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PART III a (TEIL III a) - Descriptions of selected taxa

THE FOSSIL MYGALOMORPH SPIDERS (ARANEAE) IN BALTIC AND DOMINICAN AMBER AND ABOUT EXTANT MEMBERS OF THE FAMILY MICROMYGALIDAE

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Abstract: The fossil mygalomorph spiders (Araneae: Mygalomorpha) in Baltic and Dominican amber are listed, a key to the taxa is given. Two species of the genus *Ummidia* THORELL 1875 (Ctenizidae: Pachylomerinae) in Baltic amber are redescribed, *Closthes priscus* MENGE 1869 (Dipluridae) from Baltic amber is revised, two gen. indet. (Dipluridae) from Baltic amber are reported. The first fossil member of the family Microstigmatidae: *Parvomygale* **n. gen.**, *Parvomygale distincta* **n. sp**. (Parvomygalinae **n. subfam**.) in Dominican amber is described. - The taxon Micromygalinae PLATNICK & FORSTER 1982 is **raised to family rank**, revised diagnoses of the families Micromygalidae (no fossil record) and Microstigmatidae are given.

Material: CJW = collection J. WUNDERLICH, GPIUH = Geological and Palaeontological Institute of the University Hamburg, IMGPUG = Institute and Museum for Geology and Paleontology of the Georg-August-University Goettingen in Germany.

INTRODUCTION

The first fossil member of the suborder Mygalomorpha (= Orthognatha) in Baltic amber has been described by MENGE 1869 as *Clostes priscus* (figs. 1-2; comp. the book of WUNDERLICH (1986: Fig. 291)). This spider is a member of the family Dipluridae (Funnelweb Mygalomorphs) and is redescribed in this paper; only juveniles are known. Two further species of Mygalomorpha are described from this kind of amber, these are members of the family Ctenizidae (Trapdoor spiders). – Fossil members of the Mygalomorphae in Dominican amber were described by WUNDERLICH (1988). In this paper a species of the family Microstigmatidae is added. Fossils of this family have never been described before and this species is important in the estimation of extant taxa.

EINLEITUNG

Die erste fossile Längskiefer-Spinne (Mygalomorpha, früher Orthognatha) im Baltischen Bernstein wurde von MENGE 1869 als *Clostes priscus* beschrieben (Abb. 1-2; vgl. das Buch von WUNDERLICH (1986: Abb. 291)). Es handelt sich um einen Vertreter der Familie Trichternetz-Längskieferspinnen (Dipluridae). In dieser Arbeit werden diese Art sowie Vertreter zweier unbestimmter weiterer Gattungen behandelt, im Baltischen Bernstein sind bisher nur Jungspinnen bekannt geworden. Es werden zwei weitere Arten der Längskieferspinnen in dieser Bernsteinart beschrieben. Diese gehören zur Familie Falltür-Spinnen (Ctenizidae). - Fossile Längskiefer-Spinnen im Dominikanischen Bernstein wurden von WUNDERLICH (1988) beschrieben. In der vorliegenden Arbeit wird eine Art der Familie Microstigmatidae hinzugefügt. Vertreter dieser Familie sind nicht nur neu für das Medium Bernstein; sie sind bisher fossil überhaupt noch nicht nachgewiesen worden. Diesem Fossil kommt eine beachtliche Bedeutung bei der Bewertung heutiger Taxa zu, siehe unten.

Size, the mode of life and about the frequency of Mygalomorph spiders in amber

Remark: The taxon Mygalomorpha (= Mygalomorphae) is nowadays more often called an "infraorder" than a suborder.

Mygalomorpha is a primitive suborder of Araneae. Among these animals we find today the largest spiders which have a body length of more than 10cm. Because of its large size we find mygalomorph spiders only rarely in amber; exuviae are a bit more frequent. At any rate there are surprisingly small fossil amber spiders: The body length of the smallest known adult fossil mygalomorph spider – a male which is preserved in Domonican amber: *Microsteria sexoculata* WUNDERLICH 1988 (Dipluridae) - is 2.4mm. (The „record“ of tininess in the body length of extant Mygalomorpha (♂) is far less, 0.7mm; this species is the only known member of the family Micromygalidae from Central America, see below).

Also in most extant members of the family Ctenizidae (Trapdor spiders) the body length is more than 1cm; the fossil male spiders of the genus *Ummidia* – body length 4.3-6mm are an exception. Adult females of the family Ctenizidae in Baltic amber possibly were distinctly larger, perhaps more than 1cm long. Having short and strong legs (e.g. fig. 13) they probably could easily get free from the resin. This speculation is supported by the fact that only 2 juveniles have been found, the remaining specimens are exuvia. These obviously have been transported by wind to the resin. Members of this family live in subterranean tubes. Not seldom they become many years, and adult females usually never leave their tube. Adult males leave their tube when searching females and usually die soon after copulation, not seldom as a prey of the sex-partner. After the shape of the opisthosoma – which is empty but not crumpled -, the holotype male of *Ummidia malinowskii* has not been the prey of a spider but more likely the prey of a beetle.

In contrast to the members of the Trapdoor spiders - which live in subterranean tubes – Funnelweb Mygalomorphs live in overground funnel webs, several species occur in higher strata.

Größe und Lebensweise der Längskiefer-Spinnen sowie über die Häufigkeit der fossilen Spinnen dieser Unterordnung im Bernstein

Die Längskiefer-Spinnen sind eine ursprüngliche Unterordnung der Spinnen. Unter ih-

nen finden wir heute die größten Exemplare mit einer Körper-Länge von mehr als 10cm. Da große Spinnen selten in das fossile Harz gerieten, finden wir geschlechtsreife Längskiefer-Spinnen im Bernstein außerordentlich selten; Exuvien sind etwas häufiger. Es existieren allerdings Vertreter überraschend kleiner Arten, die im Bernstein konserviert worden sind: Die kleinste bekannte fossile Längskiefer-Spinne im Dominikanischen Bernstein - ein ♂ mit einer Körper-Länge von 2.4mm - gehört zur Familie Röhren-Vogelspinnen (Dipluridae): *Microsteria sexoculata* WUNDERLICH 1988. (Der „Rekord“ der Winzigkeit für die Körper-Länge heutiger Längskiefer-Spinnen liegt mit 0.7mm (♂) allerdings noch weit darunter; es handelt sich um den einzigen bekannten Vertreter der unten behandelten Familie Micromygalidae aus Zentral-Amerika).
Auch die meisten rezenten Vertreter der Falltür-Spinnen (Ctenizidae) besitzen eine größere Körper-Länge (> 1cm); die fossilen Männchen der Gattung *Ummidia* mit einer Körper-Länge von nur 4.3 bis 6mm sind eine Ausnahme. Geschlechtsreife Weibchen der fossilen Falltür-Spinnen im Baltischen Bernstein waren möglicheweise wesentlich größer, vielleicht waren sie mehr als einen cm lang. Mit ihren kurzen, kräftigen Beinen (z.B. Abb.13) konnten sie sich vermutlich unschwer aus dem Harz befreien. Diese Vermutung wird durch den Befund gestützt, daß lediglich 2 Jungspinnen vorliegen; bei den übrigen Exemplaren handelt es sich um Häutungs-Reste (Exuvien). Diese sind offenbar vom Wind in das Harz geweht worden. Geschlechtsreife ♀ dieser unterirdisch lebenden Spinnen werden zwar nicht selten viele Jahre alt, sie verlassen ihre Wohnröre gewöhnlich aber lebenslang nicht mehr und sind daher im Bernstein kaum zu erwarten. Geschlechtsreife ♂ streifen auf der Suche nach paarungs-bereiten ♀ umher. Nach der Kopulation sterben die ♂ gewöhnlich bald; nicht selten werden sie vom Sexual-Partner erbeutet. Das Männchen von *Ummidia malinowskii* dürfte nach dem ausgefressenen (nicht aber "zerknautschten") Hinterkörper allerdings nicht die Beute einer Spinne geworden sein, sondern eher diejenige eines Käfers.
Im Gegensatz zu den unterirdisch lebenden Falltürspinnen leben die Vertreter der Trichternetz-Längskieferspinnen in oberirdischen Trichternetzen, verschiedene Arten sogar in höheren Vegetations-Schichten.

Characters of the Mygalomorpha

Characters of Mygalomorph spiders are e.g. the large and protuding basal articles of the chelicerae (e.g. figs. 2-4) and the long fangs which tip usually is directed posteriorly (fig.

4). In „modern" spiders (Araneomorpha = Labidognatha) the basal articles of the chelicerae rarely are unusual large and protuding – e.g. in many Dysderidae, Clubionidae and Corinnidae – and are crossing and working against each other in biting position.

The pedipalpi of Mygalomorph spiders possess long articles in male (e.g. fig. 8, photos), in the female and in the exuvia the pedipalpi mostly are leg-shaped and distinctly larger than shown in figs.1-2; not seldom the spiders look ten-leged instead eight-leged. In nearly all Mygalomorph spiders 2 pairs of lungs and lung covers are present: One pair in front of the epigastral furrow and one pair behind of it. In Araneomorph spiders the posterior pair of lungs is absent; several tiny spiders are lungless. Most lung covers of fossil spiders are hard to observe, more likely the posterior pair can be seen which position nearly is in the half of the opisthosoma length (fig. 22).

Furthermore characteristic in most Mygalomorph spiders is the narrow eye field (e.g. figs. 1-3, 9, 14; in fig.1 it is shown too wide) and the eye position is on a common elevation (figs. 3,10,18).

A special feature of several Mygalomorph spiders are the thickened dorsal trichobothria of the tarsi – besides of normal/thin trichobothria – in several families, e.g. fig.6. In the fossil spiders deald with in this paper thickened trichobothria occur in members of the trap door spiders (Ctenizidae) in Baltic amber as well as in Barychelidae and Theraphosidae in Dominican amber. For observation one needs a higher magnification. This kind of thickened trichobothria is not a general character of single families – for example such sensitive hairs are lacking in most Ctenizidae – but are presens „sporadically" in specified genera within different families, comp. RAVEN (1984: 22).

Kennzeichen der Längskiefer-Spinnen (Mygalomorpha)

Typische Merkmale der Längskiefer-Spinnen sind u. a. die großen und vorstehenden Grundglieder der Cheliceren (z.B. Abb. 2-4) sowie die langen, in Ruhelage nach hinten zeigenden Gift-Klauen (Abb. 4), deren Spitzen sich in keiner Position überkreuzen. Bei den "modernen" Spinnen der Unterordnung Querkiefer-Spinnen (Araneomorpha, früher Labidognatha) sind die Grundglieder der Cheliceren selten ungewöhnlich groß und vorstehend - z.B. bei vielen Sechsaugen-Spinnen (Dysderidae) und einigen Sackspinnen und Ameisen-Sackspinnen (Clubionidae und Corinnidae) - und beim Zubeißen wirken sie ± gegeneinander und überkreuzen sich.

Die Pedipalpen der Längskiefer-Spinnen besitzen beim ♂ lange Glieder (z.B. Abb.8, Fotos), beim ♀ und den vorliegenden Exuvien sind sie oft sogar beinartig und deutlich größer als in den Abb.1-2 dargestellt. Nicht selten wirken die Spinnen so, als hätten sie 10 Beine anstatt 8.

Fast alle Längskiefer-Spinnen besitzen 2 Paar Lungen und Lungen-Deckel: Ein Paar vor und ein Paar hinter der Epigstral-Furche. Querkiefer-Spinnen fehlt dagegen das hintere Paar; verschiedene winzige Spinnen sind lungenlos. Die Lungen-Deckel sind bei den fossilen Spinnen allerdings meist nicht oder kaum erkennbar, am ehesten noch das hintere Paar, das fast in der Mitte der Länge des Hinterkörpers liegt (Abb.22).

Weiterhin typisch für die meisten Längskiefer-Spinnen ist das enge Feld der kleinen Augen (Abb.1-3; in Abb.1 ist es zu breit dargestellt), und die Augen sitzen gewöhnlich auf einer gemeinsamen Erhebung (Abb.3,10,18).- Eine Besonderheit nicht weniger Längskiefer-Spinnen sind die keulenförmig/spatelförmig verdickten Becherhaare (Trichobothrien), die - neben "normalen" dünnen Becherhaaren - oben auf den Fußgliedern (Tarsen) bei verschiedenen Familien auftreten (z.B. Abb. 6). Sie sind erst bei stärkerer Vergrößerung zu erkennen. Bei den in dieser Arbeit behandelten fossilen Spinnen kommen keulenförmige Becherhaare bei Vertretern der Falltür-Spinnen (Ctenizidae) im Baltischen Bernstein sowie bei Vertretern der Barychelidae und Theraphosidae im Dominikanischen Bernstein vor. Diese Sinneshaare sind kein durchgängig vorhandenes Merkmal einzelner Familien - z. B. fehlen sie bei den meisten Falltür-Spinnen -, sondern sie treten eher "sporadisch" bei bestimmten Gattungen innerhalb der verschiedensten Familien auf, vgl. RAVEN (1984: 22).

Übersicht über die Familien und Gattungen fossiler Längskiefer-Spinnen im Baltischen und Dominikanischen Bernstein:

Family	Baltic amber	Dominican amber
Barychelidae	---	*Psalistops*, Gen. indet.
Ctenizidae	*Ummidia* (see the addendum)	---
Family near Ctenizidae	---	*Bolostromus*

Dipluridae s.l. incl.Hexathelinae	*Clostes*, 2 gen. indet.	*?Ischnothele, Masteria, Microsteria*
Microstigmatidae	---	*Parvomygale*
Theraphosidae	---	*Ischnocolinopsis*

As to expect – most Mygalomorphs prefer tropic climate more than subtropic climate– the spider fauna of the tropic Dominican amber forest was more than twice diverse as the spider fauna of the mainly subtropic Baltic amber forest: Records of 5 families and 8 genera stand opposite the record of only 2 families and 4 genera. (On the other hand the Baltic amber forest fauna of „modern“ spiders (the Araneomorpha) was distinctly more diverse). From the Dominican amber a record of the familiy Ctenizidae is (still) lacking, from Baltic amber records of Barychelidae, fam. indet., Microstigmatidae and Theraphosidae are wanting.

Remark: From the Bitterfeld locality I have before me only 1 juv. specimen of the family Dipluridae (probably of the genus *Clostes*).

Wie zu erwarten - die meisten Längskiefer-Spinnen bevorzugen eher tropisches als subtropisches Klima - war die Fauna dieser Unterordnung der Spinnen des tropischen Dominikanischen Bernstein-Waldes mehr als doppelt so formenreich wie diejenige des überwiegend subtropischen Baltischen Bernstein-Waldes: Nachweise von 5 Familien und 8 Gattungen stehen nur 2 Familien- und 4 Gattungs-Nachweisen gegenüber. - (Im Baltischen Bernstein-Wald war dagegen die Unterordnung der „modernen“ Querkiefer-Spinnen (Araneomorpha) wesentlich diverser). Vom Dominikanischen Bernstein fehlt (bisher) der Nachweis der Familie Ctenizidae, vom Baltischen Bernstein fehlen Nachweise der Barychelidae, Fam. indet., Microstigmatidae und Theraphosidae.

Anmerkung: Vom Fundort Bitterfeld liegt mir bisher lediglich 1 juv. Exemplar der Familie Dipluridae (vermutlich Gattung *Clostes*) vor.

1. Mygalomorpha in Baltic amber/Längskieferspinnen im Baltischen Bernstein

I studied members of 4 genera, three of the family Funnelweb Mygalomorphs (Dipluridae) (*Clostes* and 2 gen. indet.) and two of the family Trapdoor spiders (Ctenizidae) (*Ummidia*), compare the book of WUNDERLICH (1986) and WUNDERLICH (2000). Up to the 20th century only *Clostes priscus* MENGE 1869 (figs. 1-2) has been described to species level, compare WUNDERLICH (1986: Fig. 191) and below; adults of this species are unknown.- Questionable is the determination of a leg-part of a large spider which is figured by BACHOFEN-ECHT (1949: Fig. 50). In my opinion this is not the leg of a Theraphosidae but most probably of a Dipluridae (?*Clostes priscus*).

Ich konnte Vertreter von 4 Gattungen untersuchen, drei der Familie Trichternetz-Längskieferspinnen (Dipluridae) (*Clostes* und 2 Gen. indet.) und zwei der Familie Falltür-Spinnen (Ctenizidae) (*Ummidia*), vgl. das Buch von WUNDERLICH (1986) und WUNDERLICH (2000). Bis zur Art war bis zum 20. Jahrhundert lediglich eine Art beschrieben worden: *Clostes priscus* MENGE 1869 (Abb.1-2), vgl. WUNDERLICH (1986: Abb. 191) und unten; geschlechtsreife Spinnen dieser Art sind bisher nicht bekannt geworden.- Fraglich hinsichtlich seiner Familien-Zugehörigkeit ist das Bein-Teil einer großen Spinne, das bei BACHOFEN-ECHT (1949: Abb.50) abgebildet ist. Meiner Ansicht nach handelt es sich nicht um das Bein einer Vogelspinne (Theraphosidae), sondern vermutlich um das Bein einer Trichternetz-Längskieferspinne (Dipluridae), ?*Clostes priscus*.

Key to the Mygalomorpha in Baltic amber:

1 Posterior spinnerets unusual long (figs. 1-2), fovea a groove (figs. 1-2), leg bristles long and thin, in juveniles even hair-shaped, no thickened tarsal trichobothria. Funnel-

web Mygalomorphs (Dipluridae). 2

- Posterior spinnerets short (photos), fovea a procurved furrow (fig. 3), leg bristles in females and juveniles short and thick (e.g. fig. 13), tarsal trichobothria thickened (figs. 6,13). Trapdoor spiders (Ctenizidae). . . . . *Ummidia*

2(1) Prosoma distinctly wrinkled . . . . gen. indet. 1

- Prosoma smooth 3

3(2) 2 pairs of spinnerets. . . . . *Clostes*

- 3 pairs of spinnerets. . . . . gen. indet 2

Tabelle zur Bestimmung der Längskiefer-Spinnen im Baltischen Bernstein:

1 Hintere Spinnwarzen ungewöhnlich lang (Abb.1-2), Fovea grubenförmig (Abb.1-2), Bein-Borsten lang und dünn, bei Jungspinnen sogar haarförmig, Tarsen oben ohne keulenförmige (sondern nur mit haarförmig dünnen) Becherhaare (Trichobothrien). Trichternetz-Längskieferspinnen (Dipluridae). 2

- Hintere Spinnwarzen kurz (s. Fotos), Fovea eine nach vorn gebogene Furche (Abb. 3). Bein-Borsten beim ♀ und bei den vorliegenden Exuvien kurz und dick (z.B. Abb.13), Tarsen mit spatelförmig verdickten Becherhaaren (Abb.6,13). Falltür-Spinnen (Ctenizidae). . . . . *Ummidia*

2(1) Vorderkörper (Prosoma) deutlich runzlig . . . . Gen. indet. 1

- Vorderkörper glatt. 3

3(2) 2 Paar Spinnwarzen . . . . *Clostes*

- 3 Paar Spinnwarzen . . . . Gen. indet. 2

Comparison of the genera of the Mygalomorpha in Baltic amber:

See gen. indet. (exuvia) coll. VELTEN below and the addendum

Character	Clostes	gen. indet 1	gen. indet. 2	Ummidia
prosoma	smooth	wrinkled	smooth	wrinkled (fig.3)
shape of the fovea	a groove (fig.1)	a groove	?	a furrow (fig.3)
long PL spinnerets	+ (figs.1-2)	+	+	---
spinnerets	2 pairs	?	3 pairs	2 pairs
thick leg spines in exuviae/juveniles	---	---	---	+ (fig.13)
thickened tarsal trichobothria	---	---	---	+ (fig.6,13)
rastellum	---	---	---	+ (figs.4,11-12) (weak in the ♂)
concave tibia III	---	---	---	+ (fig.5)

a) DIPLURIDAE – Funnelweb Mygalomorphs/Trichternetz-Längskieferspinnen

(figs. 1-2) Photos 7-10

Remark regarding the German name of the family: In contrast to my book of 1986 I introduce here the name „Trichternetz-Längskieferspinnen" with reference to the English name „Funnelweb Mygalomorphs". Funnel: Fig. 30.

In the fossil Funnelweb Mygalomorphs the leg bristles are thin and the posterior spinnerets are unusual long. (Very long posterior spinnerets occur also in member of the family Hersiliidae and Agelenidae but in these families the chelicerae are not protruding) Spiders of this family build catching webs which may be found on trees.

Anmerkung zum deutschen Namen der Familie: Im Gegensatz zum von mir früher für die Dipluridae verwendeten Namen „Röhren-Vogelspinnen" – vgl. WUNDERLICH (1986) – bevorzuge ich jetzt – in Anlehnung an den englischen Namen „Funnelweb Mygalomorphs" - den Namen „Trichternetz-Längskieferspinnen". Röhre mit Deckel: Abb. 30.

Bei den fossilen Trichternetz-Längskieferspinnen sind die Borsten der Beine dünn und die hinteren Spinnwarzen sind ungewöhnlich lang. (Sehr lange hintere Spinnwarzen zeichnen auch die Familie Kreiselspinnen (Hersiliidae) aus, bei denen aber die Cheliceren nicht vorstehen).
Spinnen dieser Familie bauen Fangnetze, nicht selten auf Bäumen.

Clostes MENGE 1869 (Figs. 11-2), photo s 7-10

The genus *Clostes* is known only from fossils. Without knowledge of the adult male it is not possible to give a satisfying diagnosis of this genus, compare above. Also the relationships are not clear: Possibly it is a member of the subfamily Macrothelinae, comp. WUNDERLICH (1986: 149), which I regard as a member of the Dipluridae s. l. and possibly Hexathelidae is a family besides the Dipluridae but not including Macrothelinae (compare the spinnerets!). In the opinion of RAVEN (1982) Macrothelinae is a subfamily of the separate family Hexathelidae. Following the traditional view one can interpret Hexathelinae as a subfamily of Dipluridae and perhaps Macrothelinae is another subfamily of the Dipluridae. A good character of the subfamily Macrothelinae within the Dipluridae is the presence of tiny spines on the labium (Such spines are frequent in Mygalomorpha, e.g. in Ctenizidae, fig. 4); there are only 2 pairs of spinnerets.

Fossil related genera: In the gen. indet. 1 the prosoma is wrinkled (the number of spinnerets is not known), in the gen. indet. 2 there are 3 pairs of spinnerets instead of 2.

Extant related genera of *Clostes* are perhaps *Macrothele* AUSSERER 1871 from the South of Europe and South Asia – compare WUNDERLICH (1986: Fig. 292) -, *Hadro-*

nyche L. KOCH 1837 (?= *Atrax* O. PICKARD-CAMBRIDGE 1877 and *Porrhothele* SIMON 1892 from the Australian Region which all are tropic or subtropic genera.

Closes ?priscus MENGE 1869 (Figs. 1-2), photos 7-10

1946 *Clostes priscus*,--PETRUNKEVITCH, Amer. Mus. Novitates, no. 1328: 1-3, Abb.1-6, 79 (juv.).

Material: Two exuviae and two questionable large leg parts are deposited in the CJW, one juv., F 419/BB/AR/DIP/CJW. The best preserved spider I know from the GPIUH, old number 687, compare WUNDERLICH (1986: Photo 291). Further juveniles I saw in the IMGPUG no. B 15744, the coll. ERNST in Skagen/Denmark, the coll. M. KUTSCHER in Sassnitz, see KUTSCHER (1999: T. 10, B1; from Bitterfeld) and in the Paleontol. Museum of the Humboldt-University Berlin, no. MB. A. 594 (in amber from Bitterfeld). In private and dealers' collections I saw about a dozen further juvenile specimens.

The species can not be determined with certainty without knowledge of the adult male, and perhaps there were more than one closely related species of *Clostes* in the Baltic amber forest as in *Ummidia*, see below. The generotype (a juvenile) is missing and in a strict sense *Clostes priscus* is a dubious taxon.

The smaller ones of the juvenile specimens are about 2mm long but the specimen of the GPIUH has a body length of 3.6mm and a prosoma length of 1.7mm, the juv. F419 is 3.0mm long. Leg parts – of congeneric spiders? – suggest that there were spiders more than 1cm long; the tibia of a fossil spider is 4.8mm long.
The prosoma is flat, not wrinkled, hairs are nearly absent. The fovea is variable, mostly a groove, often circular, in some spiders wider than long, slightly procurved to slightly recurved, comp. figs. 1-2. 8 eyes (fig. 2). In the specimen from the GPIUH the clypeus is a bit protuding and as long as the large anterior median eyes, in the spider of the PIHUB - which has nearly the same length – the cylpeus is shorter and not protuding. Labium and gnathocoxae mostly are hidden by an emulsion but in two spiders (CJW) such spines are visible on both structures. – Legs and opisthosoma are covered with long and thin hairs. Legs in small specimens bear thin bristles, in large spiders at least

metatarsus and tibia I possess stronger bristles. Three tarsal claws are present, the paired ones bear long teeth. Two pairs of spinnerets, the posterios ones very long, the apical article is distinctly the longest.

Relationships: Compare above.

Distribution: Tertiary Baltic amber forest incl. the Bitterfeld deposit.

Dipluridae gen. indet. 1

Material: Part of the exuvia of a probably nearly adult female in Baltic amber and a separated amber piece, GPIUH, provisor. old no. 1424.

Preservation: The exuvia is incomplete and badly preserved, legs, spinnerets and eyes are only partly preserved.

Measurements (in mm): Prosoma (without chelicerae): Length 6.0, width 5.0, length of tibia ?I 4.1, tarsus of the pedipalpus 2.8, length of a basal article of the chelicerae 3.5, length of a fang 2.0. The body length should have been more than 1cm.
Characteristic in this genus is the wrinkled prosoma**;** the wrinkles are distinctly more frequent behind the fovea. The prosoma is indistinct and short hairy, the fovea is grove-shaped, labium and gnathocoxae are not preserved as well as most of the eyes; the anterior lateral eyes are of a special large size. The legs are very hairy, the preserved tibiae and metatarsi I bear long bristles, a third tarsal claw is present, the paired tarsal claws bear long teeth in one row, scopulae, claw tufts and thickened trichobothria are absent.

Relationships: In *Clostes* and gen. indet 2 the prosoma is smooth.

Distribution: Tertiary Baltic amber forest.

Dipluridae gen. indet. 2

Material: 1 juvenile in Baltic amber and a separated amber piece, CJW.

Preservation: The spider is badly preserved, some leg articles are missing, bubbles and an emulsion covers parts of the body. The opisthosoma is partly destroyed/empty but the spinnerets are well preserved.

Description (juv.):
Measurements (in mm): Body length about 3.7, prosoma length 1.8, tibia I 1.0, length of a posterior spinneret 1.45.
Colour: Dark brown.
Prosoma smooth, fovea probably a groove, 8 eyes, chelicerae large, labium and gnathocoxae seemingly with few tiny spines (cuspules). – Legs fairly robust; thickened trichobothria, scopulae, claw tufts and leg spines are absent, at least metatarsi and tibiae III-IV bear long bristles which are apically of special length. A third tarsal claw is present, the paired claws bear long teeth. – Opisthosoma with few long hairs; 3 pairs of spinnerets (the median pair is hard to observe), the posterior ones very long, its apical segment is by far the longest.

Relationships: See *Clostes* MENGE and gen. indet. 1.

Distribution: Tertiary Baltic amber forest.

?Dipluridae gen. indet. 3 , photos 8-9

Material: Part of an exuvia in Baltic amber, coll. J. VELTEN in Idstein.

Preserved are chelicerae, sternum, basal parts of several leg articles and a small part of opisthosomal remains; the dorsal part of the prosoma and the spinnerets are missing.
Measurements (in mm): Length of sternum + labium 3.9, width of the sternum 3.4, length of coxa I 2.9, a fang 2.7. According to these measurements - which I compared with extant Mygalomorphae - the body length of the fossil spider was most probably nearly 2cm. - There are two rows of cheliceral teeth, the medial row has long teeth. The fangs are long and strongly bent (photo), the tip of the right fang is broken off. The wide labium is fused to the sternum and bears about 40 denticles, the gnathocoxae bear a blunt proapical outgrowth and numerous denticles. The sternum bears three pairs of sigillae near the margin, the anterior pair is small. The remains of the opisthosoma are covered with longer hairs.

See the addendum.

b) CTENIZIDAE – Trapdoor spiders/Falltür-Spinnen (Figs. 3-16, photos 1-6)

According to the dorsally concave tibia III (with a sattle-shaped depression) (fig. 5) the spiders studied by me are members of the subfamily Pachylomerinae. Males and females show a strong sexual dimorphisms, see below.

Juvenile and female trapdor spiders in Baltic amber are easily to recognize by the conspicuous and thick leg spines (e.g. fig. 13) and the short spinnerets; also the procurved and not grove-shaped fovea (fig. 9) is characteristic. The rastellum (figs. 4, 11-12) is less distinct in the male. Contrarily the legs of the male are clearly more slender and there are only few leg spines or bristles. The tarsi of the fossil Ctenizidae in Baltic amber bear thickened trichobothria (fig 13) besides thin trichobothria. Tibia III bears a dorsal depression (fig. 5) which is characteristic for the subfamily Pachylomerinae and more distinct in the male.

Such depression occurs also in some other Mygalomorphs as Idiopidae and Migidae, compare RAVEN (1985: 138, 144). This depression and spines of leg III (see fig. 5) and IV as well as the strong anterior spines of the chelicerae (the rastellum) (figs. 11-12) are used for digging the tube. Catching webs are absent in Cenizidae. – Both sexes show a distinct dimorphism, compare below.

Weibliche Spinnen, sowie Juvenile und Exuvien der Falltür-Spinnen im Baltischen Bernstein sind leicht nach den auffällig und dick bestachelten Beinen (z.B. Abb. 13) und den kurzen Spinnwarzen zu identifizieren; auch die procurve (nicht grubenförmige) Furche des Vorderkörpers (Fovea) (Abb. 9) ist typisch. Die Beine des ♂ sind dagegen deutlich schlanker und kaum bestachelt (z.B. Abb.6). Die Tarsen der mir im Baltischen Bernstein vorliegenden Falltür-Spinnen tragen - neben dünnen - auch spatelförmig verdickte Becherhaare (Trichobothrien) (Abb.6,13) und Tibia III trägt - deutlicher beim geschlechtsreifen ♂ - oben eine Vertiefung (Abb.5), die für die Unterfamilie Pachylomerinae typisch ist, die aber auch bei Vertretern anderer Familien der Längskiefer-Spinnen vorkommt, z.B. bei Idiopidae und Migidae, vgl. RAVEN (1985: 138, 144). Diese Vertiefung und Stacheln der Beine III (z.B. Abb.5) und IV werden zum Graben der Wohnröhre ebenso benutzt wie die starken Borsten vorn auf den Cheliceren (das Rastellum). (Abb. 11-12). Fangnetze legen die Falltür-Spinnen nicht an, lediglich "Signal-Fäden" um den Eingang ihrer Röhre.

Die Wohnröhre - vgl. SAUER & WUNDERLICH (1997: 32, 252) - wird mit einem Deckel verschlossen und kann bei einigen Arten beim Angriff parasitischer Wespen von innen zugehalten werden; so bereits von FABRE beobachtet und beschrieben und von mir bei einem geschlechtsreifen Weibchen von *Cteniza* sp. auf Sardinien beobachtet. Gewöhnlich scheint die Wespe das Kräftemessen gegen die viel stärker wirkende Spinne zu gewinnen, sie vermag den Deckel anzuheben und in die Wohnröhre einzudringen. Auf Sardinien konnten wir nach etwa 3 bis 4 Minuten die gelähmte Spinne ausgraben; die Wespe hatte zuvor die Wohnröhre verlassen.

Da der Deckel - bei dicht vorbeilaufenden Beutetieren – von der Spinne blitzschnell nach außen (!) geöffnet werden kann, sollten diese Spinnen eigentlich "Klappdeckel-

Spinnen" heißen, denn sie bauen ja gar keine Falltür.
In Süd-Europa lebt eine große Anzahl von Falltürspinnen-Arten, bis nach Deutschland dringen als einzige Längskiefer-Spinnen 3 Arten der Familie Tapezierspinnen (Atypidae) vor, vgl. SAUER & WUNDERLICH (1997: 30, 252). Diese sind vom Bernstein (bisher) nicht bekannt.

Ummidia THORELL 1875

Diagnosis: Trochantera I-II usually notched (apparently not notched in *Ummidia damzeni*), paired tarsal claws with 1 large and a short distal tooth (juv. and females) or 2 teeth (male), unpaired tarsal claw present (figs. 7, 13), ♂ distinctly smaller than ♀, surface of the prosoma sexual dimorph: Smooth and dark brown in the female but distinctly rugose in the male and sivery in the fossil males (photo, fig. 3). Legs sexual dimorph: With numerous short and thick spines in juveniles and adult females (fig. 13); with few spines and bristles – at least one ventral pair on tibia I – and with long ventral hairs on metatarsus and tarsus I-II in adult males (fig. 6). No claw tuft and no true scopula but a false scopula (dense and not thickened hairs, fig. 6) may be present. Embolus long and thin (fig. 8d). - See also the characters of the subfamily Pachylomerinae above, e. g. the depression on tibia III.
Remark: Both sexes are so different in leg spination, body colour and prosoma surface that one can believe both are members of separate genera! What may be the reason for this pronounced dimorphism? – See the addendum: Ctenizidae.

Distribution: Extant: Western Mediterranean, fossil: Tertiary Baltic amber forest.

Ummidia malinowskii WUNDERLICH 2000 (Figs. 3-8), photo 4

Material: Holotypus ♂ in Baltic amber, F114/BB/AR/CTE/CJW.

Diagnosis (♂; ♀ unknown): Tibia I with 1 pair of strong ventral brisles (fig. 6), all metatarsi dorsally impressed (fig. 6) and thickened distally, embolus strongly bent (fig. 8).

Preservation and syninclusions: The spider is preserved in a yellow amber piece which is 4.5cm long. It lies directly besides a larger pyritized layer, ventrally it is covered fairly by an emulsion. The opisthosoma is dorsally nearly completely empty and few penetrations are present. The spinnerets are not complete, most legs are curved under the body after the femur but legs I and II are curved after the tibia. – The amber piece is rich in small bubbles and there are some stellate hairs, one hair is present in front of the right chelicera. Furthermore there are some small Nematocera, a small insect leg and a tiny mite (Acari).

Description (♂) :
Measurements (in mm): Body length 4.3, prosoma: Length 2.3, width 2.3, leg I: Femur 2.2, patella 1.0, tibia 1.4, tibia of the pedipalpus: Length 1.3, width 0.43.
Colour: Metallic silvery; legs obviously covered with a thin emulsion, the underlaying dark brown cuticula is punctuelly observable.
Prosoma (figs. 3-4): Profile similar to fig. 10, as long as wide, distinctly wrinkled (fig. 3) and convex, decreasing behind the eye field, widest in the middle, weakly hairy, marginated. Fovea distinctly procurved. 8 eyes, both rows procurved, anterior median eyes largest, posterior median eyes separated by 1 1/3 of its diameter. Chelicerae distinctly protuding, slender, teeth not observable. Sternum slightly longer than wide, sigillae not observable. Labium (fig. 4) as long as wide and with few tiny spines (cuspules), 4 ones at the anterior margin. Gnathocoxae clearly longer than wide, with some tiny spines in the basal half. – Legs (figs. 5-7) fairly long; sequence of lenth I/?=IV/II/III, partly covered with long hairs. Few spines/bristles: A field of dorsal spines on patella III, femora none, 1 ventral pair in the distal half of tibia I, an apical one on tibia III, 2 apical ones on metatarsus III. Legs I-II (sexual dimorph) modified: Metatarsus bent, dorsally concave and distally thickened, metatarsus and tarsus with long thin ventral hairs, no scopula. Tarsus I with a long dorsal sense hair and 4 thickened trichobothria. Tibia III dorsally-basally strongly concave (arrow in fig. 5). No claw tufts. Unpaired tarsal claw small. Both paired tarsal claws bear a long and a short distal tooth. – Opisthosoma partly destroyed, 1.23 times longer than wide; spinnerets short. – Pedipalpus (fig. 8) wiith a short cymbium which bears some thickened trichobothria and a small bulbus; embolus long, thin and strongly bent; no apophyses.

Retationships: In *Ummidia damzeni* n.sp. tibia I bears 3 pairs of short ventral spines, the metatarsi are not thickened distally and straight, and the embolus is less bent; the single male of *damzeni* is larger. Also the extant species of this genus are larger, the shape of the embolus is different.

Distribution: Tertiary Baltic amber forest.

Ummidia damzeni WUNDERLICH 2000 (figs. 8a-e), photos 1-3

Material: Holotypus ♂ in Baltic amber, GPIUH.

Preservation and syninclusions: The spider is beautifully and completely preserved, ventrally it is partly covered with an emulsion, e.g. the labium and parts of the spinnerets. – Detritus, some Nematocera, a tiny Acari and a tiny wingless insect are preserved in the same amber piece; stellate hairs are absent.

Diagnosis (♂; ♀ unknown): Tibia I bears 3 pairs of short ventral spines (fig.8b), all metatarsi straight, embolus only moderately bent (fig. 8d).

Description (♂):
Measurements (in mm): Body length 6.0, prosoma: Length 3.0, width 2.8, eye field: Length 0.55, width 0.95, leg I: Femur 2.5, tibia 1.5, length of the tibia of the pedipalpus 0.15, length of bulbus with embolus 0.14.
Colour: Prosoma and legs metallic silvery, opisthosoma brown.
Prosoma (photo) slightly longer than wide, widest in the middle, similar to fig. 3, distinctly rugose, few short hairs only, fovea procurved. 8 eyes which are covered with a thin ?emulsion. Chelicerae protuding, rastellum weakly developed consisting of long hairs; ventral teeth in 2 rows. Labium slightly wider than long, connected with the sternum, its teeth as well as sternal sigillae not observable, gnathocoxae (fig. 8a) with about a dozen of tiny spines (cuspules). – Legs (fig.8b) fairly long, sequence of length I/IV/II/III. Metatarsi straight and not thickened distally. Ventral hairs of tarsus and metatarsus I-II similar to *U. malinowskii* (fig. 6). Few bristles/spines similar to *U. malinowskii* but tibia I with 3 paires of short ventral spines; other tibiae spineless(?). Tibia III with a distinct dorsal depression similar to fig. 5. Metatarsus III with a pair of strong apical spines, patella III prodistally with at least 2 strong spines. Trochantera seemingly not notched. Tarsus I-II with 2-3 thickened trichobothria in the distal half, compare fig. 6. Unpaired tarsal claws small, paired claws with 1 tooth or 2 teeth. No claw tuft. – Opisthosoma covered with numerous hairs of medium length, lung covers hidden, posterior spinnerets thick (fig. 8c). – Pedipalpus (figs. 8d-e): Tibia long and thickened basally-ventrally, cymbium with 3(?) thickened trichobothria, bulbus small, embolus long, fairly bent.

Relationships: See *U. malinowskii* n.sp.

Distribution: Tertiary Baltic amber forest.

***Ummidia* sp. indet**. (figs. 9-13) Photos 5-6

Material (in Baltic amber): 1 exuvia, F428/BB/AR/CTE/CJW; 2 juv. (one is incomplete) in the same amber piece, F115/ BB/AR/CTE/CJW; 1 juv. F116/BB/AR/CTE/CJW; 1 exuvia F117/BB/AR/CTE/CJW; 5 further exuviae CJW; one exuvia each in the GPIUH, old no. 559, IMGPUG no. B 16396, Paleontological Institute Moscow, the private collections of M. GLINK and H. WEGNER in Germany.

Remark: Some of the juvenile spiders probably are members of one of the species described above but I am not able to determine juveniles to species level.

Description (juv. and exuviae): Prosoma length 1-3mm. Colour medium to dark brown, exuvia usually light brown.

Prosoma (figs. 9-12) slightly longer than wide, smooth, shiny, highest poit in the middle. Clypeus slightly protuding. 8 eyes, anterior row procurved, posterior row straight or procurved, posterior median eyes circular to ovally, fovea deep and procurved. Sternum wider than long, labium as long as wide, connected with the sternum, bearing few or several tiny spines (cuspules), rastellum well developed. Pedipalpus nearly as large as leg II, tarsus with a large claw. – Legs (figs. 12-13) very robust, I-II strongly spined (as typic also in adult females), in lateral rows on tibiae, metatarsi and tarsi; distally-laterally on patella III several spines. Femur I prodistally with 3 long and strong bristles. Tibia III dorsally in the basal half a distinct depression similar to fig. 5. Tarsi with long and thin trichobothria and some thickened trichobothria in the basal half. – Opisthosoma covered dorsally with few longer hairs. 2 pairs of spinnerets, the anterior ones slender, the posterior ones very thick.

Distribution: Tertiary Baltic amber forest.

2. Spiders in Dominican amber

I know 8 genera from 5 families. The genus *Bolostromus* AUSSERER 1875 was regarded as a member of the familyies Ctenizidae/Cyrtaucheniidae; according to OPELL (pers. commun.) it may be a genus of a separate family which has not been namen up to now.

Gen. sp. indet. Barychelidae: See WUNDERLICH (1988: 52). The body length of a juv. of the Mus. Nat. Hist. Stuttgart (Do-3268) is 2.8mm.

Pycnothelidae sensu WUNDERLICH (1986): See Barychelidae.

Key to the spider families and genera in Dominican amber

Completed key, see WUNDERLICH (1988: 41-42).

1 Tarsi with thin and thickened (similar to fig. 6) trichobothria 2

- Tarsi with thin trichobothria only (e.g. fig. 23). 4

2(1) Tarsi I-II (in all spiders?) with 2 thickened trichobothria only. – Barychelidae (part), see no. 3 . . . . Gen. indet.

- Tarsi with numerous thickened trichobothria (similar to fig. 6). 3

3(2) Apical article of the posterior spinnerets very short. Prosoma up to 1.5 times longer than wide. ♂-pedipalpus: Cymbium dorsally concave, tibia ventrally only distally with a shallow furrow. – Barychelidae (part.). . . . . *Psalistops*

- Apical article of the posterior spinnerets long. Prosoma twice as long as wide. ♂-pedipalpus: Cymbium dorsally konvex, tibia in its whole length with a ventral furrow. - Theraphosidae. . . . . *Ischnocolinopsis*

4(2) Rastellum present. Small spiders. - Family near Ctenizidae and Cyrtaucheniidae. . . . .*Bolostromus*

- Rastellum lacking. Small or larger spiders. 5

5(4) Larger spiders, body length of a ?juv. ♀ 10mm. Tarsi with bristles, gnathocoxae with cuspules, cymbium prolongated (?). - Dipluridae (part., comp. no.7) . . .?*Ischnothele*

- Smaller spiders, body length of the ♂ up to 3mm. Tarsi without bristles, gnathocoxae without cuspules, cymbium not prolongated. 6

6(5) Prosoma flat, posterior spinnerets long, paired tarsal claws with 1 row of teeth. - Dipluridae (part.). 7

- Prosoma (fig.18) not flat, thorax high as the caput, posterior spinnerets of medium length (figs.18,22), paired tarsal claws with 2 rows of teeth (fig.25). - Microstigmatidae . . . .*Parvomygale*

7(6) Posterior spinnerets with 3 articles, 8 eyes, cymbium apically excaveted. . Masteria

- Posterior spinnerets with 4 articles, 6 eyes, cymbium not excavated. . . . . . .Microsteria

a) MICROSTIGMATIDAE

Spiders of the family Microstigmatidae are small or tiny. Its prosoma is behind the fovea as high as in front of the fovea (fig. 18); the openings of the – modified – lungs are not wide and slit-shaped as in most Mygalomorphae but small and ovally as in extant Micromygalidae (not surely observable in the fossil described below).
Members of the family Microstigmatidae possess a long unpaired tarsal claw (fig. 25), the paired tarsal claws bear 2 rows of teeth. There are two pairs of spinnerets; in extant spiders the posterior spinnerets are very short and three-articulated but in the fossil species described below these spinnerets are distinct and long. This is one reason I am describing a new subfamily. – Other characters are very variable in this family, compare e.g. FORSTER & PLATNICK (1982: 2,11).
Up to now two extant subfamilies of the Microstigmatidae were known: Microstigmatinae and Micromygalinae. The second taxon I now regard as a separate family. Here I describe a further subfamily of the Microstigmatidae, the Parvomygalinae **n. subfam**.

Revised diagnosis of the Microstigmatidae (incl. fossils): 2 rows of teeth of the paired tarsal claws which are implantated dorso-laterally (fig. 25), lung openings small-ovally (not wide and slit-like). (Small to tiny spiders, thorax high as the caput, long unpaired tarsal claw).

Relationships: In Dipluridae the openings of the lungs are slit-like, the articles of the PLS are mostly of equal length and the paired tarsal claws bear only 1 row of teeth which are inserted ventrally. Micromygalidae: See below and the key.

Distribution: Extant South Africa, South and Central America; fossil in Dominican amber.

Differentiation of the families Micromygalidae and Microstigmatidae and key to the subfamilies of the Microstigmatidae:

1 2 eyes (the anterior median ones, fig.14), 3 pairs of spinnerets (figs.14-16), no lungs, serrula teeth clumped into series, 1 row of teeth of the paired tarsal claws inserting ventrally, thorax lower than caput (fig.16).- Extant, Central America. . . **MICROMYGALIDAE**

- 8 eyes (e.g. fig. 19), 1 or 2 pairs of spinnerets (e.g. fig.22), 2 pairs of lungs (e.g. fig. 22), serrula teeth not clumped into series, 2 rows of teeth of the paired tarsal claws inserting dorso-laterally (fig.25), thorax as high as the caput (fig.18).- **MICROSTIGMATIDAE**. 2

2(1) posterior lateral spinnerets longest (figs. 18,22), cheliceral retromargin with a lamella (fig. 21), tarsal organ slightly elevated (fig. 24). - Fossil in Dominican amber. . . . . **Parvomygalinae**

- Posterior lateral spinnerets shortest, no cheliceral retromargin lamella, tarsal organ distinctly elevated. - Extant, South Africa, South and Central America. . . . . **Microstigmatinae**

PARVOMYGALINAE n.subfam. of the Microstigmatidae (figs. 17-29)

Diagnosis (♂; ♀ unknown): Cheliceral retromargin with a lamella (fig. 21), 2 pairs of spinnerets, posterior lateral spinnerets long (figs.18,22), basal article distincty the longest.

Relationships: After the 2 rows of teeth of the paired tarsal claws and its dorso-lateral implantation Parvomygalinae is a member of the family Microstigmatidae. This also was the opinion of R. RAVEN (in litt. 1988) who saw the generotype. In all extant genera of the Microstigmatidae the spinnerets are different - the PLS are the shortest -, a cheliceral lamella is absent and the tarsal organ is distinctly elevated, compare RAVEN & PLATNICK (1981: Figs. 29-36). (The lung stigmata and the fine structure of the cuticula are not known).

Type genus: *Parvomygale* n.gen.n.sp. (the only known genus).

Distribution: Fossil in Tertiary Dominican amber.

***Parvomygale* n.gen.** (figs. 17-29)

Diagnosis (♂; ♀ unknown): Legs with numerous spines (e.g. fig. 26), tibia I with 3 long ventral spines, no distinct clasping spine apically on ♂-tibia I (fig. 23), labium and gnathocoxae without cuspules (fig.20), cymbium with 1 apical claw (fig.27).

Diagnosis, relationships and distribution: See the Parvomygalinae above.

Type species: *Parvomygale distincta* n.gen.n.sp. (the only known species).

***Parvomygale distincta* n.gen.n.sp.** (figs. 17-29) Photos 11-12

Material: Holotypus ♂ in Dominican amber and a separated amber piece, CJW.

Preservation and syninclusions: The spider is completely and excellently preserved.

The opisthosoma is a bit shrunk, most eyes are covered with bubbles, most legs are streched. – In the same amber piece a mite (Acari) and a small detritus particle are preserved; in the separated piece some insect legs, a Diptera: Nematocera and small detritus particles are preserved.

Diagnosis and relationships: See above.

Description (m):

Measurements (in mm): Body length 2.5, prosoma: Length without chelicerae 1.2, width 1.0, leg I: Femur about 0.85, patella 0.55, Tibia 0.55, metatarsus 0.5, tarsus 0.3, metatarsus IV 0.97, tarsus IV 0.55, length of the fang 0.3, length the a posterior spinnerets 0.2.

Colour medium brown.

Prosoma (figs. 17-21) 1.2 times longer than wide, very few hairs, very weakly wrinkled. Thorax as high as the caput, fovea deep, slightly recurved. 8 small eyes on a common elevation, the anterior medians the largest, posterior median eyes widely spaced. Basal articles of the chelicerae of medium size, protuding, bent down in a right angle in the middle. Fangs long, slender and weakly bent. The anterior margin bears at least 3 teeth; posterior margin with a distinct lamella (L in fig. 21); teeth not visible. Sternum slightly longer than wide, sigillae not visible. Labium connected with the sternum, wider than long, hairy, cuspules absent, anterior margin concave. Gnathocoxae longer than wide, cuspules absent; serrula fairly strong. – Legs (figs. 23-26) fairly long, sequence of its length IV/I/II/III, IV distinctly the longest, I thicker than the other legs, indistinctly hairy, no scopula, cleaning hairs or claw tufts. Bristles/spines numerous: Tarsi none, metatarsi: I 1 pair ventrally-apically, II 1 pair apically and 2-3 ventrally, III 8-9, IV about a dozen; tibiae: I dorsally-basally 2 thin ones, retroventrally 3 long ones, increasing in length distally, the long apical one most probably the „mating bristle", other tibiae with more spines; patellae 2, indistinct on I-II, other patellae stronger spinose; femora dorsally 6, III and IV additionally with short lateral ones. Tibia III without a dorsal depression. Trichobothria thin, long and numerous, on tarsus and metatarsus I in rows. Tarsal organ (figs. 23-24) large, slightly elevated, in a apical position. 3 tarsal claws, the unpaired one large, not situated on an elevation, ?smooth. Paired tarsal claws with 2 rows of teeth which are inserted dorso-laterally, in I about 10 teeth each. – Opisthosoma (figs. 18,22) long-ovally, covered with indistinct hairs, dorsal scutum absent, sclerotized in front of the epigastral furrow. Stigmata not visible. 2 pairs of spinnerets, the anterior ones small, the posterior ones of medium length, three-articulate, the basal article as long as the two distal ones, apical article short.- Pedipalpus (figs. 27-29; see above): Tibia with a long dorsal hair, ventrally with several bristle-shaped hairs. Cymbium distally-ventrally „empty", apically with a long claw, prolaterally with a bristle. Bulbus small, embolus of medium length, bent, with a thick and a thin sclerite on its base.

Distribution: Tertiary Dominican amber forest.

b) MICROMYGALIDAE n.rank (figs. 14-16)

Micromygalinae PLATNICK & FORSTER 1982 (in Microstigmatidae).

Diagnosis: 2 eyes only (fig. 14), serrula teeth clumped into se-ries, no lungs. - Remark: The exact bulbus structures are not known to me; these structures are partly hidden by hairs in the REM-photographs 12-15 in the original description. Further characters: 3 pairs of spinnerets (figs. 14-16), the apical article distinctly the shortest, paired tarsal claws with 1 row of teeth which are implantated ventrally, ♂-opisthosoma with large dorsal scutum, tiny spiders, body length of the only known species M. diblemma (excl. chelicerae) 0.7-0.75 (♂) mm; the smallest known Mygalomorphs.

Relationships: PLATNICK & FORSTER (1982: 11) diagnosed Microstigmatidae including Micromygalinae after the small, oval spiracle and the scaly cuticula (true pustules in Microstigmata). Regarding eyes, serrula, spinnerets, lungs, tarsal organ and teeth of the paired tarsal claws - compare the key above - there are several important differences between Micromygale and other genera of Microstigmatidae sensu PLATNICK & FORSTER - and Dipluridae -, not only in reduced structures. Therefore I prefer to distinguish two different families which perhaps are closely related. - The small spiracle and the loss of lungs most probably are in connection with the reduced size. The scaly cuticula is common in Mygalomorph spiders and its fine structure varies strongly in the genera in question. In contrast to the Dipluridae - furthermore - the apical article of the posterior spinnerets is distinctly the shortest in the Micromygalidae.

Type genus: *Micromygale* PLATNICK & FORSTER 1982 (the only known genus).

Distribution: Panama (no fossil record).

c) DIPLURIDAE

According to the similar third tarsal claw RAVEN (2000) regards *Microsteria* WUNDERLICH 1988 as a junior synonym of *Masteria* L KOCH 1873. According to my diagnosis of *Microsteria* there are more differences in the two genera: Four articles of the posterior spinnerets and a cymbium which is not excavated apically in *Microsteria,* and most probably the absence of an "australothelinae cres-cent" in contrast to *Masteria*. Therefore I doubt the synonymy of both genera.

Addendum: Dipluridae in Baltic amber

(1) Autotomy: In more than 50% of my fossil Dipluridae I found a coxa-trochanter autotomy, e.g. in the juvenile F823 (see below).

(2) Dipluridae sp. indet, juv. Photo 10

Material: 1 juv., F823/BB/AR/DIP/CJW.
The right leg I is broken off between coxa and trochanter (autotomy) and laying left of the spider which is very well preserved.
Measurements (in mm): Body length 3.0, prosoma: Length 1.5, width 1.6, width of the eye field 0.55, leg I: Femur 1.35, patella 0.7, tibia 0.85, metatarsus 0.75, tarsus 0.65, tibia IV 0.95, pedipalpal tarsus 0.8.
Prosoma nearly smooth (fine squamate), thoracal groove distinct (as in fig. 2), mouth parts hidden. 8 large eyes in a field which is twice as wide as long. Legs with long hairs and hair-shaped bristles, paired tarsal claws with long teeth. Opisthosoma covered with long hairs, probably two pairs of spinnerets (parts are hidden).

The spider may well be a member of the genus *Clostes* MENGE.

(3) Dipluridae sp. indet., exuvia or remains of an adult ♀

Material: Part of an exuvia or remains of an adult ♀, with parts of a funnel web, F822/BB/AR/DIP/CJW.
Prosoma and opisthosoma are lost, only remains of the spiders legs and pedipalpi are preserved together with parts of its web.
Measurements (in mm): Leg II: Femur 6.1, patella 3.2, tibia about 4.5, metatarsus about 5.0, tarsus about 2.8; pedipalpus: Tibia 2.6, tarsus 4.2. - The body length of the spider was probably more than 1 1/2 or even 2cm.
Tarsus and metatarsus I and II and the pedipalpal tarsus bear strong ventral bristles/spines, 4-5 pairs on the metatarsi, at least 3 pairs on the tarsi. Pedipalpal claw and paired tarsal claws with 9-10 long teeth, unpaired tarsal claw probably smooth, trichobothria thin.
According to the strong bristles of legs I-II the remains of the specimen originate more likely from an adult spider than from an exuvia. Legs and tarsal claws are similar to or even identical with the genus *Clostes* MENGE.
Larger parts of a funnel web - as a thin and curved sheet which is typical for Dipluridae - are preserved beneath the spider's remains, partly in contact with leg articles and particles of detritus near the leg articles.

Addendum: Ctenizidae in Baltic amber

Figs. 31-37

Just before printing I got a paper with the first descriptions of two members of the family Ctenizidae in Baltic amber: *Electrocteniza sadilenkoi* ESKOV & ZONSTEIN 2000 (♂) (figs. 31-36) and *Baltocteniza kulickae* ESKOV & ZONSTEIN 2000 (juv. ♀) (fig. 37), see Paleontological Journal, 35 (suppl. 3): 5268-5274, "The First Ctenozoid Mygalomorph Spiders from Eocene Baltic Amber (Araneida: Mygalomorphae: Ctenizidae)".
According to my investigations of Ctenizidae in Baltic amber - see above - the fossil spiders of *Electrocteniza* and "my" *Ummidia* may be congeneric, compare the figs. 3, 9 and 31; the new genus *Electrocteniza* may be justified or not (?= *Ummidia* THORELL 1875).
In *Baltocteniza* (adult spiders are unknown!) the shape of the prosoma and the position of the eyes are quite different from *Ummidia/Electrocteniza*: The prosoma is distinctly longer than wide and the anterior eye row is so strongly procurved, that the anterior median eyes are situated almost in the centre of the eye group (fig. 37). - According to ESKOV & ZONSTEIN (2000) *Electrocteniza* "seems closely related to" the extant genera *Latouchia* POCOCK 1901 (SE-Asia) and *Sterrhochrotus* SIMON 1892 (Turkestan); according to RAVEN (1985: 159) *Sterrhochrotus* is a juniour synonym of *Cteniza* LATREILLE 1829.

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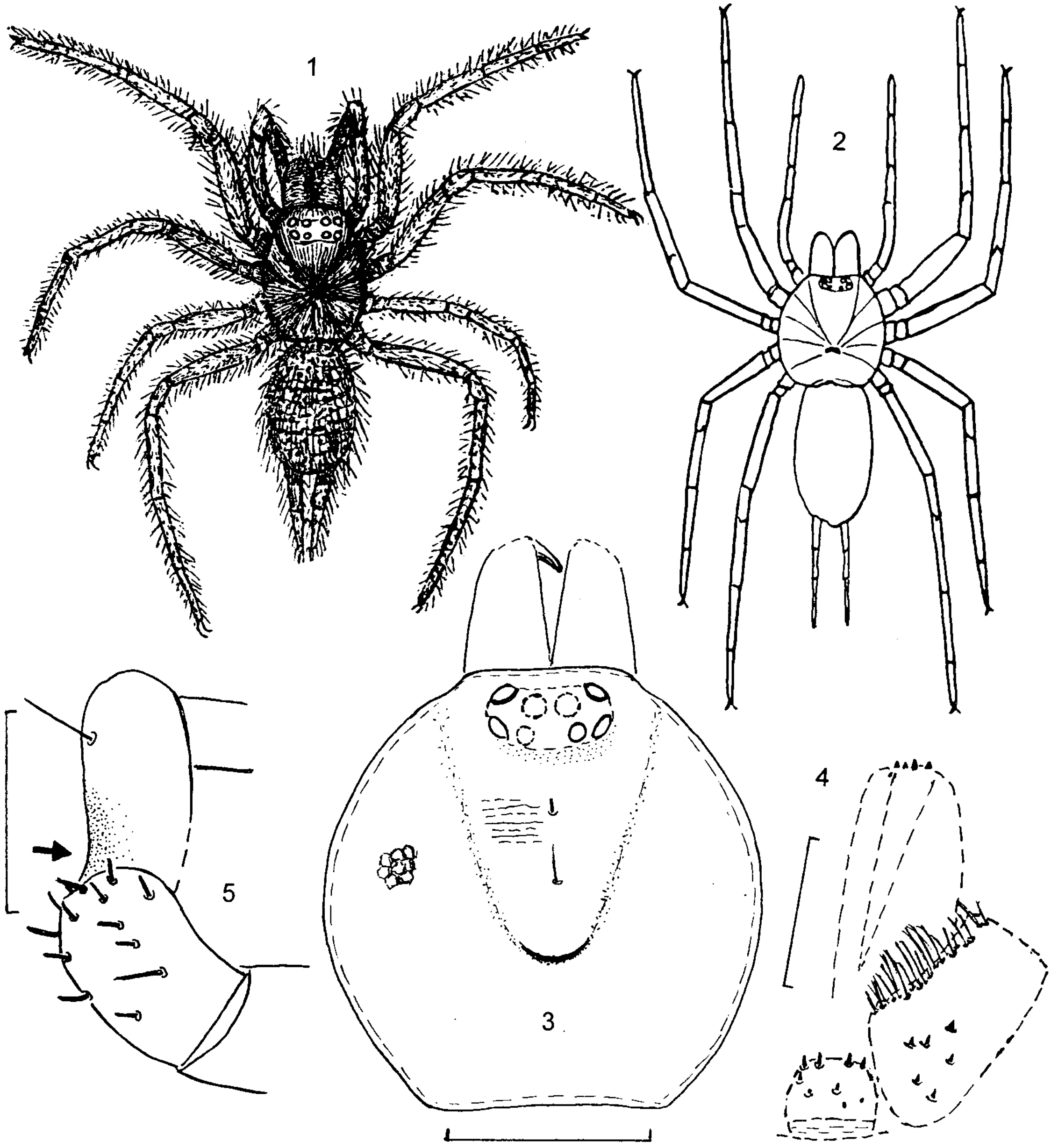
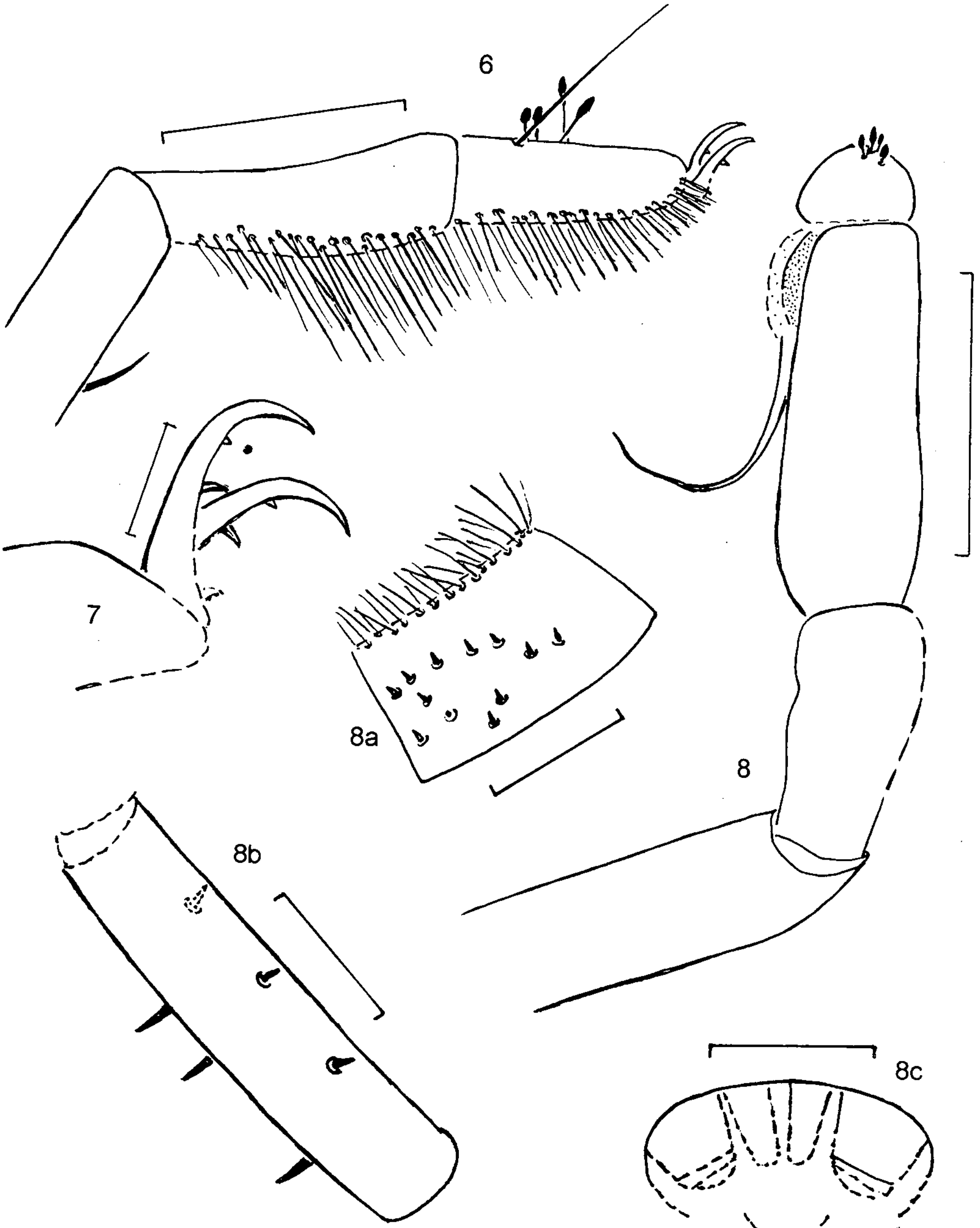
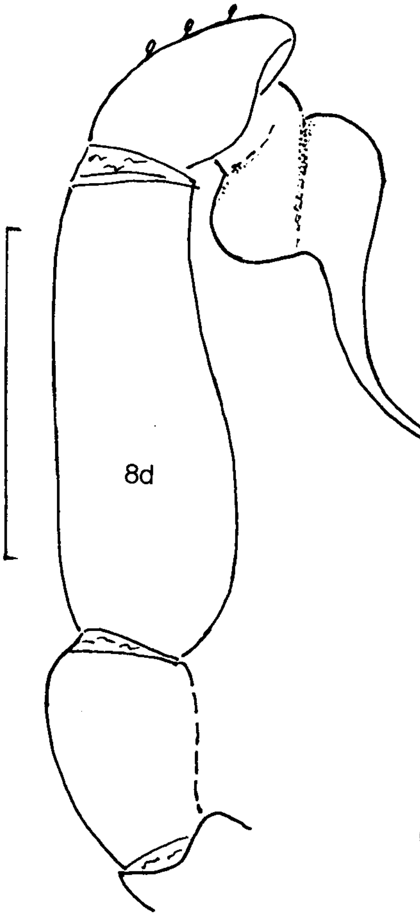


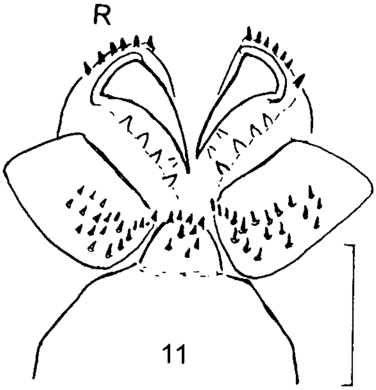
Figs.1-2: ***Clostes priscus*** MENGE 1869 (Dipluridae), juv., body dorsally; in fig. 1) the eye field is drawn too wide, in fig. 2) no hairs are drawn; 1) taken from MENGE (1869), 2) taken from PETRUNKEVITCH (1946);

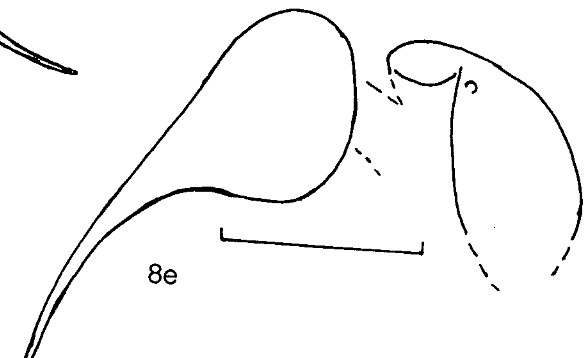
figs.3-8: ***Ummidia malinowskii*** WUNDERLICH 2000 (Ctenizidae), ♂; 3) prosoma dorsally (the hair in the centre marks the highest point); 4) labium, l. gnathocoxa and l. chelicera ventrally; 5) r. leg III retrobasally: Patella with dorsal spines and tibia with dorsal excavation (hairs not drawn); 6) r. leg I retrobasally (articles perspectively shortened; dorsal and lateral hairs not drawn; the 4 thickened tarsal trichobothria are drawn a bit enlarged); 7) claws of the r. leg II retrolaterally; 8) l. pedipalpus dorsally.- M = 0.1mm in fig.7), 0.5 in 4-5), 1.0 in the other figs.;

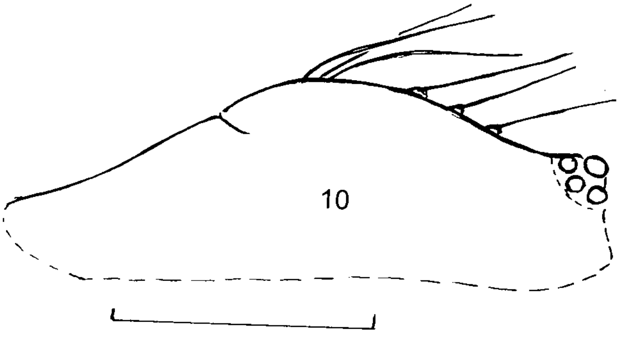


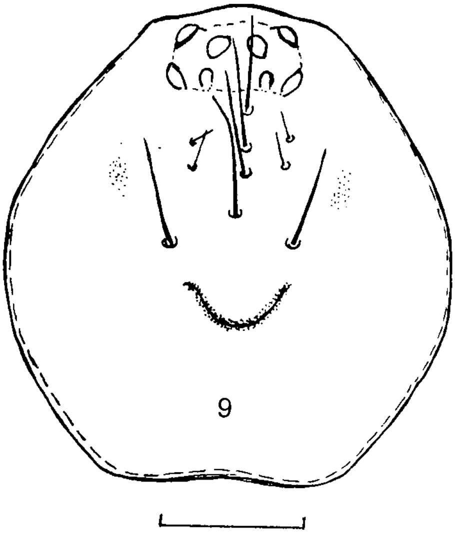
figs.8a-e: ***Ummidia damzeni*** WUNDERLICH 2000, (Ctenizidae), ♂; 8a) l. gnathocoxa ventrally; 8b) r. tibia I with spines proventrally; 8c) spinnerets ventrally; 8d) r. pedipalpus retrolaterally; 8e) distal part of the partly expanded l. pedipalpus retroventrally. – M = 1.0mm in fig. 8d), 0.5mm in the other figs.



