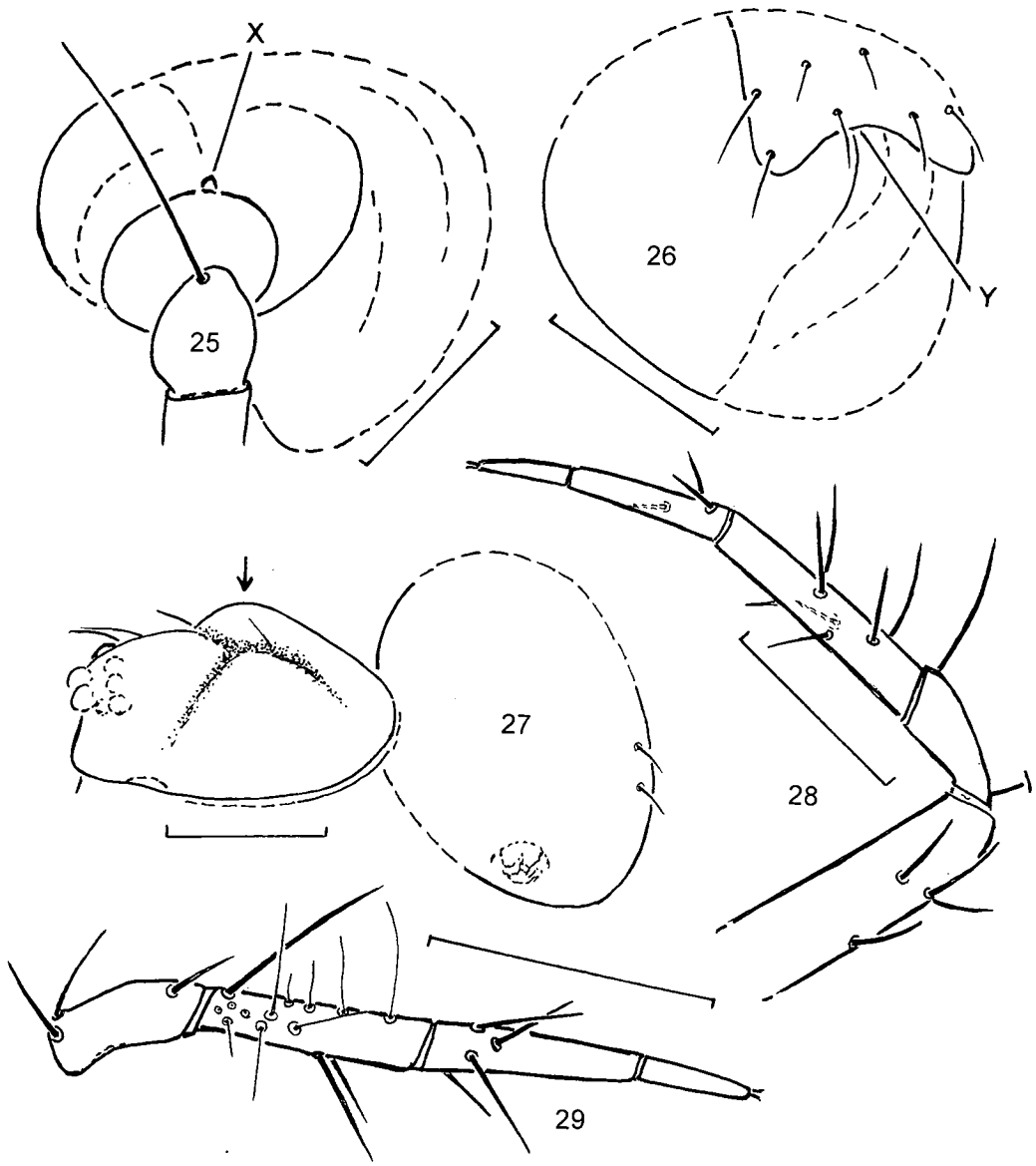
figs.12-14: ***Eotheridiosoma tuber*** **n. gen. n. sp.**, ♂ holotypus; 12) chelicerae with the ventral part of the clypeus dorsally-frontally-laterally; 13) tibia and paracymbium (P) of the r. pedipalpus; 14) l. pedipalpus retrolaterally but patella and femur dorsally (C = conductor, E = embolus, EA1 & EA2 = embolus apophyses 1 and 2, M = median apophysis). - M = 0.1;

figs. 15-17: ***Eotheridiosoma volutum*** **n. gen. n. sp.**; ♂; 15) prosoma laterally; 16) r. tibia I retrolaterally and slightly basally; 17) r. pedipalpus retrodistally. - M = 0.1;



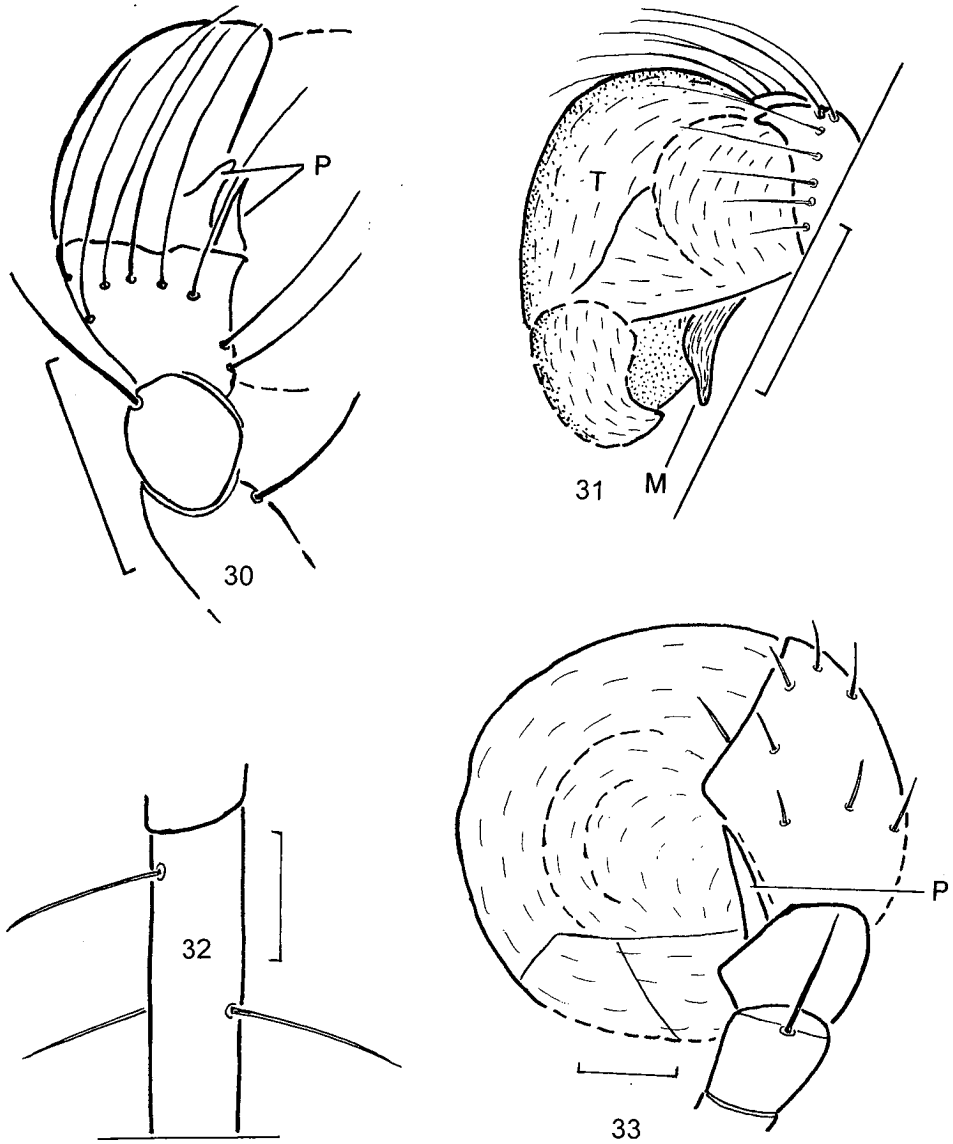
figs.18-20: ***Spinitheridiosoma balticum*** **n. gen. n. sp.**, ♂; 18) posterior eye row dorsally; 19) l. tarsus and metatarsus III with trichobothrium, dorsal bristle and tarsal organ; 20) l. pedipalpus distally. - M = 0.1;

figs. 21-24: ***Spinitheridiosoma bispinosum*** **n. gen. n. sp.**, ♂; 21) l. tibia I (distally tapering!) prolaterally with bristles, 22) l. femur I dorsally and slightly distally with bristles (macrosetae); 23) r. tibia II dorsally with bristles and trichobothria; 24) l. pedipalpus basally but patella and tibia dorsally. - M = 0.1;



figs. 25-26: ***Spinitheridiosoma rima* n. gen. n. sp.**, ♂, r. pedipalpus dorsally and retro-distally (parts are hidden) (Y = distal margin of the divided cymbium). - M = 0.2;

figs. 27-31: ***Umerosoma multispina* n. gen. n. sp.**, ♂; 27) body, dorsal-left view. The arrow indicates to the right thoracal "shoulder"; the eyes are difficult to observe; 28) r. leg I prolaterally (trichobothria are not drawn); 29) l. leg IV behind the femur with bristles and trichobothria; 30) r. pedipalpus retrodorsally. Note the bipartite paracymbium (P); 31) l. pedipalpus retrolaterally (basally hidden; not all hairs are drawn). M = median apophysis. M = 0.2 in figs. 30-31, 0.5 in the other figs.; note the theridiid-shaped tibia in fig. 30;



figs. 32-33: **Gen. et sp. indet.**, ♂; 32) basal part of the r. tibia I dorsally and slightly basally; 33) l. pedipalpus retrodorsally-basally (P = paracymbium). - M = 0.1.

BEITR. ARANEOL., 3 (2004)

THE FOSSIL SPIDERS OF THE FAMILY ANAPIDAE S. L. (AEANEAE) IN BALTIC, DOMINICAN AND MEXICAN AMBER AND THEIR EXTANT RELATIVES, WITH THE DESCRIPTION OF THE NEW SUBFAMILY COMAROMINAE

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ABSTRACT: The Araneae family Anapidae is used in a wide sense (s. l.), including Micropholcommatidae as part of the Anapinae s. str. Fossil members of the family Anapidae s. l., the subfamilies Anapinae, Comarominae, Mysmeninae and Synaphrinae in Baltic (incl. Bitterfeld) amber and Dominican amber are investigated; fossils of the Symphytognathinae are unknown. A cladogram of the subfamilies of the Anapidae s. l. and keys to the fossil genera in Baltic amber and extant holarctic genera are given. The first fossil species of the Comarominae and Synaphrinae as well as the first Anapidae species in Baltic amber are described. A new subfamily as well as the following 11 new genera and 27 new species are described in **Baltic amber**: (a) Comarominae **n. subfam.**: *Balticoroma* **n. gen.**, *B. ernstorum* **n. sp.**, *B. gracilis* **n. sp.**, *B. reschi* **n. sp.**, *B. serafinorum* **n. sp.**, *B. tibialis* **n. sp.**; (b) Anapinae s. str.: *Balticonopsis* **n. gen.**, *B. bispina* **n. sp.**, *B. bitterfeldensis* **n. sp.**, *B. bulbosa* **n. sp.**, *B. ceranowiczae* **n. sp.**, *B. holti* **n. sp.** and *B. thomasi* **n. sp.**; *Dubianapis* **n. gen.** with its type species *D. obscura* **n. sp.**; *Flagellanapis* **n. gen.** with its type species *F. voigti* **n. sp.**; *Fossilanapis* **n. gen.**, *F. anderseni* **n. sp.**, *F. baetcheri* **n. sp.**, *F. eichmanni* **n. sp.**, *F. flexiotarsus* **n. sp.**, *F. saltans* **n. sp.** and *F. unispinum* **n. sp.**; *Ruganapis* **n. gen.** with its type species *R. scutata* **n. sp.**; *Saxonanapis* **n. gen.** with its type species *S. grabenhorsti* **n. sp.**, *Tuberanapis* **n. gen.** with its type species *T. parvibulbus* **n. sp.**; (c) Mysmeninae: *Eomysmenopsis* **n. gen.** with its type species *E. spinipes* **n. sp.**; *Mysmena groehni* **n. sp.**, *Mysmena grotae* **n.**

sp., *Palaeomysmena* **n. gen.** with its type species *P. hoffeinsorum* **n. sp.**; (d) Synaphrinae: *Iardinidis* **n. gen.** with its type species *I. spinipes* **n. sp.** - Members of *Balticoroma* and *Mysmena* are known from fossil and extant taxa. - *Comaroma maculosa* OI 1960 and *Comaroma nakahirai* (YAGINUMA 1959) (with hesitation) (both extant,SE-Asia) are transferred to *Balticoroma* (**n. comb.**). *Comaroma tongjunca* ZHANG & CHEN 1994 is not a member of the family Anapidae s. l. but probably of the family Theridiidae. - From **Dominican amber** *Dominicanopsis grimaldii* **n. gen. n. sp.** is described, the smallest known species of spiders; body length of the adult male 0.33 mm. - The genus *Mysmena* SIMON 1894 is regarded in a wide sense, *Mysmenella* BRIGNOLI 1980 is regarded as a junior synonym (**n. syn.**), *Calodipoena* GERTSCH & DAVIES 1936 and *Microdipoena* BANKS 1895 again as junior synonyms (**rev. syn.**), and *Calomyspoena* BAERT & MALFAIT 1983 as a **quest. syn.**. - The importance of the new taxa regarding palaeoclimatic and ethological conclusions are discussed, possible social life is reported from members of the Comarominae. The reported remains of sperm as well as of muscles and openings of pheromone glands in articles of the first male legs in the genus *Balticoroma* and of clasping spines in the genus *Balticonopsis* are discussed.

The **material** is deposited in the following institutions and museums:

GPIUH = Geolog.-Palaeontolog. Institute, University Hamburg (Dr. W. WEITSCHAT),
IMGPUG = Inst. & Mus. Geol. & Paläont. Georg-August Univ. Göttingen (Dr. JAHNKE),
IPHUB = Institute of Palaeontology, Humboldt-University Berlin (Dr. E. PIETRZENIUK, now Dr. NEUMANN),
MZ = Museum Ziemi, Warsaw (Dr. B. CERANOWICZ),
SMF = Senckenberg- Museum Frankfurt a. M. (Dr. P. JAEGER),
ZMUK = Zoolog. Museum, University Kopenhagen (Dr. H. ENGHOFF, now Dr. N. SCHARFF).

If not otherwise stated further material is deposited in private collections (see the descriptions of the species), e.g. provisionally in the collection of the author (CJW).

INTRODUCTION (see below, "Einleitung")

In this paper I use the name Anapidae in a wide sense (s. l.) including Comarominae, Mysmeninae, Symphytognathinae and Synaphrinae besides the nominate Anapinae s. str.; in my opinion a splitting of the Anapidae s. l. to several families is not justified. The name Anapidae SIMON 1895 is older than Symphytognathidae HICKMAN 1931, see

WUNDERLICH (1986). KRATOCHVIL (1935) elevated SIMON's Anapeae to family status. SCHÜTT (2002) synonymized Micropholcommatidae (incl. *Textricella*) with the Anapinae s. str., and I agree with her conclusions. Apparently there is no doubt about the monophyly of the Anapidae s. l., and of its sister group, the Theridiosomatidae; see GRISWOLD et al. (1998), SCHÜTT (2002), WUNDERLICH (1986), and below.

The preservation of some fossil spiders in amber is excellent: Sensory hairs, tarsal organs (fig. 17), remains of muscles (figs. 26, 75), minute pedipalpal sclerites (e.g. fig. 14); probably remains of sperm (figs. 95-96, 141), femoral organs (figs. 123, 138) and possible openings of pheromone glands (fig. 11), e.g., are documented.

Fossil Anapidae s. l. are known fom the Tertiary only. Although the preservation of spiders is optimal in amber these spiders were overlooked or ignored in former times because of their tinyness. In contrast to the very few fossil specimens which have been mentioned or described in Dominican amber - see e.g. PENNEY (2002), WUNDERLICH (1988) - I had the opportunity to study more than one hundred Anapidae s. l. in Baltic amber during the last decade: 12 genera are described in this paper, besides *Balticoroma* and *Mysmena* they all are extinct. Besides the genera *Mysmena* and *Balticoroma* the strange fossil genera apparently are not strongly related to extant genera. Most frequent in genera and species are members of the Anapinae, the most frequent species is the Comarominae *Balticoroma serafinorum,* which is one of the most frequent spider species in Baltic amber at all, I saw more than 60 specimens, most are adult spiders of both sexes.

Climatology and extinction: According to the occurence of palm trees, termites, and mygalomorph spiders of the families Ctenizidae and Dipluridae, e.g., the Baltic amber forest was mainly a subtropic forest, similar to the South Mediterranean Region today. Most extant Anapidae live in the tropics and the subtropics, only very few occur in moderate climates; apparently Anapidae found good climatic conditions in the Early Tertiary Baltic amber forest. The colder and drier climate of the Baltic amber forest in the Middle Tertiary - the beginning of the Oligocene - was most probably not only the end of the Baltic amber forest but the end of the Anapidae s. l. fauna of this region, too. About 97% of the 13 fossil genera in Baltic amber are extinct, only members of *Balticoroma* and *Mysmena* (= *Mysmenella*) have survived. The modern European fauna of the Anapidae may have later invaded and then substituted the extinct fauna.

Ecology: The members of most species live in higher strata of the vegetation (similar to the Theridiidae which probably compete with the Anapidae for their preys and for the placements of their webs); members of the extant genus *Comaroma*, probably *Balticoroma*, and (?most) Synaphrinae, (e.g.), live on the ground. Except (?all) Synaphrinae the Anapidae prefer temperate, dark and wet localities.

Behaviour: Parts of capture webs (e.g. fig. 32), modified male legs I and the occurence of several conspecific spiders in the same piece of amber allow conclusions on the fossil "frozen behaviour":
(1) In most Anapidae the first leg of the male is modified (figs. 9, 33, 42) (sexual dimorphism); it is thickened, curved, hairy or/and spinose and may have the function of a "grasping leg" which helps fasten the female during the copulation. In the Comarominae pheromone glands are present as well, see KROPF (1990) and fig. 11. At least in the

female of most Mysmeninae a femoral organ I(-II) is present (figs. 123, 138), see below (its function is unknown).
(2) Social life in a common web, kleptoparasitism and commensalism.
Anapidae build modified orb webs. With some fossil Anapidae threads are preserved and few possess sticky droplets, see e.g. fig. 32; the find of the larger part of a capture web which originates with certainty from a fossil Anapidae is wanted. Especially in *Balticoroma ernstorum* and *B. serafinorum* frequently more than one - up to 9! - adult specimens of both sexes (in about the same relation) are preserved in the same piece of amber, see RESCH (1996). For a comparison: The members of the genus *Orchestina* SIMON (Oonopidae) - which are frequent in Baltic amber and tiny, too, but are no web-builders - are only rarely preserved with more than one specimen (occasionally a couple); I never found more than three specimens in the same piece of amber. - What is the most likely explanation for the common occurence of specimens of *Balticoroma*? (a) The spiders were socially living in a common capture web; (b) the spiders were kleptoparasites. - Kleptoparasitism is known from the Anapidae s. l. (e.g.) in the Anapinae: *Sofanapis antillanca* PLATNICK & FORSTER 1989 - see RAMIREZ & PLATNICK (1999) as well as in the Mysmeninae: From extant American spiders of the genus *Mysmenopsis* SIMON 1897 (?= *Isela* GRISWOLD 1985 from Africa) and probably from a fossil species in Dominican amber: *Mysmenopsis lissycoleyae* PENNEY 2000, see PENNEY (2000). This kind of behaviour is unknown in extant Comarominae. - In a laboratory C. KROPF (pers. commun., dissert.) found in two cases three-dimensional "giant webs" in which several specimens of both sexes of the extant Comarominae *Comaroma simoni* were living together. In special localities KROPF found furthermore free-living members of *C. simoni* being the most frequent species. Socially living Anapidae are unknown. The noted behaviour of *Comaroma* and probably *Balticoroma*) may be (have been) parasocial - aggregations of individual webs, see FOELIX (1996: 261-262). - In several cases I found in Baltic amber members of the Dictynidae: Hahniinae as syninclusions with *Balticoroma* which have the same small body size as *Balticoroma*; see the paper on the family Dictynidae in this volume. The solitary members of the family Hahniinae build small capture webs usually on the ground in litter and moss, and the common occurence of *Balticoroma* with the Hahniinae may indicate that the members of *Balticoroma* were "ground living" spiders, too.

An enormous diversity of Anapidae taxa is reported from the subtropic Baltic amber forest: 12 genera and 27 species; this is more than known today from the whole Holarctic Region (!). Most genera and species are members of the Anapinae s. str. In Europe members of only 5 genera occur today. In the Comarominae the number of fossil species (5) is larger than the number of extant species worldwide (three or four); apparently this subfamily is a relict, see below (biogeography). - According to my recent knowledge (Spring of 2003) Anapidae s. l. is one of the most diverse families in Baltic amber besides Theridiidae, Synotaxiidae, Linyphiidae, Corinnidae and Dictynidae s. l. I do not know of any extant subtropic forest in the Palaearctic Region which has a comparable diversity of the Anapidae like the fauna of the Baltic amber forest; the diversity in all taxonomical levels is similar to tropical (rain) forests.

Biogeography/distribution: Today two subfamilies - Anapinae and Mysmeninae - have a cosmopolitical distribution, Comarominae (Holarctic Region) and Synaphrinae (Palaearctic and Oriental Region) are restricted to the Northern Hemisphere, Symphytognathinae is restricted to tropical regions, the Neotropical and the Australian Regions. - Ac-

cording to the extant distribution - see WUNDERLICH (1986: 114) and below - and the low number of Anapidae taxa in the Americas incl. Dominican amber - in contrast to the high number of palaearctic and Baltic amber taxa - the origin of the family Anapidae s. l. may have been in the "Old World", probably in the Oriental Region. Comarominae is a relict taxon, see above (diversity). Five extinct species of *Balticoroma* are known from the Baltic amber forest, only one or two species of this genus - *maculosa* (OI 1960) and probably *nakahirai* (YAGINUMA 1959) - survived (in SE-Asia). More than two thirds of the Anapidae specimens in Baltic amber are members of the Comarominae. - The Bitterfeld deposit (see the genus *Balticoroma*): Three taxa are only known from the Bitterfeld deposit: *Balticonopsis bitterfeldensis*, *Fossilanapis eichmanni* and *Saxonanapis grabenhorsti*. - Anapidae: Mysmeninae in Rovno amber from the Ukraine: See the paper on fossil spiders from the Ukraine in this volume.

Evolution in the genus *Balticoroma*: According to the slender articles of the male leg I - see the cladogram of this genus below - the extant *maculosa* and the fossil *gracilipes* are the most "plesiomorphic" species of the genus; *serafinorum* and *ernstorum* are the - morphologically - most specialized/derived and probably the - geologically - "joungest" species of the genus *Balticoroma*. While 8 of 10 specimens (= 80%) (2 of 4 (= 50%) pieces which include specimens of this species) of the "plesiomorphic" *gracilipes* come from the Bitterfeld deposit (the remaining specimens come from other deposits, most probably from Kaliningrad). In contrast: only 10% (!) of the specimens of the derived *ernstorum* + *serafinorum* (all together about 80 specimens) originate from the Bitterfeld deposit. May one conclude that the origin of *gracilipes* was the Bitterfeld part of the Baltic amber forest? - See also the cladogram of the genus *Balticonopsis*.

Relations of the distal articles of leg I: Lengthened tarsus or shortened metatarsus? As clearly recognizable in *Balticoroma serafinorum* - compare (a) leg I with the other legs and (b) leg I of *serafinorum* with leg I of the other congeneric species - both leg articles are modified: The tarsus is lengthened and the metatarsus is shortened as well. The situation may be the same in other genera of this family.

EINLEITUNG (siehe auch oben)

Zu den Zwerg-Kugelspinnen gehören die winzigsten Spinnen überhaupt. Nach GERTSCH (1960: 14) waren die kleinsten damals bekannten Spinnen der Unterfamilie Mysmeninae o.5mm lang. FORSTER & PLATNICK (1977: 4, 20) geben 0.37mm als Körper-Länge der kleinsten bekannten Spinne derselben Unterfamilie an. Das ♂ der unten beschriebenen *Dominicanopsis grimaldii* n. gen. n. sp. (Abb. 138) ist mit einer Körper-Länge des geschlechtsreifen Männchens von 0.33mm die kleinste bekannte

Spinnenart; kleinere geschlechtsreife Spinnen sind auch rezent nicht bekannt. Die in dieser Arbeit beschriebenen fossilen Anapidae haben eine Körper-Länge von 0.33 bis 1.8mm.

Fossile Zwerg-Kugelspinnen (Anapidae) sind nur im Bernstein und nur aus dem Tertiär bekannt. Wegen ihrer guten Erhaltung im Bernstein können sie am ehesten - bisher sogar ausschließlich - in diesem Medium identifiziert werden. Die Suche nach winzigen fossilen Spinnen im Bernstein - insbesondere nach geschlechtsreifen ♂ - hat sich in den vergangenen Jahren als sehr erfolgreich erwiesen: Waren bisher lediglich zwei fossile Arten der Zwerg-Kugelspinnen bekannt (*Mysmenopsis lissycoleyae* PENNEY 2000 und *Palaeoanapis nana* WUNDERLICH 1988 in Dominikanischem Bernstein), so kennen wir jetzt bereits 31 Arten, die im Bernstein erhalten sind. In früheren Arbeiten haben weder KOCH & BERENDT, noch MENGE oder PETRUNKEVITCH fossile Vertreter der Anapidae beschrieben. Mir selbst lag nach 10-jähriger Suche zunächst lediglich eine Handvoll fossiler Anapidae vor; erst die intensive Suche in den vergangenen 10 Jahren erbrachte eine Fülle weiteren Materials, siehe unten.

Der Erhaltungszustand vieler dieser Winzlinge (Körper-Länge wenigstens 0.33mm - kaum größer als ein Punkt!), ist faszinierend, vgl. z. B. Abb. 14, 95-96, 103, 138 und die Fotos. Die Befunde und Schlußfolgerungen - etwa über die verwandtschaftlichen Beziehungen der fossilen Spinnen, zum Verhalten, zur Verbreitung oder zum damaligen Klima - sind entsprechend gut fundiert und teilweise spektakulär. Nicht nur Augen-Linsen, feinste Borsten und Sinnes-Haare, Tarsal-Organe (Abb. 17) sind erhalten; in einem Fall sind nur wenige tausendstel mm kleine Sklerite des expandierten ♂-Pedipalpus dokumentierbar (Abb. 14); bei manchen Spinnen sind möglicherweise Poren von Pheromon-Drüsen der Beine (Abb. 11) oder des Femoralorgans, bei anderen sogar Reste von Weichteilen wie Muskeln konserviert worden (Abb. 16, 75); siehe unten bei der Gattung *Balticoroma*) sowie Sperma(?)-Reste (Abb. 95-96, 141). Mit den Teilen von Fangnetzen (vgl. Abb. 32), den Geschlechts-Unterschieden der Beine u.a. sind schließlich Rückschlüsse über konserviertes "fossiles Verhalten" möglich. - Die rotbraune Körper-Färbung vieler gepanzerter fossiler Zwerg-Kugelspinnen (Fotos) entspricht derjenigen zahlreicher heutiger Verwandter und könnte der ursprünglichen Färbung sehr nahekommen.

Bisher war im Baltischen Bernstein keine einzige Art der Zwerg-Kugelspinnen (Anapidae im weiteren Sinne (= s.l.)) beschrieben worden; in diesem Bernstein liegen mir jetzt mehr als 140 Exemplarevor, die zu 27 Arten gehören. Die allermeisten sind stark gepanzert (z.B. Abb. 22, 44). Die fossilen Vertreter dieser Familie können insgesamt nicht länger als besonders selten gelten, wohl aber alle Arten für sich, mit der Ausnahme von *Balticoroma serafinorum* n. gen. n. sp., von der mir etwa 60 Exemplare vorlagen (einige habe ich bei Händlern gesehen, aber nicht erworben). Da 3 der 12 Gattungen im Baltischen Bernstein und sogar 13 der 27 Arten in nur einem einzigen Exemplar vorliegen und beinahe jedes Jahr noch unbekannte Arten erscheinen, erwarte ich, daß zahlreiche Arten und mehrere Gattungen noch zu entdecken sind!

Der Blick zurück durch das "Bernstein-Fenster" in die Zeit des frühen Tertiärs vor etwa 50 Millionen Jahren zeigt uns eine Fülle von 12 Gattungen und 27 Arten der Zwerg-Kugelspinnen (Anapidae) aus dem Baltischen Bernsteinwald (bisher dagegen nur 3 Gattungen und Arten im Dominikanischen Bernstein); das mehr als heute aus der gesamten Holarktis bekannt sind (!). Die Anapidae sind gemäß heutiger Kenntnis neben den Kugelspinnen (Theridiidae) und Baldachinspinnen (Linyphiidae) (u. a.) eine der gattungsreichsten Spinnen-Familien im Baltischen Bernstein. Offenbar hat die Familie die Zeit ihrer maximalen Entfaltung - wenigstens in dieser Faunen-Region - bereits lan-

ge hinter sich. Heute dominieren in Europa die Vertreter der Baldachinspinnen (Linyphiidae), die Unterfamilie Eigentliche Baldachinspinnen (Linyphiinae), die im Baltischen Bernstein nicht selten sind und - vor allem - die Zwergspinnen (Erigoninae), die im Baltischen Bernstein (bisher?) nicht gefunden worden sind. Die häufigsten Spinnen in höheren Vegetations-Schichten waren im Tertiär und sind noch heute die Kugelspinnen (Theridiidae), die möglicherweise - z.B. um Standorte zur Anlage der Fangnetze und um Beutetiere - mit den Zwerg-Kugelspinnen konkurriert haben dürften.
Die Genital-Strukturen der fossilen Anapidae (Abb. 14) waren im frühen Tertiär bereits so kompliziert entwickelt wie diejenigen heutiger Verwandter. Auch dieser Befund deutet darauf hin, daß die Vertreter dieser Familie bereits zu jener Zeit eine längere Evolution hinter sich hatten.
Vergleicht man die Fauna der fossilen Zwerg-Kugelspinnen des Baltischen Bernstein-Waldes mit derjenigen des heutigen nördlichen und mittleren Europas,so erscheint sie ganz fremdartig: 10 der 12 Gattungen sind rezent nicht bekannt und möglicherweise ausgestorben (die eine oder andere mag in den Tropen noch entdeckt werden); die Gattung *Balticoroma* hat in Südost-Asien überlebt, die Gattung *Mysmena* (= *Mysmenella*) hat weltweit überlebt; zwei Arten dieser Gattung (*Mysmena* s. l.) kommen heute in Mitteleuropa vor. In Europa leben heute neben *Mysmena* noch Vertreter von 4 weiteren Gattungen der Zwerg-Kugelspinnen, die zu den fossilen Gattungen - mit der Ausnahme von *Comaroma* - keine engen Beziehungen zeigen. Ich kenne keinen rezenten subtropischen Wald in der nördlichen Hemisphäre, der eine mit dem Baltischen Bernsteinwald vergleichbare Vielfalt (Diversität) an Arten und Gattungen (Taxa) der Zwerg-Kugelspinnen besitzt. Eine vergleichbare Vielfalt existiert (heute) wohl nur in tropischen primären (Regen)wäldern. Die Spinnenfauna derartiger Wälder ist in Südost-Asien (z.B. in China und Vietnam) noch kaum untersucht; vgl. die Verbreitung der Gattung *Balticoroma*!

Rezente und fossile Anapidae im Bernstein: Siehe auch das Buch von WUNDERLICH (1986: 8, 17-19, 26, 35, 52, 93-98, 100-104, 107, 109, 110, 112, 113, 121, 125-127, 137, Abb. 317).

Biogeographie, Palaeoklimatologie und Aussterberate (siehe auch Einleitung und Introduction)

Wie ist die Fremdartigkeit der fossilen Baltischen (incl. Bitterfelder) Spinnen-Fauna zu erklären? Der Verbreitungs-Schwerpunkt der Anapidae (s.l.) liegt heute in den Tropen und Subtropen. Es spricht nichts dagegen, daß die Ansprüche der fossilen Spinnen an das Klima von den heutigen Spinnen kaum verschieden waren. Gemeinsam mit ihnen lebten im Baltischen Bernsteinwald z.B. Dattelpalmen und Termiten, die keineswegs selten waren - WEIDNER (1955:70) schließt von den Termiten auf ein Klima, das demjenigen des heutigen Mittelmeer-Raumes ähnlich war - sowie Vertreter der Falltürspin-

nen und der tropischen Käscherspinnen (Deinopidae). Heute wird kaum bestritten, daß das Klima im Baltischen Bernstein-Wald wenigstens im frühen Tertiär - obwohl der Wald im heutigen nördlichen Europa lag - überwiegend subtropisch war (vermutlich existierten aber auch kühlere montane Regionen). Hier fanden die Zwerg-Kugelspinnen offenbar ausgezeichnete Lebensbedingungen vor. Das später kühlere Klima im mittleren Tertiär war vielleicht nicht nur das Ende des Baltischen Bernstein-Waldes, sondern - in dieser Region - auch dasjenige der Existenz der meister Arten der Zwerg-Kugelspinnen. Der Prozentsatz der ausgestorbenen Gattungen dieser Familie stimmt etwa mit der - geschätzten - durchschnittlichen Aussterberate fossiler Spinnen-Gattungen von neun Zehnteln im Baltischen Bernstein(wald) überein - er liegt sogar etwas darüber - und ist bemerkenswert höher als etwa derjenige bei Ameisen, Käfern und Zweiflüglern.
Von besonderem Interesse ist die Gattung *Balticoroma*. Bei einer Art - *Balticoroma serafinorum* - handelt es sich möglicherweise um die geologisch jüngste und - nach den Strukturen des ersten Beinpaares des Männchens - um die am meisten spezialisierte Art dieser Gattung, siehe das Verzweigungsschema (Cladogram) unten bei der Gattung *Balticoroma*, nach dem auch Vermutungen über die Stammart möglich sind, vgl. *gracilipes*, siehe oben, Introduction: Evolution). Ein oder zwei Arten dieser Gattung haben - in Südost-Asien - überlebt. - Vgl. das Verzweigungsschema der Gattung *Balticonopsis*.
Drei Arten der Baltischen Zwerg-Kugelspinnen sind ausschließlich vom Fundort Bitterfeld bekannt: *Balticonopsis bitterfeldensis*, *Fossilanapis eichmanni* und *Saxonanapis grabenhorsti*.

Ökologie, Verhalten und Statistik (siehe auch die Einleitung)

Die meisten Anapidae leben heute in höheren Vegetations-Schichten feuchter (Regen-) Wälder, nicht wenige finden sich am Boden im Fall-Laub oder unter Steinen. Andere - z.B. Vertreter der Gattung *Synaphris* - bevorzugen trockene und belichtete Standorte. Sie bauen meist kleine Fangnetze, abgewandelte Radnetze. Einige - z. B. verschiedene Arten der amerikanischen Gattung *Mysmenopsis* (?= *Isela* GRISWOLD 1985 aus Afrika) - leben als Diebsspinnen (Kleptoparasiten) in den Fangnetzen von Falltürspinnen (Ctenizidae). Wie die mit Klebtröpfchen besetzten dünnen Fangfäden bei einigen Spinnen im Baltischen Bernstein nahelegen (fig. 32), bauten offenbar wenigstens einige der fossilen Zwerg-Kugelspinnen Fangnetze. Rückschlüsse über die Standorte/Positionen dieser Netze ergeben sich wohl am ehesten aus den Begleit-Funden. Die Existenz fliegender Insekten (vor allem Mücken (Diptera: Nematocera)) in den Bernsteinen, in denen auch Anapidae konserviert worden sind, spricht für die Anlage von Fang-Netze in höheren Vegetations-Schichten. Diesem Bild zu wiedersprechen scheint das mehrfache Vorkommen von Vertretern der Bodenspinnen (Dictynidae: Hahniinae; siehe den Beitrag über Dictynidae in disem Band) zusammen mit Vertretern - bis zu 9 Exemplaren in demselben Bernstein-Stück! - der neu beschriebenen Gattung *Balticoroma*. Zwar leben heute die meisten Hahniinae am Boden, einige kommen aber auch in höheren Vegetations-Schichten vor, z.B. an bzw. unter Baumrinde. Ich möchte nicht ausschließen, daß

es sich bei den fossilen Vertretern der Gattung *Balticoroma* um fakultativ sozial lebende Spinnen gehandelt hat, die ein gemeinsames Netz bewohnt haben, siehe oben (Introduction: Behaviour).
Während im Baltischen Bernstein 27 Arten mit mehr als 140 Individuen aus 12 Gattungen (10 sind ausgestorben) und 4 Unterfamilien bearbeitet werden konnten, liegen im Dominikanischen Bernstein lediglich 3 Arten mit 4 Individuen aus 3 Gattungen (2 sind ausgestorben) und 2 Unterfamilien vor (Comarominae und Synaphrinae fehlen hier), vgl. die unten stehende Übersicht. Die Vielfalt dieser Familie im Baltischen Bernstein ist wesentlich gößer als diejenige im Dominikanischen Bernstein. Bis heute überlebt haben die Gattungen: *Balticoroma* und *Mysmena* aus dem Baltischen Bernsteinwald und *Mysmenopsis* aus dem Dominikanischen Bernsteinwald. Die meisten Arten müssen tatsächlich im Bernstein (nicht unbedingt auch im Bernstein-Wald!) als äußert selten gelten (vgl. oben) etwa 20 Arten und etwa 7 Gattungen im Baltischen Bernstein; zwei Arten im Dominikanischen Bernstein liegen in nur einem einzigen Exemplar vor.

List of the fossil Anapidae s l. in amber (number of specimens in brackets):

In brackets: Second position = specimens from the Bitterfeld deposit,
first position = specimens from other deposits.

Subfamily	in **Baltic amber**	in **Dominican amber**
Anapinae:		
	Balticonopsis bispina (1/0)	
	Balticonopsis bitterfeldensis (0/1)	
	Balticonopsis bulbosa (1/0)	
	Balticonopsis ceranowiczae (2/0)	
	Balticonopsis holti (1/0)	
	Balticonopsis thomasi (2/0)	
	Dubianapis obscura (1/0)	
	Flagellanapis voigti (3/1)	

Fossilanapis anderseni (1/0)
Fossilanapis baetcheri (1/0)
Fossilanapis eichmanni (0/1)
Fossilanapis flexiotarsus (1/0)
Fossilanapis saltans (2/0)
Fossilanapis unispinum (1/0)
Ruganapis scutata (3/0)
Saxonanapis grabenhorsti (0/2)
Tuberanapis parvibulbus (2/0)

Comarominae:

Balticoroma gracilipes (3/8)
Balticoroma ernstorum (17/2)
Balticoroma reschi (9/0)
Balticoroma serafinorum (about 50/5)
Balticoroma tibialis (1/0)

Palaeoanapis nana (1)

Mysmeninae:

Eomysmenopsis spinipes (1/1)
Mysmena groehni (4/4)
Mysmena grotae (6/0)
Palaeomysmena hoffeinsorum (1/0)

Dominicanopsis grimaldii (1)
Mysmenopsis lyssicoleyae (2)

Synaphrinae:

Iardinidis brevipes (1/0)

Previously described fossil species of the family Anapidae s. l.:

Mysmena fossilis PETRUNKEVITCH 1971 in Mexican amber: The holotype is a juvenile spider, not an adult ♀ as reported in the original description. According to the ventral

serrate hairs of tarsus IV the spider is a member of the family Theridiidae (in some - espec. juvenile) members of the Theridiidae the tarsi are longer than the metatarsi as in *M. fossilis*).

According to the ventral serrate hairs *Municeps minutus* PETRUNKEVITCH 1958 and *M. pulcher* PETRUNKEVITCH 1942 in Baltic amber are Theridiidae, too. The body length of the spiders which were described by PETRUNKEVITCH - juveile specimens only - is between 1.8 and 2mm - they are larger than the known adult Anapidae in Baltic amber.

According to the relatively long tarsi and the shape of the opisthosoma *Cyclosoma succini* PETRUNKEVITCH 1942 - only a single juvenile female is known from Baltic amber - may be a member of the Anapidae: Mysmeninae.

Mysmena dominicana WUNDERLICH 1998 is preserved in faked copal from Madagascar (!), see the paper on fakes in this volume. *Palaeoanapis* WUNDERLICH 1988 in Dominican amber: See below.

Misleading names: *Eomysmena* PETRUNKEVITCH 1942 and *Nanomysmena* PETRUNKEVITCH 1958 are taxa of the family Theridiidae; revisions are in preparation.

TAXONOMY of the family ANAPIDAE s. l.: The fossil taxa and remarks on the holarctic extant taxa

Diagnosis of the family Anapidae: Presence of several (or only one?) prodistal tibial and metatarsal spines on the ♂-tibia I (sexual dimorph, figs. 33, 104, 122, probably an autapomorphy) (totally absent - lost in most Comarominae; lost in several genera of other subfamilies, too), labium fused to the sternum, dwarfism, several "tendencies": See the cladogram and the remarks below (the subfamilies). - Remark: In contrast to the statement of GRISWOLD et al. (1998) the female genitalia of the Anapinae s. str. (= Anapidae auct.) are entelegyne and not haplogyne, see e.g. *Comaroma* and *Zangherella*, KROPF (1990), THALER & KNOFLACH (1998).

Relationships: As in the sister group - the Theridiosomatidae - a special web building behaviour is present, a claw of the female pedipalpus is absent, and the spiders are small; but sternal glands, a field of tibial III-IV trichobothria, usually femoral leg bristles are present, and the receptacula seminis are fused in the Theridiosomatidae. As in several Anapidae long lateral tibial I(-II) bristles and a small retrobasal paracymbium are present in the Theridiosomatidae.

Distribution: Cosmopolitical, mainly the tropics.

Anapinae s. str.
long tarsi/short metatarsi (*),
male pedipalpal patellar apophysis
and tendency to the presence of
apophyses of other pedipalpal articles,
prosomal wrinkles

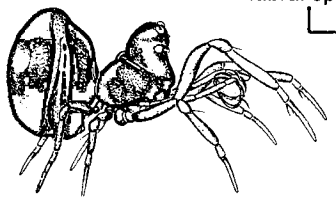
Comarominae
only <u>one short</u> tibial bristle*,
loss of male tibial & metat.
spines and lateral tibial bristles I-II*, fairly low prosoma*
and flattened opisthosoma*
4), "paracymbium" *

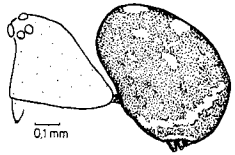
Synaphrinae
one large tooth on the
cheliceral promargin (*),
special base of the tibial
trichobothria, large bulbus (*)

Mysmeninae
femoral organ (5),
denticles <u>in</u> the chelicerae furrow, strongly
modified cymbium,
loss of the median
apophysis (*)

Symphytognathinae
basally fused chelicerae,
loss of anterior median eyes (*) & colulus, extremely
reduced female pedipalpus

opisthosomal scuta (3),
redbrown body colour,
labral spur





loss of the retrobasal paracymbium (*)

fingerprint structure of the
opisthosomal cuticula (2)

?one prodistal metatarsal & tibial
spine on the male tibia & metat. I,
dwarfism, fused labium,
long tarsi/short metatarsi (1)
<u>tendencies to</u>:
(a) reduced lungs,
(b) reduced anterior median eyes,
(c) loss of the retrobasal paracymbium,
(e) reduced female pedipalpus,
(f) modified male leg I (e.g. spines,
curved shape and/or thickened articles)
(g) modified cymbium,
(h) modified orb web

(1) Basicly probably both articles equal in length as in *Balticoroma gracilipes*.
(2) According to SCHÜTT (2002).
(3) Usually dorsal <u>and</u> ventral scuta; these are absent in the female of some extant species, indistinct (leathery) in some males, difficult to observe/recognize in some fossils, e.g. in *Balticonopsis.* In such spiders usually lateral folds, a sharp margin and a sclerotized ring around the spinnerets are observable, see the figs. e.g. of *Balticoroma.*
(4) As a reversal; a high prosoma and opisthosoma is probably a synapomorphy of Anapidae s.l. + Theridiosomatidae.
(5) An unsclerotized "spot" is usually present ventrally-distally on femur I (occasionally on femur II, as well) at least in the female; lost in (?) most species of *Mysmenopsis*.
(*) Convergences in other taxa/branches of the Anapidae s. l. are not listed.

<u>Possible **cladogram** of the subfamilies of the Anapidae s. l., based on selected characters</u>

Similar families: See the papers on Cyatholipidae, Synotaxidae and Theridiosomatidae in this volume; a paper on Theridiidae is in preparation. Small Theridiidae may be similar to the Anapidae s. l.; they possess large lung covers, their ♂-leg I is usually not modified, the ♀-pedipalpus is not (distinctly) reduced and a ventral tarsal comb of hairs may be present.

Differences of the five subfamilies: See the possible cladogram and the key below. Symphytognathinae (Autralian Region, Central and South America) are not known from fossils.

Verwechslungs-Möglichkeiten der Anapidae existieren insbesondere zu solchen Vertretern der Kugelspinnen (Theridiidae), die besonders klein sind und deren Hinterkörper kugelförmig und/oder gepanzert ist (z.B. *Phoroncidia*-Arten) sowie solchen, die besonders lange Tarsen besitzen (z. B. *Nanomysmena*-Arten). Die zahlreichen Ausnahmen bzw. konvergente Entwicklungen bei einzelnen Merkmalen können eine sichere Bestimmung erheblich erschweren. - Im Gegensatz zu den Anapidae sind bei den meisten Theridiidae die Haare unter den Tarsen IV sägerandig und gebogen (nicht glattrandig und gerade), Lungen(-Deckel) sind immer vorhanden (bei den Anapidae existieren reduzierte Lungen z. B. bei *Comaroma*, *Taymena* und *Trognoneta* und reduzierte Lungen-Deckel auch bei verschiedenen anderen Gattungen), Tibien und Metatarsen I-II tragen keine laterale Borsten, ♂-Bein I ist gewöhnlich nicht modifiziert (z. B. bei *Phoroncidia* kann es modifiziert sein), die Tarsen sind meist kürzer als die Metatarsen (ähnlich bei einigen Comaromini, bei *Saxonanapis* sind die Tarsen kürzer als die Metatarsen!), die vorderen Mittelaugen sind bei den allermeisten Arten besonders groß (so aber z. B. auch bei *Mysmena*, *Flagellanapis* und *Saxonanapis*), Apophysen der Glieder des ♂-Pedipalpus fehlen, die Tibia des ♂-Pedipalpus ist plattenartig verlängert (gelegentlich auch so bei den Anapidae), das Cymbium ist selten modifiziert/schmal, der ♀-Pedipalpus ist normal entwickelt (groß). Ein gutes Kennzeichen zahlreicher Theridiidae, das Stridulations-Organ zwischen Vorder- und Hinterkörper, ist bei fossilen Spinnen selten gut beobachtbar. Ein weiteres Kennzeichen, das interne oder retrodistale Paracymbium ist bei fossilen Theridiidae ebenfalls selten klar erkennbar; mit der Ausnahme von *Comaroma* fehlt bei den Anapidae ein retrodistales Paracymbium.
Die meisten Zwerg-Radnetzspinnen (Theridiosomatidae) sind größer als die Anapidae und ihre Beine sind stärker bestachelt, große Lungen-Deckel, Öffnungen der Sternal-Drüsen und ein retrobasales Paracymbium sind vorhanden, das ♂-Bein I ist nicht modifiziert; siehe den Beitrag über die Theridiosomatidae in diesem Band.
Bei den Kugelhöhlenspinnen (Synotaxidae) sind die Tarsen kürzer als die Metatarsen, die Spinnen haben gewöhnlich lange und schlanke Beine; siehe den Beitrag über die Synotaxidae in diesem Band sowie den Beitrag über die fossilen Becherspinnen (Cyatholipidae).

Possible cladogram: See above and SCHÜTT (2002: 47). Several "tendencies"/ predispositions are caused by the dwarfishness of the spiders. Relatively short tarsi are e.g. present in *Saxonanapis* and in most species of the Comarominae. The low prosoma and opisthosoma of the Comarominae may be a reversal. Remains of lungs are present e.g. in *Comaroma, Maymena* and *Trogloneta* but only few species are studied. According to KROPF (person. commun.) a tracheal stigma is present in the armoured Anapidae as in the other subfamilies, but it is hidden. - See SCHÜTT, Zoologica Scripta, 32: 129-151.

Key to the subfamilies of the Anapidae s. l.:

1 Opisthosoma usually with dorsal and ventral scuta and most often a sclerotized ring around the spinnerets (photos, figs. 22,33), prosoma wrinkled/punctuated (figs. 33, 66, photos), and apophyses of the ♂-pedipalpus usually present in the Anapinae (photos, figs. 35, 62, 108), labral spur present (usually not recognizable in the fossils). 2

- Opisthosoma soft, prosoma usually smooth, apophyses of the ♂-pedipalpal articles absent, labral spur absent 3

2(1) Prosomal wrinkles present (photos, fig. 66, photos), apophyses of the ♂-pedipalpal articles (figs. 35, 62, 108) usually present. Frequently two long dorsal tibial bristles. . . . . ANAPINAE

- Prosoma smooth, pedipalpal apophyses absent, cymbium with a large dorsal outgrowth (fig. 13) or with a retrodistal "paracymbium" (fig. 1). Only one short dorsal tibial bristle present . . . . . COMAROMINAE

3(1) Chelicerae fused at least at their base, female pedipalpus extremely reduced or completely absent, 6 or 4 eyes. Not known from fossils. . . . . SYMPHYTOGNATHINAE

- Chelicerae free, female pedipalpus not eytremely reduced, 8 (mostly) or less eyes. . .4

4(3) Femoral I organ (spot) present at least in the female (fig. 123) (probably very few exceptions in *Mysmenopsis*), denticles in the cheliceral furrow present, rarely one large promarginal tooth. . . . . MYSMENINAE

- Femoral organ absent, one large promarginal cheliceral tooth present, denticles in the cheliceral furrow absent (in all taxa?). . . . . SYNAPHRINAE

The subfamilies are treated in the following order: Comarominae, Anapinae, Mysmeninae, Symphytognathinae (extant), and Synaphrinae.

(1) Fossil and extant **Comarominae n. subfam**. (German name: "Sandbeerenspinnen")

Diagnosis: A "paracymbium" is present as a retrodistal cymbial outgrowth (in *Comaroma*, P in fig. 1) or as a retrodorsal outgrowth (in *Balticoroma*, figs. 5b, 8, 20-21), prosoma fairly low and opisthosoma armoured and depressed dorsoventrally (figs. 10, 22), tarsi basicly only about as long as the metatarsi (fig. 16, cladogram of the *Balticoroma*-species, but see fig. 26), only one short dorsal tibial bristle present at least on I-II, lateral tibial bristles absent, ♀-pedipalpus (fig. 28) fairly reduced (slender), epigyne wide (e.g. as in fig. 5a); probably facultatively socially living spiders, see above.

Further characters: Prosoma smooth, 6 or 8 eyes (anterior medians reduced or absent, figs. 6, 23), clypeus vertical and not protruding, labium fused to the sternum, labral spur short in *Comaroma*, (unknown in *Balticoroma*), tendency to the presence of thickened leg articles (see the cladogram of *Balticoroma*); pores - in connection with pheromone glands? - in one of the distal articles of the ♂- leg I present at least in *Comaroma* - see KROPF (dissert.) - and probably in *Balticoroma reschi*, too (fig. 11), opisthosoma with dorsal and ventral scuta (figs. 4, 15, 22) and sclerotized rings around pedicel and spinnerets, reduced lungs are present in *Comaroma* (unknown in *Balticoroma*), apophyses of articles of the ♂-pedipalpus absent, cymbium large, bulbus with three haematodochae (fig. 14) and distal sclerites, embolus moderately long and with basal outgrowth (figs. 3, 14), receptacula seminis thick-walled in *Comaroma*. Colour of the body red-brown to dark brown.

Remarks: The Comarominae possesses a remarkable mixture of structures which are apomorphic - as the "paracymbium" (not a retrobasal paracymbium!) - or plesiomorphic, as the remains of lungs, the basicly short tarsi and the presence of three haematodochae; the low body may be a reversal; the labral spur may be still small, the ♀-pedipalpus may be still not strongly reduced. The homology of the paracymbium in *Balticoroma* and *Comaroma* appears unsure to me. Lateral prosomal depressions are present in the Anapinae and in the Comarominae, see KROPF (1990: 193, Fig. 11). This character may be a (further) synapomorphy of Anapinae + Comarominae.

Relationships: E.g. based on the presence of a labral spur WUNDERLICH (1986: 113) regarded *Comaroma* as a member of the Anapinae s. str., but in this paper I regard Anapinae and Comarominae as sister groups, see the cladogram above and SCHÜTT (2002). In the Anapinae the prosoma is usually wrinkled (photos, fig. 1), - with very few exceptions - apophyses of male pedipalpal articles are present (few exceptions), long dorsal tibial bristles and lateral tibial I-II bristles are frequently present, the vulval structures are different (KROPF, person. commun.).

Type genus: *Comaroma* BERTKAU 1889. Further genus: *Balticoroma* n. gen.

Distribution: Extant: Holarctic (*Comaroma* and *Balticoroma*); fossil: Baltic amber forest (*Balticoroma*). Comarominae is a relict taxon: In the Early Tertiary Baltic amber forest existed more species than today worldwide.

Comaroma BERTKAU 1889

Diagnosis: A paracymbium is present as a retrodistal outgrowth (fig. 1), functional conductor slender (fig. 2), a large tegular apophysis is present. (Cymbium and bulbus are twisted in the natural position, fig. 1).

Type species: *Comaroma simoni* BERTKAU 1889 (figs. 1-3) from Europe. Further species: *C. mendocino* (LEVI 1957) (sub *Archaerius*) from N-America. *Comaroma maculosa* OI 1960 and *C. nikahirai* (YAGINUMA 1959) (extant, Japan): See *Balticoroma*.- According to the figs. *Comaroma tongjunca* ZHANG & CHEN 1994 from China is not a member of the Comarominae and in my opinion even not of the Anapidae s. l., but probably of the Theridiidae; a revision is needed.

Relationships: According to the low prosoma and Opisthosoma, the chaetotaxy and the structures of the ♂-pedipalpus *Balticoroma* n. gen. is related. In *Balticoroma* the structures of the ♂-pedipalpus are different: A retrodistal paracymbium is absent, a retrodorsal elevation "paracymbium" is present, the bulbus structures are different (see the figs.).

Distribution: Holarctic (Europe and N-America).

***Balticoroma* n. gen.** Photos 143-151

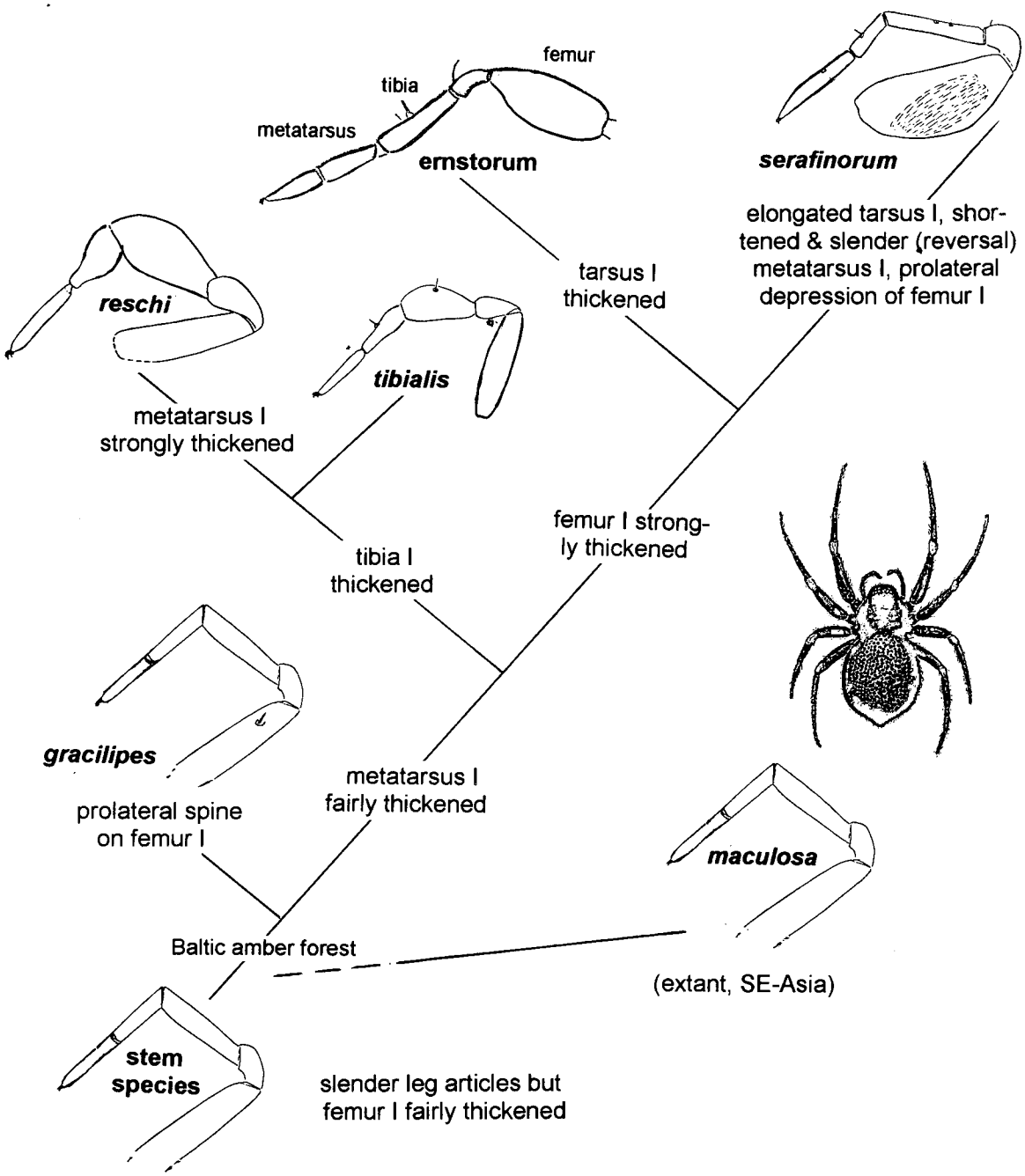
Remark: WEITSCHAT & WICHARD (2002: 72) published the name *Balticorma* (misspelling!) as a nomen nudum ; see below, *B. serafinorum*.

Diagnosis: A "paracymbium" is present as a large retrodorsal outgrowth (fig. 5b, 13), several bulbus sclerites and a large functional conductor are present.

Type species: *Balticoroma reschi* n. sp. - Further species: Four fossil species (see the cladogram) as well as one or two extant species from SE-Asia: *B. maculosa* (OI 1960) (sub *Comaroma*, **n. comb**.) and probably *B. nakahirai* (YAGINUMA 1959) (sub *Archerius*, later transferred to *Comaroma*) (♂ unknown) (**questionable n. comb**.).

Relationships: See *Comaroma*.

Distribution: Extant: SE-Asia (Japan, Korea), fossil: Baltic amber forest, incl. Bitterfeld.



Possible **cladogram** of the fossil *Balticoroma*-species in Baltic amber and the only extant species *maculosa*, mainly based on structures of the ♂-leg I. Slender leg articles are present in *gracilipes* and *maculosa* besides the hypothetical stem species (Stammart)

Key to the fossil species of the genus Balticoroma: (♂):

Remarks: By far *serafinorum* is the most frequent species. Leg I is characteristic in the male of all species. The female is unknown in *B. tibialis*. Because of the hidden genital structures the females cannot be determined to the species by morphological characters although in most of the species females are present with conspecific males in the same piece of amber.

1 Articles of leg I (the first leg) slender (fig. 7), femur I bears a prodistal bristle (fig. 27a) which is probably absent in the female . . . . . *gracilipes*

- At least one article of leg I is thickened (e.g. figs. 9, 26), femoral bristle most probably absent. 2

2(1) Tibia I distinctly thickened (figs. 9, 11). 3

- Femur I distinctly thickened (figs. 16, 22). 4

3(2) Metatarsus I strongly thickened (fig. 11). . . . . *reschi*

- Metatarsus I fairly thickened (fig. 9). . . . . *tibialis*

4(2) Tarsus I about as long as metatarsus I (fig. 16), femur I without or with a very low prolateral depression. . . . . *ernstorum*

- Tarsus I more than twice as long as metatarsus I, femur I with a distinct prolateral depression (fig. 26). . . . . *serafinorum*

***Balticoroma gracilipes* n. sp.** (figs. 6-8) Photo 145

Material: 8♂3♀ in Baltic amber; holotypus ♂ F1037/BB/AR/ANA/CJW, 1♂ paratypus F379/BB/AR/ANA/CJW, 1♂ paratypus coll. KERNEGGER in Hamburg no. 1995/104, (this fossil will probably be deposited in the GPIUH); 1♂ paratype from the Bitterfeld deposit, coll. KRUEMMER no. 2537; 4♂3♀ in the same piece of amber, paratypes, from the Bitterfeld deposit, coll. M. KUTSCHER in Sassnitz, no. K/AR/15.

Preservation and syninclusions: Holotype: The spider is completely and well preserved, the ventral side is partly covered by a white emulsion, a partly decomposited Col-

lembola is preserved in the same piece of amber. - Paratype coll. KERNEGGER: The spider is completely and fairly well preserved at the corner of a larger and clear piece of amber. The opisthosoma is dorsally and frontally covered by a white emulsion, a larger bubble is situated in front of the chelicerae. Some stellate hairs are present in the same piece of amber. - F379 is well and completely preserved. An adult member of the Acari: Gamasida is situated partly in contact to the sternum; some Acari: Trombidioidea, a Thysanura, a slender and annulated organic "object" lies in front of the left leg I, remains of insects are present in the same piece of amber. - The paratype of the coll. KRUEMMER is completely and fairly well preserved, the dorsal side is hidden, the ventral side is partly covered by a white emulsion. - The paratypes of the coll. KUTSCHER are only fairly well preserved, parts of one male are cut off. A juvenile spider of the family Mimetidae, a juv. indet. spider (partly covered with hyphae) and stellate hairs are present in the same piece of amber.

Diagnosis: The articles of leg I are not thickened (fig. 7), femur I bears a prodistal bristle (fig. 7a). ♂-pedipalpus: Fig. 8; not all of the sclerites are observable.

Description :
Measurements (in mm): Body length ♂♀ 1.1-1.3, prosoma (holotype): Length 0.58, width 0.52, leg I: Femur about 0.55 (hight 0.12-0.15), patella 0.2, tibia 0.38, metatarsus 0.25, tarsus 0.28; in F379 tarsus and metatarsus I are both 0.3mm long).
Colour dark brown. - Prosoma fairly high, wide, nearly smooth. 6 large eyes and 2 small anterior median eyes (fig. 6), anterior lateral eyes largest, posterior row distinctlyrecurved, posterior median eyes separated by two thirds of their diameter. Chelicerae fairly robust, few hairs but no teeth are observable at the anterior margin. - Legs fairly hairy and slender, distal articles of the male leg I (fig. 7) not thickened, the femur slightly thikkened, with a prodistal bristle (fig. 7a). -Tibial bristles as in the genus. - Opisthosoma strongly armoured, as in *B. reschi*. - ♂-pedipalpus (fig. 8) probably similar to *B. reschi* but not all of the structures of the bulbus are observable.

Relationships: See the cladogram. According to the - plesiomorphic - slender legs *gracilipes* may be related to the extant *B. maculosa* (OI 1960) (figs. 4-5) from SE-Asia.

Distribution: Tertiary Baltic amber forest incl. the Bitterfeld deposit (8 of 11 specimens!).

***Balticoroma tibialis* n. gen. n. sp**. (figs. 9)

Material: Holotypus ♂ in Baltic amber, F978/BB/AR/ANA/CJW.

Preservation and syninclusion: The spider is nearly completely preserved, only the tip of the left tarsus IV is cut off; body and legs are covered by a white emulsion. - Right behind the spider a Collembola is preserved which is partly decomposited, right beneath

the spider a complete member of the Symphyla is preserved.

Diagnosis (♂;♀ unknown): Leg I (fig. 9): Tibia strongly thickened, metatarsus fairly thickened.

Description (♂):
Measurements (in mm): Body length 1.05, prosomal length 0.5, leg I: Femur 0.4 (hight 0.15), patella 0.15, tibia about 0.24 (hight 0.135), hight of femur II 0.08.
Body and legs as in the genus. Tarsus II and metatarsus II are about equal in length. The structures of the bulbus are hidden.

Relationships: See the cladogram. In *B. reschi* the metatarsus I is more thickened.

Distribution: Tertiary Baltic amber forest.

***Balticoroma reschi* n. gen. n. sp.** (figs. 10-14) Photos 146-148

Derivatio nominis: The species is dedicated to UDO RESCH from Clausthal-Zellerfeld, who discovered the remarkable piece of amber which contains six specimens including the holotype, gave it to the author for a description, and published a paper on these spiders: "Ungewöhnliche Einfalt", Fossilien, 1 (1996: 15-17).

Material (in Baltic amber): 3♂ and 3 most probably adult ♀ in the same piece of amber: The holotype at the margin of the amber piece is marked with an arrow, the remaining spiders are paratypes a to e, GPIUH; 1♂ paratype f and two separated pieces of amber, MZ no. 18689; 2♂, paratypes g and h CJW.

Preservation and syninclusions: The holotype and the 5 paratypes GPIUH are preserved in a piece of amber which has a size of 26x12x5mm and 4 layers; the spiders are present within 2 layers. The holotype is preserved at the margin of the piece, is well and completely preserved, the ventral and the right sides are covered by a white emulsion. The paratypes are preserved in a second layer in a position which is turned by 90°. The male paratypes are badly preserved, one male has lost its opisthosoma and parts are cut off. The females are preserved closely together, two in contact, all are partly covered by a white emulsion, one is partly decomposited, some tarsi are separated by autotomy behind the coxa. Right beneath the females some threads incl. tiny sticky droplets are present. - In the same piece of amber furthermore four spiders (indet.) are preserved and a juv. member of the spider family Mimetidae (body length 2mm) as well as two tiny Acari larvae, and a member of the Hymenoptera (body length 1.2mm); stellate hairs are absent. - Paratype f is completely preserved, dorsally covered by a white emulsion and embedded now in artificial resin. The bulbus of the right pedipalpus is completely and well preserved, its structures are very well observable (fig. 14); in one of the separated amber pieces small remains of an insect are preserved. -

Paratype g is well and completely preserved, ventrally covered by a white emulsion. - Paratype h is completely preserved but hard to observe and ventrally thickly covered by a white emulsion.

Diagnosis: ♂-leg I (fig. 11): Tibia and metatarsus are strongly thickened; see the cladogram; ♂- pedipalpus: Figs. 13-14.

Description:
Measurements (in mm): Body length ♂ 1.0-1.1, ♀ 1.25-1.35, prosoma: Length 1♂ 0.56, 1♀ 0.48, width 1♂ 0.53, 1♀ 0.43, hight 1♂ 0.28, 1♀ 0.26; leg I (♂): Femur 0.45, patella 0.19, tibia 0.34 (hight 0.18, width 0.15), metatarsus 0.2, tarsus 0.25; ♂-leg II: Metatarsus 0.21, tarsus 0.24; hight of the ♂-femur: I 0.13, II 0.09; ♀-leg I: Metatarsus 0.21, tarsus 0.24, ♀-leg II: Metatarsus 0.21, tarsus 0.21, length of the tarsus of the ♀-pedipalpus 0.15, diameter of a pore of the ♂-tibia I nearly 0.01.
Colour dark brown. - Prosoma (fig. 10) slightly longer than wide, nearly smooth. 8 eyes which are partly hidden, anterior medians small. Clypeus fairly long, not protruding. Cheliceral teeth, mouth parts and sternum are hidden. - Legs (figs. 11-12) fairly slender, the tarsi about as long as the metatarsi but tarsus I up to 1/4 longer than metatarsus I. Dorsal tibial bristles short, 1 bristle in the middle and a bristle-shaped ?hair near the end. Patellae with 2 short bristles. Some metatarsi II bear a bristle-shaped hair basally of the middle. At least metatarsi I-III bear a long trichobothrium, its position on I in the middle. Position of the tarsal organ II in 0.25. ♂-femur I slightly thicker than II, ♂-leg I modified: Tibia and metatarsus are strongly thickened, tibia I bears at least one prolateral "spot" which may be the pore of a pheromone gland; similar pores of the male leg I are reported by KROPF from *Comaroma simoni*. Tibia II bears a long and probably few short trichobothria. Tarsal claws fairly large, appearing smooth when observed by a magnification of 150x. Articles of the ♀ fairly slender, as in fig. 28. - Opisthosoma depressed dorsoventrally in both sexes, armoured dorsally and ventrally and with a sclerotized ring around the petiolus and the spinnerets; dorsal scutum with tiny wrinkles and short hairs. ♂-pedipalpus (figs. 13-14, expanded bulbus in fig. 14): Tibia longer than the patella, cymbium with a large retrodorsal elevation ("paracymbium"), tegulum with large sclerites and three haematodochae, embolus fairly large and curved, its tip is directed to a wide functional conductor which is strongly bent apically.

Relationships: See the cladogram; *tibialis* may be most related.

Distribution: Tertiary Baltic amber forest, incl. the Bitterfeld deposit.

***Balticoroma ernstorum* n. gen. n. sp.** (figs. 15-21) Photos 143-144

Derivatio nominis: The species is named after KARIN & PETER ERNST in Skagen, Denmark, which made a larger number of fossil spiders available for a scientific research.

Material (in Baltic amber): 2♂ and 2♀ which were separated from the same piece of amber which was 5cm long, holotypus ♂ and 2 separated pieces of amber F988/BB/AR/ANA/CJW, 1♂1♀ paratypes a and b, and a separated piece of amber IPHUB, 1♀ paratypus c) and a separated piece of amber IPHUB; 2♂ paratypes d and e CJW; 1♂ paratypus f IMGPUG, prov. no. 21605; 7♂ paratypes in the same piece of amber, coll. GRÖHN no. 2176; 1♂1♀ paratypes in the same piece of amber, coll. KERNEGGER no. 23/1999; 1♂ paratype, coll. ERNST no. 173; 1♂ paratypus from the Bitterfeld deposit, coll. KRUEMMER no. 4217; 1♂ paratypus from the Bitterfeld deposit, coll. GRABENHORST no. AR-68.

Preservation and syninclusions: The holotype is well and completely preserved, the posterior part of the opisthosoma is fairly covered by a white emulsion. The distance of the couple of the paratypes a and b - which are well and completely preserved - is only one body length. Also preserved in this piece of amber (separated now) are a Myriapoda, an Opiliones, an Acari, stellate hairs and a particle of excrement. - Paratype d is preserved with a Collembola. - The paratypes e and f are completely preserved, both are ventrally covered by a white emulsion. - 2 of the 7 paratypes of the coll. GRÖHN are partly cut off; the spiders are well preserved in two layers of an amber piece which has a size of 0.5x1.5x2.0 cm. The dorsal side of all spiders is orientated in the same direction, the ventral side is partly covered by a white emulsion. One Acari and a Diptera: Chironomidae are present in the same piece of amber. - The couple of the coll. KERNEGGER lies closely together, 3 thin threads are present near the female; the piece of amber is embedded now in artificial resin. - With the paratype of the coll. ERNST remains of a Collembola are preserved. - The paratypes of the coll. GRABENHORST and KRUEMMER are completely and fairly well preserved.

Diagnosis: ♂-leg I as in fig. 16, femur very thick (hight about 0.2mm), prolaterally without a depression or depression very weak, tibia distally thicker than basally, metatarsus and tarsus about equal in length, both artickles thickened. ♂-pedipalpus as in figs. 19-21.

Description:
Measurements (in mm): Body length ♂♀ 1.1-1.2, prosoma: Length 0.5-0.55, width 0.45-0.5, hight above coxae 0.27; leg I (holotype ♂): Femur 0.53, patella 0.16, tibia 0.36, metatarsus 0.28, tarsus 0.29 (hight 0.085); ♂-femur I: Hight 0.2, width 0.18; ♀-leg I: Tibia 0.27, metatarsus 0.22, tarsus 0.22.
Colour dark brown. - Prosoma (fig. 15) similar to *B. reschi*, anterior median eyes distinctly the smallest. - Legs (figs. 16-17) fairly stout, articles slender in the female, male: See above. Tibiae with one small dorsal bristle and with at least two long trichobothria. Position of the metatarsal I trichobothrium in the middle, position of the tarsal I organ in 0.33. - Opisthosoma (photos, fig. 18) with strong dorsal and ventral scuta and a sclerotized ring around the spinnerets as well as ventrally a pair of oval structures (O in fig. 17). - ♀-pedipalpus slender. - ♂-pedipalpus (figs. 19-21) with a curved femur and a long tibia which bears a long prodorsal trichobothrium in the middle; cymbium with a large retrodorsal elevation, embolus distinctly bent.

Relationships: According to the thick ♂-femur I *serafinorum* is closely related; in *sera-*

finorum the femur I is even more thickened - 0.23-0.35mm high in contrast to 0.2mm -, and bears prolaterally a distinct depression, furthermore the ♂-tarsus I is more than twice as long as metatarsus I, the ♂-tarsus I is more slender and the distal patellar bristle is slightly longer than the diameter of the article on both sexes.

Distribution: Tertiary Baltic amber forest, incl. the Bitterfeld deposit.

***Balticoroma serafinorum* n. gen. n. sp.** (figs. 22-32) Photos 149-151

Balticorma (sic!) sp., WEITSCHAT & WICHARD (2002: T. 17, fig. a) (nomen nudum)

Derivatio nominis: The species is named after the couple SERAFIN in Kasparus, Poland, which made a larger number of fossil spiders available for a scientific research.

Material (in Baltic amber): About 60 specimens, some in collections of dealers; holotypus ♂ and 3 separated pieces of amber, F987/BB/AR/ANA/CJW, paratypes c, i, o, p, r, s, v, w and x ♂ (w and x from the Bitterfeld deposit), as well as 6 pieces of amber with 4♂, 3♂, 1♂1♀, 2♂, 1♂ and 1♂, paratypes, CJW; paratypus b coll. H. GROTE; paratypes a (♂), g and h (♂ in the same piece of amber), t (♂) MZ; paratypes ♂ e and f in the same piece of amber + two separated pieces of amber GPIUH; paratypus d (♂) coll. C. KROPF in Bern, Switzerland; paratypes (♂) j and k ZMUK; paratypes l, m and n, 1 subad. ♂ and 2♀ in the same piece of amber + 4 separated pieces of amber, MNHN Paris; paratypus q (♂) from the Bitterfeld deposit, IPHUB no. MB.A.591, paratypus u (♂), coll. F. KERNEGGER in Hamburg; 1♂1♀ paratypes y and z in the same piece of amber, CJW; paratype z1 (♂) coll. HOFFEINS; 2♂ paratypes IMGPUG no. 19558; 5♂ 4♀ paratypes in the same piece of amber with 1♂ 2♀ of *Eohahnia succini* PETRUNKEVITCH 1958 (Hahniinae) in a different layer, coll. C. GRÖHN no. 3925; 3♂4♀ paratypes with 1♂1♀ Hahniinae in the same piece of amber, coll. C. GRÖHN no. 256, 1♂ paratypus, coll. ERNST; 2♂ paratypes from the Bitterfeld deposit, coll. GRABENHORST AR-26 and AR-99. Some further spiders - no type material - are kept in the CJW.

Preservation and syninclusions: The holotype is completely and very well preserved, within the femora probably remains of muscles are preserved (fig. 26); some threads without droplets are present above the spider, in one of the separated amber pieces a Collembola is preserved, stellate hairs are absent. - With the papatype c some threads with droplets (fig. 32) - probably the part of an irregular capture web - are preserved. With the paratype d a spider is preserved, the member of the Dictynidae: Hahniinae as well as remains of a further small spider, a Diptera, threads with moss. - Remains of a Collembola are preserved with paratype h. - Paratype i was destroyed during the fruitless research for femoral muscles. - In the separated amber pieces with the paratypes l, m and n one Acari, three Hahniinae, one Diptera and excrement particles are pre-

served. - Paratypes r and s are preserved in the same piece of amber. - The genital fissure of paratype u is open. - The femora of paratype v contains remains of muscles (?). - With the paratypus x a ?juv. spider of the family Araneidae is preserved. - With the paratypes y and z an Acari and 1/2 juv. spider of the family Salticidae are preserved; right of the paratype z1 a thin thread with droplets is preserved. - Stellate hairs are very rare in the pieces of amber with *B. serafinorum*.

Diagnosis: Male femur I extremely thickened (figs. 22-23, 26-27), 0.23-0.35mm high, probasally with a distinct depression, tibia slender, tarsi II-IV about as long as the metatarsi but ♂-tarsus I more than twice as long as metatarsus I.

Description:
Measurements (in mm): Body length ♂♀ 1.0 (holotype) - 1.4 (paratype f), prosoma: Length 0.53 (holotype) - 0.63 (paratype f), width 0.5 (holotype) - 0.59 (paratype f), hight 0.25 (holotypus); length of the basal cheliceral articles 0.15 (holotype). Leg I (holotype): Femur 0.56, patella 0.16, tibia 0.38, metatarsus 0.17, tarsus 0.4, tibia IV 0.37, hight of femur I 0.23 (holotype) - 0.35 (paratype a); femur II: Length 0.32, hight 0.1.
Colour usually redbrown (e.g. in the holotype); dark brown when partly oxidated (e.g. in the paratypes j and f). The partly cut and dark brown paratype f is preserved in the same piece of amber as the redbrown and completely preserved paratype e.
Prosoma (figs. 22-24) slightly longer than wide, fairly low, nearly smooth. Eyes as in *ernstorum*. Basal cheliceral articles fairly stout, anterior cheliceral margin with a larger tooth (♀, paratype m). Sternum wide, separating the coxae IV by 1 1/2 diameters of the coxa IV. - Legs (figs. 22-23, 26-27) fairly stout, see above; the femur I is already thickened in the subadult male. Tibiae with 1 dorsal bristle, patellae with 1 dorsal-distal bristle which is slightly longer than the diameter of the patella. Position of the metatarsal trichobothrium slightly behind the middle, position of the tarsal organ I in 0.35. Tarsal claws fairly long, no teeth are observable by a magnification of 150x. Ventral hairs of tarsus IV smooth. - Opisthosoma heavily armoured on both sexes and in the subadult male, with tiny hairs on the large dorsal scutum, with lateral folds and a distinct ring around the pedicel and the short spinnerets. - Pedipalpus (figs. 29-31) similar to *ernstorum*. ♀: Legs slender, pedipalpus (fig. 28) slender; an epigyne is not observable.

Relationships: See *B. ernstorum* n. sp.

Distribution: Tertiary Baltic amber forest, incl. the Bitterfeld deposit.

(2) **Anapinae** (German name: "Gepanzerte Zwerg-Kugelspinnen") and their extant kin

Synonym according to SCHÜTT (dissert.): Micropholcomatidae (incl. *Textricella*).

Diagnosis: Most often distinct prosomal wrinkles, lateral prosomal pits, and opisthosomal scuta present (fig. 33), tibial bristles usually long, tarsi usually long and metatarsi short, male pedipalpal patellar apophysis usually present (fig. 62, 76), tendency to the presence of apophyses of femoral and tibial pedipalpal articles.

Relationships: See the Comarominae and the cladogram.

Distribution: Extant cosmopolitical, mainly tropical; fossil in Dominican amber (rare) and Baltic amber.

Key to the fossil Tertiary and extant Holarctic genera of the Anapinae (♂):

Remark: The largest spiders (♂) in Baltic amber - body length 1.35-1.6mm - are members of the genera *Balticonopsis, Fossilanapis* and *Tuberanapis* in contrast to the remaining spiders which usually have a body length of not more than 1.2mm.

1 Prosoma 1 1/2 times longer than wide (fig. 34a). Scuta of the Opisthosoma absent but a sclerotized ring around the pedicel is present. ♂-pedipalpus (fig. 35): patella short, with a dorsal-basal apophysis. Extent, SE-Asia (Corea, Japan) . . . . . *Conoculus*

- Prosoma most often slightly longer to slightly shorter than wide. Opisthosoma armoured, with dorsal and/or ventral scutum and with a sclerotized ring around the pedicel. . .2

2(1) Embolus protruding the tip of the cymbium, and guided - at least in the distal part - by the prolateral margin of the cymbium (e.g. figs. 52, 76, 85). - Fossil in Baltic amber..3

- Position of the embolus along the prolateral cymbial margin (fig. 96). ♂-pedipalpus (figs. 95-96) with a cymbial hook. . . . . *Ruganapis*

- Position of the embolus different, embolus not guided by the prolateral margin of the cymbium (e.g. figs. 68, 100, 105, 108). 4

3(2) Body length 1.35-1.8mm, tibia and metatarsus of leg I with (pro)ventral spines (e.g.

fig. 48), large anterior median eyes (fig. 44), femur of the ♂-pedipalpus with a pointed apical apophysis (e.g. fig. 46). . . . . *Balticonopsis*

- body length 0.75-1.1mm, spines of leg I absent (bristles present), small anterior median eyes (fig. 74), patella of the ♂-pedipalpus usually with a pointed apical apophysis which is directed medially (figs. 72-73). . . . . *Fossilanapis*

4(2) Tarsus I shorter or only slightly (about 1/5) longer than metatarsus I (fig. 104). Tibia and patella of the ♂-pedipalpus without apophysis (e.g. figs. 68, 100). 5

- Tarsus I 1 1/2 times up to 2 times longer than metatarsus I. Tibia and/or patella of the ♂-pedipalpus with apophysis (e.g. figs. 38, 62, 108). 7

5(4) Tarsi distinctly shorter than the metatarsi (fig. 98), embolus indistinct (short?) (figs. 99-101). . . . . *Saxonanapis*

- Tarsi longer than the metatarsi (e.g. fig. 104), embolus different. 6

6(5) All tibiae with 1 dorsal bristle (in the basal half), cymbial hump absent, bulbus complicated, embolus very long and twisted (figs. 68-70). . . . . *Flagellanapis*

- At least tibia I, II and IV with 2 dorsal bristles (fig. 104), cymbium with a large retrobasal hump (fig. 105), bulbus simple. . . . . *Tuberanapis*

7(4) 6 eyes (figs. 106-107). Tibia of the ♂-pedipalpus with a basal and a large distal apophysis (fig. 108). Fossil in Dominican amber. . . . . *Palaeoanapis*

- 6 or 8 eyes. Tibia of the ♂-pedipalpus without 2 large apophyses. Fossil in Baltic amber or extant. 8

8(7) 8 eyes (fig. 61). ♂-pedipalpus (figs. 62-64): Tibia distally wide. Fossil in Baltic amber. . . . . *Dubianapis*

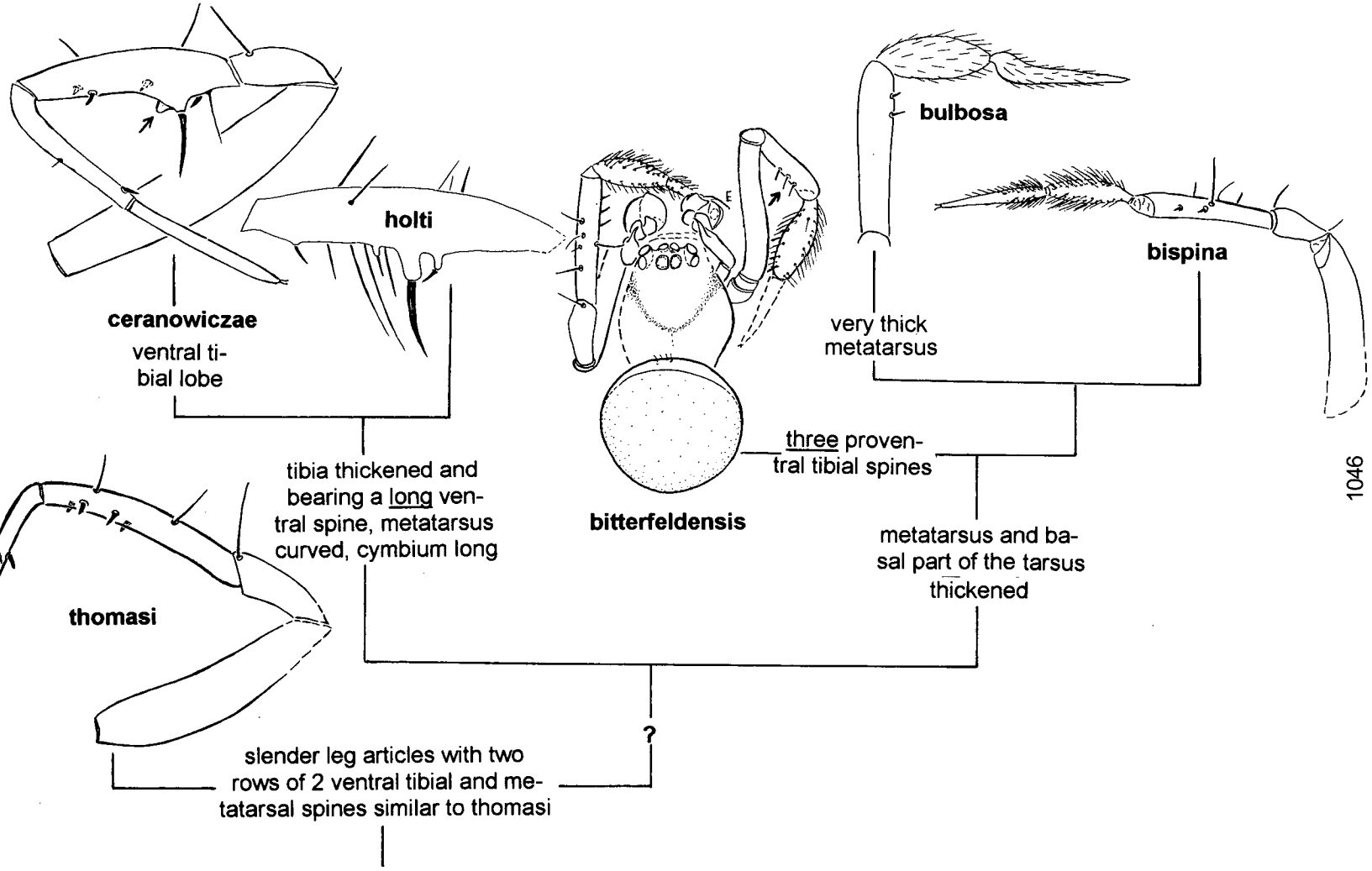
- 6 eyes or 6 larger eyes + 2 tiny anterior median eyes. ♂-pedipalpus different. Extant..9

9(8) Tarsus I prolaterally frequently with some short spines. ♂-pedipalpus (fig. 38): femur and patella dorsally with erect apophyses, cymbium and tibia fused. Mediterranean. . . . . *Zangherella*

- Tarsus I without prolateral spines. Femur of the ♂-pedipalpus without apophysis, patella with or without apophysis, cymbium free. 10

10(9) ♂♀-femur I-II without an outgrowth. ♂-pedipalpus (figs. 36-37): Patella without dorsal apophysis, bulbus elongated, embolus short and thick. Nepal. . . . . *Metanapis*

- ♂♀-femur I-II ventrally-distally with a large outgrowth (fig. 33a). ♂-pedipalpus (fig. 33a): Patella basally with an erect apophysis and with retroapical apophyses, bulbus not elongated, embolus long, thin and coilled. N-America. . . . . *Gertschanapis*



Possible **cladogram** of the species of the genus *Balticonopsis*, based on structures of the male leg I

Balticonopsis n. gen. Photos 152-156

Derivatio nominis: The name is a combination of the locality of the fossil material (Baltic amber) and the con-familiar genus *Mysmenopsis* SIMON 1895 (Mysmeninae) in which the male leg I may be similar. The gender is feminine.

Diagnosis: Tarsi usually about 1/5 longer than the metatarsi (fig. 39), 8 large eyes (fig. 53), tibia and/or metatarsus I in both sexes (pro)ventrally with strong spines or bristles (figs. 39, 42, 48, 60). ♂-pedipalpus (figs. 40-41, 46, 52, 58-59): Femur apically with a pointed apophysis which is directed foreward, bulbus fairly small, embolus long and slender, its position semicircular, prolaterally or prodistally guided by the margin of the cymbium. Body length 1.35-1.8mm.

Three species-groups: See the cladogram.

Type species: *Balticonopsis holti* n. sp.

Relationships: See *Tuberanapis* n. gen., *Fossilanapis* and the key.

Distribution: Tertiary Baltic amber forest incl. the Bitterfeld deposit and Rovno amber (*B. perkovskyi* n. sp., see the paper on fossil spiders in Ukrainean amber in this volume).

Key to the species of the genus *Balticonopsis* in Baltic amber (♂):

1 Distal leg articles slender (fig. 39), two rows of short ventral tibial and metatarsal spines; pedipalpus: Figs. 40-41 . . . . . *thomasi*

- At least one of the distal articles of leg I is thickened (figs. 42, 44-45, 47-48) 2

2(1) Tibia I distinctly thickened (figs. 48, 54), with one long spine besides short spines; metatarsus I not thickened 3

- Tibia I slender, with short spines only, metatarsus I thickened (figs. 42, 44, 47) 4

3(2) Position of the longest ventral tibial I spine in the middle (fig. 54), blunt ventral hump absent . . . . . *holti*

- Position of the longest ventral tibial I spine in the basal half, a blunt hump near its base

is present (arrow in fig. 48). . . . . *ceranowiczae*

4(2) Tibia I proventrally with 2 spines only (fig. 42). 5

- Tibia I proventrally with 3 spines (fig. 44). . . . . *bitterfeldensis*

5(4) Metatarsus and base of the tarsus I strongly thickened (fig. 47). . . . . *bulbosa*

- Metatarsus and basal part of the tarsus I only fairly thickened (fig. 42). . . . . *bispina*

***Balticonopsis thomasi* n. gen. n. sp.** (fig. 39-41) Photo 155

Derivatio nominis: The species is named after its previous owner, Mr. THOMAS.

Material: 2♂ in Baltic amber: Holotypus PIHUB coll. THOMAS no. 17; paratypus F756/ BB/AR/ANA/CJW.

Preservation and syninclusions: Holotype: The by aging darkened redbrown piece of amber with the holotype was fixed on a piece of glas. I separated the piece of amber from the glas and cut it slightly for the examination. The spider is completely and fairly well preserved, dorsally it is thickly covered by a white emulsion; above the spider a Diptera: Nematocera is preserved, behind the spider two long legs of an insect (Diptera?). Some bubbles and stellate hairs are present, too. - The paratype is completely and fairly well preserved, mainly ventrally it is thickly covered by a white emulsion, the distal parts of the bulbi are hidden.

Diagnosis (♂; ♀ unknown): Distal leg I articles slender (fig. 39), tibia I bent, tibia and metatarsus I in the distal half ventrally both with two pairs of short spines. Pedipalpus (figs. 40-41): The cymbium is not much longer than the bulbus.

Description (♂):
Measurements (in mm, holotype if not otherwise stated): Body length 1.5-1.6, prosoma (paratype): Length 1.7, width 1.55, leg I: Femur about 1.0 (hight 0.2), tibia 0.85, metatarsus 0.53, tarsus 0.65, metatarsus IV 0.38, tarsus IV 0.48, hight of femur II 0.13.
Colour medium to dark brown. - Prosoma (photo) long, only fairly high, caput (paratype) smooth, thorax covered with fine wrinkles. Chelicerae large and stout, fangs short and thick. - Legs (fig. 39) fairly long and hairy, I longest and with slender distal articles, all tibiae with 2 long dorsal bristles, I at least in the paratype with a long prolateral bristle in the distal half, in the distal half with 2 pairs of short bristles, metatarsus I with 2 pairs of short bristles in the distal half, too; tarsus I 1/5 longer than metatarsus I. - Opisthosoma dorsally completely covered with a large scutum, and with a ventral scuta. - Pedipalpus (figs. 40-41, see above): The embolus describes more than one circle and is guided by

the prodistal margin of the cymbium. The tip of the embolus bears probably a droplet of sperm in the holotype.

Relationships: According to the slender distal leg articles *thomasi* may be the most plesiomorphic species of the genus; see the cladogram.

Distribution: Tertiary Baltic amber forest.

***Balticonopsis bispina* n. gen. n. sp.** (figs. 42-43) Photo 152

Material: Holotypus ♂ in Baltic amber, F995/BB/AR/ANA/CJW.

Preservation and syninclusions: The spider is only fairly well preserved, the right and the dorsal side is strongly covered by a white emulsion, the distal part of the opisthosoma and the distal parts of the right legs III and IV are cut off. - A member of the Acari which is partly cut off is preserved near the spider.

Diagnosis (♂; ♀ unknown): leg I (fig. 42): Tibia proventrally with 2 short spines, metatarsus distinctly thickened and hairy, without spines. Pedipalpus (fig. 42): Cymbium fairly short, embolus long and bent.

Description (♂):
Measurements (in mm): Body length 1.6, prosomal length about 0.7; leg I: Femur about 0.95, patella 0.3, tibia 0.75, metatarsus 0.5, tarsus 0.56, tibia II 0.55.
Colour light to medium brown.
Prosoma partly hidden, similar to *bitterfeldensis*. - Legs: Order I/II/IV/III, I (fig. 42) distinctly larger than the remaining legs, metatarsus I hairy and distinctly thickened, tarsus hairy and thickened in the basal half, tibia distally slightly thickened, slightly bent, with two short prolateral spines in the distal half. All tibiae with 2 long dorsal bristles, I with a long additional prolateral bristle. - The remains of the opisthosoma are as in *bitterfeldensis*. - The pedipalpus (fig. 43, partly hidden): Femur slender, with an apical apophysis, tibia probably with an apical apophysis, cymbium fairly short, bulbus simple, embolus long and strongly bent, with a secretion (sperm?) at the tip.

Relationships: According to leg I there are close relationships to *biterfeldensis, bulbosa* (see the cladogram) and *perkovskyi* in Rovno amber from the Ukraine, see the paper on fossil spiders from the Ukraine in this volume.

Distribution: Tertiary Baltic amber forest.

***Balticonopsis bitterfeldensis* n. gen. n. sp.** (figs. 44-46)

Material: Holotypus ♂ in Baltic amber from the Bitterfeld deposit, ex coll. W. LUDWIG in Berlin, SMF.

Preservation and syninclusions: The spider is completely and dorsally well preserved, a fissure in the amber renders the view of the ventral side. - In front of the left tarsus and metatarsus a small worm-shaped object is preserved, stellate hairs are absent.

Diagnosis (♂; ♀ unknown): Leg I (figs. 44-45): Tibia proventrally with 3 spines, metatarsus strongly thickened and hairy, without spines, tarsus long and thickened basally. Pedipalpus (fig. 46) with a long embolus.

Description (♂):
Measurements (in mm): Body length 1.35, prosoma: length 0.7, width 0.6, hight anteriorly 0.3, lenth of the basal cheliceral articles 0.4; leg I: Femur 0.95, patella 0.3, tibia 0.63 (width 0.11), metatarsus 0.4 (hight and width 0.14), tarsus 0.48; leg IV: Tibia 0.45, metatarsus 0.28, tarsus 0.37.
Colour dark brown.
Prosoma (fig. 44) distinctly longer than wide or high, caput raised and separated from the thorax, bearing few short hairs and tiny wrinkles. 8 large eyes, posterior row straight, anterior median eyes smallest, posterior median eyes closely together. Basal articles of the chelicerae distinctly longer than the clypeus, fangs long, too, the anterior cheliceral margin bears two larger teeth. Sternum longer than wide, fairly elongated between the coxae IV which bear no outgrowth. - Legs (figs. 44-45) fairly long, order I/II/IV/III, III and IV distinctly shorter and more slender than I and II, I largest, tibia slightly bent, with long hairs, with 3 proventral spines in the distal half, metatarsus distinctly thickened and hairy, without spines, tarsus slightly bent, longer than the metatarsus, basally with long hairs. All tibiae bear 2 dorsal bristles, length of the basal bristle on tibia I 1.9 tibial diameters, tibia I bears an additional long prolateral bristle in the middle. Tarsal claws of medium size. - Opisthosoma (fig. 44) short, wider than long, scarcely covered with short hairs. A nearly smooth scutum covers completely the opisthosoma, lateral folds are present, a sclerotized ring around the spinnerets is probably absent. Spinnerets short, a colulus is not observable. - Pedipalpus (fig. 46) fairly small, femur with an apical apophysis which is directed foreward, patella and tibia short, probably without apophyses, cymbium weakly modified, fairly long, outstanding bulbal apophyses are most probably absent, embolus long protruding the cymbium.

Relationships: See *B. bispinosa* n. sp.

Distribution: Tertiary Baltic amber forest, Bitterfeld deposit.

***Balticonopsis bulbosa* n. gen. n. sp.** (fig. 47)

Material: Holotypus ♂ in Baltic amber, coll F. KERNEGGER in Hamburg no. 6/2003.

Preservation and syninclusions: The spider is completely and fairly well preserved but ventrally thickly covered by a white emulsion. The left chelicera is spread out. - The amber piece is embedded in artificial resin. - A member of the beetle family Scydmaenidae and remains of a Collembola are present in the same piece of amber.

Diagnosis (♂; ♀ unknown): Leg I (fig. 47): Tibia slender and with 2 proventral spines in the distal half, metatarsus distinctly thickened, tarsus thickened basally and bent; pedipalpus with an apical femoral apophysis and an elongated cymbium, embolus similar to *B. holti*.

Description (♂):
Measurements (in mm): Body length 1.5, prosomal length about 0.7; leg I: Tibia 0.6, metatarsus 0.36 (hight 0.16), tarsus 0.43 (hight 0.11).
Colour dark brown, probably darkened by heating.
Prosoma nearly smooth, caput raised. 8 large eyes, anterior medians smallest, posterior row recurved, posterior median eyes separated by less of their radius. Chelicerae, mouth parts and sternum hidden. - Legs (fig. 47) fairly slender, order I/II/IV/III, at least tibia I, II and IV bear 2 long bristles, prolateral tibial I bristle probably absent. Leg I hairy, see above. - The opisthosoma is dorsally completely covered with a large scutum. - Pedipalpus: See above.

Relationships: In *bispina* metatarsus I and the basal part of tarsus I are more slender.

Distribution: Tertiary Baltic amber forest.

***Balticonopsis ceranowiczae* n. gen. n. sp.** (figs. 48-52) Photo 153

Derivatio nominis: The spider is dedicated to Dr. B. CERANOWICZ at the MZ, who selected the holotype of the new species as well as numerous further spiders from the collection of the Museum Ziemi in Warsaw.

Material: 2♂ in Baltic amber, holotypus MZ no. 21689, paratypus F980/BB/AR/ANA/CJW.

Preservation and syninclusions: Holoptype: The spider is well and completely preserved, the opisthosoma id covered by a bubble, the prosoma behind the eye field possesses some depressions. Beneath the spider a small Coleoptera: Staphylinidae is preserved and above the spider plant's remains; stellate hairs are absent. - The paratype is not well preserved and incomplete: Most parts of the right legs (e.g. the retrolateral half of the tibia I) are cut off, the pedipalpi are well preserved. Stellate hairs and parts of insect's legs are present in the same piece of amber.

Diagnosis (♂; ♀ unknown): Leg I (fig. 48): Tibia ventrally with a large spoon/spine before the middle and a blunt outgrowth nearby (arrow), 4 short spines as well. Pedipalpus (figs. 51-52): Cymbium twice as long as the bulbus, embolus longer than the cymbium.

Description (♂):
Measurements (in mm): Body length 1.55, prosoma: Length and width about 0.85, hight at least 0.6; leg I: Femur 1.0 (hight 0.18), patella 0.34, tibia 0.63, metatarsus 0.45, tarsus 0.5, hight of femur II 0.14, length of tibia IV 0.5.
Colour redbrown.
Prosoma high, covered with wrinkles, most parts of the chelicerae hidden. 8 large eyes similar to fig. 53. Fangs long, sternum covered with wrinkles, separating the coxae IV by their diameter. Legs (fig. 48) fairly long, I distinctly the largest, femur and tibia thickened, tarsus slightly longer than metatarsus, patellae with 2 dorsal bristles, the distal bristle very long, tibiae with 2 dorsal bristles, too, I (see above) with an additional prolateral bristle, metatarsus I with a short prodistal spine and a trichobothrium in the middle, coxa IV without an outgrowth, tarsal claws long. - Opisthosoma (figs. 49-50) high, dorsally covered with a large scutum which bears short hairs, laterally with folds, with a sclerotized ring around the spinnerets; a colulus is not observable. - Pedipalpus (figs. 51-52) with slender articles, the femur bears a pointed apical apophysis which is directed foreward, cymbium twice as long as the bulbus, bulbus similar to *holti*, embolus long, probably in a circular position, guided by the prolateral margin of the cymbium.

Relationships: See *B. holti* n. sp.

Distribution: Tertiaty Baltic amber forest.

***Balticonopsis holti* n. gen. n. sp.** (figs. 53-59) Photo 154

Derivatio nominis: The spider is named after the dealer of amber inclusions, JENS VON HOLT in Hamburg, who brought me the holotype of the species.

Material: Holotypus in Baltic amber and a separated piece of amber, F994/BB/AR/ANA/CJW.

Preservation and syninclusions: The spider is completely and partly well preserved and is dorsally covered by a white emulsion. Numerous bubbles are present, two larger

bubbles in front and right of the spider. Remains of a small spider are present at the margin of the amber piece, stellate hairs are absent.

Diagnosis (♂; ♀ unknown): Coxa IV bears a blunt retrodisal outgrowth (fig. 57). Leg I (figs. 54-56): Tibia thickened, with a long ventral spine in the midle and 2 short spines nearby as well as 3 short spines (fig. 55), metatarsus with 3 ventral spines. Pedipalpus (figs. 58-59): Cymbium nearly twice as long as the bulbus, apically with longer hairs, embolus long and prolaterally guided - and hidden - by the cymbial margin.

Description (♂):
Measurements (in mm): Body length 1.4, prosomal length 0.7, opisthosoma 0.9 high, femur I 1.0, tibia I 0.7 (0.15 high), tibia II 0.5, tibia IV 0.4, metatarsus II 0.35, tarsus II 0.41.
Colour mainly redbrown, sternum dark brown.
Prosoma high, eye field protruding, fairly wide (fig. 53), 8 large eyes which are covered by a thin emulsion, median eyes closely together, clypeus protruding, the sternum separates the coxae IV nearly by its diameter. - Legs (figs. 54-55) fairly long, especially the femur I distinctly larger than II, tibia I thickened, ventrally with some long hairs, a long spine (spoon) on an elevation in the middle, 2 smaller spoons near the longest and a small spoon in a basal position; the left tibia bears additionally a spine in a proventral-distal position. All tibiae bear 2 dorsal bristles, thin on I-II, longer than the diameter of the tibia on I, tibia I with an additional pro- and retrolateral bristle. Metatarsus I distintly bent, with 3 ventral spines. Patellae with 2 dorsal bristles, tarsi distinctly longer than the metatarsi. Coxa IV (fig. 57) with a blunt retroventral outgrowth which bears no bristle. - Opisthosoma distinctly higher than long or wide, it bears only indistinct short hairs and a large dorsal scutum which is difficult to recognize, apparently a ring aroung the spinnerets is absent, ventral scuta may be present. The colulus is tiny or absent. - Pedipalpus (figs. 58-59; both are partly covered by a white emulsion, the bulbi are partly expanded) with short articles, the femur bears a pointed apical apophysis, patella with a plate-shaped retrodistal apophysis, tibia with two (?) trichobothria, cymbium large and very long, with some longer apical hairs, embolus long and thin, describing half a circle, prolaterally guided within the margin of the cymbium, longer than the tip of the cymbium; the bulbus bears a blunt basal apophysis and is hidden in the middle.

Relationships: In *B. ceranowiczae* an outgrowth of the coxa IV is absent, a blunt ventral outgrowth of tibia I is present, position and size of the ventral spoons/bristles of tibia I are different, e.g. the position of the longest spoon is in the basal half, metatarsus I bears only one ventral spine and the distal part of the cymbium is quite longer.

Distribution: Tertiary Baltic amber forest.

***Balticonopsis* sp. indet**. (fig. 60) Photo 156

Material: 1 ♀ in Baltic amber, F985/BB/AR/ANA/CJW.

Preservation: The spider is very well and completely preserved in an amber piece which probably was heated, a white emulsion and stellate hairs are absent.

Description (♀):
Measurements (in mm): Body length 1.8, prosomal length 0.9, leg I: Femur 1.0, patella 0.3, tibia 0.68 (hight 0.17), metatasus 0.5, tarsus 0.5, tibia II 0.5 (hight 0.135).
Colour medium brown.
Prosoma (photo): Caput raised and with a "seam" to the thorax, caput nearly smooth, thorax with wrinkles; the 8 eyes are covered by bubbles, the clypeus is long, the chelicerae are large, the fangs are hidden, the articles of the pedipalpus are slender. Legs with indistinct hairs, order I/II/IV/III, I distinctly the largest, metatarsus I (fig. 60) with 2 short proventral spines, all tibiae bear 2 long dorsal bristles, tibia I bear additionally a prolateral bristle in the middle. The opisthosoma is heavily sclerotized and bears dorsally 3 pairs of sigillae, the spinnerets are short, the genital area is indistinct.

The **relationships** are unsure; the combination of characters lead me to the conclusion that this female is a member of the genus *Balticonopsis*. This is the only known female of the genus. According to the metatarsal I spines *B. holti* may be close or even conspecific.

Distribution: Tertiary Baltic amber forest.

Conoculus KOMATSU 1940 (figs. 34a, b, 35)

Diagnosis: Prosoma (figs. 34a-b) 1 1/2 times to 2 times longer than wide, only moderately high, clypeus nearly vertically and not much longer than the field of the 8 eyes. Anterior median eyes tiny. Tibial bristles are unknown to me. Opisthosoma high, large scuta are absent, a sclerotized ring around the pedicel is present. ♂-pedipalpus (fig. 35): Patella and tibia with at least one dorsal-basal apophysis, cymbium unmodified, embolus short, in a ventro-apical posision, directed foreward.

Type species: *Conoculus lyugadinus* KOMATSU 1940 (Japan). Further species: *C. simboggulensis* PAIK 1971 (Korea) and *C. paroculus* SIMON 1899) (Sumatra), see PLATNICK & FORSTER (1989: 76).

The **relationships** are unsure. Unusual in the Anapinae are the absence of large opisthosomal scuta, the elongated prosoma and the short clypeus.

Distribution: Extant, SE-Asia (Japan, Korea, Indonesia).

***Dubianapis* n. gen.**

Diagnosis (♂; ♀ unknown): Anterior median eyes distinctly smaller than the other eyes (fig. 61), leg I not modified, tarsi twice as long as metatarsi. Pedipalpus (figs. 62-64): Patella retrolaterally with an outstanding apophysis, tibia probably without an apophysis, larger than the patella, bulbus large, embolus in a circular position (no apophyses are observable).

Type species: *Dubianapis obscura* n. sp.

Relationships: Probably *Fossilanapis* and *Ruganapis* are most related, see the key.

Distribution: Tertiary Baltic amber forest.

***Dubianapis obscura* n. gen. n. sp.** (figs. 61-64)

Material: Holotypus ♂ in Baltic amber, MZ no. 15471.

Preservation: The spider is nearly completely preserved, only parts of the left patella I are cut off; most parts of body and legs are covered by a white emulsion and bubbles, most dorsal parts of the prosoma are free.

Diagnosis (♂; ♀ unknown):
Measurements (in mm): Body length 1.0, prosoma: Length 0.47, width 0.47; femur I about 0.52 (hight 0.11), tibia II 0.35, femur IV 0.38, tarsus + metatarsus II 0.39, width of the eye field 0.23, length of the middorsal opisthosomal hairs up to 0.07.
Colour of the prosoma dark brown.
Prosoma (fig. 61) wide as long, with a long clypeus, caput nearly smooth and raised, thorax with wrinkles, and separated from the caput by a weak furrow. 8 eyes in two rows, anterior median eyes smallest, posterior row recurved, posterior median eyes separated by about their radius. - Legs fairly long, I longest and not modified, femur I fairly thickened. All tibiae bear 2 long dorsal bristles, I additionally 1 prolaterally. Tarsi about twice as long as the metatarsi. - Opisthosoma (fig. 61): Outline circular, with a large dorsal scutum and longer hairs. - Pedipalpus (figs. 62-64): Femur slender, straight and without an apophysis, patella wide, retrobasally with a short and pointed apophysis, tibia wide, slightly longer than the patella, probably without an apophysis, cymbium large and simple, bulbus large, embolus long, thin, in a circular position.

Relationships: See above.

Distribution: Tertiary Baltic amber forest.

***Flagellanapis* n. gen.**

Diagnosis (♂; ♀ unknown): 8 large eyes (figs. 65-76), leg I not modified, tarsi slightly longer thah the metatarsi, tibiae with 1 dorsal bristle only. ♂-pedipalpus (figs. 68-70): Articles without apophyses, patella bent, tibia short, cymbium large and simple, bulbus complicated, embolus very long and twisted.

Type species: *Flagellanapis voigti* n. sp., the only known species of the genus.

Relationships: According to the opisthosomal scutum, the wrinkles of the prosoma and the redbrown colour of the body *Flagellanapis* is a member of the Anapinae; in most Anapinae at least one apophysis of the ♂-pedipalpus is present. A twisted embolus has been convergently evolved in the South American genus *Anapisona aragua* PLATNICK & SHADAB 1979 and in the South African *Dippenaaria luxurians* WUNDERLICH 1995 in which apophyses of the articles of the ♂-pedipalpus are present.

Distribution: Tertiary Baltic amber forest incl. the Bitterfeld deoposit.

***Flagellanapis voigti* n. gen. n. sp.** (figs. 65-70) Photos 157-158

Derivatio nominis: The spider is named after PETER CHRISTIAN VOIGT in Hamburg, who works very busy at the "Förderverein des Arbeitskreises Bernstein" of the GPIUH and who gave some fossil spiders for the scientific research.

Material: 4♂ in Baltic amber: Holotypus from the Bitterfeld deposit, F986/BB/AR/ANA/CJW; paratypus a) F1004/CJW; paratypus b) F1005/CJW; paratypus c) F1003/CJW.

Preservation and syninclusions: The opisthosoma of the holotype is separated and situated two prosomal lengths behind and beneath the complete prosoma in a position which is turned by 90°. Behind the eyes the prosoma bears a larger opening which probably is caused by a bite. The left pedipalpus is excellently preserved. - Numerous gas bubbles, stellate hairs and other remains of plants are preserved in the same piece of amber. - Paratype a) is completely preserved in a clear piece of amber, most parts of the ventral side are covered by a white emulsion, a large bubble is present beneath the sternum. - Paratype b) is completely preserved, too, and - especially ventrally - strongly

covered by a white emulsion; a stellate hair is present beneath the spider. - Paratype c) is well and completely preserved, partly covered by a white emulsion; a large bubble is present between the right legs II and III, a questionable - phoretic? - tiny member of the Nematoda: Rhabditida is preserved right of the opisthosoma.

Diagnosis: See above.

Description (♂):
Measurements (in mm): Body length 1.4-1.5, prosoma: Length 0.68-0.72, width 0.64-0.69, hight about 0.6, opisthosoma: Length 0.9-1.1, width 0.9-1.0, hight 0.7-0.9, tibia I 0.38-0.41, metatarsus I 0.3, tarsus I 0.35.
Colour: Body and legs redbrown to dark brown.
Prosoma (figs. 65-67) high, wrinkled, with numerous hair-bearing "warts", the long clypeus with short bristles (fig. 67). 8 large eyes in a narrow field, posterior row slightly recurved. Most parts of the chelicerae/mouth parts are hidden. - Legs fairly short, I, II and IV of about the same length, I not modified, bristles long, patellae dorsally 2, tibiae dorsally 1, no laterals on I; position of the trichobothrium on metatarsus I probably in 0.55. - Opisthosoma (figs. 65-66) nearly as wide as long, depressed, with a large dorsal scutum and probably with ventral scuta, with a sclerotized ring around the spinnerets, dorsally with longer hairs and at least 8 pairs of sigillae; the spinnerets are hidden. - Pedipalpus (figs. 68-70; see above) with slender articles and a large cymbium. In the middle part the embolus is guided by the ectal margin of the cymbium.

Relationships: See above.

Distribution: Tertiary Baltic amber forest.

***Fossilanapis* n. gen.**

Diagnosis: Prosoma as long as wide and high, 8 eyes, small anterior median eyes (e.g. figs. 74, 85-86), the posterior row usually recurved, with a furrow between caput and thorax, femur IV (!) most often - except in *eichmanni, flexiotarsus*, sp. indet. F999 and the questionable ♀ - distinctly thicker than I (in these species it may be a jumping leg which would be quite unusual in a web-building spider; see the photos and the measurements of *F. baetcheri*), all tibiae with 2 long dorsal bristles (fig. 75), I additionally with a prolateral bristle, leg I without thorns/spoons but the tibia curved, tarsi up to twice as long as the metatarsi. ♂-pedipalpus (e.g. figs. 76, 90): Femur without apophysis, patella and tibia long, both together about as long as the femur, patella with an apical apophysis which is directed medially (absent in *eichmanni*), tibia widened distally and bent in a right angle near the base, with several outgrowths, embolus thick, outstanding in the not expanded bulbus. Small spiders, body length ♂♀ 0.75-1.1mm.

Type species: *Fossilanapis baetcheri* n. sp.

Relationships: The extant genus *Pseudanapis* SIMON 1905 from the tropics may be most related; in *Pseudanapis* only 6 eyes are present and pedipalpal femoral apophyses occur. - Compare *Dubianapis* and *Ruganapis*.

Distribution: Tertiary Baltic amber forest including the Bitterfeld deposit; Ukrainean amber (Inst. Zool. Kiew).

Key to the species of the genus *Fossilanapis* (♂):

Remark: In most species femur IV is distinctly thicker than I but not in *eichmanni* and *flexiotarsus*.

1 Metatarsus I distinctly thickned (fig. 87) (as in various other genera). . . . . *flexiotarsus*

- Metatarsus I not thickened (fig. 81). 2

2(1) Femur IV thicker than I, apical patellar apophysis of the pedipalpus absent (figs. 83-84). - Bitterfeld deposit. . . . . *eichmanni*

- Femur IV distinctly thicker than I, apical patellar apophysis of the pedipalpus present and large (e.g. fig. 72). - Not the Bitterfeld deposit. 3

3(2) Prosoma with a dorsal bristle-shaped hair behind the eye field (fig. 92). . . . *unispina*

- No strong prosomal hair in this position. 4

4(3) Pedipalpal patella with a retrobasal apophysis (arrow in fig. 90). . . . . *saltans*

- Retrobasal patellar apophysis absent. 5

5(4) Pedipalpal patella with an additional apical-ventral apophysis (arrow in fig. 76). Length of the dorsal patellar apophysis 0.07mm. . . . . *baetcheri*

- No additional apical-ventral apophysis. Length of the dorsal patellar apophysis 0.95 mm, larger spiders. . . . . *anderseni*

***Fossilanapis anderseri* n. gen. n. sp.** (figs. 72-74) Photo 159

Anapidae sp.,--WUNDERLICH, Spinnenfauna gestern und heute: 252, fig. 317.

Derivatio nominis: The spider is named after Dr. S. ANDERSEN who selected Araneae in the Zool. Mus. Copenhagen which are of scientific interest.

Material: Holotypus ♂ in Baltic amber, coll. HENNINGSEN no. 28-3/1968, and a questionable conspecific ♂, ZMUK.

Preservation and syninclusions: Holotype: The spider is embedded in artificial resin and nearly completely preserved in the corner of the piece of amber. The left metatarsus IV is partly cut off, mainly ventrally the spider is strongly covered by a white emulsion, some larger bubbles are present in the same piece of amber. - The questionable ♂ is completely preserved.

Diagnosis (♂; ♀ unknown): Metatarsus I slightly thickened, pedipalpus (figs. 72-73): Length of the patellar abophysis 0.95mm, tibia very wide/high.

Description (♂):
Measurements (in mm): Holotype: Body length 1.1, prosoma: Length about 0.6, width about 0.65, hight 0.4, femur I: Length 0.45, width 0.16, hight of tibia I 0.11, tarsus IV 0.25. Leg I of the questionable ♂: Femur I: Length 0.48, width 0.11, patella 0.17, tibia 0.38, metatarsus 0.2, tarsus 0.3; length of the pedipalpal patellar apophysis 0.095.
Colour yellow brown.
Prosoma wide, distinctly wrinkled (fig. 71), with a furrow between caput and thorax. 8 eyes, the anterior medians less reduced than in fig. 74. Chelicerae, gnathocoxae, labium and sternum are hidden. - Legs stout, I largest, tibia and metatarsus I not modified, metatarsus I slightly thickened, all tibiae bear 2 long bristles, I bears additionally a prolateral bristle. Patellae with a long distal bristle. Tarsi distinctly longer than the metatarsi. - Opisthosoma depressed dorso-ventrally, dorsally with short hairs and nearly completely covered with a large scutum, with a sclerotized ring and tiny plates around the spinnerets. Anterior spinnerets stout. - Pedipalpus (figs. 72-73) Femur slender, patella with a short dorsal bristle and a long dorsal-apical apophysis, tibia very wide and with a retrolateral outgrowth. The embolus of the holotype is hidden; in the questionable male it is sickle-shaped, its free distal part is 0.1mm long.

Relationships: See the key.

Distribution: Tertiary Baltic amber forest.

***Fossilanapis baetcheri* n. gen. n. sp.** (fig. 74-78) Photo 160

Derivatio nominis: The species is named after MIKE BÄÄTCHER, a dealer of fossils in Hamburg, who made some fossil spiders in amber available to me.

Material: Holotype ♂ in Baltic amber and 3 separated pieces of amber, F991/BB/AR/ANA/CJW.

Preservation and syninclusions: The piece of amber which includes the spider was cut from a clear and larger piece of amber, it is completely and well preserved on two larger bubbles, the opisthosoma is ventrally fairly covered by a white emulsion. - Within the small separated pieces of amber 2 small excrement particles and a fly - which is partly cut off - are preserved; in the large separated piece are preserved (e.g.): 2 Collembola, 1 Coleoptera which probably was a prey, 1 Formicidae, several Diptera and a piparium, remains of a Hymenoptera, 1 Acari, a tiny juvenile Araneae, an excrement ball, stellate hairs, numerous bubbles and the part of a large drop of amber.

Diagnosis (♂; ♀ unknown): Tarsus and metatarsus I slender (fig. 75), tibia I fairly thick, 0.08mm high, femur IV distinctly thicker than I, pedipalpal patellar apophysis 0.07mm long, patella with an additional small apical-ventral apophysis (arrow in fig. 76), pedipalpal tibia with a retrolateral outgrowth.

Description (♂):
Measurements (in mm): Body length 0.8, prosoma: Lenght, width and hight about 0.4, opisthosoma: Length and hight about 0.5; leg I: Tibia 0.34, metatarsus 0.16, tarsus 0.3, tibia IV 0.35, hight of femur I 0.1, of femur II 0.7, of femur IV 0.14, length of the pedipalpal patella 0.07. - Colour redbrown.
Prosoma (fig. 74) about as long as wide and high, dorsally convex and distinctly fine wrinkled, with few short hairs and a furrow between caput and thorax. 8 eyes, the anterior medians distinctly smaller than the remainings, not protruding, posterior median eyes close together, clearly separated from the laterals. Basal articles of the chelicerae fairly large, teeth, gnathocoxae, labium and sternum are hidden. - Legs (fig. 75) fairly stout, covered with short hairs, I distinctly the largest, weakly modified by a curved tibia I-II. Remains of muscles apparently are present in some leg articles (fig. 75). All tibiae bear 2 long dorsal bristles, I additional a prolateral one. Tarsi nearly twice as long as the metatarsi. Position of the metatarsal trichobothrium in the basal half. Paired tarsal claws small. - Opisthosoma high-oval, with several dorsal pairs of sigillae, scarcely covered with very short hairs and completely covered with a scutum (the ventral side is hidden). - Pedipalpus (figs. 76-78; see above): Patella bisides the long dorsal apophysis with a short ventral-apical apophysis. Apparently a basal haematodocha is observable. The sperm duct probably ends before the tip of the embolus (fig. 78).

Relationships: See the key.

Distribution: Tertiary Baltic amber forest.

***Fossilanapis eichmanni* n. gen. n. sp.** (figs. 79-85) Photo 161

Derivatio nominis: The species is named after FRIEDHELM EICHMANN from Hannover who collected the holotype at the Bitterfeld deposit and made it available for the scientific research.

Material: Holotypus in Baltic amber and a separated piece of amber, F. EICHMANN leg. in Bitterfeld, coll. EICHMANN, later most probably deposited in the GPIUH.

Preservation and syninclusions: The spider is well and completely preserved, ventrally partly covered by a white emulsion. The opisthosoma is blown up apparently by decomposition gas and therefore shows - especially ventrally - distinct furrows (figs. 79-82), beneath the prosoma some "?decomposition bubbles" are preserved. The spider's legs are strongly bent to the sternum, the right bulbus is partly expanded.

Diagnosis (♂; ♀ unknown): Prosoma (fig. 84) fairly high, with small winkles only. Pedipalpus (figs. 83, 85): Tibia with a short spine, patella with a short basal-dorsal apophysis, an apical apophysis is absent.

Description (♂):
Measurements (in mm): Body length with the blown up opisthosoma 1.1, prosoma: Length 0.45, width 0.41, hight including the sternum about 0.35; leg I: Femur 0.45, patella 0.18, tibia 0.32, metatarsus 0.2, tarsus 0.28, tibia IV 0.29, bristles on tibia I: prolateral 0.16, dorsal-basal 0.1, dorsal-distal 0.15.
Colour: Body and legs dark brown (parts are probably oxidated).
Prosoma (figs. 79-85) only fairly high, with tiny wrinkles, few short hairs, and a distinct furrow between caput and thorax. Clypeus not protruding. Chelicerae and gnathocoxae are hidden. 8 eyes, the posterior row strongly recurved, the anterior medians distinctly the smallest, posterior median eyes close together. The sternum separates the coxae IV by more of their diameter. - Legs (figs. 79-81) stout, with long bristles, 2 on the patellae (the basal one short), 2 dorsally on the tibiae, I additionally with a long prolateral bristle in the basal half; leg I unmodified. - Pedipalpus (figs. 83, 85): Patella bent nearly in a right angle, with a short erect dorsal-basal apophysis, no apical apophysis. Tibia distally widened, with a short dorsal spine in the basal half and a long bristle in the distal half. Cymbium unmodified, fairly large. Bulbus large, embolus fairly thick, outstanding.

Relationships: See the key and *F. saltans*.

Distribution: Tertiary Baltic amber forest, the Bitterfeld deposit.

***Fossilanapis flexiotarsus* n. gen. n. sp.** (figs. 86-89)

Material: Holotypus ♂ in Baltic amber and a separated piece of amber, F993/BB/AR/ANA/CJW.

Preservation and syninclusions: The spider is well and completely preserved in a clear piece of amber, a cover of a white emulsion is present at the ventral and posterior parts. - Two Acari larvae (e.g.) are preserved in the same piece of amber, a member of the Diptera: Nematocera with some eggs is present in the separated piece of amber.

Diagnosis (♂; ♀ unknown): Metatarsus I club-shaped thickened (fig. 87), tarsus I thikkened in the basal and in the distal half. Prosoma very high (fig. 86). Length of the pedipalpal tibial apophysis 0.07mm.

Description (♂):
Measurements (in mm): Body length 0.85, prosoma: Length 0.5, width 0.5, hight above the coxae 0.35, opisthosoma: Length 0.7, width 0.55, hight 0.4; leg I: Femur 0.5, tibia 0.35, metatarsus 0.17, tarsus 0.34, femur IV 0.4, length of the pedipalpal tibial apophysis 0.07.
Colour redbrown.
Prosoma (fig. 86) very high, fine wrinkled, caput and thorax are separated by a "furrow". 8 Eyes, anterior median eyes distinctly the smallest, anterior row distinctly procurved. Chelicerae, gnathocoxae, labium and sternum hidden. - Legs (fig. 87) fairly long, order I/II/IV/III, tibia I not modified, metatarsus I short and distinctly thicken, tarsus I twice as long as the metatarsus, thickened basally and distally. Femur I thicker than the remaining femora. All tibiae with 2 long dorsal bristles, I additionally with a prolateral bristle. Tarsal claws small. - Opisthosoma long and overhanging the prosoma, scarcely covered with short hairs, depressed, covered with a large scutum, a sclerotized ring around the spinnerets is present. - Pedipalpus (figs. 88-89): Femur slender, apophysis absent, patella long, apically with a long and pointed apophysis, an additional prolateral apophysis is present in the distal half. Tibia long and partly hidden, embolus not clealy observable (the bulbus is bent to the spider's body).

Relationships: See the key and *F. baetcheri*.

Distribution: Tertiary Baltic amber forest.

***Fossilanapis saltans* n. gen. n. sp.** (figs. 90-91) Photo 162

Material: 2♂ in Baltic amber, holotypus F1000/BB/AR/ANA/CJW; paratypus and a se-

parated piece of amber F1001/BB/AR/ANA/CJW.

Preservation and syninclusions: The holotype is well and completely preserved, only a weak white emulsion is present beneath the mouth parts, a bubble is present at the left side of the sternum. A small juvenile spider, a mite and one or two Collembola are present in the same piece of amber but no stellate hairs. - The paratype is completely preserved, fissures run through the spiders's body which is very heavily covered by a white emulsion. - A tiny Diptera: Nematocera and remains of plants are present in the same piece of amber.

Diagnosis (♂; ♀ unknown): Pedipalpal patella (fig. 90) with a long apical and a small retrolateral apophysis; bulbus as in fig. 91.

Description (♂):
Measurements (in mm): Body length 0.65-0.7, prosoma: Length, width and hight about 0.45, tibia I 0.3, leg IV: Femur 0.34 (hight 0.1), patella 0.12, tibia 0.26, metatarsus 0.12, tarsus 0.22.
Colour dark brown.
Prosoma as long as wide, with fine wrinkles, as in the genus (see above). Sternum with distinct wrinkles, separating the coxae IV by two of their diameters. - Legs as in the genus. - Opisthosoma covered with a large scutum and short hairs, a ventral scutum, a sclerotized ring around the spinnerets and a colulus are present. - Pedipalpus: See above; a small additional prolateral patellar apophysis is present.

Relationships: In *F. eichmanni* a large retrobasal patellar apophysis of the pedipalpus is present.

Distribution: Tertiary Baltic amber forest.

***Fossilanapis unispinum* n. gen. n. sp.** (figs. 92-93) Photos 163-164

Material: Holotypus ♂ in Baltic amber, F1002/BB/AR/ANA/CJW.

Preservation and syninclusions: The spider is completely and well preserved, mainly ventrally it is covered by a white emulsion, a bubble is preserved on the sternum; stellate hairs are absent.

Diagnosis (♂; ♀ unknown): Prosoma dorsally with a bristle-shaped hair (fig. 92). Pedipalpus (fig. 93): Apical patellar apophysis large, retrobasal patellar apophysis absent, bulbus structures unknown (hidden).

Description (♂):
Measurements (in mm): Body length 0.9, prosomal length 0.4, leg I: Femur 0.46 (hight

0.1), patella 0.16, tibia 0.37, metatarsus 0.18, tarsus 0.32, tibia II 0.3, tibia III 0.22, femur IV 0.45 (hight 0.12).
Colour redbrown.
Prosoma (fig. 92) high, with fine wrinkles and a bristle-shaped dorsal hair. Clypeus very long and concave. Eyes as in the genus; the mouth parts are hidden. - Legs with indistinct hairs, as in the genus. - Opisthosoma higher than long or wide, dorsally completely covered with a large scutum, ventral scutum hidden, a sclerotized ring around the spinnerets is present. - Pedipalpus: See above.

Relationships: In the remaining congeneric species a dorsal prosomal bristle-shaped hair is absent; see the key.

Distribution: Tertiary Baltic amber forest.

?***Fossilanapis*** **sp. indet.**

Material: 1 ♀ in Baltic amber from the Bitterfeld deposit, F996/BB/AR/ANA/CJW.

The spider is in a bad condition, deformed and darkened, the amber piece was heated. Body shape and chaetotaxy as in *Fossilanapis*, the body length is 0.75mm, the prosoma is 0.4mm high, the opisthosoma is completely covered by a large scutum, the genital area is darkened and hard to observe, femur IV is not thicker than the other femora.

Distribution: Tertiary Baltic amber forest, the Bitterfeld deposit.

Material of *Fossilanapis* sp. indet. in Baltic amber: 1 ♂ in the coll. KERNEGGER in Hamburg, no. 302/2002; 2♂ F997/CJW and F999/CJW, 1/2♂ F998/CJW. – Photo 165.

Gertschanapis PLATNICK & FORSTER 1990 (fig. 33a)

Diagnosis and **relationships**: See PLATNICK & FORSTER (1990) and the key above.

Type species: *Chasmocephalon shantzi* GERTSCH 1960 (fig. 33a), the only known species of the genus.

Distribution: North America (extant).

Metanapis BRIGNOLI 1981 (figs. 36-37)

Diagnosis: See BRIGNOLI (1981: 118) and the generic key above.

Type species: *Metanapis mahnerti* BRIGNOLI 1981 (figs. 36-37).

Distribution: Africa, Nepal (extant).

***Ruganapis* n. gen.**

Diagnosis (♂; ♀ unknown): Prosoma strongly wrinkled (figs. 94-95), 6 large eyes and small anterior median eyes (fig. 95), leg I not modified; pedipalpus (figs. 95-96): Patella prolongated, tibia basally wide and distally slender, cymbium large and flat, retrobasally with a "pointed hook" (the opening of a bulbal gland?), embolus long and thin, its position prolaterally along the cymbial margin.

Relationships: I do not know a closely related genus; see the key, e.g. *Dubianapis* and *Fossilanapis*.

Type species: *Ruganapis scutata* n. sp., the only known species of the genus.

Distribution: Tertiary Baltic amber forest.

***Ruganapis scutata* n. gen. n. sp.** (figs. 94-96) Photos 166-168

Material: 3♂ in Baltic amber, holotypus F272/BB/AR/ANA/CJW; paratype IMGPUG; paratype F981/BB/AR/ANA/CJW.

Preservation and syninclusions: The holotype is completely and excellently preserved in a yellow piece of amber which is full of bubbles, the right and ventral sides are partly covered by a white emulsion, the right leg II is partly covered by a bubble. Left of the spider and in contact with leg IV a larger bubble is preserved which is filled with a clear fluid and a moovable gas bubbla. Also preserved are 3 small excrement balls, one

Collembola, some Acari larva and stellate hairs. - The paratype IMGPUG is completely and well preserved, ventrally strongly covered by a white emulsion; no syninclusions. - The paratype F981/CJW is completely and well preserved, partly covered by a white emulsion. Two insect's legs, few excrements particles and stellate hairs are preserved in the same piece of amber.

Diagnosis: See above.

Description (♂):
Measurements (in mm): Body length 1.2, prosoma: Length and width 0.6-0.63, hight above coxae about 0.35, leg I: Femur 0.48, patella 0.15, tibia 0.41, metatarsus 0.23, tarsus 0.34, femur IV 0.48, width of the opisthosoma 0.85.
Colour redbrown to dark brown (prosoma).
Prosoma (figs. 94-95): fairly high, as long as wide, caput anteriorly with large wrinkles. Two small anterior median eyes and 6 large remaining eyes. Caput clearly separated from the thorax, clypeus not protruding, sternum distinctly wrinkled; coxae separated by more than their diameter. - Legs fairly stout, I not modified, leg IV about as long as I, tarsi about 1 1/2 times longer than the metatarsi, femur I only slightly thicker than II, patellae with a short basal and a long distal bristle, all tibiae bear 2 long dorsal bristles, I additionally a prolateral bristle. Position of the metatarsal I trichobothrium in 0.45, bothrium large. - Opisthosoma about as wide as long, distinctly depressed, dorsally nearly completely covered with a large scutum which hangs over laterally and bears few short hairs, ventrally with an epigastral scutum and a wide sclerotized ring around the short spinnerets. Probably large lung covers are present (paratype CJW). - Pedipalpus (figs. 95-96; see above): Femoral apophysis absent. Tip of the embolus probably near the cymbial hook; at the right pedipalpus a spiral "thread" originates, a secretion which may contain remains of sperm. Probably this secretion was caused from the capture procedure in the fossil resin.

Relationships: See above.

Distribution: Tertiary Baltic amber forest.

***Saxonanapis* n. gen.**

Derivatio nominis: The name is a combination of the deposit of the amber, Saxonia, and of the extant genus of the Anapinae, *Anapis*.

Diagnosis (♂; ♀ unknown): Tarsi distinctly (1/4) shorter than the metatarsi, 8 large eyes, the anterior medians not reduced (fig. 97), sequence of the dorsal tibial bristles 2/2/1/2, leg I not modified, tibia I with a pair of lateral bristles (fig. 98) Pedipalpus (figs. 99-102): Articles without apophyses, cymbium curved, bulbus - the structures are hard to observe - with a large disc-shaped retrodistal apophysis, embolus "indistinct", pro-

bably short.

Type species: *Saxonanapis grabenhorsti* n. sp., the only known species of the genus.

The **relationships** are quite unsure, no closely related genus is known to me; the short tarsi and the absence of apophyses of the ♂-pedipalpus are quite unusual in the family Anapidae. See the key.

Distribution: Tertiary Baltic amber forst, the Bitterfeld deposit.

***Saxonanapis grabenhorsti* n. gen. n. sp.** (figs. 97-102)

Derivatio nominis: This species is named after HEINRICH GRABENHORST in Celle, who made the type material of this species and many other spiders available for a scientific research and will give the material to a scientific institution, most probably the GPIUH.

Material: Holotypus ♂ and paratypus ♂ from the same piece of Baltic amber and 3 separated pieces of amber from the Bitterfeld deposit, coll. H. GRABENHORST, later probably GPIUH.

Preservation and syninclusions: The holotype is very well and completely preserved, there is no white emulsion but some "fissures" are present. - The paratype is less well preserved, its anterior parts are partly covered by a white emulsion; parts of the left tarsi III and IV and of the left opisthosomal margin are broken off. - Numerous stellate hairs, the larva of a Cicadina, the ♀ of a spider (Linyphiidae, ?*Custodela* sp.) and a spider's leg, one Acari, particles of excrement and few thraeds of spider's silk with sticky droplets and stellate hairs are preserved, too.

Diagnosis (♂; ♀ unknown): Bulbus with a large retrolateral sclerite, figs. 99-102.

Description (♂):
Measurements (in mm): Body length 0.8, prosoma: Length 0.35, hight about 0.23, leg I: Femur 0.36, patella 0.17, tibia 0.21, metatarsus 0.21, tarsus 0.15, tibia IV 0.15, hight of femur I 0.1, hight of femur II 0.07.
Colour: Holotype dark brown, paratype orange brown.
Prosoma (fig. 97) nearly smooth, only fairly high, few hairs, clypeus not protruding. 8 large eyes, anterior and posterior median eyes separated by less of their diameter. Basal cheliceral articles large. - Legs (fig. 98) stout, tarsi 1/4 shorter than the metatarsi. Bristles long and thin, none on the femora, sequence on the tibiae 2/2/1/2, I with an additional lateral pair, II with a retrolateral bristle, tarsi none. Tibiae with long trichobothria. - Opisthosoma (fig. 97) oval, with short hairs, depressed, with a large dorsal scutum and

fine wrinkles. Lung covers probably absent. Colulus tiny or absent, anterior spinnerets stout. - Pedipalpus (figs. 99-102) only fairly large, apophyses of the articles absent, patella and tibia short, patella with a dorsal bristle, cymbium not modified, apically probably slightly divided, paracymbium absent, subtegulum small; bulbus retrolaterally with a large and disc-shaped apophysis, the embolus is not observable with certainty, probably short.

Relationships: See above.

Distribution: Tertiary Baltic amber forest, the Bitterfeld deposit.

***Tuberanapis* n. gen.**

Diagnosis (♂; ♀ unknown): Clypeus very high (fig. 103), anterior cheliceral margin with 3 large teeth, tarsus I only slightly longer than metatarsus I, tibia and metatarsus I both with 2 prolateral spines (fig, 104); pedipalpus (figs. 103, 105): Femur thickened distally and with an apophysis, patella and tibia without apophyses, cymbium with a retrodorsal hump, bulbus small, embolus thin, indistinct and probably with two apophyses, median apophysis present.

Type species: *Tuberanapis parvibulbus* n. sp., the only known species of the genus.

Relationships: See the key.

Distribution: Tertiary Baltic amber forest.

***Tuberanapis parvibulbus* n. gen. n. sp.** (figs. 103-105) Photos 169-170

Material: 2♂ in Baltic amber, holotypus F982/BB/AR/ANA/CJW, paratypus F983/BB/AR/ANA/CJW.

Preservation and syninclusions: The holotype is well but incompletely preserved: The left margin of the opisthosoma - which is hollow -, the left margin of the left patella I and most parts of the left legs II-IV are cut off; emulsions are absent. Two short threads of silk are present at the tip of the left tarsus I. - The paratype is only fairly well preserved in an amber piece which was heated, some fissures hinder the view to the spider which is partly covered by a weak white emulsion. A tiny Collembola, a tiny larva of a mite and a stellate hair are present in the same piece of amber.

Diagnosis (♂; ♀ unknown): See above.

Description (♂):
Measurements (in mm): Body length 1.6, prosoma: length 0.9, width 0.7, hight above coxae 0.65; leg I: Femur 1.1, patella 0.35, tibia 0.75, metatarsus 0.45, tarsus 0.55, tibia II 0.58, tibia III 0.35, tibia IV 0.48.
Colour medium brown, opisthosomal scutum of the paratype dark brown.
Prosoma (fig. 103) nearly as high as wide, with few hairs and a furrow between caput and thorax, caput nearly smooth, thorax distinctly wrinkled. 8 large eyes (fig. 103), anterior medians smallest, posterior medians largest, posterior row recurved. Chelicerae fairly large, the anterior margin of the furrow bears 3 large teeth, fangs slender, labium with a seam to the sternum. - Legs fairly long, order I/II/IV/III, I distinctly the largest, hairy; all tibiae with 2 dorsal bristles, I additionally with a prolateral bristle in the middle (fig. 104), tibia and meatarsus both bear 2 prolateral spines. Tibiae with a longer trichobothrium. - Opisthosoma with a large dorsal scutum (which is indistinct in the holotype) and bears very short hairs. Ventral scuta are unknown, the spinnerets are short. - Pedipalpus: See above.

Relationships: See above.

Distribution: Tertiary Baltic amber forest.

Palaeoanapis WUNDERLICH 1988 (figs. 106-108)

1988 *Palaeoanapis* WUNDERLICH, Beitr. Araneol., 2: 218, figs. 258-262.

Diagnosis (♂; ♀ unknown): 6 eyes (figs. 106-107), posterior eye row straight, leg I not modified. Pedipalpus (fig. 108): Femur and patella without apophysis, tibia with a retrobasal and a distal apophysis; a "retrobasal paracymbium" is probably an artefact. Body length 0.65mm.

Type species: *Palaeoanapis nana* WUNDERLICH 1988; the only known species of the genus.

Relationships: In contrast to *Anapisona* and *Pseudanapis* a pedipalpal femoral apophysis is absent, in contrast to *Anapis* a dorsal patellar apophysis is absent, in contrast to related genera a paracymbium is probably present.

Distribution: Tertiary Dominican amber forest.

Zangherella DI CAPORIACCO 1949 (fig. 38)

Diagnosis: Tibial bristles long, its sequence 2/2/1/1 or 2/2/2/2. ♂-pedipalpus (fig. 38) with long and slender articles, tibia partially fused to the cymbium, embolus stout; no evident conductor; ♀-pedipalpus absent.

Type species: *Zangherella minima* DI CAPORIACCO 1949 (= *Anapis algerica*).

Relationships: In the related genera - e.g. *Anapis* and *Pseudanapis* - the tibia is not fused to the cymbium.

Distribution: Mediterranea (extant).

(3) **Mysmeninae** (German name: Stachelbein-Zwergkugelspinnen) and their extant kin

Diagnosis: Femoral organ (fig. 123) usually present, denticles in the cheliceral furrow present, cymbium strongly modified, median apophysis absent, fingeprint structure of the opisthosomal cuticula present.

Relationships: In the Symphytognathinae a fingerprint structure of the opisthosoma is present, too, but a femoral organ and denticles in the cheliceral furrow are absent, the chelicerae are fused at least at their base and the ♀-pedipalpus is strongly reduced or even absent.

Distribution: Cosmopolitical; fossil in Baltic and Dominican amber.

Key to the extant holarctic and fossil Tertiary genera of the Mysmeninae:

1 ♂-prosoma strongly convex (fig. 133). 6 (or 8?) eyes. ♂-pedipalpus: Figs. 135-137). -

Fossil, in Baltic amber. . . . . *Palaeomysmena*

- ♂-prosoma less convex. 8 eyes or 6 (*Eomysmenopsis*). ♂-pedipalpus different. 2

2(1) 6 eyes. ♂-tibia **II** ventrally with a strong spine (fig. 113). Body length of the ♂ about 0.7mm. - Fossil in Baltic amber. . . . . *Eomysmenopsis*

- 8 eyes. ♂-tibia II spineless. - Fossil or extant. 3

3(2) Tibia I-II mit 2 dorsal bristles (fig. 138). Body length of the ♂ nearly 0.35mm. - Fossil in Dominican amber. . . . . *Dominicanopsis*

- Tibia I-II with 1 dorsal bristle in the basal half (fig. 122). Body length > 0.5mm. - Extant or fossil in Baltic and Dominican amber. 4

4(3) Anterior median eyes distinctly smaller than anterior lateral eyes. Embolus short, thick and strongly bent. - Extant, Europe, USA. . . . . *Trogloneta*

- Anterior median eyes not smaller than anterior lateral eyes. Embolus long and thin (e.g. figs. 119, 126). - Extant and fossil 5

5(4) Reduced lungs and lung covers present. ♂-prosoma moderately raised, longer than high. Cymbium strongly elongeted (fig. 119), tegulum without apophyses. No scape of the epigyne. - Extant, America. . . . . *Maymena*

- Lungs and lung covers absent. ♂-prosoma often higher than long. Cymbium not elongated, tegulum usually with apophyses. Epigyne with or without a scape. 6

6(5) Tibia of the ♂-pedipalpus cymbium-like widened, retrolaterally with one to numerous strong spines/cusps; a cymbial thorn is absent. No scape of the epigyne. - Extant: Americas, (?) Africa; fossil in Dominican amber . . . . . *Mysmenopsis*

- Tibia of the ♂-pedipalpus not strongly widened, retrolaterally without strong spine(s) (e.g. figs. 130-131); a cymbial thorn (fig. 124) is present. Scape of the epigyne present or absent. - Extant (nearly cosmopolitical) and fossil in Baltic amber . . . . . *Mysmena* s.l.

***Eomysmenopsis* n. gen.**

Diagnosis (♂; ♀ unknown): 6 large eyes in 3 groups, eye field wide (figs. 110-111), prosoma with a lateral furrow (figs. 109-110). Metatarsi I-II without spines, tibia I (fig. 112) bent, without ventral bristle or spine, but tibia II with a ventral spine (fig. 113). Se-

quence of the long tibial bristles 2/2/1/1, additionally 1 prolateral bristle on tibia I. Pedipalpus (figs. 114-118; both bulbi of the holotype are expanded) with slender articles which lack apophyses; embolus probably short.

Type species: *Eomysmenopsis spinipes* n. sp.

Relationships: See the key of the genera. I do not know a closely related genus.

Distribution: Tertiary Baltic amber forest.

***Eomysmenopsis spinipes* n. gen. n. sp.** (figs. 109-118) Photo 171

Material: 2♂ in Baltic amber, holotypus and a separated piece of amber, F1007/BB/AR/ANA/CJW, paratypus with a small separated piece of amber from the Bitterfeld deposit, coll. M. KUTSCHER.

Preservation and syninclusions: The holotype is completely preserved, partly covered by a white emulsion and fissures in the amber; few stellate hairs. - The paratype is very well and completely preserved, both bulbi are expanded, the right one stronger. The sternum and the ventral side of the opisthosoma are hidden by a large bubble, the posterior median eyes and parts of the bulbi are covered by bubbles/emulsions, above the spider a stellate hairs and numerous small bubbles are preserved.

Diagnosis (♂; ♀ unknown): See above.

Description (♂):
Measurements (in mm): Body length 0.72, prosoma: length 0.35, width 0.38, hight above the sternum 0.43, leg I: Femur 0.38, patella 0.14, tibia 0.28, metatarsus 0.2, tarsus 0.24, length of the distal bristle of patella I 0.15, length of the tibial IV bristle 0.13; pedipalpus: Femur and patella each 0.08, tibia shorter and wider. - Colour yellow brown. - Prosoma (figs. 109-111) wider and higher than long, nearly smooth, with few hairs, ventrally hidden, with a furrow between caput and thorax. Clypeus nearly twice as long as the basal cheliceral articles. 6 large eyes (the anterior medians are absent) in a wide field, posterior median eyes close together, lateral eyes nearly contiguous. In front/ below of the posterior median eyes of the paratype a pair of tiny circular structures is present which more likely are bases of hairs than reduced lenses of the anterior median eyes. Basal cheliceral articles stout, not fused; the anterior margin bears most probably no large tooth. - Legs (figs. 112-113) fairly slender, I longest, femur I not thicker than II. A femoral organ is probably present/observable on II of the paratype, its position in 0.65. Sequence of the long dorsal tibial bristles 2/2/1/2, tibia I bent and with an additional strong prodistal bristle/spine. Metatarsal bristles absent, all patellae bear a long dorsal-distal bristle, tibia IV bears 4 dorsal trichobothria, metatarsal trichobothria unknown. - Opisthosoma (fig. 109 higher than long or wide, scarcely covered with longer hairs;

most parts of the spinnerets are hidden. - Pedipalpus (figs. 114-118; see above) with short articles which are free of apophyses; cymbium slender, bent apically. The embolus is hard to identify, probably it is fairly short.

Relationsgips: See above.

Distribution: Tertiary Baltic amber forest incl. the Bitterfeld deposit.

Maymena GERTSCH 1960

Diagnosis: Lungs and lung covers are present; ♂-pedipalpus (fig. 119): Cymbium strongly elongated, tegular apophyses absent.

Relationships: In *Mysmena* lungs are absent and a cymbial thorn is present, the cymbium is not strongly elongated.

Distribution: Extant, the Americas.

Mysmena SIMON 1894 s. l.

Remark: In accordance with LEVI (1956) and in contrast e.g. to BRIGNOLI (1980) I regard the nominal genera *Calodipoena* GERTSCH & DAVIES 1936, *Microdipoena* BANKS 1895 and *Mysmenella* BRIGNOLI 1980 again as jounger synonyms of *Mysmena* SIMON 1894 (**gen. resyn.**); *Calomyspoena* BAERT & MALFAIT 1983 is probably synonym, too (another species-group). I do not know a clearly differentiating character of the nominal genera in question. In my opinion the characters which are published by BRIGNOLI (1980) cannot justify a splitting.

Diagnosis: Cymbium modified and bearing a thorn (fig. 124), epigynal scapus most often present.

Relationships: See *Maymena*.

Distribution: Extant nearly cosmopolitical; fossil in Baltic amber.

***Mysmena groehni* n. sp.** (figs. 120-128) Photos 172-174

Derivatio nominis: This species is named after CARSTEN GRÖHN in D-21509 Glinde, who selected numerous interesting fossil spiders for a scientific research, e.g. the first specimen of this species, paratype b), which later will be given to the GPIUH.

Material: 8♂ in Baltic amber; holotypus with two separated pieces of amber, IPHUB; paratypus a) coll. F. KERNEGGER in Hamburg, no. 322/1994; paratypus b) from the Bitterfeld deposit, coll. GRÖHN no. 575; paratypus c) from the Bitterfeld deposit, coll. H. GRABENHORST in Celle, later GPIUH; paratypus d) coll. F. KERNEGGER; paratypes e) and f) from the Bitterfeld deposit, CJW. Furthermore I saw 1♂ in Baltic amber from a sand mine in Bremen, coll. H. PUND in Bremen, no. 37.