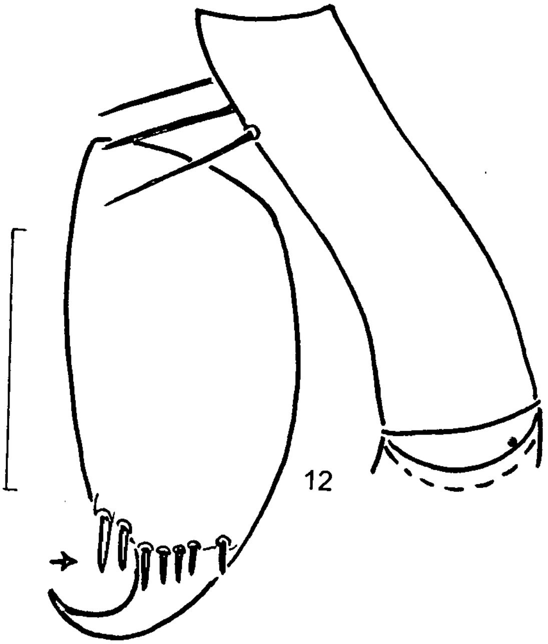








figs.9-13: ***Ummidia* sp.** (Ctenizidae), juv. and exuviae, 9-10) prosoma dorsally and laterally, 11) anterior part of the prosoma ventrally, r. chelicera with rastellum (R); 12) l. chelicera with rastellum (R) and l. femur I frontally; 13) r. tibia, metatarsus and tarsus I retrolaterally with thickened tarsal trichobothria (T) (normal hairs and thin trichobothria are not drawn).- M = 0.5mm in figs.10) and 13), 1.0 in the others; figs. 12-13: next page;



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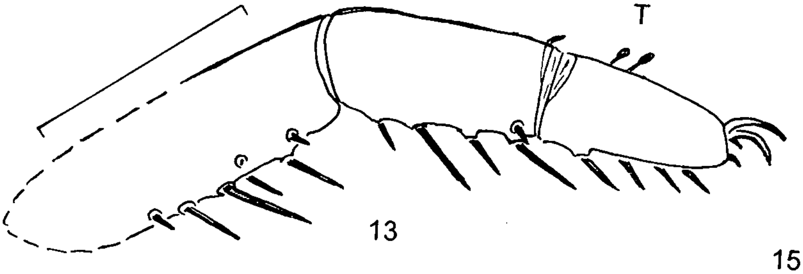

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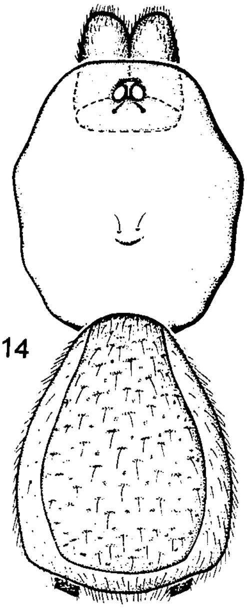

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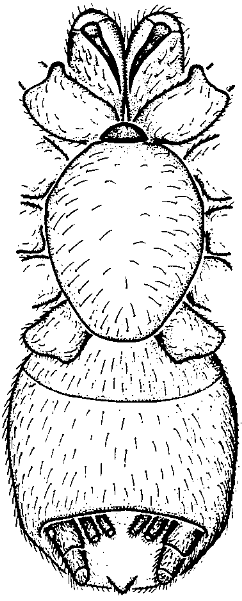

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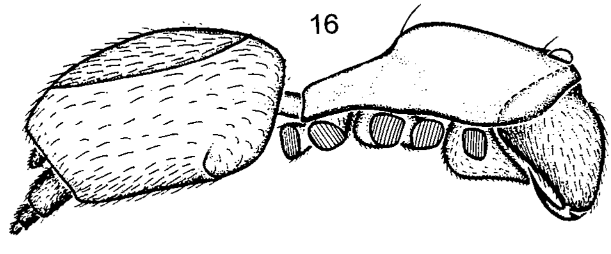

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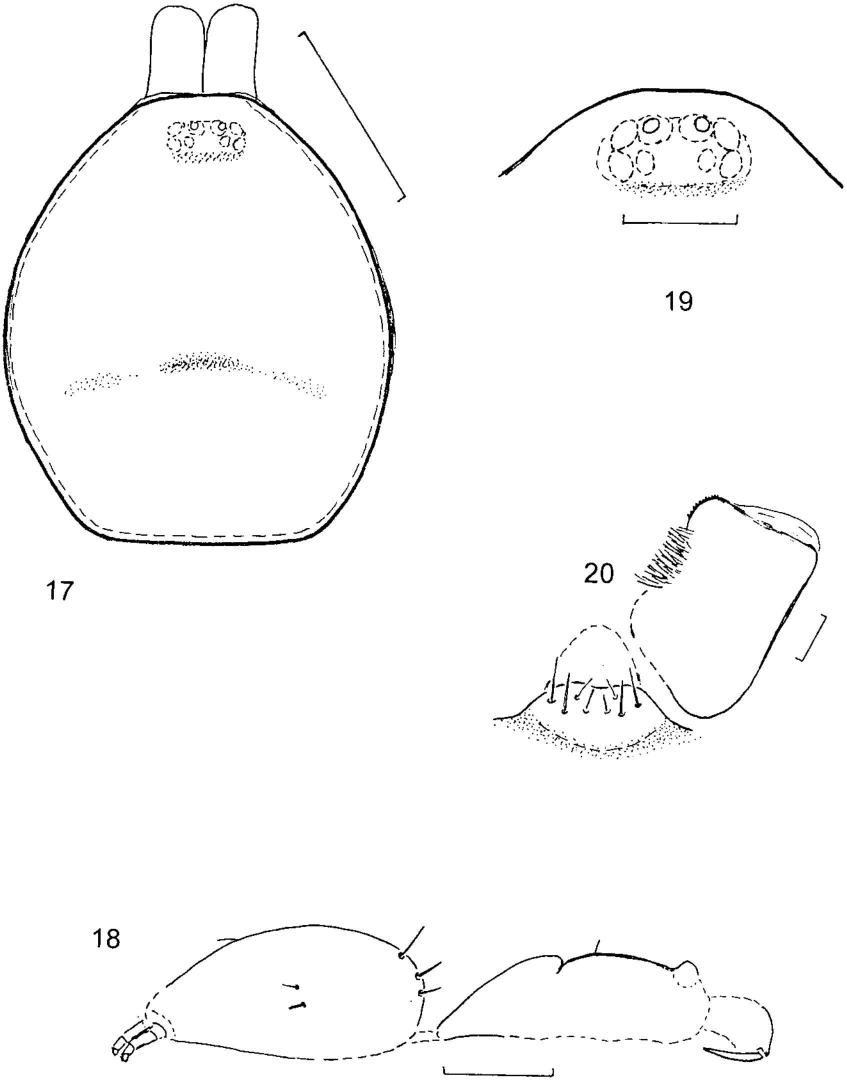
figs.14-16: ***Micromygale diblemma*** PLATNICK & FORSTER 1982 (Micromygalidae, extant), ♀, body dorsally, ventrally and laterally; taken from PLATNICK & FORSTER (1982);



figs.17-20: ***Parvomygale distincta* n.gen.n.sp**. (Microstigmatidae), ♂; 17) prosoma dorsally; 18) outline of the body laterally (only few hairs are drawn); 19) eyes (covered with bubbles) dorsally; 20) labium and l. gnathocoxa ventrally;

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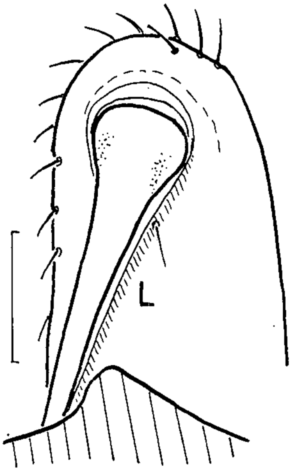

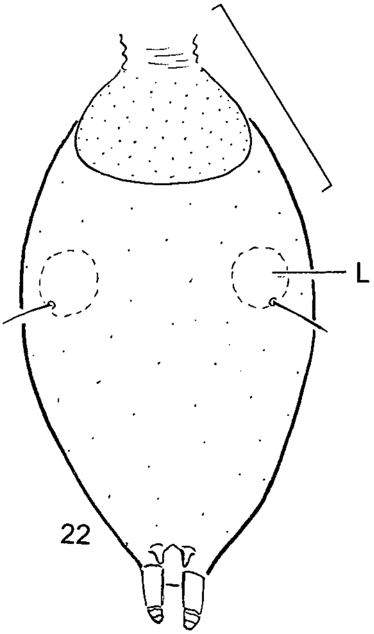

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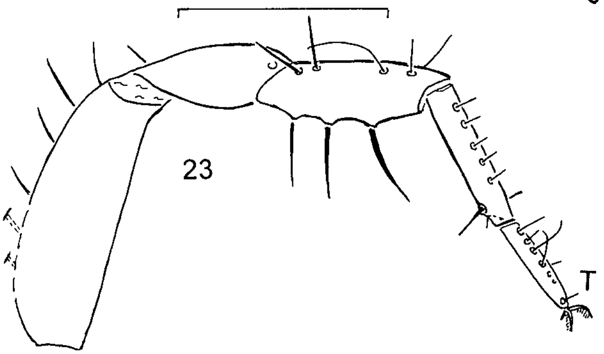

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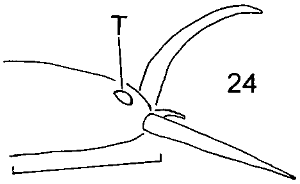

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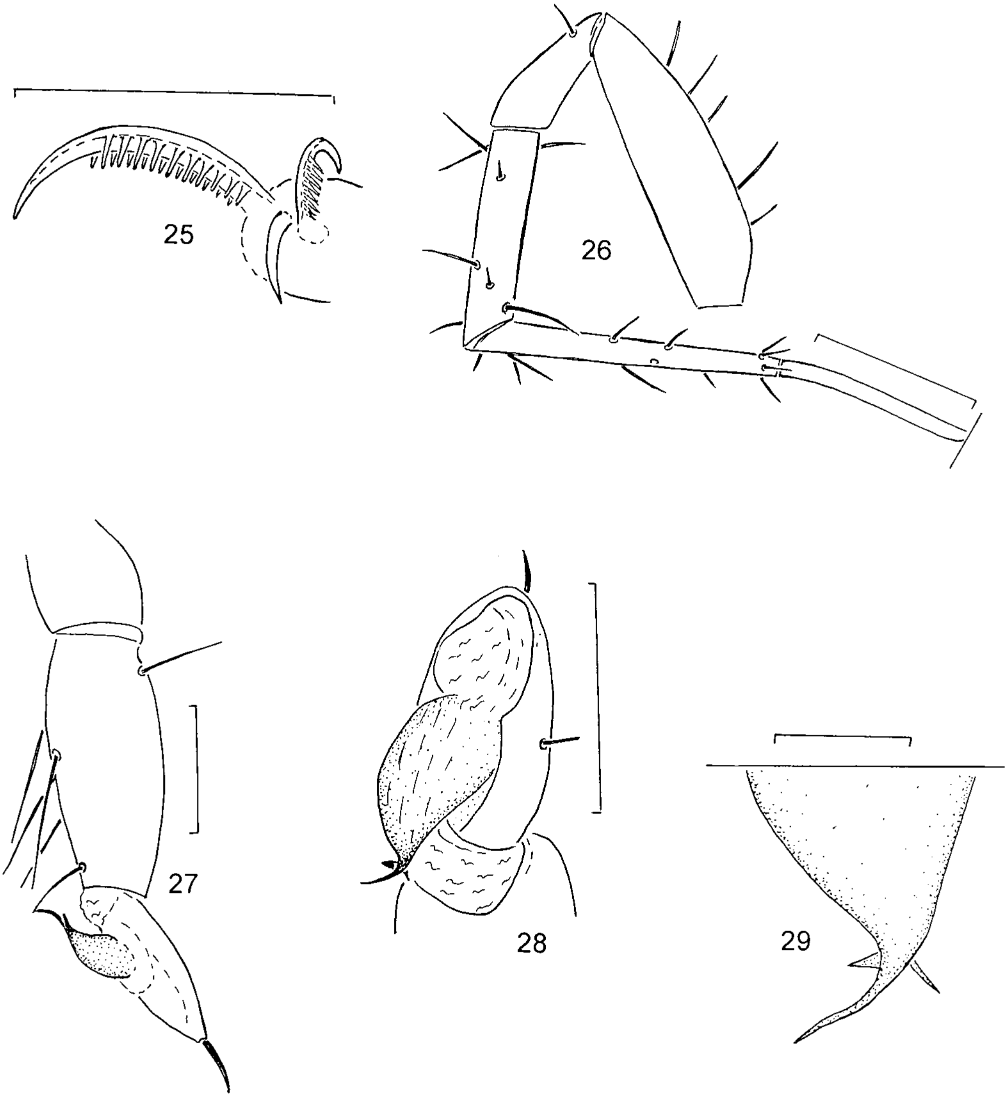
figs. 21-24: ***Parvomygale distincta* n.gen.n.sp**. (Microstigmatidae), ♂; 21) l. chelicera with retro-marginal lamella (L) retroventrally (basally hidden); 22) opisthosoma ventrally (only few hairs are drawn) (L = left posterior lung cover); 23) r. leg I retrolaterally and slightly distally (bothria a bit enlarged) (T = tarsal organ); 24) tip of the r. tarsus I retrodorsally with the tarsal organ (T) (teeth of the claws not shown);



figs. 25-29: ***Parvomygale distincta*** **n.gen.n.sp**. (Microstigmatidae): 25) claws of the l.tarsus I retrodistally (both teeth rows are shown only in the left claw); 26) r. leg IV retrolaterally (trichobothria not drawn); 27-28) r. pedipalpus retrolaterally and proventrally-distally; 29) tip of the r. pedipalpus proventrally-distally.- M = 0.05mm in fig.29), 0.1 in 20-21, 24-25), 0.2 in 19, 27-28), 0.5 in the other figs.

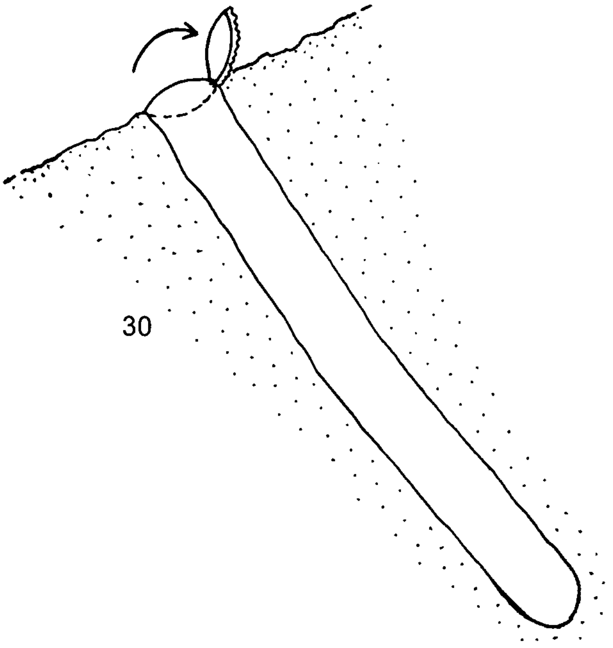
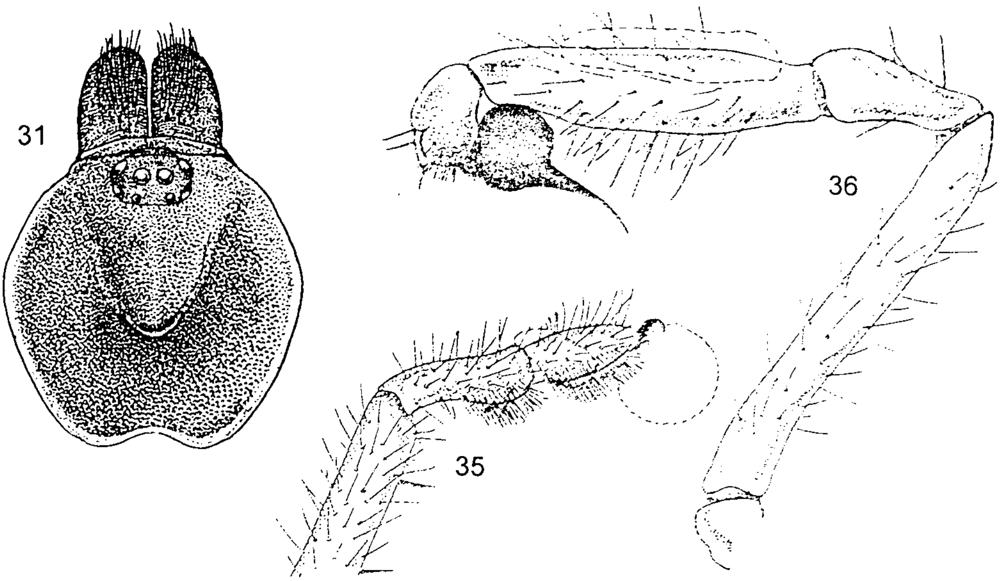
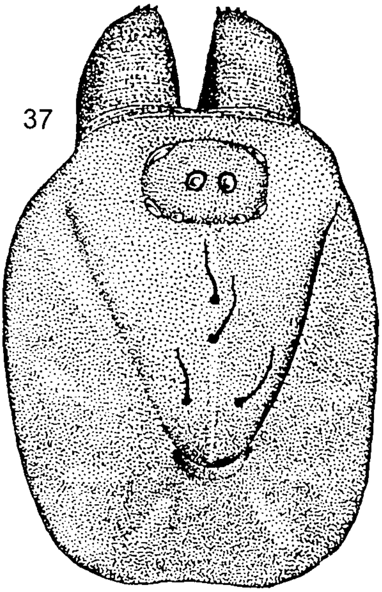
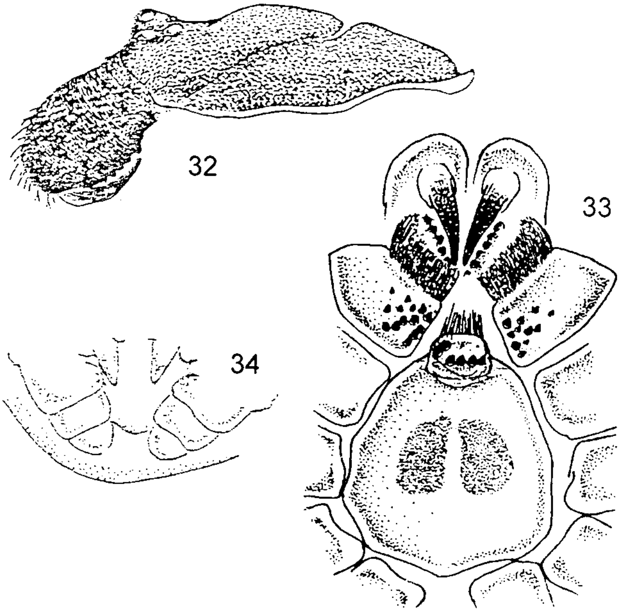


Fig. 30. Trapdoor (opened here artificially, arrow) and underground tube of an extant trapdoor spider (Ctenizidae). The tube is frequently build on an oblique surface and lined with silk. "The top of the lid is camouflaged with debris.---The lid may be held shut by the spider. When the spider feels the vibration of passing prey, it rushs out, capture the prey and takes it down to the tube." (Taken from LEVI & LEVI (1968: 2), Spiders and their kin.). - No such tube or lid has been identified in Baltic amber but the presence of a cheliceral rastellum and stout leg spines of the fossil spiders indicate the presence of such a tube and such a prey capture behaviour in the Ctenizidae of the Baltic amber forest. Comp. the tube of a fossil Segestriidae which is preserved in Baltic amber; see the paper on the Filistatoidea:Segestriidae in this volume.

Abb. 30. "Falltür" - besser "Klappdeckel" (hier künstlich geöffnet (Pfeil)) und unterirdische Röhre einer heutigen Falltürspinne (Ctenizidae). Die Röhre wird oft an einer schrägen Oberfläche angelegt und ist mit Spinnseide ausgekleidet. "Die Oberseite des Deckels ist mit Schmutz- (und Pflanzen-) teilchen getarnt.- Nimmt die Spinne die Vibrationen einer vorbeilaufenden Beute wahr, so stürzt sie heraus, fängt die Beute und transportiert sie hinunter in die Röhre." (Nach LEVI & LEVI (1968: 22): Spinnen und ihre Verwandten). - Eine derartige Röhre oder ein derartiger Deckel sind im Baltishen Bernstein bisher nicht identifiziert worden; das Vorhandensein von Stacheln vorn auf den Kiefern (Rastellum der Cheliceren) und zahlreicher starker Stacheln auf den Beinen der fossilen Spinnen deutet allerdings auf das Vorkommen derartiger Röhren und des beschriebenen Beutefang-Verhaltens bei den Falltürspinnen des Baltischen Bernsteinwaldes. - Vgl. die im Baltischen Bernstein erhaltene Wohnröhre einer fossilen Fischernetzspinne (Segestriidae); siehe die Arbeit über die Filistatoidea: Segestriidae in diesem Band.







figs. 31-36: ***Electrocteniza sadilenkoi*** ESKOV & ZONSTEIN 2000, ♂; 31) prosoma dorsally; 32) prosoma laterally; 33) prosoma ventrally; 34) spinnerets ventrally; 35) r. tibia, metatarsus and tarsus of leg I retrolaterally; 36) l. pedipalpus ventrolaterally.- Taken from ESKOV & ZONSTEIN (2000);

fig. 37: ***Baltocteniza kulickae*** ESKOV & ZONSTEIN 2000, juv. ♀, prosoma dorsally.- Taken from ESKOV & ZONSTEIN (2000).

Arachnologische Glosse

Im Dschungel der arachnologisch allgemeinverständlichen Unverständlichkeiten

Wir leben im Zeitalter des Multi-Kulti. Neudeutsche Wörter, wie „chatten", „mailen", „new economy" und „BSE", begegnen uns täglich und gehören bereits so sehr zu unserem Sprachgebrauch, dass wir vielfach nicht mehr sagen können, aus welcher Fremdsprache sie stammen.

Aber wer beherrscht heute noch Latein oder Alt-Griechisch (oder sogar beides)? Welchen Stellenwert besitzt die Erziehung zu logischem und komplexem Denken oder simplen mathematischen Zusammenhängen im Zeitalter des Computers? Mal Hand aufs Herz: Wissen Sie noch, wie man die Terme $\int x^2dx$ oder $dN/dt=N^3$ e exp $-t^2 + 2t$ löst? Stellen Sie mal diese Aufgaben den Professoren oder deren Assistenten in Ihrer Fakultät...

...und? Wie ist es ausgegangen? Na sehen Sie! Blamabel!

Um jetzt auf unser eigentliches Thema zu kommen: Wie übersetzt man z.B. „*Aphantaulax cinctus*", „*Semljicola caliginosa*" oder „*Cnephalocotes sanguinolentus*" ins Deutsche? Hat „*Ceratinopsis austera*" nur im Entferntesten etwas mit Austern zu tun, und ist „*Ceratinopsis romana*" die Lieblingsspeise der Bewohner der stiefelförmigen Halbinsel im Mediterran? Ist „*Lophomma*" die unhöfliche Aufforderung an eine alte Dame, sich endlich in Gang zu setzen, in berlinisch-westfälischem Dialekt? Nun? Das wissen Sie etwa auch nicht? Schande über Sie! Das ist doch aber Ihr Fachgebiet! Bekanntermaßen hat man doch den Organismen deshalb lateinische, altgriechische Namen oder eine Mischung davon gegeben, damit man auf der ganzen Welt versteht, was und wer damit gemeint ist. Nicht Englisch oder Esperanto sollte die Weltsprache der Wissenschaft sein, sondern Latein und Griechisch! Jedoch hat das doch so seine sprachlichen Tücken:

Verstehen Sie im internationalen Vortrag das „*Aplodrassü*" Ihres/Ihrer französischen oder gar das undeutlich und schnell vor sich hin genuschelte „*Ätippidi*", „*Leicosidi*", „*Pholciddiddi*" und „*Zeinotäxidi*" Ihres/Ihrer amerikanischen KollegenKolleginin? Oder stellen Sie sich vor, es gäbe eine Art namens „*Rhaebothorax ruricola*", könnten Sie auf Anhieb sagen, von welcher Art Ihr chinesischer Kollege gerade spricht, wenn er *Laebotholax lulicola* als typisch für die Spinnenfauna des Botanischen Gartens der Universität Peking vorstellt? Von wegen internationaler Verständlichkeit! Nur mit den gedruckten Namen in lateinischem, nicht aber in kyrillischem Alphabet oder in chinesischen, japanischen (難かしを葉はてゐの頭数), arabischen oder indischen Schriftzeichen, können Sie doch herausfinden, um welches Taxon es sich handelt. Sie glauben doch auch nicht etwa, dass sich Ihr indonesischer Kollege unter dem deutsch ausgesprochenen Namen „*Eriovixia* (pfui doch!) *laglaisei*" eine in seinem Land heimische Radnetzspinnenart vorstellen kann.

Also Schluss mit dem Schwindel! Wenn mit den gesprochenen lateinisch-griechischen Wörtern keine internationale Verständigung möglich ist, dann sollte doch zumindest jeder in seiner Landessprache begreifen, worum es sich bei den Spinnennamen handelt. Indische Arachnologen sollten indische (auf welchen der ca. 800 Dialekte sie sich auch immer einigen, ist ja schließlich deren Problem), finnische Arachnologen finnische und österreichische österreichische Trivialnamen verwenden. Wenn diese nahezu wörtliche Übersetzungen der lateinisch-griechischen Sprachen darstellen, die selbstverständlich nach wie vor auch in diesen gedruckt werden, so würden wir doch alle wieder zu humanistisch umfassend gebildeten Menschen werden.

Oder würde derjenige Professor, zu dessen Ehren Sie die Spinnenart „*Leptocephalus angustifrons*" benannt haben, diesen Namen ins Deutsche übersetzen wollen?

R. Platen

BEITR. ARANEOL., 3 (2004)

FOSSIL SPIDERS (ARANEAE) OF THE SUPERFAMILY DYSDEROIDEA IN BALTIC AND DOMINICAN AMBER, WITH REVISED FAMILY DIAGNOSES

JOERG WUNDERLICH, 75334 Straubenhardt, Germany.

Abstract: The relationships of the about 17 families of the spider superfamily Dysderoidea (Araneae) are discussed, a key, revised diagnoses and cladograms are given. Members of at least ten families are known in Baltic and/or Dominican amber; the first fossil species of the families Plectreuridae and Telemidae are described. Questionable juvenile members of the Scytodidae - or Drymusidae? - are described which possess a low prosoma in contrast to extant Scytodidae. Diguetidae GERTSCH 1949 is downgraded to a subfamily of the Plectreuridae BANKS 1898 (**n. stat.**), Loxoscelidae is regarded as a family of its own and Rhodinae (Dysderidae) is regarded in a strict sense. Psilodercinae DEELEMAN-REINHOLD 1995 (Ochyroceratidae) may be a family of its own. Theotiminae DEELEMAN-REINHOLD 1995 may be regarded as a tribus of the Ochyroceratinae. Ochyroceratidae is regarded as the sister group to the Pholcidae, Periegopidae as the sister group of the Plectreuridae and Segestriidae as the sister group of Periegopidae + Plectreuridae. - Fossil taxa of 11 or 12 spider families of the superfamily Dysderoidea are dealt with, 9 or 10 families in Baltic amber: Dysderidae, Leptonetidae, Oonopidae, Pholcidae, Plectreuridae, Scytodidae, Segestriidae, Telemidae, Tetrablemmidae, and questionable Drymusidae, and 8 families in Dominican amber: Caponiidae, Ochyroceratidae, Oonopidae, Pholcidae, Scytodidae, Segestriidae, Loxoscelidae and

Tetrablemmidae. - The following taxa are described from in Baltic amber: Questionable Drymusidae (within the Scytodidae): Gen. et sp. indet.; Dysderidae: *Dasumiana* **n. gen.**, *D. emicans* **n. sp.**, *D. valga* **n. sp.**, *Harpactea communis* **n. sp.**; *Eoleptoneta curvata* **n. sp.**, *E. duocalcar* **n. sp.**, *E. similis* **n. sp.**, *Oligoleptoneta* **n. gen.**, *O. altoculus* **n. sp.**; Oonopidae: *Orchestina gracilitibialis* **n. sp.**, ?*Stenoonops rugosus* **n. sp.;** Pholcidae: *Paraspermophora* **n. gen.**, *P. bitterfeldensis* **n. sp.**, *P. perplexa* **n. sp.**, *P.* sp. indet., Pholcidae gen. et sp. indet.; *Palaeoplectreurys* **n. gen.** *P. baltica* **n. sp.**; Scytodidae: Gen. et sp. indet.; Segestriidae: Ariadninae **n. subfam.**, *Ariadna defuncta* **n. sp.**, *Segestria flexio* **n. sp.**, *S. mortalis* **n. sp.**, *Vetsegestria* **n. gen.**, *V. quinquespinosa* **n. sp.**; Telemidae: ?*Telema moritzi* **n. sp.**, ?*T.* sp. indet.; Tetrablemmidae: *Balticoblemma* **n. gen.**, *B. unicorniculum* **n. sp.** Numerous taxa are revised. - A parasitic fossil mite (Acari: Microtrombidiidae or Trombidiidae) is described which is sucking at the prosoma of a female of the genus *Orchestina* SIMON (Oonopidae); a fossil male of *Segestria* sp. indet. (Segestriidae) is reported close to a parasitoitic wasp (Braconidae); a fossil ant and a Diptera are reported as prey of Dysderoidea, remains of spermatozoa and droplets of a capture web are reported from members of the family Tetrablemmidae. - *Palaeoplectreurys baltica* (Plectreuridae) is the first Palearctic member of this New World's family. Some special spider taxa are reported from the Bitterfeld deposit. - Some fossil members of the families Dysderidae and Segestriidae may have been aggressive ant mimics. -The following taxa are described from Dominican amber: *Arachnolithulus longipes* **n. sp.** (Ochyroceratidae), ?*Coryssocnemis velteni* **n. sp.** and *Loxosceles aculicaput* **n. sp.** (Loxoscelidae).

Material: Most material is kept in the private collection of the author (CJW); it will be given to a museum in the future.

INTRODUCTION

About 17 extant families of the superfamily Dysderoidea s. l. are generally accepted, fossils in amber of 12 or 13 families are known with this publication, see the list and the cladogram below. Members of 8 families of the Dysderoidea are reported from Dominican amber, see WUNDERLICH (1988: 14) and below (no Dysderidae, Leptonetidae, Plectreuridae nor Telemidae in contrast to Baltic amber), 9 or 10 families in Baltic amber (no Caponiidae, Ochyroceratidae nor Loxoscelidae in contrast to Dominican amber). Oonopidae, Pholcidae, Scytodidae, Segestriidae and Tetrablemmidae are reported from both kinds of amber. Filistatidae, Orsolobidae, Periegopidae and Sicariidae of the Dysderoidea are not known at all in these kinds of amber; the proof of Drymusidae in Baltic amber is questionable. What are the reasons for this absence? Most Telemidae are cave dwellers, Filistatidae and Sicariidae prefer dry biotopes (most Plectreuridae, too), Orsolobidae and Periegopidae are known only from the Southern Hemisphere. The reasons for the low diversity on generic level of members of the "Gamasomorphinae" (Oonopidae) and Dysderinae in Baltic amber is not quite clear to me; in contrast to members of the genus *Orchestina* (Oonopinae) the members of the Gamasomorphinae are not dwellers of higher strata, they live in litter and under stones. The same biotopes are preferred by the Dysderinae in contrast to the Harpacteinae of the Dysderidae; some extant Harpacteinae occur under the bark of trees.

Half of the families of the Dysderoidea is poor in genera today, only one to three genera are known, and fossils of half of the families are known from a single genus only. In Dominican amber Pholcidae is most diverse (in the tropics free-living spiders of this family are not rare), Oonopidae and Loxoscelidae are rare, Ochyroceratidae and Tetrablemidae are most rare (only one or two specimen(s) each). Only in the families Oonopidae and Pholcidae more than one genus is described from fossils. In Baltic amber the family Oonopidae is most rich in specimens and species but - with the exception of a single specimen of the questionable genus Stenoonops - only the genus *Orchestina* is present; extant members of this genus are not rare in higher strata. Members of the family Segestriidae - living today e.g. under the bark of trees - are not so rare as members of most other families; several species are present of the genus *Segestria*, and one species of the genus *Ariadna*. Besides the Segestriidae only in the family Leptonetidae more than one genus is surely known but see the indet. genera of the Dysderidae, Pholcidae, and questionable Scytodidae or Drymusidae. Plectreuridae are most rare (only one specimen), Scytodidae, Telemidae and the questionable Drymusidae are extremely rare, too, only three or four specimens of each family are known. Only juveniles have been found of the questionable Drymusidae. Most extant Telemidae are cave dwellers; their occurence in the Baltic amber forest is a surprise. The today's "New World" Plectreuridae and the questionable tropical Drymusidae - which are extinct today in the Palearctic Region - were probably relict taxa in the Western Palearctic Region already in the Early Tertiary.

Notes on the **frequency** and **ecology** of the fossils (see above, too): Members of the genus *Orchestina* SIMON 1882 (family Oonopidae) are the most frequent spiders in Baltic amber; in several non-selected spider's collections - e.g. coll. H. GRABENHORST from the Bitterfeld deposit and more than 100 specimens - I found about 10% of the specimens beeing *Orchestina* (40% males, 40% females, 20% juveniles) and members of *Segestria* LATREILLE 1804 (Segestriidae) are not rare, too. Extant members of both genera - as well as of the genus *Harpactea* BRISTOWE 1939 are known to live under the bark of trees today.

Notes on the **biogeography** of the fossil familes: (1) The discovery of a member of the family Plectreuridae in Baltic amber - which today is known only from the Americas (and mostly from dry biotopes) - was a great surprise (similar the Drymusidae). This family and the Leptonetidae are members of those spiders families which taxa (today) are restricted to the Northern Hemisphere. (2) The distribution of the Caponiidae, Drymusidae, Ochyroceratidae and Tetrablemmidae is tropical or mainly tropical; with the exception of the Drymusidae these families are reported from Dominican amber but only the Tetrablemmidae is reported from Baltic amber, too. All these families are absent from Europe today. In which period did the families Ochyroceratidae, Plectreuridae and Tetrablemmidae become extinct in Europe (and the Dysderidae in the Americas)? Were these extinctions caused by the Cretaceous-Tertiary boundary event? (Only the Plectreuridae and Plesioleptonetidae are known still to exist in the Early Tertiary in Europe, they were very rare in the Baltic amber forest). (3) Dysderidae - not known in Dominican amber - is a Palearctic and mainly Mediterranean family which has no endemic taxon in Central America. (Previous American records of *Dysdera* may really be Caponiidae). (4) Only three genera of the superfamily Dysderoidea - *Ariadna* of the Segestriidae, *Orchestina* of the Oonopidae and *Scytodes* of the Scytodidae - shared both kinds of amber. The distribution of these families is cosmopolitical and mainly tropical.

The questionable Scytodidae in Baltic amber are of special taxonomical interest: The questionable and juvenile members - gen. indet. 1 and 2 - of the families Scytodidae or Drymusidae possess a low prosoma in contrast to all extant spiders of the Scytodidae, see the figs. 12a and 12e. They may be members of the tropical family Drymusidae or of the sister group to the Drymusidae + Scytodidae. An adult fossil male of these taxa is needed for further investigations and conclusions.

Solely from the Bitterfeld deposit are known: *Ariadna defuncta* n. sp. (Segestriidae) (the only known *Ariadna* species and Ariadninae in Baltic amber!), ?*Stenoonops rugosus* n. sp. (Oonopidae) (the only known member of the subfamily "Gamasomorphinae" in Baltic amber!) and two questionable juveniles of the family Drymusidae (?Scytodidae). - Furthermore most specimens of *Paraspermophora* n. gen. (Pholcidae), including the holotype of *P. bitterfeldensis* n. sp. and ?*Telema moritzi* n. sp. (Telemidae) are known from the Bitterfeld deposit.

The **list below**: Members of the following families (underlined), subfamilies and genera of the Dysderoidea are known in Baltic amber (**BA**) and Dominican amber (DA) and treated in this paper in this order. The families which names are not underlined, are not known in amber. If not otherwise stated only the nominate subfamily is known:

(1) Filistatidae,
(2) Segestriidae: (a) Ariadninae: **BA**: *Ariadna*; DA: *Ariadna*,
    (b) Segestriinae: **BA**: *Segestria, Vetsegestria*,
(3) Plectreuridae: Plectreurinae - **BA**: *Palaeoplectreurys*,
(4) Periegopidae,
(5) Caponiidae: Nopinae - DA: *Nops*,
(6) Dysderidae: Harpacteinae - **BA**: *Harpactea, Dasumiana*,
(7) Orsolobidae,

(8) Oonopidae - **BA**: *Orchestina*, ?*Stenoonops*; DA: *Fossilopaea*, ?*Heteroonps*,
?*Opopaea*, *Oonops*, *Orchestina*, *Stenoonops*,
(9) Sicariidae,
(10) Loxoscelidae - DA: *Loxosceles*,
(11) Drymusidae - ?**BA**: 2 questionable gen. indet., see Scytodidae,
(12) Scytodidae - **BA**: *Scytodes* and 2 questionable gen. indet. (juv.); DA: *Scytodes*,
(13) Leptonetidae: (a) Leptonetinae - **BA**: *Eoleptoneta*, *Oligoleptoneta*,
(b) Plesioleptonetinae - **BA**: *Plesioleptoneta*,
(14) Telemidae - **BA**: ?*Telema*,
(15) Tetrablemmidae: Tetrablemminae - **BA**: *Balticoblemma*; DA: ?*Monoblemma*,
(16) Ochyroceratidae: ?Ochyroceratinae - DA: *Arachnolithulus*,
(17) Pholcidae: Pholcinae - **BA**: *Paraspermophora*, gen. indet.;
DA: *Modisimus*, *Pholcophora*, *Serratochorus*, gen. indet.

Extinct/extant genera: Most genera in Dominican amber are extant; extinct genera are only *Arachnolithulus* (Ochyroceratidae) and *Serratochorus* (Pholcidae). About 60%, probably more than 70% - see the juvenile spiders of the Pholcidae and questionable Drymusidae - of the genera in Baltic amber are extinct. Surviving genera of the Baltic amber forest are *Harpactea* (Dysderidae), *Orchestina* (Oonopidae), *Scytodes (Scytodidae)*, *Segestria* (Segestriidae) and most probably *Ariadna* (Segestriidae), *Stenoonops* (Oonopidae) and *Telema* (Telemidae); with the exception of *Stenoonops* these genera are still present today in Europe.

Diagnosis of the superfamily Dysderoidea (see the cladogram): Basicly presence of a "sucking basket" (see e.g. fig. 3b), an anterior position of the paired tracheal spiracles (fig. l), forward set spinnerets (e.g. figs. 2e, 17b). Most often 6 eyes or small anerior median eyes. Usually a short cymbium is present which is ventrally not concave and is not or only partly covering the large bulbus (e.g. fig. k); no epigyne but often with a "swollen" female's genital area, frequently with a special mating behaviour: "Mating bite" and simultaneous insertion of the emboli. In several families the female carries the egg sac with the help of its fangs and/or pedipalpi, see below (Pholcidae). - One or more characters are absent in several taxa, see below ("determination"). - Free hunters; tube or capture web dwellers.

Remark: In contrast to FORSTER et al. (1987) I regard the superfamily Dysderoidea in a wide sense. Similar to "my" Dysderoidea is Filistatoidea sensu LEHTINEN (1967) and Sicarioidea auct. In my opinion a splitting sensu LEHTINEN (1986) is not justified.

Relationships: Eresoclada may be the sister group, see the paper in this volume.

Determination: Remark: See the general key to the families.- For determination one may use the cladogram and the tables below, too. - How to recognize a member of the superfamily Dysderoidea? Nearly all fossil Dysderoidea possess only six eyes (e.g. figs.

p-r) as several members of the Anapidae s. l.; among the fossil spiders there are only three very rare exceptions which possess eight eyes (only one specimen each - but these spiders are of special interest!): *Palaeoplectreurys* (Plectreuridae), *Plesioleptoneta* (Plesioleptonetidae) and a gen. indet. of the family Pholcidae. Except several Leptonetidae, Ochyroceratidae and Telemidae at least one article of the male pedipalpus is thickened (e.g. fig. k); the cymbium covers not or only parts of the most often large bulbus (e.g. fig. k) in contrast to more evolved spiders; e.g. with the exception of the Pholcidae and some Dysderidae a simple bulbus is present (e.g. fig. k). A sclerotized epigyne or a true epigynal scapus are absent. Other characters of various Dysderoidea - as the basally fused chelicerae, e.g. fig. 3b - are usually difficult to observe in the fossils. - Frequency in Baltic amber: More than 50% (!) of the specimens of the Dysderoidea in Baltic amber are tiny members of the genus *Orchestina* (Oonopidae) which have distinctly thickened posterior femora (fig. m). Most of the larger six-eyed spiders - body length usually more than 3mm - are members of the Segestriidae.

Key to the families and selected subfamilies of the Dysderoidea,
based mainly on simple characters. Records in Baltic amber (BB) and Dominican amber (DB) are included. See the list on selected characters of the Dysderoidea and the figs. a-k.

1 Tarsal trichobothria present (fig. a), 8, 6, 4 or - mostly - 2 eyes (fig. b) present in a compact group. Leg bristles and teeth of the cheliceral margins absent. Colour of body and legs usually red or orange. DB. . . . . CAPONIIDAE

- Tarsal trichobothria absent, 8 eyes or less, mostly 6 or 8 eyes. Leg bristles and teeth of the cheliceral margins present or absent. Colour red, orange, yellow or grey. 2

2(1) 8 eyes (e.g. figs. c, d). 3

- 6 eyes or less (6 eyes in most amber spiders, e.g. figs. f-i, 4 eyes in some fossil Tetrablemmidae). (Rarely 8 eyes are present in the Oonopidae: In *Plectoptilus* SIMON and as an atavism in some specimens of *Orchestina* SIMON. - 6 eyes occur in several taxa of other families, too, mainly in the Anapidae s. l. (Araneoidea, see the paper in this vol.) and in cribellate Dictynidae). 5

3(2) Cribellum (fig. 1b) and calamistrum present. . . . . FILISTATIDAE

- Cribellum and calamistrum absent. 4

4(3) (Eyes in two groups which are widely spaced (fig. e). ♂ with strong bristles in the field of the median eyes (fig. e) and ventral leg spines: Genus *Eosynotaxus* of the family Synotaxidae (Araneoidea) which is similar to some Pholcidae. BB)

- Eyes in two parallel rows (fig. c). ♂: Strong bristles in the field of the median eyes and usually ventral leg spines absent. BB. . . . . .PLECTREURIDAE: PLECTREURINAE

- Position of the anterior median eyes between two triads (fig. d). (See no. 8). Leg bristles absent. BB, DB. . . . . PHOLCIDAE (part.)

5(2) Patellae 1 1/2 up to 2 1/2 times longer than the tarsi; distinct cheliceral carina present (fig. 6p). (Eyes in a compact group, figs. 6c, l, body colour usually red or orange in extant spiders). BB. . . . . DYSDERIDAE

- Patellae usually shorter than the tarsi or less than 1 1/2 times longer than the tarsi; cheliceral carina present or absent. 6

6(5) Opisthosoma with dorsal and ventral shields (scuta) (figs. 15a, c) 7

- Opisthosoma without dorsal shield (ventral shields are present in some Oonopinae). .8

7(6) Leg bristles absent (spines are present on the ♂-leg I of few species), chelicerae fused in the basal half, 6 eyes (fig. 15d) but mostly only 4 eyes (fig. 15a), males often with outgrowth of the prosoma and/or the chelicerae (figs. 15b-d). BB, DB. . . . . .TETRABLEMMIDAE

- Leg bristles usually present, chelicerae free, males rarely with such outgrowth(s). (See nos. 9, 16). BB, DB. . . . . OONOPIDAE: "GAMASOMORPHINAE"

8(6) Position of the posterior median eyes far behind the other eyes (fig. 13c). Usually slender articles of the ♂-pedipalpus. Patella-tibia autotomy. (See no. 9). BB. . . . . LEPTONETIDAE (part.): LEPTONETINAE

- Eyes in two groups which are usually triads and widely spaced (fig. 17d). Males: Chelicerae usually with outgrowth(s) (e.g. fig. 17g), pedipalpus complicated and with a large procursus (e.g. fig. 17f). (See no. 4). BB, DB. . . . . PHOLCIDAE (part.)

- Eyes in a compact group (figs. g-h). 9

- Eyes in three pairs (diads), the "Segetriid position" (fig. f). 10

9(8) Unpaired tarsal claw absent, colulus absent or strongly reduced, teeth of the cheliceral margins reduced and female pedipalpal claw absent or strongly reduced. (See nos. 7, 16). Coxa-trochanter autotomy. DB. . . . . . . OONOPIDAE: "OONOPINAE" (part.)

- Unpaired tarsal claw and numerous cheliceral teeth present, colulus large, female pedipalpus with a long claw, eyes fig. h. (See no. 8). Patella-tibia autotomy. BB. . . . . .LEPTONETIDAE (part.): ARCHOLEPTONETINAE

10(8) Median eyes distinctly in front of (widely spaced from) the other eyes (fig. i). . . .11

- Median eyes not distinctly in front of (and widely spaced from) the other eyes. 12

11(10) Prosoma more or less domed posteriorly (e.g. fig. j), no leg bristles, opisthosoma short, cymbium long, sickle-shaped pits present (fig. 12i). BB, DB . . . . . . SCYTODIDAE

- Prosoma not domed posteriorly (fig. 11a), leg bristles present, opisthosoma long, cymbium very short. ?BB . . . . .DRYMUSIDAE

12 (10) Body and legs densely covered with numerous distinct short and thick spines (fig. 9a). . . . . .SICARIIDAE

- No thick spines. 13

13(12) Leg III relatively long, stretched sidewards (fig. 10a), body flat, fovea well developed, larger spiders, cymbium very short (fig. k). DB. . . . . LOXOSCELIDAE

- Leg III distinctly shorter than the other legs, legs not stretched sidewards, body not flattened, tiny to larger spiders, cymbium usually long. .14

14(13) Cheliceral stridulating files present, similar to fig. 9b. North America. (See no. 4). . . . . PLECTREURIDAE: DIGUETINAE

- Cheliceral files absent. 15

15(14) Unpaired tarsal claws absent, onychium present. 16

- Unpaired tarsal claws present, onychium present in the Periegopidae 17

16(15) Body length usually less than 3mm, usually no cheliceral teeth, no claw of the ♀-pedipalpus. (See nos. 7, 9). BB, DB: *Orchestina* with distinctly thickened femur IV (fig. m). . . . . .OONOPIDAE: "OONOPINAE" (part.)

- Body length usually 3-5mm, usually two teeth on each cheliceral margin, claw of the ♀-pedipalpus present . . . . .ORSOLOBIDAE

17(15) Opisthosoma long and cylindrical (e.g. figs. 2a, e); legs robust, with numerous strong bristles. Usually medium-sized grey spiders. 18

- Opisthosoma short, often globular; legs long and slender, with few thin bristles or bristle-less. Pale body colour, usually tiny spiders. 19

18(17) Leg III directed forward as legs I and II (fig. 2a), one row of teeth of the tarsal retroclaws I-II, distinct paired tracheal spiracles in an anterior position similar to fig. l. Cosmopolitical distribution. BB, DB . . . . .SEGESTRIIDAE

- Leg III directed backward as leg IV, bipectinate retroclaws I-II, single tracheal spiracle near the spinnerets. Australian Region. . . . . .PERIEGOPIDAE

19(17) Anterior opisthosomal sclerite present (fig. 14a), few leg bristles, usually slender articles of the ♂-pedipalpus (fig. 14h). BB. . . . . TELEMIDAE

- Anterior opisthosomal sclerite absent, leg bristles usually absent (rarely present on posterior tibiae and metatarsi), often thickened articles of the ♂-pedipalpus, slender in fig. 16d. DB. . . . . OCHYROCERATIDAE

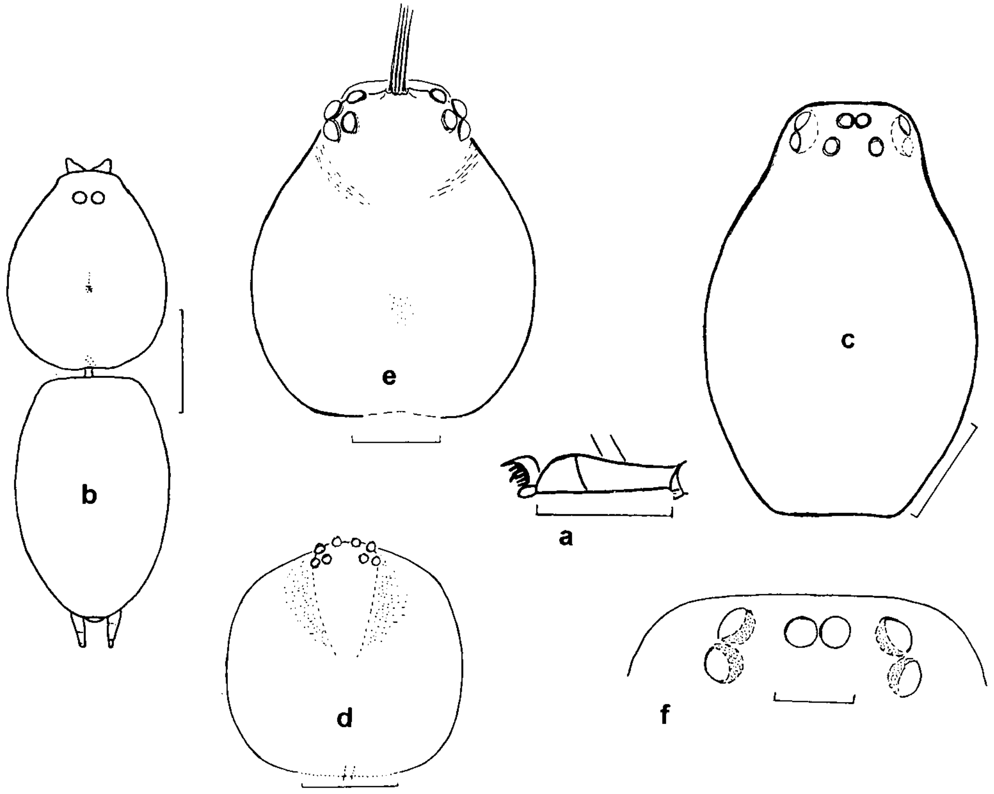


Fig. a) Nops lobatus WUNDERLICH 1988, ♂ in Dominican amber, thickened l. tarsus II retrolaterally, with two dorsal trichobothria and with pseudosegmentation. M = 0.5mm;

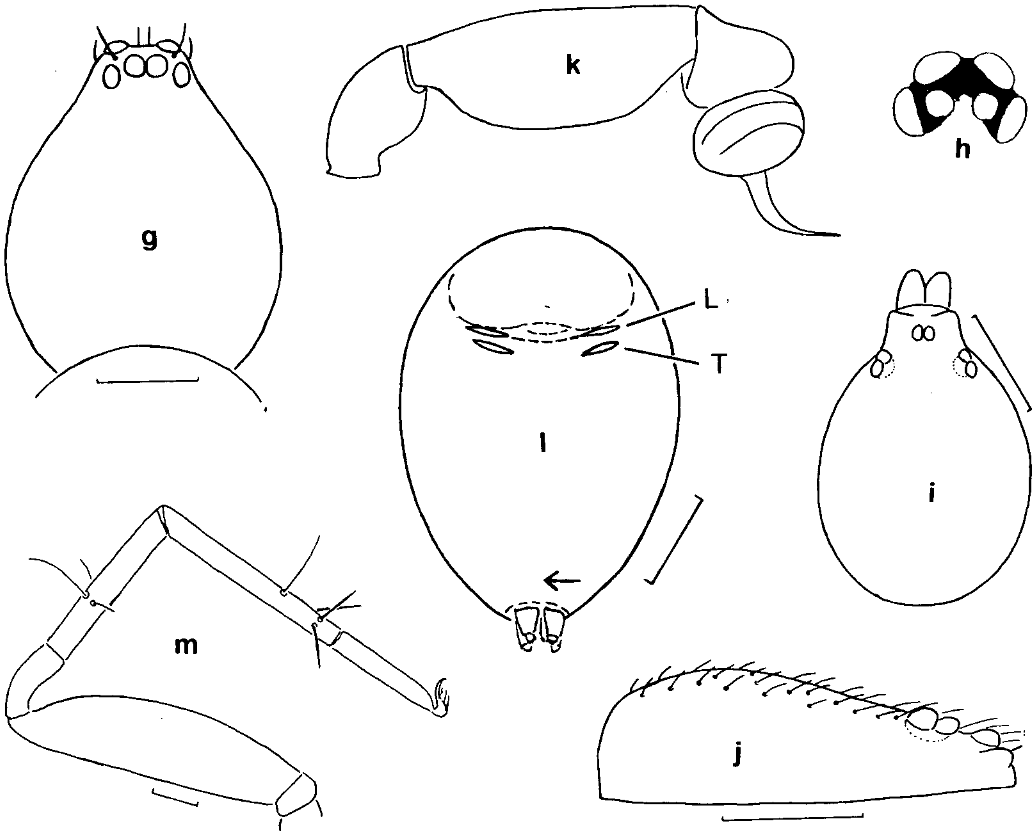
fig. b) Nops segmentatus WUNDERLICH 1988, ♂ in Dominican amber, body dorsally. M = 1.0;

fig. c) Palaeoplectreurys baltica n. gen. n. sp., ♂-prosoma dorsally. M = 0.5;

fig. d) Serratochorus pygmaeus WUNDERLICH 1988, ♂ in Dominican amber, prosoma dorsally. M = 0.2;

fig. e) Eosynotaxus sp. (Araneoidea: Synotaxidae), ♂, prosoma, dorsal view. M = 0.2;

fig. f) Segestria sp., position of the eyes dorsally. M = 0.5;



g) Fossilopopaea sulci WUNDERLICH 1988, ♂ in Dominican amber, prosoma dorsally. M = 0.2;

h) Archoleptoneta schusteri GERTSCH 1974, ♀, extant, position of the eyes dorsally. Taken from GERTSCH (1974);

fig. i) Scytodes sp., prosoma dorsally. M = 0.2;

fig. j) Scytodes planithorax WUNDERLICH 1988, ♂ in Dominican amber, prosoma laterally. M = 0.2. In most members of this genus the prosoma is stronger domed;

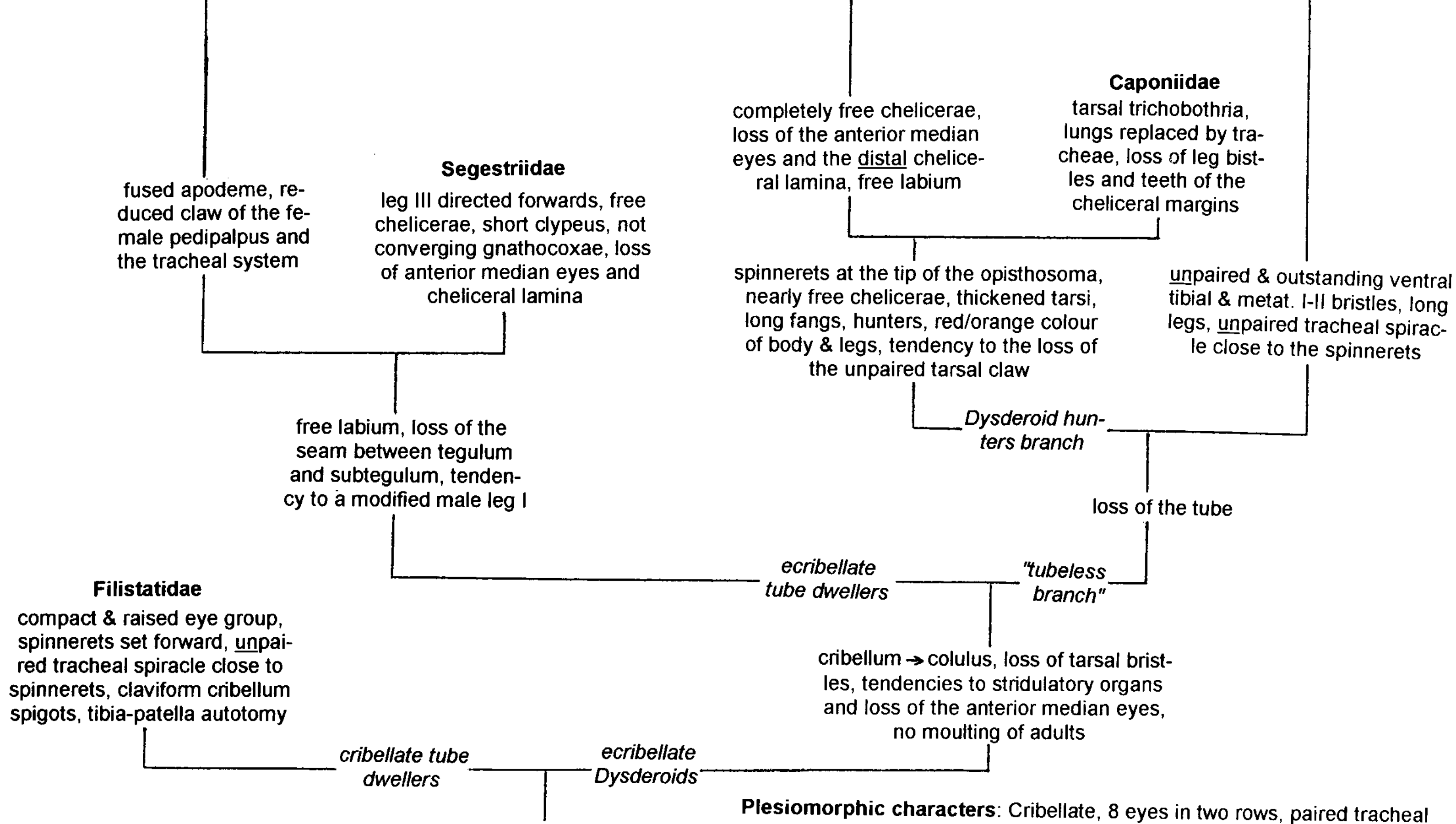
fig. k) Loxosceles caribbea GERTSCH 1958 (extant), ♂, r. pedipalpus retrolaterally. Taken from GERTSCH & ENNIK (1983: Fig. 295);

fig. l) Harpactea sp., ♀, opisthosoma ventrally. L = lung slit, T = tracheal slit. Note the absence of a tracheal opening in a posterior position (arrow). M = 0.2;

fig. m) Orchestina sp., l. leg IV with bristles and trichobothria. M = 0.1.

	unpaired tarsal claw	Cribellum	partly fused chelicerae	cheliceral lamina	(strong)paired tracheal spiracles in an anterior position	highest number of eyes	free labium	capture web/hunters (h)
Filistatidae	+	+	+	+	-	8	-	-
Plectreuridae	+	-	+	+	-	8	+	+/-
Periegopidae	+	-	?	+	-	6	+	-
Segestriidae	+	-	+	-	+	6	+	-
Pholcidae	+	-	+	+	-	8	-	+
Ochyroceratidae	+	-	+	+	-	6	+/-	+
Leptonetidae	+	-	-	-	-	6	+/-	+
Telemidae	+	-	-	-	(+)	6	-	+
Sicariidae	-	-	+	+	-	6	-	h
Loxoscelidae	-	-	+	+	-	6	-	h
Scytodidae	red.	-	+	+	-	6	-	h
Drymusidae	+	-	+	+	-	6	-	+/-
Tetrablemmidae	+	-	+	+	-	6	+	+
Caponiidae	+	-	+	+	+	8	+/-	h
Dysderidae	+/-	-	-	-	+	6	+	h
Oonopidae	+	-	-	-	+	6	+	h
Orsolobidae	+	-	-	-	+	6	+	h

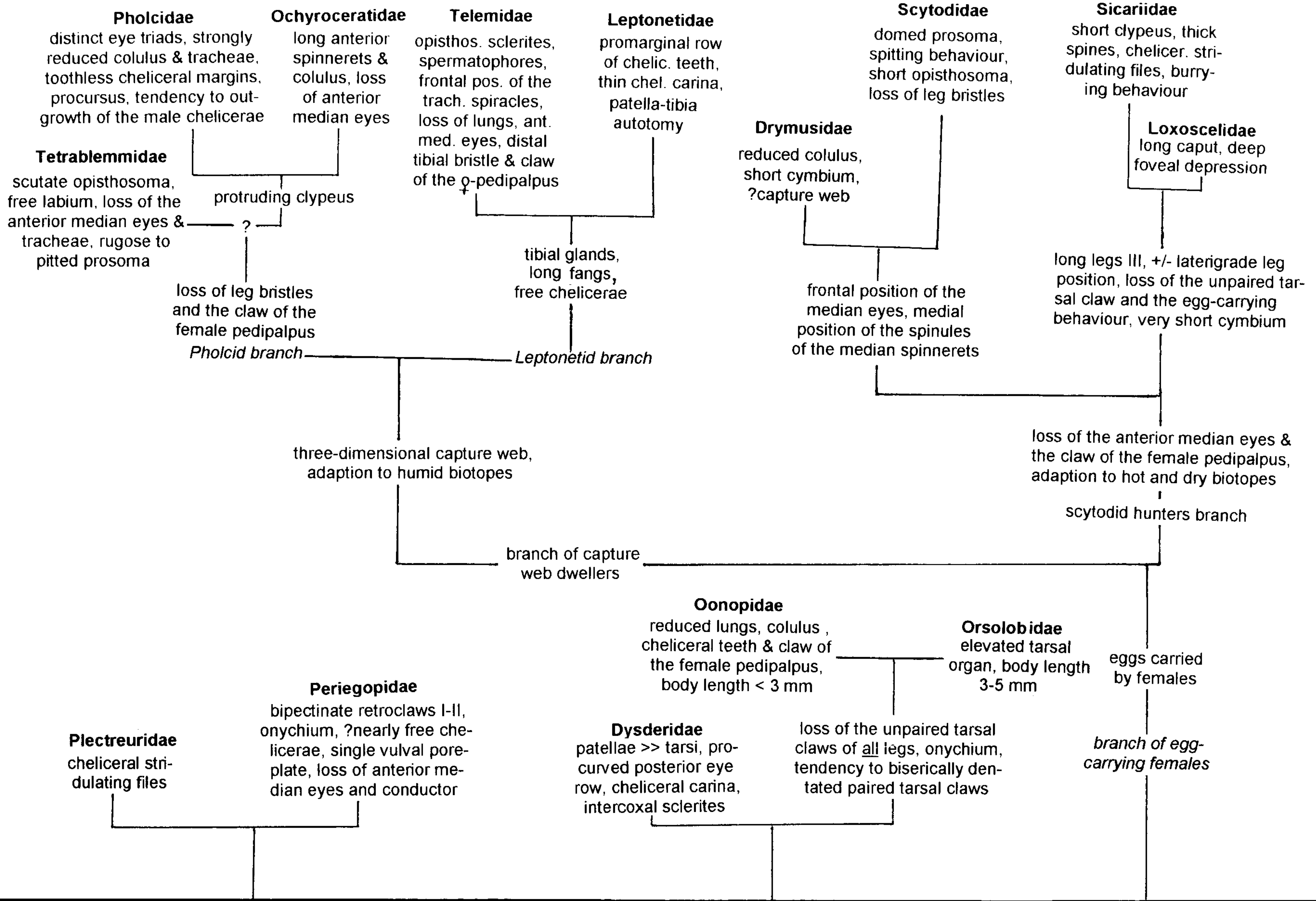
Selected family characters of the Dysderoidea



Apomorphic characters: Basally fused chelicerae with short fangs & lamina, strongly converging gnathocoxae, cylindrical opisthosoma with the spinnerets set forward, anter. pos. of the tracheal spiracles, tegulum fused to the subteg., ?simple bulbus, simultaneous insertion of the emboli, "mating fixation", tendency to bipectinate paired tarsal claws and cheliceral stridulating files.

Plesiomorphic characters: Cribellate, 8 eyes in two rows, paired tracheal apodemes, ventral tarsal bristles, strong paired ventral tibial & metat. I-II bristles, unpaired tarsal claw & female tarsal claw present, labium fused to the sternum, three pairs of heart ostia, thick male pedipalpal articles, large & ?simple bulbus, small cymbium, hairy & grey body, tube dwellers, no capture web, moulting of adult females.

Possible cladogram of the families of the superfamily Dysderoidea


Pholcidae
distinct eye triads, strongly reduced colulus & tracheae, toothless cheliceral margins, procursus, tendency to outgrowth of the male chelicerae
Ochyroceratidae
long anterior spinnerets & colulus, loss of anterior median eyes
Telemidae
opisthos. sclerites, spermatophores, frontal pos. of the trach. spiracles, loss of lungs, ant. med. eyes, distal tibial bristle & claw of the ♀-pedipalpus
Leptonetidae
promarginal row of chelic. teeth, thin chel. carina, patella-tibia autotomy
Scytodidae
domed prosoma, spitting behaviour, short opisthosoma, loss of leg bristles
Sicariidae
short clypeus, thick spines, chelicer. stridulating files, burrying behaviour
Drymusidae
reduced colulus, short cymbium, ?capture web
Loxoscelidae
long caput, deep foveal depression
Tetrablemmidae
scutate opisthosoma, free labium, loss of the anterior median eyes & tracheae, rugose to pitted prosoma
protruding clypeus
?
loss of leg bristles and the claw of the female pedipalpus
Pholcid branch
tibial glands, long fangs, free chelicerae
Leptonetid branch
long legs III, +/- laterigrade leg position, loss of the unpaired tarsal claw and the egg-carrying behaviour, very short cymbium
frontal position of the median eyes, medial position of the spinules of the median spinnerets
three-dimensional capture web, adaption to humid biotopes
loss of the anterior median eyes & the claw of the female pedipalpus, adaption to hot and dry biotopes
scytodid hunters branch
branch of capture web dwellers
Oonopidae
reduced lungs, colulus , cheliceral teeth & claw of the female pedipalpus, body length < 3 mm
Orsolobidae
elevated tarsal organ, body length 3-5 mm
eggs carried by females
Periegopidae
bipectinate retroclaws I-II, onychium, ?nearly free chelicerae, single vulval poreplate, loss of anterior median eyes and conductor
Plectreuridae
cheliceral stridulating files
Dysderidae
patellae >> tarsi, procurved posterior eye row, cheliceral carina, intercoxal sclerites
loss of the unpaired tarsal claws of all legs, onychium, tendency to biserically dentated paired tarsal claws
branch of egg-carrying females

Remarks on the cladogram, on selected family characters, reversals, convergences and losses:

(1) Reversals: (a) Reversals to plesiomorphic characters of the order Araneae: (a1) The plesiognath position of the chelicerae in the Dysderidae: Probably the special prey of these spiders - e.g. Isopoda - is the reason for the evolution of this reversal; (a2) the distinct eye triads of the Pholcidae; (b) females of the Loxoscelidae, Sicariidae, Tetrablemmidae: Tetrablemminae and at least some Telemidae do not carry their eggs but probably their ancestors did this. Sicariidae have laterigrade legs, therefore the position of the body is near the ground and there is no capacity for a lump of eggs, similar the Loxoscelidae, moreover members of the Sicariidae use their chelicerae for digging; Telemidae and Tetrablemminae probably lost this behaviour because of its tinyness: The cocoon of small/tiny spiders is usually relatively large compared with its size in larger spiders; (c) in few specimens of the six-eyed genus *Orchestina* (Oonopidae) anterior median eyes are present (fig. 8d), apparently as an atavism, see below. This atavism may show that the genetic information which codes the existence of the anterior median eyes still is present in these spiders. The presence of anterior median eyes in spiders of the genus *Plectoptilus* (Oonopidae) may be a "true" reversal; (d) a distinct foveal depression is present in the Dysderoidea in some Pholcidae, some Ochyroceratidae and in the Loxoscelidae; (e) the paired tracheal spiracle in an anterior position in the Telemidae and the anterior position of the tracheal spiracle in most Ochyroceratidae (Ochyroceratinae and Theotiminae) may be reversals; (f) a capture web within the Dysderoidea is present in the Plectreuridae: Diguetidae (with a tube!), Tetrablammidae, Pholcidae + Ochyroceratidae and Leptonetidae + Telemidae and probably the Drymusidae. Such a web is already present in the "primitive" Hypochiloidea and Austrochiloidea - as a convergence? According to my hypothesis the capture web was absent - has been lost? - in the ancestor of the Filistatidae and evolved newly two or three times in the Plectreuridae: Diguetinae, in the Pholcidae + their kin and probably in the Drymusidae; (g) the "sucking basket": See below; (h) leg spines: See no. 2 (h).

(2) Convergences/losses: (a) According to my hypothesis a derived tracheal system - see fig. 9 and no. (8) - evolved at least three times within the Dysderoidea: In the Filistatidae, the Plectreuridae + Periegopidae and in the "unpaired tracheal spiracle branch"; (b) lungs are lost in the Caponiidae and Telemidae on family level and are reduced in several other families (e.g. Tetrablemmidae); (c) the cheliceral lamina is most probably a basic character of the Dysderoide, well developed, long and with a distal tooth-like structure e.g. in the Caponiidae, Pholcidae and Plectreuridae (fig. 3b). The tooth-shaped structure may be reduced or even lost, the lamina may be translucent as in Pholcidae or thin as in the Leptonetidae, it may be shortened distally as in the Leptonetidae, shortened distally and strongly sclerotized to a "carina", e.g. in the Dysderidae. In both families the cheliceral margins usually bear numerous teeth; the presence of a lamina is impossible with the teeth. A lamina is lost several times, e.g. it is completely lost in the Segestriidae, see the cladogram; (d) a free labium (more or less movable and with a distinct seam to the sternum) is present in the "ecribellate tube dwellers", some Caponiidae, in the Dysderidae + its kin, and in the Leptonetidae at least a distinct seam

is present, see e.g. GERTSCH (1974: Fig. 56) and the description of the Plesioleptonetidae n. fam. below; (e) an unpaired tarsal claw is lost in Sicariidae + Loxoscelidae, Oonopidae + Orsolobiidae and in several Dysderidae; (f) the number of eyes (see below) is reduced in several families independently; most often the anterior median eyes are reduced. The complete plesiomorphic number of 8 eyes as a family character is present in the Filistatidae and - as a subfamily character - in the Plectreurinae; basicly 8 eyes are present furthermore in the Caponiidae and Pholcidae. Apparently an atavism is present in some specimens of the genus *Orchestina* (Oonopidae), see below. Besides cave spiders the number of eyes may be reduced e.g. in Pholcidae to four, in Caponiidae to two and in Tetrablemmidae even to one. Nothing is known about the physiological background of the tendency to loose the anterior median eyes and the "wandering" of the posterior median eyes to the position of the anterior median eyes; (g) opisthosomal scuta evolved convergently in the Tetrablemmidae, Dysderidae: Rhodinae and Oonopidae: "Gamasomorphinae"; (h) number and size of leg bristles are reduced in numerous taxa, e.g. in the Loxoscelidae; they are completely lost in the Caponiidae, Pholcidae, Scytodidae, Ochyroceratidae (present as a reversal on posterior tibia and metatarsus in few *Speocera*-species) and Tetra-blemmidae (present sexual-dimorph on leg I in some males as a reversal). Strong - and frequently numerous - leg bristles are present in the "primitive" Filistatidae, Plectreuridae, Segestriidae, probably Periegopidae as well as in many genera of the Dysderidae, Oonopidae and Orsolobidae; (i) the orange-red body colour of the "Dysderoid hunters branch" - see the cladogram - evolved convergently in the Periegopidae; (j) a coxa-trochanter autotomy is basicly present in the Dysderoidea and frequent e.g. in the Pholcidae. A patella-tibia autotomy evolved in the Filistatidae and the Leptonetidae independently; (k) thin articles of the male pedipalpus evolved e.g. in various Leptonetidae and Ochyroceratidae as well as in the Telemidae as a family character.

(3) Unfortunately the number of heart ostia is not known in most families; three ostia are reported from Scytodidae and Sicariidae, see BEATTY (1970).

(4) A long and cylindrical opisthosoma is present in some taxa of the Hypochilidae, too, see FORSTER et al. (1987: Figs. 1-2) and may be a plesiomorphic character of the Dysderoidea.

(5) A fused tracheal apodeme evolved probably more than two times within the Dysderoidea, e.g. in the ancestor of Periegopidae + Plectreuridae - see FORSTER (1993), RAMIREZ (2000) - and the ancestor of the Sicariidae + their kin.

(6) According to my investigations the chelicerae are fused at the base but not free in some Caponiidae. These finding is in contrast to reports of previous authors, e.g. PLATNICK et al. (1991). See the discussion below (and on long/short fangs as well). Also in the Periegopidae the chelicerae are probably fused basally, see FORSTER (1995: Figs. 9-10); according to FORSTER the chelicerae are free. I had no opportunity to study material of members of this family.

(7) According to my hypothesis the basic position of the paired tracheal spiracles in the Dysderoidea is quite anteriorly (fig. v; see the list). It is remarkable that three of the most "basal" families of this superfamily - Filistatidae, Plectreuridae and Periegopidae - possess the derived and unpaired type of the tracheal spiracle. - According to my hypothe-

sis an - extinct - family of the Dysderoidea should have existed which possessed a cribellum, a "sucket basket" and an eye position similar to the Filistatidae but paired tracheae in an anterior position as e.g. Dysderidae and Segestriidae. I regard this hypothetical family as the "true" sister group to the Filistatidae; members lived probably in the Triassic, Jurassic and - still? - the Cretaceous Periods.

(8) Bipectinate paired tarsal claws are not rare in the superfamily Dysderoidea, developed (or lost?) several times. They are reported e.g. from/within the Oonopidae, Orsolobidae, Periegopidae, Plectreuridae, Sicariidae and Loxoscelidae, see FORSTER (1995); in a juv. *Sicarius* sp. from Africa and *Loxosceles rufescens* not found by me; in Periegopidae and Scytodidae they are present on the legs I-II only, see FORSTER (1995: 92).

(9) Within the Dysderoidea ventral tarsal bristles are present in the Filistatidae only. Such bristles are "already" present in Mygalomorpha and the more "primitive" Austrochiloidea; therefore I regard it as a plesiomorphic character of the Dysderoidea which has been lost in the sister group of the Filistatidae. (Ventral tarsal bristles occur in other *cribellate* spider families as Eresidae and Uloboridae, too).

(10) The relationships of the Tetrablemmidae are not clear to me. According to the egg-carrying females and the presence of a capture web in the Tetrablemminae, the absence of leg bristles and the short opisthosoma the family may well be a member of the "pholcid branch".

(11) Synonymy/status: (a) In my opinion Diguetidae is a subfamily of the Plectreuridae, see below; (b) Psilodercinae (Ochyroceratidae) may well be a family of its own, see below.

(12) Not all of the apomorphic and plesiomorphic characters can easily be recognized; I compared "primitive" taxa as Filistatidae - see e.g. GRAY (1995) - and Hypochilidae. See also the discussion below.

(13) In a not quite different possible cladogram the families Periegopidae, Plectreuridae + Segestriidae are the sister group to the Filistatidae and these four families are sister to all remaining families. In this case the cribellum would have been lost two times.

(14) I use selected and special ethological and ecophysiologigal characters as the mating behaviour, egg-carrying by females (see the Pholcidae), tube dwellers/capture web dwellers and hunters, patella-tibia autotomy. The egg-carrying behaviour is not known in extant Leptonetidae; European Telemidae attach the cocoon to the underside of rocks, see ROTH (1993: 167). Remarks on the mating behaviour: See below: Oonopidae.

(15) The combination of most plesiomorphic characters in the "ecribellate Dysderoids" exists within the "ecribellate tube dwellers", the Plectreuridae: Plectreurinae: 8 eyes in parallel rows, paired and widely spaced tracheal spiracles, a cylindrical opisthosoma, fused chelicerae with a long lamella and a tube of the web. Caponiidae is similar in some respects but a tube is absent. A combination of most advanced characters is present in the Telemidae: An unpaired tracheal spiracle, no lungs, no anterior median eyes, no cheliceral lamina (?), no claw of the ♀-pedipalpus, presence of a capture web and

free chelicerae. Ochyroceratidae: Psilodercinae is similar in several respects.

(16) The shape of the tarsi which are thickened distally - most distinct in many Caponiidae and Dysderidae - may be a further apomorphic character of the Dysderoidea and lost in the "unpaired tracheal spiracle branch".

Discussion on structures of the mouth parts + chelicerae and their dependence on ecology and behaviour

In most members of the superfamily Dysderoidea we find very special chelicerae and mouth parts, there is a connection between five structures of chelicerae and mouth parts (see the list above): Fused chelicerae, a cheliceral lamina, strongly converging gnathocoxae, a fixed labium and short fangs (resp. free chelicerae, absence of a cheliceral lamina, parallel gnathocoxae a free labium and long fangs). I regard connections between ecology, behaviour, morphological structures and their function as extremely important when discussing the relationships of taxa, and they may give hints at the direction of evolution. (To my knowledge reflections on such connections are not considered in computer cladistics).

As already pointed out by previous authors the fused chelicerae with a lamina and the structures of the mouth parts build a special functional "sucking basket"; a connection to the "spitting prey capture" was discussed, too, see e.g. FORSTER (1995: 102). The combination of these structures is unique in spiders; it is similar in several Anapidae s. l. (Araneoidea) in which a cheliceral lamella is absent. Basally fused chelicerae are present in the Mimetidae: Mimetini, too. In connection to the fused basal articles of the chelicerae - which are slightly movable only - long fangs would not be useful in prey catching prey and would probably hinder the function of the "sucking basket". Therefore we find a strong lamina and short fangs in such taxa which members possess strongly fused chelicerae, e.g. in the Plectreuridae and Pholcidae. Converging gnathocoxae and a fused labium are apparently useful to this function. On the other hand we find the longest fangs in such taxa which members have completely or nearly free chelicerae as Dysderidae, Leptonetidae and Telemidae. In the Caponiidae the chelicerae are fused at the base only and the fangs are long. In the Segestriidae a cheliceral lamina is absent and the gnathocoxae are parallel, all in contrast to the Plectreuridae. Within the Segestriidae the fangs are quite different, they are short and nearly immobile in the genus *Ariadna* (fig. 2c) but long and well movable in the genus *Segestria* (fig. 2b) - a remarkable intrafamiliar variability! See the chapter on the Segestriidae below.