Preservation and syninclusions: The holotype is completely and well preserved; in front of the chelicerae some secretion is preserved, about 20 stellate hairs in the same piece of amber. In the separated pieces two Diptera and numerous stellate hairs are preserved. - Paratype a) is completely preserved, prosoma and opisthosoma are slightly deformed. Left of the spider a long ?plant hair is situated, right above the spider an excrement particle; furthermore present are several stellate hairs and a Diptera Sciaridae. - Paratype b) is completely preserved and darkened, probably heated; one Diptera, some ?leg articles of an insect and stellate hairs are preserved with the spider. - Paratype c) is well and completely preserved, a larger gas bubble is situated between prosoma and opisthosoma, in front of the opening of the mouth and between the pedipalpi a further bubble is present, a brush of stellate hairs behind the spider. - Paratype d) is completely and well preserved near a juv. indet. spider; the amber piece ia embedded in artificial resin. - Paratypes e) and f) are well and completely preserved, the opisthosoma of e) is depressed dorsally, stellate hairs are present in both pieces of amber. - Remarkable is the well preservation of most specimens of this species and the presence of numerous stellate hairs with the spiders which are not so frequent with other and not congeneric members of the family Anapidae.

Diagnosis (♂; ♀ unknown): The bristle of metatarsus I originates in the basal half of the article (fig.122); cymbial thorn as in fig. 124. One of the smallest spiders in Baltic amber.

Description (♂):
Measurements (in mm): Body length 0.6-0.7, prosomal length 0.32-0.35; leg I: Femur (paratype a) about 0.25, tibia I (holotype) 0.17, tibia IV (paratype a) 0.14, metatarsus/tarsus I (paratype b) 0.13/0.14; pedipalpus (paratype a, dorsal aspect): Femur 0.13, patella 0.06, tibia 0.05, cymbium 0.18.
Colour variable: Holotype redbrown, paratype a) medium brown, paratype b) dark brown.
Prosoma (figs. 120-121) about as wide as long, slightly higher than long, scarcely covered with hairs of medium length. 8 large eyes in a wide field, posterior row recurved, lateral eyes contiguous. Clypeus long, chelicerae fairly small, teeth hidden, sternum convex. - Legs (figs. 122-123) stout, I longest, femoral organ present, patellae distally

and tibiae basaly with a long dorsal bristle, most probably no lateral bristle of tibia I. Bristle of tibia IV twice as long as the diameter of the tibia. Position of the strong proventral metatarsal bristle in the basal half. Tiny tarsal claws. - Opisthosoma (fig. 120) higher than long or wide scarcely covered with hairs of medium length. Anterior spinnerets stout, colulus tiny. - Pedipalpus (figs. 124-128; from slightly different positions result quite different views!): Patella and tibia short, tibia very wide, cymbium long, modified distally and bearing a bent and strongly sclerotized "thorn" which is well observable in paratype a). The bulbus is more or less twisted (the ventral side may be directed retrodorsally), embolus long and thin, distally guided by the cymbium.

Relationships: See *M. grotae* n. sp.

Ecology: *Mysmena jobi* KRAUS 1967 is known to occur in dry and warm biotopes of oak - see the numerous stellate hairs with the fossils! -, chestnut and needle tree forests, e.g. in detritus and under stones.

Distribution: Tertiary Baltic amber forest, incl. the Bitterfeld deposit.

***Mysmena grotae* n. sp.** (figs. 129-131) Photo 175

Derivatio nominis: The species is named after HILDA GROTE who sent me some remarkable fosssil spiders for a scientific research.

Material: 5♂1♀ in Baltic amber; holotypus and a separated piece of amber, F990/BB/AR/ANA/CJW, paratypes a-b) 2♂ CJW; paratypes c-e) 2♂1♀ (e) in the same piece of amber, CJW.

Preservation and syninclusions: The holotype is well and completely preserved, ventrally slightly covered by a white emulsion. Laterally and in front of the spiders three mites are preserved. In the separated piece of amber a small ant (Formicidae) and some stellate hairs are preserved. - Paratype a) is completely preserved, partly covered by a white emulsion, a gas bubble is present between prosoma and opisthosoma; an ant and some stellate hairs are preserved, too. - Paratype b) is completely preserved, partly covered by a white emulsion; 2 Collembola are present in the same piece of amber. - Paratypes c-e) are completely and fairly well preserved in the same layer of the amber, partly covered by a white emulsion; the ventral side of the ♀ is well preserved. - Stellate hairs, remains of a blossom and of insects, 1 Collembola, 1 Heteroprtera, 1 Thysanoptera, 3 Hymenoptera, 2 Diptera: Brachycera, 2 Psocoptera, and a great diversity of Acari are preserved with the spider.

Diagnosis (♂; ♀ unknown): The metatarsal I bristle originates in the distal half (fig. 129), the bulbus is fairly small.

Description (♂):
Measurements (in mm): Body length ♂ about 0.8, ♀ 1.0, prosoma: length 0.4, hight 0.3, femur I 0.44, femur IV 0.34, tarsus and metatarsus I 0.21 each, femur of the ♂-pedipalpus 0.27.
Prosoma (fig. 129) high, smooth, covered with few hairs, with lateral furrows. 8 large eyes, posterior row straight, posterior median eyes separated by more than one diameter. The labium is free and wider than long. - Legs (fig. 129) stout, order I/II/IV/III, I distinctly the longest, ♂-femur I distinctly thicker than the other femora. All tibiae bear one long dorsal bristle in the basal half, I bears additionally a retrodistal bristle. The ♂-metatarsus I bears a strong proventral bristle in the distal half. - Opisthosoma (fig. 129) about globular, bearing some folds and few hairs; anterior spinnerets stout. - ♂-pedipalpus (figs. 130-131): Femur long and slender, patella and tibia distinctly longer than wide, cymbium and bulbus small, a cymbial "thorn" is not observable, embolus long and slender, apically besides a conductor. - ♀: A femoral organ is probably present proventrally in the distal third, the pedipalpus is small, a spine of metatarsus I and lung covers are absent, the colulus is relatively large, the genital area bears a small hump but no scape.

Relationships: *M. groehni* is smaller, a retrolateral tibial I bristle is most probably absent and the bristle of the ♂-metatarsus I originates in the basal half.

Distribution: Tertiary Baltic amber forest.

***Palaeomysmena* n. gen.**

Diagnosis (♂; ♀ unknown): Probably only 6 eyes (see below), clypeus not projecting, prosoma convex (fig. 133), caput slightly separated from the thorax, all tibiae with 2 long and thin dorsal bristles, I bears additionally a prolateral bristle. Tibia I not modified (II is absent). Pedipalpus (figs. 135-137): Patella longer than the convex tibia, cymbium wide and not modified, bulbus remarkable small, embolus probably in a distal position and long, with a lamellar structure at its base.

Type species: *Palaeomysmenae hoffeinsorum* n. sp.

Relationships: In *Mysmena* and *Eomysmena* the shape of the prosoma is fifferent, in *Mysmena* 8 eyes are present, in *Eomysmena* tibia II bears a ventral bristle, in *Eomysmenopsis*, *Maymena* und *Mysmena* tibiae III-IV bear only one dorsal bristle and the structures of the male pedipalpus are different, e.g. the cymbium is usually modified.

Distribution: Tertiary Baltic amber forest.

***Palaeomysmena hoffeinsorum* n. gen. n. sp.** (figs. 133-137) Photo 176

Derivatio nominis: The species is named after CHRISTEL and HANS WERNER HOFFEINS who selected numerous fossil spiders for a scientific investigation and embedded the holotype of this species in artificial resin.

Material: Holotypus ♂ in Baltic amber and a separated piece of amber, F984/BB/AR/ANA/CJW.

Preservation and syninclusions: The spider is not well preserved in a clear and yellow piece of amber which was heated. There is no white emulsion, the opisthosoma is strongly blown up, probably by decompository gas. Parts of the legs are cut off: Both tarsi III, the right leg I near the base, the left leg I near the base of the metatarsus, the right leg II near the base of the tibia. Beneath the spider - mainly between the chelicerae and beneath the left leg III - some questionable fungal hyphae and spiders' threads are present; this spider was probably the prey of a spider. Furthermore numerous tiny bubbles are preserved.

Diagnosis and **relationships**: See above.

Description (♂):
Measurements (in mm): Body length 1.55, prosoma: Length 0.65, width 0.7, hight above the coxae 0.37, femur and tibia I about 1.1 each, leg IV: Tibia 0.46, metatarsus 0.25, tarsus 0.4. - Colour speckled gey, darkened, legs probably annulated.
Prosoma (fig. 133-134) slightly wider than long, relatively low, nearly smooth, profile distinctly convex behind the eyes, caput weakly separated from the thorax, clypeus vertical. 6 large eyes in a wide field, anterior median eyes may be absent but probably tiny anterior median eyes are present and partly hidden (fig. 134) (tiny bubbles?), posterior row strongly recurved. Sternum strongly convex, separating the coxae IV by two of their diameters. Basal chelicerel articles fairly long, anterior margin probably without long teeth; with long and strong marginal-distal hairs. Fangs long, basally thick. - Legs stout, I longest, tarsi III-IV distinctly longer than the metatarsi (I-II are lost), tarsus IV 1.7 times longer than metatarsus IV. Tibia I-II not modified. Bristles long, 2 dorsally on all patellae and tibiae, tibia I with an additional prolateral bristle in the distal half. Tarsal claws indistinct. I do not find a femoral organ. - Opisthosoma (figs. 133-134) nearly globular, slightly higher than long, covered with short hairs. Lung covers absent, colulus large, as long as wide. ♂-pedipalpus (figs. 135-137) fairly small, see above. The right femur has a proventral-apical hump which most probably is an artefact. The structures of the bulbus are partly hidden, the embolus is probably long and curved around the tegulum.

Relationships: See the diagnosis of the genus.

Distribution: Tertiary Baltic amber forest.

Trogloneta SIMON 1922 (= *Troglonata* auct.)

See the revision which was given by THALER (1975).

Diagnostic is the occurrence of a row of ventral "tubulate bristles" ("Röhrchenborsten") of the ♂-tarsus I, see THALER (1975: 286, fig. 17). The tibiae bear only one dorsal bristle.

Relationships: The presence of a cymbial "thorn" indicates a close relationship to *Mysmena* SIMON s. l. and *Mysmeniola* THALER 1995 (extant, Venezuela).

Distribution: Extant; Europe incl. Madeira and Canary Islands (3 species), North America (1 species).

The following two species are preserved in Domonican amber:

***Dominicanopsis* n. gen.**

Derivatio nominis: The name is a combination of the first letters of the country Dominican Republic and the last letters of the Mysmeninae genus *Mysmenopsis*. The gender is feminine.

Diagnosis (♂; ♀ unknown): 8 eyes in a large field, anterior medians tiny and close together (figs. 138-139). Prosoma short and very high, with a distinct lateral furrow. Leg I not modified, tibia I with two long dorsal bristles (fig. 138), the other tibiae probably with only one bristle, metatarsus I spineless, femoral I organ present (fig. 138). Pedipalpus (figs. 138, 141): Bulbus moderately outstanding, apically with a large, strongly sclerotized and pointed apophysis, embolus short. Body length of the type species only at most 0.35mm; the smallest known fossil and extant spider.

Type species: *Dominicanopsis grimaldii* n. sp.

Relationships: I do not know a closely related genus. Unfortunately several structures - e.g. the teeth of the cheliceral margins and some stuctures of the bulbus - are not observable. According to the presence of a femoral organ and the soft opisthosoma *Dominicanopsis* is a member of the subfamily Mysmeninae. In the genera *Maymena, Mysmena* and *Mysmenopsis* a distinct prosomal furrow is absent and the embolus is long.

Distribution: Tertiary Dominican amber forest.

***Dominicanopsis grimaldii* n. gen. n. sp.** (figs. 138-141) Photo 178

Derivatio nominis: The species is named after D. GRIMALDI, AMNH, who selected the holotype of the new species.

Material: Holotypus ♂ in Dominican and a small separated piece of amber, AMNH no. DR-8-521.

Preservation and syninclusions: The spider is very well preserved in a clear piece of amber which smears if it is cut; most legs are bent below the body. The spider "hangs" at some thin threads of silk which partly possess remains of sticky droplets and which run to a small particle of detritus on the right side of the spider. The opisthosoma and some leg articles - e.g. the right femur IV - are deformed, the opisthosoma is dorsally depressed and apically somewhat pressed out (artificial lengthened); so the original length of the spider was only about 0.3-0.33mm. Below the spider's body a larger bubble is preserved, above the eye lenses and right of the right femoral organ small bubbles are preserved. - Some threads of spider's silk are preserved in the separated piece of amber, too.

Diagnosis and **relationships**: See above.

Description (♂):
Measurements (in mm): Body length nearly 0.35mm (the opisthosoma is deformed, the original body length was at most 0.33mm, see above and fig. 138), prosoma: Length 0.15, width 0.16, hight above coxae 0.19, diameter of the anterior median eyes 0.01, of the posterior median eyes 0.042, leg I: Femur 0.17, patella 0.06, tibia 0.1, metatarsus 0.07, tarsus 0.12, tibia IV 0.1, hight of the opisthosoma 0.8, length of the basal cheliceral articles 0.06.
Colour: Prosoma and legs light brown, opisthosoma yellow grey.
Prosoma (figs. 138-139) distinctly higher than long or wide, with a distinct oblique lateral furrow, scarcely covered with tiny hairs, cuticula smooth. 8 eyes in a large field, the anterior medians small and close together, the remainings large, position of the laterals near the prosomal margin. Basal cheliceral articles small, free, teeth of the margins not observable. Sternum wide, separating the coxae IV by more than their diameter. - Legs (figs. 138, 140) stout, covered with indistinct hairs, I longest, III shortest, with some long bristles on patellae and tibiae, tibia I bears 2 dorsal bristles, the other tibiae probably only 1, femoral I organ present, in a distal position. Tibiae with several long trichobothria, position of the trichobothrium on metatarsus I in 0.28. - Opisthosoma (fig. 138; it is deformed) fairly hairy, higher than long or wide, anterior spinnerets stout, area of the colulus. - Pedipalpus (fig. 138, 141) with short articles which bear no apophyses, cymbium small, sperm duct long and curved, embolus short, with a droplet of secretion (remains of sperm?) at the tip; a small and weakly sclerotized apophysis (a conductor?)

distally alongside the embolus, furthermore a strongly sclerotized larger apophysis in a distal position of the bulbus.

Distribution: Tertiary Dominican amber forest.

Mysmenopsis SIMON 1897 (= *Lucarachne* BRYANT 1940) (fig. 142)

See the revision of PLATNICK & SHADAB (1978) and the key to the genera above. *Isela* GRISWOLD 1985 (extant, Africa) is closely related or may even be synonym with *Mysmenopsis*. Several species are kleptoparasites, probably the only fossil known species - *Mysmenopsis lissycoleyae* PENNEY 2000 in Dominican amber, fig. 142 -, too.

Distribution: Extant: North to South America, ?Africa (*Isela*); fossil in Dominican amber.

(4) **Symphytognathinae** (Kiefer-Zwergkugelspinnen)

Diagnosis: See the paper of FORSTER & PLATNICK (1977) as well as the cladogram and the key to the subfamilies of the Anapidae above. - The chelicerae are fused together at least at their base, the female pedipalpus is extremely reduced and may even be absent; the tiny spiders possess 6 or only 4 eyes.

Relationships: See the Mysmeninae above.

Distribution: Extant: North to South America, Australian Region, Pacific Islands. Fossils of this subfamily are unknown.

(5) **Synaphrinae** WUNDERLICH 1986 (German name: Einzahn-Zwergkugelspinnen) and their extant kin

Remark: MARUSIK & LEHTINEN - Arthropoda Selecta, 11 (2): 143-152) - revised the Synaphrinae, regarded it as a family of its own, and included only the genera *Cephaia* and *Synaphris*.

Diagnosis: Special base of the tibial trichobothria, one large tooth tooth on the anterior

margin of the chelicerae (fig. 144) (probably no more cheliceral teeth), usually 8 eyes (6 in *lardinis* and *lardinidis*), femoral organ absent, ♂-leg I unmodified, bulbus large.

Genera: *Cepheia, lardinidis* (?) (fossil in Baltic amber), *Synaphris* and probably *lardinis* (?= Mysmeninae). According to the rugose prosomal cuticula the genus *Crassignatha* WUNDERLICH 1995 (extant, Malaysia) may be a member of the subfamily Anapinae, but according to MARUSIK & LEHTINEN (2002) it may be a member of the Symphytognathidae).

Relationships: See the cladogram; previously the spiders were regarded as members of the Mysmeninae in which usually a femoral I organ is present.

Distribution: Extant: At least Palaearctic and Oriental Regions (see below, *lardinis*); fossil: Tertiary Baltic amber forest.

Key to the genera of the subfamily Synaphrinae (see the remark below):

1 6 eyes (fig. 143). Fossil and extant (Nepal). 2

- 8 eyes. Extant, Mediterranean. 3

2(1) Eyes in 2 groups. Extant, Nepal. . . . . *lardinis*

- Eyes in 3 groups (fig.107). Fossil, in Baltic amber. . . . . *lardinidis*

3(1) Opisthosoma long oval. Position of the trichobothrium on metatarsus I in 0.45-0.5. . . . . *Synaphris*

- Opisthosoma spherical. Position of the trichobothrium on metatarsus I in 0.3-0.35. . . . . *Cepheia*

Cepheia SIMON 1894

Diagnosis: See BRIGNOLI (1970: 1410-1412), WUNDERLICH (1980) and the key above.

Type species: *C. longiseta* (SIMON 1881), the only known species of the genus.
Distribution: Extant, Mediterraneis.

Iardinis SIMON 1899

In my opinion the nominal members of this genus sensu BRIGNOLI (1978, 1980) from Nepal as well as *albulus* Gertsch 1960 from Guayana are most probably not congeneric with the type species from Sumatra; they may be taxa of unnamed genera. Material of the type species is missing. - **Diagnostic character**: Six eyes in two groups.

Relationships: See *Iardinidis* and the key above.

Distribution: Extant, Sumatra, ?Nepal, ?South America.

***Iardinidis* n. gen.**

Diagnosis (♂; ♀ unknown): 6 eyes of similar size in three groups (fig. 143), legs stout, IV about as long as I, articles of I-II not modified, all tibiae with 2 dorsal bristles (fig. 145); pedipalpus (figs. 146-147): Cymbium large and complicated, embolus probably short.

Type species. *Iardinidis brevipes* n. sp., the only known species of the genus.

Relationships: According to the large promarginal cheliceral tooth and the unmodified legs I-II the genus may be a member of the Synaphrinae. As in the type species of the extant genus *Iardinis* from Sumatra there occur only six eyes but the position is in three groups in contrast to *Iardinis* in which two eye groups are present.

Distribution: Tertiary Baltic amber forest.

***Iardinidis brevipes* n. gen. n. sp.** (figs. 143-147)

Material: Holotypus ♂ in Baltic amber and a separated piece of amber, F992/BB/AR/ANA/CJW.

Preservation and syninclusions: The spider is completely preserved in a clear yellow

piece of amber; the position of its legs is close to the body, a bubble is present between the body and the left legs III and IV, a thin emulsion covers the opisthosoma, the prosoma is partly hidden by legs and opisthosoma, the basal cheliceral articles are spread in the anterior direction. On the right side between legs and body a weak white emulsion is present. No syninclusions.

Diagnosis and **relationships**: See above.

Description (♂):
Measurements (in mm): Body length 0.8, prosoma (it is partly hidden): Lenght, width and hight above the coxae about 0.35, leg I: Femur 0.3, patella 0.14, tibia 0.2, metatarsus 0.15, tarsus 0.21; pedipalpus: Patella 0.06, tibia 0.07.
Colour: Prosoma and legs red brown, opisthosoma yellow brown.
Prosoma high, cuticula nearly smooth, only few hairs, clypeus long. 6 large eyes in three groups in a wide field (fig. 143). basal cheliceral articles stout, anterior cheliceral margin with one large tooth (fig. 144). Sternum strongly convex, separating the coxae IV by more than one of their diameters. - Legs (fig. 145), I only slightly longer than IV, femur I slightly stronger than II, tarsi distinctly longer than metatarsi, bristles long, all tibiae bear two dorsally, I additionally with a prolateral bristle near the middle, patellae with a long dorsal-distal bristle, tibia I bears 3 retrodorsal trichobothria, position of the metatarsal I trichobothrium in 0.3 - Opisthosoma high, scarcely covered with hairs which are fairly long. Anterior spinnerets stout, the area of the colulus is hidden. - Pedipalpus: See above.

Distribution: Tertiary Baltic amber forest.

Synaphris SIMON 1894

Diagnosis: Characteristic is the shape of the opisthosoma which is long ovally - a quite unusual shape in the Synaphrinae and in the Anapidae -, and the large cymbium which is not modified.

Five species, incl. three of the Canary Islands, see WUNDERLICH (1980, 1987).

Relationships: See the key above.

Distribution: Mediterraneis.

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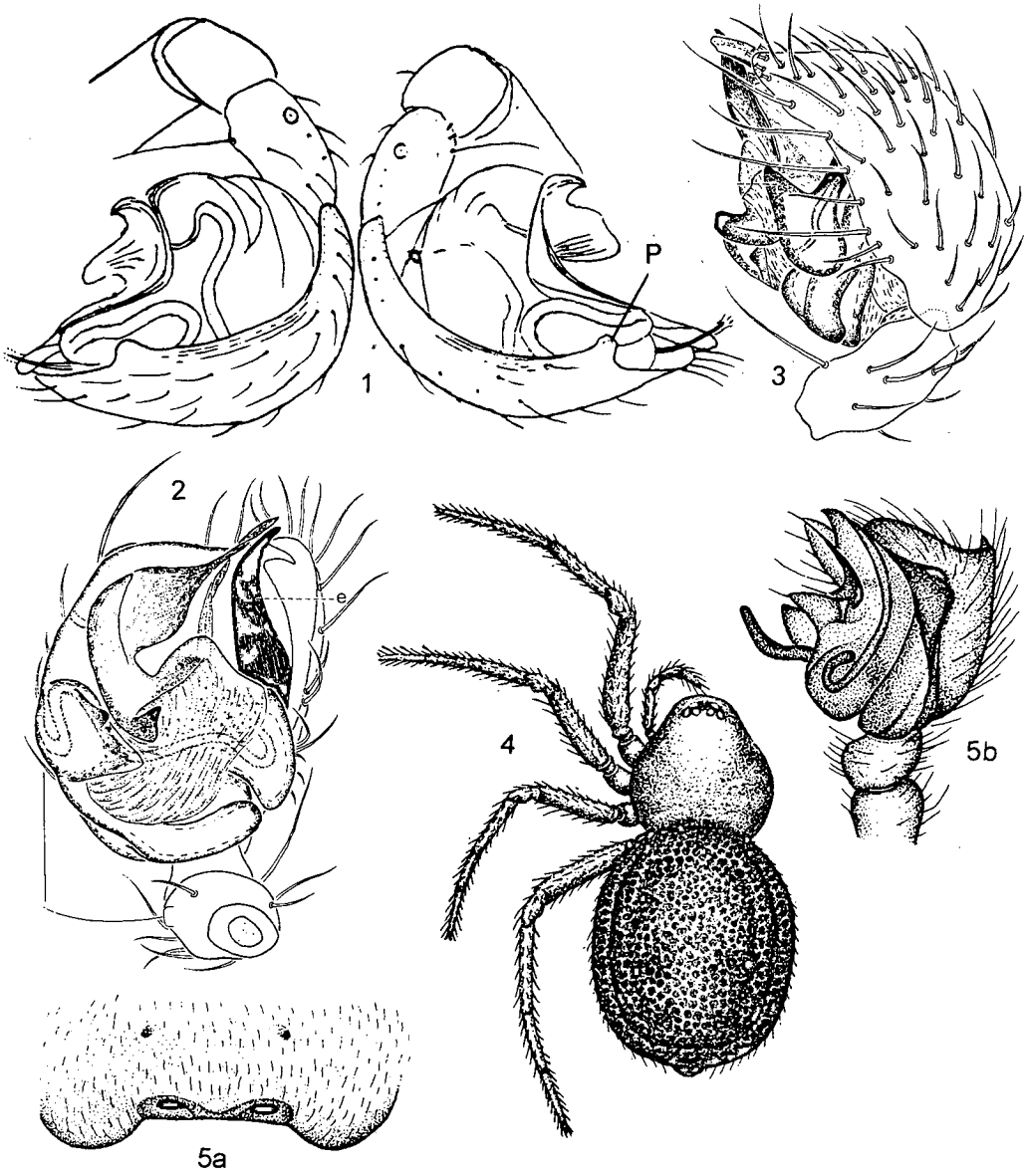
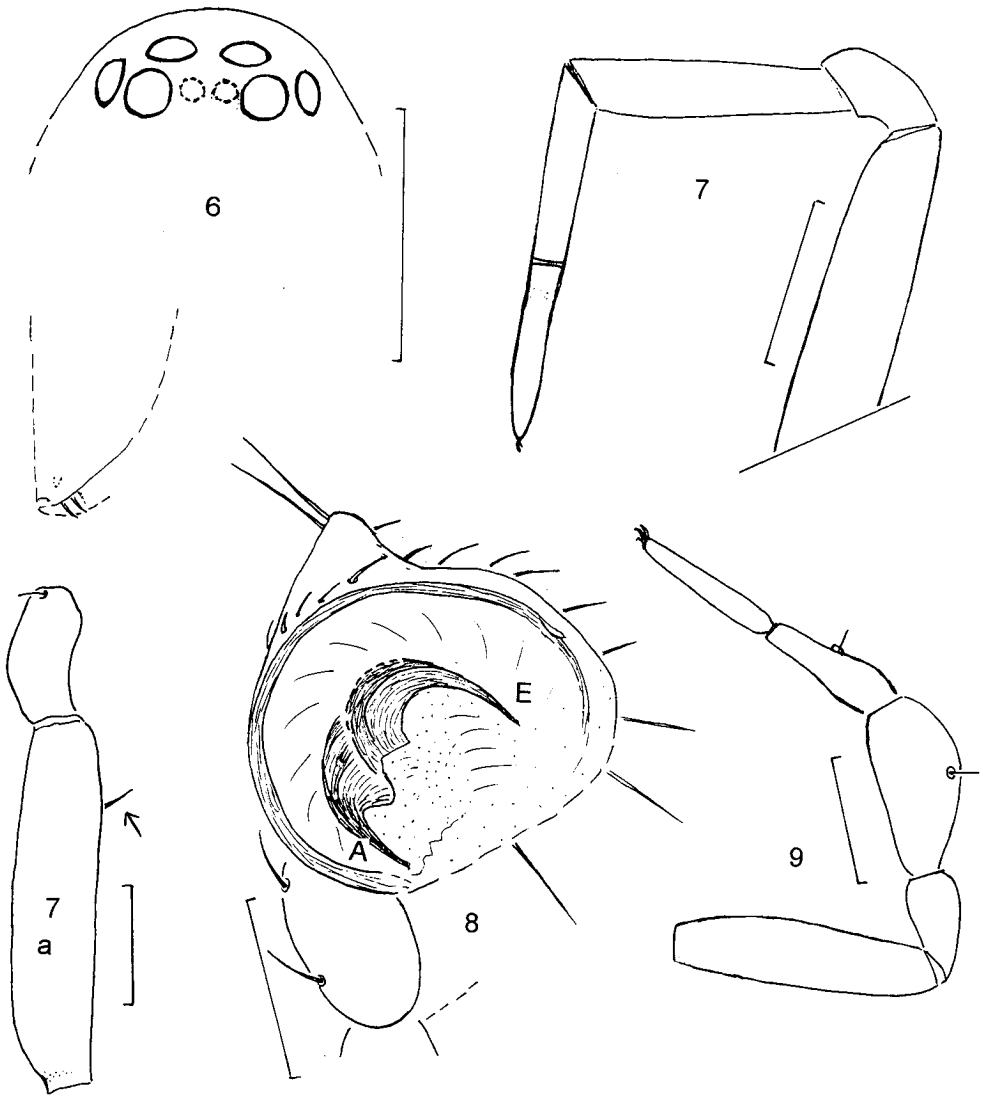


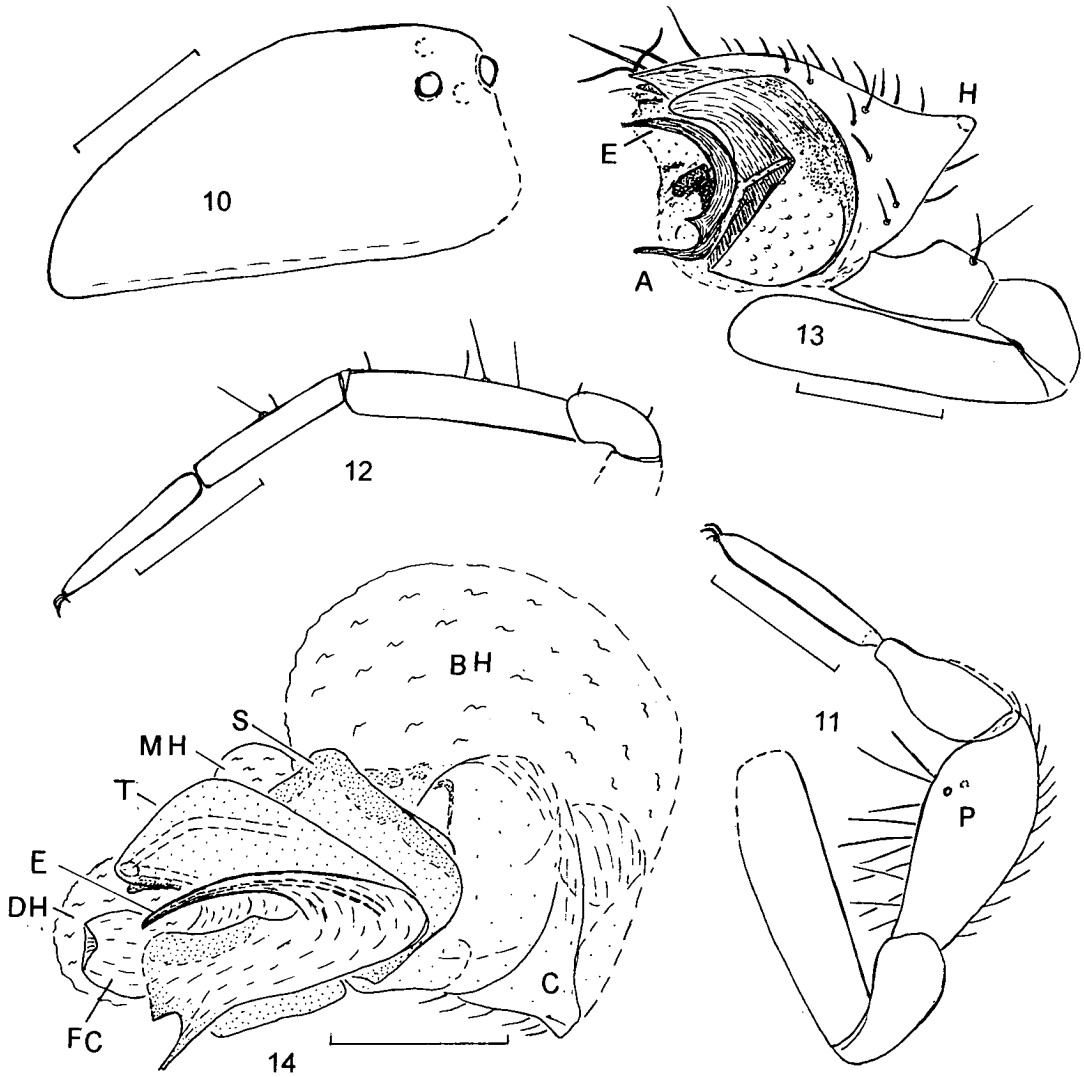
Figs. 1-3: *Comaroma simoni* BERTKAU 1889, extant, Europe, ♂; 1) pedipalpi in the natural position, dorsal aspect (ventral aspect of the spider); taken from WIEHLE (1960: Fig. 140) (P = retrodistal paracymbium); 2-3) r. pedipalpus, ventral and prolateral aspect; taken from KROPF (1990: Figs. 12-13). M = 0.1mm in figs. 2-3;

figs. 4-5b: *Balticoroma maculosa* (OI 1960), extant, SE-Asia; 4) ♀, body, left pedipalpus and left legs, dorsal aspect, body length 1.4mm; taken from OI (1960: Fig. 190); 5a) ♀, epigyne; 5b) ♂, l. pedipalpus, retrolateral aspect; taken from NAMKUNG JOON (2002: Figs. p 15-2);

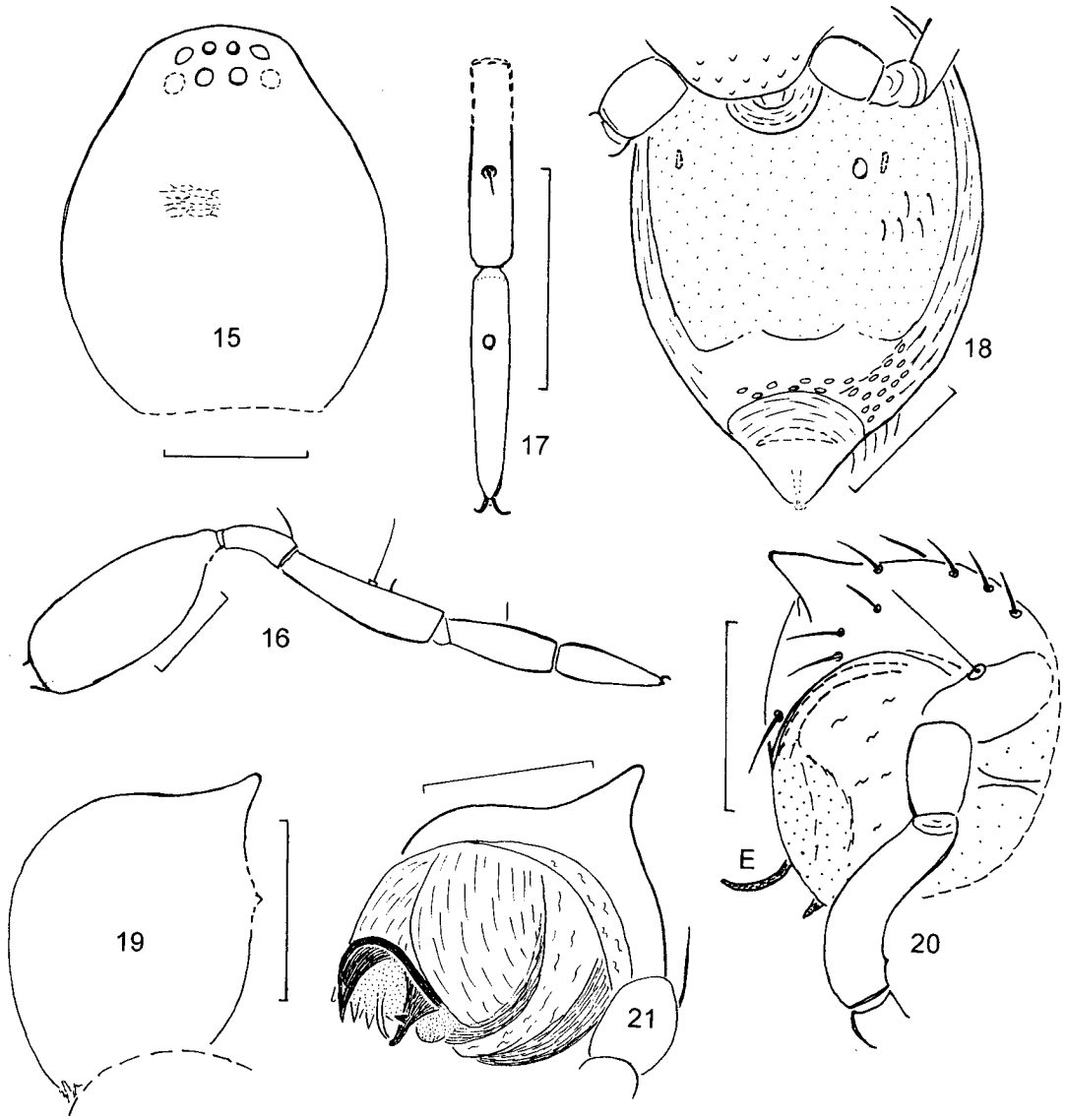


figs. 6-8: ***Balticoroma gracilipes* n. gen. n. sp.**, ♂, 7a) holotype, the remaining figs. paratype coll. KERNEGGER; 6) prosoma (partly hidden), anterior aspect; 7) l. leg I, retrolateral aspect (hairs, trichobothria and bristles are not drawn); 7a) l. femur and patella I, dorsal aspect; note the proventral femoral bristle (arrow); 8) r. pedipalpus, retrolateral aspect (some structures are hidden). A = slender basal tegular apophysis, E = embolus, H = cymbial hook (outgrowth). M = 0.1 in figs. 7a-8, 0.2 in the remaining figs.;

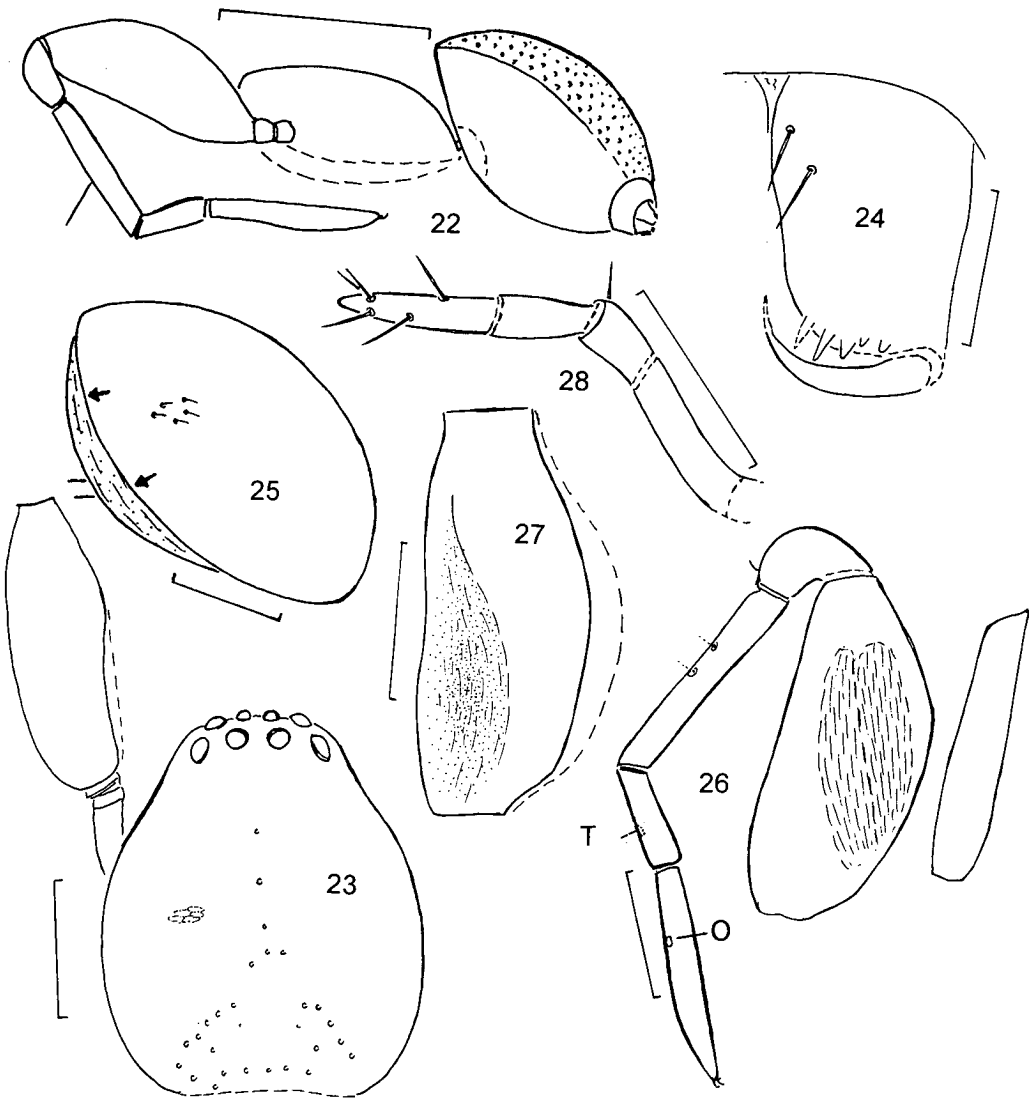
fig. 9: ***Balticoroma tibialis* n. gen. n. sp.**, ♂, l. leg I, retrolateral aspect. M = 0.2;



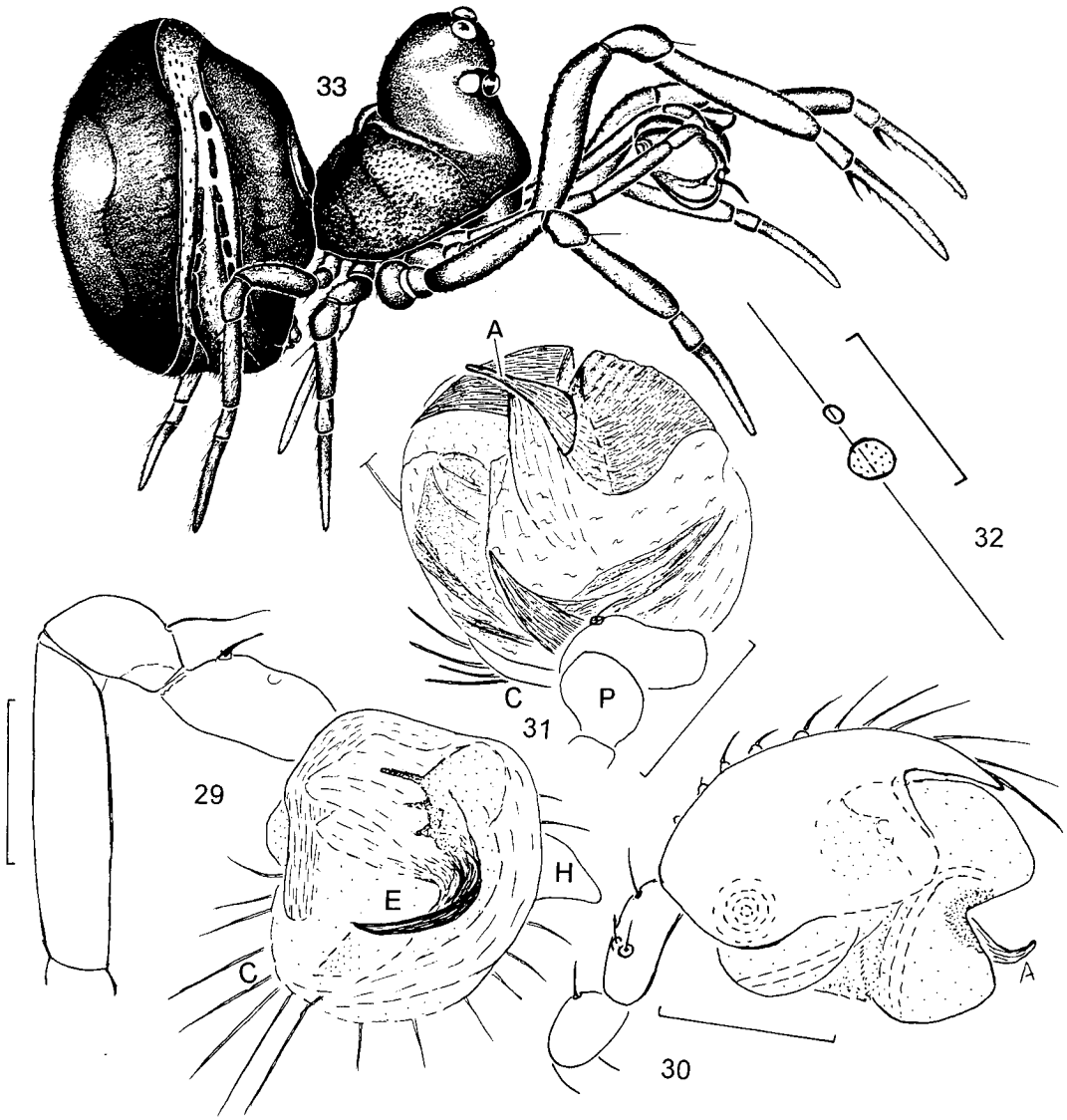
figs. 10-14: ***Balticoroma reschi* n. gen. n. sp.**, ♂, holotype figs. 11-13, a paratype fig. 10, paratype f) fg. 14; 10) outline of the prosoma, lateral and slightly anterior aspect (some eyes are hidden); 11) r. leg I, prolateral aspect (only some tibial hairs are drawn); 12) r. leg II behind the femur, prolateral and slightly ventral aspect; 13) l. pedipalpus, retrolateral aspect; 14) r. pedipalpus, bulbus completely expanded, prolateral aspect. A = slender basal tegular apophysis, BH = basal haematodocha, C = cymbium, DH = distal haematodocha, E = embolus, FC = functional conductor, H = dorsal cymbial outgrowth, MH = medial haematodocha, P ?= pores of the tibia, S = subtegulum, T = tegulum. M = 0.1 in figs. 13-14, 0.2 in the remaining figs.;



figs. 15-21: ***Balticoroma ernstorum* n. gen. n. sp.**; 15) ♂, paratype b), prosoma, dorsal aspect; 16) ♂, paratype, l. leg I, prolateral aspect; 17) ♀, paratype, l. leg I, dorsal aspect of the metatarsus with trichobothrium and the tarsus with the tarsal organ; 18) ♂, holotype, opisthosoma, ventral aspect, slightly from the left; 19) ♂, holotype, l. cymbium, dorsal aspect; 20) ♂, paratype, l. pedipalpus, dorsal-posterior aspect; 21) ♂, paratype e), l. pedipalpus. retrolateral view. E = embolus, O = l. oval structure (opening of the lung?). M = 0.1 in fig. 19, 20-21, 0.2 in the remaining figs.;



figs. 22-32: ***Balticoroma serafinorum* n. gen. n. sp.**; 22) ♂, holotype, outline of the body and the l. leg I, lateral aspect (the opisthosomal scutum is dotted); 23) ♂, paratype d), prosoma and l. femur I, dorsal aspect; 24) ♀, paratype m), l. chelicera and two eyes, oblique frontal-distal aspect; 25) ♂, paratype b), opisthosoma, dorsal-lateral and slightly frontal aspect. The arrows indicate to the margin of the dorsal scutum; 26) ♂, holotype, l. leg I, retrolateral aspect, femur with probable remains of muscles and/or glands, and femur II (at the right side); 27) ♂, paratype b), r. femur I, prodorsal aspect; note the prolateral depression. The line at the right side shows the intraspecific variability of the width of the femur; 28) ♀, paratype m), r. pedipalpus, ventral aspect; 29) ♂, paratype j),



r. pedipalpus, retrolateral aspect (some structures of the bulbus are hidden); 30) ♂, holotype, r. pedipalpus, retrolateral aspect; the bulbus may be slightly expanded. There are tiny bubbles on the base of some cymbial hairs; 31) ♂, paratype b), l. pedipalpus, ventral aspect; 32) fossil thread with remains of sticky droplets near paratype c). A = slender tegular apophysis, C = cymbium, H = cymbial outgrowth, P = patella. M = 0.5 in fig. 22, 0.2 in figs. 23, 25-28, 0.1 in the remaining figs.;

fig. 33) *Novoanapis spinipes* (FORSTER 1951), subfamily Anapinae, ♂, extant, New Zealand, body, lateral aspect, body length 1.4mm. Taken from PLATNICK & FORSTER (1989: Fig. 170);

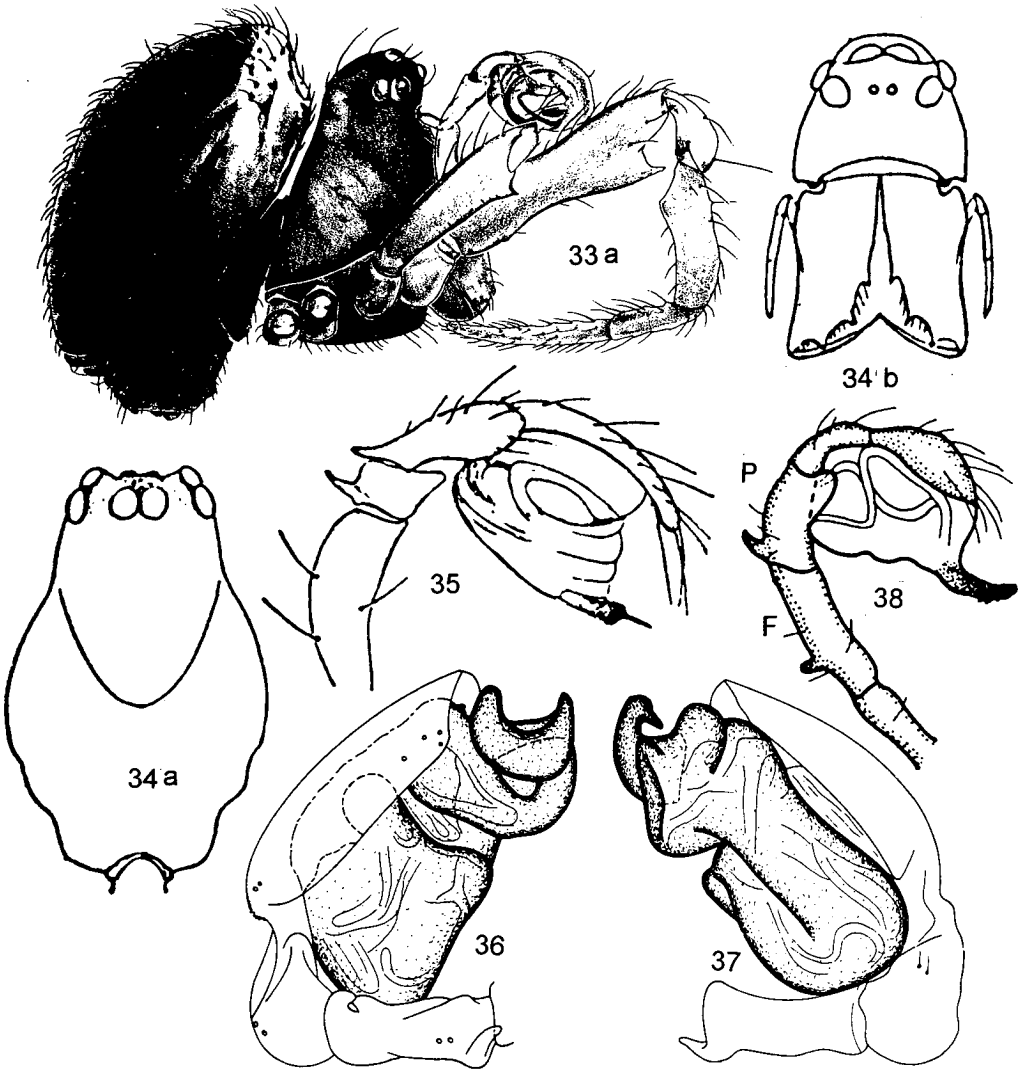
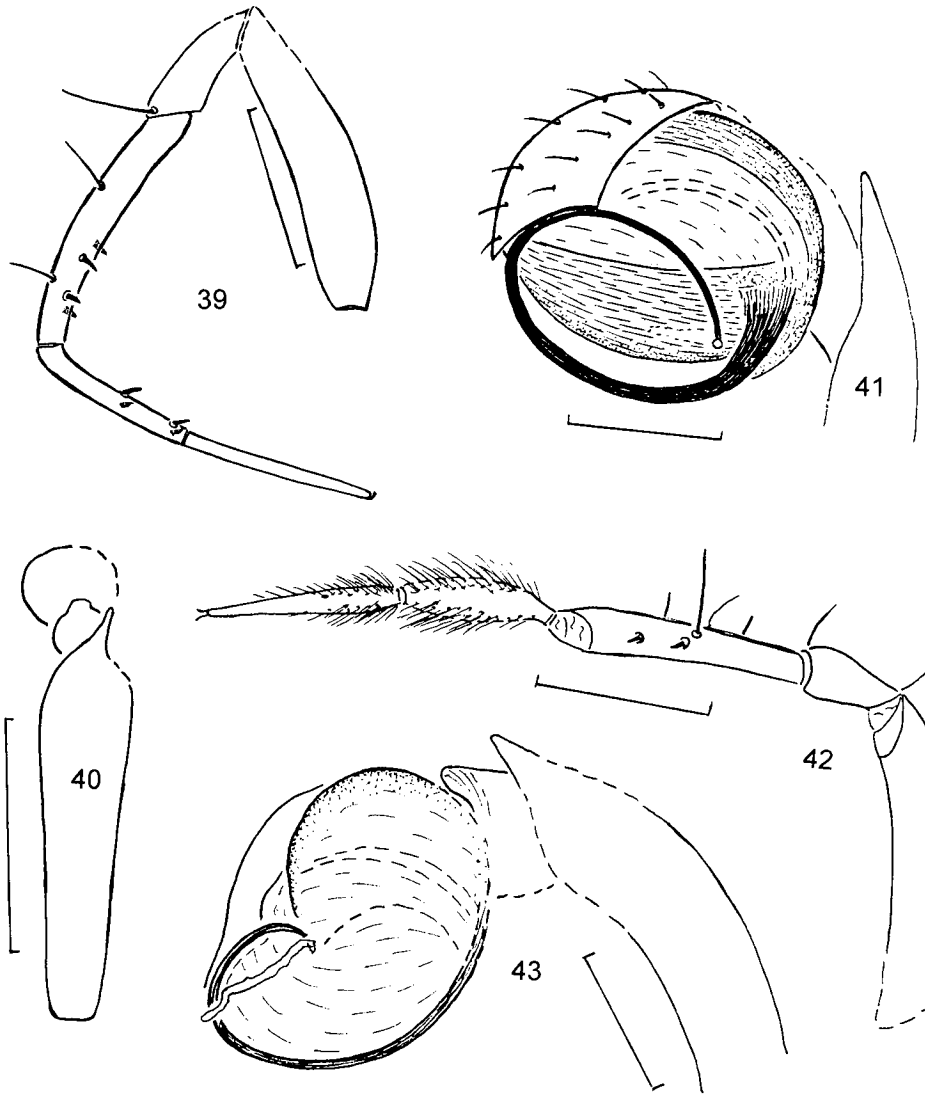


fig. 33a) *Gertschanapis shantzi* (GERTSCH 1960), subfamily Anapinae, ♂, extant, USA, body, lateral aspect. Taken from PLATNICK & FORSTER (1990: Fig. 1);

figs. 34a-35: *Conoculus lyungadinus* KOMATSU, subfamily Anapinae, extant, SE-Asia; 34a-b) ♀, prosoma, dorsal and frontal aspect; 35) ♂, pedipalpus, lateral aspect. Taken from YAGINUMA (1960);

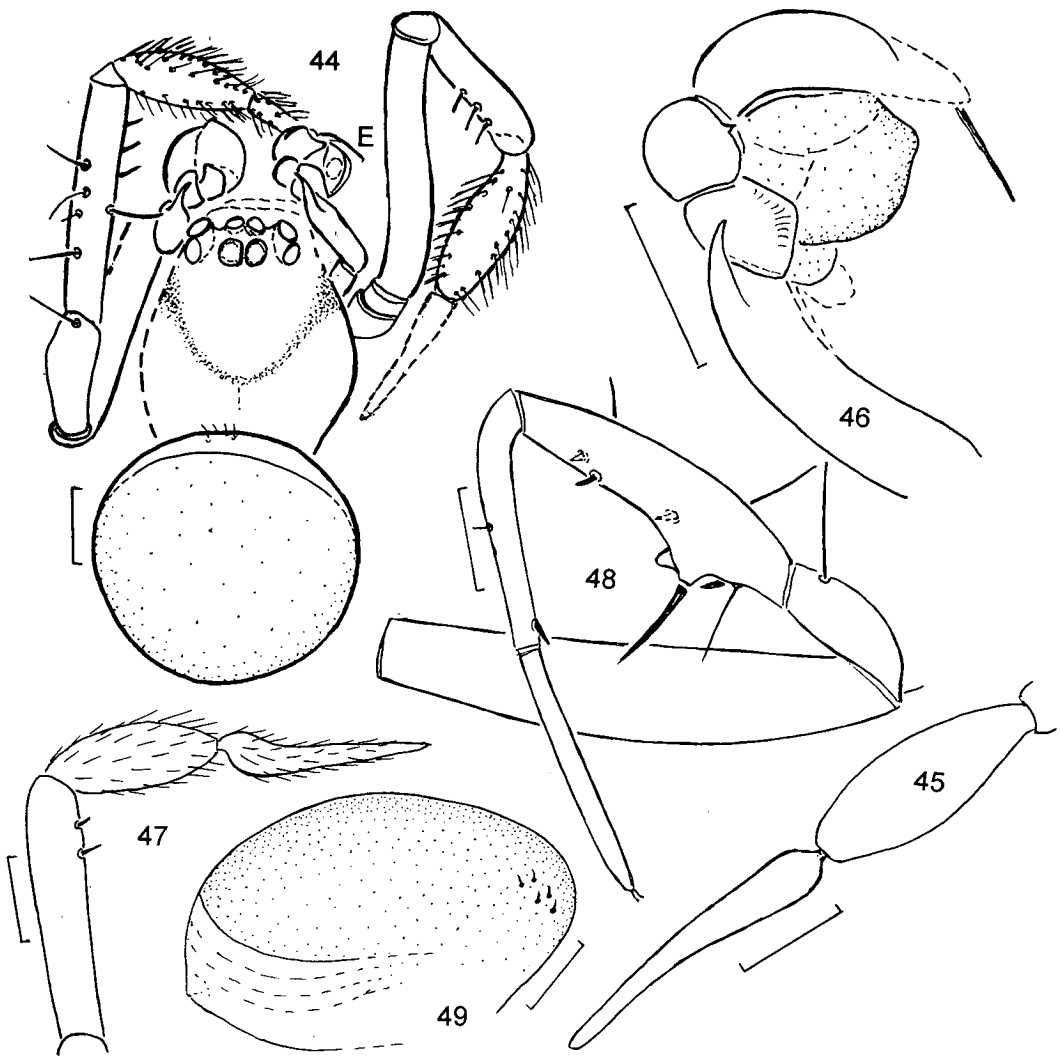
figs. 36-37: *Metanapis mahnerti* BRIGNOLI 1981, subfamily Anapinae, extant, Nepal, ♂, r. pedipalpus, retrolateral and prolateral aspect. Taken from BRIGNOLI (1981:Figs. 6-7);

fig. 38: *Zangherella algerica* (SIMON 1895), subfamily Anapinae, extant, Algeria, ♂, r. pedipalpus, retrolateral aspect. Taken from BRIGNOLI (1968: Fig. 7);



figs. 39-41: ***Balticonopsis thomasi*** **n. gen. n. sp.**, ♂, holotype, figs. 39), 41) holotype, fig. 40) paratype; 39) l. leg I, oblique retrodistal aspect; 40) femur, patella and tibia of the r. pedipalpus, dorsal aspect; 41) l. pedipalpus, retrodistal aspect. M = 0.5 in fig. 39), 0.2 in fig. 40), 0.1 in fig. 41);

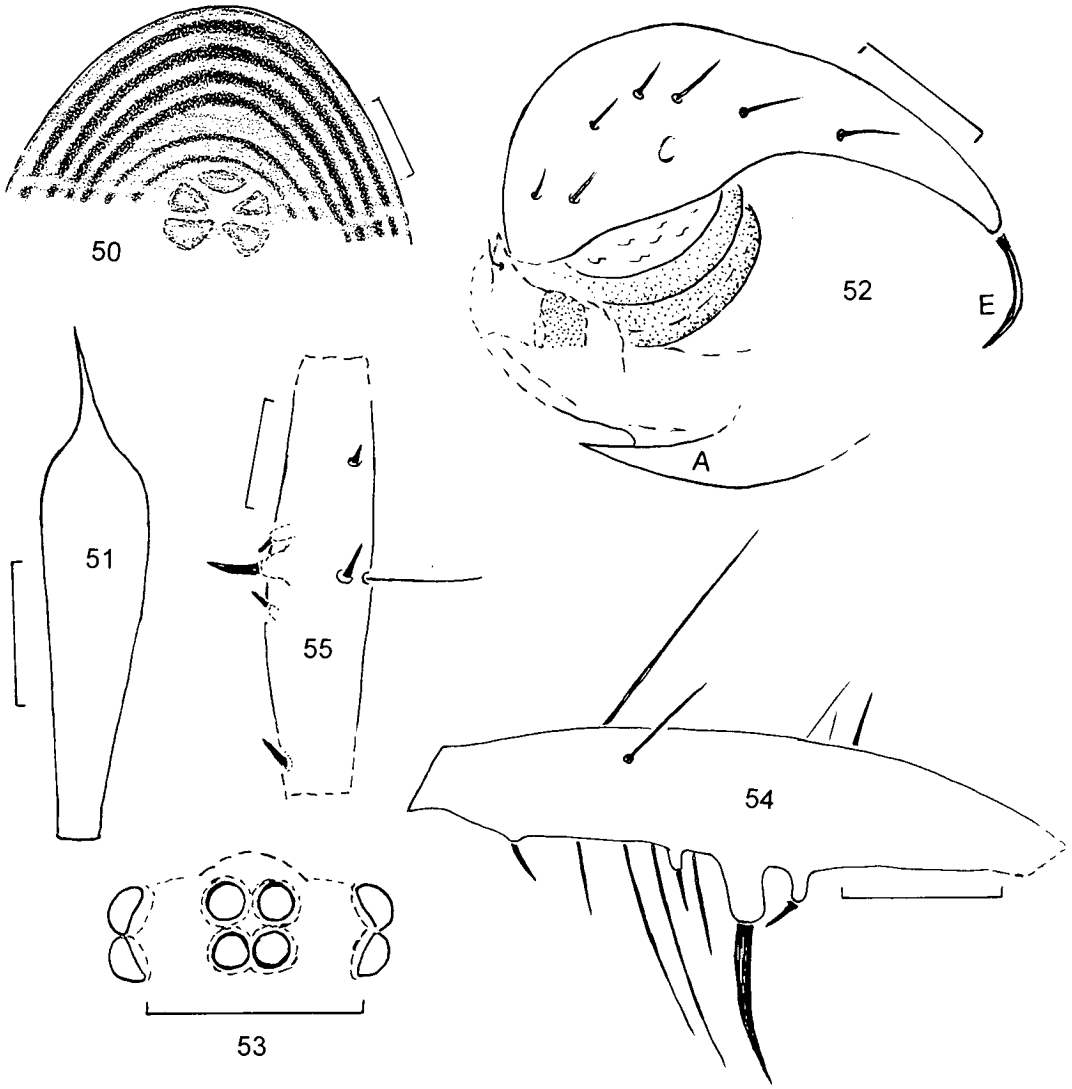
figs. 42-43: ***Balticonopsis bispina*** **n. gen. n. sp.**, ♂; 42) r. leg I, proventral aspect; 43) l. pedipalpus, retroventral aspect, with a secretion (remains of sperm?) at the tip of the embolus. M = 0.5 and 0.1;



figs. 44-46: ***Balticonopsis bitterfeldensis* n. gen. n. sp.**, ♂, holotype; 44) body, legs I and pedipalpi, dorsal aspect; 45) tarsus and metatarsus of the r. leg I, ventral aspect (hairs are not drawn); 46) r. pedipalpus, retrodorsal-basal aspect. E = embolus. M = 0.2 in figs. 44-45), 0.1 in fig. 46);

fig. 47: ***Balticonopsis bulbosa* n. gen. n. sp.**, ♂, distal articles of the l. leg I, prolateral aspect (only few hairs are drawn). M = 0.2;

figs. 48-52: ***Balticonopsis ceranowiczae* n. gen. n. sp.**, ♂, holotypus; 48) l. leg I, oblique frontal-retrolateral aspect; dotted: Prolateral spines of the tibia; the arrow indicates to the ventral tibial lobe; 49) opisthosoma from the r. side (only five bristle of the scutum are drawn); 50) spinnerets (the medians are hidden) and posterior part of the opisthosoma, ventral-distal aspect; 51) femur of the r. pedipalpus, dorsal aspect; 52) r. pedipalpus, retrdorsal-basal aspect. A = femoral apophysis, C = cymbium, E = embolus. M = 0.2 in figs. 48-50), 0.1 in figs. 51-52);



figs. 53-59: ***Balticonopsis holti* n. gen. n. sp.**, ♂; 53) outline of the eyes which are covered by a thin emulsion, dorsal-frontal aspect; 54) r. tibia I, retrolateral aspect; 55) r. tibia I, proventral aspect; some additional spines may be hidden by an emulsion; 56) r. metatarsus I, prolateral and slightly dorsal-distal aspect; some additional spines may be hidden by an emulsion; 57) r. coxa IV with the retrobasal outgrowth (arrow), ventral aspect; 58) l. pedipalpus, retrodorsal aspect, with the patellar apophysis dotted; 59) l. pedipalpus, ventral aspect, the bulbus is partly expanded. E = embolus. M = 0.1 in figs. 53, 56-59), 0.2 in figs. 54-55);

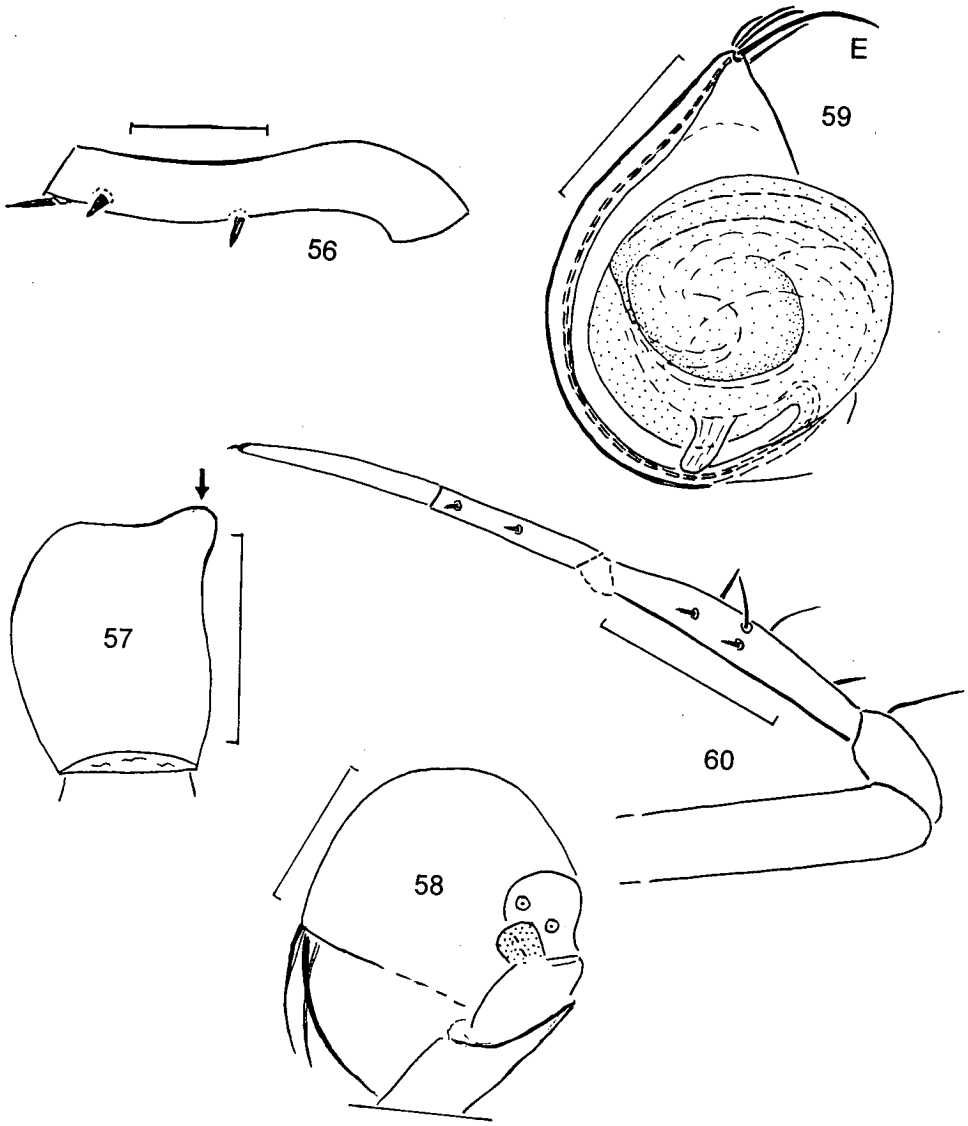
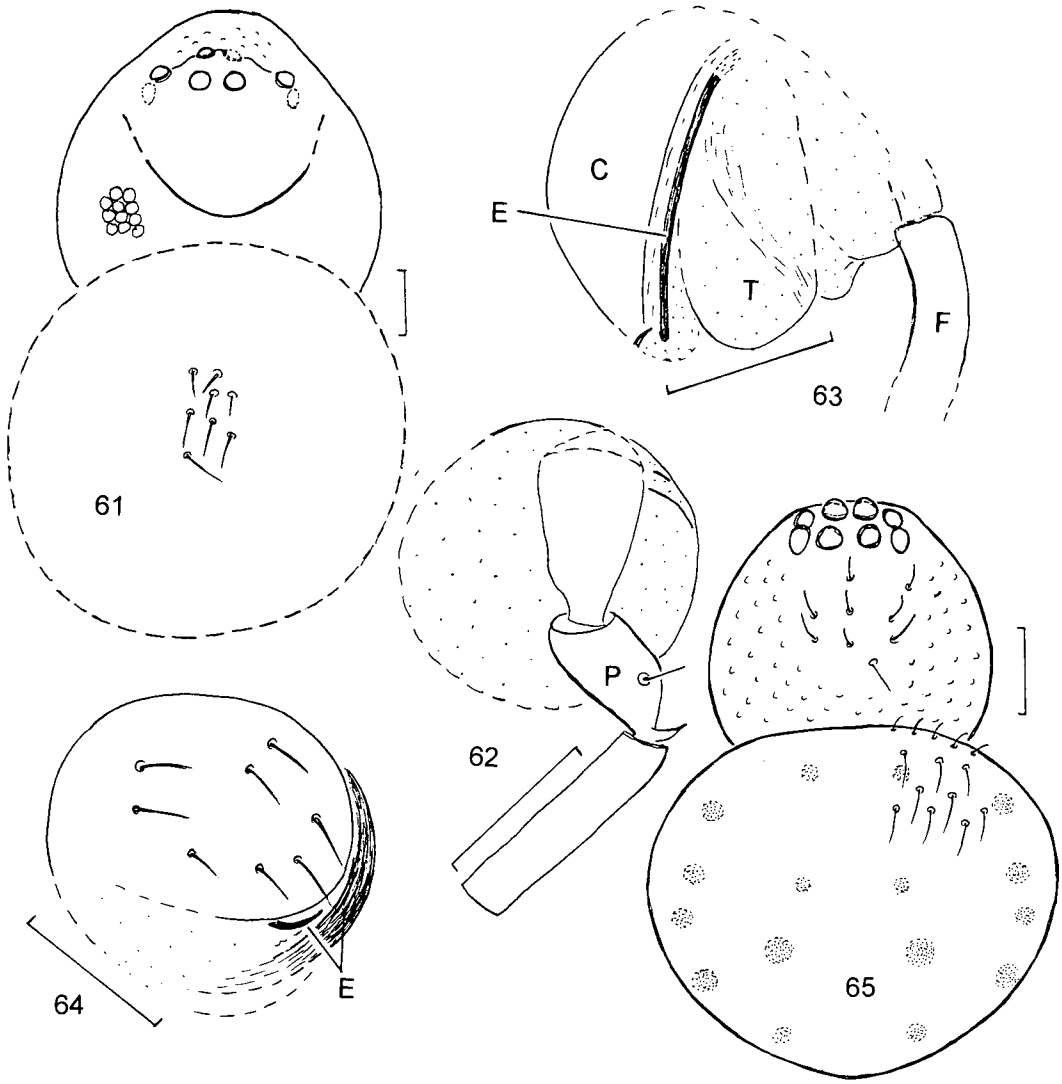
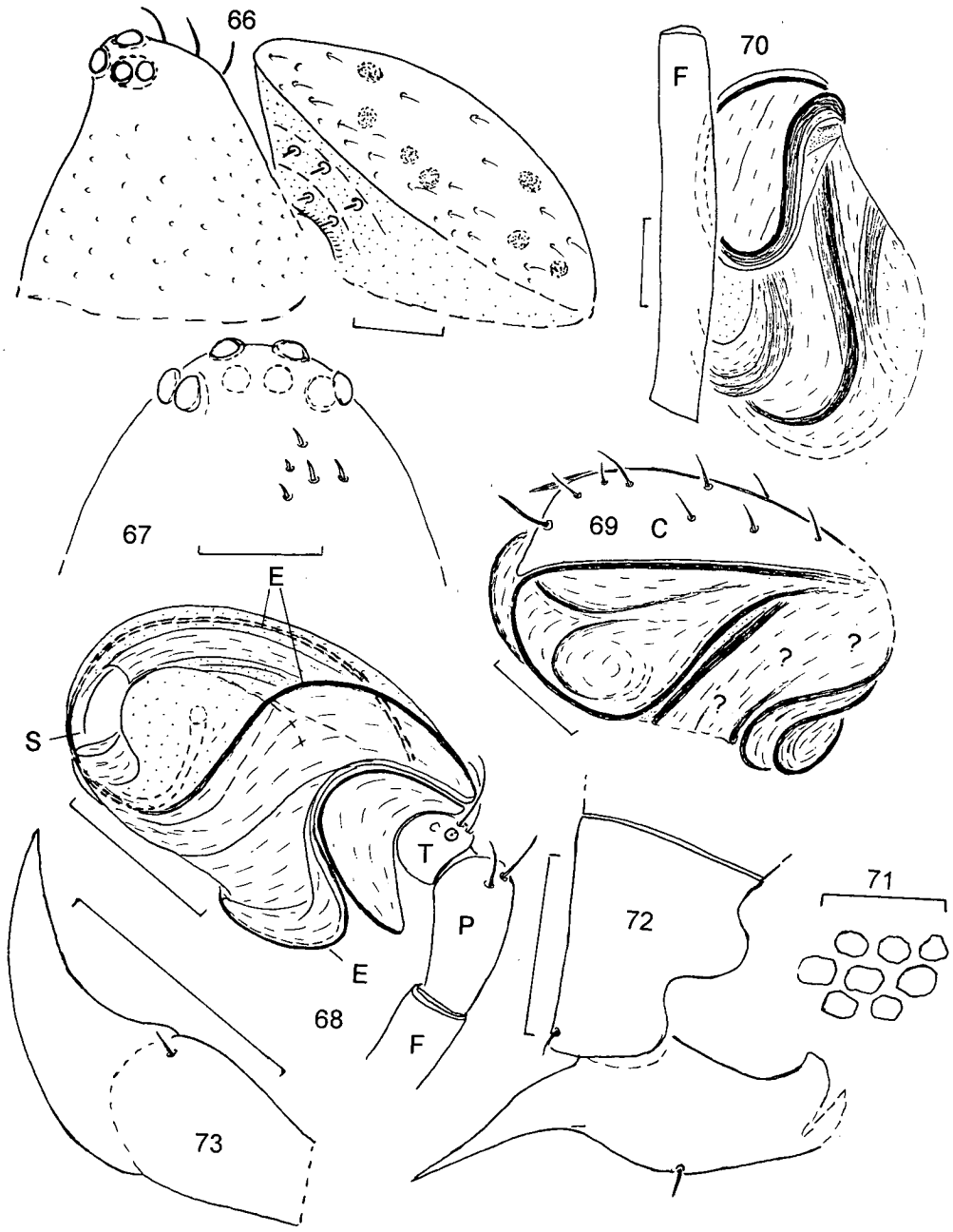


fig. 60: *Balticonopsis* sp. indet., ♀ (F985/BB/AR/ANA/CJW), r. leg I, prolateral aspect but the femur ventrally. Note the short ventral metatarsal spines. M = 0.5;

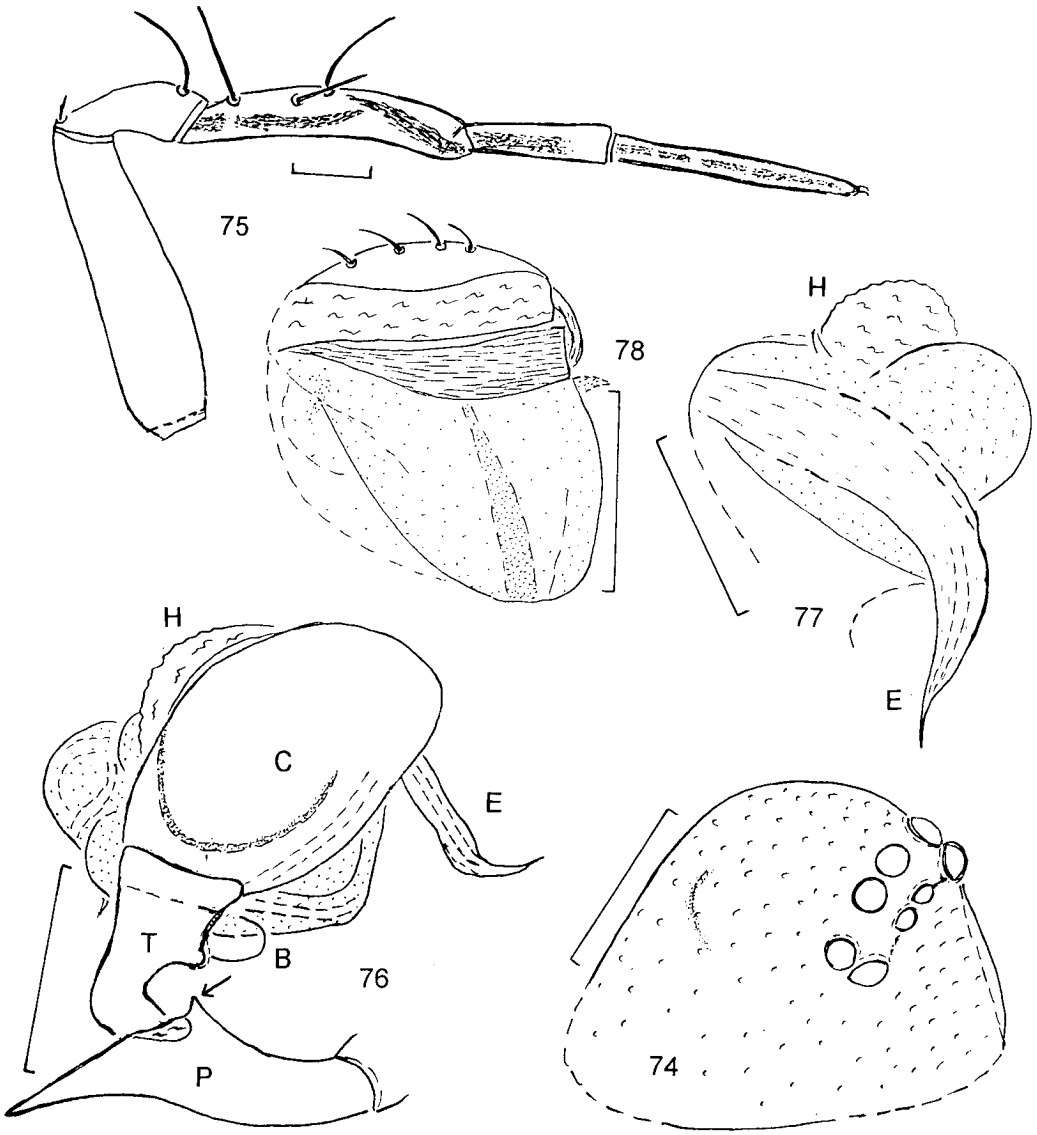


figs. 61-64: ***Dubianapis obscura*** **n. gen. n. sp.**, ♂; 61) body, dorsal aspect (only few opisthosomal hairs are drawn; the opisthosoma is covered by an emulsion); 62) r. pedipalpus, dorsal aspect; 63) l. pedipalpus, retrolateral aspect; 64) l. pedipalpus, apical aspect. C = cymbium, E = embolus, F = femur, P = patella, T = tegulum. M = 0.1;

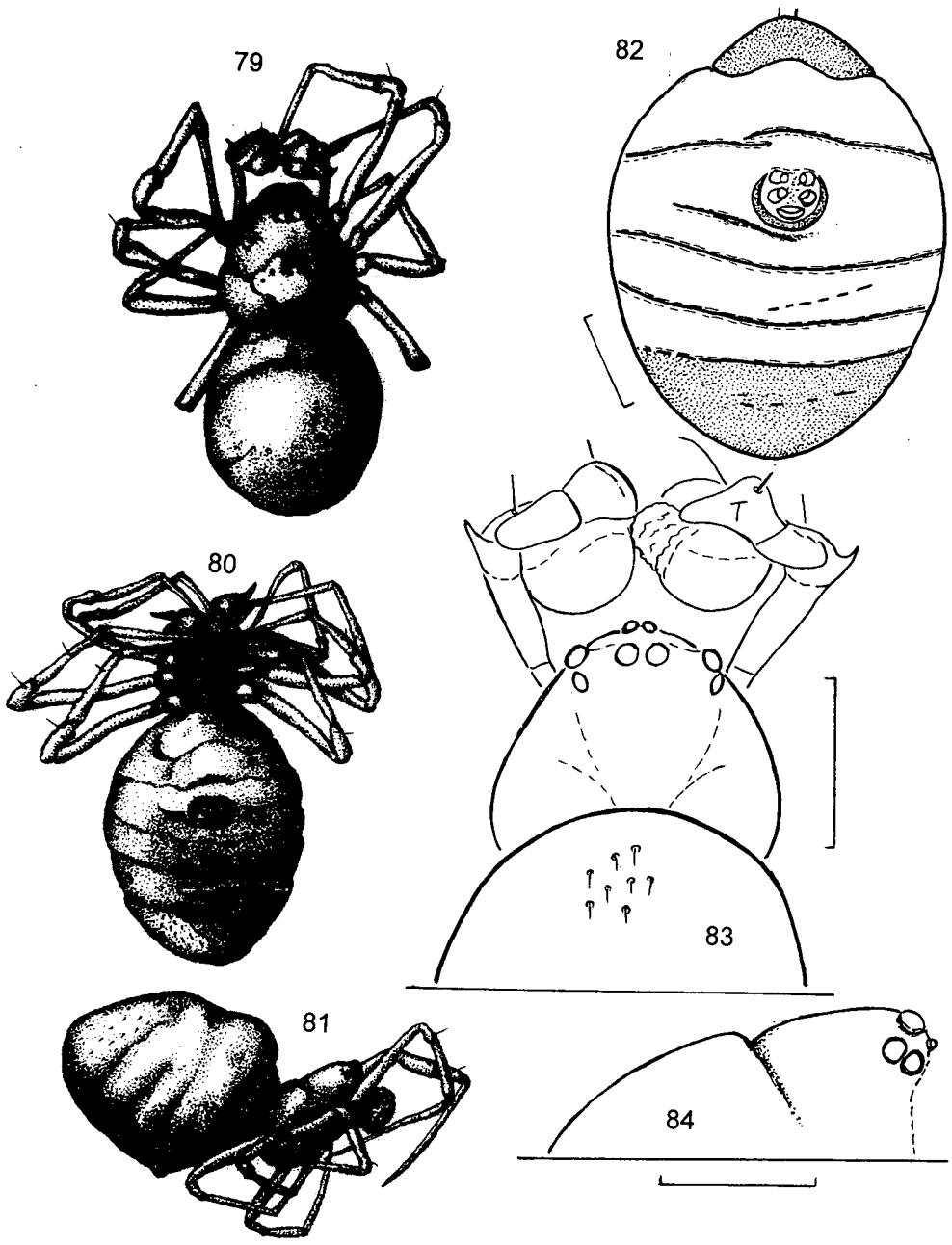
figs. 65-70: ***Flagellanapis voigti*** **n. gen. n. sp.**, ♂, figs. 65-66, 68) holotype, fig. 67 and 69) paratype b), fig. 70) paratype a); 65-66) body, dorsal aspect and slightly frontally; lateral aspect (only few hairs are drawn); 67) prosoma, frontal aspect (only 5 bristles are drawn), 68-69) l. pedipalpus, retrolateral and retrodorsal aspect; 70) r. pedipalpus, ventral aspect; the bulbus is partly hidden by the femur and distally by a bubble. C = cymbium, E = embolus, F = femur, S = tip of the embolus, T = tibia. M = 0.2 in figs. 65-68), 0.1 in figs. 69-70);



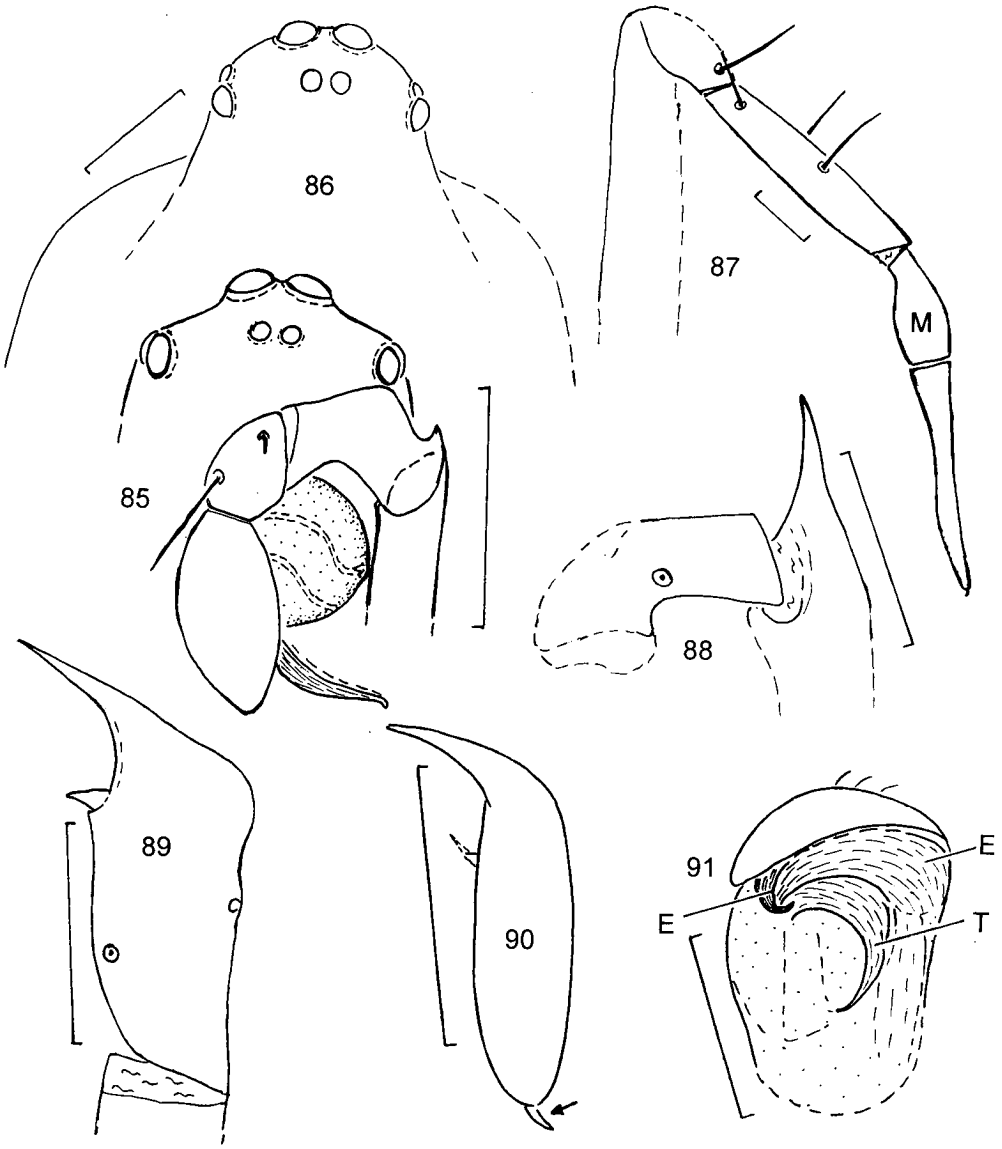
figs. 71-73: ***Fossilanapis anderseni*** **n. gen. n. sp.**, ♂; 71) some lateral wrinkles of the prosoma; 72) patella and tibia of the r. pedipalpus, retrolateral aspect; 73) patella of the l. pedipalpus, dorsal-basal aspect. M = 0.03 in fig. 71), 0.1 in the figs. 72-73);



figs. 74-78: ***Fossilanapis baetcheri* n. gen. n. sp.**, ♂; 74) prosoma, oblique dorsal-lateral aspect (not all of the wrinkles are drawn); 75) l. leg I, prolateral aspect (femur perspectively shortened), with probable remains of muscles and long patellar and tibial bristles; 76) r. pedipalpus, retrolateral aspect; the bulbus is partly expanded; 77) r. pedipalpus, prodistal aspect; 78) l. pedipalpus, ventral aspect, the bulbus is expanded. B = gas bubble, C = cymbium, E = embolus, H = basal haematodocha, P = patella, T = tibia. M = 0.1;

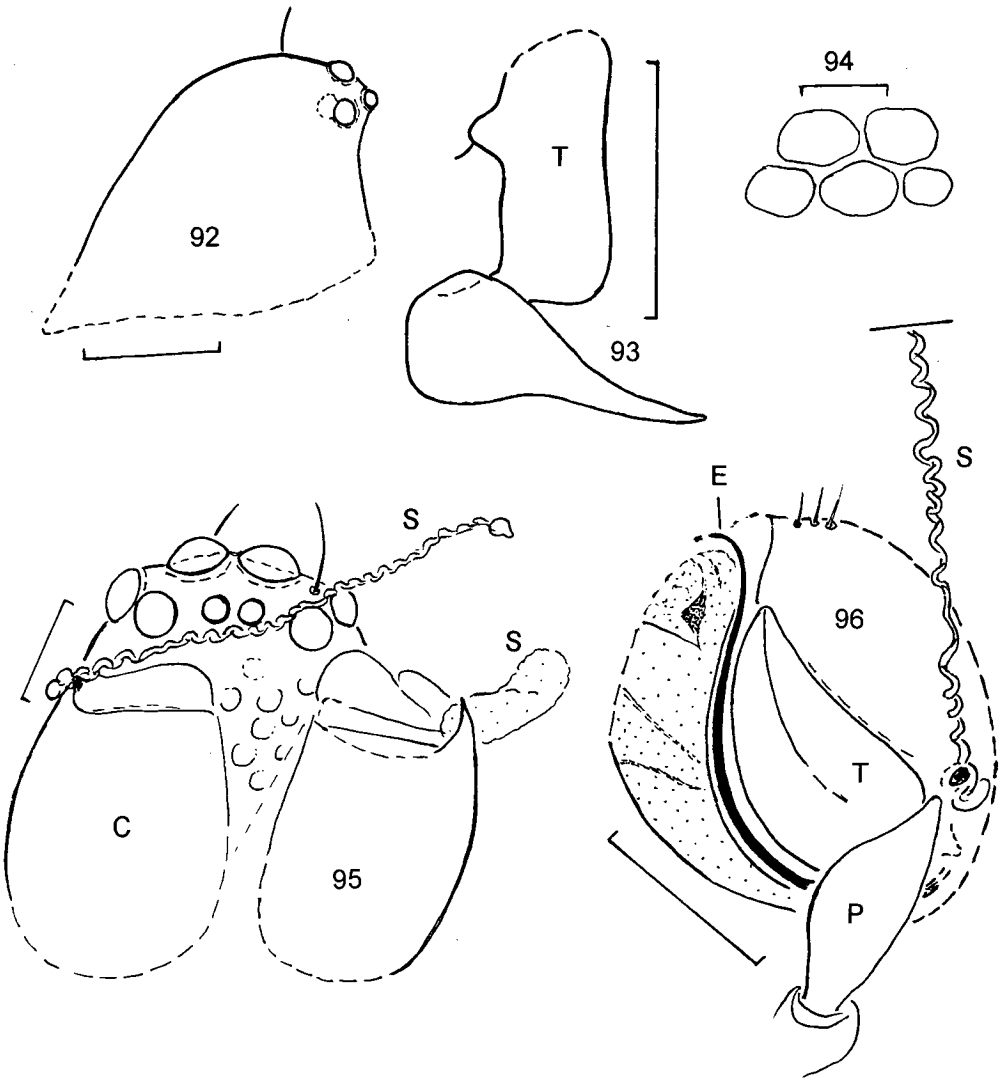


figs. 79-85: ***Fossilanapis eichmanni* n. gen. n. sp.**; ♂; 79-81: Body, dorsal, ventral and lateral aspect (drawn by F. EICHMANN); 82) opisthosoma, ventral aspect. The opisthosoma is expanded by decompostion gas and owing to this possesses distinct furrows; dotted: Sclerotized areas; 83) prosoma, pedipalpi and anterior part of the opisthosoma, dorsal aspect (T = pedipalpal tibia); 84) prosoma, lateral aspect, the ventral part is hidden; 85) prosoma and l. pedipalpus, frontal aspect. M = 0.2;
→



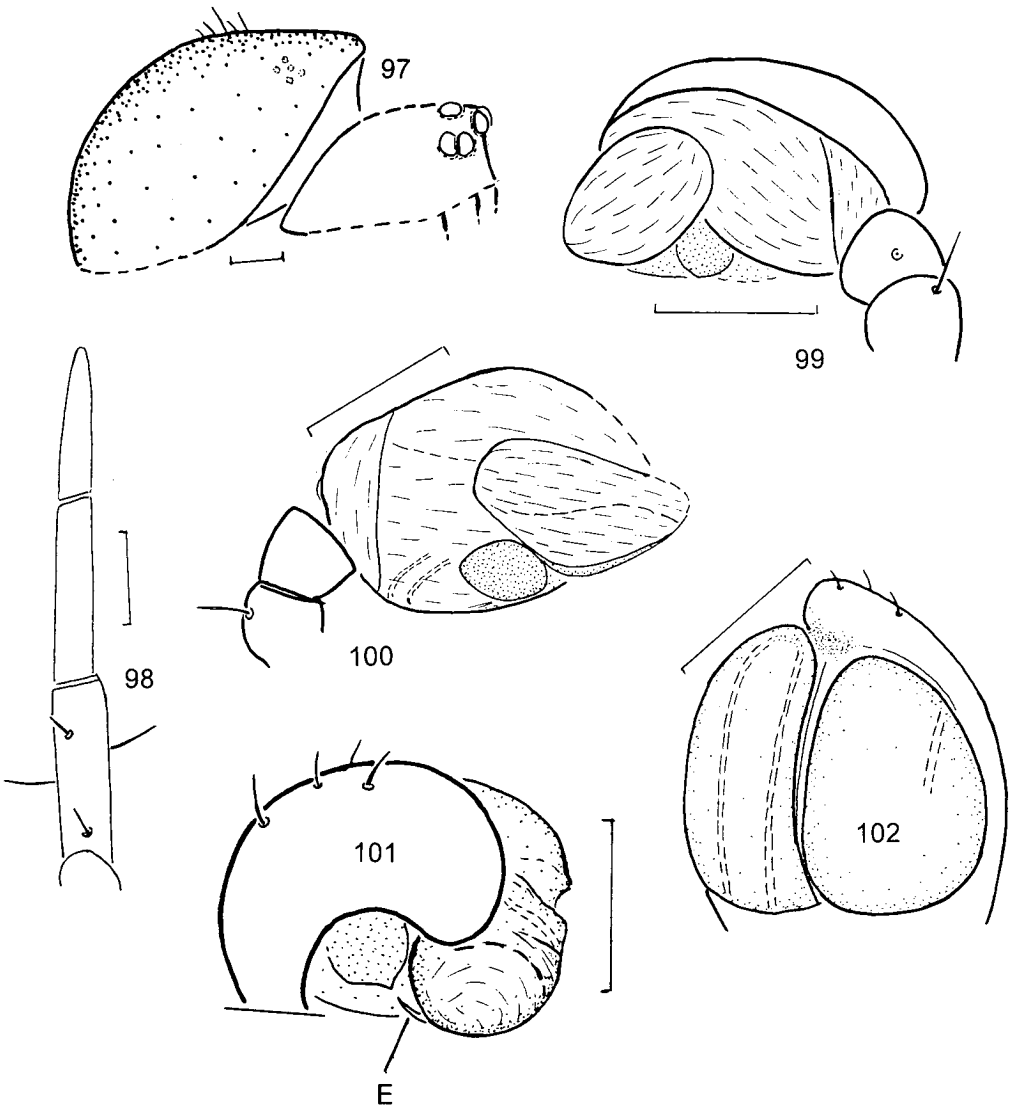
figs. 86-89: ***Fossilanapis flexiotarsus* n. gen. n. sp.**, ♂; 86) prosoma, frontal aspect (wrinkles are not drawn); 87) r. leg I, retrolateral aspect, slightly dorsally; 88) tibia and distal part of the patella of the l. pedipalpus, retrodistal aspect; 89) patella of the r. pedipalpus, dorsal aspect. M = metatarsus. M = 0.1;

figs. 90-91: ***Fossilanapis saltans* n. gen. n. sp.**, ♂; 90) paratype, patella of the r. pedipalpus, dorsal aspect. Note the small retrobasal apophysis (arrow); 91) holotype, r. pedipalpus, ventral-apical aspect (parts are hidden). E = embolus, T = tegular apophysis. M = 0.1;

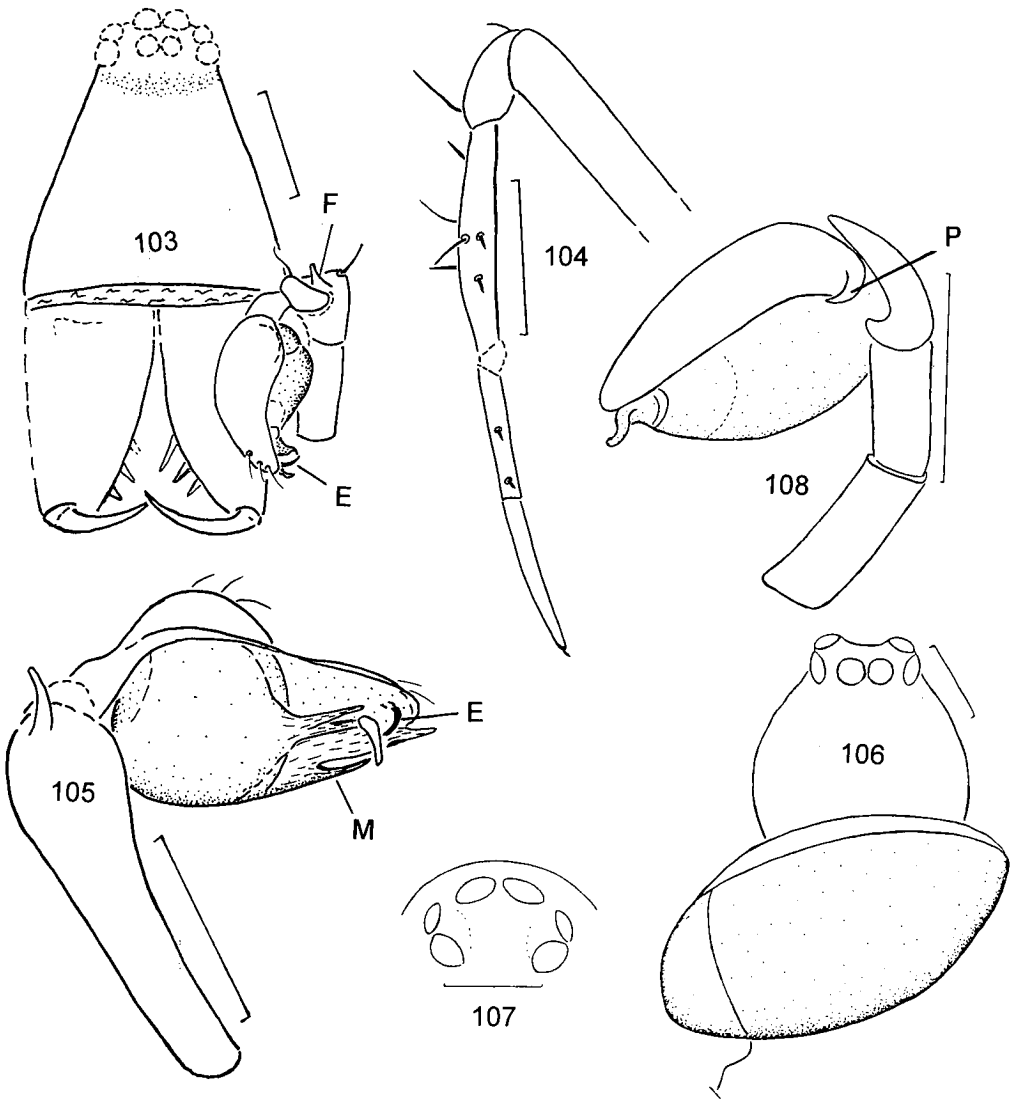


figs. 92-93: ***Fossilanapis unispinum*** **n. gen. n. sp.**, ♂; 92) prosoma, lateral aspect. Note the dorsal bristle-shaped hair. Wrinkles are not drawn; 93) tibia (T) of the l. pedipalpus, dorsal aspect and patella with its apophysis, apical aspect. M = 0.2 and 0.1;

figs. 94-96: ***Ruganapis scutata*** **n. gen. n. sp.**, ♂, holotype; 94) lateral wrinkles of the prosoma; 95) prosoma and pedipalpi, frontal aspect; 96) r. pedipalpus, prodorsal aspect. C = cymbium, E = embolus, P = patella, S = tape-shape secretion with probable remains of sperm, T = tibia. M = 0.03 in fig. 94, 0.1 in the figs. 95-96);

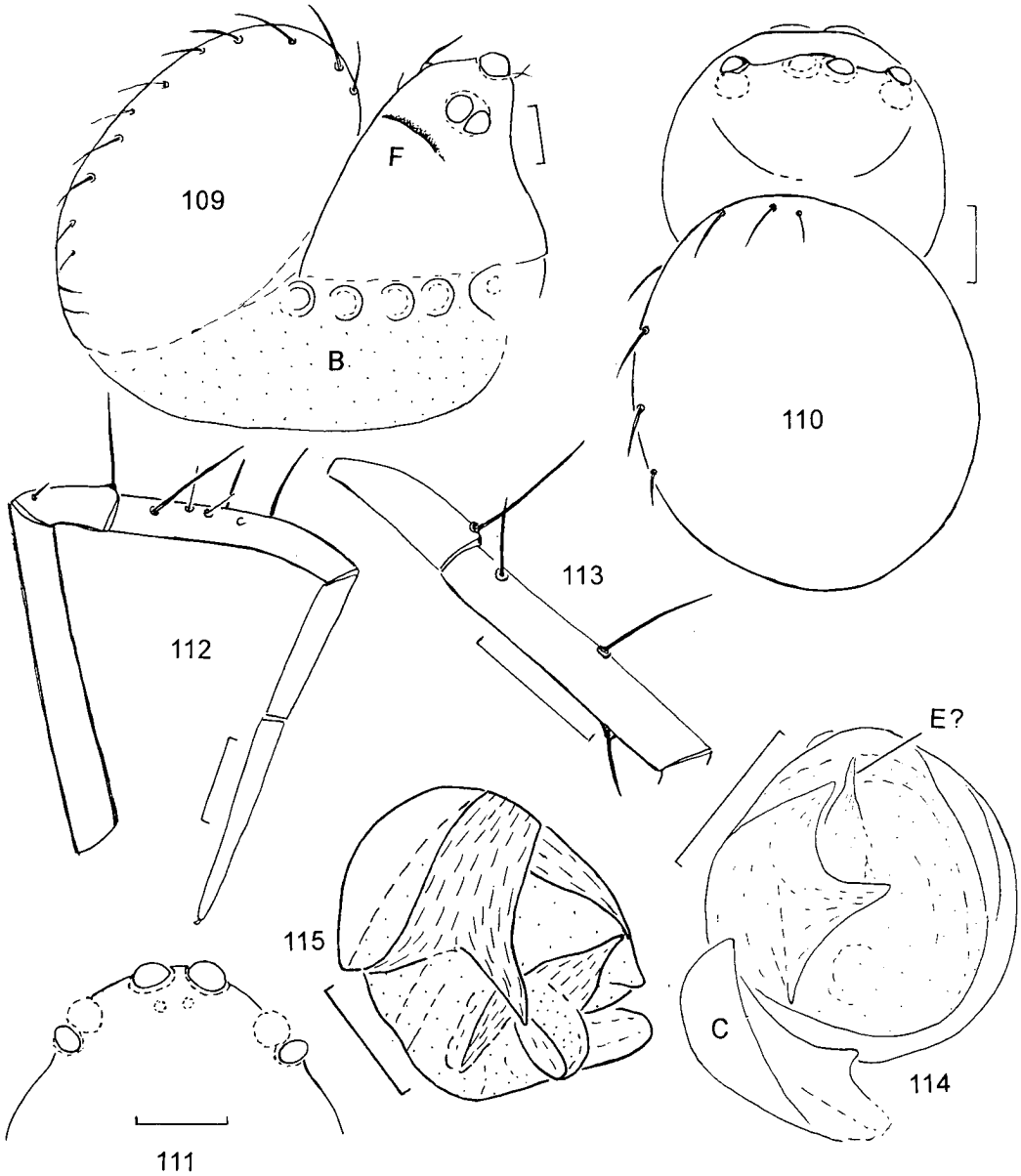


figs. 97-102: ***Saxonanapis grabenhorsti* n. gen. n. sp.**, ♂, holotype figs. 97, 99-100, paratype the remaining figs.; 97) body, lateral aspect; 98) tibia, metatarsus and tarsus of the r. leg I, dorsal aspect; 99) l. pedipalpus, retrolateral aspect; 100) r. pedipalpus, retrolateral aspect; 101) l. pedipalpus, distal aspect; 102) l. pedipalpus, retroventral-distal aspect. E ?= embolus. M = 0.1;



figs. 103-105: ***Tuberanapis parvibulbus* n. gen. n. sp.**, ♂, holotype; 103) prosoma and l. pedipalpus, anterior aspect (bubbles cover the eye lenses); 104) r. leg I, prolateral aspect; 105) r. pedipalpus, retrolateral aspect, with the femur in retrodorsal aspect. E = embolus, F = pedipalpal femoral apophysis, M ?= median apophysis. M = 0.5 in fig. 104, 0.2 in the figs. 103) and 105);

figs. 106-108: *Palaeoanapis nana* WUNDERLICH 1988 in Dominican amber, ♂, holotype; 106) body, dorsal aspect; 107) eyes, frontal aspect; 108) l. pedipalpus with the paracymbium (P), retrolateral aspect. M = 0.2 in fig. 106), 0.2 in the remaining figs.;



figs. 109-118: ***Eomysmenopsis spinipes* n. gen. n. sp.**, ♂, holotype figs. 110) and 115), paratype the remaining figs; 109) body with a large ventral bubble (B), lateral aspect (only few hairs are drawn); 110) body, dorsal aspect; 111) position of the eyes, frontal aspect; 112) r. leg I, oblique retrolateral aspect; 113) r. patella and tibia II, retrolateral aspect; 114) l. pedipalpus (bulbus expanded), ventral aspect; 115) l. pedipalpus, prolateral aspect (the bulbus structures are partly hidden); 116-117) r. pedipalpus (bulbus expanded), frontal, retrofrontal and retrolateral aspects. C = cymbium, E ?= embolus, F = prosomal furrow, H = basal haematodocha, M = emulsion. M = 0.1;

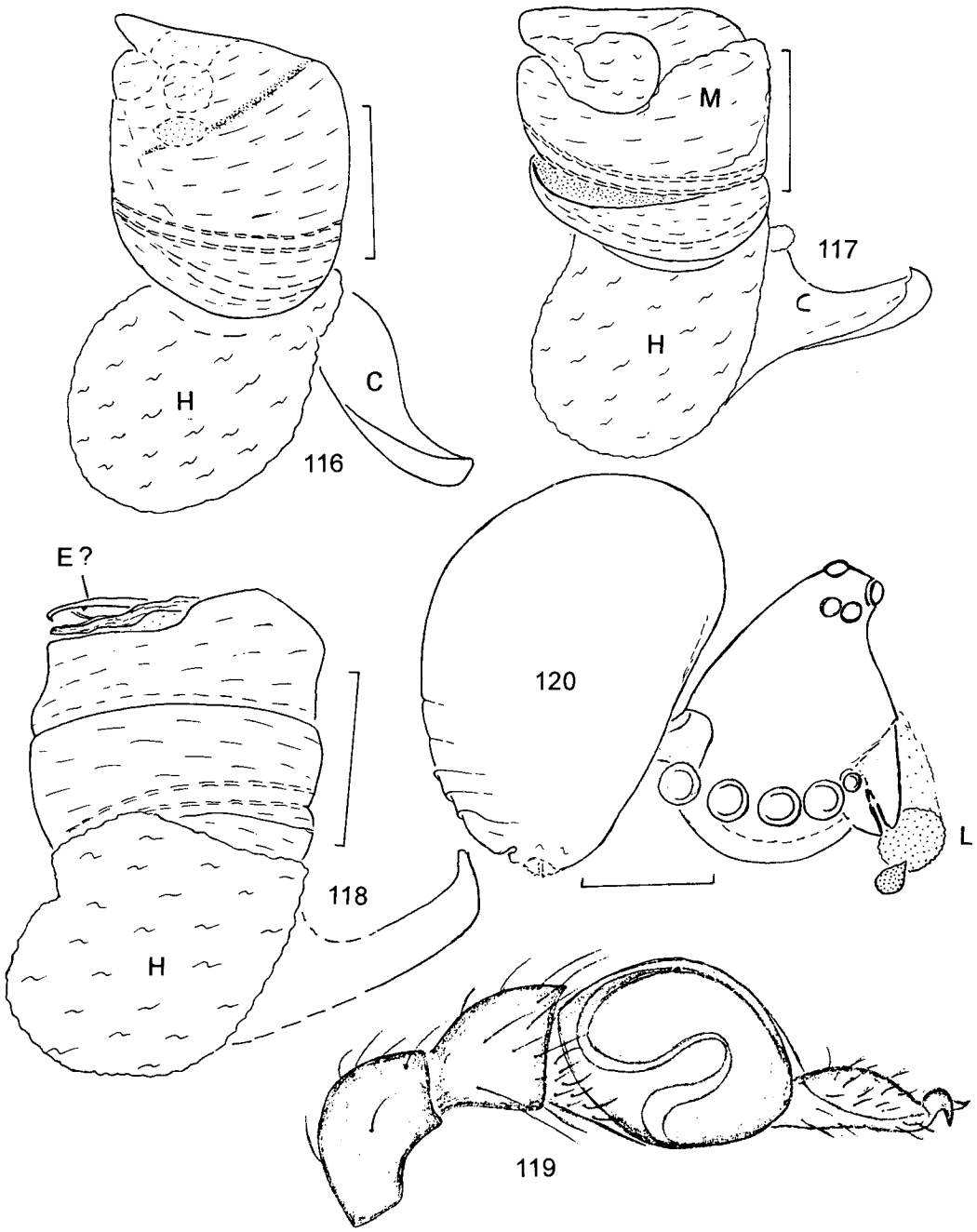
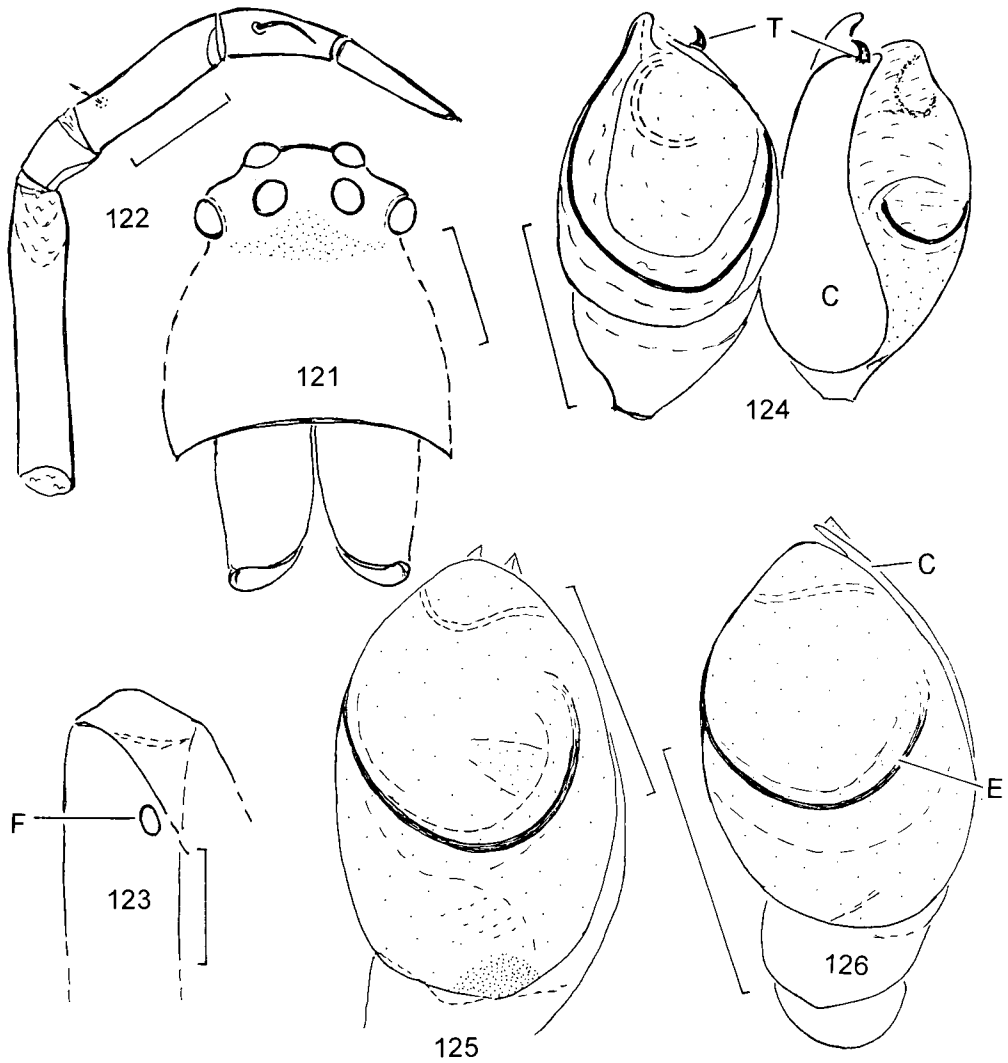
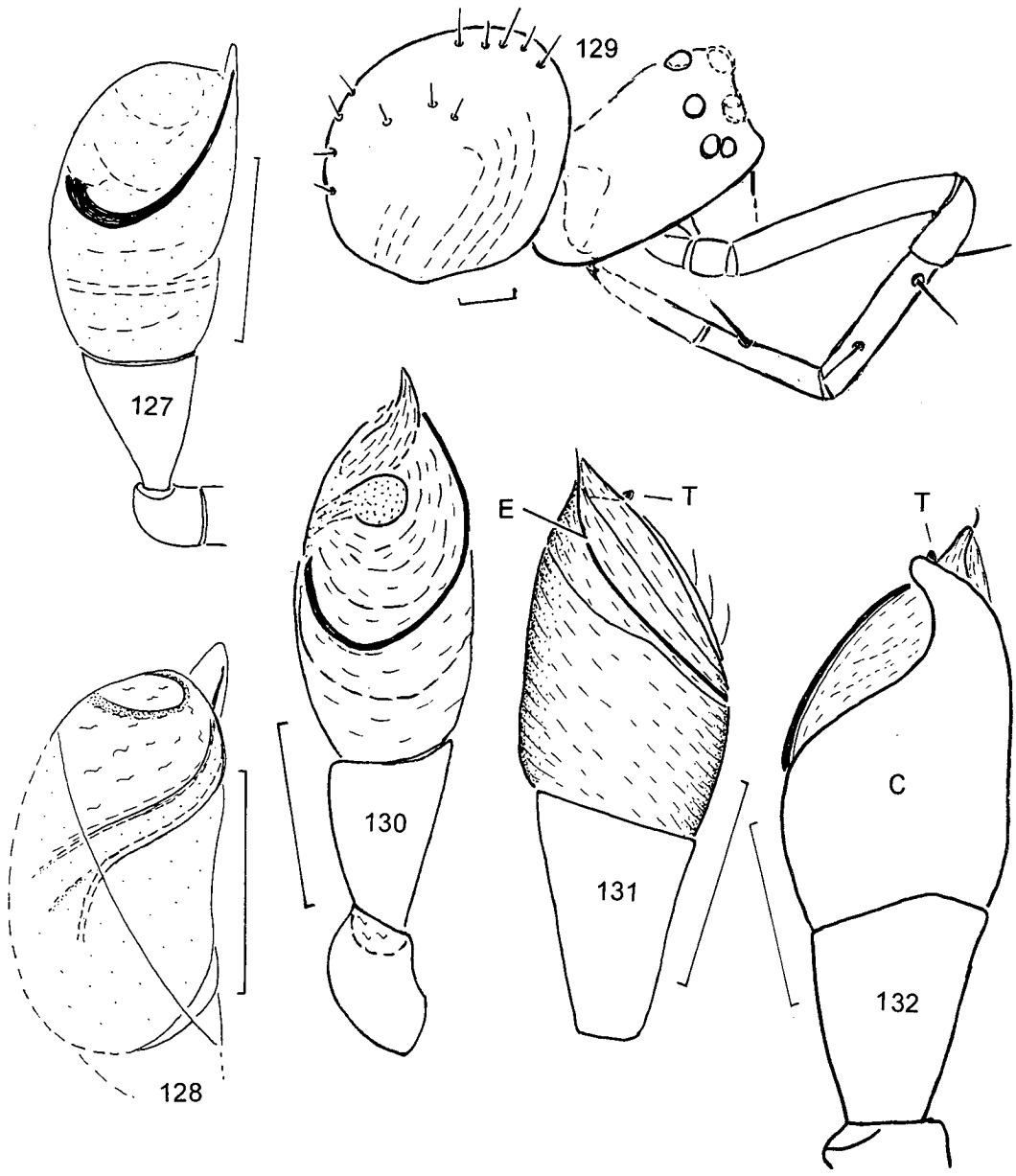


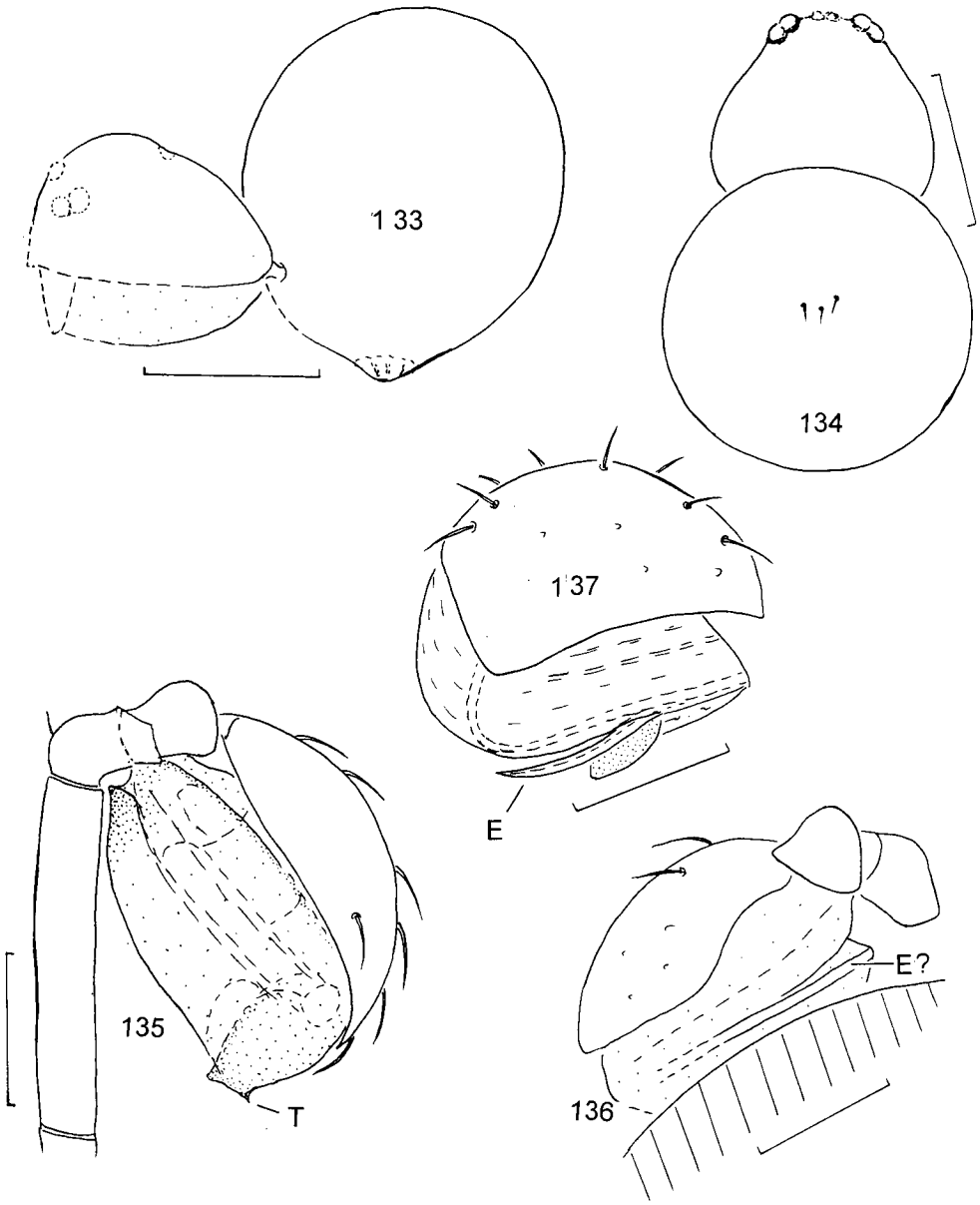
fig. 119: *Maymena misteca* GERTSCH 1960, extant, Mexico, ♂, l. pedipalpus, ventral aspect; taken from GERTSCH (1971: Fig. 146);



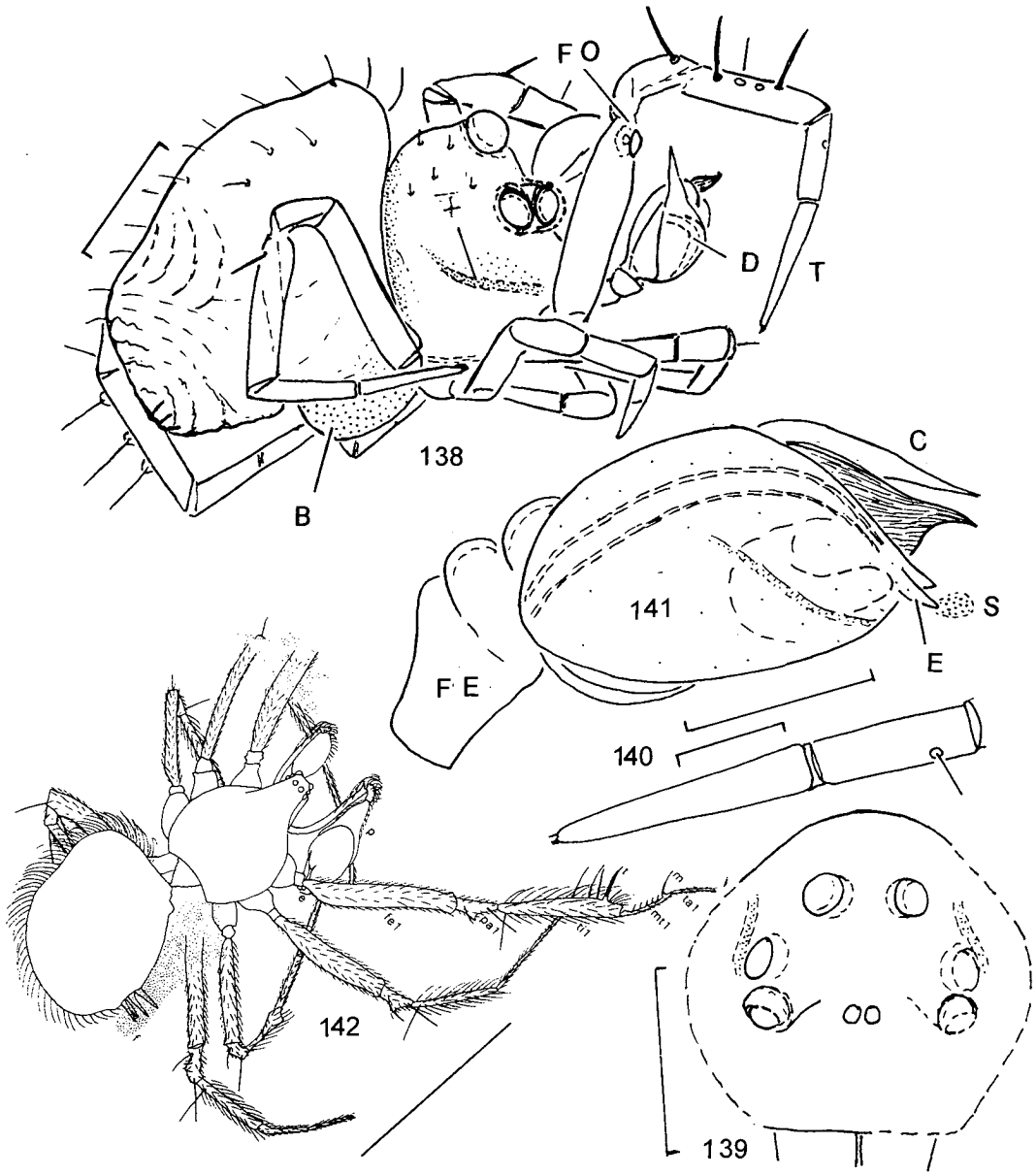
figs. 120-128: ***Mysmena groehni* n. sp.**, ♂; holotype figs. 120), 125) and 128), paratype a) figs. 123) and 126), paratype c) 127);↖120) outline of the body, lateral aspect (hairs not drawn), with a - digestive? - secretion at the mouth parts; 121) prosoma, frontal aspect; 122) l. leg I, oblique prolateral aspect (femur in ventral aspect); 123) l. femur I with the femoral organ (F), proventral aspect; 124) pedipalpi, dorsal aspect of the spider (the tarsus is twisted as in other specimens and figs.), with the cymbial "thorn" (T); 125) l. pedipalpus, retrodorsal aspect; 126) l. pedipalpus, dorsal aspect; 127) r. pedipalpus, retroventral aspect; 128) r. pedipalpus, retrolateral aspect. C = cymbium, E = embolus. M = 0.2 in the figs. 120) and 122), 0.1 in the remaining figs.;



figs. 129-132: ***Mysmena grotae* n. sp.**, ♂, holotype figs. 129) and 131-132), paratype a) fig. 130); 129) body and r. leg I, oblique lateral aspect. Only few hairs are drawn, the prosoma with some eyes are covered by a white emulsion; 130) r. pedipalpus, retrolateral aspect with the twisted tarsus; 131) l. pedipalpus, ventral aspect; 132) l. pedipalpus, dorsal aspect. C = cymbium, E = embolus, T = cymbial "thorn". M = 0.1;

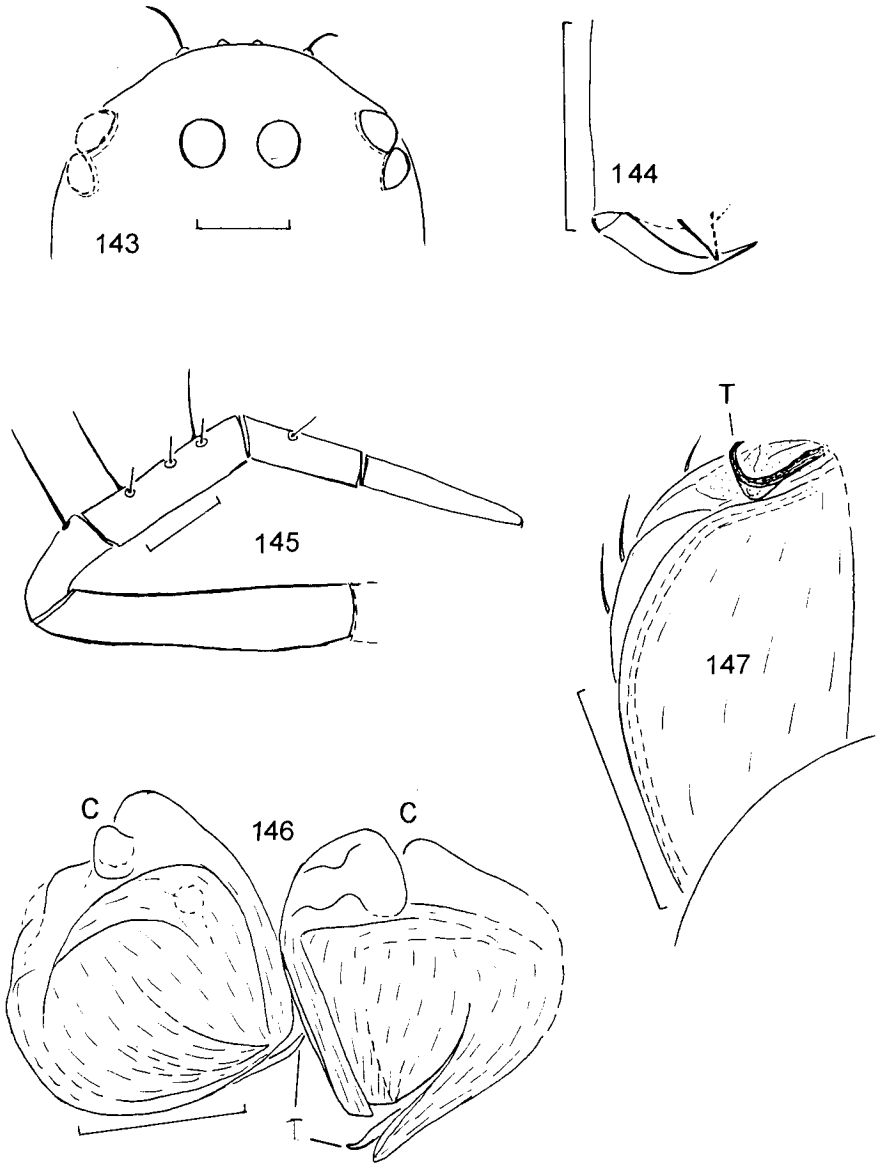


figs. 133-137: ***Palaeomysmena hoffeinsorum* n. gen. n. sp.**, ♂; 133-134) body, lateral and dorsal aspects; 135) r. pedipalpus, retrolateral aspect; 136) r. pedipalpus, prolateral aspect (ventrally hidden); 137) r. pedipalpus, apical aspect. E = embolus (or sperm duct in fig. 134?), T = questionable tip of the embolus. M = 0.5 in fig. 133-134), 0.1 in figs. 135-137);



figs. 138-141: ***Dominicanopsis grimaldii* n. gen. n. sp.**, ♂; 138) body in lateral aspect; 139) prosoma, frontal and slightly dorsal aspect; 140) l. tarsus and metatarsus I with the trichobothrium I, dorsal aspect; 141) r. pedipalpus, ventral aspect. B = bubble, C ?= distal part of the cymbium, E = embolus, F = prosomal furrow, FE = femur, FO = femoral organ, S = secretion (remains of sperm?) at the tip of the embolus, SD = sperm duct, T = r. tarsus I. M = 0.05 in figs. 140-141), 0.1 in the remaining figs.;

fig. 142: *Mysmenopsis lissycoleyae* PENNEY 2000, subfamily Mysmeninae, ♂ in Dominican amber, body in dorsal aspect. M = 1.0; taken from PENNEY (2000: Fig. 3);



figs. 143-147: ***Iardinidis brevipes* n. gen. n. sp.**, ♂; 143) position of the eyes, frontal aspect, slightly dorsally; 144) distal part of the r. chelicera, frontal aspect; 145) r. leg I, retrolateral aspect; 146) pedipalpi, frontal aspect; 147) l. pedipalpus, basally hidden. C = cymbium, T ?= tip of the embolus. M = 0.1.

BEITR: ARANEOL., **3** (2001)

ON THE RELATIONSHIPS OF THE FAMILIES OF THE SUPERFAMILY ARANEOIDEA (ARANEAE) AND THEIR KIN, WITH CLADOGRAMS, REMARKS ON THE ORIGIN OF THE ORB WEB, AND DESCRIPTION OF THE NEW AND EXTINCT FAMILIES BALTSUCCINIDAE AND PROTHERIDIIDAE IN TERTIARY BALTIC AMBER

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ABSTRACT: With some hesitation the superfamily Araneoidea (Araneae) is regarded in a wide sense including the cribellate families Deinopidae and Uloboridae (= "Orbiculariae"). Preliminary cladograms of the families of the Araneoidea and their kin are presented and remarks are given on the autotomy in this superfamily as well as on the origin of the orb web. The family Mimetidae in a wide sense - including Malkarini, Sternodini, Holarchaeini and Pararchaeini - is regarded as a member of the Araneoidea s. str. (= "ecribellate araneoid branch"), Nephilinae is regarded as subfamily of the Araneidae and not of the Tetragnathidae, the taxon Zygiellini is upgraded to family level (**n. stat.**), Anapidae is regarded in a wide sense, including Micropholcommatinae, Mysmeninae and related subfamilies. From Baltic amber are the following new and extinct spider taxa described: *Baltsuccinidae* **n. fam.**, *Baltsuccinus* **n. gen.**, *B. flagellaceus* **n. sp.** *B. similis* **n. sp.**, Protheridiidae **n. fam.**, Protheridiini **n. trib.**, *Protheriridion* **n. gen.**, *P. bitterfeldensis* **n. sp.**, *P. detritus* **n. sp.**, *P. obscurum* **n. sp.**, *P. punctatum* **n. sp.** *P. tibialis* **n. sp.**, Praetheridiini **n. trib.**, *Praetheridion* **n. gen.** and *P. fleissneri* **n. sp.** The new families are regarded as members of "old" branches of the Araneoidea which give - somewhat like "missing links" - important hints on the evolution of "modern" families. Remains of leg muscles from one of the fossils are described.

CJW= private collection of J. WUNDERLICH.

INTRODUCTION WITH REMARKS ON THE FOSSILS AND ON TAXONOMY

Do findings from Early Tertiary fossil spiders allow conclusions about the evolution of higher spider taxa? Because of the geologically old age of the order Araneae and the relatively young fossils in question – which are less than 60 million years old - most authors do not believe in such a possibility. I disagree with this opinion: There is no doubt that there are higher spider taxa in the Tertiary Baltic amber fossils - even on family level - which possess "primitive" (plesiomorphic) characters, see e. g. the papers on Araneidae, Cyatholipidae, Ephalmatoridae, Linyphiidae, Oecobiidae, Synotaxidae, Tetragnathidae, Trochanteriidae and Zoropsidae in this volume. If we compare Eaerly Tertiary Arthropoda and extant relatives we find distict evolutionary changes e. g. in the family Paussidae (Coleoptera) and in a new fossil family of the insect order Strepsiptera (a description is prepared by KINZELBACH & POHL). We find plesiomorphic characters in various extinct arthropod families in Baltic amber, e. g. in the Baltsuccinidae n. fam. and in the Protheridiidae n. fam. (both Araneae: Araneoidea, this paper), Mengeidae and a new family (both Strepsiptera), and probably Lepidothrichidae (Thysanura), which may be a synonym of Lepismatidae.
The radiation of Angiospermae and the co-evolution of numerous groups of flying insects happened in the Cretaceous period. Because of the kind of its prey depended in my opinion the radiation of most groups of the spider superfamily Araneoidea – most of its members build webs in higher strata and capture mainly flying insects – also indirectly on the radiation of Angiospermae. So it was not unlikely to discover „old"/"primitive" spider taxa which originated probably in the Lower or Middle Cretaceous period and became extinct in the Early Tertiary: Paleocene to Oligocene. Such taxa are probably the rare members of the new and extinct families Baltsuccinidae and Protheridiidae; compare also the Ephalmatoridae and the new subfamily Miraraneinae of the Araneidae. - Are these strange spiders the last survivors of their families in the Tertiary period, which lived only about 10 million years after the Cretaceous-Tertiary boundary event? The intensive study of Cretaceous amber spiders has just started and the fauna of the tropics has not been well studied. I don't want to exclude that extant members of (really?) extinct families will be discovered in the future.
The members of the extinct family Protheridiidae seem to be somewhat like a "missing link" at the base of the "coxa-trochanter autotomy clade" in which the spiders still had numerous leg bristles - see the figs. 32, 35 - in contrast to the derived members of the "spineless femur clade". - The family Protheridiidae is unknown to H. W. LEVI (pers. commun.), who investigated material.
The shape of body and legs of the members of the new family Baltsuccinidae is similar to spiders of the family Pimoidae and primitive members of the Linyphiidae. Spiders of this family possess plesiomorphic characters - compare below - as well as one of the most complicated secondary male genital organs in Tertiary spiders, see fig.7 and the photos.

Remarks on several higher taxa of the superfamily Araneoidea and on computer cladistics

With some hesitation I regard the superfamily Araneoidea in a wide sense including the cribellate Uloboridae and Deinopidae (= "Orbiculariae"), see WUNDERLICH (1995: 629-638) and below. A similar situation – cribellate and ecribellate families – we find in several other superfamilies as in Eresoidea s.l. and Oecobioidea - see the papers on these superfamilies in this volume - and in the Amaurobioidea. If Araneoidea and Deinopoidea are sister groups - as supposed by most recent authors - there is no reason to regard both taxa as different superfamilies. (By the way: The probably convergent/parallel origin of the orb web from a „pre-orb web" is not in contrast to the monophyly of the Araneoidea s.l.).

I am sure that the taxa Malkarinae, Micropholcommatinae, Mimetidae and Nephilinae are not correctly placed in papers of computer cladists, e. g. by CODDINGTON, GRISWOLD, PLATNICK, see my papers on Anapidae, Araneidae, Mimetidae, Synotaxidae and other Araneoidea families in this volume. In my opinion one does not need the help of a computer - petti fogging (in German: "Erbsenzählerei") of numerous often important characters - to find out the more likely relationships of numerous taxa. The relationships of several families are clear after looking for rare/special synapomorphies as the autotomy e. g. between patella and tibia (Linyphiidae + Pimoidae), the occurence of a comb of tarsus IV (Nesticidae and Theridiidae) or the presence of a special position of the triad complex (Araneidae).

If one - erroneously - regards for example the entelegyne family Mimetidae as a member of the Palpimanoidea/Archaeoidea (Eresoidea) - compare the paper of FORSTER & PLATNICK (1984) - or the subfamily Nephilinae (Araneidae) as a taxon of the Tetragnathidae – compare the papers of SCHARFF & CODDINGTON (1997), GRISWOLD et al. (1998) as well as my papers on Eresoidea and Araneidae in this volume -, conclusions and the diagnosis of the whole (super)family must be incorrect! Obviously computers are not the reason for an incorrect cladogram. - Compare also the remarks on this matter in my papers on the (super)families Eresoidea, Trochanteriidae and Zoropsidae in this volume and below and BECHLY (2000).

Revised diagnosis of the "ecribellate Araneoidea branch": Spinnerets in a rosette-shaped position, the anterior spinnerets thick and close together, presence of: A triad complex (lost in Mimetidae s. l. and Araneidae: Cyrtophorinae), aggregate silk glands, a scale-shaped cuticula, a cymbium with a retrobasal paracymbium (lost in the Theridiidae and some genera of different families) and the tendency to modifications (e. g. in Anapidae s. l., Linyphiidae and Tetragnathidae) and a scapus of the epigyne (lost e. g. in Tetragnathidae, Araneidae: Nephilinae and Linyphiidae: Erigoninae), basicly a sustentaculum, auxiliary hairs, no plumose but serrate hairs, and probably a "wrapping prey behaviour" and a retreat.

Selected further - plesiomorphic - characters: Ecribellate and entelegyne (e. g. Tetragnathinae-♀ secondary haplogyne), presence of an unpaired tarsal claw, basicly numerous leg bristles excl. on tarsi present (the number may be strongly reduced e. g. in some Mimetidae s. l., Anapidae s. l. and Linyphiidae: Erigoninae and are absent on femora and metatarsi on extant members of the "bristle-less femur branch") and an orb web with a closed hub (frequently modified/ irregular, lost e. g. in Mimetidae s. l., some Araneidae, Theridiidae and Linyphiidae: Erigoninae); feathery hairs and tarsal trichobothria absent, only one metatarsal trichobothrium present (it is often absent on leg IV or even on leg III: some Theridiidae), basicly no autotomy (see below), presence of 8 eyes in two rows (6 eyes - besides cave spiders - e. g. in several Theridiidae and numerous Anapidae s. l.), a large colulus (reduced or even lost e. g. in several genera of the Theridiidae), outstanding ventral tibial and metatarsal I-II bristles, and probably a soft ♂-opisthosoma, see below.

Note on the autotomy in the "ecribellate Araneoidea" (pers. obs.): There are two kinds: (a) between coxa and trochanter: In "my" "coxa-trochanter autotomy clade" (very frequent e. g. in fossils of Araneidae and most Zygiellidae); probably - as a reversal? - absent in the Cyatholipidae), see cladogram (2); (b) between patella and tibia (very frequent): In Linyphiidae and Pimoidae. Autotomy is absent in most of the remaining taxa as Tetragnathidae and Theridiosomatidae; in Anapidae and Mimetidae probably rarely present. (Absent also in Deinopidae and Uloboridae of the "cribellate Araneoidea").

Note on the scutum of the male opisthosoma in the "ecribellate Araneoidea": A dorsal scutum of the male opisthosoma is present in different taxa as Anapidae: Anapinae and Comarominae and in most Araneidae (in these taxa as synapomorphies?) as well as in numerous taxa e. g. of the Linyphiidae: Erigoninae, Mimetidae s. l. and Theridiidae. Remarkably it is totally absent in several higher taxa: Anapidae s. l.: Mysmeninae, Symphytognathinae and Synaphrinae, Baltsuccinidae (fossil), Linyphiidae: Linyphiinae s. l., Mimetidae: Mimetinae and Oarcinae, Pimoidae, Protheridiidae (fossil), Synotaxidae, Tetragnathidae, Theridiosomatidae and Zygiellidae.

Remark: I regard the absence of autotomy and an opisthosomal scutum as plesiomorphic characters of the Araneoidea. The absence of both in the Tetragnathidae may support the opinion that this family is a member of a "very old" branch. The presence of both in Araneidae and Linyphiidae: Erigoninae may support the opinion that these taxa are members of "younger" branches.

Remarks:

(1) I mainly use significant characters others than those of spinnerets; characters of spinnerets: See e.g. CODDINGTON & LEVI (1991),Annu. Rev. Ecol. Syst., 22: 565-592.

(2) Higher taxa. Many branches of my cladogram are similar or identical to those of CODDINGTON & LEVI (1991: Fig. 2), GRISWOLD et al. (1999), J. Arachnol., 27: 53-63 and some are identical with those of LEHTINEN (1967: 283, fig. 1), Ann.Zool.Fennici, 4. The main differences are the diagnosis and the relationships of my Eresoidea (**new diagnosis**) and the Eresoclada (**new clade**). This clade is not identical with the Entelegynae (see GRISWOLD (1999)) because - according to my hypothesis - spiders of the Eresoidea s. l. are primarily haplogyne (in contrast to the "entelegyne" family Eresidae): A sclerotised epigyne and a median apophysis are absent, the vulva structures of Archaeidae are clearly haplogyne, see the paper on the Eresoidea s. l. in this volume, the female condition of the Palpimanidae is regarded as "secondarily haplogyne" by several authors but see the opinion of SCHÜTT (2000). Within my Eresoidea the family Eresidae is apomorphic in being entelegyne but plesiomorphic in being cribellate. The union of Palpimanidae and Eresidae is not new: C. L. KOCH (1837) originally included *Palpimanus* in the Eresidae, see LEHTINEN (1967: 255). - Confusion was caused by the paper of FORSTER & PLATNICK (1984), Bull. Am. Mus. Nat. Hist., 178, who transferred Mimetidae, Micropholcommatidae and other taxa from the Araneoidea to their Palpimanoidea. This wrong placing was not doubted in recent papers by American authors as CODDINGTON or GRISWOLD but it was doubted by SCHÜTT (2000), Australian J. Zool., 48: 135-155.
The Oecobioidea clade is also **new** but the unit of Oecobioidea and Araneoidea s. l. is not well founded. - In my opinion the term "Canoe Tapetum Clade" sensu GRISWOLD et al. (1999) is superfluous and this clade is synonymous with the "Entelegynae", see above. - Palaeocribellatae (in my opinion also a superfluous term) = Hypochiloidea. Hypochiloidea and Austrochiloidea should be more clearly diagnosed. - Dysderoidea s. l. is nearly identical with the Filistatoidea sensu LEHTINEN (1967); the family name Dysderidae C. L. KOCH 1837 has priority because it is older than Filistatidae AUSSERER 1867; see the paper on the family Plectreuridae in this volume.

(3) There are numerous convergences and reversals, e.g. the cribellum and the posterior median eyes have been lost numerous times, the plesiomorphic plagiognathy - see KRAUS & KRAUS (1996), Mem. Queeensland Mus., 33 (2): 579-584 - has reversals in some Dysderoidea s. l. (Dysderidae, Segestriidae) and several taxa of the RTA-clade (e.g. the Clubionidae), some taxa of the "classical Haplogynae" are entelegyne (see the female Pholcidae), some taxa of the Entelegynae are secondarily haplogyne (e.g female Tetragnathinae and some female Anapidae s. l.), some Trionycha are two-clawed, a retrolateral tibial apophysis is absent in some members of the RTA-clade (e.g. Lycosidae) and present in some members of other branches (e.g. Linyphiidae: Erigoninae).

See also nos. (2), (4-7).

(4) Origin/losses of tarsal trichobothria: Such hairs are present in Mesothelae, Mygalomorpha and the RTA-clade but absent in all taxa of my Eresoidea s. l. and my Oecobioidea clade. Caponiidae is the only family of the Dysderoidea in which tarsal trichobothria are present, probably as a reversal. The presence of tarsal trichobothria in the Caponiidae probably gives an important hint at the existence of plesiomorphic genetic information of these hairs in the order Araneae. In my opinion the presence of tarsal trichobothria is a plesiomorphic character of the Araneae, these hairs were lost in the Araneomorpha clade, and reversals happened in the Caponiidae and in the RTA-clade.

(5) Origin/losses of feathery hairs: According to LEHTINEN (1967: 283, Fig. 1) feathery hairs evolved with the Araneomorpha clade and are reduced 14 times (!) within this branch. Within the Araneomorpha such hairs are not known to me from the Hypochiloidea, the Austrochiloidea (although reported by LEHTINEN (1967: 299)), the Dysderoidea s. l., the Eresoidea s. l. and most members of the RTA-clade. Therefore in my opinion these hairs are more likely to have evolved later, with the origin of the Entelegynae, reduced only at the origin of the Araneoidea s. str., the Oecobiidae and several times within the RTA-clade, and probably evolved convergently in the Austrochiloidea.