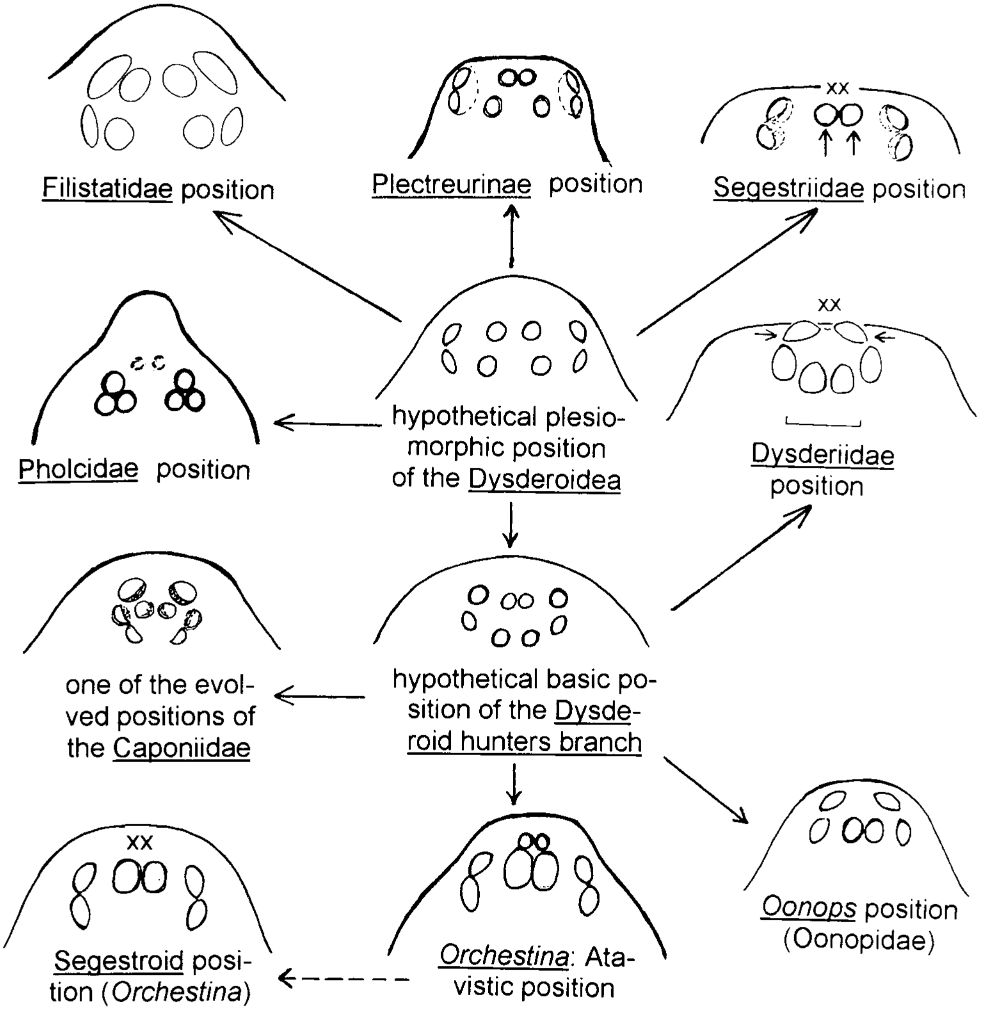
Reflections on the evolutionary loss of the anterior median eyes and the displacement of the posterior median eyes within the superfamily Dysderoidea

Within the superfamily Dysderoidea we find a distinct tendency to the loss of the anterior median eyes, see also above, the list and the cladogram. In the plesiomorphic cribellate Filistatidae and in the plesiomorphic ecribellate Plectreurinae the anterior median eyes are present in two rows (figs. 3a, 18q). The atavistic presence of the anterior median eyes (fig. 8d) in few members of the normally six-eyed genus *Orchestina* (fig. 8c) may be a key to the understanding of the unusual position (displacement) of the posterior median eyes in the position of the lost anterior median eyes within this superfamily, see the discussion on this matter by DALMAS (1916: 210-211), see fig. 8d. Such atavistic specimens of *Orchestina* may show (1) that both, anterior and posterior median eyes "moved" forwards simultanously in the ancestor of this genus and (2) that the anterior median eyes decreased at the same time and finally disappeared. That means that - at least in the ancestor of *Orchestina* - the anterior median eyes did not disappear (firstly) before the posterior median eyes "moved" forwards to the former position of the anterior median eyes.

In the family Anapidae s. l. (superfamily Araneoidea) the anterior median eyes are lost in numerous taxa, too, the clypeus is long and vertically but - in contrast to most Dysderoidea - the posterior median eyes stayed in their posterior position. In most of the six-eyed Dysderoidea the position of the clypeus is long and oblique horizontally. In contrast to the Dysderoidea there is no "sucking basket" in the Anapidae (there are some similarities in the Symphytognathidae but - e.g. - no cheliceral lamella). The Anapidae condition may indicate that the loss of the anterior median eyes does not simply depend on the existence of a long clypeus.

According to my hypothesis the presence of the "sucking basket" may have caused the "moving" of the four median eyes and finally the loss of the anterior median eyes in several taxa of the Dysderoidea, probably ten times (!) independently, see the cladogram: In the Segestriidae, Periegopidae, Plectreuridae: Diguetidae, Caponiidae (part.), Dysderidae + their kin, Leptonetidae + Telemidae, Tetrablemmidae, the Sicariid hunters branch, the Scytodid branch and the Ochyroceratidae. If the anterior median eyes were lost with the origin of the "tubeless branch" we would have two reversals to eight eyes, in the Caponiidae and in the Pholcidae (see the Oonopidae, too). - In such taxa in which the "sucking basket" disappeared - e.g. Segestriidae and Dysderidae - the anterior median eyes did not appear again. The eye field is fairly wide most often in taxa in which the anterior median eyes have been lost. If the eye field is quite narrow - Dysderidae, Leptonetidae and most Oonopidae - the posterior median eyes stayed most often in their posterior position - a matter of space?

Why is the long clypeus in several Dysderoidea free of eyes? Are here attachments of muscles of the "sucking basket" and therefore no room for eyes?



Hypothetical ways of the evolution of the eye position and eye reduction in selected taxa of the superfamily Dysderoidea

Remarks: (1) Hypothetical plesiomorphic eye position of the Dysderoidea: 8 eyes in two wide rows in which the anterior median eyes are separated (protruding clypeus); (2) Segestriidae position (*Segestria*): Anterior median eyes lost, posterior median eyes displaced (arrows) to the former position of the anterior median eyes, similar e.g. in the Diguetinae; (3) the Segestroid position is similar but more narrow; e.g. Telemidae, Orsolobidae, various Ochyroceratidae, Oonopidae and some Caponiidae; (4) Dysderidae position: Eyes is a compact group; in some taxa the posterior eye row is not procurved; (5) the atavistic presence of anterior median eyes in some specimens of the genus *Orchestina*: See above. - xx = losses of the anterior median eyes.

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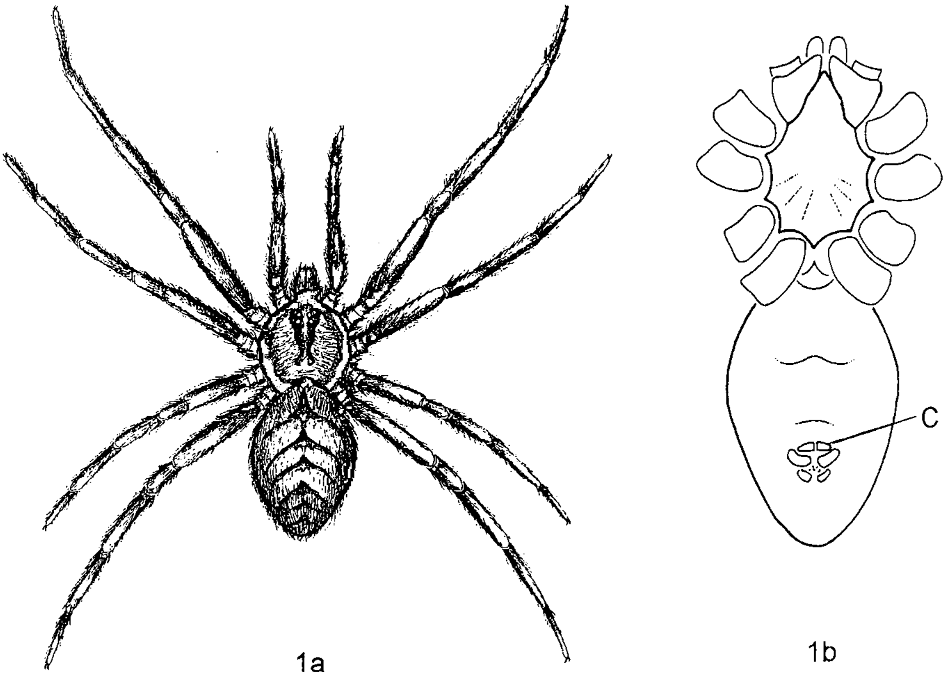
(1) FILISTATIDAE

Members of this family prefer dry and warm to hot biotopes. They live hidden in tubes in crevities in rocks or walls or under stones; silk threads are radiating from the opening of the tube. Their ecology explains that never a fossil Filistatidae in amber has been found.

Diagnosis of the Filistatidae: The only family of the Dysderoidea which is cribellate (fig. 1b) and adults are moulting in the female sex. Eye group compact and raised (fig. 1a), spinnerets set forward (fig. 1b), distinctly claviform cribellum spigots present, unpaired tracheal spiracle slose to spinnerets, patella-tibia autotomy present. - Hairy eight-eyed spiders; unpaired tarsal claws, ventral bristles of the posterior tarsi and coenospermia - ALBERTI (1990) - are present; tube dwellers. - Filistatinae and Prithinae.

Relationships: Filistatidae are most probably the sister group of the branch "ecribellate Dysderoids", see the cladogram.

Distribution: Cosmopolitical, mainly in temperate climates.



Figs. 1a-b) *Pritha* sp., ♀; a) body, dorsal view; b) body ventral view. C = cribellum. Taken from DIPPENAAR-SCHOEMAN & JOCQUE (1997: figs. 76a, e).

(2) SEGESTRIIDAE

I thank H. GRABENHORST in Celle, F. KERNEGGER in Hamburg, M. KUTSCHER in Sassnitz and F. & G. WITSCH in Köln for the loan of material.

Segestriidae - German name "Fischernetz-Spinnen" - are small to medium-sized spiders. They possess 6 eyes in a typical "segestriid position" (fig. 2k) in extant spiders: The position of the posterior median eyes is more or less in the position of the anterior median eyes which are lost. The first three pairs of legs are directed forward, and only the posterior pair is directed backward (fig. 2a) (similar to some Thomisidae: Stephanopinae, pers. obs. with preserved extant material); this leg position is very rare in spiders and is present in most fossils, too, see the photos; this is their resting leg position, and in this position the spiders lurk for prey at the entrance of their tube, photo 527.

Prey: Extant Segestriidae feed e.g. on Diplopoda and Diptera. Just in front of a juvenile *Segestria* sp. indet., F580/BB/AR/SEG/CJW, body length 2.1mm, remains of a demarged Aphidina larva are preserved, its body is 0.9mm long. A fossil female of *Segestria ?tomentosa* KOCH & BERENDT 1854 in Baltic amber (Mus. Paris no. 463), body length 7.8mm, is preserved with a small crumpled ant (Formicidae) as its prey which is preserved directly beneath the mouth parts of the spider (another ant is intact and is preserved laterally of the spider). There is a further female *Segestria* sp. indet., with a Psocoptera as a prey, CJW.

Segestriidae are nocturnal hunters, during the day they are hidden in their tube which may be build at the bark of a pine. Members of *Ariadna* prefer dry and sunny localities more than members of *Segestria*; therefore spiders of *Ariadna* are very rare in amber but members of *Segestria* and *Vetsegestria* are not so rare. The spiders possess thick femora IV, and some specimens of *Segestria* jump on its prey.

Parasitoids: Material: A male spider of the genus *Segestria* sp. indet. (Segestriidae) and a female wasp, Braconidae gen. indet., det. J. JANZEN, F495/BB/AR/SEG/CJW. Measurements (in mm): The spider: Body length about 3.0, prosoma length 1.5; body length of the wasp about 4.0. - Both animals are well and nearly completely preserved (the right leg I of the spider is missing, the stump bears a droplet of haemolymph), they are lying close together in an amber piece which was rolled. Probably the two arthropods were transported by the wind during a fight to the running and rolling resin which captured the couple. Braconid wasps larvae usually live endoparasitoitic in larvae or eggs of insects, more rare in adults; spiders are not reported as hosts of Braconidae. I do not want to exclude a parasitoitic relationship of the two arthropods in the fossil resin.

Segestriidae has been regarded as a part of the family Dysderidae in the 19th century, e.g. by KOCH & BERENDT (1854) and still by BEATTY (1970) in the 20th century. KOCH & BERENDT (1854) and MENGE in KOCH & BERENDT (1854) described sub Dysderidae members of four families in the modern sense (see the papers on these families in this volume): Segestriidae (*Segestria*, part.), Dysderidae (*Dysdera*), Oonopidae (*Segestria pusilla* MENGE (= *Orchestina* sp.)) and Zodariidae (sub *Therea* sp. and *Segestria cylindrica* KOCH & BERENDT).

Five genera of the family Segestriidae are known in amber, one (*Ariadna*) in Dominican amber, three - *Ariadna, Segestria*, *Vetsegestria*, gen. indescr.- in Baltic amber, one - *Microsegestria* - in Lebanese amber. In Baltic amber members of *Ariadna* are very rare (a single specimen), members of *Segestria* and *Versegestria* are not so rare,I saw some hundred specimens in numerous collections, >25 specimens (males, females, juveniles and exuviae) - including undescribed species - are kept in my private collection.

Diagnosis of the family Segestriidae: Leg pair III (incl. coxa, and in exuviae) directed forward (fig. 2a), chelicerae free, gnathocoxae not converging (fig. 2g), no cheliceral lamina nor anterior median eyes, eyes in the extant taxa (!) in a typical "segestriid position" (fig. 2k), spinnerets set forward (figs.2e,q), tracheal spiracles near the epigastral fold (fig. 2q). Leg I of the male may be modified (in some Ariadninae). Male pedipalpus usually very simple (fig. 2d; conductor absent) but complicated in *Gippsicola* HOGG 1900 (extant, Australian Region), and with a conductor - a basically present structure in the Segestriidae? - in *Microsegestria* n. gen. (this vol.). Two cardiac ostia, funnel dwellers.

Subfamilies: Extant: Aradninae and Segestriinae (see below). According to the complicated bulbus *Gippsicola* of the Australian Region may be a taxon of a third subfamily, see FORSTER & PLATNICK (1985: 213, 227). Extinct: In an undescribed fossil female in Baltic amber - probably a member of a fourth subfamily - the position of the posterior median eyes is almost between the posterior lateral eyes, a plesiomorphic character, see the fig. below. Microsegestriinae: See the paper on this subfamily in Lebanese amber.

Relationships (see the cladogram): According e.g. to the funnel dwelling behaviour and the position of eyes and spinnerets (which are set forward) Periegopidae and Plectreuridae are related, in which the tracheal system is different. Dysderidae are not strongly related to Segestriidae - see the cladogram below -, their position of eyes and spinnerets is quite different, the spiders are vagile hunters, their patellae are elongated and the colour of body and legs is usually red to orange. (In the Ariadninae the fangs (fig. 2c) are short, similar to the Periegopidae and Plectreuridae, and in contrast to the Dysderidae). Free chelicerae and the anterior position of the paired tracheae are shared by Dysderidae and Segestriidae. Paired tracheae is a plesiomorphic character; the free chelicerae I regard as a convergent character of both families.

Distribution: Extant: Cosmopolitical; fossil: Baltic, Dominican and Lebanese amber forests. North American amber from New Jersey (D. PENNEY, in press).

Ariadninae n. subfam.

Diagnosis: Fangs short, thick (fig. 2c) and slightly immobile ony, labium almost twice as long as wide, cymbium short and blunt, bulbus nearly globular (fig. 2d), position of the alveolus in the middle of the cymbium, male metatarsus I frequently modified, body slender, probably myrmecomorphic.

Type genus: *Ariadna* SAVIGNY & AUDOUIN 1827, the only known genus.

Relationships: Segestriidae is most related; differences: See the tab. below and the cladogram in the paper on the Microsegestriinae. In both subfamilies exist species which have paired ventral bristles of the tibia I and II as well as species which possess few or several bristles in an irregular position.

Distribution: Extant: Cosmopolitical; fossil: Baltic and Dominican amber forests.

Comparison of Ariadninae and Segestriinae:

Character	Segestriinae	Ariadninae
fangs	long and well movable, fig. 2b	short, thick and nearly immobile,fig. 2c
teeth on the cheliceral retromargin	1-2 large teeth figs. 2b, g	1 small tooth fig. 2c
male metatarsus I	unmodified	often modified
labium	fairly longer than wide, fig. 2g	nearly twice as long as wide
cymbium	long, basally wide, fig. 2h	short and blunt, fig. 2d
position of the alveolus	at the basal part of the cymbium, fig. 2h	in the middle of the cymbium, fig. 2d
shape of the bulbus	pear-shaped, fig. 2h	nearly globular, fig. 2d
genera	*Segestria, Vetsegestria*	*Ariadna*

THE FOSSILS IN AMBER

(1) **Fossil spiders in Dominican amber**: Only *Ariadna paucispinosa* WUNDERLICH 1988 and ?*Ariadna* sp. indet. are known; see WUNDERLICH (1988: 53-55, figs. 38-45).

Vetsegestria quinquespinosa is the most frequent species of the family Segestriidae in Baltic amber: Nearly half of the Segestriidae specimens are conspecific. *Segestria flexio* is not too rare.

Distribution of the fossil taxa in Baltic amber: The only specimen of the genus *Ariadna* - the determination is a bit questionable - comes from the Bitterfeld deposit; specimens of *Segestria* and *Vetsegestria* come from the Bitterfeld deposit and from other deposits.

Determination and synonymy: PETRUNKEVITCH (1950: 329) gave a provisorical key to the 10 nominal species of the genus *Segestria* in Baltic amber which were known to him; not a single male was described. (MENGE in KOCH & BERENDT (1854) mentioned males but he gave no detailled description). The identification of several species which are based on females or juveniles only is difficult or even impossible; see below: *Segestria tomentosa*.

According to the body length of 1.7mm in adults and the nearly globular and hairy opisthosoma *Segestria pusilla* MENGE in KOCH & BERENDT 1854 is a member (dubious species) of the genus *Orchestina* SIMON (Oonopidae). - *Therea* KOCH & BERENDT 1854 (= *Thereola* PETRUNKEVITCH 1955) and *Segestria cylindrica* KOCH & BERENDT 1854: See Zodariidae. - The holotypes of *Segestria elongata* KOCH & BERENDT 1854 (PETRUNKEVITCH (1942) dedicated a "neotype" of this species) and *Segestria nana* KOCH & BERENDT 1854 are apparently juveniles, dubious species; according to the large size the holotype (♀) of *S. plicata* PETRUNKEVITCH 1950 may be a junior synonym of *S. tomentosa* KOCH & BERENDT 1854, the male of *S. cristata* MENGE in KOCH & BERENDT 1854 and of *S. succinei* BERLAND 1939 is unknown; according to the very short characteristics *S. exarata* MENGE in KOCH & BERENDT 1854 and *S. undulata* MENGE in KOCH & BERENDT 1854 are nomina nuda and probably not members of the family Segestriidae.

Provisorical key to the genera and species of the Segestriinae in Baltic amber, mainly based on adult males; see also below: *Segestria cristata* and *S. tomentoso*:

1 Tibia I-II with 4 pairs of long ventral bristles (one of the retrodistal bristles may be absent) and short apical bristles, without lateral bristles (fig. 2j), metatarsus I-II with 3 pairs of ventral bristles. Prosoma (fig. 2f) long and slender, sides nearly parallel, 1.6 times longer than wide. ♂-pedipalpus fig. 2h, photo 20 . . . . Vetsegestria quinquespinosa

- Tibia I-II with three rows of long bristles (a ventral and two lateral rows of about 3 bristles) and short apical bristles (e.g. fig. 2l), metatarsus I-II with a pair or 3 ventral bristles in the basal half (fig. 2l). Prosoma (e.g. fig. 2k) wider, narrow anteriorly, 1.3-1.45 times longer than wide. *Segestria,* photo 15 2

2(1) Prosoma length 2.5 to more than 3mm, holotype ?ad. ♀ only 2.0mm (probably the largest species in Baltic amber), chelicerae strongly protruding (photo), body very hairy, bulbus of a questionable ♂: Fig. 2p. . . . . *Segestria tomentosa*

- ♂ (♀ unknown): Prosoma length 1.3-1.9mm, chelicerae fairly protruding (fig. 2k), body less hairy 3

3(2) Prosoma length 1.9mm, embolus wave-shaped (fig. 2n). . . . .*Segestria mortalis*

- Prosoma length 1.3-1.4mm, embolus apically bent in a right angle (fig. 2m). . . . .
. . . .*Segestria flexio*

***Ariadna defuncta* n. sp.** (fig. 2d)

Material: Holotypus ♂ in Baltic amber from the Bitterfeld deposit, coll. H. GRABENHORST; Geol.-Palaeontol. Inst. Univ. Hamburg.

Preservation and syninclusions: The spider is preserved in a yellow amber piece which has numerous fissures; it is in a bad condition, the left part of the prosoma, most articles of the left legs, the left pedipalpus and the left margin of the prosoma are broken off, the body is hollow, most parts of body and legs are covered by a white emulsion, the right pedipalpus is fairly well preserved, the right legs I-III are stretched forward. - No syninclusions.

Diagnosis (♂; ♀ unknown): Prosoma length 2.35mm, leg I not modified, tibia I-II bear 2 or 3 pairs of ventral and apical and lateral bristles. Pedipalpus (fig. 2d): Tibia thick, embolus slightly bent, about as long as the bulbus.

Description (♂):
Measurements (in mm): Body length about 4.7, prosoma length about 2.35, leg I: Patella 0.85, tibia 1.75, metatarsus 1.5, tarsus 0.7.
Prosoma with few indistinct hairs and 6 eyes in the typical "segestriid position", clypeus short, chelicerae fairly protruding, the fangs are hidden. - Legs robust, the right legs I-III are stretched out forward in the natural position; the femora bear few dorsal bristles, tibia I-II with 2 or 3 pairs of longer ventral and 2 pairs of lateral bristles, tibia IV at least with a long apical bristle, the metatarsus I-II bear 1.1 long ventral as well as lateral bristles; tarsus IV with longer dorsal hairs in the distal half. - Opisthosoma cylindrical,

with numerous longer hairs. - Pedipalpus: See above.

Relationships: In the extant congeneric species the number of tibial and metatarsal bristles I-II is usually higher. In *Ariadna paucispinosa* WUNDERLICH 1988 (Dominican amber) tibia I bears a pair of short ventral-basal and short lateral bristles, see WUNDERLICH (1988: Fig. 41).

Distribution: Tertiary Baltic amber forest, the Bitterfeld deposit.

Vetsegestria n. gen.

Diagnosis: Prosoma (fig. 2f) 1.6 times longer than wide, with a wide cephalic part and a narrow eye field, cheliceral retromargin with one large tooth (fig. 2g), labium as in fig. 2g, 4 pairs of long ventral tibial I bristles (fig. 2j) and with a shorter proapical bristle, no lateral bristles, cymbium (fig. 2h) long, bulbus pear-shaped.

Type species: *Vetsegestria quinquespinosa* n. sp., the only known species.

Relationships: *Vetsegestria* is a member of the Segestriinae; as in *Segestria* LATREILLE 1804, the labium is fairly wide, the cymbium long with a basal position of the alveolus, and the bulbus is pear-shaped. In contrast to *Segestria* the prosoma is very long and the cephalic part is wide, the cheliceral retromargin has only one tooth; in most members of *Segestria* there are not more than 3 pairs of ventral tibial I-II bristles as well lateral bristles.

Distribution: Tertiary Baltic amber forest incl. the Bitterfeld deposit.

Vetsegestria quinquespinosa n. gen. n. sp. (figs. 2f-j) Photo 20-21

Material: 8 ♂, 2 ♀ and 1 juv. ♀; Holotypus ♂ and 1 ♀ (paratypus a) which was separated from the same amber piece, F518/BB/AR/SEG/CJW; 1 juv. ♀ paratypus b), F517/BB/AR/SEG/CJW; 1♂ paratypus c), F519/BB/AR/SEG/CJW; 1♂ paratypus d), F520/BB/AR/SEG/CJW; 1♀ paratypus e), F521/BB/AR/SEG/CJW; 1 ♂ paratypus f) from the Bitterfeld deposit, F522/BB/AR/SEG/CJW; 1 ♂ paratypus g) from the Bitterfeld deposit, coll. M. KUTSCHER K/AR/19; 1 ♂ paratypus h) from the Bitterfeld deposit, coll. M. KUTSCHER K/AR/20; 1 ♂ paratypus i) Mus. Ziemi no. 19968; 1 ♂ paratypus j) coll. F. & G. WITSCH; 1♂ paratypus F688/BB/AR/SEG/CJW.

Preservation and syninclusions: The holotype is fairly well and completely preserved, ventrally partly covered by a white emulsion; the amber piece was heated; no syninclusions. - Paratype a) is badly preserved, the right leg I and the third leg pair are lost behind the coxa by autotomy, the opisthosoma is deformed, the right margin is broken off, the right side of body and legs are covered by a white emulsion; a stellate hair is preserved near the spider. - Paratype b) is fairly well preserved, ventrally covered by a white emulsion, the right legs I and II are broken off behind the coxa by autotomy and missing; few stellate hairs, tiny excrement balls and the part of a spider's web are preserved in the same amber piece. - Paratype c) is well and completely preserved in an amber piece which was heated; ventrally it is partly covered by a white emulsion. Furthermore preserved are some stellate hairs and Acari larvae as well as a tiny Diptera and a tiny Psocoptera, tiny excrement balls, a tiny egg of an insect and remains of bark. - Paratype d) is fairly well preserved, ventrally partly covered by a white emulsion and a larger bubble, the right leg III is broken off behind the coxa by autotomy and missing; numerous stellate hairs and some threads are preserved in the same amber piece. - Paratype e) is well and nearly completely preserved, the ventral side is partly covered by a white emulsion, the right metatarsus IV is cut off. An Acari, stellate hairs and remains of plants are preserved with the spider. - Paratype f) is completely and very well preserved together with few stellate hairs. - Paratype g) is fairly well preserved, the left leg III is missing behind the coxa by autotomy, the tip of the opisthosoma, the right leg I and the left legs I and II are cut off; few stellate hairs. - Paratype h) is well and nearly completely preserved, the amber piece was heated, the right leg III is lost behind the coxa by autotomy; numerous detritus particles but no stellate hairs. - Paratype i) is well and completely preserved, ventrally slightly covered by a white emulsion. Also preserved are some stellate hairs, a Diptera and an 11 mm long hair-shaped object as well as hairs and scales of an insect. - Paratype j) is well and nearly completely preserved.

Diagnosis: See above; prosoma length 1.0-1.2mm, the smallest member of the family Segestriidae in Baltic amber.

Description:

Measurements (in mm): Body length without chelicerae 2.1-2.6 (♂ not smaller than ♀), prosoma: Length 1.0-1.2, width 0.6-0.7, leg I (holotype): Femur 0.82, patella 0.32, tibia 0.73, metatarsus 0.65, tarsus 0.25, tibia II 0.7, tibia III 0.61, tibia IV 0.73.

Colour: Prosoma and legs dark brown, opisthosoma light brown.

Prosoma (figs. 2f-g) 1.6 times longer than wide, with a wide cephalic part, fine rugose, covered with short hairs; eye field compact, thoracal fissure absent. Chelicerae fairly robust, variable protruding, frontally with long hairs, anterior margin with 3 teeth, posterior margin with one large tooth, labium free, longer than wide, fangs and gnathocoxae long. - Legs: Order I = IV/II/III, hairs indistinct, femur IV thick, only few tibial I trichobothria. Tibia and metatarsus I-II with 4 pairs of long ventral bristles each (fig. 2j), no lateral bristles, femora with few dorsal and lateral bristles, tibia IV with 3 ventral bristles in a row, metatarsus IV with about 6 long bristles. Unpaired tarsal claw strongly bent, paired claws with long teeth, tarsus of the pedipalpus with a long claw. - Opisthosoma cylindrical, with few short hairs, the stout spinnerets are set forward. - Pedipalpus (figs. 2h-i) with fairly slender articles, embolus bent, as long as the pear-shaped bulbus.

Relationships: See above.

Distribution: Tertiary Baltic amber forest incl. the Bitterfeld deposit.

***Segestria flexio* n. sp**. (figs. 2k-m, r-s) Photos 15-16

Material: 6♂ in Baltic amber; holotypus F524/BB/AR/SEG/CJW; paratypus a) and a separated amber piece, F526/BB/AR/SEG/CJW; paratypus b) coll. F. KERNEGGER; paratypus c) F525/BB/AR/SEG/CJW; paratypus d) and a separated amber piece F494/BB/AR/SEG/CJW; paratypus e) F515/BB/AR/SEG/CJW.

Preservation and syninclusions: The holotype is well preserved, the right leg I is missing behind the coxa by autotomy, the ventral side - especially the mouth parts - are covered by a white emulsion; no stellate hairs; paratype a) is only fairly well preserved, the left leg I and both legs IV are missing behind the coxa by autotomy, two bubbles and white emulsions cover parts of the prosoma; no stellate hairs; paratype b) is now included in artificial resin; it is fairly well preserved, the left leg I is missing behind the coxa, the opisthosoma has distinct furrows; furthermore preserved are a mite, some spider's threads and pollen grains but no stellate hairs; paratype c) is well and nearly completely preserved, the left leg I is missing behind the coxa, the right leg I is cut off through the tibia, a white emulsion is present ventrally; few stellate hairs; paratype d) is fairly well preserved, the right legs III and IV are cut off. Furthermore preserved are a branch of a stellate hairs (?), a tiny mite, ventral parts of a small spider at the margin of the amber piece and a male of *Orchestina breviembolus* WUNDERLICH 1981 (Araneae: Oonopidae); paratype e) is very well preserved, only the patellae IV are partly cut off. Legs I-III are directed forward in the natural resting position; few remains of tiny insects and numerous stellate hairs are preserved in the same amber piece.

Diagnosis (♂; ♀ unknown): Prosoma length 1.3-1.4mm, tip of the embolus (figs. 2m) bent in a right angle.

Description (♂):
Measurements (in mm): Body length 2.8-3.2, prosoma: Length 1.3-1.4, width 1.1, leg II of the holotype: Femur 1.2, patella 0.45, tibia 1.05, metatarsus 0.95, tarsus 0.45, tibia IV 0.95, tibia I of paratype b) 1.05.
Colour: Prosoma and legs medium to dark brown, opisthosoma light brown
Prosoma (fig. 2k) with a narrow cepahilc part, a short clypeus and short hairs; no distinct thoracal fissure. Eyes as in fig. 2k. Chelicerae fairly protruding, teeth of their margins hidden, fangs strongly bent (fig. 2r). - Legs robust, fairly hairy, tibia with three rows of 3 bristles, one row ventrally and two rows laterally (fig. 2l), metatarsus I with a pair of ventral bristles in the basal half and apical bristles. Femur IV thick, femora with dorsal and lateral bristles, paired tarsal claws with numerous long teeth. - Opisthosoma cylindrical, most hairs are short; spinnerets (paratype c) stout. - Pedipalpus (figs. 2m, o): Articles not distinctly thickened, cymbium wide basally, tip of the embolus bent in a right angle.

Relationships: See *S. mortalis* n. sp.; *S. tomentosa* KOCH & BERENDT 1854 is larger and more hairy.

Distribution: Tertiary Baltic amber forest.

Segestria mortalis n. sp. (fig. 2n-o)

Material: Holotypus in Baltic amber, F523/BB/AR/SEG/CJW.

Preservation and syninclusions: The spider is fairly well preserved, a white emulsion is absent, the left legs II and III are broken off by autotomy, one leg is situated behind the spider, the right tarsi and metatarsi III-IV are cut off, the distal part of the right cymbium is broken off and lost, the wound is apparently healed. An artificial tube is present in the amber piece, some stellate hairs are preserved, 1 1/2 Diptera, half of a Trichoptera and some spider's threads.

Diagnosis (♂; ♀ unknown): Prosoma length 1.9mm, embolus long, distinctly bent distally (figs. 2n-o).

Description (♂):
Measurements (in mm): Body length 3.7, prosoma length 1.9, leg I: Tibia 1.75, metatarsus 1.2, tarsus 0.55.
Colour: Prosoma and legs dark brown, opisthosoma light brown. - Prosoma and opisthosoma as in *S. flexio* n. sp. Legs similar to *flexio* but more slender. - Pedipalpus (figs. 2n-0): Tibia slightly thickened, embolus long and distinctly bent distally.

Relationships: *S. flexio* is smaller, in *flexio* the tip of the embolus is stronger bent. *S. tomentosa* KOCH & BERENDT 1854 is larger and more hairy; the embolus of a questionable male is less bent.

Distribution: Tertiary Baltic amber forest.

Segestria cristata MENGE in KOCH & BERENDT 1854 and *succinei* BERLAND 1939 (figs. 2e, q)

Material: 1 ?juv. ♀ of *?cristata* in Baltic amber, F516/BB/AR/SEG/CJW.

These species are only known from juveniles; according to the medial prosomal hairs *succinei* may be a junior synonym of *cristata*. The species is somewhat similar to *flexio* but the prosoma is more hairy and bears a medial row of long bristles (fig. 2e). In the specimen F516 are the tracheal spiracles well observable, the prosoma length is 1.9 mm, tibia II is 1.2mm long.

The **relationships** are unknown.

Distribution: Tertiary Baltic amber forest.

Segestria tomentosa KOCH & BERENDT 1854, ***S. elongata*** KOCH & BERENDT 1854 and ***S. nana*** KOCH & BERENDT 1854 (fig. 2p)

See the remarks above on species which are based on juveniles only. Photos 17-18.

Material in Baltic amber: Holotypes (Pal. Inst. Humboldt Univ.): *S. tomentosa*: ?ad. ♀, no. MB.A.146; *S. elongata*: juv. ♀, no. MB.A.143; *S. nana*: juv. ♀, MB.A.145; questionable material of *tomentosa*: 1 ♀ with a prey (Formicidae), Mus. Paris no. 463; 1 exuvia F497/BB/AR/SEG/CJW; 1♂ F514/BB/AR/SEG/CJW; 1 ?ad. ♀, F527/BB/AR/SEG/CJW.

According to the shape of the opisthosoma the holotype of *S. tomentosa* may be adult, the holotypes of *elongata* and *nana* are apparently juvenile. I do not want to exclude that *nana* and *elongata* are synonym with *tomentosa*.

Prosoma length (in mm): Holotypes: *S. nana* 1.6, *elongata* 1.25, *tomentosa* 2.0; prosoma length of the ♀ F527 4.0, of the ♂ F514 2.7, of the ♀ Mus. Paris 4.0.

Body and legs of these species are quite hairy, tibia I-II bear 3 ventral as well as apical and lateral bristles. In the specimen F525 metatarsi I-II bear 3 ventral bristles in the basal half in a cross row.
The pedipalpus of a questionable male is shown in fig. 2p.
Just beneath the mouth parts of the questionable female of the Mus. Paris a crumpled Formicidae is preserved which has been the prey of the spider; a second but intact ant lies between the right femora I and II.

The **relationships** are unsure; see *S. mortalis* n. sp.

Distribution: Tertiary Baltic amber forest.

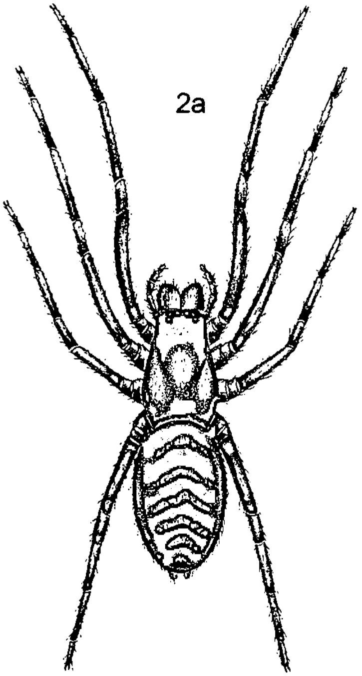
***Segestria* sp. indet., exuviae** (see *Segestria tomentosa* and *Vetsegestria quinquespinosa*) Photos 18, 454

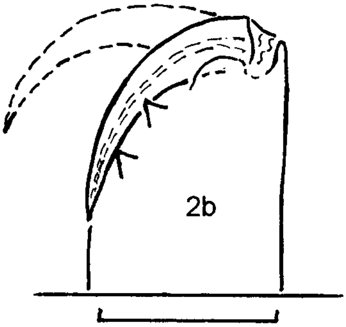
Material in Baltic amber: 1/2 exuvia, F542/BB/AR/SEG/CJW; exuvia F543/BB/AR/SEG/CJW; F927/BB/AR/SEG/CJW: An exuvia in a tube, see the paper on spiders webs.

F542: Length of tibia I 0.85mm.The prosoma as well as parts of the opisthosoma and the leg pair IV are missing. The legs I-III are stretched forwad in the natural resting position. The chelicerae bear both two large retromarginal teeth, labium and gnathocoxae are well preserved, tibia I bears 3 pairs of long ventral and lateral bristles, a pedipalpal tarsal claw is present; numerous particles of detritus are preserved in the same amber piece.

F543: Length of tibia I 2.6mm. The exuvia is well and nearly completely preserved in a clear yellow amber piece, only the tip of the right tarsus III is cut off and the right part of the prosoma is incomplete. The legs are stretched out sideward. Tibia I bears 3 pairs of long ventral andlateral bristles.

F927: Length of tibia I 2.1mm. The tip of the opisthosoma and parts of the legs are cut off, the dorsal part of the prosoma is missing. Tibia I bears 3 pairs of ventral bristles and apicals. The exuvia is preserved in its tube (!) which has a diameter of 1cm; 1.5cm of its length is preserved.





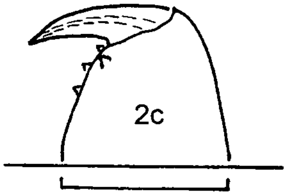
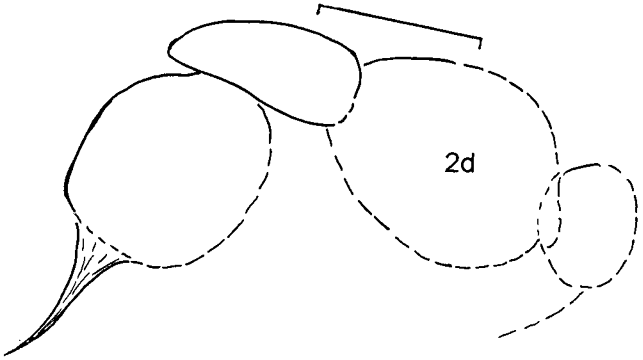
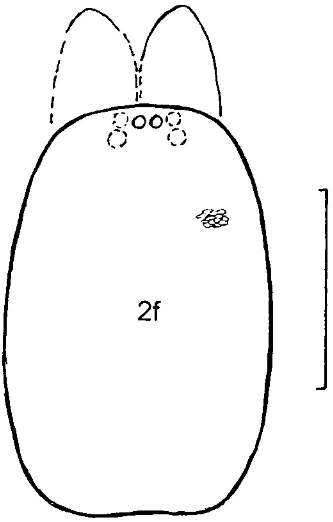


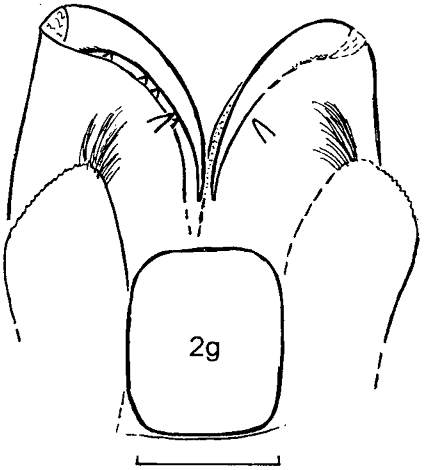
Fig. 2a) **Segestriidae sp**., extant, ♀, body dorsally; taken from DIPPENAAR-SCHOEMAN & JOCQUE (1997);

fig. 2b) ***Segestria senoculata*** (LINNAEUS 1758), extant, ♀, distal part of the l. chelicera ventrally with the movable fang in two positions; M = 0.5;

fig. 2c) ***Ariadna maderiana*** WARBOURTON 1892, extant, ♀, distal part of the l. chelicera ventrally; M = 0.5;







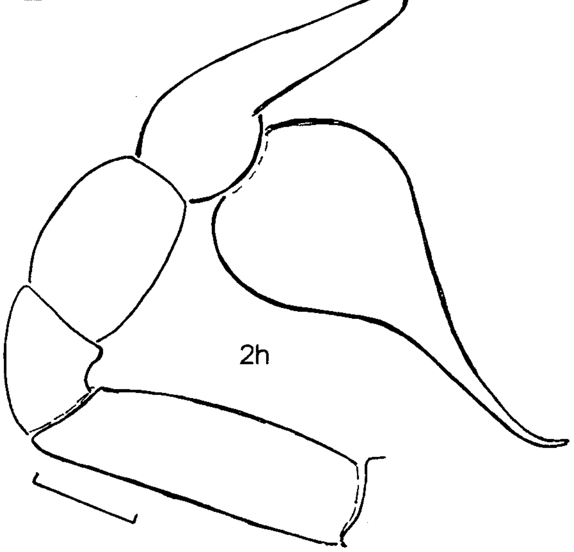
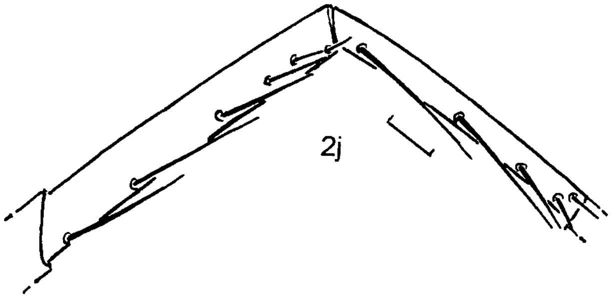
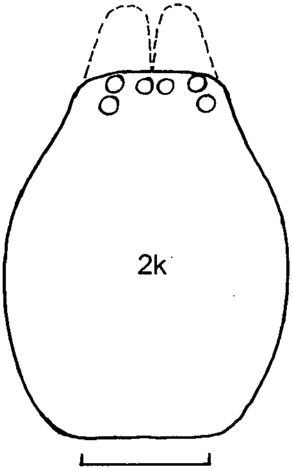


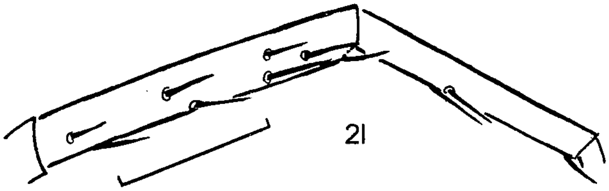
fig. 2d) ?***Ariadna defuncta*** **n. sp.**, ♂, r. pedipalpus prodorsally; M = 0.5;

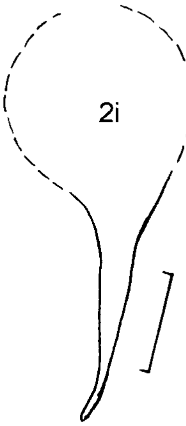
fig. 2e) ***Segestria ?cristata*** MENGE in KOCH & BERENDT 1854, ?juv. ♀ (F516), body laterally. Note the row of long dorsal medial bristles! Only three opisthosomal hairs are drawn; M = 1.0;

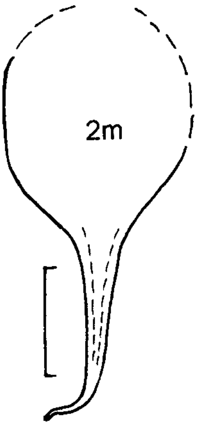
figs. 2f-j: ***Vetsegestria quinquespinosa*** **n.gen.n.sp.**; f) ♀, paratye a), prosoma dorsally; g) ♂, paratype c), mouth parts ventrally; h) ♂, paratype h), r. pedipalpus retrolaterally; i) ♂, holotype, l. bulbus with the embolus prodorsally; j) ♂, paratype h), r. tibia and metatarsus I retrolaterally; M = 0.5 in fig. f), 0.2 in g) and j), 0.1 in h) and i);

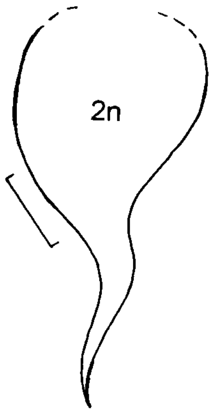




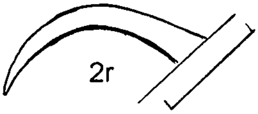


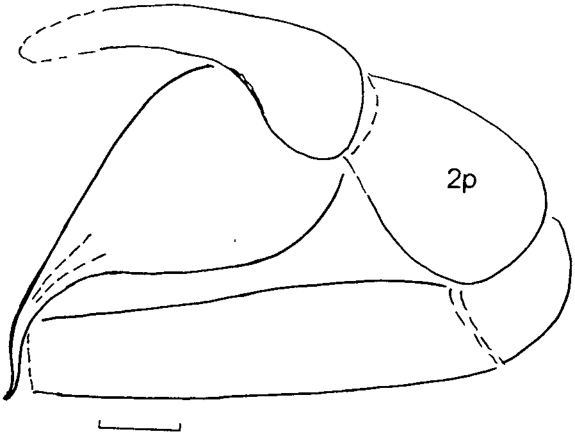


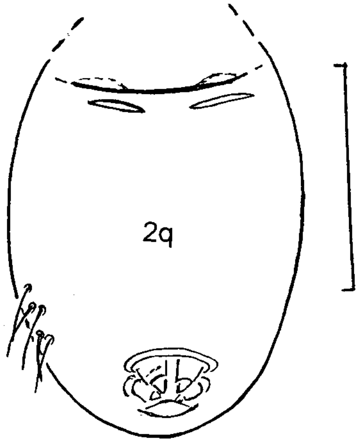


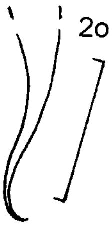


figs. 2k-m: ***Segestria flexio* n. sp.**, ♂; k) holotype, prosoma dorsally; l) paratype b), r. tibia and metatarsus I retrolaterally (the prolateral row of bristles is hidden); m) holotype, bulbus with the embolus of the l. pedipalpus retrolaterally; M = 0.5 in figs. k-l, 0.2 in m);









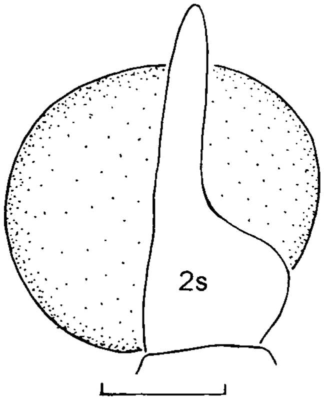


fig. 2n-0) ***Segestria mortalis* n. sp.**, ♂; n) r. bulbus with the embolus frontally; o) distal part of the l. embolus profrontally; M = 0.1 in fig. o), 0.2 in n);

fig. 2p) ***Segestria ?tomentosa*** KOCH & BERENDT 1854, ♂ (F514), l. pedipalpus retrodorsally; M = 0.2;

fig. 2q) ***Segestria ?cristata*** MENGE in KOCH & BERENDT 1854, ♀ (F516), opisthosoma ventrally. Note the anterior position of the tracheal slits near the epigastral furrow! M = 1.0;

figs. 2r-s: ***Segestria flexio* n. sp.**, ♂; paratype r; r) r. fang anteriorly (basally hidden); s) cymbium and bulbus (punctuated) of the r. pedipalpus dorsally; M = 0.1 and 0.2.

(3) PLECTREURIDAE

Plectreuridae is a "primitive" non-diverse relict spider family which is known today only from the Americas in four genera (see below). Plectreurinae are dwellers of fissures e.g. on walls and the bark of trees, similar to Segestriidae in this respect. They usually do not live in forests but in desert-like biotopes; only *Plectreurys globosus* FRANGANILLO from Cuba lives in shadowish and humid localities, see ALAYON GARCIA (1993: 5). So the discovery of a member of this family in Baltic amber was a great surprise comparable with the finding of a member of the Solifugae in this kind of amber. Few plants of the Baltic amber forest which prefer dry localities are reported by BACHOFEN-ECHT (1949: 28, 189-190): *Sciadopytis* and the Santalaceae. The presence of stellate hairs and a white emulsion on the bodies of the holotype and several arthropod syninclusions indicate clearly that the spider is preserved in Baltic but not in Dominican amber.

In contrast to similar members of the Periegopidae and Plectreuridae: Diguetinae (both are relict families and not known from fossils) and Segestriidae (not so rare in Baltic amber) - which all have only six eyes (fig. 3g) - the Plectreurinae possesses the plesiomorphic number of 8 eyes in two rows (fig. 3a).

Biogeography

The extant distribution of the family Plectreuridae s. l. (incl. Diguetinae) are exclusively the Nearctic and the Neotropic Regions, North, South and Central America (Cuba); fossils of this family have never been reported. The discovery of a member of the family Plectreuridae in the Palearctic Region asks for the modification of previous opinions. Apparently the areal of this family was much larger in the Early Tertiary; this "plesiomorphic"/old family occurred apparently in large parts of the old Laurasia and probably - in the Cretaceous - in the Southern Hemisphere, too, but now - after the separation of North America and Europe - it is a relict of the Americas, see WUNDERLICH (1986, 1995). (Also fossils of the spider families Archaeidae, Cyatholipidae and Synotaxidae are known from Baltic amber; they are today relict taxa which survived only in the Southern Hemisphere). The distribution of the Plectreuridae reminds on the distribution of some taxa of insects, e.g. the Termopsinae (Isoptera) in Baltic amber and North America (plus three small areas in SE-Asia), see ANDER (1942: 49, 52, map 5), on the Diptera family Nymphomyiidae; fossils in Baltic amber: See HOFFEINS & HOFFEINS (1995) and on the Auchenorrhyncha family Cixiidae, see SWEDO (2002: 197-207), Mitt. Mus. Nat.kd. Berlin, Dtsch. entom. Z., 49 (2).
The partial extinction of parts of the West-European beetle-fauna in a late Tertiary cold

period and its survival in Asia was documented by COOPE (1975). The European Plectreuridae became extinct at the latest at the same period as the beetle fauna but in my opinion much earlier, during the climatic change in the Oligocene. Few groups of arthropods survived in North America but not in Europe, see LARSSON (1978: 55). The stronger effects of the glaciations in Europe may be the reason for these extinctions. The more advanced Segestriidae may have alraedy started in the Early Tertiary to replace the "primitive" Plectreuridae in Europe; nowadays members of the Segestriidae are not rare in Europe whereas Plectreuridae is extinct. The probable sister group of the Plectreuridae - the Periegopidae of the Australian Region - is also a relict.

Diagnosis: Basicly 8 eyes in two wide rows (Plectreurinae, fig. 3a), the Diguetinae have only 6 eyes similar to fig. 3g, tracheae reduced, fovea absent, chelicerae distinctly fused and laminate (fig. 3b), cheliceral stridulating files present, labium free, gnathocoxae strongly converging, numerous strong leg bristles and an unpaired tarsal claw are present; claw of the ♀-pedipalpus strongly reduced; the ♂-leg I may be modified in the Plectreurinae (incl. "clasping spines", fig. 3c), a large web is present in the Diguetinae; see the comparison of the two subfamilies below.

Subfamilies: Plectreurinae and Diguetinae (see below).

Relationships: According to the fused apodeme and the reduced tracheal system as well as the reduced claw of the female pedipalpus I regard the Periegopidae as the sister group and the Segestriidae as the sister to both, see the cladogram. Only in the Segestriidae the plesiomorphic character of the large pair of tracheae outlived in this group (in an anterior position). The modified male leg I is nearly unique in the Dysderoidea (a different type is present in some Tetrablemmidae). The differences of Periegopidae and Plectreuridae as well as differences between Segestriidae and Dysderidae are shown in the cladogram; a "dysderid carina" (fig. 8) is absent in Periegopidae, Plectreuridae and Segestriidae. According to LEHTINEN (1967: 302) Plectreuridae is most related to the Filistatidae.

Distribution: Extant: The Americas; fossil: The Tertiary Baltic amber forest.

Diguetidae GERTSCH 1949 = subfamily of the Plectreuridae BANKS 1898 (**n. stat.**)

According to the reduced tracheae, the presence of cheliceral stridulating files, a free labium and the strongly reduced claw of the ♀-pedipalpus I regard Diguetinae as a subfamily of the Plectreurinae (**n. stat.**). Differences of both subfamilies and of the related Segestriidae: See below and the cladogram.

character	Plectreurinae	Diguetinae
number of eyes	8 (fig. 3a)	6 (similar to fig. 3g)
modified male leg I	frequently present	absent
number of pedipalpal stridul. teeth	1	4-5
cymbium	entire	divided
conductor	present	absent
large capture web	absent	present
genera	*Plectreurys, Kibramoa, Palaeoplectreurys*	*Diguetia, Pertica*

Comparison of characters in the subfamilies Diguetinae and Plectreurinae

Remark: According to several derived characters of the Diguetinae - loss of anterior median eyes and conductor, a divided cymbium and presence of a large capture web - Plectreurinae is the more "plesiomorphic" subfamily. If a modified male leg I is an apomorphic character of Plectreuridae + Segestriidae also the loss of such modifications is a derived character of the Diguetinae.

Palaeoplectreurys n. gen.

Diagnosis (♂; ♀ unknown): Metatarsus I retrolaterally with a short spoon which bears a strong "clasping spine" (fig. 3c). Femur I as long as the prosoma. Basal cheliceral article (fig. 3c) long. Pedipalpus (figs. 3d-f) with a long and thin embolus.

Relationships: In the extant genus *Plectreurys* SIMON 1893 the male tibia I bears a spoon, in the extant genus *Kibramoa* CHAMBERLIN 1929 a spine-bearing spoon is absent and femur I in these web-dwellers is distinctly longer than the prosoma. *Palaeoplectreurys* may be sister to the extant genera of the subfamily Plectreurinae.

Type species: *Palaeoplectreurys baltica* n. sp.

Distribution: Tertiary Baltic amber forest.

Palaeoplectreurys baltica n.gen.n.sp. (figs. 3a-f) Photo 14

Material: Holotypus ♂ in Baltic amber and a separated amber piece, F464/BB/AR/PLE/ CJW.

Preservation and syninclusions: The clear yellow amber piece was probably heated in an autoclave. The piece which contains the holotype is now embedded in artificial resin. The mouth parts are partly hidden by a fissure in the amber and by remains of a white emulsion. Both pedipalpi are clearly observable. Only the right legs I and III are completely preserved, the right leg II and the left legs I and II are wanting behind the coxa by autotomy, part of the remaining legs as well most parts of the opisthosoma are broken off with a part of the amber piece and are lost. - Some spider's threads are preserved in front and beneath the spider, right of the spider a flat bubble is preserved, right in front a small mite. - In the amber piece which I separated a juv. spider (?Theridiidae), a mite, 3 Diptera, some tiny excrement balls and stellate hairs are preserved; Diptera and spider are partly covered by a white emulsion.

Diagnosis and relationships: See above.

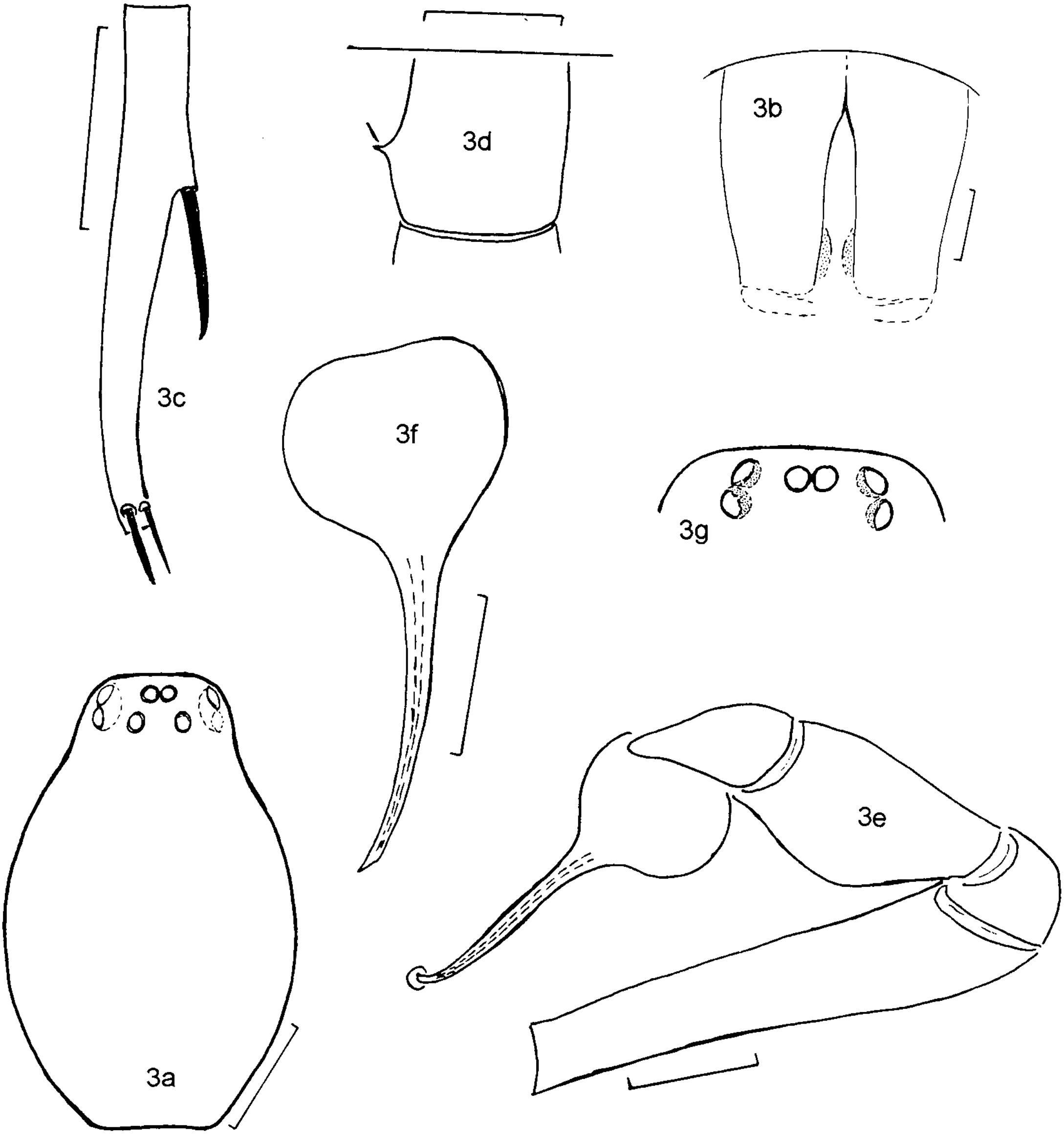
Description (♂):

Measurements (in mm): Body length unknown (most probably 4 to 4.5), prosoma: Length 1.9, width 1.28, leg I: Femur 1.85, patella 0.47, tibia 1.45, metatarsus 1.2, tarsus 1.0, metatarsus III 1.05, me-tatarsus IV 1.65.

Colour mainly dark brown, legs slightly lighter, prosoma partly covered by a silvery "emulsion".

Prosoma (figs. 3a-b, photo) nearly 1.5 times longer than wide, cuticula fine rugose (scale-shaped), scarcely covered with short hairs, flat, fovea absent. Eight fairly large eyes in two wide rows, all about equal in size, posterior row slightly procurved, lateral eyes on a low common elevation, posterior median eyes separated by 1.4 diameters, anterior median eyes nearly touching each other. Clypeus about 1.5 times longer than the field of the median eyes. Basal cheliceral articles fused in the basal quarter (arrow in fig. 3b), medio-distally with a lamina, teeth hidden. Labium free, gnathocoxae of medium length, robust, basally strongly bulging, converging above the labium, with a lateral depression in the middle. Sternum slightly longer than wide, not elongated between the coxae IV. A cheliceral stridulating organ is not clearly observable but a small ?stridulatory tooth of the pedipalpal femur is present (fig. 3d) which bears a tiny hair. - Legs fairly robust, IV longer than I, III directed backwards (photo), femur I robust, slightly bent, as long as the prosoma, tibia I without modifications, metatarsus I distinctly bent, with a pair of apical spines and a large retrolateral spine-bearing spoon in the basal half (fig. 3c). This spine - which also occurs e.g. in numerous taxa of the Mygalomorpha but only in some Plectreurinae and some Segestriidae (*Ariadna*) of the Dysderoidea - most probably had the function of a "clasping spine" which fixes the female during the copulation. Tarsus I distinctly bent. Bristles strong and numerous, of medium length; femoral bristles dorsally and laterally, I dorsally 5, prolaterally 1 in the middle and a pair dorsolaterally-distally. Patellae and tarsi bristleless. Tibia I bears 2 lateral pairs and a ventral pair, metatarsus I a ventral-apical pair. Three tasal claws, the unpaired claw is bent in a right angle, paired claws with very long teeth in one row, the prolateral claw III bears about a dozen teeth. No tarsal trichobothria, position of the metatarsal III trichobothrium in 0.65. - The opisthosoma - most parts are lost - bears few short hairs anteriorly. - Pedipalpus (figs. 3d-f): Femur long and slender, patella small, tibia thickened ventrally, cymbium short, undivided, slightly longer than wide, with long distal hairs, tegulum fused with the subtegulum, bulbus simple and nearly spherically, embolus long and thin, bent near the end, no conductor.

Distribution: Tertiary Baltic amber forest.



Figs. 3a-f: ***Plaeoplectreurys baltica*** **n.gen.n.sp.**, ♂; a) prosoma dorsally; b) chelicerae with the lamina (punctuated) and fused basally (arrow), anterior view; c) r. metatarsus I

ventrally; d) basal part of the femur of the r. pedipalpus with the prolateral ?stridulation tooth and tiny hair dorsally; e) l. pedipalpus retrolaterally with a droplet of secretion at the tip of the embolus (hairs are not drawn); f) bulbus of the l. pedipalpus ventrally; M = 0.5 in figs. a, c and g), 0.1 in fig. d), 0.2 in the remaining figs.;

fig. 3g) ***Segestria*** **sp**. (Segestriidae), position of the eyes dorsally; M = 0.5.

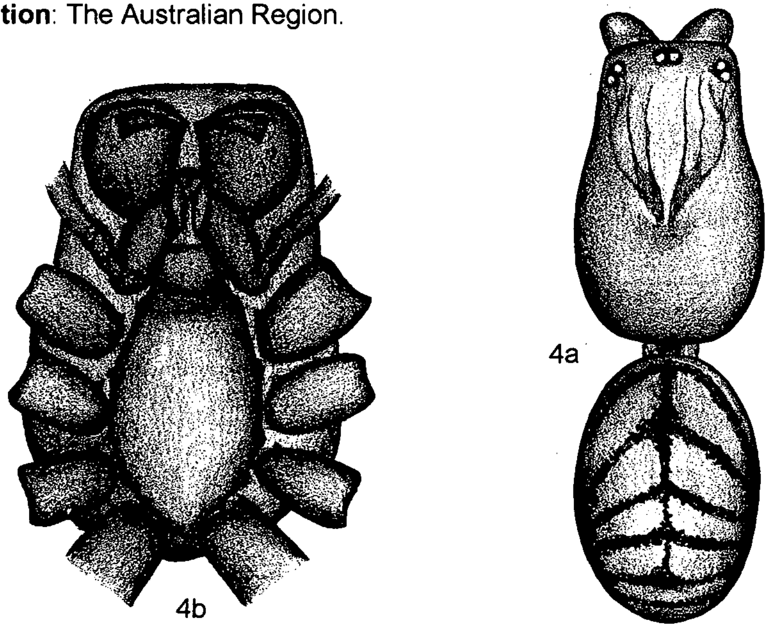
(4) PERIEGOPIDAE

No fossil member of this family is known. The reason may be that - today - the family is known only from the Southern Hemisphere, from the Australian Region, the single genus *Periegops* SIMON 1893.

Diagnosis of the family (see FORSTER (1995): Bipectinate retroclaws I-II, slender gnathocoxae (fig. 4b), distinct onychium and cheliceral lamina present, a single vulval plate, no anterior median eyes in a wide field of diads (fig. 4a), reduced tracheal system. Remark: According to FORSTER (1995: 93) the chelicerae are completely free but to FORSTER's figs. 9-10 the chelicerae may be fused at the base.

Relationships: Probably Plectreuridae is the sister group; in the Plectreuridae cheliceral stridulating files are present and bipectinate tarsal claws are usually absent (present in *Pertica* SIMON; see the cladogram.

Distribution: The Australian Region.



Figs. 4a-b: *Periegops suteri* (URQUHART 1892), extant, New Zealand, ♀; 4a) body dorsally (length 7.7mm); 4b) prosoma ventrally. Taken from FORSTER (1995: Figs. 1-2).

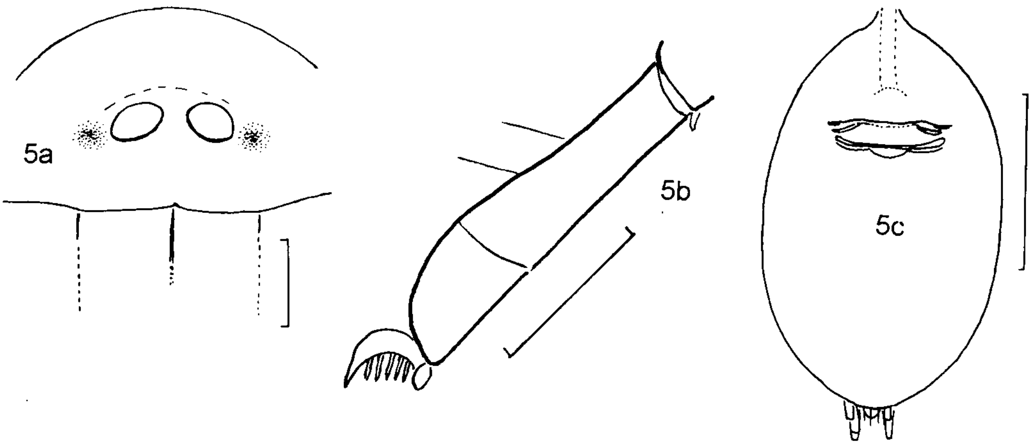
(5) CAPONIIDAE

Only two fossils of this family were described, both are members of the subfamily Nopinae and are preserved in Dominican amber: *Nops lobatus* WUNDERLICH 1988 and *Nops segmentatus* WUNDERLICH 1988. These spiders possess only two eyes (fig. 5a) and pseudosegmented tarsi (fig. 5b). Most Caponiidae live on the ground, under stones and in leaf litter.

Diagnosis of the family Caponiidae: The only family of the Dysderoidea in which the tarsi bear trichobothria (fig. 5b). Leg bristles and cheliceral teeth absent, chelicerae fused at the base (pers. obs.), cheliceral lamina present, lungs replaced by tracheae, paired tracheae near the epogastral fold (fig. 5c), body colour usually red-orange. Number of eyes 8, 6, 4 or - most often - 2 (fig. 5a). (Hunters, no capture web, see the cladogram).

Relationships: Dysderidae and their kin may be most related, see the cladogram.

Distribution: Mainly the tropic Regions of Africa (*Caponia* and *Diploglena*) and the Americas (most taxa).



Figs. 5a-c: Fossil Caponiidae: Nopinae in Dominican amber; 5a) *Nops* sp., juv, anterior view of the prosoma; 5b) *Nops lobatus* WUNDERLICH 1988, ♂, thickened l. tarsus II retrolaterally with two dorsal trichobothria and pseudosegmentation; 5c) *Nops segmentatus* WUNDERLICH 1988, ♂, opisthosoma ventrally with two pairs of tracheal spiracles.

(6) DYSDERIDAE

Dysderidae (German name: "Sechsaugenspinnen") have a worldwide distribution, most of the about 20 genera are endemic to the Mediterranean Region, in the Americas occur only introduced species as *Dysdera crocota* C. L. KOCH 1838. The position of the six eyes is narrow and the posterior row is usually distinctly procurved (figs.6c but see fig. 6l), the legs are usually stout and the chelicerae large, often protruding (photos), in most extant spiders the colour of body and legs is red or orange.

There is no report of a member of the Dysderidae in Dominican amber, and only the genera *Dasumiana* n. gen. (very rare) and *Harpactea* BRISTOWE 1939 are surely known from Baltic amber. Both are members of the subfamily Harpacteinae.

Diagnosis of the family Dysderidae: Patellae distinctly longer than the tarsi (frequently twice as long) (unique in the Dysderoidea; similar in the Palpimanidae and Spatiatoridae of the Eresoidea), two or three tarsal claws, six eyes in a compact group with the posterior row usually distinctly procurved (figs. 6c but see fig. 6l) (never the "segestriid position"), a pair of large tracheal spiracles near the epigastral fold (fig. v), prosoma heavily sclerotized and often rugose, intercoxal sclerites and a cheliceral carina (fig. 6p) are present, chelicerae and labium (fig. 6b) are free, chelicerae usually large and +/- protruding (photos), legs usually stout, opisthosoma soft in most taxa, scuta are present in the Rhodinae; gnathocoxal serrula present or absent (e.g. in *Dysdera*); colour of body and legs usually red or orange.

Subfamilies (see below): Dysderinae, Harpacteinae and Rhodinae.

Relationships: See the cladogram; Oonopidae + Orsolobidae may be the sister group.

Distribution: Mainly the Mediterranean Region; most probably no endemic taxa in the Americas or in the Southern Hemisphere.

The subfamilies

A clear differential diagnosis of the - three? - subfamilies is wanted. I regard the Rhodinae COOKE 1965 in a strict sense - including *Harpassa* SIMON 1882, *Rhode* SIMON

1882 and *Rhodera* DEELEMAN-REINHOLD 1989; the synonymy of these genera is unclear - but not in the wide sense of DEELEMAN-REINHOLD (1988, 1993). According to my hypothesis a field of tiny denticles of the bulbus - see DEELEMAN-REINHOLD (1993) - probably evolved two times: With the Rhodinae and within the Harpacteinae. Rhodinae has probably to regard as a tribus of the Harpacteinae.

Provisional **key to the subfamilies** of the Dysderidae:

1 Unpaired tarsal claws absent on all legs, claw tuft present on all legs, opisthosomal scuta absent. . . . . Dysderinae

- Unpaired tarsal claws present, claw tuft absent at least on tarsi I-II, body and legs usually more slender. 2

2(1) Posterior prolongation of the prosoma present (fig. 6a), opisthosomal scuta usually present. . . . . Rhodinae

- Posterior prolongation of the prosoma and opisthosomal scuta absent. . . Harpacteinae

The fossil taxa in Baltic amber

a) The taxa which were described by KOCH & BERENDT and MENGE 1854:

Dysdera tersa KOCH & BERENCT 1854: The original description is based on an ?adult female. According to the position of the eyes this is most probably a member of the genus *Harpactea* (**n. comb.**). - *Dysdera hippopodium* MENGE 1854, *D. glabrata* MENGE 1854 and *D. scobiculata* MENGE 1854 may be members of *Harpactea*, too and are - because of the insufficient diagnoses - **nomina nuda**.
Thereola PETRUNKEVITCH 1955 (= *Therea* KOCH & BERENDT 1854, praeocc.), type species *Therea petiolata* KOCH & BERENDT 1854, is not a member of the Dysderidae but of the Zodariidae; according to the original description the holotype has eight eyes

and a long clypeus. - The second species of *Thereola*, *Therea tersa* KOCH & BERENDT 1854 - see the remark of MENGE in KOCH & BERENDT (1854: 77) -, may be a member of the family Zodariidae, too.

b) The taxa which were described by PETRUNKEVITCH (1950, 1955 and 1958):

Harpactes extinctus PETRUNKEVITCH 1950: See below (*Harpactea extincta*), *Dasumia subita* PETRUNKEVITCH 1958: See below (*Dasumiana subita*), *Thereola petiolata* sensu PETRUNKEVITCH 1958: See below (*Dasumiana petiolata*).

c) The new described taxa

Key to the taxa of the Dysderidae in Baltic amber which are described in this volume:

1 Anterior eyes widely spaced (fig. 6l), posterior row fairly procurved, posterior median eyes and posterior lateral eyes widely spaced and small. Tibia of the male pedipalpus thick, bulbus structures complex (figs. 6m-n). *Dasumiana*. 2

- Anterior lateral eyes close together (fig. 6c), posterior row strongly procurved, the large posterior median and lateral eyes are close together. Tibia of the male pedipalpus slender, bulbus structures more simple (fig. 6h). *Harpactea*. 3

2(1) Femur I with 2 prodistal bristles similar to fig. 6d, bulbus as in fig. 6n. . . . . *valga*

- Femur I with 3 prodistal bristles, bulbus as in fig. 6m. . . . .*emicans*

3(1) Femur I bristleless (?), bulbus as in fig. 6j...*extincta* sensu PETRUNKEVITCH 1958

- Femur I bears 1-3 prodistal bristles (e.g. fig. 6d), bulbus as in figs. 6e-i). . . . *communis*

Harpactea BRISTOWE 1939

This large Mediterranean genus has probably to split up. Several extant species occur under the bark of trees. The fossil species in Baltic amber are members of the *Harpactea corticola*-group. I saw more than 50 fossil specimens and there may be more than the two species which are described below. - Some species of *Harpactea* may have been aggressive ant mimics, see CUSHING (1997: 171), Florida Entomologist, 80 (2).

Harpactea extincta PETRUNKEVITCH 1950

1950 *Harpactes extinctus* PETRUNKEVITCH, Bull. Mus. Comp. Zool. Harvard, 103: 334, figs. 160-167, 177, 181.

The holotype is a juvenile female. According to PETRUNKEVITCH (1950: 335) femur I bears a single dorsal-distal bristle. - PETRUNKEVITCH (1958: 349-351, figs. 568-572) described sub *Harpactes extinctus* a male ("androtype") as a questionable member of this species. According to PETRUNKEVITCH the legs of this specimen are bristleless and conductors are absent; the bulbus structures of this species (fig. 6j) are different of all males which I studied, and in my opinion this specimen may well be the member of an unnamed species.

Distribution: Tertiary Baltic amber forest.

***Harpactea communis* n. sp.** (figs. 6c-i) Photos 23-26

Material: 4♂ and a questionable ♂ in Baltic amber: Holotypus F537/BB/AR/DYS/CJW; paratypus F539/BB/AR/DYS/CJW; paratypus coll. C. GRÖHN no. 3914; paratypus Palaeont. Mus. Moscow; questionable ♂ F538/BB/AR/DYS/CJW.

Preservation and syninclusions: Holotypus: The spider is preserved in an amber piece which was heated; it is fairly well and nearly completely preserved, only the tip of the right tarsi I and II are cut off. There is no white emulsion. - Numerous detritus particles, few stellate hairs, some air bag pollen grains and remains of an Acari are preserved in the same amber piece. - Paratype F538: The spider is completely and well preserved in an amber piece which was heated. The opisthosoma is dorsally impressed. - A Diptera is situated in front of the spider. - Paratype F539: The male is nearly completely covered by a white emulsion, the left leg II is missing behind the coxa (autotomy), - A plant's remain and numerous stellate hairs are preserved in the same amber piece. - Paratype coll GRÖHN: The spider is completely preserved and ventrally covered by a white emulsion; the right leg I lies loose right in front of the spider. - Also preserved are some spider's threads, numerous stellate hairs, two Acari, two Diptera and a small Hymenoptera. - Paratype Mus. Moscow: The spider is well preserved, the right leg IV is missing behind the coxa (autotomy), the distal articles of the left legs I and II and the right leg I are cut off, the opisthosoma is covered by a white emulsion. - No stellate hairs.

Diagnosis (♂; ♀: See the material indet. which may be conspecific): Prosoma rugose, pedipalpus (figs. 6e-i) with a slender bulbus, a thin and curved embolus which has a basal outgrowth and two slender conductors.

Description (♂):
Measurements (in mm): Body length without chelicerae 3.2-4.2 (paratype Mus. Moscow), holotype 3.8, prosoma (holotype): Length 2.1, width 1.55, legs (holotype): I: Femur 1.9, patella 1.1, tibia 1.6, metatarsus 1.8, tarsus 0.5, femur II 1.6, femur III 1.4, femur IV 1.85, cymbium usually about 0.43 but 0.33 in the questionable male.
Colour: Light to dark brown (dark in the heated specimens).
Prosoma distinctly longer than wide, rugose, nearly hairless, no distinct thoracal fissure, 6 large eyes in a compact group (fig. 6c), posterior row distinctly procurved, posterior median eyes somewhat triangular, chelicerae only fairly large, +/- protruding and diverging, mouth parts usually hidden but see fig. 6b. - Legs fairly slender, an unpaired tarsal is claw present on all legs, scopula and claw tuft absent, paired tarsal claws with long teeth, femur I bears 1-3 (usually 2) prodistal bristles (fig. 6d), no further bristles on legs I-II, no patellar bristles, several bristles on legs III-IV on femora, tibia and metatarsus, about 10 bristles on tibia IV. - Opisthosoma soft, up to 1.7 times longer than wide, covered with short hairs, spinnerets small. - Pedipalpus (figs. 6e-i) with slender articles, cymbium distinctly longer than the patella, nearly as long as the tibia, embolus thin, curved and with a basal outgrowth, two conductors.

Relationships: The species is a member of the *Harpactea corticalis*-group and related to the extant European *H. arguta* SIMON 1907; embolus and conductors are similar (fig. 6k) but the shape of the conductors is different. According to PETRUNKEVITCH (1958), see fig. 6j, conductors are absent in *H. extincta* sensu PETRUNKEVITCH 1958, see above.

Distribution: Tertiary Baltic amber forest incl. the Bitterfeld deposit.

***Harpactea* sp. indet.**

Material in Baltic amber: 1 exuvia from the Bitterfeld deposit, F531/BB/AR/DYS/CJW; 2 ♀ F528/BB/AR/DYS/CJW and F529/BB/AR/DYS/CJW, 1 ?juv. ♀ F530/BB/AR/DYS/

CJW, 1 juv. F581/BB/AR/DYS/CJW and Mus. Ziemi in Warsaw no. 2857. Further material is kept in the CJW.

The exuvia (F531) is well preserved, the length of the prosoma is 1.9mm, most leg articles and a part of the opisthosoma are cut off, the eyes and the mouth parts (fig. 6b) are very well preserved, the anterior and the posterior cheliceral margins bear 2 small teeth, the pedipalpus bears a long tarsal claw.

F528: The spider is fairly well preserved, the right patella IV and the distal articles of the left legs III and IV are cut off, the sternum is covered by a white emulsion. The prosoma length is 2.1mm, the width is 1.55mm. The left femur I bears 3 prodorsal bristles, the right femur I only 2. The female is probably a member of *Harpactea communis* n. sp.

F529: The spider is completely and fairly well preserved, partly covered by a white emulsion; the right leg I is broken off behind the coxa and set forward. The prosoma length is 2.15mm. Both femora I bear 2 prodistal bristles.

F530: the female is well and completely preserved, the prosoma length is 1.3mm, a claw of the pedipalpus is most probably absent, the legs have an - ?artificial - "segestriid position": Legs I-III are directed forward, leg IV backward. Photo 27.

F581: A fairly well preserved juvenile spider, partly covered by a white emulsion, body length 3.5mm. The left leg I is a tiny regenerated stump.

Juv. Mus. Ziemi: The spider is preserved in an old and darkened amber piece; it is fairly well and nearly completely preserved, only the right leg II is missing behind the coxa (autotomy), the ventral side is covered by a white emulsion, the prosoma length is 1.4mm.

***Dasumiana* n. gen.**

Diagnosis (♂; questionable ♀: See below, ?*Dasumia petiolata* sensu PETRUNKEVITCH 1958): Posterior eye row only slightly procurved (fig. 6l), anterior lateral eyes distinctly the largest, posterior median eyes circular and wide apart from the posterior lateral eyes, eyes of the posterior row small, unpaired tarsal claws I-IV well developed, ♂-pedipalpus (figs. 6m-n): Patella long, tibia distinctly thickened, bulbus stout, with complex apophyses and a slender embolus (?).

Relationships: In the extant genus *Dasumia* SIMON the unpaired tarsal claws III-IV are strongly reduced or absent, the anterior lateral eyes are close together and on low elevations, the bulbus structures are quite different. In *Harpactea* BRISTOWE the posterior eye row is strongly procurved, the posterior median eyes are not circular (but more triangular) and its position is near the posterior lateral eyes, the eyes of the posterior row are larger (fig. 6c), the clypeus is shorter, the tibia of the male pedipalpus and the bulbus (fig. 6h) are usually slender, the bulbus structures are more simple.

Type species: *Dasumiana emicans* n. sp.

Distribution: Tertiary Baltic amber forest.

?***Dasumiana subita*** (PETRUNKEVITCH 1958) (**questionable n. comb.**)

1958 *Dasumia subita* PETRUNKEVITCH, Trans. Connect. Acad. Arts Sci., 41: 347, figs. 564-567.

According to PETRUNKEVITCH (1958: 347) the holotype is a "mature male" but according to fig. 564 of this author it is a subadult male. The body length is 3.57mm. According to PETRUNKEVITCH (1958: 349) legs III-IV lack an unpaired tarsal claw and claw tufts are absent. Because of the absence of claw tufts, and the widely spaced posterior median and lateral eyes this species could well be a member of *Dasumiana.*

Distribution: Tertiary Baltic amber forest.

?***Dasumiana*** sp.

1958 *Thereola petiolata*,--PETRUNKEVITCH, Trans. Connect. Acad. Arts Sci., 41: 352-353, figs. 573-577.

According to the eye position I regard the female of *Thereola petiolata* sensu PETRUNKEVITCH 1958 as a questionable member of *Dasumiana*. According to the original description of *Therea petiolata* KOCH & BERENDT 1854 (= *Thereola p.*) this species has 8 eyes and a long clypeus and is not a member of the family Dysderidae but more likely of the family Zodariidae.

Distribution: Tertiary Baltic amber forest.

***Dasumiana emicans* n.gen.n.sp**. (fig. 6m)

Material: Holotypus ♂ in Baltic amber, and two separated amber pieces F540/BB/AR/DYS/CJW.

Preservation and syninclusions: The spider is well and completely preserved, ventrally partly covered by a white emulsion. - Near the spider half a Diptera is preserved, in the larger separated amber piece a Diptera and long legs of an insect. In the centre of the prosoma of the spider a tiny (0.15mm long) flattened phoretic larva of an Acari: Astigmata (M. JUDSON det.) is preserved (fig. 6o) which bears at least two pairs of hairy structures at one end. Legs are not observable; are there hidden legs with suction cups? Laterally some questionable fungal hyphae are preserved on the surface of the cuticula of the spider's prosoma.

Diagnosis (♂; ♀ unknown): Femur I with three prodorsal bristles; pedipalpus: Fig. 6m.

Description (♂):
Measurements (in mm): Body length 2.6, prosoma: Length 1.2, width 1.05, leg I: Femur 1.15, patella 0.6, tibia 0.95, metatarsus 0.85, tarsus 0.32, tibia II 0.85, tibia III 0.73, tibia IV 0.95.
Colour: Prosoma and legs dark brown, opisthosoma light brown.
Prosoma (photo) 1.14 times longer than wide, with few indistinct hairs, fine rugose, no thoracal fissure. Eyes not well observable, similar to fig. 6l, posterior lateral eyes the largest, the other 4 eyes small, posterior row slightly procurved, posterior median eyes circular and more than one diameter apart from the posterior lateral eyes. Chelicerae slender, 0.17mm long, fairly diverging, only slightly protruding. Labium free, mouth parts hidden, sternum with longer hairs. - Legs fairly robust, hairs indistinct, patellae bristleless, femur I with 3 prodistal bristles, femur III-IV with dorsal and lateral bristles, tibia and metatarsus III-IV with ventral and lateral bristles, 8 on tibia IV; metatarsus III-IV with apical-ventral preening hairs. All metatarsi bear a trichobothrium, its position on I in 0.83. All tarsi with a well developed unpaired tarsal claw, scopula and claw tufts absent, paired tarsal claws with long teeth, about 10 on I-II. - Opisthosoma soft, 1.73 times longer than wide, covered with short hairs; spinnerets small. - Pedipalpus (fig. 6m) with a long patella similar to fig. 6n, a thick tibia, a stout subtegulum, complex bulbus structures and a thin questionable embolus.

Relationships: In *D. valga* n. sp. femur I bears only two prodistal bristles and the bulbus structures are different.

Distribution: Tertiary Baltic amber forest.

Dasumiana valga **n.gen.n.sp**. (figs. 6l, n)

Material: Holotypus ♂ in Baltic amber and a separated amber piece, F541/BB/AR/DYS/CJW.

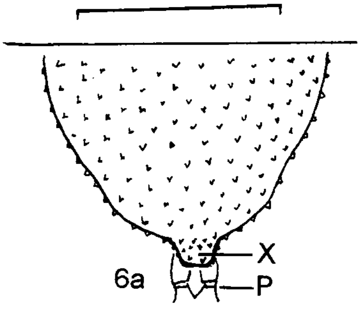
Preservation and syninclusions: The spider is well and nearly completely preserved, only the right leg IV is missing behind the coxa (autotomy), the sternum, parts of the pedipalpus and the left side of the opisthosoma are covered by a white emulsion. An Acari is preserved in front of the spider and three Acari of the same taxon are captured in the separated amber piece; no stellate hairs.

Diagnosis (♂; ♀ unknown): Femur I with two prodistal bristles similar to fig. 6d, pedipalpus: Fig. 6n.

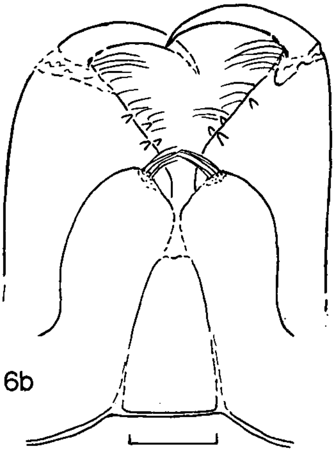
Description (♂):
Measurements (in mm): Body length 2.75, prosoma length 1.35, leg I: Femur 1.1, patella 0.65, tibia 0.95, metatarsus 1.05, femur IV 1.25, diameter of an anterior lateral eye 0.065, of a posterior median eye 0.042, of a posterior lateral eye 0.04.
Colour and body as in *emicans* n. sp., eyes fig. 6l, clypeus about as long as a diameter of an anterior lateral eye. Fangs long. Legs similar to *emicans* but femur I bears 2 prodistal bristles only. - Pedipalpus fig. 6n, articles as in *emicans*, a thin embolus is not observable.

Relationships: See *D. emicans* n. sp.

Distribution: Tertiary Baltic amber forest.



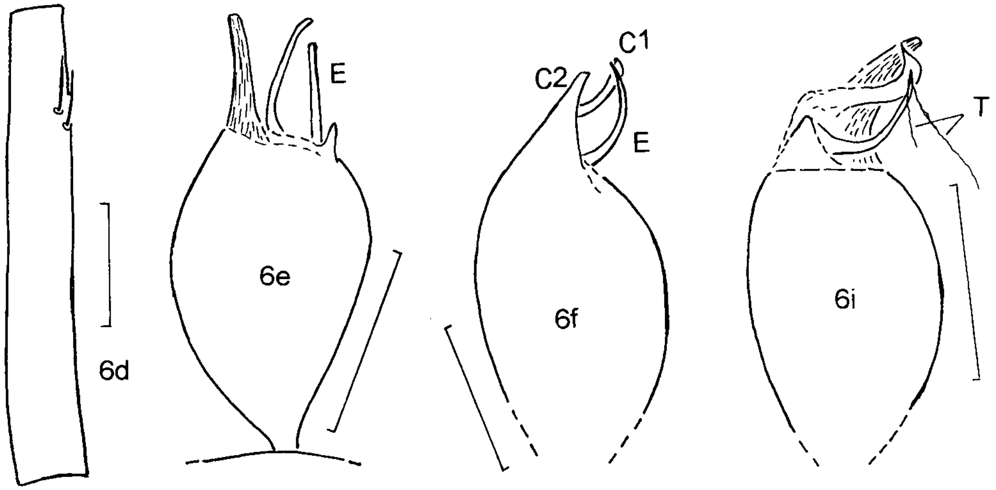
6a

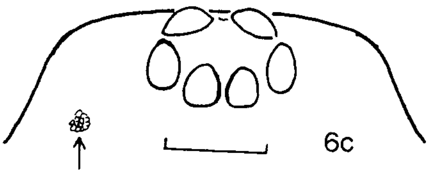


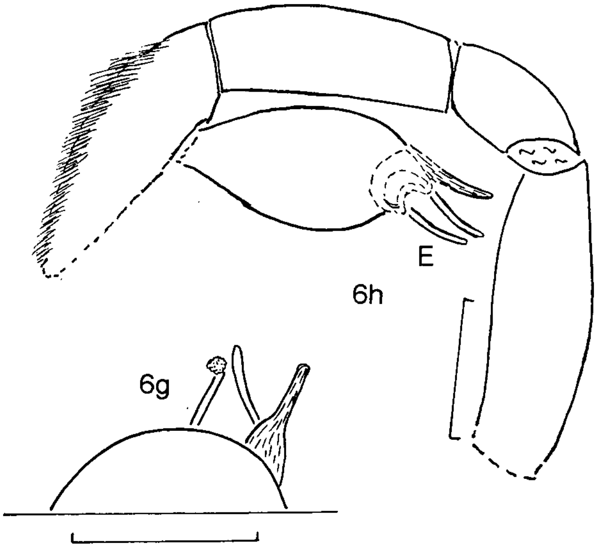
6b

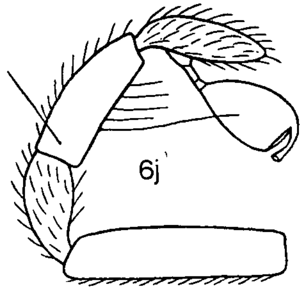
Fig. 6a: ***Rhode* sp.**, ♀ (extant, Portugal), posterior part of the prosoma dorsally with the posterior prolongation (X) and the petiolus (P); M = 0.5;

fig. 6b: ***Harpactea* sp.**, exuvia in Baltic amber, F531, mouth parts ventrally; M = 0.2;





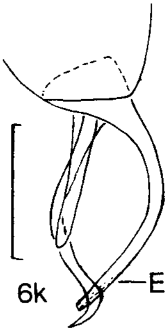


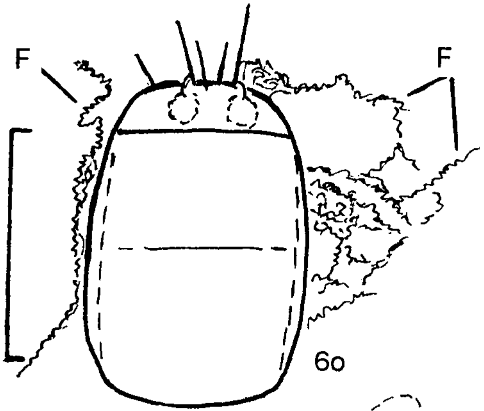


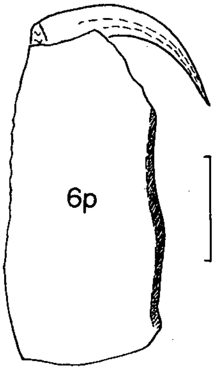
figs. 6c-i: ***Harpactea communis* n. sp.**, ♂; Holotype figs. d-g, paratype Mus. Moscow figs. c, h, paratype F539 figs. i; c) anterior part of the prosoma dorsally; the arrow indicates to a small cut of the rugose surface; d) l. femur I dorsally;

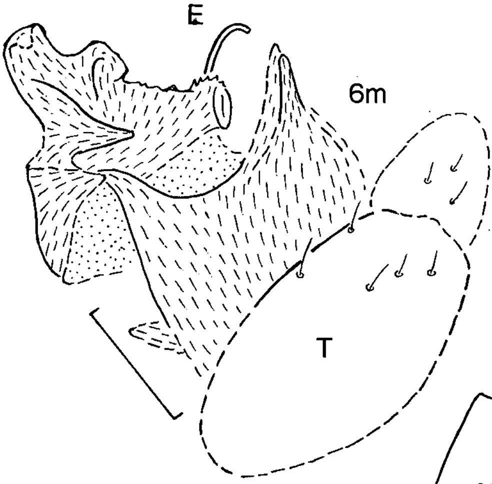
e) bulbus of the r. pedipalpus prolaterally and slightly ventrally; f) l. bulbus retrolaterally (C1, C2 = conductors 1 and 2); g) distal part of the r. bulbus retrobasally, with a droplet of secretion at the tip of the embolus; h) r. pedipalpus prolaterally; i) bulbus of the r. pedipalpus prolaterally with two thin threads of a secretion (T) at the tip of the embolus (E) (an apical bubble is not drawn); M = 0.5 in d), 0.2 in the other figs.;

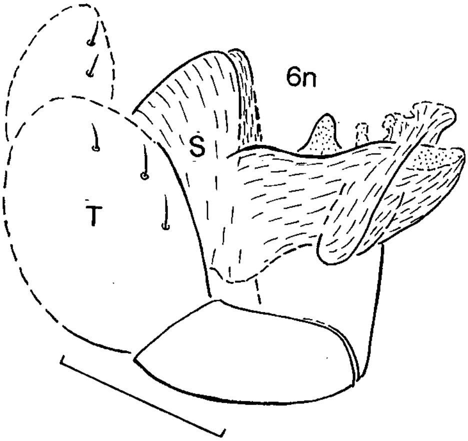
fig. 6j) ***Harpactea extincta* sensu PETRUNKEVITCH 1958** ("androtype"), r. pedipalpus retrolaterally; taken from PETRUNKEVITCH (1958: Fig. 568);











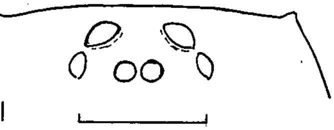


fig. 6k) ***Harpactea arguta* (SIMON 1907),** extant, Europe, ♂, distal part of the (which?) bulbus with the questionable embolus (E) and conductors; taken from BRIGNOLI (1979: Fig. 19); M = 0.2;

figs. 6l, n: ***Dasumiana valga* n. gen. n. sp**., ♂; l) anterior part of the prosoma dorsally-frontally; n) r. pedipalpus retrodorsally; S = subtegulum, T = tibia; M = 0.2;

fig. 6m) ***Dasumiana emicans* n. gen. n. sp**., ♂, l. pedipalpus (expanded?), tibia (T) and cymbium dorsally, bulbus with embolus (E) retrolaterally; M = 0.2;

fig. 6o) flattened body of a **phoretic Acari**: Astigmata on the central part of the prosoma of *Dasumiana emicans* n. gen. n. sp. with ?fungal hyphae (F); M = 0.1;

fig. 6p) ***Harpactea* sp**., extant, l. chelicera with the long medial carina (black) dorsally; M = 0.5.

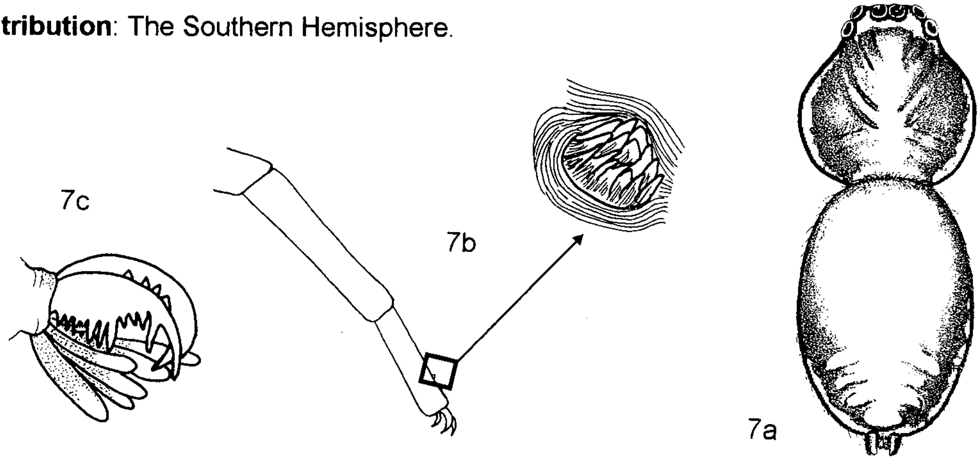
(7) ORSOLOBIDAE

No fossil member of this family is known. According to DIPPENAAR-SCHOEMAN & JOCQUE (1997: 234) "Orsolobids are ground-dwelling, wandering spiders found on low vegetation, in humus, leaf litter and moss in mountain forests...".
FORSTER & PLATNICK (1985) removed the tribus Orsolobini SIMON from the Dysderidae, gave it familiar status and included all former Dysderidae which have a raised tarsal organ.

Diagnosis of the family Orsolobidae: Raised tarsal organ (fig. 7b) and biserically dentate paired tarsal claws present, unpaired tarsal claws absent, onychium present, six eyes in a steady "segestroid position" (fig. 7a), spatulate setae under the tarsal claws and opisthosomal scuta may be present (fig. 7c). - Remark: Fig. 528 of FORSTER & PLATNICK (1985) shows the third pair of legs of a member of the Orsolobidae directed forwardly as in the Segestriidae.

Relationships: Tarsal organ elevated in contrast to the related families in which the position of the paired tracheal spiracles is anteriorly, too, see the cladogram. In the Oonopidae - which also an unpaired tarsal claw is absent - a claw of the ♀-pedipalpus and a colulus are strongly reduced or absent, too; except in various members of the genus *Orchestina* the eye position is different, and the body length is usually only 1-3mm. In the Dysderidae the posterior eye row is procurved and an unpaired tarsal claw is frequently present.

Distribution: The Southern Hemisphere.



Figs. 7a-c: *Afrilobus sp.*, ♀, extant, Africa; 7a) body dorsally; 7b) part of a leg with its enlarged tarsal organ; 7c) tarsal claws with spatulate setae. Taken from DIPPENAAR-SCHOEMAN & JOCQUE (1997: Figs. 98a, c, d).

(8) OONOPIDAE

Members of the family Oonopidae are hunters and most often ground-dwelling animals; specimens of the genus *Orchestina* SIMON live on the ground, in litter, under rocks as well as in higher strata, e.g. on leafs and unter the bark of trees (pers. obs.). The genus *Orchestina* and most probably *Stenoonops* were present in the Dominican as well as in the Baltic amber forest. In Dominican amber the family is more diverse on generic level but all taxa are very rare, in Baltic amber members of the questionable genus *Stenoonops* SIMON are very rare but *Orchestina* is frequent, I saw thousands of specimens, more than one hundred are kept in my private collection. About 10% specimens of *Orchestina* sp. may be present among unselected Baltic amber spiders, and usually the frequency of both sexes is similar. In unselected material of 110 fossil spiders of the coll. H. GRABENHORST (small pieces from the Bitterfeld deposit) I found 5 males, 5 females and 2 juveniles. The high percentage of females indicates that at least some of the species lived at/under the bark of the resin-producing trees and/or on their leafs.
There is an unknown number of undescribed species in *Orchestina*, a revision is needed which include all the material which is kept in private and Museum's collections. In this paper I describe only one species of *Orchestina* for the first time.

The genus Orchestina is of special interest: Apparently this is a "living fossil" which already is known from the Cretaceous. In my opinion this is the most plesiomorphic genus of the family Oonopidae (it probably has to split up and to regard at least as a tribus of its own); in various species the "primitive" "segetroid eye pisition" is present and in few specimens of some species small atavistic anterior median eyes appear (fig. 8d).
I know species of the genus *Orchestina* from Baltic, Burmese, Chinese, Dominican and Spanish (Alava) amber as well as in copal from the Dominican Republic (CJW), Kenya (CJW) and Madagascar (CJW). Their jumping behaviour and their ecology - see above - most probably gives the explanation for the occurence in so many fossil resins.

Diagnosis of the family Oonopidae: Unpaired tarsal claw absent, lungs, colulus and claw of the ♀-pedipalpus absent or strongly reduced, onychium present, rarely 4 eyes, most often 6 eyes in a compact group (fig. 8a) or - in most specimens of the genus *Orchestina* - in a "segestroid position" (fig. 8c); occasionally are 8 eyes present: In *Plectoptilus* SIMON 1905 ("Gamasomorphinae") (as a reversal?), and in an intraspecific variability (atavism) of *Orchestina* (fig. 8d) ("Oonopinae"). Small or tiny spiders, body length usually less than 3mm. Biserically dentate paired tarsal claws may be present. The position of the paired tracheal spiracles is near the epigastral fold. No capture web.

Relationships: See the chapters on the Dysderidae and the Orsolobiidae and the cladogram.

Subfamilies: A revision is needed. Provisionally the "Oonopinae" (dorsal opisthosomal scutum absent, ventral opisthosomal scuta present or absent) and the "Gamasomorphinae" (dorsal <u>and</u> ventral opisthosomal scuta present) are accepted.

Distribution: Cosmopolitical, mainly in temperate climates.

(a) The taxa in Dominican amber

WUNDERLICH (1988) reported members of 5 genera in Dominican amber: *Fossilopaea* WUNDERLICH 1988, *Gamasomorpha* KARSCH 1881, questionable *Heteoonops* DALMAS 1916, questionable *Opopaea* SIMON 1891 and *Orchestina* SIMON 1891. *Gamasomorpha incerta* was transferred by PENNEY (2000) to *Stenoonops* SIMON; Penney (2000) added *Oonops seldeni* PENNEY 2000 to the list of Oonopidae in Dominican amber. - A questionable female of *Heteroonops* sp. indet. is kept in my private collection, F499/BB/AR/OON/CJW; the body length is 1.5mm, ventral tibial I bristles are indistinct, the opisthosoma is deformed.

<u>Key to the genera of the family Oonopidae in Dominican amber</u>:

1 Prosomal cuticula distinctly rugose (fig. 8a), ♂-pedipalpus similar to fig. 8b. . . . .<u>*Stenoonops*</u>

- Prosomal cuticula smooth or nearly smooth, ♂-pedipalpus not similar to fig. 8b 2

2(1) A large dorsal opisthosomal scutum is present. . . . . ?<u>*Opopaea*</u>

- Dorsal opisthosomal scutum absent. 3

3(2) Long leg bristles present: Length of the three pairs of ventral tibial I bristles three times of the diameter of the article, tibial IV bristles present. . . . . ?<u>*Heteroonops*</u>

- Leg bristles short and absent at least on tibia IV. 4

4(3) Femur IV distinctly thicker than the other femora (fig. 8e), ventral opisthosomal shields absent, bulbus free, pear-shaped. . . . . *Orchestina*

- Femur IV not distinctly thicker than the other femora, ventral opisthosomal scuta absent, bulbus free, pear-shaped. . . . . *Oonops*

- Femur IV not distinctly thicker than the other femora, ventral opisthosomal scuta present, cymbium fused to the long and slender bulbus. . . . . *Fossilopaea*

(b) The taxa in Baltic amber

Stenoonops SIMON 1891

Diagnosis: Leg bristles completely absent, prosoma +/- rugose, the margin may be serrated, 6 eyes (fig. 8a), posterior row fairly recurved, posterior median eyes touching, lateral eyes distinctly separated, pedipalpus (fig. 8b) with slender articles, a long cymbium and a long bulbus which is largest basally. According to the drawings of CHICKERING (1969) in some species - not in the type species! - the bulbus is completely fused to the cymbium.

The **relationships** are unsure; probably *Stenoonops* is not monophyletic, see PENNEY (2000: 348-349) and the fused or not fused bulbus.

Distribution: Mainly tropical Regions of Africa and the Americas (not known today from the Palearctic Region); fossil in Dominican amber and most probably in Baltic amber (the Bitterfeld deposit).

?*Stenoonops rugosus* n. sp. (fig. 8b), photo 35

Material: Holotypus ♂ in Baltic amber from the Bitterfeld deposit and two separated amber pieces, F28/BB/AR/OON/CJW.

Preservation and syninclusions: The spider is fairly well preserved in a clear amber piece which most probably was heated in an autoclave. Indistinct remains of a white emulsion are present on the ventral surface, the left legs III and IV are missing behind the coxa by autotomy, some dull fissures are present on the body, the opisthosoma is distinctly deformed, depressed ventrally and - less strongly - dorsally, parts of the lateral margin look scutate at the depressed venter. - A small Diptera, some tiny Acari, detritus particles and remains (branches) of stellate hairs are also preserved.

Diagnosis (♂; ♀ unknown): Prosoma strongly rugose (similar to fig. 8a, photo); pedipalpus: Fig. 8b (the apical bulbus sclerites are hidden).

Description (♂):
Measurements (in mm): Body length 1.1, prosoma length 0.55, leg I: Femur 0.33, patella 0.16, tibia 0.27, metatarsus 0.2, tarsus 0.11, tibia II 0.23, tibia IV 0.29.
Colour: Prosoma and legs red brown, opisthosoma yellow.
Prosoma similar to *S. incertus* (WUNDERLICH 1988) (fig. 8a), strongly rugose with a serrate margin, very few hairs, thorax higher than the caput, slightly raised behind the eye field, median eyes touching, posterior lateral eyes smallest, posterior row slightly recurved, clypeus concave, chelicerae weak, sternum slightly rugose. - Legs short and robust, order IV/I/II/III, bristles absent, covered with indistinct hairs, tarsal claws on distinct onychia. - Opisthosoma long ovally, nearly smooth, distinctly deformed, dorsally probably hardened, ventrally with a large scutum in front of the epigastral fold, spinnerets large. - Pedipalpus (fig. 8b) with slender articles, patella and tibia short, cymbium large and in close contact to the bulbus which is not pear-shaped but largest basally; embolus hidden.

Relationships: I don't want to exclude with certainty that a dorsal opisthosomal scutum (or a hardened part) is present; such a scutum is not reported from extant members of *Stenoonops*. *Stenoonops incertus* (WUNDERLICH 1988) (sub *Gamasomorpha*), fossil in Dominican amber (fig. 8a) is similar in having a strongly rugose prosoma, a serrate prosomal margin and hidden apical bulbus sclerites.

Distribution: Tertiary Baltic amber forest, the Bitterfeld deposit.

Orchestina SIMON 1882

Characters: Spiders of this genus cannot be mistaken: The combination of the distinctly thickened femur IV (fig. 8e) - and jumping behaviour - and the "segestroid position" of the six eyes (fig. 8c; compare fig. 8d!) is unique in tiny spiders (body length 1-2mm). In some fossil specimens the third leg pair is directed forward as in the Segestriidae which are larger than 2mm. In several well preserved males I found spoon-shaped apical bristles on the labium (e.g. fig. 8v) which I do not know from extant spiders. The thorax is high (fig. 8h). At least in the females of one species paired erectile genital extensions are present (G in fig. 8g). In the fossils an autotomy between coxa and trochanter is very frequent. - Close relationships are unsure, the distribution is worldwide in temperate climates.

The first fossil species of this genus in Baltic amber were described by PETRUNKEVITCH: *Orchestina baltica* PETRUNKEVITCH 1942 and *O. imperialis* PETRUNKEVITCH 1963; 8 more species were described by WUNDERLICH (1981), see below; in the present paper I add the description of *Orchestina gracilitibialis* n.sp.- Fossils in other resins, frequency of specimens, on the ecology and the ratio of the sexes: See above. Key to the species: See WUNDERLICH (1981). The main diagnostic characters of the males are the propotions of the articles of the pedipalpus and the shape of the embolus.

Prey. Oonopidae are hunters, their prey is not covered with threads. A female of *Orchestina* sp. indet. in Domonican amber with a small Psocoptera as a prey was reported by WUNDERLICH (1986: 45, fig. 30). A member of the Diptera family Empididae - body length 1.4mm - has been the prey of a female of *Orchestina* sp. indet. in Baltic amber, F196/CJW. The spider's left leg IV is going around the fly's wings and opisthosoma, its mouth parts are close to the fly's thorax. I cannot find a hurt of the fly's body. - Another Diptera in Baltic amber - a Nematocera, F690/CJW, body length 0.15mm - is preserved directly in front of a male *Orchestina* sp. indet.; its body apparently is sucket out; see the photos 667-670.

Parasites. Material in Baltic amber: *Orchestina* sp. indet., ♀, with the parasitic larva of an Acari (Trombidiidae or Microtrombidiidae), coll H. FLEISSNER in Bad Nauheim. - Above the left coxa IV of the spider just in front of the opisthosoma and ventrally of the prosomal shield the parasitic mite is preserved (fig. 8i). The body length of the spider is 1.2mm, the body length of the mite is 0.15mm. The posterior legs of the mite are stretched out backward. The mite probably sucked at a skinny part of the prosoma. Photos 589-590.

Occasionally two or more specimens of *Orchestina* are preserved in the same amber piece, e.g. a male and a female, F488/BB/AR/OON/CJW, F491/BB/AR/OON/CJW, F51/BB/AR/OON/CJW (close together - post copula?); holotype (♂) and paratype (♀) of *Orchestina furca* WUNDERLICH 1981 are kept in the same amber piece. - Syninclusions of other spiders: In the amber piece no. 463 of the Mus. Paris a male of *Orchestina* sp. indet. is preserved in the same amber piece with a female of *Segestria* sp. indet.

Mating behaviour. A pair in copula was described by WUNDERLICH (1981: 109-110, figs. 25-28); it is now deposited in the Senckenberg-Museum Frankfurt a. M. A second pair of this genus in copula is kept in the Geol.-Palaeont. Inst. Göttingen, no. G 351. A third pair in copula was stolen from the Museum's collection of L. BROST (Sweden).
The pair of the SMF (figs. 8f-g) is of special interest, see WUNDERLICH (1986: 46, fig. 294). It is completely and excellently preserved and now included in a block of artificial resin; one side is covered by a white emulsion. The body length of the male is 1.15mm, the body length of the female is 1.75mm. The large opisthosoma of the female bears apparently fully developed eggs. The position of the male is at the ventral side of the female, set backward in an certain angle. The male bites in paired and spinneret-shaped "erectile genital extensions" near the female genital opening (G in fig. 8g) which is well observable. Apparently both bulbi are attached to the female genital opening and both emboli may still being inserted. A "mating bite" to the skin of the opisthosoma or fixation of the male with the help of their cheliceral outgrowths is known from several families of the Dysderoidea - Oonopidae, Dysderidae, Segestriidae, Scytodidae (sclerotized grooves!), Sicariidae and Pholcidae, see e.g. SENGLET (2001) and UHL (1995). An "erectile vulva" in the Pholcidae is reported by SENGLET (2001). Most of these spi-

ders possess a voluminous pedipalpus (articles, bulbus) which may be a reason for the necessarity of a fixation. The simulaneous insertion of the emboli and a "mating fixation" - inclusively the presence of female erectile genital extensions or grooves - may well be autapomorphic characters of the superfamily Dysderoidea.

Remarks on the fossil species of the genus *Orchestina* in Baltic amber (CJW):

Most species are known from the male sex only, see WUNDERLICH (1981).

Orchestina baltica PETRUNKEVITCH 1942, figs. 8k-m. In this species the pedipalpal articles are more slender than in most other species, see *breviembolus*. Depending on the position of the pedipalpus the shape of the embolus may be quite different; in few specimens the tip of the embolus appears divided (fig. 8l). Photo 32.

Orchestina breviembolus WUNDERLICH 1981, figs. 8n-p. In this species the pedipalpal articles are more slender than in most other species, see *baltica*. The labrial bristles are close together, the bulbus is only fairly large, the embolus is short and straight.

Orchestina cochlembolus WUNDERLICH 1981, fig. 8q-s (s: A questionable male of *cochlembolus*). The pedipalpal tibia is large, the embolus is modified.

Orchestina crassiembolus WUNDERLICH 1981, figs. 8t. In this species the embolus is short and thick.

Orchestina crassipatellaris WUNDERLICH 1981, fig. 8u. The pedipalpal patella is relatively thick, the embolus is long and modified.

Orchestina crassitibialis WUNDERLICH 1981, figs. 8v-w. The long labrial bristles are close together, the pedipalpal tibia is unusually thick, the embolus is thick and divided.

Orchestina forceps WUNDERLICH 1981, fig. 8x. In this species the embolus is bill-shaped.

Orchestina furca WUNDERLICH 1981, fig. 8y. The embolus is divided and the ventral branch is shorter than the dorsal branch.

<u>Orchestina imperialis</u> PETRUNKEVITCH 1963, figs. 8z3-8z5. In this species the pedipalpal tibia is fairly slender, the femur is thick, the embolus is very long, hair-shaped and apparently variable in the distal half. Photo 34.

<u>Orchestina tuberosa</u> WUNDERLICH 1981, fig. 8z7. In this species the pedipalpal femur is different to *furca* and the embolus is thicker.

***Orchestina gracilitibialis* n. sp.** (figs. 8z1-8z2)

Material: 2♂ in Baltic amber; holotypus and a separated amber piece, F510/BB/AR/OON/CJW; paratypus Mus. Copenhagen, coll. v. HENNINGSEN, 1-5 (1967).

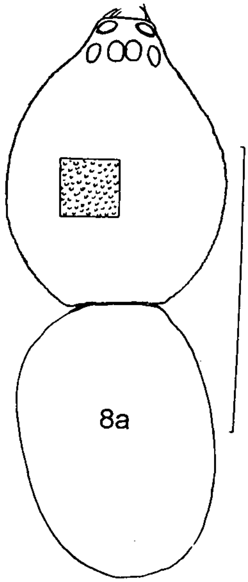
Preservation and syninclusions: <u>Holotypus</u>: The spider is well preserved, fissures are running through the body and are present above the left legs, the right leg II is missing behind the coxa by autotomy; in the separated piece some stellate hairs are present. - The <u>paratype</u> is completely preserved, most dorsal parts of the body are covered by a thick white emulsion; some stellate hairs are preserved with the spider.

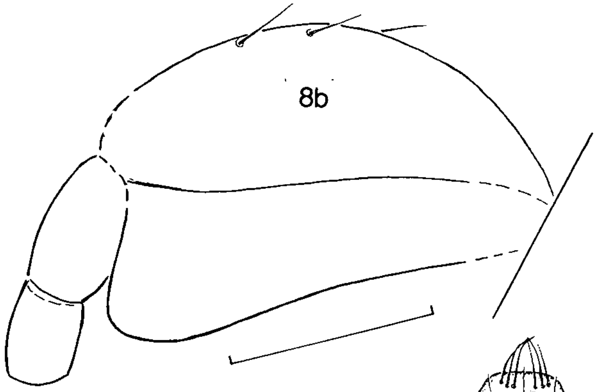
Diagnosis (♂; ♀ unknown): Clypeus with 4 pairs of bristles, distal metatarsal bristles III and IV are present; pedipalpus (figs. 8z1-8z2): Tibia slender, <u>twice as long as high</u>, bulbus large, embolus short and thick, with a claw-shaped tip.

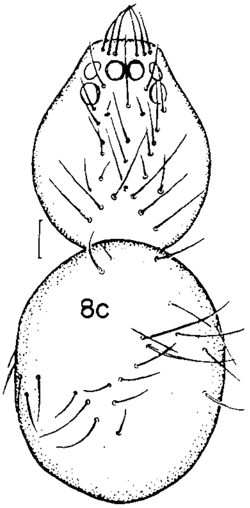
Description (♂):
Measurements (in mm): Body length 1.2 (holotypus) - 1.4, prosoma length 0.6, leg I (holotype): Femur 0.55, patella 0.16, tibia 0.5, metatarsus 0.43, tarsus 0.25, femur IV 0.56.
Colour: Body and legs medium to dark brown, opisthosoma yellow brown.
Prosoma with few dorsal hairs of medium length, six eyes similar to fig. 8c, posterior median eyes the largest, chelicerae slightly diverging distally, similar to fig. 8j, labium free, as in fig. 8s. - Legs fairly slender, femur IV distinctly thickened as in fig. 8e; few thin bristles, the metatarsi III and IV bear some distal bristles. - Opisthosoma (similar to fig. 8c) egg-shaped, with short hairs. - Pedipalpus: See above; the sperm ducts of the bulbus are well observable.

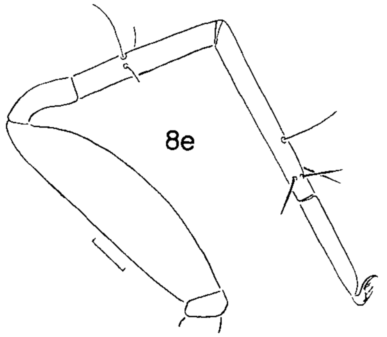
Relationships: In the other fossil species the tibia of the ♂-peddipalpus is relatively shorter and the shape of the embolus is different.

Distribution: Tertiary Baltic amber forest.









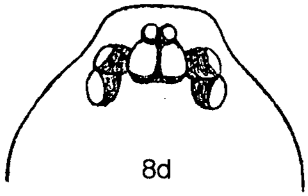


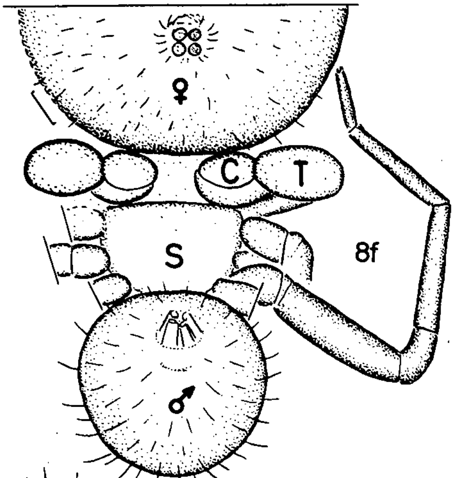
Fig. 8a) Stenoonops incerta (WUNDERLICH 1988) (sub *Gamasomorpha* i.), ♂, body dorsally; M = 0.5; Dominican amber;

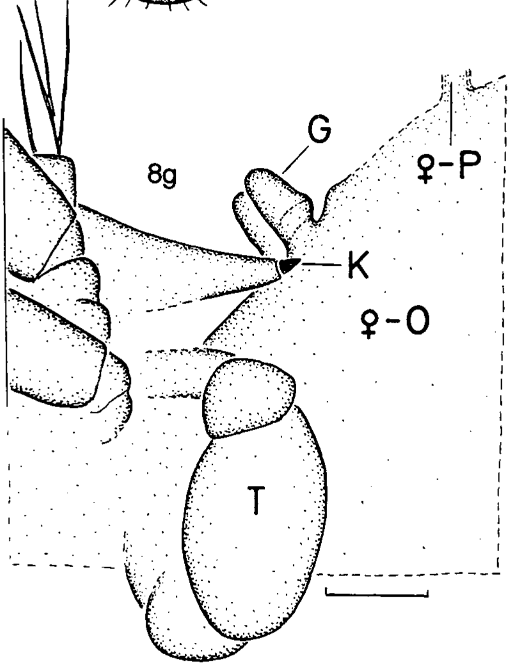
fig. 8b) ?Stenoonops rugosus **n. sp.**, ♂, l. pedipalpus prodorsally; the apical part of the bulbus is hidden; M = 0.1;

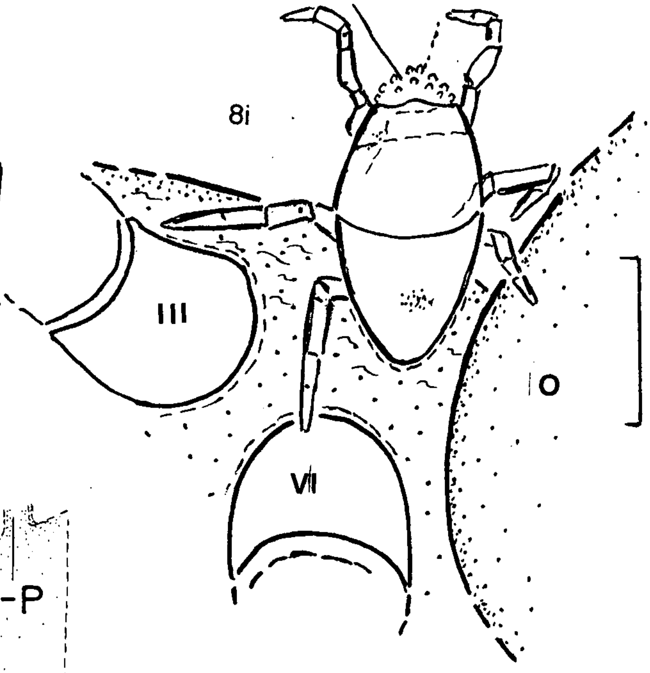
fig. 8c) Orchestina crassiembolus WUNDERLICH 1981, holotype ♂, body dorsally; only some of the opisthosomal hairs are drawn; M = 0.1;

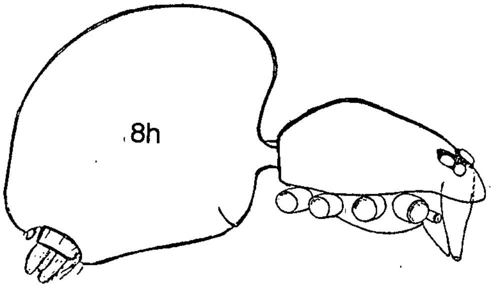
fig. 8d) Orchestina sp. indet., ♀, position of the eyes dorsally. Note the presence of small atavistic anterior median eyes in this specimen! - Taken from DALMAS (1916: Fig. 4);

fig. 8e) Orchestina sp. indet., l. leg IV with bristles and trichobothria (the hairs are not drawn); M = 0.1;





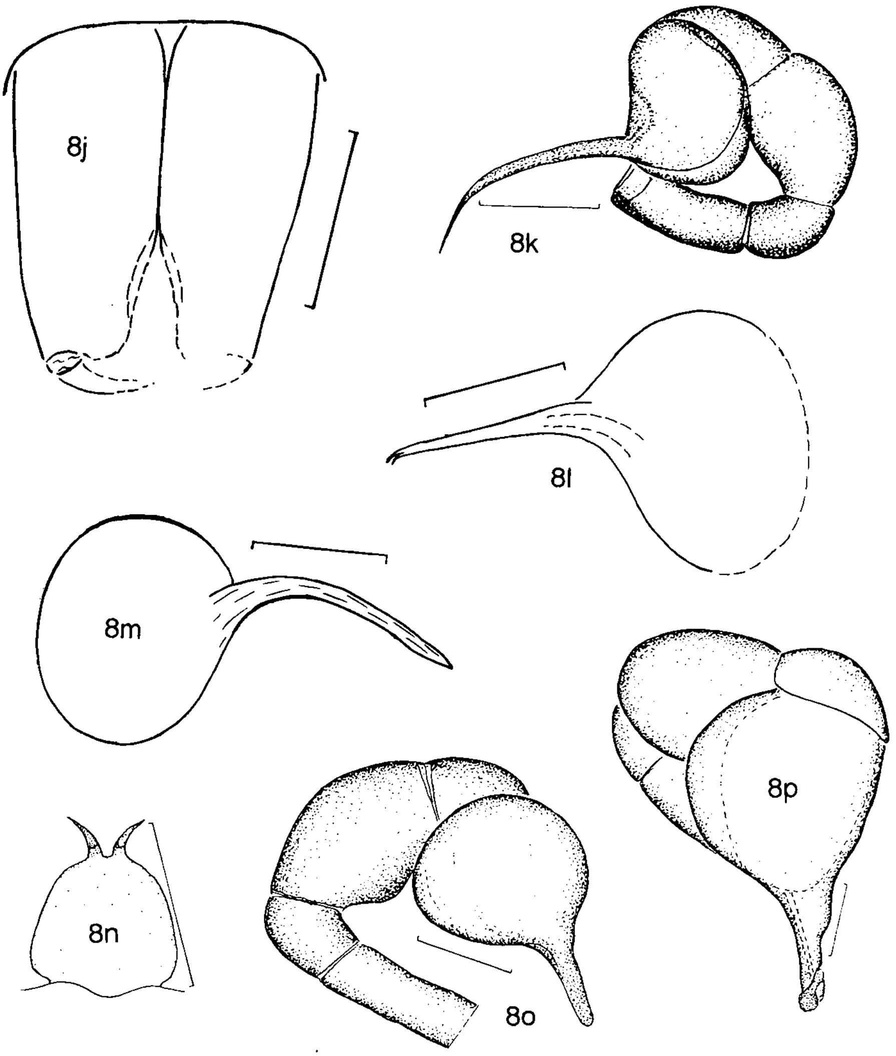




figs. 8f-g: Orchestina sp. indet., pair in copula; f) posterior view (the male chelicerae are hidden); g) lateral view of a cut section - male from the right side, female from the left side -, "mating bite" with the claw (K) of the right male fang at the base of the paired female genital extensions (G). On the top left side: Four hairs of the male clypeus. - C = cymbium, O = opisthosoma, P = pedicel of the female, S = sternum of the male, T = tibia of the male pedipalpus; M = 0.1;

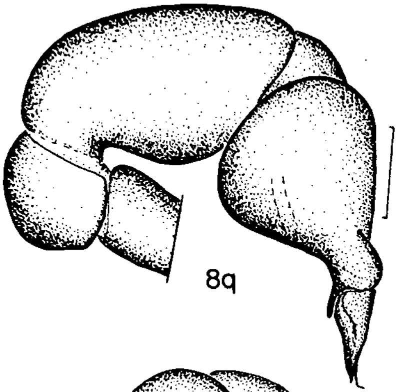
fig. 8h) Orchestina simoni DALMAS, ♀, body, lateral view. - Taken from DALMAS (1916: Fig. 9);

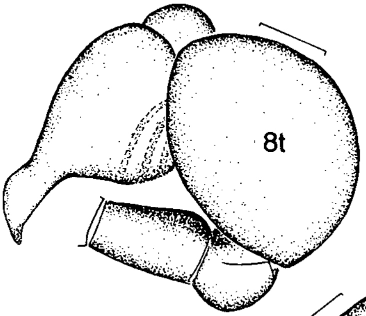
fig. 8i) Parasitic mite larva (Acari: Trombidiidae or Microtrombidiidae), ?sucking on the posterior ventral part of the prosoma of a female of *Orchestina* sp. indet. The mouth parts of the mite are hidden. - O = anterior part of the spider's opisthosoma, III, IV = third and fourth left coxa of the spider; M = 0.1;

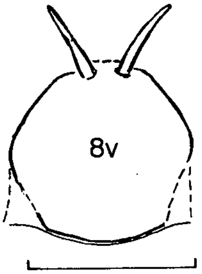


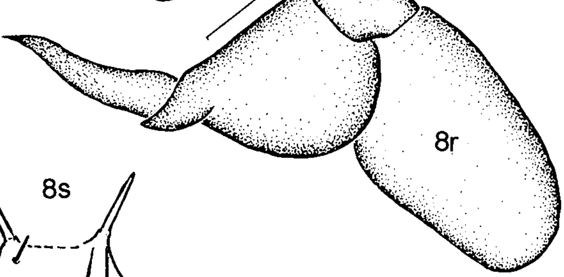
figs 8j-m: Orchestina baltica PETRUNKEVITCH 1942, ♂; j) questionable ♂ of *baltica*, F507, chelicerae, frontal view, apical parts are hidden. Note the distal divergence! k) l. pedipalpus, retrolaterally, bulbus slightly ventrally; taken from WUNDERLICH (1981: Fig. 4); l) ♂, F507, bulbus with embolus of the r. pedipalpus retrolaterally and slightly apically. Note the divided tip of the embolus; m) r. bulbus with embolus retrolaterally; M = 0.1;

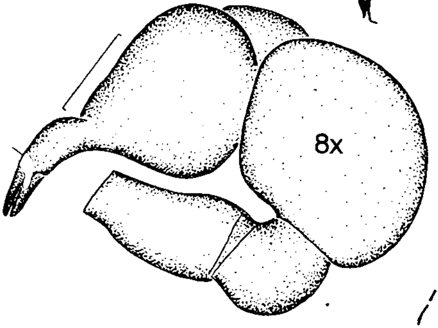
figs. 8n-p: Orchestina breviembolus WUNDERLICH 1981, ♂; n) labium ventrally; o) holotype, r. pedipalpus retroventrally; p) paratype a), r. pedipalpus retrodorsally. The sperm duct is observable in the embolus; tip of the embolus with a questionable secretion; taken from WUNDERLICH (1981: figs. 6-8); M = 0.1;

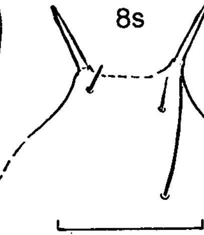


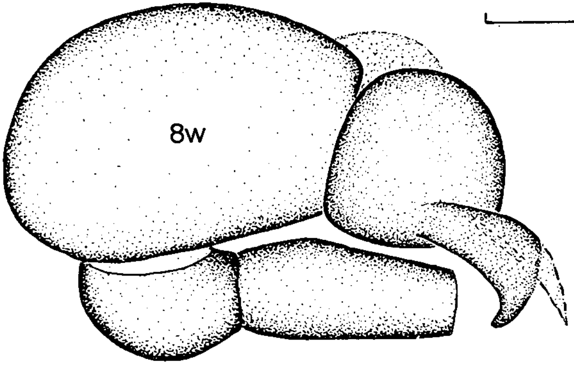


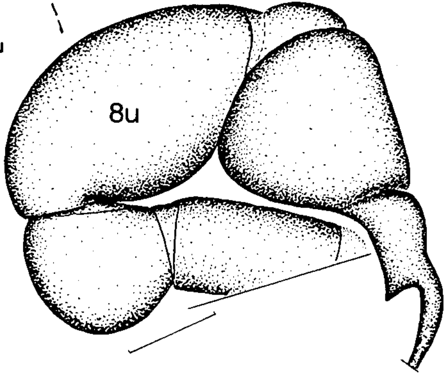












figs. 8q-s: Orchestina cochlembolus WUNDERLICH 1981, ♂; q) holotype, r. pedipalpus retrolaterally, bulbus slightly ventrally; r) holotype, l. pedipalpus retrolaterally; s) questionable ♂, F505, distal part of the labium with the apical paired spooned bristles ventrally; M = 0.1 in figs. q-r, 0.05 in fig. s;

fig. 8t) Orchestina crassiembolus, ♂, holotype, l. pedipalpus retrolaterally; M = 0.1;

fig. 8u) Orchestina crassipatellaris WUNDERLICH 1981, ♂, holotype, r. pedipalpus retrolaterally, the tip of the embolus is hidden; M = 0.1;

figs. 8v-w: Orchestina crassitibialis WUNDERLICH 1981, ♂; v) F508, labium with the apical bristles ventrally; w) holotype, r. pedipalpus retrolaterally; the dorsal branch of the embolus is partly hidden; M = 0.1;

fig. 8x) Orchestina forceps WUNDERLICH 1981, ♂, holotype, l. pedipalpus retrolaterally; M = 0.1;

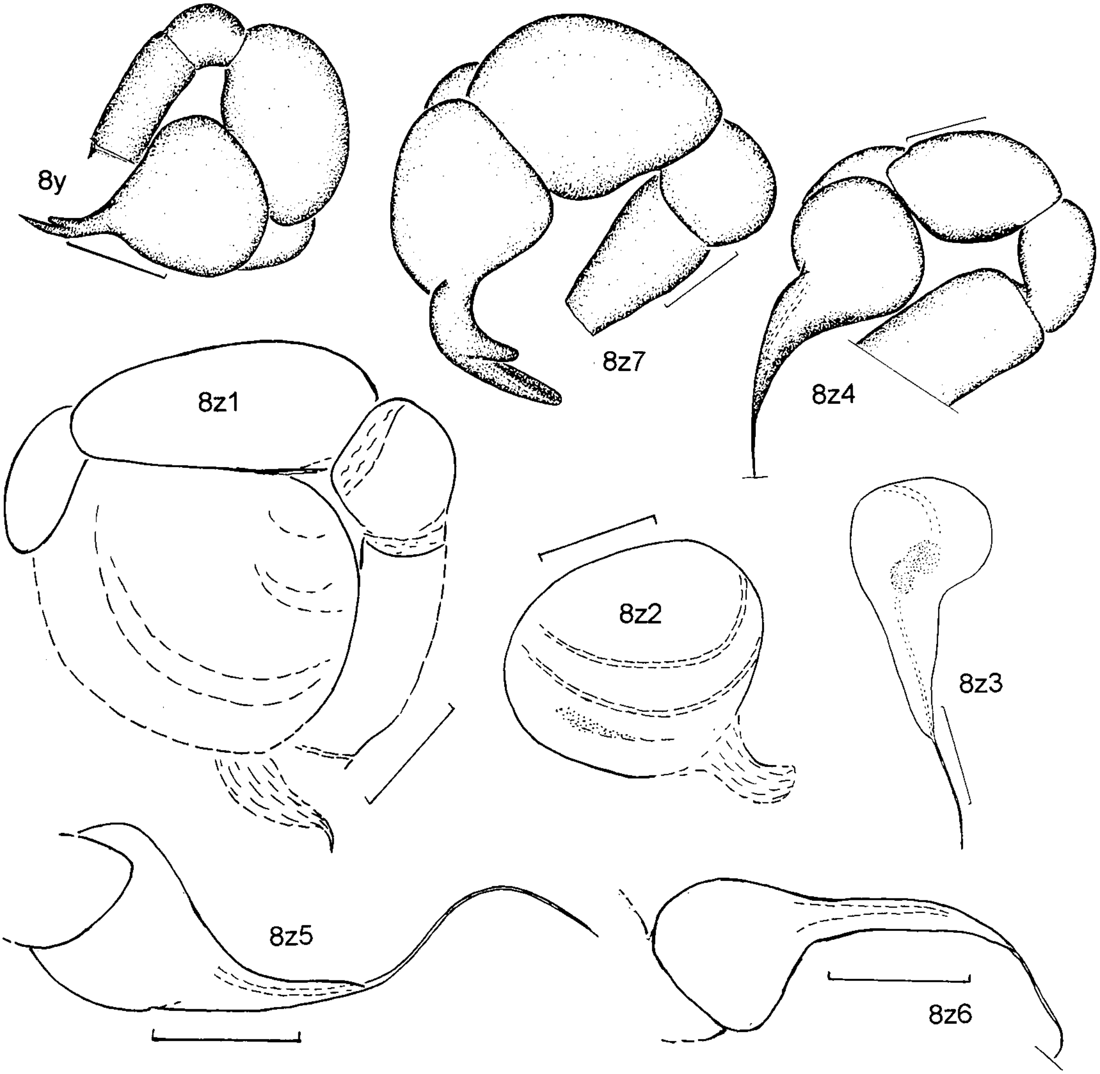


fig. 8y) <u>Orchestina furca</u> WUNDERLICH 1981, ♂, holotype, r. pedipalpus retrolaterally; M = 0.1;

figs. 8z1-8z2: <u>Orchestina gracilitibialis</u> **n. sp.**, ♂; z1) holotype, l. pedipalpus retrolaterally and slightly dorsally; z2) paratype, l. bulbus with the embolus retrolaterally and slightly basally-ventrally (the tip of the embolus is hidden); M = 0.1;

figs. 8z3-8z6: <u>Orchestina imperialis</u> PETRUNKEVITCH 1963, ♂; z3) holotype, r. bulbus with the embolus retrodorsally; d) holotype, l. pedipalpus retrolaterally; the distal part of the embolus is hidden; z5-z6: F504, z5) r. bulbus with the embolus dorsally; z6) l. bulbus with the embolus retrodorsally; the tip of the embolus is hidden; M = 0.1;

fig. 8z7) <u>Orchestina tuberosa</u> WUNDERLICH 1981, ♂, holotype, l. pedipalpus retrolaterally; M = 0.1.

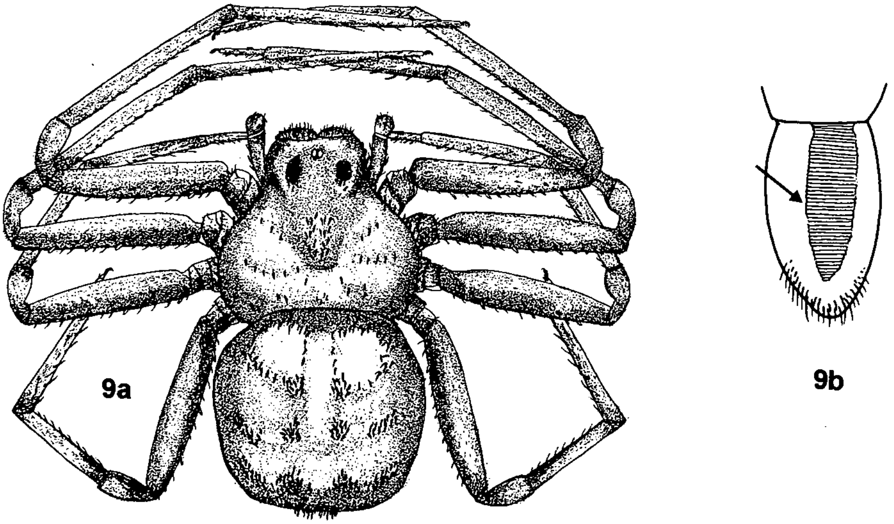
(9) SICARIIDAE

Members of this family prefer dry and warm to hot biotopes. They live hidden under stones and buried in the ground. Their ecology explains that a fossil Sicariidae in amber was never found.

Diagnosis of the family Sicariidae: Clypeus short, numerous thick spines present on body and legs (fig. 9a), stridulating cheliceral files present (fig. 9b), body flat, leg III about as long as the other legs, leg position laterigrade, no anterior median eyes, unpaired tarsal claw nor claw of the ♀-pedipalpus, very short cymbium; burrying behaviour.

Relationships: Probably Loxoscelidae is the sister group, see the cladogram. Loxoscelidae is regarded as a subfamily of the Sicariidae by various authors but in my opinions there are clear differences, see the cladogram.

Distribution: Tropical Africa, South America; the single genus *Sicarius* WALCKENAER 1847.



Figs. 9a-b: Sicarius sp.; 9a) ♀, body, dorsal view; 9b) stridulating files of the left chelicera, laterally. Taken from DIPPENAAR-SCHOEMAN & JOCQUE (1997: Figs. 111a-b).

(10) LOXOSCELIDAE

Members of this family - which often is regarded as a subfamily of the Sicariidae - spin few irregular strands of silk, e.g. under stones. There is a single genus, *Loxosceles* HEINEKEN & LOWE 1835.

From Dominican amber two species have been described: *Loxosceles defecta* WUNDERLICH 1988 and *L. deformis* WUNDERLICH 1988, both based on adult males. Furthermore two juveniles and an exuvia were reported, see WUNDERLICH (1988). In this paper I add a third fossil species.

Diagnosis of the family Loxoscelidae: Body flattened and caput long (fig. 10a, b), fovea well developed, leg position +/- laterigrade, leg III relatively long, six eyes (figs. 10a, b) (anterior medians absent), unpaired tarsal claw and claw of the ♀-pedipalpus absent, cymbium very short (fig. 10d). - Small to larger spiders.

Relationships: Probably Sicariidae is the sister group, see the cladogram.

Distribution: Pantropical and pansubtropical (introduced to Australia).

***Loxosceles aculicaput* n. sp.** (figs. 10b-d) Photo 36

Material: Holotypus ♂ in Dominican amber, F933/DB/AR/LOX/CJW.

Preservation and syninclusions: The spider is very well and completely preserved in an orange piece of amber which contains some fissures; the opisthosoma is fairly deformed. - Some tiny remains of plants and detritus are present in the same piece of amber.

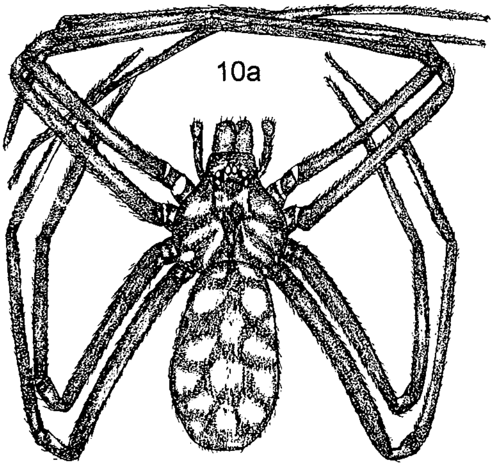
Diagnosis (♂; ♀ unknown): Femur I bears abot 5 thin bristles (fig. 10c). Pedipalpus: Fig. 10d.

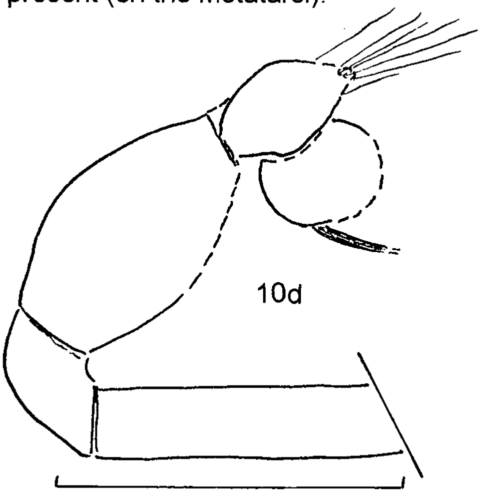
Description (♂):
Measurements (in mm): Body length 2.35, prosoma: Length 1.2, width 1.1; leg I: Femur 2.8, patella 0.4, tibia 2.9, metatarsus 3.0, tarsus 0.6, femur I 2.9, femur III 2.05, femur IV 2.55.
Colour yellow brown.
Prosoma slightly longer than wide, fovea well developed, the long caput bears about 18

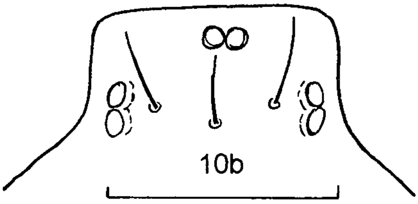
long bristle-shaped hairs (fig. 10b). 6 eyes in three pairs, eyes of the anterior row smallest and far in front of the remaining eyes. Basal articles of the chelicerae fairly long, medial carina well developed, stridulatory files absent, mouth parts hidden. - Legs very long and slender, hairs indistinct, order I/II/IV/III. Bristles thin; femur I about 5 (fig. 10c), tibia I e.g. a ventral pair in the middle and few in the distal half. Metatarsi with few bristles in the middle and in the distal half; they are stronger on legs III and IV. Position of the metatarsal trichobothrium near the end. Onychia well developed. - Opisthosoma ovally, with indistinct hairs; spinnerets of medium length. - Pedipalpus (fig. 10d) with a thick tibia and a short cymbium as in related species; bulbus slightly longer than wide, embolus thin and curved.

Relationships: In *L. deformis* WUNDERLICH 1988 and *L. defecta* WUNDERLICH 1988 (Dominican amber) only very few leg bristles are present (on the metatarsi).

Distribution: Tertiary Dominican amber forest.







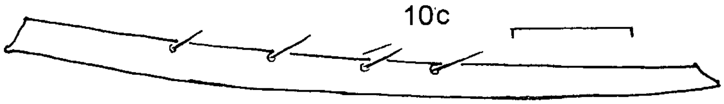


Fig. 10a) Loxosceles sp., female, extant, Africa, body, dorsal view. -Taken from DIPPENAAR-SCHOEMAN & JOCQUE (1997: Fig. 112a);

figs. 10b-d: Loxosceles aculicaput **n. sp.**,♂; b) position of the eyes, dorsal view (only three of 18 bristle-shaped hairs of the caput are drawn); c) r. femur I, prodorsal view (note 5 thin bristles); d) l. pedipalpus prolaterally and slightly from the base (the distal part of the embolus is hidden). - M = 0.5.

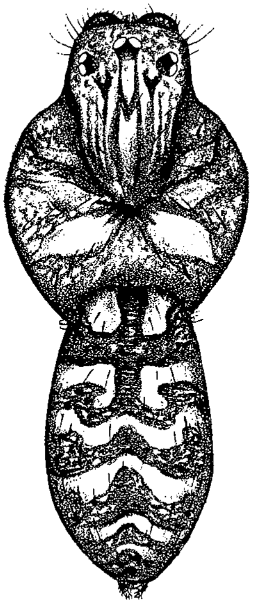
(11) DRYMUSIDAE

Questionable fossils in Baltic amber: See (12) Scytodidae!

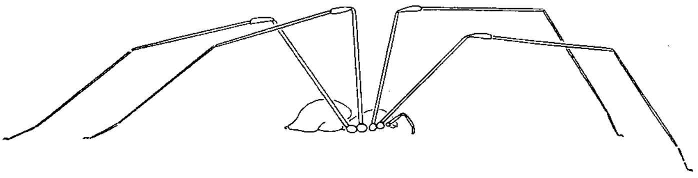
Diagnosis of the family Drymusidae: Frontal position of the posterior median eyes (fig. 11a), leg III about as long as the other legs (fig. 11b), loss of the anterior median eyes and the claw of the ♀-pedipalpus, colulus reduced; very short cymbium. Egg carrying behaviour of the females, a capture web probably is present.

Relationships: See the Scytodidae and the cladogram.

Distribution: Tropical Africa, Central and South America; the single genus *Drymusa* SIMON 1991.



11a



11b

Figs. 11a-b: *Drymusa* sp. (extant), ♀; a) body, dorsal view; b) body, lateral view. Taken from DIPPENAAR-SCHOEMAN & JOCQUE (1997: Figs. 72a-b).

(12) SCYTODIDAE

Fossil Scytodidae in amber are reported by WUNDERLICH (1986, 1988 and 1993). Fossils of this family are rare; I know only about a dozen specimens in Baltic amber and six in Dominican amber.
Members of the genera indet. 1 and 2 are of special interest: Both have a low prosoma as Drymusidae but short legs III as Scytodidae.

(Diagnostic) characters of the family Scytodidae: The extant members of the family Scytodidae (Spitting spiders, "Speispinnen" in German) are usually easily recognizable by the domed prosoma (fig. 12a but see the figs. 12e, h!), the paired six eyes in three groups with the (posterior!) median eyes in a frontal position (fig. 12b) and the long, slender and bristle-less legs (fig. 12g, photos 37-43). A fovea or a thoracal fissure are absent, the weak chelicerae are basally fused. A reduced unpaired tarsal claw is present, the female genital area bears paired sickle-shaped sclerotized stabilazing pits (fig. 12i). A unique spitting behaviour (fig. 12g) is present. Extant females carry their egg sac with the help of the chelicerae like members of related families, see the cladogram.

The prey capture behaviour of the Scytodidae is unique among spiders (a capture web is present in various species): From a distance of few cm the spiders spit sticky threads from the fangs (!) on their prey which is fixed after this procedure (fig. 12g), see the family name. Specialized posterior parts of large glands in the domed prosoma produce the material of these threads, anterior gland parts produce venom. Such behaviour is not known from fossil spiders (there is no direct report) but according to the domed prosoma of most adult fossils in Baltic amber the behaviour of the Early Tertiary *Scytodes* most probably was identic with extant congeneric spiders. It seems unlikely to me that the fossil members of the genera indet. 1 and 2 - in which a domed prosoma is absent (fig. 12e, see below) - were able to use the same prey capture behaviour as the extant spiders; these fossil spiders probably possessed the plesiomorphic low prosoma which was not yet provided with large silk-producing glands or they are members of another family (?Drymusidae).

Genera: *Scyloxes* DUNIN 1992, *Scytodes* LATREILLE 1804 and *Stedocys* ONO 1995. The genus *Scytodes* will probably split up by LEHTINEN (pers. commun.) in the future.

Relationships: Drymusidae and Pholcidae may be most related, see the cladogram; according to the median spinules on the median spinnerets Drymusidae are most related, see PLATNICK et al. (1991) . Also in Pholcidae a lamina of the partly fused chelicerae is present, the female carries its egg sac with the help of the chelicerae and there may be only six eyes but Pholcidae build capture webs, a spitting behaviour is absent, the eye position - two triads - is quite different and the bulbus structures are complicated. In the following table I compare selected characters of four "primitive" six-eyed spider families in which the eye position may be similar and the legs are long and slender, too (see also the families Leptonetidae, Ochyroceratidae, Pholcidae and Telemidae):

Selected characters	**Scytodidae**	**Drymusidae**	**Sicariidae**	**Loxoscelidae**
unpaired tarsal claw	strongly reduced	present	absent	absent
leg spines/ bristles	absent	few thin bristles	spines	absent or few bristles
fovea	absent	absent or indistinct	indistinct	large
leg III	short	short	long	long
special characters	stabilazing pits, usually distinctly domed prosoma, short opisthosoma eggs carried by females	long & narrow caput, red. colulus, sheet web?	flattened body, +/- laterigrade legs	
known in amber	Baltic & Dominican	?Baltic		Dominican

Remark: In few taxa of the families which are shown in the table cheliceral stridulating files are present, e.g. in Sicariinae and in some Scytodidae: *Scytodes*; see WUNDERLICH (1988).

Ecology: Extant spiders live in litter, under stones, under the bark of trees and in other higher strata as well as in house: The cosmopolitical *Scytodes thoracica*.

The **distribution** of the extant members of the family Scytodidae is nearly cosmopolitic but the spiders occur mainly in tropic and subtropic regions. One species - *Scytodes* *thoracica* (LATREILLE 1802) - occurs out of houses in warm localities in Germany and is not rare in houses in numerous parts of the world. - Fossils: Only few fossil spiders are known from Baltic and Dominican amber: The genus *Scytodes* is present in both kinds of amber; it is the only known genus of this family in Dominican amber. In Baltic amber *Scytodes* is only known from not-Bitterfeld localities up to now. Only from Bitterfeld gen. indet. 1 (2 specimens) is known to me, from Bitterfeld as well from a not-Bitterfeld deposit I got gen. indet. 2 including one specimen each.