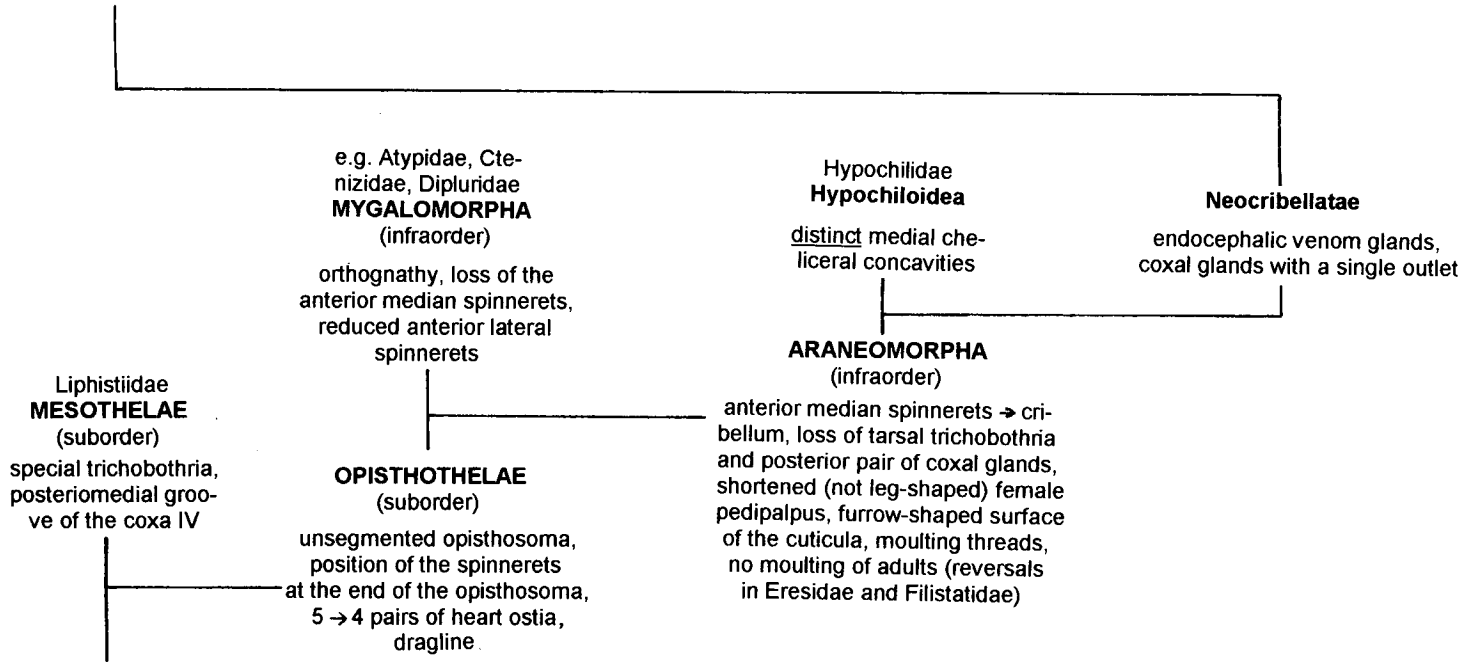
(6) The structure of the cuticula and the presence of cribellate threads are apparently linked, see WUNDERLICH (1986: 107-108): In cribellate spiders I found only small furrows, in ecribellate spiders mostly a scale-shaped surface of the cuticula but also small furrows, wrinkles or a smooth surface (e.g. in some Nesticidae).

(7) Like the furrow-shaped surface of the cuticula also the occurence of short ventral spines of the tarsus III and IV appears linked with the presence of the cribellum in the Filistatidae, Eresidae, Oecobiidae and Uloboridae but such spines are lost in most ecribellate sister groups. The origin of such spines may be with the Araneoclada.

(8) Paired ventral tibial and metatarsal bristles which are *close to the article* (TRA-clade) evolved convergently in few lower branches, too, e.g. in the Dysderoidea: Segestriidae; such bristles are absent in all taxa of the Araneoidea.

(9) The presence of a metatarsus of the legs (absence on the pedipalpus) may be a further apomorphy of the Araneae.

(10) Biogeography, remarks on "archaic" groups and records in amber: (1) The Mesothelae are today restricted to the Oriental Region; (2) the Hypochiloidea is restricted today to North America and the Oriental Region; (3) the Austrochiloidea is restricted today to the Australian Region and South America. None of these taxa are reported from Baltic or Dominican amber. - By far most of the fossil and extant spider species are members of the "modern" taxa Araneoidea and the RTA-clade. Comparably only few genera in Baltic amber are known from the Mygalomorpha, Dysderoidea, Eresidoidea and Oecobioidea which all have a mainly tropical distribution.

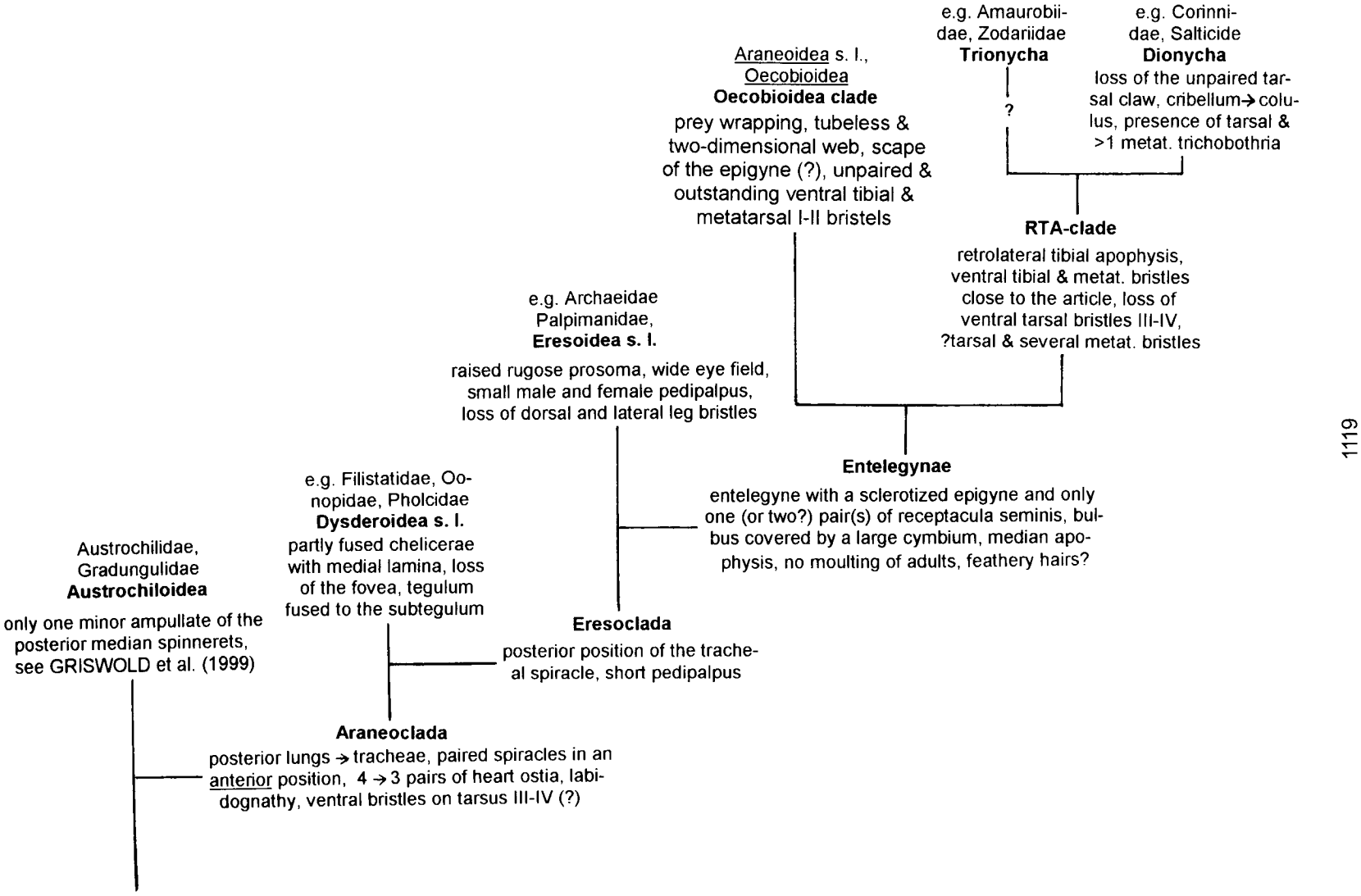


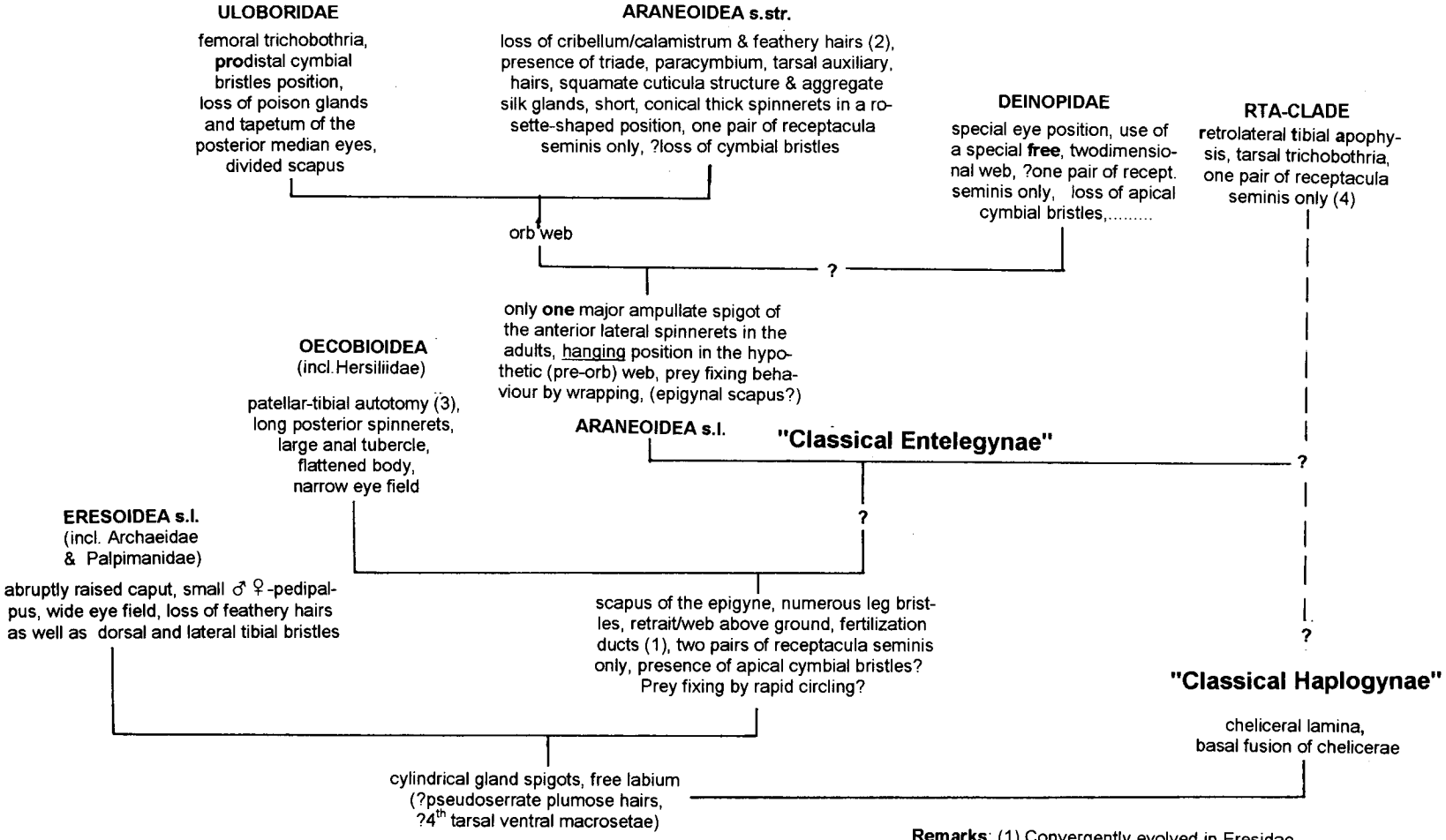
Apomorphic characters: Presence of spinnerets (four pairs in the center of the opisthosoma), a sperm web and eggs kept together with threads, endocheliceral poison glands, multidentate gnathocoxal "serrula", only five pairs of heart ostia, ?burrow/digging behaviour, male pedipalpal copulatory organ with a small/slender cymbium, three haematodochae, large subtegulum and probably a conductor but no median apophysis, ?tube dwellers, short-living males.

Plesiomorphic characters: Segmented opisthosoma with two pairs of lungs (no tracheae), presence of an unpaired tarsal claw, tarsal, metatarsal and tibial trichobothria, ?coxa-trochanter leg autotomy, two eye triads + a pair of median eyes, plagiognathy, two pairs of coxal glands, scaly cuticula, paired ventral tibial & metat. I-II bristles, haplogyny (no fertilizing ducts), at least two pairs of receptacula seminis, female genital area not sclerotized (no epigyne), long living females, moulting of adults

Synapomorphic characters with the Amblypygi (most probably the sister group of the Araneae): The petiolus and the sucking stomach.

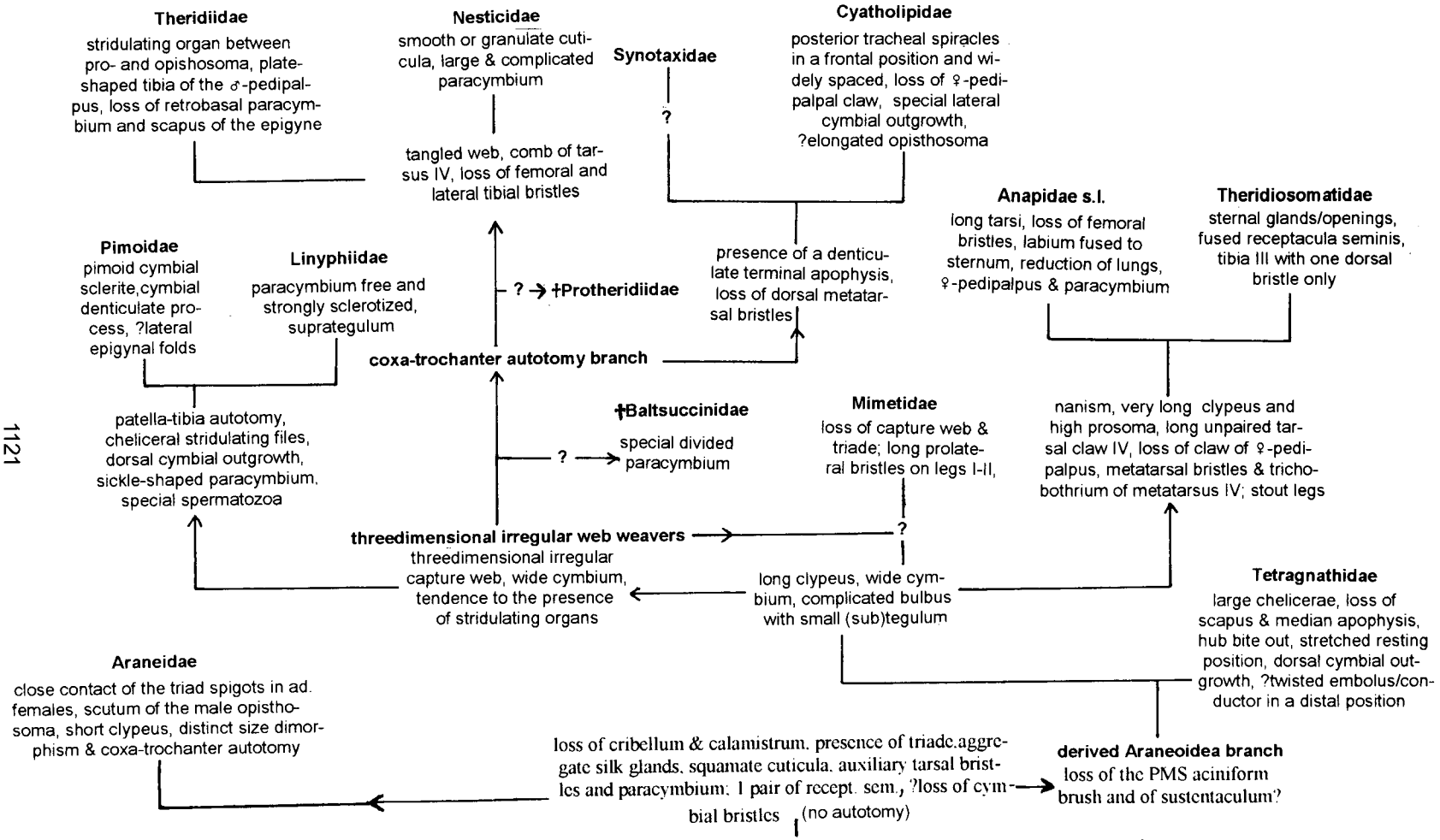
Possible relationships of the higher branches of the order Araneae
based on selected characters


e.g. Amaurobiidae, Zodariidae
Trionycha
e.g. Corinnidae, Salticide
Dionycha
loss of the unpaired tarsal claw, cribellum→colulus, presence of tarsal & >1 metat. trichobothria
Araneoidea s. l., Oecobioidea
Oecobioidea clade
prey wrapping, tubeless & two-dimensional web, scape of the epigyne (?), unpaired & outstanding ventral tibial & metatarsal I-II bristels
?
RTA-clade
retrolateral tibial apophysis, ventral tibial & metat. bristles close to the article, loss of ventral tarsal bristles III-IV, ?tarsal & several metat. bristles
e.g. Archaeidae Palpimanidae,
Eresoidea s. l.
raised rugose prosoma, wide eye field, small male and female pedipalpus, loss of dorsal and lateral leg bristles
Entelegynae
entelegyne with a sclerotized epigyne and only one (or two?) pair(s) of receptacula seminis, bulbus covered by a large cymbium, median apophysis, no moulting of adults, feathery hairs?
e.g. Filistatidae, Oonopidae, Pholcidae
Dysderoidea s. l.
partly fused chelicerae with medial lamina, loss of the fovea, tegulum fused to the subtegulum
Austrochilidae, Gradungulidae
Austrochiloidea
only one minor ampullate of the posterior median spinnerets, see GRISWOLD et al. (1999)
Eresoclada
posterior position of the tracheal spiracle, short pedipalpus
Araneoclada
posterior lungs → tracheae, paired spiracles in an anterior position, 4 → 3 pairs of heart ostia, labidognathy, ventral bristles on tarsus III-IV (?)

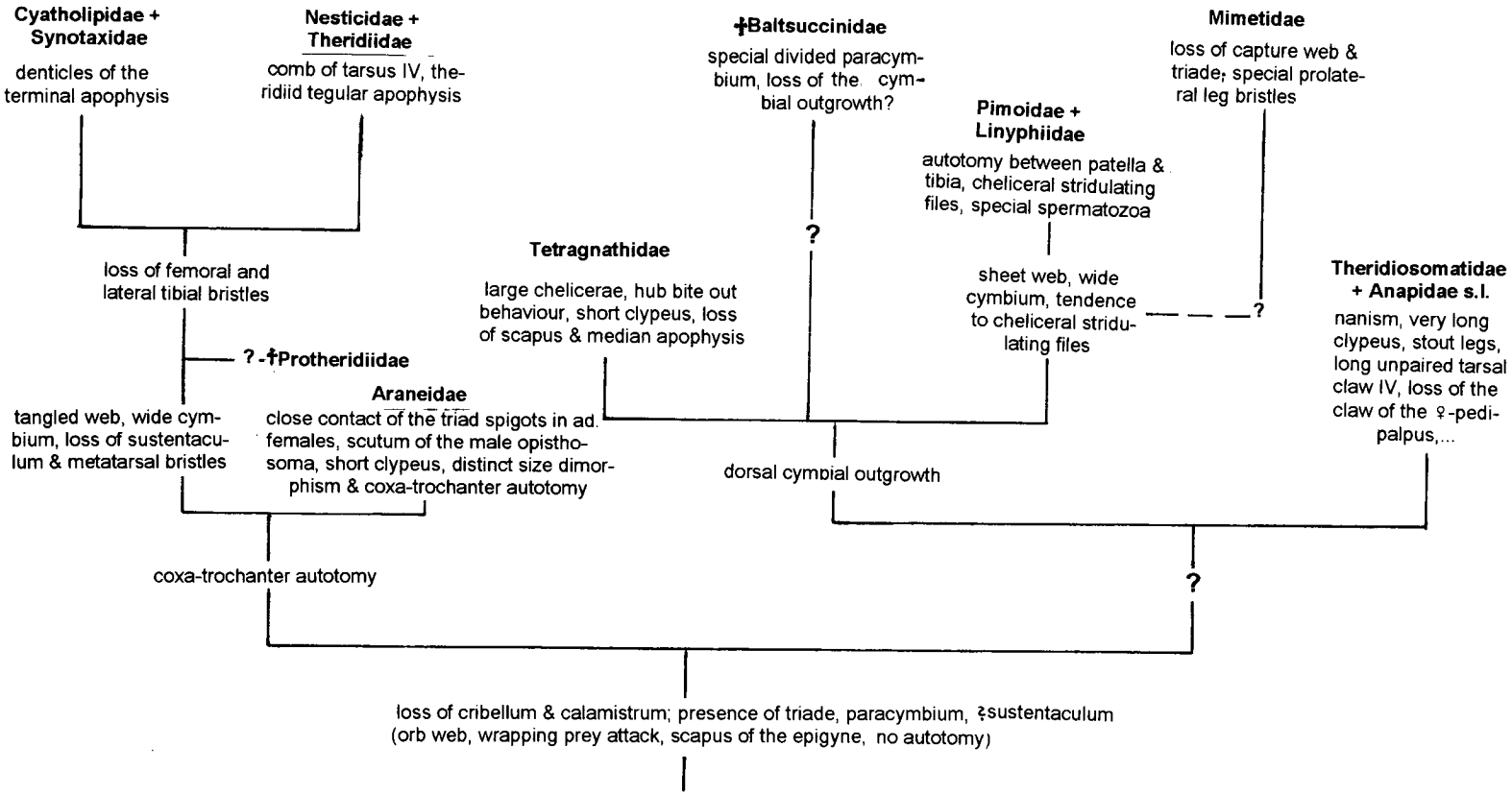


Possible cladogram (1): The superfamily ARANEOIDEA and their kin Plesiomorphic characters in brackets

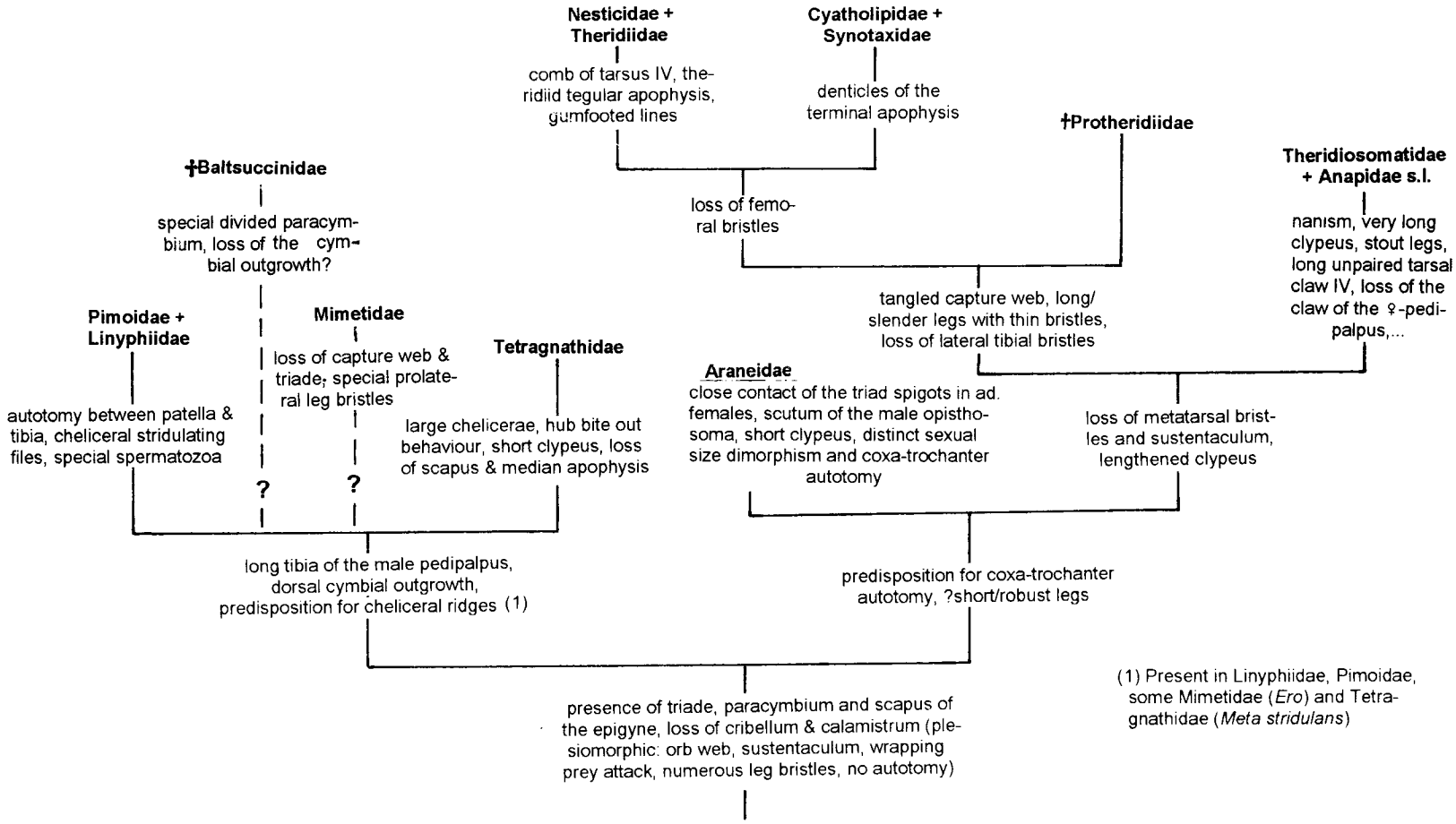
Remarks: (1) Convergently evolved in Eresidae,
(2) also lost in Eresidae, Oecobiidae and several taxa of the RTA-clade,
(3) few reversals in Oecobiidae; converg. evolved in other superfam.
(4) convergently evolved in Oecobiidae, Deinopidae, Uloboridae (part.) and ecribellate Araneoidea



Possible cladogram (2) of the families of the „ecribellate araneoid branch" (ARANEOIDEA s. str.) after selected characters , Zygiellidae excl.



Alternative possible cladogram (3) of the families of the „ecribellate araneoid branch" (ARANEOIDEA s. str.) after selected characters, Zygiellidae excl.
For more details e.g. in pairs of families compare cladogram (2)



(1) Present in Linyphiidae, Pimoidae, some Mimetidae (*Ero*) and Tetragnathidae (*Meta stridulans*)

Alternative possible cladogram (4) of the families of the „ecribellate araneoid branch" (ARANEOIDEA s. str.) after selected characters, Zygiellidae excl.
For more details e.g. in pairs of families compare cladogram (2)

Remarks on some structures of the ♂-pedipalpus in the „araneoid ecribellate branch" (= Araneoidea s. str.)

1. **"Median" and terminal apophyses** may be plesiomorphic in Araneoidea s.l. and in the related superfamily Oecobioidea but there is some doubt. The „median apophysis" in different families evolved most probably several times inde-pendently; compare the „theridiid tegular apophysis" of the Theridiidae sensu CODDINGTON (1990). Other bulbus structures – e. g. a functional conductor – evolved also appearently several times in the Araneoidea: Most probably in Araneidae, the „reduced pyriform clade" and within the Tetragnathidae.
2. A **cymbial outgrowth** in a +/- dorsal-basal position (DCO in figs. 13-14) occurs in most families of the Araneoidea s.l.; not seldom in Mimetidae, frequently in Tetragnathidae (in all fossil taxa!) and Linyphiidae (in numerous fossils!), always in Pimoidae. Is this outgrowth an apomorphy of the „ecribellate araneoid branch" or of a part of this branch (cladogram 3) - or did this structure evolve numerous times independently? In the last case there should be several losses on family level, e. g. in Theridiosomatidae + Anapidae s.l., Araneidae, Nesticidae + Theridiidae, Cyatholipidae + Synotaxidae, Baltsuccinidae as well as numerous losses within the Linyphiidae and several reversals. In my opinion did the DCO more likely evolve only once – on suprafamiliar level, compare cladogram 3 - and there are no losses on family level but within several families.
3. A **retromarginal cymbial furrow** or groove (RCF in fig. 13) occurs in numerous families and may be a synapomorphic character of the Araneoidea s.str. It is present in different families as in Linyphiidae (fig. 13) and Tetragnathidae – distinct e.g. in *Phonognatha* – and therefore it is surely not an apomorphic character of the family Synotaxidae as supposed by GRISWOLD et al. (1998: 31).
4. A **retromarginal cymbial outgrowth** (RCO in fig. 13) could well be an autapomorphy of Pimoidae + Linyphiidae (cladogram 2) and probably + Tetragnathidae (cladogram 3). The „pimoid cymbial sclerite" may be homologue.
5. The **retrobasal paracymbium** (P, figs. 13-14) is an autapomorphy of the ecribellate Araneoidea (= Araneoidea s.str.), compare e.g. WUNDERLICH (1986: 110-111). As a free/movable sclerite it occurs in several families, in the Linyphiidae (apomorphic), in few Nesticidae and Zygiellidae. The retrolateral paracymbium has been lost in Theridiidae (apomorphic), numerous taxa of the Anapidae s.l. and few taxa of the Linyphiidae and Araneidae. The flexible attachment of the paracymbium from the intersegmental membrane is unique in the family Linyphiidae, compare HORMIGA (1994).

Remarks on the cladogram on orb-web building spiders which has been given by GRISWOLD et al. (1998)

Compare cladograms (2, 3) below.

(1) Step no. 10 („**spineless femur clade**"): In this clade I know femoral macrosetae only in *Cyatholipus hirsutissimus* (Cyatholipidae) - in my opinion as a reversal - see the paper of GRISWOLD on South African Cyatholipidae, figs. - and the paper on this family in this volume. Because of the presence of autotomy between coxa and trochanter in related families – with a probable reversal in the Cyatholipidae - the newly introduced "coxa-trochanter autotomy clade" (or branch) is nearly identic with the „spineless - better: "bristleless" - femur clade", see the cladograms (2, 3). I suppose that the extinct family Protheridiidae is a basal member of these clades and the only known taxon in which femoral, lateral tibial and metatarsal bristles still are present.
(2) steps no. 18, 15 (**Anapinae and related taxa**): In my opinion has the paracymbium basicly not been lost but only strongly reduced in the Anapidae s. l. - e. g. in the Comarominae n. subfam. – similar to Theridiosomatidae. In the Anapinae s.str. (= Anapidae auct.) are the female genitalia basicly not haplogyne but entelegyne, see e.g. Comarominae and *Zangherella*; THALER & KNOFLACH (1998);
(3) clade 3 (**Synotaxidae**): A retromarginal groove/furrow of the cymbium is present in several genera of the family Synotaxidae and also found in other families as Linyphiidae and Tetragnathidae, pers. obs., see above, fig. 13;
(4) clade 5 („**Cyatholipoids**"): The paracymbium is quite variable in Cyatholipidae as well as in Synotaxidae. A possible synapomorphy of these families may be the denticulate terminal apophysis, compare the papers on these families in this volume;
(5) clade 12 ("**araneoid sheet web weavers**"): See above and below: On the origin of the orb web;
(6) clade 21: In my opinion **Nephilinae** is a member of the Araneidae and not of the Tetragnathidae, see the cladograms (2) and (3), the papers on fossil Araneidae in this volume and of SCHARFF & CODDINGTON (1997);
(7) clade 23: Basicly trichobothria are present in **Leucaugine** on all femora (not only on IV) as well as in Tetragnathinae, too (pers. obs.);
(8) clade 25 (**Tetragnathidae**): According to HEIMER & NENTWIG (1982) a - ?homologue – median apophysis is also found in Tetragnathidae. In contrast to the opinion of GRISWOLD et al. (1998) HAUSDORF (1999) regards Tetragnathidae a more basal branch than Araneidae. The relationships of these families and on the basal branch of the Araneoidea s. str. remain unclear, see my cladograms (2) and (3).
(9) clade 27 (**Araneidae**): The sustentaculum (in German „Webestachel") is a strong macrosetum ventrally-distally on tarsus IV. The presence of a sustentaculum is usually connected with the wrapping prey behaviour, and a closer study of this structure is needed. In some members of *Linyphia* (Linyphiidae) exist a wrapping prey attack but a sustentaculum is absent. Usually in Araneoidea s. str. only one such bristle is present but in *Cyrtophora* (Araneidae) I found numerous macrosetae under tarsus and metatarsus IV. In members of the Araneoidea I found such a bristle in Araneidae and exceptionelly in Tetragnathidae: *Meta*. In most members of the Araneidae – e.g. *Zygiella, Araneus* – the sustentaculum is strongly bent at the tip, compare SCHARFF & CODDINGTON (1997: Fig. 30) but e. g. in *Larinia* and Nephilinae: *Nephila* and *Nephilengys* it is not bent (pers. obs.). In *Meta* is the sustentaculum also not bent at the tip and in a proventral position (pers. obs.). For the special and usually bent sustentaculum of the family Araneidae I introduce here

the term „araneid sustentaculum". – Short ventral tarsal macrosetae are also present in more primitive superfamilies - e.g. Eresidoidea and Oecobioidea - but in these taxa it is usually not single; so the reduced number - only one - may be an autapomorphy of the Araneoidea s. str. (compare cladogram 1) with a "reversal" to multiple macrosetae in *Cyrtophora*. In cladogram 2 should the sustentaculum be lost once, in cladogram 3 twice (with reversals).
(10) **character 49** in the Araneoidea s. l. (= „Orbiculariae"): The basic presence of grooves of the book lung covers seems very dubious to me. Such grooves are absent in Uloboridae as well as in most Araneoidea s. str. More likely smooth book lung covers are plesiomorphic in the Araneoidea s. l.

On the cladograms (1 to 4) of the Araneoidea s. l. and their kin

Nanometinae FORSTER & FORSTER: See the paper on Tetragnathidae in this volume. Mimetidae incl. Malkarini, Sternodini, Pararchaeini and Holarchaeini: See the paper on Mimetidae s. l.. Zygiellidae and Nephilinae: See the paper on Araneidae and Zygiellidae in this volume.

Several recent authors agree that cribellate Araneoidea in the sense of this paper and volume (= Deinopoidea) and ecribellate Araneoidea (= Araneoidea s. str.) are sister groups within the Araneoidea s. l. (= „Orbiculariae"), compare e. g. CODDINGTON & LEVI (1991), GRISWOLD et al. (1998) and below. This supposion is not sure, compare e.g. HAUSDORF (1999). Furthermore the monophyly of the Araneoidea s.l. – compare above - does not necessarily mean that the orb web did originate only once.

CODDINGTON (1986) discussed the relationships of the Deinopidae and Deinopoidea. This author interpreted the features 8 to 10 in his fig. 12 as synapomorphies of the Deinopoidea. In my opinion at least characters 8 and 10 are plesiomorphic: (Ventral) 4th tarsal macrosetae are present e.g. in the „primitive" Filistatidae, Eresidae and Oecobioidea and pseudoserrate plumose hairs are present e. g. in the „primitive" Palpimanidae. There are relationships of the families Deinopidae and Uloboridae (compare the plesiomorphic characters mentioned above and the cladogram 1) but according to the special and derived web as well as the special prey capture behaviour in my opinion Deinopidae may be the – specialized - sister group of Uloboridae + Araneoidea s. str. and probably not the sister group of the Uloboridae, compare cladogram 1 and the next page. On the other hand: After PETERS - e. g. 1992, Zoomorph., 112: 27-37 - multiple tubuliform (cylindrical) gland spigots on PMS and PLS are common to Deinopidae and Uloboridae; also the loss of a tapetum of the "secondary" eyes is common to both families.

Therefore Deinopidae and Uloboridae may be closely related. - In any way: The higher taxon of these three taxa - Deinopidae, Uloboridae and Araneoidea s. str. - I call **Araneoidea s.l.**;in my opinion the term „Orbiculariae" is superfluous, see above.

My possible cladogram of the Araneoidea s.str. (2) is nearly identical with the cladogram of GRISWOLD et al. (1998). One of the differences is the newly proposed „coxa-trochanter autotomy clade". After this cladogram a coxa-trochanter autotomy evolved two times and a dorsal cymbial outgrowth evolved at least two times on higher level in the Araneoidea s. str.
An alternative is my cladogram (3). After this cladogram a dorsal outgrowth of the cymbium - on family level - evolved only once, the coxa-trochanter autotomy evolved only once, too but an irregular web evolved (from the orb web) twice. To my knowledge the kind of autotomy is an important and constant character on family level. Furthermore the coxa-trochanter autotomy is not an autapomorphic character of the Araneoidea (s.l. as well as s. str.) and is rare in primitive families. Araneidae and Tetragnathidae are not closely related in this cladogram but show convergences - or plesiomorphic characters? -, e.g. the short clypeus. This cladogram is also supported by (1) the link of the presence of coxa-trochanter autotomy with the loss of the wrapping prey attack in the sister group (with some reversals) and (2) by the different types of the capture web in the two „irregular capture web" branches. Perhaps in the future genetic studies will give more informations about the relationships of the Araneoidea families, compare the paper of HAUSDORF (1999) as a first step.
Probably the most correct relationships are shown in cladogram (4). According to this cladogram evolved the short clypeus - probably from a clypeus of medium length - in Araneidae + Zygiellidae and in Tetragnathidae to times indepently.
The irregular threedimensional capture web of various Araneoidea s. str. derived most probably from an orb web, see e. g. GRISWOLD et al. (1998: 22-23), probably two times, see the cladograms (3, 4). But in which way originated the orb web? See the next paragraph.

Remarks on the origin of the orb web and the web of the Oecobiinae Fig.16,photo 573.

The origin of the orb web is still a mystery. WUNDERLICH - Beitr. Araneol. (1995:69ff) - discussed the origin of the orb web and regarded the web of the Oecobiidae as a model of the orb web-building ancestors. Here I give some further remarks and some new findings on this matter.
The web of the Oecobiidae is not a true capture web but it is used for catching prey - arthropods are not caught in the web but detected outside the web with the help of signal threads which are running sidewards from the web and are raised on posts similat to Liphistiidae and Segestriidae. - The whole web construction consists of two different

webs, both are two-dimensional: (1) A lower web near the ground on which the spider is sitting in or near the center and waiting for prey, walking/wingless arthropods. This I call the "**resting web**". There exists (2) a smaller and more dense upper web which hides the spider and which I call the "**hiding web**". The upper web may be a protection against enemies as birds or parasitoitic wasps. Both webs build a hiding area (retreat). This kind of retreat - which is open to all sides - is not comparable with the tubular retreat in some Araneidae and spiders of other families but O. KRAUS (in litt.) observed members of a *Metepeira* sp. (Araneidae) in California which were sitting beneath small white "hats".

Note on fossil Oecobiidae: Members of the fossil Baltic amber genus *Mizalia* KOCH & BERENDT 1854 probably built their webs on the bark of trees and possible signal threads are preserved with a Cretaceous member of *Lebanoecobius* n. gen., compare the paper on the superfamily Oecobioidea in this volume.

In *Uroctea durandi* (LATREILLE 1809) both webs are built on a plain ground; therefore the upper web must be dome-shaped, compare fig. 16. In all members of the Oecobiini - more than a dozen species of the genus *Oecobius* of the Canary Islands have been observed by me - the webs are built over cavities e.g. on stones, in the corners of (house) walls or on the bark of trees. Because of the concave bottom the upper web in *Oecobius* can be and really is plain in contrast to the domed upper web in *Uroctea*.

At the corners of an abandoned house on Tenerife - near Igueste de San Andres, Canary Islands - I found webs of *Oecobius* sp. which had a diameter up to 6.5cm. In some of these webs the upper webs were partly destroyed and the threads were marked by dust particles as shown in the photo. The threads of the lower webs were situated near the ground or on the ground; so these webs showed the same angle as the corner of the wall. The upper webs were nearly plain. Most remarkable are the **spiral** (or ring-shaped?) threads of the lower webs which are best observable near the margin. On the Canary Islands I found such (?) spiral threads in all web of *Oecobius* webs I observed. Are these (?) spiral structures in a two-dimensional and tubeless web - which has a distance to the ground - a convergence to the orb web or a hint for a relationship to the orb web and furthermore a hint at a relationship of Oecobioidea and Araneoidea? Is the web of *Oecobius* a model of the orb weavers' ancestors' web? According to my hypothesis it is because it possesses three fundamental components of the oorb web: (1) radial/signal threads, (2) most probably spiral threads within a (3) two-dimensional web. One may imagine the absence of the upper web and the position of the lower web more removed from the ground or built even freely between rocks or stones. With a web in such a position the spider can detect and catch prey **in** the web as can members of the superfamily Araneoidea. Members of the Oecobioidea were probably the first spiders which lost its subterranean tube to rest under an overground **two**-dimensional web. The absence of a leg scopula in both superfamilies, Oecobioidea and in Araneoidea s. l. (= "Orbiculariae"), should be in connection with the web-building behaviour in these taxa. - A closer study of the web-building behaviour in *Oecobius* should be helpful to answer questions regarding the relationships of these superfamilies, and also the - quite different - **three**-dimensional web of some Hersiliidae is of interest in this respect.

Remarks on origin and relationships of the superfamily Araneoidea

The oldest questionable members of the Araneoidea: See SELDEN et al. (1999).

During the Lower to Upper Cretaceous the radiation of most Angiospermae and the co-evolution of flying insects happened, see GRIMALDI (1999). For web-building spiders in higher strata there were two main types of biotop niches: Dense vegetation and open localities. An orb web is the optimal construction to capture flying insects in more open habitats, an irregular three-dimensional web is a better construction to capture prey in dense vegetation or in cavities under stones, especially more walking than flying insects. The tangled-web of Theridiidae is more useful to catch walking insects as Formicidae which diversified probably in the late Cretacous. Members of the super-family Araneoidea profited by the diversification of flying insects in the sesond half of the Cretaceous by the latest - mainly Diptera and Hymenoptera, see ESKOV & WUNDERLICH (1995: Figs. 8-9) – and thus their evolution depended indirectly on the Angiosperm radiation. Probably most ecribellate Araneoid families – and also some others as Corinnidae, Salticidae and Zodariidae - diversified or even originated in this period.

If the Araneoidea s.l. is a monophyletic taxon: What is its sister group? This question remains unsolved and there are several possibilities, e. g.: Eresoidea s.l. (including Archaeidae and Palpimanidae), Oecobioidea, both superfamilies together, Nicodamidae, the RTA-clade, the RTA-clade + Nicodamidae. According to the presence of fertilization ducts, the overground resting position, the radial signal threads (e.g. in the Oecobiidae), the special prey capture behaviour (fixing the prey to the ground by rapid circling as a step to the wrapping prey capture behaviour in the Araneoidea s. l. by handling/moving the prey), the reduction of the number of receptacula seminis to two pairs (see the Hersiliidae) as well as probably the presence of a scapus of the epigyne, the Oecobioidea may be strongly related to the Araneoidea s.l. or even its sister group, see cladogram (1). This is not a brand-new idea - see LEHTINEN (1967: 283) - but hypothesis of various authors on the origin of the orb web, on behaviour, on the origin of several somatic and genital structures and on the relationships of the Oecobioidea were/are different, see above.

This hypothesis is supported by the similar structure of the male genitalia of the family Oecobiidae: in primitive extant taxa and in fossil taxa from the Cretaceous, the Early Tertiary Baltic amber; see the paper on the Oecobioidea in this volume: A simple and wide bulbus with the embolus originating near the center and circling a tegular (= „median") apophysis near the center, see fig. 15: The hypothetic bulbus of the ancestor of Oecobioidea + Araneoidea s.l. In my opinion the basic structure of the Deinopidae bulbus is quite similar and different from the bulbus of the more derived Uloboridae.

Totally unclear are the relationships of the Jurassic spider family Juraraneidae ESKOV; too many structures are unknown in this taxon (is a cribellum actually absent?).

DESCRIPTIONS OF THE NEW TAXA

A. Baltsuccinidae n. fam. (German name: Bernstein-Baldachinspinnen)

Diagnosis (♂; ♀ unknown): Clypeus about as long as the field of the median eyes (figs. 2,10), opisthosoma soft, eyes of the posterior row about equally spaced (fig. 1), legs with numerous bristles (fig. 3) on femora, patellae (dorsally but not laterally), tibiae and metatarsi. Pedipalpus: No patellar or tibial bristles, cymbium slender, restricted and in a prodorsal position (fig.5), a dorsal outgrowth absent, retromarginal furrow distinct, partly guiding the embolus (fig. 8), paracymbium bipartite, not outstanding, with a large bath-tube shaped, strongly sclerotized and free sclerite and a long, slender and hairy branch (figs. 7, 9, 12). A large terminal apophysis and a small questionable conductor are present, median apophysis unknown, embolus thin and very long, an embolar process is perhaps present (EA in fig. 8). Probably no leg autotomy, see below. Capture web unknown, perhaps irregular, see below; the long-legged spiders were most probably web-dwellers.

Further characters: Ecribellate, unpaired tarsal claw present, tarsal and femoral trichobothria absent, one metarsal trichobothrium present as in other members of the Araneoidea, short, its position near the base of the article (fig.3); colulus present, sustentaculum, comb of tarsus IV, cheliceral condylus, a stridulating organ and furrows of the lung covers absent; position of the posterior tracheal spiracle most probably near the spinnerets, posterior eye row recurved (fig. 1). Kind of autotomy unknown, in my opinion most probably absent: In the two long-legged fossils there is no indication regarding any kind of autotomy.

The **relationships** are doubtful. After the long clypeus and the eye position the new family may be a member of the „araneoid irregular web weavers" or the sister group of this taxon, compare the cladograms (2, 3). - In Baltsuccinidae there is a mixture of plesiomorphic characters present - as numerous leg bristles, the eye position and probably the long clypeus - as well as apomorphic characters, e.g. the restricted cymbium and the divided paracymbium (one branch is a free sclerite) and the position of the long embolus; compare the relationships of Linyphiidae and Tetragnathidae according to HEIMER (1982), HEIMER & NENTWIG (1982), see also WUNDERLICH (1986: 110). A "true" embolic division (in German: "Endapparat") as in Araneidae and Linyphiidae may be present but I am not sure about the presence of a radix. – As in most Tetragnathidae - but also in numerous other Araneoidea - there are large chelicerae (fig.2); the cymbium is restricted (fig.5) and a divided paracymbium is present as in several Tetragnathidae. In contrast to the Tetragnathi-

dae are the bulbus structures complicated and the position of embolus/conductor are quite different, tegulum/subtegulum are not unusually large, an embolic process is probably present; in contrast to most primitive Tetragnathidae - as well as Pimoidae and primitive Linyphiidae - is a dorsal outgrowth of the cymbium absent.
As in Araneidae, Zygiellidae and Tetragnathidae - in primitive Linyphiidae and in Pimoidae, too - there are numerous leg bristles (fig.3) in Baltsuccinidae; in contrast to most members of Araneidae, Zygiellidae and Tetragnathidae is the clypeus longer (fig. 2) and one branch of the bipartite paracymbium is a free sclerite of unusual shape (fig.7); in contrast to most Araneidae are a cheliceral condylus and a sustentaculum absent; as in Tetragnathidae and Zygiellidae is the bulbus not twisted.
In contrast to Linyphiidae and Pimoidae are cymbium and paracymbium quite different (the paracymbium is +/- sickle-shaped in these families) and cheliceral stridulating files are absent; the kind of autotomy is also most probably different. In some members of the Pimoidae is an embolic process present and the large branch of the paracymbium of Baltsuccinidae may be homologue to the PCS of the Pimoidae but in Pimoidae are the remaining structures of the male pedipalpus quite different, compare the paper on Pimoidae in this volume. - In Cyatholipidae and Synotaxidae is the chaetotaxy quite different and also cymbium, paracymbium and bulbus structures are otherwise, there are no femoral and no dorsal metatarsal bristles and usually a denticulate conductor is present; in Synotaxidae is the paracymbium fixed to the cymbium and is mostly an erect/outstanding structure, in most Cyatholipidae is a divided but short paracymbium present which is completely fixed to the cymbium, the anterior tracheal spiracles are in a frontal position and widely spaced. Compare the Protheridiidae n. fam. below.

Type genus: *Baltsuccinus* n.gen. (the only known genus of the family).

Distribution: Tertiary Baltic amber forest.

***Baltsuccinus* n.gen.**

Diagnosis (♂; ♀ unknown: See the family diagnosis.

Relationships: See above.

Type species: *Baltsuccinus flagellaceus* n.sp.

Distribution: Tertiary Baltic amber forest.

***Baltsuccinus flagellaceus* n.sp.** (figs. 1-9) Photos 181-182

Material: Holotype ♂ in Baltic amber and 4 separated amber pieces F40/BB/AR/BAL/CJW.

Preservation and syninclusions: Body and legs are fairly well preserved, the genital structures are excellently preserved, the body – and partly the legs - are fairly strong covered by an emulsion. The opisthosoma is hollow and cut off near the middle. Cut off are also parts of all right legs. – In front directly below and partly in contact with the spider is a member of the Braconidae (Hymenoptera) preserved. Thin threads – not sticky - are running through the amber piece. In one of the separated amber pieces is a small Diptera: Nematocera preserved.

Diagnosis (♂; ♀ unknown): Paracymbium (fig. 7) ventrally slightly asymmetric, dorsally strongly bent to the tip of the cymbium.

Description (♂):
Measurements (in mm): Body length ca 3.5, prosoma: length 2.2, width ca 1.8, length of a basal cheliceral article 1.3; leg I: Femur 4.0, patella 1.1, tibia 4.0, metatarsus 4.5, tarsus ca 1.5, tibia IV 1.9.
Colour: Prosoma and legs dark brown, legs probably originally annulated, opisthosoma yellow brown.
Prosoma (figs. 1-2; similar to fig. 10) distinctly longer than wide, not high, fairly hairy, fovea a flat grove. 8 eyes of medium size (partly covered by an emulsion), posterior row recurved, distance of the posterior median eyes less than to the lateral eyes. Clypeus concave, its length about as long as the length of the me-dian eye field. Basal articles of the chelicerae large; condylus and stridulating files absent, teeth of the furrow and most parts of labium, gnathocoxae and sternum hidden. – Legs (figs. 3-4) long and fairly robust, order I/II/V/III, I and II distinctly longer than III and IV, tibia I slightly bent, 16 times longer than wide, ti-biae and metatarsi I-II covered ventrally with very long hairs. Bristles numerous: Femur I 8, patella 2 dorsally, tibiae dorsally 2, additionally on I-II 2 pairs laterally (tibiae III-IV have less numerous bristles), metatarsi with 2 bristles basally-dorsally. Metatarsal trichobothria apparently short and in a basal position (fig.3), paired tarsal claws with numerous long teeth (perspectively shortened in fig.4), unpaired claw long and bent in a right angle, auxiliary hairs ?smooth.- Opisthosoma only partly preserved; compare *S. similis* n.sp. – ♂-pedipalpus (figs. 5-9): See above.

Relationships: See *B. similis* n. sp. Near the base of the embolus is a tiny, denticulate and nearly spherical structure present (fig.7).

Distribution: Tertiary Baltic amber forest.

***Baltsuccinus similis* n.sp.** (figs. 10-12) Photos 183-185

Material: Holotypus ♂ in Baltic amber, Inst. Mus. Geology & Paleont. Goettingen, G 359.

Preservation and syninclusions: The spider is preserved in a flat amber piece; parts of the left pedipalpus and the left legs I-III are lacking, parts of femora of these legs are cut off in the amber on a layer, the distal part of the left tibia II and the basal part of the left metatarsus II are cut off. Only very few parts of the spider are covered by an emulsion (perhaps the amber piece has been heated in an autoclave). The left femora I and II were cut off longitudinally in the amber on a layer and were embedded again by a second resin flow. Remains of muscles are preserved in these femora (fig. 11). – Also preserved in the amber piece are numerous crystals of pyrite, a tiny Rhabditida (Nematoda), several threads in a mainly parallel position, which bear tiny droplets and stellate hairs. Below the right tibia I are a tiny arthropod leg and near the right metatarsus I a tiny Collembola preserved. A larger Collembola is situated behind/above the spider, the anterior third of a wasp (Hymenoptera) is preserved in front/above the spider.

Diagnosis (♂; ♀ unknown): Basal part of the paracymbium (fig. 12) directed dorsally, distal part symmetric.

Description (♂):
Measurements (in mm): Body length 4.2, prosoma length 2.2, leg I: Femur 4.4, patella 1.1, tibia 4.4, metatarsus 5.0, tarsus 1.5, tibia IV 2.1.
Colour mainly dark brown.
Prosoma (fig. 10) and legs as in *B. flagellaceus* n.sp. Remains of muscles of the left femur I: Fig. 11. Labium longer than wide (?), gnathocoxae longer than wide.- Opisthosoma (fig. 10) more slender in the distal half, covered with short hairs, furrows of the lung covers absent. Spinnerets short. – ♂-pedipalpus: (fig. 12, compare the diagosis): Besides the shape of the large branch of the paracymbium apparently as in *S. flagellaceus*; both bulbi are expanded and the embolus and most probably the paracymbium are in an unnatural position.

Retationships: *B. flagellaceus* n.sp. is strongly related; in *flagellaceus* is the paracymbium distally (ventrally) asymmetric and basally (dorsally) bent anteriorly.

Distribution: Tertiary Baltic amber forest.

B. Protheridiidae n. fam. (German name: Ur-Kugelspinnen)

Diagnosis (♂;♀ unknown): Eye field wide (fig. 19), clypeus about as long as the eye field (fig. 20), numerous leg bristles present on femora, tibiae and in *Protheridion* on metatarsi, too (figs. 21-22, 32, 35). Pedipalpus (figs. 17-18, 23, 27, 33-34, 36, 39-40) with an outstanding retrobasal paracymbium which is fixed to the cymbium and not stronger sclerotized, two tegular apophyses present, one of these is denticulate, the distal apophysis has the function of a conductor; a long and slender embolus; embolic division absent; leg autotomy between coxa and trochanter in *Protheridion*.

Further characters: Ecribellate, unpaires tarsal claw present, tarsal and femoral trichobothria absent, one metatarsal trichobothrium present as in other members of the Araneoidea, colulus and probably a straight sustentaculum (fig. 25) are present, a comb of tarsus IV, cheliceral condylus, furrows of the lung covers, a stridulating organ and a dorsal cymbial outgrowth are absent, position of the posterior tracheal spiracle most probably near the spinnerets, labium distally rebordered, coxa and gnathocoxa unmodified. Sexual size dimorphism and capture web unknown.

The **relationships** are not sure. According to the kind of autotomy and the conformation of the structures of the bulbus may Protheridiidae be related to the Theridiidae - in which a retrobasal paracymbium is absent and usually a comb of tarsus IV is mostly present - and related to the "bristleless femur clade"; in this clade are the few leg bristles quite different. The prolaterally elongated tibia of the ♂-pedipalpus in *Protheridion* (figs. 18, 26) is similar to the Theridiidae. I regard the numerous leg bristles in the Protheridiidae as a plesiomorphic character of the Araneoidea and suppose that the new family is a basal member of the "coxa-trochanter autotomy clade" (branch) or the sister group of the "bristleless femur clade", compare the cladograms 2-4. In the Praetheridiini are femoral bristles present but metatarsal bristles are absent (fig. 35). Probably Protheridiidae is a paraphyletic taxon and the loss of metatarsal and lateral tibial bristles in the Praetheridiini may be a first step of the reduction of leg bristles in the direction to the "bristleless femur clade". - In the Baltsuccinidae - in which also a long clypeus and numerous leg bristles are present - is the kind of autotomy apparently different and the structures of the male pedipalpus are totally different. - In the Cyatholipidae and the Synotaxidae - compare FORSTER et al. (1990) - is also a denticulate bulbus apophysis present, in the Protheridiini is the paracymbium similar to the Synotaxidae. Unfortunately only few informations are given on the chaetotaxy of the Synotaxidae in the paper of FORSTER et al. (1990); according to my knowledge are femoral, lateral tibial and metatarsal bristles absent in the Synotaxidae. - A denticulate tegular apophysis/conductor occurs in several families of the Araneoidea besides Cyatholipidae and Synotaxidae, e. g. in the extant Araneidae *Gea theridioidea* (L. KOCH 1872), see DAVIES (1988: Fig. 32) and in the extant Theridiidae *Achaearanea lunata* (OLIVIER 1789). According to somatic and genitalic structures

both taxa are not confamiliar with the Protheridiidae.

Type tribus: Protheridiini n. trib.; further tribus: Praetheridiini n.trib.

Type genus: *Protheridion* n. gen.

Ecology: In the amber piece with *Protheridion detritus* n. sp. is the scale of a Pinaceae preserved. Probably built members of this genus their webs on trees of the Pinaceae.

Distribution: Tertiary Baltic amber forest.

Protheridiini n. trib.

Diagnosis (♂;♀ unknown): Legs fairly robust, lateral tibial and metatarsal bristles present (fig. 32); pedipalpus: Tibia prolaterally strongly elongated (fig. 18), paracymbium undivided, a large retroventral tegular apophysis present (fig. 23), the denticulate distal tegular apophysis is functioning as a conductor.

Relationships: In the Praetheridiini are metatarsal bristles absent, the legs are long and slender, the tibia of the ♂-pedipalpus is not strongly elongated, the paracymbium is divided, a retroventral tegular apophysis and a denticulate conductor are absent.

Type species: *Protheridion tibialis* n.sp.

Distribution: Tertiary Baltic amber forest.

Protheridion n. gen.

The **gender** of the name is neuter.

Diagnosis (♂; ♀ unknown) and **relationsphips**: See above.

Type species: *Protheridion tibialis* n.gen.n.sp.

Distribution: Tertiary Baltic amber forest.

Key to the species of the genus *Protheridion* (♂):

1 Patellar and tibial bristle of the pedipalpus present (figs.30,33).*Punctatum* group..2

- Patellar and tibial bristle of the pedipalpus absent (figs.17,23). *Tibialis* group. 3

2(1) Only one ventral macrosetum on tarsus IV, thin patellar and tibial bristles of the pedipalpus, embolus partly hidden (fig.31). . . . . ***punctatum***

- Two ventral macrosetae on tarsus IV (fig.32), strong patellar and tibial bristles of the pedipalpus, embolus as in fig.34. . . . . ***obscurum***

3(1) No ventral bristle of metatarsus III, pedipalpus figs.17-18. . . . . ***tibialis***

- A ventral metatarsal III bristle present in the middle (fig.24) . . . . . ***detritus***

- A ventro-apical metatarsal III bristle present (fig.21). . . . . ***bitterfeldensis***

***Protheridion tibialis* n.sp.** (figs. 17-19)

Material: Holotypus (two parts, compare below), F38/BB/AR/PRO/CJW.

Preservation and syninclusions: The spider is completely and well preserved, the pedipalpi are excellently preserved. The small amber piece is broken at a layer; dorsal parts of opisthosoma, legs and small parts of the prosoma are preserved separately, most parts of the spider are located in the larger piece. The ventral side of the spider is slightly covered by an emulsion. In front of and behind the spider are thin threads preserved which carry droplets, one thin thread appearently originates on the left posterior spinneret (fig.19). Below the sternum is a bubble preserved; no stellate hairs.

Diagnosis (♂; ♀ unknown): Ventral bristle of metatarsus III absent, in the retrolateral view only the apical part of the embolus is observable (fig. 1).

Description (♂):
Measurements (in mm): Body length 2.8, prosoma length 1.35, opisthosoma: Length ca 1.55, width 1.25; leg I: Femur 1.5, patella 0.4, tibia 1.1, metatarsus 1.0, tarsus 0.5, tibia of the pedipalpus including the outgrowth 0.5.

Colour: Prosoma and legs dark brown, legs not annulated, opisthosoma yellow brown.
Prosoma distinctly longer than wide, few indistinct hairs, profile distinctly convex, similar to fig. 33. Eye field wide, anterior median eyes protruding, medial eyes large, lateral eyes touching, posterior row +/- straight, clypeus shorter than the field of the median eyes, basal articles of the chelicerae short and robust, directed a bit backward, no condylus, fangs long, gnathocoxae about as long as wide, labium wider than long, rebordered. – Legs robust, order I/II/IV/III, I distinctly the longest, with numerous thin bristles similar to fig. 22: Tarsi and metatarsi I-II none, patellae and tibiae dorsally 2 (probably on tibia III the distal bristle is absent), tibiae I-II also with lateral and apical bristles, all femora 1 dorsally in the basal half, I additionally 1 prodistally. Tibiae with several long trichobothria, metatarsal trichobothria indistinct, compare fig. 32. Unpaired tarsal claw long and bent in a right angle. – Opisthosoma longer than wide, widest bevor the middle, covered with very short hairs, bearing ?two pairs of small sigillae; dorsal scutum absent, no lung cover furrows. Anterior spinnerets thick. Pedipalpus (figs 17-18, compare above): Femur long and slender, patella 1.65 times longer than wide, tibia prolaterally extremely elongated (as long as tarsus I), longer than the cymbium, patellar and tibial bristles absent, tibia bearing at least 3 trichobothria, cymbium retrolaterally with a field of long and strong hairs, paracymbium a bit concave laterally, distal tegular apophysis denticulate, embolus slightly longer than the conductor.

Relationships: See *P. bitterfeldensis* n.sp. and *P. detritus* n.sp.

Distribution: Tertiary Baltic amber forest.

***Protheridion bitterfeldensis* n.gen.n.sp.** (figs. 20-23) Photo 187

Material: Holotypus ♂ in Baltic amber from Bitterfeld, F250/BB/AR/PRO/CJW.

Preservation and syninclusions: The spider is fairly well preserved. The left side is in contact with an amber layer, the dorsal third of the opisthosoma is wanting/cut off in the amber, parts are covered by a white emulsion. – Also preserved are some longer threads and stellate hairs.

Diagnosis (♂; ♀ unknown): Metatarsus III with a ventro-apical bristle (fig. 21); a long distal part of the embolus is visible in retrolateral view (fig. 23).

Description (♂):
Measurements (in mm): Body length 2.3, prosoma length 1.3; leg I: Femur 1.5, patella 0.5, tibia 1.07, metatarsus 1.0, tarsus 0.45, tibia II 0.85, tibia III 0.48.

Colour: Prosoma and legs dark brown, opisthosoma light brown.
Prosoma (fig.20): Profile convex, troracal groove and very short hairs present, clypeus about as long as the field of the median eyes; eyes most probably as in *B. punctatus* n.sp., compare fig. 13. Basal articles of the chelicerae short and robust, directed slightly backwards, teeth not observable. – Legs (figs.21-22) robust; bristles as in *P. tibialis* but metatarsi III additionally with a ventro-apical bristle. – Opisthosoma nearly egg-shaped, widest in the middle, slightly compressed dorso-ventrally, soft, with few short hairs; spinnerets short. – Pedipalpus (fig.23): Femur long and slender, patella and tibia without bristle, tibia prolaterally strongly elongated - similar to fig. 2 -, cymbium shorter than the tibia with its outgrowth, retrolaterally with long and strong hairs, paracymbium slightly longer than wide, retrolaterally concave, (sub)tegulum large, retroventral tegular apophysis large and pointed posteriorly, distal tegular apophysis large and denticulate, distal part of the embolus free visible.

Relationships: In *P. tibialis* n.sp. a ventral bristle of tarsus III is absent, the paracymbium is wider and the embolus is in a different position. In *P. detritus* n. sp. is the position of the ventral bristle of metatarsus III in the middle, the position of embolus and conductor are different.

Distribution: Tertiary Baltic amber forest, Bitterfeld locality.

***Protheridion detritus* n.gen.n.sp**. (figs. 24-28)

Material: Holotypus ♂ in Baltic amber, F44/BB/AR/PRO/CJW.

Preservation and syninclusions: The spider is well and completely preserved. Dorsally it is touched by an amber layer, opisthosoma as well as labium and gnathocoxae are covered by an white emulsion. – Also preserved are 2 Diptera, a scale of a ♂ cone of a Pinaceae and numerous detritus particles; no stellate hairs.

Diagnosis (♂; ♀ unknown): Metatarsus III with a ventral bristle in the middle (fig. 21), ♂-pedipalpus (figs.26-28): Paracymbium long, distal part of the embolus free visible.

Description (♂):
Measurements (in mm): Body length 2.1, prosoma length about 1.1, tibia I 1.1, femur II 1.2.
Colour: Prosoma dark brown, legs medium brown, opisthosoma yellow brown.
Prosoma: Profile convex, clypeus as long as the field of the median eyes, posterior median eyes separated by less of its diameter, separated from the lateral eyes by 1

½ diameters; anterior median of the same size as posterior medians, lateral eyes touching, chelicerae robust, teeth hidden, condylus absent, labium wider than long, rebordered. Sternum convex, scanty elongated between the coxa IV. – Legs (figs.24-25) robust, similar to *B. tibialis* but metatarsus III with a ventral bristle in the middle. – Opisthosoma ovally, covered with short hairs, soft, lung covers without furrows; anterior spinnerets thick, colulus indistinct. – Pedipalpus: Figs. 26-28.

Relationships: In *P. tibialis* a ventral metatarsal bristle is absent.

Distribution: Tertiary Baltic amber forest.

***Protheridion punctatum* n.gen.n.sp.** (figs. 29-31) Photo 186

Material: Holotypus in Baltic amber, F251/BB/AR/PRO/CJW.

Preservation and syninclusions: The spider is well and nearly completely preserved, a small dorsal part of the left tibia II is cut off, the right leg IV is lost after the coxa by autotomy. There is no emulsion. All legs are strongly bent under the body. - Several stellate hairs are preserved in the same amber piece, one in a separated piece.

Diagnosis (♂; ♀ unknown): Pedipalpus (figs. 30-31): Patella and tibia with a thin (hair-shaped) bristle, retrolateral cymbial hairs of medium length, embolus small.

Description (♂):
Measurements (in mm): Body length 2.3, prosoma length 1.1, leg I: Tibia ca. 1.0, metatarsus 0.85, tarsus 0.5, metatarsus IV 0.65.
Colour: Prosoma and legs dark brown, opisthosoma grey brown, legs not annulated. Prosoma (fig. 29) distinctly longer than wide, with hairs of medium length. Thoracal groove and chelicerae hidden. Eye field wide, posterior row slightly recurved, posterior median eyes separated by a diameter, separated from the lateral eyes by about 3 diameters. Clypeus as long as the diameter of an anterior median eye. Labium a free sclerite and distinctly rebordered, no outgrowth of the gnathocoxae. - Legs fairly robust, order I/II/IV/III, covered with short hairs and numerous shorter bristles: Femora 1 prodistally, patellae 1 short dorsally-basally, 1 long dorsally-distally and 1 long retrolaterally, tibia I 2 dorsally, 2 prolaterally and 1 retrolaterally in the distal half, metatarsus I 1 retrolaterally in the basal half, metatarsus IV with a straight ventrodistal bristle, the sustentaculum (?). - Opisthosoma longer than wide, soft, covered with short hairs, dorsally with 5 pairs of sigillae. Spinnerets short, the anterior pair thick. - Pedipalpus: See above.

Relationships: See *P. obscurum* n.sp.

Distribution: Tertiary Baltic amber forest.

***Protheridion obscurum* n.gen.n.sp.** (figs. 32-34)

Material: Holotypus in Baltic amber, F252/BB/AR/PRO/CJW.

Preservation and syninclusions: The spider is situated on a resin layer and completely preserved but dorsally strongly covered by a white emulsion. - A thin thread without droplets is preserved between the prosoma and the left femur IV. No stellate hairs but few tiny scales of a Lepidoptera.

Diagnosis (♂; ♀ unknown): A second ventral macrosetum besides the sustentaculum is present. Pedipalpus (figs. 33-34): Patella and tibia each with a distinct dorsal bristle, retrolateral cymbial hairs short, embolus large.

Description (♂):
Measurements (in mm): Body length 2.9, prosoma length 1.4, width 1.2, opisthosoma length 1.7, width 1.7, metatarsus I 1.07, leg IV: Femur 1.2, patella 0.5, tibia 0.7, metatarsus 0.8, tarsus 0.42.
Colour: Prosoma and legs dark brown, opisthosoma grey brown.
Prosoma strongly covered with a white emulsion; thoracal groove indistinct. - Legs (fig. 32) robust, with numerous bristles: All femora a dorsal bristle in the basal half, I additionally with a long prolateral and a short prodistal bristle, patella, tibia, metatarsus I probably as in *B. punctatum*. Position of the long trichobothrium (?) on metatarsus IV in 0.76. A straight sustentaculum is observable under the left tarsus IV, a further macrosetum nearby. Paired tarsal claws with tiny teeth. - Opisthosoma as wide as long, soft, dorsally covered by a white emulsion. - Pedipalpus: See above.

Relationships: *P. punctatum* has fewer leg bristles, no second ventral tarsal IV macrosetum is present, the patellar and tibial bristles of the pedipalpus are thinner and the embolus is smaller.

Distribution: Tertiary Baltic amber forest.

Praetheridiini n. trib.

Diagnosis (♂ ; ♀ unknown): Legs long and slender, metatarsal bristles absent (fig. 35); pedipalpus (figs. 36-40): Paracymbium long and divided, a large and not-denticulate conductor is present.

Relationships: See the Protheridiini.

Type species: *Praetheridion fleissneri* n. sp.

Distribution: Tertiary Baltic amber forest.

***Praetheridion* n. gen.**

The **gender** of the name is neuter.

Diagnosis and relationships: See above.

Type species: *Praetheridion fleissneri* n. sp.

Distribution: Tertiary Baltic amber forest.

***Praetheridion fleissneri* n.gen.n.sp.** (figs. 35-40) Photo 188

Derivation nominis: The species is named after Dr. HELMUT FLEISSNER in Bad Nauheim.

Material: Holotypus in Baltic amber, F42/BB/AR/PRO/CJW.

Preservation and syninclusions: The amber piece which includes the holotype has been covered with a thin layer of artificial resin. The spider is well preserved, not covered with an emulsion and nearly completely preserved, only the right tarsus

and metatarsus are wanting and the left leg IV after the coxa by autotomy; the genital organs are excellently preserved. The opisthosoma and especially the prosoma are deformed by artificial dorsal depressions, most eyes are hidden by the right femur I. - Also preserved are in the amber piece bubbles, stellate hairs, excrement ballets and an ?insect larva right of the right metatasus IV.

Diagnosis (♂; ♀ unknown) and **relationships**: Compare above.

Description:
Measurements (in mm): body length 1.8, prosoma: Length about 0.85, width about 0.8, leg I: Femur 2.15, patella 0.45, tibia 2.4, metatarsus 2.45, tarsus 0.8, tibia II 1.25, tibia III 0.5, tibia IV 1.05.
Colour: Prosoma and legs dark brown, opisthosoma yellow brown.
Prosoma nearly as wide as long. Eye field wide (most of the 8 eyes are partly hidden) and fairly large. Clypeus concave, about as long as the field of the median eyes. Basal articles of the chelicerae large, the anterior margin of the furrow bears at least one tooth, fangs thick, sternum separating the coxae IV by about one diameter. A stridulating organ is not observable, most probably absent. - Legs (fig. 35) - especially I - very long, hairs indistinct, order I/II/IV/III, III distinctly the shortest. Femur I thickened near the base. Bristles numerous and slender, partly long, the basal one on tibia I is 2.8 times longer than the diameter of the tibia. All femora 1 dorsal bristle in the basal half, I additionally 2 prolaterally, patellae 2 dorsally, laterally none. Sequence of the dorsal tibial bristles 2/2/1/2, all tibiae with a pair of apical bristles and a prolateral bristle in the basal half. Metatarsal and tarsal bristles absent. Unpaired tarsal claws bent in a right angle, paired claws with tiny (or none?) teeth. Comb of tarsus IV and sustentaculum absent. Trichobothria of the metatarsi indistinct. - Opisthosoma nearly 1.7 times longer than wide, scarcely covered with very short hairs; lung covers rugose, colulus and anterior spinnerets large, posterior tracheal stigma not sure observable, most probably near the spinnerets. - Pedipalpus (figs. 36-40; compare above) with a large cymbium which bears a retrolateral furrow, paracymbium large, outstanding and with 3 outgrowths which are directed foreward.

Distribution: Tertiary Baltic amber forest.

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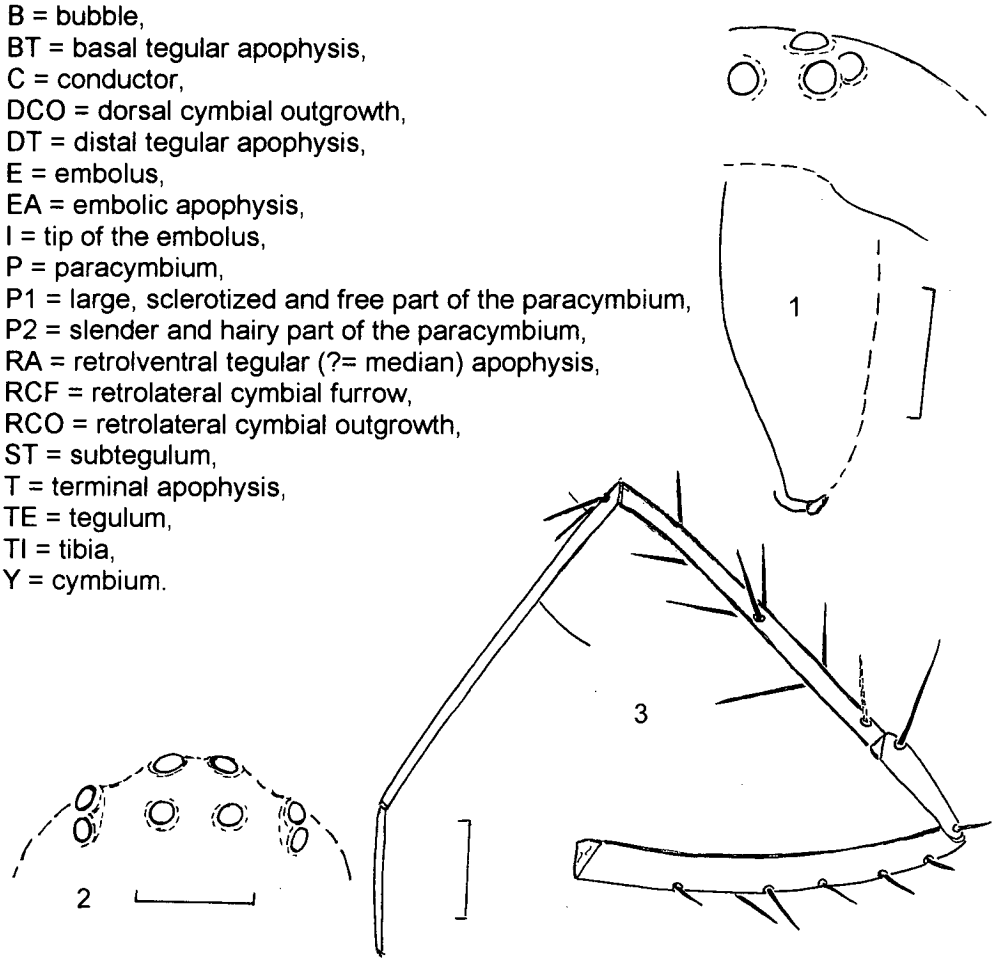
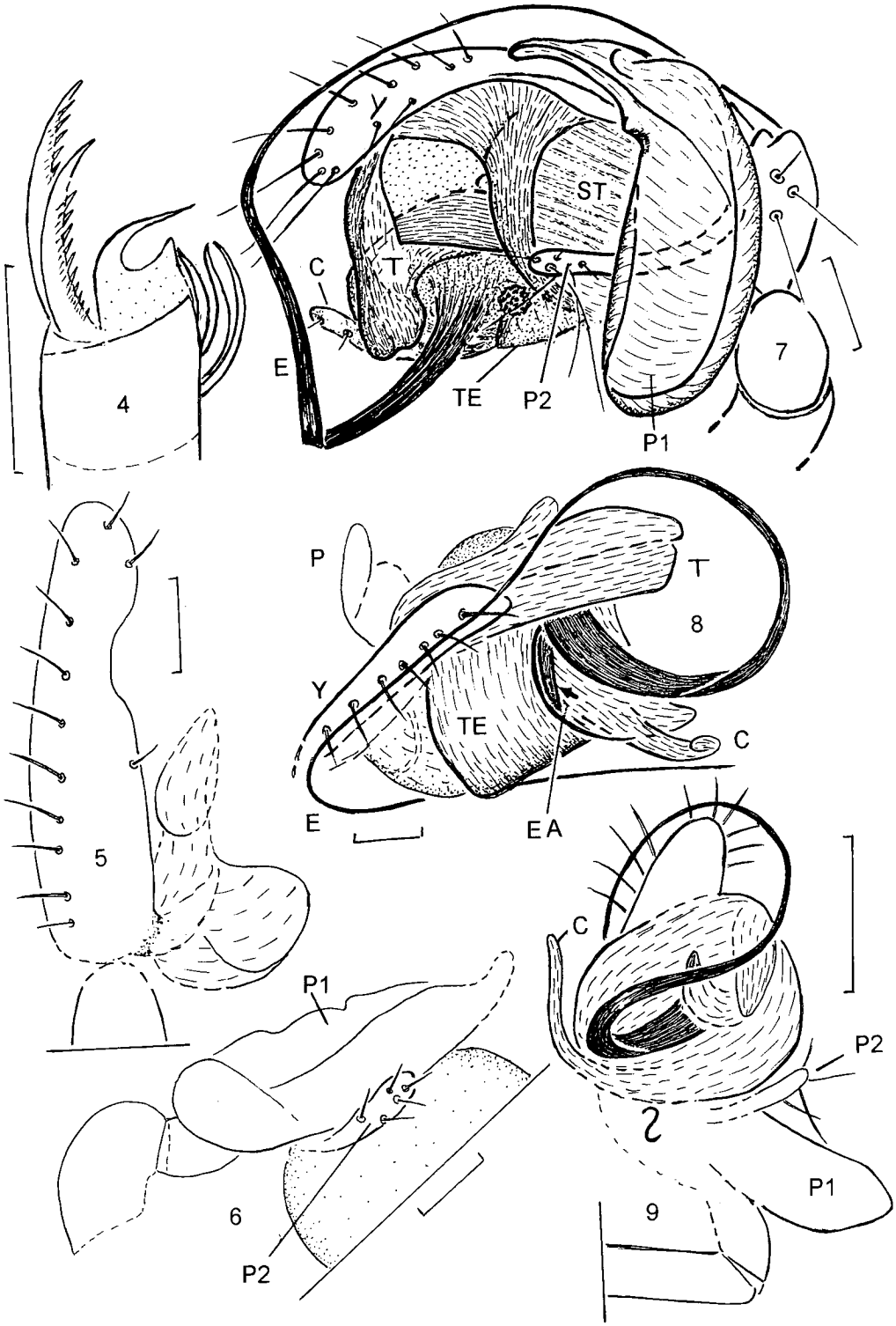
Abbreviations:

B = bubble,
BT = basal tegular apophysis,
C = conductor,
DCO = dorsal cymbial outgrowth,
DT = distal tegular apophysis,
E = embolus,
EA = embolic apophysis,
I = tip of the embolus,
P = paracymbium,
P1 = large, sclerotized and free part of the paracymbium,
P2 = slender and hairy part of the paracymbium,
RA = retrolventral tegular (?= median) apophysis,
RCF = retrolateral cymbial furrow,
RCO = retrolateral cymbial outgrowth,
ST = subtegulum,
T = terminal apophysis,
TE = tegulum,
TI = tibia,
Y = cymbium.



Figs. 1-9: ***Baltsuccinus flagellaceus*** **n.gen.n.sp.**, ♂; 1) position of the eyes dorsally; 2) l. part of the prosoma retrofrontally (cheliceral teeth hidden); 3) l. leg I retrodorsally; a dotted tibial bristle is added from the r. leg I; only one of the long metatarsal hairs has been drawn; 4) tip of l. tarsus I prolaterally (paired claws not exactly laterally), hairs not drawn; 5-6) r. pedipalpus; 5) cymbium and paracymbium dorsally; 6) patella and other distal part of the pedipalpus ca retrolaterally; 7-9) left pedipalpus; 7) retrolaterally, patella dorsally; distal part of the embolus not in the natural position; only few hairs of the cymbium are drawn; 8) prodistally. Note the embolus which is partly guided by the cymbium; 9) ventrally and slightly basally. – M (in mm) = 1.0 in fig.3, 0.1 in fig.4, 0.2 in the remaining figs.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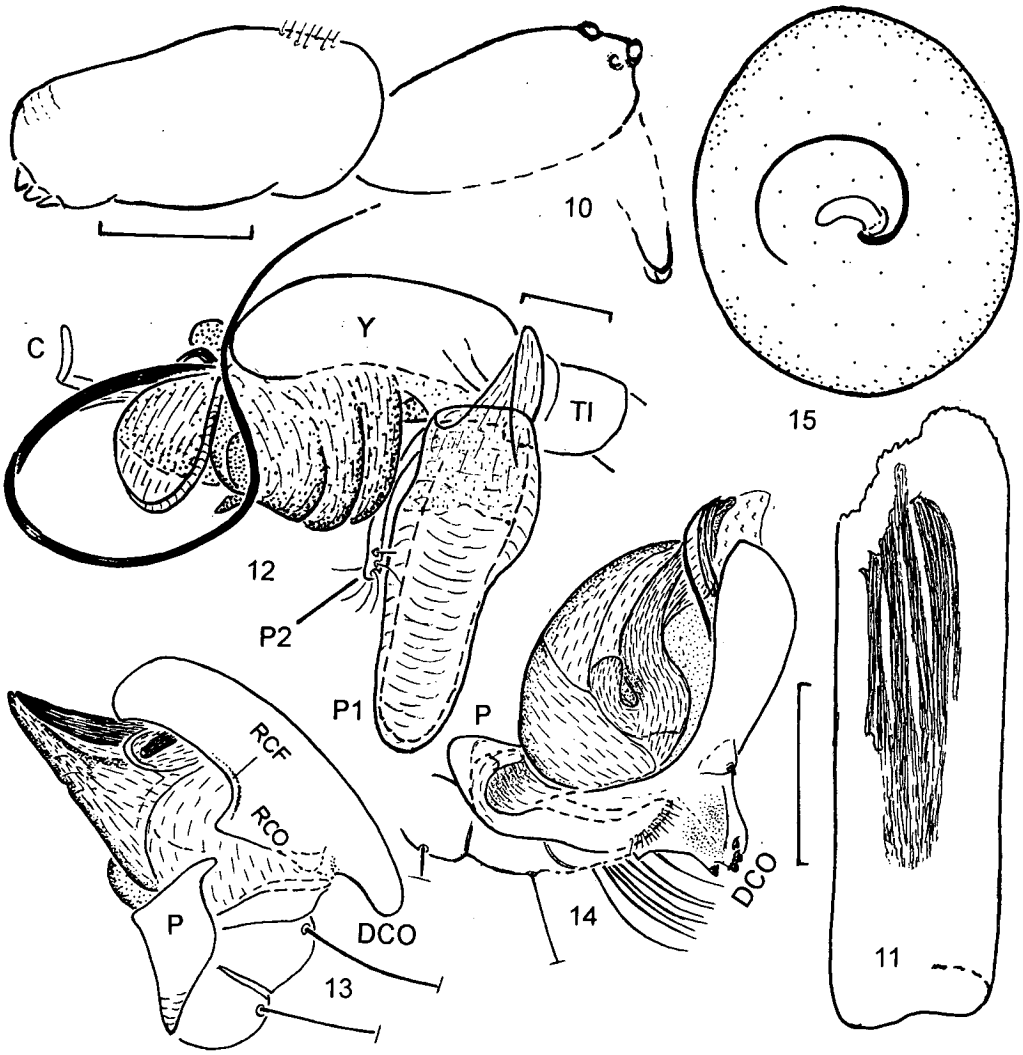


Figs. 10-12: ***Baltsuccinus similis*** **n.gen.n.sp.**, ♂; 10) outline of the body laterally (only few hairs were drawn); 11) basal part of the l. femur II with remains of muscles prolaterally. The femur has been cut off and opened **in** the resin; 12) l. pedipalpus dorsally and slightly retroapically, bulbus expanded. – M = 1.0, 0.5 and 0.2mm.

Fig. 13: ***Custodela*** **sp.** (Linyphiidae) in Baltic amber, l. ♂-pedipalpus retrolaterally.

Fig. 14: ***Anameta distenda*** **n.gen.n.sp.** (Tetragnathidae) in Baltic amber, l. ♂-pedipalpus retrolaterally.

Fig. 15: **Hypothetic** simple and wide r. **bulbus** of the Oecobioidea and Araneoidea s.l. ventrally, with embolus and tegular (= "median") apophysis in a central position.

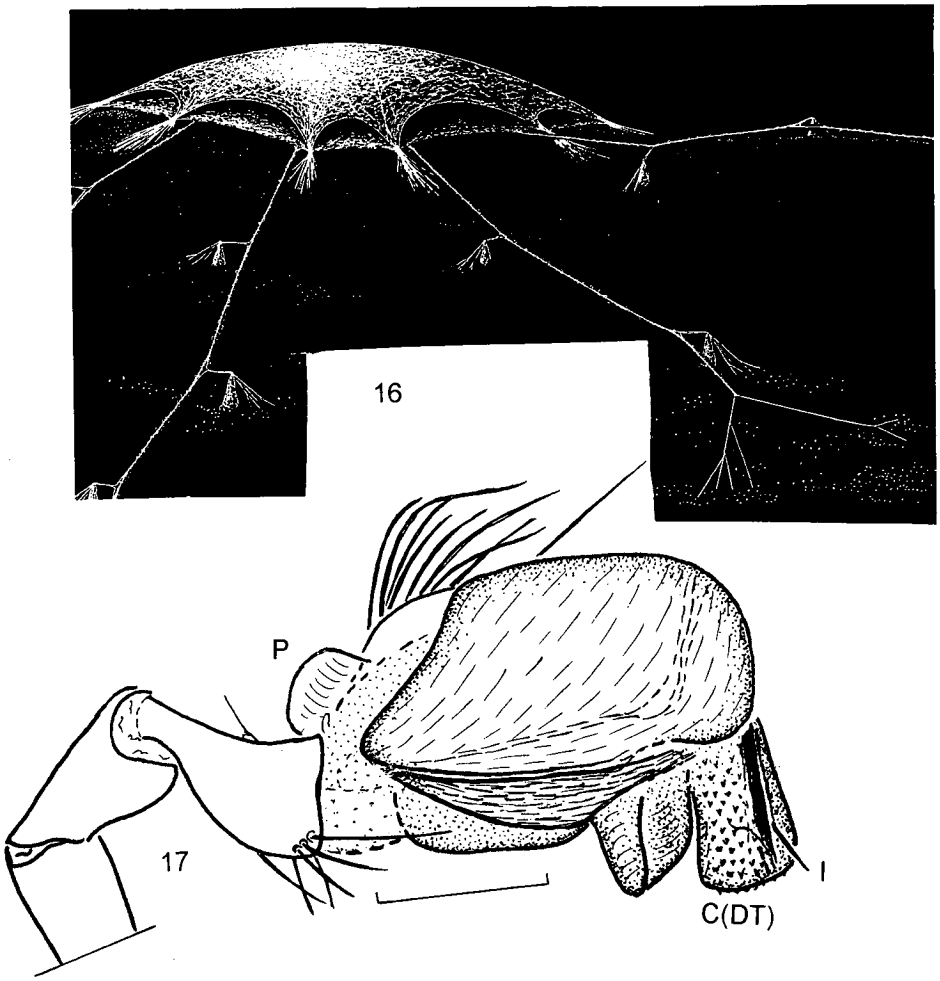
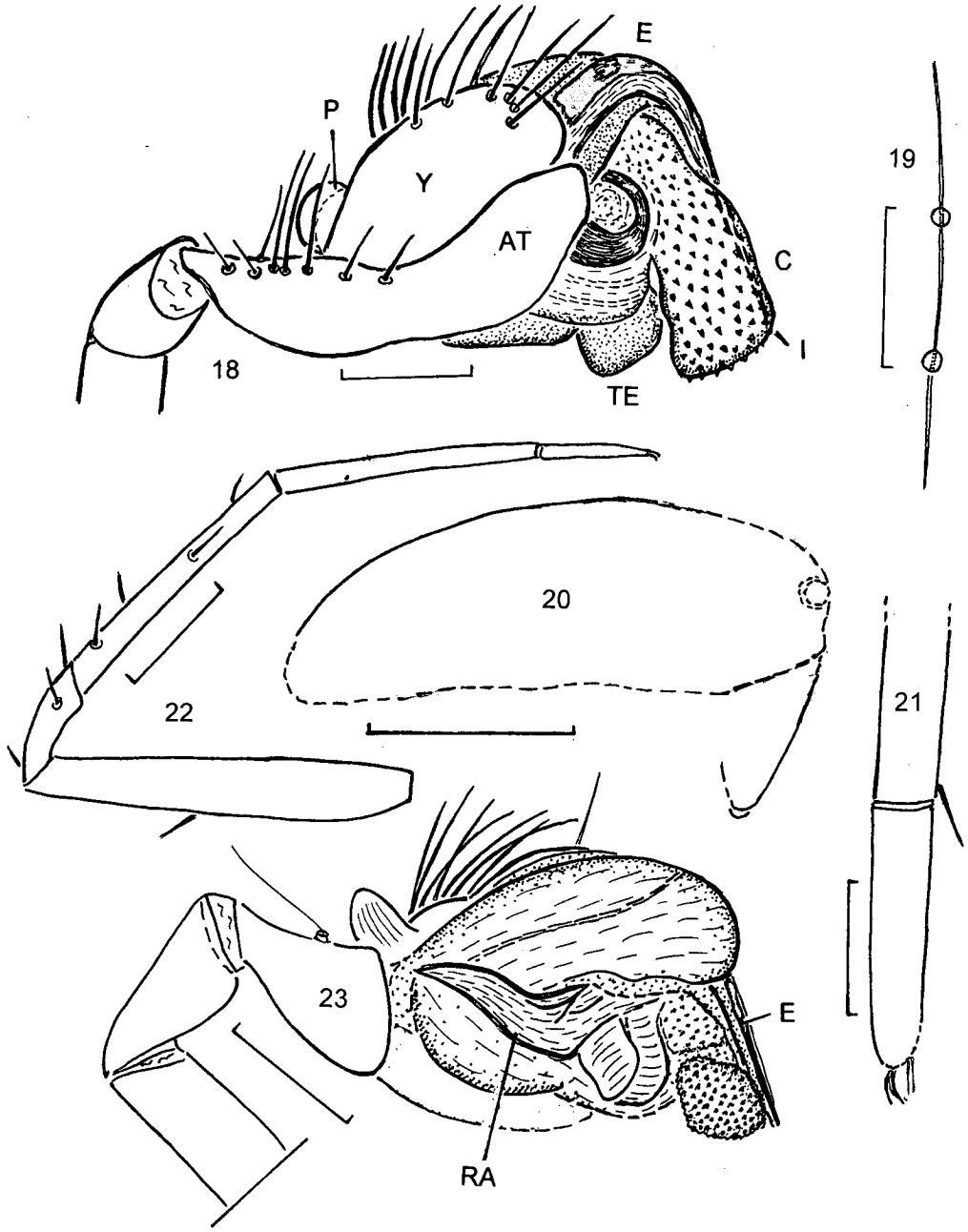
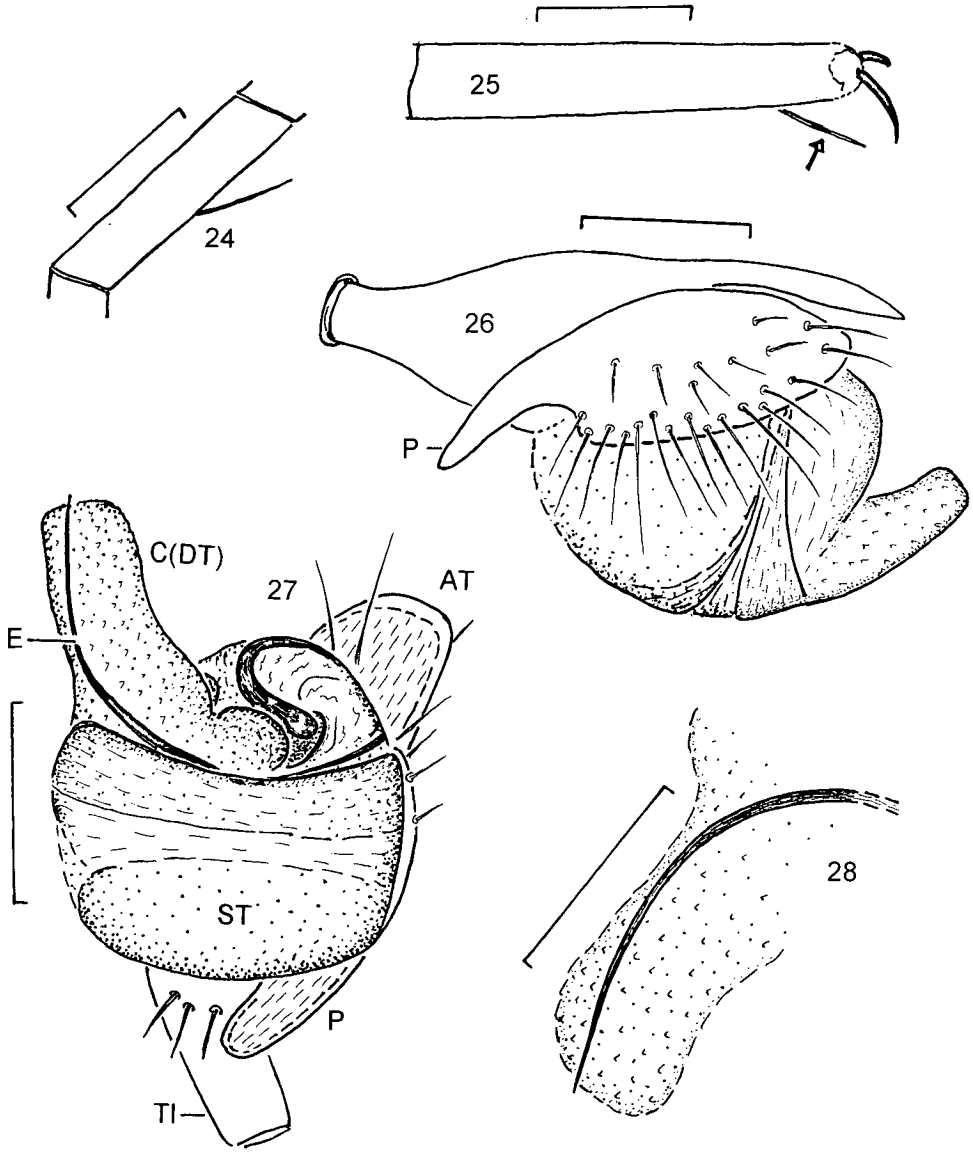


Fig. 16: Slightly schematized illustration of the retreat and signal system of ***Uroctea durandi*** (LATREILLE 1809) (Oecobiinae: Urocteini). Radii lead from the silken tent floor far beyond the attachment disk of the roof; these serve to signal passing insects. These radia/threads have no no direct contact to the ground providing for an undisturbed signal transmission. - Taken from KULLMANN (1975: Fig. 72).

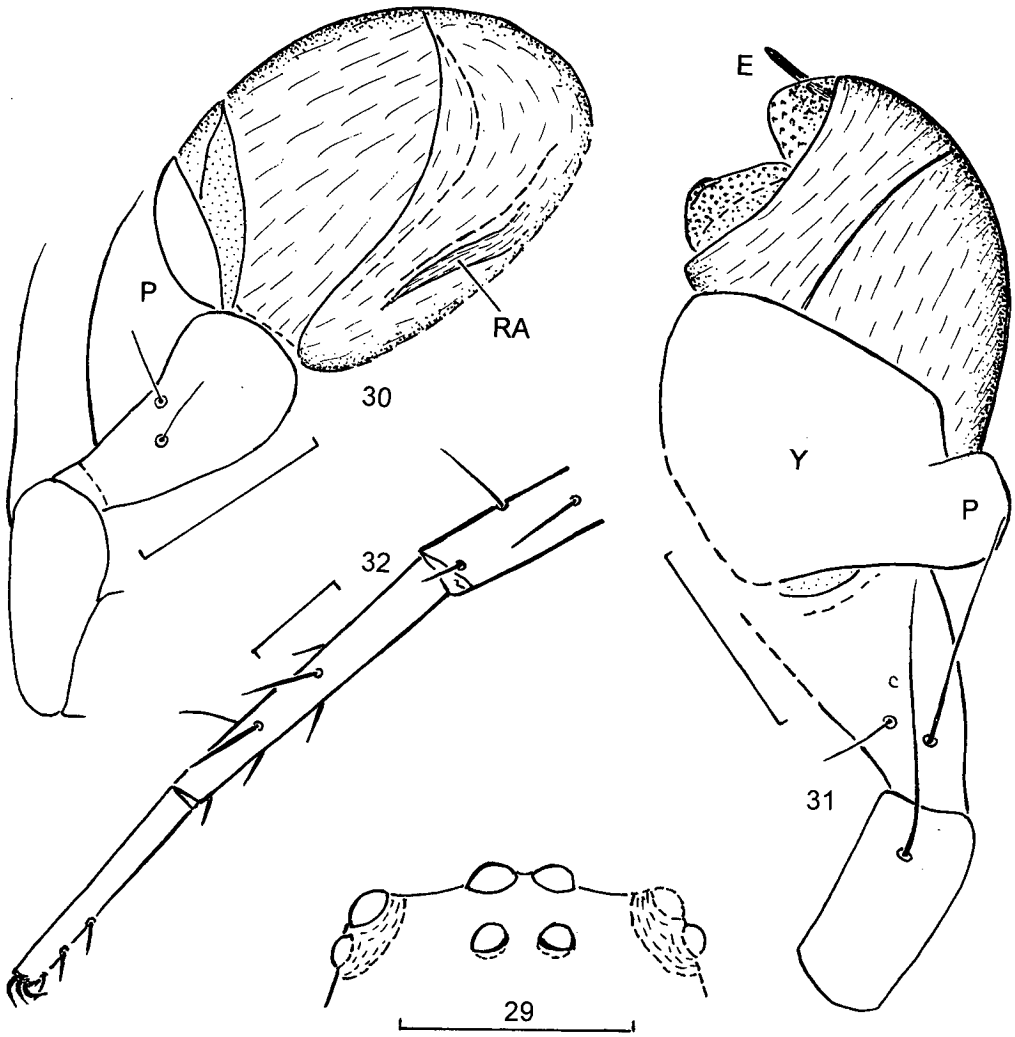
Figs. 17-19) ***Protheridion tibialis*** **n.gen.n.sp**. ♂; 17) r. pedipalpus retrolaterally and slightly dorsally, patella perspectively shortened; only few hairs are drawn; 18) l. pedipalpus prolaterally, patella perspectively shortened, only few hairs are drawn; 19) short part of a sticky thread.- M = 0.1 in fig. 19, 0.2 in figs. 17-18.



Figs. 20-23: ***Protheridion bitterfeldensis*** **n.gen.n.sp.**, ♂; 20) outline of the prosoma laterally. Only parts of the eyes and few hairs are drawn; 21) r. tarsus III and distal part of the metatarsus prolaterally and slightly dorsally, with the ventro-apical metatarsal bristle; 22) r. leg I retrolaterally; 23) r. pedipalpus retrolaterally. - M = 0.1 in fig. 22, 0.5 in fig. 20, 0.2 in figs. 21 and 23.

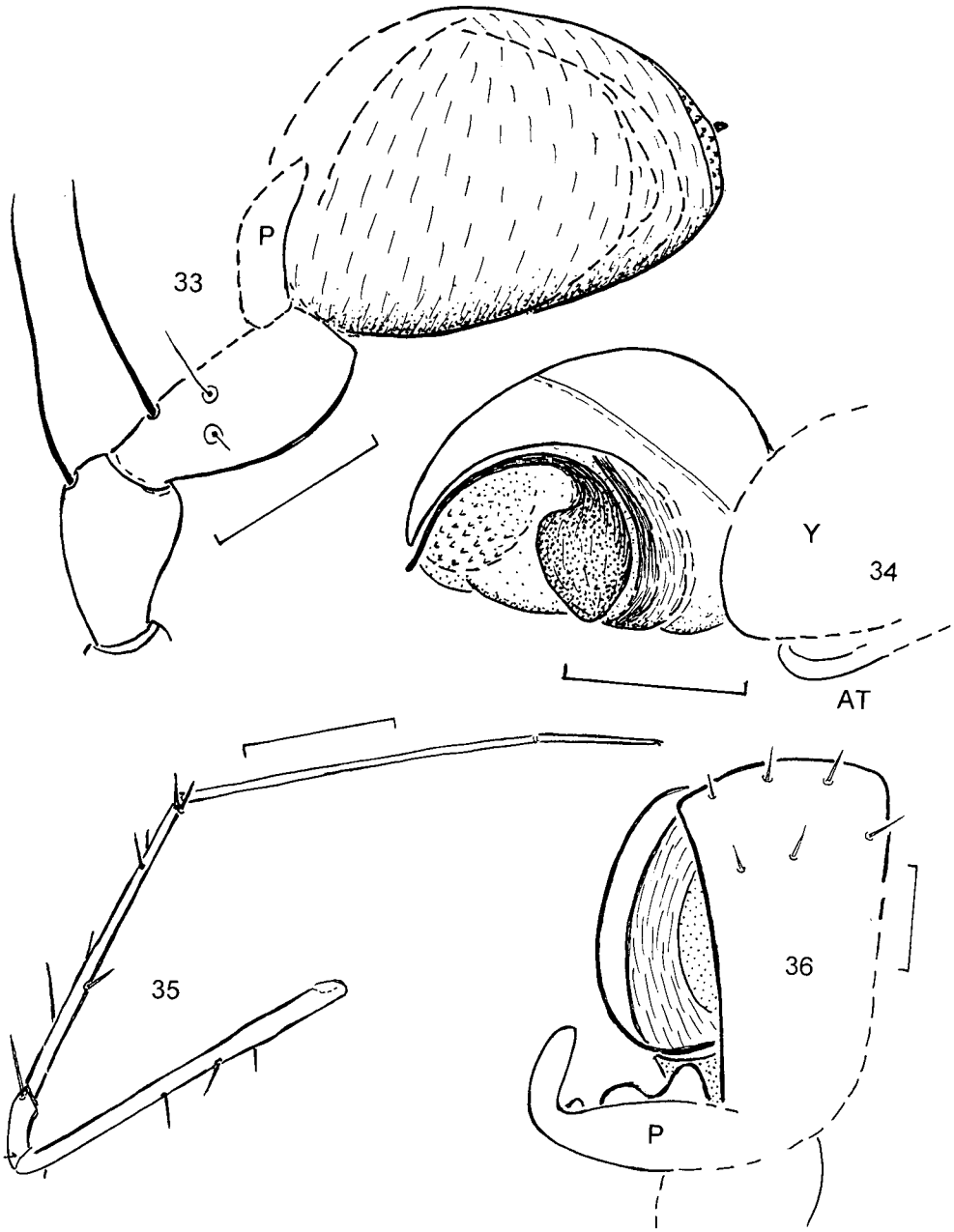


Figs. 24-28: ***Protheridion detritus*** **n.gen.n.sp.**, ♂; 24) l. metatarsus III retrolaterally; 25) l. tarsus IV with the straight sustentaculum (arrow) prodorsally; 26) r. pedipalpus dorsally; 27) l. pedipalpus dorsally-apically; 28) embolus and conductor of the r. pedipalpus retrodorsally-apically. - M = 0.2.

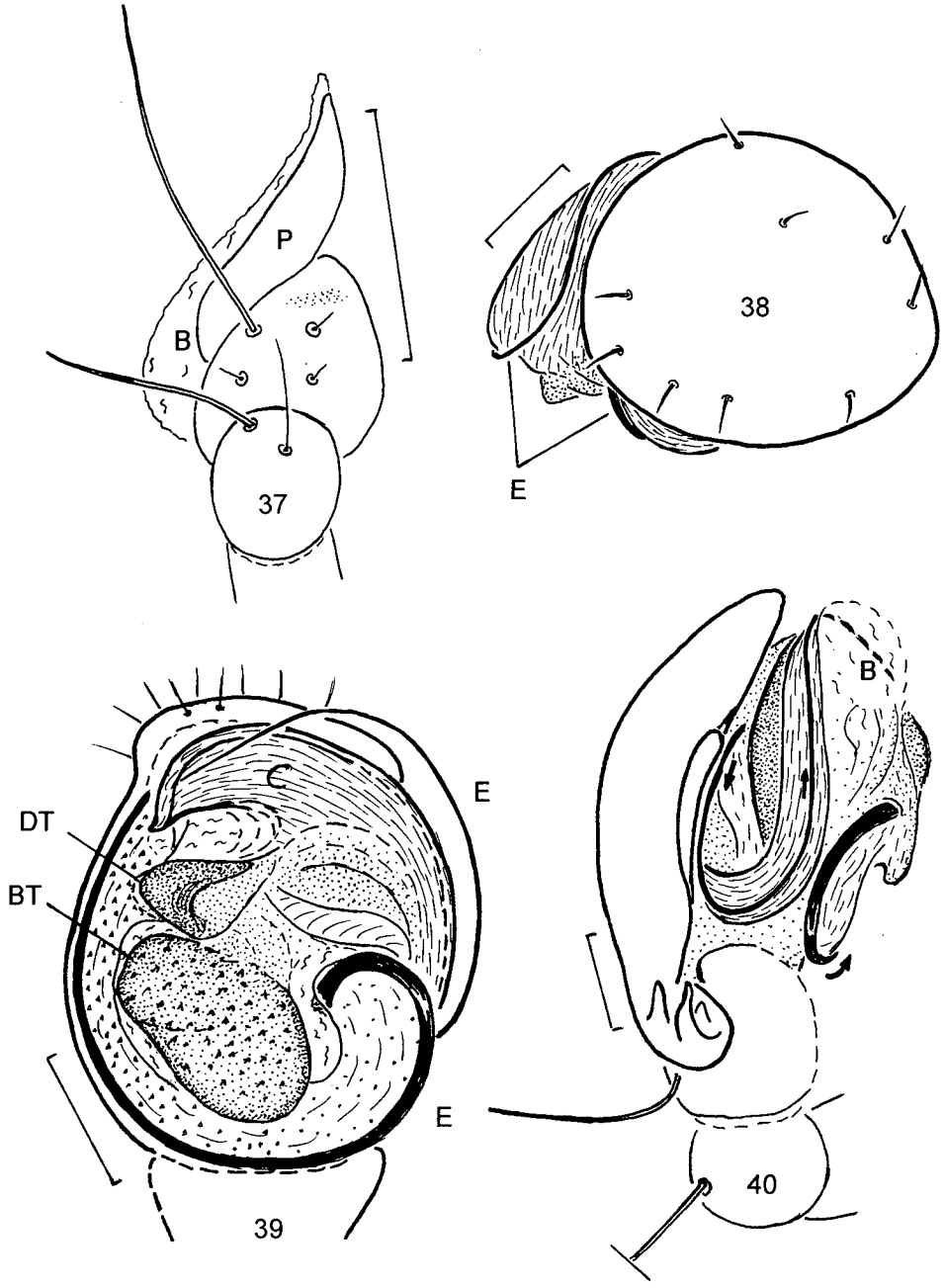


Figs. 29-31: ***Protheridion punctatum*** **n.gen.n.sp.**, ♂; 29) position of the eyes dorsally; 30) r. pedipalpus retroventrally; the long tibial hairs are not drawn; 31) r. pedipalpus dorsally. - M = 0.5 in fig. 29, 0.2 in the remaining figs.

Figs. 32-34: ***Protheridion obscurum*** **n.gen.n.sp.**, ♂; 32) l. tarsus, metatarsus and basal part of tibia IV retrolaterally. Note the distal position of the metatarsal trichobothrium! 33) r. pedipalpus retrolaterally but bulbus retroventrally; 34) r. pediplpus prodorsally. - M = 0.2.



Figs. 35-40: ***Praetheridion fleissneri*** **n.gen.n.sp.**, ♂. 35) L. leg I prolaterally and slightly dorsally; 36) l. pedipalpus dorsally; 37) patella, tibia and paracymbium with a bubble dorsally-basally; 38) r. pedipalpus apically; 39) l. pedipalpus ventrally; 40) r. pedipalpus retrolaterally and slightly distally. The arrows show the direction of the embolus. - M = 1.0 in fig. 35), 0.2 in the other figs.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BEITR. ARANEOL., 3 (2004)

THE FOSSIL SPIDERS (ARANEAE) OF THE FAMILY CYATHOLIPIDAE IN BALTIC AMBER

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Abstract: The fossil members of the family Cyatholipidae (Araneae: Araneoidea) in Baltic amber are revised and the following new taxa are described: *Balticolipus* **n. gen**. with its type species *B. kruemmeri* **n. sp**., *Cyathosuccinus* **n. gen**. with its type species *C. elongatus* **n. sp**., *Erigolipus* **n. gen**. with its type species *E. griswoldi* **n. sp**., *Spinilipus glinki* **n. sp**., *S. bispinosus* **n. sp**., *S. curvatus* **n. sp**., *S. longembolus* **n. sp**., *Succinilipus abditus* **n. sp**., *S. aspinosus* **n. sp**., *S. saxoniensis* **n. sp**., and *S. similis* **n. sp**. - A revised diagnosis of the family Cyatholipidae is given. - The knowledge of the fossil Cyatholipidae is important for biogeographic conclusions: Extant relatives of taxa in Baltic amber occur in the Australian Region. Today all taxa of the family Cyatholipidae occur in the Southern Hemisphere but apparently taxa of the Cyatholipidae were not rare in the Northern Hemisphere in the Early Tertiary - five genera are known from a single fossil forest -; this family cannot be regarded as a "Gondwanan taxon". - Parts of fossil capture webs are shortly described. - The extant African genus *Scharffia* GRISWOLD 1997 is regarded as myrmecomorphic.

The **material** is kept in several institutions and in private collections, e.g. in the collection of the author (CJW), and will be given to a museum in the future, see below.

INTRODUCTION

Previously described Cyatholipidae? An elongate opisthosoma which is similar to some members of the family Cyatholipidae is present in *Cyclosoma succini* PETRUNKEVITCH 1942; only a single juvenile female of this species is preserved in Baltic amber. In contrast to the fossil Cyatholipidae a prosomal sulcus is present in *Cyclosoma* (or an artefact?), the posterior eye row is strongly procurved and the tarsi are longer than the metatarsi. According to the long tarsi and the shape of the opisthosoma *Cyclosma* may be a member of the Anapidae: Mysmeninae.

The first doubtless fossils of the family Cyatholipidae (German name: "Becherspinnen") were mentioned by WUNDERLICH (1986: 122) and described few years later, see WUNDERLICH (1993). No other deposits than those of Baltic amber are known to contain fossil members of this family. - Fossil Cyatholipidae are not so rare as previously believed: In 1993 I described only 3 specimens, in the meantime I saw about 80 specimens more, most of them are members of the genera *Spinilipus* and *Succinilipus*. In this paper I add three new genera to the already known two genera.

The body length of most extant Cyatholipidae is less than 3.2mm (rarely up to 4.4mm) and only 1.3 - 2.2mm in the fossils. In the males of most fossil taxa a dorsal scutum is present which may be difficult to recognize and which is absent in *Erigolipus* and *Spinilipus* in which the dorsal part of the opisthosoma may be hardened.

In his important revision of the extant taxa GRISWOLD (2001: 13) doubted the correct determination of the fossils which were described by WUNDERLICH (1993) as members of the Cyatholipidae, although the structures were described and figured which are characteristic of the Cyatholipidae, e.g. the wide tracheal spiracle, the elongate opisthosoma as well as the typical paracymbium and cymbial process. - The presence of members of the family Cyatholipidae contradict the hypothesis of GRISWOLD (e.g. 2001: 2, 100) who regards Cyatholipidae to be a "Gondwanan family" although members are absent in South America. So the absence of Cyatholipidae in the Northern Hemisphere may be "wishful thinking" for that hypothesis. Cyatholipidae probably never existed in South America (their absence in South America appears "mysterious" to GRISWOLD), and - according to the various fossil records - the family is surely not a Gondwanan family. Closely related genera of the taxa in Baltic amber are found today in the Australian Region, see below. Apparently Cyatholipidae had a wide range in the Early Tertiary and got extinct - together with numerous species of other taxa of the ancient fauna - in the whole Northern Hemisphere during the Tertiary (in the Oligocene) when the climate got colder and dryer; see WUNDERLICH (1995). - The following taxa are found at the Bitterfeld deposit as well as at not-Bitterfeld deposits: *Balticolipus kruemmeri*, *Spinilipus bispinosus* and *Succinilipus abditus*; *Erigolipus griswoldi*, *Spinilipus curvatus*, *Succinilipus aspinosus*, *S. saxoniensis* and *S. similis* are only known from the Bitterfeld deposit.

According to Griswold (2001: 6) "Cyatholipidae are typically found in cool, moist tropical montane and temperate lowland forests...In the tropics they usually occur above 800 m on mountains, while in the southern temperate regions they occur down to sea level." Most spiders live in higher strata of the vegetation, some on tree trunks, few in litter. Members of the New Zealand genus *Tekella* URQUHART 1894 - which may be related to the fossil genus *Spinilipus* WUNDERLICH 1993 - are known to "hang beneath sheet webs in moist forests", see GRISWOLD (2001: 41). Capture webs of the fossil spiders: Parts of a capture web - including remains of sticky droplets - are preserved with the holotype of *Cyathosuccinus elongatus*, see the figs. 13-14 and with the holotype of *Erigolipus griswoldi*. Near the holotype of *Spinilipus*

bispinosus thin threads and probable remains of sticky droplets are preserved. - I found members of *Spinilipus* sp. indet. in the same pieces of amber with spiders of *Archaea ?paradoxa* (Archaeidae) and *Eolabulla* sp. indet. (Linyphiidae).
The unusually lengthened prosoma and petiolus of the extant African genus *Scharffia* GRISWOLD 1997 is similar to *Myrmecarchaea* WUNDERLICH (n. gen., fossil, Archaeidae) and - less distinct - to *Cresmatoneta* SIMON 1929 (extant, Europe and Japan, Linyphiidae); I regard these spiders as myrmecomorph, but according to GRISWOLD (1997: 269) their myrmecomorphy is doubtful.

TAXONOMY

Revised diagnosis of the family Cyatholipidae: Presence of a wide fold of the tracheal spiracle (fig. 65, photo) which may be placed in an advanced position, opisthosoma usually elongate above the spinnerets and covered with scuta (figs. 1, 62, photos): Most often epigastral, frequently dorsally and occasionally around spinnerets; usually 4 promarginal cheliceral teeth, rarely 3 (figs. 4, 24), no claw of the ♀-pedipalpus, area of the anterior median eyes protruding (fig. 1), sternum in several extant and in all fossil taxa strongly rugose (figs. 2, 65, photos), presence of a retromarginal cymbial process which usually forms a nippers-shaped structure together with the paracymbium (e.g. figs. 7, 11, 21, 54) and - in at least 1 fossil and 7 extant genera - of a distal parembolic process - convergently evolved in the Pimoidae - which may bear denticles (e.g. fig. 31); no median apophysis; the long embolus frequently curves back S-shaped in the distal part and may lie in a rim in a very close contact to the tegulum or to the conductor (figs. 33, 37, 55). - Remarks on the chaetotaxy: Unfortunately few is known from the extant taxa. Tibial bristles may be absent or all tibiae may bear two dorsal bristles (e.g. in *Spinilipus*, fig. 31); this may be the basic pattern. Femoral "macrosetae" are only present in *Cyatholipus hirsutissimus* and bristles on femur I in a questionable Cyatholipidae gen. indet. (2♂ CJW). - Further: A metatarsal IV trichobothrium is absent, the labium is free and wider than long, the ♂-leg I may be modified, bent, thickenend and spurs may be present (figs. 10, 51-53), 1-2 cymbial bristles are present in few genera (figs. 21, 42, 50, 54, 59).

Genera: 23 extant genera - see GRISWOLD (2001) -, and 5 fossil genera in Baltic amber as well as probably a further undescribed fossil genus, two males, in which a dorsal and a prolateral bristle occur on femur I; F1090/ CJW and F1091/CJW.

Relationships: Synotaxidae is regarded as the sister group, see the paper on this family in this volume, GRISWOLD (2001: 14), and the tab. below. The distal parembolic process of the Cyatholipidae is not homologue with the basal "parembolic process" of the Synotaxidae.

Distribution: The Southern Hemisphere: Ethiopian and Australian Regions but absent in South America. - Remarks: (1) The record of *Pokennips dentipes* (SIMON 1894) (= *Cyatholipus d.*) from Jamaica is most probably an error, see GRISWOLD (2001: 74). (2) One female of the family Cyatholipidae was just reported from Borneo, the northernmost record of the family, see DEELEMAN-REINHOLD (2001: 67).

Comparison of selected characters of the sister groups:

Character	Cyatholipidae	Synotaxidae
tracheal fold	very wide (!) (fig.65)	narrow (normal)
opisthosoma elongate & overhanging the spinnerets	+ (!) (figs.1,62) (-)	- (+)
opisthosomal scuta besides pedicel sclerotizations	usually epigastral & most often dorsally	--- (epigast. scutum in *Succinitaxus*)
trichobothrium of metatarsus IV	---	--- (in all taxa?)
convex profile of the prosoma	+ (-)	- (+)
strongly rugose sternum	+/-	---
very long and ventrally protruding clypeus	---	- (+)
hairs/humps in the field of the median eyes	---	- (+)
?stridulating organ between pedicel and opisthosoma	---	- (+)
modified leg I	- (+, fig. 53)	---
♀-pedipalpus	slender	slender
claw of the ♀-pedipalpus	absent (!)	present (in all taxa?)
scapus of the epigyne	+ (-)	- (+)
cymbial outgrowth	retromarginal, usually building a knipper-shaped structure with the paracymbium (figs. 7, 21, 50)	dorsal, outstanding or absent

Character	Cytholipidae	Synotaxidae
cymbial fold	---	+
"parembolic process"	absent or a distall process (fig. 31)	a process near the base of the embolus
bulbal denticles	+ (-)	+/-
usual shape of the distal part of the embolus	s-shaped:	spirilly:

Key to the fossil genera of the Cyatholipidae in Baltic amber (♂):

Remarks: The female is only known from *Succinilipus*. A dorsal scutum is absent in *Erigolipus* and *Spinilipus*, but the opisthosoma may dorsally be hardened in *Spinilipus*.

1 Body length at least 1.5mm, leg I long, tibia I > prosoma, prosoma dorsally smooth and about 1.3 times longer than wide, ♂-opisthosoma long and with a large dorsal scutum (fig. 62), ♂-tibia and metatarsus I curved, ♂-metatarsus I with 1-3 spurs (fig. 52), tibiae without bristles, basal patellar bristle present (figs. 5, 53). 2

- Body length 1.3-1.5mm, leg I short, tibia I < prosoma and straight, prosoma dorsally rugose (fig. 3) and about 1.15 times longer than wide, dorsal scutum of the short ♂-opisthosoma absent (fig. 38) (the opisthosoma may be dorsally hardened), metatarsal spurs absent, tibial bristles present, basal patellar bristle absent (fig. 15). 4

2(1) Cymbium elongate (figs. 6-9). - Rare. Photo 189 . . . . . *Balticolipus*

- Cymbium short (figs. 28, 31). 3

3(2) ♂-pedipalpus (figs. 11-12): Retromarginal cymbial outgrowth long, outstanding and bristleless, paracymbium stout. - Extremely rare. Photo 190 . . . *Cyathosuccinus*

- ♂-pedipalpus (figs. 54-55, 58): Retromarginal cymbial outgrowth short, and usually bearing a bristle, paracymbium with a concave (folded) distal part. Epigyne (figs. 66-

69) with a scape - Not very rare . Photos 201-209 . . . . . *Succinilipus*

4(1) Position of the trichobothrium on metatarsus I in 0.25. Pedipalpus (figs. 16-17) with a ventral tibial outgrowth and a very long basal and distal branch of the paracymbium. - Extremely rare. Photo 191 . . . . . *Erigolipus*

- Position of the trichobothrium on metatarsus I in 0.42-0.5. Pedipalpus (figs. 21, 31, 33, 36): Ventral tibial outgrowth absent, basal and distal branch of the paracymbium short, conductor outstanding and T-shaped. - Not very rare. Photos 192-200. . *Spinilipus*

Revisions of the fossils and descriptions of the new taxa

Balticolipus n. gen.

Diagnosis (♂; ♀ unknown): Tibial bristles absent (fig. 5), metatarsus I with 1-2 spurs (fig. 4), chelicerae fused basally (fig. 4), opisthosoma covered with a large dorsal scutum, cymbium elongate (figs. 6-9), paracymbium large (bulbus structures not well known).

Type species: *Balticolipus kruemmeri* n. sp. (the only known species of the genus).

Relationships: According to the chelicerae which are fused basally (fig. 4), the absence of tibial bristles, and the presence of spurs of the ♂-metatarsus I *Succinilipus* is related - see the key above -, in which the cymbium is not elongate. - See *Cyathosuccinus*, too. - Metatarsal (and tibial) spurs of the male leg I occur also in the extant Australian genera *Tekellatus* WUNDERLICH 1978 (fig. 1) and *Teemenaarus* DAVIES 1978 (tibial spurs only) in which the structures of the ♂-pedipalpus are different, and - as far known - the chelicerae are not fused at their base. Metatarsal spurs evolved apparently convergently in the extant African genus *Pokennips* GRISWOLD 2001. In *Kubwa* GRISWOLD 2001 (extant, Africa) the cymbium is elongate, too, but the paracymbium is outstanding, spurs of the ♂-metatarsus I are absent, and the structures of the bulbus are quite different; thus the cymbial elongation has been convergently evolved.

Distribution: Tertiary Baltic amber forest, incl. the Bitterfeld deposit.

***Balticolipus kruemmeri* n. gen. n. sp.** (figs. 4-9) Photo 189

Derivatio nominis: The species is named after Mr. H. KRUEMMER in Greifswald who selected the paratype b) of this species and several other fossil spiders for a scientific research.

Material: 6♂ in Baltic amber: Holotypus F35/BB/AR/CYA/CJW and a separated piece of amber; paratypus a) GPIGöttingen G2.562; paratypus b) and a separated piece of amber from the Bitterfeld deposit, coll. KRÜMMER in Greifswald, no. 4053; paratypus c) from the Bitterfeld deposit, coll. GRABENHORST in Celle, no. AR-99; paratypues d) from the Bitterfeld deposit, coll. W. LUDWIG in Berlin; paratypus e) F1086/BB/AR/CYA/CJW.

Preservation and syninclusions: The holotype is well and nearly completely preserved, only the tip of both tarsi I is cut off. The spider is dorsally partly hidden by a layer in the amber and a white emulsion; all legs are stretched out on one of the about 20 layers of the small piece of amber; apparently the flows of the resin come in a short frequence. In dead spiders - in amber, too - usually the legs are strongly bent ventrally. - In the separated piece of amber a small member of the Formicidae and an incomplete juvenile member of the Araneae are preserved; stellate hairs are absent. - Paratype a) is well and completely preserved, the body is ventrally and the opisthosoma is dorsally partly covered by a white emulsion, the legs are bent ventrally. - Also preserved are an incomplete fly (Diptera: Brachycera) and some stellate hairs. - Paratype b) is well and completely preserved together with numerous particles of detritus; the legs are bent below the body, the left side of the body is partly covered by a white emulsion. - In the separated piece of amber the leg of an insect and numerous particles of detritus are preserved but no stellate hairs. - Paratype c) is badly preserved, most parts are hidden by a white emulsion, the dorsal part of the opisthosoma is cut off, the dorsal part of the prosoma is hidden. Numerous particles of detritus are present in the same piece of amber. - Paratype d) is completely and well preserved, mainly the left side is covered by a white emulsion. - Some stellate hairs and a member of the Diptera: Nematocera are preserved in the same piece of amber. - Paratype e) is nearly completely and fairly well preserved, partly covered by a white emulsion, the right leg I is cut off through the metatarsus. - Few large tube-form structures, few threads of silk (probably a part of a capture web) and stellate hairs are preserved in the same piece of amber.

Diagnosis: See above.

Description (♂):
Measurements (in mm): Body length 1.6-1.65, prosoma: Length 0.75, width 0.6, leg I (holotype): Femur 0.9, patella 0.25, tibia 0.95, metatarsus 0.6, tibia I of the paratype a) 0.82, tibia I of the paratype b) 0.9, paratype II: tibia II 0.67, tibia III 0.32, tibia IV ca. 0.43.
Colour: Prosoma, legs and opisthosomal scutum dark brown, other parts of the opisthosoma yellow brown.
Prosoma smooth, distinctly longer than wide, not high, with low depressions between caput and thorax. 8 large eyes, anterior medians protruding, posterior row procurved.

posterior medians separated by less of their diameter. Chelicerae (fig. 4) long and slightly diverging, fused basally, with 4 promarginal teeth. Sternum rugose. - Legs (fig. 5) long and slender, order I/II/IV/III, I distinctly the longest; bristles: Only patellae with 2 dorsally. Tibia and metatarsus I distinctly bent, metatarsus I distally with a larger retroventral and frequently with a smaller prodistal spur more basally, metatarsal trichobothria indistinct. - Opisthosoma longer than wide, with few short hairs, elongate above the spinnerets, with large dorsal and epigastral scuta similar to *Succinilipus*. Spiracles widely spaced, position of the fold distinctly in front of the spinnerets, well observable in the paratype b). - Pedipalpus (figs. 6-9): Patella and tibia short, paracymbium large and sickle-shaped, cymbium strongly elongate, retromarginal cymbial outgrowth divided and bent prolaterally, bulbus only fairly outstanding, similar to *Succinilipus*, conductor denticulate, the presence of an parembolic process is unknown.

Relationships: See above.

Distribution. Tertiary Baltic amber forest, incl. the Bitterfeld deposit.

***Cyathosuccinus* n. gen.**

Diagnosis (♂; ♀ unknown): Tibial bristles absent, metatarsus I bears a ventral spur (fig. 10), the long opisthosoma bears a dorsal scutum similar to fig. 62; pedipalpus (figs. 11-12): Retromarginal cymbial outgrowth long, strongly outstanding and pointed, the exact position of the embolus is unknown.

Type species: *Cyathosuccinus elongatus* n. sp.

Relationships: In *Balticolipus* and *Succinilipus* tibial bristles are absent, too, and spurs of metatarsus I are present, but the distal part of the paracymbium is concave (folded) in *Succinilipus*, the retromarginal cymbial outgrowth is not outstanding and bears usually a bristle; in *Balticolipus* the cymbium is elongate.

Distribution: Tertiary Baltic amber forest.

***Cyathosuccinus elongatus* n. gen. n. sp.** (figs. 10-14) Photo 190

Material: Holotypus ♂ in Baltic amber, F1080/BB/AR/CYA/CJW.

Preservation and syninclusions: The spider is completely and very well preserved in a piece of amber which was heated, it is situated on a layer in the amber, the left

leg I is stretched out forward, few remains of a white emulsion are present on the body, the opisthosoma is depressed between epigaster and spinnerets. - A part of a capture web with some droplets is preserved near the spider (figs. 13-14). Directly left of the spider's opisthosoma a small Diptera: Ceratolipidae is preserved; near the spider few stellate hairs, bubbles and parts of detritus are present.

Diagnosis (♂; ♀ unknown): Pedipalpus: Figs. 11-12.

Description (♂):
Measurements (in mm): Body length 1.5, prosoma: Length 0.7, width 0.57, leg I: Femur 0.95 (0.13 wide), patella 0.22, tibia 0.65, metatarsus 0.47, tarsus 0.32, tibia II 0.6, tibia III 0.3, tibia IV 0.42.
Colour mainly medium brown, opisthosoma besides the darker scuta yellow brown.
Prosoma dsitinctly longer than wide, nearly smooth, fovea indistinct. 8 large eyes, posterior row procurved, posterior medians separated by less of their diameter, anterior medians far in front of the remaining eyes. Basal cheliceral articles large, slightly diverging, a basal fusion is unknown (the chelicerae are anteriorly covered by a white emulsion). Fangs long, gnathocoxae large and fairly converging above the wide and free labium, sternum rugose, separating the coxae IV by their diameter. - Legs fairly long and slender, order I/II/IV/III, I distinctly the longest with a strong femur, III distinctly the shortest. Hairs indistinct, patellae with a short basal and a long distal dorsal bristle as in *Succinilipus*; no other bristles. Tibia and metatarsus I fairly bent, metatarsus I bears a large ventral spur in the distal half (fig. 10). Position of the metatarsal II trichobothrium in 0.47. - Opisthosoma oval, 1.24 times longer than wide, overhanging the spinnerets, nearly smooth, with large dorsal and epigastral scuta. Tracheal fold wide, colulus and anterior spinnerets large; no scutum around the spinnerets. - Pedipalpus (figs. 11-12) with a wide tibia, a stout paracymbium, a long, pointed and outstanding retromarginal cymbial outgrowth, a large and blunt tegular lobe and a large conductor; most parts of the bulbus are hidden, the occurrence of a parembolic process is unknown.

Relationships: See above.

Distribution: Tertiary Baltic amber forest.

***Erigolipus* n. gen.**

Diagnosis (♂; ♀ unknown): All tibiae bear two long dorsal bristles (fig. 15), basal patellar bristle absent, legs fairly short, leg I not modified, prosoma dorsally distinctly rugose (similar to fig. 20), opisthosoma short, similar to *Spinilipus*, a dorsal scutum is absent; ♂-pedipalpus (figs. 16-17): Tibia with a ventral outgrowth, cymbium with a long and thin lateral bristle, basal and distal branch of the paracymbium very long.

Type species: *Erigolipus griswoldi* n. sp.

Relationships: See *Spinilipus* and the key to the genera. - In the extant African genus *Ilisoa* GRISWOLD 1987 (figs. 18-19) the structures of the male pedipalpus are somewhat similar, but coarse setae are present on the opisthosoma and a ventral tibial outgrowth of the pedipalpus is absent; thus both genera may not be closely related.

Distribution: Tertiary Baltic amber forest, the Bitterfeld deposit.

***Erigolipus griswoldi* n. gen. n. sp.** (figs. 15-17) Photo 191

Derivatio nominis: The species is dedicated to C. GRISWOLD, who published an important revision of the family Cyatholipidae.

Material: Holotypus ♂ in Baltic amber, F1034/BB/AR/CYA/CJW.

Preservation and syninclusions: The spider is completely and very well preserved, ventrally slightly covered by a white emulsion; bubbles are present on several parts of body and legs. Some loose leg hairs and the bubbles indicate that the spider was caught alive by the fossil resin and has tried to remove. - Behind the spider some threads - of a capture web? - are preserved which partly possess droplets; stellate hairs are absent.

Diagnosis (♂; ♀ unknown; see the diagnosis): Pedipalpus: Figs. 16-17.

Description (♂):
Measurements (in mm): Body length 1.5, prosoma: Length 0.65, width 0.6; leg I: Femur 0.85, patella 0.2, tibia 0.5, metatarsus 0.46, tarsus 0.4, tibia II 0.42, tibia IV 0.5; length of the opisthosomal hairs up to 0.18.
Colour: Prosoma and legs dark brown, opisthosoma gray.
Prosoma fairly wide and high, profile convex, clypeus distinctly longer than the field of the median eyes. 8 eyes which are fairly large (and partly covered by an emulsion) in a wide field, posterior row slightly recurved, posterior medians separated by more than their diameter, anterior medians protruding. Basal cheliceral articles large; most parts of labium, gnathocoxae and sternum are hidden. - Legs (fig. 15) fairly short, femur I 1.3 times longer than the prosoma, metatarsus I is slightly bent. The legs are distinctly hairy, ventrally, too. All tibiae bear 2 long dorsal bristles, the patellae bear only a long dorsal-distal bristle, the lenght of the basal bristle on tibia IV is 2.5 times of the diameter of the article. Position of the trichobothrium on metatarsus II is in about 0.25. Paired tarsal claws thin, teeth are not observable by the magnification of 150x, unpaired tarsal claw long and smooth, strongly bent. - Opisthosoma nearly globular, similar to *Spinilipus*, posteriorly only slightly elongated, scarcely covered with shorter to longer hairs. Spinnerets short. Position of the tracheal spiracles not observable (?), epigaster probably not sclerotized. - Pedipalpus: See above.

Relationships: See above.

Distribution: Tertiary Baltic amber forest, the Bitterfeld deposit.

Spinilipus WUNDERLICH 1993

Diagnosis (♂; ♀ unknown): All tibiae bear 2 dorsal bristles, a basal patellar bristle is absent (fig. 39), leg I is not modified, prosoma dorsally distinctly rugose (fig. 20, photos), position of the trichobothrium of metatarsus I in 0.43-0.5, position of the spinnerets near the end of the short opisthosoma (opisthosoma not overhanging) (photos; fig. 38 in which the opisthosoma is in an unnatural position), dorsal opisthosomal scutum absent (an hardened area may be present), bearing dorsal sigillae (fig. 20), cheliceral promargin with three teeth (fig. 24), the basal tooth in a somewhat isolated position; pedipalpus (figs. 21, 29-31, 36): Cymbium with 1-2 long bristles near the retromarginal outgrowth, a large denticulate area (part of the conductor?) is present, tegular lobe or apophysis present, conductor T-shaped, outstanding and with a furcate tip, embolus with a seam and a parembolic process.

Two species-groups, see the key. More than 50% of the about 20 specimens of the *bispinosus*-group come from the Bitterfeld deposit but not a single (!) of the 18 males of the *kerneggeri*-group (*kerneggeri* and *glinki*) come from Bitterfeld.

Type species: *Spinilipus kerneggeri* WUNDERLICH 1993.

Relationships: According to the shape of the opisthosoma and the structures of the ♂-pedipalpus - the position and the shape of the long cymbial bristle(s) (fig. 50) (which may be absent), the presence of a tegular lobe and a parembolic process as well as the T-shaped and outstanding conductor - the extant genus *Tekella* URQUHART 1894 from New Zealand is surely strongly related; the chaetotaxy is unknown in *Tekella*. In *Tekella* the legs are distinctly longer, the embolus is quite shorter and the denticulate parembolic process is smaller. - Body shape and chaetotaxy of *Spinilipus* are as in *Erigolipus* n. gen., but the position of the metatarsal trichobothrium is more basally in *Erigolipus* (0.25 instead of 0.42-0.5), a tibial outgrowth of the pedipalpus is present, and the paracymbial branches are distinctly longer.

Distribution: Tertiary Baltic amber forest, incl. the Bitterfeld deposit.

key to the species of *Spinilipus* (♂):

Remarks: Especially in males which bulbus is hidden or more or less expanded the determination may be difficult, e.g. the tegular apophysis may be hidden. - *Bispinosus* and *glinki* are the most frequent species of this genus in Baltic amber.

1 Cymbium with two long and very strong bristles (figs. 42, 48), *bispinosus*-group. .3

- Cymbium with a single long (fig. 21) or shorter (figs. 26-29, 34) retrolateral bristle, *kerneggeri*-group. 2

2(1) Length of the cymbial bristle (fig. 21) about 0.2mm, retrolateral cymbial outgrowth strongly bent backwards. . . . . .*kerneggeri*

- Length of the retrolateral cymbial bristle 0.13-0.16mm (figs. 26-29, 34). . . . . .*glinki*

3(1) Embolus in a long-oval position (figs. 47-49), apically distinctly longer than the cymbium (arrow in fig. 48) and curved here not ventrally, tegular apophysis large and sickle-shaped. . . . . .*longembolus*

- Position of the embolus more wide, not distinctly longer than the cymbium, apically curved ventrally (figs. 31, 42, 44), tegular apophysis a bit smaller or only a lobe. . . .4

4(3) Tegular apophysis blunt, embolus near the tip of the cymbium wide (fig. 44). . . . . .*curvatus*

- Tegular apophysis sickle-shaped (fig. 37), embolus slender . . . . . .*bispinosus*

Spinilipus kerneggeri WUNDERLICH 1993 (figs. 20-23) Photo 200

Material: Holotype ♂ in Baltic amber and a separated piece of amber, Geol.-Paläont. Inst. Univ. Hamburg, type catalogue no. 3598 (coll. F. KERNEGGER). No further material.

Diagnosis (♂; ♀ unknown): Cymbium with a long bristle, length about 0.2mm, retromarginal cymbial outgrowth strongly bent backward (fig. 21). Pedipalpus: Figs. 21-23. - Body: Fig. 20, 1.3mm long.

Relationships: See *S. glinki* n. sp.

Distribution: Tertiary Baltic amber forest.

***Spinilipus glinki* n. sp.** (figs. 24-34) Photos 194-199

Derivatio nominis: The species is named after M. GLINK in 21641 Apensen, who

selected some interesting fossil spiders in Baltic amber for a scientific research, e.g. the paratype a) of *S. glinki* n. sp.

Material: About 17♂ in Baltic amber; holotypus F1106/BB/AR/CYA/CJW; paratypus a) and 3 separated pieces of amber, coll. M. GLINK; paratypus b) and a separated piece of amber from a locality in Denmark, F1094/BB/AR/CYA/CJW; the paratypes c) - in the larger piece of amber - and h) were separated from the same piece of amber, F1089/BB/AR/CYA/CJW; paratypus d) and a separated piece of amber, F1093/ BB/AR/CYA/CJW; paratypus e) F1095/ BB/AR/CYA/CJW; paratypus f) coll. ERNST no. 52; paratypus g) (embedded in artificial resin) coll. HOFFEINS no. 1419/1; paratypus h): See paratypus c); a probably conspecific ♂, F1092/BB/AR/CYA/CJW. A further - badly preserved - ♂ (coll. HOFFEINS no. 604) and 5 - not well preserved - ♂, F1105/BB/AR/CYA/ CJW may be conspecific, too.

Preservation and syninclusions: The holotype is completely and excellently preserved in a piece of amber which most probably was slightly heated, a white emulsion is absent; seven legs are stretched upwards, only the articles of the right leg III beyond the femur are bent downwards. - The paratype a) is nearly completely preserved, the left leg I is lost by autotomy beyond the coxa, mainly ventrally a white emulsion is present. Remains of poison are present near the tip of the left fang (fig. 25). In the separated pieces some particles of excrement and an ant are preserved. - The paratype c) is badly preserved, partly oxidated and covered by a white emulsion; the opisthosoma is deformed. - The paratype d) is well and completely preserved, a white emulsion is absent, both pedipalpi are expanded. - The paratype e) is completely preserved, the pedipalpi are very well observable, the dorsal side is strongly covered by a white emulsion. - The paratype f) is fairly well preserved, parts of the left legs are cut off. - The paratype g) is well and completely preserved, embedded in artificial resin, both pedipalpi are well observable, their bulbi are partly expanded, the chelicera are spread in an unnatural position (fig. 24). Few stellate hairs, 1 Acari and 1 Diptera: Nematocera are preserved in the same piece of amber. - The paratype h) is completely and well preserved, the right side is partly covered by a white emulsion, a bubble covers most parts of the right tibia IV, possible remains of sperm are preserved at the tip of the right embolus. A stellate hair is preserved in front of the spider. - The probably conspecific ♂ F1092 is well and completely preserved, both emboli are not preserved in their natural position. A tiny Hymenoptera, a Diptera: Nematocera and some stellate hairs are also preserved.

Diagnosis (♂; ♀ unknown): Pedipalpus: Figs. 26-34; length of the retrolateral cymbial bristle 0.13-0.16mm.

Description (♂):
Measurements (in mm): Body length 1.3-1.4, prosomal length and width about 0.6, tibia I 0.48 (paratype b), 0.55 (paratype a) to 0.65 (paratype h), 7.5-8 times longer than wide at the end; legs of paratype a): Leg I: Femur 0.65, patella 0.2, tibia 0.55, metatarsus 0.38, tarsus 0.3, tibia II 0.46, tibia III 0.27, tibia IV 0.38.
Colour: Prosoma and legs dark brown, opisthosoma light brown.
Prosoma about as wide as long, as in fig. 20, rugose, eyes as in fig. 20; chelicerae (figs. 24-25, in an unnatural position in fig. 24) basally not fused, anterior margin with three teeth, the strongest tooth in a somewhat isolated basal position, fangs fairly curved, with remains of poison in fig. 25. - Legs as in the genus, order I/II/IV/III, I distinctly the longest, position of the trichobothrium on metatarsus I in 0.42-0.45. -

Opisthosoma short as in fig. 20, bearing at least 3 pairs of dorsal sigillae, dorsally hardened, epigastral scutum present, spinnerets stout, tracheal fold very wide. - Pedipalpus (figs. 26-34): Tibia longer than the patella, bearing a dorsal bristle, retromarginal cymbial bristle fairly bent, bent two times in some males (figs. 34, 34a), with a pointed or blunt tip, tiny "teeth" may be present; a strong retrolateral hair may occur (fig. 27), embolus very long and curved, with a seam and a parembolic process, tegular apophysis strong and sickle-shaped in the holotype (fig. 30), probably hidden (or absent?) in the - really conspecific? - paratype g) (fig. 31), a spoon-shaped distal tegular apophysis is present, denticulate area large, conductor outstanding and T-shaped, with a furcate tip.

Relationships: In the strongly related *S. kerneggeri* the cymbial bristle is longer (about 0.2 instead of 0.13-0.16mm) and the retromarginal cymbial outgrowth is strongly bent back-ward.

Distribution: Tertiary Baltic amber forest; not known from the Bitterfeld deposit.

***Spinilipus bispinosus* n. sp.** (figs. 35-37) Photo 192

Material: 10♂ and several probably conspecific ♂ in Baltic amber; holotypus from the Bitterfeld deposit, F1087/BB/AR/CYA/CJW; paratypus a) from the Biterfeld deposit and a separated piece of amber, Paläont. Inst. Humboldt Univ. Berlin, MB.A.500; paratypus b) from the Bitterfeld deposit and a separated piece of amber, coll. HOFFEINS no. 680; paratypus c) from the Bitterfeld deposit and 2 separated pieces of amber, F1097/BB/AR/CYA/CJW; paratypus d) F1099/BB/AR/CYA/CJW; paratypus e) from the Bitterfeld deposit, F1098/BB/AR/CYA/CJW; paratypus f) embedded in artificial resin, coll. KERNEGGER no. 308/2002; paratypus g) from the Bitterfel deposit, F1100/BB/AR/CYA/CJW; paratypus h) from the Bitterfeld deposit, F1103/BB/AR/CYA/CJW; paratypus i) F1104/BB/AR/CYA/CJW. - Three probably conspecific ♂, at least two come not from the Bitterfeld deposit, F1101/BB/AR/CYA/CJW. - Further questionable males from the Bitterfeld deposit are kept e.g. in the PMHUB no. MB.A.566 and in the private collections of FLEISSNER (no. BB11098 ARA), KUTSCHER (no. AR-7) and SCHIPPLICK (no. 1).

Preservation and syninclusions: The holotype is completely and well preserved in a piece of amber which was heated, a white emulsion is absent; because of the heating the surface of prosoma and legs is net-shaped. Stellate hairs are absent. - The paratype a) is fairly well preserved in a small piece of amber, the left side is covered by a white emulsion, the distal part of the opisthosoma and parts of the left legs III and IV are cut off. - The paratype b) is completely and fairly well preserved in a piece of amber which was heated. A fissure in the amber is present on the body, a stellate hair is situated right of the spider. - The paratype c) is fairly well preserved in a piece of amber which was heated, a white emulsion is absent, a larger bubble is preserved on the body, some particles of excrement and numerous particles of detritus are preserved in the separated piece of amber, stellate hairs are absent. - The paratype d) is completely and fairly well preserved in a piece of amber which was heated; the

ventral side of body and legs are thickly covered by a white emulsion. - The paratype e) is completely and fairly well preserved in a piece of amber which has numerous fissures, together with an ant which is parasited by a mite. - The paratype f) is completely and fairly well preserved, embedded in artificial resin. - The paratype g) is completely and fairly well preserved in a piece of amber which was heated, the opisthosoma is dorsally strongly depressed and ventrally covered by a white emulsion. A dragline is running from the spinnerets to the left legs, a member of the Diptera: Brachycera is preserved in the same piece of amber. - The paratype h) is completely and fairly well preserved, ventrally covered by a white emulsion, the opisthosoma is dorsally deformed.

Diagnosis (♂; ♀ unknown): Pedipalpus (figs. 35-37): Tegular apophysis sickle-shaped, part of the embolus near the tip of the cymbium slender.

Description (♂):
Measurements (in mm): Body length 1.3, prosomal length 0.6, tibia I 0.6 (width in the middle 0.06), tibia II 0.5, tibia IV nearly 0.5.
Colour: Prosoma and legs medium brown, opisthosoma light brown.
Body as in fig. 20, clypeus longer than the field of the median eyes, basal articles of the chelicera fairly stout, fangs long, gnathocoxae strongly converging above the labium which is free. - Legs fairly long, order I/II/IV/III, I not much longer than II and IV, all tibiae bear 2 dorsal bristles, the patellae 1 distally, length of the distal bristle on tibia I 1 1/2 times of the diameter of the tibia. Position of the metatarsal I trichobothrium up to 0.5, absent on IV. - Opisthosoma short, with an epigastral scutum, dorsally hardened and with three pairs of sigillae. The tracheal fold is wide, the anterior spinnerets are stout.

Relationships: In the most related *S. curvatus* the tegular apophysis is blunt and the part of the embolus near the tip of the cymbium is wider.

Distribution: Tertiary Baltic amber forest, incl. the Bitterfeld deposit.

***Spinilipus curvatus* n. sp.** (figs. 38-45) Photo 193

Material: 4♂ in Baltic amber from Bitterfeld; holotypus and a separated piece of amber, F1088/BB/AR/CYA/CJW; paratypus a) and a separated piece of amber, coll. M. KUTSCHER in Sassnitz; paratypus b) and a separated piece of amber, F1096/BB/AR/CYA/CJW; paratypus c) F1102/BB/AR/CYA/CJW.

Preservation and syninclusions: The holotype is completely and fairly well preserved, weakly covered by emulsions, the structures of the bulbus and the chelicerae are excellently preserved, stellate hairs are absent. - The paratype a) is well but incompletely preserved, the left side is covered by a weak white emulsion, parts of the right legs I-II and half of the right pedipalpus are cut off, stellate hairs are absent. - The paratype b) is well and nearly completely preserved in a piece of amber which probably was heated; it is only ventrally weakly covered by a white emulsion, the

prosoma is strongly darkened, the opisthosoma is deformed and has distinct lateral folds, the right tibia I is wanting near the base, stellate hairs are absent, a tiny insect (Collembola?) is preserved in the separated piece of amber. - The paratype c) is completely and well preserved but ventrally thickly covered by a white emulsion; stellate hairs are absent.

Diagnosis (♂; ♀ unlnown): Pedipalpus: Figs. 41-45, tegular apophysis blunt, part of the embolus near the tip of the cymbium wide.

Description (♂):
Measurements (in mm): Body length 1.3-1.5, prosomal length 0.65-0.7, leg I: Femur 0.65, patella 0.17, tibia 0.56, metatarsus 0.43, tarsus 0.31.
Colour: Prosoma and legs dark brown, opisthosoma linght brown.
Prosoma (figs. 38-40) nearly as wide as long, rugose, as in the genus; the anterior cheliceral margin bears 3 teeth, the median one largest, the basal one somewhat isolated. - Legs as in *bispinosus*, position of the trichobothrium on metatarsus II in 0.5. The ventral hairs of femur I (fig. 39) are covered by an emulsion thus they look like bristles. - Opisthosoma (fig. 38) higher than long, as in the genus. - Pedipalpus (figs. 41-45; see the diagnosis) with slender articles, tibia longer than the patella, with a long dorsal bristle.

Relationships: See *S. curvatus* n. sp.

Distribution: Tertiary Baltic amber forest, the Bitterfeld eposit.

***Spinilipus longembolus* n. sp.** (figs. 46-49)

Material: Holotypus ♂ in Baltic amber and 2 separated pieces of amber, coll. ERNST in Skagen; later probably Zool. Inst. Univ. Copenhagen.

Preservation and syninclusions: The spider is completely and well preserved in a piece of amber which has a drill-hole; the ventral side of its body is covered by a white emulsion. Several bubbles are present, e.g. between pro- and opisthosoma and on the left pedipalpus. - Alongside the spider the larva of a mite as well as some excrement balls and stellate hairs are preserved; in the smaller piece of separated amber a small Collembola, in the larger piece a Diptera, some excrement balls, stellate hairs and particles of detritus are present.

Diagnosis (♂; ♀ unknown): Pedipalpus: Figs. 46-49, embolus distinctly longer than wide, slender (fig. 49).

Description (♂):
Measurements (in mm): Body length 1.4, prosomal length and width 0.6, leg I: Femur 0.76, patella 0.19, tibia 0.55, metatarsus 0.45, tarsus 0.31, tibia II 0.52, tibia IV 0.43.
Body and legs as in the genus, the position of the trichobothrium on metatarsus II is

in 0.5, the opisthosoma bears at least 3 pairs of sigillae. Pedipalpus (figs. 46-49; see the diagnosis) with a large and sickle-shaped tegular apophysis and a long and slender embolus.

Relationships: See the key.

Distribution: Tertiary Baltic amber forest, the Bitterfeld deposit.

Succinilipus WUNDERLICH 1993

Diagnosis: Tibial bristles absent, tibia and metatarsus I curved, metatarsus I with 1-3 spurs (figs. 51-53), the long opisthosoma bears a large dorsal scutum (fig. 62), chelicerae fused basally (as in fig. 4); ♂-pedipalpus (figs. 54-55, 57-59): The paracymbium bears a concave part, the retromarginal outgrowth bears usually a shorter bristle. ♀: Tibia I only slightly bent, the epigastral scutum is band-shaped (fig. 66), a dorsal opisthosomal scutum is absent, the epigyne (figs. 66-69) is a wide sclerotized plate which has a scape and a pair of larger depressions/openings.

Type species: *Succinilipus teuberi* WUNDERLICH 1993.

Relationships: See *Balticolipus* and *Cyathosuccinus*.

Distribution: Tertiary Baltic amber forest, incl. the Bitterfeld deposit.

Key to the species of Succinilipus (♂):

1 Retrolateral cymbial bristle long (fig. 64). . . . . *teuberi*

- Cymbial bristle short (figs. 54, 59). 3

- Cymbial bristle absent (fig. 58). 4

3(1) Origin of the cymbial bristle below the cymbial margin (fig. 54). . . . . *abditus*

- Origin of the cymbial bristle on the cymbial process (fig. 59). . . . . *saxoniensis*

4(1) Two large spurs and a small spur on metatarsus I (fig. 56). . . . . *aspinosus*

- Metatarsus I bears only a large and a small spur (fig. 60). . . . . *similis*

***Succinilipus abditus* n. sp.** (figs. 51-55) Photo 202

Material: Holotypus ♂ in Baltic amber, F1079/BB/AR/CAY/CJW; paratypus ♂ and a separated piece of amber from the Bitterfeld deposit, coll. KRÜMMER no. 815; a probably conspecific ♂ from the Bitterfeld deposit, Palaeont. Inst. Humboldt Univ. Berlin, no. MB.A.592.

Preservation and syninclusions: The holotype is nearly completely preserved, the ventral side of the body is thickly covered by a white emulsion, the distal part of the left tibia I and the basal part of the left metatarsus I are cut off. Directly above the spider a juvenile Araneae: Salticidae is preserved, nearby an Arthropod's leg, several Acari, few stellate hairs, thin threads of silk and excrement particles. - The paratype is well and completely preserved at two fissures in the amber, a white emulsion and stellate hairs are absent. - The questionable ♂ was put in paraffin oil and looks now translucent; it is well and completely preserved; syninclusions are absent in the small piece of amber.

Diagnosis (♂; ♀ unknown): Tibia and metatarsus I are strongly bent, metatarsus I bear 2-3 ventral spurs (figs. 51-53), a short bristle is present below the retromarginal cymbial process (fig. 54).

Description (♂):
Measurements (in mm): Body length 1.9-2.0, prosomal length 1.0, leg I (questionable ♂): Femur 1.0 (hight 0.17), patella 0.32, tibia 1.2, metatarsus 0.7, tarsus 0.48, tibia II 0.8, tibia III 0.43, tibia IV 0.6.
Colour: Prosoma, legs and opisthosomal scuta medium to dark brown, remaining parts of the opisthosoma light brown.
Prosoma dorsally smooth. 8 large eyes, posterior row slightly recurved. Basal cheliceral articles large and slightly diverging, anterior margin with 4 teeth (questionable ♂), fangs long and slender, labium free and wider than long, sternum strongly rugose. - Legs (figs. 51-53) fairly long and slender, order I/II/IV/III, I distinctly the longest, III distinctly the shortest, hairs indistinct, patellae with 2 dorsal bristles, no other bristles, femur I fairly thick, tibia and metatarsus I distinctly bent, metatarsus I with 2-3 ventral spurs in the distal half in a quite variable position, position of the metatarsal trichobothria unknown . - Opisthosoma oval, overhanging the spinnerets, covered with few short hairs, bearing a large dorsal and an epigastral scutum. Tracheal fold wide, colulus large, basal articles of the anterior spinnerets stout. - Pedipalpus (figs. 54-55): Patella short, bearing 2 short dorsal bristles, tibia longer than wide, paracymbium stout, with a concave (folded) distal part, retromarginal cymbial outgrowth large, below bearing a short and bent bristle. Bulbus with a large tegular lobe and a large denticulate distal part of the conductor. Embolus in a prolateral position; most parts of the questionable parembolic process are hidden.

Relationships: See the key. *S. teuberi* may be most related.

Distribution: Tertiary Baltic amber forest incl. the Bitterfeld deposit.

***Succinilipus aspinosus* n. sp.** (fig. 56-58)

Material: Holotypus ♂ in Baltic amber from the Bitterfeld deposit, Palaeont. Inst. Humbuldt Univ. Berlin, no. MB.A.563.

Preservation and syninclusions: The spider is well and nearly completely preserved, only the left leg I is cut off through the base of the metatarsus. There are only weak white emulsions on the body. - Above the spider three long and thin threads without droplets run through the piece of amber. Numerous particles of detritus are present but no stellate hairs.

Diagnosis (♂; ♀ unknown): Metatarsus I only slightly bent near the base (fig. 56), bearing 2-3 ventral spurs in the distal half. A bristle of the retromarginal cymbial outgrowth is absent.

Description (♂):
Measurements (in mm): Body length 1.65, metatarsus I 0.6, tibia IV 0.37.
Colour mainly dark brown, opisthosoma ventrally light brown.
Body and legs are as in *S. abditus* n. sp. but the spurs of metatarsus I are different. The position of the metatarsal trichobothria is unknown. Pedipalpus: See above.

Relationships: In *S. similis* n. sp. only a small and a large spur of metatarsus I are present. In the lateral aspect I found no difference in the structure of the bulbus in the two species.

Distribution: Tertiary Baltic amber forest, the Bitterfeld deposit.

Succinilipus saxoniensis WUNDERLICH 1993 (fig. 59)

Material: Holotypus ♂ in Baltic amber, Geol.-Paläont. Inst. Univ. Hamburg, 3600; no other material.

Body length 1.8mm, most parts of leg I are unknown (lost). The opisthosoma bears a large dorsal scutum, the bristle on the retromarginal cymbial process is short (fig. 59). The female is unknown.

Relationships: See the key.

Distribution: Tertiary Baltic amber forest, the Bitterfeld deposit.

***Succinilipus similis* n. sp.** (fig. 60) Photo 203

Material: Holotypus ♂ in Baltic amber from the Bitterfeld deposit, coll. M. KUTSCHER in Sassnitz no. K/AR/3.

Preservation and syninclusions: The spider is nearly completely and fairly well preserved, the left leg I is cut off through the metatarsus, only few remains of a white emulsion are present, additional larger organic syninclusions are absent.

Diagnosis (♂; ♀ unknown): Metatarsus I only slightly bent near the base, with a small and a large distal ventral spur; a bristle of the retromarginal cymbial outgrowth is absent.

Description (♂):
Measurements (in mm): Body length 1.8, prosomal length 0.95, leg I: Femur 0.9, patella 0.23, tibia 1.0, metatarsus 0.63, tarsus 0.4, tibia II 0.75, tibia IV 0.48.
Colour: Legs medium brown, opisthosoma light brown, prosoma and opisthosomal scuta dark brown. - Body and legs as in *S. abditus* n. sp. but metatarsus I is only slightly bent, and the spurs are different. Pedipalpus in lateral aspect as in *aspinosus*.

Relationships: See *S. aspinosus* n. sp.

Distribution: Tertiary Baltic amber forest, the Bitterfeld deposit.

Succinilipus teuberi WUNDERLICH 1993 (figs. 61-64) Photo 204

Material: Holotypus ♂ in Baltic amber, Geol.-Paläont. Inst. Univ. Hamburg, type catalogue no. 3600.

Body length 1.8mm, prosoma: Fig. 61, metatarsus I only slightly bent, with only one spur in a distal position (fig. 63). Opisthosoma (fig. 62) with a large dorsal scutum which was overlooked by me in the original description. Retromarginal cymbial outgrowth with a larger bristle away from the margin (fig. 64) which also was overlooked by me in the original description.

Relationships: See the key.

Distribution: Tertiary Baltic amber forest.

***Succinilipus* sp. indet**. (figs. 65-69, Photos 205-209)

Remark: I am not sure about the congenerity of all the females, especially of the small females from the coll. GRABENHORST and EHLEN.

Material in Baltic amber: 3♂, F1050/BB/AR/CYA/CJW, F1051/BB/AR/CYA/CJW (fig. 65) and F1077/BB/AR/CYA/CJW; further males: Mus. Krakau, Museum Ziemi 12055, coll. GRÖHN, coll. KUTSCHER (Bitterfeld deposit), coll. GRABENHORST (Bitterfeld deposit), coll. PAULSEN (Bitterfeld deposit), PIHUB nos. MB.A 592 and 562 (Bitterfeld deposit), CJW.

7♀ e.g.:

Coll. GRABENHORST, no. AR-98 : Body length 1.5mm; epigyne (fig. 66): A wide sclerotized plate which has a scape between a pair of groves, a large median depression and a pair of larger lateral pits.

PIHUB no. MB.A. 584 (from the Bitterfeld deposit): Body length 1.85mm; epigyne (fig. 67): A wide sclerotized plate with a larger scape in an anterior position and a pair of large pits.

F1084/BB/AR/CYA/CJW: Body length 2.0mm, tibia I 0.8mm long; epigyne (fig. 68): A sclerotized plate with a nearly circular scape in an anterior position; paired lateral pits are not observable but probably a large medial plug (in German language: "Begattungs-Zeichen").

Coll. H. EHLEN in Hamburg no. 117 from the Bitterfeld deposit: Body length 1.6mm, length of tibia I 0.8mm; epigyne (fig. 69): A wide sclerotized plate with a short (divided?) scape and a very large and partly divided pit/grove which probably bears a pair of plugs.

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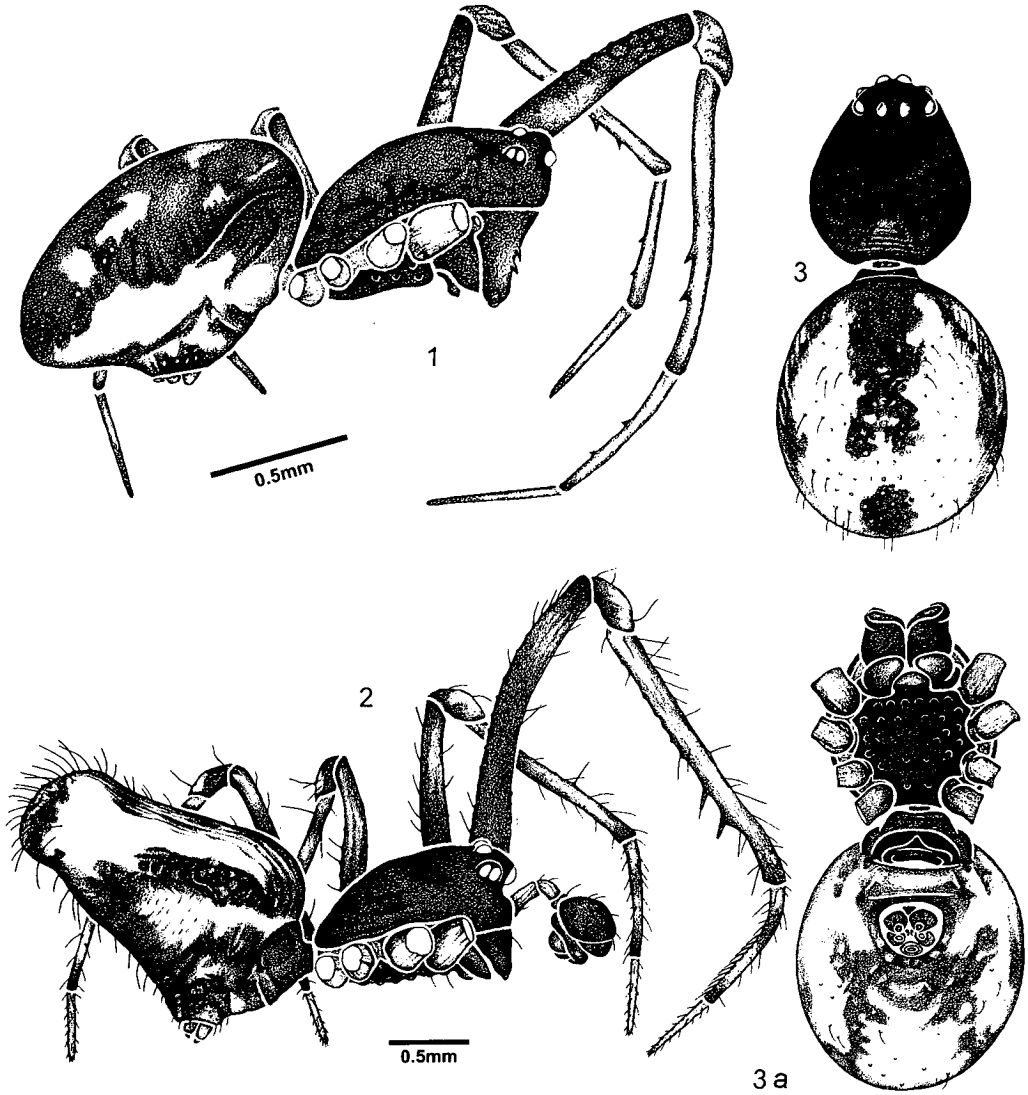
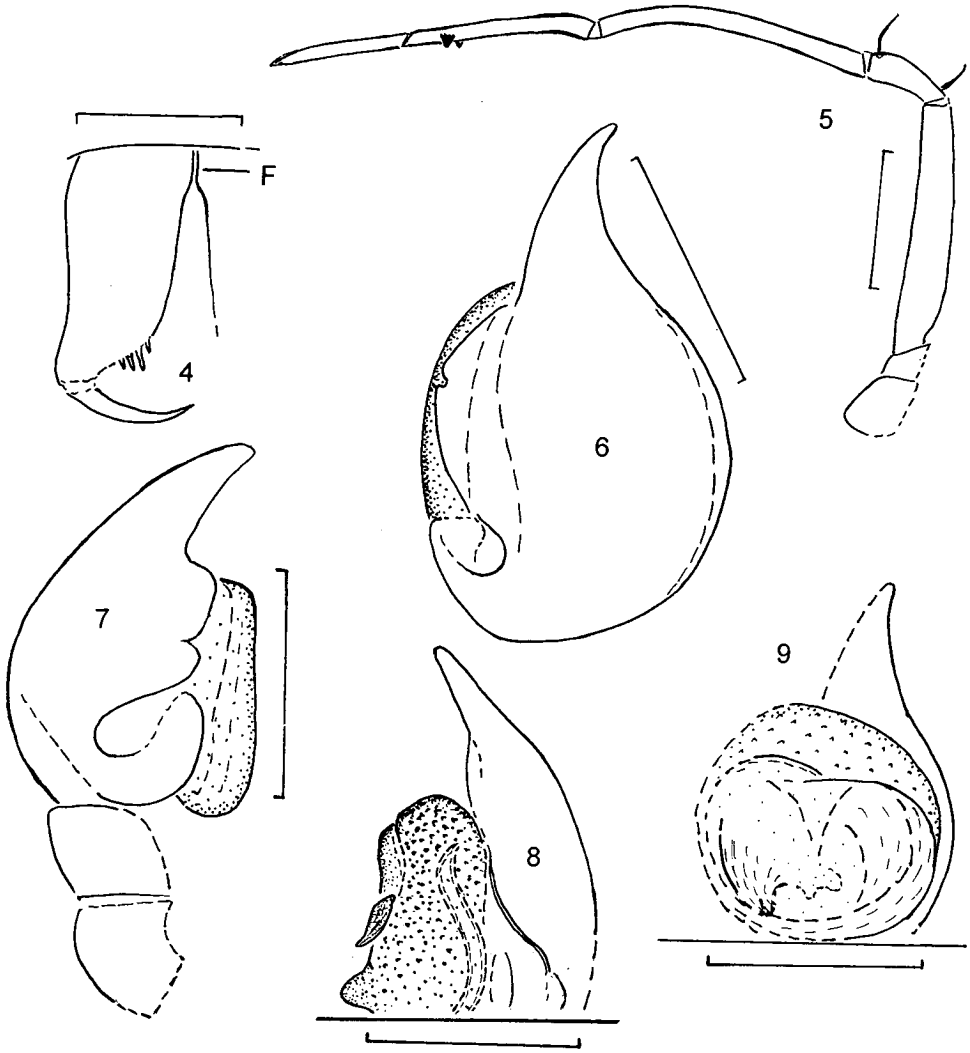
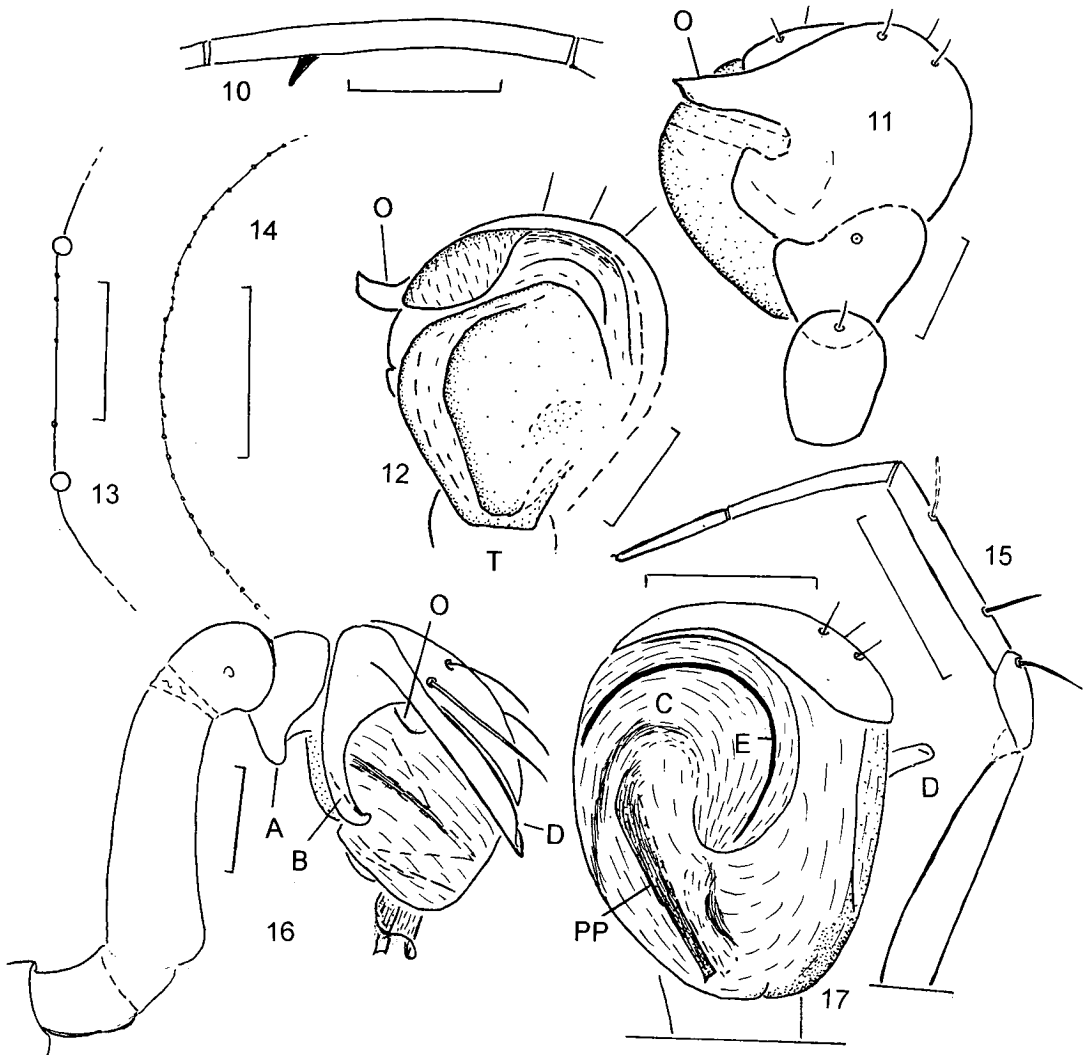


Fig.1) *Tekellatus lamingtoniensis* WUNDERLICH 1978, **extant**, Australia, ♂, body, lateral aspect; taken from GRISWOLD (2001: Fig. 35);

figs. 2-3: *Teemenaarus silvestris* DAVIES 1978, **extant**, Australia, body of the ♂; 2) lateral aspect; 3) dorsal aspect; 3a) ventral aspect; taken from GRISWOLD;

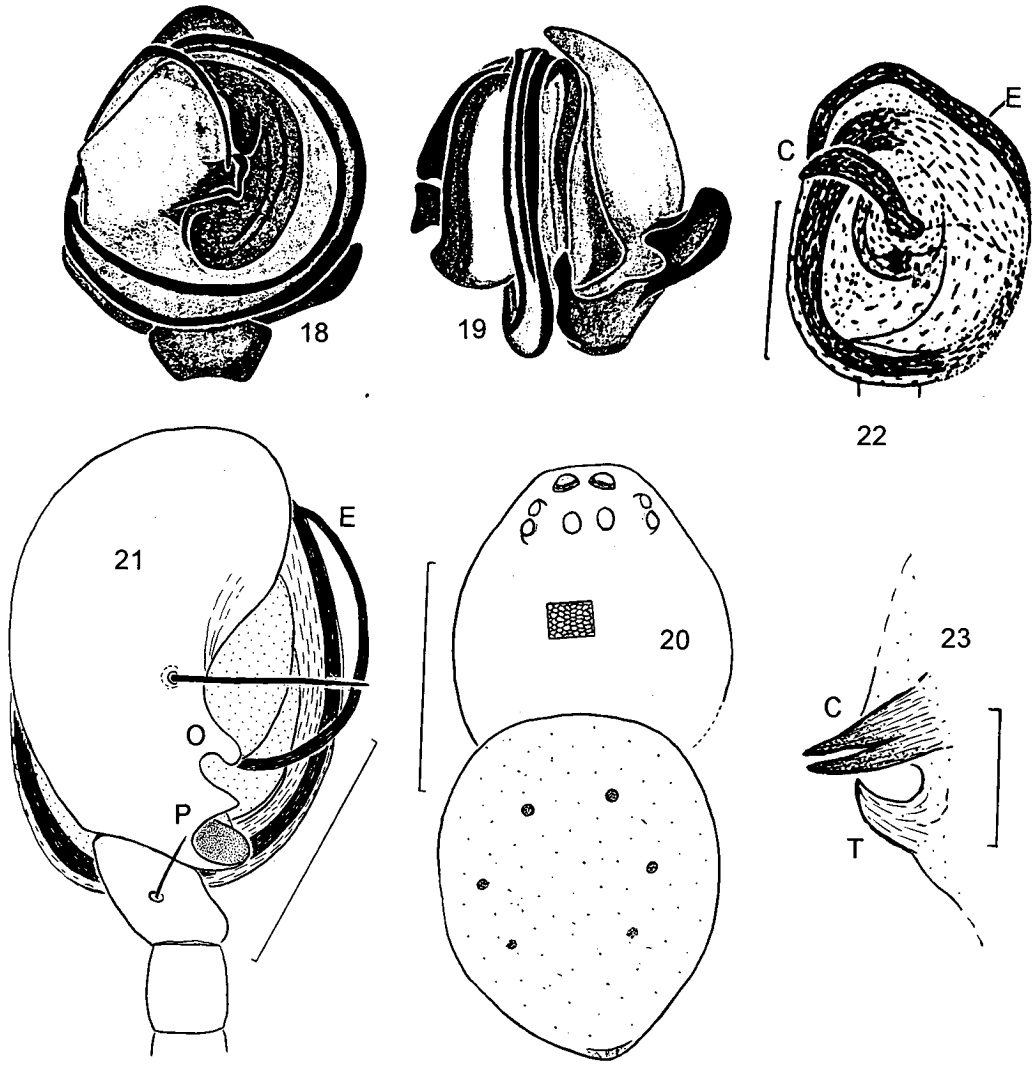


figs. 4-9: ***Balticolipus kruemmeri*** **n. gen. n. sp.**, ♂; 4) paratype d), 5) paratype b), 6) holotype, 7-9) paratype a); 4) r. chelicera, anterior aspect; note the fused basal area (F); 5) l. leg I, retrolateral aspect. Note the small distal-ventral metatarsal spurs; 6) l. pedipalpus, dorsal aspect; 7) r. pedipalpus, retrolateral aspect; 8) distal part of the l. pedipalpus, retrolateral and slightly ventral aspect; 9) r. pedipalpus, ventral aspect; the bulbus is partly covered by an emulsion, the basal part is hidden. - M = 0.5mm in fig. 4, 0.2mm in the remaining figs.;



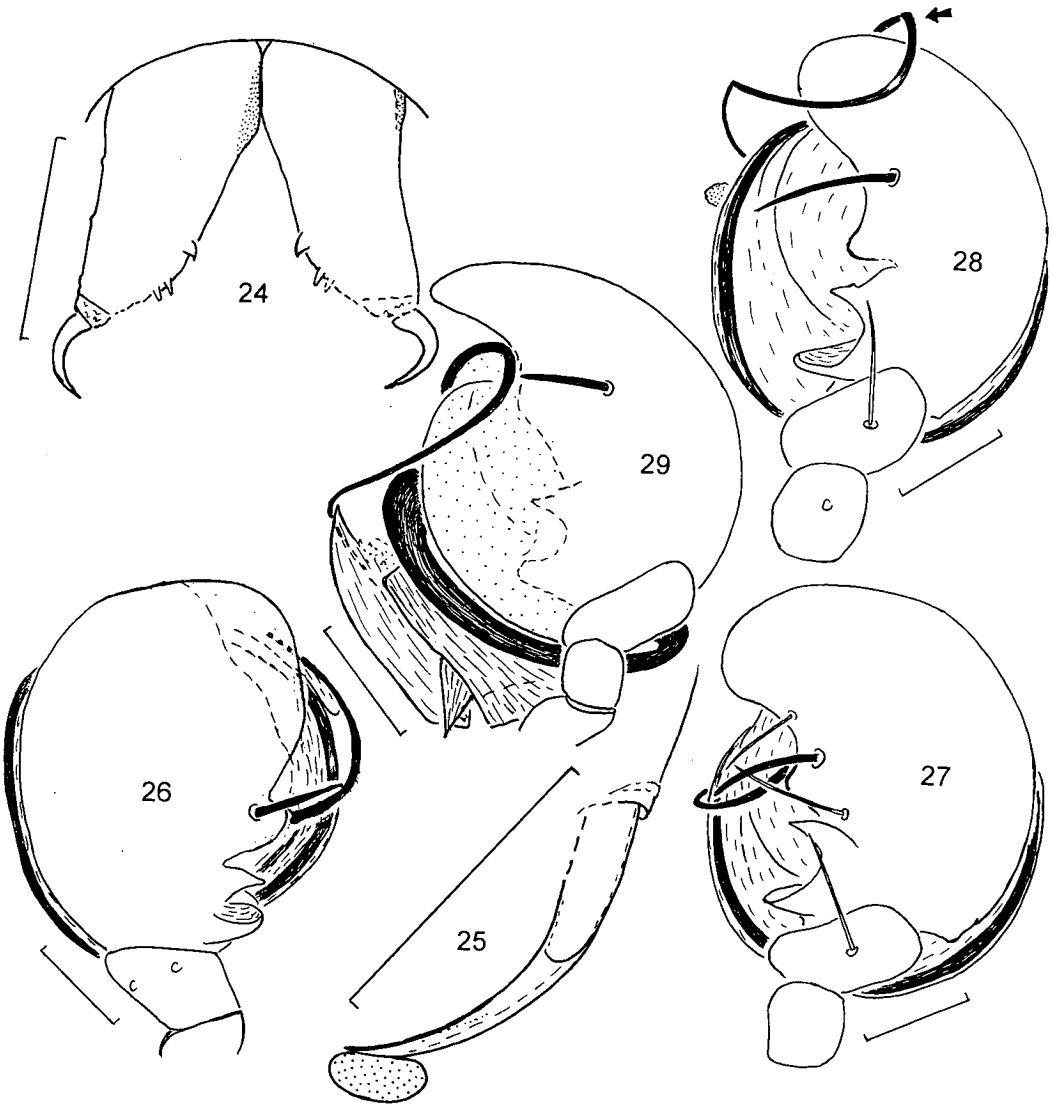
figs. 10-14: ***Cyathosuccinus elongatus* n. gen. n. sp.**, ♂; 10) l. metatarsus I with spur, retrolateral aspect (hairs are not drawn); 11) l. pedipalpus, retrodorsal aspect; 12) r. pedipalpus, ventral aspect (partly hidden); 13) part of a thread with droplets of the part of a capture web above the r. tibia of *Cyathosuccinus elongatus*; 14) questionable part of a thread with droplets of the part of a capture web above and behind the opisthosoma of *Cyathosuccinus elongatus*. - O = retromarginal outgrowth of the cymbium. - M = 0.1 in figs. 11-12), 0.2 in the remaining figs.;

figs. 15-17: ***Erigolipus griswoldi* n. gen. n. sp.**, ♂; 15) l. leg I, retrolateral aspect; 16) r. pedipalpus, retrolateral aspect; 17) l. pedipalpus, ventral-apical aspect (only three cymbial hairs are drawn). - A = ventral tibial apophysis, B = basal branch of the paracymbium, C = conductor, D = distal branch of the paracymbium, E = embolus, O = retromarginal cymbial outgrowth, PP ?= parembolic process. - M = 0.5 in fig. 15), 0.1 in figs. 16-17);

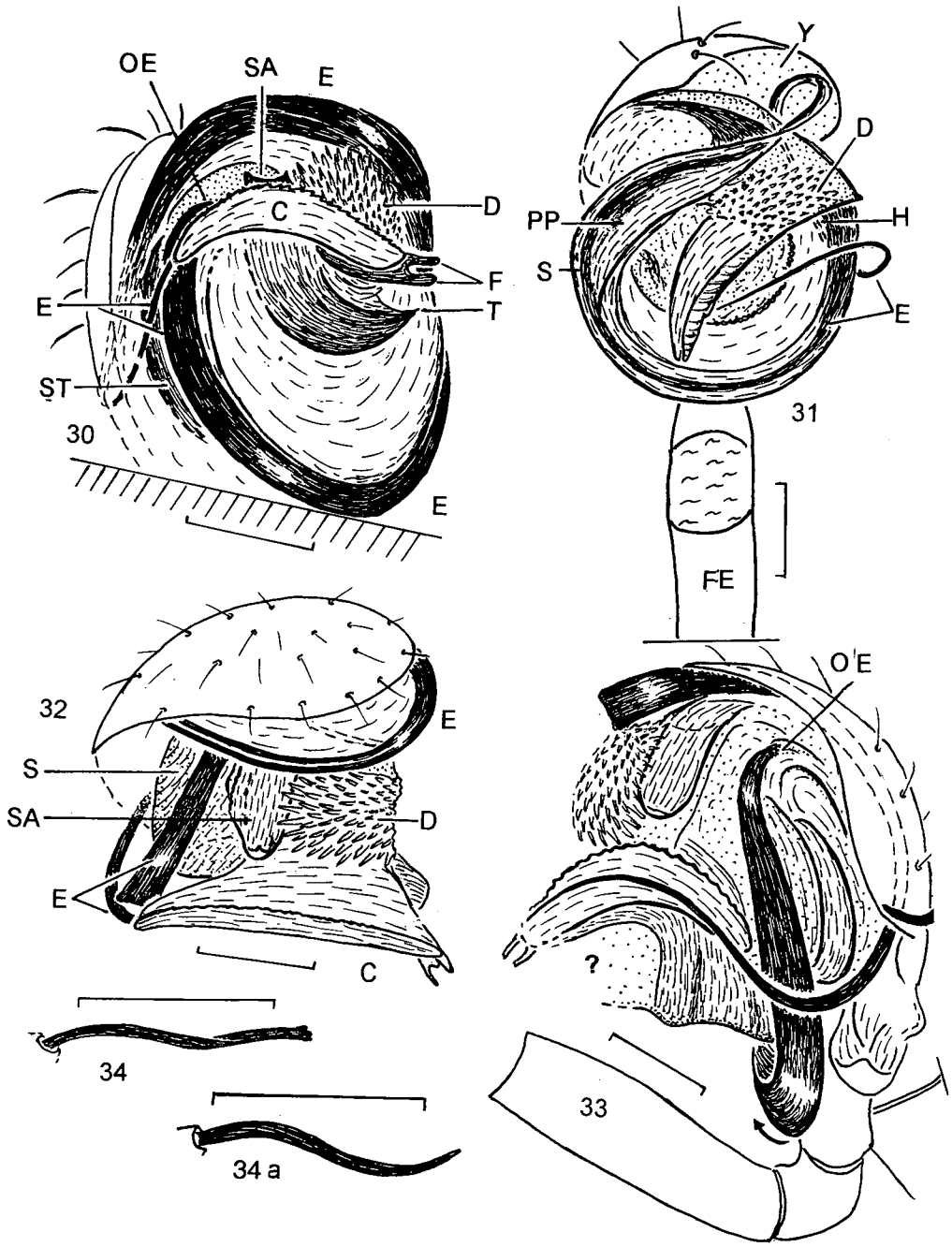


figs. 18-19: *Ilisoa knysna* GRISWOLD 1987, **extant**, South Africa, l. ♂-pedipalpus, ventral and retrolateral aspect, no M; taken from GRISWOLD (1987);

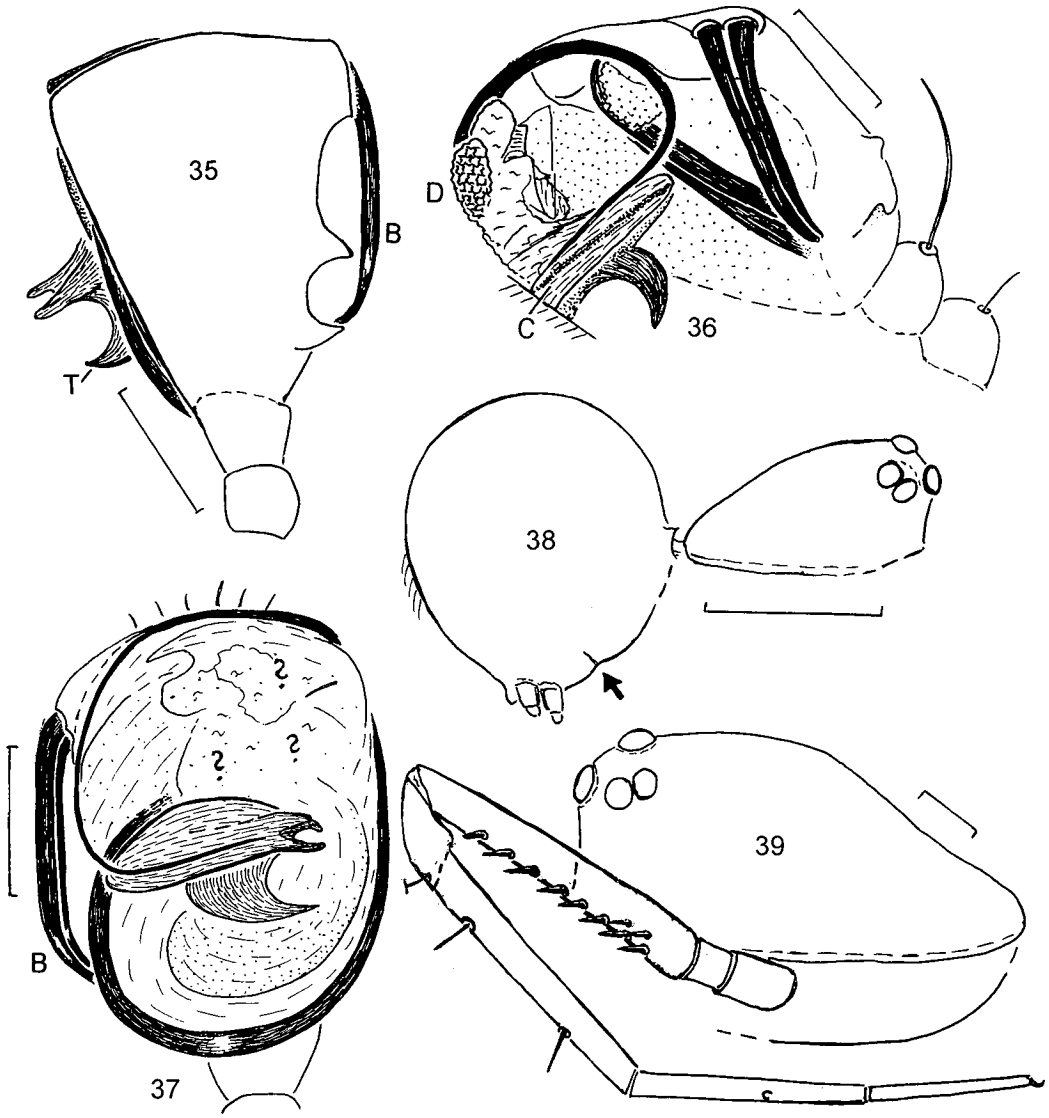
figs. 20-23: *Spinilipus kerneggeri* WUNDERLICH 1993, ♂, holotype; 20) body, dorsal aspect; in the prosomal square the rugose structure of the cuticula is shown; 21) r. pedipalpus, dorsal aspect; 22) bulbus of the r. pedipalpus, ventral aspect; 23) the divided conductor and the tegular apophysis of the left pedipalpus, retrolateral aspect. The figs. are taken from WUNDERLICH (1993: Fig. 4); 23). - C = conductor, E = embolus, O = retromarginal outgrowth of the cymbium, P = paracymbium, T = tegular apophysis. - M = 0.5 in fig. 20), 0.1 in fig. 23), 0.2 in the remaining figs.;



figs. 24-34a: ***Spinilipus glinki* n. sp.**, ♂; holotype fig. 34a), paratype a): Figs. 25-27, paratype b): Fig. 28), paratype d): Fig. 29), paratype g): figs. 24 and 31), paratype h): Figs. 30, 32-33), probably conspecific ♂: Fig. 34a); 24) chelicerae, anterior-distal aspect; 25) l. fang with droplet of poison near the tip; 26) r. pedipalpus, dorsal and slightly basal aspect; 27) l. pedipalpus, dorsal and slightly distal aspect; 28) r. pedipalpus, dorsal and slightly retrobasal aspect, with the distal part of the embolus in an unnatural position above the cymbium (arrow) (cymbial hairs are not drawn); 29) l. pedipalpus with the bulbus expanded, basal-dorsal aspect; 30) r. pedipalpus, retroventral aspect; 31) l. pedipalpus, ventral aspect (the bulbus is somewhat expanded); 32) r. pedipalpus with the bulbus partly expanded, apical aspect; 33) l. pedipalpus,

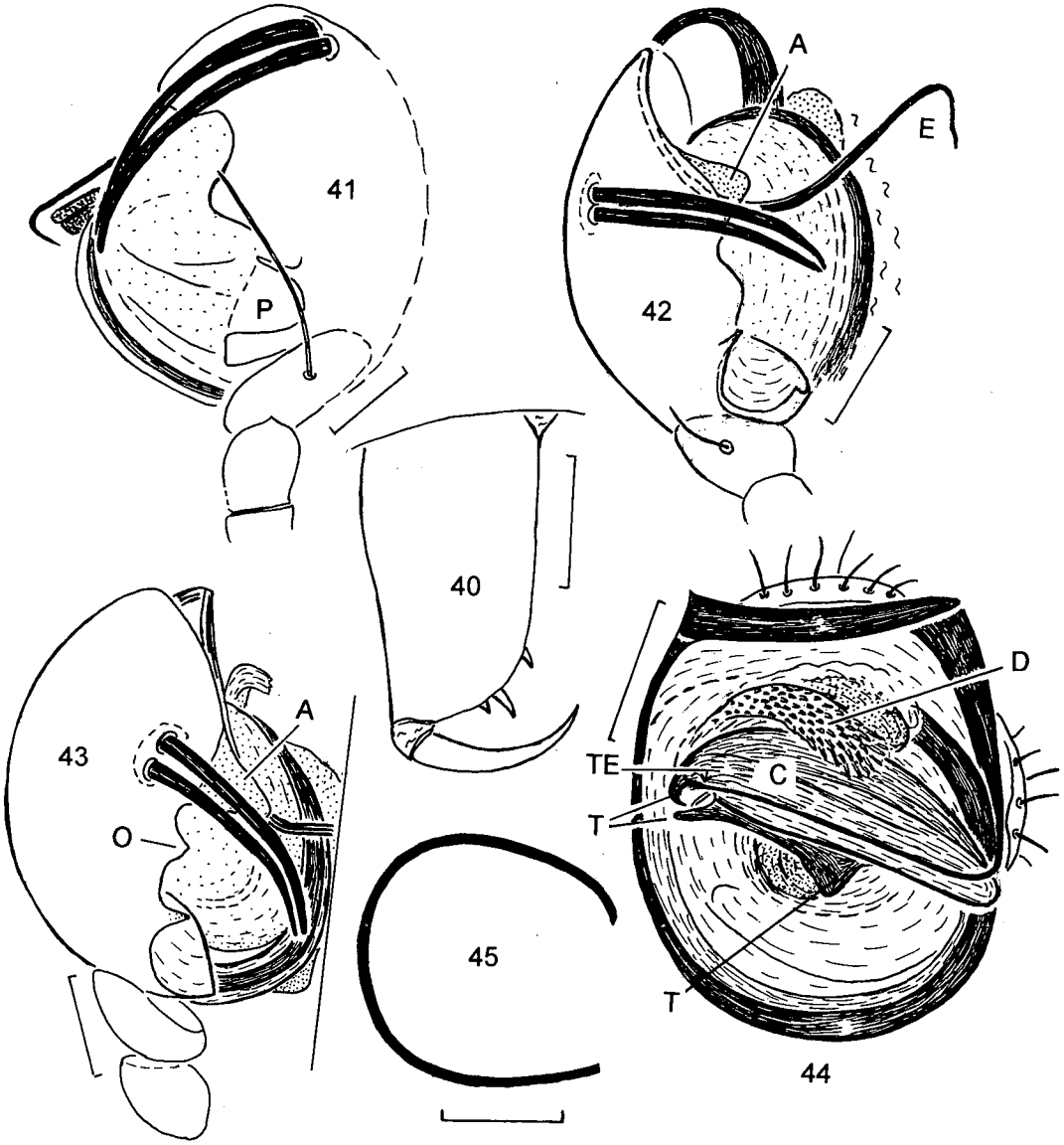


retrolateral aspect; 34) retrolateral cymbial bristle, dorsal aspect; 34a) retrolateral cymbial bristle, dorsal-basal aspect. - C = conductor, D = denticulate area, E = embolus, F = furcate tip of the conductor, FE = femur, H = hidden (dorsal) part of the embolus, OE = origin of the embolus, PP ?= parembolic process, S = seam of the embolus, SA = spoon-shaped apophysis, ST = subtegulum, T = tegular apophysis, Y = cymbium. - M = 0.2 in fig. 24, 0.1 in the remaining figs.;

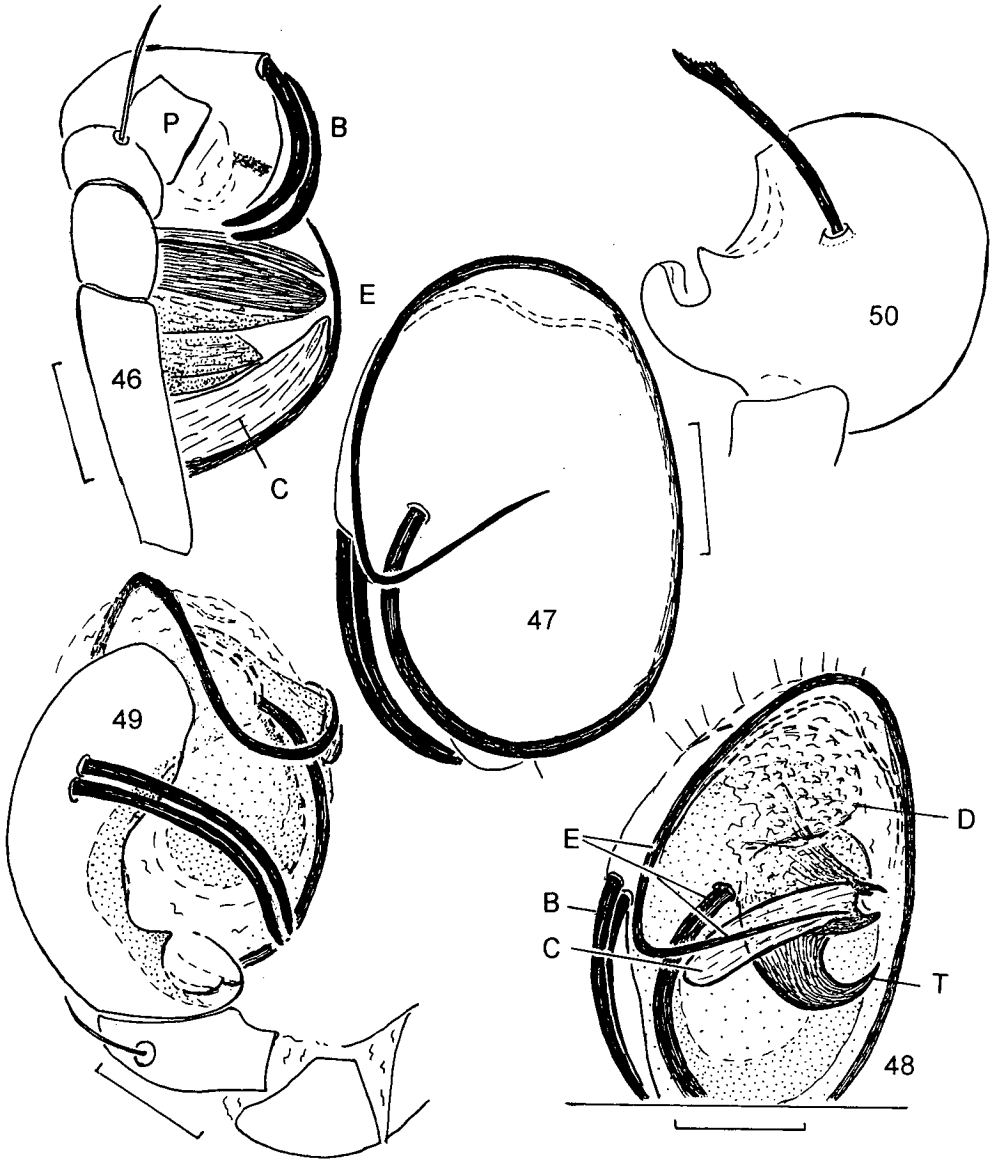


figs. 35-37: ***Spinilipus bispinosus*** **n. sp.**, ♂; 35) paratype b), r. pedipalpus, dorsal aspect; 36) paratype a), l. pedipalpus, retrolateral aspect; 37) paratype b), r. pedipalpus, ventral aspect; the distal structures are hidden. - B = cymbial bristles, C = conductor, D = denticulate area. - M = 0.1;

figs. 38-45: ***Spinilipus curvatus*** **n. sp.**, ♂; holotype: figs. 40), 42), 44-45), paratype a) figs. 38 and 41), paratype b) figs. 39 and 43); 38) body, lateral aspect, opisthosoma in an unnatural position (its end is turned downward by 45°); the arrow indicates to the tracheal furrow; 39) prosoma and l. leg I, lateral aspect; the ventral femoral

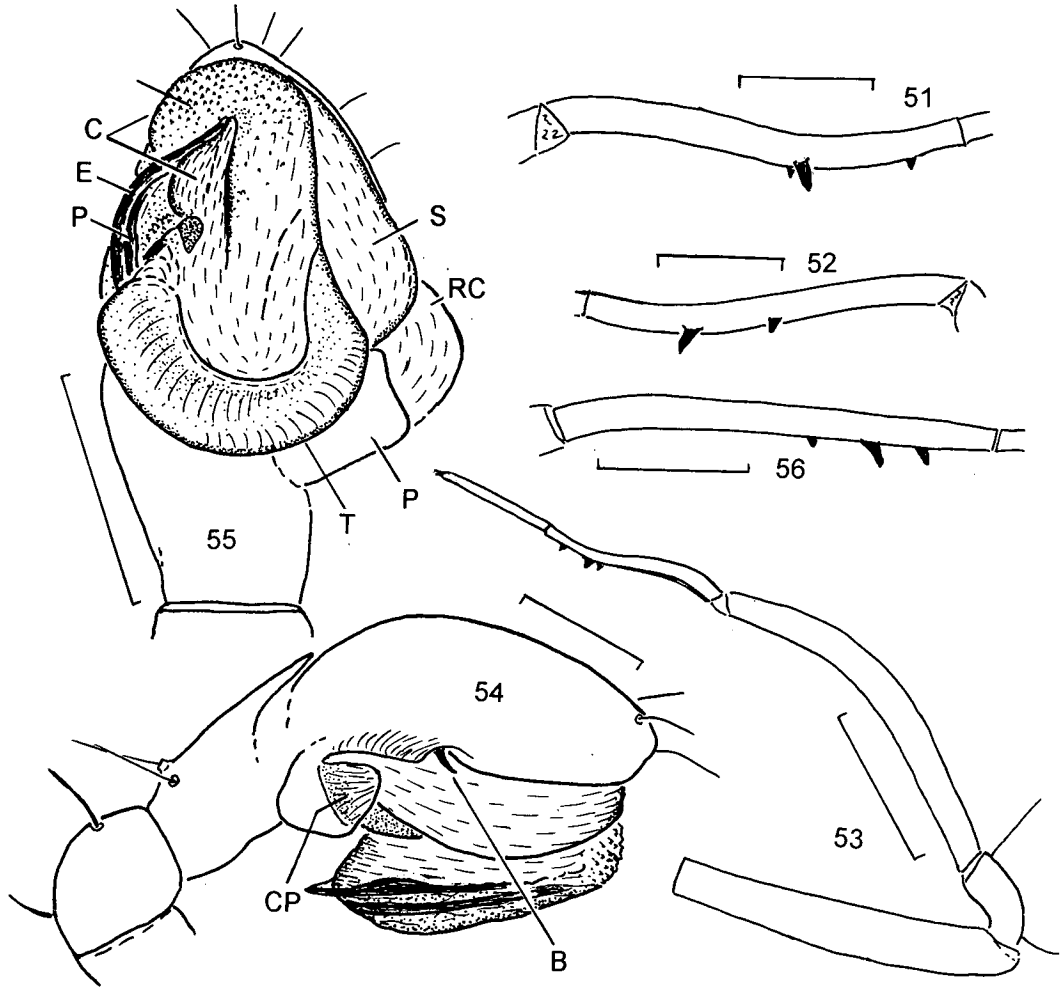


hairs are covered by an emulsion and therefore look like spines; 40) r. chelicera, anterior aspect; 41) l. pedipalpus, dorsal aspect; 42) r. pedipalpus, retrolateral aspect (slightly apically); the embolus is in an unnatural position; 43) r. pedipalpus, retrolateral and slightly apical aspect; 44) l. pedipalpus, ventral and slightly retrodistal aspect; 45) position of parts of the embolus, retrodorsal aspect. - A = additional retromarginal cymbial outgrowth, C = conductor, D = denticulate area, F = furcate tip of the conductor, O = retromarginal cymbial outgrowth, T = tegular apophysis, TE = tip of the embolus. M = 0.5 in fig. 38), 0.1 in the remaining figs.;



figs. 46-49: ***Spinilipus longembolus* n. sp.,** ♂; 46) r. pedipalpus, dorsal-basal aspect; 47) r. pedipalpus, retrolateral aspect; 48) r. pedipalpus, retrolateral aspect; 49) outline of the r. pedipalpus, with the position of the embolus, ventral aspect. - B = retrolateral cymbial bristles, C = conductor, D = denticulate area, E = embolus, P = paracymbium, T = tegular apophysis. - M = 0.1;

fig. 50) *Tekella uniseta* FORSTER 1988, **extant**, New Zealand, ♂, l. pedipalpus, dorsal aspect; taken from FORSTER (1988: Fig. 80);



figs. 51-55: ***Succinilipus abditus* n. sp.**, ♂; 51) holotype, r. metatarsus I, retrolateral and slightly ventral aspect; 52) paratype coll. KRUEMMER, l. metatarsus I, retrolateral aspect; 53) probably conspecific ♂, PIHUB MB.A 592, l. leg I, retrolateral aspect; 54) paratype coll. KRUEMMER, r. pedipalpus, retrolateral aspect; 55) paratype coll. KRUEMMER, l. pedipalpus, ventral aspect. - B = retrolateral cymbial bristle, C = conductor, CP = concave (folded) distal part of the paracymbium, D = denticlate area, E = embolus, P = paracymbium, PP ?= embolic process, RC = retromarginal cymbial process, S = subtegulum, T = tegular lobe. - M = 0.5 in fig. 53), 0.2 in figs. 51-52), 0.1 in the remaining figs.;

figs. 56-58: ***Succinilipus aspinosus* n. sp.**, ♂; 56) r. metatarsus I with spurs, retrolateral aspect; 57) l. pedipalpus, dorsal aspect; 58) r. pedipalpus with the bulbus slightly expanded, retrolateral aspect. - CP = concave distal part of the paracymbium; E = embolus, O = retromarginal cymbial outgrowth, P = paracymbium. - M = 0.2 in fig. 56), 0.1 in the remaining figs.;

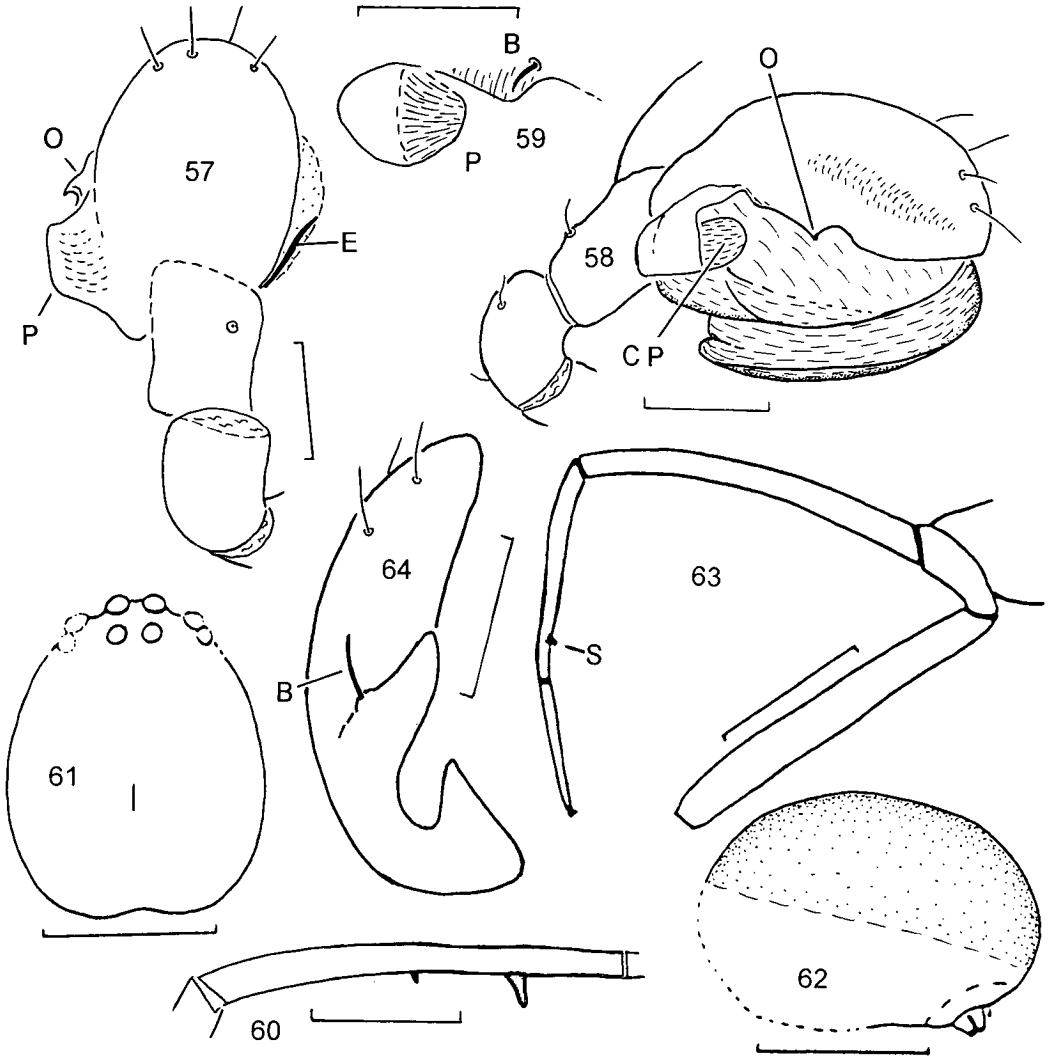


fig. 59) Succinilipus saxoniensis WUNDERLICH 1993, ♂, holotype, paracymbium (P) and retrolateral cymbial bristle (B) of the r. pedipalpus, retrolateral and slightly distal aspect. - M = 0.1;

fig. 60) ***Succinilipus similis* n. sp.**, ♂, r. metatarsus I, retrolateral aspect (hairs are not drawn). - M = 0.2;

figs. 61-64: Succinilipus teuberi WUNDERLICH 1993, ♂, holotype; 61) prosoma, dorsal aspect; 62) opisthosoma with the dorsal scutum puntuared, lateral aspect; 63) l. leg I with the ventral spur (S), retrolateral aspect; 64) cymbium of the r. pedipalpus with the retrolateral bristle (B), retrolateral aspect. - M = 0.1 in fig. 64), 0.5 in the remaining figs.;

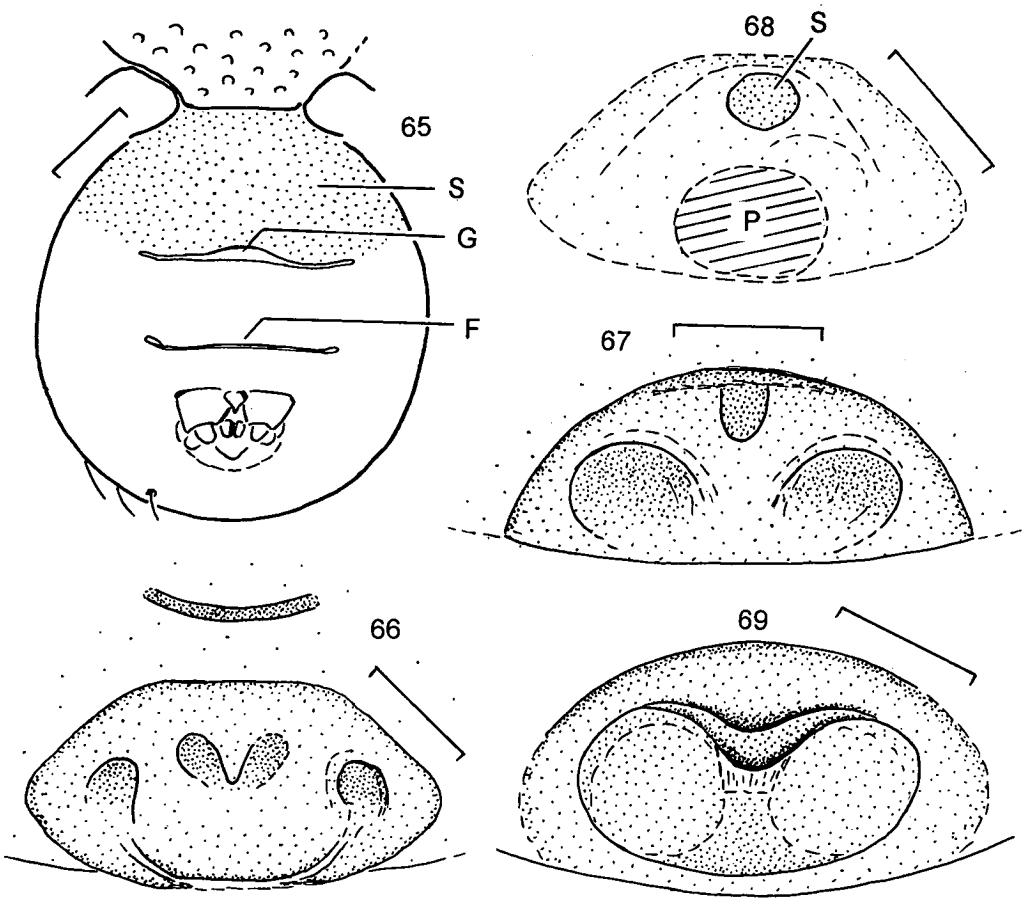


fig. 65) *Succinilipus* sp. indet., ♂, F1051/BB/AR/CYA/CJW, posterior part of the rugose sternum, and opisthosoma, ventral aspect. - S = epigastral scutum, G = genital opening within the epigastral fold, F = tracheal fold. - M = 0.2;

fig. 66) *Succinilipus* sp. indet., ♀, coll. GRABENHORST AR-98, epigyne and band-shaped small epigastral scutum (as in other congeneric species), ventral aspect. - M = 0.1;

fig. 67) *Succinilipus* sp. indet. , ♀, PIHUB no. MB.A584, epigyne. - M = 0.1;

fig. 68) *Succinilipus* sp. indet., ♀, epigyne with a questionable large (P) plug (in the German language: "Begattungs-Zeichen"). - S = scapus. - M = 0.1;

fig. 69) *Succinilipus* sp. indet., ♀, coll. EHLEN no. 117, epigyne. - M = 0.1.

BEITR. ARANEOL., 3 (2004)

THE FOSSIL SPIDERS (ARANEAE) OF THE FAMILY SYNOTAXIDAE IN BALTIC AMBER

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Abstract: The fossil members of the spider family Synotaxidae (Araneae: Araneoidea) in Baltic amber are revised. There are 10 genera and about 18 species, all are extinct. The great diversity of the Synotaxidae in Baltic amber and the occurrence of extant relatives in Australia and South America indicate that this family is not a "Gondwanan taxon". Today 12 genera of the Synotaxidae are known. With the exception of *Synotaxus* SIMON 1894 (part.) all extant genera are restricted to the Southern Hemisphere. - A revised diagnosis of the family Synotaxidae is given. The family Acrometidae WUNDERLICH 1979 is regarded as a taxon - probably a subfamily - of the Synotaxidae (**n. comb.**), the already known taxa are revised. - The following new fossil taxa are described from Baltic amber: *Acrometa clava* **n. sp.**, *A. eichmanni* **n. sp.**, *A. incidens* **n. sp.**, *A. pala* **n. sp.**, *Cornuanandrus bifurcatus* **n. sp.**, *C. corniculans* **n. sp.**, *C. minor* **n. sp.**, *Dubiosynotaxus* **n. gen.**, *D. perfectus* **n. sp.**, *Eosynotaxus* **n. gen.**, *E. custodens* **n. sp.**, *E. bispinosus* **n. sp.**, *E. bitterfeldensis* **n. sp.**, *E. fastigatus* **n. sp.**, *E. paucispina* **n. sp.**, *E. spinipes* **n. sp.**, *E. wegneri* **n. sp.**, *Gibbersynotaxus* **n. gen.**, *G. parvus* **n. sp.**, *Protophysoglenes* **n. gen.**, *P. impressum* **n. sp.**, *Pseudoacrometa wittmanni* **n. sp.**, *Succinitaxus* **n. gen.**, *S. brevis* **n. sp.**, *?S. minutus* **n. sp.**, *Sulcosynotaxus* **n. gen.** and *S. cavatus* **n. sp.** - A coxal-epigastral stridulatory organ - as the first report in this family - is described from *Succinitaxus brevis*, a new questionable stridulatory organ and questionable remains of muscles are described from *Sulcosynotaxus*. Questionable red eye's pigment is reported in fossils from two genera: *Eosynotaxus* and *Gibbersynotaxus*. An epigynal plug is reported from *Acrometa cristata*. - The knowlegde of the diverse fossil taxa of the Synotaxidae may be important for a revision of this family.

Material: If not otherwise stated the material is kept in the collection of the author (CJW); in the future it will be given to a museum, e.g. the SMF and the GPIUH.

INTRODUCTION

Few years ago the family Synotaxidae - with three subfamilies - was separated from the family Theridiidae, see FORSTER et al. (1990). The diagnostic characters of the family are not quite clear, and probably the family is heterogene.
Little is known about the ecology of the family Synotaxidae. Apparently most spiders build sheet webs in higher strata of the vegettion, see FORSTER et al. (1990: Fig. 191); other species live on the ground and build their capture webs e.g. under stones and between fallen leaves; see also below, *Acrometa cristata* and *Eosynotaxus*.
Relative few of the tiny members of the Synotaxidae in Baltic amber are known to me - probably they were overlooked -, the larger spiders of the genera *Acrometa* and *Anandrus* are quite frequent in Baltic amber - I saw thousands of specimens -, but the very long-legged members of *Pseudoacrometa* are rare.
To my knowledge all of the 10 genera in Baltic amber are extinct; females are very rare. The family Synotaxidae in Baltic amber is nearly as diverse in genera and species as the Anapidae s. l.; specimens of *Acrometa* and *Anandrus* are even distinctly more frequent than Anapidae. 120 specimens indet. - most often males, CJW - are waiting for a revision.
FORSTER et al. (1990) listed 12 extant genera of the Synotaxidae worldwide. Nearly all of them are restricted to the Southern Hemisphere - only *Synotaxus* is spread from South to North America -, but no African taxus has been known up to now. Further genera will be described; I saw members of few Australian undescribed genera. Australian - at least the tiny members of an undescribed genus - and South American genera show relationships to the Baltic amber taxa, but there are no congeneric species.
Red pigments (or a product of decomposition?) of the anterior median eyes in *Eosynotaxus wegneri* and *Gibbersynotaxus* apparently indicate close relationships of the Synotaxidae to the family Theridiidae in which questionable red eye's pigments are known, e.g. in *Episinus antecognatus* WUNDERLICH 1986 in copal from the Dominican Republic, see WUNDERLICH (1986: 77). I found questionable red eye's pigments also in *Eriauchenius* sp. in copal from Madagascar (CJW), in a juv. *Archaea* sp. in Baltic amber (both family Archaeidae) as well as in a juv. member of the family Theridiidae, both coll. HOFFEINS.
Courtship behaviour: See *Succinitaxus* and *Sulcosynotaxus*.

EINLEITUNG

Die Kugel-Höhlenspinnen (Synotaxidae) wurden erst kürzlich - mit drei Unterfamilien

- aus der Familie Kugelspinnen (Theridiidae) "ausgegliedert" und als eigene Familie aufgefaßt, vgl. FORSTER et al. (1990). Den deutschen Familien-Namen habe ich wegen ihrer Verwandtschaft/Ähnlichkeit z. B. mit den Kugelspinnen (Theridiidae) und den Höhlenspinnen (Nesticidae) gewählt. Die Synotaxidae scheinen mir bisher nicht eindeutig/sicher diagnostiziert und sind möglicherweise keine monophyletische Gruppe. Im Gegensatz zu den meisten Höhlenspinnen (Nesticidae) ist das Paracymbium einfacher strukturiert (vgl. aber *Eosynotaxus*!) und lateral meist konkav; Zähne im Furchenrand der Cheliceren fehlen gewöhnlich. Im Gegensatz zu den meisten Kugelspinnen (Theridiidae) fehlen bei den Synotaxidae sägerandige Haare unter dem Tarsus IV, das Paracymbium befindet sich in retrobasaler Position und ist dorsal häufig konkav. Ein Stridulations-Organ zwischen Pro- und Opisthosoma kommt bei der Unterfamilie Pahorinae vor; es ist aber anders als bei den Theridiidae. Fragliches rotes Pigment (oder ein Abbau-Produkt) der vorderen Mittelaugen bei *Eosynotaxus wegneri* und *Gibbersynotaxus* könnte auf enge Beziehungen der Synotaxidae zu den Theridiidae hindeuten, bei denen ebenfalls rote fragliche Pigmente der Augen vorkommen, so bei *Episinus antecognatus* WUNDERLICH 1986 in Kopal aus der Dominikanischen Republik und rezenten Kugelspinnen, vgl. WUNDERLICH (1986: 77). Fragliche rote Pigmente der vorderen Mittelaugen fand ich auch bei *Eriauchenius* sp. (Archaeidae) in Kopal von Madagaskar (CJW) sowie im Baltischen Bernstein bei 1 juv. *Archaea* sp. und 1 juv. Vertreter der Kugelspinnen (Theridiidae), beide Slg. HOFFEINS. - Balz: Siehe *Succinitaxus* und *Sulcosynotaxus*.

Über die Ökologie der Familie Synotaxidae ist noch wenig bekannt. Die meisten Arten legen ihre unregelmäßigen Fangnetze offenbar in höheren Vegetations-Schichten an, so wenigstens einige größere und langbeinige Arten, vgl. FORSTER et al. (1990: Abb.191); andere Arten leben am Boden und bauen Fangnetze möglicherweise im Fall-Laub, unter Steinen u.ä.; siehe unten: *Acrometa cristata* und *Eosynotaxus*.

Die kleinen fossilen Arten der Kugel-Höhlenspinnen liegen in nur wenigen Exemplaren vor - auf sie ist bisher möglicherweise wenig geachtet worden -, die größeren Vertreter der Gattungen *Acrometa* und *Anandrus* gehören zu den häufigsten Spinnen im Baltischen Bernstein, ich sah tausende von Exemplaren; die besonders langbeinigen Vertreter von *Pseudoacrometa* sind aber selten.

Im Baltischen Bernstein liegen mir Vertreter (fast nur ♂) von 10 Gattungen vor, die - soweit sich bei heutiger Kenntnis beurteilen läßt - alle ausgestorben sind. Bereits jetzt läßt sich feststellen, daß die fossilen Synotaxidae nahezu so divers (arten- und gattungsreich) vorliegen wie die fossilen Anapidae; an Individuen (vor allem Vertreter der Gattungen *Acrometa* und *Anandrus*) sind sie sogar deutlich häufiger. 120 unbestimmte Vertreter der Synotaxidae - meist ♂, Slg. JW - warten auf eine Revision.

FORSTER et al. (1990) führen weltweit 12 rezente Gattungen der Synotaxidae auf. Fast alle Taxa sind auf die südliche Hemisphaere beschränkt, lediglich *Synotaxus* kommt auf der südlichen wie nördlichen Halbkugel (Amerika) vor. Bemerkenswerterweise ist bisher kein einziges Taxon der Synotaxidae aus Afrika bekannt geworden. Die rezenten Synotaxidae sind noch wenig untersucht; mit der Entdeckung weiterer - ganz überwiegend tropischer - Gattungen ist somit zu rechnen; ich sah Vertreter unbeschriebener australischer Gattungen. Beziehungen der fossilen zu rezenten Gattungen bestehen zur Fauna Süd-Amerikas und zur Australischen Region; gattungsgleiche Arten fehlen allerdings.

TAXONOMY

Diagnosis of the family Synotaxidae: Paracymbium in a retrobasal position and fused to the cymbium, outstanding, usuallyly anteriorly excavated (spoon-shaped, e.g. figs. 2-4, 17, 32, 57-58, 83). Usually a "basal parembolic process" (figs. 3, 22, 26, 38) is present (which is not homologue to the distal embolic process of the Cyatholipidae). As in the Cyatholipidae a median apophysis is absent and a sheet web is build. There is the "tendency" to reduced and/or widely spaced tibial bristles (e.g. in fossil taxa, figs. 52, 81) and the presence of hairs (in several taxa on a hump) in the field of the median eyes (e.g. figs. 60, 95-96). - **Further characters**: In the extant genera there are often spurs on the tibia of the ♂-pedipalpus and/or a modified pedicel (fig. 97) and/or a stridulatory organ between pro- and opisthosoma; see the fossil genus *Sulcosynotaxus*. Denticles (cuspules) may be present on the conductor, on the tegular lobe, on the paracymbium (in *Acrometa* and *Sulcosynotaxus*), on the cymbial outgrowth (fig. 57), on the hump between the median eyes (in *Gibbersynotaxus*), and in the cheliceral furrow, see FORSTER et al. (1990: Fig. 49). The function of the denticles/cus-pules is unknown. Autotomy occurs between coxa and trochanter. - **Remark**: A retrobasal/dorsal cymbial outgrowth/process (e.g. figs. 33-34, 65, 75) is present in several extant and most (!) fossil taxa. It may be fused with the paracymbium (fig. 34) and in some taxa I am not sure if it is a paracymbium or a retrobasal cymbial outgrowth which hide a small/ reduced paracymbium. - The body length of members of the Synotaxidae is 0.9-5.2mm.

Relationships: According e.g. to the absence of a comb of tarsus IV as well as a median apophysis and denticles on various bulbal sclerites Cyatholipidae is regarded as the sister group, see GRISWOLD (2001: 14). In the Cyatholipidae - see the paper on this family in this volume - a very wide fold of the posterior tracheal spiracles is present, the prosomal profile is usually convex, most often four (instead of usually three) promarginal cheliceral teeth are present, a claw of the ♀-pedipalpus is absent, the opisthosoma is usually elongate and scutate, overhanging the spinnerets (rarely in the Synotaxidae), the unpaired tarsal claw is usually longer, and a retromarginal process in about the middle of the cymbium is present (in the Synotaxidae a basal-retrodorsal cymbial process may be present).

Infrafamiliar higher taxa: FORSTER & PLATNICK (1990) listed three subfamilies: Pahorinae, Physogleninae and Synotaxinae. According to shape and position of the paracymbium and the presence of a parembolic process Acrometidae WUNDERLICH 1978 is a taxon of the Synotaxidae, too, and may be a fourth subfamily (**n. comb.**) or a tribus only, see below. According to the structures of their bulbus in my opinion Physogleninae sensu FORSTER et al. is not a monophyletic taxon, and sclerites of the pedicel/the opisthosoma may have evolved more than once. So the subfamilies may be justified or not - a revision including the fossil taxa is needed.

Distribution: Extant: Australian Region, the Americas, mainly tropical and subtropical Regions, mainly in the Southern Hemisphere (only *Synotaxus* is known from both Americas); not known today from Eurasia, Africa and the Oriental Region. Fossil in the Early Tertiary Baltic amber (diverse in genera!).

List of the fossil genera and selected characters (in the alphabetic order):

Remark: Tibial bristles are absent in the genera *Dubiosynotaxus, Gibbersynotaxus, Protosynotaxus* and *?Succinitaxus minutus*; tibial bristles are strongly reduced or absent in *Eosynotaxus*.

Acrometa PETRUNKEVITCH 1942 with conspicuous prosomal hairs which are usually directed foreward (figs.1,8) (similar in some other genera), a long and spiral embolus, a similar embolic process, and a blunt paracymbium which bears numerous tiny denticles (cuspules) (figs. 2-4; compare fig. 17!), very frequent in Baltic amber;

Anandrus MENGE 1856 (= *Elucus* PETRUNKEVITCH 1942) with an unusual small cymbium + bulbus, a blunt paracymbium and characteristic structures of the bulbus (fig. 22), frequent in Baltic amber;

Cornuanandrus WUNDERLICH 1986 with a large dorsal outgrowth of the cymbium (figs. 32-38; comp. *Eosynotaxus*!) near to the small paracymbium;

Dubiosynotaxus n. gen. without tibial bristles, unusually long trichobothria and tarsi which are longer than the metatarsi (fig. 39; unique in this family);

Eosynotaxus n. gen. with the eyes in two widely spaced groups (fig. 60) and bristle-shaped hairs which are directed foreward in the field of the median eyes (figs. 50, 60) as well as ventral spines e.g. on femur and metatarsus III (figs. 53, 61-62);

Gibbersynotaxus n. gen. with a large blunt outgrowth in the field of the median eyes which bears denticles (cuspules) (figs. 71-72) and no tibial bristles;

Protophysoglenes n. gen. with a pair of low posterior prosomal depressions (fig. 76), leg bristles absent, ♂-pedipalpus with a dorsal cymbial outgrowth and a strongly elongate bulbus (fig. 77);

Pseudoacrometa WUNDERLICH 1986 with the bulbus (figs. 17, 19) similar to *Acrometa* but a very long leg I, a long opisthosoma, and a long paracymbium which lacks cuspules;

Succinitaxus n. gen. with the opisthosoma slightly bulging above the spinnerets and a sclerotized epigaster (figs. 78, 80a), presence of a coxal-epigastral stridulatory organ (fig. 80a), and a small/hidden paracymbium at the base of a large retrobasal outstanding cymbial outgrowth (figs. 87, 90);

Sulcosynotaxus n. gen. with a ventero-sternal organ (fig. 92) and a paracymbium similar to *Acrometa* but a short embolus which runs counterclock-wise in the right pedipalpus (fig. 93-94).

Key to the fossil genera of the family Synotaxidae in Baltic amber (♂):

Compare the list above!

1 Length of the body > 1.6mm. Basal - thin - tibial bristle distinctly longer than the tibial diameter and not near to the tibial base 2

- length of the body < 1.6mm. Basal tibial bristle more or less reduced, its position near to the tibial base (e.g. fig. 52). 5

2(1) with a ventero-sternal organ (fig. 92). Right embolus in a counterclockwise position (figs.93-94) (paracymbium similar to *Acrometa*, bearing denticles). . . . . *Sulcosynotaxus*

- no ventero-sternal organ. Right embolus in a clock-wise position, embolus and parembolic apophysis very long and spirally (figs. 2-6). 3

- no ventero-sternal organ. Parembolic apophysis slightly bent, embolus of medium length, position of the right embolus counterclockwise (figs. 22, 29). 4

3(2) leg I very long and covered with short hairs, opisthosoma long; prosoma without long dorsal hairs;paracymbium long and without denticles (figs.5-6).*Pseudoacrometa*
Photo 218

- leg I of medium length and covered with longer hairs, opisthosoma egg-shaped (photos); prosoma with long dorsal hairs which are usually directed foreward (figs.1, but erect in 8); paracymbium short and covered with tiny denticles (figs. 2-4) as in *Sulcosynotaxus*.- Very frequent in Baltic amber . Photos 210-217 . . . . . *Acrometa*

4(2) cymbium and bulbus unusually small, origin of the embolus basally (fig. 22). - Frequent in Baltic amber. Photos 219-220 . . . . . *Anandrus*

- cymbium and bulbus of normal size, origin of the embolus retrolaterally (figs. 20-21, 26). Photo 222 . . . . . *Cornuanandrus*

5(1) prosoma with a pair of low depressions (fig. 76), bulbus strongly elongate (fig. 77). Photo 230. . . . . .*Protophysoglenes*

- no prosomal depressions, bulbus not strongly elongate (e.g. figs. 55, 75). 6

6(5) eyes in two widely separated groups and with strong hairs/bristles between the field of the median eyes (fig. 60); ventral spines are present at least on femur and metatarsus III (figs. 61-62) Photos 225-227. . . . . .*Eosynotaxus*

- eye field not in two widely separated groups; no strong hairs/bristles between the field of the median eyes. 7

7(6) prosoma with a large outgrowth in the field of the median eyes (figs. 71-72). . . .

Photos 228-229. . . . . *Gibbersynotaxus*

- no such outgrowth. 8

8(7) tarsi shorter than metatarsi, opisthosoma slightly bulging above the spinnerets and with a sclerotized epigaster (figs. 78, 80a), coxal-epigastral stridulatory organ present (fig. 80a), ♂-pedipalpus of normal size, conductor with tiny denticles (figs. 84-85, 91). Photos 23 1-233 . . . . . *Succinitaxus*

- tarsi longer than metatarsi (fig. 39), coxal-epigastral stridulatory organ absent, ♂-pedipalpus small, denticles of the conductor absent (figs. 41-42). . . *Dubiosynotaxus*
Photos 223-224

The genera are treated in the following order: *Acrometa, Pseudoacrometa, Anandrus, Cornuanandrus, Dubiosynotaxus, Eosynotaxus, Gibbersynotaxus, Protophysoglenes, Succinitaxus* and *Sulcosynotaxus*.

Taxonomy of the Acrometidae WUNDERLICH 1979

According to the structures of the ♂-pedipalpus - see above - I now regard the family Acrometidae WUNDERLICH 1979 as a taxon of the Synotaxidae; it may be synonym with the Synotaxinae or a subfamily (I prefer this) of its own or a tribus only (**n. comb.**). The genera of this taxon are the larger fossil members of this family with long tibial bristles, see the key: *Acrometa, Anandrus, Cornuanandrus, Pseudoacrometa* and *Sulcosynotaxus*.

Taxonomical history: PETRUNKEVITCH (1958) regarded *Acrometa* and *Anandrus* (sub *Elucus*) as members of the family Araneidae. Later I thought the taxon to be a member of the Tetragnathidae and (1979) as a family of its own. Only in 1990 the family Synotaxidae was separated from the Theridiidae by Forster et al. - ESKOV & MARUSIK (1992) synonymized erroneously Acrometidae with Nesticidae. These authors overlooked that in the Acrometidae a comb of tarsus IV is absent, the shape of the paracymbium and the presence of an parembolic process of *Acrometa* - as well as in the related taxa - are characteristic for the Synotaxidae. MARUSIK & ESKOV (pers. commun.) synonymized both taxa mainly because of the shape of the paracymbium of *Acrometa* which is apparently similar to the paracymbium of *Gaucelmus* KEYSERLING 1884 (Nesticidae). But in *Gaucelmus* the fine structure of the paracymbial denticles is different of the cusps of *Acrometa*, the surface of the cuticula is smooth, and the ventral hairs of tarsus IV are serrate, see WUNDERLICH (1986: 124, 132). See also the Synotaxidae-shaped paracymbium of *Pseudoacrometa* which is close to *Acrometa*.

Acrometa PETRUNKEVITCH 1942

Synonyms - see WUNDERLICH (1986: 131) -: *Eogonatium* PETRUNKEVITCH 1942, *Liticen* PETRUNKEVITCH 1942, *Theridiometa* PETRUNKEVITCH 1942 and *Viocurus* OETRUNKEVITCH 1958. *Siga* MENGE in KOCH & BERENDT 1854 is a questionable synonym, it may be synonym with *Clya* KOCH & BERENDT 1854 (= *Nanomysmena* PETRUNKEVITCH 1958), see WUNDERLICH (1986: 131, 139).

Diagnosis: ♂♀-opisthosoma with long hairs (photo), ♂-prosoma with long dorsal hairs (figs. 1, photos) which usually are directed forward (fig. 1, photos) but are erect in *eichmanni*, fig. 8); the epigyne (fig. 4a) is a strongly sclerotized wide plate with a large median opening which is pointing anteriorly; cymbium with a retrolateral fold and a dorsal-basal depression (figs. 11-12), paracymbium large, outstanding and with numerous denticles (e.g. figs. 1, 5), embolus and parembolic process are long, thin and strongly bent/spirally (e.g. figs. 3, 6). (Furthermore - as in the related genera - the cheliceral promargin bears three wide teeth, the tibial bristles are long and thin, and the embolus has a seam as in *Pseudoacrometa*, e.g. fig. 12.

Type species: *Acrometa cristata* PETRUNKEVITCH 1942.

Relationships: In *Pseudoacrometa* the cuticula of the legs is nearly smooth, leg I is longer, the leg hairs are shorter, the opisthosoma is distinctly longer than wide, long dorsal-medial hairs of the ♂-prosoma and denticles of the paracymbium are absent.

Distribution: Tertiary Baltic amber forest, incl. the Bitterfeld deposit.

Key to the species of the genus *Acrometa* (♂):

Remarks: (1) Position and size of the prosomal hair brush (fig. 1, photo; different in *A. eichmanni*, fig. 8) is intraspecific variable and may depend e.g. on the preservation. (2) Depending on the exact position the size and the shape of the paracymbium appear quite different. Unfortunately it was impossible to draw the paracymbium of the different species in the same position.

1 Prosomal hairs in an upright position, prosoma with a low depression behind the field of the eyes (fig. 8). Most paracymbial denticles are observable in the dorsal aspect (fig. 9). . . . . *eichmanni*

- Prosomal hair brush present, the hairs are directed forward (fig. 1), depression behind the eye field absent. Paracymbium different. 2

2(1) Paracymbium very large, distinctly divided at the end (arrow in fig. 11)...*incidens*

- Paracymbium not distinctly divided at the end. 3

3(2) Paracymbium large, with strong folds and outstanding sidewards (fig. 13). . .*pala*

- Paracymbium shorter, strong folds absent but weak depressions present, paracymbium outstanding oblique backwards (figs. 2, 5). 4

4(3) Bulbus as in fig. 6, spiral parembolic process absent; paracymbium club-shaped (blunt) (fig. 5). Very rare. . . . . *clava*

- Bulbus as in fig. 3, a long and spiral parembolic process is present; paracymbium shorter (fig. 2). By far the most frequent species of the genus. . . . . *cristata*

Acrometa cristata PETRUNKEVITCH 1942 (figs. 1-4a) Photos 210-212

Synonyms: See WUNDERLICH (1986: 132). *Siga crinita* MENGE in KOCH & BERENDT 1854 may be a further synonym (quest. syn.).

Material: 1♂ with exuvia in Baltic amber from the Bitterfeld deposit, coll. GRABENHORST AR-19; 1 questionable ♀ from the Bitterfeld deposit, coll. GRABENHORST AR-54; numerous ♂ and few ♀ (some are questionable) in the collection of the author, e.g. 1♂ and 1♀ partly in contact and probably in a post copular position in the same piece of amber, F689/BB/AR/SYN/CJW; 1♂ with the part of an irregular capture web incl. sticky droplets F1040/BB/AR/SYN/CJW; 2♂ F1041/CJW and 1042/CJW.

Remark: At least - much more than? - two thirds of the congeneric specimens in Baltic amber are members of *cristata*.

Diagnosis: ♂: Prosoma as in fig. 1, pedipalpus (figs. 2-4): Parembolic process long and spiral, paracymbium relatively stout; questionable ♀: epigyne (fig. 4a) with a wide opening which points anteriorly.

Description:
Body length ♂♀ 1.8 (♂)-2.8mm, prosomal length 1.0-1.3mm, prosoma with a dorsal brush of hairs (fig. 1), legs and opisthosoma similar to *A. eichmanni*.
The epigynal opening of a questionable conspecific female of from the Bitterfeld de-

posit, coll. GRABENHORST AR-54 (fig. 4a), is filled with a plug (in German: "Begattungs-Zeichen"), a secretion of the male pedipalpus which hardens and closes the opening of the epigyne to hinder further copulations of. This is the first fossil record of such a structure.
A male and a female (F689) are probably preserved in a "post-copular position" (photo); the epigyne is hidden by a white emulsion.
With a male (F1040) the part of an irregular capture web is preserved which bears sticky droplets (photo).

Relationships: See the key.

Distribution: Tertiary Baltic amber forest, incl. the Bitterfeld deposit.

***Acrometa clava* n. sp.** (figs. 5-7) Photo 213

Material: Holotypus ♂ in Baltic amber, F1044/BB/AR/SYN/CJW.

Preservation and syninclusions: The spider is completely but only fairly well preserved, most parts of the body are covered by a white emulsion, a layer (fissure) runs through the body. Several stellate hairs are preserved in the same piece of amber.

Diagnosis (♂; ♀ unknown): Pedipalpus (figs. 5-7): Paracymbium large and club-shaped, parembolic process and conductor are short.

Description (♂):
Measurements (in mm): Body length 2.4, prosomal length 1.2, leg I: Femur 1.7, patella 0.55, tibia 1.45, metatarsus 1.3, tarsus 0.8, tibia II 1.2, tibia III 0.6, tibia IV 1.0.
Colour: Prosoma and legs dark brown, the opisthosoma is hidden. Prosoma similar to *cristata*, labium free, distinctly wider than long. Legs only fairly long, similar to *eichmanni* but with longer hairs. Position of the metatarsal trichobothria unknown. Opisthosoma (photo) egg-shaped, covered with long hairs, anterior spinnerets stout, colulus distinct.

Relationships: See the key.

Distribution: Tertiary Baltic amber forest.

***Acrometa eichmanni* n. sp.** (figs. 8-10) Photos 214-216

Material: Holotypus ♂ in Baltic amber, coll. F. EICHMANN no. 500; later most probably Geolog.-Paläontol. Inst. Univ. Hamburg.

Preservation and syninclusions: The spider is well and nearly completely preserved in a piece of amber which probably was heated; the left leg I is lost behind the coxa by autotomy, the opisthosoma is deformed, three legs are stretched out forward. Few stellate hairs are preserved in the same piece of amber.

Diagnosis (♂; ♀ unknown): Shape of the prosoma as in fig. 8, with thin erect dorsal hairs. Pedipalpus (figs. 9-10): Most denticles of the paracymbium are observable in the dorsal aspect.

Description (♂):
Measurements (in mm): Body length 2.1, prosoma: Length 1.2, width 1.05, leg I: Femur 1.42, patella 0.43, tibia 1.3, metatarsus 1.1, tarsus 0.75, tibia II 0.95, tibia III 0.5, tibia IV 0.75.
Colour: Prosoma and legs dark brown, opisthosoma yellow brown.
Prosoma nearly as wide as long, profile (fig. 8) convex but low directly behind the eye field, with thin erect dorsal-medial hairs; fovea distinct, anterior median eyes largest, posterior row slightly procurved, posterior median eyes separated by 1 1/5 diameters, clypeus vertical and long, chelicerae fairly large, mouth parts hidden. - Legs only fairly long, order I/II/IV/III, hairs not distinct, patella with 2 thin dorsal bristles, tibiae with long and thin (hair-shaped) bristles, their sequence is 2/2/1/2. Position of the metatarsal II trichobothrium in 0.55. - Opisthosoma oval, covered with long hairs. - Pedipalpus: See above.

Relationships: See the key. *A. incidens* may be most related.

Distribution: Tertiary Baltic amber forest.

***Acrometa incidens* n. sp.** (figs. 11-12) Photo 217

Material: 2♂ inBaltic amber, Holotypus F1045/BB/AR/SYN/CJW, paratypus F1046/BB/AR/SYN/CJW.

Preservation and syninclusions: Holotype: The spider is completely and fairly well preserved, the left side is partly hidden by a layer in the amber, mainly the ventral side of the opisthosoma is covered by a white emulsion. There are no other larger organic inclusions. - The paratype is completely and well preserved, bubbles are present at the opisthosoma, the mouth parts, both pedipalpi and on the left metatarsus IV; there are only few white emulsions and no other larger organic inclusions.

Diagnosis (♂; ♀ unknown): The large paracymbium is distinctly divided at the end (arrow in fig. 11).

Description (♂):
Measurements (in mm): Body length 2.5-2.6, prosomal length 1.25-1.3, tibia I 1.4.

Colour: Prosoma and legs dark brown, opisthosoma yellow brown.
Prosoma similar to *A. cristata*, with a deep fovea. Clypeus oblique vertical. Legs only fairly long, similar to *A. eichmanni*. Position of the metatarsal II trichobothrium in 0.45. Opisthosoma egg-shaped (holotype) to nearly globular, covered with long hairs. Pedipalpus: See above. The retrolateral cymbial fold, the basal cymbial depression and the seam of the embolus are well observable, see the figs.

Relationships: See the key. *A. eichmanni* may be most related.

Distribution: Tertiary Baltic amber forest.

***Acrometa pala* n. sp.** (figs. 13-15)

Material: Holotypus ♂ in Baltic amber, F1043/BB/AR/SYN/CJW.

Preservation and syninclusions: The spider is completely but only fairly well preserved; the opisthosoma as well as parts of the prosoma, legs and pedipalpi are covered by a white emulsion. Several stellate hairs are preserved in the same piece of amber which most probably was heated.

Diagnosis (♂; ♀ unknown): Paracymbium (figs. 13-15) with strong folds, outstanding sideward.

Description (♂):
Measurements (in mm): Body length 2.4, prosomal length 1.2, leg I: Femur 1.95, patella 0.43, tibia 1.55, metatarsus 1.25, tarsus 0.85, tibia II 1.2, tibia IV 0.95.
Colour: Prosoma and legs dak brown, the opisthosoma is covered by a white emulsion. Prosoma as in *A. cristata*. Legs similar to *A. eichmanni* but longer. Position of the metatarsal trochobothrium unknown. Opisthosoma covered with long hairs. Pedipalpus: See above; bulbus as in fig. 15.

Relationships: See the key.

Distribution: Tertiary Baltic amber forest.

Pseudoacrometa WUNDERLICH 1986

Diagnosis (♂; ♀ unknown): Cuticula of the legs nearly smooth, legs (especially I) very long and slender, leg bristles hair-shaped, opisthosoma nearly twice as long as

wide, covered with short hairs; pedipalpus (figs. 16-19) with a long paracymbium, a long and spiral embolus which bears a seam, and a long and spiral parembolic process; the bulbus is distinctly wider than long.

Type species: *Pseudoacrometa gracilipes* WUNDERLICH 1986, figs. 16-17. Photo 218.

Relationships: The structures of the bulbus are similar in *Acrometa*; in *Acrometa* the prosoma bears long dorsal-medial hairs, it is more stout and convex dorsally, the legs are shorter, the opisthosoma is egg-shaped short and bears long hairs, the paracymbium bears denticles and the bulbus is only about as wide as long.

Distribution: Tertiary Baltic amber forest.

***Pseudoacrometa wittmanni* n. sp.** (figs. 18-19)

Derivatio nominis: The spider is named after MAX WITTMANN, who presented the holotype to the Naturkundemuseum in Stuttgart.

Material: Holotypus ♂ in Baltic amber, coll. M. WITTMANN, Museum für Naturkunde Stuttgart.

Preservation and syninclusions: Both legs I and the right leg IV are missing behind the coxa by autotomy, the ventral part of the body is covered by a white emulsion and 2 bubbles. Two small Collembola and few stellate hairs are also preserved.

Diagnosis (♂; ♀ unknown): Paracymbium (fig. 18) only 0.15mm long, Bulbus as in fig. 19.

Description (♂):
Measurements (in mm): Body length about 1.9, prosomal length about 0.7, leg II: Femur 2.0, patella 0.28, tibia 1.6, metatarsus 1.5, tarsus 0.62, tibia III 0.8, tibia IV 1.25. - Colour: Prosoma and legs brown, opisthosoma yellow brown.
Prosoma low, with short hairs and a large fovea. 8 larger eyes which are partly hidden, clypeus about as long as the field of the median eyes. Legs (I is missing) long and slender, covered with short hairs. Patellae and tibiae with 2 thin dorsal bristles (only one on tibia III). Position of the metatarsal III trichobothrium in 0.45. Opisthosoma distinctly longer than wide as in *gracilipes*; with indistinct short hairs. Pedipalpus: See above.

Relationships: In *P. gracilipes* WUNDERLICH 1986 the paracymbium is longer (0.25mm), and the position of the embolus is different.

Distribution: Tertiary Baltic amber forest.

Anandrus MENGE 1856 Photos 219-221

Synonym: *Elucus* PETRUNKEVITCH 1942 with the type species *E. inermis* PETRUNKEVITCH 1942; see WUNDERLICH (1986: 134).

Diagnosis: Cymbium and bulbus unusual small, cymbial outgrowth present and near to/fused with the paracymbium (fig. 21), the embolus originates in a retrobasal position (fig. 22). - Further characters: See WUNDERLICH (1986: 134); the anterior median eyes are largest (fig. 20).

Type species: *Elucus infelix* PETRUNKEVITCH 1942.

Remark: A revision of the genus is needed; there are numerous specimens in the private collection of the author.

Relationships: According to the small paracymbium and the structures of the bulbus *Cornuanandrus* is most related; in *Cornuanandrus* the cymbium and the bulbus are of a normal size, and the embolus originates in a retrobasal position.

Distribution: Tertiary Baltic amber forest.

Cornuanandrus WUNDERLICH 1986

Diagnosis (♂; ♀ unknown): Cymbium with a retrobasal-dorsal outgrowth (figs. 26, 32-34), paracymbium usually small and +/- hidden, parembolic process thin, conductor large, pointed and strongly sclerotized, embolus long, originating retrolaterally (figs. 26, 32, 36). - Remarks: The short metatarsal trichobothria - which are only slightly longer than the diameter of the article - may not be unique in this genus. In contrast to my earlier note (1986: 135) tibia III bears only one and not two dorsal bristles.

Type species: *Cornuanandrus maior* WUNDERLICH 1986 (see below: *C. minor*).

Relationships: See *Anandrus*.

Distribution: Tertiary Baltic amber forest, incl. the Bitterfeld deposit.

Key to the species of the genus *Cornuanandrus* (♂):

1 With a hump in the field of the median eyes (fig. 27). . . . . *corniculans*

- No such hump. 2

2(1) Body length 1.85mm. Pedipalpus: Figs. 33-34. . . . . *minor*

- Body length 3.0-3.6mm. 3

3(2) Conductor in a more distal position, distally bent (fig. 26). . . . . *bitterfeldensis*

- Conductor in a more basal position, distally straight (fig. 38). . . . . *maior*

Cornuanandrus bifurcatus n. sp. (figs. 23-25)

Material: Holotypus ♂ in Baltic amber from the Bitterfeld deposit, F1031/BB/AR/SYN/CJW.

Preservation and syninclusions: The spider is preserved in a clear yellow piece of amber; mainly the ventral and the left sides are covered by a white emulsion, the right legs I and II are missing behind the coxa by autotomy, the opisthosoma is twisted by 90° compared with the prosoma; parts of the right tarsus IV and the left tibia I are cut off, the left leg IV is cut off through tibia and metatarsus. Stellate hairs are absent.

Diagnosis (♂; ♀ unknown): Cymbium with a divided outgrowth (fig. 25).

Description (♂):
Measurements (in mm): Body length 3.3, prosoma: Length 1.6, width 1.2, femur I 3.5, tibia II 2.1, tibia IV 1.9, diameter of an anterior median eye 0.09.
Prosoma and legs dark brown, opisthosoma light grey.
Prosoma low, covered with few indistinct hairs, with a large fovea. Eyes (fig. 23) small, in two wide rows, anterior medians largest, posterior row procurved, lateral eyes distinctly separated and elevated. Clypeus distinctly concave, slightly longer than the field of the median eyes, fairly protruding. - Legs long, order I/II/IV/III. Bristles short, patellae two dorsally, sequence on the tibiae 2/2/1/2. Trichobothria and tarsal claws short. - Opisthosoma (fig. 24) distinctly longer than wide or high, scarcely covered with short hairs, anterior spinnerets stout, colulus fairly large, as wide as long. - Pedipalpus (see above, fig. 25): Tibia as short as the patella, structures of the bulbus similar to *corniculans*.

Relationships: See *C. corniculans* n. sp.

Distribution: Tertiary Baltic amber, the Bitterfeld deposit.

***Cornuanandrus bitterfeldensis* n. sp.** (fig. 26)

Material: Holotypus ♂ in Baltic amber from the Bitterfeld deposit, F1030/BB/AR/SYN/CJW.

Preservation and syninclusions: The spider is placed at the margin of a piece of amber which has numerous marginal fissures; its opisthosoma is completely covered by a white emulsion, most leg articles are broken off, only the right leg IV is complete; the right leg III is broken off through the patella, two leg articles are loose. - A tiny Diptera: Nematocera is present, too, but no stellate hairs.

Diagnosis (♂; ♀ unknown): Pedipalpus (fig. 26) with an outstanding cymbial outgrowth, a long embolus at the cymbial margin, a curved thin parembolic process and a large conductor.

Description (♂):
Measurements (in mm): Body length 3.0, prosoma: Length 1.2, width 1.05, femur 2.0, tibia II 1.45, tarsus I 1.1.
Colour: Prosoma and legs medium brown, the opisthosoma is covered by a white emulsion. - Prosoma fairly wide, covered with short hairs, fovea low. 8 eyes of medium size, posterior row slightly procurved, anterior eyes separated by their diameter, posterior median eyes separated by 1 1/4 diameters, clypeus long, most parts of the mouth parts are hidden. - Legs long (several articles are lost). - Opisthosoma oval. - Pedipalpus: See above.

Relationships: In *C. maior* WUNDERLICH the position of the cymbial process is different, the conductor is more slender, its position more basal.

Distribution: Tertiary Baltic amber forest, the Bitterfeld deposit.

***Cornuanandrus corniculans* n. sp.** (figs. 27-32) Photo 222

Material: Holotypus ♂ in Baltic amber, F1032/BB/AR/SYN/CJW.

Preservation and syninclusions: The spider is well preserved in a clear yellow piece of amber between two layers which distinctly hinder the view to the spider. The left leg I is lost behind the coxa by autotomy, the right tarsus I and parts of the right metatarsus I are lost, the right legs III and IV are partly broken off, parts of the eyes are covered by bubbles, the opisthosoma is slightly deformed and covered by a white emulsion. - Above the right tibia I a tiny questionable member of the Psocoptera is preserved, nearby the spider some stellate hairs and an excrement particle.

Diagnosis (♂; ♀ unknown): With a small outgrowth in the field of the median eyes (figs. 27-28). Pedipalpus (figs. 29-32): Cymbial outgrowth/paracymbium distally divided, parembolic process strong, conductor long.

Description (♂):
Measurements (in mm): Body length 2.9, prosomal length 1.5, length of the prosomal outgrowth 0.05, leg I: Femur 3.5, patella 0.65, tibia 3.0, metatarsus 3.8, tarsus II 1.15, tibia IV 1.6.
Colour: Prosoma und Beine dunkelbraun, opisthosoma grey.
Prosoma (figs. 27-28) low, anterior part with longer hairs, eyes only fairly large, with a small and blunt outgrowth (horn) in the field of the median eyes. Clypeus slightly longer than the field of the median eyes, basal articles of the chelicerae large. - Legs - especially I - long and slender, fairly hairy, order I/II/IV/III. The patellae bear 2 dorsal bristles. Sequence of the indistinct dorsal tibial bristles 2/2/1/2. - Opisthosoma 1.8 times longer than wide, covered with short hairs, spinnerets short. - Pedipalpus (figs. 29-32, see above): Patella slightly longer than the tibia and with 2 dorsal bristles, tibia with one thin bristle and two trichobothria, cymbial outgrowth/paracymbium - probably both are fused - complicated and distally divided.

Relationships: In the closely related *C. bifurcatus* an outgrowth in the field of the median eyes is absent and the cymbial process is slightly different.

Distribution: Tertiary Baltic amber forest.

***Cornuanandrus minor* n. sp**. (figs. 33-34)

See my previous remark on this species, WUNDERLICH (1986: 135).

Material: Holotypus ♂ in Baltic amber, F1033/BB/AR/SYN/CJW.

Preservation and syninclusions: The spider is well and nearly completely preserved in a clear yellow piece of amber and is ventrally covered by a white emulsion, the right tarsus I is lost. Larger organic syninclusions are absent.

Diagnosis (♂; ♀ unknown): Prosomal length only 0.9mm, conductor showing slightly oblique in a ventral direction.

Description (♂):
Measurements (in mm): Body length 1.85, prosoma: Length 0.9, width 0.85, right leg I: Femur 2.1, patella 0.4, tibia 1.75, leg II: Tibia 1.15, metatarsus 1.55, tarsus 0.7, tibia III 0.5, tibia IV 0.9, left leg I - a shortened regenerate? -: Femur 1.95, patella 0.4, tibia > 1.4, metatarsus 1.0, tarsus 0.35.
Colour: Prosoma and legs dark brown, opisthosoma light brown.
Prosoma slightly longer than wide, covered with few hairs, with a large fovea and low depressions between caput and thorax. Eyes only fairly large, anterior medians lar-

gest, posterior row slightly recurved. Basal cheliceral articles large. - Legs long and slender, with short hairs, order I/II/IV/III, I distinctly the longest. Bristles short and thin, the patelle bear 2, sequence of the dorsal tibial bristles 2/2/1/2, bristles only slightly longer than the tibial diameter. Trichobothria short, tarsal claws small. - Opisthosoma long, scarcely covered with short hairs, spinnerets hidden. - Pedipalpus (figs. 33-34): Tibia longer than the patella, at least the patella bear 1 dorsal-basal bristle; cymbial outgrowth/paracymbium similar to *maior*, embolus long, originating in a retrolateral position, counterclock-wise in the right pedipalpus.

Relationships: *C. maior* WUNDERLICH 1986 (figs. 35-38) is closely related; in *maior* the length of the prosoma is 1.5mm and the conductor is not showing oblique in the ventral direction; the cymbial outgrowth is quite similar.

Distribution: Tertiary Baltic amber forest.

***Dubiosynotaxus* n. gen.**

Diagnosis (♂; questionable ♀): Tarsi longer than metatarsi, metatarsal trichobothria long (fig. 39); ♂-pedipalpus (figs. 39-42): Cymbium and bulbus small, embolus very long and coilled. Epigyne (fig. 43) of the questionable ♀ with a wide posterior groove.

Type species: *Dubiosynotaxus perfectus* n. sp. (the only known species of the genus).

Relationships: According to the structures of the bulbus *Succinitaxus* may be most related; in *Succinitaxus* the tarsi are shorter than the metatarsi, the pedipalpus is larger, and the conductor bears denticles.

Distribution: Tertiary Baltic amber forest.

***Dubiosynotaxus perfectus* n. gen. n. sp.** (figs. 39-43) Photos 223-224

Material: 2♂ and a questionable ♀ in Baltic amber; holotypus ♂ Museum Ziemi in Warsaw no. 16189; paratypus ♂ and a separated piece of amber, F1022/BB/AR/SYN/CJW; questionable ♀ coll. ERNST in Skagen, Denmark.

Preservation and syninclusions: Holotype: The spider is very well and completely preserved, dorsal and right parts of the opisthosoma are covered by a white emulsion, the right leg I shows in a dorsal direction, the remaining legs show in ventral directions; no syninclusions. - The male paratype is completely preserved, covered by a white emulsion; 2 larger bubbles are present between leg articles, a beetle is

preserved in the separated piece of amber. - The questionable ♀ is well preserved, there is no white emulsion, parts of the left leg II are cut off, the opisthosoma is blown up probably by decomposition gas or eggs. A bubble and questionable remains of excrement are preserved at the spinnerets and the anal tubercle.

Diagnosis (♂; questionable ♀): ♂-pedipalpus (figs. 40-42): Patella slightly longer than the tibia, the cymbium bears a retrodistal bristle. Smallest member of the family Synotaxidae in Baltic amber, prosomal length 0.4-0.45mm.

Description ♂):
Measurements (holotype in mm): Body length 0.9, prosomal length 0.4, leg I: Femur 0.52, patella 0.17, tibia 0.4, metatarsus 0.23, tarsus 0.27, tibia IV 0.3, length of the metatarsal I-IV trichobothria 0.13, length of the dorsal opisthosomal hairs 0.05-0.1, length of the cymbium 0.145, diameter of an anterior median eye 0.06. - Metatarsus/tarsus I of the paratype (♂) 0.2/0.22. - Questionable ♀: Body length 1.35, prosomal length 0.45, leg I: Femur ca 0.5, patella 0.19, tibia 0.4, metatarsus 0.2, tarsus 0.24.
Colour: Prosoma and legs dark brown in the holotype, light brown in the remaining spiders, opisthosoma grey brown.
Prosoma slightly longer than wide, only fairly high, fovea wide, field of the eyes wide and protruding, eyes large (partly covered by bubbles), clypeus slightly longer than the field of the median eyes, basal cheliceral articles small. - Legs fairly short, I not much longer than II, tarsi longer than the metatarsi (fig. 39, see above), patellae and tibiae with indistinct hair-shaped dorsal bristles, metatarsal trichobothria long (fig. 39), position on metatarsus I in 0.7, on IV in 0.82. Tarsal claws small. - Opisthosoma egg-shaped, covered with short hairs. Basal articles of the anterior spinnerets stout, colulus small. - ♂-pedipalpus (figs. 40-42): See above. Epigyne of the questionable ♀ (fig. 43) only fairly sclerotized, with a wide posterior groove.

Relationships: See above.

Distribution: Tertiary Baltic amber forest.

***Eosynotaxus* n. gen.**

Diagnosis (♂; ♀): 8 eyes in two widely separated groups (figs. 44, 60), ♂-prosoma with strong hairs/bristles on a hump in the field of the median eyes which are directed forward (figs. 60, 66), at leat ♂-metatarsus and femur III with ventral spines (figs. 50, 61-62), leg I very long, leg IV slender, only a single tiny dorsal-basal tibial bristle may be present, cymbial outgrowth/paracymbium complicated (e.g. figs. 57, 64, 70), a sickle-shaped apophysis may be present; bulbus large, conductor with denticles, most parts of the embolus are hidden (see fig. 70). Epigyne (fig. 49) protruding, a scapus is absent. - In at least one species (*custodens*) the female carries its eggs (photo), see below.

Remarks: (1) Ecology: The spiders of this genus are very rare in Baltic amber; each

of the seven known species is represented by only a single specimen. This - and the light colour of the - weakly sclerotized - prosoma may indicate that these spiders did not live in higher strata of the vegetation but were quite diverse in on the ground, e.g. within fallen leaves; (2) There are unsolved questions: (a) What is the function of the ventral leg spines in male *Eosynotaxus*? (b) Why is the leg III most spiny?

Type species: *Eosynotaxus wegneri* n. sp.

Relationships: See the key, *Gibbersynotaxus* and *Succinitaxus*. - In *Tupua* PLATNICK 1990 and *Paratupua* PLATNICK 1990 (extant, Australian Region) bristles in the field of the median eyes are present, too (figs. 95-96), but the position of the eyes is quite different, ventral leg spines are absent, the structures of the bulbus are quite different, e.g. a free observable, long and thin embolus and a thin parembolic process are present and the paracymbium is different, too. Therefore I regard the prosomal bristles as convergently evolved in the extant genera.

Distribution: Tertiary Baltic amber forest, incl. the Bitterfeld deposit.

Comparison of the species of *Eosynotaxus* (♂):

(p = proventral/prolateral, r = retroventral)

Character	*bispinosus*	*wegneri*	*bitterfeldensis*	*paucispina*	*spinipes*	*fastigatus*
number of bristles in the eye field	2	3	4	4 (or 5?)	4 (fig. 60)	2
row(s) of ventral leg spines:						
femora	III (r)	III (r)	III (r)	III (r)	II (p, r) III (p, r)	II (p, r) III (p, r)
metatarsus	III (p)	III (p)	III (p)	III (p)	III (p) (fig. 62)	III (p)

***Eosynotaxus custodens* n. gen. n. sp.** (figs. 44-49) Photo 522

Material: Holotypus ♀ with a lump of first instars in Baltic amber, F446/BB/AR/SYN/

CJW.

Preservation and syninclusions: The spider and the lump of first instars are well preserved, three larger and few smaller fissures hinder the view - see the photo -, the left leg I of the spider is cut off through the patella, parts of the instars, the chelicerae and the anterior part of the prosoma are more or less covered by a white emulsion, the opisthosoma is somewhat deformed, the right leg II is broken between patella and tibia, remains of blood (haemolyph) are preserved between these articles (fig. 47). - Few stellate hairs (one on the sternum) and particles of detritus are also preserved. Some threads of silk - a dragline? - are running from the anterior spinnerets to the distal articles of the left legs III and IV and one thread runs to the left coxa I.

Diagnosis (♀; ♂ unknown): Prosomal length 0.55mm, length of tibia I about 1.5mm, genital area (fig. 49) protruding.

Description (♀):
Measurements (in mm): Body length 1.15, prosomal length 0.55, length of tibia I about 1.5. - Colour medium brown.
Prosoma wide, 8 large eyes in two groups which are widely spaced (fig. 44), anterior medians separated by about two of their diameter. The clypeus is long and protruding, most mouth parts are hidden, the labium is free (fig. 45). The pedipalpus bears hairs but no bristles and a long and strong tarsal claw which is bent inwards in a right angle (fig. 46). The legs are long and slender, I by far the longest, III and IV are very short, IV only slightly longer than III. The tibiae bear only two very thin (hair-shaped) dorsal bristles. A metatarsal IV trichobothrium is most probably absent, position of the metatarsal II trichobothrium in about 0.32. The opisthosoma is nearly globular, anterior spinnerets stout, colulus (fig. 48) and anal tubercle large, the position of the small tracheal spiracle is near the spinnerets (fig. 48), the genital area (fig. 49) is strongly outstanding, about triangular, without an appendage.

Relationships: I do not want to exclude that this female is conspecific with one of the species which are described from the male sex.

Distribution: Tertiary Baltic amber forest.

Description of the lump of first instars (photo): Diameter of the lump about 1.3mm; it is larger than the spiders body (!). The lump is hold between the anterior femora, the claws of the pedipalpal tarsi (fig. 46) are directed to the instars and nearly in contact with them. The number of instars may be about two dozens, their body length is about 0.3mm, most of their legs are strongly bent beneath their body, in a position close together and nearly parallel. The surface of the lump is build by a translucent "emulsion" (secretion?), not by threads (!). - Within the superfamily Araneoidea only rarely the egg sac is carried by the female, e.g. in the Synotaxidae *Mangua gunni* FORSTER 1990 (extant, New Zealand), see FORSTER & PLATNICK (1990: Fig. 259). Within the superfamily Dysderoidea females of several families carry their egg sac to protect it; POINAR & POINAR (1999: 74, fig. 72) report shortly a fossil female of the family Pholcidae in Dominican amber which protect its eggs. - A similar egg-caying behaviour is very rarely present in taxa of other superfamilies, too, e.g. in some taxa of the Sparassidae and - as a family character - in the Pisauridae.

***Eosynotaxus bispinosus* n. gen. n. sp.** (figs. 50-54)

Material: Holotypus ♂ in Baltic amber, coll. F. EICHMANN, later probably Geol.-Palaeontol. Inst. Univ. Hamburg.

Preservation and syninclusions: The opisthosoma is completely covered by a white emulsion, also the legs and the prosoma on the left side; the opisthosoma is depressed at the right side, the right leg I is lost behind the coxa by autotomy, the pedipalpi are bent ventrally to the body. Stellate hairs are absent.

Diagnosis (♂; ♀ unknown): Only two bristles in the field of the median eyes (figs. 50-51), femur and metatarsus III bear ventral spines; pedipalpus (fig. 54) with a long tibial bristle, and a pointed and bent cymbial outgrowth.

Description (♂):
Measurements (in mm): Body length 1.4, prosomal length 0.6, leg I: Femur 1.5, patella 0.25, tibia 1.6, metatarsus 1.6, tarsus 0.9, tibia II 0.8, tibia III 0.45, tibia IV 0.55.
Colour: Prosoma and legs dark brown, probably partly pyritized, opisthosoma covered by a white emulsion.
Prosoma (figs. 50-51) high, clypeus strongly concave, higher than the length of the field of the median eyes, ventrally protruding, with a low furrow between caput and thorax. 8 eyes in 2 widely spaced groups similar to fig. 60, anterior medians smallest, posterior row straight; with one pair of bristles on a hump in the field of the median eyes. Chelicerae/mouth parts hidden. - Legs long and slender, scarcely covered with hairs, I distinctly the longest, III and IV very short. The patellae bear 2 tiny dorsal bristles, most tibiae bear a tiny dorsal bristle near the base (fig. 52). Femur III bears 3 retroventral spines (fig. 53), metatarsus III bears few proventral spines. - Opisthosoma egg-shaped, scarcely covered with hairs which are fairly short. - Pedipalpus (fig. 54): Tibia with a long retrodorsal bristle, cymbial outgrowth pointed and bent; the structures of the bulbus are hidden.

Relationships: In *fastigatus* also two bristles occur in the eye field of the median eyes but there is a greater number of ventral leg spines (see the tab. above), a long pedipalpal tibial bristle is absent.

Distribution: Tertiary Baltic amber forest.

***Eosynotaxus bitterfeldensis* n. gen. n. sp.** (fig. 55)

Material: Holotypus ♂ in Baltic amber from the Bitterfeld deposit and a separated piece of amber, coll. GRABENHORST AR-36, later most probably GPIUH.

Preservation and syninclusions: The spider is fairly well preserved at the margin of a small piece of amber which possesses some fissures and which was cut from a larger piece. The right leg I is lost behind the coxa by autotomy, the left leg I is cut off through the end of the femur, distal parts of the right leg IV are cut off, too, a white emulsion is absent. - Remains of a small Diptera and numerous stellate hairs are present in the same piece of amber.

Diagnosis (♂; ♀ unknown): 4 bristles in the field of the median eyes as in fig. 60, ventral bristles on femur and metatarsus III only, pedipalpus: Fig. 55.

Description (♂):
Measurements (in mm): Body length 1.3, prosomal length 0.5, leg II: Femur 1.03 (width in the middle 0.8), patella 0.2, tibia 0.65, metatarsus 0.92, tarsus 0.53, femur IV 0.9 (width in the middle 0.55). - Colour light brown.
Prosoma as in the genus, the field of the medium eyes bears 4 bristles as in fig. 60. Legs long and slender, femur and metatarsus III bear both 3-4 ventral spines. Opisthosoma high, covered with hairs of medium length; stout anterior spinnerets. Pedipalpus (fig. 55): Cymbial outgrowth with a slender and sickle-shaped apophysis.

Relationships: See the tab. above.

Distribution: Tertiary Baltic amber forest, the Bitterfeld deposit.

***Eosynotaxus fastigatus* n. gen. n. sp.** (fig. 56)

Material: Holotypus ♂ in Baltic amber, F1036/BB/AR/SYN/CJW.

Preservation and syninclusions: The spider is completely preserved on a layer in the amber; most parts of body and legs are covered by a white emulsion. Some stellate hairs inclusive a larger "arm" with knots are preserved in the same piece of amber.

Diagnosis (♂; ♀ unknown): 2 bristles in the field of the median eyes similar to figs. 50-51, ventral leg spines are present on femora II-III and metatarsus III (see the tab. above); pedipalpus: Fig. 56.

Description (♂):
Measurements (in mm): Body length 1.6, prosomal length 0.75, tibia I 1.65. - Colour light brown. - Prosoma as in the genus, the field of the median eyes bears two bristles similar to figs. 50-51. - Legs long and slender, as in the genus, ventral spines on femora II-III and on metatarsus III. - The opisthosoma is covered by a white emulsion. - The bulbus (fig. 56) bears a large and denticulate conductor.

Relationships: See the tab. above; the ventral leg spination is as in *spinipes*.

Distribution: Tertiary Baltic amber forest.

***Eosynotaxus paucispina* n. gen. n. sp.** (figs. 57-59) Photo 225

Material: Holotypus ♂ and 2 separated pieces of Baltic amber, coll. C. GRÖHN, later GPIUH.

Preservation and syninclusions: The spider is completely and well preserved, the opisthosoma as well as the ventral and right sides of the prosoma are covered by a white emulsion, the bulbus of the left pedipalpus is expanded, several larger bubbles are present at the mouth parts and near the legs. Thin threads without droplets - probably remains of a capture web - are present behind, above and right of the spider. Few stellate hairs.

Diagnosis (♂; ♀ unknown): 4 or 5 bristles in the field of the median eyes similar to fig. 60, presence of ventral spines on femur and metatarsus III; pedipalpus (figs. 57-59): Cymbial outgrowth with 3 hairy apical denticles and 5 denticles near the sickle-shaped apophysis.

Description (♂):
Measurements (in mm): Body length 1.35, prosomal length and width about 0.5, leg : Femur 1.7, patella 0.28, tibia 1.7, metatarsus 1.75, tarsus 1.0, tibia II 0.65, tibia III 0.32, tibia IV 0.5. - Colour light brown.
Prosoma high, eyes as in the genus, 4 or 5 bristles in the field of the median eyes, anterior cheliceral margins probably without teeth, fangs slender. - Legs slender, I very long, the tibiae bear a short and thin bristle near the base. Metatarsus and femur III bear 3 ventral spines. Position of the metatarsal trichobothrium: 0.43 in I, 0.33 in II, 0.27 in III, absent on metatarsus IV. - Opisthosoma egg-shaped, covered with short hairs. - Pedipalpus: See above; the left bulbus is expanded.

Relationships: See the tab. above.

Distribution: Tertiary Baltic amber forest.

***Eosynotaxus spinipes* n. gen. n. sp.** Photo 226

Material: Holotypus ♂ in Baltic amber and 4 separated pieces of amber, F1035/BB/AR/SYN/CJW.

Preservation and syninclusions: The spider is well preserved, the opisthosoma is dorsally somewhat depressed, both legs I are absent beyond the coxa by autotomy; the ventral parts are partly covered by a white emulsion and touching a layer in the

amber. Some fissures are running through body and legs. - The separated pieces of amber contain a mite, 2 particles of excrement, some stellate hairs and a piece of moss.

Diagnosis (♂; ♀ unknown): 4 bristles in the field of the median eyes (fig. 60), the femora II-III bear two rows of ventral spines (fig. 61), metatarsus III bears 6 proventral to prolateral spines (fig. 62), the cymbial outgrowth is wide (fig. 65).

Description (♂):
Measurements (in mm): Body length 1.5, prosoma: Length 0.7, width 0.62, leg II (I is lost): Femur 1.2, patella 0.24, tibia 0.8, metatarsus 1.1, tarsus 0.6, tibia III 0.4, tibia IV 0.58, length of a fang 0.16.
Colour: Prosoma and legs medium brown, opisthosoma yellow-grey.
Prosoma (fig. 60) wide, bearing few hairs; clypeus similar to *E. wegneri*. 8 larger eyes in two widely spaced groups, 4 bristles in the field of the median eyes which are directed forward. Large basal articles of the chelicerae, long fangs which are basally thick. Sternum wide, separating the coxae IV by nearly two of their diameters. - Legs (figs. 61-62) (I is lost) slender, II is long, patellae with 1 dorsal-distal bristle, longer tibial bristles absent, femora II-III with two rows of ventral spines, metatarsus III with proventral spines/bristles (the distal two are bristles). Metatarsal trichobothria nearly twice as long as the diameter of the metatarsus, position on III in 0.32, probably absent on IV. A lyraform organ is observable near the base of the left tibia I (fig. 63), the tarsal claws are small. - The opisthosoma is similar to *E. wegneri*, high, egg-shaped, with indistinct hairs. Because of the position of the spider's body the area between pro- and opisthosoma is not observable, the lung covers are distinct, the basal articles of the anterior spinnerets are very large. Pedipalpus (fig. 65): Tibia large, cymbial outgrowth long and distally wide, paracymbium and bulbus are only partly observable, a sickle-shaped apophysis of the cymbial outgrowth is present.

Relationships: See *E. fastigata*.

Distribution: Tertiary Baltic amber forest.

***Eosynotaxus wegneri* n. gen. n. sp.** (figs. 66-70) Photo 227

Derivatio nominis: The species is named after HORST WEGNER in Hannover who selected several interesting spiders for a scientific research.

Material: Holotypus ♂ in Baltic amber and 4 separated pieces of amber, F1021/BB/AR/SYN/CJW.

Preservation and syninclusions: The spider is preserved in a clear yellow piece of amber, is well preserved, ventrally covered by a white emulsion and touching two layers within the amber. The left leg I is lost beyond the coxa by autotomy, a fissure

is running dorsally-medially through the body. - Below the spider a stellate hair is preserved, tiny remains of plants are preserved near the spider. In the separated pieces of amber a fly (Diptera: Brachycera), stellate hairs, particles of excrement, remains of plants and bubbles are preserved.

Diagnosis (♂; ♀ unknown): 3 bristles in the field of the median eyes (figs. 66-67), metatarsus III with only two prolateral macrosetae near the base, femur III bears 3 retroventral spines, no other leg spines. Pedipalpus (figs. 69-70) with complicated paracymbium/cymbial outgrowth and a denticulate conductor.

Description (♂):
Measurements (in mm): Body length 1.3, prosomal length 0.6, leg I: Femur 1.85 (diameter 0.11), patella 0.3, tibia 1.9, metatarsus 1.73, tarsus 0.9, tibia II 0.75, tibia III 0.34, tibia IV 0.53. - Colour: Prosoma and legs medium brown, opisthosoma yellow brown. The anterior median eyes possess a distinct red colour which may be pigments or products of decomposition.
Prosoma (figs. 66-67) similar to *E. spinipes* but only with 3 bristles in the field of the median eyes. - Legs (fig. 68) slender, I very long, tibia I 3 times as long as the prosoma, femora thin, only III bears 3 retroventral spines, metatarsus III (fig. 68) bears two macrosetae near the base, patellae with 1 very short dorsal-distal bristle, tibiae bristleless. Metatarsal trichobothria about 1 1/2 times as long as the metatarsal diameter, position on I in 0.34, absent on IV. - Opisthosoma (fig. 66) high, egg-shaped, fairly hairy, ventrally partly hidden. - Pedipalpus (figs. 69-70) with a large tibia and complicated paracymbium/cymbial outgrowth; the conductor bears numerous denticles, most parts of the embolus are hidden.

Relationships: See the tab. above.

Distribution: Tertiary Baltic amber forest.

***Gibbersynotaxus* n. gen.**

Diagnosis (♂; ♀ unknown): A denticulate outgrowth is present in the field of the median eyes (figs. 71-72), tibiae without bristles; pedipalpus (figs. 73-75): Patella and tibia small, cymbium retrobasally with three outgrowths, two of these are probably a bipartite paracymbium, embolus probably basally originating and with a large loop (most distal structures of the bulbus are hidden).

Type species: *Gibbersynotaxus parvus* n. sp.

Relationships: Most probably *Succinitaxus* (see below) and *Eosynotaxus* are related. Questionable red eye's pigments are also present in a long-legged member of *Eosynotaxus* but in *Eosynotaxus* bristles in the field of the median eyes are present and the structures of cymbium and bulbus are quite different. - An outgrowth in the field of the median eyes is also present in the genus *Nomaua* FORSTER 1990 (ex-

tant, New Zealand) but according to the long opisthosoma, the hairs (not denticles) of the prosomal outgrowth and the different structures of the male pedipalpus both genera are not strongly related; the prosomal outgrowth most probably evolved convergently.

Distribution: Tertiary Baltic amber forest.

***Gibbersynotaxus parvus* n. gen. n. sp.** (figs. 71-75) Photos 228-229

Material: Holotypus ♂ in Baltic amber and 2 separated pieces of amber, F1023/BB/AR/SYN/CJW.

Preservation and syninclusions: The spider is completely and very well preserved; there are only weak ventral white emulsions of the chelicerae and the opisthosoma. The prosoma is probably somewhat deformed (not drawn) and the opisthosoma is slightly deformed, too. - Two stellate hairs and tiny particles of detritus are preserved in the smaller part of separated amber; 1 1/2 Diptera: Nematocera, a larger piece of a spider's leg (?Theridiidae), some stellate hairs and particles of detritus are preserved in the larger piece of separated amber.

Diagnosis: See above.

Description (♂):
Measurements (in mm): Body length 1.0, prosoma: Length 0.5, width 0.45, hight above the chelicerae 0.3; leg I: Femur 0.6, patella 0.2, tibia 0.55, metatarsus 0.48, tarsus 0.31, tibia II 0.52, tibia IV about 0.42.
Colour of body and legs yellow brown, anterior median eyes redbrown which may be remains of a red pigment or products of decomposition.
Prosoma (figs. 71-72) nearly as wide as long, nearly smooth, with a long clypeus and a larger blunt outgrowth in the field of the median eyes which bears numerous denticles. 8 large eyes, posterior row strongly recurved, posterior median eyes separated by their radius. Basal articles of the chelicerae short, labium hidden, gnathocoxae converging, sternum wide, separating the coxae IV by more of their diameter. - Legs fairly short, hairs not distinct, tarsi distinctly shorter than the metatarsi, patellae with 2 hair-shaped dorsal bristles, other articles britleless, metatarsal trichobothria indistinct, paired tarsal claws only fairly curved, unpaired claw indistinct. - Opisthosoma with only few hairs, nearly globular, the area around the spinnerets is hidden. - Pedipalpus (figs. 73-75): Patella with a long bristle, tibia short, cymbium and bulbus: See above.

Relationships: See above.

Distribution: Tertiary Baltic amber forest.

***Protophysoglenes* n. gen.**

Diagnosis (♂; ♀ unknown): The prosoma bears a pair of low posterior depressions (fig.76), leg bristles absent; pedipalpus (fig.77) with an elongate bulbus,a spoon-shaped cymbial outgrowth, a retrolateral cymbial fold and a short retrobasal paracymbium; the embolus is hidden.

Type species: *Protophysoglenes impressum* n. sp.

The relationships are unclear. The absence of leg bristles, the shape of the cymbial outgrowth and the elongate bulbus are similar to *Physoglenes* SIMON 1904 (extant, Chile), but in *Physoglenes* the pedicel is strongly modified, the legs are very long and the prosoma bears no depressions. On the other hand I do not want to exclude relationships to *Physoglenes* and the Physogleninae s. str. (excl. *Meringa, Tupua* and *Paratupua*).

Distribution: Teriary Baltic amber forest.

***Protophysoglenes impressum* n. gen. n. sp.** (figs. 76-77) Photo 230

Material: Holotypus ♂ in Baltic amber, F1019/BB/AR/SYN/CJW.

Preservation and syninclusions: The spider is placed near the surface of a larger piece of amber (size about 4x2.5x1.5cm), is well and completely preserved, ventrally covered by a thick white emulsion, the body is transparent, remains of organic material are present in the opisthosoma. - A large two-clawed spider (indet.) is preserved left of the spider (its prosoma and most legs are hidden); nearby thin threads of silk, particles of detritus, remains of plants and stellate hairs are present. Remains of the "Blue Earth" are preserved in a fissure on the opposite surface of the spider's position.

Diagnosis (♂; ♀ unknoown): See above. The body length is 1.1mm, the area of the median eyes bears a single stronger hair.

Description (♂):
Measurements (in mm): Body length 1.1, prosoma: Length 0.47, width 0.5, tibia I 0.6, tibia II 0.52, femur IV 0.52. - Colour light orange.
Prosoma slightly wider than long, bulging in the field of the median eyes and with a single stronger hair (fig. 76). 8 large eyes, the largest anterior median eyes are widely spaced, the posterior row is strongly recurved, the posterior median eyes are separated by less of their diameter. A pair of low depressions is present in the posterior prosomal half. The clypeus is long, the basal articles of the chelicerae are fairly short, the mouth parts and the sternum are hidden. - Legs of only medium length,

hairy, bristles are absent, order I/II/IV/III, I not much longer than II, III distinctly the shortest, the metatarsus I bears a long trichobothrium in the distal half. - Opisthosoma nearly globular, covered with indistinct short hairs. - Pedipalpus (fig. 77; see the diagnosis): Tibia shorter than the patella, both articles bear a dorsal bristle, cymbium fairly short, the paracymbium is stronger sclerotized. The position of the tip of the embolus is probably at the apical part of the bulbus.

Relationships: See above.

Distribution: Tertiary Baltic amber forest.

***Succinitaxus* n. gen.**

Diagnosis (mainly based on the type species): Epigaster sclerotized and rugose (figs. 78, 80a), coxal-epigastral stridulatory organ present (fig. 80a), opisthosoma slightly bulging above the spinnerets (fig. 78), paracymbium small/hidden and placed at the base of a large retrobasal cymbial outgrowth (figs. 83, 87-88), embolus long and bent, a denticulate conductor is present, the tibial bristles are thin (fig. 81) and widely spaced or absent (in the psobably congeneric *S. minutus*).

Type species: *Succinitaxus brevis* n. sp.

Relationships: See the key. In *Sulcosynotaxus* a stridulatory organ of a different type is present.

Distribution: Tertiary Baltic amber forest, incl. the Bitterfeld deposit.

***Succinitaxus brevis* n. gen. n. sp.** (figs. 78-88) Photos 231-233

Material: 5 ♂ in Baltic amber; holotypus and a separated piece of amber, F1023/BB/AR/SYN/CJW; paratypes: A probably conspecific ♂ from the Bitterfeld deposit, F1024/BB/AR/SYN/CJW; 2♂ F1025/CJW and F1026/CJW, 1♂ coll. ERNST in Skagen.

Preservation and syninclusions: The holotype is completely and very well preserved, a white emulsion is absent; behind the epigaster a larger, unsclerotized, irregular and band-shaped structure is present (fig. 78), probably remains of a secretion from the genital opening. Two thin threads of silk without droplets, small remains of ?wood and a stellate hair are present near the spider. In the separated piece of am-

ber some bubbles and stellate hairs are preserved. - Paratypes: F1023 is badly preserved, covered by a white emulsion, fissures are running through the amber, both bulbi are hidden. - F1025 is very well preserved, the right legs II and IV are lost beyond the coxa by autotomy, there is no white emulsion. In the same piece of amber a juvenile member of the Araneae is preserved, stellate hairs are absent. - F1026 is fairly well preserved, the right leg I is absent behind the coxa, a white emulsion covers parts of the ventral and right sides of the spider's body, stellate hairs are absent. - The ♂ of the coll. ERNST is completely and well preserved, the dorsal and the left side of the body are covered by a white emulsion; stellate hairs are absent.

Diagnosis (♂; ♀ unknown): Tibiae with distinct dorsal bristles (fig. 81).

Description (♂):
Measurements (holotype in mm): Body length 1.25, prosomal length and width 0.45; leg I: Femur 0.6, patella 0.18, tibia 0.53, metatarsus 0.35, tarsus 0.27, tibia II 0.45, leg IV: Femur 0.57, patella 0.16, tibia 0.47, metatarsus 0.31, tarsus 0.25; body length of the paratype F1025 1.1.
Colour: Body and legs dark brown, opisthosoma yellow-brown.
Prosoma (figs. 78-80a) high, as wide as long, fovea indistinct, 8 large eyes, posterior row straight, lateral eyes contiguous, the anterior and the posterior median eyes are separated by about their diameter. Chelicerae: Basal articles fairly stout, distinctly shorter than the hight of the prosoma, slightly diverging; anterior cheliceral margin with at least one tooth, fangs only slightly bent. Sternum about as long as wide, separating the coxae IV by more than their diameter (fig. 80a). - Legs short, only fairly hairy, I not much longer than II. All patellae bear 2 dorsal bristles. Tibia I, II and IV bear 2 thin dorsal bristles which are widely spaced (fig. 81), their position on tibia I in 0.11 and 0.85, tibia III bears 1 dorsal bristle. The coxae IV bear a stridulatory tooth (arrow in fig. 80a). Metatarsi I-III bear a trichobothrium, its position on I is in 0. 84, similar on II but 0.54 on III; probably absent on IV. Paired tarsal claws small, unpaired claws tiny. - Opisthosoma (figs. 78, 80a, 82) wide, slightly depressed and bulging above the spinnerets, anterior margin variable convex to concave, dorsally with short hairs and three pairs of small sigillae. The epigaster is sclerotized and possesses a rugose field; together with a coxal tooth (fig. 80a) a stridulating organ was built in these fossil males which indicate a stridulating courtship behaviour in the Early Tertiary spiders which was similar to (e.g.) several extant species of the family Linyphiidae, subfamily Erigoninae. - The anterior spinnerets and the anal tubercle are large, the colulus is fairly large, the tracheal fold is narrow, its position is near the spinnerets. - ♂-pedipalpus (figs. 83-88): Patella about globular, cymbium with a large and outstanding retrobasal outgrowth and - most probably - with a small paracymbium below - and hidden by the - cymbial outgrowth (fig. 87) similar to *Cornuanandrus*. Bulbus only fairly prominent, the questionable parembolic process is thick and only slightly bent, the embolus is long, its position along the cymbial margin and counterclockwise in the right pedipalpus, its distal part is curved around the denticulate conductor.

Relationships: See ?*S. minutus* n. sp.

Distribution: Tertiary Baltic amber forest, incl. the Bitterfeld deposit (?).

?***Succinitaxus minutus* n. gen. n. sp.** (figs. 89-91)

Material: Holotypus ♂ (two parts, kept in glycerine) and 2 separated pieces of Baltic amber, F1020/ BB/AR/SYN/CJW.

Preservation and syninclusions: The piece of amber broke during my study of the inclusion; the spider broke in two pieces, too, and is kept now in glycerine. Only after the brake the view to the right pedipalpus appeared. The spider is nearly completely and well preserved, its body is ventrally partly covered by a white emulsion, parts of the spinnerets and of the opisthosoma are absent. The opened body is nearly hollow and contains remains of small organic particles. Fragmented remains of questionable muscles are present e.g. within the left femur I (fig. 89). - At the end of the right tibia IV a bubble is present, a stellate hairs and particles of detritus are present in the same piece of amber. The separated pieces of amber contain bubbles and particles of detritus.

Diagnosis (♂; ♀ unknown): Tibial bristles are absent. Pedipalpus: Figs. 90-91.

Description (♂):
Measurements (in mm): Body length 0.92, prosomal length 0.47; leg I: Femur 0.65, tibia 0.58, tibia II 0.5, tibia IV 0.4. - Colour grey-brown; remains of pigment indicate that the legs probably were annulated.
Prosoma high, with 8 large eyes, the anterior medians smallest, the posterior medians widely spaced, basal cheliceral articles stout. - Legs short, order I/II/IV/III, length of the metatarsi about 1.6 times of the tarsi. Fragmented remains of questionable muscles are present in several articles of the legs, best observable in the left femur I (fig. 89). The patellae bear 1 dorsal-distal bristle; no other leg bristles. The metatarsal trichobothria are at least two times as long as the diameter of the article, position on I in 0.87. Paired tarsal claws fairly long, unpaired claw small. - Opisthosoma high, covered with short hairs, the shape is similar to *S. brevis*; the anterior spinnerets are stout. - ♂-pedipalpus (figs. 90-91) with short patella and tibia, a divided cymbial outgrowth and a small and hidden paracymbium; the embolus is long and curved, the conductor may be bipartite and bears numerous denticles.

Relationships: In *S. brevis* the tibial bristles are distinct, two patellar bristles are present, and the cymbial outgrowth is different; the presence of a stridulatory organ in *minutus* is unknown. Probably both species are not congeneric.

Distribution: Tertiary Baltic amber forest.

***Sulcosynotaxus* n. gen.**

Diagnosis (♂; ♀ unknown): Body length 3.7mm - largest known fossil member of the family Synotaxidae -; legs very long, opisthosoma 1.6 times longer than high, ♂ with a special questionable stridulating ventero-sternal organ (fig. 92). ♂-pedipalpus

(figs. 93-94): Paracymbium compact and with numerous denticles, without a dorsal branch, parembolic apophysis long, thin and strongly bent, embolus long, its position nearly in a circle, counterclockwise in the right pedipalpus.

Type species: *Sulcosynotaxus cavatus* n. sp.

Relationships: According to the compact and denticulate paracymbium *Acrometa* PETRUNKEVITCH is most related; in *Acrometa* the legs are distinctly shorter, strong dorsal-medial prosomal hairs are present, a questionable stridulating organ is absent and the position of the right embolus is clockwise.

Distribution: Tertiary Baltic amber forest, the Bitterfeld deposit.

***Sulcosynotaxus cavatus* n. gen. n. sp.** (figs. 92-94)

Material: Holotypus ♂ and a separated piece of Baltic amber from the Bitterfeld deposit, PIHUB, no. MB.A.585.

Preservation and syninclusions: Because of a layer in the amber, fissures and a white emulsion the spider is only fairly well observable, the right leg I is lost beyond the coxa by autotomy, the left leg II is broken off at the base of the metatarsus and lost, the left leg IV is cut off through the tibia, the left metatarsus and tarsus I are broken off and placed nearby, the opisthosoma is somewhat depressed on the right side and situated below a bubble. - Mainly in the separated piece of amber numerous bubbles are preserved; stellate hairs are absent.

Diagnosis (♂; ♀ unknown): See above; pedipalpus as in figs. 93-94.

Description (♂):
Measurements (in mm): Body length 3.7, prosomal length 1.7; opisthosoma: Length 2.4, hight 1.5; leg I: Femur 4.0, tibia 4.7, tibia II 3.0, tibia III 1.3, tibia IV 2.3.
Colour: Prosoma and legs dark brown, opisthosoma light brown.
Prosoma (most parts are hidden by a white emulsion) with few hairs only. 8 fairly large eyes are present. Clypeus about as long as the field of the median eyes, only slightly protruding. Basal cheliceral articles and gnathocoxae large, gnathocoxae laterally distinctly concave, labium wider than long, with an apically bulging margin. Sternum prolongated between the coxae IV (fig. 92), posteriorly with a distinct depression which has a sharp margin, see below. - Legs -except IV - very long and slender, order I/II/IV/III, tibia I nearly 2.8 times as long as the prosoma, fairly covered with longer hairs. Bristles very thin, hair-shaped, 2 dorsally on the patellae, sequence on the tibiae 2/2/1/2, bristles 1 - 1 3/4 times as long as the diameter of the tibia. Metatarsus IV twice as long as tarsus IV. Tarsal claws and metatarsal trichobothria short. - Opisthosoma 1.6 times as long as high, scarcely covered with short hairs. Spinnerets short, the anteriors thick. Epigaster protruding. There is a larger anterior ventral outgrowth (partly covered by a white emulsion) which may fit into a distinct posterior depression of the sternum (fig. 92). Both structures built probably a "ven-

tero-sternal stridulatory organ". Probably there exist dorsal parts of this organ which are hidden. - Stridulating organs between prosoma and opisthosoma are known from several taxa of the family Synotaxidae, see FORSTER et al. (1990), but their position is different. - ♂-pedipalpus (figs. 93-94; see above) with short patella and tibia.

Relationships: See above.

Distribution: Tertiary Baltic amber forest, the Bitterfeld deposit.