1. Spiders in Dominican amber

Three species are known in Dominican amber: *Scytodes piliformes* WUNDERLICH 1988, *S. planithorax* WUNDERLICH 1988 and *S. stridulans* WUNDERLICH 1988, see WUNDERLICH (1988: 71-75). *S. stridulans* may be related to the extant *S. bajula* SIMON 1891 (St. Vincent, Venezuela, Mexico).

2. Spiders in Baltic amber

Key to the fossil genera of the family Scytodidae in Baltic amber

1 Prosoma distinctly domed (fig.12a), opisthosoma short (fig. 12g). . . . . *Scytodes*

- prosoma low (fig. 12e), opisthosoma long ovally (photo) 2

2(1) legs very long and slender, femur I about 1.7 times longer than the prosoma. . . . . .gen. indet. 1

- legs shorter, femur I as long as the prosoma. . . . . gen. indet. 2

Scytodes weitschati WUNDERLICH 1993 (figs. 12a-d) Photos 37-39

Scytodes weitschati, Mitt. Geol.-Paläont. Inst. Univ. Hamburg, 75: 243-247.

In Baltic amber *Scytodes weitschati* WUNDERLICH 1993 has been described from an adult male (figs. 12a-d) and a questionable juvenile spider. Now I have before me one more male of this species, F445/BB/AR/SCY/CJW (see below) and two *Scytodes* sp. indet. (?= *weitschati*): An ?adult female, F176/BB/AR/SCY/CJW and a juv. ♂, SPGIH 2537, ex coll. HERRLING. - Male F445: The spider is incompletely preserved in an amber piece which was heated in an autoclave. Some leg articles are cut off, the right coxa IV, the left femur IV and the prosoma posteriorly are deformed; the spider apparently was a prey - sucked out by a spider? The prosoma is somewhat lower than in the holotype.

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

?Scytodidae: Gen. indet. 1 (figs. 12e-f) Photos 40-41

Material: 2 juv. in Baltic amber from Bitterfeld: F36/BB/AR/?SCY/CJW and F174/BB/AR/?SCY/CJW (coll. LUDWIG). - The prosoma of both specimens is somewhat deformed.

Short description (see the family characters): Prosoma low (figs. 12e-f), legs very long and slender, femur I 1.7-1.8 times longer than the prosoma, length of the prosoma about 0.75mm, length of femur I about 1.3mm, clypeus short and not prolongated, no leg bristles, no fovea, leg III distinctly shorter than the other legs, a distinct onychium is present, an unpaired tarsal claw is probably absent. Opisthosoma long ovally, colulus hidden.

Relationships:In gen. indet. 2 the prosoma also is not domed but slightly convex, the legs are relatively shorter - compare the key. - The not domed prosoma of this genus - which may be identic with gen. indet. 2 - is of great interest because the domed prosoma is a family character. In Drymusidae (extant, South Africa, Central America) - in which the prosoma also is low, an unpaired tarsal claw is present - the caput is strongly prolongated, leg bristles and a shallow fovea are present. - The spiders of gen. indet. 1 and 2 well may be members of an undescribed genus or even subfamily which is related to *Scytodes,* in which the prosoma glands still were smaller or they are a taxon of the family Drymusidae. Scytodidae possesses two functional different parts of poison glands: The larger part produces sticky threads, the smaller part poison. Mainly the large first part causes the domed prosoma in extant Scytodidae. An adult male is needed to confirm this hypothesis.

Relationships: See ?Scytodidae gen. indet. 2.
Distribution: Tertiary Baltic amber forest, up to now Bitterfeld locality only.

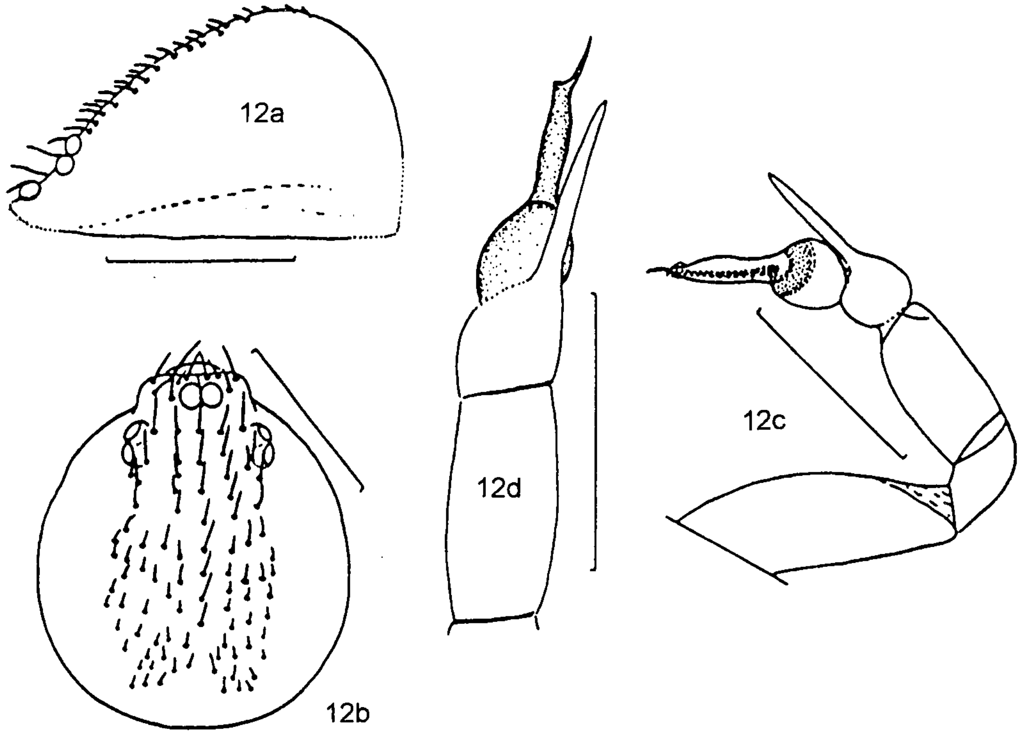
?Scytodidae: Gen. indet. 2 Photo 42

Material: Juv. in Baltic amber, F175/BB/AR/?SCY/CJW.

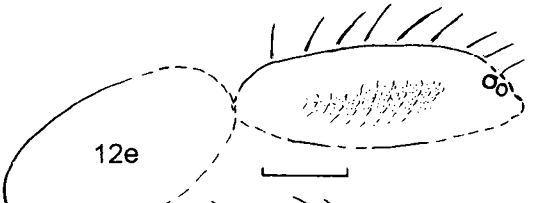
Short description (see the family diagnosis): The prosoma is not domed, legs long, femur I as long as the prosoma, length of the prosoma 0.88mm, femur I about 0.95mm long, clypus short, no leg bristles, leg III distinctly shorter than the other legs, an unpaired tarsal claw is probably absent, opisthosoma long ovally, a large colulus is present..

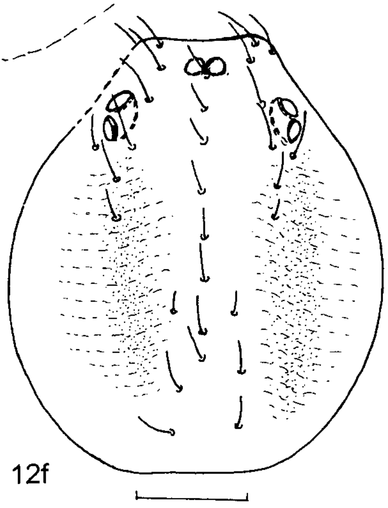
Relationships: In gen. indet. 1 the prosoma is not domed, too, but the legs are relatively longer.

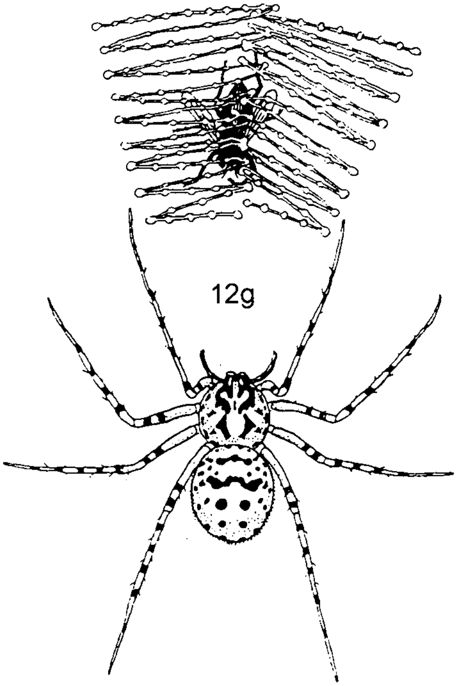
Distribution: Tertiary Baltic amber, Bitterfeld and not-Bitterfeld deposits.

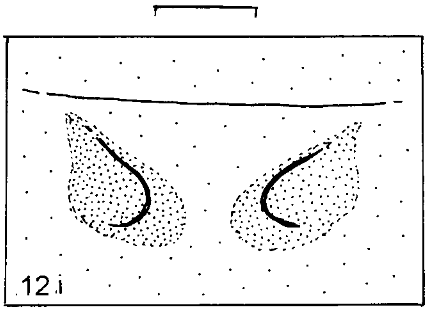


Figs. 12a-d: *Scytodes weitschati* WUNDERLICH 1993, ♂; a-b: prosoma laterally and dorsally; c-d: l. pedipalpus retrolaterally and dorsally. M = 1.0 in a-b, 0.5 in c-d;









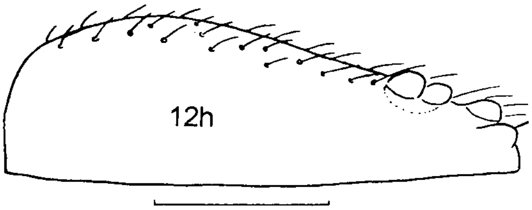


fig. 12e) ?Scytodidae gen. indet. 1, (F174) juv., outline of the body laterally; prosoma somewhat deformed. M = 0.2;

fig. 12f) ?Scytodidae gen. indet. 1 (F36), juv., prosoma dorsally, somewhat deformed. M = 0.2;

fig. 12g) a female of the extant species *Scytodes thoracica* (LATREILLE 1802) - body length about 5mm - has fixed its prey - a fly - by a "spruzzo", that are sticky threads originating from its fangs (!). - After BRISTOWE (1947), taken from WIEHLE (1953: Fig. 91).

12h) *Scytodes planithorax* WUNDERLICH 1988, ♂ in Dominican amber, prosoma, lateral view. M = 0.5.

fig. 12i) *Scytodes tenerifensis* WUNDERLICH 1987, ♀, extant, genital area with the sickle-shaped pits behind the epigastral fold; M = 0.2.

(13) LEPTONETIDAE

INTRODUCTION

Only a single species of this family has ever been described from fossils: *Eoleptoneta kut*scheri WUNDERLICH 1991 in Baltic amber. The family is restricted to the Northern Hemisphere and is known today e.g. from the South of Europe. Most spiders are weakly pigmented and "live deep in ground detritus and under embedded rocks in mesic situations of forests and mountains." GERTSCH (1974: 146); several extant species are cave dwellers. Their ecology explain the rareness of these fossils in amber. The large eyes of the fossil spiders indicate that these spiders were not cave dwellers.
Leptonetidae are usually six-eyed (fig. 13a, c), long-legged and small to tiny spiders which have a body length one to three mm. In most spiders - the Leptonetinae - the posterior median eyes are situated distinctly behind the other eyes (fig. 13c). Autotomy occurs in the Leptonetidae between patella and tibia (photos); I observed this kind of autotomy in two thirds of the fossil Leptonetidae. A patella-tibia autotomy in the Dysderoidea is known besides the Leptonetidae only from the Filistatidae. - In the about 50 million years old Baltic amber I found members of the advanced Leptonetinae but no Archoleptonetinae.

TAXONOMY

Revised diagnosis of the family Leptonetidae: The only ecribellate members of the Dysderoidea which has the leg autotomy between patella and tibia (photos), tibial glands usually present - fig. 13j; see PLATNICK (1986) -, opisthosoma usually more or less globular (photos), chelicerae free, with a thin carina and a promarginal row of teeth (fig. 13b), fangs long (figs. 13b, q). 6 eyes in a narrow group, the posterior median eyes far behind the other eyes (Leptonetinae, fig. 13c) or between the other eyes (Archoleptonetinae, fig. 13a). Male pedipalpus (figs. 13jd-e, k-n, r-o): Tibia usually with a bristle-bearing retrodistal spoon, cymbium usually with a constriction. - Further characters: Clypeus strongly protruding and concave (figs. 13a, c, photos), legs long and slender - tibia I frequently three times longer than the prosoma - with bristles (tibiae with two dorsal bristles (fig. 13i)), leg IV slender, egg carrying behaviour by female unknown (probably present), colulus large, claw of the ♀-pedipalpus large, body length less than 3mm.

Relationships: According to the presence of tibial glands - see PLATNICK (1986) -, free chelicerae and long fangs the Telemidae should be the sister group; in the Telemidae lungs, a claw of the ♀-pedipalpus, a cheliceral carina and a patella-tibia autotomy are absent; a "segestroid eye position", a single dorsal tibial bristle only, and a coxa-trochanter autotomy are present. The clypeus and the opisthosoma are similar in most Pholcidae and in some Telemidae. In the Ochyroceratidae - which may be similar, too - leg bristles are absent at least on the anterior tibiae, see the chapter on this family.

Distribution: The Northern Hemisphere, mainly temperate climates.

Subfamilies: (1) Archoleptonetinae GERTSCH 1974 have their six eyes in a compact group (fig. 13a); a cymbial constriction is absent (as well as in some Leptonetinae). Archoleptonetinae is restricted to the Americas; only the genus *Archaeoleptoneta* is known; (2) Leptonetinae in which the posteror median eyes are situated far behind the other eyes (fig. 13c). The distribution is holarctic; fossil in Baltic amber including the Bitterfeld deposit.

Key to the genera of the Leptonetidae in Baltic amber:

1 Anterior median eyes distinctly raised (fig.13m), metatarsal bristles absent, longest bristle on tibia IV 0.35mm long; bristle-bearing pedipalpal tibial spoon absent (fig. 13n). . . . .*Oligoleptoneta*

- Anterior eyes slightly raised, metatarsal bristles present, longest bristle on tibia IV 0.2mm long; bristle-bearing pedipalpal tibia spoon present (figs.13d-e,k-m)..*Eoleptoneta*

Eoleptoneta WUNDERLICH 1991

Diagnosis: No distal cheliceral teeth (fig. 13b), femoral bristles absent, metatarsal bristles present; ♂-pedipalpus (figs. 13d-e): Tibia with 1-2 bristle-bearing spoons, cymbial depression variable; ♀ with a raised genital area.

Relationships: In *Oligoleptoneta* n. gen. metatarsal bristles and a spoon of pedipalpal tibia are absent and the eye area is raised.

Type species: *Eoleptoneta kutscheri* WUNDERLICH 1991.

Distribution: Tertiary Baltic amber forest incl. the Bitterfeld deposit.

Eoleptoneta kutscheri WUNDERLICH 1991 (figs. 13b-g) Photos 44-45

Material (in Baltic amber from the Bitterfeld deposit): Holotypus ♂ F1403/BB/AR/LEP/CJW; 1 ♂ Palaeont. Mus. Humboldt University no. MB.A.558.

The male MB.A.558 is deformed by heating in an autoclave (?); both legs I are missing behind the patella by autotomy. Pedipalpus (figs. 13d-e,g): The patella bears a short dorsal-distal bristle, the tibial spoon is as in the holotype, slender, 0.1mm long, its position just behind the middle of the tibial length, the - deformed! - cymbium seems to bear a constriction.

Diagnosis (♂; ♀ unknown): Pedipalpus (figs. 13d-e, g): Bristle-bearing spoon of the tibia slender and 0.1mm long.

Relationships: See *E. similis* n. sp. and *E. duocalcar* n. sp.

Distribution: Tertiary Baltic amber forest, the Bitterfeld deposit.

Eoleptoneta similis n. sp. (fig. 13h) Photo 47

Material: Holotypus ♂ in Baltic amber, coll. F. KERNEGGER no. 319/94.

Preservation and syninclusions: The spider is well and nearly completely preserved, only the first left leg I is missing behind the patella by autotomy. Body and legs are covered by a white emulsion. Both bulbi are bent to the body. - Some Acari, a Collembola, remains of two Diptera, spider's threads and stellate hairs are also preserved in the amber piece.

Diagnosis (♂; ♀ unknown): Length of the pedipalpal tibial spoon with the bristle 0.7mm, fig. 13h.

Description (♂):
Measurements (in mm): Body length 1.25, prosoma length 0.62, width 0.58, femur I 1.5, longest bristle on tibia IV 0.2 as in *kutscheri*.
Colour: Prosoma and legs dark brown, opisthosoma light brown.
Body and legs as in *E. duocalcar* and *kutscheri* but there are probably less bristles on tibia IV, only two bristles are observable in the distal half (probably the number of bristles is intraspecific variable or some bristles are broken off). All metatarsi with a trichobothrium, its position on II in 0.43. Pedipalpus similar to *kutscheri* but the spoon is shorter, fig. 13h.

Reationships: In *E. kutscheri* the pedipalpal tibial spoon with the bristle is longer (0.1mm) and more slender.

Distribution: Tertiary Baltic amber forest.

***Eoleptoneta duocalcar* n. sp.** (figs. 13i-l) Photo 46

Material: Holotypus ♂ in Baltic amber and three separated amber pieces, F467/BB/AR/LEP/CJW.

Preservation and syninclusions: The spider is fairly well preserved, the right leg I is cut off through the tibia. The ventral part of the prosoma is covered by a large bubble, the opisthosoma is covered by a white emulsion. - In the same amber piece two flies and a beetle (Pselaphidae) are preserved, in the separated amber pieces an ant,a mite, remains of two insects, excrement balls and some detritus particles are preserved.

Diagnosis (♂; ♀ unknown): Tibia of the pedipalpus with two spoons (figs. 13k-l).

Description (♂):
Measurements (in mm): Body length 1.5, prosoma length 0.75, leg I: Femur 1.35, patella 0.2, tibia 1.5, metatarsus 1.2, tarsus 0.68, tibia IV 1.2. - Colour light brown.
Prosoma nearly smooth, with a distinct foveal depression and a long clypeus; 6 eyes as in *E. kutscheri*, chelicerae fairly protruding. - Legs long and slender, I distinctly the longest, III distinctly the shortest, patellae, tibiae and metatarsi with bristles, length of the

longest bristle on tibia IV 0.2mm, tibiae with two dorsal bristles (fig. 13i), metatarsi II-III bear a ventral bristle in the middle. All metatarsi bear a trichobothrium, its position on I in 0.52, on IV in 0.43. Patella and tibia I-II bear - mainly dorsally - tiny droplets which may be remains of secretions of the tibial glands. The diameter of the droplets is about 0.01mm. - Opisthosoma as in *E. similis*. - Pedipalpus (figs.13k-l): Tibia with two spoons.

Relationships: In *E. kutscheri* and *E. similis* the tibia of the male pedipalpus bears only one spoon.

Distribution: Tertiary Baltic amber forest.

Eoleptoneta curvata n. sp. (figs. 13q-r)

Material: Holotypus ♂ in Baltic amber from the Bitterfeld deposit, coll. H. GRABENHORST no: AR-66, later Geolog.-Palaeontol. Institute University of Hamburg.

Preservation and syninclusions: The spider is only fairly well and incompletely preserved in an amber piece which apparently was heated. Several leg articles are cut off, only the left legs II-IV are complete. The opisthosoma is dorsally compressed; only remains of a white emulsion are present. - Numerous tiny detritus particles are preserved in the same amber piece but no stellate hairs.

Diagnosis (♂; ♀ unknown): Bristle of the pedipalpal spoon distinctly curved (fig. 13r).

Description (♂):
Measurements (in mm): Body length 1.5, prosoma length 0.7, leg II: Femur 1.15, patella 0.2, tibia 1.2, metatarsus 1.0, tarsus 0.7, femur IV 1.5, tibia IV 1.5.
Colour: Medium to dark brown.
Prosoma: The eyes are hidden, its position may be as in fig. 13m, clypeus long, chlelicerae long and slender, teeth hidden, fangs very long (fig. 13q), gnathocoxae long and with a medial depression, labium free, wider than long. - Legs long and slender, with some thin bristles, patellae 1 dorsally-distally, tibiae 2 dorsally, III-IV with apical bristles, too, metatarsus I-II 1(?), III-IV 2. Position of the long trichobothrium on metatarsus II in 0.43. - Opisthosoma 1.6 times longer than wide, covered with indistinct hairs; colulus difficult to observe. - Pedipalpus (fig. 13r) with slender articles, bristle of the tibial spoon distinctly curved, a hair is present nearby, cymbial depression distinct, bulbus with a dorsal depression, embolus thin and curved upwards.

Relationships: In the other congeneric fossil species the spooned bristle is not distinctly curved.

Distribution: Tertiary Baltic amber forest, Bitterfeld deposit.

Oligoleptoneta n. gen.

Diagnosis (♂; ♀ unknown): Six eyes on an elevation, anterior eyes distinctly raised (fig. 13m), long leg bristles, femoral and metatarsal bristles absent; pedipalpus (figs. 13o-p): No strong femoral bristles, tibia with strong retrolateral bristles but no spoon, cymbium with a strong constriction and a short distal part which may be divided (partly hidden).

Relationships: See *Eoleptoneta*.

Type species: *Oligoleptoneta altoculus* n. sp.

Distribution: Tertiary Baltic amber forest.

Oligoleptoneta altoculus n. gen. n. sp. (figs. 13m-p) Photo 48

Material: Holotypus ♂ in Baltic amber, F468/BB/AR/LEP/CJW.

Preservation and syninclusions: The spider is well and nearly completely preserved, only the tip of the left tarsus IV is cut off and the right leg II is missing behind the patella by autotomy. The ventral side of body and legs as well as parts of the pedipalpi are covered by a white emulsion; a large gas bubble covers the anterior-ventral part of the opisthosoma, small bubbles cover the anterior eyes. - Some excrement balls are preserved in the same amber piece.

Diagnosis: See above.

Description (♂):
Measurements (in mm): Body lengt 1.9, prosoma length 0.85, leg I: Femur 1.85, patella 0.4, tibia 1.9, metatarsus 1.45, tarsus 0.85, tibia III 0.95. - Colour yellow brown.
Prosoma nearly smooth, with a distinct foveal depression and a long clypeus. 6 eyes (fig. 13m), the anterior 4 eyes raised (and covered with bubbles). Most parts of the chelicerae are hidden, the fangs are slender and very long. - Legs long and slender, I distinctly the longest, III distinctly the shortest. The tibia I bears long and outstanding ventral hairs. Few bristles, longest on IV, the longest bristle on tibia IV is 0.35mm long. Patellae with a long dorsal-distal bristle, all tibiae bear two dorsal bristles, no laterals, femora and metatarsi are bristle-less. All metatarsi bear a trichobothrium, its position on IV in 0.56. - Pedipalpus (see above) with a curved femur.

Relationships: See above.

Distribution: Tertiary Baltic amber forest.

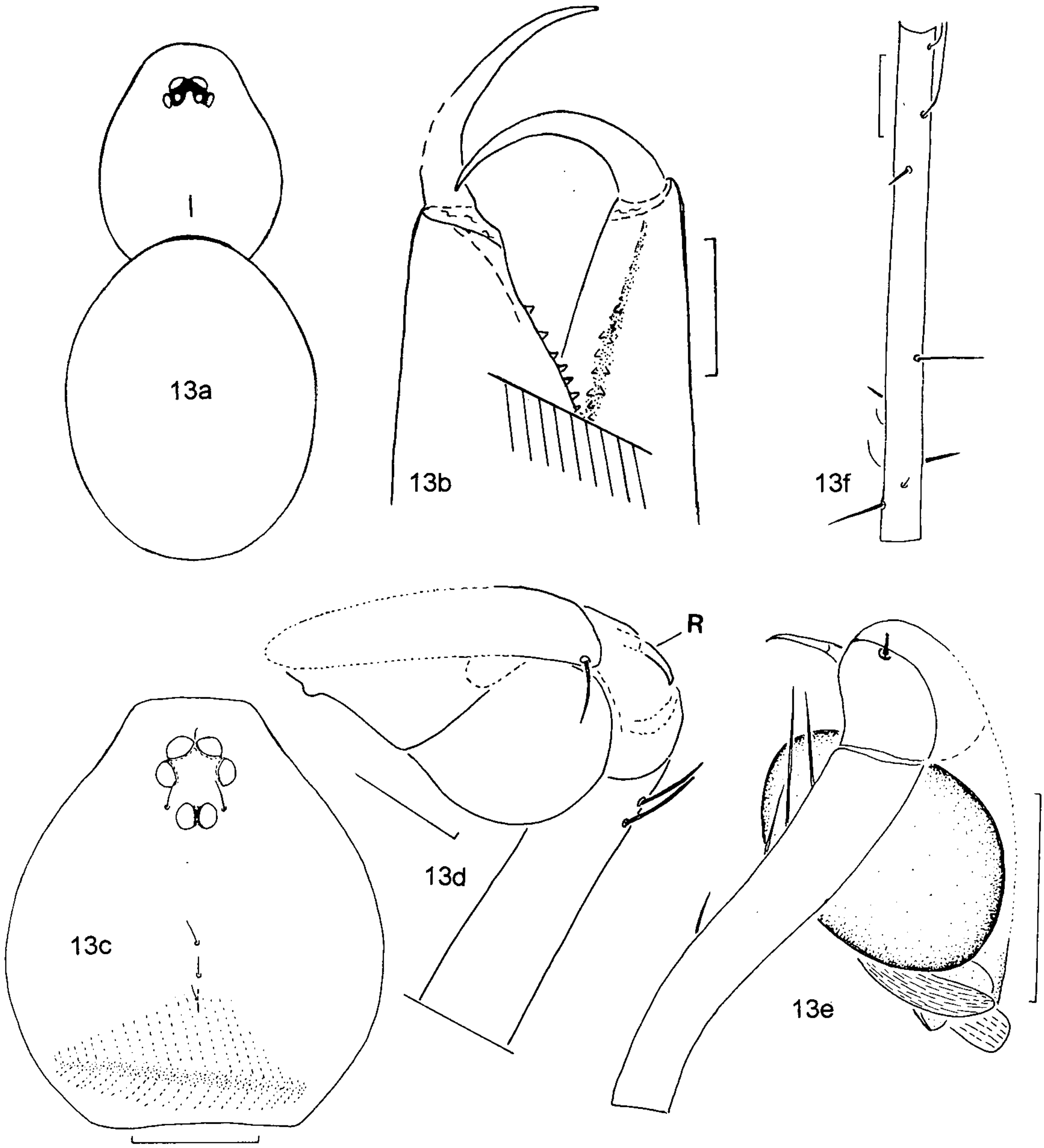


Fig. 13a: Archoleptoneta schusteri GERTSCH 1974, body dorsally; taken from GERTSCH (1974: Fig. 130);

figs. 13 b-g: Eoleptoneta kutscheri WUNDERLICH 1991, ♂; b) no. MB.A.558, chelicerae with teeth ventrally (basally hidden); c-g) holotype, c) prosoma dorsally (posteriorly deformed); d) l. pedipalpus mainly retrolaterally but patella distally and femur ventrally; e) l. pedipalpus: Femur dorsally, bulbus basally-ventrally; f) r. tibia IV with bristles and trichobothria dorsally; g) bristle-bearing tibial spoon of the r. pedipalpus dorsally-distally; M in fig. g = 0.05, in the remaining figs. 0.1;

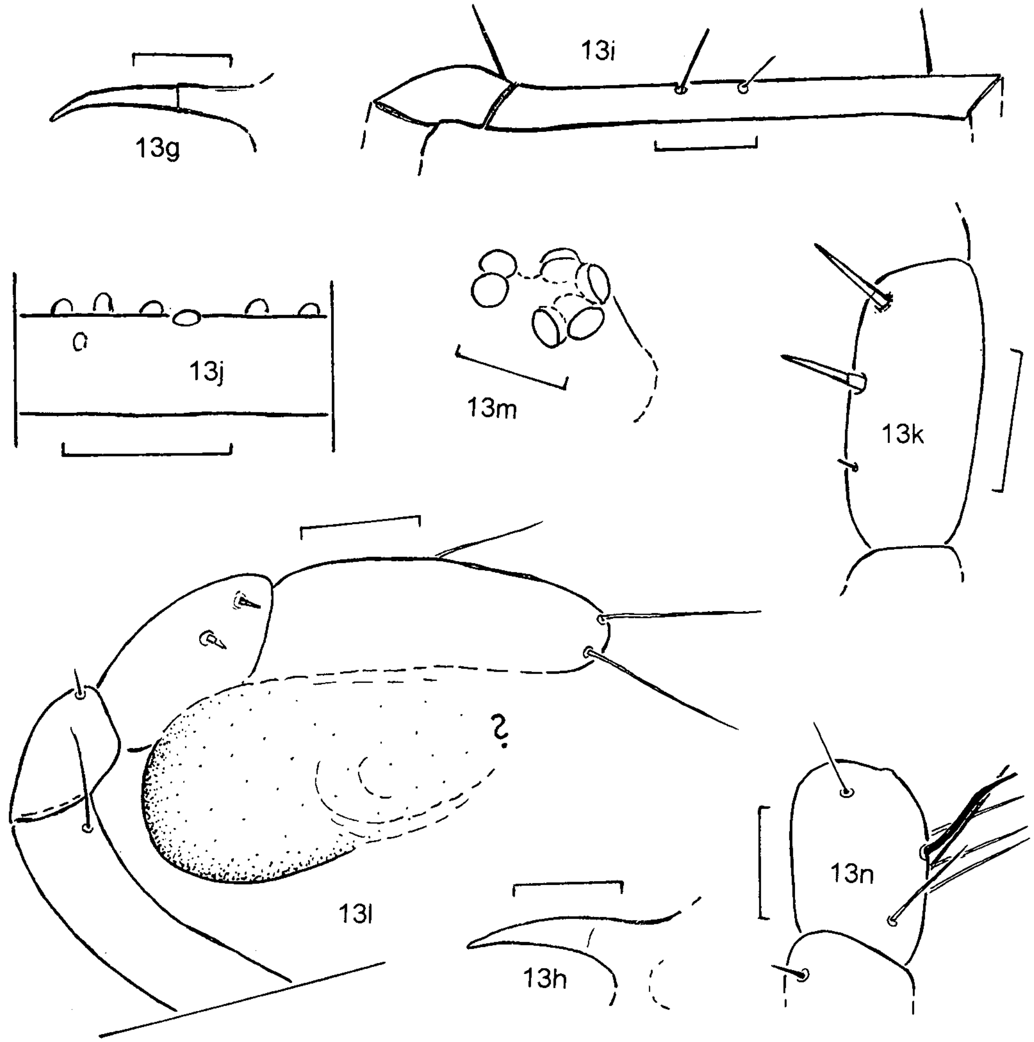
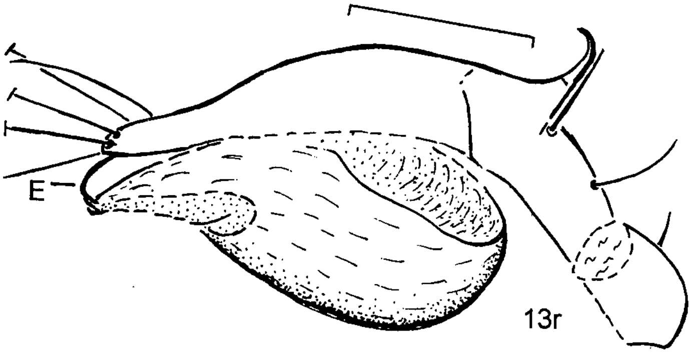
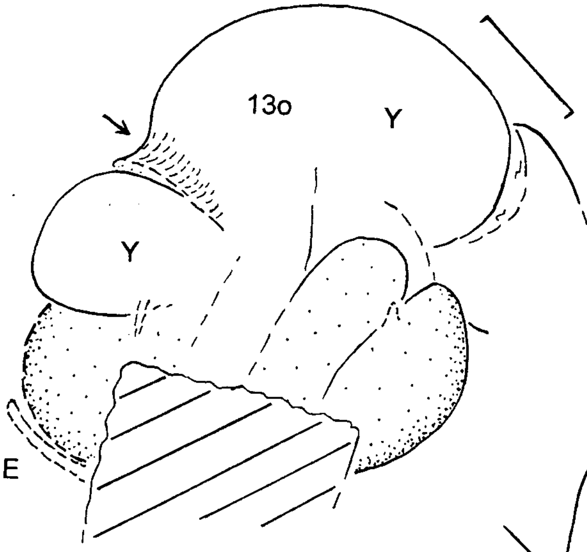


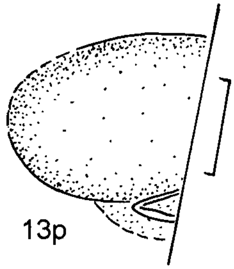
fig. 13h: *Eoleptoneta similis* **n. sp.**, ♂, bristle-bearing tibial spoon of the r. pedipalpus dorsally-distally; M = 0.05;

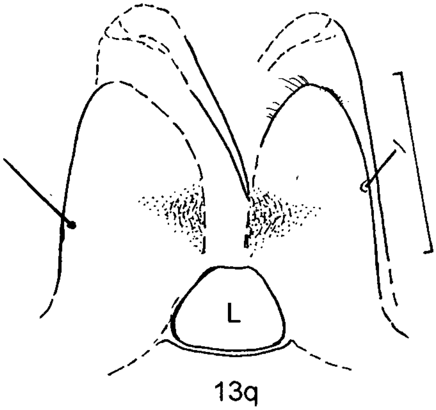
figs. i-l: *Eoleptoneta duocalcar* **n. sp.**, ♂; i) r. patella and tibia retrolaterally. The tibia bears two dorsal bristles and a trichobothrium. Note the absence of a basal patellar bristle; j) middle part of the r. tibia II retrolaterally. Note the tiny droplets which may be remains of secretions of the tibial glands; k) tibia of the l. pedipalpus dorsally; l) r. pedipalpus retrolaterally; the distal bulbus structures are hidden; M = 0.2 in fig. i), 0.1 in the remaining figs.;

figs. m-p: *Oligoleptoneta altoculus* **n. gen. n. sp.**, ♂; m) eyes and clypeus retrodorsally; n) tibia of the r. pedipalpus retrodorsally (small hairs are not drawn); o) l. pedipalpus retrolaterally and slightly distally; the arrow indicates to the cymbial constriction; p) basal part of the r. bulbus retrobasally; E = embolus Y = cymbium; M = 0.2 in fig. m), 0.1 in the remaining figs.; ⟶









figs. q-r: Eoleptoneta curvata **n. sp**., ♂; q) mouth parts ventrally (parts are hidden); r) l. pedipalpus retrolaterally and slightly distally; E = embolus, L = labium; M = 0.2.

(14) TELEMIDAE

Up to now no fossil species of the family Telemidae was reported, only its occurence in Tertiary Baltic amber was published by WUNDERLICH in BACHOFEN-ECHT (1996: 218). The ecology is similar to the Leptonetidae. The family is widely distributed in few genera; in Europe only the eye-less *Telema tenella* SIMON 1882 occurs in caves in the South of this continent. Members of the fossil species have large eyes (fig. 14b) and surely were free-living.
In the similar six-eyed fossil spiders of the family Leptonetidae is the eye position quite different, two dorsal tibial bristles are present and the leg autotomy occurs between patella and tibia. In similar fossil Oonopidae a long single dorsal tibial bristle is absent, too, and in the as fossils - frequent members of the genus *Orchestina* SIMON femur IV is distinctly thickened (fig. 8e).

Diagnosis of the family Telemidae: Anterior opisthosomal sclerite present (fig. 14a) (not observable in the fossils), tibial glands present (fig. 14e), lungs absent, tracheal spiracles in a frontal position, anterior median eyes absent, eyes in a "segestroid position" (fig. 14b), only one tibial bristle present (in the basal half, figs. 14e, g), claw of the female pedipalpus absent, spermatophores present, free chelicerae, long fangs, slender articles of the male pedipalpus with the cymbium long, very slender (except basally) and convex ventrally (fig. 14h); European Telemidae attach their cocoon to the underside of rocks. - Further characters: Clypeus strongly protruding and concave (figs. 14b, k), the opisthosoma may be globular.

Relationships: See the Leptonetidae - in which tibial glands most often are present, too - and the cladogram.

Distribution: Extant: Nearly cosmopolitical, mainly in temperate climates; not known from Australia and probably not present in South America. Fossil: Baltic amber; the probably single species is more frequent in the Bitterfeld deposit than in other deposits.

?***Telema moritzi* n. sp**. (figs. 14b-l) Photos 49-50

Derivatio nominis: The species is dedicated to Dr. MANFRED MORITZ in Berlin who determined the paratype in the PIHUB to the genus *Telema*.

Material: 5♂2♀ in Baltic amber: Paratypes which come not from the Bitterfeld deposit: 1♂ F777/BB/AR/TEL/CJW; 1♀ and 2 separated amber pieces F483/BB/AR/TEL/CJW; the following specimens come frome the Bitterfeld deposit: Holotypus ♂ F484/BB/AR/TEL/CJW; paratypes: 1♂ F485/BB/AR/TEL/ CJW; 1♂ Palaeontolog. Inst. Humboldt University Berlin, MB.A.595; 1♂ and 1♀ coll. H. GRABENHORST nos. AR-93 and AR-98. The material from the coll. GRABENHORST and the CJW will probably be deposited in the GPIHamburg or the SMF.

Preservation and syninclusions: Holotypus: The pedipalpi are well, body and legs are fairly well preserved, parts of the right leg II are missing. Remains of a small Diptera and a pair of wings of an Isoptera are preserved in the same amber piece. - Paratypes: F483: The spider is well and completely preserved in a yellow piece of amber which contains numerous bubbles; the fossil is ventrally covered by a white emulsion. Remains of spiders's threads are preserved behind the field of the spinnerets. In the large separated piece of amber two stellate hairs, hair-shaped structures and mycelia of an unknown fungus are preserved. - F485: The male is well and completely preserved; ventrally it is covered by a white emulsion. - F777: The spider is fairly well preserved in an amber piece which was heated. Several leg articles are missing, the left legs III-IV are complete, the right leg I is broken off between patella and tibia by autotomy. Remains of a Collembola and some Arthropod leg articles are preserved in the same amber piece. - MB.A.595: The spider is only fairly well preserved, the ventral side of the body is completely covered by a white emulsion, leg IV is complete, the other legs are cut off most often behind the tibia; there are fissures in the amber piece. No syninclusions. - AR93: The spider is fairly well preserved, the left patella I and the left tarsus and metatarsus IV (the distal half) are cut off. 1/2 Diptera, some Acari and stellate hairs are preserved in the same piece of amber. - AR98 is completely preserved, ventrally a weak white emulsion is present. A small member of the Diptera and stellate hairs are preserved in the same piece of amber.

Diagnosis: Eyes close together, as in figs. 14b, k), pedipalpus (figs. 14h-k): Cymbial outgrowth (paracymbium) absent, bulbus very large, embolus large and in an apical position, the variable tip is straight (paratypes F485, PIHUB), slightly bent ventrally (paratypus F777) (not figured) or bent dorsally (holotype). Genital area (fig. 14l) protruding, with a slit in a cross position.

Description (♂):
Measurements (in mm): Body length 1.0 (AR-93) to 1.3, prosoma: Length 0.45 (AR-93) to 0.65, width 0.45-0.6, leg I: Femur about 1.1, patella 0.2, tibia usually 1.05-1.15 but only 0.75 in AR-93, metatarsus 0.8, tarsus 0.55, tibia IV 0.9.
Colour: Body and legs medium to dark brown, opisthosoma yellow brown.
Prosoma longer than wide, with a very low thoracal depression and indistinct hairs. Clypeus protruding, as long as the width of the eye field. 6 large eyes (figs. 14b, k), the medians are the largest and contiguous. Basal cheliceral articles large, anterior margin with long and curved bristles as in fig. 14c, teeth not observable, fangs long (fig. 14c). - ♀-pedipalpus (fig. 14d) with longer hairs, without a claw. - Legs long and thin (fig. 14g), patellae with a long dorsal-distal bristle, tibiae with a single long bristle in the basal half near the middle. E.g. in the females F483 (fig. 14e) and AR-93 a row of at least 10 tibial IV gland plates are observable which are typical in the family Telemidae (and most

Leptonetidae), see PLATNICK (1986). - Opisthosoma nearly globular, covered with some longer hairs (fig. 14k), colulus large, with a strong distal hairs (fig. 14f), anterior spinnerets large and widely spaced. - ♂-pedipalpus (figs. 14h-k) with slender articles, a long and slender cymbium and an egg-shaped bulbus; embolus large, in an apical position, tip variable (see above) and probably divided apically. Epigyne (fig. 14l) protruding, with a slit in a cross position.

Relationships: According to its characters I regards this fossil species with only a small question mark to the genus *Telema* SIMON. In contrast to the eye-less extant European *Telema tenella* SIMON 1882 exist 6 large eyes, in the extant Japanese *T. napponica* (YAGINUMA 1972) the embolus is smaller.

Distribution: Tertiary Baltic amber forest, Bitterfeld deposit - most specimens (!) - and not-Bitterfeld deposits

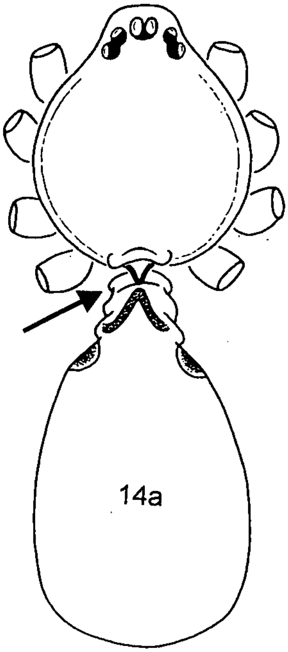
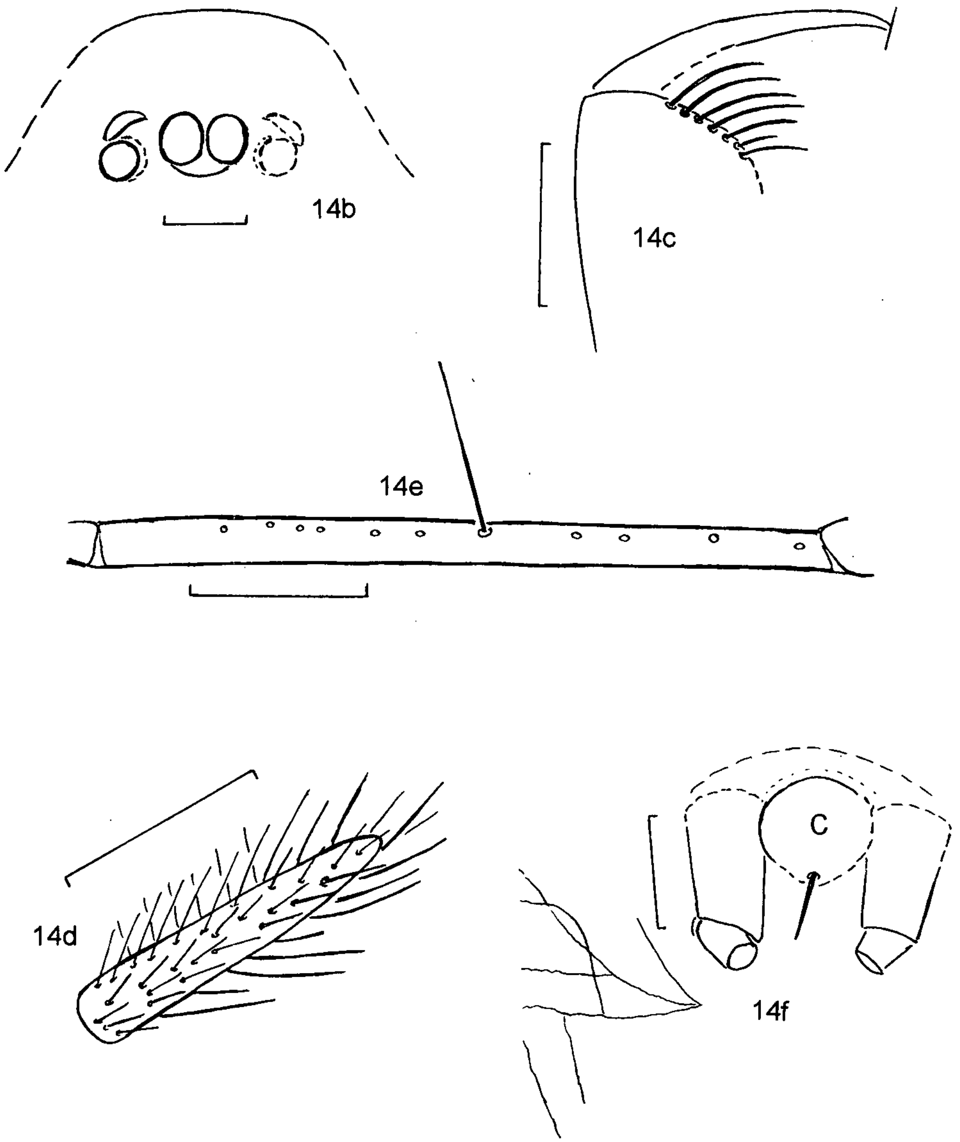
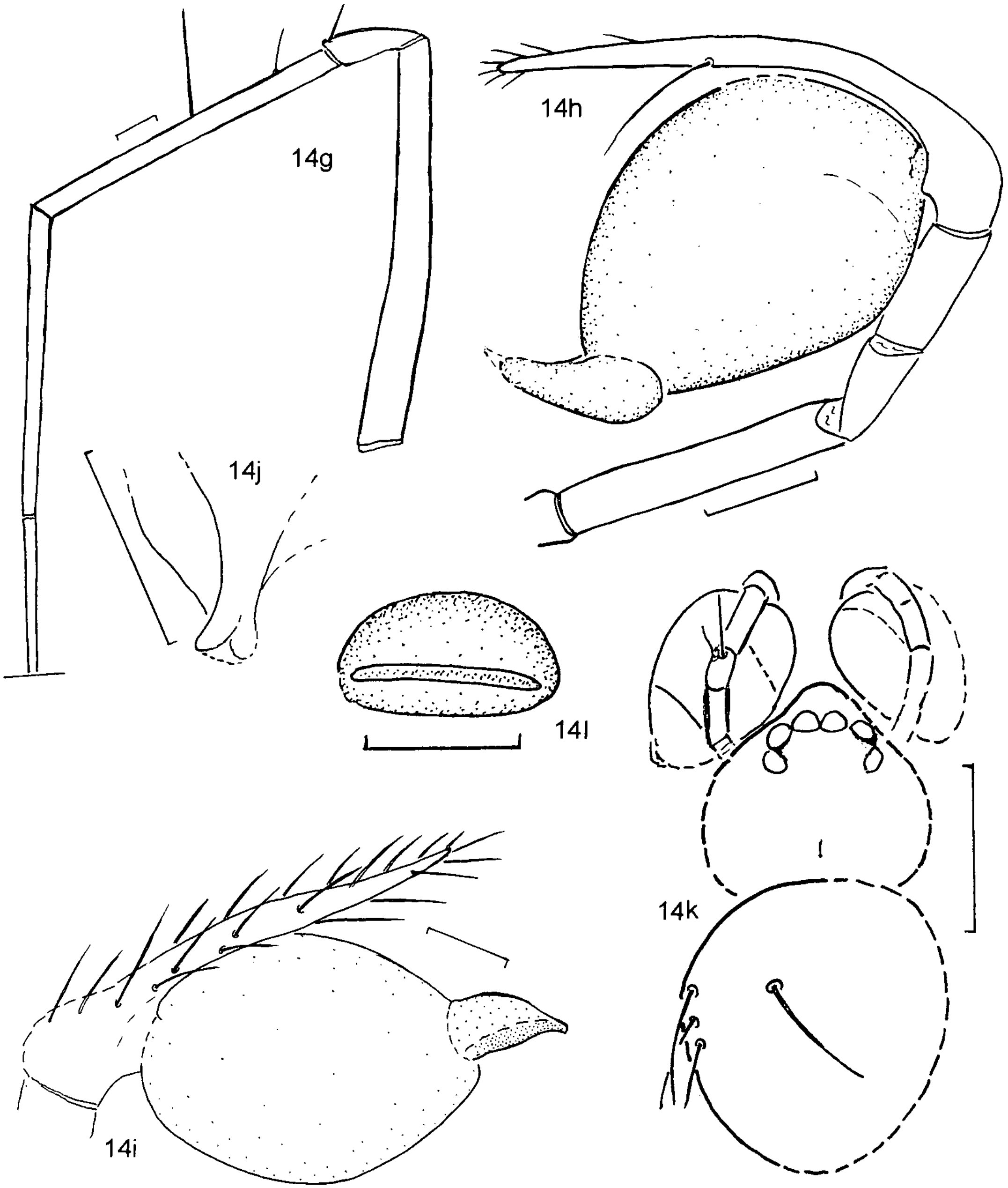


Fig. 14a) Telemidae sp., extant, ♂, dorsal view of the body. Note the anterior opisthosomal sclerites. - Taken from DIPPENAAR-SCHOEMAN & JOCQUE (1997: Fig.114b);



figs. 14b-f: ?*Telema moritzi* **n. sp**., ♀ (paratype F483); b) anterior part of the prosoma dorsally and slightly frontally; c) l. chelicera, frontal-dorsal view; d) tarsus of the r. pedipalpus retrodorsally (not all hairs are drawn); e) r. tibia IV with a single large dorsal bristle and a row of dorsal gland plates, prodorsal view. There may be more plates; hairs are not drawn; f) colulus and anterior spinnerets ventrally and slightly from the left. M = 0.2mm in fig. e), 0.1 in the remaining figs.;



figs. 14g-k: ?<u>*Telema moritzi*</u> **n. sp.**, ♂; g) (Mus. Berlin), l. leg IV retrolaterally; hairs and the distal part of the tarsus are not drawn. Note the single tibial bristle in the basal half; h) holotype, l. pedipalpus retrolaterally; i) (Mus. Berlin), r. pedipalpus retrolaterally; j) (Mus. Berlin), r. embolus, apical view; k) (AR-93) body and pedipalpi, dorsal view (only few hairs are drawn). - M = 0.3 in fig. 14k, 0.1 in the remaining figs.

fig. 14l) ?<u>*Telema moritzi*</u> **n. sp.**, ♀ (AR-98), genital area, ventral-left apsect. M = 0.1.

(15) TETRABLEMMIDAE

Tetrablemmidae are small short-legged armoured tropical spiders. The spiders of both kinds of amber are members of the subfamily Tetrablemminae; no fossil member of the second subfamily - the Pacullinae - is known.

Up to now only a single fossil species of the family Tetrablemmidae has been described: ?*Monoblemma spinosum* WUNDERLICH 1988 in Dominican amber.

Members of the Tetrablemmidae have not seldom only 4 eyes, e.g. the spiders in Dominican amber (fig. 15a), and I introduce here the German name „Vieraugenspinnen" for this family. The spiders in Baltic amber have 6 eyes, figs. 15b-d. Today Tetrablemmidae are absent in Europe but in the tropics they are common. In the early Tertiary these spiders perhaps had its northernmost distribution in the subtropic-tropic Baltic amber forest. Its rareness in the Baltic amber is most likely a result of its tropic distribution as well as its ecology: The spiders construct sheet webs usually on the ground e.g. between leaves, they did this apparently already in the early Tertiary: A spider's thread is preserved in Baltic amber which contains even remains of sticky drops, see fig. 15j.

The body length of the strongly armoured spiders of the subfamily Tetrablemminae – compare figs. 15a,c,f, photo – lies between 0.7 and 2mm, the fossils are 1.0 to 1.33mm long. With the exception of leg I in the males of few species leg bristles are absent. Not seldom the prosoma and/or the chelicerae bear „horns" in the males, the same in the fossil spiders, compare figs. 15b,d). The chelicerae bear a medial lamella (fig. 15d) or carina. The number of eyes varies strongly in this family; frequently there is the quite unusual number of 4 eyes (e.g. the fossil in Dominican amber, fig. 15a) or 6 eyes (e.g. the fossils in Baltic amber, fig. 15b); some spiders possess only 2 eyes, few are eyeless and one species of the genus *Monoblemma* has only a single eye; this is unique in spiders. The bulbus is +/-pear-shaped in this primitive spiders, not seldom articles of the ♂-pedipalpus are thickened (fig. 15b).
In the Baltic amber males remains of sperm cells (!) seem to be preserved at the tip of the embolus (figs. 15h-i); see also the male in Dominican amber, WUNDERLICH (1988: Fig. 67).

Bisher war erst eine einzige fossile Art der Familie Tetrablemmidae bekannt geworden: ?*Monoblemma spinosum* WUNDERLICH 1988 in Dominikanischem Bernstei. Die Spinnen beider behandelten Bernstein-Arten gehören zur Unterfamilie Tetrablemminae; ein fossiler Nachweis der zweiten Unterfamilie – Pacullinae fehlt bisher,- vgl. LEHTINEN (1981).
Vertreter der Tetrablemmidae besitzen nicht selten nur 4 Augen, so die Spinnen im Dominikanischen Bernstein (Abb. 15a), und ich führe hier den deutschen Namen „Vier-

augenspinnen" für diese Familie ein. Die Spinnen im Baltischenh Bernstein besitzen 6 Augen, vgl. Abb. 15b-d. Sie fehlen heute in Europa, sind aber in den Tropen weit verbreitet. Im frühen Tertiär hatten sie vielleicht im tropisch-subtropischen Baltischen Bernsteinwald ihre nördlichste Verbreitung. Ihre Seltenheit im Baltischen Bernstein resultiert vermutlich sowohl aus ihrer tropischen Verbreitung als auch aus ihrer Lebensweise: Sie legen ihre unregelmäßigen Fangnetze gewöhnlich am Boden an, z.B. zwischen Blättern. Nahe dem Paratypus von *Balticoblemma unicorniculum* ist offenbar ein Fangfaden erhalten geblieben, der sogar Reste von Klebtröpfchen enthält, vgl. Abb. 15j.
Die Gesamtlänge der stark gepanzerten Spinnen der Unterfamilie Tatrablemminae – vgl. Abb. 15a-c,f, Foto - liegt zwischen 0.7 und 2mm, die Fossilien sind 1.0 bis 1.33mm lang. Borsten der Beine fehlen mit Ausnahme von Bein I bei den Männchen einiger Arten. Nicht selten tragen der Vorderkörper und/oder die Oberkiefer (Cheliceren) der Männchen „Hörnchen", so auch bei den fossilen Spinnen (Abb. 15b,d). Die Cheliceren tragen eine mittlere Lamelle (Abb. 15d). Die Zahl der Augen variiert stark innerhalb dieser Familie; oft existieren ungewöhnliche 4 Augen (Fossilien in Dominikanischem Bernstein, Abb. 15a) oder 6 (Fossilien im Baltischen Bernstein, Abb. 15b-d), einige besitzen lediglich 2 Augen, manche sind augenlos, eine Art der Gattung *Monoblemma* besitzt lediglich ein eiziges Auge; das ist einzigartig bei den Spinnen. Der Bulbus dieser ursprünlichen Spinnen ist +/- birnenförmig, nicht selten sind einzelne Glieder des ♂-Pedipalpus verdickt (Abb.15b).
Bei den vorliegenden Männchen im Baltischen Bernstein – vgl. auch das Männchen im Dominikanischen Bernstein, WUNDERLICH (1988: Abb. 67) - scheinen aus der Spitze des Samen-Überträgers (Embolus) Spermatozoen ausgetreten und in Resten erhalten geblieben zu sein (!) (Abb. 15h-i).

Diagnosis of the family Tetrablemmidae (see also the subfamilies): Opisthosoma dorsally and ventrally heavily armoured and 3-4 long lateral plates (figs. 15. a,c,f), prosoma most often reddish and rugose (fig3, 15b-d) to pittet, absence of leg bristles (except ♂-leg I in few species), free labium (fig. 15e), no anterior median eyes and tracheae, cheliceral lamina or carina (more basally) present (fig. 15d), three tarsal claws, tendency to outgrowths of prosoma and/or chelicerae in the male (figs. 15b-d, g).

Two clearly separated **subfamilies**, see LEHTINEN (1981): (a) Tetrablemminae incl. Brignoliellini (body length 0.7-2mm, position of the metatarsal I trichobothrium in 0.33-0.46, eyeless or 1, 2, 4 eyes (most often, fig. 15a) or 6 eyes (fig. 15b), short-legged, embolus usually thin (figs. 15g-i), cocoon fixed in the centre of the sheet web, pantropical) and (b) Pacullinae (body length 3-9.5mm, position of the metatarsal I trichobothrium in 0.5-0.75mm, 6 eyes in three pairs in a steady "segestroid position", longer legged, embolus usually thick, capture web - according to LEHTINEN (1981) - unknown, cocoon carried by the female by the chelicerae, Oriental Region).

Relationships: Probably the Pholcidae and Ochyroceratidae are most related, see the cladogram. - Similar members of the Oonopidae lack an unpaired tarsal claw and the opisthosomal scuta are different (no lateral long plates).

Distribution: Pantropical; fossil in Baltic and Dominican amber (very rare).

(a) SPIDERS IN DOMINICAN AMBER

?*Monoblemma spinosum* WUNDERLICH 1988 (fig. 15a)

1988 ?*Monoblemma spinosum* WUNDERLICH; Beitr. Araneol., 2: 61, figs. 64-67 (♂).

Material: Holotypus ♂, Senckenberg-Museum Frankfurt a. M. (SMF); 1 ♂ Staatl. Mus. f. Naturkunde Stuttgart no. 4614.

The body length of this species is 1.0mm; there are only 4 eyes (fig. 15a).

(b) SPIDERS IN BALTIC AMBER

Balticoblemma n.gen.

Diagnosis (♂; ♀ unknown): Prosoma distinctly wrinkled (figs. 15b-d), 6 eyes with an outgrowth in a raised eye field; chelicerae frontally with a large blunt "horn" which is directed frontally-dorsally (figs. 15b-d, g). ♂-Pedipalpus (figs. 15g-i): Tibia thickened, embolus slender, no conductor.

Relationships: In contrast to the +/- related extant genera from SE-Asia the prosoma is distinctly wrinkled in *Balticoblemma*. Furthermore in *Ablemma* ROEWER 1963 the embolus is depressed, *Tetrablemma* O. PICKARD-CAMBRIDGE 1873 sensu LEHTINEN 1981 has only 4 eyes and the cheliceral horn is tapering distally and +/- directed backwards, in *Gunasekara* LEHTINEN 1981, *Mariblemma* LEHTINEN 1981 and *Shearella* LEHTINEN 1981 the cheliceral horn is smaller and the embolus is usually different.

Type species: *Balticoblemma unicorniculum* n.gen.n.sp.

Distribution: Tertiary Baltic amber forest.

***Balticoblemma unicorniculum* n.gen.n.sp.** (figs. 15b-j) Photo 51

Acknowledgements: I am grateful to CARSTEN GRÖHN in Hamburg and MANFRED KUTSCHER in Sassnitz who sent me males of the new species from their private collections for study.

Material: 6♂ in Baltic amber; holotype with 2 separated amber pieces coll. J. WUNDERLICH F487/BB/AR/TET/CJW; paratypus a) F480/BB/AR/TET/CJW; paratypus b) F481/BB/AR/TET/CJW; paratypus c) F482/BB/AR/TET/CJW; paratypus with 4 separated amber pieces coll. C. GRÖHN no. in Hamburg no. 942, in the future most probably preserved in the Geological-Paleontological Institute of the University Hamburg; paratypus from the Bitterfeld deposit, coll. M. KUTSCHER in Sassnitz no. K/AR/5.

Preservation and syninclusions: a) Holotype: The spider is well and completely preserved, the opisthosoma is ventrally and laterally partly covered by an emulsion. The spider has been cut from a larger piece of amber. – In the separated pieces a small spider – a juv. *Orchestina* sp. (Oonopidae) -, some Acari and Diptera as well as small plant particles, few stellate hairs and a larger drop of resin are preserved; – b) paratype of the coll. GRÖHN: This spider is well and completely preserved, too. It is not covered by an emulsion, some fissures („Blitzer") hinder the observation of the spider's body and legs. The „horns" of the chelicerae and the eyes are partly hidden. Near the left side of the spider a thin thread is preserved (fig. 15j) which is twice as long as the spiders body and bears some sticky droplets. – Furthermore preserved are numerous stellate hairs and some other plant inclusions, 2 *Orchestina* females (Araneae: Oonopidae), 1 Aphidina, 1 Hymenoptera (Prototropidae), 1 Coleoptera (Anobiidae), 1 Diptera (Chironomidae) and 1 Collembola. - The remaining males are completely and +/- well preserved.

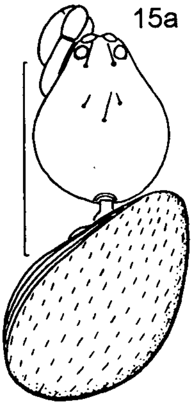
Diagnosis: See above.

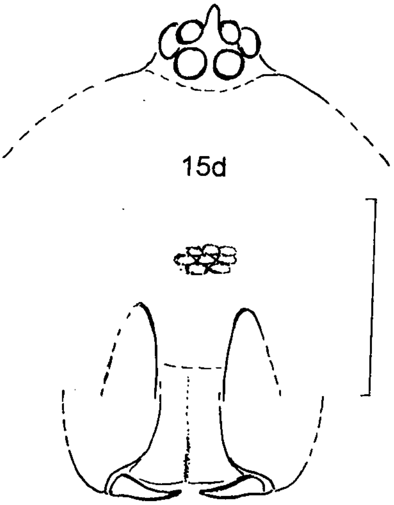
Description (♂):
Measurements (paratype, in mm): Body length 1.33 (the other males 1.25-1.45), prosoma: Length 0.55, width 0.53, hight about 0.3; leg I: Femur 0.5, patella 0.15, tibia 0.34, metatarsus 0.25, tarsus 0.25, tibia IV 0.38.
Colour usually dark brown (probably heated material), partly silvery covers are present, too or reddish/orange, so the paratype from the coll. GRÖHN and F480 in which probably the original colour is preserved.
Prosoma (figs. 15b-g) slightly longer than wide, distinctly wrinkled (the same the sternum), no thoracal fovea or ridge, with a pair of low lateral depressions which are nearly smooth. 6 eyes in a compact group on a common elevation and a small outgrowth in the eye field which is directed slightly forwards. Chelicerae robust, widely spaced, with a median lamella, frontally with a large blunt „horn" which is directed frontally-dorsally. The anterior cheliceral margin bears at least one tooth, posterior margin with at least 3 teeth. Fangs robust, gnathocoxae long and converging, labium 3 times wider than long, sternum wider than long, separating the coxae IV by 2 1/2 of its width. - Legs short and robust, its order IV/I/II/III, bristles absent, long hairs present. Paired tarsal claws long. Tibiae with at least 3 trichobothria, metatarsi with 1 trichobothrium in the middle. –

Opisthosoma (figs. 15b-c, f) dorsally, laterally and ventrally strongly armoured, frontally-dorsally with a wrinkled field, laterally with three long and distinct plates and an additional longitudinal row of tiny isolated scuta more ventrally (paratype F480), dorsally with longer hairs. Spinnerets short and thick. – Pedipalpus (figs. 15g-i): Tibia thickened, cymbium short, bulbus pear-shaped, embolus thin, slightly bent, shorter than the bulbus, no conductor. – At the tip of the embolus of both males a tiny drop is preserved (figs. 15h-i) in which remains of – most often spherical - sperm cells seem to be preserved. Flagella are not visible by the magnification of 150x.

Relationships: See above.

Distribution: Tertiary Baltic amber forest incl. the Bitterfeld deposit.


15a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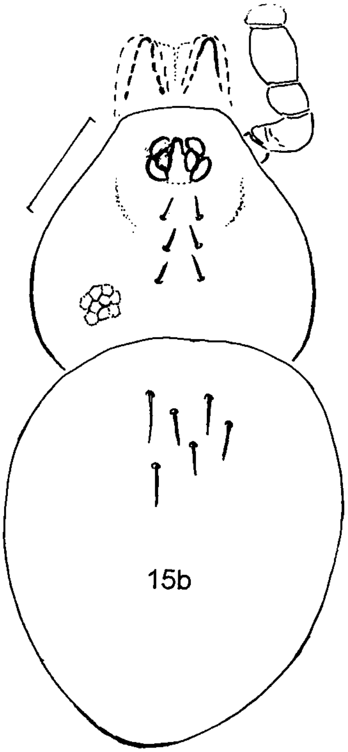

15b

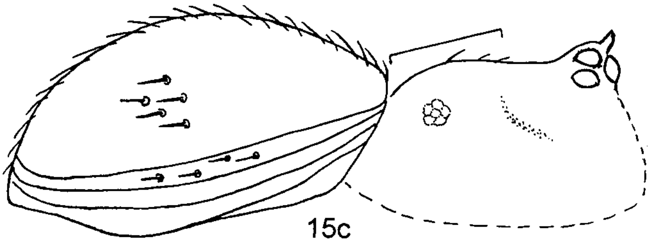
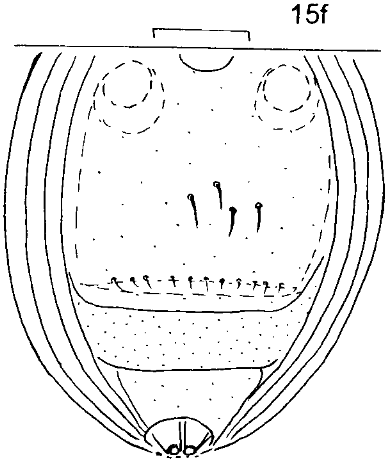

15c

Fig. 15a) ?<u>Monoblemma spinosum</u> WUNDERLICH 1988, ♂, in Dominican amber, body and l. pedipalpus dorsally; M = 0.5;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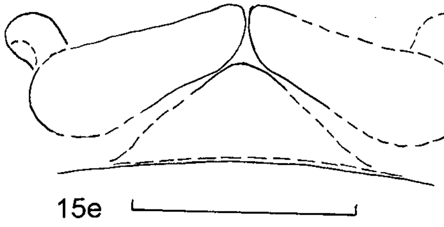
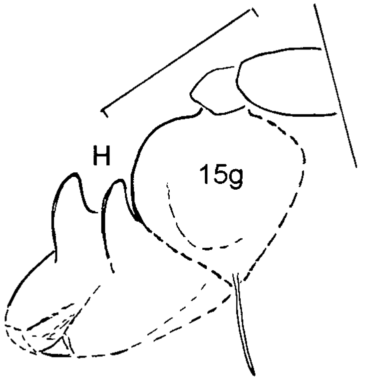
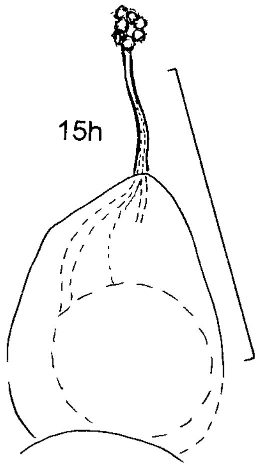

15e



15g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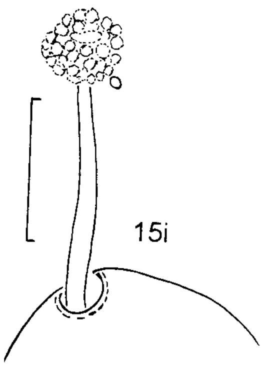
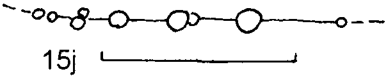

15i


15j

figs. 15b-i) <u>*Balticoblemma unicorniculum*</u> **n. gen. n. sp.**, ♂, holotype figs. e, g, i, paratype coll. GRÖHN: The remaining figs.; b) body and r. pedipalpus without the bulbus dorsally; c) body laterally; d) prosoma frontally; e) gnathocoxae and labium ventrally; f) opisthosoma ventrally; g) chelicerae with "horns" (H) and l. pedipalpus retrofrontally; h) r. bulbus with the embolus retrolaterally, with remains of spermatozoa at the tip; i) r. embolus prodistally, with a droplet of remains of spermatozoa; M = 0.5 in fig. a, 0.05 in fig. i, 0.2 in the remaining figs.;

fig. 15j) part of a <u>spider's thread</u> with remains of ?sticky droplets near the paratype (coll. GROEHN) of <u>*Balticoblemma unicorniculum*</u>; M = 0.2.

(16) OCHYROCERATIDAE

Members of the family Ochyroceratidae live in caves or in deep litter in forests. Their ecology explains the rareness of fossils in amber; only a single species has been described, in Dominican amber: *Arachnolithulus pygmaeus* WUNDERLICH 1988 (figs. 16a-d), which is a member of the subfamily Ochyroceratinae. In this paper I describe a second fossil species from Dominican amber.

Diagnosis of the family Ochyroceratidae: Clypeus strongly protruding (fig. 16a) and concave, six eyes in a "segestroid" position (fig. 16a), leg bristles usually absent (present on the posterior tibiae and metatarsi in *Speocera*), long anterior spinnerets, reduced number of spigots of the medium spinnerets (only one in all taxa?). See the cladogram and DEELEMAN-REINHOLD (1995: 5-6).

Further characters: Body length less than 3mm, legs long and slender, a row of long promarginal cheliceral teeth present (fig. 16b) or absent, the cheliceral lamina may be reduced, the labium may be free, see DEELEMAN-REINHOLD (1995: Figs. 84, 140) or fused to the sternum (fig. 49) and may have an incision (fig. 16c); the colulus is large, lungs may be absent, the position of the tracheal spiracle is variable, a claw of the female pedipalpus is absent, egg-carrying behaviour by females is present, autotomy between coxa and trochanter, parthenogenesis present in some taxa, see DEELEMAN-REINHOLD (1995: 6).

Relationships: According to the protruding clypeus, the absence of leg bristles and a claw of the female pedipalpus as well as the presence of the egg-carrying behaviour by females Pholcidae may be the sister group, see the cladogram. In Pholcidae basicly 8 eyes are present in two triads, the chelicerae are toothless, the colulus is strongly reduced and the male chelicerae frequently bear outgrowths.

Distribution: Cosmotropical.

The subfamilies

DEELEMAN-REINHOLD (1995) distinguished three subfamilies:Ochyroceratinae, Psilodercinae DEELEMAN-REINHOLD 1995 and Theotiminae DEELEMAN-REINHOLD 1995. Psilodercinae is quite distinct to all other taxa of the Ochyroceratidae, see the tab. below. Therefore I don't want to exclude that Psilodercinae has to regard as a family of its own. Theotiminae may be regarded as a tribus of the Ochyroceratinae. A cheliceral lamina is well developed in the Psilodercinae but usually reduced in the Ochyroceratinae and Theotiminae.

Arachnolithulus WUNDERLICH 1988

Diagnosis (♂; questionable ♀: See WUNDERLICH (1988: 64)): Male chelicerae diverging, cheliceral teeth present (fig. 16b) of indistinct/absent (in longipes), labial incision present at least in the type spcies (fig. 16c); ♂-pedipalpus (figs. 16d-f): Femoral and tibial apophyses absent, cymbium with a retrodistal apophysis (basal apophysis absent), embolus long and thin.

Remark: In contrast to my previous statement - WUNDERLICH (1988: 62) - an unpaired tarsal claw is probably present.

Type species: *Arachnolithulus pygmaeus* WUNDERLICH 1988.

Relationships: In the extant genus *Althepus* THORELL 1898 a distal cymbial apophysis is present, too, but an additional retrobasal cymbial apophysis is usually also present. In the type species of extant genus *Ochyrocera* SIMON 1891 - *O. arietina* SIMON 1891 - the bulbus structures are different, e. g. a large embolus is most often present which may be curved backwards (a revision is needed).

Distribution: Tertiary Dominican amber forest (Island of Hispaniola).

Arachnolithulus longipes n. sp. (figs. 16e-f)

Material: Holotypus ♂ in Dominican amber, Staatl. Mus. Naturkunde Stuttgart, Do-3063 -E.

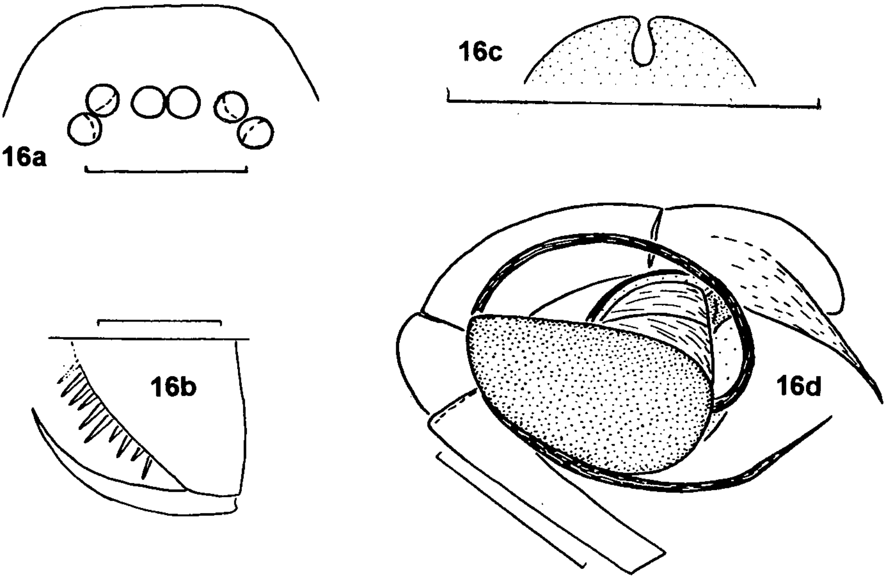
Preservation and syninclusions: The spider is fairly well and nearly completely preserved in a piece of amber which probably was heated; the tips of some tarsi are cut off. - A beetle (Staphylinidae) of which the distal part is cut off, a branch with two larger leafs directly above the spider and three particles of ?excrement particles are preserved in the same piece of amber.

Diagnosis (♂; ♀ unknown): Legs very long (femur I is 1.8 times longer than the body), teeth of the cheliceral promargin reduced; pedipalpus (figs. 16e-f) with a long retrodistal cymbial outgrowth and an embolus of medium length.

Description (♂):
Measurements (in mm): Body length 1.15, prosomal length about 0.45, leg I: Femur 2.1, patella 0.17, tibia 1.8, length of the basal cheliceral articles 0.3.
Colour light brown with some parts of the body darkened (by heating?).

Character	Psilodercinae	Ochyroceratinae incl. Theotiminae
lungs	present	replaced by tracheae
position of the tracheal stigma	closer to the spinnerets	half way between epigastral fold and spinnerets
teeth of the cheliceral promargin	0-3	6-7
labium	not incised	incised (fig.16c)
attachment of the bulbus	usually at the end of the cymbium	usually near the midlle of the cymbium (fig.16d)

Characters of the Psilodercinae and Ochyroceratinae incl. Theotiminae

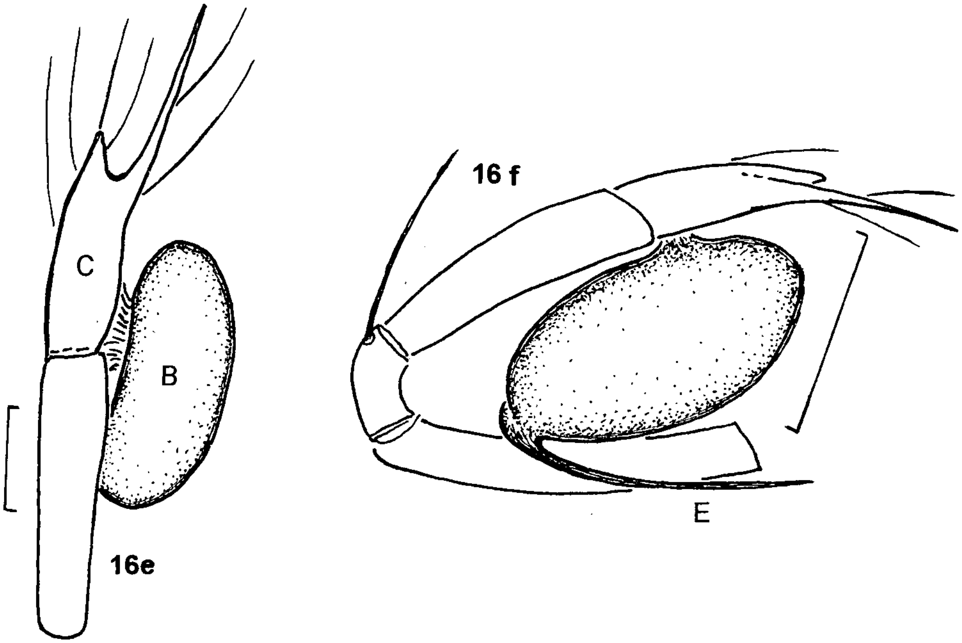


Figs. 16a-d: *Arachnolithulus pygmaeus* WUNDERLICH 1988, ♂ in Dominican amber; a) eyes dorsally; b) distal part of the r. chelicera ventrally & slightly distally; c) distal part of the labium ventrally; d) r. pedipalpus (bulbus expanded) retrolaterally. M = 0.1mm.

Prosoma: Six eyes in a similar position as in fig. 16a (they are partly hidden), chelicerae large, diverging distally, stridulating files absent, carina well developed, marginal teeth tiny or absent, most mouth parts are hidden, the gnathocoxae are long. - Legs long and slender, order I/IV/II/III, tarsi short, bristles absent, tarsal claws tiny. - Opisthosoma long ovally (deformed), covered with short hairs. - Pedipalpus (figs. 16e-f) with slender articles, patella with a long dorsal bristle, tibia long, cymbium with a long and slender retrodistal apophysis, bulbus ovaly, embolus slender, curved, as long as the bulbus.

Relationships: *A. pygmaeus* WUNDERLICH 1988 - preserved in Dominican amber, too - is smaller (body length 0.8mm, length of femur I 0.8mm), the chelicerae bear a row of long teeth (fig. 16b) and the embolus is much longer (fig. 16d).

Distribution: Tertiary Dominican amber forest (Island of Hispaniola).



figs. 16e-f: *Arachnolithulus longipes* **n. sp.**, ♂, r. pedipalpus, dorsal and retrolateral view (only few cymbial hairs are drawn). (B = bulbus, C = cymbium, E = embolus). M = 0.1.

(17) PHOLCIDAE

INTRODUCTION

The genera in Dominican and Baltic amber are all members of the subfamily Pholcinae. A larger numer of fossil Pholcidae has been described from Dominican amber, see WUNDERLICH (1988: 76-85), the genera *Modisimus* SIMON 1893 (5 species), *Pholcophora* BANKS 1896 (3 species), *Serratochorus* WUNDERLICH 1988 (1 species, fig. 17b) and one gen. indet.; all genera are extant.[x] At the end of this paper I add the description of a memeber of the neotropical genus *Coryssocnemis* in Dominican amber. - In Baltic amber no sure member of the family Pholcidae (English name: Daddy Long-Legs Spiders, German name: Zitterspinnen) was published before the book of WUNDERLICH (1986: 21); these specimens were neither documented nor described.

[x] According to C. DEELEMAN (in litt. 1990) the genus *Serratochorus* is present in SE-Asia.

Two dubious taxa of the Pholcidae in Baltic amber have been described: (1) *Phalangopus subtiles* MENGE in KOCH & BERENDT 1854. According to the short and insufficient diagnosis of this taxon - "*Phalangopus* with long slender legs similar to *Pholcus* but a different position of the eyes" - I regard this taxon as a nomen dubium which even may be a member of another family, e.g. Leptonetidae or Synotaxidae. - (2) *Miropholcus heteropus* PETRUNKEVITCH 1942 - known from a juvenile specimen only, see WUNDERLICH (1986: 21) - has robust legs and is not a member of the family Pholcidae but probably of the Trochanteriidae. I regard this taxon as a nomen dubium, too.

In the last years I had the opportunity to study a dozen specimens of this family which is rare in Baltic amber. I recognized members of probably three genera, and I named only one, *Paraspermophora* n.gen., of which I know several adult spiders of both sexes.

The Pholcidae in Baltic amber possess usually 6 eyes (figs. 17b-c) but rarely 8 eyes (fig. 17l). The legs are long, slender and bristleless (fig. 17m, photos), the ganthocoxae are strongly converging over the labium (fig. 17i), the male pedipalpus is complicated (fig. 17f), see the family diagnosis below. - The complex structure of the procursus in the fossils (figs. 17f, h) indicates an extrusion of spermatozoa of other males from the female genitalia during the copulation, see UHL (1995); so this behaviour apparently was present already in the Early Tertiary.

Diagnosis and **description** of the family Pholcidae: Prosoma about as wide as long, usually six or eight eyes (the anterior median eyes reduced or absent), rarely two eyes, its position in triads and eye region often raised (figs. 17b-c), clypeus long and protruding (fig. 17b), chelicerae fused basally (as in several families of the Dysderoidea; difficult to observe in most fossils), lamina present (it may be tooth-shaped, L in fig. 17g), furrow margins toothless, male chelicerae usually with anterior outgrowths/humps e.g. as in fig. 17g. Gnathocoxae strongly converging above the labium (fig. 17i) as in related families. Legs long to very long, slender and bristle-less (fig. 17m), short femoral spines may be present, the tarsi may have pseudosegments in long-legged spiders (fig. 17e). Opisthosoma short and high (fig. 17b) or elongated(17a), usually with a "swollen" female's genital area (fig. 17j) as in related families. Tracheal system reduced or even absent; an unpaired "tracheal fold" may be present - as a relict? Colulus tiny or absent. Claw of the female pedipalpus tiny or absent. Various types of stridulating organs are present, see HUBER (2000). Male pedipalpus complex, with a special retrodistal paracymbium, the procursus; embolus usually hard to recognize. The females do not build a cocoon but carry their eggs and first instars with the help of their anterior legs, pedipalpal claws and fangs or with one or two of these articles (fig. 1, photo) as do females of the related families Leptonetidae, (unknown in the Telemidae), Ochyroceratidae, Drymusidae, Scytodidae and at least some Tetrablemmidae (Pacullinae) as well as the not related Pisauridae and few Sparassidae and Synotaxidae. Autotomy is frequent and occurs between coxa and trochanter (in the amber fossils frequently at leg I). The spiders hang usually in their three-dimensional capture web (fig.17a) in which sticky droplets may occur (the capture web may be strongly reduced). In numerous species they shake their web so rapidly that spider and web seem to disappear. The capture web may possess sticky droplets. In numerous species the prey is wrapped.

Relationships: Probably Ochyroceratidae or Tetrablemmidae (compare the outgrowths of numerouus males!) is the sister family; see the tab. below and the cladogram.
Distribution: Cosmopolitical, mainly in the tropics. (In houses nearly world-wide distributed is the large and well-known species *Pholcus phalangioides*).

Character	Pholcidae	Ochyro- ceratidae	Lepto- netidae	Telemidae
leg bristles	*absent*	none or few on legs III-IV	none to numerous	few, tibiae only 1 dors.
number of eyes	8, 6 (*triads*) (2)	6	6	6
leg glands (fig.14e)	-	-	+	+
colulus	*tiny or absent*	*twice as long* as wide	large & wide	very large

teeth of the cheliceral margins	*none*	several	several	one to few
claw of the ♀-pedipalpus	tiny or absent	absent	*present*	absent
♀ carry their eggs	+	+	+	?(-)
stridulating organs	+/-	-(+)	-(+)	-
special characters	chelicerae basally *widely fused*, eye region often *raised*; *outgrowth(s)* of ♂-chelicerae, complex bulbus with *procursus*	lungs present or absent	*patella-tibia autototomy*, cheliceral carina	*zigzag abdominal sclerite* above the pedicel, *no lungs*

Comparison of selected characters of four families of the superfamily Dysderoidea, Pholcidae and some related families, in which the legs are long to very long and the female's genital area usually is "swollen". In cave dwellers the eyes may be reduced or even absent. In similar long-legged spiders - e.g. Cyatholipidae, Synotaxidae and Theridiidae of the superfamily Araneoidea - 8 eyes and usually thin dorsal tibial bristles are present and the cymbium covers dorsally completely the complex bulbus. - Six-eyed Oonopidae and Orsolobiidae are usually short-legged, an unpaired tasal claw is absent and paired tracheal spiracles near the epigastral furrow are present. - See also the chapters on the Leptonetidae, Scytodidae, Plectreuridae and Telemidae.

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

1 6 eyes, triads on a distinct elevation (figs. 17a-b) or not. 2

- 8 eyes (figs. 17l), eyes not on distinct elevations. . . . . gen. indet. 1

2(1) eye triads on distinct elevations (figs. 17a-b), tibia IV about 2-3 times longer than the prosoma. . . . . *Paraspermophora*

- eye triads not on elevations and widely spaced. Tibia IV only slightly longer than the prosoma. ♂-pedipalpus figs. 17f, h . . . . gen. indet. 2

Paraspermophora n. gen. (figs. 17c-k) Photos 52-54

Diagnosis: Small spiders, body length 1.0-1.3mm (♀), 6 eyes on elevations (figs. 17b-c), opisthosoma nearly globular (fig. c), tibia IV about 2-3 times longer than the prosoma, colulus and claw of the female pedipalpus most probably absent but with apical bristles (best observable in the female of the coll. KRUEMMER no. 3416), basal articles of the ♂-chelicerae with basal humps (fig. 17g) but no "horns", ♂-pedipalpus (figs. 17f, h): Femur with a retrobasal tooth (arrow in fig. 17f), procursus complicated and devided, with a long retrolateral sclerite, embolus bottle-shaped (distally abruptly smaller). Genital area of the female +/- outstanding (figs. 17j-k), with a knob-shaped structure and probably with large paired sclerotized "plates".

Relationships: According to the size, the habitus and the male pedipalpus there are relationships to the extant genera *Spermophora* HENTZ 1841, *Spermophorides* WUNDERLICH 1991 (Mediterraneis), *Belisana* THORELL 1898 (at least tropical SE-Asia) and related genera. In *Spermophora* and *Spermophorides* a long frontal cheliceral outgrowth is present. In *Spermophora* the eye triads are more close together and the bulbus structures are different, a "spermophora flap" is present, see HUBERT (2001: 4). In *Spermophorides* the legs are longer, tibia IV is usually 4 times longer than the prosoma, the procursus is not divided and the embolus is nearly cylindrical. According to C. DEELEMAN (pers. commun.) in *Belisana* the prosoma is more flattened than in *Paraspermophora*; according to B. A. HUBER (pers. commun.) *Belisana* is not a monophyletic genus.

Type species: *Paraspermophora perplexa* n. sp.

Distribution: Tertiary Baltic amber forest incl. the Bitterfeld deposit.

Paraspermophora perplexa n. gen. n. sp. (figs. 17c-f) Photos 52-53

Material (in Baltic amber): Holotypus ♂ and a separated amber piece, Geological-Palaeontological Institute University Hamburg; a questionable ♂ and two separated amber pieces, coll. SCHEELE no. 352, Geological-Palaeontological Institute University Hamburg.

Preservation and syninclusions: a) Holotype: The spider is very well and completely preserved in a clear yellow amber piece. - (b) Questionable ♂: The amber piece is embedded in artificial resin. The preservation is well, and the spider is nearly completely preserved, the right leg I is missing, the left leg II lies separately under and behind the body (autotomy). - Some stellate hairs are present; in the one of the separated amber pieces a Diptera and a beetle (Mordellidae) are preserved.

Diagnosis (♂; questionable ♀): Tibia I about 1.4 times longer than the prosoma; pedipalpus (fig. 17f): Appendix basally wide, distally straight.

Description (holotype ♂):
Measurements (in mm): Body length 1.0, prosoma: Length and width about 0.55, opisthosoma: Length, width and hight about 0.6, leg I: Femur 1.25, patella 0.18, tibia 1.3, metatarsus 1.5, tarsus 0.65, tibia II 0.85, tibia III 0.65, tibia IV 0.95, femur IV 1.0, tibia of the pedipalpus 0.25, tibia of the ♂-pedipalpus: Length 0.25, hight 0.4.
Colour brown. - Prosoma (figs. 17c-d): Caput elevated, depressed behind the eye field, with a long and protruding clypeus. 6 large eyes in 2 triads, a depression between the triads as in *Spermophora*. Basal articles of the chelicerae large and robust, anteriorly partly hidden, probably similar to fig. 5. Labium fused to the sternum, gnathocoxae long and strongly converging. - Legs slender, tibia IV only twice as long as the prosoma, covered with few weak hairs, bristles absent, tarsi with about 15 pseudosegments (fig. 17e). Position of the trichobothrium on metatarsus I in 0.25. - Opisthosoma (fig.17c) nearly globular, covered with short hairs. - Pedipalpus (fig. 17f): The trochanter bears a large and blunt outgrowth, the femur is strongly thickened ventrally in the basal half and bears a retrodorsal tooth, patella small, tibia thick, procursus divided, both sclerites pointed, the anterior sclerite fringed. Bulbus nearly globular, appendix basally wide, in dorsal view straight, bent, embolus thick, distally abruptly smaller (bottle-shaped), with a secretion (remains of spematozoa?) at the tip. - Questionable ♀: Prosoma length about 0.6mm, gnathocoxae and labium: See fig. 17i, genital area (see fig. 17j) protruding and with a pair of ?sclerotized structures.

Questionable ♂: Measurements (in mm): Body length 1.0, prosoma: Length and width 0.55, tibia IV 0.95. The bulbus structures are similar to the holotype but not all structures are clearly observable.

Relationships: In *P. bitterfeldensis* n. sp. the legs are absolutely and relatively longer, tibia I is 3.5 times longer than the prosoma, the tip of the appendix is quite different, blunt and strongly bent, also the procursus has a different shape.

Distribution: Tertiary Baltic amber forest incl. Bitterfeld deposit.

***Paraspermophora bitterfeldensis* n. gen. n. sp.** (fig. 17g-h)

Material: Holotypus ♂ in Baltic amber from the Bitterfeld deposit, F367/BB/AR/PHO/CJW.

Preservation and syninclusions: The amber piece was probably heated in an autoclave. The spider is fairly well but incompletely preserved, the left leg II is missing behind the coxa by autotomy, the right legs I-II and the left leg III are complete, articles of the remaining legs are cut off, parts of the right body side are covered by a white emulsion, a large gas bubble is preserved directly beneath the body, the pedipalpi are very well preserved. Several bubbles and stellate hairs are preserved in the same amber piece.

Diagnosis (♂; ♀ unknown): Legs very long, tibia I 3.5 times longer than the prosoma. Pedipalpus (fig. 17h): The tip of the appendix is strongly bent.

Description (♂):
Measurements (in mm): Body length 1.2, prosoma length 0.55, tibia I 1.9.
Colour medium to dark brown.
Prosoma similar to *P. perplexa* n. sp., the large basal articles of the chelicerae bear basally three humps (fig. 17g). Legs similar to *perplexa* but distinctly longer, tibia I 3.5 times longer than the prosoma, order I/II/IV/III. Opisthosoma nearly globular, the area of the colulus and most parts of the spinnerets are hidden. Pedipalpus: See the diagnosis; tibia about as large as the femur.

Relationships: See *P. perplexa* n. sp.

Distribution: Tertiary Baltic amber forest, Bitterfeld deposit.

Indet. material of the genus *Paraspermophora* in Baltic amber:

1 1/2 ♂ (three amber pieces), Bitterfeld deposit, F449/BB/AR/PHO/CJW; 1♂ and 3 separated amber pieces, 1 ♂ F366/BB/AR/PHO/CJW (fig. 7); 3♀, F448/BB/AR/PHO/CJW, F450/BB/AR/PHO/CJW and F465/BB/AR/PHO/CJW (fig. 17k); 1♀ from the Bitterfeld deposit, coll. KRUEMMER no. 3416; 1♀ from the Bitterfeld deposit; 1 ?ad. ♀ from the Bitterfeld deposit, coll. A. PAULSEN; 1♂ from the Bitterfeld deposit, coll. GRABENHORST; 1♂ from the Bitterfeld deposit coll. M. KUTSCHER K/AR/18; 1♀ coll. F. EICHMANN no. 110.

Pholcidae gen. indet. 1 (figs. 17l-m)

Material: 1 ?ad. ♀ in Baltic amber and three separated amber pieces, F452/BB/AR/PHO/CJW.
The prosoma is ventrally, the opisthosoma is completely covered by a white emulsion,

several parts of the legs are cut off, only the right leg III is complete, the left legs II-IV are nearly complete.
Measurements (in mm): Body length 1.9, prosoma length 0.7, tibia IV 2.1. 8 eyes with two triads on elevations (fig. 17l), the distinct anterior median eyes are separated by only one diameter. Legs (fig. 17m) very long and slender, tibia IV three times longer than the prosoma. Shape of the opisthosoma as in *Paraspermophora*, the genital area and the colulus area are hidden.

Distribution: Tertiary Baltic amber forest.

Pholcidae gen. indet. 2

Material: 1 ?juv. ♀ in Baltic amber, F451/BB/AR/PHO/CJW.

The spider is nearly completely preserved, only the right tarsus and most parts of the right metatarsus of leg I are cut off, the mouth parts and the sternum are covered with a white emulsion.
Measurements (in mm): Body length 1.05, prosoma length 0.55, tibia I 0.85, tibia II and IV about 0.6.
6 eyes in two triads are not situated on elevations and are separated by nearly 1 1/2 diameters of a triad. The shape of the opisthosoma is as in *Paraspermophora*, the legs are shorter and the eyes are different. The genital area is not elevated.

Distribution: Tertiary Baltic amber forest.

Coryssocnemis SIMON 1893

Diagnosis (♂): 8 eyes, femur I-II may bear short ventral spines (fig. 17n); pedipalpus (fig. 17o) with a simple procursus, see HUBER (2000: 246).

Relationships: In *Mesabolivar* GONZALEZ-SPONGA 1998 short ventral femoral I-II spines may be present, too (as well as tibial and metatarsal spines), but the procursus is more complicated and members of this genus are not known from Central America.

Distribution: Extant: South America (Venezuela) and Central America (Trinidad), see HUBER (2000: 248); fossil: Tertiary Dominican amber forest (Island of Hispaniola).

?***Coryssocnemis velteni* n. sp.** (figs. 17n-o)

Derivatio nominis: This spider is named after JÜRGEN VELTEN in Idstein, who recognized this fossil as quite unusual.

Material: Holotypus ♂ in Dominican amber, F934/DB/AR/PHO/CJW.

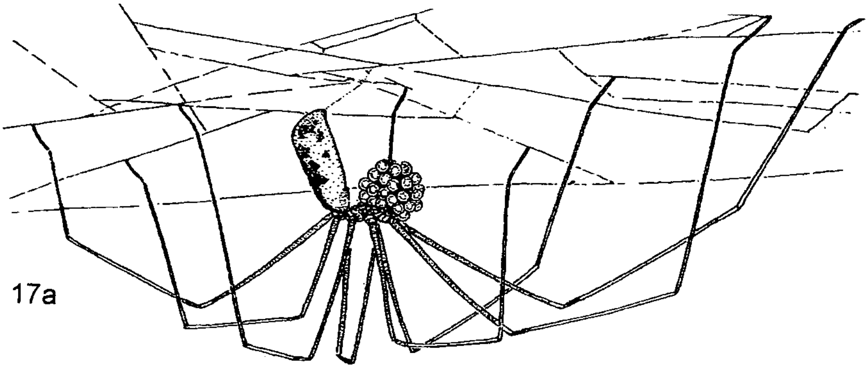
Preservation and syninclusions: The spider is incompletely preserved and partly decomposited - e.g. by a fungus close to the right pedipalpus - in a piece of amber (2.15cm long, several fissures), which probably was heated. The left pedipalpus is wanting, most parts of the body are destroyed or absent, most legs are preserved. - A 4.7mm long piece of amber, 1 Cicada (its caput is partly cut off), the exuvia of a Cicada, remains of a partly decomposited juvenile spider, remains of partly decomposited Collembola, a larger piece of excrement (1.1mm long) as well as some smaller pieces, a small piece of seed, some tiny seeds on the included piece of amber including two seedlings and remains of several plants and hyphae are preserved in the same piece of amber.

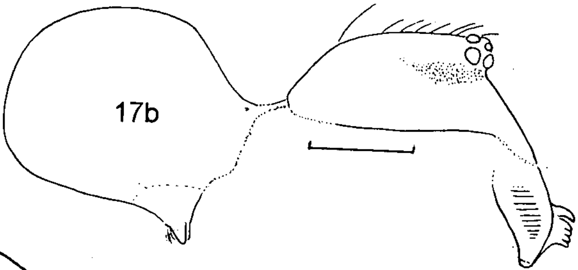
Diagnosis (♂; ♀ unknown): femur I-II with a ventral row of short spines (fig. 17n), pedipalpus: Fig. 17p.

Description (♂):
Measurements (in mm): Body length unknown, probably about 2.0, leg I: Femur 5.3, patella 0.35, tibia 5.35, metatarsus 8.6, tarsus about 0.9, tibia II 3.5, tibia III 2.85, tibia IV 3.15.
Colour light brown.
Prosoma: Most parts are lost. - Legs very long and slender, order I/II/IV/III, femur I-II with short ventral spines in a row (fig. 17o), no other spines or bristles, position of the metatarsal trichobothrium unknown, tarsi short, with pseudosegments (fig. 17n). - The opisthosoma is not preserved. - Pedipalpus (fig. 17p): Patella short, tibia fairly thickened, most parts of the cymbium are hidden, bulbus ovally, with several apical apophyses which are hard to observe.

Relationships: According to the distribution and the short ventral femoral spines *velteni* is more likely a member of the genus *Coryssocnemis* than of the related *Mesabolivar*, a better preserved fossil specimen is needed to confirm this supposion.

Distribution: Tertiary Dominican amber forest (island of Hispaniola).


17a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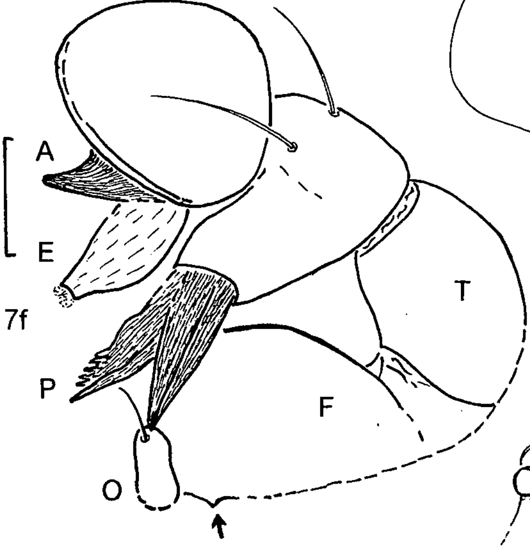
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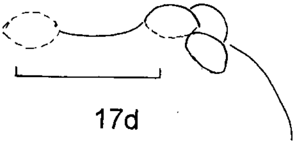
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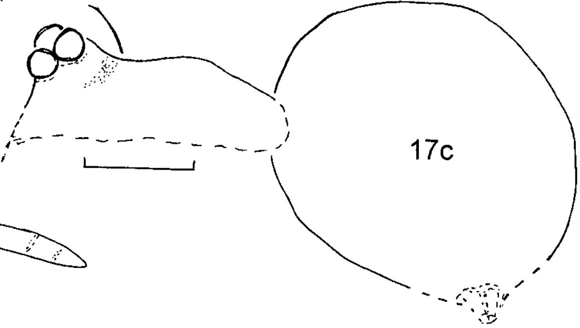
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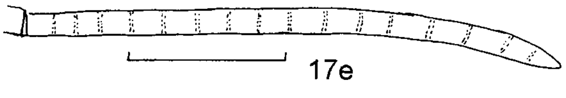
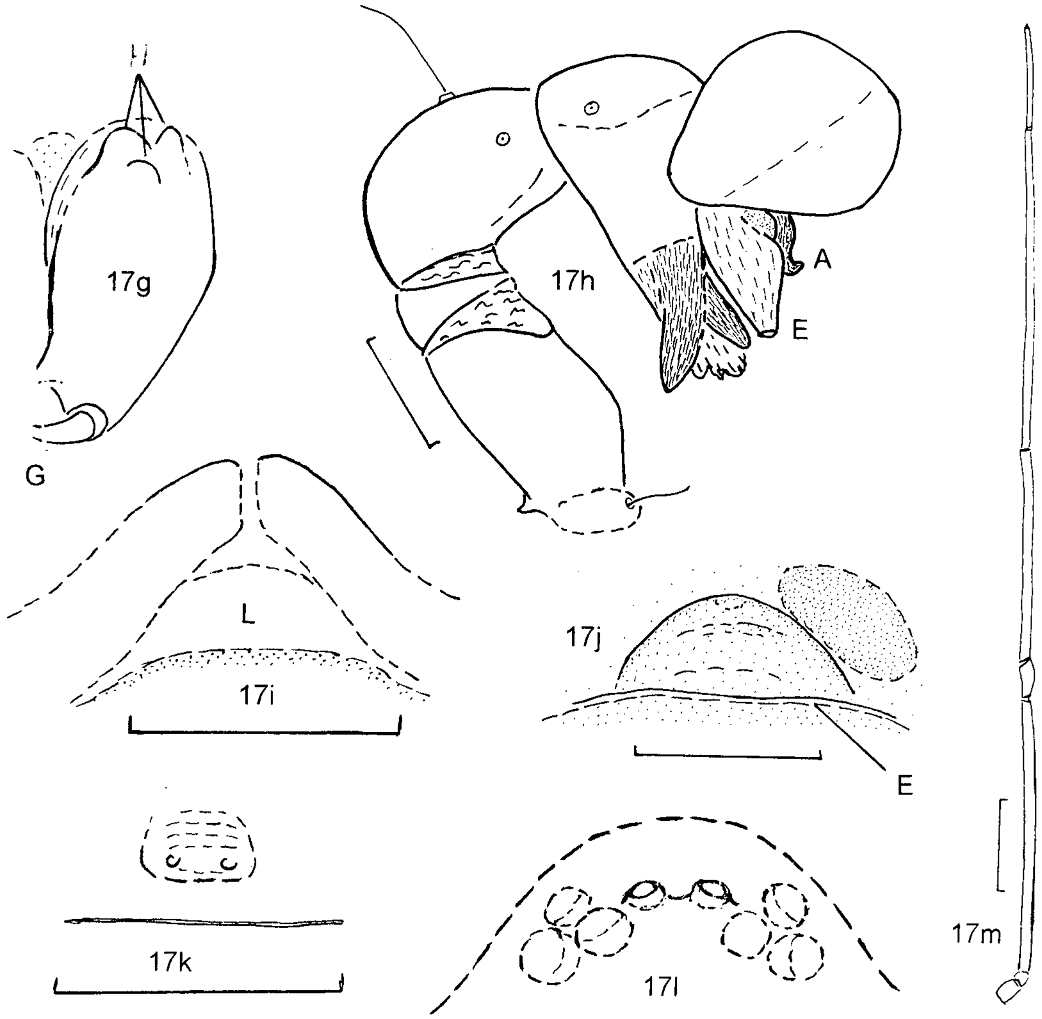

17e

Fig. 17a) Pholcus phalangioides (FUESSLIN 1775), extant, ♀ carrying eggs and hanging in its capture web in its natural position. Body length of the spider abot 10mm. Taken from ROBERTS (1995);

fig. 17b) Serratochorus pygmaeus WUNDERLICH 1988, ♂ in Dominican amber, body laterally; M = 0.2;

figs. 17c-f: **Paraspermophora perplexa n.gen.n.sp.**, holotypus ♂; c) outline of the body laterally and slightly ventrally; d) eyes dorsally (most left eyes are hidden); e) l. tarsus I with pseudosegments dorsally (hairs and claws are not drawn); f) l. pedipalpus retrolaterally (only few hairs are drawn);



figs. 17g-h: ***Paraspermophora bitterfeldensis* n.gen.n.sp.**, ♂; g) l. chelicera retro-frontally and slightly apically; h) r. pedipalpus retrolaterally;

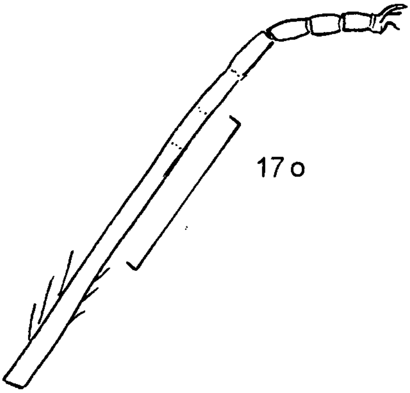
fig. 17i) *Paraspermophora* sp. indet., ♂, F366, labium and gnathocoxae ventrally;

fig. 17j) *Paraspermophora* sp. indet., ♀, coll. KRUEMMER, protruding genital area ventrally-apically and slightly from the left;

fig. 17k) *Paraspermophora* sp. indet., ♀ (F465), genital area ventrally with the epigastral fold;

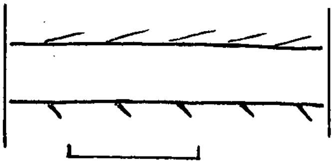
17l-m: Pholcidae gen. indet. 1, ?ad. ♀; l) eyes (partly hidden/reconstructed) dorsally; m) long and bristle-less leg I, prolaterally.

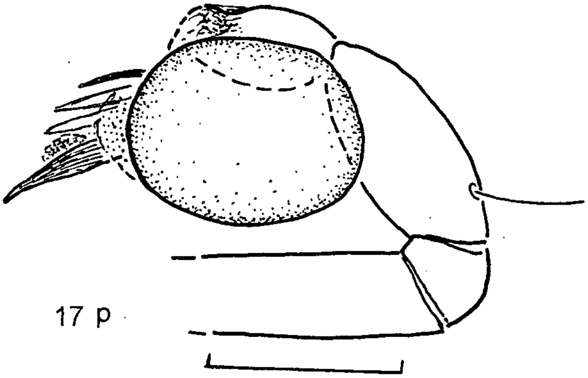
A = appendix, E = embolus, F = femur, G = fang, H = basal humps, L = labium, M = tooth-shaped lamella, O = outgrowth of the pedipalpal trochanter, P = procursus, S = ?sclerotized "plate", T = tibia.- M = 1.0 in fig.m, 0.2 in figs.b-e,i, 0.1 in the remaining figs.



17 o

17n





17 p

figs. 17n-p: ?***Coryssocnemis velteni* n. sp.**, ♂; n) short middle part of the right femur I, retrolateral view. Note the short ventral spines; o) tarsus III (?), lateral view. Note the pseudosegments in the distal third of the article (only few hairs are drawn); p) r. pedipalpus, prolateral view; M = 0.2.

BEITR. ARANEOL., 3 (2004)

FOSSIL AND EXTANT SPIDERS (ARANEAE) OF THE SUPERFAMILY ERESOIDEA S. L., WITH SPECIAL REFERENCE TO THE ARCHAEIDAE AND REMARKS ON SOME HIGHER TAXA OF THE SUPERFAMILY ARANEOIDEA

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Abstract: The superfamily Eresoidea is used here in a wide sense: The cribellate family Eresidae is regarded as the sister group of all other - ecribellate - Eresoid taxa: Lagonomegopidae (extinct), Archaeidae s. l. (including Mecysmaucheniinae), Huttoniidae, Spatiatoridae (extinct) and Palpimanidae s.l. (incl. Stenochilinae). The Jurarchaeinae ESKOV 1987 is regarded as a questionable synonym of the Archaeinae. A cladogram, diagnoses and keys are given of/to the extant and fossil families and subfamilis of the superfamily Eresoidea. The fossil Archaeidae from Baltic amber - all are extinct taxa of the subfamily Archaeinae - and Spatiatoridae are revised. Spatiatoridae and Lagonomegopidae are extinct families of the Eresoidea. The following taxa of the Archaeidae: Archaeinae in Early Tertiary Baltic amber are described: *Archaea bitterfeldensis* **n. sp.**, *A. compacta* **n. sp.**, *Eoarchaea vidua* **n. sp.**, *Myrmecarchaea* **n. gen.**, *M. pediculus* **n. sp.**, *M. petiolus* **n. sp.**, *Saxonarchaea* **n. gen.**, *S. dentata* **n. sp.** and *S. diabolica* **n. sp.**. *Eriauchenius* O. PICKARD-CAMBRIDGE 1881 is revalidated; *Afrarchaea* FORSTER & PLATNICK 1984 is regarded as junior synonym of *Eriauchenius* (**n.syn.**), several nominal *Archaea* species – *incompta, laevigata* and *sphinx* - are regarded as questionably synonyms of *Archaea paradoxa* KOCH & BERENDT 1854. Mimetarchaeinae ESKOV 1992 in Baltic amber is a synonym of Mimetidae: Mimetini (**n. syn.**). The subfossil *Archaea copalensis* LOURENCO 2000 in copal from Madagascar is synonymized with *Eriauchenius gracilicollis* (MILLOT 1948) (**n. syn.**). *Entomocephalus formicoides* HOLL 1829 - published from Baltic amber - is most probably a fake and a putative synonym of

Myrmarachne formicaria (DE GEER 1778) (**n. syn.**). Previously as putative neotropic published fossil Archaeidae in Dominican amber are really falsified subfossils in copal from Madagascar. Previously described fossil Eresidae in Baltic amber are regarded as members of the family Zodariidae. The downgraded Micropholcommatini & Textricellini (Anapidae s.l.), Mimetidae probably with the Pararchaeinae incl. *Holarchaea* as well as Malkarinae are regarded as members of the superfamily Araneoidea and not of the Eresoidea s.l. - Biogeography: The closest relative of the extinct family Spatiatoridae in Baltic amber is probably the extant Huttoniidae from New Zealand; the closest relatives of the extinct Archaeidae (Archaeinae) in Baltic amber exist in South Africa and in the Australian Region. The presence of five extint genera of the Arachaeinae in the Early Tertiary Baltic amber as well as of *Jurarchaea* ESKOV of the Northern Hemisphere - but only two extant genera of the Southern Hemisphere and worldwide - indicate that this is a relict but not a "gondwanan" subfamily. Ant-mimicry is present in the family Spatiatoridae (*Spatiator*) and in one genus of the fossil Archaeidae in Baltic amber (*Myrmecarchaea*); this is the first record of myrmecomorphy in this family. Spiders as a prey of fossil Archaeidae is confirmed. Parthenogenesis is supposed to have occurred in at least one extinct genus of the Archaeidae in Baltic amber (*Eoarchaea* FORSTER & PLATNICK 1984). Cheliceral gland lobes and its excretions are reported from fossil Archaeidae.

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

INTRODUCTION

The main aim of this investigation is the revision of the bizarre members of the subfamily Archaeinae (see the photos and e.g. figs. 11, 32, 44) and the clarification of its biogeographic and taxonomic relationships. FORSTER & PLATNICK (1984) recognized the relationships of Archaeidae and Palpimanidae and according to my investigations this finding is correct. Furthermore I discuss the relationships of extant and fossil higher taxa of the radically new defined superfamily Eresoidea and describe new taxa of the family Archaeidae.

Extant spiders of the family Archaeidae (Arachaeinae and Mecysmaucheniinae) are exclusively known from the Southern Hemisphere: Australia, South America (only Mecysmaucheniinae), South Africa and Madagascar (only Archaeinae). As fossils we know only members of the subfamily Archaeinae and only from Europe in Baltic amber (subfossils in copal from Madagascar). Archaeidae is one of the very few families which were earlier known as fossils than extant. In the middle of the 19th century the knowledge of several fossil spiders in Baltic amber was better than the knowledge of extant spiders of the tropic Southern hemisphere. Unfortunately several workers on extant spiders ignore today the importance of fossil spiders. For example the genus *Archaea* (fossil in Baltic amber) and *Eriauchenius* (extant, South Africa and Madagascar) have been described independently, were synonymized later on but are regarded as different genera again in this paper. One and a half centuries no student looked carefully at the unique structures of the male pedipalpus of the relatively frequent fossil *Archaea paradoxa* (figs. 20-23) and compared it with its extant relatives (e.g. fig. 45)!

In no way the Archaeidae in Baltic amber are rare spiders; *Archaea paradoxa* - see the photos - I know them in Baltic amber e.g. from Russia, Poland and Bitterfeld in Germany, specimens are present in all larger collections. By far most of the Archaeidae in Baltic amber are members of *A. paradoxa* (photos, e.g. figs. 13-18), I saw hundreds of specimens in museums and private or dealer's collections. Members of *Eoarchaea* (photos, fig. 29) in Baltic amber are not too rare, too but specimens of *Baltarchaea, Myrmecarchaea* and *Saxonarchaea* are extremely rare; the adult male of *Baltarchaea* ("short-necked"), *Eoarchaea* (parthenogenetic?) and *Myrmecarchaea* (ant-shaped) is unknown, see the photos.

EINLEITUNG

Der Schwerpunkt dieser Untersuchung liegt bei der Revision der "exotischen" Vertreter der Unterfamilie Eigentliche Urspinnen (Archaeinae) im Bernstein - vgl. die Fotos und z. B. die Abb. 11, 32, 44 - und der Klärung ihrer biogeographischen und verwandtschaftlichen Beziehungen. FORSTER & PLATNICK (1984) erkannten die Beziehungen der Urspinnen zu den Tasterfußspinnen (Palpimanidae) und meine Untersuchungen bestätigen diesen Befund. Weiterhin diskutiere ich u.a. die Beziehungen verwandter höherer heutiger und fossiler Gruppen (Taxa) der in dieser Arbeit radikal neu definierten Überfamilie der Röhrenspinnen-Verwandten (Eresoidea) und beschreibe neue Gattungen und Arten der Familie Archaeidae.

Spinnen der Familie Urspinnen (Archaeidae) - Unterfamilien Archaeinae und Mecysmaucheniinae - kommen heute ausschließlich in der südlichen Hemisphäre vor: In Australien, Süd-Amerika (hier nur Mecysmaucheniinae), Süd-Afrika und auf Madagaskar (nur Archaeinae). Fossil kennen wir sie nur aus Europa im Baltischen Bernstein und nur Vertreter der Unterfamilie Archaeinae (subfossil auch in Kopal aus Madagaskar). Sie gehören zu den wenigen Familien, die rezent erst bekannt wurden, nachdem sie bereits Jahrzehnte zuvor fossil im Bernstein beschrieben worden waren. In der Mitte des 19. Jahrhunderts waren nämlich die Kenntnisse von manchen fossilen Spinnen im Baltischen Bernstein besser als von tropischen Spinnen der südlichen Hemisphäre. Wie es bedauerlicherweise z.T. auch heute noch der Fall ist, verkennen und ignorieren manche Bearbeiter rezenter Spinnen die Bedeutung fossiler Spinnen. So wurden die Gattungen *Archaea* (fossil im Baltischen Bernstein) und *Eriauchenius* (rezent, Süd-Afrika und Madagaskar) getrennt beschrieben, später synonymisiert und jetzt - in dieser Arbeit – wieder als eigene Gattungen aufgefaßt. Eineinhalb Jahrhunderte lang hat sich kein Bearbeiter die einzigartigen Strukturen des ♂-Pedipalpus der relativ häufigen fossilen *Archaea paradoxa* (Abb. 20-23) näher angesehen und mit denjenigen heutiger Verwandter verglichen (z. B. Abb. 45)!

Urspinnen sind im Baltischen Bernstein keineswegs selten. *Archaea paradoxa* kenne ich vom Baltischen Bernstein z.B. aus Rußland, Polen und auch von Fundorten aus Deutschland (Bitterfeld); in allen größeren Sammlungen existieren Stücke. Bei weitem die meisten aller Urspinnen im Baltischen Bernstein gehören zu *A. paradoxa* (Fotos, z. B. Abb. 13-18); mir lagen Hunderte von Exemplaren aus Museen und privaten Sammlungen sowie von Händlern vor. Auch Vertreter der Gattung *Eoarchaea* (Fotos, Abb. 29) sind nicht besonders selten; Spinnen der Gattungen *Baltarchaea*, *Myrmecarchaea* und *Saxonarchaea* sind dagegen extrem selten, das geschlechtsreife Männchen von *Baltarchaea* ("kurzhalsig"), *Eoarchaea* (parthenogenetisch?) und *Myrmecarchaea* (ameisen-ähnlich) ist unbekannt, siehe die Fotos.

Characters of the Archaeidae

Fossil Archaeidae are characterized (1) by long and diverging chelicerae which are extremely long in some species (e.g. fig. 33) but relatively short in other species (fig. 27); (2) by special „peg teeth" of the cheliceral furrows (fig. 11) which are no true teeth but thickened bristles (compare the circular base in fig. 47); (3) by lateral stridulating files (e.g. fig. 13) which build a stridulating organ in connection with small teeth in a variable position; (4) by a foramen which separates chelicerae and gnathocoxae (endites) (arrow in fig. 13); (5) by the absence of leg spines and bristles (as in Palpimanidae s.l. and

Spatiatoridae); (6) at least in the Archaeinae spinnerets and anal tubercle are hidden by a sclerotized ring (fig. 35); (7) also at least in the Archaeinae the base of the prosomal hairs is distinctly enlarged (fig. 17) (observable by a high magnification); (8) a small ♀-pedipalpus is typical (figs. 10, 13) (also the ♂-pedipalpus – with the exception of tibia and trochanter - is smaller than „usual"). A reduced ♀-pedipalpus evolved convergently in the family Anapidae s.l. (9) In the Archaeinae the femora bear a dorsal hump (arrow in fig. 42); (10) bear the metatarsi – with the exception of metatarsus I and most distinct on the often thickened metatarsus I – ventral ?preening hairs (fig. 36) as in numerous other related or not related families.

In contrast to the extant Archaeidae the opisthosoma in all fossil Archaeidae bears distinct folds/furrows (figs. 14, 26, 32, photos) which are rarely absent (fig. 26), most in juveniles. These folds were erroneously regarded as artifacts (results of shrinking processes) by various authors. In the fossil spiders the opisthosoma bears rows of hairs longitudinally between the furrows (figs. 27, 32). Only in very few juvelines those folds are absent, and in such spiders the opisthosoma looks bursting/swollen, perhaps puffed up by putrefactional gases. Hence I conclude that these folds are not artifacts. In extant Archaeidae opisthosomal folds are absent or indistinct. – Folds of the opisthosoma also occur in few taxa of other spider families, e.g. in the genus *Palfuria* SIMON 1910 (Zodariidae).

Nearly all Archaeid characters occur solely in other spider families, too, e.g. long chelicerae in some male Dictynidae and generally in Mimetidae and many Tetragnathidae, a foramen and peg teeth of the chelicerae occur also e.g. in Mimetidae (peg teeth also in few Thomisidae), and leg spines/bristles are absent also e.g. in Pholcidae, Sicariidae, Scytodidae and some Corinnidae. But these characters never occur in the combination which is listed above.

In the fossil Archaeidae in Baltic amber – and similar in Archaeidae in copal from Madagascar – I found not seldom red or redbrown anterior median eys. Red(brown) eyes I found in extant Archaeidae as well as in some extant Theridiidae and Thomisidae, too; see the paper on this matter in this volume.

Merkmale der Urspinnen (Archaeidae)

Die fossilen Urspinnen sind ausgezeichnet (1) durch lange und divergierende Grundglieder der Oberkiefer (Cheliceren) (bei einigen Arten sind sie extrem lang (Abb. 33), bei anderen relativ kurz, Abb. 27), die (2) dicke, pflock-ähnliche Zähne tragen ("peg teeth", Abb.11), bei denen es sich genauer um spezielle Borsten handelt, wie die ringförmige Basis zeigt, in die sie eingesenkt sind (Abb. 47); (3) seitliche Schrill-Rillen (Abb. 13), die mit Zähnen in unterschiedlicher Position ein der Balz dienendes Stridulations-Organ bilden und die (4) durch eine Lücke (Foramen) von den Gnathocoxen getrennt sind (Pfeil in Abb.13), (5) durch das vollständige Fehlen von Borsten der Beine (so auch bei den Palpimanidae s.l. und Spatiatoridae), (6) sind bei den Eigentlichen Urspinnen (Archaeinae) die Spinnwarzen und der After-Deckel weitgehend umschlossen und verborgen von/in einem gut ausgebildeten Ring (Abb. 35); (7) trägt der Vorderkörper bei ihnen (den Archaeinae) Härchen mit einer ungewöhnlich stark verbreiterten Basis (Abb. 17), die allerdings erst bei starker Vergrößerung erkennbar ist; (8) ist ein ungewöhnlich kleiner ♀-Pedipalpus typisch (Abb.10, 13) (der ♂-Pedipalpus ist – mit Ausnahme von Tibia und Trochanter - ebenfalls deutlich kleiner als "üblich"). Ein besonders kleiner ♀-Pedipalpus existiert - konvergent entstanden - auch bei den Zwerg-Kugelspinnen (Anapidae s.l.); (9) existiert bei den Archaeinae eine dorsale Erhebung der Femora (Pfeil in Abb. 42) und (10) tragen die oft verdickten Metatarsen außer I - besonders deutlich die Metatarsen III - ventrale (?Putz-)haare (Abb.36), wie sie auch bei verschiedenen anderen Familien vorkommen.

Im Gegensatz zu den heutigen Urspinnen trägt der Hinterkörper (das Opisthosoma) bei nahezu allen fossilen Urspinnen deutliche Falten oder Furchen (z.B. Abb. 14, 26, 32, Fotos), die selten fehlen (fig. 26), so meist bei jüngeren Jugendstadien (Nymphen). Diese Falten wurden von verschiedenen Autoren irrtümlich für Artefakte (Ergebnisse von Schrumpfungs-Prozessen) gehalten. Das Opisthosoma der fossilen Spinnen trägt Reihen von Haaren längs zwischen den Furchen in derselben Position (z.B. Abb. 27, 32). Unter den mir vorliegenden fossilen Urspinnen fand ich nur ganz wenige Nymphen ohne derartige Falten (Foto). Bei diesen Spinnen ist der Hinterkörper prall und wirkt wie aufgebläht, vermutlich haben es Verwesungs-Gase aufgedunsen. Daher halte ich die Opisthosoma-Falten keineswegs für Artefakte, sondern dagegen ihr - seltenes - Fehlen für unnatürlich. Bei den rezenten Vertretern der Urspinnen fehlen diese Furchen oder sie sind ganz undeutlich ausgeprägt. - Falten des Hinterkörpers existieren auch bei Vertretern anderer Familien, z.B. bei der Gattung *Palfuria* SIMON 1910 (Zodariidae).
Fast alle typischen Merkmale der Archaeidae (vgl. oben) kommen einzeln auch bei anderen Spinnen-Familien vor, so die langen Cheliceren z.B. bei einigen Kräuselspinnen-Männchen (Dictynidae) und Spinnenfresser-Spinnen (Mimetidae) sowie vielen Streckerspinnen (Tetragnathidae), ein Foramen und pflock-ähnliche Zähne der Cheliceren bei Mimetidae (pflock-ähnliche Zähne auch bei einigen Thomisidae), und Bein-Borsten fehlen auch bei Vertretern anderer Überfamilien, z.B. bei den Pholcidae, Sicariidae, Scytodidae und einigen Corinnidae. Die Merkmale existieren bei anderen Familien aber niemals in der oben aufgeführten Merkmals-Kombination.

Bei den fossilen Urspinnen im Baltischen Bernstein - und ganz ähnlich bei solchen in Kopal von Madagaskar - fielen mir die oft deutlich roten oder rotbraunen vorderen Mittelaugen auf. Rote Augen fand ich nicht bei den wenigen rezenten Archaeidae, die mir vorliegen; ich fand sie auch bei einigen heutigen Kugelspinnen (Theridiidae) und Krabbenspinnen (Thomisidae); sie werden an anderer Stelle in diesem Band diskutiert.

Remarks on the ecology of the Archaeidae s.l.

Extant members of the genus *Eriauchenius* (= *Afrarchaea*) live in higher strata as well as on the ground e.g. among fallen leaves, extant members of *Austrarchaea* on tree trunks, too. Like other Archaeidae s.l. and Palpimanidae s.l. capture webs are absent and most spiders are spider eaters (araneophag), most members of the Archaeinae are even obligatorical araneophag. (Also in the Mimetidae – see the paper in this volume – a capture web is absent and most spiders feed on spiders). Members of the Archaeidae genus *Mecysmauchenius* feed also on moths and flies when cept in laboratory, see FORSTER & PLATNICK (1984: 32). Probably the frequent members of *Archaea paradoxa* looked for prey on the bark of trees in a "waiting position" - as the extant spiders of *Austrarchaea* - while the (in amber) very rare members of the genera *Myrmecarchaea*, *Saxonarchaea* and *Baltarchaea* lived probably lamong fallen leaves and on lower plants; such spiders only rarely fall in a resin trap.
Did the fossil Archaeidae really feed on spiders?. The similar peg teeth in fossil and extant spiders refer to the same prey. Fossils in Baltic amber (CJW) probably confirm this kind of prey, see below. - In fig. 51 given by BACHOFEN-ECHT (1949: 55) seemingly an ant is the prey of an *Archaea paradoxa*. I studied the amber piece from the BACHOFEN-ECHT collection in the Zoolog. Staatssammlung Muenchen: The ant is preserved in front of the spider, and both are not in direct contact. In my opinion both animals are accidently preserved closely together.
Another amber piece (CJW) shows that fossil Archaeids itself have been the prey of spiders: A juvenile *Archaea paradoxa* (photo) is captured in a web part, spun in and seemingly sucked off. The prosoma cover is missing, tibia I is 1.2mm long. Fungus threads are preserved specially on the legs. Stellate hairs which most probably originate from deciduous trees are hanging on the web threads.

Anmerkungen zur Ökologie der Archaeidae s.l.

Rezente Vertreter der Gattung *Eriauchenius* (= *Afrarchaea*) leben sowohl in höheren Vegetations-Schichten als auch am Boden im Fall-Laub, Vertreter von *Austrarchaea* auch an Baumstämmen. Wie auch die übrigen Vertreter der Urspinnen im weiten Sinne (Archaeidae s. l.) und der Tasterfußspinnen im weiten Sinne (Palpimanidae s. l.) bauen sie keine Fangnetze und ernähren sich ganz überwiegend von Spinnen (sie sind araneophag), die Urspinnen (Araneinae) sogar ausschließlich. (Auch bei den Vertretern der

Spinnenfresser-Spinnen - Mimetidae; vgl. die Arbeit in diesem Band – fehlt ein Fangnetz und sie erbeuten überwiegend Spinnen). Vertreter der rezenten Urspinnen-Gattung *Mecysmauchenius* fressen in Gefangenschaft auch Motten und Fliegen, vgl. FORSTER & PLATNICK (1984:32). Möglicherweise lauerten die im Baltischen Bernstein häufigen Vertreter von *Archaea paradoxa* an der Rinde von Bäumen (wie heutige *Austrarchaea*) auf Beute, die viel selteneren Vertreter der fossilen Gattungen *Myrmecarchaea*, *Saxonarchaea* und *Baltarchaea* lebten dagegen wohl eher im Fall-Laub oder auf Kräutern und sind daher nur gelegentlich in eine Harz-Falle geraten.

Ernährten sich die fossilen Urspinnen tatsächlich von Spinnen? Die bei fossilen und rezenten Spinnen ähnlichen Strukturen der Cheliceren deuten auf diese Beutetiere. Fossilien im Baltischen Bernstein (CJW, siehe unten) bestätigen möglicherweise diese Art von Beute. - Die von BACHOFEN-ECHT (1949: 55, Abb. 51) abgebildete *Archaea paradoxa* (das Stück lag mir aus der Zoolog. Staatssammlung München vor) hat die <u>vor</u> ihr (nicht in direktem Kontakt!) liegende Ameise vermutlich <u>nicht</u> erbeutet. Es handelt sich wohl eher um eine zufällige "Zusammenschwemmung".

Ein Stück in meiner Sammlung zeigt, dass die fossilen Urspinnen selbst auch Beute anderer Spinnen wurden: Es handelt sich um einen in einem Netzteil befindlichen, eingesponnenen und offenbar ausgesaugten juvenilen Vertreter von *Archaea paradoxa* (Foto). Der Spinne fehlt die Prosoma-Decke, die Tibia I ist 1.2mm lang. Besonders an den Beinen befinden sich Pilz-Fäden. An den Spinnfäden hängen zahlreiche Sternhaare, die von Laubbäumen stammen dürften.

Biogeography and distribution of the Archaeidae s.l.

See also below sub the distribution of the Archaeidae s.l. !

a) **Extant** taxa	**distribution**
Austrarchaea	Australian Region
Eriauchenius	S-Africa, Madagascar
Mecysmaucheniinae (div. genera)	S-America, New Zealand

b) **fossil** taxa	**distribution**
Archaea	Baltic amber incl. Bitterfeld
Baltarchaea	Baltic amber not from Bitterfeld
Eoarchaea	Baltic amber incl. Bitterfeld
Myrmecarchaea	Baltic amber not from Bitterfeld
Saxonarchaea	Baltic amber from Bitterfeld only (?)

Distribution of the fossil and extant genera of the subfamily Archaeinae and of the subfamily Mecysmaucheniinae

Verbreitung der fossilen und rezenten Gattungen der Unterfamilie Archaeinae und der Unterfamilie Mecysmaucheniinae

Conspicuous in the list above is that...

(1a) All extant taxa are known from southern regions of the Southern Hemisphere only („distribution of contitental southern points"), (b) contrarily all fossil taxa are known from the Northern hemisphere.
Concering (a): Archaeidae are extinct in the whole Northern Hemisphere – perhaps we will find still existing taxa e.g. in SE-Asian jungles;
Concering (b): Large and well studied amber deposits are not yet known from the Southern hemisphere. So this lack is most probably not a gap of the fauna but a gap of our knowledge;
(2) The 5 genera of fossil amber spiders all are members of the subfamily Archaeinae; no Mecysmaucheniinae are known. The explanation may be the that only a small sector of the Northern Tertiary fauna has been studied which is preserved in the Baltic amber.
(3) There most possibly exist differences in the Archaeidae faunas from the Bitterfeld deposit and from not-Bitterfeld deposits. *Archaea paradoxa* – by far the most frequent species - is known from Bitterfeld and from not-Bitterfeld deposits, *Baltarchaea conica* (3 specimens) and *Myrmecarchaea* (3 specimens) are not known from Bitterfeld, and

Saxonarchaea (few speciemens) is known probably exclusively from Bitterfeld (a single spider is probably not of the Bitterfeld origin).

SURVEY OF THE FOSSIL TAXA OF THE SUPERFAMILY ERESOIDEA IN AMBER AND COPAL (incl. erroneous determinations and fakes)

I. Spiders in Baltic amber (Tertiary)

A. Recorded taxa:

Archaeidae s.l. (Dawn Spiders s.l., Urspinnen im weiteren Sinne)

Archaeinae (Dawn Spiders s. str., Eigentliche Urspinnen)

Genera: *Archaea* KOCH & BERENDT 1854, *Baltarchaea* ESKOV 1992, *Eoarchaea* FORSTER & PLATNICK 1984, *Myrmecarchaea* n. gen. and *Saxonarchaea* n.gen. (*Entomocephalus formicoides* HOLL 1829 - PETRUNKEVITCH (1958: 372) -: See the paper on fakes in this volume; a member of the family Salticidae).

Spatiatoridae (Dickkopf-Spinnen) (extinct)

Only the genus *Spatiator* PETRUNKEVITCH 1942, the single species *praeceps* PETRUNKEVITCH 1942.

Adorator PETRUNKEVITCH 1942: See the paper on the family Zodariidae in this volume.

B. Erroneous records:

1. Eresidae (Röhrenspinnen)

This family is not known from Baltic amber. Previous records of the genus *Eresus* refer to taxa of the Zodariidae, see the paper on the family Zodariidae in this volume and WUNDERLICH (1986: 42).

2. Mimetarchaeinae ESKOV 1992 = Synonym of Mimetidae: Mimetinae: Mimetini (Spinnenfresser-Spinnen) (**n.syn.**). See the paper on the family Mimetidae in this volume.

After the new synonymy the speculations of ESKOV (1992) about the relationships of Archaeidae and Mimetidae are invalid, see the paper on Mimetidae in this volume. – In contrast to FORSTER & PLATNICK (1984) I (again) regard the Mimetidae as not related to the Archaeidae but as a member of the superfamily Araneoidea and related probably to the Nesticidae.

II. Spiders in Dominican amber (Tertiary)

A. Recorded taxa:

Palpimanidae: Palpimaninae (Eigentliche Tasterfusspinnen)

Tribus Otiothopini, genus *Otiothops* MACLEAY 1839 (?), two sp. indet., see WUNDERLICH (1988: 92-93).

B. Erroneous record:

Faked Archaeinae: See below (subfossils in copal from Madagascar).

III. Spiders in Siberian amber (Cretaceous)

Lagonomegopidae ESKOV & WUNDERLICH 1995

Genus *Lagonomegops* ESKOV & WUNDERLICH 1995, the single species *L. suchatchevae* ESKOV & WUNDERLICH 1995 (only juveniles are known).

IV. Spiders in subfossil copal from Madagascar

Archaea copalensis LOURENCO 2000 = *Eriauchenius gracilicollis* (MILLOT 1948) (**n. comb** & **n**. **syn**.).

THE HIGHER TAXA OF THE ERESOIDEA

Remark on some questionable taxa (see the papar of FORSTER & PLATNICK (1984)): I regard Malkaridae as well as *Holarchaea* and *Pararchaea* as members of the superfamily Araneoidea, see the paper on Mimetidae s.l. in this volume. Micropholcommatidae and Textricellidae I regard as members of the Araneoidea, too, see the paper on Anapidae s.l. in this volume. Jurarchaeinae ESKOV 1987: See the addendum.

In contrast to FORSTER & PLATNICK (1984) I regard several taxa in a wide sense and some families sensu FORSTER & PLATNICK as subfamilies or even tribus (e.g. Otiothopini). Archaeidae KOCH & BERENDT 1854 (extant), Eresidae C. L. KOCH 1851, Huttoniidae SIMON 1893, Lagonomegopidae ESKOV & WUNDERLICH 1995 (extinct), Palpimanidae THORELL 1870 s.l. (incl. Stenochilinae) and Spatiatoridae PETRUNKEVITCH 1942 (extinct) I regard as members of the superfamily Eresoidea C. L. KOCH 1851 (**n. comb**.) in a totally new sense. According to my investigations the superfamily Archaeoidea (= Palpimanoidea) sensu FORSTER & PLATNICK (1984) is a mixture of taxa of the superfamiles Eresoidea s.l. (e.g. Archaeidae, Palpimanidae, Huttoniidae) as well as Araneoidea (Anapidae and Mimetidae), see below.

The construction of a cladogram is difficult because of numerous convergent evolved structures which often are hard to recognize as convergences.

Leg bristles in Eresoidea were reduced probably in two steps, (a) dorsal and lateral bristles as an apomorphy of the superfamily Eresoidea, and (b) ventral bristles in the ecribellate sister group of the Eresidae: Archaeidae, Palpimanidae and related families.

Araneophagy occurs at least in Archaeidae and Palpimaninae. Probably this character is an apomorphy of Archaeidae s.l. + Palpimanidae s.l. and has perhaps been lost in the Huttoniidae and Stenochilinae or it evolved two times independently.

Retrolateral cheliceral stridulating files occur in more than a dozen spider families. In some families as Linyphiidae we find such files in nearly all the taxa, in other families as Mimetidae sporadically and in few as Tetragnathidae only rarely (*Meta stridulans* WUNDERLICH). From „my“ Eresoidea I know cheliceral stridulating files not from the Eresidae but from the branch Archaeidae s.l. (see below) + Palpimanidae s.l. (figs. 7, 13, 15), see PLATNICK et al. (1999). Such files seem not reported from the Stenochilinae but fig. 321 in the paper of FORSTER & PLATNICK (1984) indicates the presence of widely spaced lateral cheliceral files. Hence it seems likely to me that such files are an apopmorphy of the ecribellate branch of the Eresoidea.

According to LEHTINEN (1982) the strong anterior legs of several Palpimanidae s.l. (and also in the Eresidae) are in connection with the digging behaviour. Such legs and the digging behaviour are probably a synapomorphy of the Eresoidea but may be symplesiomorphic. On the other hand the large frontal legs of the Palpimanidae s. l. are more likely not in connection with the digging behaviour but with locating their special prey, spiders: Members of *Palpimanus canariensis* KULCZYNSKI 1909 are moving with raised anterior legs (pers. obs.).

Difficult to interpret are reductions/reversals of several structures which probably took place several times independently:

(1) The reduction of the median and posterior spinnerets: One or two times within the Archaeidae, apomorphic in the Mecysmaucheïinae and probably in *Baltarchaea* ESKOV as well as in the branch Palpimanidae (the grade of reduction is variable);

(2) The eyes: In most Mecysmaucheniinae the anterior median eyes are lost (fig. 11) and probably the loss occured several times independently (8 eyes are present in *Aotaroa* FORSTER & PLATNICK and *Zearchaea* WILTON). (In the genus *Hybosida* SIMON (Palpimaninae) the posterior median eyes are lost).

(3) True cheliceral teeth are reduced e.g. in Archaeinae, Eresidae and Stenochilinae. This character may well be a synapomorphy of the Eresoidea.

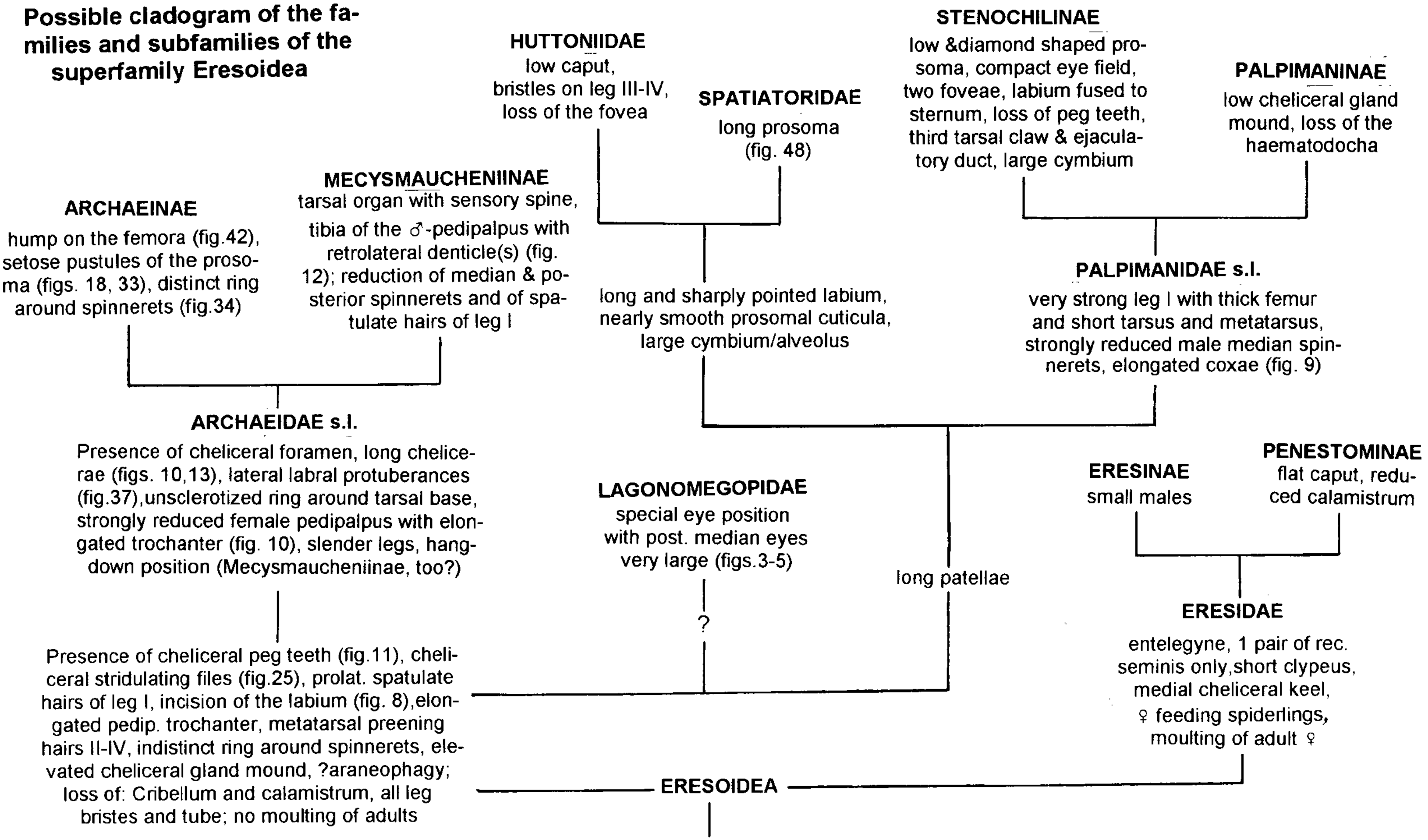
Remarks:

(1) The conformation of the bulbus structures is basicly very similar in Eresidae, Palpimanidae and Spatiatoridae (fig. 56): Usually there is a large and protruding (sub)tegulum, embolus and conductor originate often in a distal position and are directed to the tip of the cymbium, a median apophysis is absent; compare e. g. the bulbi of the genera *Stegodyphus* (Eresidae) and *Palpimanus* (Palpimanidae)!

(2) According to the presence of short ventral tarsal spines in the Eresidae – especially on IV and probably in connection with the cribellate thread production – there are relationships to other cribellate taxa: Filistatidae, Oecobioidea (Oecobiini), Araneoidea s l. (Uloboridae ad part.) as well as to numerous members of the ecribellate Zodariidae. These spines evolved convergently at least two times,are probably present plesiomorphic in the first listed families, and evolved probably as an apomorphy in the Zodariidae.

(3) Ventral metatarsal preening hairs – in many taxa specialized as an apical preening comb – seem to occur only in ecribellate vagrant (not web-building) taxa. Preening hairs evolved several times independently, in ecribellate Eresoidea as well as in the Corinnidae, in the Zodariidae and in other taxa.

Possible cladogram of the families and subfamilies of the superfamily Eresoidea



HUTTONIIDAE
low caput,
bristles on leg III-IV,
loss of the fovea

SPATIATORIDAE
long prosoma
(fig. 48)

STENOCHILINAE
low &diamond shaped prosoma, compact eye field, two foveae, labium fused to sternum, loss of peg teeth, third tarsal claw & ejaculatory duct, large cymbium

PALPIMANINAE
low cheliceral gland mound, loss of the haematodocha

ARCHAEINAE
hump on the femora (fig.42), setose pustules of the prosoma (figs. 18, 33), distinct ring around spinnerets (fig.34)

MECYSMAUCHENIINAE
tarsal organ with sensory spine, tibia of the ♂-pedipalpus with retrolateral denticle(s) (fig. 12); reduction of median & posterior spinnerets and of spatulate hairs of leg I

long and sharply pointed labium, nearly smooth prosomal cuticula, large cymbium/alveolus

PALPIMANIDAE s.l.
very strong leg I with thick femur and short tarsus and metatarsus, strongly reduced male median spinnerets, elongated coxae (fig. 9)

ARCHAEIDAE s.l.
Presence of cheliceral foramen, long chelicerae (figs. 10,13), lateral labral protuberances (fig.37),unsclerotized ring around tarsal base, strongly reduced female pedipalpus with elongated trochanter (fig. 10), slender legs, hang-down position (Mecysmaucheniinae, too?)

LAGONOMEGOPIDAE
special eye position with post. median eyes very large (figs.3-5)

?

long patellae

ERESINAE
small males

PENESTOMINAE
flat caput, reduced calamistrum

ERESIDAE
entelegyne, 1 pair of rec. seminis only,short clypeus, medial cheliceral keel, ♀ feeding spiderlings, moulting of adult ♀

Presence of cheliceral peg teeth (fig.11), cheliceral stridulating files (fig.25), prolat. spatulate hairs of leg I, incision of the labium (fig. 8),elongated pedip. trochanter, metatarsal preening hairs II-IV, indistinct ring around spinnerets, elevated cheliceral gland mound, ?araneophagy; loss of: Cribellum and calamistrum, all leg bristes and tube; no moulting of adults

ERESOIDEA

a) **Apomorphies**: Large raised caput (figs.2,10), rugose & heavily sclerotized prosoma,?strong frontal legs, wide eye field, widely spaced median & lateral eyes (figs.1,11,33), loss of dorsal and lateral leg bristles, reduced cheliceral teeth, small ♂♀-pedipalpus

b) **Plesiomorphies**: Cribellate, haplogyne, several pairs of recept. seminis, thickened tibia of the ♂-pedipalpus, outstanding bulbus, hairy body and legs, no leg autotomy, ?digging behaviour and tube but no capture web? Moulting of adults

Key to the fossil and extant families and subfamilies of the superfamily Eresoidea:

1 Special eye position, posterior median eyes very large (figs. 3-5). Fossil in Siberian and New Jersey amber. Genus *Lagonomegops*. . . . . LAGONOMEGOPIDAE

- Eye position otherwise. Extant or fossil, not in Siberian amber. 2

2(1) With cribellum and calamistrum (except in *Wajane*); ventral leg spines - also on tarsi - present. 3

- No cribellum and calamistrum; usually no leg spines except in Huttoniinae (no. 5) on III-IV; no ventral tarsal leg spines. 4

3(2) Caput raised (fig. 2), calamistrum long, males distinctly smaller than females. . . . . ERESIDAE: Eresinae

- Caput flat, calamistrum reduced, males not distinctly smaller than females. . . . .

. . . . ERESIDAE: Penestominae

4(2) Two foveae in a row, "diamond-shaped" prosoma. Genera *Colopea* and *Stenochilus*. . . . . .PALPIMANIDAE: Stenochilinae

- One fovea present or fovea absent, prosoma not diamond-shaped. 5

5(4) Bristles present on legs III-IV, low caput, no fovea.Genus *Huttonia*...HUTTONIIDAE

- No bristles on legs III-IV, caput distinctly raised (e.g. fig. 10), fovea usually present. . .6

6(5) Spatulate hairs on leg I forming a prolateral brush (e.g. as in fig.3) . . . . .PALPIMANIDAE: Palpimaninae

- No prolateral brush of spatulate hairs on leg I. 7

7(6) Size of legs, chelicerae, ♀-pedipalpus and cymbium normal. . . . .SPATIATORIDAE

- Legs slender, ♀-pedipalpus and cymbium reduced, chelicerae usually strongly enlarged (e.g. fig. 11). Archaeidae. 8

8(7) Median and posterior spinnerets reduced, no dorsal hump of the femora, retrolateral denticle(s) on the tibia of the ♂-pedipalpus present (fig. 12). . . . . ARCHAEIDAE: Mecysmaucheniinae

- Median and posterior spinnerets not reduced, femora with a dorsal hump (fig.42), tibial denticle(s) of the ♂-pedipalpus absent. . . . . .ARCHAEIDAE: Archaeinae

DIAGNOSES AND DESCRIPTIONS

The superfamily ERESOIDEA C.L. KOCH 1851 s.l. - Röhrenspinnen-Verwandte

Diagnosis: Large raised caput present with wide eye field and widely spaced median and lateral eyes (figs. 1-2,11,33), prosoma rugose and heavily sclerotized, long or strong anterior legs (except in Huttoniidae and Spatiatoridae) and no dorsal or lateral leg spines except prolateral metatarsal bristles on legs III-IV in Huttoniidae (ventral leg bristles are present in Eresidae), no or reduced true cheliceral teeth, small ♂♀ pedipalpus (the bulbus may be large), no feathery hairs (?).

Further – basic/plesiomorphic - **characters**: Capture web as well as cribellum & calamistrum present (mostly lost, see the cladogram, present only in Eresidae (but *Wajane* is ecribellate)), opisthosoma often with scuta (e.g. fig. 14), colulus small or absent, 3 tarsal claws, no tarsal trichobothria (in contrast to the statement of LEHTINEN (1967: 283)), one trichobothrium on the metatarsi, plumose hairs frequent, haplogyne and with more than one pair of receptacula seminis or entelegyne: Eresidae; cheliceral "peg teeth" (fig. 11) present except in the Eresidae; retrodistal tibial apophysis of the ♂-pedipalpus absent, tegular apophyses may be present (see figs. 20-23), bulbus basicly simple, large and usually outstanding, no median apophysis, probably digging behavour and a tube (see above), no leg autotomy, vulval glands (probably plesiomorphic).

The **relationships** are not sure. Acoording to LEHTINEN (1967) Archaeidae is a member of the superfamily Araneoidea, Palpimanidae is a member of the superfamily Zodarioidea and Eresidae is the only family of the superfamily Eresoidea in the branch Zodariides. - According to FORSTER & PLATNICK (1984) Mimetidae, Archaeidae Mecysmaucheniidae, Pararchaeidae/Holarchaeidae and Micropholcommatidae are members of the superfamily Palpimanoidea (but the older name Archaeoidea would be correct for this taxon, see the note of FORSTER & PLATNICK (1984: 104)). I regard Mimetidae and Malkaridae as members of the superfamily Araneoidea – see the paper on Mimetidae in this volume and the book of WUNDERLICH (1986: 124-125).

The family Zodariidae is quite more evolved than Eresoidea and a member of the "RTA-clade"; members of the RTA-clade are basicly entelegyne (few - as some Anapidae and Tetragnathidae - are secondarily haplogyne), the tarsi carry trichobothria (very few exceptions), a median apophysis and a retrolateral tibia apophysis of the ♂-pedipalpus are basicly present.