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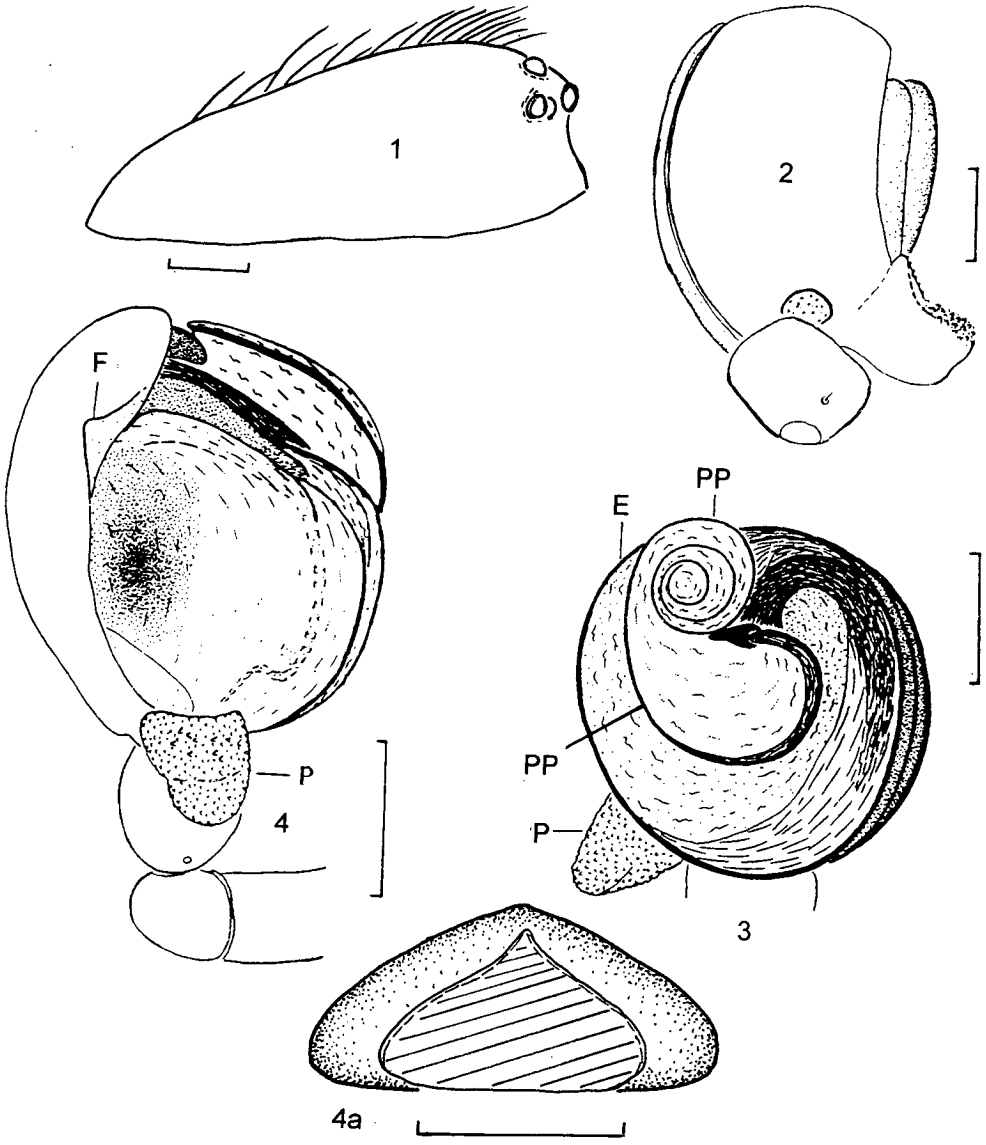
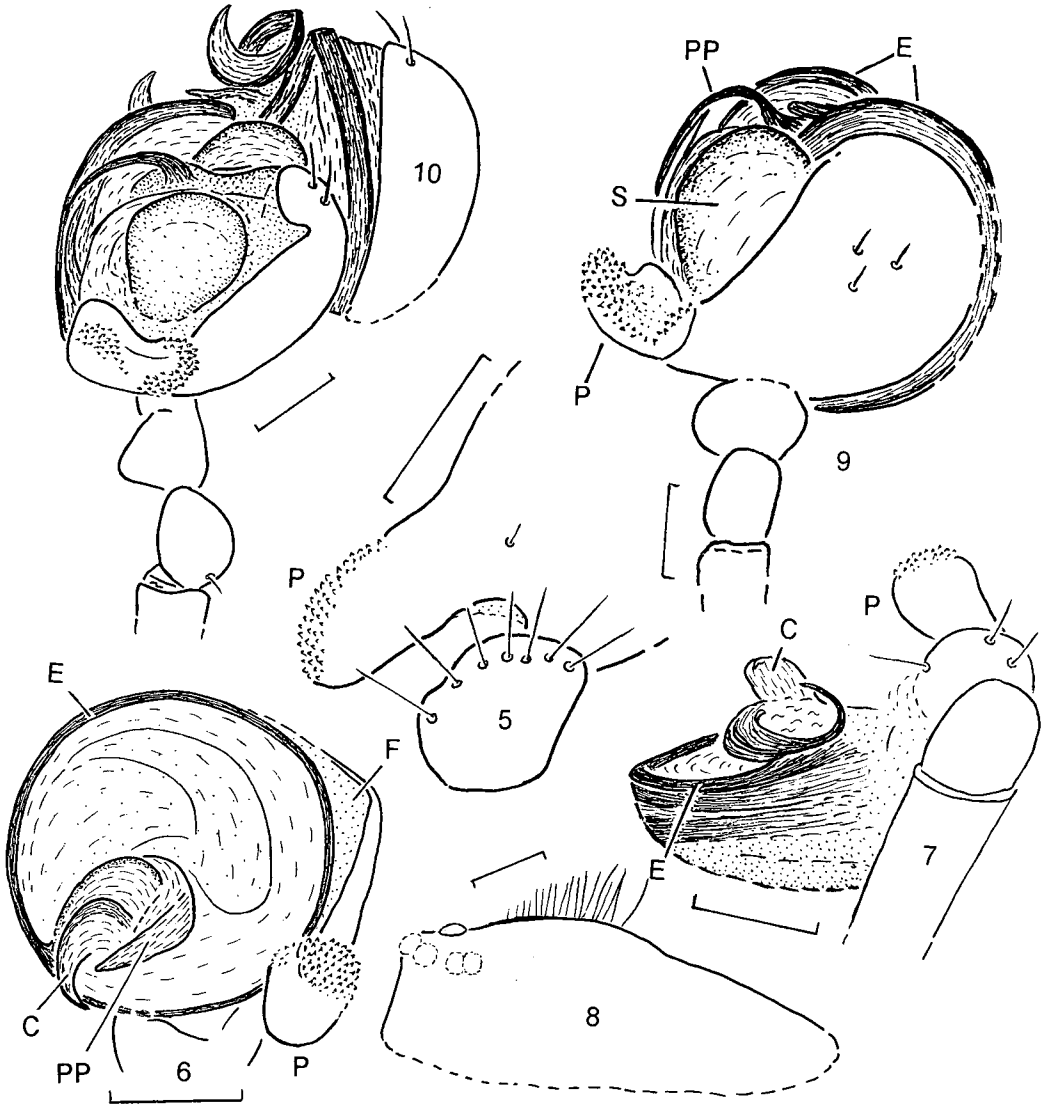


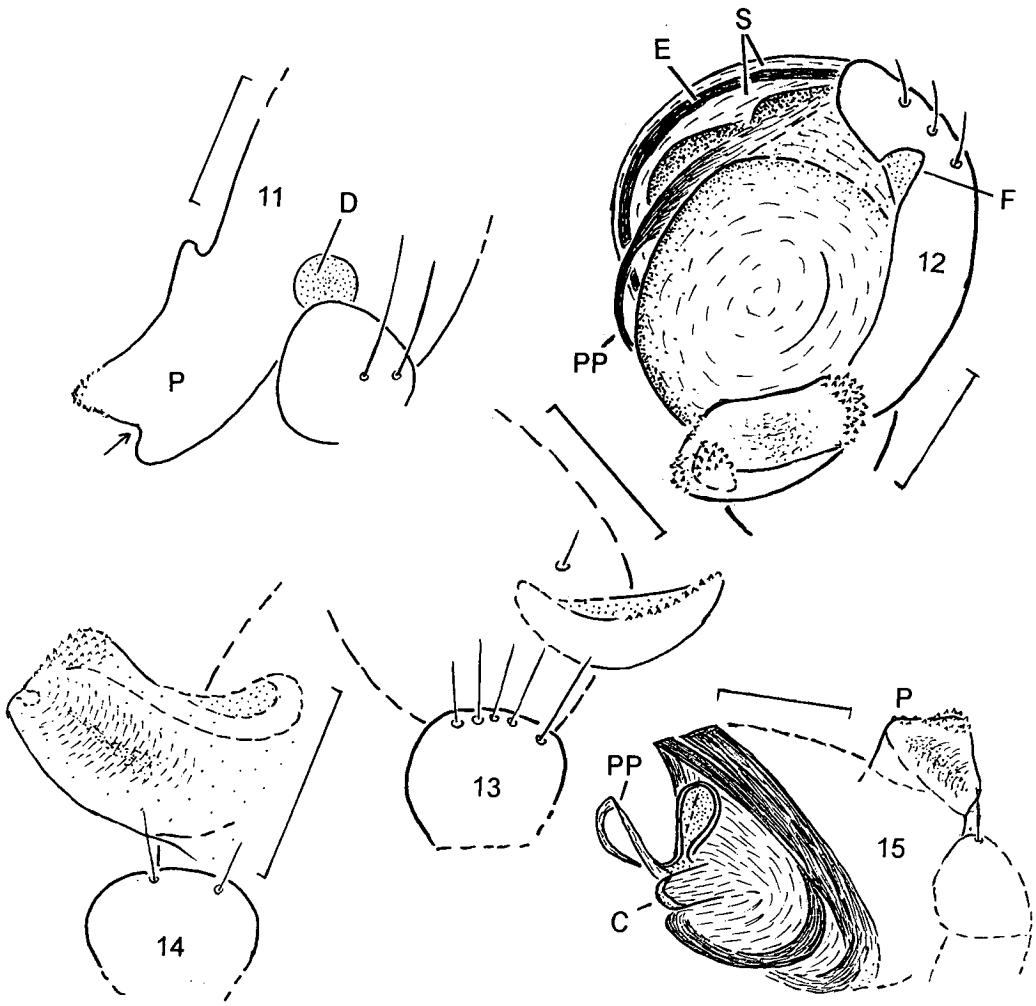
Figs. 1-4: ***Acrometa cristata*** PETRUNKEVITCH 1942, one of the most frequent spider species in Baltic amber, ♂; 1) Prosoma, lateral aspect (CJW); 2-5) r. pedipalpus, dorsal, ventral and retrolateral aspect (CJW; figs. 2 and 4 F1042). M = 0.2mm. E = embolus, F = cymbial furrow, P = paracymbium, PP = parembolic process;

fig. 4a) ***Acrometa*** ?***cristata*** PETRUNKEVITCH 1942 (coll. GRABENHORST no. 54), ♀, epigyne, ventral-aboral aspect. The wide epigynal opening is filled by a "plug" (in German: "Begattungs-Zeichen") which prevents further copulations. M = 0.2;



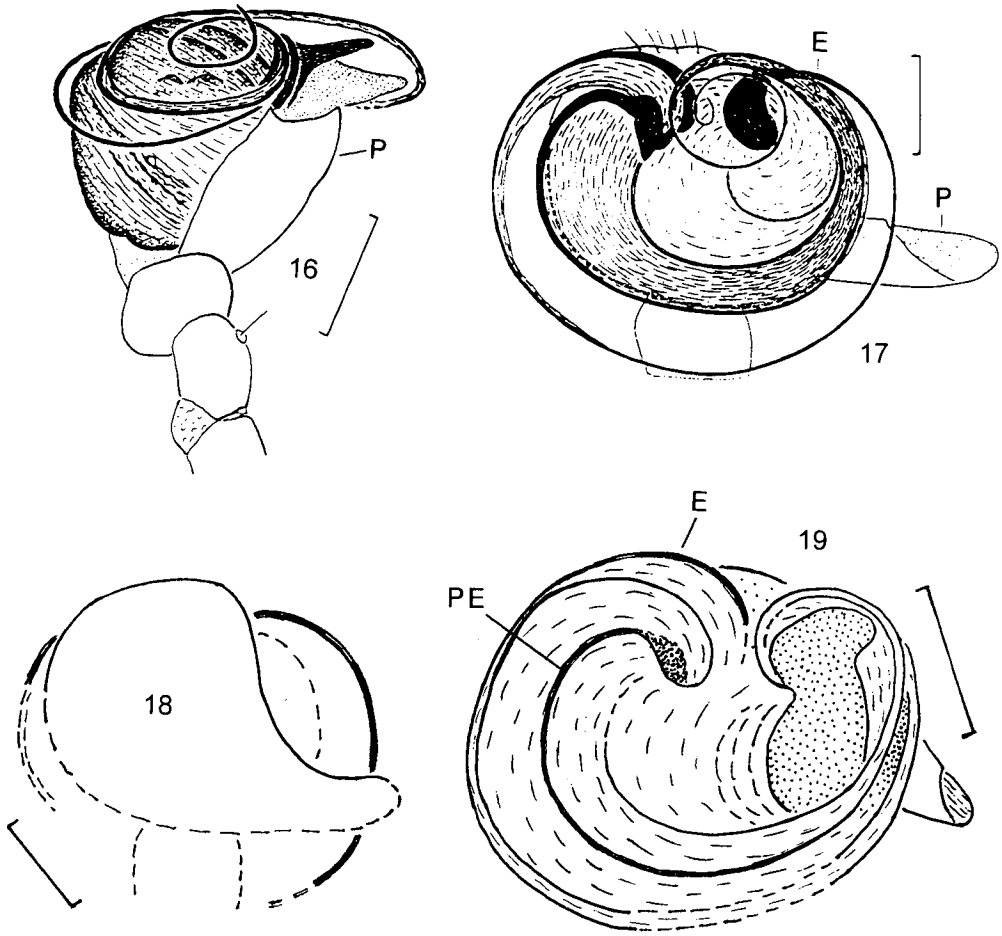
figs. 5-7: ***Acrometa clava* n. sp.**, ♂; 5) tibia of the l. pedipalpus, paracymbium and basal part of the cymbium, dorsal aspect; 6) l. pedipalpus, ventral aspect; 7) l. pedipalpus, femur and patella dorsal aspect, bulbus retrobasal aspect (parts of the bulbus structures are hidden). M = 0.2. C = conductor, E = embolus, F = cymbial furrow, P = paracymbium, PP = parembolic process;

figs. 8-10: ***Acrometa eichmanni* n. sp.**, ♂, 8) outline of the prosoma, left aspect; 9) l. pedipalpus, dorsal aspect; 10) l. pedipalpus (above) and r. pedipalpus, left aspect. M = 0.2. E = embolus, P = paracymbium, PP = parembolic process, S = subtegulum;



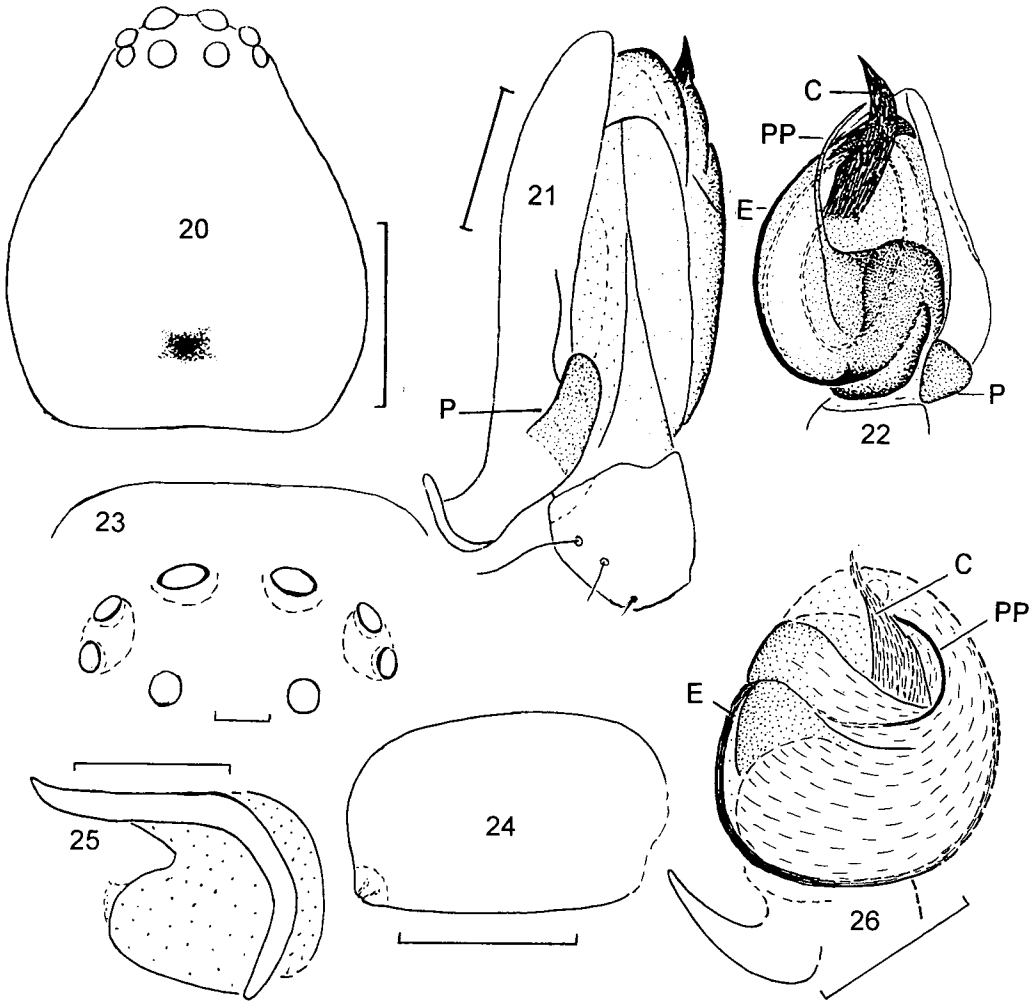
figs. 11-12: ***Acrometa incidens* n. sp.**, ♂, holotype; 11) l. tibia and cymbium with the inclined (arrow) paracymbium; 12) l. pedipalpus, retrodorsal aspect (only three cymbial hairs are drawn). M = 0.2. D = dorsal-basal depression of the cymbium, E = embolus, F = cymbial fold, P = paracymbium, PP = parembolic process, S = "seam" of the embolus;

figs. 13-15: ***Acrometa pala* n. sp.**, ♂; 13) tibia, paracymbium and basal part of the cymbium of the r. pedipalpus, prodorsal aspect; 14) tibia and paracymbium of the l. pedipalpus, dorsal aspect; slightly from behind (parts are covered by a white emulsion); 15) l. pedipalpus, retrolateral aspect. M = 0.2. C = conductor, P = paracymbium, PP = parembolic process;



figs. 16-17: ***Pseudoacrometa gracilips*** WUNDERLICH 1986, ♂; 16) l. pedipalpus (with expanded bulbus), 17) l. pedipalpus, ventral aspect. M = 0.2;

figs. 18-19: ***Pseudoacrometa wittmanni*** n. sp., ♂, 18) r. pedipalpus (partly hidden), dorsal aspect; 19) l. pedipalpus, ventral aspect. M = 0.1;

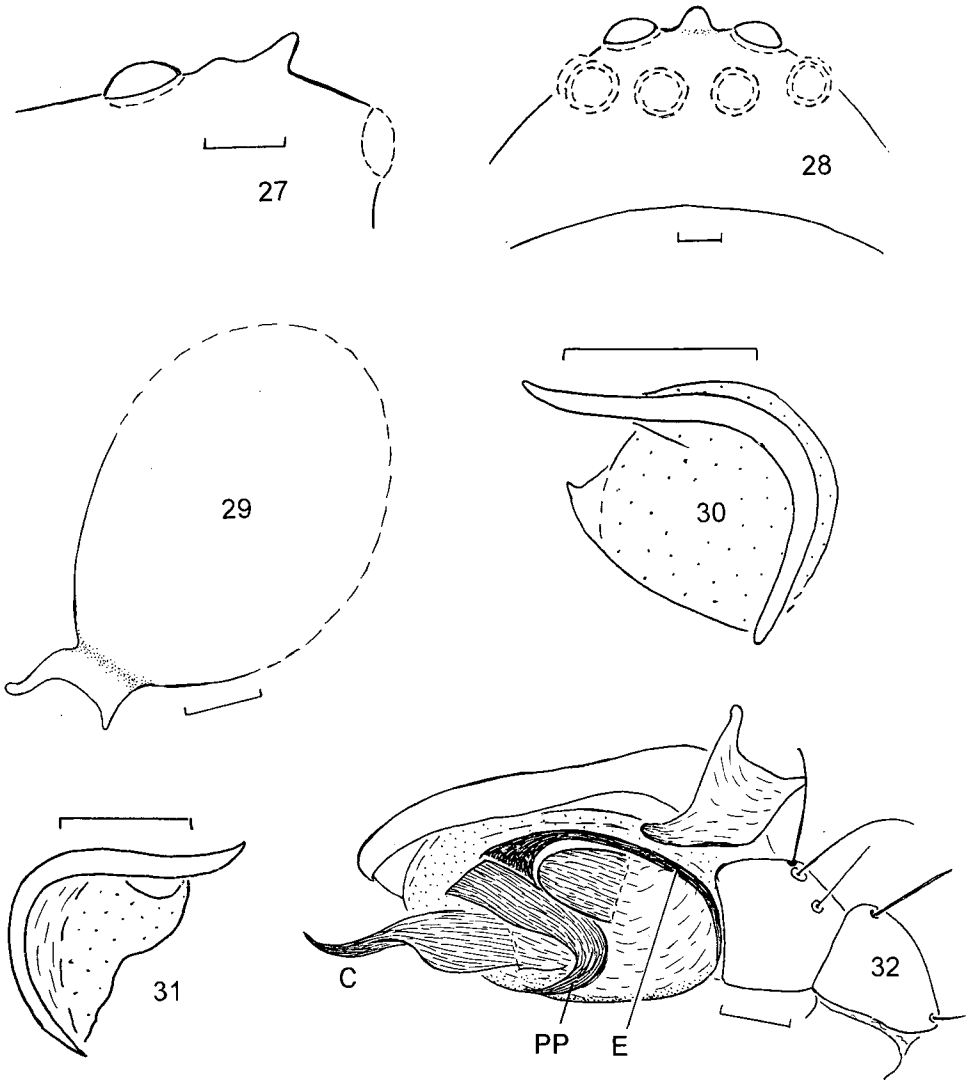


figs. 20-21: ***Anandrus redemptus*** (PETRUNKEVITCH 1950), ♂, holotype; 20) prosoma, dorsal aspect; 21) r. pedipalpus, retrolateral aspect. M = 0.5 and 0.2;

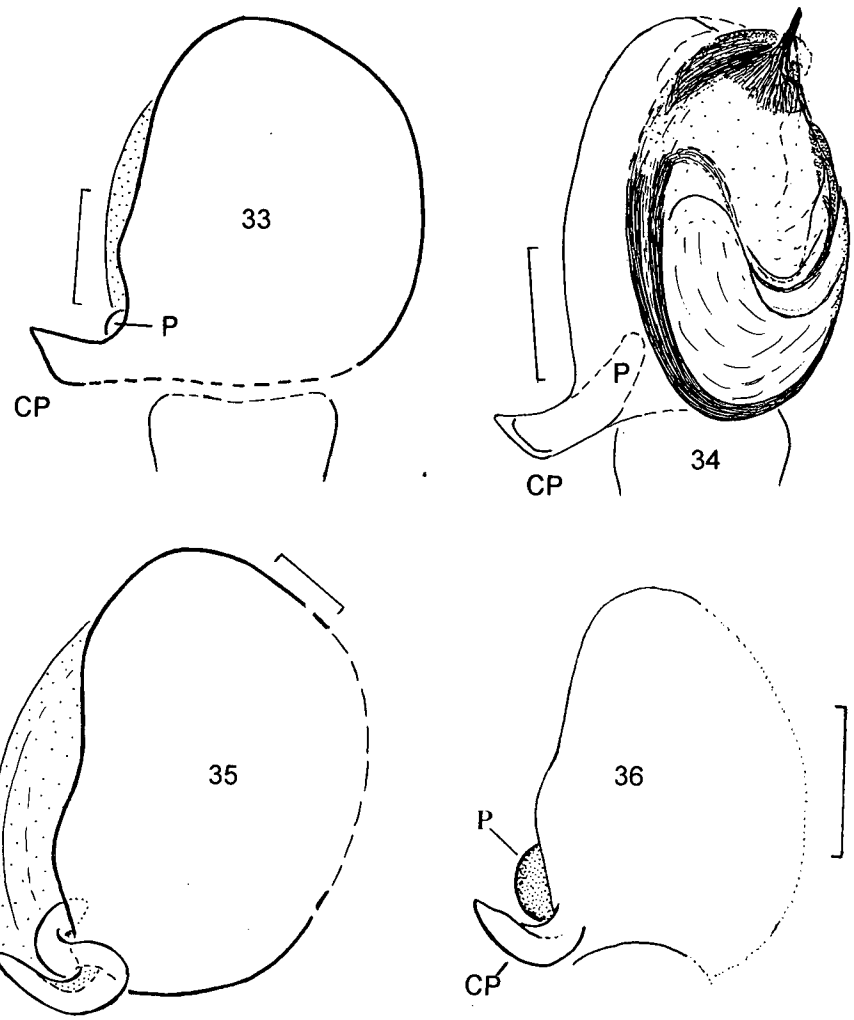
fig. 22) ***Anandrus infelix*** (PETRUNKEVITCH 1950), ♂, l. pedipalpus, ventral aspect, slightly retrolaterally. M = 01;

figs. 23-25: ***Cornuanandrus bifurcatus*** **n. sp.**, ♂; 23) position of the eyes, dorsal and slightly anterior aspect; 24) outline of the opisthosoma, lateral aspect; 25) l. paracymbium, dorsal aspect. M = 0.1 in the figs. 23) and 25), 1.0 in fig. 24);

fig. 26) ***Cornuanandrus bitterfeldensis*** **n. sp.**, ♂, r. pedipalpus, ventral aspect (parts are hidden). M = 0.1. C = conductor, E = embolus, PP = parembolic process;

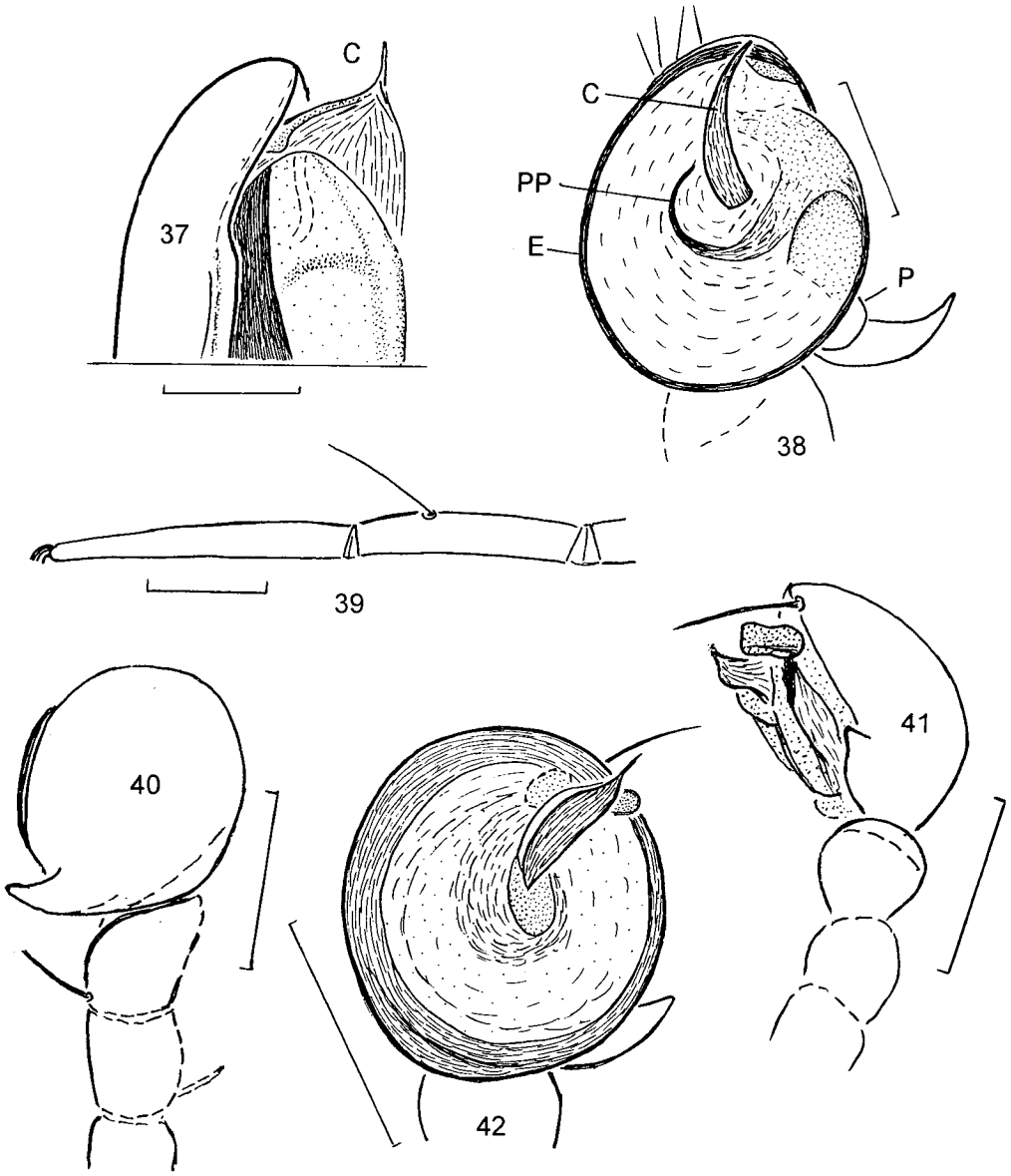


figs. 27-32: ***Cornuanandrus corniculans* n. sp.**, ♂; 27) anterior part of the prosoma with the "horn" and two eyes, lateral aspect; 28) eyes and "horn", anterior aspect (the anterior eyes are covered by bubbles); 29) cymbium of the l. pedipalpus, dorsal aspect; 30) paracymbium of the l. pedipalpus, dorsal aspect; 31) paracymbium of the r. pedipalpus, dorsal aspect, slightly differrent as in fig. 30; 32) l. pedipalpus, retrolateral and slightly ventral aspect. M = 0.1. C = conductor, E = embolus, PP = parembolic process;



figs. 33-34: ***Cornuanandrus minor* n. sp.**, ♂, 33) l. pedipalpus, dorsal aspect; 34) r. pedipalpus, retroventral aspect (parts of the bulbus structures are covered by a white emulsion). M = 0.1. CP = cymbial process, P = paracymbium;

figs. 35-38: ***Cornuanandrus maior*** WUNDERLICH 1986, ♂ , holotype; 35-36: Cymbium of the left pedipalpus, dorsal aspect; 36) taken from WUNDERLICH (1986: Fig. 286), 35) redrawn fig.; 37) distal part of the r. pedipalpus, retrolateral aspect; 38) l. pedipalpus, ventral aspect. M = 0.2 in the figs. 36) and 38), 0.1 in the figs. 35) and 37). C = conductor, E = embolus, P = paracymbium, PP = parembolic process;



figs. 39-42: ***Dubiosynotaxus perfectus* n. gen. n. sp.**, ♂, holotype; 39) l. metatarsus and tarsus, retrolateral aspect; 40) l. pedipalpus, dorsal aspect; 41) l. pedipalpus, retrolateral aspect; 42) l. pedipalpus, ventral aspect. M = 0.1;

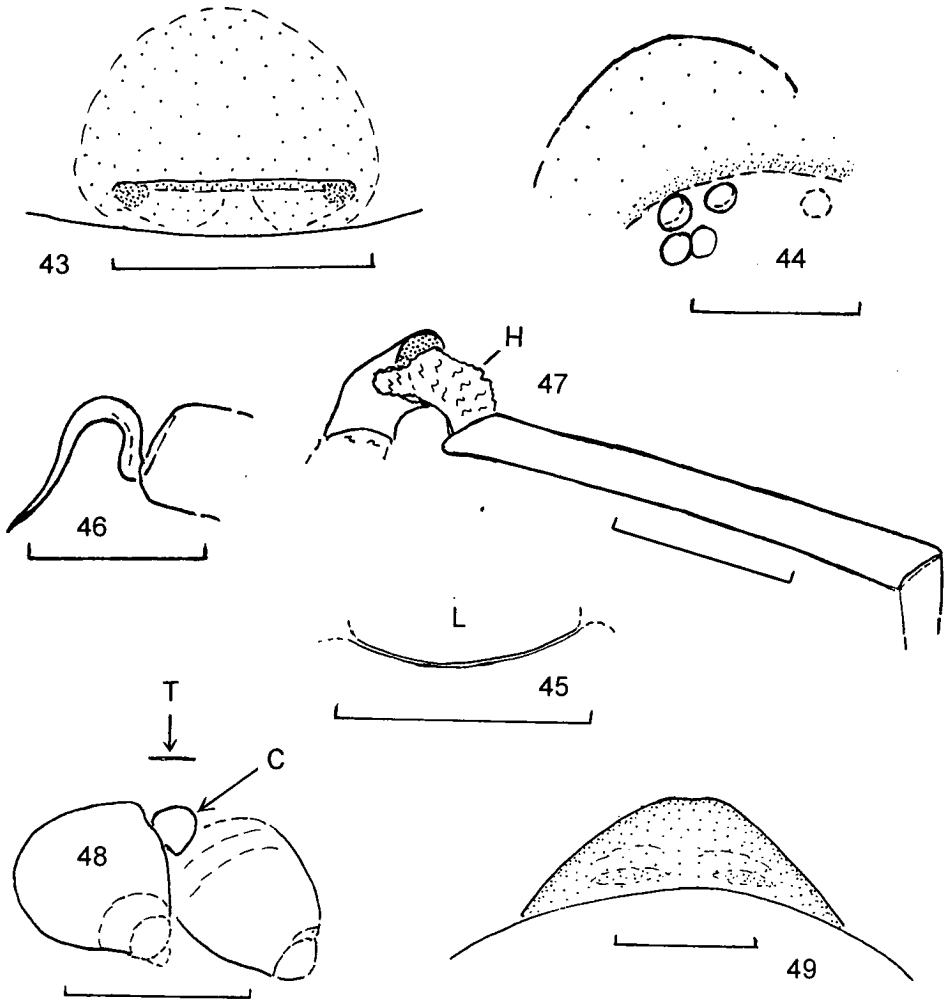
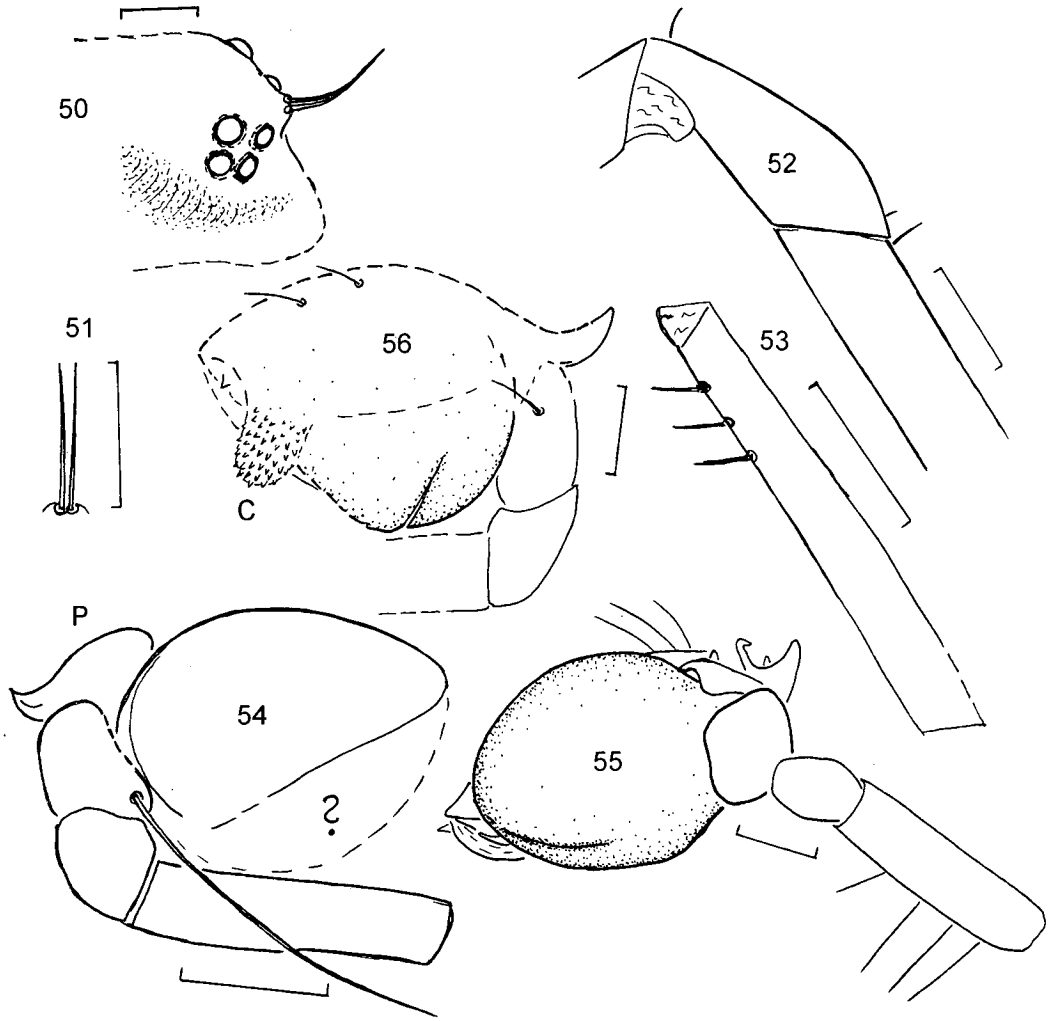


fig. 43) ***Dubiosynotaxus ?perfectus* n. gen. n. sp.**, questionable ♀ (coll. ERNST), epigyne. M = 0.1;

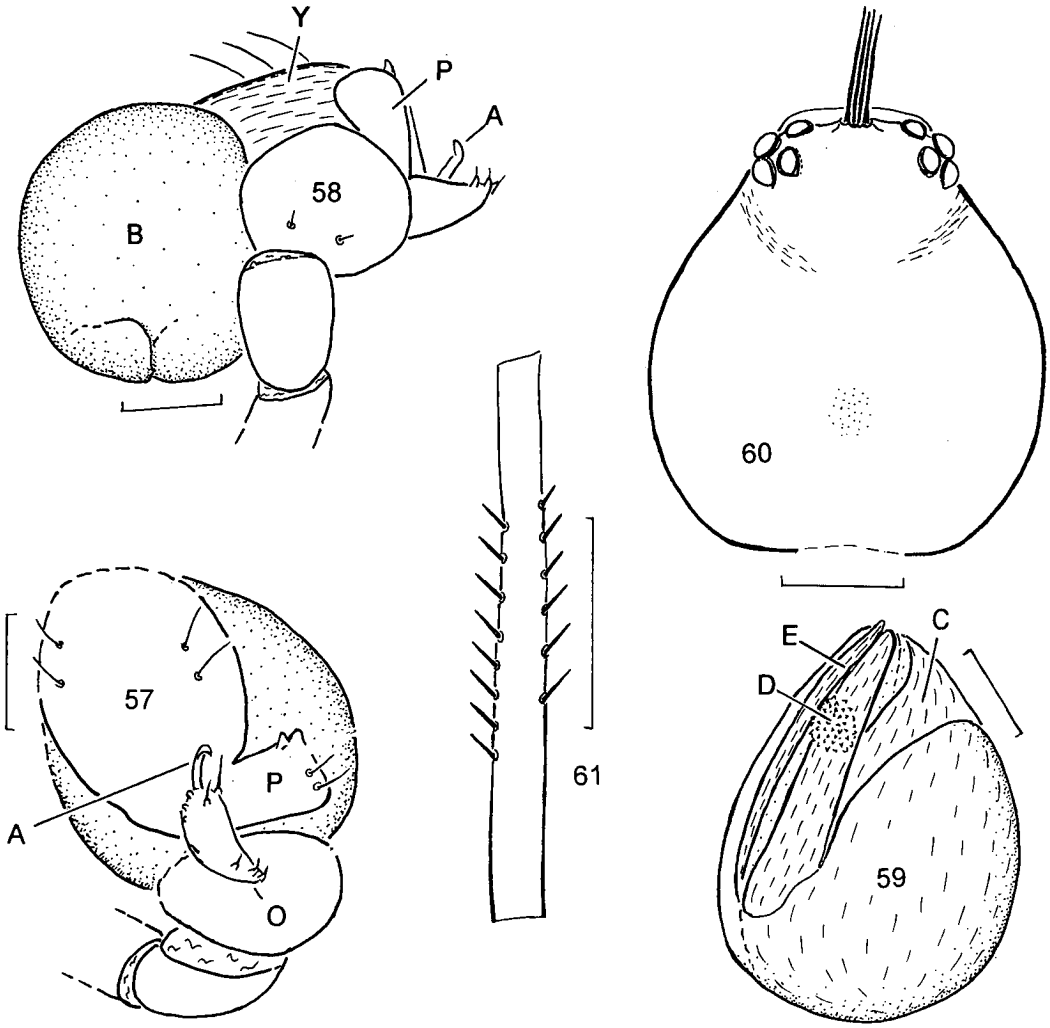
figs. 44-49: ***Eosynotaxus custodens* n. gen. n. sp.**, ♀; 44) left eye group and clypeus, dorsal-anterior-left aspect (most parts of the right side are hidden); 45) seam between sternum and labium (L); 46) claw od the r. pedipalpus, ventral aspect; 47) r. leg II, retrodistal aspect, with a brake - no autotomy! - between patella and tibia and remains of blood (hemolymph, H); hairs and the thin tibial bristles are not drawn; 48) tracheal spiracle fold (T), colulus (C) and anterior spinnerets, ventral-distal aspect; 49) the protruding genital area (punctured) and part of the opisthosoma, seen from behind. M = 0.05 in fig. 46), 0.5 in fig. 48), 0.2 in fig. 48) and 0.1 in the remaining figs.;



figs. 50-54: ***Eosynotaxus bispinosus* n. gen. n. sp.**, ♂; 50) anterior part of the prosoma, dorsal-lateral aspect; 51) bristles in the field of the median eyes, dorsal aspect; 52) patella and basal part of the tibia of the l. leg I, with the tiny basal tibial bristle, prolateral aspect; 53) l. ♂-femur III, retrolateral aspect; 54) r. ♂-pedipalpus, retrolateral aspect (the cymbium is hidden by the bulbus, parts of the bulbus are hidden). M = 0.1. P = paracymbium;

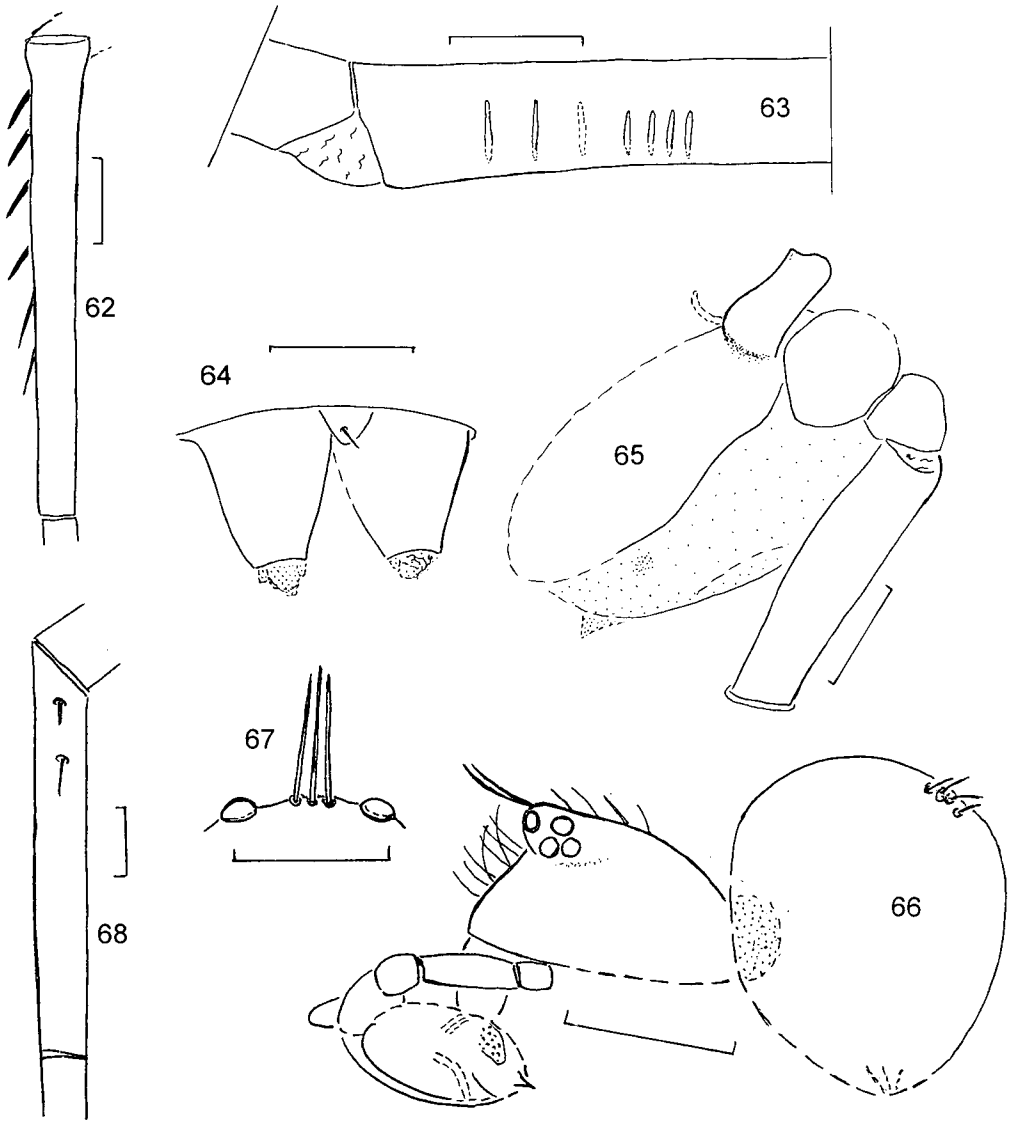
fig. 55) ***Eosynotaxus bitterfeldensis* n. gen. n. sp.**, ♂, l. pedipalpus, femur, patella and tibia: Retrodorsal aspect, bulbus: Retroventral aspect. M = 0.1;

fig. 56) ***Eosynotaxus fastigatus* n. gen. n. sp.**, ♂, l. pedipalpus (partly hidden by a white emulsion), retrolateral aspect. M = 0.1. C = conductor;

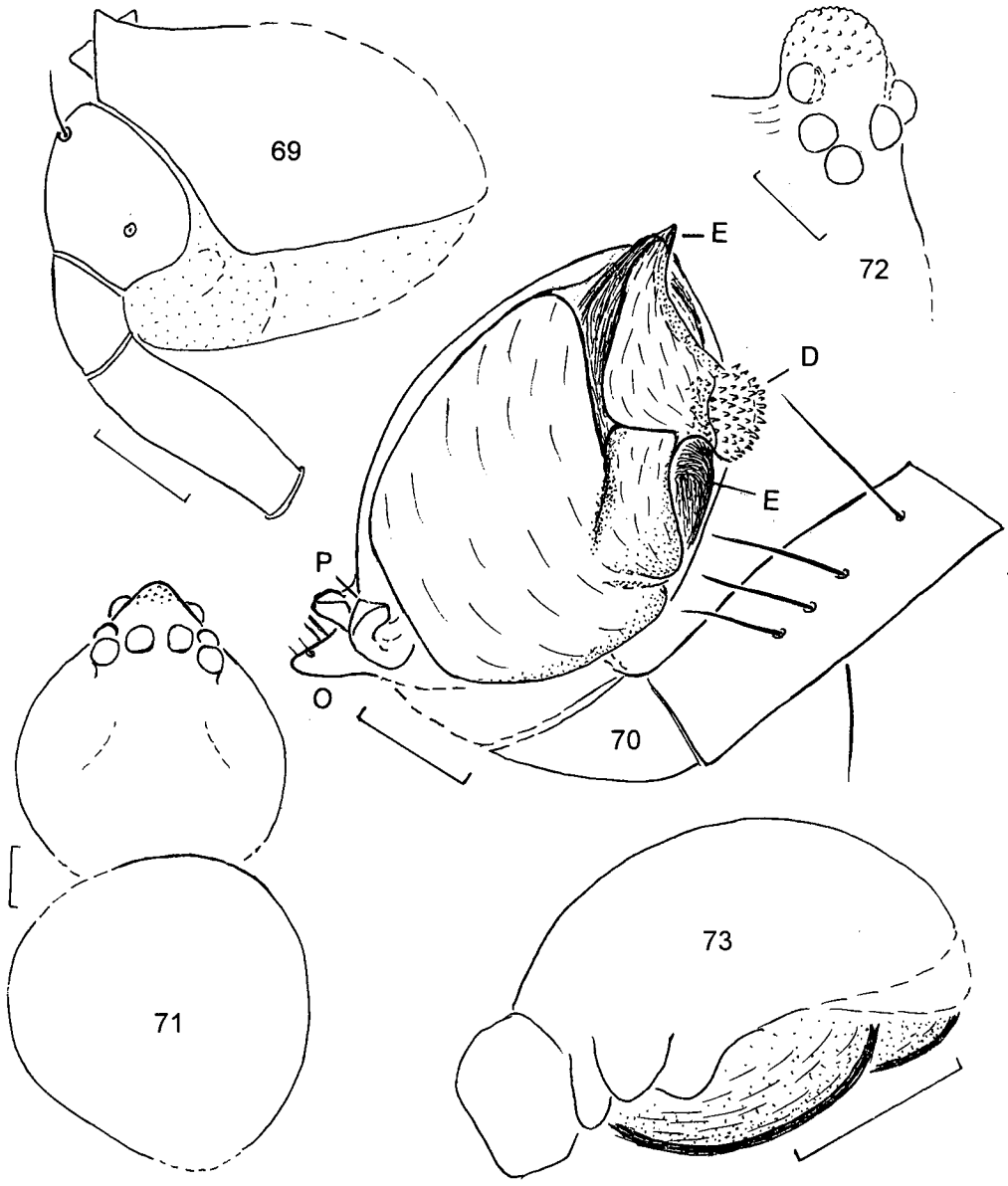


figs. 57-59: ***Eosynotaxus paucispina* n. gen. n. sp.**, ♂; 57) r. pedipalpus, dorsal aspect (only few hairs are drawn); 58) l. pedipalpus with expanded bulbus, dorsal aspect (only few cymbial hairs are drawn); 59) l. pedipalpus, ventral aspect. M = 0.1. A = sickle-shaped apophysis of the cymbial outgrowth, B = expanded bulbus, C = conductor, D = denticles, E = embolus, O = denticles of the cymbial outgrowth, P = paracymbium, Y = cymbium;

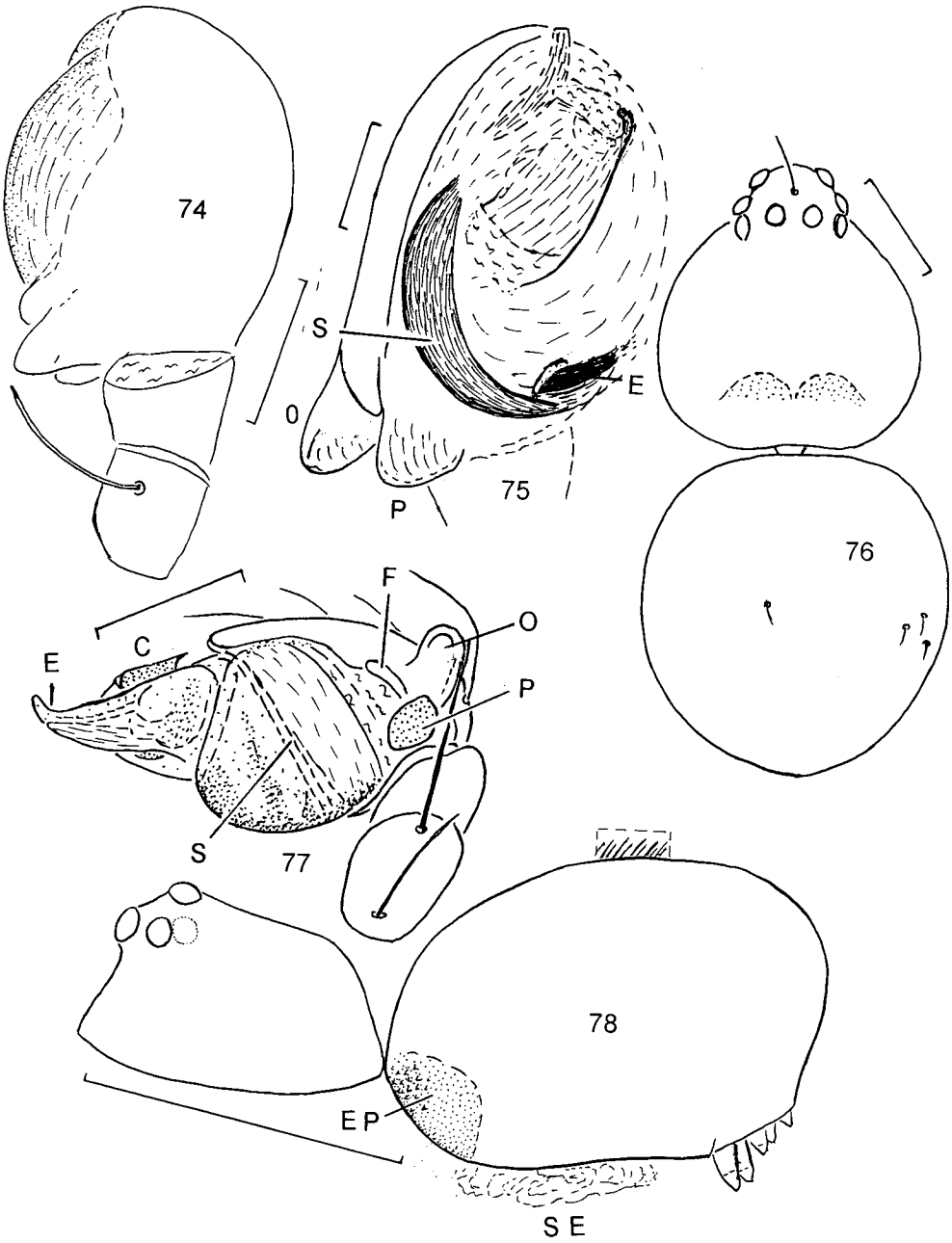
figs. 60-65: ***Eosynotaxus spinipes* n. gen. n. sp.**, ♂; 60) prosoma, dorsal aspect; 61) r. femur II, ventral aspect; 62) r. metatarsus III, dorsal aspect; 63) lyriform organ (a group of slit sense organs) of the basal part of the l. tibia IV, retroventral-distal aspect; 64) colulus and anterior spinnerets, ventral and slightly right aspect; 65) r. pedipalpus, prodorsal-basal aspect. M = 0.5 in fig. 61), 0.2 in fig. 60), 0.1 in the remaining figs.;



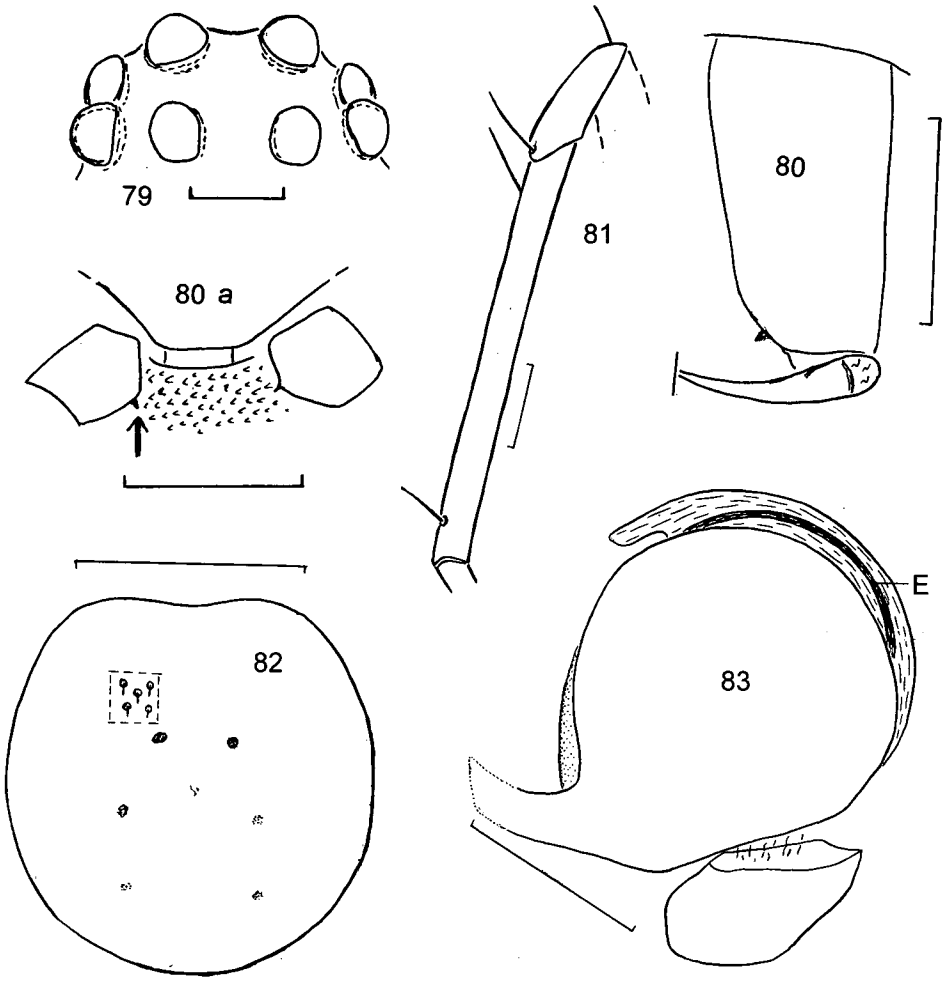
figs. 66-70: ***Eosynotaxus wegneri* n. gen. n. sp.**, ♂; 66) body and l. pedipalpus, lateral aspect (only few hairs are drawn); 67) anterior median eyes and bristles, dorsal aspect; 68) r. metatarsus III, prolateral aspect; 69) l. pedipalpus, prodorsal-basal aspect; 70) r. pedipalpus, ventral and slightly retrolateral aspect. M = 0.5 in fig. 66), 0.1 in the remaining figs. D = denticulate conductor, E = embolus, O = cymbial outgrowth, P = paracymbium;



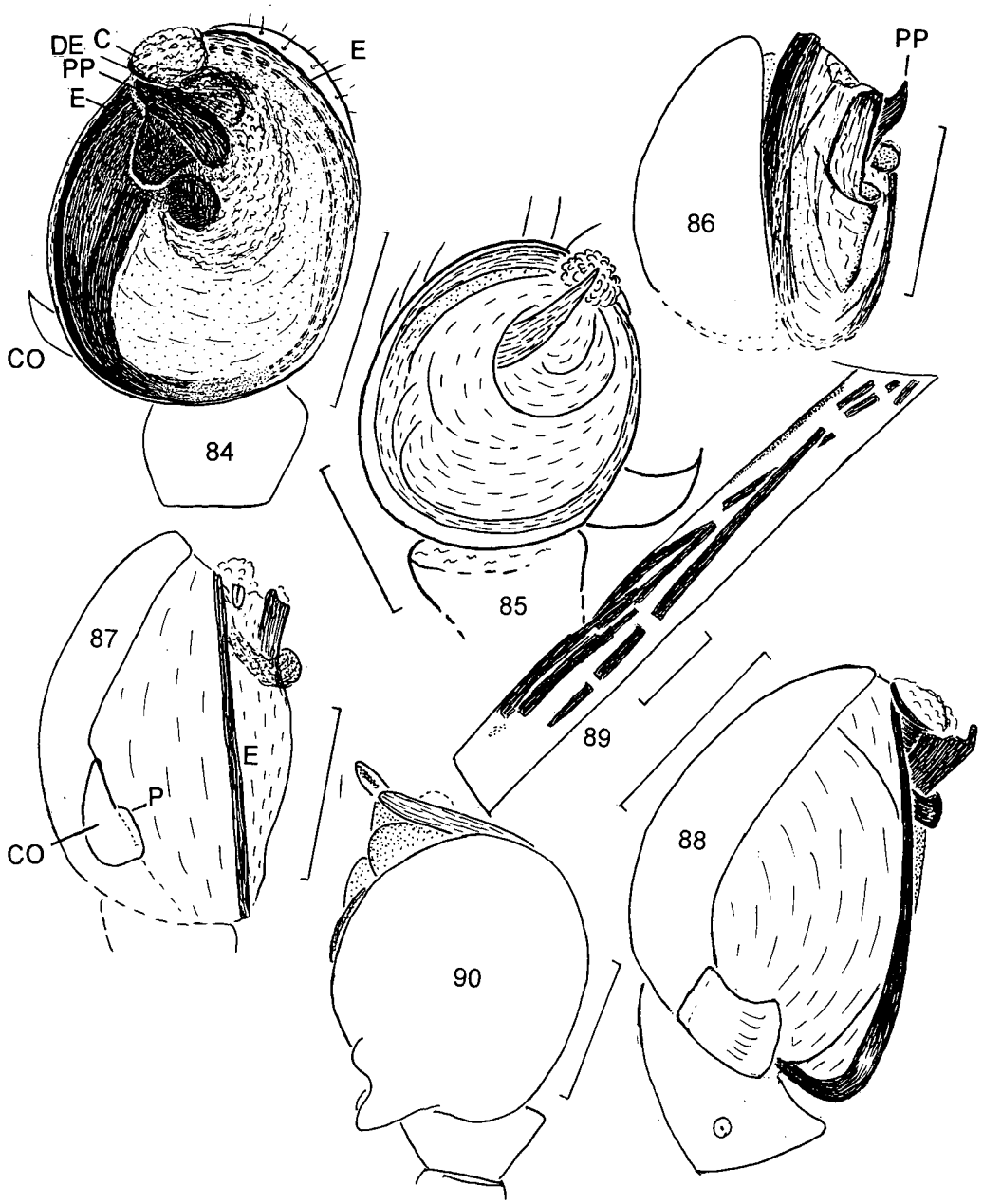
figs. 71-75: ***Gibbersynotaxus parvus* n. gen. n. sp.**, ♂; 71) body, dorsal aspect; 72) anterior part of the prosoma, lateral aspect; 73) r. pedipalpus, retrodorsal and slightly basal aspect; 74) l. pedipalpus, dorsal and slightly retrolateral aspect; 75) r. pedipalpus, retroventral aspect. M = 0.1. E = questionable origin of the embolus, O = cymbial outgrowth, P =paracymbium, S = subtegulum;



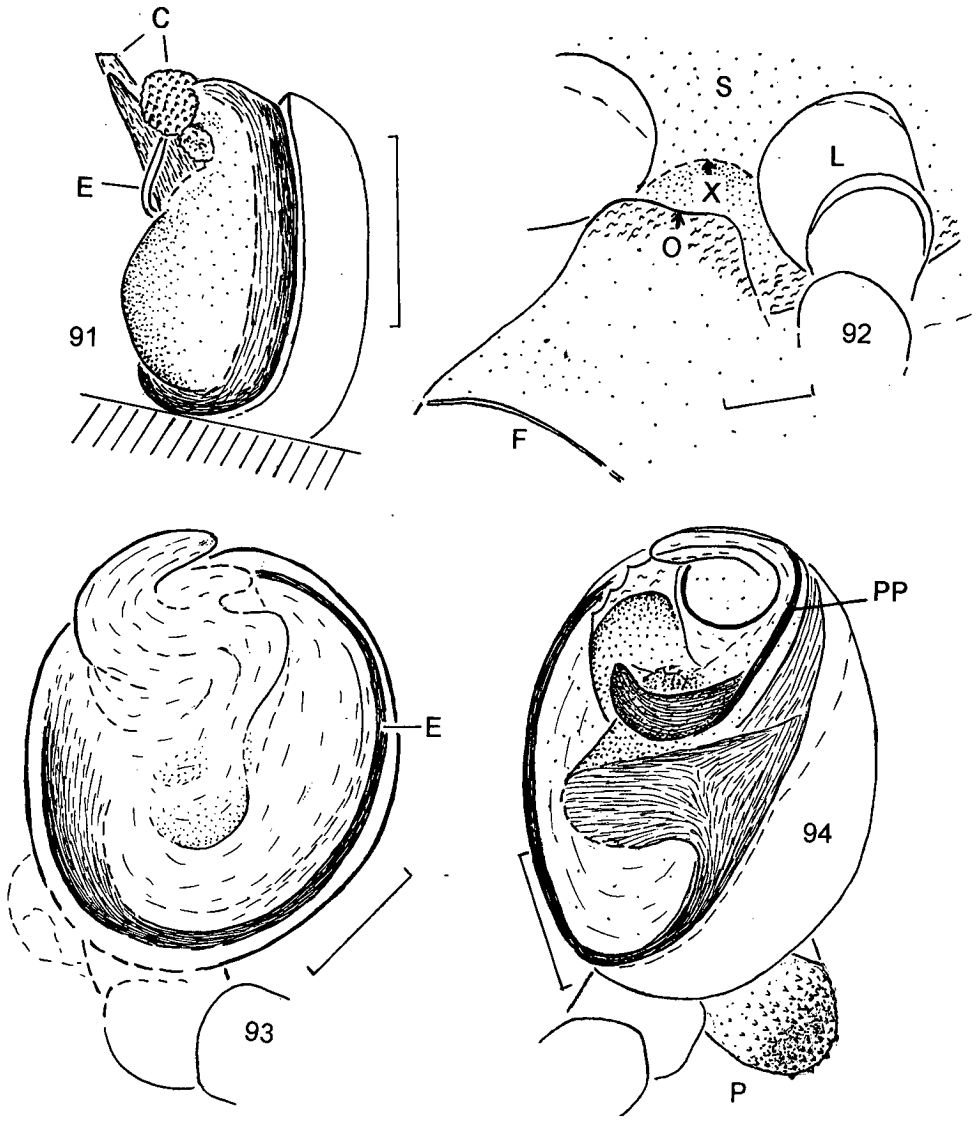
figs. 76-77: ***Protophysoglenes impressum* n. gen. n. sp.**, ♂; 76) body, dorsal aspect (only few hairs are drawn). Note the paired prosomal depressions; 77) l. pedipalpus, retrolateral aspect. M = 0.2 and 0.1. C ?= conductor, E ?= embolus, F = cymbial fold, O = cymbial outgrowth, P = paracymbium, S = tegular sperm duct;



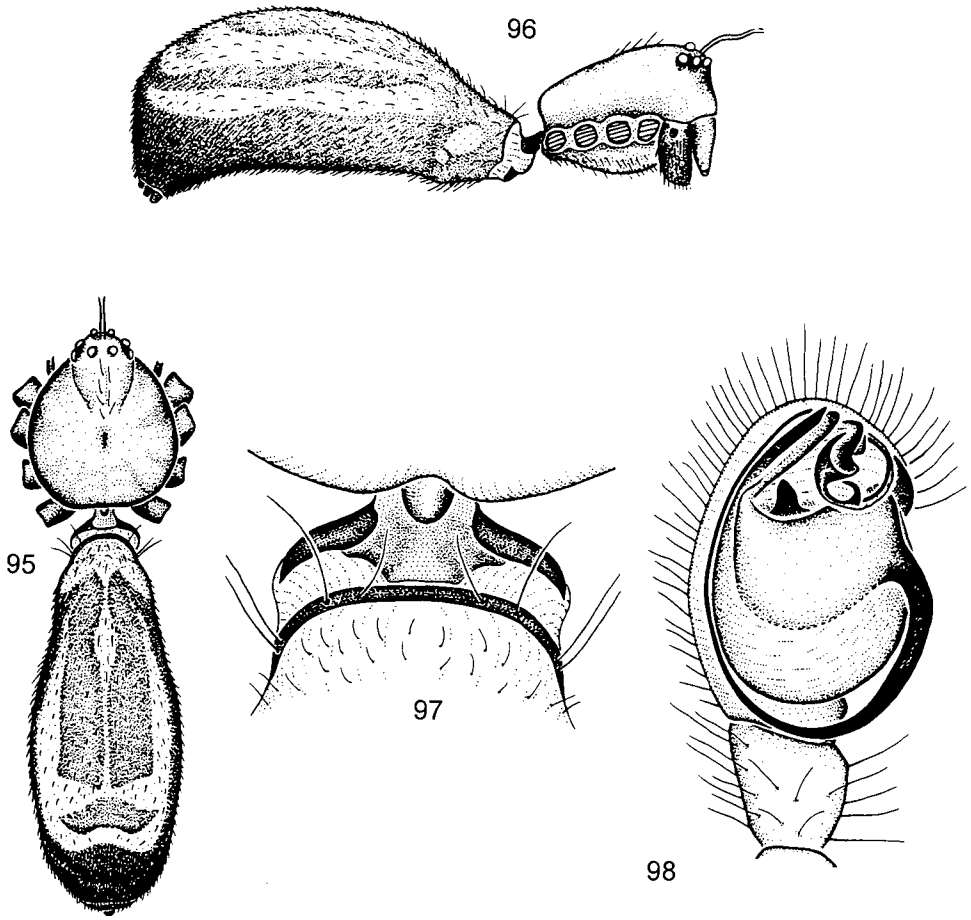
figs. 78-88: ***Succinitaxus brevis* n. gen. n. sp.**, ♂; fig. 85): Paratype coll. ERNST; the remaining figs.: Holotype;←78) body, lateral aspect; 79) position of the eyes, dorsal aspect; 80) l. chelicera, frontal aspect; 80a) area between sternum and opisthosoma, ventral aspect. Note the stridulatory tooth on the right coxa IV (arrow) and the rugose stridulatory epigastral field between the coxae IV; 81) l. patella and tibia I with bristles, retrolateral aspect; 82) opisthosoma, dorsal aspect. Note the paired sigillae (only few of the short hairs are drawn); 83) l. pedipalpus, dorsal aspect. The tibia is slightly separated from the cymbium; 84) r. pedipalpus, ventral aspect; 85) l. pedipalpus, ventral aspect; 86) l. pedipalpus, prolateral-ventral aspect; 87) r. pedipalpus, retroletarel and slightly ventral aspect; 88) r. pedipalus, retrolateral aspect. M = 0.5 in fig. 78 and 82), 0.2 in fig. 80a), 0.1 in the remaining figs. C = conductor, CO = cymbial outgrowth, DE = distal part of the embolus, E = embolus, EP = epigastral scutum, O = cymbial outgrowth, P ?= paracymbium, PP = parembolic process, SE = questionable secretion of the genital opening.



figs. 89-91: ?***Succinitaxus minutus*** **n. gen. n. sp.**, ♂, holotype; 89) l. femur I, retro-ventral aspect, with questionable fragmented remains of muscles; 90) l. pedipalpus, dorsal aspect; 91)→r. pedipalpus, prolateral aspect. M = 0.1. C = conductor, E ?= embolus;



figs. 92-94: ***Sulcosynotaxus cavatus* n. gen. n. sp.**, ♂, holotype; 92) area between opisthosoma and sternum, ventral aspect and from left-behind; 93) r. pedipalpus, ventral aspect (the central part and the paracymbium are hidden); 94) l pedipalpus, retroventral and slightly distal aspect. M = 0.2. E = embolus, F = epigastral furrow, L = left coxa, O = ventral outgrowth of the opisthosoma, P = paracymbium, PP = parembolic process, X = excavation of the posterior margin of the sternum (S);



figs. 95-98: ***Tupua bisetosa*** PLATNICK 1990, extant, Tasmania, ♂; taken from FORSTER et al. (1990: Figs. 95-97, 101); 95-96) body, dorsal and lateral aspect, body length 3.86mm; 97) pedicel and anterior opisthosomal region, dorsal view; 98) l. pedipalpus, ventral aspect.

BEITR. ARANEOL., 3 (2004)

REMARKS ON THE FOSSIL SPIDERS (ARANEAE) OF THE FAMILY NESTICIDAE IN AMBER, WITH THE DESCRIPTION OF A NEW SPECIES IN BALTIC AMBER

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Abstract: The fossil genera of the spider (Araneae) family Nesticidae in Baltic an Dominican amber are listed, a key is given to the genera in Baltic amber, a diagnosis of the family Nesticidae is given, *Eopopino rudloffi* **n. sp**. is described from Baltic amber.

Introduction

Nesticidae (Cave Spiders; German name: "Höhlenspinnen") is not a diverse family of the superfamily Araneoidea; its members live in caves, unter stones and in litter and

build an irregular web.
Nesticidae are rare in Dominican amber - only a single specimen of *Hispanonesticus latopalpus* WUNDERLICH 1986 is known to me, see WUNDERLICH (1986: 128) and (1988: 126) - but in Baltic amber they are not so rare as previously thought; after my work of 1986 I saw several hundred fossils in this kind of amber, new descriptions are in preparation, one is found below. The frequency of members of the genus *Eopopino* PETRUNKEVITCH in Baltic amber may be a hint that these spiders occured in higher strata of the vegetation.

Diagnosis of the family Nesticidae: There are tiny denticles in the cheliceral furrow, see fig. 253 in the book of WUNDERLICH (1986), the anterior cheliceral margin bears 3 wide teeth. Tarsus IV bears usually a ventral row of bent and serrated strong hairs (a "comb" (fig. 1) as in most Theridiidae, which may be indistinct (e.g. in the fossil genus *Eopopino* PETRUNKEVITCH) or even absent (e.g. in *Heteronesticus* WUNDERLICH and *Hispanonesticus* WUNDERLICH). The surface of the prosomal and legs' cuticula is smooth or weakly granular. The labium is distinctly rebordered, see fig. 269 in the book of WUNDERLICH (1986). The leg bristles are thin or even absent, the trichobothria are short. The epigyne may have a scape. The paracymbium has a retrobasal position, it is large and usually complicated (e.g. figs. 4-5), occasionally more simple, rarely blunt and bearing tiny denticles, see fig. 254 in the book of WUNDERLICH (1986). At least the females of some taxa bear their egg sac attached to the spinnerets.

Subfamilies: Only the nominate subfamily. Tribus: See WUNDERLICH (1986: 123).

Relationships: Most probably Theridiidae is the sister group; see the paper on this family in this volume.

Distribution: Cosmopolitical.

Key to the genera of the family Nesticidae in Baltic amber (♂):

1 Tibia I nearly 4 times as long as the prosoma, metatarsus I distinctly bent (fig. 2), paracymbium (fig. 3) compact, ventral hairs of tarsus IV bent and weakly serrated.- Only *B. flexuosus* . Photo 234 . . . . . *Balticonesticus*

- Tibia I about 1-.7 times as long as the prosoma, metatarsus I not distinctly bent, paracymbium more complicated (figs. 4-5), ventral hairs of tarsus IV smooth or serrated...2

2(1) Outline of the apical branch of the paracymbium nearly circular (fig. 4) and outstanding, ventral hairs of tarsus IV straight and smooth.- Only *H. magnoparacymbialis*. . . . . Photos 235-236. . . . . *Heteronesticus*

- Paracymbium slender, its position about parallel to the cymbium (fig.5), ventral hairs of tarsus IV bent and serrated, similar to fig.1. Several species and subspecies....*Eopopino* Photos 237-239

***Eopopino rudloffi* n. sp.** (figs. 5-6) Photo 239

Derivatio nominis: The species is named after KNUT RUDLOFF in Meldorf, who made numerous fossil spiders in Baltic amber from the Bitterfeld deposit available to a scientific study.

Material: Holotypus ♂ in Baltic amber from the Bitterfeld deposit, coll. GRABENHORST in Celle, no. AR-65; later probably Geol.-Palaeontol. Inst. Univ. Hamburg.

Preservation and syninclusions: The spider is well preserved, partly hidden, mainly the left side is partly covered by a white emulsion, both legs I are lost beyond the coxa by autotomy, median parts of the left legs II and IV are lost (cut off within the resin), on the left metatarsus and tarsus III numerous whitish particles are present (shrinked bubbles?). Some long threads of spider's silk are preserved below the spider, a tiny Hymenoptera is present in front of the spider, few balls of excrement and numerous particles of detritus are preserved around the spider; stellate hairs are absent.

Diagnosis (♂; ♀ unknown): Pedipalpus as in figs. 5-6, radix apophysis with a pointed tip.

Description (♂):
Measurements (in mm): Body iength 2.3, prosomal length 1.3, metatarsus II 1.55, leg IV: Femur 2.2, patella ca 0.4, tibia 1.7, metatarsus 1.6, tarsus 0.6.
Colour: Prosoma and legs medium brown, opisthosoma yellow brown.
Prosoma (most parts are hidden) with a long clypeus and 8 large eyes. Legs long and slender, hairy, tibial bristles thin, sequence most probably 2/2/1/2. Position of the trichobothrium on metatarsus II in 0.88. The hairs of the comb of tarsus IV are only weakly serrated. Opisthosoma oval, hairy, with a large colulus. Pedipalpus (figs. 5-6, see above) with a long embolus which originates in a prolateral position.

Relationships: In the related *E. inopinatus* WUNDERLICH 1986 a pointed tip of the radix apophysis is absent and the shape of the tegulum is different.

Distribution: Tertiary Baltic amber, the Bitterfeld deposit.

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WUNDERLICH, J. (1986): Spinnenfauna gestern und heute. Fossile Spinnen in Bernstein und ihre heute lebenden Verwandten. 283pp. Publishing House J. Wunderlich.

-- (1988): Die fossilen Spinnen im Dominikanischen Bernstein. -- Beitr. Anaeol., 2: 1-378. Publishing House J. Wunderlich.

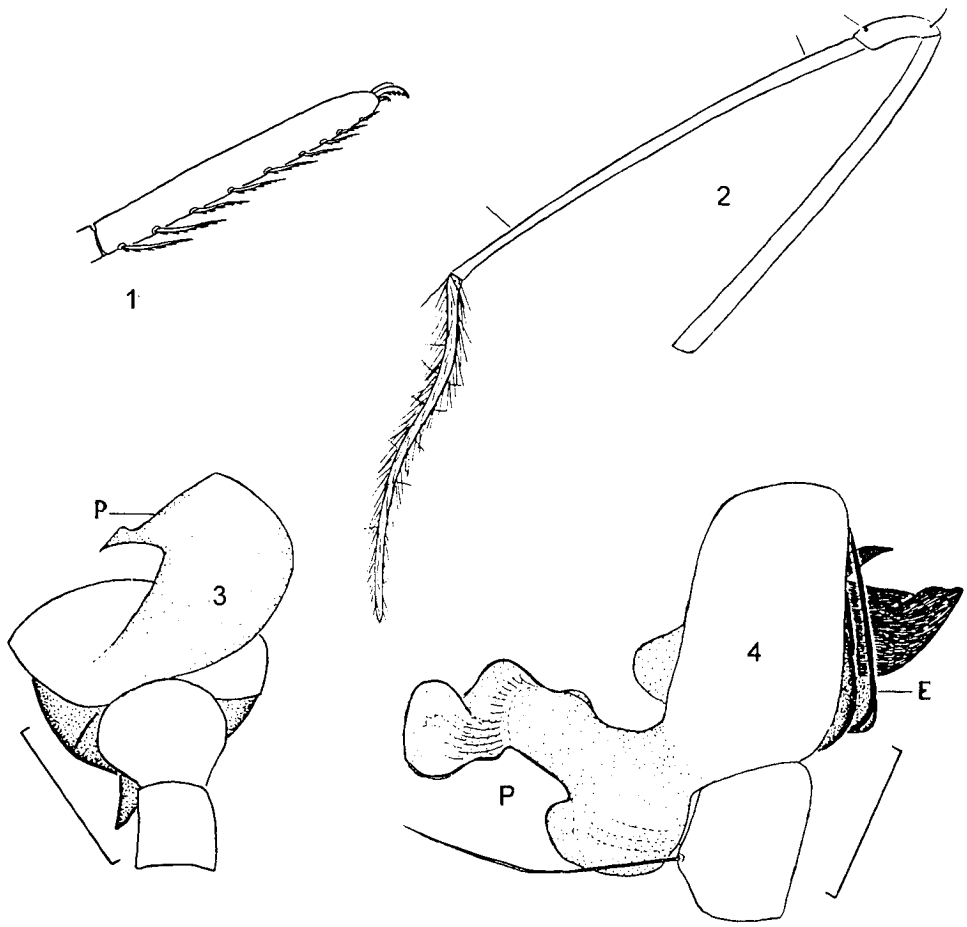
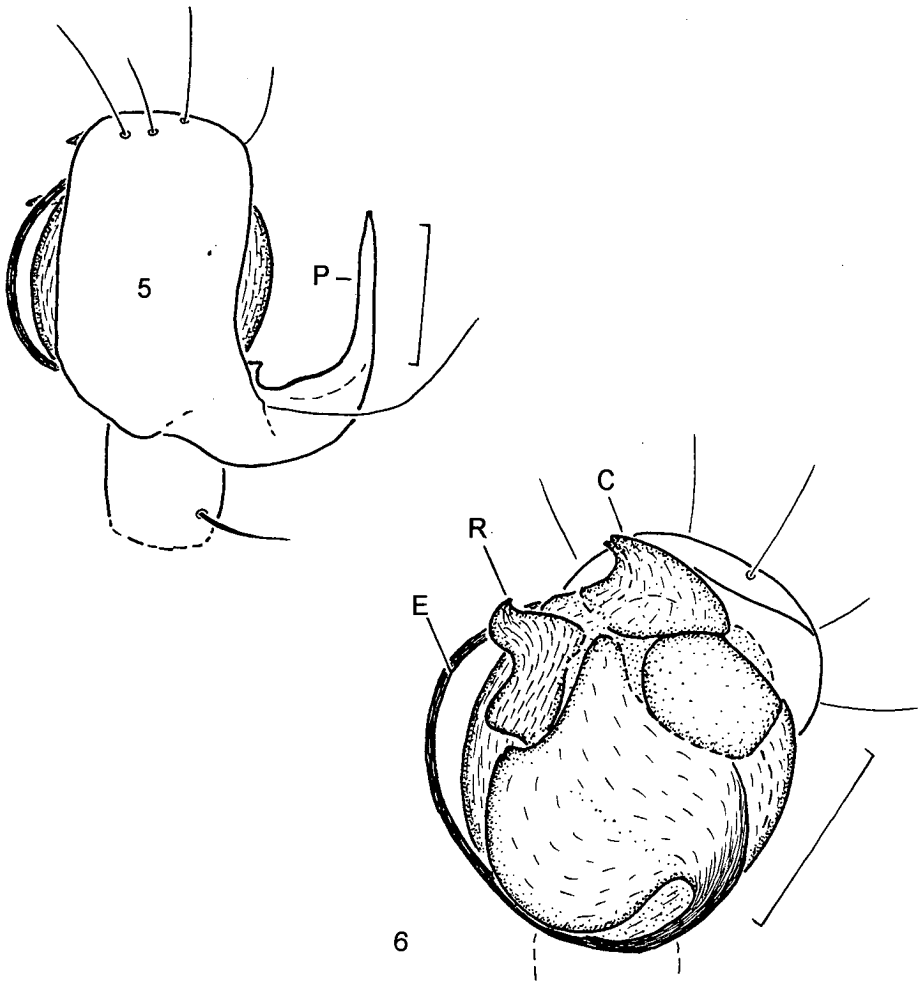


Fig. 1) Comb of bent serrated ventral hairs of tarsus IV of most members of the family Theridiidae and Nesticidae (not in the fossil Nesticidae);

figs. 2-3: *Balticonesticus flexuosus* WUNDERLICH 1986, ♂; 2) l. leg I except the tarsus, retrolateral aspect. Hairs are only drawn on the metatarsus. The femur is 4.5mm long; 3) r. pedipalpus, dorsal and slightly prolateral aspect; P = paracymbium;

fig. 4) *Heteronesticus magnoparacymbialis* WUNDERLICH 1986, ♂, l. pedipalpus, dorsal aspect; M = 0.2mm;



figs. 5-6: ***Eopopino rudloffi* n. sp.**, ♂; 5) r. pedipalpus, dorsal aspect (only few cymbial hairs are drawn); 6) l. pedipalpus, ventral aspect. C = conductor, E = embolus, R = pointed tip of the radix apophysis. M = 0.2.

BEITR. ARANEOL., 3 (2004)

REMARKS ON THE FOSSIL SPIDERS (ARANEAE) OF THE FAMILY THERIDIIDAE IN BALTIC AND DOMINICAN AMBER

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Abstract: The higher taxa of the fossil spiders (Araneae) of the family Theridiidae in Baltic and Dominican amber are listed, a diagnosis of the family Theridiidae is given.

Introduction

Theridiidae (Comfooted Spiders; German name: "Kugelspinnen") is a very diverse family of spiders which has a cosmopolitical distribution; members of all the 7 subfamilies (see below) are known to me from Early Tertiary fossils, see WUNDERLICH (1986, 1988) but the first member from the Cretaceous Period is still waiting for a discovery. - Members of the genera *Dipoena* THORELL 1869 and *Clya* KOCH & BERENDT 1854

(=*Nanomysmena* PETRUNKEVITCH 1958) are the most frequent spiders in Baltic amber besides the genera *Acrometa* PETRUNKEVITCH 1942 (Synotaxidae) and *Orchestina* SIMON 1882 (Oonopidae), and are frequent in other Tertiary ambers and in copals, too. Most fossil males of *Dipoena* possess a very high prosoma with dorsal folds (figs. 2-3), the males of *Clya* have a circular or spiril embolus (fig. 4) similar to *Acrometa*.
I saw about 20 000 fossil Theridiidae, and selected about 1000 adult specimens in Baltic amber for revisions and descriptions in the future which are kept in the CJW and in few other collections.
Most members of the Theridiidae live in higher strata of the vegetation, some on the ground. On trees in the tropics the Theridiidae are the dominant family; numerous genera and probably thousands of extant species are waiting for a description. - Most spiders build irregular capture webs of two main types, frequently ants are the prey - the most frequent prey of spiders in Baltic amber are ants, see the photos. Members of some extant species are ant-mimicking, others are kleptoparasites, e.g. members of the genus *Argyrodes* SIMON 1864 in Dominican amber - see WUNDERLICH (1988: 128-131) -, which are unknown from Baltic amber.

The following genera are known from Dominican amber (see WUNDERLICH(1988):

Achaearanea, Anelosimus, Argyrodes, Chrosiothes, ?Chrysso, Cornutidion, Craspedisia, Dipoena (?= *Dipoenata, Lasaeola*), *Episinus, Spintharus, Stemmops, Styposis* and *Theridion*.

The following genera are known to me from Baltic amber:

Clya (= *Nanomysmena*, see WUNDERLICH (1986: 139)), *Dipoena* (?= *Dipoenata, Lasaeola*), *Eomysmena, Episinus* (= *Flegia*), *Phoroncidia, Steatoda* (= *Lithyphantes*) and probably *Theridion*. - PETRUNKEVITCH (1958: 381-383) listed some more nominal genera, most of them have to be revised: *Astodipoena, Clythia, Corynitis, Eodipoena, Euryopis, Municeps, Mysmena* and *Nactodipoena*.

Diagnosis of the family Theridiidae: Tarsus IV bears a row of bent and serrated strong ventral hairs (a "comb") (fig. 1) which is absent in several genera as *Argyrodes* and *Dipoena*. A prosomal-opisthosomal stridulatory organ with posterior files on the prosoma and bristles on the opisthosoma is present in numerous taxa. A single epigynal pit or a pair of pits is present, a scape is absent. ♂-pedipalpus (figs. 5-6): The tibia has a plate-shaped apical outgrowth which bears long hairs, a retrodistal **or** internal paracymbium is present (a retrobasal paracymbium - as e.g. in Linyphiidae and Nesticidae - is absent). - Further: The characters of the superfamily Araneoidea. Femoral, lateral tibial and metatarsal bristles are absent and the tibial bristles are thin as in related families. Red questionable pigments of the anterior median eyes are present in several taxa, see the paper on spider's "red eyes" in this volume. Most often the opisthosoma is soft and globular but it may be distinctly longer than wide (e.g. in *Episinus*) or more or less armoured (e.g. in *Phoroncidia*).

Subfamilies: Anelosiminae, Argyrodinae, Hadrotarsinae (incl. *Dipoena*), Latrodectinae, Pholcommatinae, Spintharinae and Theridiinae.

Relationships: In the related Nesticidae a comb of tarsus IV is usually present, and gumfooted lines are present in the web, too, but the surface of the prosomal and legs' cuticula is smooth or weakly granular (scale-shaped in the Theridiidae), denticles in the cheliceral furrow are present and the pedipalpal tibia is not plate-shaped, a distinct retrobasal paracymbium is present and an epigynal scape may be present.

Distribution: Cosmopolitical; fossil in Tertiary resins and in copal.

LITERATURE

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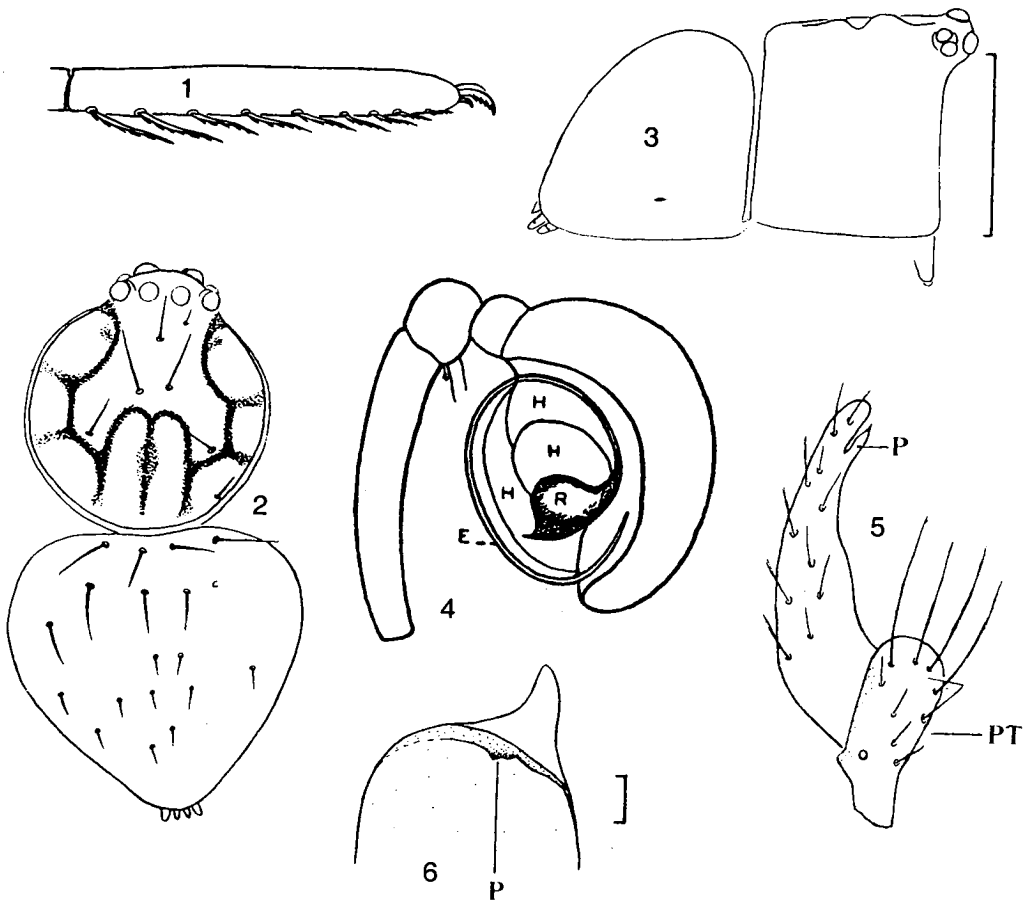

Fig. 1) Comb of serrated ventral hairs of tarsus IV of a member of the family Theridiidae which is similar in most Nesticidae;

figs. 2-3: *Dipoena* (*Lasaeola*) sp., ♂, body, dorsal and lateral aspect. Note the dorsal furrow of the very high prosoma; M = 0.5mm;

fig. 4) *Clya* (= *Nanomysmena*) sp., ♂, r. pedipalpus, retrolateral aspect. Taken from PETRUNKEVITCH (1958: Fig. 190);

fig. 5) Plate-shaped elongated tibia (PT) and retrodistal paracymbium (P) of *Robertus* sp. (Theridiidae), retrolateral aspect;

fig. 6) Distal part of the cymbium with the intern paracymbium (P) of *Euryopis* sp. (Theridiidae), ventral aspect.

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FOSSIL PIRATE SPIDERS (ARANEAE: ARANEOIDEA: MIMETIDAE S. L.) IN BALTIC AND DOMINICAN AMBER, WITH NOTES ON INTRAFAMILIAR HIGHER TAXA

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Abstract: Mimetidae is revised and regarded in a wide sense as a member of the superfamily Araneoidea, including Malkarini and Sternoidini (**n. nom.** & **n. stat.**) of the Malkarinae, Holarchaeini (**n. stat.**) and Pararchaeini (**n. stat.**) of the Pararchaeinae as well as Mimetini and Oarcini of the Mimetinae. Only members of the Mimetinae are known from the Tertiary Baltic and Dominican amber, likely incl. Oarcini in Baltic amber. Today only in the Australian Region all subfamilies and tribus besides S-American Oarcini are present. A preliminary cladogram of the subfamilies and tribus is given. The fossil subfamily Mimetarchaeinae ESKOV 1992 from Baltic amber is synonymized with the tribus Mimetini (**n.syn.**), *Mimetarchaea* ESKOV 1992 is probably a junior synonym of *Mimetus* HENTZ 1832 (**quest. n. syn.**). - The fossil spider taxa of the Mimetidae: Mimetinae in Baltic and Dominican amber are listed, keys to the genera are given. There are no fossil members of the genus *Ero* C.L. KOCH 1837 in Baltic amber; fossil species sub *Ero* sensu KOCH & BERENDT and PETRUNKEVITCH are regarded as members of *Succinero*. *Corynitis* MENGE in KOCH & BERENDT 1854 in Baltic amber is regarded as a nomen nudum and a questionable synonym of *Mimetus* or *Succinero*. - The following taxa from Baltic amber are described: *Palaeoero* **n. gen.**, *P. longitarsus* **n. sp.**, ?*Mimetus brevipes* **n. sp.**, ?*Mimetus longipes* **n. sp.**, *Praeoarces* **n. gen.**; *P. exitus* **n. sp.**; furthermore three indet. fossil species (?juv. and ♀) of the Mimetidae are described in Baltic amber. Likely fossil Mimetid egg sacs in Baltic amber are reported.

Acknowledgements: I am most grateful to R. R. FORSTER for the present of Malkaridae sp. indet. and *Matilda* sp., to V. V. HICKMAN for the present of *Pararchaea* sp. and to N. I. PLATNICK (AMNH) for the loan of *Gnolus* sp. and *Oarces* sp.

Material: CJW = private collection of J. WUNDERLICH.

INTRODUCTION

The family Mimetidae s. l. (Pirate Spiders s. l.) - I regard the taxon in a wide sense - is relatively poor in species. Solely members of the subfamily Mimetinae are known from Baltic and Dominican amber. Only one species - ?*Mimetus bituberculatus* WUNDERLICH 1988 has been described from Dominican amber, see WUNDERLICH (1988: 176-178). Mimetidae in Baltic amber are diverse and not rare, I saw several hundred specimens of numerous undescribed and several described species, four genera, see below. Members of the extant genus *Ero* C. L. KOCH 1837 are not rare in large parts of the world; they live e. g. under stones and the bark of trees. Here one can find their egg sacs with the typical loose threads - see the photo - which also may occur in Baltic amber. The relatively high frequence of specimens and the presence of egg sacs in Baltic amber indicate that some of the fossil Mimetidae species lived on/beneath the bark on trees, similar to its extant relatives.

Prey. Mimetinae - German name "Spider Eater" - feed besides on insects mainly on spiders, e. g. on Theridiidae, see WUNDERLICH (1986: 44, Fig. 332 and 1988: 176, fig. 703). Remains of the prey may be nearly complete if it were succed out through a tiny hole of a leg. A similar behaviour is known also from Archaeinae, Palpimaninae and various genera of several other spider families, mainly Salticidae and Theridiidae. - In a piece of Baltic amber (CJW) - size 0.8x1.8x1.8cm - two ♀ of the genus *Custodela* (Linyphiidae) incl. a part of a capture web with sticky threads and a juv. Mimetidae-♂ (?*Succinero* sp.) in contact to the web are preserved. The spiders and the web are situated in the same amber layer. The body length of the spiders is 1.5 to 1.6mm; they are partly covered by a white emulsion and therefore were captured by the resin alive. Probably the Mimetidae tried to catch one of the Linyphiidae in the same way as some extant relatives: Moving at the margin of the web like a possible prey. Photo 615.

Extant and fossil genera of the Mimetidae need a revision; *Ero* and *Mimetus* - the only genera of the family which occur today in Europe - have probably to split up, see BRIGNOLI (1979) and below.
Typic characters of the Mimetinae: See the diagnosis of the subfamily below. Most characteristic are the prolateral bristles of the legs I-II, see figs. 1, 24, 32, 39.
The new fossil genus *Praeoarces* - a likely member of the tribus Oarcini (extant: South America!) - in Baltic amber is of special interest because of the mixtute of characters; it seems to be somewhat like a "link" between the tribus Mimetini and Oarcini: The chelicerae are basally fused as in *Ero, Mimetus* and related genera of the Mimetini but the clypeus is short as in the Oarcini (rarely in the Mimetini) and tibia I of the female is ventrally flattened as typical in the Oarcini (fig. 32) (the fossil male is unknown).

EINLEITUNG

Spinnenfresser-Spinnen (Mimetidae) - ich fasse sie im weiten Sinne auf - sind eine relativ artenarme Familie. Vom Baltischen und Dominikanischen Bernstein sind ausschließlich Vertreter der Eigentlichen Spinnenfresser-Spinnen (Mimetinae) bekannt. Im Dominikanischem Bernstein sind sie nicht häufig, es wurde lediglich eine Art beschrieben: ?*Mimetus bituberculatus* WUNDERLICH 1988, vgl. WUNDERLICH (1988: 176-178). Im Baltischen Bernstein sind Mimetidae dagegen formenreich und keineswegs selten, mir lagen mehrere hundert Exemplare zahlreicher unbeschriebener und verschiedener beschriebener Arten vor, vier Gattungen.
Vertreter der rezenten Gattung *Ero* leben in Deutschland nicht selten z.B. unter Steinen wie auch an und unter der Rinde von Bäumen, wo man ihre typischen tropfenförmigen Kokons finden kann, die mit dicken und lockeren Fäden umsponnen sind und die nach meinen Befunden auch im Baltischen Bernstein vorkommen dürften. Die relative Häufigkeit der Spinnen sowie das Vorkommen von Kokons im Baltischen Bernstein sprechen dafür, daß wenigstens einige der Spinnenfresser-Spinnen - ähnlich ihren heutigen Verwandten - Bewohner von Baumrinde waren.
Beute: Eigentliche Spinnenfresser-Spinnen (Name!) erbeuten - wie die Eigentlichen Urspinnen (Archaeinae), die Eigentlichen Tasterfuß-Spinnen (Palpimaninae) sowie Vertreter von Gattungen verschiedener Familien wie Kugelspinnen (Theridiidae) und Springspinnen (Salticidae) - neben Insekten überwiegend Spinnen, so die in allen Tertiären Bernstein-Arten häufigen Kugelspinnen, vgl. WUNDERLICH (1986: 44, Abb.332 und 1988: 176, Abb.703), die sie gelegentlich äußerlich nahezu unbeschädigt hinterlassen, sofern sie sie durch die Bißstelle in einem Bein ausgesaugt haben. - In einem 0.8x1.8x1.8cm großen Stück Baltischen Bernsteins (CJW) sind 2 ♀ von *Custodela* sp. (Linyphiidae) mit einem Netzteil incl. Klebfäden konserviert sowie - in Kontakt mit dem Netz - ein juv. Mimetidae-♂ (?*Succinero* sp.). Alle drei Spinnen und der Netzteil liegen in derselben Schlaube. Die Körper-Länge der Spinnen beträgt 1.5 bis 1.6mm. Sie sind teilweise verlumt und somit lebend in die Harzfalle geraten. Möglicherweise versuchte die Spinnenfresser-Spinne eine der Baldachinspinnen zu erbeuten, indem sie am Rand des Fangnetzes durch Bewegungen eine potentielle Beute imitierte, wie es auch von heutigen Mimetidae bekannt ist. Foto.

Die rezenten und fossilen Gattungen der Mimetinae sind revisions-bedürftig; die einzigen heute auch in Europa vorkommenden Gattungen *Ero* und *Mimetus* sind möglicherweise "Sammel-Gattungen", vgl. BRIGNOLI (1979).

Die neue Gattung *Praeoarces* - sie könnte ein Vertreter des Tribus Oarcini sein, der heute nur in Süd-Amerika vorkommen! - ist wegen ihrer Merkmalskombination von besonderem Interesse; sie scheint so etwas wie ein "Bindeglied" zwischen den Tribus Mimetini und Oarcini zu sein: Die Cheliceren sind basal miteinander verwachsen wie bei *Ero, Mimetus* und verwandten Gattungen der Mimetini, aber der Clypeus ist kurz wie bei den Oarcini und selten bei den Mimetini und die ♀-Tibia I ist unten abgeflacht wie typisch bei den Oarcini (Abb. 32) (das fossile ♂ ist unbekannt).

Typische Merkmale der Eigentlichen Spinnenfresser-Spinnen (Mimetinae) sind vor allem (vgl. auch die untenstehende Diagnose):

1. Auffällige Längsreihen von Borsten vorn auf den Metatarsen (meist auch auf den Tibien) der ersten beiden Bein-Paare (Abb. 1, 24, 32, 39): Zwischen langen Borsten stehen meist mehrere (selten nur eine) wesentlich kürzere und stärker gebogene Börstchen, deren Länge und Krümmung zum Gliedende zunehmen (bei Jungspinnen können die kurzen Borsten wie auch Borsten der Femora fehlen, siehe Foto);
2. am Grunde miteinander verwachsene Grundglieder der Oberkiefer (Cheliceren) (Pfeil in Abb. 16 und 31);
3. pflock-ähnliche "Zähne" ("peg teeth") - genauer: Borsten - der Cheliceren (Abb.13, 16), die - im Gegensatz zu echten Zähnen - an ihrer Basis ringförmig eingesenkt sind. Derartige Borsten der Cheliceren haben sie - konvergent entstanden - mit Vertretern verschiedener anderer Familien gemeinsam, z.B. mit den Eigentlichen Urspinnen (Archaeinae), Tasterfuß-Spinnen (Palpimaninae), einigen Zwergkugelspinnen (Anapidae: Micropholcommatini) und einigen Krabben-Spinnen (Thomisidae: Amyciaea SIMON);
4. und 5. zwei Merkmale des ♂-Pedipalpus: Ein kurzes Endglied und meist eine lange Tibia (z.B. Abb.18; vgl. aber Abb. 28!);
6. und 7. sind zwei Merkmale des Verhaltens: Die Spinnen bauen keine Fangnetze und sie ernähren sich ganz überwiegend von Spinnen (siehe oben).

The suprageneric taxa

Mimetidae s. l.

Revised diagnosis of the Mimetidae s. l.: Usually long chelicerae (fig. 16; but compare fig. 9); except in Pararchaeinae, some Malkarinae and Oarcini-♂ the legs I-II are "capture legs" in both sexes: Metatarsi - mostly also tibiae - I-II have prolaterally a row of strong bristles, and between these usually a row of 2- >10 short bristles which are stronger bent and increasing in length, the "mimetid leg bristles", see figs. 1, 24, 26, 32. Capture web, triade and sustentaculum are absent. Mainly araneophag. No distinct leg autotomy. Usually - probably basicly - numerous leg bristles present, a long clypeus and a long embolus in a wide loop as in figs. 20 and 38. Epigynal scapus present or absent.

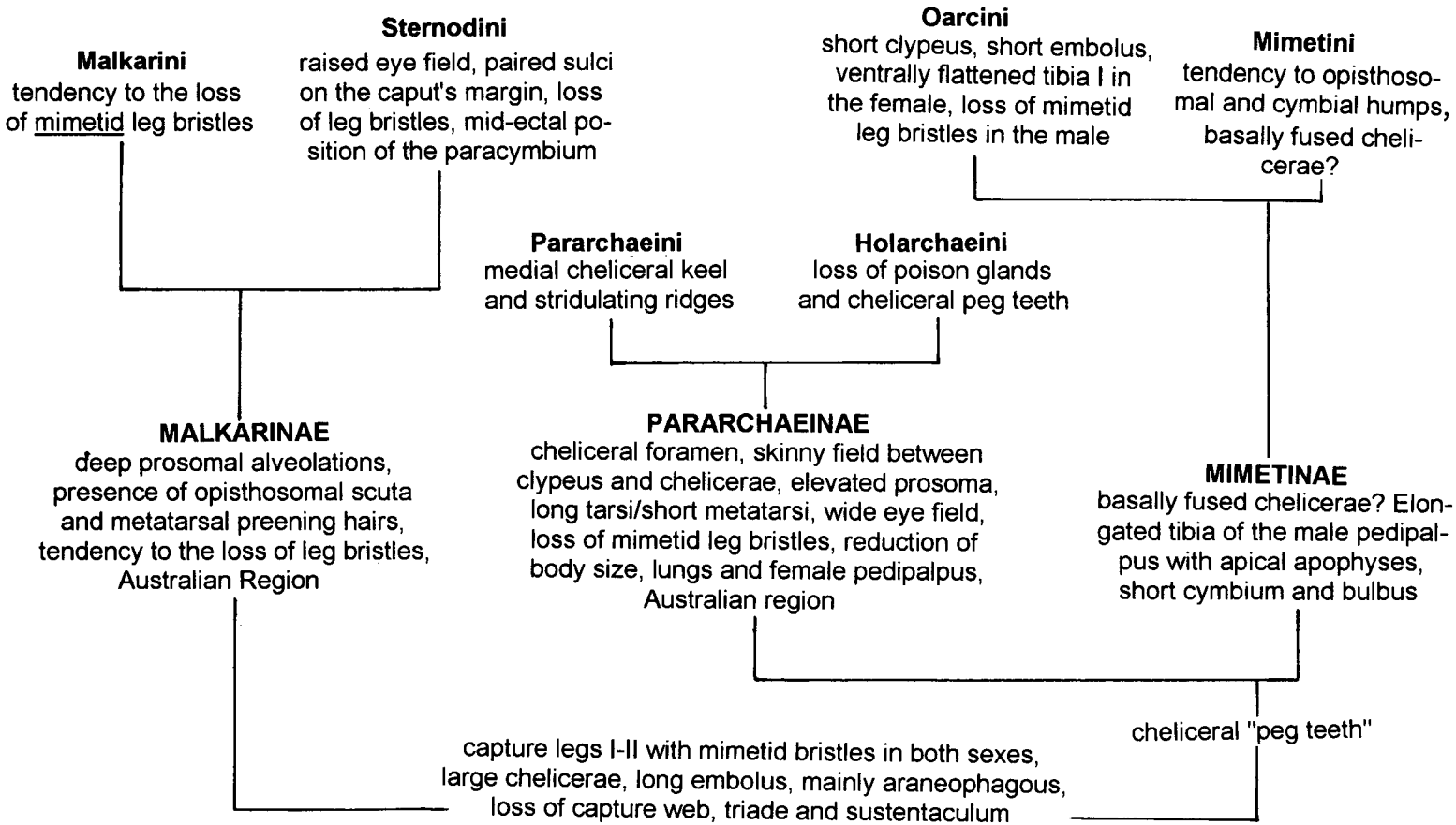
Remarks: (1) Usually are cheliceral "peg teeth" (fig. 13) present in the Mimetidae but Malkarinae have normal teeth and Holarchaeini none. These peg teeth may be a synapomorphy of the family Mimetidae with a loss in the Malkarinae and Holarchaeini but in my opinion more likely is their presence an apomorphy of the sister group of the Malkarinae with a loss in the Holarchaeini, see the preliminary cladogram. (2) According to my

hypothesis the character "capture legs I-II" is an autapomorphy of the Mimetidae s. l. Capture legs are extremely developed in female Oarcini (fig. 33), indistinct or even absent in several Malkarinae, absent in Pararchaeinae and - sexual dimorph - in male Oarcini. (3) If the orb web with sticky threads is an autapomorphy of the Araneoidea s. str. the triade also is an autapomorphy and has been lost in the Mimetidae "together" with the capture web. These losts may be in connection with the origin of its araneophagy. (Within the superfamily Araneoidea a triade is also absent in the Araneidae: Cyrtophorinae in which a sticky spiral of the capture web is absent, too). (4) A cheliceral gap - or even a foramen - is present in taxa which have large chelicerae; a foramen is most distinct in the Pararchaeinae similar to the Archaeidae (Eresoidea), a cheliceral gap in some Mimetini is similar e. g. to some Tetragnathidae (Araneoidea). (5) A capture web has also lost in several other taxa of the Araneoidea, e. g. in numerous Erigoninae (Linyphiinae), some Theridiidae and in adult *Pachygnatha* SUNDEVALL (Tetragnathidae). (6) Leg autotomy: I found rarely a coxa-trochanter autotomy in *Ero, Mimetus* (Mimetinae) and *Matilda* FORSTER (Malkarinae).

Subfamilies (see FORSTER & FORSTER (1999), PLATNICK & SHADAB (1993)): Mimetinae, Malkarinae and Pararchaeinae (**n. comb.**), see the cladogram. Several taxa of the Australian Region which are regarded as families e. g. by FORSTER & FORSTER (1999) - Malkaridae, Holarchaeidae, Pararchaeidae and Sternodidae within the superfamily Araneoidea - are in my opinion nothing else than subfamilies or even tribus of diverse and cosmopolitical distributed families and are downgraded in this paper.

The **relationships** are controversially discussed. LEHTINEN (1967) regarded the family Mimetidae s. str. (= Mimetinae) as a member of the superfamily Araneoidea. According to FORSTER & PLATNICK (1984) Mimetidae are related to Arachaeidae and Palpimanidae, see the paper on the superfamily Eresidae in this volume. Like most Mimetidae also Archaeidae and Palpimanidae usually are araneophagous, build no capture web and possess cheliceral peg teeth. Peg teeth and araneophagy may be "linked convergences" of these taxa and are also known within other superfamilies. According to several characters - the numerous leg bristles, the not raised caput, the presence of a retrobasal paracymbium, the conformation of the complicated bulbus structures and the entelegyne condition - Mimetidae is not at all related to the "primitive" Archaeidae or Palpimanidae but is surely a member of the superfamily Araneoidea. This opinion is in contrast to the recent opinion of CODDINGTON, FORSTER, GRISWOLD and PLATNICK but identic with the opinion of LEHTINEN, SCHÜTT (pers. commun.) and SHEAR; see also WUNDERLICH (1986: 103). According to SHEAR (1981) show Mimetidae relationships to Araneidae, Linyphiidae and especially to Tetragnathidae: Metinae, and (p. 261) "...one suspects that the Mimetidae may represent an early development from protometines that may have moved through web-parasitism to, in some cases, exclusive araneophagy.". Mimetidae possess large chelicerae as Metinae but quite different genital organs; therefore a close relationship appears unlikely to me. - Regarding to the basicly long clypeus, the numerous leg bristles, the rareness of leg autotomy and the presence of an orb web as well as the similar conformation of the bulbus structures there may be relationships of the Mimetidae to the "irregular capture web weaver's branch", see the paper on the superfamily Araneoidea in this volume and WUNDERLICH (1986).

Distribution: Extant cosmopolitical; fossil in Baltic and Dominican amber.



Preliminary cladogram of the higher taxa of the Mimetidae s. l.

Mimetinae SIMON 1881 (Mimetidae sensu PLATNICK & SHADAB (1993))

Revised diagnosis: Mimetid leg bristles present -see above- except in males of the tribus Oarcini (see below), probably basicly chelicerae fused basally (fig.16,31) (except in *Gnolus* and *Oarces*). Spinnerets: "Enlarged, rotund, and incised cylindrical gland spigots", see PLATNICK & SHADAB (1993: 9). Male pedipalpus: Usually bulbus and cymbium short and tibia long and slender (figs. 5,8,18 but compare figs. 19 and 28!); terminal apophysis originating from the center of the distal hematodocha and consisting of two parts, median apophysis absent (?) see SHEAR (1981: 261); "tendency" to opisthosomal humps. Usually complete mimetid leg bristles present but sexual dimorph absent in males of the Oarcini; the number of the small bristles may be reduced to one, see *Palaeoero* n. gen. fig. 26.

Synonyms: See Mimetini.

Tribus: Mimetini and Oarcini SIMON.

Relationships: According to my hypothesis Malkarinae and Pararchaeinae are most related to the Mimetinae, a triade is absent in Malkarini sp. (K. SCHÜTT, pers. commun.), see the preliminary cladogram. Probably Pararchaeinae is the sister group to the Mimetinae. In the Pararchaeinae are mimetid leg bristles absent but a cheliceral foramen is present which is stronger developed than the cheliceral gap in some Mimetinae and peg teeth are present in the Pararchaeini. - In some taxa of the Malkarini are the mimetid leg bristles similar to the Mimetinae, see WUNDERLICH (1986: 125) and below. According to PLATNICK & FORSTER (1987: 1) "The enlarged Malkaridae is tendatively treated as the sister-group of the Mimetidae, but could proove to represent only a highly autapomorphic subgroup of that family.". In the Malkarinae are peg teeth and dorsal tibial bristles absent, metatarsal preening hairs are present and distinct (unique in the Araneoidea! In *Mimetus* I found only weak hairs of such kind), tarsus and metatarsus I may be thickened (more distinct in the male).

Distribution: Cosmopolitical.

Tribus Mimetini SIMON 1881

Synonyms: Gelanorinae sensu ROEWER (1942), see PLATNICK & SHADAB (1993: 9) and Mimetarchaeinae ESKOV 1992 (**n. syn.**, see next page).

Material of the Mimetarchaeinae: Holotypus (subad. ♂) of the type - and only known - species *Mimetarchaea gintaras* ESKOV 1992: Amber Museum Palanga, Lithunia.

According to my investigation the holotype of *M. gintaras* is a subadult male and not an adult male as published by ESKOV (1992); the embolus of *gintaras* sensu ESKOV is nothing else than the margin of the pedipalpal tarsus (!). Characters of the spider - chelicerae, mimetid leg bristles - indicate clearly that it is a member of the Mimetini; ESKOV's speculations on relationships of Archaeidae and Mimetidae are invalid. According to the long chelicerae and the short clypeus *Mimetarchaea gintaras* may be a member of the genus *Mimetus* HENTZ (**questionable new synonymy**).

Diagnosis: Embolus long (fig. 20), cheliceral gap often present, opisthosoma and cymbium (fig. 5) not seldom with dorsal outgrowth/hump, basicly long clypeus and narrow eye field (cheliceral stridulating files may be present, in *Ero*).

Genera: Fossil: *Mimetus* HENTZ, *Palaeoero* n. gen. (extinct) and *Succinero* n. gen. (extinct); extant: *Ero* C. L. KOCH, *Mimetus* HENTZ and other genera.

Relationships: Mainly according to the short cymbium and bulbus as well as the basally fused chelicerae - according to my hypothesis probably a reversal in the extant branch of *Oarces* + *Gnolus* but still present in the extinct genus *Praeoarces* - are the Oarcini most related. In the Oarcini are the prosoma lower and the clypeus shorter than in most Mimetini, the eye field is usually wider, the embolus is short, mimetid leg bristles are absent in the male and tibia I is ventrally flattened in the female.

Distribution: Cosmopolitical.

Tribus Oarcini SIMON 1890 (**n. stat.**)

Oarcinae: PLATNICK & SHADAB (1993).

Synonym: Gnoleae SIMON 1895.

Revised diagnosis: Clypeus short (fig. 31), eye field usually wide (figs. 31, 33), legs laterigrade (fig.30, unknown in the single fossil!), tibia I (-II) flattened ventrally (cross section nearly half a circle) and bent in the female (fig. 32-33), no mimetid leg bristles (only numerous strong bristles) and a circular cross section of tibia I in the male (a strong sexual dimorphism); embolus short. - Chelicerae basally free in the extant genera *Gnolus* and *Oarces* or fused basally: In the extinct genus *Praeoarces* n. gen. (fig. 31). (In some species of *Oarces* occur mimetid bristles also on the retroventral margin of the ♀-tibia I).

Genera: Extant: *Oarces* SIMON 1879 and *Gnolus* SIMON 1879, see PLATNICK & SHADAB (1993); fossil: *Praeoarces* n. gen. in Baltic amber.

Relationships: See Mimetini.
Distribution: Extant: South America, fossil: Probably Baltic amber forest.

Pararchaeinae FORSTER & PLATNICK 1984 (sub Pararchaeidae) **(n. stat.)**

Diagnosis: Cheliceral foramen and skinny area between the chelicerae and the short clypeus present (fig. 35; FORSTER & FORSTER (1999: Fig. 13.7)), high prosoma, wide eye field, long tarsi/short metatarsi (fig. 34), small (reduced) body size, female pedipalpus and lungs; no mimetid leg bristles (fig. 34); cheliceral "peg teeth" (fig. 36) are present in the Pararchaeini.

Tribus: Pararchaeini and Holarchaeini.

Relationships: See Mimetinae and the cladogram. - Archaeidae are entelegyne spiders in which a cheliceral foramen and peg teeth evolved convergently, see the paper on the superfamily Eresoidea in this volume and FORSTER & PLATNICK (1984).

Distribution: Australian Region.

Pararchaeini FORSTER & PLATNICK 1984 (sub Pararchaeidae) (**n. stat.**)

Revised diagnosis: Presence of a medial cheliceral keel, medial cheliceral stridulating ridges (fig. 36), a thickened ♂-tarsus I (fig. 34), a short clypeus (fig. 35) and cheliceral peg teeth (fig. 36). Male pedipalpus: Figs. 37-38. See also the preliminary cladogram.

Relationships: According to my hypothesis Holarchaeini is related, see the preliminary cladogram. In the Holarchaeini poison glands, cheliceral peg teeth, a medial cheliceral keel and cheliceral stridulating ridges are absent. - Also in the Micropholcommatini (Anapidae: Anapinae) peg teeth are present and the tarsi are longer than the metatarsi but in the Micropholcommatinae a triade and a patellar apophysis of the male pedipalpus are present, a cheliceral foramen and a paracymbium are absent.

Distribution: Australian Region.

Holarchaeini FORSTER & PLATNICK 1984 (sub Holarchaeidae) **(n. stat.)**

Revised diagnosis: No poison glands, no cheliceral peg teeth, cheliceral foramen outlined ventrally only by unsclerotized cuticula. See also the preliminary cladogram.

Relationships: See the Pararchaeini.

Distribution: Australian Region.

Malkarinae DAVIES 1980, Shield Spiders

Diagnosis: Presence of deep prosomal alveolations, opisthosomal scuta, metatarsal **III** + IV preening hairs, tendency to loss (mimetid) leg bristles. Cheliceral teeth present but "peg teeth" absent.

Notes mainly on the "mimetid leg bristles" in the Malkarini: R. R. FORSTER (pers. commun., 14th IX 1984): "I have no doubt that Val DAVIES' Malkarinae are in fact Mimetids. Most of our species and some of the Australian ones have the typical Mimetid spination of the first two pairs of legs and the male palp and female genitalia fit in quite well, too. I think that eventually they will be placed as a sub-family of the Mimetidae. The spiders do not make any snare... The egg sac is a typical Mimetid type... The tendency appears to be for the spines to be reduced and in some of the Australian species the legs are spineless.". - Are the "mimetid leg bristles" in fact reduced in some of Australian and New Zealand Malkarini? If a juvenile of the Malkarini from New Zealand - CJW, present of R. R. FORSTER - is conspecific with a pair of adults from the same locality we probably will know the direction of evolution: The juvenile has the complete mimetid leg bristles I-II but in the adults are the short bristles absent/lost. This may well be a case of neotony. On the other hand I found small juvenile fossil Mimetini in Baltic amber in which - in contrast to adults - small mimetid leg bristles are absent, see below: Juvenile Mimetini indet. Also in adult Mimetini the number of the small mimetid leg bristles may be reduced (but one bristle is still present!), see *Palaeoero longitarsus* n. gen. n. sp. below.

Relationships: Malkarinae may well be the sister group of Pararchaeinae + Mimetinae, see the preliminary cladogram and above (Mimetinae).

Tribus: Malkarini and Sternoidini (see below).

Distribution: Australian Region.

Malkarini DAVIES 1980 (sub Araneidae: Malkarinae) (**n. stat.**)

Diagnosis: Tendence to the loss of "mimetid leg bristles", (position of the paracymbium

retrobasally). See also the diagnosis of the Malkarinae and the preliminary cladogram.

Relationships: In the Sternoidini is the eye region raised, there are sulci of the camargin of the caput, leg bristles are absent and the position of the paracymbium is midectal, see MORAN (1986), PLATNICK & FORSTER (1987).

Distribution: Australian Region.

Sternodini n. nom. & **n. stat.**, pro Sternodidae MORAN 1986.

The name *Sternodes* BUTLER 1929 is praeoccupied - see PLATNICK (1998: 226), Advances in Spider Taxonomy - and was replaced by *Sternoides* PLATNICK 1998. According to the IRZN, art. 39 I introduce here the name Sternoidini **n. nov**. and give it the **n. stat**. of a tribus.

Diagnosis: Raised eye field and paired sulci on the caput's margin present, no leg bristles, mid-ectal position of the paracymbium, see MORAN (1986), PLATNICK & FORSTER (1987).

Relationships: See the Malkarini.

Distribution: Australian Region, South America, see PLATNICK & FORSTER (1987).

THE FOSSIL TAXA (see also Mimetarchaeninae and *Mimetarchaea* above: Mimetini)

A. The taxa in Dominican amber

See the remark on the genus *Mimetus* HENTZ above and below.

?*Mimetus bituberculatus* WUNDERLICH 1988,
?*Mimetus* sp. sensu WUNDERLICH 1988.

B. The taxa in Baltic amber

Key to the tribus

1 Clypeus short (fig. 31); "mimetid leg bristles" I-II present in extant spiders (!) only in the female (figs. 32-33) (fossil male unknown), ♀-tibia I bent and ventrally flattened, cross section nearly half a circle, embolus in extant spiders short. - Only *Praeoarces*. . . . . ***Oarcini***

- clypeus usually long in the fossils (figs. 16, 22); "mimetid leg bristles" I-II present in both sexes (figs. 1, 17, 24-26), cross section of tibia I circular in both sexes, ♀-tibia I straight, embolus long (figs. 7, 12). - ?*Mimetus, Palaeoero* and *Succinero*. . . . . ***Mimetini***

1. Mimetini

Key to the genera

Compare the indet. spiders below.

1 Femur I retrolaterally in the basal half with a row of short (?stridulating) bristles (fig.14) which are basally distinctly bent in the basal part of the femur. Patella of the ♂-pedipalpus dorsally-distally in the fossils with more than one long bristle (fig.18). . . . . ?**Mimetus**

- No such row of short femoral bristles. Patella of the ♂-pedipalpus dorsally-distally with one long bristle only (figs. 8, 28). 2

2(1) Tarsus I distinctly longer than metatarsus I, fig. 25, articles II equal in length. Femur I bears only one dorsal bristle (and apicals). Tibia and metatarsus I-II: Usually only 1 short bristle between the long prolateral bristles (fig.24), very short articles of the ♂-pedipalpus (figs. 28) . Photo 246 . . . . . **Palaeoero**

- All tarsi distinctly shorter than the metatarsi. Femur I bears a row of long prolateral bristles (and apicals). Tibia and metatarsus I-II: 2->10 short bristles between the long prolateral bristles (figs.1,17). Photos 243-245 . . . . . **Succinero**

The following taxa have been described in Baltic amber:

Succinero (= Ero) setulosa (KOCH & BERENDT 1854) (n. comb.),
Succinero (= Ero) aberrans (PETRUNKEVITCH 1958) (n. comb.),
Succinero (= Ero) carboneana (PETRUNKEVITCH 1942) (n. comb.),
Succinero (= Ero) permunda (PETRUNKEVITCH 1942) (n. comb.),
?Mimetus (= Mimetarchaea) gintaras (ESKOV 1992) (quest. n. comb., see above).

I regard the species which were described sub *Ero* as members of *Succinero* n. gen.; I never found a member of the genus *Ero* C. L. KOCH in Baltic amber.

Ero sphaerica KOCH & BERENDT 1854: According to the original description - e. g. to the leg bristles - this species is not a member of the Mimetidae.

Nomina nuda (no diagnosic characters):
Ero coronata MENGE in KOCH & BERENDT 1854,
Ero exulpta MENGE in KOCH & BERENDT 1854,
Ero quadripunctata MENGE in KOCH & BERENDT 1854,
Corynitis MENGE in KOCH & BERENDT 1854 is probably an older synonym of *Succinero* or *Mimetus*. The descriptions of *Corynitis* and its two fossil species in Baltic amber - *C. spinosa* MENGE in KOCH & BERENDT 1854 and *C. undulata* MENGE in KOCH & BERENDT 1854 - are very short and insufficient, and therefore I regard these taxa as nomina nuda.

***Succinero* n. gen.**

Diagnosis: Prosoma not distinctly raised/convex (fig. 9), tibia of the ♂-pedipalpus with apophyses (fig.11), cymbium retrolaterally with long bristle-shaped hairs in a row (figs.5, 8,11); an epigynal scapus is probably present (figs. 29-30) (cheliceral stridulating ridges are absent).

Relationships: In the extant genus *Ero* C. L. KOCH 1837 bear the chelicerae lateral stridulating ridges (in all species?), the prosoma is high and strongly convex, the opisthosoma bears usually humps, strong cymbial bristles are absent. In *Mimetus* HENTZ 1832 bears the femur I in both sexes retrolaterally short (?stridulating) bristles (fig. 14) and the patella of the ♂-pedipalpus bears usually more than one long bristle (fig. 15). In *Palaeoero* n. gen. is tarsus I longer than metatarsus I and the "mimetid leg bristles" are different.

Type species: *Ero carboneana* PETRUNKEVITCH 1942 (fig. 5).

Distribution: Tertiary Baltic amber forest, Ukrainean amber from Rovno.

Succinero setulosa (KOCH & BERENDT 1854) (**n. comb**.)

Material in Baltic amber: 1♂1♀ Paleontological Museum of the Humboldt University Berlin, Nr. MB. A 166, type material?.

The couple of spiders - MB. A 166, probably not type material - are not members of the family Mimetidae: The male is a member of the family Araneidae, the female is probably a member of the genus *Acrometa* PETRUNKEVITCH (Synotaxidae).

Distribution: Tertiary Baltic amber forest.

Succinero aberrans (PETRUNKEVITCH 1958) (**n. comb**.) (figs.3-4a)

In this species is the clypeus relatively high; ♂-pedipalpus: Figs. 3-4a.

Distribution: Tertiary Baltic amber forest.

Succinero carboneana (PETRUNKEVITCH 1958) (**n. comb**.) (fig. 5) Photo 243

In this species bears the cymbium a long and erect dorsal apophysis which may be part of the paracymbium, fig. 5, F513/BB/CJW.

Distribution: Tertiary Baltic amber forest.

Succinero permunda (PETRUNKEVITCH 1942) (**n. comb**.) (figs. 6-8)

Material: 1 ♂ F366/BB/AR/MIM/CJW.

This species has a large complicated but not outstanding paracymbium (figs. 6-8). The male sensu PETRUNKEVITCH (1958) sub *permunda* (fig. 7) may be not conspecific.

Distribution: Tertiary Baltic amber forest.

Succinero sp. indet. (figs. 9-11) Photo 245

Material: 1 ♂ in Baltic amber and a separated amber piece, F359/BB/AR/MIM/CJW.

Measurements (in mm): Body length 3.5, prosoma: Length 2.0, width 1.65, metatarsus I > 3.5, tarsus I > 2.0. Prosoma fig. 9, cheliceral peg teeth long and slender, legs long and slender, with typical mimetid bristles, pedipalpus (figs. 10-11) similar to or identical with *permunda*.

Distribution: Tertiary Baltic amber forest.

Mimetus HENTZ 1832

Diagnosis: Femur I retrobasally with a row of short (?stridulating) bristles (fig. 14), chelicerae longer than the hight of the prosoma. ♂-pedipalpus: Patella - at least in the fossils - with more than 1 long bristle (fig.18); after SHEAR (1981) at least in *Mimetus puritanus* CHAMBERLIN (extant, USA) is the subtegulum small, the terminal apophysis is complicated, the embolus is long and there is an additional conductor, see figs. 15, 20.

Relationships: Probably *Mimetus* has to split up, see BRIGNOLI (1979) and compare the male pedipalpus of the extant "*Mimetus" rapax* O. PICKARD-CAMBRIDGE 1899 (Central America) and the extant "*Mimetus" maculosus* RAINBOW 1904 (Australia).

Distribution: Extant nearly cosmopolitical, fossil: Tertiary Baltic and Dominican amber forests.

?***Mimetus longipes*** **n.sp.** (figs. 13-15)

Material: Holotypus ♂ in Baltic amber, F362/BB/AR/MIM/CJW.

Preservation and syninclusions: The spider is well and completely preserved, ventrally there is a weak emulsion, the dorsal view is partly hidden by amber layers. - Few stellate hairs, numerous bristles, a Nematocera and some threads are present beneath the spider.

Diagnosis (♂; ♀ unknown): Legs very long, tibia I 3.1mm. ♂-pedipalpus: Fig. 15.

Description (♂):
Measurements (in mm): Body length 4.1, prosoma length about 2.3, hight about the chelicerae 0.5, length of the chelicerae 0.85; leg I: Femur 3.4, patella 1.0, tibia 3.1, metatarsus 3.2, tarsus 1.3, tibia IV 2.1.
Colour yellow- to medium brown (the legs).
Prosoma low, similar to fig. 16 but chelicerae longer and anterior cheliceral margin with longer bristles (fig. 13). - Legs long, bristles similar to *M. brevipes* n. sp.: Femur I dorsally 5/7 + apical bristles and retrobasally a row of stort bristle (fig. 14), tarsi short. - Opisthosoma ovally, weakly covered with hairs of medium length. Anterior spinnerets thick, colulus large. - Pedipalpus (fig. 15): Patella with a dorsal outgrowth which bears three long bristles, tibia long and with numerous long hairs and bristles, cymbium most probably without outgrowth, paracymbium wide, ?terminal apophysis sickle-shaped, embolus strongly bent.

Relationships: ?*M. brevipes* n.sp. is smaller, the legs are distinctly shorter, the number of cheliceral peg teeth is lower, the tibia of the pedipalpus is relatively longer and more slender.

Distribution: Tertiary Baltic amber forest.

?***Mimetus brevipes*** **n.sp.** (figs. 16-18)

Material: Holotypus in Baltic amber and two separated amber pieces, present of P. C. VOIGT in Hamburg, collection of the Geological-Paleontological Institute of the University Hamburg.

Preservation and syninclusions: The spider is well and nearly completely preserved, only the right tarsus I and the end of the rigth metatarsus I are cut off, ventrally and laterally there is a weak emulsion, the frontal and dorsal view is partly hidden by amber layers and bubbles. - Few stellate hairs are also preserved and two Nematocera in the larger one of the separated amber pieces.

Diagnosis (♂; ♀ unknown): Legs short, tibia I 2.1mm long. ♂-pedipalpus (fig. 18): Tibia long and slender, bulbus relatively small but tegulum large.

Description (♂):
Measurements (in mm): Body length 2.85, prosoma: Length about 1.45, width 1.3, hight above the chelicerae 0.6, length of the chelicerae 0.65; leg I: Femur 2.5, patella 0.8, tibia 2.1, metatarsus 1.95, tarsus about 0.9, tibia IV about 1.5.
Colour: Prosoma and legs brown, Oopisthosoma yellow.
Prosoma (fig. 16) low, with few long hairs. 8 large eyes, posterior row procurved, anterior median eyes the largest and slightly protuding. Basal articles of the chelicerae longer than the hight of the prosoma, anterior cheliceral margin with some slender "peg teeth".

Labium and gnathocoxae are covered by a white emulsion. - Legs of medium length, order I/II/IV/III, I and II distinctly longer than III and IV. Femur IV retrobasally with a row of short bristles similar to fig. 14. Numerous long bristles, femur I 5 dorsally and 3 short apically, patellae 2 dorsally, tibia I and II dorsally and laterally about 10, metatarsus I prolaterally 4 long bristles and usually 4 short bristles between the long ones (fig. 17). - Opisthosoma ovally, dorsally weakly covered with short hairs. - Pedipalpus (fig. 18) with a long femur, see above.

Relationships: See *M. longipes* n.sp.

Distribution: Tertiary Baltic amber forest.

***Palaeoero* n.gen.**

Diagnosis (♂;♀ unknown): Usually only one dorsal bristle between the long prolateral bristles on tibia and metatarsus I-II (fig.24). Tarsus I distinctly longer than metatarsus I (fig. 24). Pedipalpus (figs. 27-28): Tibia and patella very short, cymbium with a large and tripartite paracymbium, embolus long.

Relationships: In the other genera of the Mimetini is tarsus I shorter than metatarsus I and usually there are two or more short "mimetid leg bristles". In contrast to *Ero* C. L. KOCH are furthermore lateral cheliceral stridulating ridges absent, in contrast to *Mimetus* HENTZ are short bristles of femur I absent, in contrast to *Succinero* there are no cymbial bristle-shaped hairs in a row and the pedipalpal articles are shorter.

Type species: *Palaeoero longitarsus* n. sp. (the only known species).

Distribution: Tertiary Baltic amber forest.

***Palaeoero longitarsus* n.gen.n.sp.** (figs. 22-28) Photo 246

Material: Holotype ♂ in Baltic amber and a separated amber piece, coll. F. KERN-EGGER in Hamburg no. 2/91.

Preservation and syninclusions: The spider is completely preserved in a yellow amber piece, the left side is partly covered by a white emulsion. - On its right is a small Nematocera preserved, in the separated amber piece 2 small pieces of excrement; some detritus particles and stellate hairs.

Diagnosis: See above.

Description (♂):
Measurements (in mm): Body length 2.1, prosoma length 1.0; leg I: Femur 1.5, patella 0.46, tibia 1.3, metatarsus 0.7 (!), tarsus 1.3, leg II: Tibia 1.0, metatarsus 0.8, tarsus 0.8, tibia III 0.68, leg IV: Tibia 0.9, metatarsus 0.75, tarsus 0.5.
Colour yellow brown.
Prosoma (fig. 22) - it is ventrally covered by an emulsion - weakly covered with hairs of medium length, short and high, clypeus distinctly longer than the field of the median eyes, about as long as the basal articles of the chelicerae. 8 large eyes, anterior medians distinctly the largest and slightly protuding, posterior row procurved, posterior median eyes separated by its diameter. Basal articles of the chelicerae slender, basally fused, "peg teeth" not observable. - Legs (figs. 23-26) of medium length, III and IV distinctly shorter than I and II. Tarsus I with numerous long hairs, 1.85 times longer than metatarsus I, tarsus and metatarsus equal in length. Numerous long bristles, femora with short apical bristles and a long dorsal one in the middle. Typical "mimetid bristles" on tibia I-II (except basally) and on metatarsus I-II in the basal 2/3; mostly only one short bristle between the long bristles, rarely two. All metatarsi bear a trichobothrium near the end of the article (fig. 24). - Opisthosoma ovally, dorsally sparsely covered with long hairs. - ♂-pedipalpus (figs. 27-28) (see also above): Patella nearly spherical, with a retrodorsal bristle, tibia also short, with at least 2 trichobothria, cymbium of medium length, dorsally with long hairs in an irregular position, paracymbium tripartite.

Relationships and distribution: See above.

Mimetini sp. indet. 1 (fig. 29)

Material: 1 ♀ in Baltia amber, Muzeum Ziemi in Warsaw no. 1927/6.

Preservation and syninclusions: The spider is completely preserved, the left side is covered by a white emulsion. - Also preserved are two small Nematocera, some excrement pieces, detritus particles, stellate hairs and two small parts of a spider's capture web which is partly in contact with the spider.

Short description (♀; ♂ unknown): Measurements (in mm): Body length about 3.0, femur I nearly 3.0, length of the distal bristle of patella IV 0.6. - Prosoma low. Legs similar to Mimetini sp. indet. 2 but femora with only one dorsal bristle and leg bristles shorter. Opisthosoma slightly longer than wide, sparsely covered with longer hairs, humps absent. Epigyne (fig. 29) with a slightly outstanding scapus which is distally quite narrow.

Relationships: I don't want to exclude that the spider is a member of the genus *Succinero* n. gen. In the Mimetini indet. 2 is the scapus distinctly larger and more outstanding, the leg bristles are shorter.

Distribution: Tertiary Baltic amber forest.

Mimetini sp. indet. 2 (fig. 30)

Material: 1 ♀ in Baltic amber, Zoological Museum of the University Copenhagen, coll. v. HENNINGSEN no. 26-2/1965.

Preservation and syninclusions: The spider is preserved in a small redbrown amber piece. The left margin of the opisthosoma and most parts of the left legs are cut off. - Mainly beneath the spider's body are thick, loose and coarse threads preserved (fig. 30) which probably were an outer part of an egg sac.

Short description (♀,♂ unknown): Measurements (in mm): Body length 3.5, prosoma length 1.7, femur II 3.1, length of the distal bristle on patella IV 1.0. - Prosoma (fig. 30) long and low. Legs: Femora I-II with one dorsal bristle in the basal half, femur IV with two bristles in the distal half. Short retrobasal bristles on femur I are absent, metatarsus I bears numerous (4-10) short prolateral bristles between the long bristles. Opisthosoma (fig. 30) slightly longer than wide, humps are absent. Epigyne (fig. 30) with a large and outstanding scapus which is bent in a right angle.

Relationships: I don't want to exclude that this is a member of the genus *Succinero* n. gen.; see also Mimetini indet. 1.

Distribution: Tertiary Baltic amber forest..

Mimetini sp. indet. 3 (photo) Photo 242

Material: juv. ♀ in Baltic amber, F363/BB/AR/MIM/CJW.

Description (juv. ♀):
Measurements (in mm): Body length 1.4, prosoma length 0.6, leg I: Femur 0.95, patella 0.3, tibia 0.88, metarsus 0.78, tarsus 0.47.
Prosoma fairly convex, hight above the chelicerae equal to the length of the chelicerae which are distinctly fused at their base, similar to fig. 16. Legs long and slender. No femoral bristles, long bristles on patellae, tibiae, metatarsi and basally on the tarsi, 8 long mimetid prolateral bristles on metatarsus I but no short bristles between the long ones. Opisthosoma high, no dorsal humps.

Relationships: The complete absence of small mimetid leg bristles is remarkable and not known from adult Mimetini. In *Palaeoero* n. gen. is only one small mimetid bristle

present between the long bristles. According to CUTLER (1999: Figs. 6-10) appear the short mimetid leg bristles in *Mimetus* in the 3. instar (fig. 10).

Distribution: Tertiary Baltic amber forest.

Mimetini sp. indet. 4

Material: 1 juv. ♀ in Baltic amber, F364/BB/AR/MIM/CJW.

The spider is 1.75mm long. The small mimetid leg bristles on metatarsus I are well developed.

Distribution: Tertiary Baltic amber forest.

2. Oarcini

***Praeoarces* n. gen.**

Diagnosis (♀; ♂ unknown): Clypeus short; see the diagnosis of the Oarcini above.

Relationships: In the extant genera *Oarces* SIMON 1879 and *Gnolus* SIMON 1879 (South America) - in which also a short clypeus and a flattened and curved ♀-tibia I are present - are the chelicerae free and additional retroventral mimetid leg I-II bristles may occur. The natural leg position is unknown, and a male is needed, see above.

Type species (the only known species of the genus): *Praeoarces exitus* n. sp.

Distribution: Tertiary Baltic amber forest.

***Praeoarces exitus* n. sp.** (figs. 31-32)

Material: Holotypus ♀ in Baltic amber, F360/BB/AR/MIM/CJW.

Preservation and syninclusions: The spider is partly well but incompletely preserved: Most parts of the left leg I are wanting, the right part of body and legs including the genital area are covered by a white emulsion. The legs are curved under the body in an unnatural position. - Numerous small bubbles and some stellate hairs are also present in the amber piece.

Diagnosis: See above; the genital area is hidden.

Description (♀):
Measurements (in mm): Body length 2.7, prosoma length 1.1, leg II: Femur 1.6, tibia 1.15, metatarsus 1.2, tarsus partly hidden, clearly shorter than the metatarsus (also tarsus I is distinctly shorter than metatarsus I).
Colour: Prosoma and legs medium brown, opisthosoma yellow brown.
Prosoma (fig. 31) - most parts are hidden - with a short clypeus and a wide eye field, posterior median eyes closely together, widely separated from the lateral eyes. Chelicerae distinctly longer than the hight of the prosoma, basal area fused, apically with long "peg teeth". - The legs are robust and curved under the body in an unnatural position which is not laterigrade. The hairs are short, the bristles of the two anterior pairs have the typical "mimetid bristles" on tibiae and metatarsi, tibia I ventrally distinctly flattened with the cross section nearly half a circle (fig. 32), tibia II slightly flattened, tibia I curved, patellar bristles hair-shaped, femora with few bristles, I with 1 prolaterally in the middle and few short ones apically. - Opisthosoma long ovally, covered with very short hairs, vertically increasing above the small spinnerets. Genital area and epigaster are hidden by a white emulsion. - According to the proportions of body and legs as well as the partly blunt - used up - long mimetid leg bristles the spider should be adult.

Relationships: A male is needed for a closer study. Because of the possible sexual dimorphism in the anterior legs it would probably be difficult to recognize a congeneric male! - In the living fossil the leg position may have been laterigrade. - See also above.

Distribution: Tertiary Baltic amber forest.