According to the combined presence of such characters as the presence of cheliceral peg teeth and the loss of leg spines - as well as other characters which are listed above - the families Spatiatoridae, Palpimanidae s.l., Huttoniidae, Lagonomegopidae and Archaeidae are...

(1) not related to the Zodariidae,

(2) united in a monophyletic taxon and
(3) related to the cribellate Eresidae according to synapomorphies as the large raised and heavily sclerotized caput with a basicly wide eye field as well as the bulbus structures - e.g. the absence of a median apophysis - and the loss of dorsal and lateral leg bristles.

According to CODDINGTON & LEVI (1991) Eresidae is the sister group of Oecobiidae + Hersiliidae and more primitive than the Palpimanidae. Furthermore CODDINGTON & LEVI regarded the Palpimanoidea as the sister group of Araneoidea s.l. + the RTA-clade. Contrarily to this opinion and my opinion of 1995: 633 (fig.A) I now think - mainly because of the entelegyne status of the Oecobioidea and the seemingly orbweb-shaped web in Oecobiinae in which a tube is absent - that this superfamily is more evolved and more related to the Araneoidea than the Eresoidea (including the Palpimanidae) in which a median apophysis is absent.
According to GRISWOLD et al. (1999) Eresidae is the sister group of the Oecobiidae and both are members of the superfamily Eresoidea. According to the autotomy between patella and tibia, the large anal tubercle, the long posterior spinnerets and the special - circling - prey catching behaviour the Oecobioidea (incl. the Hersiliidae) is a superfamily of its own, see WUNDERLICH (1987: 106) and the paper on the Oecobioidea in this volume.
The sister group of "my" Eresoidea may be the large branch of Oecobioidea + Araneoidea s.l. + RTA-clade or the branch of Oecobioidea + Araneoidea s.l.

Type family: Eresidae C.L. KOCH 1851.- Further families which are included in this paper: Lagonomegopidae (extinct), Spatiatoridae (extinct), Palpimanidae s.l., Huttoniidae and Archaeidae s.l.

Distribution: Cosmopolitical, mainly tropical. - In Europe today only members of the genera *Eresus* and *Stegodyphus* (Eresidae) as well as *Palpimanus* (Palpimanidae) are present but from the Early Tertiary Baltic amber forest we know members of the families Archaeidae (5 genera) and Spatiatoridae (the genus *Spatiator*), from the Cretaceous Period one genus of the family Lagonomegopidae (*Lagonomegops*) has been described. Surely we still know only very few of the fossil taxa.

ERESIDAE C.L. KOCH 1851 - Röhrenspinnen (figs. 1-2)

Diagnosis: Cribellate (except *Wajane*), dorsal or lateral leg bristles or spines absent, short ventral spines present on the tarsi, medial cheliceral keel present, cheliceral teeth reduced, clypeus short, moulting of adults at least in the females (similar to Mygalomorpha and Dysderoidea: Filistatidae), females feeding their spiderlings (similar to some Theridiidae and Amaurobiidae), sessile, tube-dwellers, no leg autotomy.

Remark on the moulting of adults: Within the Dysderoidea s. l. - the Filistatidae - and within the Eresoidea s. l. - the Eresidae - moulting of adults occurs only in the cribellate families (the only cribellate families of both superfamilies). Females of these families are quite long-living spiders as females of most Mygalomorpha.

Relationships: Eresidae may be the sister group of the branch of Palpimanidae s.l. + Huttoniidae + Spatiatoridae + Archaeidae s.l., see above and the cladogram. These taxa are ecribellate, haplogyne and usually araneophag, peg teeth and lateral stridulating files of the chelicerae are present, a capture web and all leg bristles are absent (few bristles are present in the Huttoniidae) and there is no moulting in the adults.

Subfamilies: Eresinae and Penestominae, see the key above.

Distribution: Widely distributed, mainly in the tropics, very rare in S-America, absent in N-America and in the Australian Region; fossil not known from amber, see above.

LAGONOMEGOPIDAE ESKOV & WUNDERLICH 1995 (figs. 3-5)

Diagnosis (juv.!): Prosoma (figs. 3-5) with a very wide eye field, posterior median eyes very large and widely spaced, its position in the middle of the length of the prosoma. (Ecribellate, no leg bristles, no tarsal trichobothria, cheliceral peg teeth present).

Relationships: Without the knowledge of adults the relationships are not sure. According to the cheliceral peg teeth and the lack of leg spines the Lagonomegopidae are related to the Palpimanidae but caput, eye position and the hairs of leg I are different.

Type genus: *Lagonomegops* ESKOV & WUNDERLICH 1995 (the only known genus).

Distribution: Fossil in Cretaceous Siberian amber and in Cretaceous amber from New Jersey, see D. PENNEY, Meganeura, 2: 25 (1998).

PALPIMANIDAE s.l. - Tasterfußspinnen im weiten Sinne (fig. 6-9)

Diagnosis: Depressed and basally elongated coxae (fig. 9), strongly enlarged anterior legs with very long patellae and a dense prolateral scopula (fig. 6); order of leg articles usually: Patella > coxa > tarsus > metatarsus; at least in the male the median spinnerets are reduced to spigots. - Further characters: See the cladogram and below (the subfamilies); cheliceral stridulating files present (fig. 7), leg bristles absent, tarsus I movable retrolaterally. The apically deeply notched labium (fig. 8) - known to me from *Palpimanus* and *Otiothops* - may be a further synapomorphy of this family.

Relationships: Huttoniidae + Spatiatoridae may be the sister group, see the Lagomegopidae and the cladogram.

Subfamilies and its characters: Palpimaninae (incl. Chedimini and Otiothopini) and Stenochilinae: 2 genera, *Colopea* and *Stenochilus* from SE-Asia and the Australian Region. „My" subfamilies are regarded as families by FORSTER & PLATNICK (1984); see the cladogram. In contrast to the Palpimaninae both anterior leg pairs are strongly developed in the Stenochilinae and an ejaculatory duct is absent in this subfamily according to LEHTINEN (1982).

Distribution: Cosmopolitical, rare in moderate climates; fossil in Dominican amber (Palpimaninae).

HUTTONIIDAE

Diagnosis: No fovea, lateral/ventral bristles/spines on legs III-IV present, slender anterior legs. (In contrast to the statement of FORSTER & PLATNICK (1984: 87) are cheliceral stridulating files present, pers. obs.).

Relationships: Spatiatoridae may be the sister group, see the cladogram.

Distribution: Australian Region (only the genus *Huttonia* O. PICKARD-CAMBRIDGE 1879 is known).

SPATIATORIDAE - Dickkopfspinnen (figs. 48-56)

See WUNDERLICH (1986: 21-22, figs. 7-12)

Diagnosis: Fairly myrmecomorphic, prosoma long and with a distinctly raised caput (figs. 48-49). Further characters: Cheliceral stridulatory files - see WUNDERLICH (1986: Fig. 8) and "peg teeth" (fig. 50) present in both sexes, anterior legs slender, labium strongly pointed (fig. 51), the cymbium covers most parts of the small bulbus, a large conductor hides partly the embolus (fig.56), ♀-pedipalpus not reduced, epigyne absent.

Relationships: According to the large cymbium and alveolus - similar to the Stenochilinae -, the three pairs of spinnerets and the nearly smooth cuticula of the prosoma the family Huttoniidae - extant, New Zealand - may be most related. In the Huttoniidaethe ♀-pedipalpus is also not distinctly reduced but bristles of the legs III and IV are present, the caput is low and a fovea is absent.

Genera: *Spatiator* PETRUNKEVITCH 1942, the only known genus. - According to PETRUNKEVITCH (1942) also *Adorator* PETRUNKEVITCH 1942 is a member of the Spatiatoridae but *Adorator* is actually a taxon of the family Zodariidae, see the paper on the Zodariidae in this volume.

Distribution: Tertiary Baltic amber forest.

Spatiator **PETRUNKEVITCH 1942** (figs. 48-56)

Diagnosis: See above.

Type species: *Spatiator praeceps* PETRUNKEVITCH 1942, the only known species. Remark: According to the quite variable proportions of the cymbium there may be several fossil species which are preserved in the Baltic amber. Unfortunately PETRUNKEVITCH (1942) selected a female as the holotype of *S. praeceps* and a male as the paratype ("androtype"). Probably males surely can be determined according to their bulbus structures, but only rarely the bulbus is observable in the ventral aspect as in fig.56.

Relationships: See above.

Distribution: Tertiary Baltic amber forest.

Spatiator praeceps PETRUNKEVITCH 1942 (figs. 48-56) Photos 84-85

Material: 3♂ F553/BB/AR/SPA/CJW, F554 and F555, 2♀ F461 and F550, 1 juv. F462, 6 specimens CJW (no no.); 1♂ Geol.-Paläont. Inst. Univ. Göttingen no. B16.126; 1♂ Geol.-Paläont. Inst. Univ. Hamburg no. 4301 (coll. GRÖHN 3923); 1♂ coll. LIEDTKE no. 425; 1 juv. ♀ coll. HOFFEINS no. 1419/2; 1♂ coll. KERNEGGER no. 1998/111; 1♂ Mus. Ziemi no. 212/41.

Description: Body length 3.2-5.4mm (♀), prosoma (figs. 48-51) fairly rugose, with a long clypeus, a distinctly raised caput and a compact eye group, anterior median eyes distinctly the largest, posterior row procurved, fovea long, chelicerae robust, fangs short and thick, anterior margin with special "peg teeth", lateral stridulating files distinct, labium free, long and sharply pointed apically, gnathocoxae strongly converging, serrula present. - Legs fairly robust, bristles absent, leg I not enlarged, third pair long, patellae long, tarsal trichobothria absent, one metatarsal trichobothrium and preening hairs present, unpaired tarsal claw small, anterior tibia, metatarsus and tarsus with prodorsal to prolateral spatulate hairs (figs. 53-54) which are short in the juveniles but have a long stalk in the adults. In some specimens - from other families, too - droplets (fig. 55) are preserved on various leg hairs which should be not confused with the spatulate hairs. Tarsus I may be movable outwards (fig. 52) as in related taxa and in some Dysderidae (Dysderoidea). - Opisthosoma long, covered with very short hairs, at least the male epigaster bears a large scutum. Colulus absent, tracheal spiracle about 1 1/2 of the length of the anterior spinnerets in front of the spinnerets. Three pairs of spinnerets, the medians small. - ♂-pedipalpus (fig. 56) with stout articles, pedipalpus with stridulating bristles in both sexes, tibial apophysis absent, with a large cymbium which covers most parts of the small bulbus, embolus nearly straight, partly hidded by a long conductor. A (sclerotized) epigyne is absent.

Relationships: See above.

Distribution: Tertiary Baltic amber forest.

ARCHAEIDAE s.l. - Dawn Spiders, Urspinnen im weiten Sinne Photos 56 -83

Diagnosis: Cheliceral foramen and very long and +/- diverging chelicerae present (except in *Baltarchaea*, fig. 27) (e.g. figs. 11, 13, 33), lateral cheliceral stridulating files figs. 13, 32) (not known in all genera) and cheliceral gland lobes (fig. 16) present, unsclerotized ring around the tarsal base, usually anterior cheliceral hairs which frequently are combined with humps (figs. 11, 44) (absent in the fossil taxa) and lateral labral protuberances present (figs. 10, 34), elongated trochanter of the strongly reduced ♀-pedipalpus, preening hairs present at least on metatarsus III (fig. 36); legs usually very long and slender (figs. 32, 44, but stout in *Baltarchaea*, fig. 27); see the cladogram.

Remark: The large number of receptacula seminis in most taxa of the Archaeidae – see FORSTER & PLATNICK (1984) - is a plesiomorphic character in spiders which is typical for many haplogyne taxa and Mygalomorpha and does not occur e.g. in the entelegyne Mimetidae s.l.

Relationships: See the cladogram.

Subfamilies: Archaeinae and Mecysmaucheniinae (incl. *Zearchaea*, see below.

Ecology: The spiders are "waiting predators"; several extant species live in rain forests and feed on spiders.

Distribution: Extant: S-America (only the subfamily Mecysmaucheniinae), S-Africa, Madagascar, Australia, New Zealand; fossil (only Archaeinae): Tertiary Baltic, Burmese and Rovno ambers, copal from Madagascar (subfossil). Archaeinae is not known from the Americas; their absence today in SE-Asia is surprising to me. Mecysmaucheniinae is surprisingly unknown from South Africa. Both subfamilies occur together only in the Australian Region; hence the origin of this family may have been in the Australian Region.

Differences between Archaeinae and Mecysmaucheniinae:

Character	Archaeinae	Mecysmaucheniinae
hump of the femora	+ (fig.42)	-
setose pustules of the prosoma	+ (figs.13,28)	-
distinct ring around spinnerets	+ (figs.34-35)	-

reduction of median & posterior spinnerets	-	+
spatulate hairs of leg I	+ (-?)	-
tracheal spiracle	paired (fig.35)	single
tarsal organ	capsulate	exposed and with sensory bristle
tibia of the ♂-pedipalpus with retrolateral denticle(s)	-	+ (fig.12)
posterior receptaculum	+	-

Stridulating organs in the genera of the Archaeidae s.l.
(Übersicht über die Stridulations-Organe der Cheliceren bei den Gattungen der Archaeidae s.l.):

Archaea: Position of the cheliceral stridulating files in the basal half, femur of the pedipalpus with some proventral teeth (fig. 17); see FORSTER & PLATNICK (1984: Figs. 16-17).

Myrmecarchaea: Unknown; most probably as in *Archaea*.

Saxonarchaea: Cheliceral stridulating files retrolaterally in the middle (fig. 32), one stridulating tooth proventrally-apically on the trochanter (!) of the pedipalpus (fig. 38).

Baltarchaea: Unknown; probably absent.

Austrarchaea: Cheliceral stridulating files retrolaterally in the distal 2/3, stridulating teeth probably proventrally on the femur of the pedipalpus.

Eoarchaea: As in *Archaea*.

Myrmecarchaea: Most probably as in *Archaea*.

Eriauchenius: Cheliceral stridulating files retrolaterally in the distal half, stridulating tooth at one of the pedipalpus articles: On the patella in *gracilicollis* (MILLOT) (fig. 45) or prodorsally on the femur, e.g. in *vadoni* (MILLOT).

Mecysmauchenius (as in other members of the Mecysmaucheniinae): Cheliceral stridulating files retrolaterally-proximally, stridulating tooth/teeth proventrally/laterally on the femur of the pedipalpus.

About 50 million years ago Archaeidae already had a pronounced <u>courtship behaviour</u>: Most spiders used retrolateral cheliceral stridulating files in connection with a stridulating tooth or several teeth on an article of the pedipalpus in both sexes (fig. 19). The most primitive conditions probably occur in the Mecysmaucheniinae as well as in the genera *Archaea* (fossil) and *Austrarchaea* (?) (extant) of the Archaeinae: One tooth or several teeth of the pedipalpal <u>femur</u> is/were/are used for stridulating similar to numerous spiders of other families, e.g. Spatiatoridae and Pimoidae, most Palpimanidae and Linyphiidae, several Pholcidae and Hahniidae as well as some Mimetidae.

Die fossilen Urspinnen besaßen bereits vor 50 Millionen Jahren ein ausgeprägtes <u>Balz-Verhalten</u>. Benutzt wurden Stridulations-Rillen außen auf den "Oberkiefern" (Cheliceren), auf denen ein Stridulations-Zahn (oder mehrere) eines Gliedes des Pedipalpus entlang gerieben wurde(n), dessen Position je nach Gattung verschieden ist und der in beiden Geschlechtern existiert(e) (Abb. 19). Die ursprünglichen Verhältnisse könnten bei den Mecysmaucheniinae sowie den Gattungen *Archaea* (fossil) und *Austrarchaea* (?) (rezent) der Archaeinae vorliegen: Ein Zahn oder mehrere Zähne des <u>Femur</u> des Pedipalpus dien(t)en als Stridulations-Zähne ganz ähnlich wie bei vielen Spinnen anderer Familien, z.B. den meisten Tasterfuß-Spinnen (Palpimanidae s.l.) und Pimoidae, Dickkopfspinnen (Spatiatoridae) und Baldachinspinnen (Linyphiidae), nicht wenigen Zitterspinnen (Pholcidae), Hahniidae und einigen Spinnenfresser-Spinnen (Mimetidae).

ARCHAEINAE

The special importance of the fossil Archaeinae

For six reasons fossil members of the Archaeidae: Archaeinae are among the most remarkable spiders of those which are treated in this volume:

(1) The morphology of the prosoma. The basal articles of the chelicerae are extremely enlarged, their margins bear special long and blunt bristles ("peg teeth", photos, figs. 11, 33) which are no true teeth and which may be useful for prey-capture. In all taxa there is a large gap (foramen) between chelicerae and labium/gnathocoxae (photos, arrow in fig. 13) and in several species there is a long "neck" which is absolutely unusual in spiders; therefore the opening of the mouth is extraordinary far away from the base of the chelicerae in these spiders (photos, arrow in fig. 44).

(2) Behaviour and prey. Archaeidae are not vagile hunting spiders but they use a "sit-and-wait" position in a "head-down-position" for prey-catching at least in the extant species. Extant Archaeinae feed mainly on spiders; according to LEGENDRE (1977: 17) forest spiders do so - even exclusively - as do the (some?) related Palpimanidae (see MURPHY (1992) and most of the not related Mimetidae (Araneoidea). In some distance of a ♂ of a *Archaea paradoxa* in Baltic amber lies a juveniles Theridiidae indet. which was probably the prey of the *Archaea* (F567); the deformation of the Theridiidae may be an artifact because the piece of amber was heated. Another female Theridiidae indet. is preserved as possible prey directly below of - and partly in contact with - a probably juvenile *Archaea* sp. indet. (F713).The opisthosoma of the Theridiidae is bears distinct folds. - It is striking that "peg teeth" occur in spider-eating spiders of these three families - Archaeidae, Palpimanidae and Mimetidae - and may have to do with the kind of their prey. The powerful chelicerae of the Archaeidae may be an adaptation to the spider-catching behaviour. Furthermore the shape of the anterior legs should play an important role in spider catching: The legs are powerful and strongly scopulate in the related Palpimanidae (fig. 6). In most Mimetidae the anterior legs bear special long prolateral bristles - see the paper on the Mimetidae in this volume -, and in most Archaeidae the anterior legs are very long and slender (photos, figs.32,44) as in numerous Mimetidae - for examining, touching and catching their prey?

(3) Biodiversity. We know more fossil genera (five, all are extinct) in only a single former forest - the Early Tertiary Baltic amber forest - than extant genera worldwide (two); Archaeinae is a relict subfamily (the same is apparently true for the whole family Archaeidae).

(4) Biogeography. (a) World-wide distribution: Today the subfamily Archaeinae is restricted to the Southern Hemisphere (South Africa, Australian Region). The presence of five genera in the Early Tertiary in the Baltic amber forest of the Northern Hemisphere indicates that its today's distribution is the result of extinction in the Northern Hemisphere, similar to the Cyatholipidae and Synotaxidae; Archaeinae is not a "gondwanan subfamily", it is absent e.g. in the Americas and India, but apparently it was widely distributed in the Early Tertiary; see ESKOV (1992) and WUNDERLICH (1995) contra LEGENDRE (1977). Spiders of this subfamily as well as the whole family Archaeidae survived only in the Southern Hemisphere. One reason for the survival in the Southern Hemisphere may be the stronger effects of the glaciations in the Northern Hemisphere during the Tertiary. A second reason was probably the competition of members of the also spider-eating (!) spiders of the family Mimetidae - they were not quite rare in the Baltic amber forest. - (b) The fauna of the Bitterfeld deposit (see the general part of these papers): 6 or even 7 specimens of the genus *Saxonarchaea* come from the Bitterfeld deposit - one or none come from other deposits - although I studied many more spiders from other deposits than from Bitterfeld. This is not an accident - the probability of an

accident is less than one to one million (!). Doubtless there exist at least quantitative differences in the Bitterfeld Archaeid spider fauna compared with the summerized not-Bitterfeld Baltic amber fauna, and most probably the differences are even qualitative, on genus level. That means that there existed endemic taxa of the former Bitterfeld amber forest (which was a part of the large Baltic amber forest): The genus *Saxonarchaea* with two species, *S. dentata* and *S. diabolica*. In contrast to these taxa the species of the genera *Baltarchaea* (3 specimens) and *Myrmecarchaea* (3 specimens) are not known from the Bitterfeld deposit.

(5) Myrmecomorphy/ant-mimicry. Myrmecomorphy is an example for Batesian mimicry. It is known in fossil spiders from some members of the following families: Archaeidae (*Myrmecarchaea*), Spatiatoridae and Corinnidae (Baltic amber), Salticidae (Dominican amber, see WUNDERLICH (1988) (not known from Baltic amber), Gnaphosidae and Zodariidae (Baltic amber)see the papers on Corinnidae, Salticidae and Zodariidae in this volume. Within fossil Archaeidae of the Baltic amber forest the species of the genus *Myrmecarchaea* are not spider-shaped but most probably ant-shaped (myrmecomorphic); I do not want to exclude that they are wasp-shaped, see the photos: Their body is not bipartite but tripartite with an extremely elongated petiolus which consists apparently of a larger medial and a pair of lateral sclerotized "tubes"; the legs are very long and slender, prosoma and opisthosoma are slender, in *M. petiolus* n. sp. the shape of the opisthosoma is cylindrical and narrow in the middle. A long body, a cylindrical opisthosoma with a "lace" as well as long and slender legs are typical in myrmecomorphic spiders, an elongated petiolus occurs in numerous myrmecomorphic Corinnidae, e. g. the Castianeirinae. The fossil members of *Myrmecarchaea* may possess the grade two of myrmecomorphy sensu WUNDERLICH (1995: 452). - In most of the not-myrmecomorphic Archaeinae the long chelicerae, the long body as well as the long and slender legs are predispositions to myrmecomorphy. - The behaviour of the fossil spiders is unknown but I do not want to exclude that members of *Myrmecarchaea* raised their opisthosoma ("opisthosomal warning") similar to numerous extant ants and ant-mimiking spiders. In contrast to strong lateral movements there is no morpholocigal indication of the petiolus against up-and-down movements of the opisthosoma. - Probably worker ants of the subfamily Dolichoderinae were the model of the myrmecomorphic Archaeidae in the Baltic amber forest; spiders of *Myrmecarchaea* apparently are more similar to ants of this subfamily than to members of other subfamilies. These ants evolved probably in the Upper Cretaceous, and therefore this kind of ant-mimicry should not be older.

(6) Parthenogenesis is probably rare in spiders; it is surely reported in the extant species *Dysdera hungarica* KULCZYNSKI 1897 (Dysderidae, Europe), see GRUBER (1990). Within the five genera of Archaeidae in Baltic amber there are two genera in which no male - juvenile or adult - has been reported: *Baltarchaea* (two females and one juvenile) and *Eoarchaea* (more than 30 females and several juveniles). In several hundred fossil spider species I never found such an unusual sex ratio as in *Eoarchaea*. In fossil members of the genus *Archaea* adult males are probably a bit more rare than adult females. In traps - resin is a kind of trap - usually far more male spiders are found than females: Males are surching for females which are ready for copulation. From these findings in my opinion it is not unlikely that parthenogenesis existed in the fossil ge-

nus *Eoarchaea* and probably in *Baltarchaea*, too. - ESKOV (1992) regarded the members of *Eoarchaea* as juveniles of *Archaea*. According to the proportions of prosoma, opisthosoma and legs, the complete absence of a "neck" (which is already present in juvenile *Archaea* of the same size) and the absence of intermediate classes of size I regard the larger specimens of *Eoarchaea* as adult females but not as juveniles, see below. - In 1♀ of *E. hyperoptica* (coll. HOFFEINS no. 1445/1) the genital area is distinctly sclerotized. - Parthenogenesis is also present in the Ochyroceratidae and probably in *Hahnia microphthalma* SNEZELL & DUFFEY 1980 (pers. suggestion).

Die besondere Bedeutung der fossilen Urspinnen (Unterfamilie Archaeinae):

Fossile Urspinnen gehören aus sechs verschiedenen Gründen zu den bemerkenswertesten Spinnen, die in diesem Band behandelt werden:

1. Die Gestaltdes Vorderkörpers: Die Grundglieder der Kiefer (Cheliceren) sind extrem verlängert und tragen besondere lange und stumpfe pflock-ähnliche Borsten ("peg teeth", "pflock-ähnliche Zähne", tasächlich handelt es sich allerdings um abgewandelte Borsten, siehe die Fotos und Abb. 11, 33), die beim Beutefang nützlich sein dürften. Es existiert eine große Lücke (ein Foramen) zwischen den Kiefern und der "Unterlippe" (dem Labium) (Fotos, Pfeil in Abb. 13), und bei verschiedenen Arten existiert ein langer "Hals", der bei Spinnen ganz ungewöhnlich ist, sodaß die Mundöffnung von der Basis der Kiefer außergewöhnlich weit entfernt ist (Fotos, Pfeil in Abb. 44).

2. Verhalten und Beute. Urspinnen sind keine schnell beweglichen Jäger, sondern sie lauern in einer Position "kopfunter" auf Beute, so wenigstens die heutigen Spinnen. Heutige Urspinnen ernähren sich von Spinnen, Urspinnen des Regenwaldes nach LEGENDRE (1977: 17) sogar ausschließlich. Ebenso ernähren sich die (einige?) verwandte Tasterfußspinnen (Palpimanidae), vgl. MURPHY (1992) und nicht verwandte Spinnenfresser-Spinnen (Mimetidae der Überfamilie Radnetzspinnen-Verwandte, Araneoidea). Vor dem Männchen einer *Archaea paradoxa* (F567/BB/AR/ARC/CJW) und unter dem juvenilen Weibchen einer *Archaea* sp. indet. (F713/BB/AR/ARC/CJW) (photo) im Baltischen Bernstein sind ♀ unbestimmter Kugelspinnen konserviert, bei denen es sich um Beutetiere gehandelt haben könnte. Die Deformation des einen Weibchens könnte allerdings auf ein Erhitzen des Bernsteinstückes zurückzuführen sein. - Es ist auffällig, daß "pflockähnliche Zähne" der Kiefer bei Vertretern dreier spinnenfressender Spinnen-Familien vorkommen: Bei Urspinnen, Tasterfußspinnen und Spinnenfresser-Spinnen. Sie könnten mit der Art der Beute zu tun haben. Die mächtig entwickelten Kiefer der Urspinnen könnten eine Anpassung an ein besondere Verhalten beim Erbeutens von Spinnen sein. Weiterhin sollte die Ausbildung der vorderen Beine eine wichtige Rolle beim Erbeuten von Spinnen spielen: Die Beine sind mächtig entwickelt

und tragen zahlreiche spatelförmige Haare bei den Tasterfußspinnen (Abb. 7). Bei den meisten Spinnenfresser-Spinnen tragen die vorderen Beine besondere lange Haare - vgl. die Arbeit über die Spinnenfresser-Spinnen in diesem Band - und bei den meisten Urspinnen sind die vorderen Beine ungewöhnlich lang und dünn wie bei vielen Mimetidae, siehe die Fotos und Abb. 32, 44 - als Tastorgane zum Orten der Beute?

3. Biologische Vielfalt. Es ist eine größere Anzahl fossiler Gattungen der Eigentlichen Urspinnen (Archaeinae) aus einem einzigen fossilen Wald - dem Baltischen Bernsteinwald aus dem Tertiär - bekannt (nämlich fünf, alle sind ausgestorben) als heutige Gattungen weltweit (lediglich zwei); die Urspinnen sind das Überbleibsel (Relikt) einer im Tertiär weit verbreiteten Familie.

4. Verbreitung (Biogeographie). a) Weltweite Verbreitung. Heute ist die Unterfamilie der Urspinnen auf die Südliche Erdhälfte beschränkt (Süd-Afrika, Australische Region). Das Vorkommen von fünf Gattungen im Zeitalter des frühen Tertiärs des Baltischen Bernsteinwaldes auf der Nördlichen Halbkugel weist darauf hin, daß die heutige Verbreitung das Ergebnis des Aussterbens auf der Nördlichen Halbkugel ist. Die Urspinnen sind somit keine besondere Familie des vorzeitlichen Südkontinents Gondwanaland, sondern sie waren früher schlicht wesentlich weiter verbreitet als heute; vgl. ESKOV (1992) und WUNDERLICH (1995), dagegen LEGENDRE (1977). Spinnen dieser Unterfamilie sowie der gesamten Familie Urspinnen überlebten ausschließlich auf der Südlichen Erdhalbkugel. Eine Ursache für das Überleben auf der Südlichen Halbkugel könnten die ausgeprägteren Auswirkungen der Eiszeiten auf der Nördlichen Hemisphäre während des Tertiärs gewesen sein, eine zweite Ursache möglicherweise die Konkurrenz durch Vertreter der Spinnenfresser-Spinnen (Mimetidae) - sie waren im Baltischen Bernsteinwald nicht besonders selten -, die sich wie die Urspinnen von Spinnen ernährten. - (b) Die Fauna der Bitterfelder Lagerstätte (siehe den allgemeinen Teil in diesem Band): Wenigstens 6 der 7 Individuen der Gattung *Saxonarchaea* stammen von der Bitterfelder Lagerstätte - eines oder keines stammt von anderen Lagerstätten - obwohl mir eine wesentlich größere Anzahl Spinnen von Nicht-Bitterfelder Lagerstätten vorlag. Dies ist sicher kein Zufall: Die Wahrscheinlichkeit eines Zufalls beträgt weniger als eins zu einer Million (!). Zweifellos existierten bei den Urspinnen zumindest quantitative Unterschiede zwischen der Bitterfelder Spinnen-Fauna und der übrigen Baltischen Spinnen-Fauna und möglicherweise sogar qualitative Unterschiede auf Gattungsniveau. Das bedeutet, daß endemische Gruppen des ehemaligen Bitterfelder Waldes (der vermutlich ein Teil des großen Baltischen Bernsteinwaldes war) existierten: Die Gattung *Saxonarchaea* mit den beiden Arten *S. dentata* und *S. diabolica*. Im Gegensatz zu diesen Arten sind Vertreter der Gattungen *Baltarchaea* (3 Exemplare) und *Myrmecarchaea* (3 Exemplare) nicht von der Bitterfelder Lagerstätte bekannt.

5. Ameisen-Mimikry. Ameisenähnlichkeit ist ein Beispiel der BATES'schen Mimikry. Bei fossilen Spinnen ist sie von einigen Vertretern der folgenden Familien bekannt: Urspinnen (Archaeidae, Gattung *Myrmecarchaea*), Dickkopfspinnen (Spatiatoridae) und Ameisen-Sackspinnen (Corinnidae) im Baltischen Bernstein, Springspinnen (Salticidae) im Dominikanischen Bernstein und Ameisen-Jäger (Zodariidae) im Baltischen Bernstein; siehe die Arbeiten über Corinnidae, Salticidae und Zodariidae in diesem Band. Die Urspinnen-Arten der Gattung *Myrmecarchaea* sind eher ameisen-ähnlich (myrmeco-

morph) als spinnen-ähnlich, vgl. die Fotos: Ihr Körper ist nicht zweiteilig sondern dreiteilig mit einem extrem verlängerten "Stielchen" (Petiolus) zwischen Vorder- und Hinterkörper (er besteht aus einer größeren mittleren Röhre und einem Paar seitlicher Röhren, durch die Blut, Verdauungssäfte, Nahrungsbrei und Nervenstränge ziehen), die Beine sind sehr lang und dünn, Vorder- und Hinterkörper sind schlank, bei *M. petiolus* ist der Hinterkörper zylindrisch und besitzt darüber hinaus in der Mitte eine schwache Einschnürung. Ein langgestreckter Körper mit einem zylindrischen Hinterkörper sowie einer Einschnürung und lange, schlanke Beine sind charakteristisch für ameisen-ähnliche Spinnen; ein verlängerter Petiolus kommt bei zahlreichen ameisen-ähnlichen Ameisen-Sackspinnen vor, z. B. bei der Unterfamilie Castianeirinae. Die fossilen Vertreter der Gattung *Myrmecarchaea* dürften den "zweiten Grad der Ameisen-Ähnlichkeit" im Sinne von WUNDERLICH (1995: 452) besitzen. Ich möchte allerdings eine Wespen-Ähnlichkeit nicht ganz ausschließen. - Bei den meisten nicht ameisen-ähnlichen Urspinnen sind die langen Kiefer (Cheliceren), der langgestreckte Körper und die langen, schlanken Beine (vgl. die Fotos) durchaus als Prädispositionen (im Sinne von "Vorstufen") der Ameisen-Mimikry aufzufassen. - Zwar ist das Verhalten der fossilen Spinnen unbekannt, ich möchte allerdings nicht ausschließen, daß Spinnen der Gattung *Myrmecarchaea* ihren Hinterkörper anheben konnten - "Opisthosoma-Drohen" -; ähnlich verhalten sich zahlreiche heutige Ameisen und ameisen-ähnliche Spinnen. Im Gegensatz zu ausgeprägten seitlichen Bewegungen scheint der Bau des Petiolus eine Auf- und Abbewegung des Hinterkörpers erlaubt zu haben. - Welche Bedeutung hat die Ameisen-Mimikry? Die meisten Vögel meiden Ameisen, sie munden ihnen nicht; Vögel können sogar eine regelrechte "Ekel-Reaktion" zeigen, falls sie einmal eine Ameise erbeutet haben, vgl. WUNDERLICH (1995). Daher gewährt Ameisen-Ähnlichkeit einen gewissen Schutz vor Feinden. Sie hat sich bei den verschiedensten Gruppen von Gliederfüßern im Laufe vieler Generationen herausgebildet. Möglicherweise waren Ameisen-Arbeiterinnen der Unterfamilie Dolichoderinae das "Vorbild" der Urspinnen, die als "Nachahmer" anzusehen sind. Vertreter der Gattung *Myrmecarchaea* sind Arbeiterinnen der Dolichoderinae offenbar ähnlicher als Ameisen anderer Unterfamilien. Da diese Ameisen vermutlich in der Oberen Kreide entstanden sind, dürfte die ausgeprägte Form der Ameisen-Ähnlichkeit nicht älter sein.

6. Jungfernzeugung (Parthenogenesis) ist eine (ein)geschlechtliche Fortpflanzung durch Weibchen, bei der die Männchen "abgeschafft" oder wenigstens sehr selten sind, wie etwa die Drohnen bei der Honigbiene. Zum Beispiel bei Blattläusen und Stabheuschrecken ist Jungfernzeugung nicht selten, bei Spinnen ist sie dagegen vermutlich selten; sicher nachgewiesen ist sie bei der heutigen europäischen Sechsaugenspinne (Dysderidae) *Dysdera hungarica*, die in Gefangenschaft über drei Generationen ohne Männchen gezogen wurde, vgl. GRUBER (1990). Bei den fünf Gattungen der Urspinnen, die vom Baltischen Bernstein bekannt sind, ist bei *Baltarchaea* (zwei Weibchen, eine Jungspinne) und *Eoarchaea* (mehr als 30 Weibchen, mehrere Jungspinnen) kein einziges Männchen - jung oder geschlechtsreif - bekannt geworden. Bei mehreren hundert fossilen Spinnenarten fand ich kein derartiges Verhältnis der Geschlechter, die Männchen sind - meist deutlich - häufiger als die Weibchen, so z. B. bei den Zwerg-Sechsaugenspinnen der Gattung *Orchestina*; bei *Archaea paradoxa* sind die Männchen möglicherweise etwas seltener als die Weibchen. In Bodenfallen wird gewöhnlich eine wesentlich größere Anzahl von Männchen als Weibchen gefangen. Die Erklärung liegt

darin, daß die Männchen - wenigstens während der Paarungszeit - nach paarungsbereiten Weibchen suchend umherlaufen. Die Verhältnisse waren bei den fossilen Harzfallen ebenso. Daher halte ich es für nicht unwahrscheinlich, daß Jungfernzeugung bei der fossilen Gattung *Eoarchaea* existiert hat und vielleicht auch bei der Gattung *Baltarchaea*. - ESKOV (1992) hielt die Vertreter von *Eoarchaea* für Jungspinnen von *Archaea*. Nach den Proportionen von Vorder- und Hinterkörper sowie den Beinen, dem vollständigen Fehlen eines "Halses" - der bei jungen *Archaea* derselben Größe bereits existiert - und dem Fehlen von "Zwischengrößen" halte ich dagegen die größeren Vertreter von *Eoarchaea* für geschlechtsreife ♀. Bei einem ♀ von *E. hyperoptica* (coll. HOFFEINS Nr. 1445/1) ist die Genital-Region deutlich sklerotisiert.

Parthenogenese kommt auch bei Vertretern der Familie Ochyroceratidae vor und möglicherweise bei *Hahnia microphthalma* SNAZELL & DUFFEY 1980 (pers. Vermutung).

Diagnosis of the subfamily Archaeinae: Presence of a dorsal hump of the femora (fig. 25), hairs of the body usually arranged in rows (fig. 18), setose pustules on the prosoma (figs. 18, 28-32), distinct sclerotized ring around spinnerets (figs. 34-35), special posterior respiratory system, see FORSTER & PLATNICK 81984: 12-14). - Further characters: Cheliceral stridulating files (figs. 15, 32), presence of metatarsal preening hairs (fig. 36), spatulate hairs of leg I, and most often large anterior median eyes.

Remarks: (1) MILLOT (1948: 4) reported as the first author serrated hairs under metatarsus III in the family Archaeidae, in *Eriauchenius*; see FORSTER & PLATNICK (1984: 7). I found ?serrated hairs in fossil genera of the Archaeidae: Archaeinae (most distinct in *Archaea* and *Saxonarchaea*) in Baltic amber (fig. 36) as well as in the Mecysmaucheniinae (*Mecysmauchenius*, *Aotearoa*), and - in several taxa - also on metatarsi II and IV. With hesitation MILLOT regarded these as "stridulating hairs" by contact with the cheliceral stridulating files but in my opinion these hairs are "preening hairs", as e.g. in the Palpimanidae. True stridulating teeth are present on artictles of the ♂-pedipalpus, see above and figs. 15,19. (2) Secretion of the cheliceral glands: At the right chelicera of a subfossil juvenile of *Eriauchenius gracilicollis* (MILLOT 1948) (arrow in fig. 47) as well at both chelicerae of the holotype of the fossil *Eoarchaea vidua* n. sp. a secretion is preserved in the same position between the "peg teeth". I regard this as a secretion of the cheliceral glands, see the gland lobes fig. 16 and FORSTER & PLATNICK (1984: Figs. 34-39).

Relationships: In the Mecysmaucheniinae exists a special tarsal organ, the median and posterior spinnerets are reduced, a hump of the femora is lacking, spatulate hairs of leg I are not known, there are retrolateral denticles on the tibia of the ♂-pedipalpus and the posterior respiratory system is different, the tracheal spiracle is single, see the tab. above.

Distribution: Extant known only from the Southern Hemisphere: S-Africa, Madagascar, Australia; fossil known only from the Northern Hemisphere, from Early Tertiary Baltic, Burmese and Rovno ambers. (The Archaeinae from Madagascar are probably all subfossil).

Key to the extant and fossil genera of the subfamily Archaeinae:

1 Fossil in Baltic amber. Anterior cheliceral hair absent (fig. 33). 3

- Extant or subfossil in copal from Madagascar. Anterior cheliceral hair present (figs. 11, 44). 2

2(1) Dorsal opisthosomal scutum present, embolus long and thin. Australia. . . . . *Austrarchaea*

- Dorsal opisthosomal scutum absent, embolus (fig. 45) short and thick. S-Africa, Madagascar (= *Afrarchaea*). . . . . *Eriauchenius*

3(1) Petiolus extremely long (photos 75-76) . . . .*Myrmecarchaea*

- Petiolus short (photos, figs. 14, 32). 4

4(3) Prosoma with a pair of posterior projections, opisthosoma with humps and projecting above spinnerets, chelicerae and legs stout (figs. 26-27), ♂ unknown. . *Baltarchaea*
Photos 66-67

- Prosoma without posterior projections (with humps in *Archaea bitterfeldensis*), opisthosoma without projections, chelicerae and legs long and slender (fig. 32). 5

5(4) Prosoma anteriorly with a pair of strong "horns" and with dorsal thorns (fig. 32); pedipalpal trochanteral stridulating tooth present (fig. 38). . . . .*Saxonarchaea*

- No such "horns" or thorns, e.g. figs. 18, 24, 29, trochanteral stridulating tooth absent..6

6(5) Caput overhanging posteriorly, prosoma with large and hairy pustules (fig. 13), male pedipalpus: Figs. 20-23). Photos 56-63 . . . .*Archaea*

- Caput not overhanging posteriorly, large pustules absent (fig. 29), male unknown. . . . .
Photos 71-73. . . . . *Eoarchaea*

Archaea KOCH & BERENDT 1854 (figs. 13-25)

Questionably synonym: According to ESKOV (1992) *Eoarchaea* FORSTER & PLATNICK 1984 is a synonym of *Archaea* but in my opinion *Eoarchaea* is a separate genus, see below.

Diagnosis: Prosoma (figs.13, 24, photos): Caput high, posteriorly overhanging, without thorns (strong bristles), position of the cheliceral stridulating files in the basal half (fig.15), position of the stridulating teeth basally-proventrally on the femur of the pedipalpus (fig. 15). Opisthosoma (fig. 14) without humps, metatarsus III twice as long as tarsus III, ♂-pedipalpus (figs.20-23): Subtegulum/tegulum very large, embolus and tegular apophyses in a basal position, embolus fairly long, nearly straight.

Relationships: According to the shape of the prosoma and its special hairs as well as the opisthosomal furrows there are relationships to *Saxonarchaea* n.gen.. In the distinctly smaller *Saxonarchaea* there are dorsal thorns and anterior "horns" on the prosoma, the caput is lower and not overhanging posteriorly, the position of the cheliceral stridulating files is in the middle, the position of the stridulating tooth is on the pedipalpal trochanter, the legs are shorter, the metatarsi are relativlely shorter, III is thickened in both sexes and only 1.2 times longer than tarsus III, the embolus is longer, more slender and distinctly bent. – In the extant genera *Eriauchenius* and *Austrarchaea* the prosoma is similar but the position of the cheliceral stridulating files is in the distal half, the opisthosoma bears no distinct furrows, a frontal hair of the chelicerae is present and the structures of the male pedipalpus are quite different.

Type species: *Archaea paradoxa* KOCH & BERENDT 1854 (the only known species of the genus).

Distribution: Fossil in Baltic amber incl. the Bitterfeld locality.

Key to the species of the genus Archaea in Baltic amber:

Remark: The male is only known from *A. paradoxa* which is by far the most frequent species.

1 The posterior part of the prosoma bears two pairs of humps (fig. 24). . . .*bitterfeldensis*

- No such humps (fig. 13). 2

2(1) Caput wider than high, chelicerae relatively short, anterior median eyes large (fig. 25, photo). . . . . *compacta*

- Caput higher than wide, chelicerae very long, anterior median eyes smaller (fig. 13, photos). 3

3(2) Anterior median eyes only slightly larger than the other eyes, their diameter < 0.1 mm. . . . . *pougneti*

- Anterior median eyes distinctly larger than the other eyes, their diameter > 0.1 mm (fig. 13); ♂-pedipalpus figs. 20-23. . . . . *paradoxa*

Archaea paradoxa KOCH & BERENDT 1854 (figs. 13-23), photos 56-64

Material: Numerous ♂♀, juv. in Baltic amber incl. the Bitterfeld locality, in the CJW, e.g. F561, 565 and 566 as well as in numerous private collections; specimens are present in every larger collection, e.g. 1♂ and 1♀ from the Bitterfeld deposit in the coll. M. KUTSCHER nos. K/AR/10 (♂) and K/AR/11 (♀), in the Geolog.-Paleontol. Institute of the University Hamburg, in the Zool. Staatssammlung Munic, coll. BACHOFEN-ECHT, in the Geol.-Paleontol. Institute of the University Göttingen, 5 males nos. 3B 791, B 282, B 16052, B 16205 and G 2403, coll. EICHMANN, coll. GRABENHORST (Bitterfeld deposit). Holotype of *Archaea laevigata* KOCH & BERENDT 1854, juv. ♂, Palaeont. Mus. Berlin MB.A.1083, Palaeont. Mus. Moscow.

Synonyms: *Archaea incompta* MENGE in KOCH & BERENDT 1854, *laevigata* (= *levigata*) KOCH & BERENDT 1854 and probably *sphinx* MENGE in KOCH & BERENDT 1854.

Diagnosis: ♂♀-caput strongly raised (figs.13, 18, photos), higher than wide, dorsally bearing longitudinal rows of hairs on tubercles, chelicerae very long and slender, anterior prosomal „horns“ absent, legs very long and slender, metatarsus I about 2.8 times longer than tarsus I, metatarsus III twice as long as tarsus III (♂), femur of the ♂-pedipalpus with stridulating teeth (fig. 17), position of the trichobothrium on metatarsus I in about 0.9, on IV in about 0.7 (♂), labium very long, tip probably blunt, ♂-pedipalpus (figs. 15, 19-23) with very large (sub) tegulum, tegular apophysis bent in a right angle, ?embolus in a basal position, of medium length, nearly straight.

Measurements (in mm): Body length about 2.5-3.5, prosoma: Length about 1.5, hight also 1.5, length of the chelicerae in larger specimens 1.5, length of the ♂-tibia I in largerb specimens about 2.5, diameter of the anterior median eyes >0.1mm. Order of the legs I/?IV/II/III.

Juveniles (shape of the prosoma!): See above. The tarsus of the subadult male has a blunt outgrowth at the tip (figs. 18-19).

Hairs: At least some of the prosomal, opisthosomal and leg's hairs are usually lost, and only the tuberculate base of the hairs is present, see the photos and fig. 13. In few specimens most hairs are still present, e.g. in the male F564/CJW and in a female of the GPIH, see the photos.

Relationships: See *Archaea compacta* n. sp. and *A. bitterfeldensis* n. sp.

Distribution: Tertiary Baltic amber forest incl. the Bitterfeld locality.

?*Archaea bitterfeldensis* n. sp. (fig. 24)

Material: Holotypus ?ad. ♀ in Baltic amber from the Bitterfeld deposit, Palaeont. Mus. Humboldt Univ. Berlin, MB.A.985.

Preservation and syninclusions: The spider is only fairly well preserved, the amber piece was apparently heated, the left half of the opisthosoma and most leg articles are cut off, only the right legs I-III are complete. Mainly the right side of the spider is covered by a white emulsion. - Remains of a Collembola and of a Diptera are preserved, too; no stellate hairs.

Diagnosis (♀; ♂ unknown): The only known species of the genus in which the caput bears posterior humps; the anterior tarsi are very short.

Description (♀):
Measurements (in mm): Body length 3.2, prosomal length 1.8, leg I: Femur 2.3, patella 0.6, tibia 2.5, metatarsus 0.85, tarsus 0.22, metatarsus III 0.52, tarsus III 0.28, length of a chelicera 1.15, diameter of the anterior median eyes 0.13.
Colour of prosoma and legs medium brown.
Prosoma (fig. 24) with a strongly raised caput which bears two pairs of posterior humps and numerous larger tubercles which are most often in an irregular position but build lateral rows. Cheliceral stridulating files hidden, fangs long and strongly bent. Pedipalpi with slender articles (fig. 24). Legs long and slender, order I/?IV/II/III, I by far the longest; covered with short hairs. Position of the metatarsal trichobothrium I in 0.95. Opisthosoma with distinct furrows which are partly hidden by a white emulsion.

Relationships: In *A. paradoxa* the chelicerae are longer and more slender, they are similar to *compacta*. In *A. compacta* and *A. paradoxa* prosomal hunps are absent. A male of *bitterfeldensis* is needed to confirm that this species is a true member of the genus *Archaea*.

Distribution: Tertiary Baltic amber forest, the Bitterfeld deposit.

Archaea compacta **n. sp.** (fig. 25)

Material: Holotypus ♀ in Baltic amber, F560/BB/AR/ARC/CJW.

Preservation and syninclusions: The spider is fairly well preserved in an amber piece which was heated; both legs I are cut off through the tibia, ventral leg articles are covered by a white emulsion, fissures cover the opisthosoma, the retrolateral surface of the right chelicera shows some artefacts. - A particle of amber is preserved between the chelicerae; no stellate hairs.

Diagnosis (♀; ♂ unknown): The only known species in which the prosoma (in anterior view) is wider than high (ratio 1 : 1.15, anterior aspect), see the photo; anterior median eyes larger than in other congeneric species (fig. 25).

Description (♀):
Measurements (in mm): Body length 2.7, prosoma: Length 1.1, hight 1.3, caput width 0.82, caput hight in anterior view 0.72, femur I 2.25, tibia III 1.05, diameter of the anterior median eyes 0.15, length of the chelicerae 1.1.
Colour medium brown.
Prosoma (fig. 25, photo) high, caput in anterior view wider than high (ratio 1 : 1.15), hairs short and indistinct, tubercles small, less dense than in *paradoxa*, anterior median eyes distinctly the largest, chelicerae fairly robust, with a long row of "peg teeth" on the anterior margin and short rows on the posterior margin and with teeth between both rows; stridulating field large. Pedipalpus with slender articles. Legs long and slender, with short tarsi, similar to *paradoxa*. Opisthosoma nearly egg-shaped, with a large epigastric scutum; folds and hairs are indistinctly preserved; a sclerotized ring around the spinnerets, anterior spinnerets thick, colulus absent. Epigaster with the genital area strongly sclerotized.

Relationships (see the key): In *A. bitterfelensis* the prosomal tubercles are larger and more dense, in *paradoxa* the caput is higher, more slender and bears longitudinal rows of hairs.

Distribution: Tertiary Batic amber forest.

Archaea pougneti SIMON 1884 Photo 65

Material: 1 ?ad. ♀ in Baltic amber, F559/BB/AR/ARC/CJW.

Diagnosis (♂; ♀ unknown): Anterior median eyes only as large as the other eyes, diameter <0.1mm, caput higher than wide. The body length of the ♀ F559 is 1.9mm, the body length of the holotype is - according to SIMON - 5mm(!) but this statement may be an error.

Relationships: In the other congeneric species the anterior median eyes are larger than the other eyes.

Distribution: Tertiary Baltic amber forest.

Baltarchaea ESKOV 1992 (Figs. 26-28)

Diagnosis (♀; ♂ unknown): Prosoma and opisthosoma with humps (figs. 26-27), opisthosoma prolongated beyond the spinnerets (and with distinct furrows), legs short and stout (figs.26-28), <u>body and legs densily covered with thin and very thick hairs</u> (fig.26-27); chelicerae: Most probably no frontal hairs.

Relationships: In *Archaea* and *Saxonarchaea* body and legs are less hairy, the shape of the prosoma is quite different, humps of the opisthosoma are absent, legs and chelicerae are distinctly longer.

Type species (the only known species): *Archaea conica* KOCH & BERENDT 1854.

Distribution: Tertiary Baltic amber forest (not know from Bitterfeld).

Baltarchaea conica (KOCH & BERENDT 1854) (Figs 33-35) Photos 66-67

Material (in Baltic amber): 1♀ Mueum Ziemi in Warsaw, no. 18816; 1 juv. ♀

F568/BB/AR/ARC/CJW. - KOCH & BERENCT (1854) listed a female from the collection of the Museum of the Earth of STERNBERG in Prague as the holotype. No further material is known.

Diagnosis: See above. Remarkable are the dense hairs of body and legs; the eyes – most probably 8 – are mostly covered with hairs, the opisthosoma is covered with hairs which are particularly thick and apparently of the plumose type. The dorsal hairs of the prosoma have a very wide base (figs. 34-35) which are typic in Archaeinae; the lateral hairs are clue-shaped and similar to a fungus mycel. The spinnerets are surrounded by a distinct sclerotized ring, the frontal ones very thick, the others reduced or hidden. The genital area bears a distinct wide slit. – Measurements (♀ in mm): Body length 3.6, prosomal length 1.5, length of tibia I about 1.0, body length of the juvenile 1.5..

Distribution: Tertiary Baltic amber forest (not known from Bitterfeld).

Eoarchaea FORSTER & PLATNICK 1984

Diagnosis (♀; ♂ unknown): Smallest known fossil Archaeidae, prosoma (photo, fig. 29) without a "neck", without tubercles or thick hairs. Opisthosomal furrows are present in contrast to the statement of FORSTER & PLATNICK (1984: 25). Stridulating organ as in *Archaea*. Probably parthenogenetic, see above.

Type species: *Archaea hyperoptica* MENGE in KOCH & BERENDT 1854.

Relationships: In the other genera of the family Archaeidae a prosomal "neck" is present. See the key. - ESKOV (1992) synonymized erroneously *Eoarchaea* with *Archaea* and regarded *hyperoptica* as an "assemblage of various juvenile *Archaea*".

Distribution: Tertiary Baltic amber forest incl. the Bitterfeld deposit.

Eoarchaea hyperoptica (MENGE in KOCH & BERENDT 1854) Photos 71-73

Archaea hyperoptica MENGE in KOCH & BERENDT (1954: 22) (♀).
Archaea hyperoptica,--PETRUNKEVITCH (1950: 265, figs. 4-10, 187) (♀).
Eoarchaea hyperoptica,--FORSTER & PLATNICK (1984: 25-26, figs. 13-17) (♀).

Material (in Baltic amber): 11♀ coll. JW, e.g. F562, F594-598; 1♀ Mus. Moscow, 4♀ coll. M KUTSCHER in Sassnitz (Bitterfeld deposit). I saw numerous further females in dealer's collections.

Remarks: (1) The number of specimens and the sex of the type material was not noted by MENGE (1854: 22). (2) Because of the proportions of prosoma, legs and opisthosoma and the relatively conform size I regard most - if not all - specimens not as juveniles but as adult females. - In contrast e.g. to *Archaea paradoxa* I never found a male of *hyperoptica*. Therefore I suppose the existance of parthenogenesis in this species and probably in the whole genus; the second congeneric species is also known from females only.

Diagnosis (♀;♂ unknown): Prosoma longer than high, profile raising oblique (photo).

Description (♀):
Measurements (in mm): Body length 1.3 (?juvenile, e.g. F595) - 1.9 (F562), most often about 1.7, tibia I (F562) 0.95.
Prosoma: See the photo. Opisthosoma and legs as in *E. vidua* n. sp. Genital area unmodified.

Relationships: In *E. vidua* n. sp. the prosoma is higher than long and the profile is steeply arising.

Distribution: Tertiary Baltic amber forest incl. the Bitterfeld deposit.

***Eoarchaea vidua* n. sp.** (figs. 29-30) Photo 74

Material (in Baltic amber): Holotypus ♀ F563/BB/AR/ARC/CJW; 1♀ paratypus from the Bitterfeld deposit coll. M. KUTSCHER in Sassnitz K/AR/12.

Preservation and syninclusions: Holotype: The spider is excellently and nearly completely preserved, the left tarsus IV is cut off; there is no whit emulsion. A bubble is preserved beneath the right femur III. A small medial bubble (a secretion?) is preserved on both chelicerae, see the photo. - One stellate hair is present in the amber piece. - Parytype: The amber piece was heated and embedded in artificial resin. The spider is fairly well and completely preserved within several fissures. - A larger Hymenoptera, some tiny Acari and a stellate hair are preserved in front of the spider.

Diagnosis (♀): Prosoma higher than long, fig. 29.

Description (♀):
Measurements (in mm): Body length without chelicerae 1.2 (holotype) - 1.35, prosomal

length about 0.5, hight 0.6, leg I (holotype): Femur 1.2, patella 0.3, tibia 0.95, metatarsus 0.52, tarsus 0.35, tibia IV 0.62, chelicerae 0.6.
Colour yellow brown.
Prosoma (fig. 29) higher than long, steeply raising, fine rugose, bearing few tiny tubercles, hairs absent. The eye quartetts are widely spaced, anterior median eyes largest, cheliceral "peg teeth" long. Labium (fig. 30) 1.7 times longer than wide, with an apical incision, gnathocoxae long and slender. Pedipalpus with small articles and a retrolaterally long trochanter. Legs long and slender, I longest, III shortest; bristleless, femoral humps present; position of the metatarsal trichobothrium I in 0.12, trichobothrium on metatarsus IV probably absent. Opisthosoma longer than wide, with distinct furrows and indistinct hairs; anterior spinnerets stout.

Relationships: See *E. hyperoptica*.

Distribution: Tertiary Baltic amber forest incl. the Bitterfeld deposit.

***Myrmecarchaea* n. gen.** (German name: Ameisen-Urspinnen)

Diagnosis (♀;♂ unknown): The only known myrmecomorphic genus of the family Archaeidae, body slender, petiolus extremely elongated, longer than the width of the prosoma, see the photos. (I do not want to exclude an Ichneumomorphy which could be a very special kind of BATESIAN mimicry. While resting on a plant the body shape could well have been a kind of camouflage).

Further characters: Legs very long and slender, cheliceral stridulating organ most probably as in *Archaea*, apical incision of the labium unknown.

Type species: *Myrmecarchaea petiolus* n. sp. Further species: *M. pediculus* n. sp. A third specimen (probably a subadult male and probably a third species; not seen) is kept in a private collection, and the description is in preparation.

Relationships: Members of the other genera of the Archaeidae are not myrmecomorphic and the petiolus is short. *Archaea* may be most related. The structures of the pedipalpus of the unknown male will give more informations about the relationships.

Distribution: Tertiary Baltic amber forest.

Myrmecarchaea sp. indet.: 1♂ F1132/BB/AR/ARC/CJW (embedded in artificial resin by H. W. HOFFEINS), body length 3.6mm, caput raised, pedipalpal tarsus distinctly raised, opisthosoma narrow in the middle and with distinct furrows (photo 75).

***Myrmecarchaea petiolus* n. gen. n. sp.** Photos 76-77

Material: Holotypus juv. ♂ in Baltic amber, GPIH, coll. GRÖHN.

Preservation and syninclusions: The spider is excellently and nearly completely preserved, only a small part of the dorsal surface of the left patella IV is cut off. There is no white emulsion, the ventral side of the spider is partly hidden by a layer of the fossil resin. According to some dark brown parts in the fossil resin the amber piece was heated. - A lump of stellate hairs is preserved beneath the spider.

Diagnosis (juv. ♂): Caput only gradually raising (similar to *Eoarchaea hyperoptica* but more slender), opisthosoma narrow in the middle, see the photo).

Description (juv. ♂):
Measurements (in mm): Body length without chelicerae 2.1, prosoma: Length 0.7, width 0.45, chelicerae nearly 0.7, petiolus nearly 0.55, leg I: Femur 2.25, patella 0.35, tibia 1.8, tibia II 1.4, tibia III 0.95, tibia IV about 1.0, opisthosoma: Length 1.0, width nearly 0.4. - Colour medium brown; the prosoma is covered by a silvery "film".
Prosoma (photo) nearly 1.6 times longer than wide, nearly smooth, caput gradually raised, with three rows of tiny tubercles, in the middle about 16 tiny tubercles, fovea absent. Chelicerae long, slender and diverging, bearing long "peg teeth", without an anterior bristle-bearing hump, the stridulating files are hidden, sternum, labium and gnathocoxae long and partly hidden, petiolus similar to *M. pediculus* but distinctly flattened. Eyes most probably similar to *Archaea*, covered by small bubbles and emulsions. Pedipalpus small, the tarsus is slightly thickened. - Legs (photo) very long and slender, order I/II/IV/III, I distinctly the longest, bristleless, hairs indistinct, dorsal femoral humps present. Metatarsal trichobothrium near the end of the article. - Opisthosoma (photo) 2.6 times longer than wide, narrow in the middle, without a dorsal scutum or a ring around the spinnerets, hairs indistinct, lateral furrows and cross furrows in the distal third are present, the pedipalpal tarsus is distinctly thickened.

Relationships: In *M. pediculus* n. sp. the caput is elevated with a "neck" and is fine rugose, the petiolus is not distinctly flattened and the opisthosoma is not narrow in the middle.

Distribution: Tertiary Baltic amber forest.

***Myrmecarchaea pediculus* n. gen. n. sp.** (fig. 31) Photo 78

Material: Holotypus, a probably adult ♀ in Baltic amber, GPIH no. 3907, coll. GRÖHN.

Preservation and syninclusions: The spider is fairly well and nearly completely preserved, the dorsal surface of the opisthosoma is cut off on a layer within the amber, and a large gas bubble fills most parts of the opisthosoma, a further large bubble is situated above the right femora, parts of the body are hidden by a layer in the amber. Most probably the amber piece was heated, a weak white emulsion is present ventrally on the prosoma, a white bubble ventrally-distally on the opisthosoma. A thread is running from the spinnerets in the right direction. - Detritus and excrement particles, numerous stellate hairs, an Acari, two tiny insects and - in a different layer - a female spider (?*Acrometa* sp.) are preserved in the same amber piece.

Diagnosis (?ad. ♀): Caput with a "neck" (fig. 31), opisthosoma ovally (photo).

Description (?ad. ♀):
Measurements (in mm): Body length without chelicerae 3.3, prosoma: Length 0.95, width 0.55, basal article of the chelicerae 0.8, fang 0.4, petiolus nearly 0.65, leg I: Femur 2.9, patella 0.45, tibia 2.4, metatarsus 0.83, tarsus 0.4, tibia II 1.8, tibia III 1.2, tibia IV 1.25.
Colour light to medium brown.
Prosoma 1.73 times longer than wide, fine rugose, with tiny tubercles, caput distinctly raised (fig. 31), eyes partly hidden, similar to *Archaea*. Chelicerae long, slender and diverging, with long "peg teeth" similar to *Archaea*, stridulating files hidden, fangs long, slender and distinctly curved; sternum, labium and gnathocoxae long and slender. Petiolus (photo) extremely long, consisting of three tubes, not so strongly flattened as in *M. petiolus*, widened at the posterior end. - Articles of the pedipalpus partly hidden, very small. - Legs very long and slender, as in *M. petiolus*. Position of the metatarsal trichobothrium I in 0.95, IV in 0.67. - Opisthosoma long ovally, with furrows and indistinct short hairs, anteriorly with a sclerotized ring; spinnerets hidden, genital area smooth.

Relationships: See *M. petiolus* n. sp.

Distribution: Tertiary Baltic amber forest.

Saxonarchaea n. gen. (figs. 32-43)

Diagnosis: Caput (figs. 32-33, 37) high, with thorns and with a pair of anterior "horns", posteriorly not overhanging, lateral stridulatory files in the middle of the chelicerae, metatarsus III about 1.2 times longer than tarsus III, ♂-pe-dipalpus (figs. 39-41): Position of the stridulating tooth proapically on the trochanter; it is shorter than in other Archaeidae, cymbium small, several tegular apophyses present, embolus very long, slender and bent.

Relationships: See *Archaea*.

Type species: *Saxonarchaea dentata* n. gen. n. sp..

Distribution: Tertiary Baltic amber forest; at least 6 of 7 specimens come from the Bitterfeld deposit.

***Saxonarchaea dentata* n. gen. n. sp.** (figs. 32-41), photo 68

Material (in Baltic amber from Bitterfeld; F558 probably not from Bitterfeld): Holotypus, a probably adult ♀, F558/BB/AR/ARC/CJW, 1♂ paratypus and a separated amber piece coll. M. KUTSCHER in Sassnitz; 1♂ paratypus, Palaeontological Museum of the Humboldt-University Berlin no. MB. A. 602.; 1 juv. paratypus coll. SCHIPPLICK no. 4.

Preservation and syninclusions: Holotype: The spider is nearly completely preserved, the left patella II and the right patella I are cut off. The opisthosoma is totally covered by a white emulsion, the left leg I is streched backward over the opisthosoma. - On the left leg I lies a thin hair-shaped ?arthropod structure, near the spiders are numerous stellate hairs preserved. - The paratype from the coll. KUTSCHER is well and completely preserved in a clear yellow amber piece. Ventrally and at the right side the opisthosoma is partly covered by an emulsion, both pedipalpi and the right leg I are bent backwards in an unnatural position, the chelicerae are widely spread out (fig. 33). – In the separated amber piece a small ball of an excremet in preserved. – The paratype from the Pal. Mus. of the HU is preserved in an orange amber piece which has partly been embedded in artificial resin. The spiders body is darkened, the spinnerets are hidden by an emulsion, cut off are the right legs I and II and the left leg II; both chelicerae and the right pdipalpus are partly cut off. – No further inclusions. – The paratype of the coll. SCHIPPLICK is fairly well and completely preserved, compressed between two layers of the fossil resin.

Diagnosis: Prosoma distinctly longer than wide and with distinct tubercles, profile concave (fig. 32).

Description:
Measurements (in mm): Body length ♂ 1.9, ♀ 2.7, juv. 1.3, prosoma: Length 0.75-0.85, juv. 0.5, width 0.5, hight 0.7; leg I (♂): Femur 1.65, patella 0.2, tibia 1.55, metatarsus 0.55, tarsus 0.34, tibia II 1.25, tibia III 0.73, tibia IV 0.79; ♀-tibia I: Length 1.8, width 0.07 at the base, length of the male chelicerae 0.8.
Colour medium to light brown.

Prosoma (figs. 32-33, 37; fig. 32 is a reconstruction) in the juvenile slightly but in the adults distinctly longer than wide, more flat in the juvenile but strongly raised in the adults, caput not overhanging posteriorly, dorsally frontally with a pair of "horns", behind these a pair of „thorns", and behind these 3 pairs of „thorns", its position nearly in a half circle; the longest "thorns" are apparently present in the juvenile. The prosoma is covered with „pustules" which bear tiny hairs and which build rows laterally (compare the photo). Most hairs seem te be rubbed off. 8 eyes in 2 widely spaced groups, the anterior median eyes a bit larger than the other eyes; anteriorly a pair of distinct „horns" which are large already in the juvenile. Chelicerae long and slender, retrolaterally with a field of stridulating files, frontally without hump, in the distal half with long „peg teeth". In the paratype from the HU a divided anterior outgrowth of the labrum is observable (fig. 37). Sternum narrow, coxae IV nearly touching. – Legs (figs. 32, 36) long and slender, tibia I 25 times longer than wide at the base in the female, sequence of the length I/II/IV/III, I distinctly the longest, metatarsus I in the male 1.5 times longer than tarsus I, metatarsus III 1.2 times longer than tarsus III, thickened, ventrally bearing preening hairs (fig. 36). Dorsal femoral humps distinct in the male, indistinct in the female. Tarsal trichobothria absent, all metatarsi bear one trichobothrium, its position on II in 0.88. – Opisthosoma distinctly longer than wide in the male, with a dorsal scutum which is probably absent in the female, and with pronounced furrows and „ribs" bearing thick short hairs which are directed backwards. Epigaster prominent and strongly sclerotized in both sexes. Spinnerets - only the anterior pair is distinctly visible – surrounded by a large sclerotized ring. In one of the paratypes probably the paired tracheal stigma is observable near the spinnerets (fig. 35). – Male pedipalpus (figs. 38-41) with slender articles and a small cymbium, position of the stridulating tooth on the trochanter; bulbus with several apophyses and a long, thin and strongly bent embolus.

Relationships: See *S. diabolica* n. sp.

Distribution: Tertiary Baltic amber forest; the Bitterfeld locality (only?).

***Saxonarchaea diabolica* n. gen. n. sp. (figs. 42-43) Photos 69-70**

Material: Three specimens in Baltic amber from the Bitterfeld deposit, holotypus, ?ad. ♀, F556/BB/AR/ARC/CJW; paratypes: juv. ♂ and ♀, coll. H. GRABENHORST nos. AR 76 and AR 79.

Preservation and syninclusions: Holotype: The spider is well and completely preserved, situated on a larger bubble which hide the ventral side of the spider. The opisthosoma looks bursting probably because of petrefaction processes. - In the same amber piece two small excrement ballets, a tiny larva of an insect (?) and an arm of a stellate hair are preserved. - The paratypes are well and nearly completely preserved; parts of the posterior legs of AR76 are cut off, several Acari and stellate hairs are present with AR79.

Diagnosis (?ad. ♀): Prosoma as long as wide, profile convex (fig. 42), prosomal "horns" and thorns long.

Description (?ad. ♀):
Measurements (in mm): Body length without chelicerae 1.15, prosoma: Length 0.48, width 0.48, leg I: Femur 0.85, patella 0.2, tibia 0.75, metatarsus about 0.35, tarsus about 0.27, tibia II 0.62, tibia III 0.3, tibia IV 0.38; body length of the paratypes: ♀ 0.8, juv. ♂ 1.1, prosomal thorns up to 0.03.
Colour: Prosoma medium brown, legs and opisthosoma yellow brown.
Prosoma (fig. 42-43) very fine rugose, as wide as long, hairless, profile convex, tubercles present (more distinct in the juvenile), anteriorly with a pair of "horns", clypeus as longs as a "horn", chelicerae slender, "peg teeth" distinct, fangs long and slender. Pedipalpus with small articles; in the juvenile male the basal half of the tarsus is thickened. - Legs long and very slender, bristleless, with indistinct hairs, order I/II/IV/III; the femoral hump IV is well developed (arrow in fig. 42). - Opisthosoma (fig. 42) egg-shaped, with distinct folds and long hairs (not drawn).

Relationships: In *S. dentata* n. sp. the prosoma is distinctly longer than wide and has a "neck", the prosomal "horns" and thorns are smaller.

Distribution: Tertiary Baltic amber forest, the Bitterfeld deposit.

Eriauchenius O. PICKARD-CAMBRIDGE 1881 (figs. 44-47) Photos 79-83

Synonym: *Afrarchaea* FORSTER & PLATNICK 1984 (**n.syn.**). ESKOV (1992) synonymized *Afrarchaea* with *Archaea* KOCH & BERENDT 1854 and regarded also *Eriauchenius* as a synonym of *Archaea*. But *Archaea* and *Eriauchenius* are genera of its own (see above). According to the structures e.g. of the male pedipalpus *Afrarchaea* is a synonym of *Eriauchenius*. African species: See LOTZ (1996).

Diagnosis: Cheliceral hook pointed or only a simple hair in this position, position of the stridulating files in the distal half of the chelicerae or in the middle retroventrally (most probably overlooked in *E. legendrei* (PLATNICK 1991) (sub *Archaea*, **n. comb**.), stridulating tooth dorsally on an article of the ♂-pedipalpus (e.g. fig. 45) (this position in all species?), caput high, overhanging posteriorly (fig. 44), with or without thorns. Opisthosoma without a dorsal scutum or distinct furrows. ♂-pedipalpus (fig. 45): Cymbium long, embolus short, in a distal position, conductor large, leaf-shaped and bent.

Relationships: According to the high caput there are relationships to *Austrarchaea* FORSTER & PLATNICK 1984; but in *Austrarchaea* the cheliceral hump is blunt (a hair is not reported), the ♂-opisthosoma bears a dorsal scutum and humps, a stridulating tooth of a pedipalpus article is not reported but probably present, the cymbium is short, the embolus is long and thin. Compare *Archaea*.

Distribution: S-Africa, Madagascar.

Austrarchaea FORSTER & PLATNICK 1984

Diagnosis: Cheliceral hook distinct and blunt, position of the stridulating files of the chelicerae distally-retroventrally (stridulating teeth probably on the femur of the pedipalpus), caput high, overhanging posteriorly, with or without thorns, opisthosoma with a dorsal scutum in the male and with dorsal humps, (without furrows); male pedipalpus with a short cymbium, a long embolus in a distal position, several tegular apophyses and a conductor of medium length.

Relationships: See *Eriauchenius*.

Distribution: Australia.

MECYSMAUCHENIINAE SIMON 1895 (figs. 10-12)

Diagnosis: Tarsal organ with a sensory spine accompanied by one or more short lobes, see FORSTER & PLATNICK (1984: Figs. 104-115), median and posterior spinnerets reduced, retrolateral denticle(s) on the tibia of the ♂-pedipalpus (fig. 12) present (mostly no anterior median eyes, figs. 10-11).

Tribus: Mecysmaucheniini (with two rows of cheliceral promargin teeth, fig. 11), and Zearchaeini FORSTER & PLATNICK 1984 (with few cheliceral peg teeth only) sub Mecysmaucheniinae and Zearchaeinae, see FORSTER & PLATNICK (1984).

Relationships: See the Archaeinae above.

Distribution: S-America, New Zealand.

Mesarchaea FORSTER & PLATNICK 1984

This genus is remarkable because there exist characters of Archaeinae and Mecysmaucheiinae: There are only 6 eyes, median and posterior spinnerets are reduced and there are „thorns" on the tibia of the male pedipalpus (typical patterns of the Mecysmaucheniinae). On the other hand there exist a ring around the spinnerets and a broad basis of the prosoma hairs as in Archaeinae. I agree with the opinion of FORSTER & PLATNICK (1984) in placing *Mesarchaea* in the Mecysmaucheniinae; the ring around the spinnerets and the special prosoma hairs should have evolved convergently to the Archaeinae.

Distribution: Chile.

Fossil Archaeidae in copal and fakes in "Dominican amber"

Fakes of subfossil Archaeidae (figs. 46-47) Photo 83

In the year 1996 I bought a collection from the firm MÖCK near Stuttgart declared "Dominican amber"; the inclusions are deformed. I was very surprised to find members of the family Archaeidae - see below - within this material which has never been reported from the Neotropic Region! Therefore I asked (1) M. A. GEY from the Niedersächsisches Landesamt für Bodenforschung in Hannover for a determination with the help of the C14 method (three samples including one with an Archaeidae), (2) G. HECK from the Rathgen-Forschungslabor in Berlin for an investigation with the help of the pyrolysis gas-chromatography and (3) H. ONO in Tokyo for the determination of typical genera of the spider family Thomisidae. Furthermore (4) I compared juvenile and adult subfossil and extant spiders of *Eriauchenius gracilicollis* (MILLOT), see below. - The results: (1) The origin of the copal was the year 1963; that means that the resin is subfossil copal and not amber. (2) According to G. HECK the resin is much more likely to be Dominican amber than copal (pers. commun. in II 1999). (3) The genera of the Thomisidae are South Ethiopian but not Neotropical. (4) The subfossil and extant spiders from Madagascar are conspecific. - Remarks: (1) The reasons for the misleading by the pyrolysis gas-chromatography may be (a) that the resin-producing plants of Dominican amber as well as copal from Madagascar are both members of the genus *Hymenaea* (Leguminosae) and (b) that the copal was heated most probably in an autoclave and therefore the results were similar to (Dominican) amber. (2) A high number of inclusions has been sold - by the firm MÖCK as "Dominican amber" and probably will cause more confusions in scientific publications, see WUNDERLICH (1999). The selling is going on although I informed the firm MÖCK about the fakes (!). - Conclusion: The material in question was falsified (by unknown persons).