Fossil egg sacs

WUNDERLICH (1986: 46-47, figs. 32, 351) described shortly an egg sac of a spider which has thick, coarse and loose outer threads which are typic in spiders of the superfamily Araneoidea, e. g. Mimetidae but also Theridiidae produce similar cocoons and are much more frequent in Baltic amber than Mimetidae. See the figs. 10-11 of an egg sac of an extant species - *Ero* sp. -, BÜRGIS (1989). See also Mimetini sp. indet. 2 above and fig. 30. See the photos 503, 505

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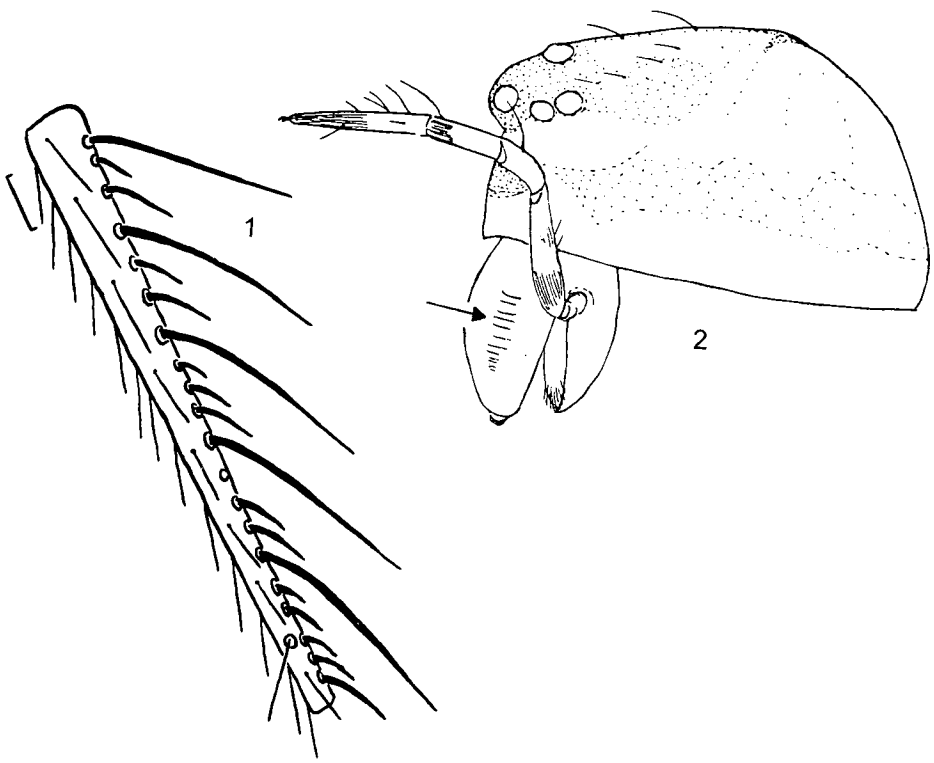
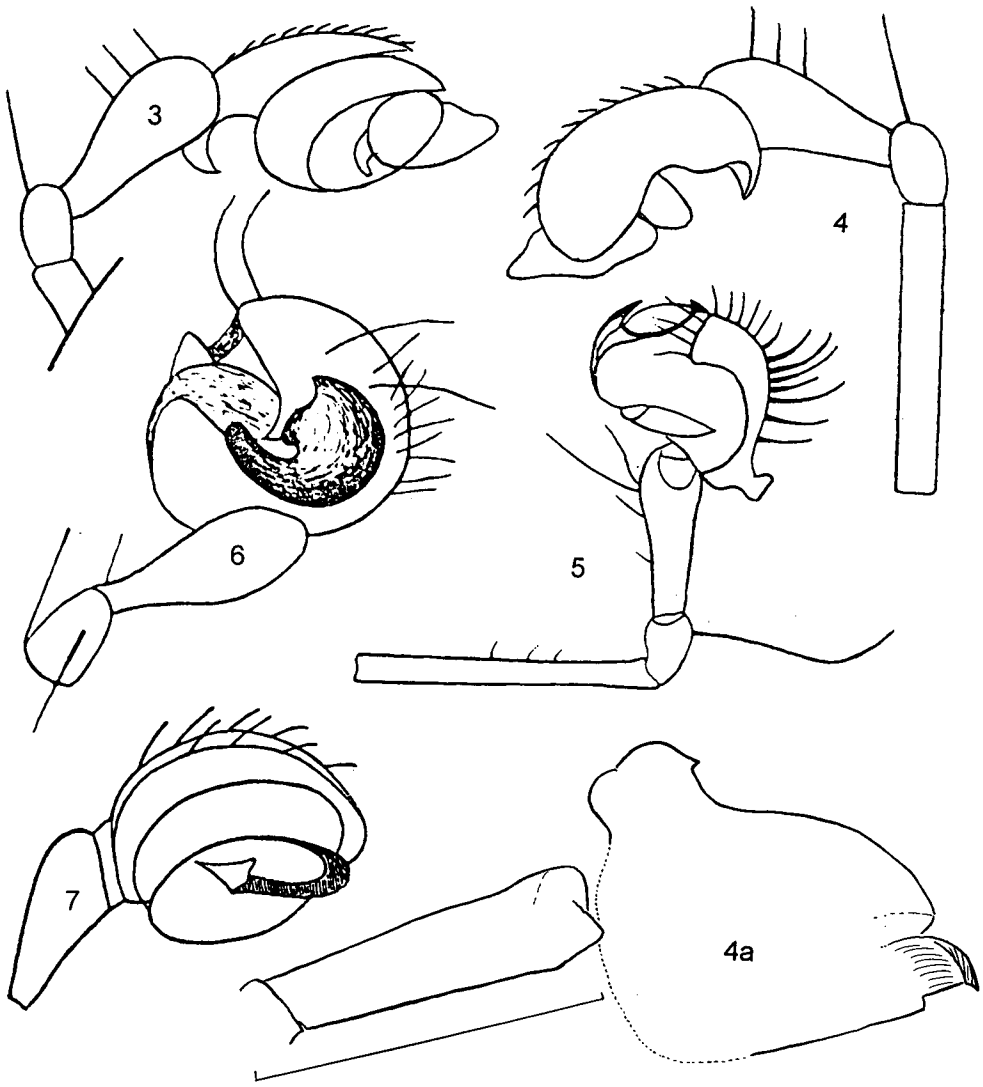


Fig. 1) ***Ero* sp.** (extant, ♀), metatarsus I dorsally;

fig. 2) ***Ero* sp.** (extant, ♀), prosoma laterally, chelicera with lateral stridulating files (arrow); after WIEHLE (1953);



figs. 3-4a: ***Succinero aberrans*** (PETRUNKEVITCH 1958); 3-4) l. ♂-pedipalpus pro- and retrolaterally; taken from PETRUNKEVITCH (1958: Figs. 372-373); 4a) outline of the r. pedipalpus retrolaterally; M = 0.5;

fig. 5) ***Succinero carboneana*** (PETRUNKEVITCH 1942), l. ♂-pedipalpus retrolaterally; taken from PETRUNKEVITCH (1942: Fig. 111);

fig. 6) ***Succinero permunda*** (PETRUNKEVITCH 1942), holotypus ♂, l. pedipalpus dorsally; taken from PETRUNKEVITCH (1942: Fig. 93);

fig. 7) ***Succinero permunda*** sensu PETRUNKEVITCH 1958, ♂, l. pedipalpus proventrally; taken from PETRUNKEVITCH (1958: Fig. 365);

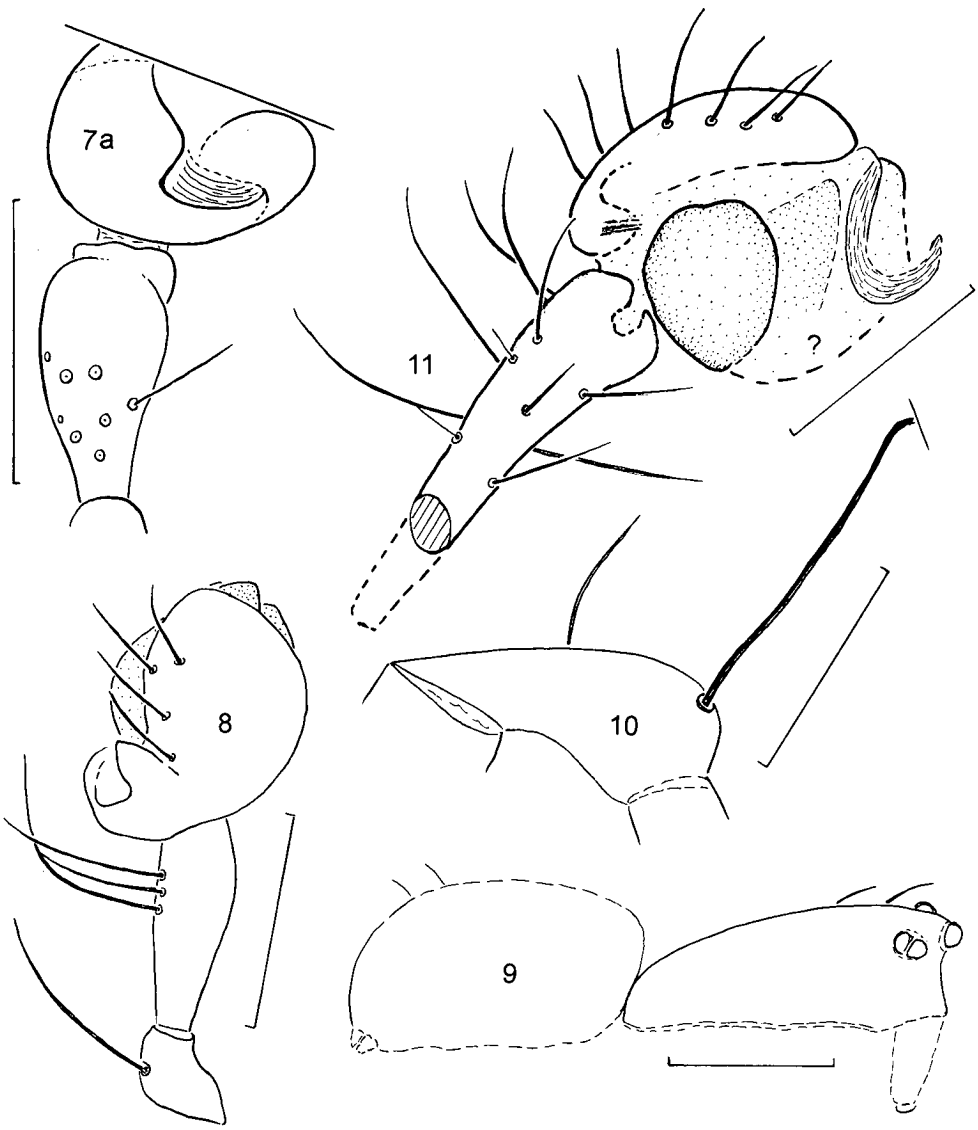


fig. 7a) ***Succinero permunda*** (PETRUNKEVITCH 1958), ♂, holotypus, tibia and paracymbium of the r. pedipalpus dorsally; M = 0.5;

fig. 8) ***Succinero ?permunda***, ♂ (F366/BB/AR/MIM/CJW), l. pedipalpus prodorsally; M = 0.5mm;

figs. 9-11: ***Succinero* sp. indet.**, ♂ (F359/BB/AR/MIM/CJW); 9) body laterally; 10) patella of the l. pedipalpus prolaterally; 11) r. pedipalpus retrolaterally (bristles of the cymbium are not drawn); M = 1.0, 0.2 and 0.5mm;

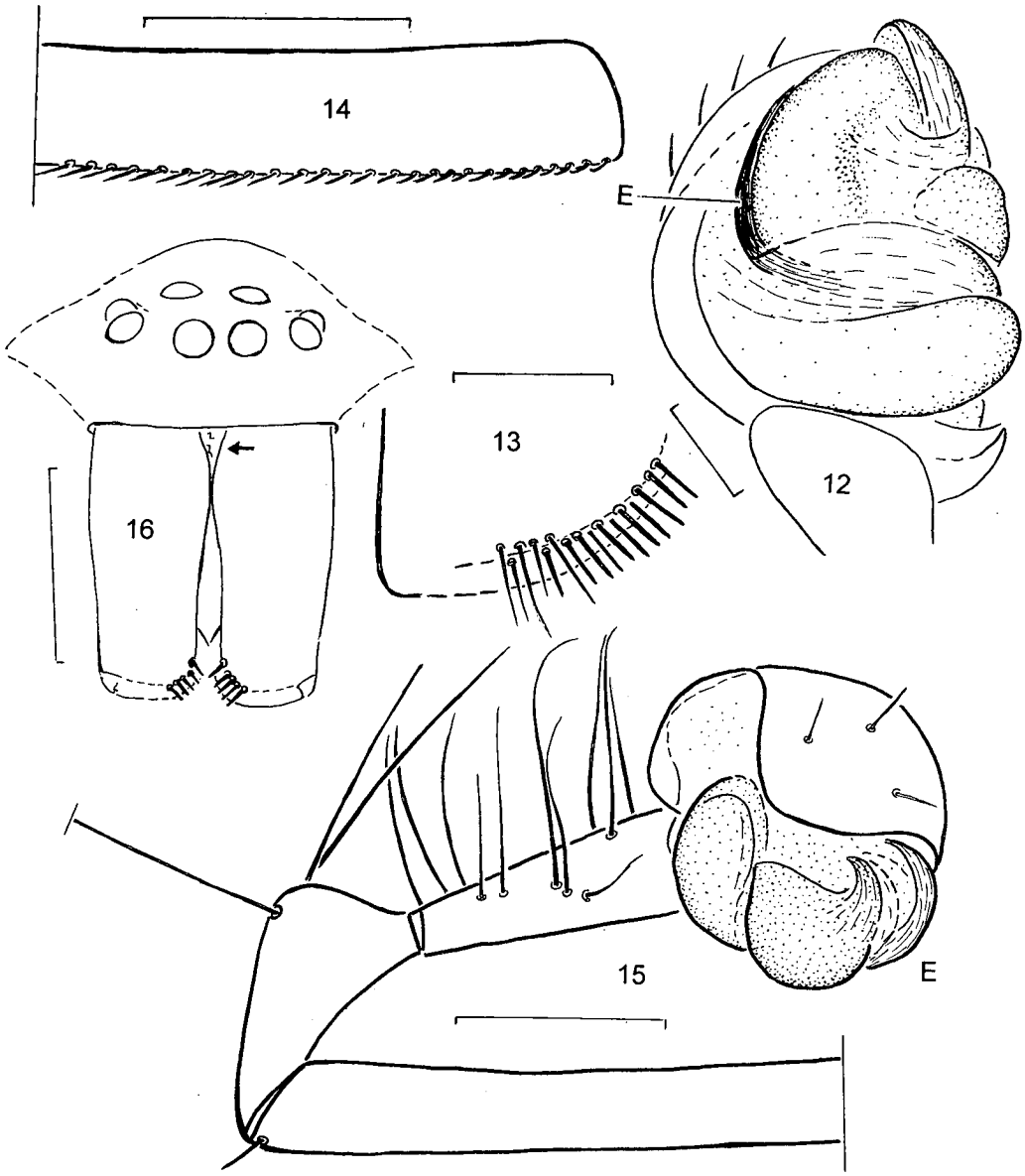
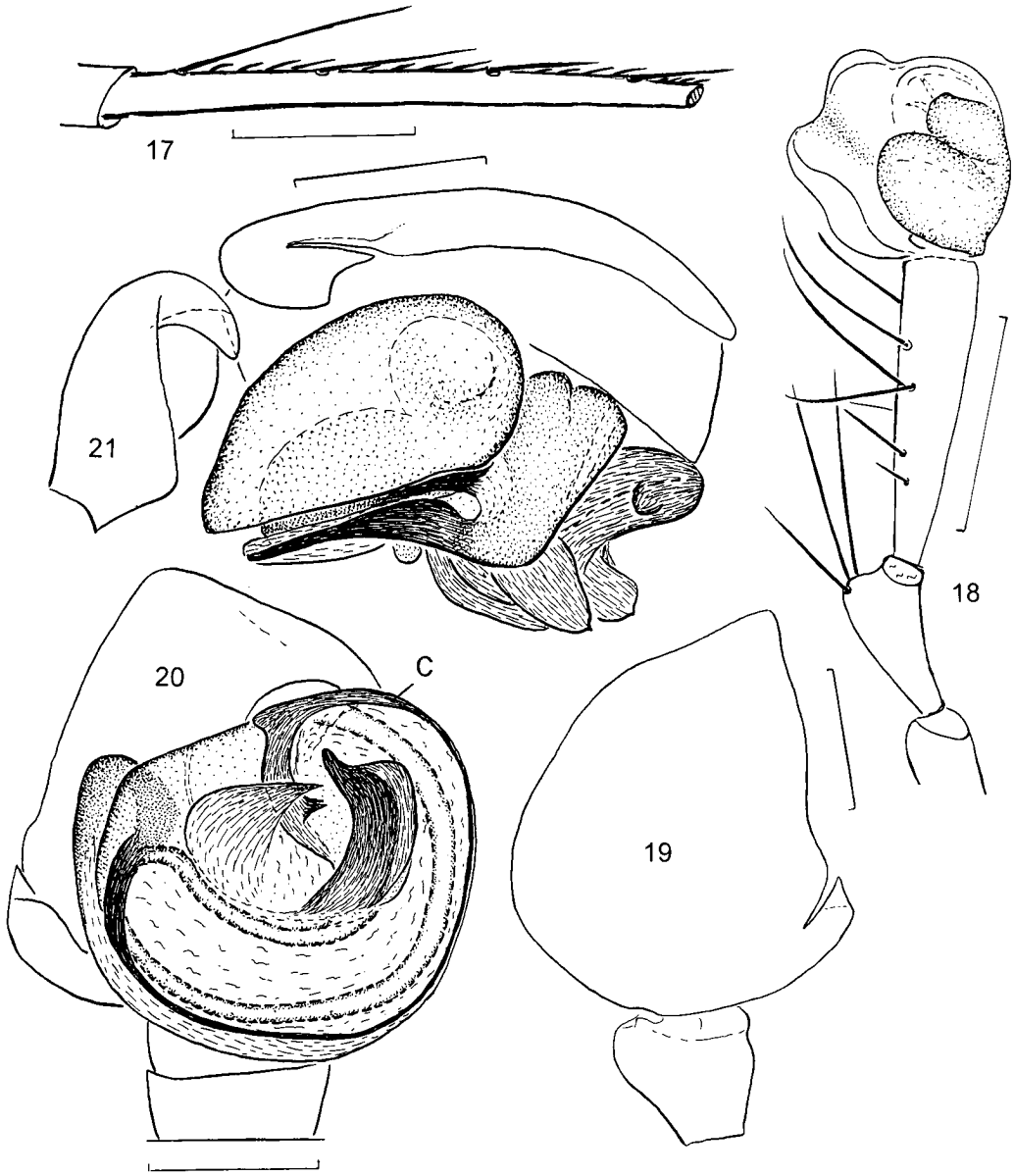


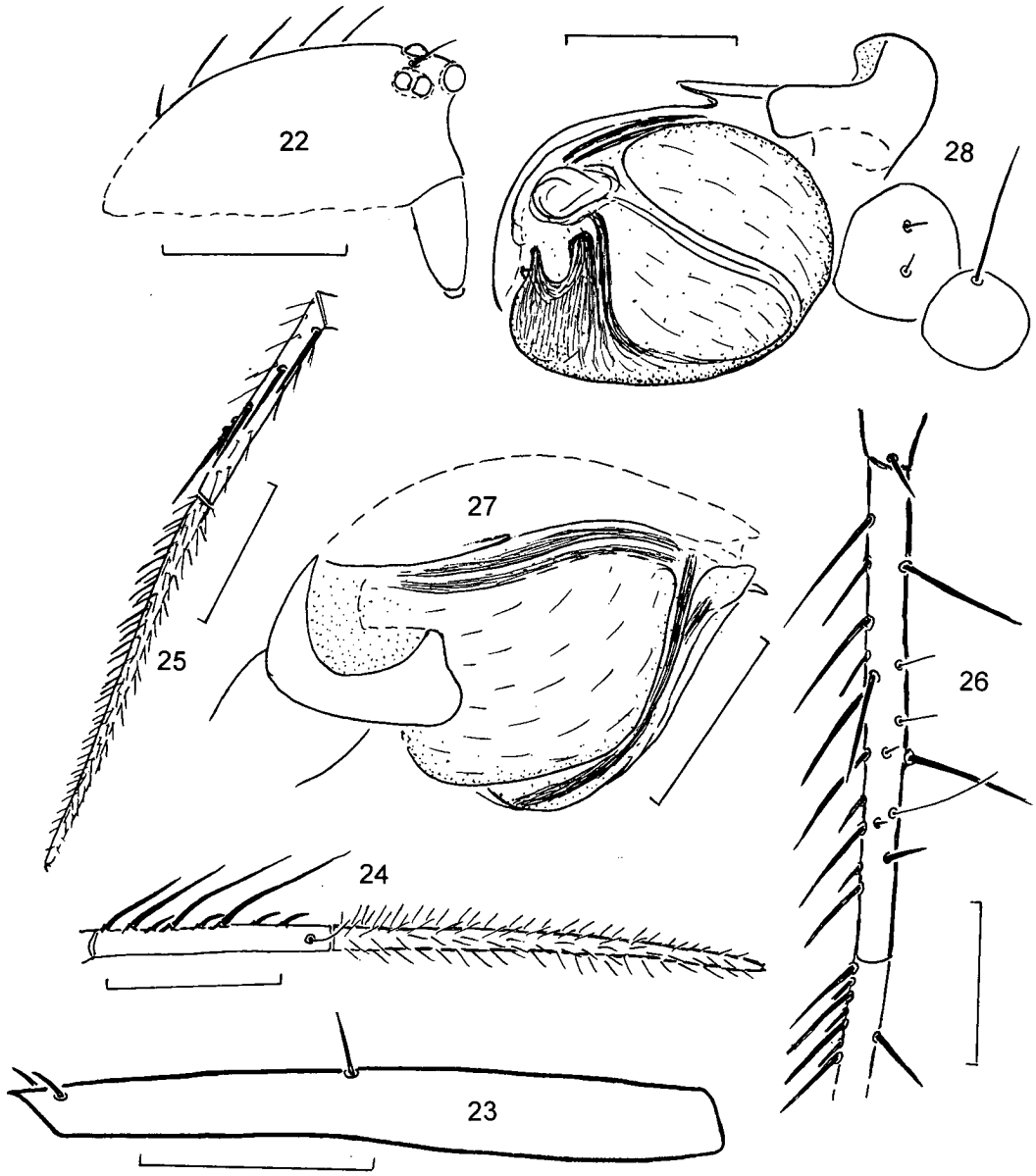
fig. 12) ?***Succinero* sp.**, ♂ (F365/BB/AR/MIM/CJW), l. pedipalpus ventrally and slightly probasally; the basal part of the embolus (E) is covered by a bubble; M = 0.2mm;

figs. 13-15: ?***Mimetus longipes* n.sp.**, ♂; 13) r. chelicera with peg teeth frontally; 14) basal part of r. femur I retrolaterally with the row of short bristles; 15) r. pedipalpus retrolaterally; E ?= embolus; M = 0.2, 1.0 and 0.5mm;



figs. 16-18: ?***Mimetus brevipes*** **n.gen.n.sp.**, ♂; 16) prosoma frontally with the basally fused chelicerae (arrow); 17) r. metatarsus I retrolaterally (apically cutted); 18) r. pedipalpus retrolaterally with the tarsus slightly twisted; M = 0.5, 1.0 and 0.5mm;

figs. 19-21: "***Mimetus" rapax*** O. PICKARD-CAMBRIDGE 1899 (extant, America), ♂, r. pedipalpus dorsally, ventrally and retrolaterally; C = conductor; M = 0.2mm;



figs. 22-28: ***Palaeoero longitarsus*** **n.gen.n.sp.**, ♂; 22) prosoma laterally; 23) l. femur I prolaterally with bristles (hairs not drawn); 24-25) r. metatarsus and tarsus I dorsally and prolaterally; 26) l. tibia I dorsally and basal part of the metatarsus dorsally-basally (hairs not drawn); 27) r. pedipalpus retrolaterally; 28) l. pedipalpus retroventrally; M = 0.5mm in figs.22-26, 0.2mm in figs. 27-28;

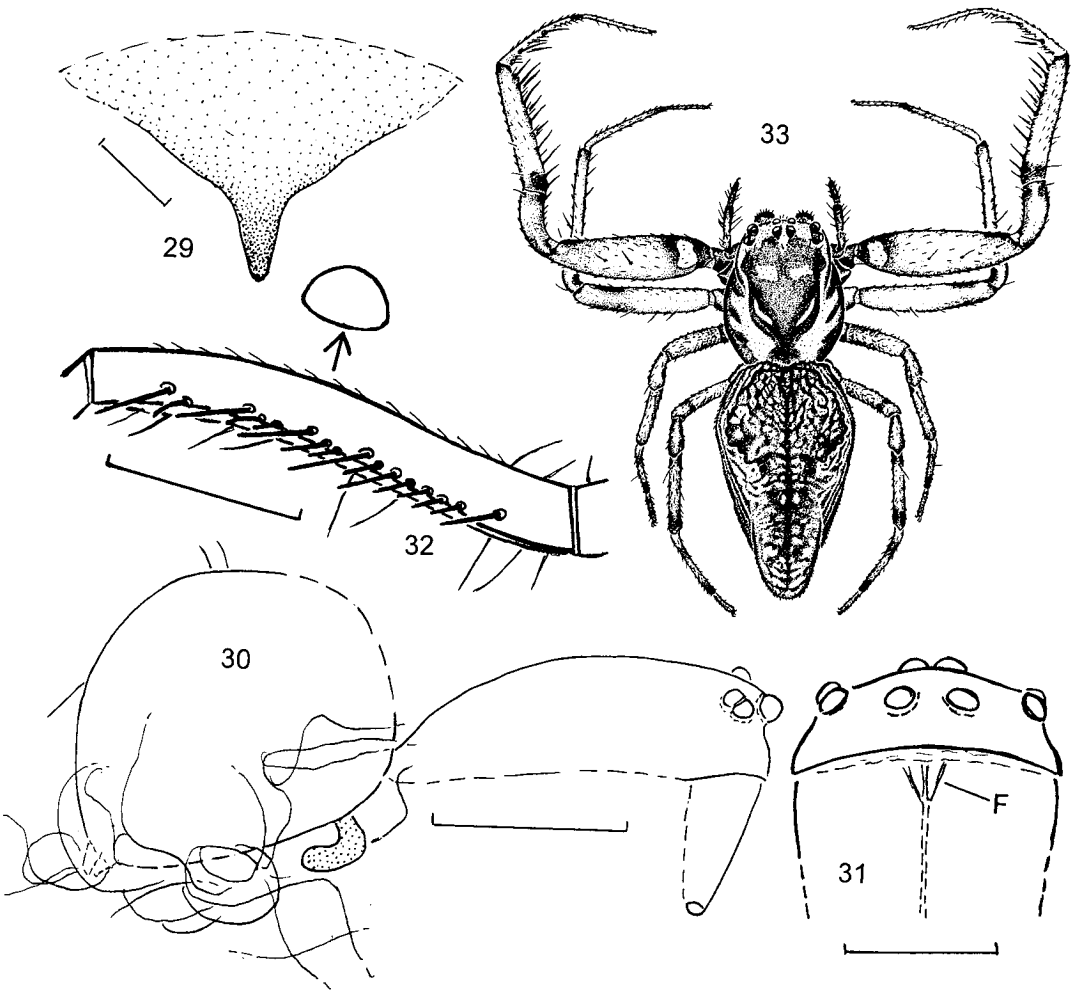


fig. 29) **Mimetini sp. indet. 1**, fossil ♀ in Baltic amber, epigyne ventrally; M = 0.1mm;

fig. 30) **Mimetini sp. indet. 2**, fossil ♀ in Baltic amber, body with the scapus of the epigyne (punctated) and some thick, coarse and loose threads - only few are drawn - which probably wer an outer part of an egg sac; M = 1.0.

figs. 31-32: ***Praeoarces exitus* n. gen. n. sp.**, ♀; 31) dorsal part of the prosoma frontal and slightly ventral view (F = fused basal area of the chelicerae); 32) r. tibia I prolateral-basal and slightly ventral view; the cross section is shown above the tibia; only few hairs are drawn; M = 0.5;

fig. 33) ***Oarces reticulatus*** (NICOLET 1849), extant, Chile, ♀, dorsal view of the body. Taken from PLATNICK & SHADAB (1993: Fig. 54);

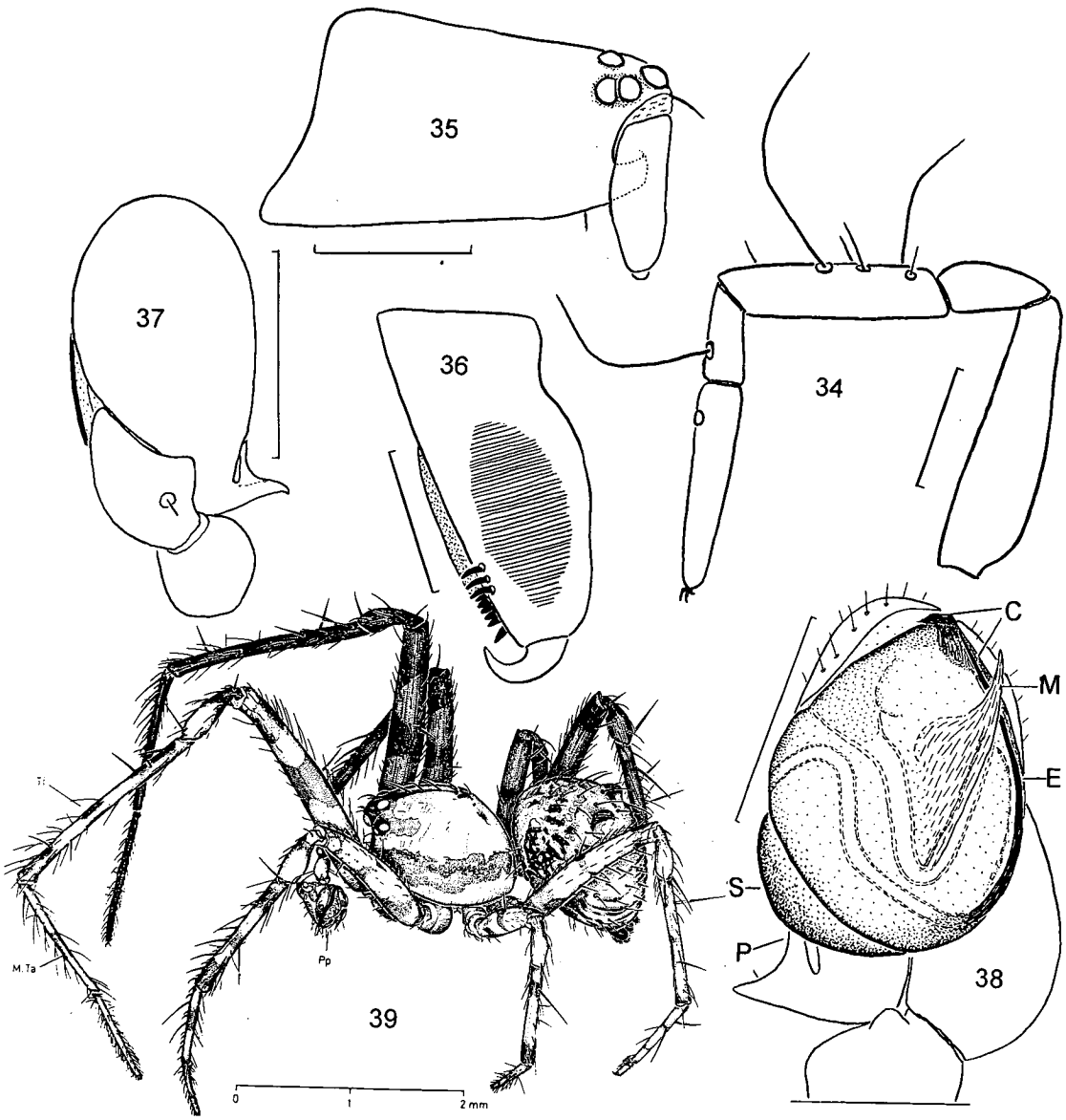


fig. 34) ***Pararchaea* sp.**, extant, Tasmania, ♀, l. leg I retrolaterally;

figs. 35-38: ***Pararchaea bryophila*** HICKMAN 1955, extant, Tasmania, ♂; 35) prosoma laterally; 36) r. chelicera prolaterally with "peg teeth", lamella (punctated) and stridulating ridges; 37-38) r. pedipalpus dorsally and ventrally; M = 0.2mm in fig. 35, 0.1 in the remaining figs.; C = conductor, E = embolus, M = median apophysis, P = paracymbium, S = subtegulum;

fig. 39) ***Ero furcata*** (VILLERS 1789), extant, Germany, ♂, body laterally; taken from BÜRGIS (1989: Fig. 2).

BEITR. ARANEOL., 3 (2004)

DESCRIPTIONS OF THE FIRST FOSSIL SPIDERS (ARANEAE) OF THE FAMILY PIMOIDAE IN BALTIC AMBER

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ABSTRACT: The first fossil species of the family Pimoidae (Araneae) are described from Baltic amber: *Pimoa expandens* **n.sp.**, *P. hormigai* **n.sp.**, *P. inopinata* **n.sp.**, *P. liedtkei* **n.sp.**, *P. lingua* **n.sp.** and *P. multicuspuli* **n.sp.**. *Memoratrix* PETRUNKEVITCH 1942 is regarded as a dubious genus (Pimoidae or Linyphiidae) and a possible senior synonym of *Pimoa* CHAMBERLIN & IVIE 1943. The origin of the families Pimoidae and Linyphiidae is assumed in the Northern hemisphere.

CJW = collection of JOERG WUNDERLICH.

INTRODUCTION

The family Pimoidae WUNDERLICH 1986 was described just 18 years ago as a subfamily of the Linyphiidae and as the primitive sister group of (all other) Linyphiidae, compare WUNDERLICH (1986: 119). HORMIGA (1993, 1994) regarded the Pimoidae as a family of its own, and I agree with this author. - I introduce here the German family name „Ur-Baldachinspinnen" for the Pimoidae. - As in the Linyphiidae the autotomy occurs in Pimoidae between patella and tibia (fig. 13). Primitive characters of the Pimoidae are e. g. the high number of leg bristles (figs.6,12,23), probably the thick cheliceral teeth (slender in Linyphiidae) and a paracymbium which is fused to the cymbium (figs. 3-5, 10) (in Linyphiidae it is usually a free sclerite). Derived characters of the Linyphiidae are the presence of a lamella characteristica and a terminal apophysis which are absent in the Pimoidae. Lateral stridulating files occur at least in the male but are not observable or absent in the known fossils of the Pimoidae.

Extant members of the family Pimoidae are relicts which are known from special Holarctic regions and are absent in the tropics; two species occur in the South of Europe. Only one genus – *Pimoa* CHAMBERLIN & IVIE 1936 – is known. Most spiders live in mountain areas, e.g. in the Alps, the Himalya Mountains and Western North America (e.g. in the Red Wood). „The Himalayas and the Alps are relatively new formations, dating from the Tertiary, and have been suggested as refugia during the Pleistocene climate changes." Compare HORMIGA (1994: 18). – In the amber piece with *Pimoa multicuspuli* n.sp. a member of the insect order Caddis flies (Trichoptera) is preserved; so *multicuspuli* - as the other *Pimoa* species? - perhaps did live near a brook in a mountain area but most probably not in a tropic or subtropic lowland region. From the tropic Dominican amber Pimoidae are unknown.

Pimoidae is exclusively known from the Northern hemisphere and by far most taxa of its sister group – Linyphiidae – are also known from the Northern hemisphere. In the Early Tertiary both families occurred in the Baltic amber forest within the Northern hemisphere; so one can imagine that the ancestor of Pimoidae + Linyphiidae evolved in Euramerica, probably in the Cretaceous period.

Because of its extant distribution and ecology it was not unlikely to discover Pimoidae in Baltic amber. After HORMIGA (1994) extant North American Pimoidae "build relative large sheet webs usually close to the ground...Among the commonest places for webs are fallen tree trunks and hollow stumps;...". The nocturnal spiders prefer shaddow and humid localities, several species are found in caves, some underneath bark, compare the description of *Pimoa inopinata* n.sp.

In contrast to the fossil Linyphiidae Pimoidae are rare in Baltic amber: Up to now only about half a dozen species is known, each species from one specimen only. Also in contrast to Linyphiidae females of fossil Pimoidae are nearly as frequent as males.

TAXONOMY

Taxonomic importance of the Pimoidae fossils; evolution of male genital structures and conclusions

(1) The bulbus-structures in the ca. 50 million years old fossil spiders of the genus Pimoa are as complicated as in the extant spiders of this genus, compare figs. 4, 15 and 26 with 10 and 11. - See the remarks regarding the cymbium below, nos. 2 and 3. - Here we have a large step in time but a small step in the evolution of male spider bulbus structures. Also the epigyne is very similar in extant and fossil spiders. Similar findings are known from extant and fossil Baltic amber spiders from several other spider genera, e.g. *Dipoena* (*Lasaeola*) (Theridiidae), *Mastigusa* (?Dictynidae) and *Apostenus* (Liocranidae), see the book of WUNDERLICH (1986) and the papers on these families in this volume.
(2) I regard the not sclerotized cuspules in the fossil *Pimoa hormigai* (fig. 25) as a plesiomorphic character and the sclerotized denticles in other *Pimoa* species (e. g. figs. 10,14) as derived because they are more specialized.
(3) A membrane of the PCS - character 6 in the paper of HORMIGA - (see the figs. 3-6) is most probably absent in *Pimoa expandens*. According to HORMIGA (1994: 6) - I agree with this opinion - this absence is a plesiomorphic condition in the Pimoidae.
(4) According to HORMIGA (1994) a short scapus of the epigyne and dorsal folds of the scapus are plesiomorph characters within the Pimoidae. But perhaps a long scapus and lateral folds as in the fossil species Pimoa lingua n.sp. (figs. 7-9) are plesiomorph characters of this family. Otherwise a long scapus should have evolved at least two times independently.

Diagnosis of the family Pimoidae: Autotomy – as in the Linyhiidae – between patella and tibia, see fig. 16 (right legs I and II). Lateral cheliceral stridulatory files usually present (not observable or absent in the fossils). ♂: Pedipalpus: Tibia usually distinctly thickened in the distal half and with apical outgrowths (figs. 4, 10), cymbium with a retrolateral sclerite in a position distally of the paracymbium ("pimoid cymbial sclerite", PCS, figs. 3-5,10,25) an additional and usually denticle-bearing - cuspules-bearing in *hormigai* - dorso-ectal process near the PCS („cymbial denticulate process", CDP, figs. 10-11, 25); a special "pimoid embolic-tegular process" (PEP, figs. 4-5, 10-11, 26) arises near the embolus. Median apophysis with a „conductor", see HORMIGA (1994) and figs. 5, 26. – ♀: Epigyne (figs. 7-9): Basal-lateral groves or openings absent; an longitudinally unfolded scapus present which bears a dorsal and a ventral plate-shaped part and lateral to dorsal folds or grooves.

Type genus: *Pimoa* CHAMBERLIN & IVIE 1943. - There are several species-groups; some of these may represent seperate subgenera or even genera.

Relationships: According to the autotomy between patella and tibia, the large number of bristles (in primitive taxa), the lateral cheliceral stridulating files and other characters Pimoidae and Linyphiidae are sister groups. Probably there are also relationships to the Baltsuccinidae n. fam., see the paper on two new fossil spider families of the Araneoidea in this volume. In the Linyphiidae a strong additional retrolateral outgrowth or sclerite of the cymbium, a denticulate dorso-ectal process of the cymbium and lateral folds of the scapus of the epigne are absent, the paracymbium usually is a free sclerite and a suprategulum (embolic division) is present.

The only known genus and its distribution: *Pimoa* CHAMBERLIN & IVIE 1943, extant Holarctic and fossil in Baltic amber (the first fossil record of the family Pimoidae). *Memoratrix* may be a senior synonym of *Pimoa*, see below. The absence of Pimoidae in amber from Bitterfeld may be due to the larger/long-legged spiders of this family which may be only rarely preserved in the usually small Bitterfeld amber pieces, the absence in Dominican amber is because of the tropic character of the Dominican amber forest.

DETERMINATION

Key to the fossil species of the genus *Pimoa:*

Compare especially the shape of the tibia of the ♂-pedipalpus and of the cymbium.

1 Metatarsus I with about a dozen of bristles in the basal and distal half (e.g. fig. 2) (compare also ?*Pimoa* sp. indet., juv. and *Memoratrix* below). 2

- Metatarsus I with with 2 or 6 bristles in the basal half only (e.g. fig. 23). 4

- Number of bristles of metatarsus I unknown, ♂-pedipalpus figs. 27-29. . .***inopinata***

2(1) ♀ (♂ unknown): Epigyne figs. 16-17. . . . . ***liedtkei***

- ♂ (♀ unknown). 3

3(2) Largest known fossil *Pimoa* species, body length 6mm. Outgrowth of the cymbium (CDP) distally wide (figs. 14-15). . . . . ***multicuspuli***

- Body length about 3 1/2mm. Outgrowth of the cymbium (CDP) long and slender (figs. 25-26). . . . . ***hormigai***

4(1) Metatarsus I-II with 2 bristles (fig. 2). ♂ pedipalpus figs. 3-5, ♀ unknown. . . . . ***expandens***

- Metatarsus I-II with 6 bristles (fig. 6). Epigyne figs. 7-9, ♂ unknown . . . ***lingua***

DESCRIPTIONS OF THE FOSSIL TAXA

***Pimoa expandens* n.sp.** (figs. 1-5)

Material: Holotype ♂ in Baltic amber and 2 separated amber pieces, F34/BB/AR/PIM/CJW:

Preservation and syninclusions: The spider is preserved in a yellow amber piece which has been irregularly cut out. Ventrally and on the eyes there is an emulsion. The left legs II-IV and the right leg III are preserved in its whole length, the other legs are partly cut off, the opisthosoma is deformed and cut partly distally. Both pedipalpi are expanded, its structures are beautiful preserved but because of its position a bit hard to observe. - In the larger separated piece the left tarsus I of the holotype is preserved, in the smaller piece a fly (Diptera).

Diagnosis (♂; ♀ unknown): Metatarsus I with 2 lateral bristles in the basal half only (fig.2), bristles on femur IV absent, ♂-pedipalpus (expanded, figs. 3-5): Paracymbium large, simple and fused to the cymbium, distally with long hairs,

embolus of medium length.

Description (♂):
Measurements (in mm): Body length about 2.85, prosoma length 1.3, leg I: femur ca 3.6, patella 0.5, tibia 4.3, metatarsus > 3.2 (the distal part is cut off), tibia II 2.5, tibia III 1.3, tibia IV 1.75.
Colour medium (the legs) to light brown (the body).
Prosoma (fig.1; most parts are hidden) longer than wide, with a deep fovea, and a long clypeus which is not protruding and longer than the field of the median eyes. 8 eyes in 2 rows, posterior row procurved, posterior median eyes separated by more than its diameter. Cheliceral stridulating files not clearly observable and probably absent but trochanter of the pedipalpus with a short prolateral ?stridulating bristle. - Legs (fig.2) long and slender, sequence of its length I/II/IV/III, I distinctly the longest; with numerous thin bristles. Bristles on leg I: Femur 2 prolaterally, patella 2 dorsally, tibia ca 10, metatarsus 2 laterally, tarsus none, femora II-IV none. Position of the metatarsal trichobothrium unknown, tarsal claws small. - Opisthosoma distinctly longer than wide, with few short hairs and short spinnerets. – ♂-pedipalpus (figs. 3-5, see also above; sclerites difficult to interprete): Patella distally with a long dorsal bristle, tibia with some bristle-shaped hairs and some trichobothria, ventral branch of the PEP longer, thinner and more sclerotized than the dorsal branch; PCS complicated and appearantly fused to the cymbium; conductor large, PEP long, embolus difficult to observe.

Relationships: Compare *P. lingua* n.sp. and *P. multicuspuli* n.sp.

Distribution: Tertiary Baltic amber forest.

***Pimoa hormigai* n.sp**. (fig.s 23-26) Photo 247

Derivatio nominis: The species is dedicated to GUSTAVO HORMIGA, who published an important work of the extant members of the family Pimoidae.

Material: Holotypus in Baltic amber, F157/BB/AR/PIM/CJW.

Preservation and syninclusions: The spider is very well preserved and nearly complete, only the right leg II has been lost after the patella by autotomy and the left leg I is cut off near the end of the femur. The eyes are covered by a thin emulsion. - Some thin and dropless threads are preserved near the spider. No other inclusions.

Diagnosis (♂, ♀ unknown): Metatarsus I with a dozen bristles in the basal and

distal half (fig. 23), ♂-pedipalpus (figs. 24-26): Cymbium partly divided longitudinally, with a long and foreward directed outgrowth (CDP) which bears numerous cuspules, embolus thickened.

Description (♂):
Measurements (in mm): Body length 3.5, prosoma: length 1.6, width 1.5, leg I: Femur 4.1, patella 0.8, tibia 4.2, metatarsus 4.9, tarsus 2.0, tibia III 1.6, tibia IV 2.6, femur II 3.1, longest bristle of tibia I 0.1.
Colour: Prosoma dark brown, legs medium brown, opisthosoma covered by a white emulsion.
Prosoma slightly longer than wide, smooth, with a deep fovea, eyes of medium size, posterior row distinctly procurved, posterior medium eyes separated by less than one diameter. Clypeus nearly as long as 1 1/2 diameters of the anterior median eyes. Chelicerae of medium length, robust, teeth hidden, stridulating files very fine (or even absent?). Sternum long as wide, labium distinctly wider than long, most parts of the gnathocoxae hidden. - Legs (fig. 23) long and thin, sequence I/II/IV/III, I distinctly the longest, with numerous thin bristles: Femora I-II usually 4 prolaterally and none to few dorsally, patellae dorsally a short basally and a long distally, tibiae and metatarsi with dorsal, ventral and lateral bristles, I about one dozen. Small tarsal claws. Metatarsal trichobothria short, position of I in 0.11. - Opisthosoma 1.4 times longer than wide, covered with short hairs; spinnerets hidden. - ♂-Pedipalpus (figs. 24-26): Patella and tibia short, each with a thin dorsal bristle, tibia additionally with some strong hairs, paracymbium small, PCS large and complicated, CDP in a distal position, long, excavated retrolaterally, bearing numerous tiny and not sclerotized cuspules, PEP appearantly not divided, median apophysis large, conductor sickle-shaped, embolus of medium length, thickened in the distal half.

Relationships: As in *multicuspuli* n.sp. metatarsus I bears about a dozen bristles. - *Pimoa hormigai* is quite different to all other extant and fossil congeneric species, compare HORMIGA (1991). In contrast to all other known species of the genus *Pimoa* there is a long and foreward directed cymbial outgrowth (CDP) which bears tiny and not sclerotized cuspules. These not sclerotized cuspules may be a primitive feature.

Distribution: Tertiary Baltic amber forest.

Pimoa inopinata n.sp. (figs. 27-29)

Material: Holotypus (♂) in Baltic amber, F215/BB/AR/PIM/CJW.

Preservation and **syninclusions**: After some darkenings the amber piece most probably has been heated in an autoclave. The prosoma of the spider has a dorsal depression, the sternum is deformed, the opisthosoma has a dorsal and a ventral depression, the legs are somewhat compressed laterally, both legs IV are stretched out backwards, body and legs are dorsally and ventrally partly covered by a white emulsion; so most probably the spider has been captured by the fossil resin while dying after a hit or soon after its dead. The left bulbus is expanded. - The first leg pair and the right leg II have been cut off through the femur, parts of the right tarsus and metatarsus I are preserved in front of the left side of the spider. - Some thin web threads and a tiny Acari are also preserved in the amber piece but no stellate hairs.

Diagnosis (♂; ♀ unknown): Number of bristles of metatarsus I unknown. ♂-pedipalpus (figs. 26-29; the bulbus of the left pedipalpus is expanded): Cymbium distally-ventrally deeply excavated and here with denticles.

Description (♂):
Measurements (in mm): Body length 3.1, prosoma length 1.5, length of metatarsus II 1.9, tarsus II 1.2, leg IV: Femur 3.5, patella 0.5, tibia 3.1, metatarsus 2.9, tarsus 1.1.
Colour: Prosoma and legs dark brown, opisthosoma medium brown.
Prosoma (it is strongly deformed) with 8 small eyes in a position similar to *P. hormigai*, clypeus somewhat longer than the field of the median eyes. Two large teeth are observable on the anterior cheliceral margin. - Legs - most parts of legs I are lost - long and slender, with numerous long and thin bristles: Femur I at least 1 prolaterally, other femora none, patellae 2 dorsally, tibia II about 12 dorsally, ventrally and laterally, metatarsus II 6 in the basal half and in the middle. - Opisthosoma 1.7 times longer than wide, covered with hairs of medium length, spinnerets short. - ♂-pedipalpus (figs. 26-29): Tibia short and high, dorsally with a hair-shaped basal and a longer distal bristle. At the stalk of the left PCS a tooth is observable. Only on the left distal cymbial excavity and margin (fig. 28) denticles are observable. Conductor and median apophysis are large, the distal part of the embolus is thin.

Ecology: The amber piece which includes the holotype of *Pimoa inopinata* and some threads of a - ?this - spiders capture web has not been cleared by the sun, and stellate hairs are absent. Therefore I assume that the spider lived underneath the bark of a tree. Probably this tree was one of the "amber pines", *Pinites* sp., which produced the fossil resin which captured the spider.

Relationships: The shape of the cymbium is different in the other fossil *Pimoa* species.

Distribution: Tertiary Baltic amber forest.

***Pimoa lingua* n.sp.** (figs. 6-9)

Material: Holotype ♀ in Baltic amber, F33/BB/AR/PIM/CJW.

Preservation and syninclusions: The spider is fairly well preserved, the prosoma is dorsally well visible and mainly frontally-ventrally covered with an emulsion, the opisthosoma is covered with an emulsion nearly allover, the scapus of the epigyne is free. Caused by autospasy after the patella the right legs II and IV and the left leg IV are lacking. Cut off are the left tibia and patella II, the left patella and tibia I are partly cut off longitudinally in its lengt, the right leg I is cut off at the end of the femur. - Below the spider there are thin threads without droplets preserved; above the spider lies the long part of a thin insect leg and a small plant inclusion (moss?); no stellate hairs.

Diagnosis (♀; ♂ unknown): Metatarsus I with 6 bristles in the basal half (fig. 6), all femura with 1 dorsal bristle, femur IV retrodistally with 1-2 additional bristles, scapus of the epigyne (fig. 7-9) very long.

Description (♀):
Measurements (in mm): Body length 3.4, length of the prosoma 1.5, leg I: Femur 3.3, patella 0.5, tibia 3.3, metatarsus 3.1, tarsus 1.7.
Colour: Prosoma and legs dark brown, opisthosoma light gray.
Prosoma with a distinct fovea. Clypeus concave and protruding, as long as the field of the median eyes. Eyes of medium size, the posterior median ones slightly larger than the frontal ones and separated by its diameter, posterior row straight. Chelicerae without stridulating files, at least 2 large teeth on the anterior margin. Fang long, thin and not strongly bent. Sternum small and prolongated between the cocae IV. Claw of the pedipalpus slightly bent, ?smooth. - Legs (fig.6; both legs IV are lost beyond the patella) long and slender, especially I; III distinctly shorter, not strongly covered with hairs. Bristles numerous: Femora I-IV 1 dorsally in the basal half, IV 1-2 retrodistally (!), patellae 2 dorsally, the distal one twice as long as the basal one; tibiae I-III (most probably IV, too) 2 dorsally, additionally lateral and ventral ones, at least 5 on tibia I and III, 2 of these ventrally. Length of the distal patellar bristle III 2.6 diameters of the patella. No apical bristles. - Opisthosoma (fig.7) long ovally, covered with short hairs. Spinnerets short (difficult to observe). - Epigyne (figs. 7-9) with a very long scapus which bears long folds laterally and a pair of apical openings.

Relationships: In *P. expandens* n.sp. the leg spination is distictly different, e.g. there are only 2 bristles on metatarsus I, compare also the femur bristles. Without knowledge of the male the relationships of this species are not sure. *P. multicuspuli* is much larger. In *P. liedtkei* n.sp. the scapus is distinctly shorter.

Distribution: Tertiary Baltic amber forest.

***Pimoa multicuspuli* n.sp.** (figs. 13-15)

Material: Holotypus ♂ in Baltic amber F30/BB/AR/PIM/CJW.

Preservation and syninclusions: The spider is preserved in a remarkable amber piece – 6x2.5x1.6cm - and in a remarkable way; so a closer study of the piece is ingenious. The amber piece consists of numerous layers around an amber drop; a large and some smaller layers cover the spider. Every layer of this fossil fly-paper contains insects or rests of insects. Probably there were rainy and stormy days while the amber was originating: A lot of stellate hairs are preserved in the amber piece and on a layer below the spider numerous excavities may result from water droplets from splashs. – Seemingly the spider tried to cross the resin horizontally and has been fixed – by rain droplets and within its own web ? – at the frontal part of its prosoma. During the next amber flow all left legs broke through its femora and at least three times autospasy between patella and tibia ocurred. Complete is only the right leg III, nearly complete is the right leg IV. Two leg parts are preserved at the left side of the spider (the leg III is broken through its tibia), so the right side of the spider should have been the directed to the top of the amber tree. A flow did cover the living spider, otherwise the spider would have dried out and the autospasy would not have worked. Some open leg articles seem to be dried out; these articles probably have partly been free for some time. The ventral side of the spider – which is directed to the inner side of the amber drop – is covered by a white emulsion; the dorsal side is clear. So the dorsal side seemingly has been cleared by heating from the sun. Also a Trichoptera and a small Nematocera near the spider have been cleared on one side by the sun in the same way. – In front of the spider the rest of a Collembola is preserved, behind/below the spider in other layers a small juvenile spider, a large Trichoptera, a small Hymenoptera and a large Nematocera: ?*Elephantomyia* sp. are preserved. Further inclusions: Several Diptera and Acari and numerous detritus particles. Above the spider – mainly on the left side – a larger part of the sheet web of ?this spider is preserved. Probably the spider has been fixed within its web. Threads are numerous nearly throgh the wholw lenght of the amber piece (6 cm).

Diagnosis (♂; ♀ unknown): Larger spiders, body lenght about 5.5mm, metatarsus I with 12 bristles in the basal and distal half (fig.13). ♂-pedipalpus (figs. 14-15): Paracymbium sickle-shaped, fused to the cymbium and connected by a seem, PCS T-shaped, CDP large and whith numerous cuspules/denticles, median apophysis short, embolus long, PEP ?not divided.

Description (♂):
Measurements (in mm): Body length perhaps 6.0, prosoma: Length ca 3.2, width 2.2, metatarsus and tibia I ca 8.8 each, leg IV: Femur 6.0, patella 0.8, metatarsus 5.5.
Colour: Prosoma and legs dark brown, opisthosoma medium brown.

Prosoma (ventrally it is hidden) distinctly longer than wide, with a deep fovea. 8 large eyes, posterior row recurved, posterior medium eyes separated by nearly a diameter. Clypeus long and concave. – Legs (fig. 13) very long and slender, bearing numerous long and slender bristles: Femora a dorsal one, additionally at least I and II a prolateral one in the distal half, patellae 2 dorsally (the basal one may be reduced), tibiae at least 5 bristles dorsally, laterally and ventrally, metatarsus I 12 lateral, dorsal and ventral bristles. Tarsal claws large, paired claws with numerous slender teeth, unpaired claw most probably smooth. – Opisthosoma 1.5 times longer than wide (artificially compressed dorsally), covered with thin hairs of medium length; spinnerets hidden. – Pedipalpus (figs. 14-15; compare above): Patella and tibia each with a longer dorsal bristle, tibia with some hairs and trichobothria which are not drawn, thickened distally, cymbium with large outgrowths.

Relationships: *Pimoa multicuspuli* is the largest known fossil member of the family Pimoidae. There are metatarsal bristles in the basal and distal half. In contrast to *P. expandens* the cymbium bears numerous cuspules. The hairy and slender paracymbium reminds on the ventral and hairy branch of the paracymbium in the family Baltsuccinidae n. fam. – compare the description in this volume - and seems to be a plesiomorphic character.

Ecology: After the large eyes this should not be a true cave species. The presence of a member of the order Trichoptera in the same amber piece shows that the habitat of these spiders most probably has been near a brook. The presence of preserved threads with the spider (see above) give a hint that the fossil spiders built sheet webs as the extant members of this family do.

Distribution: Tertiary Baltic amber forest.

***Pimoa liedtkei* n.sp.** (figs. 16-17)

Derivatio nominis: The species is dedicated to GERHARD LIEDTKE in Itzehoe, the owner of the holotype.

Material: Holotype ♀ in Baltic amber, coll. G. LIEDTKE no. 426.

Preservation and syninclusions: The spider is well but not completely preserved; the right side is covered by a white emulsion, the right legs I and II are broken off after the patella (by autospasy) and missing, parts of all left legs are cut off. The distal part of the right femur III has been broken at least two times and has been healed without a crack (photo). – No stellate hairs.

Diagnosis (♀; ♂ unknown): Metatarsus I with numerous bristles in the basal

and distal half, a dozen on I-II, scapus of the epigyne (figs. 16-17) of medium length, with large lateral folds.

Description (♀):
Measurements (in mm): Body length 4.5, prosoma length 2.1; leg I: Femur 4.6, patella 0.6, tibia 3.7, metatarsus partly and tarsus completely cut off, leg II: Tibia 3.8, metatarsus 4.7, tarsus 1.9, tibia III lost, tibia IV 3.5; length of the scapus 0.5.
Colour: Prosoma and legs dark brown, opisthosoma medium to light brown.
Prosoma with few hairs and a distinct fovea. Most probably 8 eyes which are partly hidden by an emulsion. Clypeus at least as long as the field of the median eyes, slightly concave, chelicerae 1.7 times longer than the high of the prosoma, no lateral stridulating files but rough cuticula, labium strongly rebordered, sternum with long hairs. Pedipalpus with long articles, its claw moderately bent, with about half a dozen small teeth. – Legs (fig. 16) long and slender, order I/II/IV/III, with short hairs and numerous bristles: Femora usually 1 retrolateral and 1 dorsal in the distal quarter (an additional dorsal bristle may occur in the basal half), patellae a short dorsally-basally and a long distally, tibiae with dorsal, lateral and ventral bristles, tibia I about a dozen, tibia IV about 10, metatarsi I-II about a dozen in the basal and distal half, tibia IV about 10. – Opisthosoma (fig. 16) two times longer than high, with hairs of medium length; colulus of medium size. – Epigyne: See above.

Relationships: In *P. liedtkei* the metatarsi bear more bristles than in the other known fossil species of the genus; in *P. lingua* n.sp. the scapus of the epigyne is distinctly longer.

Distribution: Tertiary Baltic amber forest.

?***Pimoa*** sp. indet. (fig. 22)

Material: 1 juv. ♀ in Baltic amber, F31/BB/AR/PIM/CJW.

Description:
Measurements (in mm): Body length 2.6, prosoma length 1.15, tibia I 2.1.
Legs long and slender, with numerous long and slender bristles. Femora probably without bristles, tibia I 2 dorsally and 5 laterally, metatarsus I 6 dorsal and lateral bristles in the basal and distal half. A hypha of a Fungus - 0.62mm long - is preserved retrobasally on the left femur I. Position of the metatarsal trichobothrium I in 0.09. Opisthosoma nearly ovoid and covered by a white emulsion; no scapus is observable.

Relationships: After the small size and the numerous bristles on metatarsus I

this spider could well be a member of the genus *Pimoa*. In contrast to the other fossil *Pimoa* species the femora probably bear no bristles.

Distribution: Tertiary Baltic amber forest.

Memoratrix PETRUNKEVITCH 1942 (figs. 18-21)

PETRUNKEVITCH (1942) regarded the fossil genus *Memoratrix* – described from Baltic amber - as a member of the Araneidae: Metinae. Metinae are nowadays believed to be a taxon of the Tetragnathidae. After the chaetotaxy and the long clypeus I regard *Memoratrix* as a questionable member of the families Pimoidae or Linyphiidae.
The generotype – *Memoratrix rydei* PETRUNKEVITCH 1942 – has been described after a fossil female that in my opinion should be subadult, figs. 18-21. The body length is 5.7 mm, metatarsus I bears bristles in the basal as well as in the distal half as in *Pimoa hormigai, liedtkei and multicuspuli*. – The male described by PETRUNKEVITCH (1958) sub *Memoratrix rydei* – like the female larger than most *Pimoa* species described above, body length 5.9mm – may be congeneric or not; according to the original figures the genital structures are more like Linyphiidae. I regard *Memoratrix* as a dubius genus and cannot exclude with certainty that it is a senior synonym of *Pimoa* CHAMBERLIN & IVIE 1943.

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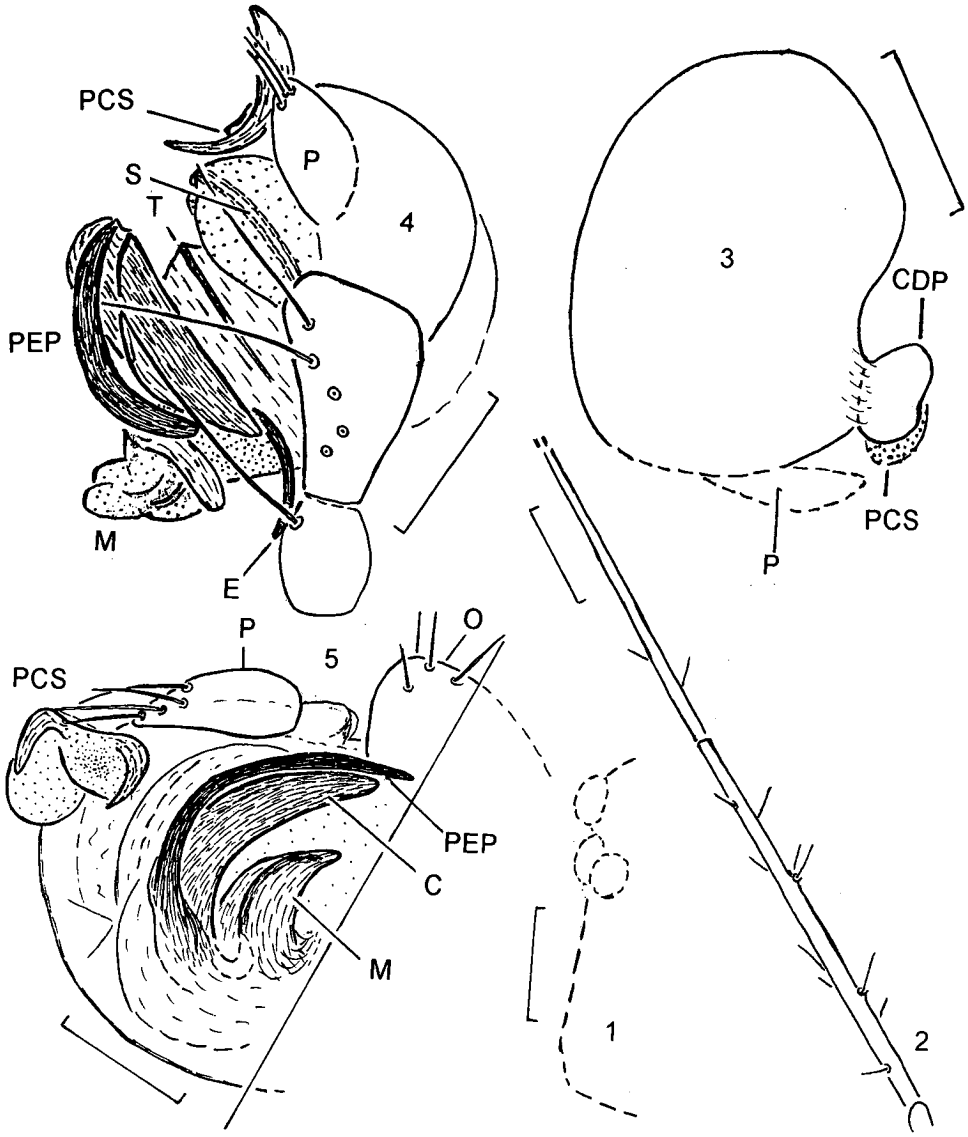
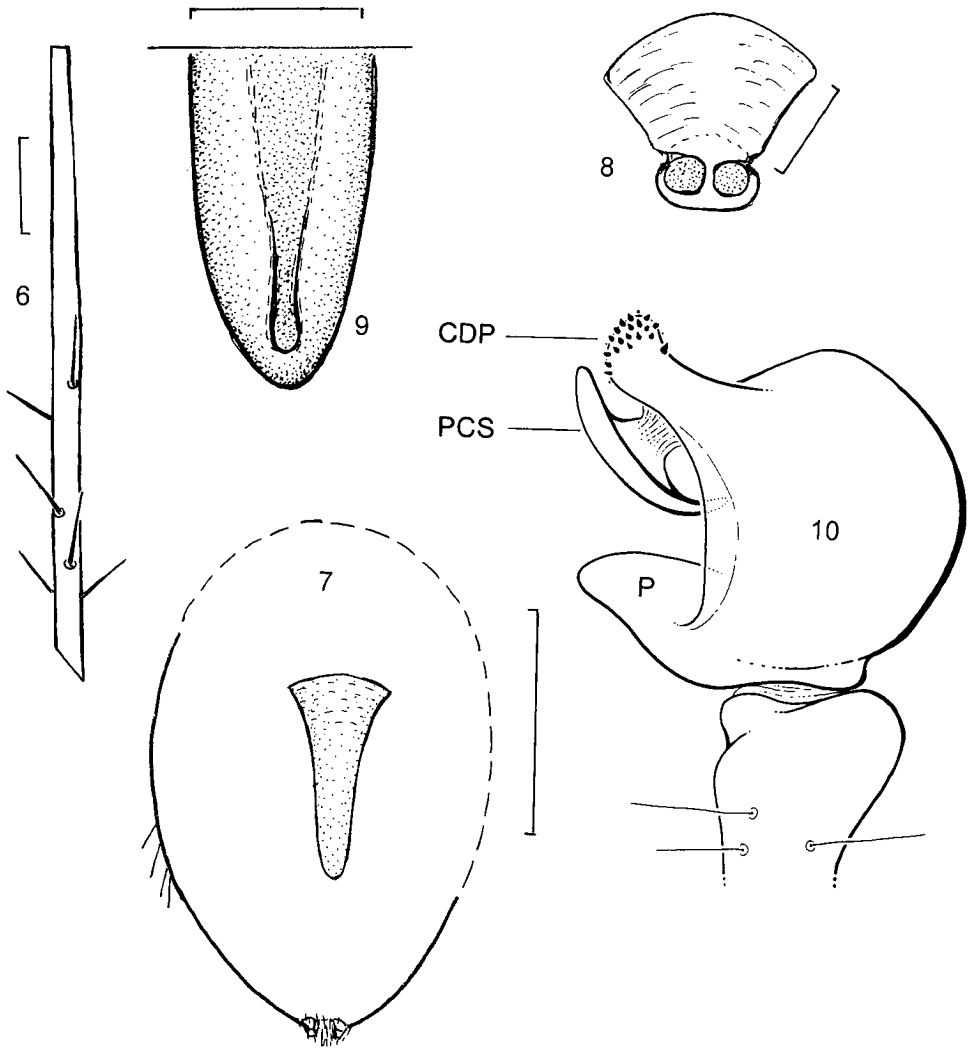
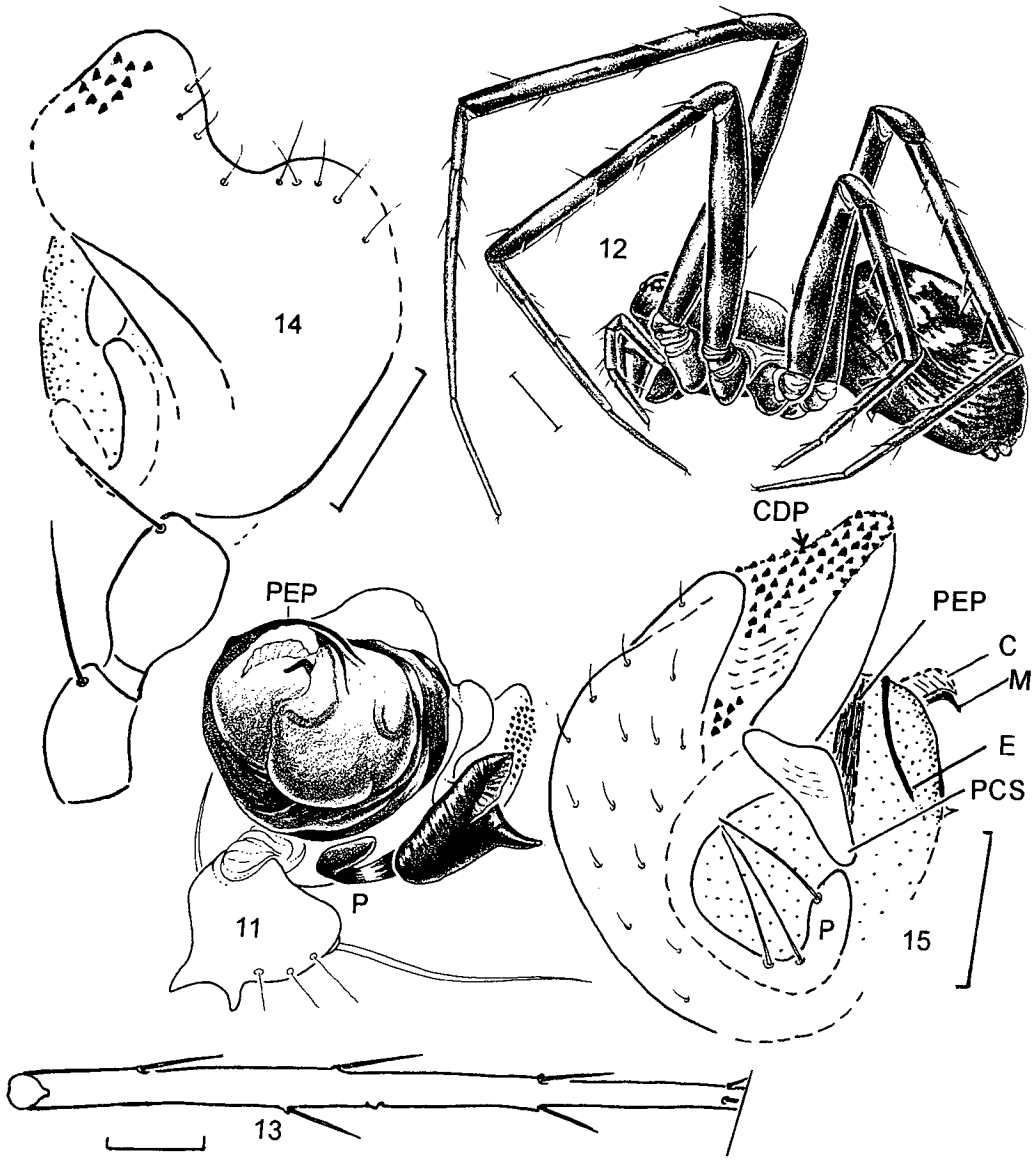


Figs.1-5: ***Pimoa expandens*** **n.sp.**, ♂; 1) clypeus, lateral eyes and anterior medium eye laterally; 2) l. tibia and metatarsus I (apically cut off) dorsally; 3) r. cymbium dorsally (PCS covered by a dorsal emulsion); 4) l. expanded pedipalpus dorsally-retrobasally (only 2 tibial hairs are drawn, retrolateral tibial trichobothria not drawn); 5) l. expanded pedipalpus retroventrally. - C = cymbium, E = embolus, M = median apophysis, O = dorsal-distal outgrowth of the tibia; P = paracymbium, PCS = pimoid cymbial sclerite, PEP = pimoid embolic-tegular process, S = sperm duct of the subtegulum, T = tegulum. - M (in mm) = 1.0 in fig.2; 0.2 in the other figs.



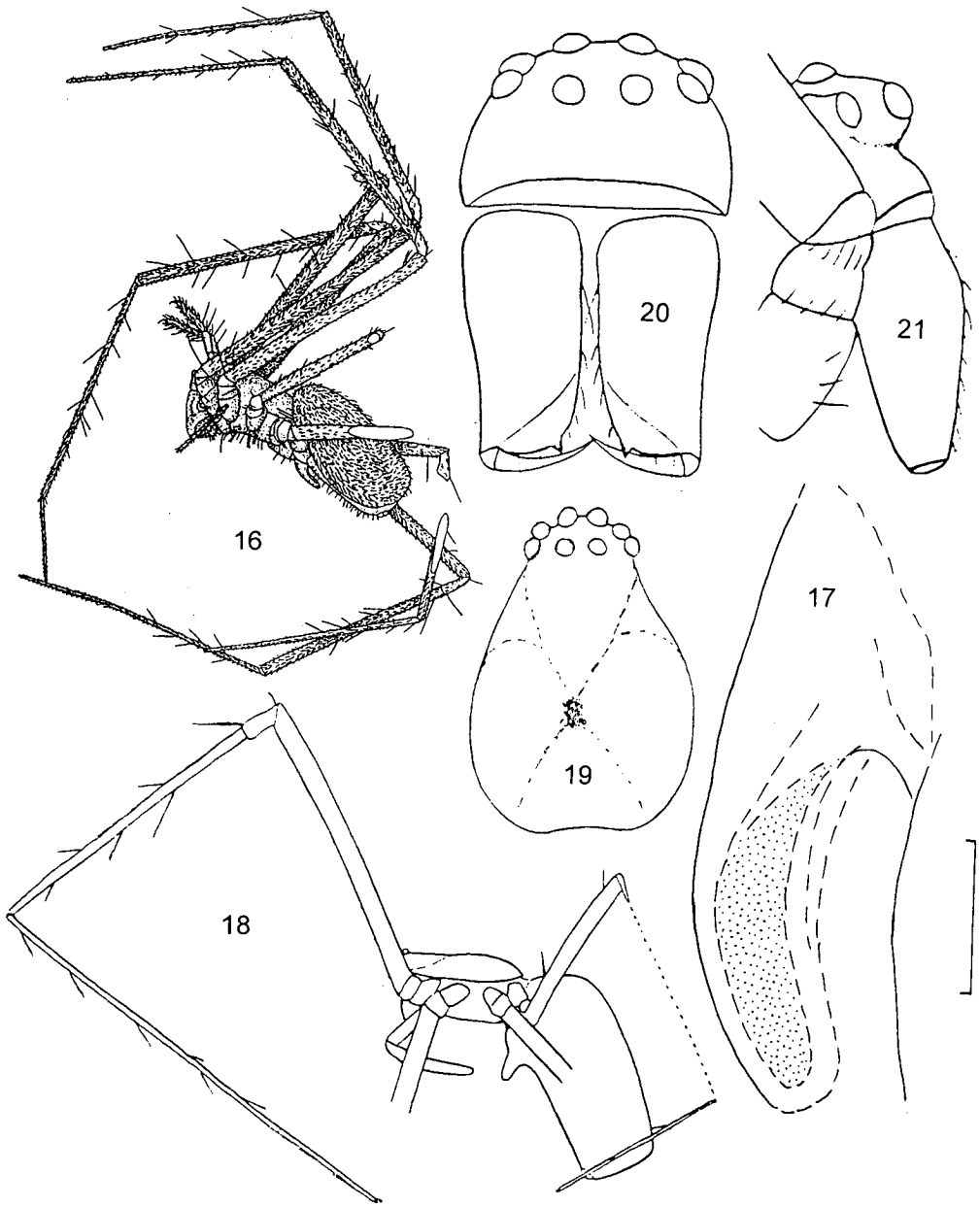
Figs.6-9: ***Pimoa lingua* n.sp.**, ♀; 6) l. metatarsus I re-trolaterally and slightly ventrally; 7) opisthosoma with epigyne ventrally; 8) scapus apically; 9) distal part of the scapus laterally.

Fig. 10: ***Pimoa altioculata*** (KEYSERLING 1886), extant, USA, l. ♂-pedipalpus dorsally. - Explanation of the abbreviations: See above.



Figs. 11-12: ***Pimoa rupicola*** (SIMON 1884), extant, S-Europe; 11) l. ♂-pedipalpus ventrally; 12) ♀, body laterally. – CDP = cymbial denticulate process. - Figs. 10-12 after HORMIGA (1994). - M in fig.12 = 1mm.

Figs. 13-15: ***Pimoa multicuspuli*** **n.sp.**, ♂; 13) l. tibia I (separated by autotomy) dorsally; 14) l. pedipalpus dorsally and slightly apically (only few of the cuspules are drawn); 15) r. pedipalpus retrolaterally and slightly apically; C = conductor, CDP = cymbial denticulate process, E = tip of the embolus, M = median apophysis, PCS = pimoid cymbial sclerite, PEP = pimoid embolic-tegular process. - M = 1.0mm in fig.13, 0.5mm in the other figs.



Figs. 16-17: ***Pimoa liedtkei* n.sp.**, ♀; 16) body laterally, drawn by G. LIEDTKE, no M; 17) epigyne laterally, M = 0.2.

Figs. 18-21: **Memoratrix rydei** PETRUNKEVITCH 1942, after PETRUNKEVITCH (1942: Figs. 212-215), Linyphiidae or Pimoidae, ?subad. ♀ in Baltic amber; 18) body laterally; 19-20) prosoma dorsally and frontally; 21) frontal part of the prosoma laterally.

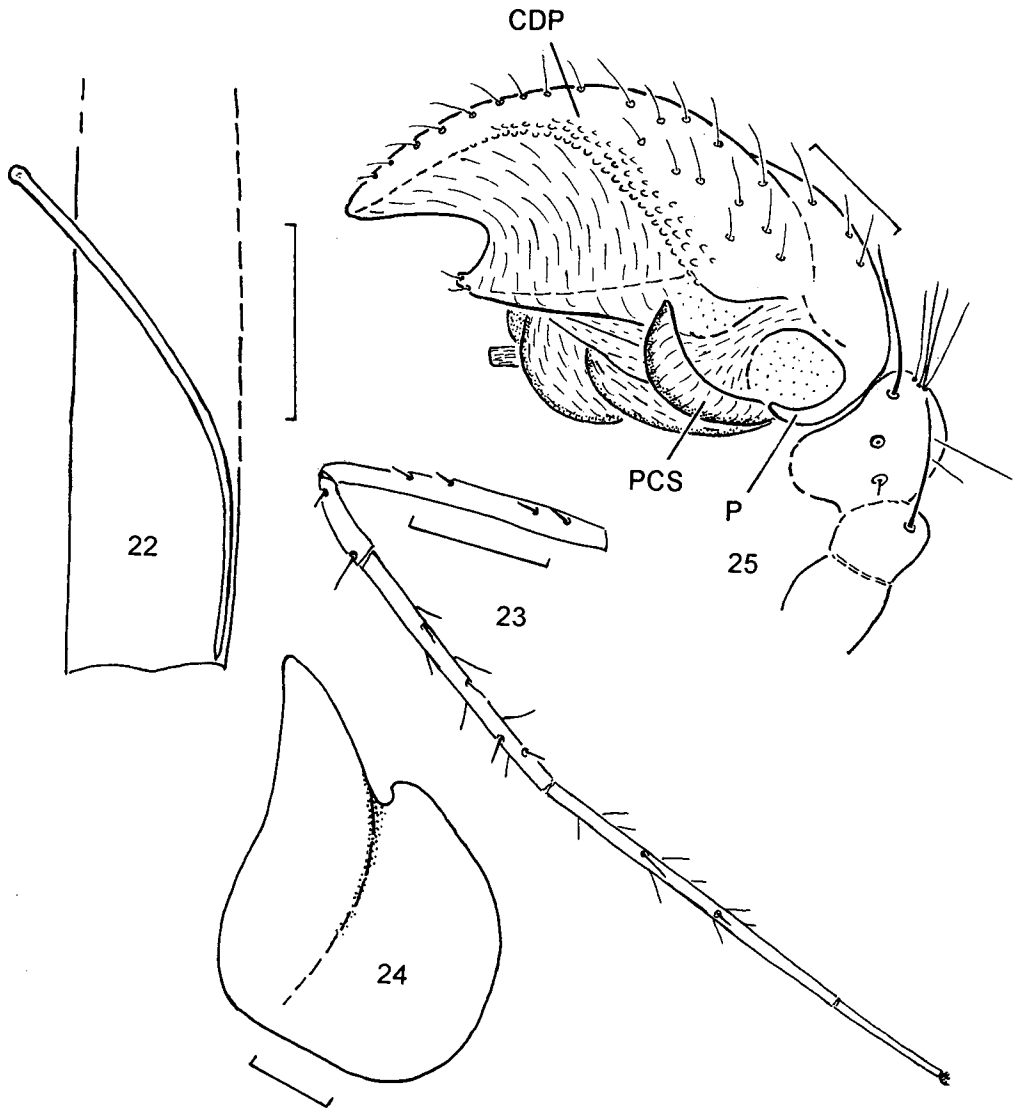
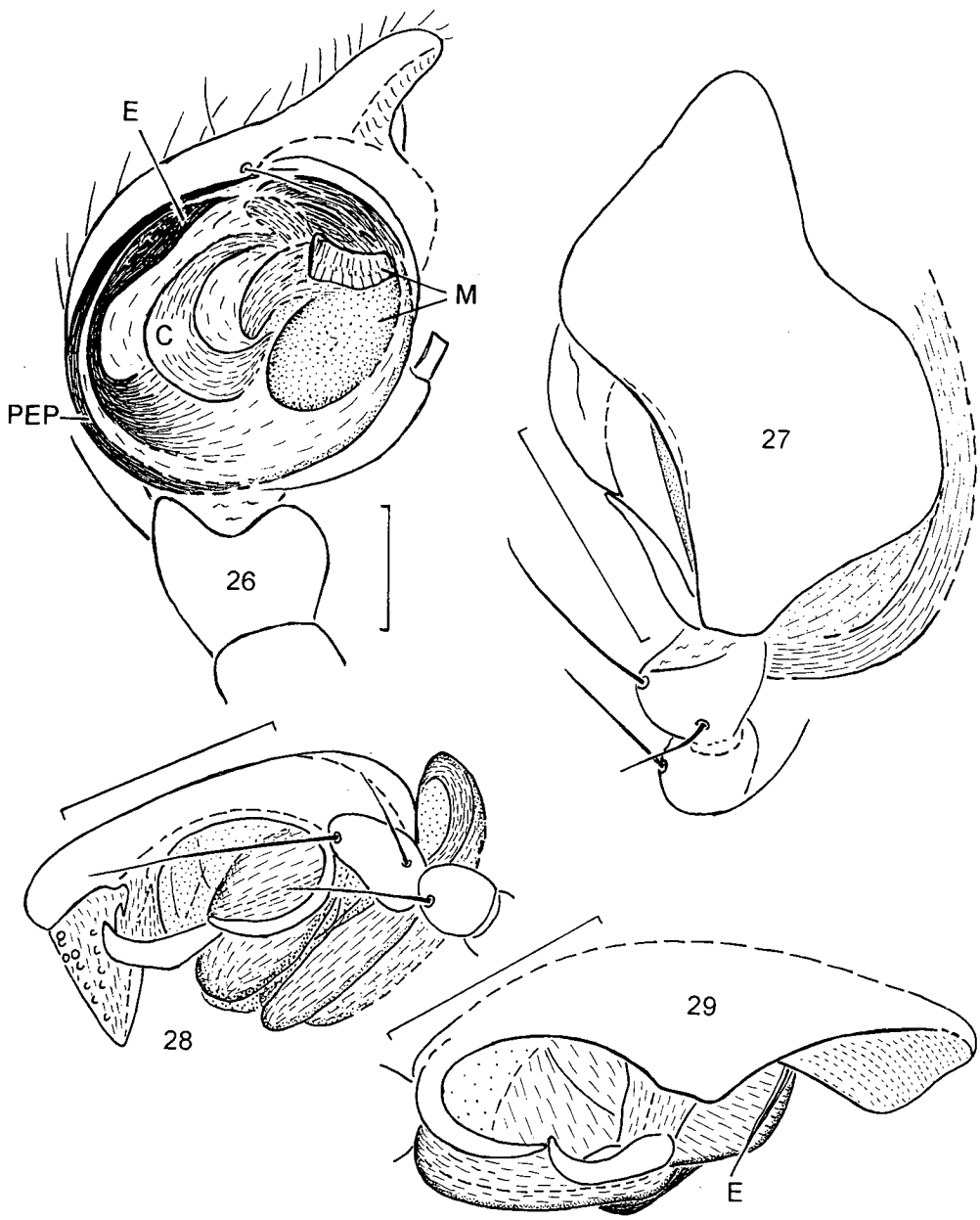


Fig. 22: A **hypha of a Fungus** preserved retrobasally on the l. femur I of *Pimoa* sp. (juv.). - M = 0.2.

Figs. 23-26: ***Pimoa hormigai* n.sp.**, ♂; 23) r. leg I prolaterally; 24-26) l. pedipalpus; 24) outline of the cymbium dorsally (cuspules not drawn), 25-26) pedipalpus retrolaterally - slightly dorsally - and ventrally. - Abbreviationes: Compare figs. 13-15. - M = 2.0 in fig. 23, 0.2 in figs. 24-26.



Figs. 27-29: ***Pimoa inopinata*** **n.sp.**, ♂; 27 and 29) l. pedipalpus (expanded) dorsally; retrolaterally and slightly ventrally; 28) r. pedipalpus retrolaterally. - E = tip of the embolus. - M = 0.5.

BEITR. ARANEOL., 3 (2004)

THE FOSSIL SPIDERS OF THE FAMILY LINYPHIIDAE IN BALTIC AND DOMINICAN AMBER (ARANEAE: LINYPHIIDAE)

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Abstract: The relationships and synonymy of some fossil genera of the family Linyphiidae (Araneae) and few members of related families in Baltic and Dominican amber are discussed: *Antopia* MENGE in KOCH & BERENDT 1854 is regarded as a genus of the family Theridiidae and not of the Linyphiidae, probably it is a senior synonym of *Eomysmena* PETRUNKEVITCH 1942; *Impulsor* PETRUNKEVITCH 1942 is also regarded as a member of the family Theridiidae; *Malleator* PETRUNKEVITCH 1942 is regarded as a junior synonym of *Episinus* WALCKENAER 1809 (= *Flegia* KOCH & BERENDT 1854 (Theridiidae)) (**n.syn.**); *Memoratrix* PETRUNKEVITCH 1942 is regarded as a possible member of the Pimoidae, *Metridina* is probably a genus of the family Araneidae, *Mystagogus* PETRUNKEVITCH 1942 is regarded as a questionable genus of the family Cyatholipidae; *Obnisius* PETRUNKEVITCH 1942 is regarded as a questionable synonym of *Custodela* PETRUNKEVITCH 1942. - Keys to the 8 fossil genera and 39 species of the family Linyphiidae in Baltic amber are given. - The following fossil spider taxa - 7 new genera and *Custodela*, 35 new species - of the family Linyphiidae are described from Baltic amber: *Custodela* PETRUNKEVITCH 1942 with 19 new species: *acuta, acutula, bispina, bispinosa, clava, curva, curvata, divergens, expandens, falcata, femurspinosa, henningseni, kochi, lanx, obtusa, parva, pseudokochi, stridulans* and *tibialis; Custodela cheiracantha* (KOCH & BERENDT 1854, *C. oblonga* (KOCH & BERENDT 1854) and ?*C. tenuipes* (PETRUNKEVITCH 1942) (sub *Obnisius*) are revised; *Custodelela* **n. gen**. with its type species *hamata* **n. sp**., *Eolabulla* **n.gen** is described with 6 new species**:** *falcata, gladiformis, laminata, perforata, sagittata* and *similis*; *Eophantes* **n.gen** with its type species *complicatus* **n.sp**.; *Paralabulla* **n.gen** with three

new species: *bitterfeldensis, dubia* and *succinifera*; *Succineta* **n.gen** with 2 new species: *brevispina* and *discoidalis*; *Succiphantes* **n.gen**. with 2 new species: *velteni* and *tanasevitchi*. – Most taxa in Baltic amber are members of the more "primitive" subfamily Linyphiinae which was distinctly dominant, by far most of the species are members of the genus *Custodela*; members of the more evolved Micronetinae are very rare; advanced taxa of the diverse subfamily Erigoninae are absent. - A parasitic Acari (Microtrombidiidae), remains of haemolymph and digestive liquid, questionable remains of sperm and insects as prey are reported from fossil Linyphiidae in Baltic amber. - In contrast to the fauna in Dominican amber all Baltic amber genera are extinct. - Short remarks are given on Linyphiidae in Dominican and Cretaceous amber; *?Lepthyphantes lamellatus* WUNDERLICH 1988 is transferred to *Custodela*. This species is preserved in Baltic but not in Dominican amber.

Deposition of the material if not otherwise noted: Collection of J. WUNDERLICH (CJW). PMHUB = Palaeontological Museum of the Humboldt University Berlin.

Scale ("M") in mm.

INTRODUCTION

Fossil Linyphiidae in Baltic amber are relatively frequent, I saw thousands of adult specimens. In this paper I will describe only a part of the hitherto unknown species, the best preserved specimens. Dozens of further species are waiting for a description. The material is deposited in numerous museums and private collections – in mine, too.
Most frequent are spiders of the genus *Custodela* PETRUNKEVITCH 1942: About two third of the species and about four fifth of the specimens may belong to this genus. Probably in the Early Tertiary the extinct members of this genus played the important role which today is occupied by the large genus *Lepthyphantes* MENGE s. l.

The oldest fossil Linyphiidae have been reported from the Upper Cretaceous Canadian amber by MCALPINE & MARTIN (1969). From the Lower Cretaceous Lebanese amber PENNEY & SELDEN (2002) described a female (gen. & sp. indet.) as a member of the family Linyphiidae. According to the absence of cheliceral stridulatory files, the shape of the body, labium and gnathocoxae, - the length of the clypeus is unknown -, the stronger leg bristles and the epigyne - similar to Zygiellidae in Baltic amber; a scapus is absent -, I regard this spider not as a member of the Linyphiidae but most probably of the Zygiellidae (**n. quest. relat.**).

In the Younger Tertiary Dominican amber members of the subfamilies Linyphiinae and Micronetinae are preserved. Up to now by far most of the members which are known of the Linyphiidae taxa in Baltic amber are members of the "plesiomorphic" subfamily Linyphiinae; this subfamily was clearly dominant. (In the extant fauna of the Northern Hemisphere members of the Micronetinae are more frequent than the Linyphiinae). These Early Tertiary Linyphiidae in Baltic amber possess plesiomorphic characters as an unfolded scapus of the epigyne (fig. 18), mostly an unusually long apophysis of the suprategulum and a long thin, embolus (figs. 21, 32, 53, but compare fig. 41). (With the help of the long apophysis of the suprategulum the males probably turned up the long scapus of the epigyne during the copulation). - Members of the „modern" subfamily Micronetinae, in which an infolded scapus exists (fig. 102) and frequently a thick and flat embolus (fig. 100 but compare fig. 38), a shorter suprategular apophysis and a FICKERT's gland (fig. 38) are represented only by very few specimens of the new genera *Agynetiphantes* and *Succineta*. - Some of the diverse and nearly world-wide distributed extant genera *Agyneta, Centromerus, Lepthyphantes* (Micronetinae) and *Linyphia* (Linyphiinae) - or near relatives - are known from the Dominican amber but not from the Baltic amber; these may be " young" genera which originated in the Middle or Late Tertiary. - Nor are taxa of the diverse and cosmopolitically distributed Erigoninae (yet?) known from Baltic amber; Erigoninae may be the most youngest subfamily of the Linyphiidae. I do not want to exclude that this subfamily – which is mainly distributed in moderate climates – did not yet exist in the Early Tertiary, at least not in the mainly subtropic Baltic amber forest. Such „negative records" can be of great interest but cannot give sure evidence for a general absence of taxa in the Early Tertiary.

The excellent preservation of - occasionally tiny - taxonomically important genital structures allows to clarify relationships: The presence of a FICKERT's gland (fig. 38) in *Agynetiphantes* indicates the membership of this genus in the subfamily Micronetinae.

EINLEITUNG

Fossile Baldachinspinnen (Linyphiidae) im Baltischen Bernstein sind relativ häufig, ich sah Tausende von adulten Exemplaren. In dieser Arbeit beschreibe ich nur einen Teil der bisher unbekannten Arten nach den am besten erhaltenen Exemplaren. Dutzende weiterer Arten sind noch zu beschreiben. Das Material ist in zahlreichen Museen und in privaten Sammmlungen – auch in meiner - deponiert.
Besonders häufig sind Spinnen der Gattung *Custodela* PETRUNKEVITCH 1942: Etwa Zwei Drittel der Arten und etwa Vier Fünftel der Individuen gehören zu dieser Gattung. Möglicherweise nahmen die ausgestorbenen Vertreter dieser Gattung im Frühen Tertiär die bedeutende Rolle der heutigen Gattung *Lepthyphantes* MENGE s. l. ein.

Der Nachweis der ältesten fossilen Linyphiidae stammt von Bernstein der Oberen Kreide Kanadas, durch MCALPINE & MARTIN (1969). Vom Bernstein der Unteren Kreide des Libanon beschrieben PENNEY & SELDEN (2002) ein Weibchen (Gattung und Art unbestimmt) als Vertreter der Linyphiidae. Nach dem Fehlen von Stridulations-Rillen der Cheliceren, der Form von Körper, Labium und Gnathocoxen (die Länge des Clypeus ist unbekannt), den stärkeren Borsten der Beine und der Epigyne (er ähnelt derjenigen von Zygiellidae im Baltischen Bernstein; ein Scapus fehlt), halte ich diese Spinne für keinen Vertreter der Linyphiidae, sondern vermutlich der Zygiellidae (**n. quest. relat.**).
Im Dominikanischen Bernstein des jüngeren Tertiärs sind Vertreter der Unterfamilien Linyphiinae und Micronetinae nachgewiesen worden. Im Baltischen Bernstein sind fast ausschließlich Vertreter der ursprünglichen Linyphiidae bekannt geworden: Vertreter der Unterfamilie Linyphiinae; diese Unterfamilie war eindeutig dominant. (In der heutigen Fauna der Nördlichen Hemisphaere sind Vertreter der Unterfamilie Micronetinae häufiger). Diese Linyphiinae des Frühen Tertiärs besitzen usprüngliche Merkmale wie einen ungefalteten (gestreckten) Scapus der Epigyne (Abb. 18), eine ungewöhnlich lange Apophyse des Suprategulums und einen langen, dünnen Embolus (figs. 21, 32, 53; vgl. aber Abb. 41). (Mit Hilfe der langen Apophyse des Suprategulums haben die Männchen vermutlich den langen Scapus der Epigyne während der Kopulation hochgeklappt). - Spinnen der "modernen" Unterfamilie Micronetinae - bei ihnen existiert ein eingefalteter Scapus der Epigyne, Abb. 102, häufig ein dicker, flacher Embolus (Abb. 100, vgl. Abb. 38) und meist eine kurze Apophyse des Suprategulums sowie eine FICKERT'sche Drüse (Abb. 38) - sind nur mit ganz wenigen Individuen der neuen Gattungen *Agynetiphantes* und *Succineta* vertreten. - Einige der artenreichen und heute nahezu weltweit verbreiteten Gattungen *Agyneta, Centromerus, Lepthyphantes* (Micronetinae) und *Linyphia* (Linyphiinae) - oder nahe Verwandte - sind zwar vom Dominikanischen Bernstein, nicht aber vom Baltischen Bernstein bekannt; sie könnten "junge" Gattungen sein, die erst im Mittleren oder Jungen Tertiär entstanden sind. - Auch Taxa der artenreichen und kosmopolitisch verbreiteten Unterfamilie Erigoninae (Zwergspinnen) sind vom Baltischen Bernstein (bisher?) nicht bekannt geworden; sie dürften die jüngste Unterfamilie der Linyphiidae sein. Ich möchte nicht ausschließen, daß die Zwergspinnen im frühen Tertiär noch nicht existiert haben, wenigstens nicht im überwiegend subtropischen Baltischen Bernsteinwald. Derartige „Negativ-Nachweise" können von großem Interesse sein; sie können allerdings nicht als sicherer Nachweis für eine allgemeine Abwesenheit in Frühen Tertiär gelten.

Die hervorragende Erhaltung - gelegentlich winziger - taxonomisch wichtiger Genital-Strukturen ermöglicht es, verwandtschaftliche Beziehungen zu klären: Die Existenz einer FICKERT'schen Drüse (Abb. 38) - einer blasigen Erweiterung des Samenkanals im Tegulum des ♂-Pedipalpus - weist auf die Zugehörigkeit der Gattung *Agynetiphantes* zur Unterfamilie Micronetinae.

TAXONOMY

Diagnosis of the family Linyphiidae: Autotomy between patella and tibia is frequent (fig. 1, photos). Basicly with numerous leg bristles (fig. 15). Lateral cheliceral stridulatory

files (fig. 2) usually are present (often not observable or even absent in the fossils), paracymbium +/- hairless and stronger sclerotized, a free and movable sclerite (fig. 9), bulbus with a suprategulum (embolic division), epigyne basicly with a scapus.

Relationships: Pimoidae is the sister group, autotomy and cheliceral stridulating files are the same, see the paper on this family in this volume. In the Pimoidae a strong additional retrolateral outgrowth or sclerite of the cymbium, a denticulate dorso-ectal process of the cymbium and lateral folds of the epigyne are present, a free paracymbium and a suprategulum are absent (the paracymbium is fixed to the cymbium). (Amber fossils: In most species the anterior metatarsi bear more than two bristles; in fossil Linyphiidae bear the anterior metatarsi not more than 2 bristles).

Distribution: Cosmopolitical, most taxa occur in the Northern hemisphere and in moderate climates (here the most diverse family of spiders).

Characters of the (fossil) Linyphiidae (general diagnostic characters in bold print)

Most members of the family Linyphiidae can be recognized by a combination of characters, e.g. the usually long and slender legs with its numerous thin bristles (fig. 15; in such a manner the fossils in amber), the presence of **lateral cheliceral stridulatory files** (fig. 2) in most taxa (hard to observe in some fossil spiders), the usually long scapus of the epigyne (figs. 18 but comp. fig. 102) in the fossils, the presence of a **paracymbium** (figs. 6, 9, 29, 35, 50) which is somewhat sickle-shaped and a **free sclerite** (not easily observed in fossil spiders). Furthermore in most fossils a suprategular apophysis occurs which may be long and needle-shaped (e. g. figs. 9, 13, 31, 84, 100 but comp. figs. 21, 38) and a large dorsal outgrowth of the cymbium in most members of the genus *Custodela* (figs 76 but comp. fig. 64). - In about 35% of the specimens a **leg autotomy between patella and tibia** (fig. 1, photos) occurs which also is present in the Leptonetidae, Hersiliidae, several Oecobiidae (e. g. the fossil Mizaliinae), the closely related Pimoidae and very few not related taxa. Leg autotomy in spiders of other families usually occurs between coxa and trochanter or is absent. In contrast to nearly all similar members of the families Theridiidae, Nesticidae, Synotaxidae and Cyatholipidae - which also possess a long clypeus but a different leg autotomy and no cheliceral files - in the fossil Linyphiidae tibia III bears two dorsal bristles, in the other families mostly only one; and in the fossil Linyphiidae bristles on the femora and metatarsi as well as lateral tibial bristles of the two frontal legs exist (e.g. fig. 15). In most species of the family Pimoidae bear the anterior metatarsi more than two bristles, in fossil Linyphiidae only 1-2.

Merkmale der (fossilen) Baldachinspinnen (Linyphiidae)
(Allgemeine Merkmale der Linyphiidae in Fettdruck)

Die meisten Baldachinspinnen sind nach einer Kombination von Merkmalen zu erkennen, z.B. an den langen, schlanken Beinen, die reichlich mit dünnen Borsten besetzt sind (Abb. 15; so bei den Fossilien im Bernstein), dem Vorkommen eines **Paracymbiums** (Abb. 6, 9, 29, 35, 50), das ein **freies Sklerit** ist (es ist häutig mit dem Cymbium verbunden, was bei den fossilen Spinnen gewöhnlich kaum beobachtbar ist), dem Bulbus meist anliegt und eine +/- sichelartige Form besitzt. Bei den fossilen Weibchen der Baldachin-Spinnen trägt die Geschlechtsplatte (Epigyne) gewöhnlich einen langen Anhang (Scapus) (Abb.18, vgl. aber Abb. 102). Weiterhin existiert bei den meisten fossilen Baldachinspinnen ein oft langer und nadelförmiger Anhang des Bulbus (Suprategular-Apophyse) (z. B. Abb. 9, 13, 31, 38, 84, 100, vgl. aber Abb. 21, 38) und bei den meisten Arten der Gattung *Custodela* ein oberer Auswuchs des Cymbiums (z. B. Abb. 76, vgl. aber Abb. 64). - Häufig - bei etwa 35 % der fossilen Linyphiidae - existiert eine Abtrennung der Beine an einer "Sollbruchstelle" **(Autotomie) zwischen der Patella und der Tibia** (Abb. 1, Fotos). Diese Art der Autotomie ist bei Spinnen nicht häufig; bei fossilen Spinnen ist sie noch bei den Schlankbein-Spinnen (Leptonetidae), Kreiselspinnen (Hersiliidae), Scheibennetz-Spinnen (Oecobiidae: Mizaliinae) und den mit den Linyphiidae nahe verwandten Ur-Baldachinspinnen (Pimoidae) anzutreffen. Bei den meisten Vertretern anderer Spinnen-Familien brechen die Beine - wenn überhaupt - bereits nahe dem Grunde nach der Coxa ab (z. B. bei den Araneidae). Bei mehr als einem Viertel der fossilen Baldachin-Spinnen ist das entsprechende Bein erst beim Versuch der Befreiung aus dem Harz abgebrochen; nicht selten liegt es lose neben der Spinne. Gelegentlich ist Blutflüssigkeit (Haemolymphe) aus dem Beinstumpf ausgetreten, Abb. 40.
Im Gegensatz zu den allermeisten Vertretern der den Baldachin-Spinnen ähnelnden Kugelspinnen (Theridiidae), Höhlenspinnen (Nesticidae), Kugel-Höhlenspinnen (Synotaxidae) und Becherspinnen (Cyatholipidae) - bei denen ebenfalls der Clypeus länger als das Augen-Feld ist, aber eine andere Art der Autotomie vorkommt und Stridulations-Rillen der Cheliceren fehlen - trägt Tibia III bei den fossilen Linyphiidae zwei dorsale Borsten ähnlich Abb. 15, bei den anderen Familien fast immer nur eine; außerdem existieren bei den fossilen Linyphiidae immer Borsten auf den Femora und Metatarsen sowie seitlich auf den Schienen (Tibien) der ersten beiden Bein-Paare, z.B. wie Abb. 15. Bei den meisten Arten der nahe verwandten Pimoidae tragen die vorderen Metatarsen mehr als zwei Borsten.
Bei fast allen rezenten Baldachinspinnen existieren schließlich in beiden Geschlechtern seitliche **Schrill-Rillen** (Stridulations-Rillen) auf den Grundgliedern der Cheliceren (Abb.2). Sie werden bei der Balz mit Hilfe eines Zähnchens auf dem Femur des Pedipalpus über die Rillen (bzw. Rippen) streichenden Schrill-Zahns am Grunde des Femurs des Pedipalpus zum Vibrieren ("Schrillen") gebracht. Bei den meisten fossilen Linyphiidae sind sie - oft positions-bedingt - nicht beobachtbar; bei einigen Vertretern der Gattung *Custodela* fehlen sie möglicherweise, so wohl auch bei *Eolabulla*. Derartige Rillen kommen außer bei den Urspinnen (Archaeidae), den Tasterfuss-Spinnen (Palpimanidae) und den mit den Baldachin-Spinnen nahe verwandten Ur-Baldachinspinnen (Pimoidae,siehe den Beitrag in diesem Band) noch bei weiteren Familien vor (z.B. Hahniidae), bei diesen allerdings meist nur sporadisch bei wenigen Gattungen oder Arten.

Capture webs, prey, fossil remains and on the ecology of the fossil Linyphiidae

Extant Linyphiinae - e. g. members of the genus *Lepthyphantes* MENGE - build irregular capture webs in which they wait for prey in an inverted position. Members of several extant species live in higher strata as most probably did most of the fossil spiders which are therefore frequent in Baltic amber, mainly members of *Custodela*. Members of other taxa - e. g. most Erigoninae - live near the ground, e. g. in fallen leaves and under stones.
Members of the extant genus *Labulla* SIMON are closely related to the genus *Eolabulla* n. gen. These spiders are widely distributed in Europe, live in light forests and build their capture webs e. g. at the base of tree trunks within roots in small hollows. Did fossil members of *Labulla* build their capture webs in similar places? The occurence of several Collembola hint at such an ecological behaviour. The (extant) species of *Labulla* apparently prefer a higher humidity of the air.
The capture web in *Labulla* consists only of a simple sheet; scaffolding threads are absent. In contrast to other Linyphiinae these spiders do not hang beneath the web but wait in a hiding-place nearby.
Extant *Labulla*-species are spread over most parts of Europe, in moderate and subtropic climates.
Within the part of a capture web of a *Custodela* sp. indet. (CJW) in Baltic amber a Collembola and some Nematocera are preserved. Collembola and Diptera are known as the prey of extant Linyphiidae.
On the opisthosoma of a spider of the genus *Custodela* sp. indet., ♂, F381/BB/AR/CJW, a 0.35mm long parasitoitic larva of an Acari (Prostigmata: Microtrombiidae) (det. A. WOHLTMANN) is preserved, see the chapter on parasites in part I of this volume.
Remains of haemolymph (fig. 40) and remains of digestive liquid (?) (fig. 39) are preserved e. g. with the holotype of *Custodelela hamata* n. sp., see below.
With the holotype of *Custodelela hamata* n. sp. remains of questionable sperm and a questionable sperm web (fig. 48) are preserved, see below. Photos 249-250.

Fangnetze, Beute, fossile Reste und zur Ökologie der fossilen Baldachinspinnen

Heutige Baldachinspinnen der Unterfamilie Linyphiinae bauen unregelmäßige Fangnetze, in denen sie gewöhnlich bauchoben hängend auf Beute lauern, so z.B. die Vertreter der Gattung *Lepthyphantes* MENGE. Vertreter nicht weniger Arten leben heute in höhe-

ren Vegetations-Schichten, auf Kräutern und Bäumen - wie auch die meisten fossilen Spinnen, z. B. *Custodela*, die daher häufig in die Harz-Fallen gerieten -, andere leben am Boden, z.B. in Fall-Laub und unter Steinen.
Die Vertreter der rezenten Gattung *Labulla* SIMON sind mit der fossilen Gattung *Eolabulla* n. gen. nahe verwandt. Sie sind in Europa weit verbreitet, leben in lichten Wäldern und bauen ihre Fangnetze z.B. am Fuss von Baumstämmen, zwischen Wurzeln und kleinen Mulden. Bauten die fossilen Vertreter von *Eolabulla* ihre Fangnetze an entsprechenden Standorten? Dafür könnte das Vorkommen mehrerer Kugelspringer (Collembola) als Syninklusen bei *E. similis* n.sp. sprechen, die möglicherweise im Mulm der Bodenstreu gelebt haben. Die (rezenten) *Labulla*-Arten scheinen eine eher höhere Luft-Feuchtigkeit zu bevorzugen.
Das Fangetz der Spinnen der Gattung *Labulla* besteht lediglich aus einer einfachen Decke, Gerüstfäden fehlen. Die Spinnen hängen nicht unter der Decke, sondern lauern in einem Schlupfwinkel nahebei; ein für Baldachinspinnen ganz ungewöhnliches Verhalten. - Die heutigen *Labulla*-Arten kommen in ganz Europa vor, somit sowohl in gemäßigten als auch in subtropischen Klimaten (Mediterraneis).
Im Fangnetzteil beim ♂ einer *Custodela* sp. (CJW) im Baltischen Bernstein sind ein Springschwanz (Collembola) und einige Mücken (Diptera: Nematocera) konserviert. Mücken und Springschwänze sind als Beute auch von heutigen Baldachin-Spinnen bekannt.
Auf dem Hinterkörper einer Spinne der Gattung *Custodeles* sp. indet., ♂, F381/BB/AR/CJW, ist eine 0.35mm lange parasitische Milben-Larve der Familie Microtrombidiidae (Prostigmata) (det. A. WOHLTMANN) konserviert, siehe das Kapitel über Parasiten, Foto.
Reste von Haemolymphe (Abb. 40) und Reste von Verdauungssaft (?) (Abb. 39) sind beim Holotypus von *Custodela hamata* n. sp. konserviert, siehe unten.
Mit dem Holotypus von *Custodelela acutula* n. sp. sind fragliche Reste von Sperma und fragliche Reste eines Sperma-Netzes erhalten (Abb. 48), siehe unten.

SPIDERS IN BALTIC AMBER

Synonymy (*Linyphia* LETREILLE: See *Custodela* below)

PETRUNKEVITCH (1942ff) described - usually without exact knowledge of the genital structures and even according to juveniles only - new species and even new genera in

the family Linyphiidae which really are members of other families, see WUNDERLICH (1986) and below. In the year 1942 this author described members of several families (!) as Linyphiidae: Theridiidae, Nesticidae, Synotaxidae, questionable Araneidae and questionable Cyatholipidae (Cyatholipidae and Synotaxidae were regarded as lower taxa of other families at that time). On the other hand he mistook *Memoratrix*, a member of the Pimoidae or Linyphiidae as a member of the Tetragnathidae (Metinae).

In my opinion only *Custodela* and probably *Obnisius* (?= *Custodela*, see below) really are members of the Linyphiidae; *Memoratrix* is more likely a genus of the Pimoidae than of the Linyphiidae.-The relationships of *Meditrina* PETRUNKEVITCH 1942 (♂ unknown) are quite unsure; according to the short and robust leg I regard the genus not as a member of the Linyphiidae but more likly as a member of the Araneidae. - Acording to the shape of the prosoma and the pedipalpus I regard *Malleator* PETRUNKEVITCH 1942 as a junior synonym of *Episinus* LATREILLE 1809 (= *Flegia* KOCH & BERENDT 1854) (**n. syn.**). According to the absence of femoral and metatarsal bristles and the plate-shaped tibia of the ♂-pedipalpus - which was misunderstood by PETRUNKEVITCH as "external apophysis" - I regard *Impulsor* PETRUNKE-VITCH 1942 also as a member of the Theridiidae; I investigated the holotype. *Eopopino* PETRUNKEVITCH 1942 is a member of the family Nesticidae, see WUNDERLICH (1986).
According to the sickle-shaped and free paracymbium *Obnisius* PETRUNKEVITCH 1942 (♀ unknown) should be a member of the Linyphiidae (? = *Custodela*), see below. Prosoma and ♂-pedipalpus - the left bulbus of the holotype is expanded - and are drawn quite inaquately. - *Liticen* PETRUNKEVITCH 1942 is a synonym of *Acrometa* PETRUNKEVITCH 1942 (most probably a member of the family Synotaxidae, see WUNDERLICH (1986). - *Mystagogus* PETRUNKEVITCH 1942: The holotype of the type species (investigated by me) is a subadult male, not an adult male as suggested by PETRUNKEVITCH and the opisthosoma is posteriorly not wider than anteriorly. According to PETRUNKEVITCH a colulus is absent but it may really be present. According to PETRUNKEVITCH the tarsal claws are smooth (but really so?). The relationships of the genus are unclear; according to the absence (?) of tarsal claws *Mystagogus* may be a member of the family Cyatholipidae. - According to the plate-shaped elongated tibia of the ♂-pedipalpus I regard *Impulsor* PETRUNKEVITCH 1942 (♀ unknown) as a member of the Theridiidae. I investigated the holotype; the structures of the ♂-pedipalpus are drawn very inexactly by PETRUNKEVITCH.
I regard *Antopia* MENGE in KOCH & BERENDT 1854 as a member of the Theridiidae and not of the Linyphiidae (an older synonym of *Eomysmena* PETRUNKEVITCH 1942?).

Fossil members of the subfamily Erigoninae - no record from Baltic amber! -: See WUNDERLICH (1986: 27).

Previously - WUNDERLICH (1986: 27) - I regarded 7 juvenile fossil spiders in Baltic amber of the coll. BERENDT in the PMHUB as syntypes of *Micryphantes regularis* KOCH & BERENDT 1854. But MENGE in KOCH & BERENDT (1854: 39) noted that these specimens are juveniles of several species and that none specimen fit in the fig. 28 of the original description. Therefore these spiders of the coll. BERENDT are not syntypes of *Micryphantes regularis*.

Synonymie

Linyphia LATREILLE: See *Custodela* below.

PETRUNKEVITCH (1942ff) hat - gewöhnlich ohne genaue Kenntnis der Genital-Strukturen, z.T. sogar lediglich nach Jungspinnen - neue Arten und sogar neue Gattungen als Linyphiidae beschrieben, die tatsächlich zu anderen Familien gehören, vgl. WUNDERLICH (1986) und unten. Dieser Autor hat im Jahre 1942 Vertreter verschiedener Familien (!) als Linyphiidae beschrieben: Theridiidae, Nesticidae, Synotaxidae, fragliche Araneidae und fragliche Cyatholipidae (Cyatholipidae und Synotaxidae wurden damals als untergeordnete Taxa anderer Familien aufgefaßt). Andererseits hat er eine Gattung der Pimoidae oder Linyphiidae - *Memoratrix* - als Vertreter der Familie Strekkerspinnen (Tetragnathidae, Unterfamilie Metinae) mißdeutet, siehe unten.

Von den von PETRUNKEVITCH (1942ff) beschriebenen Gattungen gehören meiner Ansicht nach nur *Custodela* und möglicherweise *Obnisius* (?= *Custodela*) tatsächlich zu den Baldachinspinnen; *Memoratrix* ist eher ein Vertreter der Pimoidae als der Linyphiidae. - Die Beziehungen von *Meditrina* PETRUNKEVITCH (1942 (♂ unbekannt) sind ganz unsicher; nach den kurzen und robusten Beinen halte ich die Gattung nicht für einen Vertreter der Linyphiidae, sondern eher für einen der Araneidae. - *Malleator* PETRUNKEVITCH 1942 halte ich nach der Form des Prosomas und dem ♂-Pedipalpus für ein Synonym von *Episinus* LATREILLE 1809 (= *Flegia* KOCH & BERENDT 1854) (Theridiidae) (**n. syn.**). - *Impulsor* PETRUNKEVITCH 1942 halte ich nach den fehlenden Borsten der Femora und Metatarsen und der plattenartig verlängerten Tibia des ♂-Pedipalpus - von PETRUNKEVITCH irrtümlich als "external apophysis" mißdeutet - (der Holotypus lag mir vor) ebenfalls für einen Vertreter der Theridiidae. - *Eopopino* PETRUNKEVITCH 1942 hat sich als ein Vertreter der Familie Nesticidae erwiesen, vgl. WUNDERLICH (1986).
Obnisius PETRUNKEVITCH 1942 (♀ unbekannt) dürfte nach dem sichelförmigen und freien Paracymbium ein Vertreter der Linyphiidae sein (?= *Custodela*). Prosoma und ♂-Pedipalpus - der Holotypus lag mir vor - sind bei PETRUNKEVITCH (1942: Abb.273-274) ganz ungenau dargestellt; der linke Pedipalpus des Holotypus ist expandiert. - *Liticen* PETRUNKEVITCH 1942 hat sich als ein Synonym vom *Acrometa* PETRUNKEVITCH 1942 (wahrscheinlich Familie Synotaxidae) erwiesen, vgl. WUNDERLICH (1986).- *Mystagogus* PETRUNKEVITCH 1942: Bei dem Holotypus der Typusart - er lag mir vor - handelt es sich nicht wie von PETRUNKEVITCH angegeben um ein adultes ♂, sondern um ein subadultes ♂, und das Opisthosoma ist nicht wie angegeben hinten breiter als vorn (es kann lagebedingt so erscheinen). Nach PETRUNKEVITCH fehlt ein Colulus; ich glaube allerdings einen solchen erkennen zu können. Auffällig sind die nach PETRUNKEVITCH zahnlosen Tarsal-Krallen (tatsächlich so?). Die Beziehungen der Gattung sind unsicher; nach den ?fehlenden Zähnen der Tarsal-Krallen könnte es sich um einen Vertreter der Cyatholipidae handeln. - *Impulsor* PETRUNKEVITCH 1942 (♀ unbekannt) halte ich nach der plattenartig verlängerten Tibia des ♂-Pedipalpus für

einen Vertreter der Theridiidae. Der Holotypus lag mir vor; die Strukturen des ♂-Pedipalpus sind bei PETRUNKEVITCH ganz ungenau dargestellt.
Antopia MENGE in KOCH & BERENDT 1854 halte ich für keine Gattung der Linyphiidae, sondern eher der Theridiidae (älteres Synonym von *Eomysmena* PETRUNKEVITCH 1942?).

Zur Kenntnis der fossilen Vertreter der Unterfamilie Erigoninae (bisher kein Nachweis im Baltischen Bernstein!): Siehe WUNDERLICH (1986: 27).

Früher - WUNDERLICH (1986: 27) hielt ich 7 juvenile fossile Spinnen im Baltischen Bernstein aus der Slg. BERENDT (PMHUB) für Syntypen von *Micryphantes regularis* KOCH & BERENDT 1854. Nach MENGE in KOCH & BERENDT (1854: 39) sind diese Spinnen allerdings Juvenile verschiedener Arten und keine stimmt mit Abb. 28 der Original-Beschreibung überein. Diese Spinnen der Slg. BERENDT sind daher keine Syntypen von *Micryphantes regularis*.

Remark on taxa from the Bitterfeld deposit:

One genus - *Custodelela* n. gen. (one species) - and six species of other genera are only known from the Bitterfeld deposit, see the list below. No member of the genus *Eolabulla* n. gen. (six species) is known from the Bitterfeld deposit.

List of the fossil taxa in Baltic amber in the order as described in this paper:

(Excl. species of the questionable genus *Memoratrix*, see Pimoidae and below)

Bitt. dep. = found at the Bitterfeld deposit.

1. **Eolabulla** n.gen.,
   falcata n.sp., gladiformis n.sp., laminata n.sp., perforata n.sp., sagitta n.sp., similis n.sp., sp. indet. (subad. ♂), sp.indet. (♀),
2. **Paralabulla** n.gen.,

bitterfeldensis n.sp. (Bitt. dep.), succinifera n.sp., P. sp. indet., ?P. dubia n.sp.,

3. Succiphantes n.gen.,
tanasevitchi n.sp., velteni n.sp.,

4. Eophantes n.gen.,
complicatus n.sp.,

5. Agynetiphantes n.gen.,
gibbiferus n.sp.,

6. Custodelela n.gen.
hamata n. sp. (Bitt. dep.),

7. Custodela PETRUNKEVITCH 1942,
acuta n.sp., acutula n.sp., bispina n.sp. (Bitt. dep.), bispinosa n.sp. (Bitt. dep.), cheiracantha (KOCH & BERENDT 1854), clava n.sp., curva n.sp., curvata n.sp., divergens n.sp., expandens n.sp., falcata n.sp., femurspinosa n.sp., henningseni n.sp., kochi n.sp., laminata (WUNDERLICH 1988) (sub ?Lepthyphantes), lanx n.sp., oblonga (KOCH & BERENDT 1854), obtusa n.sp., parva n.sp., pseudokochi n.sp., stridulans n.sp., sp. near stridulans (Bitt. dep.), tibialis n.sp., sp. (♀) (Bitt. dep.), ?Custodela sp. indet., ♀, ?Custodela tenuipes (PETRUNKEVITCH 1942) (sub Obnisius),

8. Succineta n.gen.,
discoidalis n.sp., brevispina n.sp., ?S. sp. indet. (♀).

(9. Memoratrix PETRUNKEVITCH 1942: Questionable Pimoidae, see below at the end of this paper)

Key to the fossil genera of the family Linyphiidae in Baltic amber:

Remarks: (1) Several taxa of the superfamily Araneoidea are similar to the Linyphiidae, mainly (a) the very rare members of the Pimoidae, see the paper on this family in this volume. In constrast to the fossil Linyphiidae in the fossil Pimoidae metatarsus I bears usually more than two bristles, and the paracymbium is not a free sclerite but fixed to the cymbium; (b) the extremely rare members of the family Baltsuccinidae, see the paper on the superfamily Araneoidea in this volume. In contrast to the fossil Linyphiidae there are two bristles very near to the base of metatarsus I and the genital structures are quite different in the Baltsuccinidae. - (2) Occasionally we find a subadult male of fossil Linyphiidae. Their pedipalpal tarsus is large, "swollen" and simple, without sclerites, e. g. in *Eolabulla* sp. (fig. 17) which has a "horn" at its end. In this "horn" most probably the long suprategular apophysis (fig. 16) is hidden. In such specimens only rarely the sure determination to the genus is possible. Subadult males of the genus *Episinus* (Theridiidae) may be similar in this respect but have no femoral or metatarsal bristles.

1 Metatarsus I and mostly II in all species except *Eolabulla falcata* with a dorsal bristle each in the basal and distal half (fig. 15). Large conductor/terminal apophysis present (e.g. T in fig. 13) 2

- Metatarsus I-II with one dorsal bristle in the basal half only (e.g. fig. 54). Small or large terminal apophysis. 3

2(1) Terminal apophysis widened distally, suprategular apophysis shorter and less sclerotized (figs. 29-32). Female unknown . Photos 261-263 . . . . . *Succiphantes*

- Terminal apophysis pointed, suprategular apophysis very long and strongly sclerotized (figs. 10-11,13). Epigyne of the questionable female figs. 18-19. Photo 257. . . *Eolabulla*

3(1) Pedipalpus: Tibia distinctly higher than long and with a curved dorsal spine (arrow in fig. 37), suprategular apophysis short and thick (fig. 38). . . . . *Agynetiphantes*

- Pedipalpus (e. g. figs. 20-21, 45, 53): Tibia usually not higher than long, a dorsal spine is absent. 4

4(1) Embolus very wide, flat and free visible (fig.100). Epigyne of the questionable female with a short and folded scapus (fig. 102). Photo 260 . . . . . *Succineta*

- Embolus thin, very long and free visible (e.g. figs. 29-30) or embolus hidden except the distal part (e.g. figs. 33, 53, 62). 5

5(4) Embolus very long and free visible (e.g. figs. 29-30). Epigyne of the questionable female with scapus and pseudoparmula (figs. 25-26). Photos 258-259 . . . . . *Paralabulla*

- Only the distal part of the embolus is visible (e.g. figs. 33,53,62). Epigyne with scapus only in *Custodela* (figs.86,95) or female unknown (*Eophantes*, *Custodelela*) 6

6(5) Lamella characteristica like a double claw, no fringed lamella (fig. 33), female unknown. . . . . *Eophantes*

- A fringed lamella is present (e.g. figs. 57, 61-62, 66). Epigyne as in figs. 87,96. 7

7(6) Suprategular apophysis hook-shaped (fig. 41), photos 255-256 . . . . . *Custodelela*

- Suprategular apophysis long, outstanding and scarcely bent (figs. 44-45, 60-62 . . . . . Photos 249ff . . . . . *Custodela*

Descriptions of the taxa

1. ***Eolabulla*** n. gen.

Diagnosis: Stridulating files of the chelicerae indistinct or absent. Metatarsus I mostly with 2 dorsal bristles in the basal and in the distal half (fig. 15) (only *falcata* with a single bristle1), the femora bear dorsal bristles, at least I with one prolaterally, tibia I with dorsal, lateral and ventral bristles. ♂-pedipalpus (e.g. figs. 3-4,9-12): Tibia bristle in a dorsal position, paracymbium complicated, basally with a posterior outgrowth and dorsally also often with outgrowths; conductor (probably the terminal apophysis) large, embolus long and thin, its position nearly circular and clockwise in the right pedipalpus, suprategular apophysis very long, protuding and slender. Body length (♂) 1.7-3.0mm, mostly nearly 3mm. Epigyne (figs. 18-19) with a long scapus.

Relationships: According to the plesiomorphic numerous leg bristles and the structures of the bulbus I regard the genus as a member of the Linyphiinae. According to the structures of the male pedipalpus - small tegulum, shape and position of the conductor and the long embolus - there are strong relationships to *Labulla* SIMON 1884 (extant, Europe, ?Africa); both may be sister groups. In *Labulla* there are more leg bristles (e. g. on the metatarsi), the male chelicerae are divergent distally, the tibia of the male pedipalpus is distinctly longer than wide, bears a blunt outgrowth and a bristle in a retrolaterail position in the middle of the tibia, the suprategular apophysis is shorter, the conductor is distinctly larger and the paracymbium is more simple. There are fine and indistinct cheliceral stridulating files in *Labulla* , prolateral femoral stridulating teeth of the pedipalpus are well developed. In *Eolabulla* I did discover no stridulating files, and because of the position stridulating teeth are not sure observable; in *perforata* such teeth are apparently absent. - In *Succiphantes* n. gen. there are also two bristles on the anterior metatarsi but the bulbus structures are more prominent, the suprategular apophysis is less sclerotized and may be divided apically. - In *Paralabulla* n. gen. metatarsus I bears only one bristle, cymbial outgrowths are absent, conductor and suprategular apophysis are smaller.

Type species: *Eolabulla laminata* n.sp.

Distribution: Tertiary Baltic amber forest; no material from the Bitterfeld deposit.

Key to the fossil species of the genus Eolabulla (♂):

1 Body length only 1.7mm. Length of the bristles on the pedipalpal patella and tibia < 0.2mm. Metatarsus I with 1 dorsal bristle in the basal half. Suprategular apophysis only slightly longer than the conductor/terminal apophysis, its tip thickened (figs. 3-5)..*falcata*

- Body length 2.4-3.2mm. Length of the bristles on the pedipalpal patella and tibia ≥0.3mm. Metatarsus I with 2 dorsal bristles in the basal and the distal half (fig. 15). Suprategular apophysis distinctly longer than conductor/terminal apophysis, its tip pointed (e.g. figs. 7-11). 2

2(1) Paracymbium basally-ventrally with a large outgrowth similar to *falcata*, suprategular apophysis thick (figs. 6-8). Bristles on patella/tibia of the ♂-pedipalpus 0.43/0.5mm long. . . . . *gladiformis*

- Paracymbium with smaller outgrowths, suprategular apophysis more slender (e.g. figs. 9-12). Bristles on patella/tibia of the ♂-pedipalpus up to 0.35/0.4mm long. 3

3(2) Paracymbium basally with a long outgrowth near the tibia (e. g. fig.9). 4

- Paracymbium most probably wothout a long outgrowth in this position. 5

4(3) Paracymbium (fig. 11) basally-dorsally with 2 outgrowths and without strong hairs. . . . . *perforata*

- Paracymbium (fig. 9) basally-dorsally with 3 outgrowths and with 2 strong (and some smaller) hairs . . . . . *laminata*

5(3) Bulbus: Fig.13. . . . . .*sagitta*

- Bulbus: Fig.16 (in different position as in fig.13!). . . . . *similis*

falcata. . . . . .ca 0.15-0.17mm
gladiformis . . . . .ca 0.43/0.5
laminata. . . . . .ca 0.35/?
perforata. . . . . ?0.35/0.4
sagitta. . . . . ca 0.3/ca 0.33
similis. . . . . ca 0.3/>0.3

Length of the male pedipalpal bristles on patella and tibia in the species of *Eolabulla*

***Eolabulla falcata* n. gen. n. sp.** (Fig. 3-5)

Material: Holotypus ♂ in Baltic amber, Zoolog. Mus. Kopenhagen, coll. V. HENNINGSEN no.12-4 1957.

Preservations and syninclusions: The spider is preserved on fissure at a layer in the corner of an orange amber piece. Body and legs are fairly well, the pedipalpi are well preserved. The anterior legs are partly cut off; at the right sind and partly ventrally is the body covered by a white emulsion, therefore eyes and chelicerae are partly hidden. - Some stellate hairs, excrement and detritus particles are also preserved in the amber piece.

Diagnosis (♂ ; ♀ unknown): Smallest known member of the genus, body length 1.7mm, metatarsus I with one dorsal bristle in the basal half only. Pedipalpus (figs. 3-5): Paracymbium with a large lateral and blunt outgrowth, supratgular apophysis fairly long only, thickened at the end, only sligthly longer than the conductor.

Description (♂):
Measurements (in mm): Body length about 1.7, prosoma length 0.85, leg I: tibia 0.9, metatarsus about 1.1, tarsus etwa 0.7?, right tibia II 0.95.
Colour: Prosoma and legs dark brown, opisthosoma light brown.
Prosoma (most parts are hidden): Clypeus longer than the field of the median eyes, eyes fairly large, posterior median eyes largest, separated by slightly more than its diameter, posterior row +/- straight. - Legs long, I distinctly longest, bristles numerous but only partly preserved, probably similar to *sagittata* n. sp. but a ventral tibia and a distal metatarsal bristle apparently absent. - Opisthosoma ovally, 1.5 times longer than high, scarcely covered with short hairs. - Pedipalpus (figs. 3-5): Paracymbium (the basal part is hidden) with a large blunt retrolateral outgrowth, bulbus with a large conductor/ terminal apophysis, a long embolus, a large lamella and a longer suprategular apophysis.

Relationships: The other species of *Eolabulla* are larger and metatarsus I bears 2 dorsal bristles.

Distribution: Tertiary Baltic amber forest.

***Eolabulla gladiformis* n. gen. n. sp.** (Fig. 6-8)

Material: Holotypus ♂ in Baltic amber, CJW.

Preservation and syninclusions: The spider is preserved in a clear yellow amber piece, ventrally it is partly covered by a white emulsion. Body and legs are altered partly by oxidation. The right leg II and the left legs III and IV are missing behind the patella by autotomy. All tarsi except the right tarsus IV are partly cut off, also the opisthosoma is ventrally cut off in the left half. - Above the left femur IV a small Acari larva is preserved; no stellate hairs but some thin spider's threads are furthermore present.

Diagnosis (♂; ♀ unknown): Pedipalpus (figs. 6-8): Patella and tibia bear a very long bristle each (0.43/0.5mm long), paracymbium with a large blunt ventral-basal outgrowth, suprategular apophysis wide, sword-shaped, the free part is 0.4mm long.

Description (♂):
Measurements (in mm): Body length 3.0, prosoma length 1.2, leg I: Femur about 2.5, patella 0.45, tibia 2.75, metatarsus 2.6, (tarsus partly cut off), length of the free part of the suprategular apophysis o.4mm.
Colour: Body and legs medium brown, body ?pyritized.
Prosoma: Caput not elevated, 8 eyes which are only fairly well preserved. Chelicerae large, not diverging; stridulating files and teeth not observable. - Legs long, scarcely covered with hairs, with long and thin bristles which are wll observable: Femora a dorsal bristle in the basal half (probably no bristle on IV), I additionally 1 in the middle or in the distal half, patellae 2 dorsal bristles (the distal bristle short), tibiae 2 dorsally and few short bristles apically, I additionally a lateral pair and a ventral pair in the distal half. Metatarsus I 2 dorsally, the other metatarsi probably with only 1 bristle. Paired tarsal claws short and slender. - Opisthosoma ovally, scarcely covered with short hairs. - Pedipalpi fairly well preserved (see above), most parts are hidden in the conductor.

Relationships: According to the large basal-ventral outgrowth of the paracymbium *falcata* is related; in *falcata* metatarsus I bears only 1 bristle, the bristles of the pedipalpus are distinctly shorter, the outgrowth of the paracymbium is even larger and the suprategular apophysis is thickened at the tip.

Distribution: Tertiary Baltic amber forest.

***Eolabulla laminata* n. gen. n. sp.** (Fig. 9)

Material: Holotypus ♂ in Baltic amber, F392/BB/AR/LIN/CJW.

Preservation and syninclusions: The spider is situated on an amber layer at the end of a small amber piece. Most parts of the left embolus are cut off, the whole opisthosoma and the distal parts of the chelicerae are covered by a white emulsion and has a dorsal depression. Several leg articles are cut off, only the leg pair IV is complete. -

Above the right metatarsus IV a stellate hair is preserved, left beneath the spider a ?juv. spider (indet.) is preserved in which the opisthosoma is missing.

Diagnosis (♂; ♀ unknown): Pedipalpus (fig. 9): Paracymbium with a ventral-basal outgrowth near the tibia, a tripartite dorsal-basal outgrowth and several hairs (only three are drawn) are present; suprategular apophysis very long and bent.

Description (♂):
Measurements (in mm): Body length about 3.0, prosoma length 1.3, metatarsus IV 2.15, free part of the suprategular apophysis 0.6.
Colour: Prosoma and legs dark brown, opisthosoma grey.
Prosoma with a distinct fovea, clypeus longer than the field of the median eyes, not strongly protruding. Eyes large, anterior median eyes the largest and protruding, posterior row slightly procurved, posterior median eyes only fairly large, separated by more than one diameter. Chelicerae large, anterior margin with few large teeth. - Legs long and with long bristles, basal bristle on tibia I 3.7 times longer than the diameter of the tibia; number of the bristles similar to *sagitta*. - Opisthosoma ovally, scarcela covered with short hairs; spinnerets hidden. - Pedipalpus (fig. 9, see above): Tibia dorsally with stronger hairs, patella and tibia both with a thin dorsal bristle which are not shown in the fig., the paracymbium bears a long distal branch, embolus long and thin.

Relationships: In *perforata* the paracymbium is different, there are no longer hairs and only 2 basal-dorsal outgrowths.

Distribution: Tertiary Baltic amber forest.

***Eolabulla perforata* n. gen. n. sp.** (Figs. 10-11)

Material: Holotypus ♂ in Baltia amber, F393/BB/AR/LIN/CJW.

Preservation and syninclusions: The spider is preserved in a clear and yellow amber piece which is pierced; the hole goes throught the right tibia and metatarsus I. Most ventral parts of the prosoma are covered by a white emulsion, the dorsal aspect of the spider is partly hidden by an amber layer. The left legs I and II are cut off through the tibia, parts of the right tibia and metatarsus II are cut off. - Small detritus particles are also preserved in the amber piece but no stellate hairs.

Diagnosis (♂; ♀ unknown): Pedipalpus (figs. 10-11): Paracymbium ventro-basally with a straight outgrowth, dorsally with 2 outgrowths, suprategular apophysis and embolus long.

Description (♂):
Measurements (in mm): Body length 3.0, prosoma length 1.3, tibia + metatarsus I 5.6, tarsus I 1.4, length of the free part of the suprategular apophysis 0.6.
Colour: Prosoma and legs dark brown, opisthosoma yellow brown.
Prosoma with a distinct fovea, caput slightly elevated as in other congeneric species. Eyes large, posterior row slightly procurved, chelicerae large. - Legs long, order of the length I/II/IV/III, with long bristles similar to *sagitta*. Paired tarsal claws slender, without long teeth. - Opisthosoma ovally, scarcely covered with short hairs. - Pedipalpus: See above.

Relationships: See *laminata* n. sp.

Distribution: Tertiary Baltic amber forest.

***Eolabulla sagitta* n. gen. n. sp.** (Figs. 12-14)

Material: Holotypus ♂ in Baltic amber, F394/BB/AR/LIN/CJW.

Preservation and syninclusions: The holotype and the amber piece are preserved in artificial resin; it is nearly completely and well preserved, ventrally covered by a white emulsion, partly hidden by reflecting structures. The right leg IV is broken at the end of the tibia, the right metatarsus is missing, the right tarsus has an unnatural position. The left pedipalpus is well observable in its ventral aspect. - There are some gas bubbles preserved in the amber piece and in the right femora III and IV; no stellate hairs.

Diagnosis (♂; ♀ unknown): Legs very long, pedipalpus (figs. 12-14): Paracymbium with small outgrowths, suprategular apophysis very long, much longer than the conductor.

Description (♂):
Measurements (in mm): Body length about 2.4, prosoma length about 1.2, leg I: Femur 1.9, patella about 0.35, tibia 2.1, metatarsus 2.3, tibia II 2.0, tibia III 0.95, tibia IV 1.2, length of the basal bristle of tibia II 0.2.
Colour: Prosoma and legs medium brown, opisthosoma yellow brown.
Prosoma with a distinct fovea. Most eyes are hidden. Clypeus longer than the field of the median eyes, chelicerae long, slightly divergent (the margins are hidden), no (distinct) stridulating files. - Legs very long and slender, order I/II/IV/III, with numerous long bristles: At least femora I-II 1 dorsally, I additionally 1 prolaterally. All patellae and tibiae 2 dorsally, at least tibia I additionally a lateral and a ventral pair. Metatarsus I with 2 dorsal bristles, the remaining metatarsi bear only one. - Opisthosoma ovally, with short

bristles. - Pedipalpus (figs. 12-14; see above): Patella nearly sphaerically, tibia distinctly larger, about as long as wide, both with a dorsal bristle. Origin of the embolus probably prolaterally, its position not naturally within the conductor; suprategular apophysis long and slender.

Relationships: Probably *E. similis* n. sp. is most related; in *similis* the bulbus structures are different but it was impossible to draw both bulbi in the same position.

Distribution: Tertiary Baltic amber forest.

***Eolabulla similis* n. gen. n. sp**. (Figs. 15-16)

Material: Holotypus ♂ in Baltic amber, F395/BB/AR/LIN/CJW.

Preservation and syninclusions: The spider is omly fairly well but completely preserved. Parts of the spider are hidden, e. g. eyes and chelicerae; the left pedipalpus is well observable in the ventral aspect. - Some Collembola, spider threads, numerous stellate hairs and a "Cicadina" larva are also preserved in the amber piece.

Diagnosis (♂; ♀ unknown): Pedipalpus (fig. 14; the paracymbium is insufficiently observable): Bulbus basally with a large sclerite (part of the lamella?), suprategular apophysis long and slender.

Description (♂):
Measurements (in mm): Body length 2.6, prosoma length about 1.3, leg I: Tibia 2.1, metatarsus 2.4, tarsus 1.1, tibia II 1.75.
Colour mainly dark brown, opisthosoma more light.
Most parts of the prosoma are hidden. - legs long and slender, covered with short hairs, I not distinctly longer than II or IV, with long bristles (fig. 15), femora: At least I-III with a dorsal bristle in the basal half, I probably with 1 prolateral bristle, patellae and tibiae 2 dorsally, tibia I baers at least one lateral pair, metatarsus I 2 dorsally, the others 1. - Opisthosoma ovally, with short hairs, 1.6 times longer than high. - Pedipalpus: See above.

Relationships: See *E. sagitta* n. sp.

Distribution: Tertiary Baltic amber forest.

***Eolabulla* sp. indet.** (subad. males) (fig. 17) Photo 257

Material: 3 subad. ♂ in Baltic amber, F13/BB/AR/LIN/CJW, F14/BB/AR/LIN/CJW and F396/BB/AR/LIN/CJW.

In these - probably not conspecific - males metatarsus I bears two dorsal bristles, the tarsus of the pedipalpus (fig. 17) is very large and bears a horn-shaped dorsal-apical outgrowth which most probably encloses the suprategular apophysis. The body length of the specimens is 2.2 to 2.6mm. Such subadult Linyphiidae males are not too rare. In *Custodela* males only a single dorsal bristle is present on metatarsus I.

Distribution: Tertiary Baltic amber forest.

***Eolabulla* sp. indet. 1 and 2** (2 females) (figs. 18-19)

Material (in Baltic amber): 2 ♀: (1) sp. indet. 1: F12/BB/AR/LIN/CJW; (2) sp. indet. 2: Coll. HERRLING in Hamburg.

The body length of these females is 2.3mm, the prosoma length 1.0mm. Metatarsus I bears 2 dorsal bristles. The scapus of the epigyne in sp. 2 is basally wider than in sp. 1 (figs. 18-19). Probably these females are conspecific with one of the species which are are described above and which are based on males.

Distribution: Tertiary Baltic amber forest.

2. ***Paralabulla* n. gen.**

Diagnosis: Stridulating files of the chelicerae most probably absent. Leg bristles: All metatarsi beaer 1 dorsal bristle (fig. 24), femora: Only I with 1 prolateral (no dorsal bristles). Pedipalpus (figs. 20-23): Cymbium short, paracymbium simple, conductor large, embolus long and thin, distally strongly curved and nearly circular, median apophysis large and divided longitudinally. Epigyne of a questionable female bears a short scapus and a long "pseudoparmula".

Relationships: See *Eolabulla* n. gen.

Type species: *Paralabulla bitterfeldensis* n. sp.

Distribution: Tertiary Baltic amber forest incl. Bitterfeld deposit.

***Paralabulla bitterfeldensis* n. gen. n. sp.** (Figs. 20-22)

Material: Holotypus ♂ in Baltic amber from Bitterfeld, coll. H. GRABENHORST in Celle.

Preservation and syninclusions: The spider is well and nearly completely preserved, only the right leg I is missing behind the patella (autotomy), the right side of the body is slightly covered by a white emulsion. The opisthosoma is slightly deformed. Right of the spider a fissure in the amber is present, behind the spider a stellate hair and a Nematocera.

Diagnosis (♂; ♀ unknown): The bulbus (fis. 20-22) bears a long embolus and a wide conductor.

Description (♂):
Measurements (in mm): Body length 1.6, prosoma length 0.8, leg I: Femur 1.1, patella 0.17, tibia 1.2, metatarsus 1.3, tarsus 0.7, tibia II 0.9, tibia III 0.55, tibia IV 0.7.
Colour medium brown.
Prosoma high, with few dorsal hairs and a distinct fovea. Eyes of medium size, posterior row recurved, posterior median eyes separated by its diameter. Clypeus long, basal articles of the chelicerae most probably without stridulating files but pedipalpus with a small ?stridulating spine, teeth not observable; coxae IV separated by a diamer. - Legs (fig. 24): long and slender, order I/II/IV/III, indistinctly covered with hairs. Bristles long, the basal bristle on tibia IV 4 1/2 times longer than the diameter of the tibia. Femora: Only 1 prolaterally on I, all tibiae dorsally 2, I additionally a lateral pair, one metatarsal bristle. - Opisthosoma ovally, hairs indistinct; colulus fairly large. - Pedipalpus (figs. 20-22, see above): Patella slightly longer than wide, tibia about as long as wide, the tibial bristle twice as long as the patellar bristle, paracymbium toothless.

Relationships: In *P. succinifera* embolus and conductor are more slender, the position of the distal part of the embolus and the lamella are different.

Distribution: Tertiary Baltic amber forest, Bitterfeld deposit.

***Paralabulla succinifera* n. gen. n. sp.** (fig. 23) Photo 259

Material: Holotypus ♂ in Baltic amber, CJW.

Preservation and syninclusion: The spider is beautifully and completely preserved. The right leg I is slightly deformed (by heating?), the left leg IV is broken through the tibia, the embolus is also broken (arrow in fig. 23), the left pedipalpus is slightly covered by a white emulsion. - A large crack is running through/around the body. No stellate hairs.

Diagnosis (♂; ♀ unknown): Embolus (fig. 23) very long, a sclerotized tooth is present distally of the median appophysis.

Description (♂):
Measurements (in mm): Body length 1.7, prosoma length 0.75, tibia I 1.2.
Colour: Prosoma and legs dark brown, opisthosoma yellow grey.
Prosoma, legs and opisthosoma similar to *E. bitterfeldensis* but chelicerae laterally not observable. - Pedipalpus: Fig. 23, see above.

Relationships: See *P. bitterfeldensis* n. sp.

Distribution: Tertiary Baltic amber forest.

***Paralabulla* sp. indet.** (fig. 24)

Material: 1 ♂ in amber from Bitterfeld, Palaeontol. Inst. Humboldt University Berlin no. MB.A.516.

The preservation is well, the bulbi are bent to the body and only insufficiently observable, the embolus is similar to *P. succinifera*, the body length is 1.4mm. Leg I: Fig. 24.

Distribution: Baltic amber forest, Bitterfeld deposit.

?***Paralabulla dubia* n. gen. n. sp.** (Figs. 25-26) Photo 258

Material: Holotypus ♀ in Baltic amber, F422/BB/AR/LIN/CJW.

Preservation and syninclusions: The spider is completely preserved, body and legs are covered by a white emulsion at large parts but the epigyne is free. - No stellate hairs.

Diagnosis (♀; ♂ unknown): Epigyne (figs. 25-26) large and prominent, with a pair of large grooves, anteriorly with a short scapus, and with a long "pseudoparmula" (see below).

Description (♀):
Measurements (in mm): Body length about 2.8, tibia I about 1.6, metatarsus I about 1.65, tarsus I 0.85.
Colour mainly orange brown.
The prosoma is completely hidden. Tarsus of the pedipalpus with few long hairs; the tip is hidden. Legs (most parts are hidden) long, with long bristles, tibiae 2 dorsally and at least a pair of laterals, all metatarsi a dorsal bristle in the basal half similar to fig. 24. Opisthosoma ovally, with few dorsal hairs, colulus large. Epigyne (see also above): The origin of the large outgrowth appears not to be at the posterior margin of the epigyne but inside to the anterior margin; therefore I prefer to call this structure a "pseudoparmula". The small (anterior) scapus is hairy, the "pseudoparmula" is hairless.

Relationships: In contrast to *Custodela* and *Eolabulla* - see the key - the epigyne bears a "pseudoparmula" in the questionable female of *Paralabulla*; in most members of *Eolabully* only one metatarsal bristle is present. The epigyne of the questionable female of *Paralabulla* is similar to the epigyne of *Pityohyphantes* SIMON 1929 (extant, Holarctic Region). In *Pityohyphantes* the structures of the male pedipalpus are quite different to *Paralabulla*.

Distribution: Tertiary Baltic amber forest.

3. ***Succiphantes* n. gen.**

Diagnosis (♂; ♀ unknown): Metatarsus I bears (in the type species!) two bristles, one in the basal half and one in the distal half (fig. 28). ♂-pedipalpus (figs. 29-31): Embolus long and thin, its distal part lying in a large conductor (= terminal apophysis) (terminal apophysis divided in the type species).

Relationships: See *Eolabulla* and *Custodela*.

Type species: *Succiphantes velteni* n. sp.

Distribution: Tertiary Baltic amber forest.

***Succiphantes velteni* n. gen. n. sp.** (Figs. 27-31) ¡Photos 262-263

Derivatio nominis: The species is named after JÜRGEN VELTEN in Idstein who kindly presented rare arachnids for scienctific investigations.

Material (in Baltic amber): Holotypus ♂, F260/BB/AR/LIN/CJW; 1♂ paratypus a) with two separated amber pieces F398/BB/AR/LIN/CJW; 1♂ paratypus b) coll. JÜRGEN VELTEN.

Preservation and syninclusions: (1) Holotypus: The spider is preserved in a clear yellow amber piece and is nearly complete, only the right tarsus III is partly cut off. A reflecting structure is situated in contact behind the spider, a second one transverse through the body. Most parts of the spider are covered by a white emulsion, so the opisthosoma completely. - Some bubbles but no stellate hairs; (2) paratypus a): The spider is fairly well preserved and ventrally covered by a white emulsion. The right leg I is broken off behind the patella and lying in front of the spider. - Few stellate hairs are preserved in the amber pieces with the spider; (3) paratypus b): The spider is well and nearly completely preserved, the right leg II is missing behind the patella (autotomy), the right legs III and IV are missing behind the base of the metatarsus. Both bulbi are partly expanded. - Some detritus particles and stelate hairs are preserved with the spider.

Diagnosis (♂; ♀ unknown): Pedipalpus (figs. 29-31): Terminal apophysis (conductor) very large, suprategular apophysis wide and divided apically.

Description (♂):
Measurements (in mm): Body length 2.6, prosoma: Length 1.3, width 1.1, leg I: Femur 1.5, patella 0.48, tibia 1.95, metatarsus 2.0, tarsus 1.05, tibia II 1.6, tibia III 1.15, tibia IV 1.4.
Colour: Prosoma and legs dark brown, opisthosoma - it is covered by a white emulsion - light grey.
Prosoma: Caput only slightly elevated, fovea distinct, eyes large, posterior row slightly procurved, posterior median eyes separated by less than their diameter. Clypeus distinctly longer than the field of the median eyes. Chelicerae large, not diverging, retrolaterally with fine stridulating ridges (fig. 27), teeth hidden. - Legs long, covered with short hairs, with numerous long and straight bristles: All femora bear 1 dorsally in the basal half, I additionally a prolateral one in the middle, patellae 2 dorsally, tibiae (fig. 28) 2 dorsally and few short apically, II 1 retrolaterally and 1 retroventrally, metatarsus I 2 dorsally, II-IV a dorsal bristle in the basal half. Position of the metatarsal trichobothrium I-II in 0.2, absent on IV. - Opisthosoma ovally, with short hairs. - Pedipalpus (figs. 29-31): Patella as long as wide, patella and tibia with a longer retrodorsal bristle, cymbium with a small hump, paracymbium with a large outgrowth, suprategular apophysis divided apically, embolus long and thin, guided distally by a large conductor (terminal apophysis), lamella insufficiently observable.

Relationships: See *S. tanasevitchi* n. sp.

Distribution: Tertiary Baltic amber forest.

***Succiphantes tanasevitchi* n. gen. n. sp.** (Fig. 32) Photo 261

Derivatio nominis: This species is dedicated to the well-known Russian specialist of the spider family Linyphiidae, ANDREI TANASEVITCH.

Material: Holotypus ♂ in Baltic amber, F423/BB/AR/LIN/CJW.

Preservation and syninclusions: The spider is excellently preserved, an emulsion is absent. Bubbles cover the anterior coxae, the left leg I is broken behind the patella, the left leg II is broken off near the end of the femur, the left leg III is cut off at the end of the patella, some tarsi are partly cut off, too. - Some stellate hairs are also preserved.

Diagnosis (♂;♀, unknown): Suprategular apophysis bent and pointed, terminal apophysis complicated (fig. 32).

Description (♂):
Measurements (in mm): Body length 3.1, prosoma length 1.5, leg I: Femur 2.7, tibia 2.75, metatarsus II 2.3.
Colour: Prosoma and legs dark brown, opisthosoma yellow brown.
Prosoma fine rugose, with few short hairs. Eyes as in *velteni*. Clypeus and chelicerae long, chelicerae as long as the hight of the caput, with numerous distinct lateral stridulating files in a wide field, at least the anterior margin with few teeth. - Legs (only the right leg II is complete) long and slender. Bristles similar to *velteni* but the right tibia I bears a pair of short ventral bristles. Position of the metatarsal II trichobothrium in 0.17. - Opisthosoma 1.8 times longer than high, covered with indistinct short hairs, colulus of medium size. - Pedipalpus (fig. 32): Patella and tibia with a dorsal bristle, the tibial bristle larger, tibia higher than long, with at least one dorsal trichobothrium, cymbium with a retrodorsal hump, the paracymbium bears a large posterior outgrowth, suprategular apophysis long, pointed and bent downwards.

Relationships: In *S. velteni* n. sp. the suprategular apophysis is widened and divided apically, the shape of the terminal apophyses is different.

Distribution: Tertiary Baltic amber forest.

4. ***Eophantes* n. gen.**

Diagnosis (♂; ♀ unknown): Femur I with a dorsal and a prolateral bristle, metatarsus I with 1 dorsal bristle. Pedipalpus (figs. 33-35): Cymbium with an outgrowth, paracymbium simple, lamella characteristica divided, like a double claw (sickle-shaped), terminal apophysis also divided (two or three parts), embolus thin (most parts are hidden), suprategular apophysis long and slender, bent upwards.

Relationships: According to the chaetotaxy and the simple sickle-shaped paracymbium *Custodela* may be ralated; in *Custodela* the terminal apophysis and the lamella characteristica are quite different.

Type species: *Eophantes complicatus* n. sp.

Distribution: Tertiary Baltic amber forest.

***Eophantes complicatus* n. gen. n. sp.** (Figs. 33-35)

Material: Holotypus ♂ in Baltic amber, F391/BB/AR/LIN/CJW.

Preservation and syninclusions: The spider is well and completely preserved, most parts of the opisthosoma and some parts of the pedipalpi are covered by a white emulsion. The left bulbus seems to be partly expanded. - The amber layer around the spider is partly darkened, most probably the amber piece was heated in an autoclave. Some stellate hairs are also preserved with the spider.

Diagnosis (♂; ♀ unknown): See the diagnosis of the genus.

Description (♂):
Measurements (in mm): Body length about 1.8, prosoma length 0.9, leg I: Femur 1.2, patella 0.3, tibia 1.4, metatarsus 1.35, tarsus 0.8.
Colour: Body and legs - apparently artificial - darkened brown, opisthosoma light brown.
Prosoma with a high and concave clypeus and a distinct fovea. Caput raised, 8 large eyes, large chelicerae with at least one large tooth on the anterior margin; fine lateral stridulating files; the mouth parts are hidden. - Legs long and slender, its order I/IV/II/III, metatarsus I shorter than tibia I. Bristles long, the basal one on tibia I 1 1/2 times longer than the diameter of the tibia, femora 1 dorsally and at least 1 prolaterally on I, patella 2 dorsally (the basal one short), anterior tibiae 2 dorsally, 1 ventrally, a pair laterally and apical ones; all metatarsi 1 dorsally in the basal half; position of the metatarsal tricho-

bothrium I in 0.34, absent on IV. - Opisthosoma ovally, with indistinct hairs. - Pedipalpus (figs. 33-35, see also above): Tibial bristle slightly longer than the patellar bristle.

Relationships: See above.

Distribution: Tertiary Baltic amber forest.

5. ***Agynetiphantes* n. gen.**

Diagnosis (♂;♀ unknown): Only one metatarsal bristle is present, chelicerae distally diverging (fig. 36), pedipalpus (figs. 37-38): Tibia distinctly higher than long, with a ventral outgrowth and a curved dorsal spine (arrow in fig. 37), dorsal cymbial outgrowth absent, paracymbium simple and sickle-shaped, embolus slender and of medium length, suprategulum short and thick; a distinct FICKERT's gland is present.

Relationships: In other Linyphiidae of the Baltic amber forest the chelicerae are not diverging and a curved spine of the pedipalpal tibia is absent. According to the bulbus structures - especially the presence of a FICKERT's gland - *Agynetiphantes* could be a member of the subfamily Micronetinae which is extremely rare in Baltic amber, see *Succineta* n. gen. but paracymbium, lamella, embolus and conductor are similar to *Custodela*.

Type species: *Agynetipjantes gibbiferus* n. sp.

Distribution: Tertiary Baltic amber forest.

***Agynetiphantes gibbiferus* n. gen. n. sp.** (Figs. 36-38)

Material: Holotypus ♂ in Baltic amber, F22/BB/AR/LIN/CJW.

Preservation and syninclusions: The spider is well and completely preserved, the ventral part of the body and one side of the legs is covered by a white emulsion. A large gas bubble is preserved within the prosoma. - Some stellate hairs, few detritus particles and a long antenna of an insect are preserved in the same amber piece.

Diagnosis: See above.

Description (♂):
Measurements (in mm): Body length 1.5, prosoma length 0.7, leg I: Femur 2.2, patella 0.5, tibia 2.35, metatarsus 2.2, tarsus 1.3, tibia IV 1.9.
Colour yellow brown.
Prosoma nearly hairless, fovea distinct, 8 large eyes in a compact group, posterior row straight, clypeus longer than the field of the medium eyes, chelicerae long, diverging distally and with a prodistal hook; lateral stridulating files probably absent, teeth hidden. - Legs long and slender, covered with indistinct hairs, order I/II/IV/III, metatarsus I shorter than tibia I. Bristles short and thin: Femora 1 dorsally in the middle, I additionally a prolateral bristle in the distal half, patellae 2 dorsally, tibiae 2 dorsally and only I additionally a prolateral bristle in the distal half, no apically, all metatarsi 1 in the basal half. Position of the trichobothrium of metatarsus I in 0.2. - Opisthosoma ovally, posteriorly narrow, covered with indistinct hairs. - Pedipalpus (figs. 37-38, see above): Patella and tibia short, both with a dorsal bristle; a large FICKERT's gland is present Lamella characteristica u-shaped, in a ventral position, directed retrolaterally. The embolus is partly hidden by the conductor in the retrolateral view.

Relationships: See above.

Distribution: Tertiary Baltic amber forest.

6. ***Custodelela* n. gen.**

Diagnosis (♂; ♀ unknown): Leg bristles: Metatarsus I 1 dorsally, tibia I-II 2 dorsally, I a pair laterally, II 1 retrolaterally, ventrally none. No cheliceral stridulating files. Pedipalpus (figs. 41-42): Cymbium with a basal horn, paracymbium basally divided, suprategular apophysis short and hook-shaped, position of the embolus retrolaterally of the conductor.

Relationships: Chaetotaxy, cymbium and paracymbium are as in *Custodela* PETRUNKEVITCH 1942 but in *Custodela* an long, outstanding and slightly bent suprategular apophysis is present.

Type species: *Custodelela hamata* n. sp.

Distribution: Tertiary Baltic amber forest, Bitterfeld deposit.

***Custodelela hamata* n. gen. n. sp.** (Figs. 39-42) Photos 255-256

Material: Holotypus ♂ in Baltic amber from Bitterfeld, F182/BB/AR/LIN/CJW.

Preservation and syninclusions: The spider is excellently and completely preserved. The right leg II was autotomized behind the patella and is now lying beneath the left leg III on the other side of the spider. Blood (haemolymph) is bulged out of the patella of the right leg II in a stalked bubble and covering the tip of the patella (fig. 40). Because of the "fresh blood" the spider must got alive into the resin. Remains of digestive liquid is preserved on the mouth parts (fig. 39). Parts of the left leg I have been dried out. - A thin spider's thread is running from the left tibia IV to the left patella III. Furthermore preserved are 1 tiny Diptera, 2 Collembola (one with excrements), 1 tiny Nematoda: Rhabditida larva ventrally of the spider as well as - behind one of the Collembola - numerous stellate hairs and some pollen grains (no air-bag pollen grains).

Diagnosis (♂; ♀ unknown): See above.

Description (♂):
Measurements (in mm): Body length 1.9, prosoma length 0.9, leg I: Femur 1.25, patella 0.25, tibia 1.4, metatarsus 1.4, tarsus 0.8, tibia II 1.15, tibia III 0.85, tibia IV 1.0.
Colour: Prosoma and legs dark brown, opisthosoma yellow brown.
Prosoma: The large eight eyes are partly hidden; chelicerae long, teeth hidden, lateral stridulating files absent. - Legs long and slender, covered with short hairs, order I/II/IV/III. Bristles long and numerous: Femora: Only I-II a dorsal bristle in the basal half, tibiae 2 dorsally and few apically, I additionally a pair in the distal half, tibia II a retrodistal bristle, metatarsi with a dorsal bristle in the distal half. Position of the metatarsus I trichobothrium in 0.14, metarasal trichobothrium IV absent. - Opisthosoma 1.7 times longer than high, covered with short hairs, spinnerets of medium length. - Pedipalpus (figs. 41-42): Patella and tibia with a dorsal bristle, tibia thick and with several trichobothria, paracymbium simple, basally divided, bulbus: See the diagnosis.

Relationships: See above.

Distribution: Tertiary Baltic amber forest.

7. ***Custodela*** PETRUNKEVITCH 1942

Material: Numerous specimens of *Custodela* sp. indet., CJW. Photo 254

Questionable synonym: *Obnisius* PETRUNKEVITCH 1942. - According to the chaetotaxy and the free paracymbium (fig. 97) I regard *Obnisius* as a questionable synonym of *Custodela*, see above. The type species (the only known species of the genus) is *O. tenuipes* PETRUNKEVITCH 1942, the body length is 2.2mm.

Males of the genus *Custodela* in Baltic amber are very frequent and also females are not rare; more than 50% of the Linyphiidae in Baltic amber are members of this genus. I suppose that there may be fifty or even hundred species of *Custodela* in this kind of amber. In this paper I describe two - questionable - females, only one as a new species; there are numerous more species in my collection. Usually it is not sure which female is conspecific with a species which is described by a male, and up to now I did not find both sexes of *Custodela* in well preservation and "good" position in the same amber piece.

Diagnosis: Metatarsus I-II with 1 dorsal bristle (fig. 54), cymbium frequently with a dorsal outgrowth (e. g. fig. 43), embolus long, thin and only visible in the distal part (figs. 53, 58, 62), suprategular apophysis very long, lamella fringed (e. g. figs. 56-58), an additional bulbus apophysis (X in figs. 45, 53 and 95) may be present but is usually not observable in the fossils, epigyne (figs. 87, 96) with a long scapus.

Type species: *Linyphia cheiracantha* KOCH & BERENDT 1854. - Remark: MENGE in KOCH & BERENDT (1954) regarded *Linyphia oblonga* KOCH & BERENDT 1854 as synonym with *cheiracantha*. I investigated type material of both species and found different species, see below.

Remark on ?*Linyphia oblonga* sensu PETRUNKEVITCH (1950): PETRUNKEVITCH (1950: 287-288) described sub ?*Linyphia oblonga* a male which is preserved in a bad condition and has very long legs. According to the - really? - short clypeus: Based on the description of PETRUNKEVITCH only "as high as one half of the length of the quadrangle" (of the median eyes) I regard this male as a questionable member of the family Linyphiidae, and I do not want to exclude that it is a member of the genus *Custodela*.

Relationships: See *Custodelela* n. gen. and *Agynetiphantes* n. gen.

Distribution: Tertiary Baltic amber forest incl. the Bitterfeld deposit.

Predators: See the paper on the family Mimetidae in this volume.
Autotomy between patella and tibia is very frequent in the fossil spiders in amber (see also above). In a male of *Custodela* sp. indet., F60/BB/AR/LIN/CJW, photo, five legs are loose; the spider losts its legs while trying to get out of the resin. At the brakes some blood (haemolymph) is observable.
A **parasitoitic Acari** (Trombidiidae) is preserved on the opisthosoma of a male of *Custodela* sp. indet., F381/BB/AR/LIN/CJW, see the chapter on parasites in part 1 of this volume, photo.
Remains of ?sperm are preserved with the holotype ♂ of *C. acutula* n. sp., fig. 48.

Key to the species of the genus *Custodela* (males):

Remarks: (1) The shape of the cymbial outgrowth may be more specific than the shape of the paracymbium. - (2) In all species of the *cheiracantha* species-group an cymbial outgrowth and a paracymbial hook in the basal half are present. (A cymbial outgrowth occurs convergently also in other species groups and other genera). - (3) Caution: The pedipalpal structures may look quite different in the same species which is observed even in a slightly different position! - (4) Only the description of *C. parva* n. sp. (fig. 87) is based on a female; see also fig. 96.

1 Tibial bristle of the ♂-pedipalpus strongly bent inwards (prolaterally) (fig.49), no distinct cymbial outgrowth, paracymbium with a distinct outgrowth in the distal half (figs. 50,81-83). 2

- Tibial bristle of the pedipalpus slightly bent forewards (frontally) (e.g. figs. 43,86), a distinct cymbial outgrowth present or absent, paracymbium variable. 5

2(1) Patella of the pedipalpus with a pair of dorsal bristles (fig. 49) which is unique in *Custodela*, small ventral paracymbial outgrowth, fig. 50. . . . . *bispina*

- patella of the pedipalpus with a single bristle (e.g. fig. 59), large ventral paracymbbial outgrowth. 3

3(2) Conductor very large, straight and not compressed laterally (figs.83-84), suprategular apophysis very long . . . . . *oblonga*

- Conductor small, slightly bent and compressed laterally (fig. 60-61). 4

4(3) Distal bulbus structures as in fig. 60. . . . . *curva*

- Distal bulbus structures as in fig. 61. . . . . *curvata*

5(1) Tibia I with 2 retrolateral bristles (fig.51). Pedipalpus: Fig. 53 . . . . . *bispinosa*

- Tibia I with 1 retrolateral bristle (e. g. fig. 54). 6

6(5) Cymbium with a distinct dorsal-basal outgrowth (e. g. figs. 43, 77), paracymbium without a large outgrowth (e.g. fig. 56). 7

- Cymbium without a distinct dorsal-basal outgrowth (e.g. figs. 64-66), paracymbium often with a large outgrowth. 14

7(6) Pedipalpus (figs. 77-79): Dorsal-basal outgrowth of the cymbium with a distinct retrolateral depression (fig. 77). . . . . *lanx*

- Dorsal-basal cymbial outgrowth without a distinct retrolateral depression (e.g. figs. 43, 53, 55-56). 8

8(7) Tibia I-II - besides apical bristles - with ventral bristles at least on two articles (fig. 54). 9

- Tibia I-II without ventral bristles. 12

9(8) Basal-dorsal outgrowth of the cymbium conical and slightly smaller (figs. 43-45, 85-86). 10

- Basal-dorsal outgrowth of the cymbium nearly club-shaped and larger (figs. 55-56). . . . . *cheiracantha*

10(9) Conductor (fig. 86) blunt. . . . . *obtusa*

- Conductor (fig. 45) slightly pointed. 11

11(10) Pedipalpus as in fig. 44. . . . . *acuta*

- Pedipalpus as in fig. 49. . . . . *acutula*

12(8) Paracymbium with a large outgrowth (fig. 73). . . . . *henningseni*

- Paracymbium with a small outgrowth (fig. 76). 13

13(12) Long legs, length of tibia I about 2.9mm. . . . . *kochi*

- Shorter legs, length of tibia I about 1.9mm. . . . . *pseudokochi*

14(6) Femora with two rows of ventral bristle-shaped hairs (fig. 70). Pedipalpus: Figs. 71-72. . . . . *femurspinosa*

- Femora ventrally with normal hairs. 15

15(14) Paracymbium simple, sickle-shaped, without hook or outgrowth (fig. 68). . . . . *falcata*

- Paracymbium with a small hook (figs. 64-65) or a large outgrowth (e.g. fig. 60). . 16

16(15) Paracymbium with a large blunt outgrowth (fig. 58). . . . . *clava*

- Paracymbium with a hook or a small outgrowth (fig. 64-65). 17

17(16) Short apical tibial bristles present (as in fig. 54) Pedipalpus: Figs. 94-95 . . . . . *tibialis*

- Short apical tibial bristles absent (as in fig. 51). 18

18(17) Pedipalpus: Fig. 64. . . . . *divergens*

- Pedipalpus: Fig. 65. . . . . *expandens*

- Pedipalpus: See WUNDERLICH (1988: Fig. 266). . . . . lamellata

- Pedipalpus: Fig. 91. . . . . *stridulans*

DESCRIPTIONS OF THE SPECIES

***Custodela acuta* n. sp.** (figs. 43-45)

Material: Holotypus ♂ in Baltic amber, F412/BB/AR/LIN/CJW.

Preservation and syninclusions: The spider is well and nearly completely preserved, only few ventral parts are covered by an emulsion. The left leg IV is broken off between patella and tibia and these articles are missing; the left patellae I and II are cut off. - Parts of a Diptera and a Collembola are also preserved in the amber piece but no stellate hairs.

Diagnosis (♂; ♀ unknown): Ventral tibial bristles I-II present, paracymbium simple, without a distinct outgrowth, similar to *cheiracantha*; free observable parts of embolus and conductor (terminal apophysis) are a bit pointed.

Description (♂):

Measurements (in mm): Body length 2.75, prosoma: Length 1.2, width 1.0, leg I: Femur 2.4, patella 0.45, tibia 2.4, metatarsus 2.55, tarsus 1.8, tibia II 2.05, tibia III 1.5, tibia IV 2.0.
Colour: Prosoma and legs medium brown, opisthosoma yellow brown.
Prosoma very similar to *C. lanx* n.sp. - Legs also as in *lanx*; position of the trichobothrium on metatarsus I in 0.18, position of the bristle on metatarsus I in 0.38. - Opisthosoma long ovally, dorsally covered with few short hairs. - Pedipalpus: Figs. 43-45, an additional bulbus sclerite (X in fig. 45) is well observable.

Relationships: Compare *C. acutula* n.sp. In *obtusa* the conductor is blunt and the outgrowths of the cymbium are different. In *spinosa* the pedipalpus is similar but there are two retrolateral tibial I bristles (in contrast to other species).

Distribution: Tertiary Baltic amber forest.

***Custodela acutula* n.sp.** (figs. 46-48) Photos 249-250

Material: Holotypus ♂ in Baltic amber from Bitterfeld, coll. M. KUTSCHER K/AR/17.

Preservation and syninclusions: The spider is fairly well preserved, the amber piece was probably heated in an autoclave, some articles of the right leg I and the left legs I and IV are cut off. There is no emulsion. - In connection with the genital opening remains of a questionable sperm droplet and a questionable sperm web are preserved, fig. 48, Photos 249-250 and the chapter on fossil webs.

Diagnosis (♂; ♀ unknown): Tibia I-II with ventral bristles. Pedipalpus (figs. 47) with a pointed conductor.

Description (♂):
Measurements (in mm): Body length 2.0, tibia I 2.2.
Colour: Prosoma and legs dark brown, opisthosoma yellow brown.
Prosoma and legs similar to *C. lanx* n.sp. The large labrum is observable (fig. 46), also the rebordered labium and most parts of the gnathocoxae which bear a distinct probasal depression which may be a deformation (see above) or typic for this species or the species group. - Opisthosoma ovally, covered dorsally with few indistinct hairs. - Pedipalpus (fig. 47): Basal cymbial outgrowth of medium length, paracymbium simple, no outgrowth; conductor and embolus bent, conductor pointed.

Relationships: *C. acuta* n.sp. is larger and the pedipalpus is different, the conductor is wider; see also the key.

Distribution: Tertiary Baltic amber forest, Bitterfeld deposit.

***Custodela bispina* n.sp.** (figs. 49-50)

Material: Holotypus ♂ in Baltic amber from Bitterfeld, F424/BB/AR/LIN/CJW.

Preservation and syninclusions: The spider is well and nearly completely preserved, only the tip of the right tarsus IV and the retromarginal tip of the left tibia IV are cut off. The retrolateral patellar bristle of the right pedipalpus is broken off. The right fang is spread off. - The tarsal claws of the left leg II bear a thread with some stellate hairs. Also 4 Diptera, tiny remains of a ?Collembola and some legs of Diptera are preserved.

Diagnosis (♂;♀ unknown): Ventral tibial bristles absent, pedipalpus (figs. 51-52): Patella with a pair of dorsal bristles - unique in *Custodela* -, dorsal tibial bristle distinctly bent prolaterally, no distinct cymbial outgrowth, special shape of the paracymbium.

Description (♂):
Measurements (in mm): Body length 2.55, prosoma length 1.0, leg I: Femur 1.6, patella 0.3, tibia 1.85, metatarsus 1.85, tarsus 0.95, tibia IV 1.2.
Colour: Prosoma and legs medium to dark brown, opisthosoma yellow brown.
Prosoma with few hairs and a distinct fovea. Chelicerae large, with fine lateral stridulating files; margins with few teeth. - Legs long and slender, its order I/II/IV/III, I distinctly the longest. Bristles as in the genus, no ventral bristles, the basal bristle of tibia I 2 times longer than the tibial diameter, position of the trichobothrium of metatarsus I in 0.18, position of the bristle of metatarsus I in 0.32. - Opisthosoma 1.65 times longer than high, covered with indistinct short hairs, colulus large. - Pedipalpus: See the diagnosis.

Relationships: In the other described *Custodela* species the patella of the pedipalpus bears only one dorsal bristle.

Distribution: Tertiary Baltic amber forest, Bitterfeld deposit.

***Custodela bispinosa* n.sp.** (figs. 51-53) Photo 251

Material: Holotypus ♂ in Baltic amber from Bitterfeld, F413/BB/AR/LIN/CJW.

Preservation and syninclusions: The spider is completely and fairly well preserved, the opisthosoma is partly covered by an emulsion and somewhat deformed. - In the small amber piece also some detritus particles and stellate hairs are preserved.

Diagnosis (♂;♀ unknown): Tibia I with two retrolateral bristles (fig. 51), ventral tibial bristles I-II present. Pedipalpus (figs. 52-53): Cymbium with two larger outgrowths. Body length only about 1.65mm.

Description (m):
Measurements (in mm): Body length about 1.65 (?), prosoma length about 0.9, tibia I 1.85.
Colour: Prosoma and legs medium to dark brown, opisthosoma yellow brown.
Observable prosoma (most parts are hidden) similar to *C. lanx* n.sp. - Legs long and slender, with long tibial bristles, ventral and apical tibial bristles present, tibia I with two retrolateral bristles in the distal half (fig. 51). - Opisthosoma (it is deformed) with indistinct short hairs. - Pedipalpus (figs. 52-53) in retroventral position as in *acuta*; also an additional bulbus sclerite (X in fig. 53) is present. In retrolateral position embolus and conductor look shorter than in the related species.

Relationships: In the related species only one retrolateral bristle of tibia I is present. *C. acuta* seems most related. See ?*C.* sp. below and the key.

Distribution: Tertiary Baltic amber forest, Bitterfeld deposit.

Custodela cheiracantha (KOCH & BERENDT 1854) (figs. 54-57)

Material: (1) Holotypus ♂ sub *Linyphia*, Palaeontol. Inst. Humboldt University, no. MB. A. 1058 (old no. 7234).

Remarks: (1) MENGE in KOCH & BERENDT (1854: 42) states that he has no doubt that *Linyphia oblonga* and *L. cheiracantha* belong to the same species; he selected the name *cheiracantha* for the species. I investigated type material of both species, and I found three different species: *Cheiracantha*, *oblonga* and *kochi* n. sp. - (2) According the figures which are given by PETRUNKEVITCH (1942) sub *cheiracantha* I doubt the conspecifity of the fossils.

Preservation and syninclusions: (1) Holotype: The spider is not well preserved, the amber piece with the spider's body is strongly darkened, the left body side and both pedipalpi are covered by a white emulsion, the right body side is partly hidden

by a resin flow, the left legs II and III are broken off behind the patella (autotomy). - Also a badly preserved ant (?), a badly preserved small spider as well as numerous stellate hairs are preserved in the amber piece with the holotype. - (2) The questionable male is well preserved. - (3) There are several males in the CJW which may be conspecific with *cheiracantha*.

Diagnosis (♂; ♀ unknown): Ventral bristle of tibia I present (fig. 54), pedipalpus (figs. 55-57): Cymbium with a larger and blunt outgrowth, paracymbium simple, terminal apophysis thick, suprategular apophysis large, embolus hidden.

Description (♂):
Measurements (holotypus in mm): Body length about 2.0, prosoma length about 1.0, leg I: Femur 1.25, patella 0.3, tibia 1.3, metatarsus 1.5, tarsus 0.8.
Colour - by aging - dark brown.
Prosoma (most parts are hidden) fairly raised, with few hairs and 8 eyes of medium size. - Legs slender, order I/II/IV/III. Bristles long and thin, length of the basal bristle on tibia I 0.25 (= 2 1/2 diameters of the tibia). At least femur I with a dorsal and a prolateral bristle, tibiae with 2 dorsal bristles, I additionally a lateral pair in the distal half, 1 ventrally in the distal half, short apical tibial bristles are present, all metatarsi with a dorsal bristle in the basal half (position in 0.32 on metatarsus I, fig. 54), position of the trichobothrium on metatarsus I in 0.3. - Opisthosoma ovally. - Pedipalpus: See above.

Relationships: See *C. lanx* n. sp. and the key.

Distribution: Tertiary Baltic amber forest.

***Custodela clava* n.sp.** (fig. 58)

Material: Holotypus ♂ in Baltic amber, F414/BB/AR/LIN/CJW.

Preservation and syninclusions: The spider is fairly well and completely preserved, its right side is covered by an emulsion, a bubble is preserved between the II and IV right femur, also a tiny Acari larva but no stellate hairs.

Diagnosis (♂; ♀ unknown): No ventral tibial bristles. Pedipalpus (fig. 60): No distinct cymbial outgrowth, paracymbial outgrowth distinct, blunt, its position in the distal half.

Description (♂):

Measurements (in mm): Body length 2.0, prosoma length about 0.9, tibia I 2.1, tibia II 1.6, tibia IV about 1.35.
Colour: Prosoma and legs medium brown, opisthosoma yellow brown.
Prosoma (most parts are hidden) with long chelicerae which bear fine lateral stridulating files. - Legs long and slender, its order I/II/IV/III, I distinctly the largest. Bristles as in the genus and of medium length, the basal one of tibia I 2.1 times longer than the tibial diameter. Position of the trichobothrium of metatarsus I in 0.31. - Opisthosoma long oval, covered with few short hairs. - Pedipalpus: See the diagnosis.

Relationships: In the related species the tibial bristle of the pedipalpus is bent and the outgrowth of the paracymbium is longer and pointed.

Distribution: Tertiary Baltic amber forest.

***Custodela curva* n.sp**. (figs. 59-60)

Material: Holotypus ♂ in Baltic amber, F415/BB/AR/LIN/CJW.

Preservation and syninclusions: The spider is completely and well preserved, ventrally it is covered by an emulsion; some cracks are present laterally of the body. - Behind and below of the spider some stellate hairs are preserved.

Diagnosis (♂; ♀ unknown): Ventral tibial bristles absent. Pedipalpus (figs. 59-60): Tibial bristle distinctly bent prolaterally, distinct dorsal cymbial outgrowth absent, a large ventral outgrowth of the paracymbium present.

Description (♂):
Measurements (in mm): Body length 2.2, Prosoma: Length 0.9, width 0.7, leg I: Femur 1.55, patella 0.22, tibia 1.6, metatarsus 1.6, tarsus 0.85, length of the basal tibial I bristle 0.15.
Colour: Prosoma and legs medium brown, opisthosoma yellow brown.
Prosoma 1.28 times longer than wide, fovea distinct, clypeus long and concave, 8 large eyes present, posterior row straight, posterior median eyes separated by less than 1 diameter. Chelicerae large, distally slightly diverging, laterally with distinct stridulating files; anterior margin of the furrow with at least two teeth. - Legs long and slender, its order I/II/IV/III, bristles short, the basal tibial bristle I 1.35 longer than the tibial diameter. Ventral tibial bristles absent, apical tibial bristles indistinct, other bristles as in the genus. - Opisthosoma 1.75 times longer than wide, covered

with indistinct hairs. - Pedipalpus (figs. 59-60): Tibial bristle distinctly bent prolaterally, cymbium with a large retrolateral outgrowth, no distinct dorsal-basal outgrowth.

Relationships: In *C. curvata* n.sp. the distal bulbus structures are different, in *oblonga* the terminal apophysis is much larger, the outgrowth of the paracymbium is a bit larger and the leg bristles are longer.

Distribution: Tertiary Baltic amber forest.

***Custodela curvata* n.sp.** (figs. 61-62)

Material: Holotypus ♂ in Baltic amber from Bitterfeld, F426/BB/AR/LIN/CJW.

Preservation and syninclusions: The spider is well and completely preserved, prosoma and opisthosoma are dorsally strongly deformed (compressed); ventrally parts of the body are covered by an emulsion. - A large bubble is preserved in front of the spinnerets; also two stellate hairs are present in the small amber piece.

Diagnosis (♂; ♀ unknown): Ventral tibial bristles absent. Pedipalpus (figs. 61-62): Dorsal cymbial bristle distinctly bent prolaterally (similar to *curva*), no distinct dorsal outgrowth of the cymbium, a large ventral outgrowth of the paracymbium present.

Description (♂):
Measurements (in mm): Body length 1.8, prosoma length 0.8, leg I: Femur 1.15, patella 0.27, tibia 1.3, metatarsus 1.35, tarsus 0.75.
Colour: Prosoma and legs medium brown, opisthosoma yellow brown.
Prosoma (it is strongly deformed) with few hairs, 8 large eyes, posterior median eyes separated by less than one diameter. Chelicerae long, with fine lateral stridulating files. - Legs long and slender, bristles as in the genus. Length of the basal bristle of tibia I = 2 tibial diameters. Position of the metatarsal trichobothrium I in 0.21. - Opisthosoma ovally, covered with indistinct short hairs. - Pedipalpus: See the diagnosis; a short part of the embolus is observable (fig. 62).

Relationships: See *C. curva* n.sp.

Distribution: Tertiary Baltic amber forest, Bitterfeld deposit.

***Custodela divergens* n.sp.** (figs. 63-64)

Material: Holotypus ♂ in Baltic amber, F416/BB/AR/LIN/CJW.

Preservation and syninclusions: The spider is well preserved and not covered by an emulsion; the dorsal quarter of the opisthosoma and parts of the legs IV are cut off. - Near the spider a part of a tiny arthropod leg and a stellate hair are preserved.

Diagnosis (♂; ♀ unknown): Ventral and short apical tibial bristles absent, tibial bristles short (length of the dorsal-basal tibial bristle I a bit shorter than the tibia diameter, the distal bristle 1.4 times longer), chelicerae diverging distally (fig. 63), paracymbium (fig. 64) with a small hook in the middle of its length ventrally-posteriorly. Small spiders.

Description (♂):
Measurements (in mm): Body length 1.6, prosoma: Length 0.8, width 0.65, leg I: Femur 0.9, patella 0.23, tibia 1.0, metatarsus 0.95, tarsus 0.55, dorsal bristles of tibia I: The basal one 0.09, the distal one 0.14.
Colour yellow brown.
Prosoma (fig. 63) similar to *expandens* but chelicerae a bit more diverging distally. - Anterior legs long and slender, with short bristles - compare the diagnosis -, its number as in *expandens*. No ventral or apical tibial bristles. - Opisthosoma long oval, with indistinct hairs. - Pedipalpus (fig. 64, see above) with longer distal cymbial hairs.

Relationships: See the key.

Distribution: Tertiary Baltic amber forest.

***Custodela expandens* n.sp.** (figs. 65-67)

Material: Holotypus ♂ in Baltic amber and a separated amber piece, F417/BB/AR/LIN/CJW

Preservation and syninclusions: The spider is well and completely preserved; mainly the right side of the body is covered by an emulsion. Two bubbles are placed on the right side of the opisthosoma, one bubble in front of the spider. - In the separated amber piece some detritus particles are preserved; no stellate hairs.

Diagnosis (♂; ♀ unknown): Ventral and short apical tibial bristles absent, paracymbium with a hook and a low depression in the distal half (fig. 65).

Description (♂):
Measurements (in mm): Body length 2.1, prosoma length 0.95, leg I: Femur 1.85, patella 0.3, tibia 1.75, metatarsus 1.8, tarsus 0.95, tibia II 1.3, tibia III 0.8, tibia IV 1.15.
Colour light brown.
Prosoma with very few short hairs and an distinct fovea. Posterior eye row slightly procurved, posterior median eyes separated by nearly one diameter. Chelicerae long, slightly diverging distally; lateral stridulating files present. - Legs long and slender, its order I/II/IV/III. Bristles thin, the basal one on tibia I two times longer than the tibial diameter, no apical or ventral tibial bristles, lateral bristles as in *stridulans*. At least femur I with a dorsal and a prolateral bristle, all metatarsi with a dorsal bristle in the basal half. Position of the trichobothrium of metatarsus I in 0.2. - Opisthosoma long oval, covered with indistinct short hairs. - Pedipalpus: See above; the right bulbus (fig. 65) is partly expanded, with the ?embolus observable.

Relationships: See the key.

Distribution: Tertiary Baltic amber forest.

***Custodela falcata* n.sp.** (figs. 68-69)

Material: Holotypus ♂ in Baltic amber and a separated amber piece, F418/BB/AR/LIN/CJW.

Preservation and syninclusions: The spider is fairly well preserved, some cracks are present in the amber piece; prosoma with the mouth parts are partly covered by an emulsion, the left leg I is broken off between the patella and the tibia and is missing, the right tarsus I is oxidated and darkened, a bubble is placed ventrally on parts of sternum and opisthosoma. - The prosoma is dorsally distinctly compressed. - No stellate hairs.

Diagnosis (♂; ♀ unknown): No distinct dorsal outgrowth of the cymbium, no outgrowth or hook on the large paracymbium (fig. 68).

Description (♂):
Measurements (in mm): Body length 2.3, prosoma length 1.0, leg I: Femur: 2.0, patella 0.3, tibia 2.2, tibia II 1.5.
Colour: Prosoma and legs dark brown, opisthosoma grey brown.

Prosoma strongly deformed, frontally with long hairs. - Legs long and slender, its order I/II/III/III. Bristles as in *expandens*. Dorsal tibial I bristles about 2 times longer than the tibia diameter. Position of the trichobothrium of metatarsus I in 0.23, metatarsal trichobothrium IV absent. - Opisthosoma two times longer than high, covered with short hairs. - Pedipalpus (figs. 68-69): Patellar bristle as long as the tibial bristle, paracymbium large, no outgrowth or hook, T2 in a prolateral position in the slightly expanded bulbus.

Relationships: See the key.

Distribution: Tertiary Baltic amber forest.

***Custodela femurspinosa* n.sp.** (figs. 70-72)

Material: Holotypus ♂ in Baltic amber from Bitterfeld, F32/BB/AR/LIN/CJW.

Preservation and syninclusions: The spider is dorsally and partly ventrally covered by a white emulsion, a bubble is situated on the basal parts of the right pedipalpus, both patellae I are partly cut off. Most of the ventral femoral hairs are artificially thickened by thin covers of ?gas. - Numerous tiny detritus particles are also preserved but no stellate hair.

Diagnosis (♂; ♀ unknown): Legs robust, tibia I only 8.9 times longer than high, femora I-VI (fig. 70) with two rows of bristle-shaped hairs. Pedipalpus (figs. 71-72): Cymbium without a dorsal outgrowth, suprategular apophysis only fairly long.

Description (♂):
Measurements (in mm): Body length 2.1, prosoma length ca 1.0, leg I: Femur 1.3, tibia 1.4, metatarsus 1.6.
Colour light to medium brown.
Prosoma including the eye region partly hidden by an emulsion, clypeus long, chelicerae robust, probably indistinct lateral stridulating files are present, the anterior cheliceral margin bears three teeth. - Legs robust, tibia I only 8.9 times longer than high. All femora (fig. 70) with 2 rows of ventral bristle-shaped hairs, femur I bears a dorsal and a prolateral bristle, tibiae with 2 dorsal and short apical bristles, I additionally with a pair of lateral bristles in the distal half, II with a retrolateral bristle. All metatarsi bear a dorsal bristle in the basal half. Position of the trichobothrium on metatarsus II in 0.16. - Opisthosoma 1.8 times longer than wide, with some dorsal hairs of medium length. - Pedipalpus: See above.

Relationships: *C. femurspinosa* is the only known species of this genus in which ventral bristle-shaped hairs occur.

Distribution: Tertiary Baltic amber, Bitterfeld deposit.

***Custodela henningseni* n.sp.** (fig. 73)

Derivatio nominis: The species is named after V. HENNINGSEN who collected numerous specimens and gave it to the Zool. Mus. Kopenhagen.

Material: Holotypus ♂ in Baltic amber, Zoological Museum Copenhagen, coll. V. HENNINGSEN 1-7 1966.

Preservation and syninclusions: The spider is well and nearly completely preserved in a redbrown amber piece, only the left leg II is cut off through the tibia. Few parts of the right body side are covered by an emulsion. A larger bubble is placed under the right femur II, a bubble of hemolymph or sperm is preserved before the genital opening, see *C. acutula* n.sp. No stellate hairs.

Diagnosis (♂; ♀ unknown): Ventral tibial bristles absent. Pedipalpus (fig. 73): Cymbium with a large dosal-basal outgrowth, paracymbium with a large outgrowth in the distal half, T1 very long.

Description (♂):
Measurements (in mm): Body length 2.0, prosoma length 0.9, tibia I about 1.5.
Colour: Body and legs medium brown.
Prosoma: 8 large eyes, few short hairs. The long chelicerae bear fine lateral stridulating files. - Legs long and slender. Bristles as in the genus. Basal tibial bristle I 2.2 times longer than the tibia diameter. Position of metatarsal bristle I in 0.31, position of metatarsal I trichobothrium in 0.21. - Opisthosoma two times longer than wide, covered with indistinct hairs. - Pedipalpus: See the diagnosis.

Relationships: In the related species - e. g. *cheiracantha* - a large outgrowth of the paracymbium is absent.

Distribution: Tertiary Baltic amber forest.

***Custodela kochi* n.sp.** (figs. 74-76)

Material: Holotypus ♂: Syntypus of *Linyphia oblonga* KOCH & BERENDT 1854 (see below: *Custodela oblonga*), Palaeontol. Inst. Humboldt University no. MB. A.

1060 (old no. 7222a).
Preservation and syninclusions: The spider is fairly well preserved, the ventral side is covered by an emulsion, the right leg II is cut off through the end of the femur, parts of the left legs I and II and the right leg I are cut off. - Some stellate hairs are preserved in the redbrown amber piece which has been darkened by aging/oxidation.

Diagnosis (♂; ♀ unknown): Tibia I without ventral bristles, legs very long, tibia I 2.9mm long. Pedipalpus (figs. 74-76): The two outgrowths of the cymbium are widely spaced and of equal size, paracymbium with a small outgrowth.

Description (♂):
Measurements (in mm): Body length 2.5, prosoma length about 1.1, leg I: Tibia about 2.85, metatarsus 3.15, tarsus 1.25, tibia IV 1.85.
Colour dark brown.
Prosoma with few hairs, a large fovea and 8 eyes of medium size; chelicerae hidden. - Legs very long and slender, tibia I 2.6 times longer than the prosoma, its order I/II/IV/III, tarsi short, hairs indistinct. Bristles long, the dorsal basal one of tibia I 3 1/3 times longer than the tibia diameter, short apical, ventral, pro- and retrolateral tibial bristles present. Femoral bristles as in *cheiracantha*. Position of the trichobothrium on metatarsus I in 0.22, no trichobothrium on metatarsus IV. - Opisthosoma 1.7 times longer than wide, covered with few short hairs. - Pedipalpus (figs. 74-76): Compare the diagnosis. Paracymbium with a large ventral outgrowth similar to *C. lanx* (fig. 77) which is not observable which is shown in the position of fig. 76.

Relationships: See *kochi* and *lanx*. In *cheiracantha* and *oblonga* the position of the trichobothrium of metatarsus I and/or the outgrowth of the cymbium are different; tibia I bears a ventral bristle in *oblonga*, the paracymbium is different.

Distribution: Tertiary Baltic amber forest.

Custodela lamellata (WUNDERLICH 1988) (sub ?*Lepthyphantes lamellatus*, fig. 264-266) (**n. comb.**): The holotype of this species is preserved in Baltic but not in Dominican amber. In the fig. 266 the embolus membrane (EM) is mistaken for the conductor and the embolus (E) for the suprategular apophysis.

***Custodela lanx* n.sp.** (figs. 77-80)

Material in Baltic amber: Holotypus ♂ F410/BB/AR/LIN/CJW and paratypus ♂ F411/BB/AR/LIN/CJW.
Preservation and syninclusions: Holotypus: The spider is well preserved in a small amber piece, the opisthosoma is partly covered by an emulsion, the left leg I is wanting after the patella (autotomy), some leg articles are cut off. A bubble is placed under the opisthosoma on the left metatarsus IV. - No stellate hairs. - Pa-

tatypus: The spider is placed at the margin of an amber piece from which 5 legs are „going out". The spider has been darkened by oxidation. The pedipalpi are fairly well preserved. - Behind the spider few tiny Acari and a small Diptera are preserved. No stellate hairs but some pollen grains.

Diagnosis (♂; ♀ unknown): Ventral tibial bristles present. Pedipalpus: Outgrowth of the cymbium large, with a distinct retrolateral depression (D in fig. 77); embolus bent in a retrolateral direction.

Description (♂):
Measurements (holotypus in mm): Body length 2.3, prosoma length 1.1, leg I: Femur 1.65, patella 0.3, tibia 1.65, metatarsus 1.7, tibia IV 1.35. Body length of the paratypus 2.5.
Colour: Holotypus: Prosoma and legs dark brown, opisthosoma yellow grey, paratypus: Dark brown.
Prosoma: Caput with hairs of medium length and a distinct fovea. Clypeus as long as the field of the medium eyes. 8 large eyes, posterior row procurved, posterior median eyes separated by about ¾ of its diameter. Chelicerae large, laterally with numerous stridulating files. - Legs long and slender. Bristles very long (fig. 80), the basal one of tibia I 4 times longer than the tibial diameter, ventral and short apical tibial bristles present, metatarsi with 1 dorsal bristle but on the right leg III of the holotype an abnormal high number of bristles is present (fig. 80): On patella, tibia and metatarsus some bristles are doubled: The distal ones of patella and tibia and the basal one of the metatarsus; 3 additional bristles are present in the distal half of the metatarsus. Position of the trichobothrium on metatarsus I in about 0.18, in half way to the bristle. - Opisthosoma about two times longer than high, covered with hairs of medium length. - Pedipalpus (figs. 77-79): Femora with a short prolateral stridulating tooth as usual in the genus, paracymbium with a large ventral outgrowth; see the diagnosis.

Relationships: In *cheiracantha* a depression of the cymbial outgrowth is absent; compare the key.

Distribution: Tertiary Baltic amber forest.

Custodela oblonga (KOCH & BERENDT 1854) (figs. 81-84)

Material in Baltic amber: (1) Lectotypus ♂ (one of two syntypes of *Linyphia oblonga* KOCH & BERENDT 1854; Palaeontol. Inst. Humboldt University no. MB. A. 1059 (old no. 7222) (see „remarks" below); (2) questionable male F7/BB/AR/LIN/CJW.

Remarks: (1) C. *oblonga* is not a synonym of *cheiracantha*, compare the remark with *cheiracantha*. - (2) As the first revising author I select one of the two not conspecific syntypes as the lectotype of *oblonga* and the other syntype as the holotype of *Custodela kochi* n.sp., see above; PIHUB no. MB. A. 1060 (old no. 7222a). - (3) In the questionable male of *oblonga* the genital structures are better observable than in the holotype.

Preservation and syninclusions: (1) Lectotypus: The spider is preserved in a red-brown amber piece which surface is full of rents; the piece is darkened by aging and not complete, dorsal parts of both legs one are cut off. The ventral side of the body and the right side of the opisthosoma is covered by an emulsion. - Also preserved in the amber piece are e. g. few stellate hairs, some silk threads, 2 Diptera: Nematocera, remains of a Collembola and the dorsal half of another spider of the family Linyphiidae (?*Custodela* sp.). - (2) The questionable male is well and nearly completely preserved, only the right leg II is broken off and lost behind the patella; the ventral side and parts of the pedipalpi are hidden.

Diagnosis (♂; ♀ unknown): Ventral tibial bristles absent. Pedipalpus (figs. 80-83): Tibial bristle distinctly bent prolaterally, no distinct cymbial outgrowth (fig. 82), paracymbial outgrowth very large and compressed laterally, its position in the distal half, T2 large and simple.

Description (♂):
Measurements (lectotypus in mm): Body length about 2.0, prosoma length 0.9, tibia I 1.8), leg I of the questionable male: Femur 1.55, patella 0.3, tibia 1.65, metatarsus 1.65, tarsus 0.85.
Colour dark brown.
Prosoma with few hairs and a long fovea. Posterior eye row recurved (questionable male), posterior eyes separated by its diameter, chelicerae long and slender, its order I/IV/=II/III. No ventral tibial bristles, short apical tibial bristles, the basal dorsal tibial bristle 2 times longer than the tibial diameter, position of the trichobothrium of metatarsus I in 0.14. - Opisthosoma long oval, covered with indistinct hairs. - Pedipalpus (figs. 81-84): See the diagnosis. Both bulbi of the holotypus are partly expanded.

Relationsips: *C. curva* n.sp. and its kin seem most related; in these species the outgrowth of the paracymbium is not compressed.

Distribution: Tertiary Baltic amber forest.

***Custodela obtusa* n. sp.** (figs. 85-86)

Material: Holotypus ♂ in Baltic amber, F409/BB/AR/LIN/CJW.

Preservation and syninclusions: The spider is well and nearly completely preserved, only the tip of the left tibia I is cut off. The right side of body and legs are strongly covered by an emulsion, the left and ventral sides have been cleared by the sun. - Some detritus particles are also preserved in the small amber piece but no stellate hairs.

Diagnosis (♂;♀ unknown): Ventral tibial bristles I-II present. Pedipalpus (figs. 85-86): Cymbium with a distinct dorsal-basal outgrowth and a second outgrowth retrolaterally; paracymbium simple, without outgrowth, similar to *cheiracanthium*, conductor (terminal apophysis 1) blunt, distal part of the embolus long.

Description (♂):
Measurements (in mm): Body length 2.3, prosoma length about 1.1, left tibia I about 2.0, right tibia I (a regenerate) about 1.1, tibia II about 1.75.
Colour: Prosoma and legs medium brown, opisthosoma yellow brown.
Prosoma legs and opisthosoma very similar to *C. lanx* n.sp. Chelicerae retrolaterally with indistinct stridulating files (?). - The right leg I is distinctly shortened and seemingly has been regenerated; the tibia is shorter than tibia III, the number of bristles is reduced, the metatarsal bristle, prolateral, ventral and apical tibial bristles are absent, the length of the distal patellar bristle is reduced. - Pedipalpus: See the diagnosis.

Relationships: See *C. acuta* and *lanx*.

Distribution: Tertiary Baltic amber forest.

?***Custodela parva*** **n.sp**. (fig. 87) Photo 252

Material: Holotypus ♀ in Baltic amber from Bitterfeld, CJW.

Preservation and syninclusions: The spider is fairly well and completely preserved in a flat amber piece and dorsally covered by an emulsion. Above the spider few stellate hairs are present.

Diagnosis (♀; ♂ unknown): Smallest known member of the genus *Custodela*, prosoma length about 0.6mm. Ventral tibial bristles present. Epigyne (fig. 87) very large, with paired grooves and a long scapus which is widened in the basal half and nearly reaching the spinnerets.

Description (♀):
Measurements (in mm): Body length 1.35, prosoma length about 0.6, tibia I 0.9.
Colour: Prosoma and legs medium brown, opisthosoma yellow brown.

Prosoma (most parts are hidden) with large eyes and a convex sternum. Coxae IV separated by its diameter. Claw of the pedipalpus present. - Legs: Few ventral and short apical tibial bristles I-II present, other bristles as in the genus. Metatarsal trichobothria not known. - Opisthosoma oval, covered with short hairs, spinnerets short. - Epigyne: See the diagnosis.

The **relationships** are not sure, the male is unknown, all known males of the genus *Custodela* are larger. In ?*C.* sp. (fig. 95) the epigyne is quite different, the scapus is much shorter.

Distribution: Tertiary Baltic amber forest, Bitterfeld deposit.

***Custodela pseudokochi* n.sp**. (figs. 88-89)

Material in Baltic amber: (1) holotypus ♂ in Baltic amber, F408/BB/AR/LIN/CJW, (2) a questionable ♂ from Bitterfeld, F186/BB/AR/LIN/CJW.

Preservation and syninclusions: (1) Holotype: The spider is well preserved but partly covered by an emulsion. Only the first leg pair is complete, the other legs are partly cut off. - No stellate hairs are preserved in the small amber piece. - (2) Questionable ♂: The spider is well preserved, the right leg I is a shortened regenerate, the tibia is only 1.7mm long, the bristles are present but small.

Diagnosis (♂; ♀ unknown): Ventral tibial bristles I-II absent. Pedipalpus: figs. 88-89, paracymbium as in *C. kochi*.

Description (♂):
Measurements (holotype in mm): Body length 2.1, prosoma length 0.95, leg I: Femur 1.5, patella 0.3, tibia 1.9, metatarsus 1.9, tarsus 0.95.
Colour: Prosoma and legs dark brown, opisthosoma yellow brown.
Prosoma as in *kochi* but smaller. Clypeus strongly concave, lateral cheliceral stridulating files indistinct. - Legs slender and of medium length, tibia I two times longer than the prosoma, bristles as in *kochi*, position of the trichobothrium of metatarsus I in 0.24. - Opisthosoma 1.75 times longer than high, covered with indistinct short hairs. - Pedipalpus: See the diagnosis. The distal bulbus structures of the right pedipalpus are very well preserved. The shape of the tooth of the lamella (T in fig. 89) seems not to be specific in this species.

Relationships: In *kochi* n. sp. the legs are much longer, tibia I 2.9mm, and 2.6 times longer than the prosoma.

Distribution: Tertiary Baltic amber forest.

***Custodela stridulans* n.sp.** (figs. 90-92) Photo 253

Material: Holotypus ♂ in Baltic amber from Bitterfeld, F19/BB/AR/LIN/CJW.

Preservation and syninclusions: The spider is well and nearly completely preserved, only the left leg III is broken off behind the patella, the tip of the right tibia I and the base of the metatarsus are cut off. Most parts of the opisthosoma - except the ventral side - are covered by an emulsion, a bubble is preserved under the labium, two insect larva (Aphidina), few stellate hairs and excrement balls are also present.

Diagnosis (♂;♀ unknown): Metatarsal IV bristle absent, retrolateral cheliceral stridulating files distinct (fig. 90). Pedipalpus (fig. 91-92) (the bulbus is ventrally hidden): No cymbial outgrowth, paracymbium with an outgrowth in the distal half, a small tegular hook (arrow) is present.

Description (♂):
Measurements (in mm): Body length 2.0, prosoma length 0.85, leg I: Tibia 1.4, metatarsus 1.5, tarsus 0.8, tibia IV 0.95.
Colour: Prosoma and legs dark brown, opisthosoma yellow brown.
Prosoma with a large fovea and some hairs of medium length. 8 large eyes, posterior medium eyes largest, separated by less than their diameter, posterior row slightly procurved. Clypeus longer than the field of the medium eyes, chelicerae long, lateral stridulating files distinct and widely spaced (fig. 90). - Legs long and slender, I clearly the longest, hairs short and indistinct. Bristles long: Femora I-II 1 dorsally in the basal half, I additionally a prolateral one in the distal half, patellae 1/1 dorsally, tibiae 1/1 dorsally, I a lateral pair distally, no ventral or apical bristles. Tibia II 1 retrodorsally in the distal half, metatarsi I-III with a dorsal bristle in the basal half, position of I in 0.32 and a trichobothrium, its position in 0.16. - Opisthosoma 1.26 times longer than high, covered by indistinct short hairs. Anterior and posterior spinnerets of medium length. - Pedipalpus: See the diagnosis.

Relationships: In *C. tibialis* n.sp. apical tibial bristles are present, the paracymbium is similar, the apical bulbus structures are different.

Distribution: Tertiary Baltic amber forest, Bitterfeld deposit.

Custodela* sp. near *stridulans (fig. 93)

Material: 1♂ in Baltic amber from the Bitterfeld deposit, F18/BB/AR/LIN/CJW.

In the male the teeth of the anterior cheliceral margin are well observable (fig. 93) and also the right pedipalpal femoral stridulating tooth. The bulbi are covered by an emulsion. A metatarsal IV bristle is absent. - There are several more males in my collection which are related with *stridulans* or even conspecific.

Distribution: Tertiary Baltic amber forest, Bitterfeld deposit.

***Custodela tibialis* n. sp.** (figs.94-95)

Material: Holotypus ♂ in Baltic amber, coll. ERNST in Skagen, later probably deposited in the Zool. Mus. Kopenhagen.

Preservation and syninclusions: The spider is fairly well preserved, parts of the body are covered by an emulsion (and bacteria?), a large bubble is placed under the base of the right legs and the sternum, parts of tibia and metatarsus of the left leg IV are cut off. - No stellate hairs are preserved in the small amber piece.

Diagnosis (♂;♀ unknown): Pedipalpus (figs. 94-95): Paracymbium with a ventral outgrowth in the distal half, embolus thick and straight.

Description (♂):
Measurements (in mm): Body length 1.9, prosoma: Length 0.95, width 0.8, tibia I 1.0, metatarsus I 1.15.
Colour: Prosoma and legs dark brown, opisthosoma light brown.
Prosoma and opisthosoma as in *C. stridulans* n.sp. - Legs similar to *stridulans* but apical tibial bristles absent; bristles of metatarsus IV absent or broken off. - Pedipalpus: See the diagnosis.

Relationships: See *C. stridulans* and the key.

Distribution: Tertiary Baltic amber forest.

***?Custodela* sp. indet.** (fig. 96)

Material: 2♀ in Baltic amber from the Bitterfeld deposit; ♀a) F8/BB/AR/LIN/CJW; ♀b) F9/BB/AR/LIN/CJW.

Body length about 1.8, prosoma length about 0.75, tibia I about 1.05mm. - Ventral tibial bristles present, 1 retrolateral bristle on tibia I. Claw of the pedipalpus bent distally. - Epigyne (fig. 96) (female b) with a pair of large grooves and with a scapus reaching half way to the spinnerets.

Relationships: In ?*C. parva* n.sp. (fig. 87) the epigyne is quite different, the scapus is much longer and widened in the basal half. - Also *C. bispinosa* n.sp. is known from the Bitterfeld deposit. In this species also ventral tibial bristles I-II are present but tibia I bears two retrolateral bristles. In *C. bispina* n.sp. - also from the Bitterfeld locality - ventral tibial bristles are absent.

Distribution: Tertiary Baltic amber forest, Bitterfeld deposit.

8. *Succineta* n. gen.

Diagnosis (♂, questionable ♀): Femur I bears a dorsal bristle, bristle on metatarsus IV absent, ♂-pedipalpus (figs. 98-101): Paracymbium not sickle-shaped but folded and and curved in a right angle, similar e. g. to *Agyneta* HULL, position of the radix directly ventrally to the paracymbium, lamella characteristica short, complicated and toothed, terminal apophysis widened distally, embolus very wide, toothed apically and probably with two apophyses (fig. 100). Questionable female: Epigyne (fig. 102) wide, with a short and folded scapus and a pair of large grooves.

Relationships: According to the shape of embolus and paracymbium *Succineta* is a member of the subfamily Micronetinae although a FICKERT's gland is not observable. Also the fossil genus *Agynetiphantes* n. gen. (♀ unknown) is probably a member of the Micronetinae but the male chelicerae are diverging in *Agynetiphantes* the shape of the paracymbium and the bulbus structures - especially the embolus - are quite different. - In the extant genera *Microneta* MENGE and *Theonina* SIMON - which may be related - the terminal apophysis is reduced; in the extant genus *Agyneta* HULL - which also may be related - the male chelicerae are usually distinctly diverging and the tibia of the male pedipalpus bears frequently apophyses. In the extant genus *Lepthyphantes* MENGE a bristle of femur I is usually absent and the shape of the paracymbium is different.

Type species: *Succineta discoidalis* n. sp.

Distribution: Tertiary Baltic amber forest.

***Succineta discoidalis* n.gen.n.sp.** (fig. 98-100)

Material in Baltic amber, holotypus ♂, F397/BB/AR/LIN/CJW, paratypus ♂ Mus. Ziemi in Warsaw no. 9915.

Preservation and syninclusions: (1) Holotype: Body and legs are fairly well preserved, partly covered by a white emulsion. The distal part of the opisthosoma is broken off with an amber piece and missing, the left legs I and II are broken off behind the patella (autotomy), some leg articles are cut off, one of the legs is preserved in front of the spider, another leg beneath the spider. - Few stellate hairs. (2) The paratype is well preserved in a small amber piece which has been perforated, the left leg IV is broken off behind the patella, some leg articles are cut off.- Above the spider a stellate hair is preserved.

Diagnosis (♂; questionable ♀): Leg bristles long, length of the pedipalpal tibial bristle 0.11mm, the lamella characteristica bears 4 teeth, its ventral branch is strongly curved (fig. 100).

Description:
Measurements (in mm): Holotype: Body length 1.9, prosoma length 0.7-0.8, legI (paratype): Femur 1.2, patella 0.22, tibia 1.2.
Colour: Prosoma and legs medium to dark brown, opisthosoma light brown.
Prosoma: Caput higher than the thorax, eyes large, posterior row procurved, posterior median eyes separated by about one diameter, clypeus concave, chelicerae only slightly diverging, teeth not observable, laterally stridulating files present, coxae IV separated by less of their diameter. - Legs long and slender, covered with short hairs, order I/II/IV/III. Bristles long, femora I-III 1 dorsally, I 1 prolaterally near the middle, patellae 2 dorsally, tibiae 2 dorsally and few apically, I additionally a lateral pair in the distal half, II 1 retrolaterally, no ventral bristles. Metatarsus I-III with a dorsal bristle in the basal half. Position of the long metatarsal I trichobothrium in 0.15, probably no trichobothrium on metatarsus IV. - Opisthosoma ovally, covered with few short hairs. - Pedipalpus (figs. 98-100, see the diagnosis of the genus): Patella short, its dorsal bristle slightly longer than the tibial bristle, tibia slightly longer than wide, with at least two trichobothria, the cymbium bears blunt outgrowths, the paracymbium is toothless.

Relationships: See *S. brevispina* n. sp.

Distribution: Tertiary Baltic amber forest.

Succineta *brevispina* n.gen.n.sp. (fig. 101)

Material: Holotypus ♂ in Baltic amber, F262/BB/AR/LIN/CJW.

Preservation and syninclusions: The spider is well preserved, partly (e. g. ventrally) covered by a white emulsion, the right legs I and II are broken off and situated in front of the spider. - A stellate hair and a globular excrement particle are preserved above the spider, a stellate hair ventrally, a Nematocera and 2 small parts of insects left to the spider.

Diagnosis (♂; ♀ unknown): Leg bristle short (see below). Pedipalpus (fig. 101): Length of the tibial bristle 0.06mm, the patellar bristle is 3 times longer, the lamella characteristica bears at least 5 teeth, the ventral branch is only slightly curved.

Description (♂):
Measurements (in mm): Body length 2.0, prosoma length 0.9, leg I: Femur 1.15, patella 0.15, tibia 1.2, metatarsus 1.2, tarsus 0.75, tibia II 1.0, tibia IV 0.95.
Colour: Prosoma and legs dark brown, opisthosoma light brown.
Prosoma as in *S. discoidalis* n. sp. - Legs long and slender, order I/II/IV/III, with short hairs and bristles. Sequence of bristle as in *discoidalis* but bristles shorter. Position of the trichobothrium on metatarsus I in 0.2. - Opisthosoma 1.72 times longer than high, dorsally covered with short hairs. - Pedipalpus (fig. 101) similar to *discoidalis* but the tibial bristle is shorter and the lamella is different, see below and the diagnosis.

Relationships: In *S. discoidalis* n. sp. the leg bristles are longer, *discoidalis* (holoype)/*brevispina*: (a) the dorsal-distal bristle on patella I: 0.19/0.14, (b) bristle of the pedipalpal tibia: 0.11/0.06 (in mm). Furthermore the shape of the lamella characteristica is different in both species, compare figs. 100 and 101: The ventral branch is stronger curved in *discoidalis* and bears only four teeth.

Distribution: Tertiary Baltic amber forest.

?***Succineta* sp. indet.** (fig. 102)

Material: 1 ♀ in Baltic amber, F15/BB/AR/LIN/CJW.

Preservation and syninclusions: The spider is completely and fairly well preserved, parts are covered by a white emulsion, the left leg II is broken off between patella and tibia (autotomy) and lying at the side of the spider, the opisthosoma has a dorsal depression. - Two spider's threads are preserved beneath and behind the spider, near to the spider two small excrement particles; no stellate hairs.

Diagnosis (♀): Epigyne (fig. 102) wide, with a pair of large grooves and a short folded scapus.

Measurements (in mm): Body length 2.1, prosoma length 0.9, metatarsus I 1.35, tarsus I 0.85. - Leg bristles as in S. discoidalis n. sp. - Epigyne: See above.

The **relationships** are unclear without knowledge of the male. According to the wide epigyne and the folderd scapus this female could well be a member of the genus *Succineta* n. gen. and may be conspecific with one of the species which are described above.

Distribution: Tertiary Baltic amber forest.

(**9**. ***Memoratrix*** PETRUNKEVITCH 1942)

Type species: *Memoratrix rydei* PETRUNKEVITCH 1942 (sub Metinae).

According to PETRUNKEVITCH (1942) the holotype of the type species is a "mature female". Concerning the relatively short scapus of the epigyne which is covered by a thick white emulsion in my opinion this specimen most probably is a subadult female. In contrast to the fossil Linyphiidae in Baltic amber the anterior metatarsi of *rydei* bear more than two bristles in the basal and in the distal half. - PETRUNKEVITCH (1958) described with hesitation the conspecific male of *rydei* which also possesses numeous leg bristles. According to the large anterior median eyes and the different proportions of the legs I regard the male not as conspecific with *rydei* and concerning the numerous bristles of metatarsus I (including lateral bristles) the genus is more likely a taxon of the family Pimoidae than of the Linyphiidae, see the paper on the Pimoidae in this volume.

Members of two subfamilies are known in Dominican amber: Micronetinae, genus *Agyneta* HULL 1911 and Linyphiinae, genus *Selenyphantes* GERTSCH & DAVIES 1946 but no member of the Erigoninae, see below.

Agyneta HULL 1911: Three described fossil species are known, *bigibber* WUNDERLICH 1988, *fastigata* WUNDERLICH 1988, *separata* WUNDERLICH 1988, and *A.* sp. indet. sensu WUNDERLICH 1988.
Synonymy: Following MILLIDGE and other authors PENNEY (2001: 995) regards *Meioneta* HULL 1920 separate to the genus *Agyneta* but SAARISTO (1983) - based on the structures of the male pedipalpus - founded very well the synonymy of both nominal genera. As in numerous other genera of the Linyphiidae the position of the metatarsal trichobothrium is quite variable in *Agyneta*, a trichobothrium of metatarsus IV is present or absent and the number of the cheliceral teeth is not uniform.

Only one further genus of the family Linyphiidae is known which is preserved in Dominican amber: ***Selenyphantes*** GERTSCH & DAVIES 1946 (= *Palaeolinyphia* WUNDERLICH 1986; synonymy: See PLATNICK (1993: 349), Advances is Spider Taxonomy 1988-1991). The single fossil species - *flagelliferus* (WUNDERLICH 1986) - is related to the extant *S. longispinosus* (O. PICKARD-CAMBRIDGE 1896) from Central America but is not a synonym of this species, see WUNDERLICH (1986: 84). (The numbers of the figs. 173 and 174 of *Palaeolinyphia flagellifera* - in the book of WUNDERLICH (1986) are changed by mistake).

?***Lepthyphantes lamellatus*** WUNDERLICH 1988: This species is a member of the genus *Custodela* PETRUNKEVITCH 1942 and is preserved in Baltic amber but not in Dominican amber, see above. *Custodela* is only known from Baltic amber.

Grammonota deformans WUNDERLICH 1998, see WUNDERLICH (1999): This species - a member of the subfamily Erigoninae and probably a member of the genus *Ceratinopsis* EMERTON 1882 - is not preserved in Dominican amber but in copal from Madagascar, see the paper on fakes in this volume. Members of the Erigoninae are not known from Dominican amber. Photo 248

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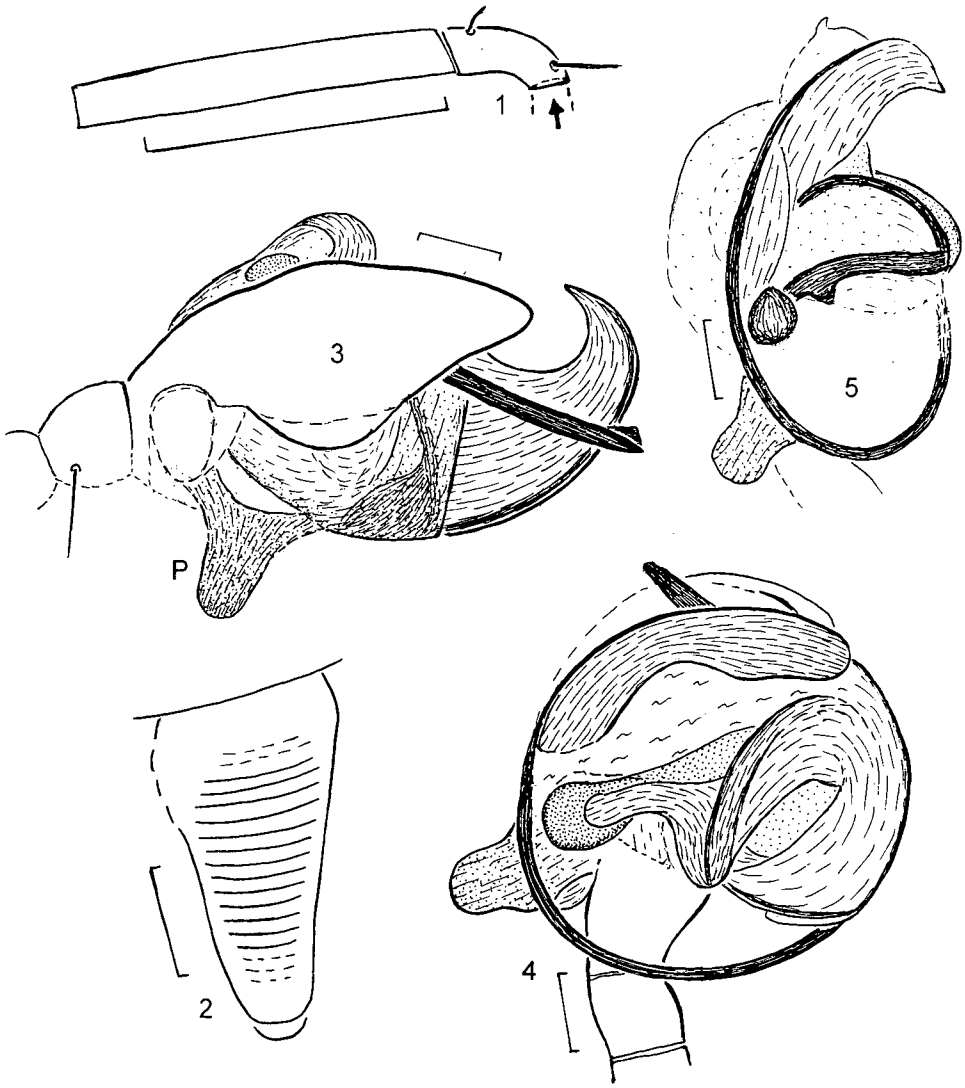
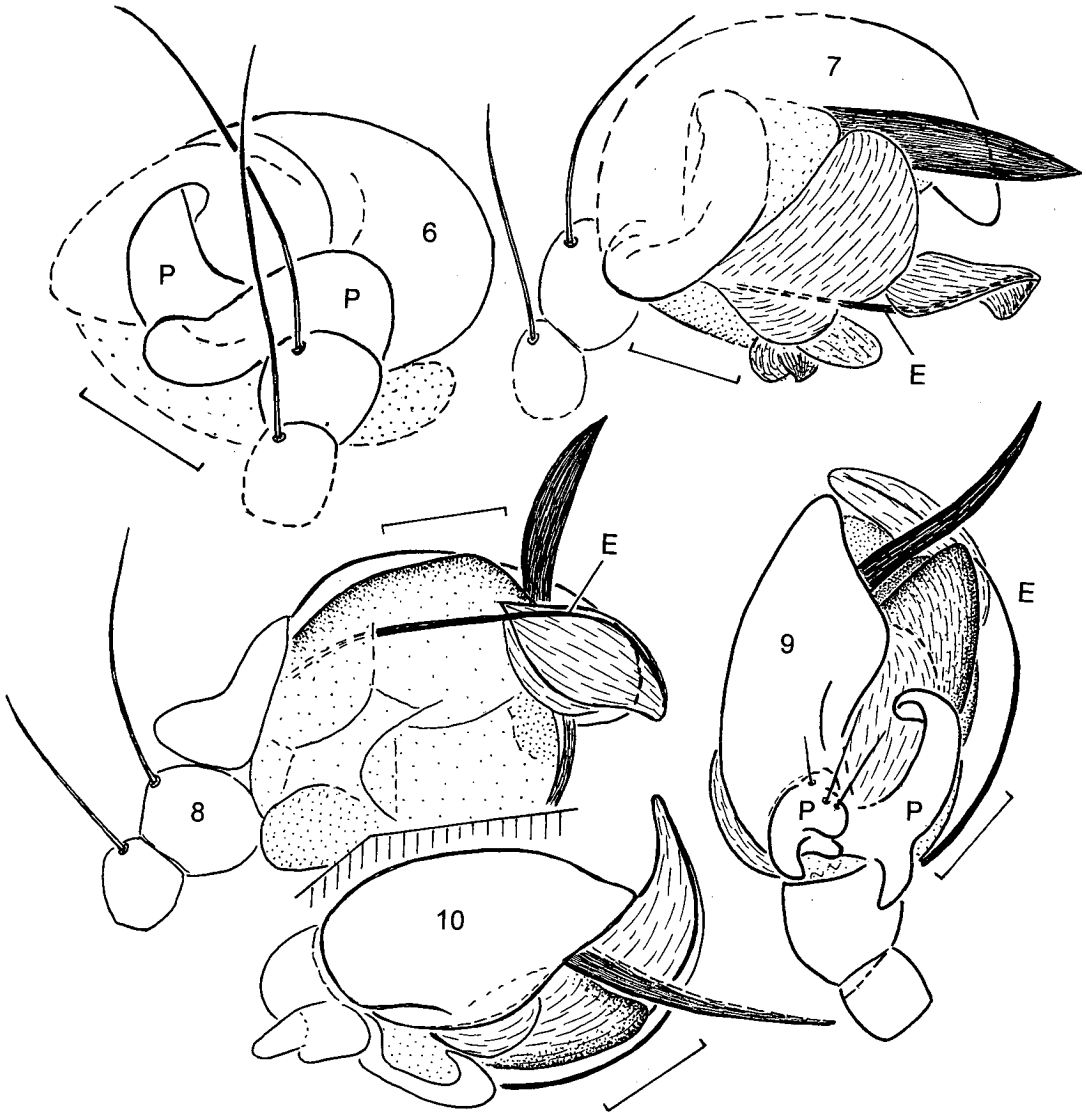


Fig. 1: Autotomy in a Linyphiidae leg in Baltic amber with a brake (arrow) between patella and tibia; M = 0.1mm;

fig. 2: Linyphiidae gen. and sp. indet., r. ♂-chelicera with stridulating files retrolaterally; M = 0.1

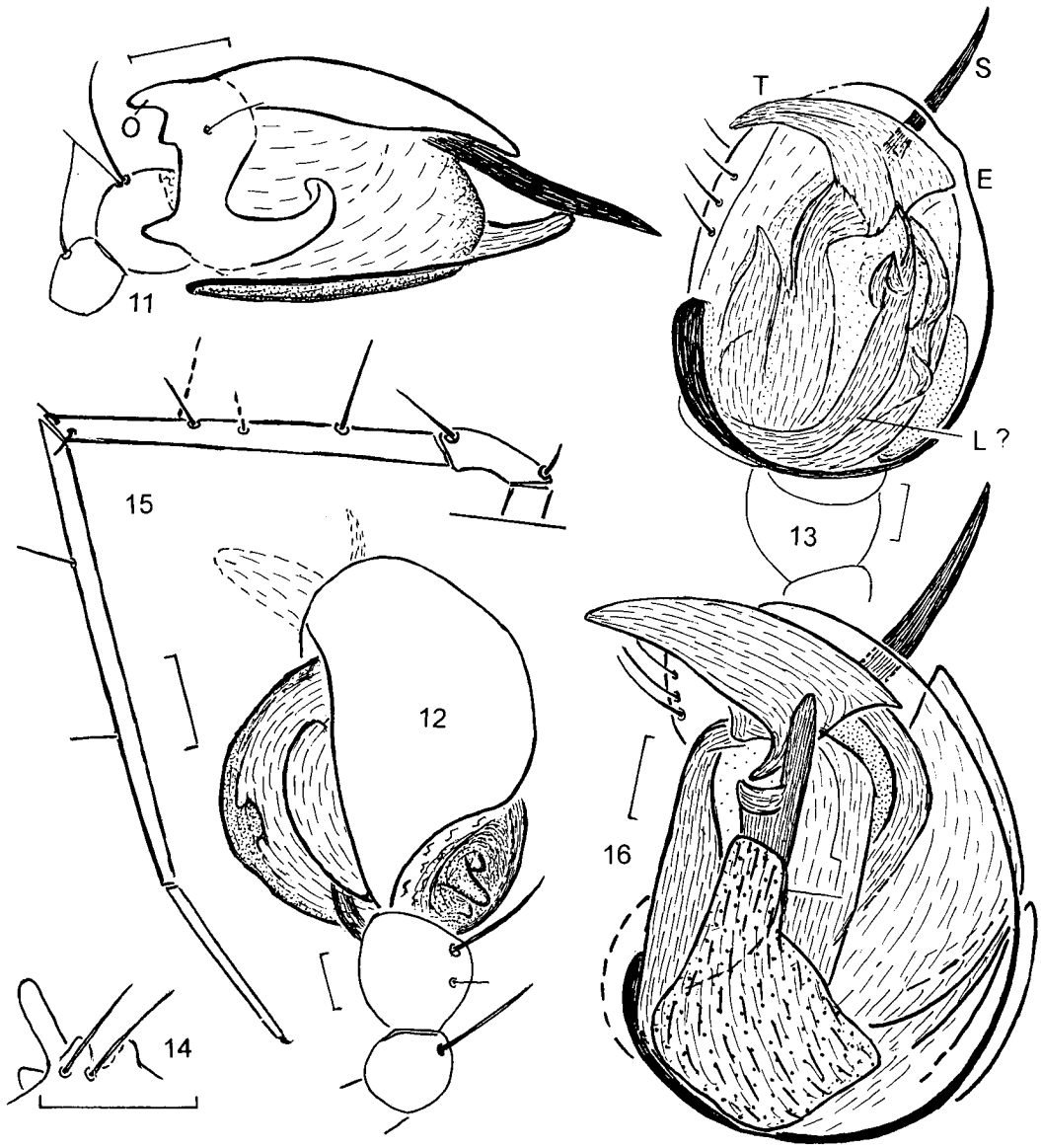
figs. 3-5: ***Eolabulla falcata*** **n.gen.n.sp.**, r. ♂-pedipalpus retrodorsally, ventrally-distally and retroventrally; M = 0.1;



figs. 6-8: ***Eolabulla gladiformis*** **n.gen.n.sp.**, ♂; 6) l. pedipalpus dorsally-basally; 7-8) r. pedipalpus retrodorsally and retroventrally; E = embolus, P = paracymbium; M = 0.2;

fig. 9: ***Eolabulla laminata*** **n.gen.n.sp.**, r. ♂-pedipalpus retrodorsally and slightly from behind (the bristles of patella and tibia are not drawn); E = embolus, P = paracymbium; M = 0.2;

figs. 10-11: ***Eolabulla perforata*** **n.gen.n.sp.**, r. ♂-pedipalpus retrolaterally and dorsally/slightly retrodistally; O = dorsal outgrowths of the paracymbium; M = 0.2;



figs. 12-14: ***Eolabulla sagitta*** **n.gen.n.sp.**, ♂; 12) r. pedipalpus dorsally and slightly probasally; 13) l. pedipalpus ventrally (the distal part of the embolus is separated from the conductor); 14) part of the paracymbium of the r. pedipalpus retrolaterally and slightly basally; E = embolus, L ?= lamella, S = suprategular apophysis, T = terminal apophysis (conductor); M = 0.1;

figs. 15-16: ***Eolabulla similis*** **n.gen.n.sp.**, ♂; 15) distal articles of the l. leg I retrolaterally (2 bristles of the tibia are broken off); 16) l. pedipalpus ventrally and slightly retroapically; M = 0.5 and 0.1;

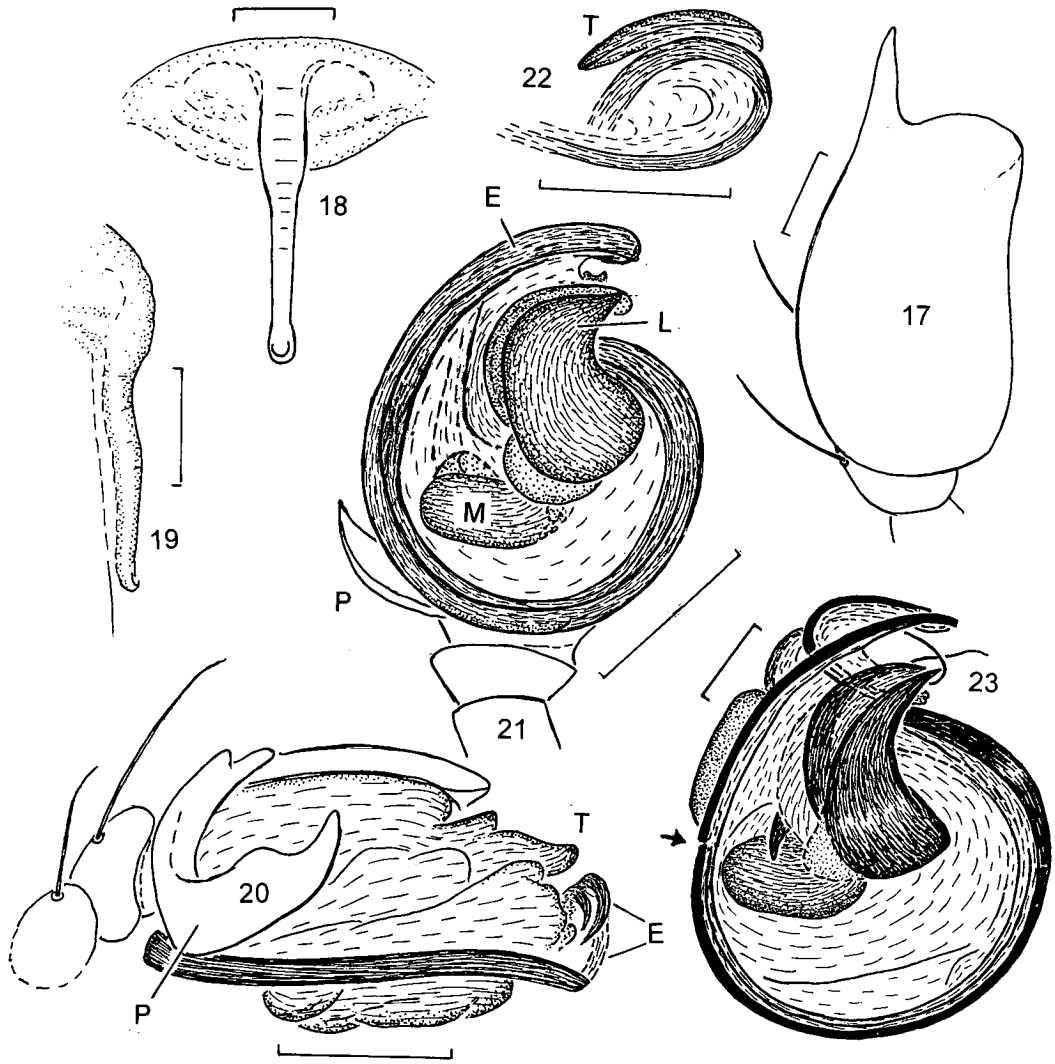


fig. 17: ***Eolabulla*** sp. indet., pedipalpus of a subadult male; M = 0.2;

figs. 18-19: ***Eolabulla*** sp. indet. 1, ♀; 18) epigyne ventrally; 19) outline of the epigyne laterally; M = 0.2;

figs. 20-22: ***Paralabulla bitterfeldensis*** **n.gen.n.sp.**, holotypus ♂; 20) r. pedipalpus retrolaterally and slightly ventrally; 21) r. pedipalpus ventrally; 22) r. embolus with terminal apophysis; E = embolus, M = median apophysis, L = lamella, P = paracymbium, T = terminal apophysis; M = 0.2;

fig. 23: ***Paralabulla succinifera*** **n.gen.n.sp.**, ♂, r. pedipalpus ventrally; the arrow indicates to the brake of the embolus; M = 0.1;

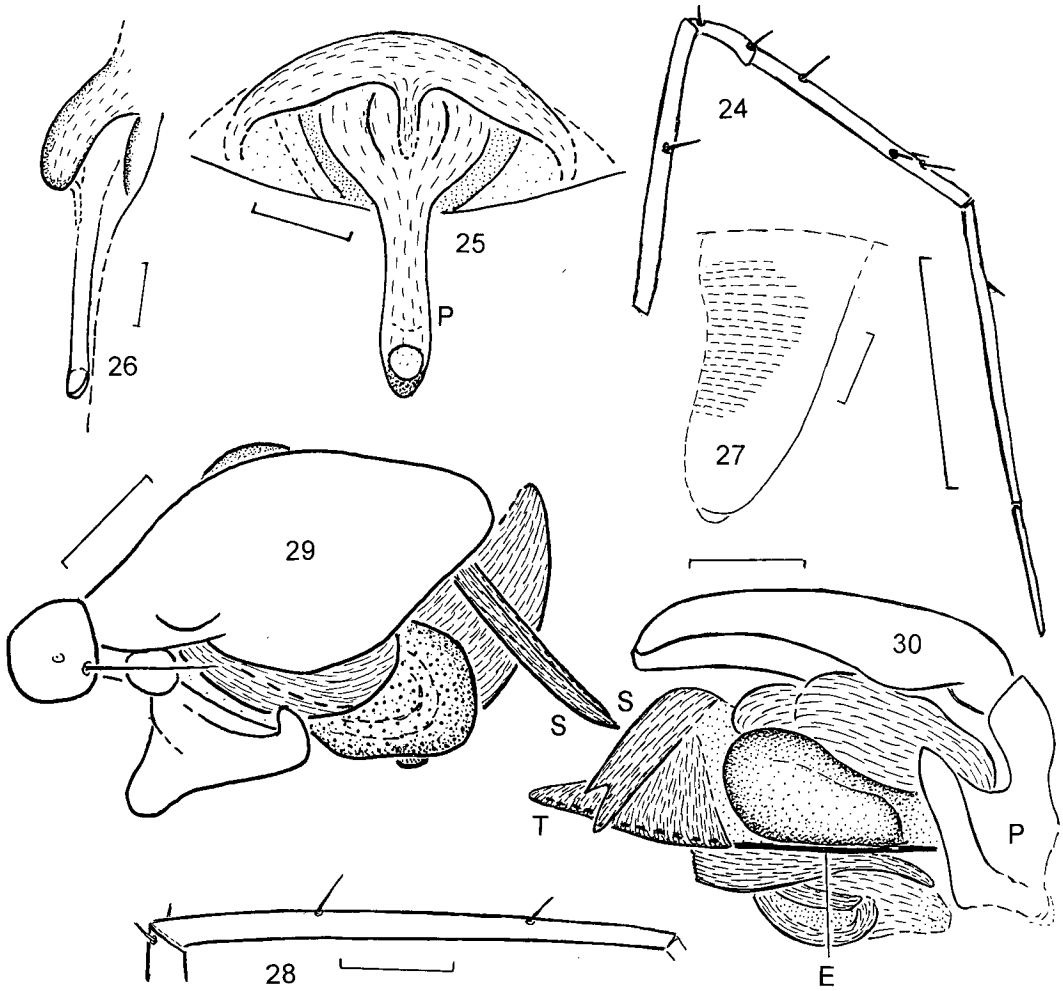


fig. 24: ***Paralabulla*** sp. indet., ♂, l. leg I prolaterally and slightly from behind; M = 1.0;

figs. 25-26: ?***Paralabulla dubia*** **n.gen.n.sp.**, ♀; 25) epigyne with "pseudoparmula" (P) ventrally and slightly posteriorly; 26) epigyne laterally; M = 0.2;

figs. 27-31: ***Succiphantes velteni*** **n.gen.n.sp.**, ♂, 27-29, 31) holotypus, 30) paratypus a; 27) r. chelicera retrolaterally with stridulating files; 28) r. metatarsus I with bristles retrolaterally; 29) r. pedipalpus dorsally and slightly retrobasally; 30) l. pedipalpus (bulbus partly expanded) retroventrally; 31) r. pedipalpus retroventrally; E = embolus, L = lamella, P = paracymbium, S = suprategular apophysis, T = terminal apophysis (conductor), TE = tegulum; M = 1.0 in fig. 27), 0.2 in the remaining figs.;

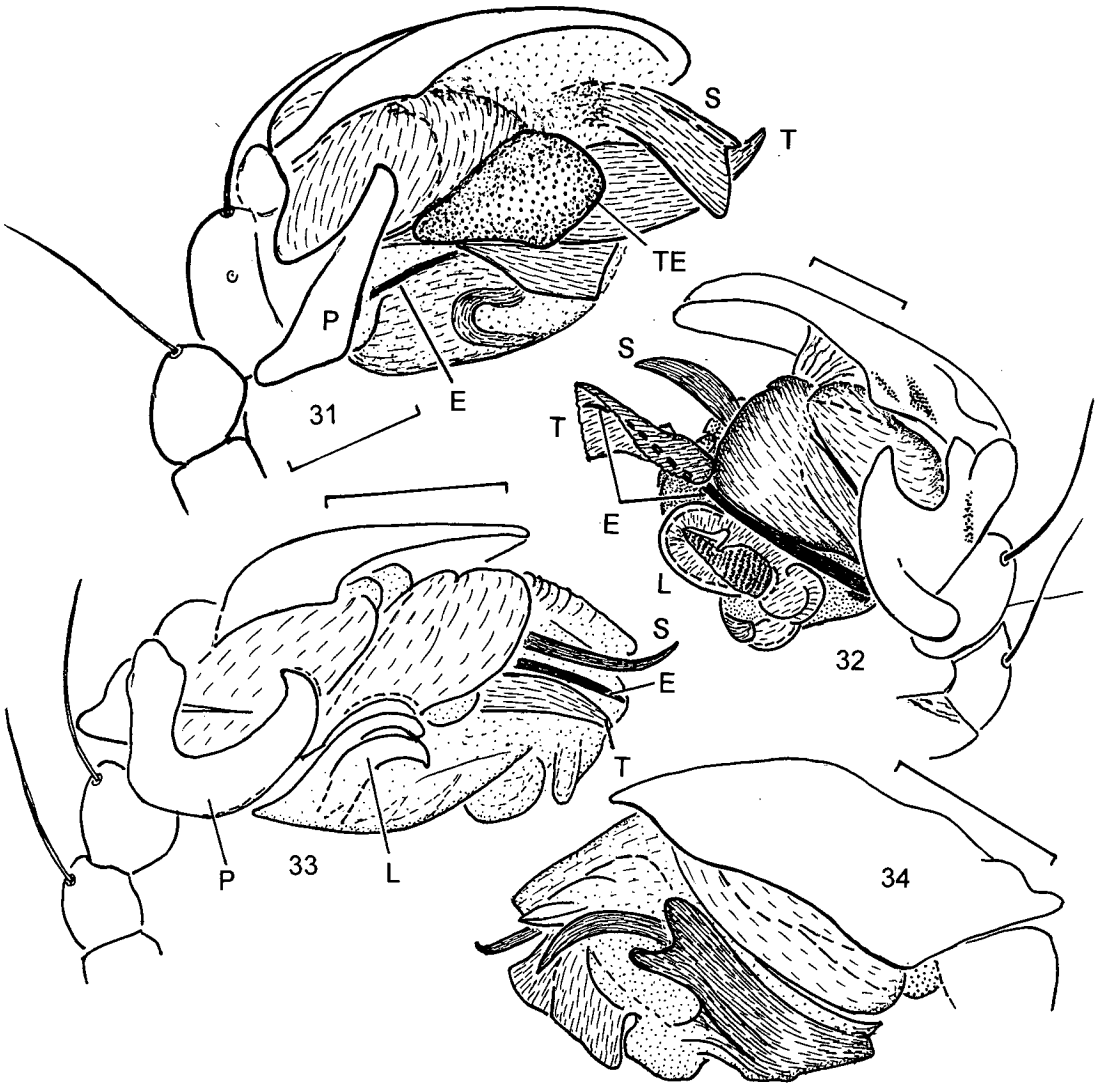
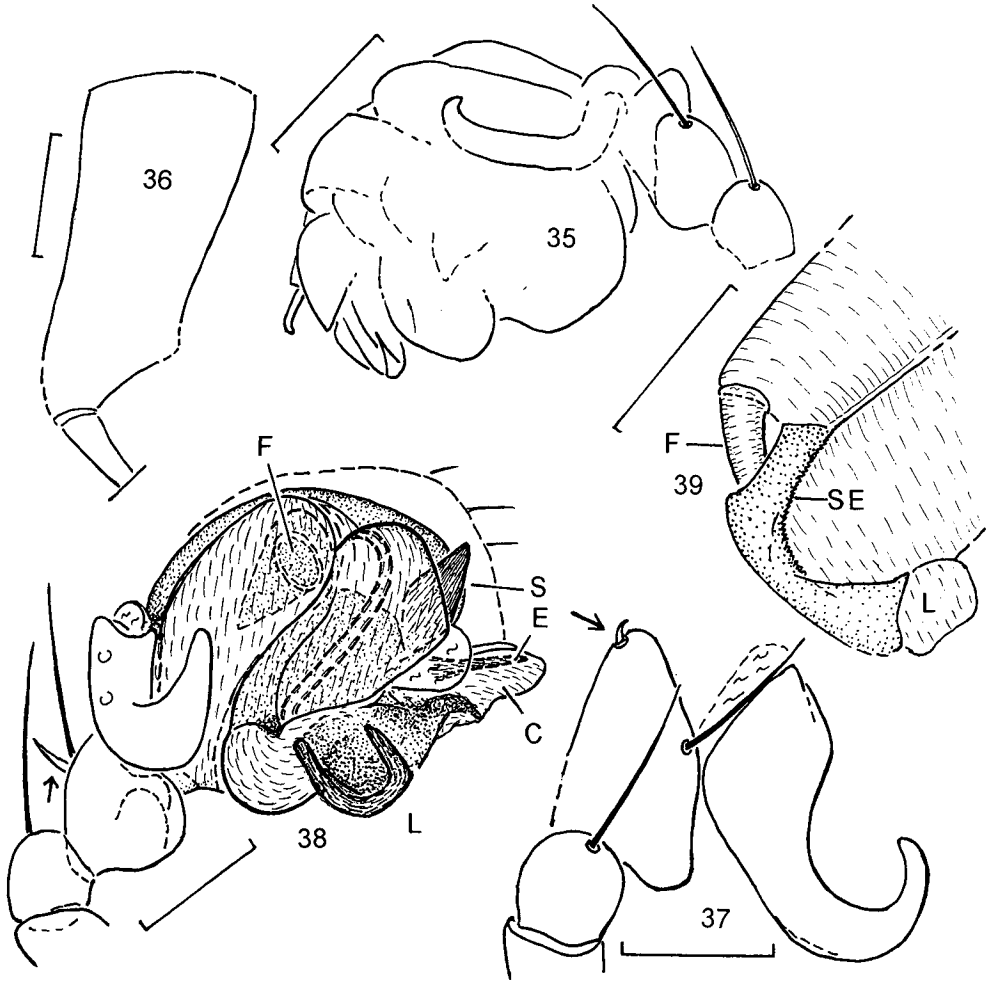


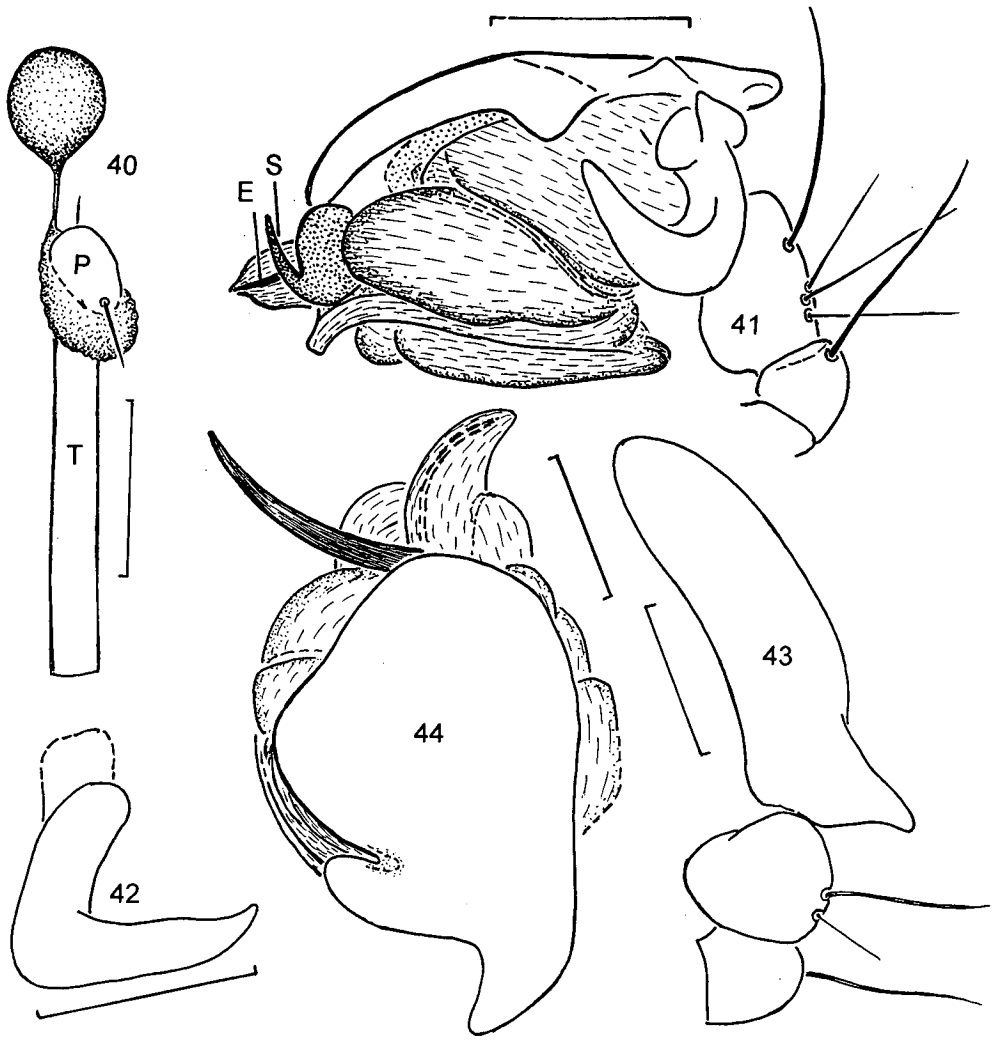
fig. 32: ***Succiphantes tanasevitchi*** **n.gen.n.sp.**, ♂, l. pedipalpus retrolaterally, the bulbus is slightly expanded at the basal haematodocha; E = embolus, L = lamella, S = suprategular apophysis, T = terminal apophysis (conductor); M = 0.2;

figs. 33-35: ***Eophantes complicatus*** **n.gen.n.sp.**, ♂; 33) r. pedipalpus retrolaterally and slightly ventrally; 34) r. pedipalpus prolaterally; 35) l. pedipalpus retroventrally, bulbus partly expanded; E = embolus, L = lamella, P = paracymbium, S = suprategular apophysis, T = terminal apophysis (conductor); M = 0.2;



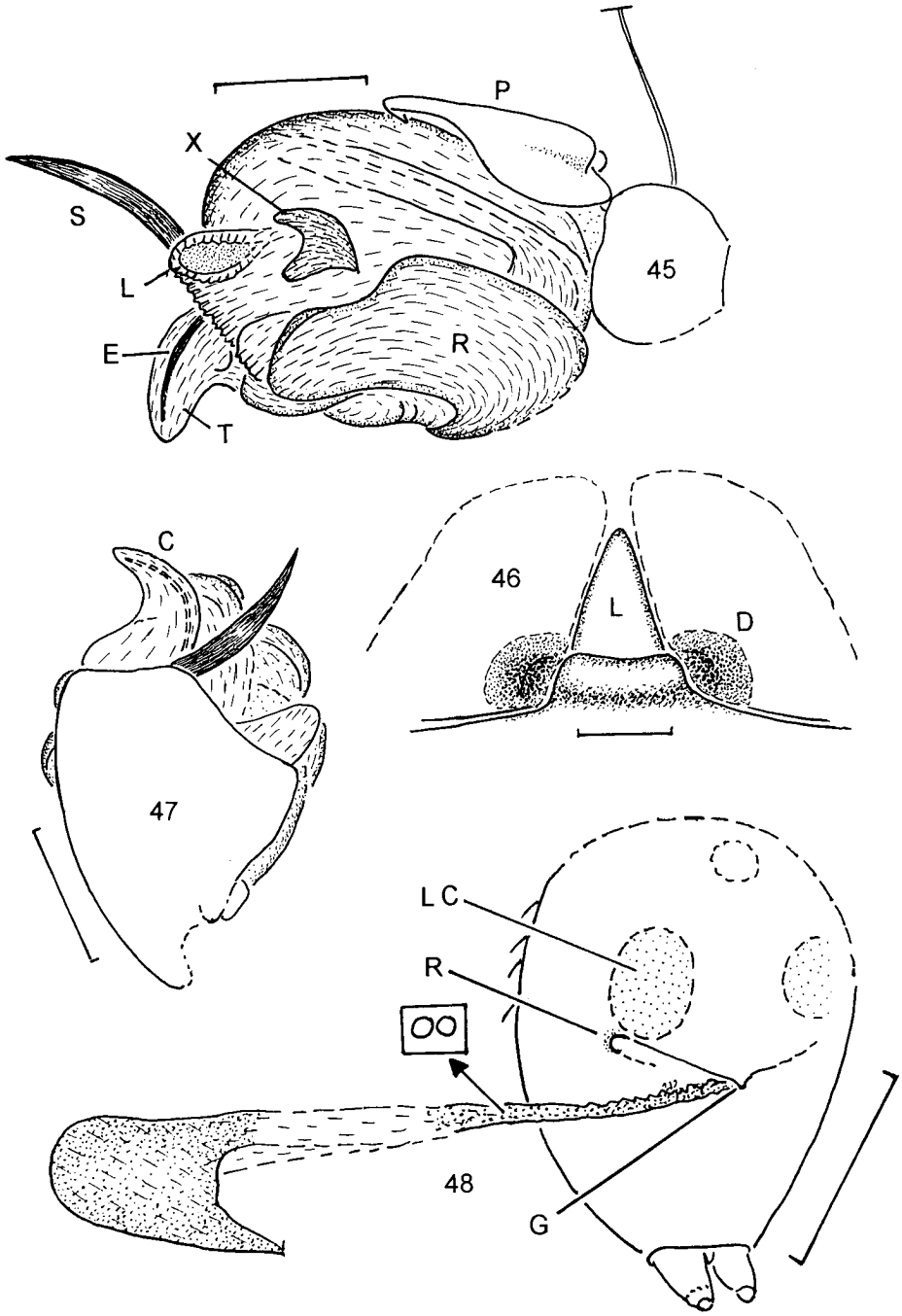
figs. 36-38: ***Agynetiphantes gibbiferus*** **n.gen.n.sp.**, ♂; 36) r. chelicera, retrofrontal-distal aspect; 37) patella dorsally, tibia retrodorsally and paracymbium retrolaterally of the r. pedipalpus; the arrow indicated to the short spine of the tibia; 38) r. pedipalpus retroventrally; C = conductor (terminal apophysis), E = embolus, F = FICKERT's gland, L = lamella, S = suprategular apophysis; M = 0.1;

figs. 39-42: ***Custodelela hamata*** **n.gen.n.sp.**, ♂; 39) l. chelicera retrolaterally, with the fang (F), labium (L), serrula (SE) of the gnathocoxa and remains of secreted digestive liquid and enzyms (punctated); 40) autotomy and remains of blood (haemolymph) (punctated) of the r. leg II retroventrally; remains of blood are preserved between the tip of the patella (P) and the tibia (T) as well as as in a bubble on a thin stalk (hairs are not drawn); 41) l. pedipalpus retrolaterally and slightly ventrally; 42) r. paracymbium; E = embolus, S = suprategular apophysis; M = 0.5 in fig. 40), 0.2 in the remaining figs.



Figs. 43-45: ***Custodela acuta* n.sp.,** ♂, l. pedipalpus; 43) pedipalpus without bulbus prolaterally and slightly dorsally-basally; 44) pedipalpus dorsally and slightly frontally; 45) pedipalpus retroventrally; E = embolus, L = Lamella, P = paracymbium, R = radix, S = suprategular apophysis, T = terminal apophysis (conductor), X = additional bulbus apophysis; M = 0.2;

figs. 46-48: ***Custodela acutula* n.sp.**, ♂; 46) labrum (L) in front of the rebordered labium and mediobasal depression (D) of the l. gnathocoxa ventrally; 47) r. pedipalpus dorsally and slightly apically; 48) opisthosoma ventrally and slightly from the right side, with remains of questionable sperm (droplet, sperm web?) in connection with the genital opening (G), two „particles" are enlarged; C = translucent conductor with embolus (dotted line), LC = right lung cover, R = right end of the epigastral furrow; M = 0.2 in fig. 47, 0.1 in figs. 46 and 48.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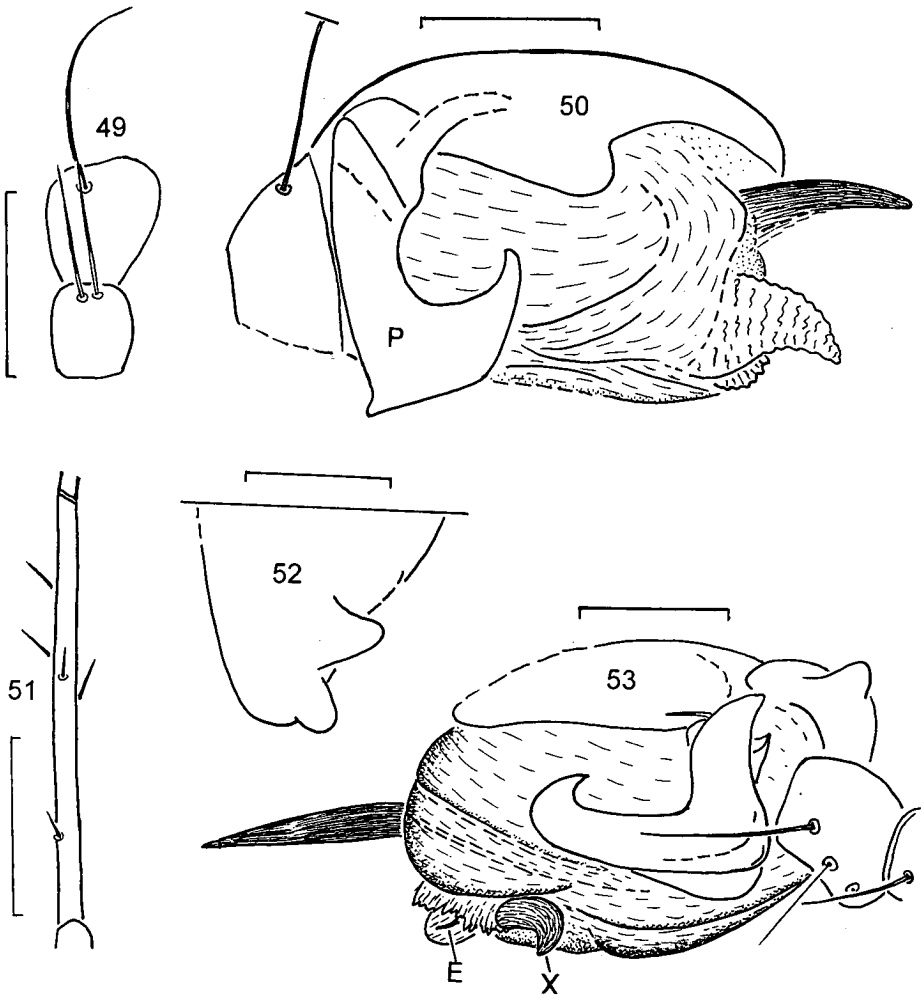
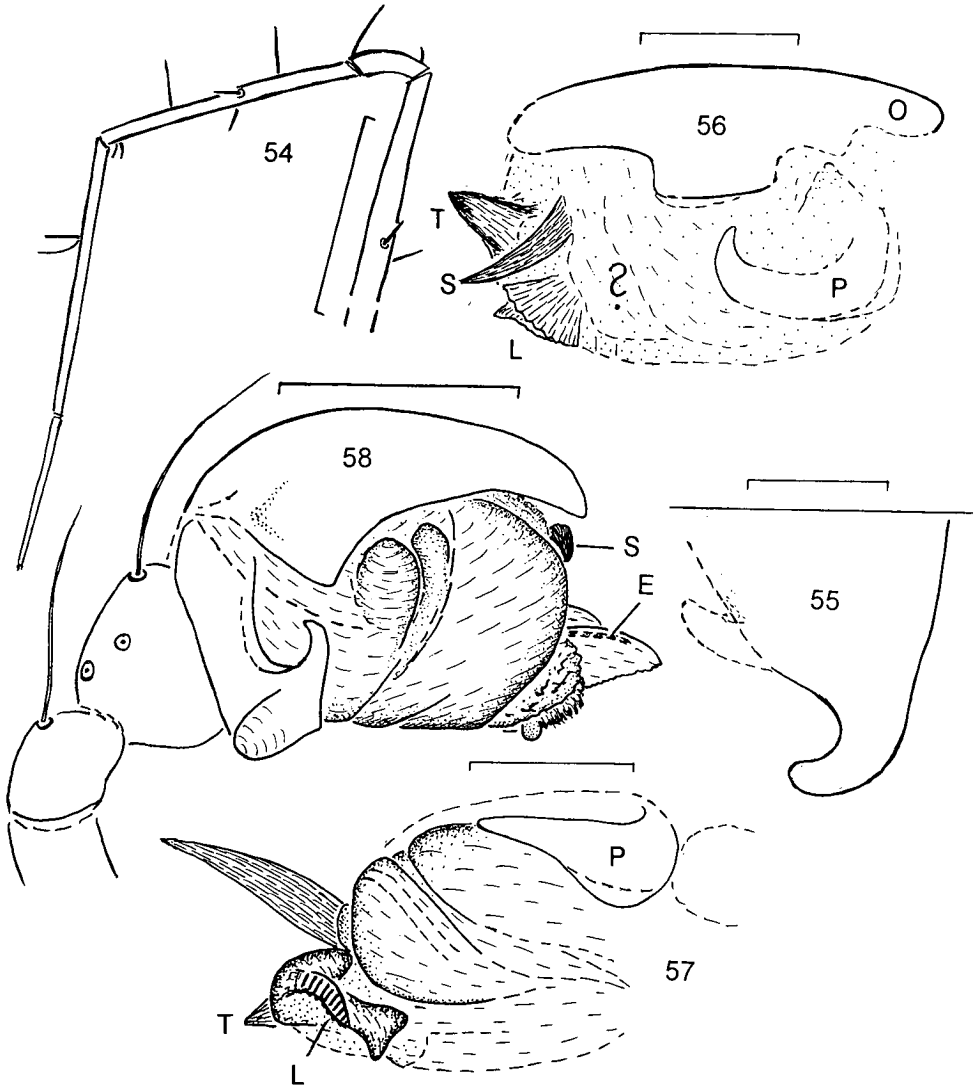


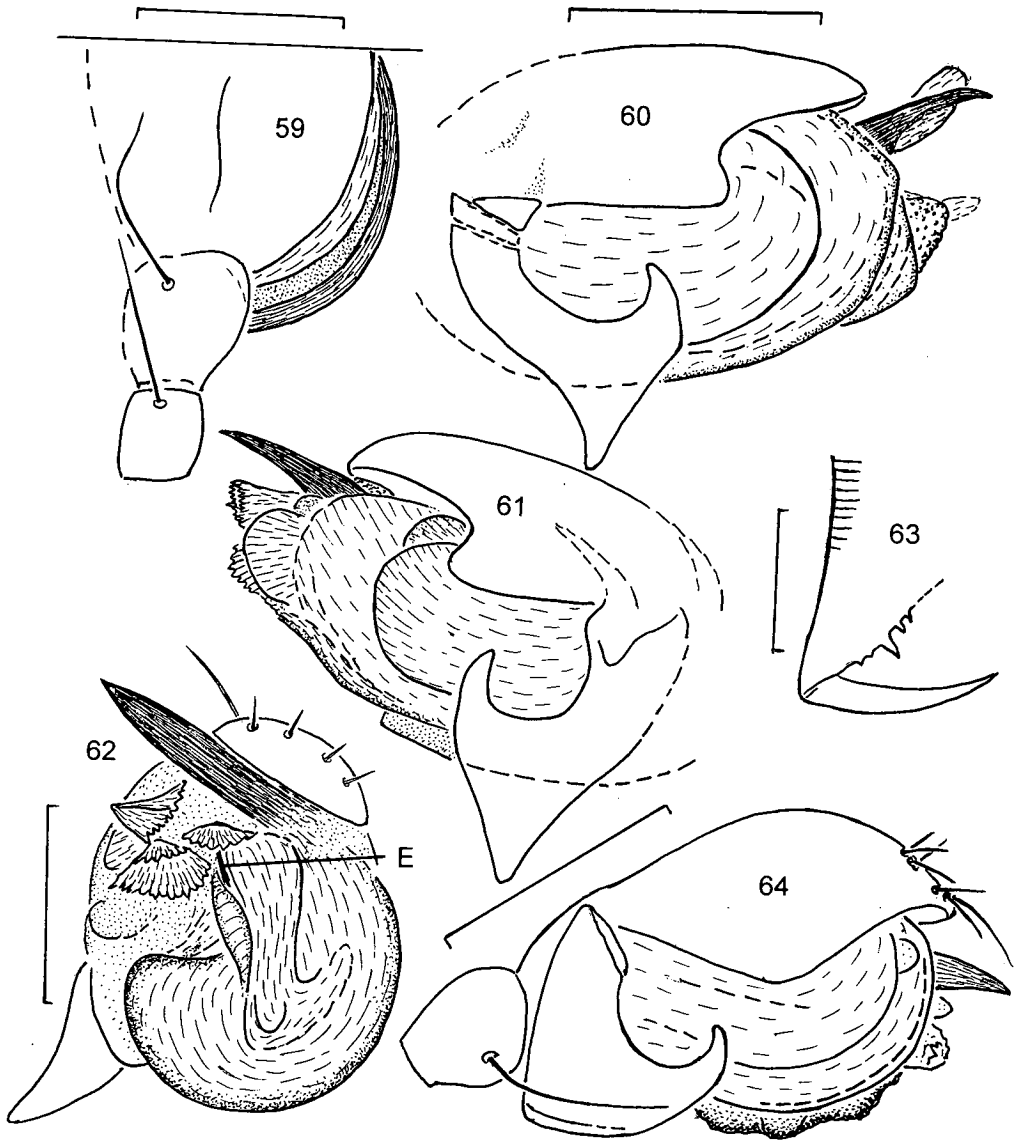
figs. 49-50: ***Custodela bispina* n.sp.**, ♂; 49) patella and tibia of the l. pedipalpus with bristles dorsally; 50) r. pedipalpus retrolaterally; P = paracymbium; M = 0.2;

figs. 51-53: ***Custodela bispinosa* n.sp.**, ♂; 51) l. tibia I dorsally; 52) basal part of the r. cymbium; 53) l. pedipalpus retrolaterally; E = embolus, X = additional bulbus apophysis; M = 0.5 in fig. 51, 0.2 in figs. 52-53;



figs. 54-57: ***Custodela cheiracantha*** (KOCH & BERENDT 1854), holotypus ♂; 54) r. leg I with bristles and metatarsal trichobothrium (T); 55) basal part of the l. cymbium dorsally (partly hidden by an emulsion); 56) l. pedipalpus retrolaterally (partly covered by an emulsion); 57) l. pedipalpus retroventrally; L = lamella, O = dorsal-basal outgrowth of the cymbium, P = paracymbium, S = suprategular apophysis, T = terminal apophysis; M = 1.0 in fig. 54, 0.2 in the other figs.;

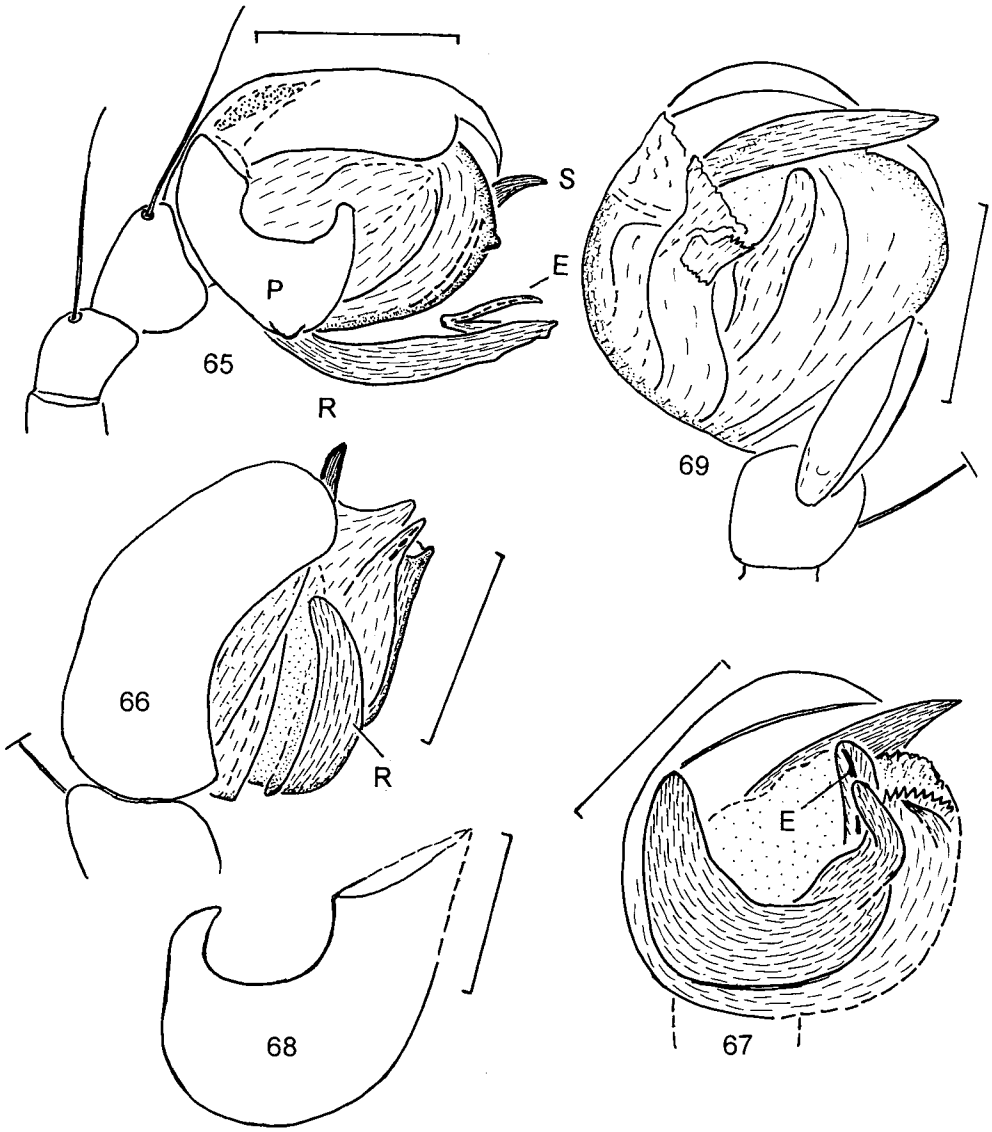
figs. 58: ***Custodela clava*** **n.sp.**, ♂, r. pedipalpus retrolaterally; E = embolus, S = suprategular apophysis; M = 0.2;



figs. 59-60: ***Custodela curva* n.sp.**, ♂; 59) patella, tibia and basal part of cymbium and bulbus of the l. pedipalpus dorsally; 60) r. pedipalpus retrolaterally; M = 0.2;

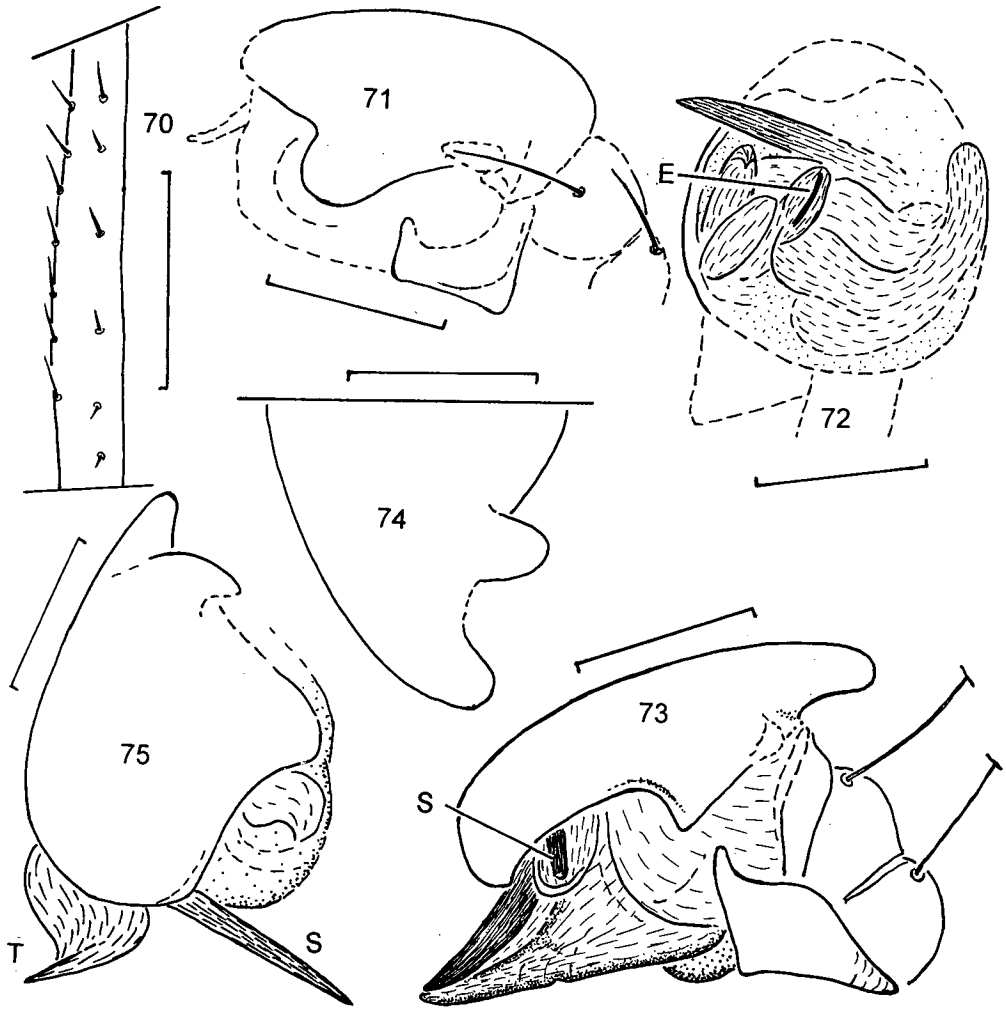
figs. 61-62: ***Custodela curvata* n.sp.**, ♂; 61) l. pedipalpus retrolaterally; 62) r. pedipalpus ventrally; E = embolus; M = 0.2;

figs. 63-64: ***Custodela divergens* n.sp.**, ♂; 63) distal part of the r. chelicera frontally; 64) r. pedipalpus retrolaterally and slightly dorsally; M = 0.2;



figs. 65-67: ***Custodela expandens* n.sp.,** ♂; 65) r. pedipalpus retrolaterally (radix with embolus partly expanded); 66-67) l. pedipalpus prolaterally and ventrally; E = embolus, P = paracymbium, R = radix, S = suprategular apophysis, T = terminal apophysis; M = 0.2;

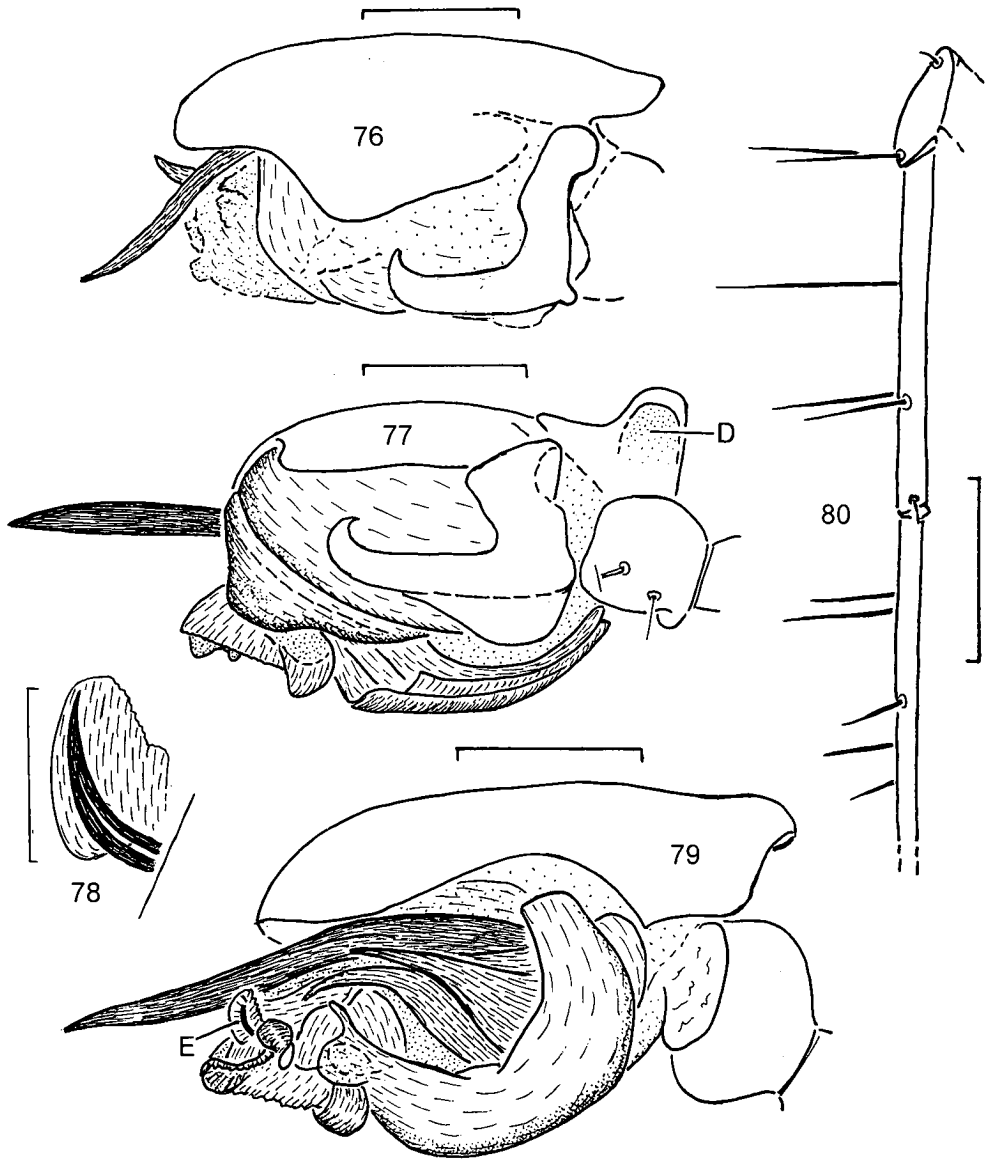
figs. 68-69: ***Custodela falcata* n.sp.,** ♂; 68) paracymbium of the l. pedipalpus retrolaterally; 69) l. pedipalpus ventrally; M = 0.1 and 0.2;



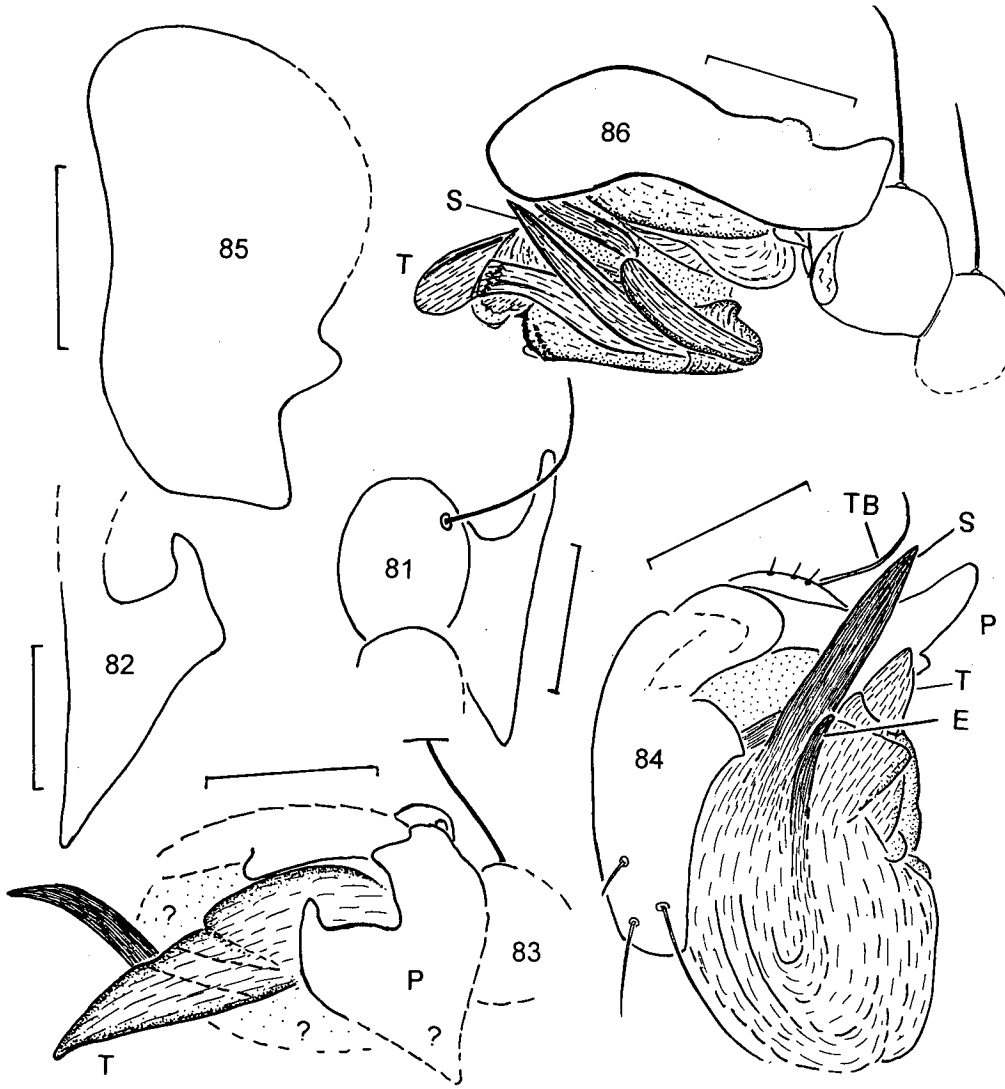
figs. 70-72: ***Custodela femurspinosa* n.sp.,** ♂; 70) l. femur I retroventrally (the tip is wanting); 71) l. pedipalpus retrolaterally (parts are hidden by an emulsion); 72) r. pedipalpus ventrally (parts are hidden); E = embolus; M = 0.5 in fig. 70), 0.2 in the other figs.;

fig. 73: ***Custodela henningseni* n.sp.**, ♂, l. pedipalpus retrolaterally; bulbus probably not quite in its natural position; S ?= suprategular apophysis; M = 0.2;

figs. 74-76: ***Custodela kochi* n.sp.**, ♂; 74) basal part of the r. cymbium dorsally; 75) l. pedipalpus dorsally and slightly apically; 76) l. pedipalpus retrolaterally and slightly dorsally-basally; S = suprategular apophysis, T = terminal apophysis; M = 0.2;



figs. 77-80: ***Custodela lanx* n.sp.**, holotypus ♂; 77) l. pedipalpus retroventrally; 78) distal part of the r. embolus and conductor retroventrally-distally; 79) r. pedipalpus prolaterally; 80) r. leg III: Patella, tibia and metatarsus with an abnormal high number of bristles; E = embolus, D = depression of the dorsal cymbial outgrowth; M = 0.5 in fig. 80), 0.1 in fig. 78), 0.2 in figs. 77) and 79);



figs. 81-84: ***Custodela oblonga*** KOCH & BERENDT 1854), 81-83) questionable male, 84) male holotype; 81) tibia and paracymbium of the r. pedipalpus dorsally; 82) paracymbium of the r. pedipalpus retrolaterally; 83) l. pedipalpus retroventrally (some structures are hidden); 84) l. pedipalpus with partly expanded bulbus retrodorsally-apically; E = embolus, P = paracymbium, S = suprategular apophysis, T ?= terminal apophysis, TB = tibial bristle; M = 0.1 in fig. 82, 0.2 in the remaining figs.;

figs. 85-86: ***Custodela obtusa*** **n.sp.,** ♂; 85) r. cymbium dorsally and slightly prolaterally; 86) r. pedipalpus prodorsally with the bulbus partly expanded; S = suprategular apophysis, T = translucent terminal apophysis (conductor) with the embolus; M = 0.2;

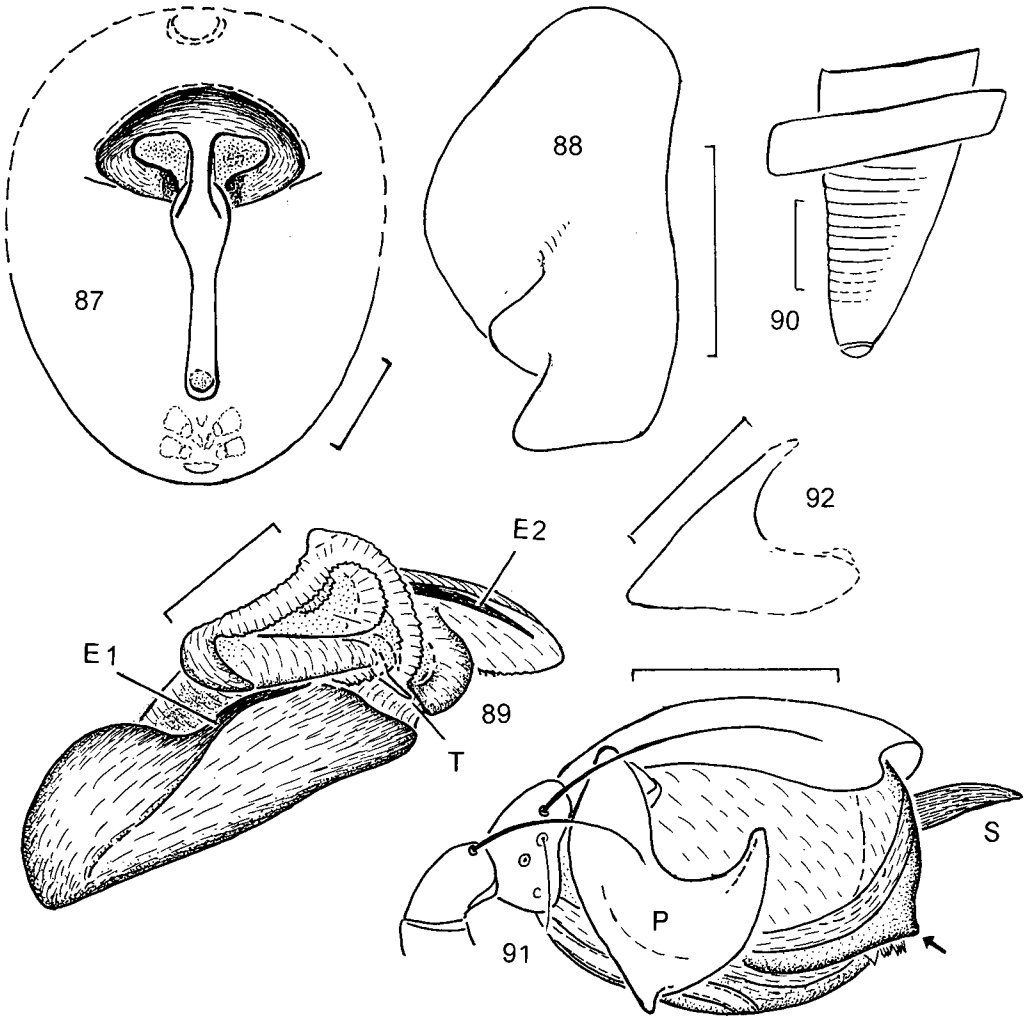


fig. 87: ?***Custodela parva*** **n.sp.**, ♀, opisthosoma with epigyne ventrally; M = 0.2;

figs. 88-89: ***Custodela pseudokochi*** **n.sp.**, holotypus ♂; 88) l. cymbium dorsally and slightly prolaterally; 89) distal sclerites of the partly expanded r. bulbus retroventrally; E1, E2 = basal and distal parts of the embolus, T = tooth of the lamella; M = 0.2 in fig. 88, 0.1 in fig. 89;

figs. 90-92: ***Custodela stridulans*** **n.sp.,** ♂; 90) r. chelicera retrolaterally with stridulating files, partly hidden by the pedipalpal femur; 91) r. pedipalpus retrolaterally with the hook of the tegulum (arrow); 92) r. paracymbium retrodorsally; P = paracymbium, S = suprategular apophysis; M = 0.2;

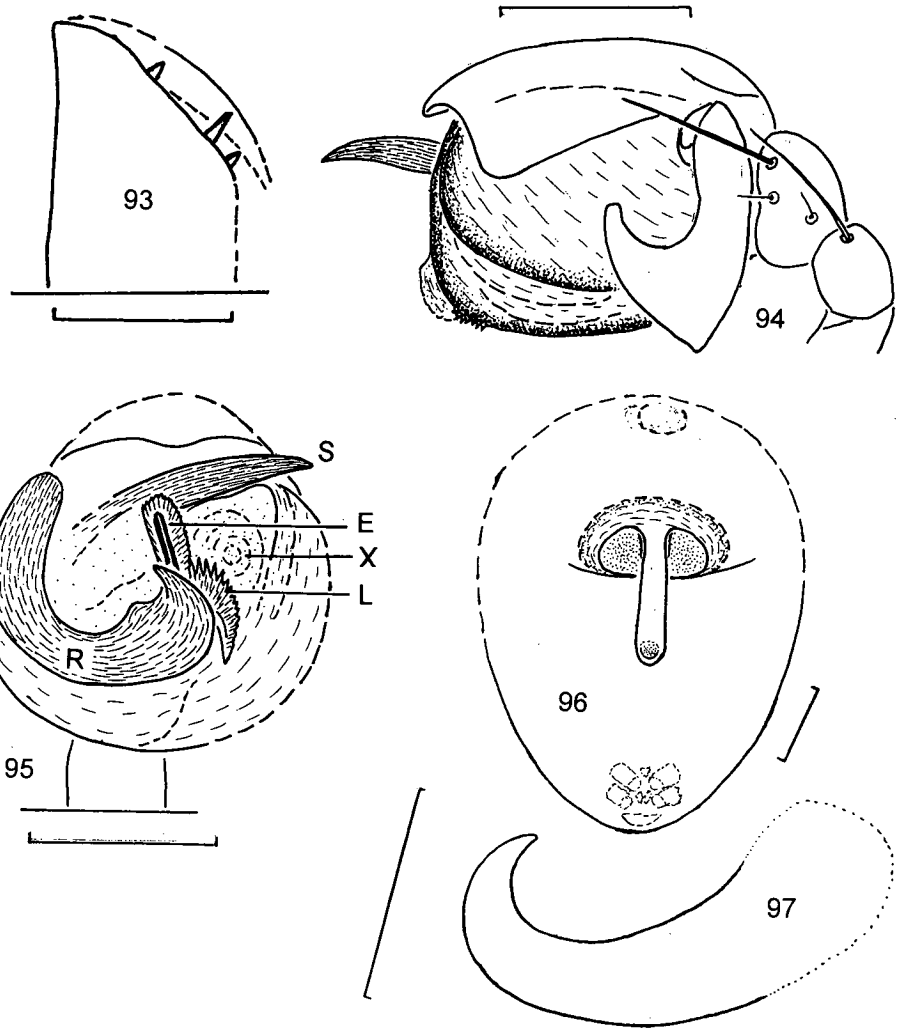
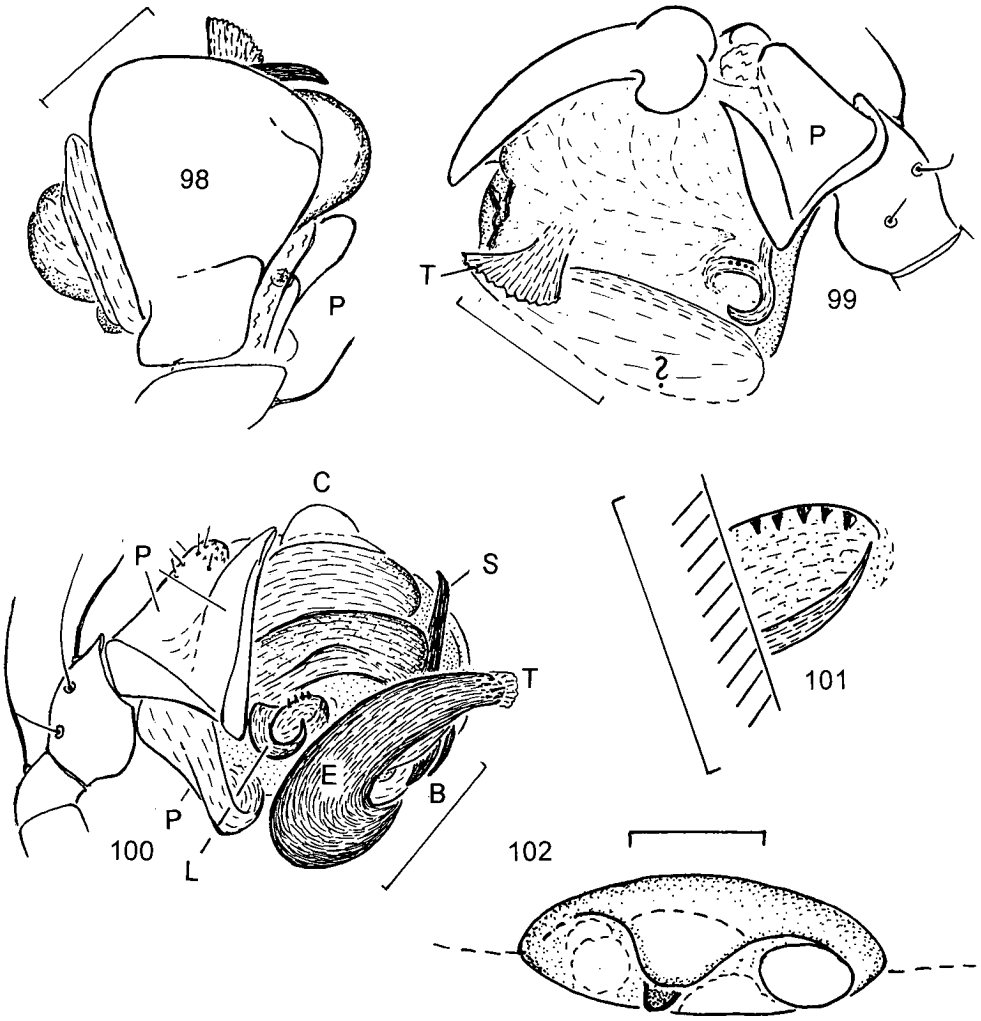


fig. 93: ***Custodela* sp.** near *stridulans* n.sp., ♂, l. chelicera frontally-dorsally; M = 0.2;

figs. 94-95: ***Custodela tibialis* n.sp.**, ♂, l. pedipalpus retrolaterally and ventrally-apically; E = embolus with terminal apophysis (conductor), L = lamella, R = radix, S = suprategular apophysis, X = additional bulbus apophysis; M = 0.2;

fig. 96: ?***Custodela* sp.**, ♀, opisthosoma with epigyne ventrally; M = 0.2;

fig. 97: ***Obnisius tenuipes*** PETRUNKEVITCH 1942 (?= *Custodela* sp.), holotypus ♂, outline of the partly hidden l. paracymbium retrolaterally; M = 0.1;



figs. 98-100: ***Succineta discoidalis*** **n.gen.n.sp.**, ♂, 98-99) holotypus, 100) paratypus; 98) r. pedipalpus dorsally; 99) l. pedipalpus retrolaterally; 100) r. pedipal-pus retrolaterally and slightly ventrally; B = basal embolus apophyses, C = cymbium, E = embolus, L = lamella characteristica, P = paracymbium, R = radix, S = distal part of the suprategular apophysis, T= terminal apophysis (conductor); M = 0.2;

fig. 101: ***Succineta brevispina*** **n.gen.n.sp.,** ♂, lamella characteristica of the r. pedipalpus retrolaterally (basal part hidden); M = 0.1;

fig. 102: ?***Succineta*** **sp.,** ♀, epigyne, ventral-lateral aspect; M = 0.2.

BEITR. ARANEOL., 3 (2004)

NO PROOF OF FOSSIL SPIDERS (ARANEAE) OF THE FAMILY PSECHRIDAE IN BALTIC AMBER

JOERG WUNDERLICH, Hindenburgstr. 94, 75334 Straubenhardt, Germany.

Abstract: No fossil spiders (Araneae) of the family Pechridae are known from Baltic amber.

PETRUNKEVITCH (1958: 125) reported fossil members of the cribellate spider family Psechridae as frequent in Baltic amber. LEHTINEN (1967: 324) regarded these spiders as typical members of the family Amaurobiidae; see the remark of WUNDERLICH (1986: 24, 39). In my opinion the Psechridae sensu PETRUNKEVITCH (1958) are members of the family Zoropsidae, most often of the genus *Eomatachia* PETRUNKEVITCH 1942, which are not rare in Baltic amber; see the paper on the Zoropsidae in this volume. Among 80 000 spiders in Baltic amber I never found a member of the family Psechridae.

LITERATURE

LEHTINEN; P. T. (1967): Classification of the cribellate spiders and some allied families, with notes on the evolution of the suborder Araneomorpha.--Ann. Zool. Fennici, 4: 199-468.

PETRUNKEVITCH, A. (1958): Amber Spiders in European collections.--Trans. Connect. Acad. Arts Sci., 41: 97-400.

WUNDERLICH, J. (1987): Spinnenfauna gestern und heute. Fossile Spinnen und ihre heute lebenden Verwandten. 283pp.

BEITR. ARANEOL., 3 (2004)

FOSSIL SPIDERS OF THE FAMILY AMAUROBIIDAE (ARACHNIDA: ARANEAE) IN BALTIC AND DOMINICAN AMBER

J. WUNDERLICH, 75334 Straubenhardt, Germany.

Abstract: The first sure fossil member of the family Amaurobiidae (Amaurobiinae, gen. indet., juv.) is reported from Baltic amber. The family is unknown from Dominican amber.

Introduction

The delimination of the cosmopolitical distributed family Amaurobiidae (German name "Finsterspinnen") is quite unclear. Characteristic for the cribellate subfamily Amaurobiinae is the calamistrum which consists of two rows of curved hairs (fig. 1), calamistrum and pseudocalamistrum. - In the similar spiders of the genus *Eomatachia* PETRUNKEVITCH 1942 the calamistrum consists of only one row of hairs and a suture is present

on the male tibia; see the paper on the family Zoropsidae in this volume.
The spider which is described below is the only sure fossil member of the family Amaurobiidae which I know, and most probably the first fossil record of the family at all.

Nominal taxon in Dominican amber: The single specimen - a juvenile ♀ - was published by SCHAWALLER (1981). It is not preserved in Dominican but in Baltic amber - see WUNDERLICH (1988: 195-196), Beitr. Araneol., 2 - and may be a member of the genus *Eomatachia* PETRUNKEVITCH 1842 (Zoropsidae). So Amaurobiidae is unknown from Dominican amber.

Nominal taxa in Baltic amber: *Amaurobius faustus* KOCH & BERENDT 1854, *A. rimosus* KOCH & BERENDT 1854, *A. spinimanus* MENGE in KOCH & BERENDT 1854 and *A. succini* PETRUNKEVITCH 1942, *Auximus fossilis* PETRUNKEVITCH 1950 and *A. succini* PETRUNKEVITCH 1942.
Remarks: From not a single fossil specimen a double row of calamistral hairs is reported, the description of *Amaurobius succini* is based on exuviae, the only male was shortly described from *Amaurobius spinimanus*. In my opinion all species in question are most probably members of the genus *Eomatachia* PETRUNKEVITCH (Zoropsidae), which is not rare in Baltic amber.

Amaurobiinae gen. & sp. indet. Photo 264

Material: A juvenile in Baltic amber, private coll. of the author, F827/BB/AR/AMA/CJW.

Preservation: The spider is completely and fairly well preserved beneath a layer in the fossil resin.

Description: Measurements (in mm): Body length 4.2, prosoma length about 1.8, tibia I 1.1, tibia IV 1.1. Habitus similar to *Eomatachia* PETRUNKEVITCH and *Amaurobius* C. L. KOCH 1837. Eye field wide, eyes fairly small, posterior row procurved, posterior median eyes separated by more than one diameter, anterior median eyes separated by less than one diameter. Labium free, as wide as long, legs stout, partly hidden, with numerous short bristles, tarsus III with three trichobothria, paired tarsal claws with long teeth. The calamistrum consists of two rows of curved hairs similar to fig. 1, and runs along 55% of the length of the depressed metatarsus IV. Opisthosoma ovally, covered with hairs of medium length; most parts of spinnerets and cribellum are hidden

Relationships: See above. A male is needed for further conclusions.

Distribution: Tertiary Baltic amber forest.

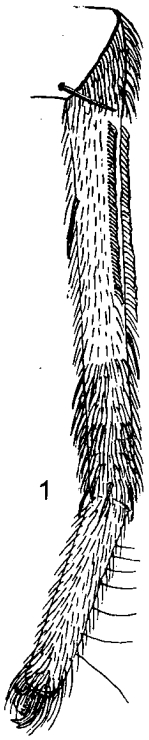


Fig. 1: *Amaurobius* sp. (extant), ♀, r. metatarsus and tarsus IV, retrolateral aspect. Note the double row of hairs of the metatarsal calamistrum. - Taken from WIEHLE (1953: Fig. 263).

BEITR. ARANEOL., 3 (2004)

FOSSIL SPIDERS (ARANEAE) OF THE FAMILY DICTYNIDAE S. L., INCLUDING CRYPHOECINAE AND HAHNIINAE IN BALTIC AND DOMINICAN AMBER AND COPAL FROM MADAGASCAR, AND ON SELECTED EXTANT HOLARCTIC TAXA, WITH NEW DESCRIPTIONS AND DIAGNOSES

JOERG WUNDERLICH, 75334 Straubenhardt, Germany.

Abstract: A new diagnosis of the family Dictynidae s. l. (Copaldictyninae, Cryphoecinae (?= Cicurininae), Dictyninae, Hahniinae and Mizagallinae) and a key to the fossil and extant holarctic subfamilies and genera are given, the **new subfamilies** Mizagallinae (known from fossils in Baltic amber and from extant taxa) and Copaldictyninae (known from copal of Madagascar), and the **new tribus** Hahniini and Antisteini are introduced; Antisteini are unknown from fossils. 15 of 16 fossil genera of the Dictynidae s. l. of the Baltic amber forest are extinct (= about 40% of all described holarctic genera) and known from this amber forest only, solely members of *Mastigusa* survived in the nests of ants. - The following fossil taxa are described from Baltic amber: (1) Cryphoecinae: *Balticocryphoeca* **n. gen** with its type species *B. curvitarsis* **n. sp.**, *Cryphoezaga* **n. gen**. with its type species *C. dubia* **n. sp.**, *Eocryphoeca* PETRUNKEVITCH 1942, *E. bitterfeldensis* **n. sp.**, *E. electrina* **n. sp.**, *E. falcata* **n. sp.**, *E. gibbifera* **n. sp.**, *E. ligula* **n. sp.**, *E. mammilla* **n. sp.** and *E. splendens* **n. sp.**, *Eocryphoecara* **n. gen.** with ist type species *E. abicera* **n. sp.**, *Gibbermastigusa* **n. gen**. with its type species *G. lateralis* **n. sp.**, *Mastigusa arcuata* **n. sp.**, *M. bitterfeldensis* **n. sp.**, *M. laticymbium* **n. sp.**, *M. magnibulbus* **n. sp.** and *M. scutata* **n. sp.**, *Protomastigusa* **n. gen**. with its type species *P. composita* **n. sp.**; *Clythia* KOCH & BERENDT 1854 and *Thyelia* KOCH & BERENDT 1854 are dubious genera; *Eocry-*

phoeca PETRUNKEVITCH 1946 may be a member of the family Agelenidae. No fossil taxon of the Cryphoecinae is known from Dominican amber. (b) Hahniinae: *Cymbiohahnia* **n. gen**. with its type species *C. parens* **n. sp**., *Protohahnia* **n. gen**., *P. antiqua* **n. sp**. and *P. tripartita* **n. sp**.; *Eohahnia* PETRUNKEVITCH 1958 and its type species *E. succini* PETRUNKEVITCH 1958 are revised, the male is described for the first time. No named fossil taxon of the Hahniidae is known from Dominican amber. The following extant taxa of the Hahniinae are described from the Palaearctic Region: *Hahniharmia* **n. gen**. with its type species *Hahnia picta* KULCZYNSKI 1897 and *Spinihahnia* **n. gen**. with its type species *Hahnia petrobia* SIMON 1875; remarks are given on the taxonomy of the extant genera *Asiohahnia* OVTCHINNIKOV 1992, *Hahnia* C. L. KOCH 1841 and *Iberina* SIMON 1881. (3) Dictyninae in Baltic amber: *Brommellina* **n. gen.** with its type species *B. longungulae* **n. sp**., *Chelicirrum* **n. gen** with its type species *C. stridulans* **n. sp**., *Eobrommella* **n. gen.** with its type species *E. scutata* **n. sp**., *Eodictyna* **n. gen**. with its type species *E. communus* **n. sp**., *Scopulyna* **n. gen**. with its type species *S. cursor* **n. sp.** (4) Mizagallinae **n. subfam**., *Mizagalla* **n. gen**., *M. quattuor* **n. sp**., *M. tuberculata* **n. sp**.; the extant genus *Mizaga* SIMON 1898 is regarded as a member of the Mizagallinae, too. - The following (sub)recent taxa are described from copal of Madagascar: Copaldictyninae **n. subfam**. and *Copaldictyna* **n. gen**. with its type species *C. madagascariensis* **n. sp**. - Synonymy: (a) Fossils in Baltic amber: The synonymy of Arthrodictynidae PETRUNKEVITCH 1942, *Auximus* sensu PETRUNKEVITCH 1958 and *Eolathys* PETRUNKEVITCH 1950 - all described from Baltic amber - is shortly discussed. (b) Extants: *Altella* SIMON 1884 (**n. syn**.) and probably *Hackmania* LEHTINEN 1967 (**quest. syn**.) = *Argenna* THORELL 1869. - Parthenogenesis is supposed to exist in the extant *Hahnia microphthalma* SNAZELL & DUFFEY 1980. Three kinds of stridulatory organs are reported from the Dictynidae s.l.; kleptoparasitism and social life in fossil Hahniinae are shortly discussed; parts of capture webs including cribellate threads are reported from fossil members of the Dictyninae; distinct allometric growth is reported from the male chelicerae of *Eodictyna communis*; weakly regenerated legs are reported from *Eocryphoeca bitterfeldensis*.

Most of the **material** is kept in the private collection of the author (CJW) and will probably be given later to the SMF.

INTRODUCTION

In this paper tiny to small three-clawed cribellate and ecribellate spiders are provisionally united in the family Dictynidae sensu lato. Fossils of this family are diverse and males are not rare in amber, but - probably because of its tinyness - they have been

greatly overlooked in former times; only two genera have been described in Baltic amber: *Eohahnia* and the questionable *Eolathys*; from Dominican amber only taxa of the subfamily Dictyninae were described, see WUNDERLICH (1988), and a questionable (pers. commun.) member of the Hahniinae is mentioned, see PENNEY (1999). I saw hundreds of fossil male Dictynidae s.l. in Baltic amber, but very few females, and I know 16 genera in this kind of amber, most rich in species are *Eocryphoeca* and *Mastigusa*, see the list below. The most frequent species are *Eohahnia succini* PETRUNKEVITCH and *Eodictyna communis* n. gen. n. sp.. In the last species hairs of body and legs may be completely preserved or more or less rubbed off similar to *Archaea paradoxa* (Arachaeidae). - I compared all related holarctic extant genera with the fossil/extinct genera, see the keys. - Members of the new subfamily Copaldictyninae from Madagascar are probably not extinct.

Ecology: Extant spiders of the Dictynidae s.l. live rarely underground (e.g. *Hahnia microphthalma*), on the ground as well as in higher strata, see below (the subfamilies); they spin small webs which may possess a tube (e.g. in *Tuberta*). The short-legged species of the Dictyninae genus *Eobrommella* may have lived on the ground, the main part of the numerous long-legged Dictyninae occurred more likely in higher strata.

Biogeography: Three species are known from the Bitterfeld deposit (Baltic amber) only: *Eocryphoeca bitterfeldensis* n. sp., *Mastigusa bitterfeldensis* n. sp. and *M. magnibulbus* n. sp. - The Copaldictyninae are only known from Madagascar.

Possibilities of confusion: In contrast to small and similar members of the superfamily Araneoidea the fossil Dictynidae of the superfamily Amaurobioidea possess at least one tarsal trichobothrium; furthermore at least one retrolateral tibial apophysis of the male pedipalpus is present, and a sclerotized epigyne with a scapus is absent. Fossil Agelenidae are larger than fossil Dictynidae s.l., possess usually long posterior spinnerets and usually a median apophysis. Fossil Zoropsidae are most often larger, a suture near the base of the male tibia is usually present and a distinct median apophysis is present in all taxa, see the paper on this family in this volume. Members of the cribellate Amaurobiidae: Amaurobiinae - which are extremely rare in Baltic amber - possess a calamistrum in two rows, see the paper on this family in this volume. Small cribellate members of the family Uloboridae lack tarsal trichobothria and a pedipalpal tibial apophysis but possess femoral trichobothria.

List of the fossil Dictynidae s. l. in Baltic amber:

(a) Cryphoecinae:

Balticocryphoeca n. gen.

B. curvitarsi n. sp.
(*Clythia* KOCH & BERENDT 1854 is a dubious genus, see *Eocryphoeca* and the paper on the family Agelenidae in this volume)
Cryphoezaga n. gen.
C. dubia n. sp.
Eocryphoeca PETRUNKEVITCH 1946
E. bitterfeldensis n. sp.
(*E. distincta* PETRUNKEVITCH 1950 is a dubious species)
E. electrina n. sp.
E. falcata n. sp.
(*E. fossilis* (PETRUNKEVITCH 1942) (sub *Myro*) is a dubious species)
E. gibbifera n. sp.
E. gracilipes (KOCH & BERENDT 1854)
E. ligula n. sp.
E. mammilla n. sp.
E. splendens n. sp.
Eocryphoecara n. gen.
E. abicera n. sp.
Gibbermastigusa n. gen.
G. lateralis n. sp.
Mastigusa MENGE in KOCH & BERENDT 1854
M. acuminata MENGE in KOCH & BERENDT 1854
M. arcuata n. sp.
M. bitterfeldensis n. sp.
M. laticymbium n. sp.
M. magnibulbus n. sp.
M. media WUNDERLICH 1986
M. modesta WUNDERLICH 1986
M. scutata n. sp.
Protomastigusa n. gen.
P. complicata n. sp.
(*Thyelia* KOCH & BERENDT 1854 is a dubious genus, see below)

(b) Hahniinae:

Cymbiohahnia n. gen.
C. parens n. sp.
Eohahnia PETRUNKEVITCH 1958
E. succini PETRUNKEVITCH 1958
Protohahnia n. gen.
P. antiqua n. sp.
P. tripartita n. sp.
"*Tegenaria*" *obscura* KOCH & BERENDT 1854 (a questionable taxon)

(c) Dictyninae:

Brommellina n. gen

B. longungulae n. sp.
Chelicirrum n. gen.
C. stridulans n. sp.
Eobrommella n. gen
E. scutata n. sp.
Eodictyna n. gen.
E. communis n. sp.
(*Eolathys* PETRUNKEVITCH 1950)
(*E. debilis* PETRUNKEVITCH 1950)
(*E. succini* PETRUNKEVITCH 1950)
Scopulyna n. gen.
S. cursor n. sp.
(Gen. sp. indet.)

(d) Mizagallinae:

Mizagalla n. gen.
M. quattuor n. sp.
M. tuberculata n. sp.

TAXONOMY, DETERMINATION AND EVOLUTION

Remarks on the fossils:

(1) Cryphoecinae: *Mastigusa* is the only genus of the Cryphoecinae - and even of the Dictynidae s.l. - of the Baltic amber forest which is not extinct. The bulbus structures of the fossils - see e.g. figs. 15-16 - are as complicated as in the related extant species; see also WUNDERLICH (1986). Members of this genus survived the climate changes of the Tertiary Period in the nests of ants.

(2) Dictyninae: In all the fossil taxa in Baltic amber the legs bear numerous bristles and one or several long tarsal trichobothria (fig. 115); in most extant species the number of leg bristles is reduced, the tarsal trichobothria are short, their number may be reduced to one. The members of most extant taxa are larger than the fossil spi-

ders, so these reductions are not a matter of dwarfishness. (In extant European Dictyninae I found at least one short tarsal trichobothrium in contrast to the statement of several authors who reported the absence of tarsal trichobothria in some taxa).

(3) Hahniinae: In all fossil taxa in Baltic amber a scinny distal tegular process is present, see e.g. fig. 47, in the smallest members of *Eohahnia*, too. Such a process is absent in several extant taxa (see below) and has apparently been lost several times independently during the Tertiary evolution. - I am not sure about the presence of cheliceral stridulatory files in the fossil specimens which occur in extant species.

(4) Mizagallinae: Members of the two known species of the only extant known genus - *Mizaga* SIMON 1898 - live in semi-marine biotopes (see below); the two fossil species of the genus *Mizagalla* which are known from Baltic amber most probably lived not in such a biotope but terrestrial; aquatic spiders are not known from amber, and would be hard to recognize as such animals.

Provisional revised diagnosis of the Dictynidae s.l.: Absence of: Feathery hairs, and lateral epigynal spurs, reductions of: Body size (body length most often 1-4mm), length and number of tarsal trichobothria (basicly four?) (loss in Copaldictyninae), of the median apophysis (see the "tegular apophysis" in *Eocryphoeca*!) - at least of a movable - median apophysis. - Further characters: Ecribellate (a colulus may be present or absent) or cribellate (Copaldictyninae, Dictyninae; cribellum and especially the calamistrum may be reduced or lost in the male). Tendency to the presence of stridulatory organs of three different types, see Copaldictyninae, Hahniinae and Dictyninae. Leg autotomy is present between coxa and trochanter but is not frequent.
Remarks: (1) The diagnosis of the Dictynidae s. l. is insufficient, only reductions ("negative characters") are known to me. (2) In some members of the Cryphoecinae - e.g. in *Cryphoeca* and *Balticocryphoeca* - a "tegular apophysis" is present which may be a "median apophysis".

Subfamilies: I provisionally regard Copaldictyninae, Cryphoecinae, Dictyninae, Hahniinae and Mizagallinae as members of the Dictynidae s.l. - see the discussion of LEHTINEN (1967) - but probably Dictynidae s. l. is not a monophyletic taxon. The dubious ecribellate Litisedinae LEHTINEN 1967 (Japan and Polynesia): See LEHTINEN (1967: e.g. p 354). May be that Cicurininae F. O. PICKARD-CAMBRIDGE 1893 and Cryphoecinae KISHIDA 1955 have to unite to a single subfamily (Cicurininae has priority) or Cicurininae is a separate subfamily. I am not sure about that and exclude in this paper *Cicurina* MENGE 1871 - and probably strongly related genera - from the Cryphoecinae, although in the ecribellate genus *Cicurina* the posterior spinnerets are short and the colulus is not bilobed in contrast to (all?) Agelenidae (see also fig. 6c of *Eocryphoeca* (!) and compare fig. 18). In *Cicurina* the eyes are small and the bordered margin of the tegulum (!) has the function of a conductor; the pedipalpal tibial apophysis is surprisingly similar to the apophysis of *Brommella*, *Brommellina* and *Eobrommella* (Dictyninae).

Relationships: The family is a member of the branch Amaurobiides sensu LEHTINEN (1967); close relationships - the sister group - are/is unknown. In the Agelenidae a cribellum is absent, a colulus is present and usually bilobed (compare below:

Cryphoecinae, figs. 6c (!), 18), a movable median apophysis is probably basicly present, a coxa-trochanter autotomy is absent according to ROTH. See below: The subfamilies.

Distribution: Cosmopolitical.

Remark on the reduction of tarsal trichobothria within the Dictynidae and in some oher taxa of the RTA-clade: Members of the Nicodamidae and Phyxelidae (Amaurobioidea) have none - apparently tarsal trichobothria have been lost -, and in the Titanoecidae only indistinct thick trichobothria are present which are not longer than the normal hairs, see ROTH (1993: 61). In several Dictynidae number and size of tarsal trichobothria are reduced (to none in *Dictyna* and in the Copaldictyninae); very few trichobothria or even only a single short metatarsal trichobothrium may be present.

Key to the subfamilies of the Dictynidae s.l. which are treated in this volume:

1 Cribellum (figs. 89, 112) and calamistrum (figs. 88,103, 115) (usually or always?) present, at least the calamistrum may be reduced/absent in the male. Male chelicerae most often modified in the Dictyninae (elongated, excavated or with humps, figs. 76, 78, 86, photos). Pedipalpal patellar outgrowth only present in *Nigma* LEHTINEN 1967 (Dictyninae), basal tip of the conductor usually elongated to the tibia in the Dictyninae (figs. 74, 90-91, 105). Tubeless capture web present at least in the Dictyninae. 2

- Cribellum and calamistrum absent (see *Cryphoezaga*!); position of the spinnerets usually in a wide field (fig. 18) or even in a transverse row (figs. 31, 51). Male chelicerae usually not modified (fig. 3), rarely modified (in the Mizagallinae, fig. 116). Pedipalpal patellar lobe or apophysis present (figs. 5, 10, 40, 53) or absent, conductor not elongated in this way (figs. 5, 11, 13, 32, 62). Tube of the capture web present or absent. 3

2(1) Retrolateral cheliceral files present (fig. 132); ♂-pedipalpus (figs. 137-142): Tibia with a separate "paratibia", cymbium with a dorsal "horn" and a retrolateral furrow. - In copal from Madagascar. . . . . Copaldictyninae

- Cheliceral files absent; ♂-pedipalpus: "Paratibia", cymbial "horn" and furrow absent; basal tip of the conductor most often elongated to the tibia (e.g. fig. 74, 90-91, 105 but see fig. 98). - Extant (cosmopolitical) and fossil. . . . . Dictyninae

3(1) One kind of stridulatory organs usually present: (a) a lateral field of stridulatory

ridges in the Hahniini (fig. 48; unknown in the fossils) or (b) a stridulatory organ between prosoma and opisthosoma in the Antisteini (opisthosomal bristles: Fig. 33). Position of the spinnerets in a transverse row (fig. 31). Position of the tracheal fold in 0.1-0.75% between spinnerets and the epigastral furrow, usually far in front of the spinnerets, e.g. fig. 31, 66, 69). Male pedipalpus: Basal patellar outgrowth present, cymbium with a prolateral or retrolateral furrow (figs. 46, 62), a "scinny conductor" (fig. 61) may be present (present in all fossil species) . . . . . Hahniinae

- Stridulatory organs absent. Position of the spinnerets narrow or in a wide field but not in a single transverse row. Position of the tracheal fold near the spinnerets, in 0.05-0.1. Male pedipalpus: Basal patellar lobe usually absent, cymbial furrow absent, lamellar conductor present (figs. 5, 11, 13), "scinny conductor" absent. 4

4(3) ♂-chelicerae not tuberculate, ♂-pedipalpus (figs. 1-2, 4c-e, 5, 11-13, 16, 28): Bulbus large, lamellar conductor present, embolar seam absent. . . . . Cryphoecinae

- ♂-chelicerae distinctly tuberculate (fig. 116), ♂-pedipalpus (figs. 120, 126-127, 128-129): Bulbus small, conductor absent, embolar seam present. . . . . Mizagallinae

Comparison of the subfamilies of the Dictynidae s. l. (excl. Cicurininae):

character	Dictyninae	Copal-dictyninae	Cryph-oecinae	Hahniinae	Miza-gallinae
cribellum/ colulus	cribellum	cribellum	colulus which may be reduced or even absent (see *Cryphoezaga*)		
stridulatory organs lamillar	rare	cheliceral files	absent	usually present (e.g. chelic. files)	absent
conductor	present	present	present	absent	absent
♀ genital area	not sclerotized	unknown	strongly sclerotized	not sclerotized	weakly sclerotized
special	♂-chelicerae usually modified,	"paratibia", cymbial	basicly with a	all spinnerets in 1 transver-	chelicerae distinctly tubercu-

characters	conductor modified, directed to the tibia	horn	scletotized tegular apophysis	sal row, pedipalpal patellar apophysis, basicly with a scinny teg. ap.	late, ant. spinn. separated by not more than one diameter, embolar seam
distribution	cosmopol.	cosmopol.	cosmopol. (?holarctic)	cosmopol.	W Palaearctic, W Africa

(1) **CRYPHOECINAE**

See Cryphoeceae sensu SIMON 1897 of his Agelenidae and Cryphoecinae sensu LEHTINEN (1967: 362-364) of his Hahniidae.

Diagnosis: Position of the spinnerets in a wide field (especially the anterior spinnerets are usually widely spaced) (fig.18), lamellar conductor present (figs. 5,11,13), guiding the embolus, ?basicly with a sclerotized and not movable tegular apophysis (figs.5,5e-f,5y-z). (Low ability for leg regeneration: See *Eocryphoeca bitterfeldensis*).

Relationships: Hahniinae may be the closest relative, see the key above. In the Agelenidae numerous - more than 4 or 5 - tarsal trichobothria are present, the apical article of the posterior spinnerets is long, compare figs. 5g-h; lateral epigynal spurs are usually present. - According to the structures of the male pedipalpus the extant (New Zealand) genus *Neomyro* FORSTER 1973 (sub Desidae) may be a member of the Cryphoecinae. - *Cicurina* (see above) may be related, too.

Holarctic genera: See the key.

Distribution: Cosmopolitical (or holarctic only?); Tertiary Baltic amber forest.

Cryphoecinae in Baltic amber

Key to the extant holarctic and fossil Baltic amber genera of the Cryphoecinae (♂):

See ROTH (1993: 47-49).

1 Bulbus very complicated and compact, embolus and conductor very long and turning several times (figs. 1-2). - Extant, Europe. . . . . *Tuberta*

- Bulbus structures different, e.g. figs. 5, 11, 13). - Extant and fossil 2

2(1) Tegulum and subtegulum small, widely surrounded by a large loop of embolus and conductor (figs. 13, 29). - Fossil in Baltic amber. 3

- Tegulum and subtegulum larger, not widely surrounded by embolus and conductor, e.g. figs. 5, 4d-e, 5e-f). - Fossil and extant. 4

3(2) Tibia I bears 4-6 pairs of strong ventral bristles, embolus and conductor free, in a vertical position (figs. 13, 15).- Extant (Europe) and fossil in **Baltic amber**..*Mastigusa*
Photos 276-277

- Tibia I bears 2 pairs of thinner ventral bristles, embolus partly enclosed within the conductor, in a nearly horizontal position (fig. 29). - Fossil in **Baltic amber**. . . . . .
Photos 278-279. . . . . *Protomastigusa*

4(2) Tarsi distinctly curved (fig. 5c) (unique in this family), pedipalpal femur with two ventral-apical apophyses (figs. 5d-e). Eye position: Fig. 5a), compare fig. 6h) of the dubious genus *Clythia* in which the tarsi are straight. - Fossil in **Baltic amber**. . . . . .
Photos 265-267 . . . . . *Balticocryphoeca*

- Tarsi straight, pedipalpal femoral apophyses absent or present (in *Gibbermastigusa*). - Extant or fossil in Baltic amber. 5

5(4) Pedipalpal femur with two ventral-distal apophyses (figs. 9-10). - Fossil in **Baltic amber**. Photo 275. . . . . *Gibbermastigusa*

- No pedipalpal femoral apophysis. - Fossil and extant. 6

6(5) Distal part of the cymbium long and slender (e.g. fig. 4d). - Extant, N-America and probably W Mediterranean; Baltic amber (*Cryphoezaga*) 10

- Cymbium short (e.g. figs. 5, 5z, 10). - Extant and fossil in Baltic amber. 7

7(6) Tibia I-II with more than 3 pairs of strong ventral bristles which are close to the tibia as in fig. 5b. - Extant 8

- Tibia I with 2 pairs of thin ventral bristles and apicals (similar to fig. 5m). - Fossil in Baltic amber 9

8(7) Colulus with two setae, origin of the embolus retrolaterally. - N-America. . . . . .
. . . . . *Neocryphoeca*

- Colulus with about 10 setae, origin of the embolus basally (fig. 5). - Holarctic. . . . . .
. . . . . *Cryphoeca*

9(7) Prosoma 1.32-1.45 times longer than wide, posterior eye row procurved (fig. 5w), tegular apophysis curved foreward (fig. 6a), rarely ventrally (fig. 5y), outgrowth

of the conductor absent. - Fossil in **Baltic amber**. Photos 272ff . . . . . *Eocryphoeca*

- Prosoma 1.5 times longer than wide, posterior eye row recurved (fig. 5i), tegular apophysis curved backward (fig. 5k), outgrowth of the conductor present, cymbium and embolus are longer. - Fossil in **Baltic amber**. Photos 269-271 . . *Eocryphoecara*

10(6) Chelicerae diverging distally (fig. 3), pedipalpus figs. 4b-e. - **Baltic amber**. . . . . Photo 268 . . . . . *Cryphoezaga*

- Chelicerae not diverging, pedipalpus different. - Extant. 11

11(10) Patellae with a suture (fig. 6g), pedipalpal patella with a ventral-distal outgrowth in the basal half. 12

- Patellar suture absent, pedipalpal patella without an outgrowth. 13

12(11) Ventral tibial I bristles absent. . . . . *Willisus*

- Ventral tibial I bristles present. . . . . *Calymmaria*

13(11) Tibia I with 5 pairs of ventral bristles, pedipalpal femur with a distinct row of ventral macrosetae (similar in *Balticocryphoeca*). - N-America, ?W-Mediterranean, see LEHTINEN (1967: 230) . . . . . *Dirksia*

- Tibia I with 4 pairs of ventral bristles, pedipalpal femur without ventral macrosetae. - N-America. . . . . *Ethobuella*

***Balticocryphoeca* n. gen.**

Diagnosis (♂; ♀ unknown): Tarsi distinctly bent (fig. 5c), leg III about as long as the other legs (photo), eyes of the posterior row very large and distinctly recurved (fig. 5a), tibia I-II usually with 5 pairs of long ventral bristles (fig. 5b), thoracal fissure very long (photo), opisthosoma about two times longer than wide; pedipalpus (figs. 5d-f): Two femoral apophyses present, three tibal apophyses, cymbium long and slender distally, two tegular apophyses, conductor wide, embolus long.

Type species: *Balticocryphoeca curvitarsis* n. sp.

Relationships: In *Cryphoeca* THORELL 1870 and *Neocryphoeca* ROTH 1970 - which probably all are related - a tegular apophysis is present, too, but the tarsi and the posterior eye row are straight, the posterior eyes are smaller, pedipalpal femoral apophyses are absent, the tibial apophyses and the cymbium are short. In *Gibber-*

mastigusa two pedipalpal femoral apophyses are present, too, but the the tarsi are straight, the eyes of the posterior row are smaller and the cymbium is short. See the key.
Distribution: Tertiary Baltic amber forest incl. the Bitterfeld deposit.

***Balticocryphoeca* curvitarsis n. gen. n. sp.** (figs. 5a-g) Photos 265-267

Material: 3♂ in Baltic amber, holotypus F829/BB/AR/DIC/CJW; paratypus a) ZMHUB MB.A.598; paratypus b) from the Bitterfeld deposit coll. HOFFEINS in Hamburg 949.

Preservation and syninclusions: The holotype is completely and very well preserved, a weak emulsion covers sternum and coxae ventrally. Two large bubbles are preserved left of the left leg IV and left of the opisthosoma.- No stellate hairs. - Paratype (a) is fairly well preserved, ventral parts are partly covered by a white emulsion, the left femur I is broken within the resin, the patella is lacking, the right leg I is broken through the femur, the dorsal part of the right patella II and the left patella IV are cut off, the distal articles of the right leg IV are cut off. - Few tiny excrement particles are preserved in the same amber piece. - Paratype (b) is well and nearly completely preserved, only the right tarsus IV and the dorsal part of the left patella IV are cut off. Ventral parts of the spider are covered by a white emulsion, the right bulbus is probably partly expanded; no stellate hairs.

Diagnosis (♂; ♀ unknown): Tibia I with 6 pairs of ventral bristles (fig. 5b), pedipalpal femur (fig. 5e) with long retroventral hars and two apical apophyses.

Description (♂):
Measurements (in mm): Body length 4.1-4.3, prosoma: Length 1.8, width 1.5, length of the thoracal fissure 0.5, leg I: Femur 1.7, patella 0.65, tibia 1.7, metatarsus 1.6, tarsus 0.5, tibia II 1.7, tibia III 1.55, tibia IV 1.7, metatarsus IV 1.9.
Colour: Prosoma and legs dark brown, opisthosoma yellow brown.
Prosoma (photo, fig. 5a) 1.2 times longer than wide, low, covered with hairs of medium length, thoracal furrow very long (see above), eyes very large, posterior row distinctly recurved, posterior median eyes separated by about their radius. Clypeus about as long as 1 1/2 diameters of the anterior median eyes. Chelicerae slender, of medium length, condylus and plumose hairs present, teeth hidden, fangs of medium length. Labium free, wider than long, gnathocoxae slightly longer than wide, not converging, sternum not prolongated between the coxae IV. - Legs (fig. 5b-c) fairly long and slender, hairs short, order IV/I/II/III, III not much shorter than the other legs, tarsi short and distintly bent. Numerous bristles, femora dorsally 3 and a pair near the end, patellae 2 dorsally, tibia I-II ventrally usually with 6 pairs of longer bristles and with 2 dorsal hair-shaped bristles, metatarsus I-II bear 3 pairs of ventral bristles and a lateral pair. Paired tarsal claws large, they bear about 10 long teeth, unpaired claw large and strongly bent. The tarsi bear 5 long trichobothria. - Opisthosoma (photo) 1.9

times longer than wide, covered with hairs of medium length, anal tubercle large, colulus large and probably not bilobed, anterior and posterior spinnerets fairly short, biarticulate, the posteriors slightly longer and more slender, their apical article only slightly longer than wide, fig. 5f. - Pedipalpus: See above.

Relationships: See above.

Distribution: Tertiary Baltic amber forest incl. the Bitterfeld deposit.

Clythia KOCH & BERENDT 1854, ***Myro*** sensu PETRUNKEVITCH, ***Thyelia*** KOCH & BERENDT 1854 and ***Textrix*** sensu KOCH & BERENDT 1854

Clythia - type species *Clythia alma* KOCH & BERENDT 1854 - was originally described sub Theridiidae; see PETRUNKEVITCH (1958: 381). In the holotype of *Clythia alma* - prosoma: Fig. 6h - I found 5 pairs of ventral tibial I bristles; therefore *Clythia* cannot be a member of the family Theridiidae. I regard *Clythia* as a dubious genus; the male is unknown.

According to MENGE in KOCH & BERENDT (1854: 50) the members of *Textrix* sensu KOCH & BERENDT 1854 are really members of *Clythia*; see also PETRUNKEVITCH (1958: 370, 376 and 381).

Myro PETRUNKEVITCH: See *Eocryphoeca*. - *Myro extinctus* PETRUNKEVITCH 1958 (sub Agelenidae: Cybaeinae): In the holotype (ZMHUB, seen) a retrolateral tibial apophysis is present in contrast to the statement of PETRUNKEVITCH (1958: 132). The spider is strongly deformed and darkened by heating, an unpared tarsal claw is most probably present, tibia I-II bear probably only 2 pairs of ventral bristles. I do not want to exclude that *M. extinctus* is a member of the Dictynidae: Cryphoecinae.

Thyelia - type species according to PETRUNKEVITCH (1958: 370) *Thyelia tristis* KOCH & BERENDT 1854 - is a dubious genus, too. The holotype of the generotype could not be found in the PMHUB. PETRUNKEVITCH (1958: 370) listed 11 species of *Thyelia*, all with a question mark. In my opinion these species may be an essamblage of different gerena and/or even different families.

***Cryphoezaga* n. gen.**

Diagnosis (♂; ♀ unknown): Functional cribellum absent (see below), chelicerae diverging distally (fig. 3), prosoma low and only about 1.25 times longer than wide, clypeus short, leg II > IV; pedipalpus (figs. 4b-e): Tibia with three retrodistal/ventral apo-

physes, cymbium elongated, conductor and embolus describe a large loop.

Type species: *Cryphoezaga dubia* n. sp.

The **relationships** are doubtful. The small anterior median eyes and the diverging chelicerae are similar to numerous Dictyninae but the bulbus structures are different, the conductor is not elongated basally and directed to the pedipalpal tibia. A calamistrum is absent and at least a functional cribellum, too; a small structure in front of the spinnerets may be a colulus but I do not want to exclude that this is a strongly reduced cribellum.

Distribution: Tertiary Baltic amber forest.

***Cryphoezaga dubia* n. gen. n. sp.** (figs. 3, 4-4a) Photo 268

Material: 4♂ in Baltic amber, holotypus F757/BB/AR/DIC/CJW, paratypes: F758/BB/AR/DIC/CJW (with a separated amber piece), F759/BB/AR/DIC/CJW and F760/BB/AR/DIC/CJW (with a separated amber piece).

Preservation and syninclusions: The holotype is well preserved at the margin of a yellow amber piece, the tip of the right tarsi III-IV, the dorsal half of the distal parts of the left leg I are cut off, the left legs II-IV are cut off through their femora, some left parts of the spider are covered by a white emulsion. - A tiny wasp and several stellate hairs are preserved near the spider, thin threads are running right of the spiders body (partly in contact) from the right pedipalpus. - The paratype F758 is badly preserved and strongly deformed in an amber piece which was heated, a white emulsion is present, the pedipalpi are fairly well observable. - A deformed Diptera and some stellate hairs are preserved near the spider. - The paratype F760 is well but incompletely preserved, ventral parts are covered by a weak white emulsion, parts of the right legs I-IV are cut off, 3 Diptera and some stellate hairs are preserved near the spider, 3 deformed Diptera and some stellate hairs in the separated amber piece.

Diagnosis (♂; ♀ unknown): See above. The legs bear numerous long bristles (figs. 4-4a).

Description (♂):
Measurements in mm): Body length about 2.5, prosoma length 1.0-1.3, leg I (holotype): Femur at least 1.0, tibia 1.45, metatarsus 1.0, tarsus 0.45, tibia II 1.25, tibia III 0.75, tibia IV about 0.95.
Colour: Prosoma and legs dark brown, legs probably annulated, opisthosoma light brown.
Prosoma (fig. 3) about 1.25 times longer than wide, with few hairs and an indistinct

thoracal fissure. Most eyes are of medium size but the anterior median eyes are distinctly the smallest, anterior and posterior median eyes separated by less than their diameter, posterior row procurved, clypeus nearly as long as the diameter of the anterior median eyes, chelicerae fairly long, diverging distally, with distinct condyli, stridulating files absent, teeth not observable. Most parts of the mouth parts are hidden, the labium is longer than wide. - Legs (figs. 4-4a) fairly long and slender, with longer hairs, order I/II/IV/III. Numerous long bristles, femora besides apicals 1 dorsal bristle in the middle, II additionally 1 prodorsally, I 2 prodorsally, patellae 2 dorsally, tibia I 2 dorsally and 2 lateral pairs, metatarsus I with a lateral pair near the middle, leg IV fig. 4a. Calamistrum absent, at least 2 long tarsal trichobothria, a long and some shorter metatarsal trichobothria. Paired tarsal claws, with long teeth. - Opisthosoma ovally, covered scarcely with hairs of medium length. Spinnerets fairly long, anteriors separated by about one diameter, cribellum absent or strongly reduced, see above. - Pedipalpus (figs. 4b-e, see above): Patella and tibia bear 1 dorsal bristle, tibia with 3 apophyses, the retroventral-distal apophysis is divided. Bulbus structures not well observable, embolus long and thin, originating retrolaterally.

Relationships: See above.

Distribution: Tertiary Baltic amber forest.

Eocryphoeca PETRUNKEVITCH 1958

Diagnosis: Anterior and posterior eye row (fig. 5w) procurved, prosoma 1.32-1.45 times longer than wide, clypeus as long as 2 1/2 diameters of the anterior median eyes, about two paires of thin ventral tibial I-II bristles, 5 tarsal trichobothria (see *E. gibbifera*), spinnerets relatively long. ♂-pedipalpus (e.g. figs. 5x-z, 6d-f): Cymbium short, tegular apophysis curved foreward or - rarely (in *gracilipes*) - bent ventrally.

Type species: *Tegenaria gracilipes* KOCH & BERENDT 1854.

Relationships: In *Eocryphoecara* n. gen. the prosoma is relatively longer, the posterior eye row is recurved, the cymbium is longer, the tegular apophysis is curved backward, an additional outgrowth of the conductor is present and the embolus is longer. - PETRUNKEVITCH (1958: 126) regarded *Eocryphoeca* as a member of the Ageleninae, and this may be correct; in my opinion it is not strongly related to *Cryphoeca*. In this paper I provisionally list *Eocryphoeca* in the Dictynidae: Cryphoecinae.

Species: Besides the dubious *E. distincta* and *E. fossilis* as well as *E. gracilipes* (KOCH & BERENDT 1854) I describe 7 species for the first time.

Distribution: Tertiary Baltic amber forest incl. the Bitterfeld deposit.

Key to the species of *Eocryphoeca* (♂):

Remark: Not included are *E.* sp. indet. (see below), the dubious *E. distincta* PETRUNKEVITCH 1950 and *E. fossilis* PETRUNKEVITCH 1942.

1 Tegular apophysis apically hook-shaped (fig. 5z) and cuved ventrally-medially (fig. 5y), pedipalpal tibial apophysis as in figs. 5x-z. . . . . *gracilipes*

- Tegular apophysis not hook-shaped, curved foreward (e.g. figs. 5r, t, 6a, e-f), pedipalpal tibial apophysis different. 2

2(1) Origin of the pedipalpal tibial apophysis in the basal half and outstanding in a right angle (figs. 5q, 6b). 3

- Origin of the pedipalpal tibial apophysis in the middle of the article, not outstanding in a right angle (e.g. figs. 5p, 6d). 4

3(2) Only a single retrolateral pedipalpal tibial apophysis (fig. 6b). . . . . *mammilla*

- Two retrolateral tibial apophyses (fig. 5q). . . . . *electrina*

4 (2) Retrolateral pedipalpal tibial apophysis widened apically (figs. 5v, 6a), tegular apophysis larger. 5

- Retrolateral tibial apophysis narrow apically (figs. 5p, s, 6e), tegular apophysis smaller. 6

5(4) Retrolateral tibial apophysis more slender (fig. 5v). . . . . *gibbifera*

- Retrolateral tibial apophysis wider (fig. 6a). . . . . *ligula*

6(4) Retrolateral tibial apophysis ventrally distinctly convex (figs. 5p, 6d-f). 7

- Retrolateral tibial apophysis ventrally not distinctly convex, tegular apophysis more slender (figs. 5s-t). . . . . *falcata*

7(6) Retrolateral pedipalpal tibial apophysis with two apical-medial apophyses (fig. 6d). . . . . *splendens*

- Retrolateral pedipalpal tibial apophysis apically-medially with a tooth-shaped outgrowth only (fig. 5p). . . . . *bitterfeldensis*

***Eocryphoeca bitterfeldensis* n. sp.** (figs. 5m-p)

Material: Holotypus ♂ in Baltic amber from the Bitterfeld deposit, F835/BB/AR/DIC/CJW.

Preservation and syninclusions: The spider is preserved in an orange-brown amber piece which probably was heated. It is fairly well preserved, the left leg I is a very small regenerate (fig. 5n), the apical part of the left femur II, the patella of the left leg IV are cut off as well as parts of the right legs I and II. A short blunt stump on the right coxa IV seems to be another regenerate. - No stellate hairs.

Diagnosis (♂; ♀ unknown): Pedipalpus with a long retrolateral apophysis (fig. 5p), a thin medio-apical and a prolateral outgrowth (the structures of the bulbus are hidden).

Description (♂):
Measurements (in mm): Body length about 4.2, prosoma: length 2.0, width 1.5, tibia I 1.65.
Colour: Prosoma and legs dark brown, opisthosoma light brown.
Body and legs quite similar to *E. splendens*; left tibia and metatarsus: Fig. 5m, large spigots of the posterior spinnerets: Fig. 5o. Regenerates (fig. 5n): On the stump of the left coxa I a small club-shaped (two-segmented?) regenerate has grown. A short and blunt stump on the right coxa IV seems to be a further regenerate. Apparently the ability to regenerate legs is quite low in this species (and genus? and subfamily?).

Relationships: See *E. splendens* n. sp.

Distribution: Tertiary Baltic amber forest, Bitterfeld deposit.

Eocryphoeca distincta PETRUNKEVITCH 1950 (not seen) is based on a female spider; its genital structures are unknown, and I regard *distincta* as a dubious species.

***Eocryphoeca electrina* n. sp.** (fig. 5q-r)

Material: Holotypus ♂ in Baltic amber, F877/BB/AR/DIC/CJW.

Preservation and syninclusions: The spider is fairly well preserved, the ventral side is covered by a white emulsion, both patellae IV and dorsal parts of both tibiae IV are cut off; no stellate hairs.

Diagnosis (♂; ♀ unknown): Pedipalpus (figs. 5q-r): Tibia with a shorter and outstanding apophysis which originates in the basal half of the article and with a longer and slender retrolateral apophysis, conductor slender, tegular apophysis stout and blunt.

Description (♂):
Measurements (in mm): Body length 4.7, prosoma: Length 2.5, width 1.9, tibia I 1.9.
Colour: Body and legs dark brown, opisthosoma light brown.
Body and legs quite similar to *E. splendens* n. sp.

Relationships: See the key.

Distribution: Tertiary Baltic amber forest.

***Eocryphoeca falcata* n. sp**. (fig. 5s-t)

I **thank** Mr. PETER BÖDEKER in Berlin for the kind present of this fossil.

Material: Holotypus ♂ in Baltic amber, collected by PETER BÖDEKER in Berlin-Tegel in a tunnel 8m deep, F 876/BB/AR/DIC/CJW.

Preservation and syninclusions: The spider is only fairly well and incompletely preserved, the ventral side is covered by a white emulsion, the dorsal side is hidden by a layer of the fossil resin, the left fang and several leg articles including the tips of all tarsi except the right tarsus IV are cut off. - Remains of some stellate hairs and particles of detritus are preserved near the spider.

Diagnosis (♂; ♀ unknown): Pedipalpus (figs. 5s-t): Tibia with a long retrolateral apophysis, tegular apophysis long, slender, bent and close to the bulbus. Body length only 3.5mm (probably the smlallest species of the genus).

Description (♂):
Measurements (in mm): Body length about 3.5, prosomal length 1.6, tibia I 1.85, tibia IV 1.85.
Colour: Prosoma and legs dark brown, opisthosoma light brown.
Body and legs quite similar to *E. splendens* n. sp. but probably the number of the ventral tibial I bristles is lower.

Relationships: See the key.
Distribution: Tertiary Baltic amber forest, Berlin deposit.

Eocryphoeca fossilis (PETRUNKEVITCH 1942) (sub *Myro* according to PETRUNKEVITCH 1946) is based on a badly preserved male spider (not seen). The structures of the pedipalpus are unknown, and therefore I cannot give a diagnosis of this species.

***Eocryphoeca gibbifera* n. sp.** (fig. 5u-v)

Material: Holotypus ♂ in Baltic amber, F875/BB/AR/DIC/CJW.

Preservation and syninclusions: The spider is only fairly well preserved, mainly ventral parts are covered by a white emulsion, dorsal parts are hidden by a larger layer in the amber, cut off are the tips of the right tarsus III and the right cymbium as well as parts of both legs I and the right leg II at the base of the metatarsus. - Right of the spider a thread is running through the amber piece.

Diagnosis (♂; ♀ unknown): Pedipalpus (figs. 5u-v): Three tibial apophyses, retrolateral apophysis widened apically and ventrally concave, tegular apophysis large and outstanding.

Description (♂):
Measurements (in mm): Body length 4.2, prosoma length 2.2, tibia I 1.8, tibia IV 1.8.
Colour: Prosoma and legs dark brown, opisthosoma light brown.
Body and legs quite similar to *E. splendens* n. sp. On the left tarsus IV 5 longer trichobothria are observable.

Relationships: In *E. ligula* n. sp. the retrolateral pedipalpal tibial apophysis is wider and shorter, the tegular apophysis is smaller.

Distribution: Tertiary Baltic amber forest.

Eocryphoeca gracilipes (KOCH & BERENDT 1854) (sub *Tegenaria*) (figs. 5w-z)
Photos 272-273

Material: 4♂ in Baltic amber: Holotypus PMHUB no. MB.A.579, 1♂ GPIGöttingen 1B498, 1♂ F881/BB/AR/DIC/CJW, 1♂ F882/BB/AR/DIC/CJW.

Remark on the holotype: The spider is strongly darkened, prosoma and legs are deformed, the bulbi are partly covered by a white emulsion (therefore the conspecifity of the other listed males is not quite sure!), the prosoma is 2.25mm long.

Diagnosis (♂; ♀ unknown): Pedipalpus (figs. 5x-z): Tibia with a wide and outstanding retrolateral apophysis near the middle of the article and a large retrodistal-ventral apophysis, tegular apophysis hook-shaped, the tip is directed ventrally-medially.

Eyes: Fig. 5w. Body and legs quite similar to *E. splendens* n. sp. *E. gracilipes* is the most frequent species of the genus. Most of the other species are represented by a single specimen only.

Relationships: See the key and *E.* sp. below (the "androtype"). The "hypotype" (♀) of *E. gracilipes* sensu PETRUNKEVITCH 1946 is probably a member of *Eocryphoeca*.

Distribution: Tertiary Baltic amber forest.

***Eocryphoeca ligula* n. sp.** (fig. 6a)

Material: 2♂ in Baltic amber, holotypus F879/BB/AR/DIC/CJW, paratypus F880/BB/AR/DIC/CJW.

Preservation and syninclusions: Holotype: The spider is well and completely preserved in a 9cm long piece of amber; body and legs are partly covered by a white emulsion, the opisthosoma is depressed dorsally. - A Diptera is present in the same amber piece but no stellate hairs. - The paratype is fairly well preserved, the ventral part is covered by a white emulsion and a layer of resin, dorsal parts of the right leg IV and the left leg I are cut off. - Numerous hyphae are growing on the right legs III and I and IV, and are present laterally of these legs. Furthermore preserved are 2 Diptera, 1 Coccina, 1 Araneae (Linyphiidae: *Custodela* sp.), particles of detritus but no stellate hairs.

Diagnosis (♂; ♀ unknown): Pedipalpus (fig. 6a): Retrolateral tibial apophysis short and widened apically, tegular apophysis of medium size. Probably the largest species of the genus.

Description (♂):
Measurements (in mm): Body length 5.5, prosomal length about 2.8, tibia I 2.25.
Colour: Prosoma and legs dark brown, opisthosoma medium brown.
Body and legs quite similar to *E. splendens* n. sp.

Relationships: See *E. gibbifera* n. sp.

Distribution: Tertiary Baltic amber forest.

***Eocryphoeca mammilla* n. sp.** (fig. 6b) Photo 274

Material: Holotypus ♂ in Baltic amber and a separated piece of amber, F878/BB/AR/DIC/CJW.

Preservation and syninclusions: The spider is well and nearly completely preserved in a 5cm long piece of amber, only the right leg III is missing behind the coxa by autotomy; ventrally on the mouth parts a white emulsion is present. - 1 Acari and several Diptera - one beneath the left tarsus and metatarsus I and one in the separated piece of amber - are preserved near the spider; no stellate hairs.

Diagnosis (♂; ♀ unknown): Pedipalpus (fig. 6b): Tibia with a slender retrolateral apophysis which originates in the middle of the article and with a retrobasal outgrowth.

Description (♂):
Measurements (in mm): Body length 4.5, prosoml length 2.4, tibia I 2.35, tibia IV 1.9.
Colour dark brown; probably darkened by aging.
Body and legs are quite similar to *E. splendens* n. sp.

Relationships: See the key. In the private collection of F. EICHMANN a male is kept in which the pedipalpal tibial apophysis is outstanding in a similar way but the apophysis is wider; the tegular apophysis is large in this specimen.

Distribution: Tertiary Baltic amber forest.

***Eocryphoeca splendens* n. sp.** (figs. 6c-f)

Material: 2♂ in Baltic amber, holotypus F833/BB/AR/DIC/CJW, paratypus and a separated piece of amber, F834/BB/AR/DIC/CJW.

Preservation and syninclusions: Holotype: The spider is well and nearly completely preserved, only the dorsal part of the right cymbium is cut off, few parts of the body are covered by a white emulsion; no stellate hairs. - The paratype is fairly well preserved, both left legs I and II are cut off through the tibia, the ventral part of the opisthosoma is partly covered by a white emulsion; no stellate hairs.

Diagnosis (♂; ♀ unknown): Pedipalpus (figs. 6d-f): Tibia with a long retrolateral apophysis which originates in the middle of the article, two apical apophyses and a proapical outgrowth; tegular apophysis fairly thick and bent, embolus thin, partly hidden.

Description (♂):
Measurements (in mm): Body length about 4.2, prosoma: Length about 2.0, width 1.45, leg I: Femur 2.2, patella 0.55, tibia 2.1, metatarsus 2.05, tarsus 1.2, tibia II 1.8, tibia III 1.45, tibia IV 2.0.
Colour: Prosoma and legs dark brown, opisthosoma light brown.
Prosoma 1.38 times lomger than wide, with a long caput, a long thoracal fissure, few hairs of medium length and large posterior medium eyes similar to *E. gracilipes* (fig. 5w), both eye rows procurved. Clypeus about 2 1/2 times longer than the diameter of an anterior median eye. Chelicerae fairly large, mouth parts hidden. - Legs fairly long, covered with hairs of medium length, order IV/I/II/III. Numerous thin bristles: Femora 2 dorsally and apicals, at least I 1 additional prodistally; patellae 2 dorsally and a thin retrolaterally; tibiae with dorsal, lateral and ventral bristles, tibia I-II e.g. a ventral pair near the middle, tibia IV bears about 10 bristles, metatarsus I bears about 7 bristles; 3 longer and 2? shorter tarsal trichobothria. Paired tarsal claws with long teeth. - Opisthosoma 1.7 times longer than wide, scarcely covered with hairs of medium length; colulus replaced by a pair of hairs (fig. 6c), tracheal spiracle near the colulus, anterior spinnerets fairly long, separated by their diameter, apical article of the posterior spinnerets fairly long, with large spigots, see the photo. - Pedipalpus (figs. 6d-f): Patella and tibia about as long as wide, patella with a long dorsal-distal bristle, tibia with at least 2 dorsal bristles and 3 apophyses (see above), tegular apophysis curved continuously, embolus thin and partly hidden by the large conductor.

Relationships: In *E. bitterfeldensis* n. sp. the shape of the retrolateral pedipalpal tibial apophysis is identical but apical apophyses are absent, only a short tooth-shaped outgrowth is present.

Distribution: Tertiary Baltic amber forest.

***Eocryphoeca* sp. indet.**

Material: 1♂ in Baltic amber, "androtype" of *Eocryphoeca gracilipes* (KOCH & BERENDT 1854) sensu PETRUNKEVITCH 1958, ZMHUB.

Remarks: The structures of the pedipalpus are different from *E. gracilipes* - see above - but similar to *E. splendens* n. sp.; the preparation of the amber piece - which is kept under glas - could clarify the relationships.

Distribution: Tertiary Baltic amber forest.

***Eocryphoecara* n. gen.**

Diagnosis (♂; ♀ unknown): Posterior eye row recurved (fig. 5i), caput long, prosoma

1.5 times longer than wide; ♂-pedipalpus (figs. 5j-l): cymbium long, conductor with an additional outgrowth, tegular apophysis curved backward, embolus long.

Type species: *Eocryphoecara abicera* n. sp.

Relationships: See *Eocryphoeca*.

Distribution: Tertiary Baltic amber forest.

***Eocryphoecara abicera* n. gen. n. sp.** (figs. 5i-l) Photos 269-271

Material: Holotypus ♂ in Baltic amber and a separated amber piece, F830/BB/AR/DIC/CJW.

Preservation and syninclusions: The spider is well and completely preserved, some ventral parts of the body are covered by a white emulsion; few stellate hairs.

Diagnosis (♂; ♀ unknown): Pedipalpus (figs. 5j-l) with a simple retrolateral tibial apophysis, a long and outstanding tegular apophysis and a long embolus which originates in a basal position.

Description (♂):
Measurements (in mm): Body length 4.2, prosoma: length 2.2, width 1.45, leg I: Femur 1.7, patella 0.6, tibia 1.6, metatarsus 1.4, tarsus 0.85, leg IV: Femur 1.85, tibia 1.7, metatarsus 2.05, tarsus 1.0.
Colour: Prosoma and legs medium brown, opisthosoma yellow brown.
Prosoma 1.5 times longer than wide, with a long caput, a long thoracal fissure, scarcely covered with hairs. Eyes (fig. 5i) large (partly covered with bubbles), both rows procurved, posterior median eyes separated by about one diameter. Chelicerae fairly large, condylus distinct, fangs long and slender, labium and gnathocoxae hidden, sternum small elongated between the coxae IV. - Legs fairly hairy and fairly long, order IV/I/II/III, III relatively long. Bristles numerous, femora 3 dorsally, one or a pair near the end, I additionally 2 prodistally, patellae 2 dorsally, III-IV an additional lateral pair, tibiae with dorsal, lateral and ventral bristles, I about 8, IV about 10, metatarsus IV about 15. Paired tarsal claws with long teeth. The tarsi bear at least 3 trichobothria which have small bothria. - Opisthosoma 1.6 times longer than wide, scarcely covered with hairs of medium length; spinnerets as in *Eocryphoeca*. - Pedipalpus (figs. 5j-l): Patella and tibia as long as wide, patella with a dorsal-distal bristle, tibia with 4 bristles, few tiny trichobothria, a large retroapical and a proapical apophysis, cymbium long, tegular apophysis long and outstanding, a long conductor which has a long distal outgrowth, embolus long and thin, originating in a basal position and describing half a circle.

Relationships: See above.

Distribution: Tertiary Baltic amber forest.

***Gibbermastigusa* n. gen.**

Diagnosis (♂; ♀ unknown): Clypeus long (fig. 7), tibia I with 5 prolateral and 2 longer retroventral bristles (fig. 8); pedipalpus (figs. 9-12): Femur with a pair of ventral-distal outgrowths, patella with a retrolateral outgrowth, tibia with a retrolateral and a large ventral outgrowth, cymbium short, embolus & conductor describe a large loop.

Type species: *Gibbermastigusa lateralis* n. sp.

Relationships: In the other fossil Cryphoecinae except *Balticocryphoeca* femoral pedipalpal outgrowths are absent. See the key; *Mastigusa* may be the closest relative.

Distribution: Tertiary Baltic amber forest.

***Gibbermastigusa lateralis* n. gen. n. sp.** (figs. 7-12) Photo 275

Material: 2♂ in Baltic amber: Holotypus and 2 separated amber pieces coll. HOFFEINS in Hamburg no. 500, to be deposited in the Deutsches Entomologisches Institut in Eberswalde; paratypus PMHUB no. MB.A.186 (coll. BERENDT).

Preservation and syninclusions: Holotypus: The spider is completely and well preserved, some ventral parts are covered by a white emulsion, the opisthosoma is covered by a larger gas bubble.- Numerous stellate hairs are preserved near the spider and a tiny excrement ball in one of the separated amber pieces.- The paratype is nearly completely preserved in an old and darkened link which is perforated, tarsus and parts of the metatarsus of the right leg IV are cut off by the perforation. The ventral side of the spider is thickly covered by a white emulsion, parts of the dorsal side are covered by a layer of amber. - 3 Acari are preserved near the spider.

Diagnosis (♂; ♀ unknown): Pedipalpus (figs. 9-12, see above).

Description (♂):
Measurements (in mm): Body length 2.5, prosoma: Length 1.2, width 1.0, leg I: Femur 1.2, patella 0.45, tibia 1.55, metatarsus 1.65, tarsus 0.6, tibia II 1.2, tibia III 0.7,

tibia IV 1.0.
Colour (holotype): Prosoma and legs dark brown, opisthosoma yellow brown.
Prosoma (fig. 7) 1.2 times longer than wide, nearly hairless, with a distinct thoracal fissure. Eyes of medium size, field rather wide, posterior row slightly recurved, posterior median eyes separated by nearly their diameter. Clypeus 1.7 times longer than the diameter of the anterior median eyes. Chelicerae stout, 1.4 times longer than the hight of the caput, bearing some long frontal hairs and large condyli; teeth hidden, fangs long, labium wider than long, gnathocoxae longer than wide, not converging above the labium, sternum about as wide as long. - Legs (fig. 8) long and slender, hairs indistinct, order I/IV/II/III, bristles slender: Femora 2 dorsally and apicals, I bear an additional prolateral bristle, patellae with 2 short dorsal bristles, tibia I bears 5 proventral and 2 longer retroventral bristles, metatarsus I bears 5 pairs of ventral bristles. The tarsi bear 2 longer trichobothria. - Opisthosoma covered with few short hairs, spinnerets partly hidden, similar to *Mastigusa*, tracheal spiracle hidden. - Pedipalpus (see above), patella and tibia with a dorsal bristle each, origin of the embolus retrolaterally.

Relationships: See above.

Distribution: Tertiary Baltic amber forest.

Mastigusa MENGE in KOCH & BERENDT 1854

German name: "Widderhornspinnen".

Diagnosis: Tibia I-II with 4-6 pairs of strong ventral bristles (see the photos and WUNDERLICH (1986: Figs, 82, 92)), the retrolateral number may be less. ♂-pedipalpus (e.g. figs. 13, 15-16): The tibia bears a ventral and a retrodorsal apophysis and a prodorsal hook, cymbium, embolus and conductor are normally in a vertical position, see WUNDERLICH (1986: Figs. 68-70), bulbus small, surrounded widely by the very long embolus and conductor.
Remarks: In three species the opisthosoma bears a dorsal scutum (see the key, fig. 26) (an armoured opisthosoma is quite unusual in the Cryphoecinae and Dictynidae s. l.), the clypeus is long, the tarsi bear 2 long and probably 1-2 short trichobothria. - Firstly this genus was known from fossils in Baltic amber - described by MENGE (1854: 94) - and later found extant in Europe, published in 1871 by THORELL, see WUNDERLICH (1986).

Type species: *Mastigusa acuminata* MENGE in KOCH & BERENDT 1854, fossil in Baltic amber. - Other species: 3 extant species in Europe and N-Africa - see WUNDERLICH (1986) - and 7 further extinct species in Baltic amber. There is some more indet. material in the private collection of the author which may include undescribed species. Members of *Mastigusa* are not so rare as thought before; I saw mearly 50

specimens in private and museum's collections, females are quite rare.

Relationships: WUNDERLICH (1995) regarded *Mastigusa* as a member of the family Dictynidae, and PLATNICK (1998) listed the genus in the Dictynidae, too. According to the pattern of the spinnerets, the small size and the structures of the bulbus *Mastigusa* should be a member of the Dictynidae s.l.: Cryphoecinae. - See *Protomastigusa* n. gen. In the extant genus *Tuberta* the bulbus structures are compact, embolus & conductor are turning several times and its position is not in a single plain. See also *Gibbermastigusa* in which the pedipalpal femur bears 2 distal-ventral apophyses, the chaetotaxy is different and the structures of the bulbus are more compact.

Ecology and evolution: At least the extant *M. arietina* (THORELL 1871) is myrmecophilous, a synectran of ants; in some areas specimens are frequently collected in ant's nests - much more in Finland than in Germany - but they are also found at tree trunks and occasionally under stones. The size of the eye lenses is reduced in most extant specimens of *arietina* in contrast to the fossil species and the extant *macrophthalma* (KULCZYNSKI 1897). The large eye lenses of the fossil species may indicate that these species did not live in ant's nests.

Distribution: Europe, N-Africa, fossil in Tertiary Baltic amber incl. the Bitterfeld deposit.

Key to the fossil species of *Mastigusa* in Baltic amber (♂):

Remark: The largest diameter of the loop of embolus & conductor is about (in mm) in: *Acuminata* 1.8, *arcuata* 1.5, *bitterfeldensis* 1.35, *laticymbium* 1.05, *magnibulbus* 0.7, *media* WUNDERLICH 1986 1.4, *modesta* WUNDERLICH 1986 1.1, *scutata* 0.5.

1 Pedipalpus (figs. 19-21): Cymbium wide, tibia with a retrodistal and a retrobasal apophysis, the embolus described 1 1/2 loops. . . . . *laticymbium*

- Pedipalpus (e.g. figs. 15-16): Cymbium narrow in the distal half, tibia with a retrolateral apophysis only, the embolus describes about one loop only. 2

2(1) Opisthosomal scutum present (fig. 26); see WUNDERLICH (1986: Fig. 70). . . . 3

- Opisthosomal scutum absent. 4

3(2) Largest diameter of the loop of embolus & conductor 1.8mm (fig.13), pedipalpal tibial apophysis: See WUNDERLICH (1986: Fig. 93), legs not annulated. . . *acuminata*

- Largest diameter of the loop of embolus & conductor 1.5mm (fig. 15), pedipalpal tibial apophysis fig. 14, legs distinctly annulated. . . . . *arcuata*

- Largest diameter of the loop of embolus & conductor 0.5mm (fig. 28), tibial apophysis fig. 27, legs probably not annulated. . . . . *scutata*

4(2) Pedipalpal tibial apophysis very large (fig. 22), bulbus very large, loop of embolus & conductor short (fig. 23). . . . . *magnibulbus*

- Pedipalpal apophysis as well as bulbus smaller, loop of embolus & conductor longer. e.g. figs. 16-17. 5

5(4) Bulbus higher than long (fig. 17), retrolateral pedipalpal tibial apophysis as in fig. 16. . . . . *bitterfeldensis*

- Bulbus (tegulum + subtegulum) longer than high, tibial apophysis as in figs.24-25..6

6(5) Pedipalpal tibial apophysis as in fig. 24, diameter of the loop of embolus & conductor 1.4mm. Photo 276 . . . . . *media*

- Pedipalpal tibial apophysis as in fig. 25, diameter of the loop of embolus & conductor 1.1mm. . . . . *modesta*

Mastigusa acuminata MENGE in KOCH & BERENDT 1854 (fig. 13)

1986 *Mastigusa acuminata*,--WUNDERLICH, Spinnenfauna gestern und heute: 71, figs. 70, 76, 91-94.

Material: Neotypus (**new**) ♂ in Baltic amber and a separated amber piece ex coll. CASPARI, F756/BB/AR/DIC/CJW.

MENGE in KOCH & BERENDT (1854: 94) described shortly a male from his private collection - most probably this collection is lost - as "*Mastigusa* mit widderhornähnlich nach hinten gebogenen Geisseln an den männlichen Tasterkolben, fast so lang als der ganze Leib, *M. acuminata*" ("*Mastigusa* with an embolus bent backwards like a ram's horn, nearly as long as the whole body, *M. acuminata*.". - According to this description the male F756 from my private collection - which will be given to the Senckenberg-Museum Frankfurt a. M. - is most probably conspecific with *acuminata*. Males of this species possess the largest/longest loop of embolus & conductor of the genus *Mastigusa*. The holotype - and previously the only known specimen of this species - is lost, and I decide the male F756/CJW as the neotype (**new**) of *acuminata*, see article 75 of the IRZN.

Relationships: See the key.

Distribution: Tertiary Baltic amber forest.

***Mastigusa arcuata* n. sp.** (figs. 14-15)

Material: Holotypus ♂ in Baltic amber, F749/BB/AR/DIC/CJW.

Preservation and syninclusions: The spider is fairly well preserved in an amber piece which was heated; ventrally it is covered by a white emulsion. The left leg I is missing behind the coxa by autotomy, both patellae IV are cut off. - An arm of a stellate hair is preserved near the spider.

Diagnosis (♂; ♀ unknown): Legs distinctly annulated, opisthosoma with a dorsal scutum as in fig. 26. Pedipalpus (figs. 14-15): Tip of the tibial apophysis convex, largest diameter of the loop of embolus & conductor 1.5mm.

Description (♂):
Measurements (in mm): Body length 2.5, prosoma: Length 1.3, width 1.1, tibia I 1.0. Colour: Prosoma, legs and opisthosomal scutum dark brown, opisthosoma light brown. - Prosoma as in the genus. - Legs of medium length, tibia I bears probably 5 pairs of ventral bristles. - Opisthosoma with a dorsal scutum as in fig. 26. - Pedipalpus (figs. 14-15, see above): Patella and tibia both bear a dorsal bristle, the cymbium is slender in the distal part, the bulbus is small.

Relationships: See the key. *M. media* may be most related, its legs are probably not annulated. In *M. scutata* an opisthosomal scutum is present, too, but the shape of the pedipalpal tibial apophysis is quite different and the loop of embolus & conductor is much smaller.

Distribution: Tertiary Baltic amber forest.

***Mastigusa bitterfeldensis* n. sp.** (figs. 16-17)

Material: Holotypus ♂ in Baltic amber from the Bitterfeld deposit, F748/BB/AR/DIC/CJW.

Preservation and syninclusions: The spider is fairly well and nearly completely preserved, only the tip of the left tarsus I is cut off; the dorsal side of the prosoma is slightly, the opisthosoma is thicker covered by a white emulsion. - Some larger bubbles are preserved near the spider in the same layer but no stellate hairs.

Diagnosis (♂; ♀ unknown): Pedipalpus (figs. 16-17: Tibia apophysis large, slightly concave at the end, bulbus higher than long, largest diameter of embolus & conductor 1.35mm.

Description (♂):
Measurements (in mm): Body length 2.6, prosomal length 1.25, tibia I 1.4.
Colour: Prosoma and legs dark brown, opisthosoma light brown. - Prosoma as in the genus; posterior median eyes probably larger than in the other fossil species. - Legs fairly long, tibia I bears 5 pairs of ventral bristles. - Opisthosoma ovally (covered by a white emulsion), dorsal scutum absent, spinnerets long. - Pedipalpus (figs. 16-17): See above; patella with a long bristle, the right tibia is hidden.

Relationships: See the key; the shape of the pedipalpal tibial apophysis is unique in this species.

Distribution: Tertiary Baltic amber forest, Bitterfeld deposit.

***Mastigusa laticymbium* n. gen. n. sp.** (figs. 18-21)

Material: 2♂ in Baltic amber, holotypus F751/BB/AR/DIC/CJW, paratypus: Private coll. R. KRAUSE in Hamburg.

Preservation and syninclusions: (a) Holotype: The spider is fairly well and nearly completely preserved, the retrolateral half of the distal leg IV articles are broken off with a piece of amber, most ventral parts are hidden by an amber layer. - An adult Acari and few particles of detritus are preserved in the same amber piece. - The paratype is fairly well preserved and partly covered by a white emulsion, the tip of the right tarsus II and both tarsi and metatarsi I are cut off, the left pedipalpus is broken off and missing behind the tibia. - A double dragline (fig. 18) is running from the anterior spinnerets in the right direction; no stellate hairs.

Diagnosis (♂; ♀ unknown): Pedipalpus (figs. 19-21): Cymbium wide in the distal half, tibia with a retrobasal and a retroapical apophysis, embolus & conductor describe 1 1/2 loops, largest diameter of embolus & conductor 1.05.

Description (♂):
Measuremensts (in mm): Body length 2.1-2.3, prosoma: Length 1.0-1.1 (holotype), width 1.0 (holotype), tibia I (paratype) 1.1.
Colour: Prosoma and legs dark brown, opisthosoma light brown.
Prosoma as in the genus, legs fairly stout, tibia I with 4 pairs of ventral bristles, a further prolateral bristle in the basal half may be present, metatarsus I with 3 pairs of ventral bristles, tarsi with 2 long trichobothria. - Opisthosma ovally, hairs of medium length, position of the tracheal openings unknown, colulus undivided, anterior spinnerets (fig. 18) stout, remains of a doubled dragline are present. - Pedipalpus (see above): The tibia bears an indistinct bristle.

Relationships: See the key. In the related species the cymbium is narrow in the distal half and the embolus describes about one loop only.

Distribution: Tertiary Baltic amber forest.

***Mastigusa magnibulbus* n. sp**. (figs. 22-23)

Material: Holotypus in Baltic amber from the Bitterfeld deposit, F747/BB/AR/DIC/CJW.

Preservation and syninclusions: The spider is completely and fairly well preserved; some parts - e.g. the sternum - are covered by a white emulsion, a larger bubble is preserved beneath the right tibia I, furthermore numerous particles of detritus and few stellate hairs are present.

Diagnosis (♂; ♀ unknown): Pedipalpus (figs. 22-23): Tibia with a single large apophysis, bulbus large and circular, conductor thin, largest diameter of embolus & conductor 0.7.

Description (♂):
Measurements (in mm): Body length 2.1, prosomal length 0.9, tibia I 0.9.
Colour: Prosoma and legs dark brown, opisthosoma light brown.
Prosoma as in the genus. - Legs fairly stout, tibia I bears probably 5 pairs of ventral bristles. - Opisthosoma ovally, covered with short hairs. The long posterior spinnerets are widely spaced. - Pedipalpus (figs. 22-23): The patella bears one, the tibia two dorsal bristles, the tibia bears a long retrolateral apophysis, the cymbium is slender in the distal part, the bulbus is large and circular.

Relationships: See the key; the bulbus is larger, the conductor is thinner than in the other congeneric species,

Distribution: Tertiary Baltic amber forest, Bitterfeld deposit.

Mastigusa media WUNDERLICH 1986 (fig. 24)

See WUNDERLICH (1986: 72, fig. 71, 77, 95) and the key. Pedipalpal tibial apophysis: Fig. 24.

Relationships: See the key.

Distribution: Tertiary Baltic amber forest.

Mastigusa modesta WUNDERLICH 1986 (fig. 25) Photo 276

See WUNDERLICH (1986: 72-73, figs. 72-73, 78, 96) and the key. Pedipalpal tibial apophysis: Fig. 25.

Relationships: See the key.

Distribution: Tertiary Baltic amber forest.

Mastigusa scutata n. sp. (figs. 26-28)

Material: Holotypus in Baltic amber, F750/BB/AR/DIC/CJW.

Preservation and syninclusions: The spider is completely preserved, ventrally thickly covered by a white emulsion and a larger gas bubble. - Also preserved are a larger adult Acari (Parasitengona), a tiny insect larva (?), tiny scales of an insect and tiny excrement balls; no stellate hairs.

Diagnosis (♂; ♀ unknown): Opisthosoma with a dorsal scutum (fig. 26), pedipalpal apophysis long and slender (fig. 27), embolus and conductor describe nearly a circle and a relatively small loop of 0.5mm.

Description (♂):
Measurements (in mm): Body length 2.1, prosomal length 0.95, tibia I 0.83.
Colour: Prosoma, legs and opisthosomal scutum dark brown, opisthosoma besides the scutum light brown, legs probably not annulated.
Prosoma as in the genus. - Legs fairly stout, tibia I with 4 pairs of ventral bristles. -

Opisthosoma ovally, with a dorsal scutum in the anterior half (fig. 26) and few hairs. - Pedipalpus (figs. 27-28; see above): The patella bears a long, the tibia a short dorsal bristle.

Relationships: See the key. In two other fossil species an opisthosomal scutum is present, but the largest diameter of embolus & conductor is 0.7/1.8mm in these species and the shape of the pedipalpal tibial apophysis is different.

Distribution: Tertiary Baltic amber forest.

Mastigusa sp. indet. Photo 277

Material: 1 subad. ♂ in Baltic amber, F888/BB/AR/DIC/CJW.

The body length is 2.5mm. The very large tarsus of the pedipalpus (photo) is laterally compressed and has a partly separate "pocket" for the short branch of embolus & conductor medio-ventrally.

Distribution: Tertiary Baltic amber forest.

Protomastigusa **n. gen**.

Diagnosis (♂; ♀ unknown): Prosoma wider than long, tibia I with 2 pairs of ventral bristles, thoracal fissure indistinct, embolus in close contact to the conductor and partly enclosed by the conductor, describing a large loop around the bulbus, its position nearly horizontal (fig. 29).

Type species: *Protomastigusa composita* n. sp.

Relationships: In the related genera the prosoma is longer than wide and the embolus is not enclosed by the conductor. In *Mastigusa* MENGE in KOCH & BERENDT 1854 the thoracal fissure is distinct, tibia I bears 4-6 pairs of stronger ventral bristles, embolus and conductor are free and in a nearly vertical position.

Distribution: Tertiary Baltic amber forest.

***Protomastigusa composita* n. gen. n. sp.** (figs. 29-30) Photos 278-279

Material: Holotypus ♂ in Baltic amber, F725/BB/AR/DIC/CJW.

Preservation and syninclusions: The spider is completely and well preserved but ventrally partly covered by a white emulsion. - In front of the spider in the next layer beneath the spider a male scale insect (Coccina: Matsucoccidae) is preserved; no stellate hairs.

Diagnosis (♂; ♀ unknown): See above. Pedipalpus: Figs. 29-30.

Description (♂):
Measurements (in mm): Body length 2.0, prosoma: Length 0.9, width 0.96, tibia I 0.6, tibia II 0.57, tibia III about 0.4, tibia IV about 0.52.
Colour orange (!) brown.
Prosoma wider than long (see above), with an indistinct thoracal fissure, a medial row of longer bristles and a transverse row of 3 longer bristles in front of the thoracal fissure (two more bristles are probably broken off). Eyes large, posterior row straight, posterior median eyes separated by their diameter, anterior median eyes smallest. Labium free, 1.7 times wider than long. - Legs stout, order IV/I/II/III, tarsi long, bristles few, tibia I bears 2 pairs ventrally and 2 dorsally, patellae and femora dorsally 2, metatarsus I bear 2 ventral pairs. Unpaired tarsal claws small. Calamistrum absent. The tarsi bear at least 2 trichobothria. - Opisthosoma ovally, dorsally scarcely covered with shorter hairs. Cribellum most probably absent. The thick anterior spinnerets are separated by their diameter, the posterior spinnerets are situated behind the anteriors. - Pedipalpus (figs. 29-30): Patella and tibia short and bristleless, tibia with a blunt retrolateral apophysis, cymbium wide, embolus fused with the conductor, long, describing a wide loop around the bulbus, in a nearly horizontal position, with a concave part retrolaterally in the middle.

Relationships: See above.

Distribution: Tertiary Baltic amber forest.

(2) HAHNIINAE s. str.

Hahniinae (German name: "Bodenspinnen") are small to tiny spiders which usually

have the spinnerets in a single transverse row (figs. 31, 39, photo) and possess one of two kinds of stridulatory organs, see below (the diagnosis of the subfamily, figs. 33, 48) which are unknown in the fossils. Most members spin small sheetwebs near the soil surface in dump places near water, in moss, on tree trunks and under stones. Some spiders live on/under the bark of trees - e.g. spiders of *Hahniharmia* and probably *Eohahnia* - or other higher strata, e.g. members of *Alistra* THORELL 1894 on leaves and at branches of trees, see BOSMANS (1992: 91). At least in one species - *Iberina microphthalma*, see below - probably parthenogenesis exists.

Fossils: No named taxon is known from Dominican amber, see PENNEY (2000: 356). Only a single species with a single specimen has been reported from Baltic amber - *Eoahnia succini* PETRUNKEVITCH 1958 - but members of Hahniinae are not extremely rare in this kind of amber: I saw more than 100 specimens, 40 fossil specimens are kept in my private collection, there are three genera, occasionally 3, 4 or even 8 specimens (CJW, coll. GRÖHN) are preserved in the same amber piece; three times I found members of *Eohahnia* together with *Balticoroma* sp. (Anapidae), in which occasionally several specimens occur in the same amber piece, too. The reason for such a frequency is unknown; were they socially living spiders or pseudo-social animals which were living with ants? Tiny spiders may have lived in their small capture webs close together and could be captured all together by a large flow of resin or by few sudden flows at the same place. But another explanation for the spider's "commutities" is more plausible to me:
Besides members of the families Salticidae, Theridiidae and Uloboridae some extant members of the family Anapidae s. l. and at least one species of the Dictynidae: Dictyninae - *Archaeodictyna ulova* GRISWOLD & GRISWOLD 1987 - are known to be kleptoparasites, several small spiders are present at the same capture web of a large(r) spider and steal their prey. Although fairly rare altogether there is a relatively high percentage of more than one or two members of *Eohahnia* in the same piece of amber (see above). The frequence of more than two members of *Eohahnia* and *Balticoroma* and of both together in the same amber piece is much higher than the frequence of several members of the genus *Orchestina* SIMON (Oonopidae) in the same piece of amber. *Orchestina* are not web-builders; they are much more frequent than *Eohahnia* and *Balticoroma* but are not preserved together with members of these two genera. Probably the wind blew several specimens of *Eohahnia* - and sometimes together with *Balticoroma* - from a host's web into the fossil resin or a drop of resin fell down and enclosed the spiders.

Diagnosis of the subfamily Hahniinae: All spinnerets basicly in a wide transverse row (figs. 31, 39, 66), colulus strongly reduced; position of the tracheal fold in 0.1-0.75, basicly in an advanced position (figs. 31, 58, 66); presence of two quite different kinds of stridulatory organs: (a) between a field of short bristles posterior on the prosoma and a pair of fields of apressed opisthosomal setae sidewards of the petiolus in the Antisteini (fig. 33) or (b) between retrolateral cheliceral files (fig. 48) and a stridulatory hook or tooth of the pedipalpal femur in the Hahneini (fig. 52) (I am not sure about the presence of such an organ in the fossil taxa). Male pedipalpus: Patella and tibia with an apophysis (figs. 53, 73) (in *Antistea* the femur, too), no median apophysis nor primary conductor but presence of a prolateral or retrolateral cymbial fold

which guards the embolus (figs. 34, 46, 62) (convergently evolved in several Agelenidae) and a not sclerotized distal tegular apophysis in most Hahniini ("scinny conductor" e.g. fig. 61). Epigyne not sclerotized, vulva with one or two pairs of receptacula seminis or with thickened ducts only.

Remark: Most authors regard Hahniinae as a family of its own; LEHTINEN (1967: 362) united Cryphoecinae and Hahniinae as subfamilies of the widened family Hahniidae; this author gave no reason for his opinion. - The diagnosis of the subfamily Hahniinae depends strongly on its limits: If the Cryphoecinae are included the diagnostic characters - the position of the tracheal fold, the position of the spinnerets and the structures of the male pedipalpus (patellar process, furrow of the cymbial margin) - would be quite different. Regarding these and other structures e.g. LEVI & CODDINGTON (1991) did not regard the Cryphoecinae as a member of the Hahniidae but of the Dictynidae. According to my hypothesis Cryphoecinae and Hahniinae are not taxa of the Agelenidae (the opinion of several previous authors) but more likely of the Dictynidae s. l..

Relationships: According to the unsclerotized female genital area Dictyninae is related but Cryphoecinae is probably closely related, too, see the key.

Tribus: Antisteini n. trib. (*Antistea* SIMON 1898 and *Neoantistea* GERTSCH 1934) which are not known as fossils and Hahniini (the remaining genera, in my opinion incl. the Neotropical Cybaeolini, see below).

Distribution: Cosmopolitical; Tertiary Baltic - and Dominican? - amber forests.

Antisteini n. trib.

Diagnosis: Tarsi with 3-5 trichobothria, stridulatory organ between prosoma and opisthosoma (fig. 33, see also above), tracheal fold (fig. 31) midway between epigastral furrow and spinnerets or nearer to the epigastral furrow, no "scinny conductor", body length 2.3-5mm.

Genera: *Antistea* SIMON 1898 (tracheal fold equidistant between epigastral furrow and spinnerets, pedipalpal femoral apophysis present) and *Neoantistea* GERTSCH 1934 (tracheal fold twice as far from spinnerets as from epigstral furrow, pedipalpal femoral apophysis absent).

Relationships: See the Hahniini.

Distribution: Holarctic (incl. Nepal).

Hahniini (incl. Cybaeolini)

Diagnosis: Tarsi with 2 trichobothria (according to LEHTINEN (1967: 364) 3-4 tarsal trichobothria are present in *Muizenbergia* HEWITT 1955), stridulatory organ between lateral cheliceral files or corns and a spur of the pedipalpal femur (figs. 48, 52) (absent in the extant genus *Asiohahnia*, unknown in the fossil taxa), tracheal fold nearer to the spinnenets than to the epigastral furrow, "scinny conductor" present (fig. 61) or absent, body length usually 1-2.4mm.

Relationships: In the Antisteini 3-5 tarsal trichobothria and another kind of stridulatory organs are present, the tracheal fold is usually in a more anterior position, the spiders are larger and its distribution is different.

Remark: I regard the neotropical Cybaeolinae sensu LEHTINEN (1967) as a synonym of the Hahniini (a species-group); in the Cybaeolinae a cheliceral stridulatory organ and a lateral cymbial furrow are present, too, the pedipalpal patellar apophysis has also a basal origin, the pattern of the spinnerets is a wide field, the position of the tracheal fold is in 0.1-0.25, see LEHTINEN (1967: 362).

Genera: See below.

Distribution: Cosmopolitical; Tertiary Baltic - and Dominican? - amber forests.

Provisorical **key** to the fossil and extant holarctic genera of the tribus Hahniini:

1 Legs without bristles, posterior cheliceral margin with one tooth, receptacula seminis absent and vulval ducts thickened (fig. 45) . . . . . *Hahniharmia*

- leg bristles present at least on tibiae dorsally and on metatarsi III-IV apically, posterior cheliceral margin with more than one tooth, one or two pairs of receptacula seminis present (e.g. fig. 57). 2

2(1) "Scinny conductor" absent (fig. 37), dorsal femoral bristles (usually?) absent. . . . . *Iberina* s.l.

- "Scinny conductor" present (figs. 47, 61), dorsal femoral bristles usually present at

least on some femora. 3

3(2) Cymbium and bulbus strongly elongated (figs. 61-62). Fossil in **Baltic amber**. . . Photo 296 . . . . . *Cymbiohahnia*

-Cymbium and bulbus not strongly elongated (e.g. figs.53,70-71). Extant and fossil..4

4(3) Area of the tracheal spiracle distinctly sclerotized, posterior margin of the fold strongly procurved (fig. 66, photo), pedipalpal tibial apophysis short and blunt (figs. 67-68). Fossil in **Baltic amber**. Photos 297-298 . . . . . *Eohahnia*

- Area of the tracheal spiracle not sclerotized, fold not strongly procurved (e.g. fig. 69), male pedipalpus different. 5

5(4) Tracheal fold very wide (figs. 51, 69). 6

- Tracheal fold narrow, similar to fig. 31. 7

6(5) Male pedipalpus (figs. 53-55): Cymbium with strong bristles, "scinny conductor" small. Extant. . . . . *Spinihahnia*

- Male pedipalpus (figs. 70-73): Cymbial bristles absent, "scinny conductor" very large. Fossil in **Baltic amber**. Photos 299-300 . . . . . *Protohahnia*

7(6) Tibia I with several ventral bristles, cheliceral stridulating files absent. . . . . *Asiohahnia*

- Tibia I with 0-2 ventral bristles, cheliceral stridulating files present (similar to fig. 48) or chelicerae laterally corniculate. . . . . *Hahnia* s.l.

The extant holarctic taxa:

Asiohahnia OVTCHINNIKOV 1992

Diagnosis: Cheliceral stridulatory files absent, several strong ventral tibial I-II bristles

present, anterior median eyes smaller than posterior median eyes, pedipalpal tibial apophysis short (fig. 40), origin of the embolus basally (near to the tibia).

Type species: *Asiohahnia alatavica* OVTCHINNIKOV 1992.

Relationships: In *Eohahnia* and *Protohahnia* probably cheliceral stridulatory files are absent, too, but in these genera the tracheal fold and the male pedipalpus are different, see the key. In *Hahnia* cheliceral stridulatory files or scales are present and the origin of the embolus is retrolaterally.

Distribution: Asia.

Hahnia C. L. KOCH 1841 s. l.

Questionable synonyms (species-groups?) are e.g. *Iberina* LEHTINEN 1967 (see below), *Muizenbergia* HEWITT 1915 and *Scotussa* SIMON 1898, see BOSMANS (1992). According to the strong "variability" of genital and other structures - see below - the genus *Hahnia* s. l. probably has to split up, a revision is needed.

Diagnosis: Few leg bristles only (usually 1-2 ventral bristles on tibia I-II), position of the narrow tracheal fold usually twice as far from the epigastric furrow as from the spinnerets, male pedipalpal tibial apophysis usually very long and strongly curved (fig. 34), the tibial apophysis in connection with the cymbial furrow may have the function of a conductor as probably in some members of related genera, too, see WEISS & SARBU (1996), and compare Dictyninae below, e.g. *Brommella*. - Further characters and variability: Cheliceral scales or files: See JOCQUE & BOSMANS (1982: Figs. 6-9), anterior median eyes slightly to distinctly smaller than the anterior lateral eyes, posterior cheliceral margin with 3-6 teeth, prosoma usually long (e.g. in *nava*, fig. 35), the vulva has one or two pairs of receptacula seminis. A "scinny conductor" is present as in related genera except *Iberina*; this structure was called "cymbial conductor" by OPELL & BEATTY (1976: 420).

Type species: *Hahnia pusilla* C. L. KOCH 1841. (*Hahnia mammifera* WUNDERLICH 1995 - see below - is a nomen humoristicum).

Relationships: *Asiohahnia, Hahniharmia, Iberina* and *Spinihahnia* are most related, see the key.

Distribution: Cosmopolitical.

Remarks on the unusual extant species ***Hahnia mammifera*** WUNDERLICH 1995:

This tiny and eyeless spider species has been described from a cave of the southern Germany; the male is still unknown. The female feeds its spiderlings using their modified lateral spinnerets (fig. 47a) (!). The bio-patent of this unique spider species is hold by the author and can now be purchased; please contact the author for the conditions via his e-mail: joergwunderlich@t-online.de.

A patent on a species? The plant species *Banisteriopsis caapi* growing in the Amazon basin is holy to about 400 Indian tribes, and its extract is made use by them e.g. because of its psychoactive effects. Loren Miller, the owner of the US firm International Plant Medicine Corporation described a subspecies said to be hithero unknown which he had got from the garden of an Ecuadorian native; see "Kaperbrief" no. 1 (2002: 2). In July 1986 he obtained with the patent all the rights concerning this plant including the potential use for developing new medicine in the therapeutic fields of cancer, Parkinson and psychotherapy. Now there is the fear that the South American native will have to pay patent fees when using their indigenous plant to a US firm - and this is not the only example.
In the western industrial states the opinion seems to prevail that species and newly discovered genes are patentable. Species and genes, however, exist without the human brains controlling them; they are not inventions, but only discoveries of already existing structures and systems. As a consequence they can never be patentable! This also refers to the above mentioned species of spiders, of course.
Pretending to research biodiversity big business corporations press forward into unknown regions of mainly the "Third World"; the "Biodiversity Convention" secures their access to the resources. Doe to suitable financial supplies and highly developed technology private companies from the north can exploit the genetic wealth and occupy market positions.
An important instrument for the profit making of the business are the so-called "rights to intellectual property" (TRIPS) within the framework of the World Trade Organization (WTO).
According to countless critics patenting is nothing but an inadmissable privatizing of ressources which belong to all people without any restrictions. Therefore they should be used collectively. This patenting can also be described as "bio-piracy", it humiliates the indigenous people, and therefore is as inacceptable - even ridiculous! - as the papal gift-bull by Pope Alexander VI., who - as God's deputy - gave all the lands west and south of the Azores to queen Isabella of Castile and king Ferdinand of Aragon about 500 years ago; see SHIVA (1997, 2002). At that time it was the pope who ruled over the "world", today it is the huge capital owners and mega combines. The power of the popes has ended; the devasting effects of the power of high finance and mega combines which despise mankind - also concerning biopiracy - as long as they are tolerated silently by the citizens - those concerning directly and those who are responsible.

Anmerkungen zur ungewöhnlichen rezenten Art **Hahnia mammifera** WUNDERLICH 1995:

Diese winzige augenlose Spinnenart wurde von einer Höhle in Süddeutschland beschrieben; das Männchen ist noch unbekannt. Das Weibchen füttert seine Jungen mit der Hilfe der modifizierten seitlichen Spinnwarzen (fig. 47a) (!). Das Bio-Patent dieser einzigartigen Spinnenart wird vom Autor gehalten und steht jetzt zum Verkauf; Anfragen bitte an den Autor, e-mail: joergwunderlich@t-online.de.

Ein Patent auf eine Spinnenart? Die im Amazonasbecken wachsende Pflanzenart *Banisteriopsis caapi* ist rund 400 Indianervölkern heilig, und ihr Extrakt wird von ihnen u. a. wegen seiner psychoaktiven Eigenschaften genutzt. Loren Miller, der Inhaber der US-Firma International Plant Medicine Corporation, beschrieb eine angeblich bis dahin unbekannte Unterart nach Exemplaren, die er aus dem Garten einer ecuadorianischen Ureinwohnerin bezogen hatte; siehe KAPERBRIEF Nr. 1 (2002: 2); www.biopiraterie.de. Im Juli 1986 erhielt er mit dem Patent alle Rechte über diese Pflanze incl. der potentiellen Nutzung zur Arzneimittelentwicklung in den Therapiebereichen Krebs, Parkinson und Psychotherapie. Nun steht zu befürchten, daß die südamerikanischen Ureinwohner bei weiterer Nutzung ihrer heimischen Pflanze - und diese ist kein Einzelbeispiel! - Patentgebühren an eine US-Firma zahlen müssen...
In den westlichen Industriestaaten scheint sich die Meinung durchzusetzen, daß Arten von Lebewesen und neu entdeckte Gene patentierbar seien. Lebewesen und Gene existieren und funktionieren allerdings völlig unabhängig vom menschlichen Geist; sie sind keine Erfindungen, sondern lediglich Entdeckungen bereits existierender Strukturen oder Systeme. Somit können sie niemals patentierbar sein! Dies bezieht sich selbstverständlich auch auf die oben aufgeführte Spinnenart.
Unter dem Vorwand der Erforschung der Biodiversität dringen zur Zeit Konzerne in unberührte Gebiete vorwiegend der "Dritten Welt" vor - die "Biodiversitäts-Konvention" sichert den Unternehmen Zugang zu den Ressourcen zu. Aufgrund entsprechender Kapitalausstattung und hochentwickelter Technik können private Unternehmen des Nordens weltweit Gen-Schätze ausbeuten und Marktpositionen besetzen. Ein wichtiges Instrument zur Gewinnerzielung der Konzerne sind dabei sogenannte "geistige Eigentumsrechte" (TRIPS) im Rahmen der Welthandelsorganisation (WTO). Nach Ansicht zahlreicher Kritiker ist diese "Patentierung" nichts anderes als eine unzulässige Privatisierung von Ressourcen, die uneingeschränkt allen Menschen gehören; sie sollen daher einer kollektiven Nutzung unterliegen. Diese "Patentierung" kann als "Biopiraterie" bezeichnet werden; sie demütigt die endogenen Völker und ist ebensowenig akzeptabel - ja lächerlich! - wie die "Schenkungsbulle" des Papstes Alexanders des Sechsten, der - als Stellvertreter Gottes! - vor einem halben Jahrtausend alle Ländereien 100 Seemeilen westlich und südlich der Azoren der Königin Isabella von Kastilien und dem König Ferdinand von Aragon zugesprochen hatte;

siehe SHIVA (1997, 2002). Damals beherrschte der Papst "die Welt", heute sind es die großen Kapitaleigner und Mega-Konzerne. Die Macht der Päpste ist gebrochen; die verheerenden, menschenverachtenden Auswirkungen der Macht von Großkapital und Mega-Konzernen wird - auch hinsichtlich von Biopiraterie - solange weiter wachsen, wie es von den Bürgern - direkt Betroffenen und Verantwortlichen - stillschweigend geduldet wird.

Hahniharmia n. gen.

Derivatio nominis: The genus is dedicated to Dr. M. HARM who revised the central European Hahniinae.

Diagnosis: Leg bristles completely absent (fig. 42), posterior cheliceral margin with one tooth only, clypeus short and not protruding, receptacula seminis absent (thickened ducts are present, fig. 45); pedipalpus (fig. 46-47): Retromarginal cymbial furrow and "scinny conductor" present as in related genera except *Iberina*, bulbus ovally.

Type species: *Hahnia picta* KULCZYNSKI 1897 (figs. 41-47), the only known species.

Ecology: I know specimens to live under the bark of trees; according to SIMON (1937: 1026) they may live in moss, too.

Relationships: The only genus of the Hahniinae in which leg bristles and receptacula seminis are absent; the sister group is unknown, it may be a species-group of *Hahnia* s. l.

Distribution: Central and South Europe.

Iberina SIMON 1881 s. l.

Diagnosis: "Scinny conductor" absent (figs. 37-38; compare fig. 47), bulbus (a)

ovally or (b) - in the *montana*-group sensu HARM (1966) - the clypeus is long and protruding (the anterior margin is observable from above), the tegulum is circular and the embolus very long (figs. 37-38), primary and secondary receptacula seminis are close together, see HARM (1966: Fig. 2). Probably only the *montana*-group is a member of *Iberina*, a revision is needed.

Variability: Position of the narrow tracheal fold usually twice as far from the epigastral furrow as from the spinnerets but in *flaviceps* EMERTON midway between epigastral furrow and spinnerets, similar to fig. 31. Order of legs usually IV/I/II/III but I/IV/II/III in *sanguanensis* EXLINE. Shape of the tegulum: See above.

Type species: *Iberina mazarredoi* SIMON 1881.

Further species: See LEHTINEN (1967: 240); further species (a) in Europe: *Caeca* GEORGESCU & SARBU 1992 (♂ see WEISS & SARBU (1996) and probably *microphthalma* (SNAZELL & DUFFEY 1980) (sub *Hahnia*, ♂ unknown); (b) in North America: *Flaviceps* EMERTON, *glacialis* SOERENSEN, *nobilis* OPELL & BEATTY, *okefinokensis* CHAMBERLIN, *sanjuanensis* EXLINE and *veracruzana* GERTSCH & DAVIES, see OPELL & BEATTY (1976).

Relationships: In the related genera a "scinny conductor" is present; see the key.

Probable occurence of parthenogenesis: From the extant European species *Iberina microphthalma* (SNAZELL & DUFFEY) 12 females are known to me (mostly captured in traps) but not a single male. In traps predominantly males are captured and therefore I do not want to exclude that this microcavernicolic (myrmecophilic?) spiders breed parthenogenetical as it is known from the extant Dysderidae *Dysdera hungarica* KULCZYNSKI 1897, too - see FOELIX (1996: 187), GRUBER (1990). Parthenogenesis probably occurs also in the extinct genus *Eoarchaea* FORSTER & PLATNICK 1984 of the Archaeidae; see the paper on the superfamily Eresoidea in this volume.

Distribution: Holarctic.

***Spinihahnia* n. gen.**

Diagnosis: Position of the tracheal spiracle as in *Hahnia* but width of the fold half as wide as the width of the prosoma (fig. 51), legs with numerous strong bristles (figs. 49-50), 2-5 ventral tibial I bristles present, metatarsus IV 1.4 times longer than tarsus IV; ♂-pedipalpus (figs. 52-55): Tibia longer than patella, cymbium with long bristles, retrolateral furrow very short, tibial apophysis strongly bent, bulbus small.

Type species: *Hahnia petrobia* SIMON 1875 (figs. 48-57); the only known species of the genus.

Relationships: In *Hahnia* there are only few leg bristles present, 0-2 ventrally on tibia I, a long retrolateral cymbial furrow exists, cymbial bristles are absent, the bulbus is large and less convex.

Spinihahnia petrobia (SIMON 1875) (figs. 48-56)

1994 *Hahnia petrobia*,-- MALTEN, Arachnol. Mitt., 8: 59,

Diagnosis (see also above): Strongly pigmented spiders, femora I-II darkened, tarsus IV with a retrodistal bistle (fig. 50), epigyne fig. 56, vulva fig. 57.

Body length 1.9-2.9mm, prosomal length 1.05-1.4mm, prosoma about 1.5 times longer than wide, anterior median eyes smallest, clypeus fairly long, vertical, chelieral stridulatory files fig. 48, the posterior cheliceral margin bears usually 4-5 teeth, femoral pedipalpal stridulatory spur fig. 52.

Ecology: The spiders are xerophilic, see BARRIENTOS (1985: 97), MALTEN (1994: 59).

Distribution: SW- and Central Europe; first German record (no locality!): See SIMON (1937: 1045).

Descriptions of the taxa in Baltic amber:

"Tegenaria" obscura KOCH & BERENDT 1854

Material: Holotypus ♀ in Baltic amber, PMHUB, MB.A.152.

The ventral part of the body is covered by a white emulsion, the body is 2.3mm long,

the prosoma is 0.9mm long, the anterior eyes are distinctly smaller than the large posterior median eyes, the posterior eye row is distinctly procurved.

The **relationships** are unsure because of the unknown tracheal fold and the unknown male. According to the position of the spinnerets in a transverse row the female is a member of the family Hahniinae.

Distribution: Tertiary Baltic amber forest.

***Cymbiohahnia* n. gen.**

Diagnosis (♂; ♀ unknown): Cheliceral stridulating files probably absent, anterior median eyes smaller than laterals, tracheal fold weakly sclerotized and fairly wide (fig. 58). Pedipalpus (figs. 59-63): Cymbium strongly elongated probasally and distally, the prolateral cymbial distal margin guides the embolus in its resting position (fig. 61, comp. fig. 62), origin of the embolus retrolaterally, conductor fairly small.

Type species: *Cymbiohahnia parens* n. sp. (the only known species of the genus).

Relationships: The sister group is unknown; in the other genera of the Hahniinae the cymbium is not elongated basally and distally in this way.

Distribution: Tertiary Baltic amber forest incl. the Bitterfeld deposit.

***Cymbiohahnia parens* n. gen. n. sp.** (fig. 58-63) Photo 296

Material: 15♂ in Baltic amber: Holotypus F739/BB/AR/DIC/CJW, Paratypes: F740-742, F744 from the Bitterfeld deposit, 8♂ F743, 1♂ Mus. Ziemi in Warszawa no. 13619, 1♂ coll. HOFFEINS in Hamburg no. 1267, 1♂ coll. KERNEGGER.

Preservation and syninclusions: The holotype is fairly well preserved, the distal part of the opisthosoma and the left patella IV are cut off, mainly dorsal parts of the body are covered by a white emulsion, bubbles are preserved beneath the sternum and both pedipalpi; no stellate hairs. - Paratype F740 is completely preserved in an amber piece which was heated, ventral parts are covered by a white emulsion, two larger bubbles are present beneath the body, a bubble and 2 excrement balets are preserved near the spider.- Paratype F741 is fairly well and completely preserved with a ventral white emulsion. The 2.9cm long clear yellow piece of amber was pro-

bably heated. A large bubble is present on the left opisthosomal surface; no stellate hairs. - F742 is completely preserved in an amber piece which was heated. - Paratype F744 is incompletely preserved in an amber piece which was heated, arterior leg articles and parts of both pedipalpi are cut off; no stellate hairs. - F896 is completely preserved in an amber piece which was heated. - The paratype coll. KERNEGGER is completely preserved in an amber piece which was heated; it is now embeded in artificial resin. - The paratype of the Museum Ziemi is well and completely preserved, the ventral side is covered by a white emulsion, the ventral side of the opisthosoma is covered by a bubble, an excrement bubble is preserved above the anal tubercle (photo); few stellate hairs. - Paratype coll. HOFFEINS: The spider is well and completely preserved, bubbles are present beneath the opisthosoma and the right bulbus.

Diagnosis (♂;♀ unknown): Pedipalpus (figs. 59-63) with elongated cymbium, see above, embolus with a narrow seam in the basal half.

Description (♂):
Measurements (in mm): Body length 1.8-2.3, prosoma: Length 0.85-0.95, width 0.8-1.0, tibia I (holotype) 0.75, tibia IV (♂ Museum Ziemi) 0.8.

Colour: Prosoma and legs medium to dark brown, opisthosoma light brown, legs not annulated.
Prosoma about as long as wide (see above), with few hairs and a long thoracal fissure,eye field wide, anterior median eyes smaller than the laterals, posterior row slightly procurved, posterior median eyes separated by their diameter, clypeus longer than the diameter of an anterior lateral eye, basal cheliceral article fairly long, fangs long and slender, teeth of the furrows unknown, lateral files absent, labium and gnathocoxae wide. - Legs of medium length, order IV/I/II/III, the femora bear long ventral hairs, bristles as in *Protohahnia*, few bristles on I-II, numerous bristles on III-IV. Tarsi long, with 2 trichobothria (observable on few tarsi only). - Opisthosoma covered with short hairs, tracheal fold wide (fig. 58), weakly sclerotized and distinctly nearer to the spinnerets than to the epigastral furrow, spinnerets long, similar to *Hahnia*, the apical article of the lateral spinnerets half as long as the basal article. - Pedipalpus: See above; the tibia and the large patella bear a dorsal bristle, the patellar apophysis is strong, the tibial apophysis is very long, slender and curved. In F742 both pedipalpi are expanded.

Relationships: See above.

Distribution: Tertiary Baltic amber forest incl. the Bitterfeld deposit.

Eohahnia PETRUNKEVITCH 1958

Diagnosis: Area of the tracheal spiracle (fig. 66) distinctly sclerotized, posterior mar-

gin of the tracheal fold strongly procurved, posterior eye row procurved in contrast to fig. 65 (see the diagnosis of the species), anterior and posterior median eyes about equal in size (the anterior eyes may probably be larger), few and thin leg bristles (metatarsi I-II bear usually a ventral-distal bristle), position of the posterior spinnerets nearly behind the anterior lateral spinnerets (fig. 66); ♂-pedipalpus (figs. 57-58): Patellar apophysis pointed, retrolateral tibial apophysis short and blunt, conductor present, embolus fairly long, its origin unknown (a well preserved pedipalpus in a ventral, position is needed). Epigyne (fig. 66) with two small pits; one pair of receptacula seminis in an anterior position. Small spiders, body length usually 1.0-1.3mm.

Type species: *Eohahnia succini* PETRUNKEVITCH 1958, the only known species of the genus).

Relationships: See *Asiohahnia, Protohahnia* and the key. The position of the posterior spinnerets may be more plesiomorphic than in other Hahniinae.

Distribution: Tertiary Baltic amber forest incl. the Bitterfeld deposit.

Eohahnia succini PETRUNKEVITCH 1958 (figs. 64-68) Photos 297-298

Material in Baltic amber: Numerous ♂♀ and juv. in private, museum's and dealer's collections as well in the CJW, e.g. 1♀ F 729, 1♂ F730, 1♂ 1♀ from the Bitterfeld deposit F731, 8 specimens in the same piece of amber F732, 1♂ Zool. Mus. Kopenhagen, coll. ANDERSON 28/3-1968.

Remarks: (a) This is the most frequent species of the Hahniinae in Baltic amber. The small holotype is probably conspecific with some or all of the material which was studied by me. (b) It is remarkable that *E. succini* and *Balticoroma serafinorum* n. gen. n. sp. (Anapidae) are preserved with more than two speciemens each in the same pieces of amber. Both species may have been kleptoparasites, see above.

Diagnosis: See the diagnosis of the genus. According to PETRUNKEVITCH (1958: 359) the posterior eye row is recurved in the holotype and the anterior eyes are "contiguus and much larger than those of the second row" (fig. 65). In the material which was studied by me I found no such spiders; therefore I suppose (a) that the anterior eyes of the holotype are covered by bubbles which was not recognized by PETRUNKEVITCH and (b) that the drawing 591 of PETRUNKEVITCH (1985) (fig. 65 in this paper) was based in an oblique dorsal-posterior position.

Description:
Measurements (in mm): Body length 1.0-1.3, prosomal length about 0.55.
Posterior eye row procurved (in contrast to fig. 65, see above), anterior median eyes

separated by about 3/4 of their diameter, posterior median eyes separated by more than one diameter. Few thin leg bristles which are indistinct on I-II, the tibiae bear 2 dorsally, metatarsus IV bears at least one bristle in a ventral-rertolateral position and may bear 4 apical bristles; weak patellar bristles. Two tarsal trichobothria, Metatarsus IV about 1.35 times longer than tarsus IV. Femur I may be darkened (F730/CJW).

Relationships: See above (*succini* is the only known member of *Eohahnia*).

Distribution: Tertiary Baltic amber forest incl. the Bitterfeld deposit.

***Protohahnia* n. gen.**

Diagnosis (♂; ♀ unknown): Anterior median eyes smaller than the anterior lateral eyes (photo), ventral tibial I-II bristles absent, tracheal fold very wide and slightly recurved (fig. 69), pedipalpal patellar apophysis directed backward (fig. 73), scinny conductor very large (fig. 7). The prolateral cymbial margin probably holds the embolus in its resting position (fig. 70).

Type species: *Protohahnia antiqua* n. sp.

Relationships: The specimens of *Eohahnia* are smaller, the tracheal fold is different, the pedipalpal patellar apophysis is directed foreward. In *Asiohahnia* the tracheal fold is more narrow, ventral tibial I-II bristles are present, the origin of the embolus is basally.

Distribution: Tertiary Baltic amber forest.

***Protohahnia antiqua* n. gen. n. sp.** (fig. 69-71) Photo 299

Material: Holotypus ♂ in Baltic amber and a separated piece of amber, F734/BB/AR/DIC/CJW.

Preservation and syninclusions: The spider is well an nearly completely preserved, only the left leg IV is cut off behind the tibia; ventrally a weakly emulsion is present. - Few thin threads are preserved beneath the legs. In the separated piece of amber a tiny excrement ball and a tiny splinter of amber are preserved.

Diagnosis (♂; ♀ unknown): Pedipalpal tibial and patellar apophyses undivided (fig.

71).

Description (♂):
Measurements (in mm): Body length 2.1, prosoma: Length 1.05, width 0.8, leg I: Femur 0.8, patella 0.35, tibia 0.65, metatarsus 0.6, tarsus 0.4, tibia II 0.6, tibia III 0.5, tibia IV 0.65.
Colour medium brown, legs not annulated.
Prosoma (photo) 1.3 times longer than wide, caput with few hairs and a distinct thoracal fissure, eyes fairly large, anterior median eyes slightly smaller than the posterior median eyes, posterior row slightly procurved, posterior median eyes separated by 1.2 diameters, clypeus as long as 2 diameters of the anterior median eyes, chelicerae fairly long, teeth of their margins hidden, lateral stridulatory files absent, gnathocoxae slightly converging, the sternum separates the coxae IV by less of their diameter. - Legs (photo) fairly stout, order IV/I/II/III, hairs not distinct, bristles fairly long, few on I-II, numerous on III-IV, femora with a bristle in the middle and apicals, I with an additional prodistal bristle, patellae 2 dorsally, tibiae 2 dorsally, I and II with an additional prodistal bristle, III-IV bears a mid-ventral bristle, metatarsi with apical bristles, 4 on III, IV additionally with a prolateral bristle in the middle. The tarsi bear 2 trichobothria. - The opisthosoma (fig. 69) bears short hairs. Tracheal fold probably not sclerotized, very wide, slightly recurved, its position nearer to the spinnerets than to the epigastral furrow. Spinnerets in a transverse row. - Pedipalpus (figs. 70-71): with a long patella which bears a dorsal bristle and a long, cuved retroventral apophysis, tibia with a dorsal bristle and a longer retrolateral apophysis, scinny conductor very large, embolus long and thin, describing one loop, originating retrolaterally.

Relationships: *P. tripartita* n. sp. is smaller, the pedipalpal patella is thicker, its apophysis is divided at the tip, the tibial apophysis is tripartite.

Distribution: Tertiary Baltic amber forest.

***Protohahnia tripartita* n. gen. n. sp.** (figs. 72-73) Photo 300

Material: 3♂ in Baltic amber, holotypus F733/BB/AR/DIC/CJW, paratypus and a separated piece of amber F735/BB/AR/DIC/CJW, 1 questionable ♂ F736/BB/AR/DIC/CJW.

Preservation and syninclusions: Holotypus: The spider is nearly completely preserved in an amber piece which was heated, most parts are covered by a white emulsion, the tip of the right tarsus I is cut off, the tips of most of the remaining tarsi are cut off within the amber on a layer; no stellate hairs. - The paratype is completely preserved in an amber piece which was heated, a white emulsion is present on the

ventral side of its body. - The questionable ♂ is well and completely preserved, a weak white emulsion is present on the ventral side of the body; numerous detritus and excrement particles are preserved in the separated piece of amber.

Diagnosis (♂; ♀ unknown): Pedipalpus (figs. 72-73): Patella thickened, its apophysis divided at the tip (observable in the holotype), tibial apophysis tripartite.

Description (♂):
Measurements (in mm): Body length 1.3 (questionable ♂) - 1.6 (holotype), prosomal length 0.6-0.7, leg I (holotype): Femur 0.63, patella 0.22, tibia 0.51, metatarsus 0.5, tarsus about 0.45.
Colour: Prosoma and legs medium to dark (the heated specimens) brown, opisthosoma light brown.
Prosoma and legs similar to *P. antiqua* n. sp. but smaller, anterior median eyes as large as the posterior median eyes. The number of leg bristles is variable. The tracheal fold is hidden in the three specimens. - Pedipalpus (figs. 72-73, see above): Cymbium and bulbus ovally, bulbus prominent as in *antiqua*, best observable in the questionable male.

Relationships: See *P. antiqua* n. sp.

Distribution: Tertiary Baltic amber forest.

(3) **DICTYNINAE** s. str. (German name: "Kräuselspinnen")

Remarks on the **synonymy** of...

(a) some fossil taxa in Baltic amber: Arthrodictynidae PETRUNKEVITCH 1942 is a questionable synonym of the Dictynidae, see WUNDERLICH (1986: 24). I regard *Auximus* - now a synonym of *Lathys* - sensu PETRUNKEVITCH 1950 and 1958 as a member of the Family Zoropsidae s. l. (?*Eomatachia*). Probably *Eolathys* PETRUNKEVITCH is not a member of the Dictyninae but of the Zoropsidae, too, see below.

(b) some extant and mainly holarctic taxa (see LEHTINEN (1967) and ROTH (1993: 89). I regard *Dictyna* SUNDEVALL 1833 in a wide sense (s.l.) (= *Archaeodictyna*, *Brigittea, Emblyna* and other nominal genera); these genera may be regarded as subgenera of *Dictyna* s. l. see WUNDERLICH (1992: 421). Diagnostic characters: See

the key. As in *Nigma* the single metatarsal trichobothrium (which is present at least on metatarsus IV) is not curved backwards (fig. 130a).

Altella SIMON 1884 = *Argenna* THORELL1869 (**n. syn.**): There is no difference in the male genital structures; unique is the not sclerotized blunt apical area of the male pedipalpal tibia in both nominal genera. LEHTINEN (1967: 356) regarded both nominal genera as different mainly because of their body colour, the number of leg bristles and the length of their calamistrum but see his remark (1967: 360). The body colour is surely not an important taxonomical character; in (*Altella*) *lucida* I found (the - according to LEHTINEN - unusual number of) up to 15 calamistral hairs, and the number of leg bristles is highly variable, I found occasionally an apical ring of bristles in *lucida* as in *Argenna subnigra*, ventral bristles of the male tibia I may be absent in *lucida* (peson. observ.) (the presence of those bristles may be a speciality of the closely related *A. biuncata* and *lucida*). In *A. lucida* I found only one tarsal trichobothrium, but several in *Argenna*. I regard the reduction of tarsal trichobothria in *lucida* (and *biuncata*) as a result of the dwarfishness of these taxa.
Hackmania LEHTINEN 1967 may also be a synonym of *Argenna* (**quest. syn.**), see the key no. 12, a revision is needed.

Fossils: The small to tiny and basicly cribellate Dictyninae s. str. are not quite rare in Baltic amber (at least 5 genera), especially *Eodictyna communis* n. gen. n. sp., and in Dominican amber, too: The extinct genera *Hispaniolyna* WUNDERLICH 1988, *Palaeodictyna* WUNDERLICH 1988, *Palaeolathys* WUNDERLICH 1988 and *Succinyna* WUNDERLICH 1988 are known from Dominican amber, see WUNDERLICH 1988.
Fossils members of the diverse and cosmopolitical genus *Dictyna* s. l. are not known from Baltic amber nor from Dominican amber; so this may be a relatively "young" genus.

Diagnosis of the Dictyninae s. str.: Basicly cribellate spiders (figs. 89, 112), the cribellum may be reduced and the calamistrum (fig. 88, 115) may even be absent in the male - see e.g. *Dubiodictyna* -, anterior spinnerets widely spaced (fig. 91), median apophysis and "scinny conductor" absent, conductor very large and usually elongated basally(near the tibia) (e.g. figs. 74, 77, 90-91, 105 but see figs. 98-99), male chelicerae frequently modified (elongated, diverging, excavated, bearing humps (figs. 76, 78, 86-87, 109), tendency to the reduction of the eyes (especially the anterior median eyes) and to the presence of a cheliceral or opisthosomal stridulatory organ (no cheliceral files!), e.g. in *Brommella* (fig. 97), *Chelicirrum* (fig. 86) and *Lathys* (part., *dentichelis*). (No feathery hairs). Epigyne not sclerotized.

The **subdivision** into tribus is unclear; in my opinion Tricholathysini is not a monophyletic taxon, and the limit of the Dictynini (e.g. *Dictyna* s. l. and *Nigma*) is not sure, revisions - especially of the tropical taxa - are needed.

The **relationships** are unsure; probably the cribellate Copaldictyninae is most related, see below. In the Hahniinae the female genital area is unsclerotized, too.

Distribution: Cosmopolitical; fossil in Baltic and Dominican amber.

Key to the extant holarctic and fossil genera of the Dictyninae in Baltic amber (♂):

Not included are the dubious Baltic amber genus *Eolathys* PETRUNKEVITCH 1950 and the Nearctic genus *Argennina* GERTSCH & MULAIK 1936 (♂ unknown). The ecribellate extant European genus *Mizaga* SIMON 1898: See the new subfamily Mizagallinae below. See also Dictynidae sp. indet. below.

1 Femur, patella and tibia of the pedipalpus strongly thickened, the femur larger than the small cymbium + bulbus (fig. 79). - Extant, North America. . . . . *Thallumetus*

- Pedipalpal femur smaller than cymbium + bulbus; femur rarely strongly thickened (the femur may be thickened e.g. in some species of *Tricholathys*). 2

2(1) Pedipalpal tibial apophysis with a very long and seythe-shaped retrolateral branch which is nearly as long as the cymbium (figs. 82, 95, 99). - Extant and fossil in Baltic amber. 3

- Tibial apophyses different, no such long and seythe-shaped retrolateral branch. - Extant, and fossil in Baltic amber. 5

3(2) Opisthosoma with a sclerotized stridulatory area in an anterior-ventral position (fig. 97) (comp. Hahniinae: Antisteini). - Extant, holarctic (= *Pagomys*). . . . *Brommella*

- Opisthosomal stridulatory area most probably absent (a dorsal scutum is present in *Eobrommella*). - Fossil in Baltic amber. 4

4(3) Dorsal opisthosomal scutum present (fig. 93), paired tarsal claws of normal length. - Fossil in **Baltic amber**. Photo 283 . . . . . *Eobrommella*

- Opisthosomal scutum absent, paired tarsal claws unusually long (fig. 80). - Fossil in **Baltic amber**. Photo 282 . . . . . *Brommellina*

5(2) Chelicerae usually with a row of long and curved frontal hairs, laterally with short stridulatory bristles (fig. 85-87); a T-shaped paracymbium is present (fig. 91). - **Baltic amber** . Photos 280-281 . . . . . *Chelicirrum*

- No such cheliceral hairs or bristles, no large paracymbium. 6

6(5) Tarsal pseudoscopula (thin but not spatulate hairs) present (fig. 110). Caput very long, eyes small (fig. 108), chelicerae long, diverging and strongly toothed (fig. 109). - **Baltic amber**. . . . . *Scopulyna*

- Tarsal pseudoscopula absent. Caput variable, eyes usually larger, small in *Eodictyna* (no. 14), the anterior median eyes may be small, e.g. in *Lathys*, see no. 7. - Extant

or fossil in Baltic amber (*Eodictyna*, no. 14). 7

7(6) Anterior median eyes strongly reduced or absent. Basal part of the conductor frequently twisted and most often prolongated to a retrodorsal component which is situated on the tibia (but ventrally e.g. in *L. sexoculata*). Legs annulated. - Holarctic. . . . . *Lathys*

- Size of the anterior median eyes at least 2/3 of the anterior lateral eyes, tip of the conductor in a ventral position, legs annulated or unicoloured. 8

8(7) Embolus and conductor build an apical loop (fig. 74). - North America. . . . *Iviella*

- Embolus and conductor build not an apical loop. 9

9(8) Pedipalpal tibia with ctenidia (tiny sclerotized teeth, fig. 77) (absent in *D. ammophila*), chelicerae excavate in about the middle (fig. 76), prosoma with rows of longitudinal hairs and straight metatarsal trichobotria as in *Nigma* (no. 10). - Cosmopolitical. . . . . *Dictyna* s. l.

- Ctenidia absent, chelicerae not diverging or diverging distally (figs. 78, 109), no prosomal hairs in this position except in *Nigma*. 10

10(9) Chelicerae frontally in the basal half with a blunt outgrowth (fig. 78), pedipalpal patella distally with a small retrodorsal hook/outgrowth. Dorsal side of the opisthosoma usually greenish. - Holarctic. (= *Ergatis, Heterodictyna*). . . . . *Nigma*

-No such chel. outgrowth nor pedipalpal patellar hook. Opisthosoma not greenish..11

11(10) Tarsal trichobothria strongly reduced, short and indistinct. Anterior cheliceral margin with 2-3 teeth. - North America. . . . . *Mallos*

- Tarsi with at least one long trichobothrium (fig. 116). Cheliceral teeth variable. . . .12

12 (11) Pedipalpal tibia distinctly thickened, metatarsus and tibia I with numerous ventral teeth in 4 irregular rows. - Holarctic (?= *Argenna*). . . . . *Hackmania*

- Pedipalpal tibia not distinctly thickened, no such metatarsal and tibial teeth. 13

13(12) Embolus and conductor build a retrobasal loop (fig. 79a). - North America . . . . . *Tricholathys*

- No retrobasal loop of embolus and conductor. 14

14(13) Chelicerae very long (similar to fig. 116, photo). Pedipalpal tibia with a long furcate apophysis (fig. 104), bulbus fig. 105. - Fossil in **Baltic amber**. . . . . *Eodictyna*
Photos 284-291

- Chelicerae of normal length. Pedipalpal tibial apophysis different - Extant. 15

15(14) Legs with numerous long hairs, pedipalpal tibial apophysis absent, cymbium

elongated (fig. 79b), calamistrum completely absent. - Palaearctic. . . . . *Devade*

- Legs with normal hairs, pedipalpal tibial apophysis present, blunt and apically with a weakly sclerotized area (fig. 75), cymbium not elongated, calamistrum present. - Holarctic (= *Altella*). . . . . *Argenna*

Descriptions of the taxa in Baltic amber:

***Brommellina* n. gen.**

Diagnosis (♂; ♀ unknown): Tarsal claws (fig. 80) very long, paired claws 0.07mm long, chelicerae fairly short, cribellum unknown, calamistrum absent; pedipalpus (figs. 81-84): Tibia with a long retrodistal apophysis and a blunt retrobasal outgrowth, bulbus with a plate-shaped conductor and a long embolus which describes probably two circles.

Type species: *Brommellina longungulae* n. sp. (the only known species of the genus).

Relationships: See *Eobrommella* n. gen.

Distribution: Tertiary Baltic amber forest.

***Brommellina longungulae* n. gen. n. sp.** (figs. 80-84) Photo 282

Material: Holotypus ♂ in Baltic amber, F767/BB/AR/DIC/CJW.

Preservation and syninclusions: The spider is badly preserved and has been the prey of an unknown predator. The distal part of the left tibia II is cut off, the left leg I is broken off behind the coxa, its trochanter and basal part of the femur are preserved right in front of the spider, the right leg IV is broken off behind the coxa and is damaged at its basal articles, the opisthosoma is damaged and strongly deformed, probably sucket out by a spider; a white emulsion covers mainly the ventral part of the spider. - A large bubble and remains of stellate hairs are preserved near the spider,

the larva of a tiny (?parasitic) Acari is preserved behind the left metatarsus II.

Diagnosis (♂; ♀ unknown): See above.

Description (♂):
Measurements (in mm): Body length 2.3, prosomal length 1.2, tibia I 1.05, tibia IV 0.9.
Colour: Prosoma and legs medium brown, opisthosoma whittish.
Prosoma low and long, thoracal fissure long. 8 large eyes which are partly hidden by a white emulsion, posterior row procurved, posterior median eyes separated by nearly one diameter, clypeus short, chelicerae fairly stout, mouth parts hidden. - Legs stout, fairly hairy, I longest, covered with numerous long bristles, femora 2 dorsally and 3 distally, tibia IV bears at least 7 bristles, metatarsus IV bears at least 10 bristles. Tarsus I is fairly thickened. The tarsi bear at least one long trichobothrium and long claws (fig. 80, see above), the paired tarsal claws bear at least one large tooth but other teeth may be hidden, the unpaired claw is probably smooth. A calamistrum is absent. - Opisthosoma: Most parts are destroyed; cribellum unknown. - Pedipalpus (figs. 80-84; see above) with stout articles, tibia with 2 long dorsal trichobothria; the long retrodistal apophysis bears a longitudinal furrow, the cymbium bears some strong hairs besides normal hairs, the bulbus bears a large apophysis, only a part of the embolus is observable.

Relationships: See above.

Distribution: Tertiary Baltic amber forest.

***Chelicirrum* n. gen.**

Diagnosis (♂; ♀ unknown): Cribellum divided (fig. 89), calamistrum well developed and long (fig. 88), chelicerae (figs. 85-87) elongated, retrolateral cheliceral stridulatory bristles and long frontal curved hairs present, tibia and metatarsus IV with long and curved ?sensory hairs (fig. 88), labium 1.2 times longer than wide; male pedipalpus (figs. 90-92): Tibia with a large blunt retroventral outgrowth and with dorsal apophyses, cymbium with a T-shaped paracymbium, position of the embolus in a distal circle, conductor very large, its functional part is in a the distal position.

Type species: *Chelicirrum stridulans* n. sp. (the only known species of the genus).

Relationships: In the extant genus *Lathys* SIMON 1884 - which may be related - the legs are annulated, the pedipalpal structures are different, e.g. a paracymbium is absent, the basal part of the conductor is strongly elongated to a most often dorsal (!) position and usually twisted. In *Lathys dentichelis* (SIMON 1883) cheliceral stridulating teeth are present, too, but their position is more anterior-laterally. In my opinion

these teeth evolved convergently in both genera because of the numerous and important other differences in these taxa. - In *Balticodictyna* n. gen. cheliceral tubercles are present but lateral bristles and long anterior hairs are absent, and the male genital structures are quite different. - In *Iviella* LEHTINEN 1967 (extant, North America) a distally folded lamella of the conductor and a distal loop of the embolus are present, too (fig. 74) but a ventral pedipalpal tibial outgrowth, a paracymbium as well as cheliceral stridulatory bristles and long cheliceral and leg IV hairs are absent.

Distribution: Tertiary Baltic amber forest incl. the Bitterfeld deposit.

***Chelicirrum stridulans* n. gen. n. sp.** (fig. 85-92a) Photos 280-281

Material: 6♂ in Baltic amber, holotypus F788/BB/AR/DIC/CJW; paratypes: F789/BB/AR/DIC/CJW (and a separated amber piece), F790/BB/AR/DIC/CJW from the Bitterfeld deposit (and a separated amber piece), Museum Kopenhagen, coll. v. HENNINGSEN 16-1 (1961), Museum Kopenhagen (no number), coll. M. KUTSCHER in Sassnitz K/AR/2 from the Bitterfeld deposit, paratypus F1136/BB/AR/DIC/CJW.

Preservation and syninclusions: Holotype: The spider is only fairly well preserved, the dorsal margin of the left tibia I, parts of the left tibia II and the left metatarsus II as well as the left tarsi I and II are cut off, most ventral parts of the body are covered by a white emulsion, the opisthosoma is deformed, bubbles cover the opisthosoma ventrally. - Few stellate hairs and a tiny insect larva (?) above the spider are preserved in the same amber piece. - F789 is preserved in an amber piece which was heated, parts of body and legs are covered by a white emulsion. - One Diptera, several stellate hairs and numerous particles of detritus are preserved with the spider. - F790 is nearly completely preserved, apical parts of both tarsi I are cut off. - Beneath the spider one Diptera is preserved in another layer, a thread of silk is present right of the spider; no stellate hairs. - Paratype coll. v. HENNINGSEN: The spider is very well preserved in an amber piece which is darkened, parts of the left legs II and III as well as the right tarsus I and the right leg IV behind the patella are cut off, few remains of white emulsions are preserved at the ventral part of the body and a long thread of spider's silk. - The second paratype from the Mus. Kopenhagen is not well preserved, the amber piece was heated and possesses a central hole, the spider's opisthosoma is depressed ventrally, the right pedipalpus is broken off at the end of the femur and lost, parts of the spider are covered by a white emulsion or hidden by a layer. - One Acari, numerous pollen grains and some threads of silk are also present. - K/AR/2 is well preserved in a small piece of amber which was heated, some leg articles and the tips of both pedipalpi are cut off, most ventral parts are covered by a white emulsion; no further inclusions.

Diagnosis (♂; ♀ unknown; see the diagnosis of the genus): Male pedipalpus: Figs. 90-92.

Remark: In both males from the Bitterfeld deposit the long hairs of leg IV are absent as well long cheliceral hairs in the male from the coll. KUTSCHER; probably these hairs are rubbed off. The pedipalpal structures - so far as observable - show no differences to the other males.

Description (♂):
Measurements (in mm): Body length 2.3 (♂ from the coll. KUTSCHER) to 3.4 (coll.v. HENNINGSEN), prosoma: Length 1.05-1.9, width 0.9 - about 1.55, leg I: ♂ coll. KUTSCHER: Tibia I 1.15, tibia IV 0.8, ♂ coll. v. HENNINGSEN: Tibia I 1.95, tibia IV 1.55.
Colour: Prosoma and legs medium to dark brown, opisthosoma light brown, legs not annulated.
Prosoma (figs. 85-87): Profile distinctly convex, bearing some longer hairs, thoracal fissure distinct; 8 small eyes, anterior median eyes smallest, clypeus about as long as 1 1/2 diameters of the anterior median eyes, posterior row straight, posterior median eyes separated by more than one of their diameters. Chelicerae (figs. 85-87) long, frontally with long and curved hairs (absent - rubbed off? - in the ♂ of the coll. KUTSCHER), retrolaterally with a long row of small stridulatory teeth and low "furrows" (not files) (similar furrow frontally), labium 1.2 times wider than long, sternum narrow posteriorly. - Legs fairly long and slender, order I/IV/II/III. Tibia and metatarsus IV (fig. 88) bear long and curved hairs, prolaterally and dorsally on the tibia, prolaterally on the metatarsus; such hairs are absent - rubbed off? - in the males from the Bitterfeld deposit. Bristles are short and numerous on tibiae and metatarsi (the number is quite variable); femora: Only I bears a short prodistal bristle, patellae smooth, tibiae ventrally 1-3 and apicals, laterals mainly on III-IV, III and IV bear additionally a dorsal-basal bristle, metatarsi most often 3 ventrally and apicals, III-IV have laterals, too. At least one long tarsal IV trichobothrium (observable in the male F789), its length is nearly three times the diameter of the tarsus. Calamistrum (fig. 88) distinct and at least as long as 4/5 of the length of the article. The unpaired tarsal claws bear long teeth, the unpaired claw is long. - Opisthosoma (fig. 85) ovally, covered with short hairs. Anterior spinnerets stout, cribellum (fig. 89) indistinctly divided. - Pedipalpus (figs. 90-92; see above): Tibia with a large blunt retroventral apophysis and several distal dorsal apophyses, cymbium with an indistinct retrolateral outgrowth and a T-shaped sclerotized retrobasal paracymbium, the emblus build a distal circle and has a basal apophysis, the basal part of the conductor has two slender apophyses.

Relationships. See above.

Distribution: Tertiary Baltic amber forest incl. the Bitterfeld deposit.

***Eobrommella* n. gen.**

Diagnosis (♂; ♀ unknown): Opisthosoma with a dorsal scutum (fig. 93), chelicerae

stout, area of the cribellum hidden (!), calamistrum indistinct or absent; pedipalpus (figs. 94-96): Tibia with a longer basal-ventral and a very long scythe-shaped and divided retrodistal apophysis.

Type species: *Eobrommella scutata* n. sp. (the only known species of the genus).

The **relationships** are unknown; see the key. A sclerotized opisthosoma is quite rare in the Dictyninae s. str.; I know no other genus. The retrodistal pedipalpal tibial apophysis is similar in *Brommella* and *Brommellina* which have a soft opisthosoma.

Distribution: Tertiary Baltic amber forest.

***Eobrommella scutata* n. gen. n. sp.** (figs. 93-96) Photo 283

Material: Holotypus ♂ in Baltic amber, F787/BB/AR/DIC/CJW.

Preservation and syninclusions: The spider is well and completely preserved, most parts of the bulbi are hidden, the opisthosoma is ventrally partly covered by a white emulsion. - A large bubble is present beneath the sternum. A tiny insect (?larva) and several stellate hairs are preserved near the spider.

Diagnosis (♂; ♀ unknown): See above and the key.

Description (♂):
Measurements (in mm): Body length 1.5, prosoma: Length 0.75, width 0.63, leg I: Femur 0.57, patella 0.23, tibia 0.45, metatarsus 0.42, tarsus 0.3, tibia II 0.4, femur IV 0.56.
Colour: Prosoma and legs medium brown, opisthosoma light brown.
Prosoma fairly low, ovally, 1.2 times longer than wide, with a distinct thoracal fissure and few long hairs. 8 eyes of medium size, anterior medians smallest, posterior row slightly procurved, posterior median eyes separated by more than their diameter. Clypeus about as long as 1 1/2 diameters of the anterior median eyes. Chelicerae stout, not modified, condylus well developed, teeth unknown (hidden), fangs long, mouth parts and most parts of the sternum are hidden. - Legs fairly slender and of medium length, I and IV about the same length. Bristles few and short; femora: I-II bear 2 dorsally, patellae 1 dorsal-apical bristle, the tibiae bear a short retrodorsal-basal bristle and IV 1 ventrally-distally, at least metatarsus III-IV with 2 apical-ventral bristles. The calamistral area is hidden by an emulsion. Only one tarsal trichobothrium is observable. Paired tarsal claws short, their length about 0.02mm. - Opisthosoma (fig. 93) ovally, dorsally covered with hairs of medium length and most probably a scutum (or a hardened area). Anterior spinnerets stout, cribellum and tracheal fold hidden by a white emulsion. - Pedipalpus (figs. 94-96): Femur stout, patella short, tibia long and curved, with a basally originating long apophysis and a basal branch

which bears a tooth; most parts of the bulbus are hidden, the embolus is long and thin. The shape of the tibial apophyses lead to the opinion that these apophyses function in the same way as in *Brommella*, see fig. 100.

Relationships: See above.

Distribution: Tertiary Baltic amber forest.

***Eodictyna* n. gen.**

Diagnosis (♂; ♀ unknown; see below: Dictynidae sp. indet.): Chelicerae strongly elongated and slightly diverging distally (photos), leg IV shorter than II (!), calamistrum (fig. 103) well developed, legs with numerous bristles; pedipalpus (figs. 104-105): Tibia with a long and bipartite apophysis, cymbium wide, conductor long and with a distal lobe, pointed and curved beneath the tibia, embolus long, describing more than one circle.

Type species: *Eodictyna communis* n. sp. (the only known species of the genus).

Relationships: According to the structures of the bulbus the extant genus *Dictyna* SUNDEVALL 1833 s. l. is related; in *Dictyna* s. l. the tarsal trichobothria are shorter, the leg bristles are reduced, the male chelicerae are excavete in the middle (fig. 66), and tibial ctenidia (fig. 77) are present (except in *D. ammophila* MENGE 1871).

Distribution: Tertiary Baltic amber forest (the most frequent spiders of the subfamily Dictyninae in this kind of amber).

***Eodictyna communis* n. gen. n. sp.** (fig. 101-107) Photo 284-291

Material: 37♂ in Baltic amber: Holotypus F796/BB/AR/DIC/CJW, paratypes: F797/BB/AR/DIC/CJW, F798, F799, F800, F802, F804, F805 (with pollen grains), F806, F807 (with the part of a capture web and a hurt), 1♂ Mus. Krakau, 2♂ coll. F. KERNEGGER in Hamburg no. 105/95 and without no., 1♂ Mus. Ziemi no. 7175, 2♂ coll. ERNST in Skagen (Denmark), 2♂ coll. HOFFEINS in Hamburg no. 473 and without no., 1♂ Mus. Nat. Hist. New York.

Preservation and syninclusions: Holotype: The spider is completely preserved,

most parts are very well observable; the amber piece was heated, therefore only few remains of a white emulsion are present. Both pedipalpi are streched foreward and observable in the ventral view; no stellate hairs. - F799 is very well preserved, the small eyes are not covered by bubbles or emulsions. - No. 473 of the coll. HOFFEINS is preserved hanging under a drop of resin in the amber (photo). A long thread of spider's silk is running through the piece of amber and is partly in contact with the spider; it is not originating from the spinnerets of the spider and is partly spiral-shaped. - The male F807 was injured at the surface of a layer in the resin, a right area of the opisthosoma and most parts of the right legs III and IV were cut off, a large and a small bubble are observable (photo). Directly behind the spider and in the same layer of the fossil resin the part of a fossil cribellate capture web is preserved (fig. 107): There are several - in my opinion cribellate - threads including branchings. The threads appear beaded, see FOELIX (1996: 104c, 112). Numerous swellings - which may be puffs - are preserved; the diameter of the smaller swellings is about 0.003mm. To my knowledge this is the first document of a fossil cribellate capture web. According to the thread's structure of an *Eomatachia* sp. (sub *Amaurobius succini* PETRUNKEVITCH (1942: Fig. 404) these threads much more likely are attachment's threads.

Diagnosis (♂; ♀ unknown; see above): Pedipalpus (figs. 104-105): Tibia with a long, bipartite apophysis.

Description (♂):
Measurements (in mm): Body length 2.0 (paratype F802), 2.8 (holotypus) - 2.9 (F797, F799); Prosoma: Length about 1.3, width 0.9, tibiae: I 1.05, II 0.85, III 0.65, IV 0.7, leg I of F798: Tibia 1.0, metatarsus 1.05, tarsus 0.6. Length of the chelicerae in F800 1.0.
Colour: Prosoma and legs medium brown to red brown, legs not annulated, opisthosoma light brown to yellowish.
Prosoma (photos, figs. 101-102) with a distinct thoracal fissure and long hairs (if they are not rubbed off) in irregular rows. 8 small eyes in a wide field, posterior row straight, the posterior median eyes are separated by about 2 diameters. Chelicerae long and slender, distinctly variable, relatively longer and more slender in larger males, 2/3 of the prosomal length in the smallest males to 3/4 of the prosomal length in the largest males. These differences of the proportion I regard as the result of allometric growth which I found also e.g. in *Lathys dentichelis* (Dictyninae), and which is known in several further families of spiders, e.g. in Clubionidae, Corinnidae, Liocranidae and Tetragnathidae. To my knowledge this is the first record of allometric growth in fossil spiders. - Condylus distinct, cheliceral promargin with long plumose hairs and a large tooth (photo). Gnathocoxae (fig. 102) stout, labium about as long as wide. - Legs only fairly slender, covered with few to numerous hairs; in several specimens metatarsus I bears long and curved hairs. Order I/II/IV/III (II>IV). Numerous bristles (fig. 103) on femora, patellae, tibiae and metatarsi similar to *Scopulyna*, femora with apical bristles, I-III bear a dorsal bristle in the basal half. Metatarsus IV (fig. 103) straight, calamistrum well developed, occupying more than 3/4 of the article's length, hairs only slightly curved. At least one longer tarsal trichobothrium. - Opisthosoma ovally, with hairs of medium length, cribellum well developed, as in *Scopulyna*. - Pedipalpus (figs. 104-105): See above; the patella is thickened. In the tegulum of the holotype the sperm ducts are observable.

Relationships: See below: Dictynidae sp. indet.

Ecology: Pollen grains of a ?Fagaceae (fig. 106) are preserved with paratype F805 and indicate that this spider lived in a mixed forest. Parts of a capture web (fig. 106; see above) indicate that the spiders were not free hunters.

Distribution: Tertiary Baltic amber forest.

Eolathys PETRUNKEVITCH 1950

Material of the type species: Holotype, a ?juvenile ♀, Mus. Comp. Zool. Harvard Univ.

Diagnosis (?juv. ♀): Few and indistinct leg bristles, no ventral tibial bristles, all femora bear one middorsal bristle; short chelicerae, prosomal length about 1mm. - According to PETRUNKEVITCH (1950: 268) tarsal trichobothria are absent but I found at least one tarsal trichobothrium in *E. succini*.

Type species: *Eolathys succini* PETRUNKEVITCH 1950. A further probably congeneric species is *E. debilis* PETRUNKEVITCH 1950.

The **relationships** are unsure, the male is unknown. I do not want to exclude that *succini* is a member of the family Zoropsidae s. l., the genus *Eomatachia*.

Distribution: Tertiary Baltic amber forest.

***Scopulyna* n. gen.**

Diagnosis (♂; ♀ unknown): Tarsal pseudoscopula (consisting of non-spatulate hairs) (fig. 110) present, caput very long and with parallel sides (fig. 108), eyes small, chelicerae (fig. 109, photo) long, slender and diverging distally, pedipalpus (figs. 113-114): Tibia with two retrodistal apophyses, calamistrum (fig. 110) long, cribellum (fig. 112) undivided.

Type species: *Scopulyna cursor* n. sp.

Relationships: The presence of a tarsal pseudoscopula is quite unusual in the Dictyninae and Dictynidae s. l. In *Eodictyna* n. gen. the ♂-chelicerae are long, too but a psedoscopula is absent, caput and pedipalpus are quite different. In the extant genus *Lathys* SIMON 1884 - which may be related - the conductor is usually elongated retrobasally, a pseudoscopula is absent, there are several long tarsal trichobothria and the legs are annulated.

Distribution: Tertiary Baltic amber forest.

***Scopulyna cursor* n. gen. n. sp.** (figs. 108-114) Photos 292-294

Material: 2♂ in Baltic amber, holotypus Pal. Mus. Humboldt Univ. Berlin, MB.A.600; paratype and a separated piece of amber, F794/BB/AR/DIC/CJW.

Preservation and syninclusions: a) Holotype: The spider is very well preserved, there is no white emulsion, both legs I and the left leg IV are lost behind the coxa by autotomy, a larger bubble is preserved beneath the opisthosoma. - The paratype is completely but only fairly well preserved, parts of body and legs are covered by a white emulsion or layers in the fossil resin. - Few threads - most probably ecribellate - are preserved on the spider's body and legs, a stellate hair and 3 gas bubbles are present in the same piece of amber.

Diagnosis (♂; ♀ unknown): See above.

Description (♂):
Measurements (in mm): Body length 2.25-2.35, prosoma: Length 1.3, width 0.95, leg I (paratype): Femur 1.15, patella 0.45, tibia 1.1, metatarsus 0.95, tarsus 0.5; holotype: Tibia II 0.85, tibia III 0.6, tibia IV 0.75.
Colour: Prosoma and legs medium brown, opisthosoma yellow brown, legs not annulated.
Prosoma (photo, figs. 108-109) 1.37 times longer than wide, with a very long caput (its sides are parallel), slightly raised, dorsally covered with several long hairs, fovea distinct. 8 small eyes in a wide field, anterior median eyes smallest, posterior median eyes separated by slightly more than their diameter, posterior row slightly recurved, chelicerae very long, slender and diverging distally, anterior margin with a large tooth, posterior row with 3 smaller teeth, fangs very long, gnathocoxae long and parallel, labium 1/5 wider than long, distally rebordered, sternum small elongated between the coxae IV. - Legs fairly slender, order I/II/IV/III, hairy in the paratype (most hairs apparently are rubbed off in the holotype), with numerous bristles, femora with a dorsal bristle in the basal half and with apicals, patellae 2 dorsally, tibiae with dorsal and lateral bristles; leg IV fig. 111. Tarsus I slightly thickened, length more than 2/3 of the metatarsus. Tarsal pseudoscopula (fig. 110) most distinct in the holotype on legs I-II, tarsal trichobothria short and indistinct (only one trichobothrium?), paired

tarsal claws with long teeth. - Opisthosoma ovally, in the holotype with few longer hairs, in the paratype with numerous long hairs. Cribellum undivided, anterior lateral spinnerets stout and widely spaced (fig. 112). - Pedipalpus (figs. 113-114): Femur slightly bent, patella wide, tibia nearly two times longer than wide, with 2 retrodistal apophyses, cymbium elongated, the basal prolongation and parts of the embolus are hidden.

Relationships: See above.

Distribution: Tertiary Baltic amber forest.

Dictynidae gen. et sp. indet. 1 (fig. 115) Photo 557

Material: 1 ?ad. ♀ in Baltic amber, F810/BB/AR/DIC/CJW.

Preservation and syninclusions: The spider is well and completely preserved, parts of the anterior median eyes and of the mouth parts are covered by a white emulsion. - Two apparently ecribellate threads are running through the amber piece below the tip of the opisthosoma (fig. 115), one is hold ventrally by the tarsal claws of both legs IV and bears two droplets, the second thread is 7.3mm long, runs along the ventral side of the left tarsus IV and has a divided branch. In contrast to the web part of *Eodictyna communis* n. sp. (fig. 107) puffs are not observable, and therefore these threads should be a portion of the ecribellate part of the capture web of this spider.

Diagnosis (?ad. ♀): Metatarsus IV (fig. 115) laterally depressed, with the calamistrum on a convex margin.

Description:
Measurements (in mm): Body length 2.6, prosomal length 1.1, tibia I 0.57, tibia IV 0.5, diameterof a posterior median eye about 0.045. prosoma wide and fairly low, with long dorsal hairs and small eyes, posterior median eyes separated by about 2 1/2 of their diameter. Chelicerae stout, mouth parts hidden. - Pedipalpus not thickened, bristleless. - Legs stout and hairy, order I/II/IV/III, III relatively long. Few bristles, femur I-II bear a distinct mid-dorsal bristle, 2 dorsally on patellae and tibiae (thin), a strong distal to apical bristle is present on all metatarsi, the left metatarsus IV bears a pair, tarsi with one trichobothrium (fig. 115). - Opisthosoma ovally, scarcely covered with short hairs, genital area with a pair of indistinct depressions.

Relationships: In *Eodictyna* the femora I-II bear a dorsal bristle in the basal half, and there are some apical bristles on all femora. In *Eolathy* - according to PETRUNKEVITCH (1950: 270-271) - all femora bear a dorsal bristle ("spine").

Distribution: Tertiary Baltic amber forest.

?Dictyninae gen. et sp. indet. 2 (fig.115a)

Material: 1 juv. ♀, F177/BB/AR/?DIC/CJW.

Preservation and syninclusions: The basal articles of the left pedipalpus and the left legs I-II are missing, the left half of the prosoma behind the eye region and the left femur III are destroyed by decomposition; probably an Arthropod feeded on the spider. In the decomposited area some hyphae and numerous questionable Bacteria are preserved. - Numerous bubbles and detritus particles are preserved around the spider; no stellate hairs.

Diagnosis and relationships: Chelicerae unusually long (fig. 115a), 1.65 times longer than the hight of the prosoma, its position vertically. The relationships are unsure; a male is needed.

Description:
Measurements (in mm): Body length 4.5, prosomal length about 2.3, tibiae: I 2.2, II 2.2, III 1.9, IV 2.0. Eye field nearly as wide as the caput, posterior eye row procurved, clypeus fairly long, condylus absent. Leg bristles long, tibia I bears 3 ventral pairs, metatarsus I bears 2 ventral pairs besides short apicals. Tarsal trichobothria of medium length. The opisthosoma is 1.65 times longer than high.

Distribution: Tertiary Baltic amber forest.

(4) MIZAGALLINAE n. subfam.

Diagnosis: Anterior spinnerets (figs. 118, 124) separated by not more than one diameter, male chelicerae modified, distinctly tuberculate, elongated and diverging (figs. 116, 122), ♂-pedipalpus (figs. 119-120, 125-127, 129): Cymbium elongated, conductor absent, embolus with a seam in the basal half. ♀ (*Mizaga*; unknown in *Mizagalla*): Epigyne (fig. 130) sclerotized, with a pair of large pits.

Further characters: Ecribellate, colulus absent (*Mizaga*) or present (*Mizagalla*, fig. 124), the ♂-chelicerae may be projecting (fig. 116), gnathocoxae (fig. 122) widened distally, cymbial bristles may be present (absent in *Mizagalla quattuor*), body size 2.5-3.8mm. The extant *Mizaga racovitzai* (FAGE 1909) is a "marine" spider, see

ROTH (1967).

Type genus: *Mizagalla* n. gen. Further genus: *Mizaga* SIMON 1898 (= *Desidiopsis* FAGE 1909 and *Halocryphoeca* CAPORIACCO 1934) (extant). The relationships of the nearctic genus *Saltonia* CHAMBERLIN & IVIE 1942 is quite unsure; I did not have the opportunity to study material.

Relationships: In Hahniinae a cribellum is absent, too, but other characters are quite different, see the tab. above, e.g. a conductor is absent. - According to FAGE (1909) *Mizaga* is a member of the Cybaeinae (Agelenidae or a separate family), ROTH placed it with some hesitation within the Agelenidae: Cryphoecinae, LEHTINEN (1967) within the Dictynidae: Tricholathysinae. I follow LEHTINEN in the family placement but I regard *Mizaga* and *Mizagalla* as members of the new subfamily Mizagallinae because of different characters which are listed in the tab. above.

Distribution: Extant: W Palaearctic, W Africa; fossil: Tertiary Baltic amber forest.

***Mizagalla* n. gen.**

Diagnosis (♂; ♀ unknown): Clypeus short, ventral tibial I-II bristles present, colulus present (fig. 124), anterior spinnerets close or fairly close together (figs. 118, 124); see the diagnosis of the subfamily.

Type species: *Mizagalla quattuor* n. sp.

Relationships: In the extant genus *Mizaga* FAGE 1909 a colulus is absent.

Distribution: Tertiary Baltic amber forest.

***Mizagalla tuberculata* n. gen. n. sp.** (figs. 111-120) Photo 302

Material: Holotypus ♂ in Baltic amber, F791/BB/AR/DIC/CJW.

Preservation and syninclusions: The spider is well and completely preserved, parts of the opisthosoma are covered by a white emulsion; most probably the amber piece was heated. Both pedipalpi are expanded and are partly covered by a white emulsion. Few stellate hairs and several bubbles are preserved near the spider.

Diagnosis (♂; ♀ unknown): Pedipalpus (figs. 119-120): Tibia probably with 3 apophyses (the lateral view is hidden), cymbial bristles absent, embolus fairly long and bent.

Description (♂):
Measurements (in mm): Body length 2.3, prosomal length about 1.1, leg I: Patella 0.4, tibia 1.6, metatarsus 1.4, tarsus 0.6, tibia II 1.4, tibia III 0.85, tibia IV 1.1.
Colour: Prosoma and legs medium brown, opisthosoma yellow brown.
Prosoma (fig. 116): Profile strongly convex, bearing few hairs, thoracal fissure absent, eyes small, field wide, anterior medians smallest, posterior median eyes separated by more than one diameter, posterior row slightly procurved. Chelicerae large, bulging, tuberculate, distinctly diverging distally, with a large promarginal tooth and several small retrolateral teeth similar to fig. 122; condyli well developed, fangs long, labium longer than wide. - Legs long, order I/II/IV/III, slender, with short tarsi, indistinct hairs and numerous longer bristles (fig. 117): Femora with 1 dorsal bristle before the middle, 1 probasally-distally and few apicals, patellae 2 dorsally (some are broken off), hair-shaped on I-II, number variable on the tibiae, usually with dorsal, ventral and lateral bristles but no apicals, metatarsus I-II with 1-3 proventral bristles, III-IV about 6 bristles. Calamistrum absent, paired tarsal claws with long teeth, unpaired claws strongly bent, 2 long tarsal trichobothria. - Opisthosoma long ovally, two times longer than wide, covered with short hairs; spinnerets short, the anterior stout (fig. 118), only fairly spaced; the area in front of the anterior spinnerets is hidden. - Pedipalpus (figs. 119-120; both bulbi are expanded): Femur long and slender, slightly bent, patella with a dorsal-distal bristle, tibia with three apophyses, cymbium long and slender, without bristles, bulbus small and simple, embolus fairly long and bent, directed to the tip of the cymbium in the expanded bulbus, its basal half with a "seam".

Relationships: See *M. quattuor* n. sp.

Distribution: Tertiary Baltic amber forest.

***Mizagalla quattuor* n. gen. n. sp.** (figs. 121-127) Photo 301

Material: Holotypus in Baltic amber and 3 separated amber pieces, F792/BB/AR/DIC/CJW.

Preservation and syninclusions: The spider is completely and very well preserved - even the ducts within the fangs (fig. 123) are observable - in an amber piece which was heated. There are weak remains of white emulsions; larger bubbles are preserved e.g. right in front of the right chelicera and beneath the left tibia II. - Numerous stellate hairs, few Diptera, 1 Acari and 1 Thysanoptera are preserved in the same piece of amber.

Diagnosis (♂; ♀ unknown): Pedipalpus (figs. 125-127): Tibia with 4 apophyses, cymbial bristles present, embolus relatively short.

Description (♂):
Measurements (in mm): Body length 2.5, prosomal length 1.15, length of the basal cheliceral article 0.8, fang 0.45, leg I: Femur 1.3, patella 0.35, tibia 1.55, metatarsus 1.2, tarsus 0.55, tibia IV 1.0, tibia II about 1.3, tibia III 0.8.
Colour: Prosoma and legs medium brown, opisthosoma light brown.
Body and legs are similar to *tuberculata* but a low fovea is present and the clypeus is longer, about two times of the diameter of the anterior median eyes. Mouth parts (fig. 122): Chelicerae with pustules, several teeth are observable on the cheliceral retromargin, the labium is about as long as wide, the gnathocoxae are very long and widened distally. Leg I is distinctly the largest, metatarsus I is curved, the tarsi bear two long trichobothria (fig. 121). Numerous leg bristles; distinct pustules ventrally and retrolaterally in the basal half of femora I-II. The opisthosoma is two times longer than high, covered with indistinct short hairs. The anterior spinnerets are close together (fig. 124), fairly stout, a large colulus is present, the tracheal fold is hard to observe. The pedipalpus (figs. 125-127; see above) has a small bulbus; a conductor is absent.

Relationships: In *M. tuberculata* n. sp. the clypeus is shorter, the anterior spinnerets are distinctly separated, the embolus is longer, cymbial bristles are absent, and probably only 3 pedipalpal tibial apophyses are present.

Distribution: Tertiary Baltic amber forest.

Taxa in copal from Madagascar

(5) Copaldictyninae n. subfam.

Diagnosis (♂; ♀ unknown): Cribellum (photo) and cheliceral stridulatory files (fig. 132) present (a quite unusual combination of characters in spiders!), tarsal trichobothria absent. Male pedipalpus (figs. 139, 141-142): Presence of a "paratibia" as a separate component (unique in spiders!), a dorsal-basal cymbial "horn" and a retrolateral cymbial furrow are present.

Further characters: Habitus similar to Linyphiidae (photos), feathery hairs absent, plumose cheliceral hairs present, claw tufts and leg scolulae absent, unpaired tarsal claw present, femoral trichobothria absent, one metatarsal trichobothrium present (figs. 133, 135), numerous leg bristles present (figs. 133-134) but distinctly paired tibial bristles absent, tibial suture absent, trochantera not notched, leg autotomy between coxa and trochanter and ability of leg regeneration present, gnathocoxal serrula present, labium free and not rebordered, clypeus short, spinnerets (fig. 136, photo) fairly short; male pedipalpus (figs. 137-142): Dorsal tibial outgrowth present, retrolateral tibial apophysis absent (probably replaced by the "paratibia"), tegulum and subtegulum fairly small, conductor long, embolus very long, bearing a basal gland, a tegular apophysis (?= median apophysis) is present but a sickle-shaped median apophysis is absent.

Type genus: *Copaldictyna* n. gen. (the only known genus of the subfamily).

Relationships: The presence of plumose hairs and of two major ampullate spigots on the anterior lateral spinnerets (fig. 136; see HARVEY (1995: Fig. 11) exclude the membership of the Araneoidea s. l. ("Orbiculariae"); Araneoidea possess only one major ampullate spigot on these spinnerets. A pedipalpal retrolateral tibial apophysis is absent but a free "paratibia" is present which may be a modified apophysis. These characters indicate that Copaldictyninae is a member of the "retrolateral tibial apophysis clade" (RTA-clade). - In some respects (cymbial furrow, long embolus) the male pedipalpus is similar to the genus *Campostichomma KARSCH 1891* (Amaurobioidea, Lycosoidea) - see GRISWOLD (1993: Figs. 31-34) - but *Campostichomma* is ecribellate, a suture of the male tibia and tarsal trichobothria are present, a paratibia is absent. - The small size, the presence of a cribellum, the absence of tarsal trichobothria, the cymbial furrow and the large conductor indicate relationships to the Dintyninae s. str. which may be the sister group. (the cheliceral stridulatory files may be a convergence to the related Hahniini). In the Dictyninae cheliceral stridulatory files, a paratibia, a cymbial horn and a retrolateral cymbial furrow are absent, the male chelicerae are most often modified, and the conductor is usually prolongated to the pedipalpal tibia. - The presence of cheliceral stridulatory files is very rare within the RTA-clade; to my knowledge such files occur in the Dictynidae s. l.: Hahniinae: Hahniini and Copaldictyninae, some Tengellidae and few Salticidae.

Ecology: The fauna and the flora which is preserved in the copal of North Madagascar led to the conclusion that the spiders lived in a forest; see the paper on spiders in copal of Madagascar in this volume. Apparently spiders of this taxon - 7 males in my private collection - are not so rare and lived probably in higher strata.

Distribution: Madagascar, subrecent (subfossil), preserved in copal. According to the determination with the help of the C14-method of some copal pieces of the same collection the spiders were probably captured in the copal in the year of 1963, see the paper on spiders in copal from Madagascar in this volume. If their environment is completely destroyed now, the subfamily Copaldictyninae may already be extinct. - I do not want to exclude that confamiliar taxa will be discovered in South Africa in the future; the South African fauna is not well-studied up to now.

***Copaldictyna* n. gen.**

Diagnosis (♂; ♀ unknown): See above. Body length 2.5-2.8mm.

Type species: *Copaldictyna madagascariensis* n. sp. (the only known species of the genus).

Relationships: See above.

Distribution: Madagascar, subrecent, preserved in copal, see above.

***Copaldictyna madagascariensis* n. gen. n. sp.** (figs. 131-142) Photos 303-307

Material (in copal from N-Madagasacar): 7♂, holotypus F813/CM/AR/DIC/CJW, paratypes: F814/CM/AR/DIC/CJW with a separated piece of copal; F815/CM/AR/DIC/CJW; F923-F926/CJW. - The material will probably be deposited in the SMF in the future.

Preservation and syninclusions: Holotypus: The spider is completely and excellently preserved in a light yellow piece of copal, the legs are spread sideward, the anterior cuticula with the eyes appears "doubled", a larger air bubble is preserved between the left chelicera and the left bulbus, the position of the right embolus is near the mouth. - In the same piece of copal are preserved: Remains of plants, 4 Diptera, 2 Hymenoptera; right beneath the spider remains of a three-clawed female spider (leg articles, a pedipalpus). - Paratype F814 is well and nearly completely preserved in a yellow piece of copal. Only the tip of the left tarsus I is cut off. 1 Diptera and 1 Hymenoptera are present in the same piece of copal. In the separated piece 1 Lepidoptera, 1 Diptera and 1 Acari are preserved. - Paratype F815 is only fairly well preserved in a yellow piece of copal, the dorsal half of the right patella, the dorsal half of the opisthosoma and parts of the left leg IV are cut off. Remains of plants, a tiny Hymenoptera and some tiny excrement particles are preserved in the same piece of copal. - Paratype F923 is completely and well preserved, the opisthosoma bears a dorsal depression, the right patellae I and II are thickly covered by hyphae of an unknown fungus. 1 Acari, 1 Lepidoptera, several Diptera, Psocoptera and Coleoptera as well as 1 tiny Hymenoptera are preserved, too. - Paratype F924 is completely and well preserved. A longer part of a web - of this spider? - incl. remains of prey and a tiny mite (0.1mm long), a male spider (Theridiidae), several Diptera, insect's eggs, the larva of an insect and remains of plants are preserved in the same piece of copal. - Paratype F925 is well preserved, the left legs I and II are lost behind the coxa by autotomy. - 1 tiny Hymenoptera, 1 Thysanoptera and 2 Diptera are

preserved, too. - Paratype F926 is completely and well preserved just behind the remains of a larger insect's wing in a piece of copal which is 8cm long. - Also preserved are 3 juv. spiders, 1 Isoptera, several Acari (1 on the abdomen of the termite), Collembola, Lepidoptera, Diptera and Thysanoptera.

Diagnosis (♂; ♀ unknown): See above.

Description (♂):
Measurements (in mm): Body length 2.5-2.8, prosoma: Length 1.2, width 1.1, leg I (holotype): Left leg: Femur 1.1, patella 0.45, tibia 1.15 (right tibia 1.0), metatarsus 0.63, tarsus 0.5, tibia II 0.9, tibia III 0.7, tibia IV 0.9. The right leg I of the holotype may be a regenerate.
Colour: Prosoma and legs light to medium brown, opisthosoma yellow brown, legs not annulated.
Prosoma (figs. 131-132) nearly as long as wide, caput abruptly smaller, covered with some thin hairs, fovea well developed. 8 large eyes, posterior row straight, posterior median eyes largest, separated by 1 1/3 of their diameter, clypeus only as short as 2/3 of the diameter of an anterior median eye. Chelicerae fairly slender and long, condylus well developed; laterally with distinct stridulatory files, anterior margin with plumose hairs and at least 2 stout teeth, posterior margin hidden. Labium free, about as long as wide, not rebordered, gnathocoxae distinctly longer than wide, only fairly converging, sternum 1.35 times longer than wide, small elongated between the coxae IV. - Legs (figs. 133-135, photos) only fairly long, order I/II/IV/III, III not much shorter than IV, covered with short hairs and numerous bristles of medium length, their number is quite variable especially on tibia I; femora: I-IV up to 2 dorsally, I-II (some III) additionally 1 prodistally; patella I a thin dorsal-distal bristle; tibiae: Dorsally: III-IV bear usually 1 near to the base; ventrally: I-II 2 short +/- paired bristles near the base and 1 in the middle, laterally: II-IV may bear 1 or a pair distally. Tibia I bear at least 9 (holotype) up to 16 (paratype F814), ventral bristles; metatarsi: I-II a basal-ventral pair, III-IV with apicals. Ventral tarsal and metatarsal bristles absent. Position of the tarsal organ I in 0.28, femoral and tarsal trichobothria absent, all metatarsi with 1 trichobothrium near the end. Feathery hairs absent. Paired tarsal claws slender, with long teeth, unpaired claw well developed, bent in a right angle. Trochantera slightly notched. Metatarsus IV straight, calamistrum in a long row, about as long as 4/5 of the length of the article. - Opisthosoma (photos) ovally, covered with indistinct short hairs, widest in the middle. Tracheal spiracle 0.11mm wide, its position 0.08mm in front of the hairy anterior area of the cribellum. Cribellum well developed, undivided. Anterior lateral spinnerets with a stout basal and two short distal articles, two major ampullate spigots are present, besides other spigots (fig. 136), median spinnerets large, bearing large spinules, posterior spinnerets slightly shorter than the anteriors, the apical article bearing large spinules; half as long as the basal article. Anal tubercle fairly small. - Pedipalpus (Figs. 137-142): Femur with few prolateral stridulatory bristles, patella short, tibia with a bristle-bearing dorsal outgrowth, a proapical hump and a large retroapical free component ("paratibia"), which has a scinny connection to the tibia and bears a dorsal tooth. Cymbium basally wide and here with a blunt "horn", retrolaterally with a deep furrow which not guides the embolus, distally narrow and with a depression. Alveolus long - most bulbi are expanded -, subtegulum fairly small, tegular sperm duct wide, conductor long and divided distally, embolus thin and very long, basally wide and here with a

gland, nearby a tegular (median?) apophysis, a free sclerite which has a a strong sclerotized apical "tooth" near to the apical parts of the conductor in the expanded bulbus.

Relationships: See above.

Distribution: Madagascar, subrecent/subfossil, preserved in copal.

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