***Eriauchenius gracilicollis* (MILLOT 1948)** (sub *Archaea g.*) (figs. 44-47) Photos 81-83

1999 Archaeidae gen. & sp. indet.,–WUNDERLICH, Ent. Mus. Cienc. Nat. Alava, 14 (2): 167-172, fig. 1-2, 10.

2000 *Archaea copalensis* LOURENCO, Earth and Planetary Sciences, 330: 509-512, figs. 1-2 (**n. syn**.).

Material in copal from Madagascar: 1♂ F600/CM/AR/ARC/CJW, 1♀ F601/CM/AR/ARC/CJW, 1 juv. F71/CM/AR/ARC/CJW (heated), 1 juv. F599/CM/AR/ARC/CJW (heated), 5 further juveniles in heated copal from Madagascar, CJW.

The holotype of *Archaea copalensis* LOURENCO 2000 is (1) not a member of the genus *Archaea* KOCH & BERENDT 1854 but of *Eriauchenius* (differences of the genera: See above), (2) a synonym of *Eriauchenius gracilicollis* (MILLOT 1948) (**n. syn**.) and (3) - according to the small size as well as the size and the position of the cheliceral bristle - not an adult but a juvenile spider.
LOURENCO based the differences of *copalensis* and *gracilicollis* mainly on the more basal position of the anterior cheliceral bristle of the juvenile holotype of *copalensis* in contrast to *gracilicollis* which has a long "neck", too (fig. 44). Already MILLOT (1948: 5) pointed out that the position of the cheliceral bristle is more basally in the juveniles than in the adults. Furthermore the bristle is longer in juveniles than in adults (pers. obs. in subfossil spiders of *gracilicollis*, see figs. 44 and 46). Therefore the new synonymy is well founded in my opinion.

Distribution: Madagascar, extant and subfossil in copal.

Addendum

The fossil taxon Jurarchaeinae ESKOV 1987 from the Jurassic of Kazakhstan - which is not preserved in amber - is regarded as a questionable synonym of the Archaeinae KOCH & BERENDT 1854 (**n. quest. syn**.). In my opinion the poor preservation of the single specimen, the female holotype, does not allow sure conclusions on the relationships of the Jurarchaeinae. First of all: The structures of the vulva are unknown, and thus its haplogyne or entelegyne status is unknown, too. (A sclerotized epigynal plate occurs in several haplogyne spider taxa). The presence or absence of a sclerotized basal ring of the tarsi and lateral protuberances of the labrum are not clearly recognizable from the fossil, and its sternum may be deformed so that the close distance of the coxae IV of the fossil may be an artifact. - According to PENNEY - J. Arachnol., 31: 126 (2002) - "*Jurarchaea* belongs either in the family Pararchaeidae or Holarchaeidae.".

Afrarchaea grimaldii PENNEY 2003 - J. Arachnol., 31: 122ff (2003) - was described from Burmese amber, which - according to PENNEY - is Upper Cretaceous (88-95 ma), see the figs. 57-58. In this taxon a cheliceral bristle is present, thus the presence of this bristle may be an apomorphy of the Archaeidae (present also in the Mecysmaucheniinae, fig. 11), and lost in the Archaeinae taxa of the Baltic amber. - According to the quite different pedipalpal structures (fig. 58; compare fig. 45) *grimaldii* is not a member of *Eriauchenius* (= *Afrarchaea*) but of an unnamed genus.

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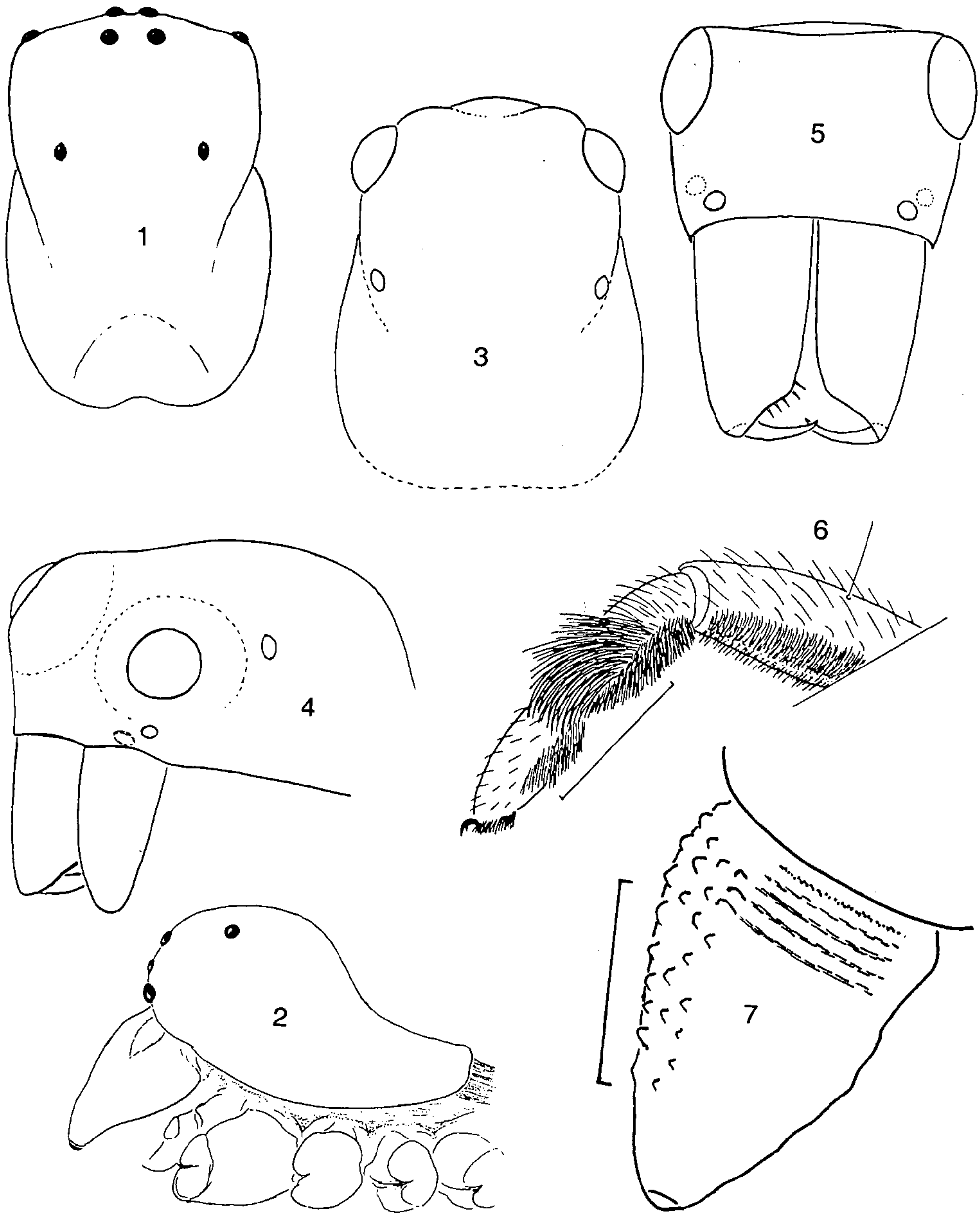
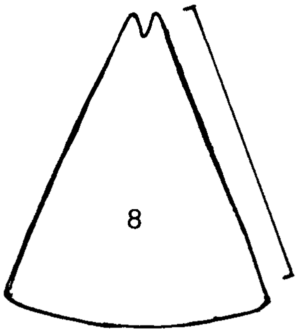
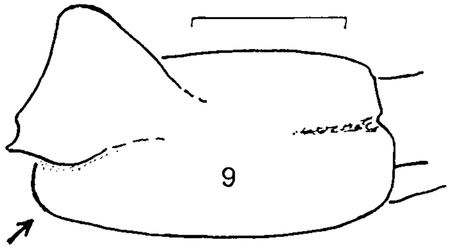
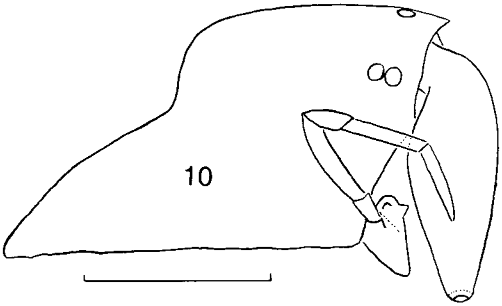


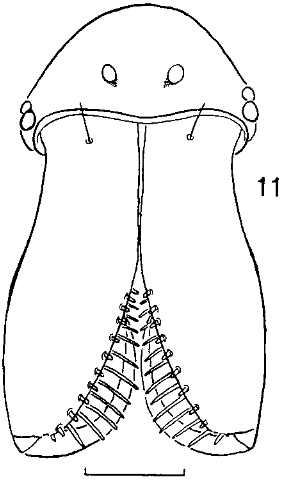
Figs.1-2: Extant **ERESIDAE**: *Stegodyphus* sp., prosoma, dorsal and laterat view; taken from KRAUS & KRAUS (1989, 1990);

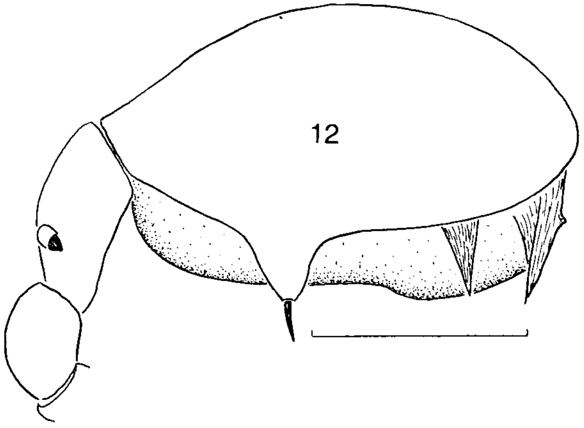
figs. 3-5: Fossil **LAGONOMEGOPIDAE**: *Lagonomegops sukatchevae* ESKOV & WUNDERLICH 1995, juv.; prosoma dorsally, laterally and frontally;





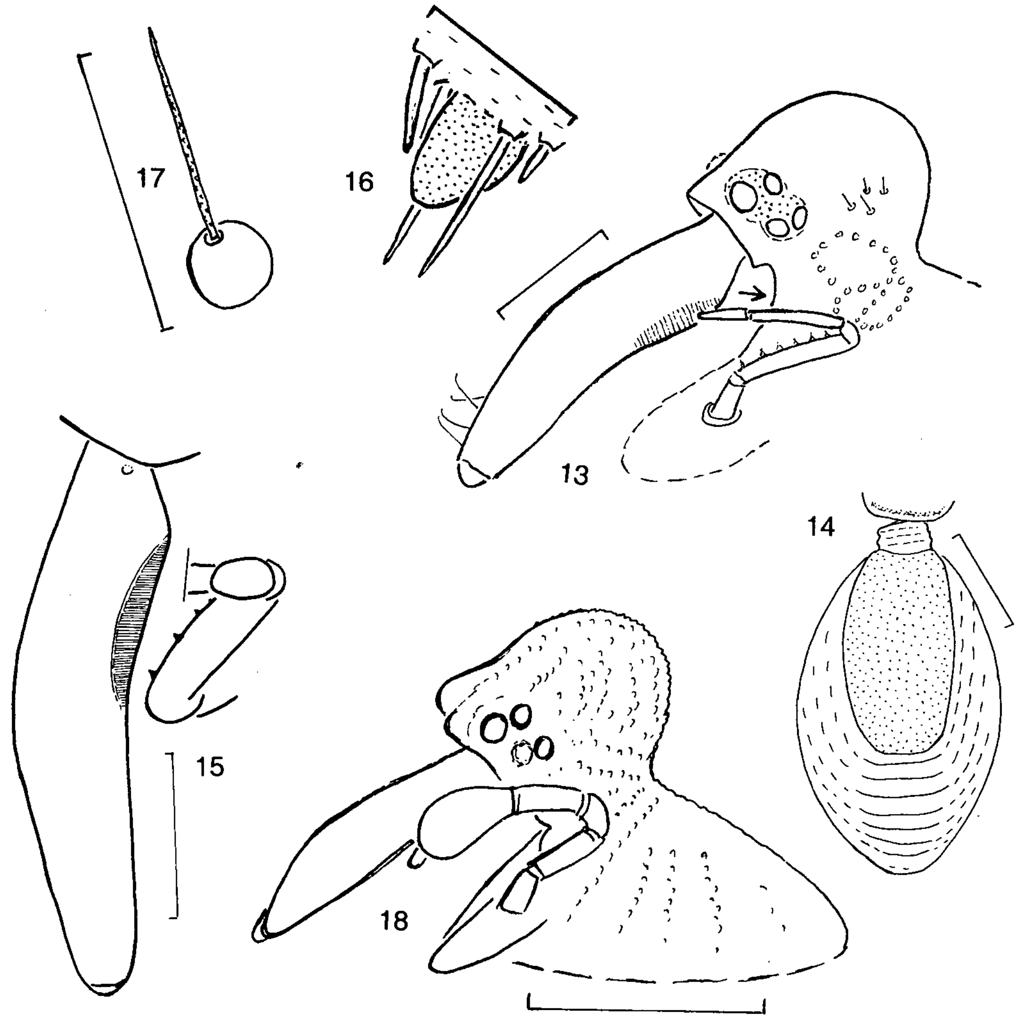




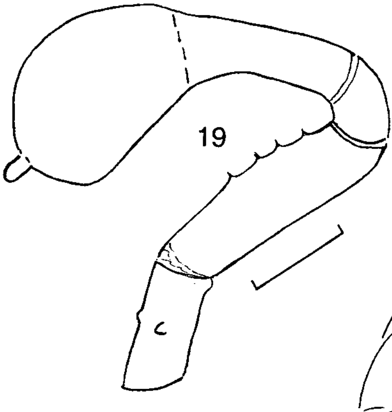


figs. 6-9: **PALPIMANIDAE: PALPIMANINAE**; 6) ?*Otiothops* sp., juv. ♀ in Dominican amber, distal articles of the r. leg. I prolaterally; 7-9) *Palpimanus gibbulus* DUFOUR 1820, extant, ♂, 7) r. chelicera with basal stridulating files retrobasally; 8) labium ventrally; 9) l. trochanter I prolaterally with the ventral-basal outgrowth (arrow) (for a study one has to separate the leg); M = 0.5mm;

figs. 10-12: Extant **ARCHAEIDAE: MECYSMAUCHENIINAE**: *Mecysmauchenius segmentatus* SIMON 1884; 10-11) ♂♀ prosoma laterally and frontally, M = 1mm; 12) ♂, r. pedipalpus retrolaterally, M = 0.2mm;



figs. 13-47: Extant and fossil **ARCHAEIDAE: ARCHAEINAE**:
figs. 13-23: *Archaea paradoxa* KOCH & BERENDT 1854; fossil in Baltic amber; 13) ♀ F561/CJW, anterior part of the prosoma, lateral aspect. Note the foramen (arrow) and the curved distal cheliceral sensory hairs; 14) ♂ F565/CJW, opisthosoma with scutum and folds, dorsal aspect; 15) ♂ (CJW), l. chelicera retrolaterally with stridulating field and l. pedipalpal femur with stridulating teeth; 16) ♂ (F565/CJW), cheliceral gland lobe (spotted) between "peg teeth" in the distal half of the l. chelicera, frontal-basal aspect; 17) ♂ (CJW), specific hair with large base of the anterior part of the prosoma; 18) subad. ♂ (GPIH, coll. HERRLING), prosoma laterally; 19) the same specimen as before, l. pedipalpus retrolaterally, femur slightly ventrally. Note the four short proventral stridulating bristles of the femur; 20-23) ♂, (20-22: F564/CJW, 23: CJW), 20) l. pedipalpus with expanded bulbus sclerites, dorsal-basal aspect; 21) r. pedipalpus retrolaterally; 22) l. pedipalpus with expanded bulbus sclerites retrolaterally; 23) l. pedipalpus dorsally, hairs not drawn; E = embolus, EA = embolic apophysis, O = outgrowth of the tegulum; M = 1.0 mm in fig. 18, 0.5 in figs. 13-15, 0.1 in figs. 16-17, 0.2 in the remaining figs.;



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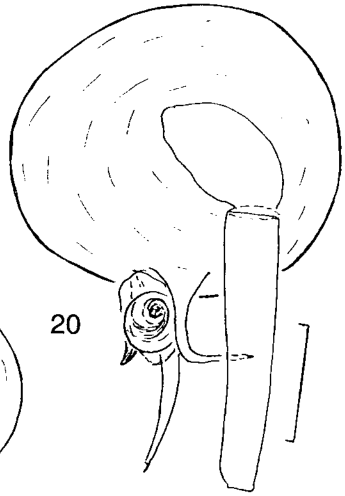

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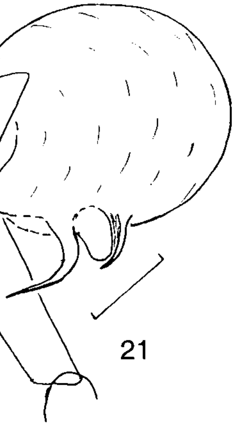

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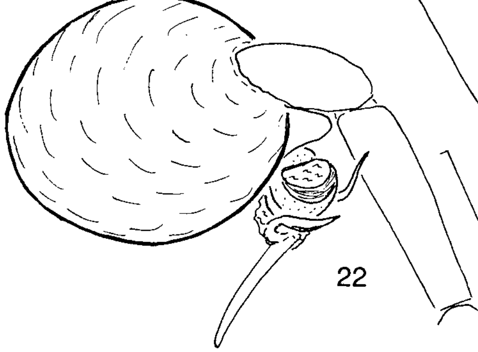

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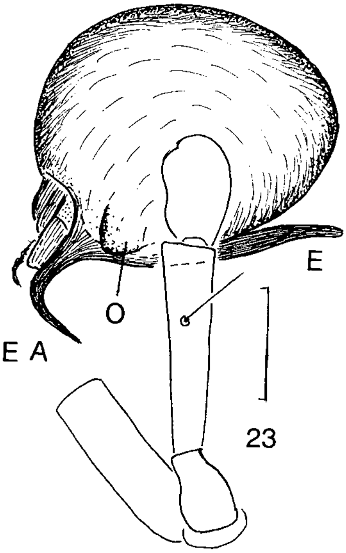

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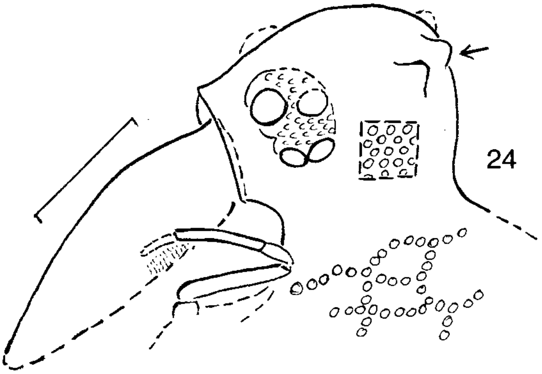

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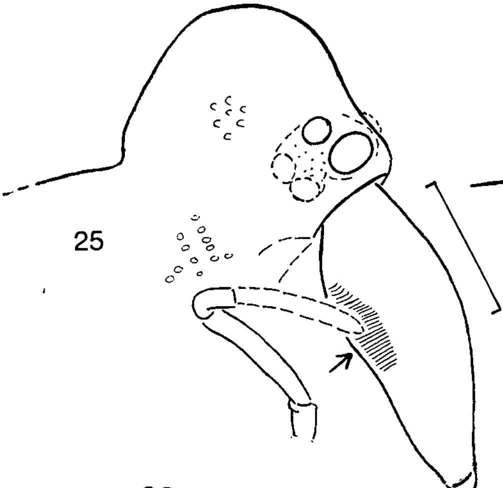
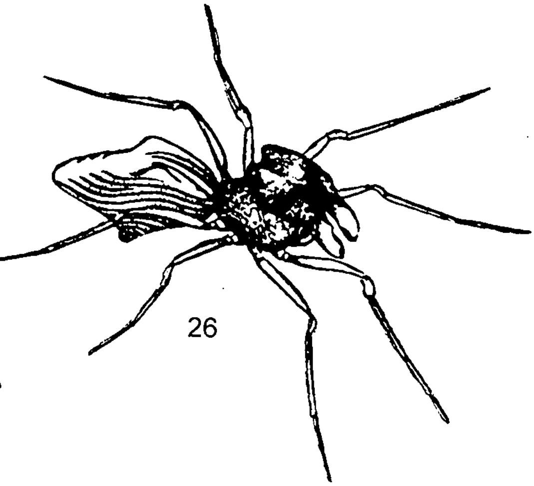
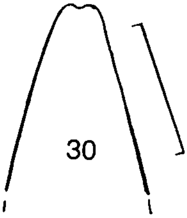
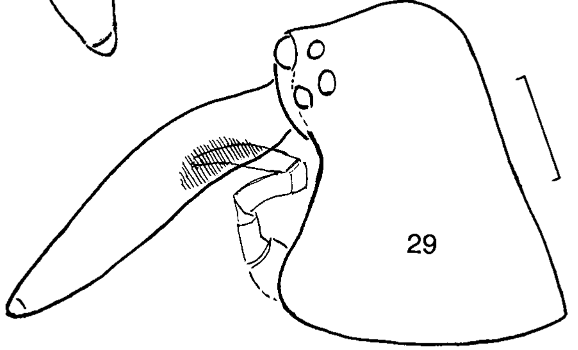
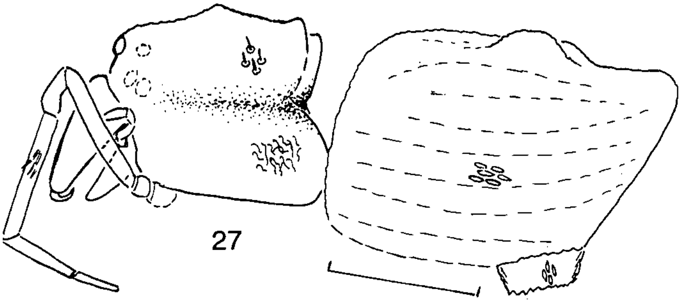
fig. 24) ?<u>*Archaea bitterfeldensis*</u> **n. sp.**, ♀, anterior part of the prosoma, lateral aspect. Note the posterior humps (arrow); M = 0.5;











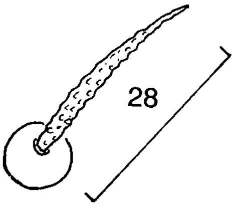
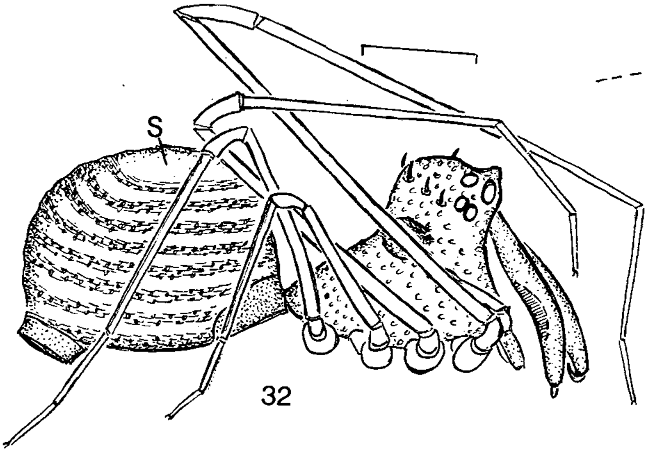


fig. 25) Archaea compacta **n. sp.**, ♀, anterior part of the prosoma, lateral aspect. Note the field of fine cheliceral stridulating files (arrow).Only few tubercles are drawn;M = 0.5;

figs. 26-28: Baltarchaea conica (KOCH & BERENDT 1854), ♀; 26) body and legs in retrodorsal aspect, taken from KOCH & BERENDT (1985: T. 2, fig. 10); 27-28) female of the Mus. Ziemi; 27) body and I. leg I laterally; only few hairs are drawn; 28) special setose pustule of the caput; M = 1.0 and 0.1;

figs. 29-30: Eoarchaea vidua **n. sp.**, ♀, holotype; 29) prosoma laterally; 30) labium (basally hidden), ventral aspect. Note the apical incision; M = 0.2 and 0.1;



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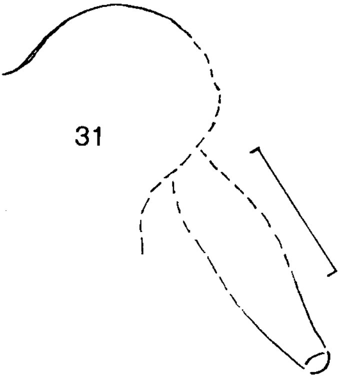

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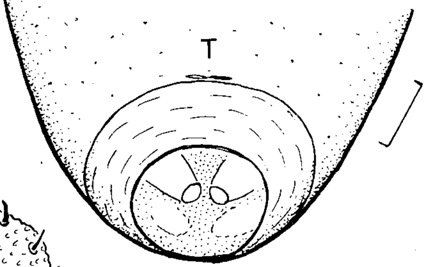

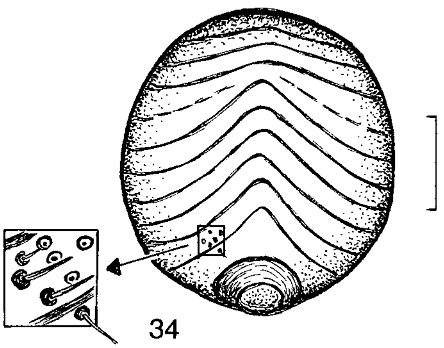

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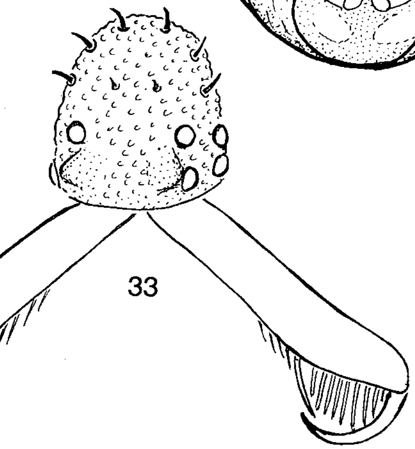

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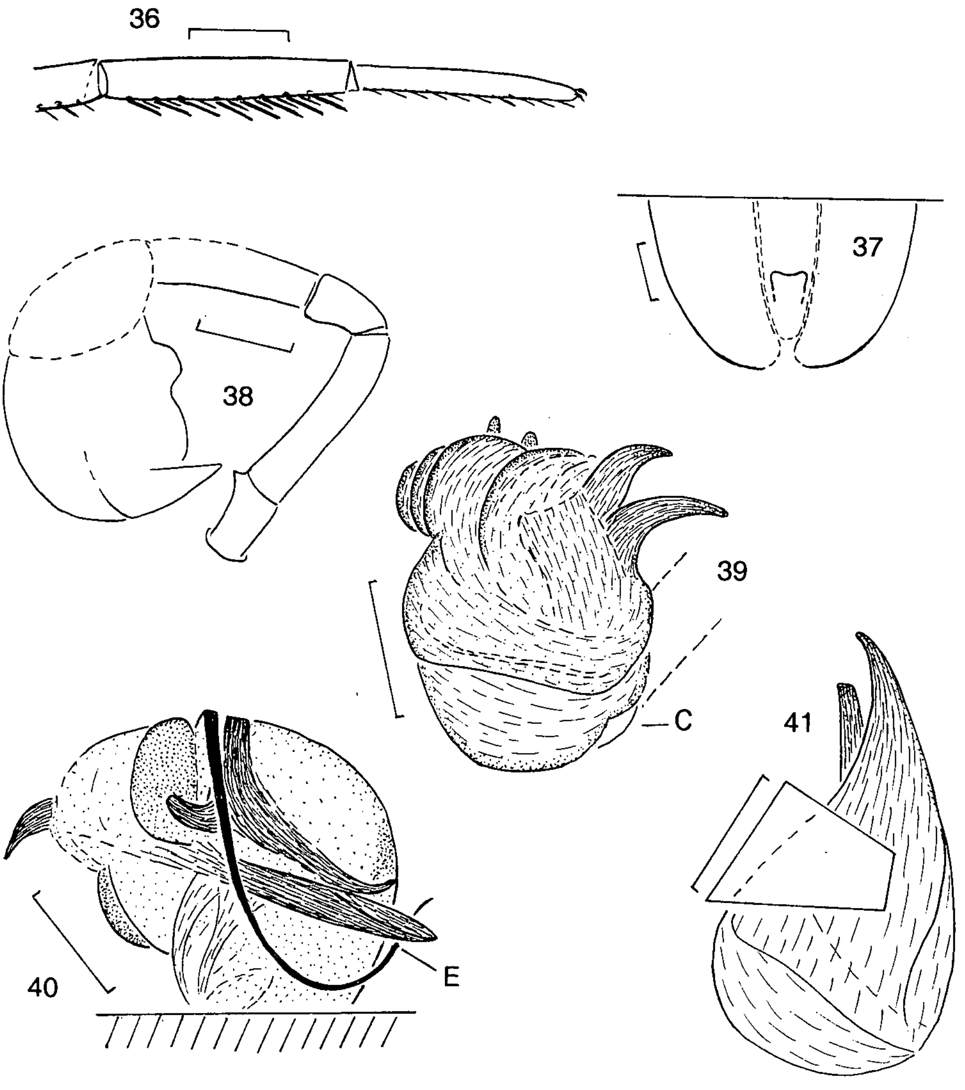
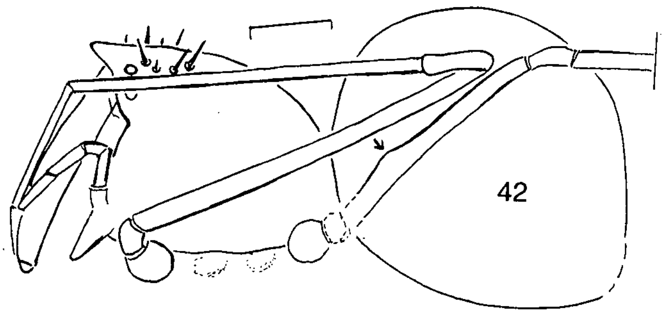
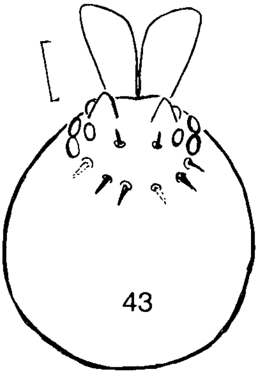
fig. 31) Myrmecarchaea pediculus **n. gen. n. sp.**,?ad. ♀, outline of the anterior part of the prosoma with the r. chelicera, lateral aspect (the eyes are hidden); M = 0.5;

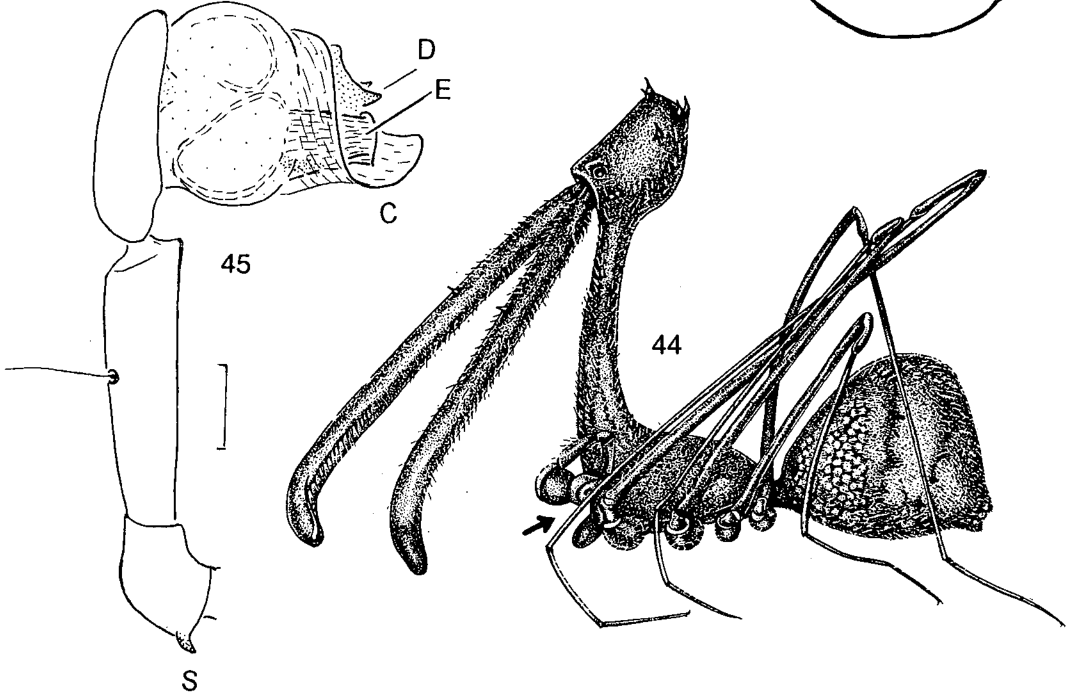
figs. 32-41: Saxonarchaea dentata **n. gen. n. sp.**; 32) reconstruction of a fossil male (S = dorsal opisthosomal scutum); figs. 33, 36, 39-41: Holotype, remaining figs.: Palaeont. Inst. HU; 33) ♂, prosoma, anterior aspect and slightly from the left side; the chelicera are spread in an unnatural position; 34) ♂-opisthosoma aborally, with folds, some hairs on tiny plates (a part is enlarged) and ring around the spinnerets; 35) the same specimen, enlarged distal part of the opisthosoma, ventral aspect, with the paired tracheal stigma (T) and the ring around the spinnerets;



Saxonarchaea dentata **n. gen. n. sp**.; 36) ♂, r. tarsus and thickened metatarsus III with bristle-shaped metatarsal preening hairs (only ventral hairs are drawn); 37) ♂, gnathocoxae and frontal-medial outgrowth of the labrum; 38) ♂, l. pedipalpus retrolaterally, outline of the bulbus (cymbium and sclerites of the bulbus are partly hidden), with the trochanteral stridulatory tooth; 39-40) ♂, r. pedipalpus, dorsal-distal and ventral-distal aspect (E = embolus); 41) l. pedipalpus, distal-dorsal aspect (partly hidden); M = 0.5 in fig. 32, 0.2 in figs. 33-34, 0.1 in the remaining figs.;

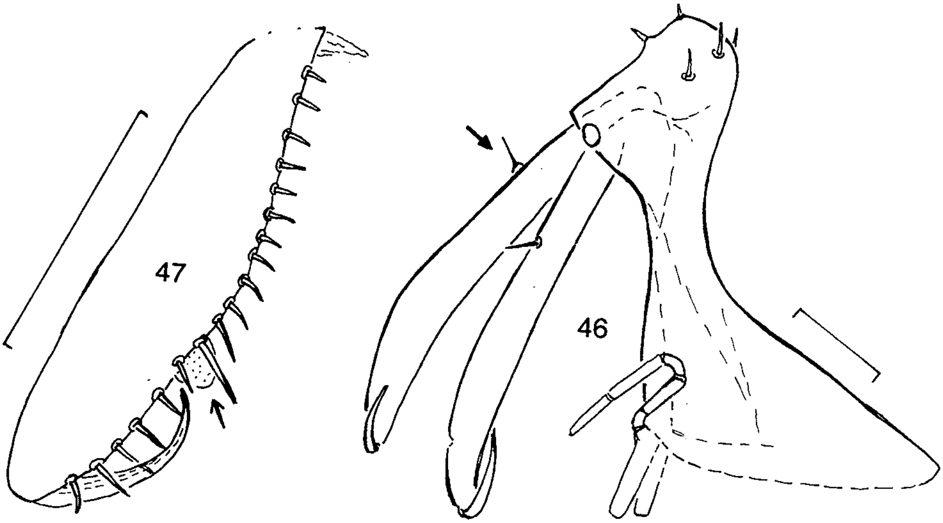






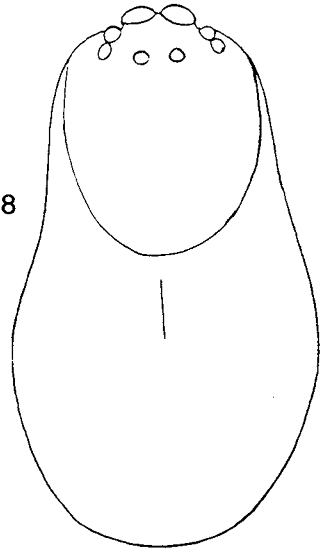
figs. 42-43: Saxonarchaea diabolica **n. gen. n. sp.**, holotype, ?ad. ♀; 42) body with the left legs I and IV, lateral aspect; the arrow indicates to the dorsal hump of femur IV; 43) prosoma, dorsal aspect (two thorns are apparently broken off and lost); M = 0.2;

figs. 44-47: Eriauchenius gracilicollis (MILLOT 1948), Madagascar; 44-45) extant, 46-47) subfossil in heated copal; 44) ♂, lateral aspect. The arrow indicates to the opening of the mouth behind the pedipalpi. Taken from LEGENDRE (1965: Fig. 1); 45) ♂, r. pedipalpus retrolaterally (C = conductor, E = embolus, S = patellar stridulating tooth, T = tegular apophyses);



Eriauchenius gracilicollis (MILLOT 1948); 46) juv. ♀, F599/CJW, deformed prosoma, lateral aspect; "peg teeth" and most eyes are not drawn; the arrow indicates to the r. cheliceral bristle; 47) juv. ♀, CJW, deformed distal part of the r. chelicera, anterior aspect, with "peg teeth"; the arrow indicates to questional secretion of the cheliceral gland; M = 0.2 and 0.1;

figs. 48-56: **FOSSIL SPATIATORIDAE**: *Spatiator praeceps* PETRUNKEVITCH 1942 (fig. 48), *Spatiator* sp. indet. (fig. 56) and *S. ?praeceps* (the remaining figs.) in Baltic amber; 48) ♀, prosoma, dorsal aspect, taken from PETRUNKEVITCH (1942: Fig. 169); 49) ?ad. ♀, F550/CJW, outline of the prosoma, lateral aspect; 50) juv., F462/CJW, distal part of the r. chelicera frontally. Note the stout fang and 5 long "peg teeth" (special thikkened blunt hairs); 51) ♂, Geol. Palaeont. Inst. Goettingen, labium (L) and gnathocoxae ventrally; 52) ♂, Mus. Ziemi no. 212/41, outline of the r. leg I distally and slightly ventrally. Note the position of the tarsus which is directed outwars in this specimen; 53) ♀, F461/CJW, part of the l. tarsus I retrolaterally. Note the long prodorsal spatulate and normal hairs (only few hairs are drawn); 54) juv., F462/CJW, some prolateral spatulate hairs of the r. tarsus I; 55) ♂, Mus. Ziemi no. 212/41, distal part of an erect hair of the l. metatarsus II with a droplet near the tip; 56) ♂, Geol. Palaeont. Inst. Goettingen, B16.126, r. pedipalpus ventrally (C = conductor, E = embolus); M = 0.5 in figs. 49 and 52, 0.05 in fig. 55, 0.03 in fig. 54, 0.1 in fig. 53 and 0.2 in the remaining figs.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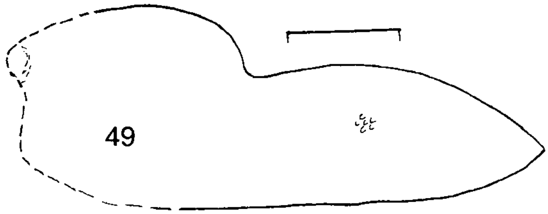
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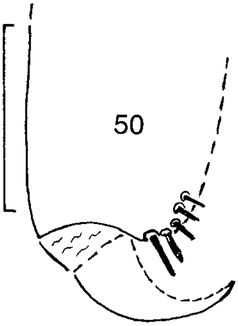
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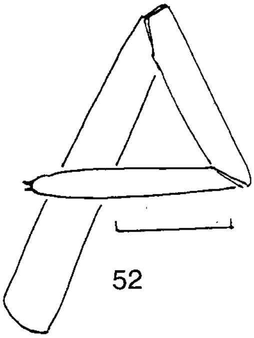
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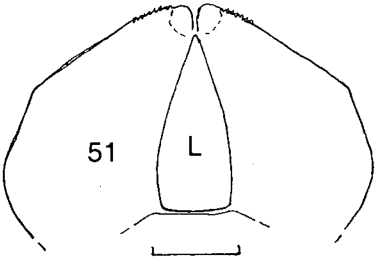
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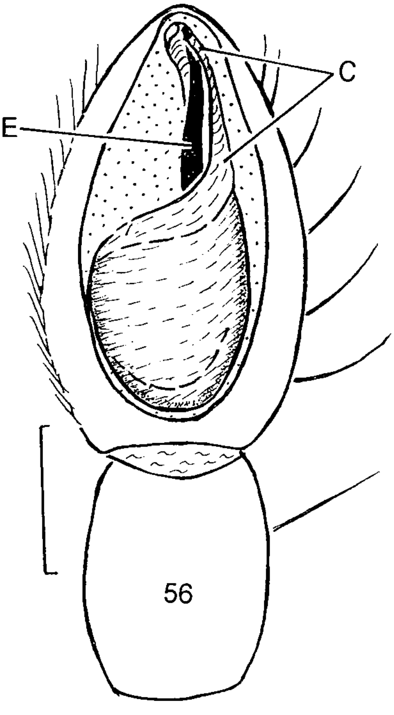

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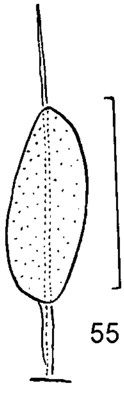
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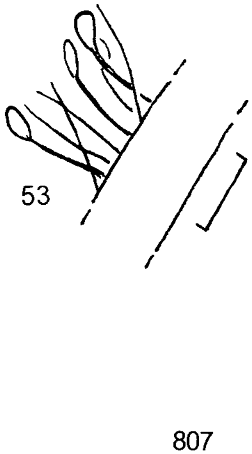
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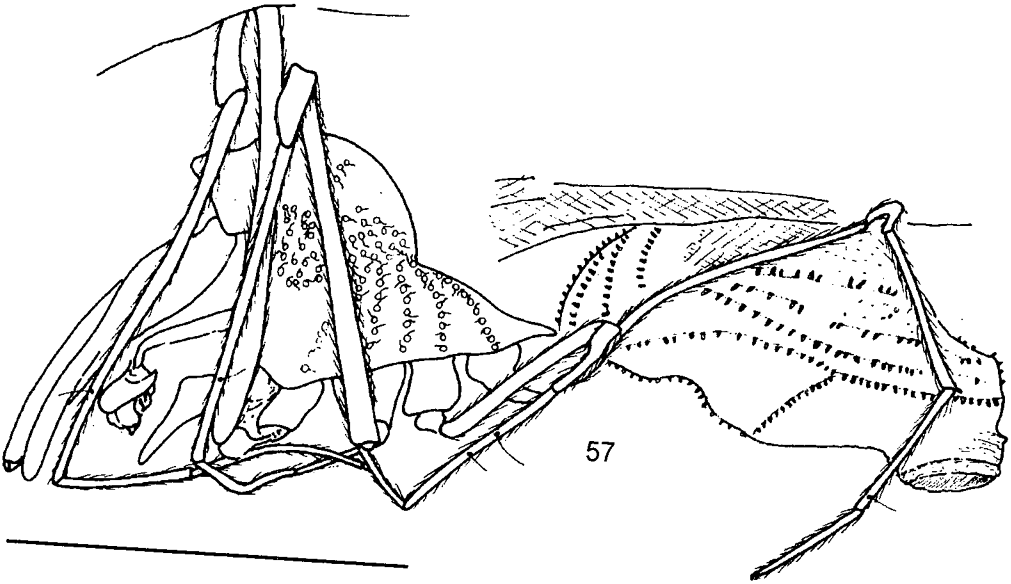
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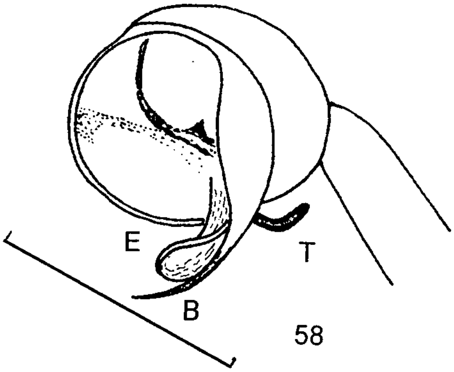

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figs. 57-58: "*Afrarchaea*" *grimaldii* PENNEY 2003, holotype male from Burmese amber; 57) body, lateral aspect (M = 1.0); 58) retroventral aspect of the l. pedipalpus (M = 0.1.), B = bulbus apophysis (?= conductor), E = embolus, T = tegular apophysis. Taken from PENNEY (2003: Figs. 1,3).

BEITR. ARANEOL., 3 (2004)

ON SELECTED HIGHER AND LOWER TAXA OF FOSSIL AND EXTANT SPIDERS OF THE SUPERFAMILY OECOBIOIDEA, WITH A PROVISIONAL CLADOGRAM (ARANEAE: HERSILIIDAE AND OECOBIIDAE)

JÖRG WUNDERLICH, D-75334 Straubenhardt.

ABSTRACT: The fossil and extant higher and selected lower taxa of the spider superfamily Oecobioidea BLACKWALL 1862 (Araneae: Hersiliidae and Oecobiidae) are revised, their relationships are discussed, keys and a provisional cladogram are given to/of the fossil and extant higher taxa. According to their male genital structures the most primitive taxa are reported from Cretaceous Lebanese and Tertiary Baltic ambers as well from the extant genus *Uroecobius* (Uroecobiinae); derived taxa are known from Dominican and Mexican amber and extant. **Oecobiidae**: The extinct taxa Lebanoecobiinae **n. subfam.**, *Lebanoecobius* **n.gen**. and *L. schleei* **n.sp**. are described from Cretaceous Lebanese amber together with a part of the spiders web. The extant subfamily Urocteinae THORELL 1869 is down-graded to tribus rank (**n. stat**.) of the Oecobiinae, the extinct family Mizaliidae THORELL 1870 from Tertiary Baltic amber is down-graded to subfamily rank (**n. stat**.) of the Oecobiidae. *Paruroctea* PETRUNKEVITCH 1942 is regarded as junior synonym of *Mizalia* MENGE 1854. The status of the nominal species of the genus *Mizalia* is discussed. *Mizalia gemini* **n.sp.** and *M. spirembolus* **n.sp**. are described from Baltic amber. The extant Urocteanini (Oecobiidae: ?Uroecobiinae KULLMANN & ZIMMERMANNN 1976) **n.trib**. is described. - **Hersiliidae**: *Neotama* BAEHR & BAEHR 1993 (**n. syn**.), *Perturbator* PETRUNKEVITCH 1971, *Priscotama* PETRUNKEVITCH 1971, *Prototama* PETRUNKEVITCH 1971 and *Tama* sensu WUNDERLICH

(1986, 1987, 1988) (neotropical) are regarded as junior synonyms of *Fictotama* PETRUNKEVITCH 1963, *Hersilia* AUDOUIN 1826 has probably to split up, the taxa *Gerdiopsis* **n.gen**. with its fossil type species *G. infrigens* **n.sp**., *Gerdiorum* **n.gen**. with its type species *G. inflexum* **n.sp**. in Baltic amber as well as the genera *Hersiliopsis* **n.gen** with its type species *H. madagascariensis* **n.sp**. and *Hersiliana* **n. gen**. with its type species *H. brevipes* **n. sp**. in copal from Madagascar (subfossil) are described. - Regenerated legs are reported from a fossil *Mizalia* species.

Material is kept in the following institutions/collections:

CJW = collection JOERG WUNDERLICH,
MNHNP = Museum national d'Histiore naturelle Paris, Laboratoire d'entomologie,
MZW = Museum Ziemi Warszawa,
PIHUB = Palaeontological Institute of the Humboldt-University Berlin,
GPIH = Geolog.-Palaeontol. Institute of the University Hamburg,
SMNHS = State Museum Natural History Stuttgart.

INTRODUCTION

The Cretaceous Lebanoecobiinae n. subfam. is the oldest known member of the superfamily Oecobioidea. The old and primitive fossil of this subfamily give hints to the phylogeny of the family Oecobiidae, compare below.
In both families of the superfamily Oecobioidea – the ecribellate Hersiliidae and in the cribellate or ecribellate Oecobiidae – the body is flattened, the legs are directed more or less sideward, there are ventral tarsal and metatarsal bristles (fig.10), the eye region is narrow (figs. 1,16), WUNDERLICH (1986: Figs. 299-300; 1988: Figs. 721-722), SAUER & WUNDERLICH (1997: Figs. p. 43 and 47), the prey is fixed with threads by rapid circling behaviour and – with the exception of the fossil genus *Gerdia* MENGE (fig. 2) - the prosoma is about wide as long (figs. 1, 16). With the exception of the fossil genus *Mizalia* KOCH & BERENDT (fig.12) the cymbium bears apical bristles (figs. 7, 19). In the Hersiliidae the posterior spinnerets are unusually long (fig.1), the legs (except III) are usually long, in several members the metatarsus I, II and IV is biarticulate (arrows in fig.1) in others flexible/ pseudoarticulate (fig. 4, photo), and feathery hairs of body and

legs are present (fig.3). In the shorter-legged Oecobiidae the prosoma is prolongated to a „nose" (fig. 15a), leg III is about long as leg II, the anal tubercle is very large and has a unique hairy shape (fig. 18), and feathery hairs are absent.

An irregular capture web and a retraite are build in several genera of the Hersiliidae, a tent-shaped web as a retraite is known from the extant members of the Oecobiidae, see SAUER & WUNDERLICH (1997: Fig. p. 257) and the paper on the superfamily Araneoidea s. l. in this volume; compare the fossil *Lebanoecobius* (fig. 31). Several Hersiliidae wait for prey on rocks, walls or bark in a head-down position, compare WUNDERLICH (1986: Figs. 299-300; here not the life-position is given!) and SAUER & WUNDERLICH (1997: Fig. p. 47). Extant members of the genera *Oecobius* and *Uroctea* prefer ants as prey. Did the members of the fossil genus *Mizalia* already feed on ants? Probably such a feeding spider will be discovered in Baltic amber in the future...

Lebanoecobius lived in the Early Cretaceous Lebanese amber forest; from this period only very few ants are known and the prey probably has been ant-shaped wing-less wasps or Diptera which are preserved in the amber piece near the holotype of *L. schleei* n. sp. together with remains of the supposed spiders web.

The frequency of members of the genus *Mizalia* in Baltic amber give a hint that these spiders occured on the bark of trees. Probably also the rare fossil members of the family Hersiliidae lived on bark; these large and most often long-legged spiders were kept only rarely in fossil resin.

The distribution of both families is mainly pantropic but Oecobiidae are very common in the subtropic Canary Islands, too. Fossils of Hersiliidae and Oecobiidae are known from Baltic and Dominican amber from different genera; the genera in Dominican amber are extant, the genera in Baltic amber probably all are extinct and seem to be the most primitive known genera of these families besides the extinct Cretaceous genus *Lebanoecobius*. From copal of Madagascar two subfossil species are described in this paper.

EINLEITUNG (siehe auch oben)

Die Scheibennetz-Spinnen bauen familien-typische scheibenförmige bzw. zeltähnliche Netze als "Versteck" (retraite), keine Fangnetze - vgl. SAUER & WUNDERLICH (1997: Abb.S.257) und die Arbeit über die Überfamilie Araneoidea (Radnetzspinnen-Verwandte) in diesem Band -, von denen sternförmig auf Pfosten gelegte Signal-Fäden fortführen. Unter diesen Gespinsten lauern die Spinnen - vgl. SAUER & WUNDERLICH (1997: Abb. S. 43) z.B. an Felsen, Mauern und Baumrinde. Bei Berührung der Signal-Fäden durch potentielle Beutetiere wird die Spinne alarmiert, eilt zur Beute und fesselt diese mit Hilfe spezieller Fäden durch schnelles Umkreisen und Einwickeln. Kreiselspinnen (Hersiliidae) - vgl. SAUER & WUNDERLICH (1997: Abb. S.47), WUNDERLICH (1988: Abb. 721) und WUNDERLICH (1986: Abb. 299-300) – laufen ent-weder frei umher bzw. lauern "kopfunter" an Baumstämmen und Felsen auf Beute oder lauern nahe einem unregelmäßigen Fangetz in einem Versteck auf Beute. Fesselung und Umkreisen der Beute (Familienname!) erfolgt wie bei den Scheibennetz-Spinnen.

Vertreter der Scheibennetz-Spinnen sind z.B. nach dem „nasenförmig“ vorstehenden Vorderkörper (Abb.15a und 16) und dem speziellen, großen und haarigen Analhügel (Abb. 18) zu identifizieren, Vertreter der Kreiselspinnen nach den noch wesentlich längeren hinteren Spinnwarzen, die denjenigen der Röhren-Vogelspinnen (Dipluridae) ähneln, die aber weit vorstehende Oberkiefer und zwei Paar Lungen besitzen.

Manche rezente Scheibennetz-Spinnen leben an der Rinde von Bäumen, so z. B. Vertreter der Gattung *Platoecobius* in Nord-Amerika, die möglicherweise keine Gespinste anlegen. Web: See photo 573.

Ähnlich verhielten sich vielleicht die fossilen Bernstein-Scheibennetzspinnen der Gattung *Mizalia* vor rund 40 bis 50 Millionen Jahren im Baltischen Bernstein-Wald, wo "unvorsichtige" Vertreter in das Harz gelangten und hierin bis heute konserviert wurden. Häufig haben sie ein oder mehrere Bein(e) beim Versuch verloren, sich aus dem Harz zu brefreien (Foto). Ihr Aussehen und die Ruhehaltung der Beine ist bei den fossilen Spinnen ähnlich wie bei den heutigen. Vertreter der Alt-Scheibennetzspinnen (Lebanoecobiinae) legten möglicherweise bereits ebenfalls Netze an, vgl. unten und Abb. 31.

Während aus der Familie Oecobiidae vom Dominikanischen Bernstein Vertreter der „modernen“ Gattung *Oecobius* (Unterfamilie Oecobiinae, Eigentliche Scheibennetz-Spinnen) bekannt geworden sind - vgl. WUNDERLICH (1988) -, die auch heute noch in zahlreichen Arten weit verbreitet ist, sind im Baltischen Bernstein ausschließlich Vertreter der ausgestorbenen Gattung *Mizalia* (= *Paruroctea*) (siehe unten) gefunden worden. Bei diesen Spinnen handelt es sich um Vertreter der von mir in dieser Arbeit erstmals deutsch benannten Gruppe der Bernstein-Scheibennetzspinnen (Unterfamilie Mizaliinae). Diese Spinnen sind ausschließlich vom Baltischen Bernstein bekannt. Sie besitzen - verglichen mit den meisten heutigen Arten der Familie - einfache männliche Genital-Strukturen, vgl. Abb. 12 und 21. Ich halte diese Spinnen für die urtümlichsten Vertreter ihrer Familie neben den rezenten Uroecobiinae und den fossilen Lebanoecobiinae aus der Kreidezeit.

Aus dem tropischen Afrika sind vor erst 24 Jahren ecribellate Scheibennetz-Spinnen beschrieben worden, bei denen ebenfalls sehr einfache Genital-Strukturen existieren: Eine Art der Gattung *Uroecobius* KULLMANN & ZIMMERMANN 1976 (vgl. auch unten die Gattung *Urocteana*). Die Autoren von *Uroecobius* hielten diese Spinnen (Name!) für ursprünglich. Möglicherweise handelt es sich bei ihnen tatsächlich um ?letzte Überlebende einer urtümlichen Gruppe von Scheibennetz-Spinnen des frühen Tertiärs oder sogar aus der Kreidezeit, entfernten Verwandten der Gattung *Mizalia*. Die urtümlichen Vertreter der Gattung *Mizalia* hatten bereits im frühen Tertiär Spinnsieb (Cribellum) und Kräuselkamm (Calamistrum) in beiden Geschlechtern verloren.

TAXONOMY AND DISTRIBUTION

Superfamily Oecobioidea BLACKWALL 1862 (Scheibennetzspinnen-Verwandte)

Diagnosis: Body flattened (figs.1-2, photos), autotomy basicly between patella and tibia (fig. 27), see remark (3), wide – nearly circular shaped – prosoma (figs.1,16 but see fig. 2) with a narrow eye field, distal article of the posterior spinnerets long (figs.1,18); anal tubercle large (fig. 18), legs usually annulated (not in Mizaliinae), strong bristles or spines apically on the cymbium present (lost in Mizaliinae); "sit-and-wait-position", web basicly present as a tent-shaped retraite in Oecobiidae - see fig. p.257 in the book of SAUER & WUNDERLICH (1997) -, web lost, or a not tent-shaped capture web present in some Hersiliidae; special kind of prey catching by rapid circling (not known in the fossils but present in my opinion according to the similar body-shape, spinnerets and legs).

Remarks: (1) Besides apomorphic characters in both families there are plesiomorphic characters, too, e.g. feathery hairs in Hersiliidae and cribellum/calamistrum in several Oecobiidae, see the cladogram. The second pair of receptacula seminis in Hersiliidae may be plesiomorphic or an apomorphic reversal.

(2) A flexible zone of the metatarsi (except III) occurs usually in those taxa in which all metatarsi are long and undivided. In *Gerdia* and *Hersiliola* the short metatarsi are undivided; in in the short-legged genus *Hersilia* and related genera as *Hersiliopsis* and *Murricia* the short metatarsi I, II and IV are divided.

(3) Autotomy: In all members of the Hersiliidae as well as in the Oecobiidae: Lebanoecobiinae and Oecobiini a break may occur between patella and tibia (photo, fig. 20a in the book of WEITSCHAT & WICHARD) as in Filistatidae, Leptonetidae, Linyphiidae and Pimoidae; in the Mizaliinae a break frequently occurs between coxa and trochanter, in the other taxa of the Oecobiidae probably autotomy is absent.

(4) Members of both families live on surfaces of bark of trees and rocks, their body is flattened and near to the underground, usually the legs are streched more or less sideward. In Contrast to typicalal laterigrade spiders as Selenopidae and most Thomisidae - see SAUER & WUNDERLICH (1997: Figs. p. 89) - femur I is not directed sideward but more foreward, the figs. 1-2 are not quite typical, but see SAUER & WUNDERLICH (1997: Figs. p. 43 & 46) (furthermore e.g. Selenopidae and Thomisidae are able to move fast in lateral directions). The leg position in several Hersiliidae and Oecobiidae I call "mediograde". (5) A web is build in most taxa of Oecobioidea, a +/- tent-shaped web as a "retraite" in Oecobiidae – known only from extant taxa, see the paper on two new fossil families of the Araneoidea in this volume - and an irregular capture web is knowm from several Hersiliidae.

(6) The cymbial bristles may be a plesiomorphic character. Also e.g. in several Mygalomorpha as well as in the more advanced Lycosidae, Uloboridae and Zodariidae apical cymbial bristles may be present.

(7) Convergences: The autotomy between patella and tibia evolved probably two times convergently in taxa of this superfamily (see above) and – also two times - a capture web originated in the Hersiliidae, see the cladogram. Cribellum and calamistrum have been lost four times in the Oecobioidea: In Hersiliidae, Mizaliinae, Uroecobiinae and Urocteini. Complicated bulbus structures besides the presence of a conductor evolved most probably several times in both families, see below.

Families: Hersiliidae and Oecobiidae.

Relationships: The sister group of the Oecobioidea is not known with certainty. In my opinion it well may be Araneoidea s.l. (?+ the RTA-clade) - see the paper on the Araneoidea in this volume - or probably an extinct family of the Cretaceous period, preserved in Brazil (Santana). I do not want to exclude that Nicodamidae is a branch between Oecobioidea and Araneoidea s. l.

Distribution: Extant nearly cosmopilitical, but mainly pantropic (Hersiliidae) and subtropical. Fossil in Cretaceous Lebanese amber, Tertiary in Baltic, Dominican and Mexican ambers - see WUNDERLICH (1988), subfossil in copal from Madagascar.

1. Family Hersiliidae THORELL 1869

Diagnosis and relationships: See the cladogram and below (Oecobiidae).
Usually at least one short ventral bristle is present at least on metatarsus and tarsus III.

Remarks: (1) The fossil and extant genera of the Hersiliidae need a revision; e.g. the genus *Hersilia* AUDOUIN 1826 has to split up in my opinion. (2) Legs: A flexible zone of the metatarsi (except III) occurs usually in those taxa in which all metatarsi are long and undivided, but in *Gerdia*, *Hersiliana* and *Hersiliola* the short metatarsi are all undivided, and in the short-legged genus *Hersilia* and related genera as *Hersiliopsis* and *Murricia* the short metatarsi I, II and IV are divided.

Distribution: Extant mainly pantropical and subtropical; fossil in Tertiary amber, see WUNDERLICH (1986, 1987, 1988), subfossil in copal from Madagascar.

Provisorical key to the extant and fossil Tertiary genera of the family Hersiliidae, except the taxa in Baltic amber (see below):

See BAEHR & BAEHR (1993: 6-7). Three large promarginal cheliceral teeth are present in *Fictotama, Hersilia* and *Tamopsis* but unknown in *Gerdia, Hersiliana* and *Hersiliopsis.*

1 Metatarsus I, II and IV biarticulate, without flexible zone (fig. 1). 2

- All metatarsi entire (fig. 5, 9c), flexible zone present or absent. 5

2(1) Embolus laying in (and probably fused to) a large conductor (fig. 9), no other bulbus sclerites. - Subfossil in copal from Madagascar. Photos 86-87. . . . . *Hersiliopsis*

- Bulbus different. - Extant. 3

3(2) Eye region not raised. - Sri Lanka (Ceylon). . . . . *Promurricia*

- Eye region +/- raised. 4

4(3) Opisthosoma with compressed hairs. - Sri Lanka to Singapore. . . . . *Murricia*

- Opisthosoma without (?) compressed hairs. - Widely spread. . . . . *Hersilia*

5(1) Metatarsus I and II only about 2 1/2 times longer than the tarsus, apical article of the posterior spinnerets only about as long as the basal article. - Southern Europe, Africa, Near East to Afghanistan. . . . . *Hersiliola*

- Metatarsus I, II and IV at least 4 times longer than the tarsus, apical article of the posterior spinnerets distinctly longer than the basal article. 6

6(5) Metatarsi without a flexible zone (as in *Hersiliola*). Short legs and spinnerets, 1.1 metatarsal IV trichobothria (fig. 9b). - Subfossil in copal from Madagascar. . . . *Hersiliana*
Photo 88

- Metatarsus I, II and IV with a flexible zone and pseudosegments (see fig. 4). - Cosmopolitical incl. Madagascar 7

7(6) Bulbus very simple, without an apophysis, embolus short, pedipalpal tibia at least twice as long as wide (fig. 9g). - *T. edwardsi*, SW-Europe and at least North Africa. . . . . *Tama* s. str.

- At least one tegular apophysis present similar to figs. 7-8 or 24-25. 8

8(7) Bulbus simple, only one tegular apophysis present similar to fig. 4-5, cymbium strongly elongated,see WUNDERLICH (1988: Figs.165-167; but compare figs.160-161!) - Oriental Region and Neotropical Region, Dominican and Mexican amber. . . *Fictotama*

- Bulbus more complicated, long, narrow and pear-shaped, cymbium not strongly elongated (figs. 24-25). - Australian Region, New Guinea. . . . . *Tamopsis*

The taxa and their distribution:

(a) Extant genera: 7 described – and in my opinion several undescribed – genera, see „*Hersilia*" sensu BAEHR & BAEHR which probably has to split up. The genera *Tama* SIMON 1882 – type species *Hersilia edwardsi* LUCAS 1836 – and *Hersiliola* THORELL 1870 may be restricted to SW-Europe and N-Africa. *Tamopsis* BAEHR & BAEHR 1987 occurs in the Australian Region and New Guinea, *Hersilia* s.str. at least in Africa and *Fictotama* PETRUNKEVITCH 1963 (= *Neotama* BAEHR & BAEHR 1993) is widespread in the neotropics (also fossil in Dominican and Mexican ambers) and the Oriental Region but absent in Australia and most probably in Africa, see BAEHR & BAEHR (1993: 87); *Murricia* SIMON 1882 and *Promurricia* BAEHR & BAEHR 1993 are distributed in the Oriental Region, only the female was described by BAEHR & BAEHR.

(b) Neotropical extant and fossil taxa and synonymy:

Fictotama PETRUNKEVITCH 1963; synonyms: *Neotama* BAEHR & BAEHR 1993 **n. syn**., *Prototama* PETRUNKEVITCH 1971, *Priscotama* PETRUNKEVITCH 1971, *Perturbator* PETRUNKEVITCH 1971; *Tama* sensu WUNDERLICH 1986, 1987 and 1988 (neotropical species) (**n.comb**.).
Fictotama minor (WUNDERLICH 1987) (questionable), *F. maior* (WUNDERLICH 1988) and *F. media* (WUNDERLICH 1988), *F.* sp. (sub *Tama* sp.) sensu SCHAWALLER 1981, ♀, *F.* sp. (sub *Tama* sp.) sensu WUNDERLICH 1988, juv. (all **n. comb**.).

Synonymy: According to WUNDERLICH (1988: 88) the mentioned fossil genera are syno-nyms of *Tama* SIMON 1882 but the neotropical *Tama*-species are not congeneric with the type species of *Tama*. BAEHR & BAEHR (1993) - who overlooked the synonymy which has been published by WUNDERLICH (1988) on neotropical genera - created the name *Neotama* for Oriental species. According to the metatarsal articulation and the genital organs – e.g. the long cymbium and the simple bulbus sclerites – the synonymy is justified in my opinion; see WUNDERLICH (1988: 88) and BAEHR & BAEHR (1993: 68). The oldest name *Fictotama* - known from Tertiary Mexican amber - has priority.

(c) Fossil taxa in Baltic amber:

Gerdia MENGE 1869, *G. myura* MENGE 1869, *Gerdiopsis* n.gen, *G. infrigens* n.sp., *Gerdiorum* n.gen., *G. inflexum* n.sp., ?*Hersilia miranda* KOCH & BERENDT 1894, Hersiliidae sp. indet. 1-3.

Key to the named fossil taxa of the family Hersiliidae in Baltic amber

See the remarks on Hersiliidae sp. 1-3 below.

1 Prosoma long ovally (fig.2), legs short (fig.2), length of leg I 5.6mm, metatarsus I, II and IV uniarticulate, flexible zone absent. . . . . <u>*Gerdia myura*</u>

- Prosoma as wide as long as in fig. 1, legs variable. 2

2(1) Metatarsus I, II and IV biarticulate, flexible zone of the <u>short</u> metatarsi absent as in fig.1. . . . . ?<u>*Hersilia miranda*</u>

- Metatarsus I, II and IV uniarticulate, flexible zone of the long metatarsi absent or present. 3

3(2) Flexible tarsal and metatarsal zones absent. ♂-pedipalpus (fig.7a): Tegular apophysis undivided and in a more retrobasal position. Photo 90 . . . . . <u>*Gerdiorum inflexum*</u>

- A large tarsal and metatarsal flexible zone - except on leg III - present (fig.4), ♂-pedipalpus (fig.7): Tegular apophysis divided and in a more prodistal position. . . . .
Photo 89 . . . . <u>*Gerdiopsis infrigens*</u>

Gerdia MENGE 1869

Diagnosis (♀; ♂ unknown): Metatarsi uniarticulate, flexible zone absent, legs short (fig. 2), leg I only 1.3 times longer than the 4.3mm long body, posterior spinnerets as long as the opisthosoma, its apical article long, prosoma and opisthosoma (fig.2) long ovally (!). <u>Remark</u>: Characters are given after MENGE (1869) - are all characters correctly described? The shape of the long prosoma is totally unusual in the other members of the family Hersiliidae!

Relationships: In the extant genus *Hersiliola* also all metatarsi are uniarticulate and a flexible zone is absent but the shape of prosoma and opisthosoma is about as wide as long, the distal article of the posterior spinnerets is only about as long as the basal article and the metatarsi are short. See also the subfossil genus *Hersiliana* from

Madagascar.

Type species: *Gerdia myura* MENGE 1869 (called „Mäuseschwanzspinnerin" by MENGE), fig.2, type deposition unknown, type probably lost.

Distribution: Tertiary Baltic amber forest.

Gerdiopsis n.gen.

Diagnosis (♂ ; ♀ unknown): Legs very long, metatarsi uniarticulate, tarsi and metatarsi except III with a long flexible zone (photo, fig. 4), metatarsus III with 2 pairs of trichobothria (fig.5), eye region probably strongly raised, eyes unknown, posterior spinnerets long. Pedipalpus (figs.6-7): Tibia long, bulbus short, a divided tegular apophysis present, embolus long, no further sclerites.

Relationships: In *Gerdia* MENGE 1869 (extinct, in Baltic amber) the legs are much shorter – see above -, a flexible zone of the metatarsi is absent and the shape of prosoma and opisthosoma - according to MENGE - is long ovally (fig.2). In *Hersiliola* THORELL 1870 the posterior spinnerets are short, the structures of the bulbus are similar. In *Hersilia* AUDOUIN 1826 in which metatarsus III also bears 2 pairs of trichobothria – see BENOIT (1967: 3) - the metatarsi I, II and IV are biarticulate and a flexible zone is absent. In the related genus *Gerdiorum* flexible zones of tarsi and metatarsi are absent, the tegular apophysis is undivided and in a more probasal position.

Type species: *Gerdiopsis infrigens* n.sp.

Distribution: Tertiary Baltic amber forest.

***Gerdiopsis infrigens* n.gen.sp**. (figs. 3-7) Photo 89

Material in Baltic amber: Holotype ♂ F50/BB/AR/HER/CJW.

Diagnosis (♂; ♀ unknown): Pedipalpus (figs. 6-7): With a short patella and a long tibia, cymbium of medium length and with 2 apical bristles, tegular (= „median") apophysis divided and in a retrodistal position.

Preservation and syninclusions: The ventral side of the spider and the pedipalpi are well preserved, most parts of the dorsal side are destroyed/cut off on an included amber layer, most parts of the leg articles are missing, the right leg III is nearly complete, the spinnerets are complete, autotomy after the patella of both legs I and the right leg II; the flow out of hemolymph from the patella demonstrates that the spider was caught alive in the resin. Silk threads are comming out of the spigots of the left posterior spinneret. – Also preserved are numerous detritus particles, 2 Acari (one is an Oribatei), stellate hairs, a small part of a leaver moss and some pollen grains, e. g. an air bag pollen grain from a Pinaceae and pollen grains from a Fagaceae. Furthermore few Nematoda (one is probably a member of the Mermithidae and is situated at the mouth parts of the spider, fungus hyphae and numerous ?Bacteria e.g. behind the opisthosoma), and several splinters of amber within the amber piece.

Description (♂):
Measurements (in mm): Body length 4.0, prosoma length 2.0, opisthosoma length 2.0, leg I: Femur 4.7, patella lost, tibia +/- 5.0, metatarsus +/- 7.0, tarsus +/- 1.0; leg III: Femur 2.3, patella +/- 0.6, tibia 2.6, metatarsus 2.1, tarsus 0.6, length of the posterior spinnerets 2.0
Colour dark brown, legs most probably not annulated.
Prosoma (most parts are destroyed) probably as long as wide, eye region probably strongly raised; feathery hairs numerous (fig.3). Legs – except III - very long and slender, I more than 18mm (about 20.5mm) long, with numerous short bristles: Femur I (the dorsal parts are missing) probably about 7, tibia I (it is incomplete) 2 dorsally and few laterally, metatarsus III 2 ventrally and a pair apically. Metatarsi with few distal trichobothria, two pairs on III (fig.5). Feathery hairs as in fig.3. Metatarsi – except III - with a long flexible zone nearly a long the distal 2/3 (fig.4). Opisthosoma dorsoventrally compressed, slightly longer than wide, posterior spinnerets as long as the opisthosoma, basal article short. Pedipalpus: See the diagnosis; embolus hidden.

Relationships: See above.

Distribution: Tertiary Baltic amber forest.

***Gerdiorum* n.gen.**

Diagnosis (♂; ♀ unknown): Legs very long, metatarsi uniarticulate, tarsi and metatarsi without a flexible zone. Pedipalpus (fig.7a) with an undivided tegular apophysis and a long embolus, no further sclerites.

Relationships: See *Gerdiopsis* n.gen.

Type species: *Gerdiorum inflexum* n.sp.

Distribution: Tertiary Baltic amber forest.

***Gerdiorum inflexum* n.gen.n.sp**. (fig. 7a) Photo 90

Material: Holotypus ♂ in Baltic amber F132/BB/AR/HER/CJW.

Preservation and syninclusions: The spider is well but incompletely preserved, the opisthosoma is covered partly by an emulsion on all sides. The right leg I is incomplete by autotomy after the patella, only the right leg III is complete, the other legs are broken off through the femur or partly cut off, the right legs II and IV are cut off at the end of the metatarsus. - No stellate hairs.

Diagnosis (♂): Tegular apophysis in a retrobasal position (fig. 7a).

Description (♂):
Measurements (in mm): Body length 4.0, prosoma: length 2.3, width 2.3, leg II most probably > 15, femur I 5.2, femur II +/- 5.0, femur III 2.0, femur IV +/- 5.0, tibia II and tibia IV +/-5.3, opithosoma length 2.5, length of the apical article of the posterior spinnerets 1.7.
Colour: Prosoma and legs medium brown, opisthosoma yellow brown.
Prosoma as long as wide, covered with short hairs. Fovea long and deep, eye region strongly raised, both eye rows strongly recurved, anterior lateral eyes tiny, the other eyes large. Clypeus only slightly protuding, its length more than one diameter of an anterior median eye. Sternum wider than long, gnathocoxae strongly converging. - Legs very long, II at least 4 times longer than the body. Numerous short bristles: Femur I 2 dorsally in the basal half, 1 retrobasally and 2 prolaterally; patellae 1/1 dorsally, tibia II at least 5 laterally and 1 ventrally, metatarsus IV some laterally, tarsus IV some short ventrally. Metatarsus III with at least 2 distal trichobothria in, the basal one shorter. - Opisthosoma slightly longer than wide, widest in the distal half, covered with few short hairs. Posterior spinnerets nearly as long as the opisthosoma. - Pedipalpus (fig. 7a): Tibia long, cymbium short, two apical bristles as in *Gerdiopsis*, embolus long, thin, position in a wide circle, legular apophysis undivided and in a retrobasal position.

Relationships: See *Gerdiopsis* n. gen.

Distribution: Tertiary Baltic amber forest.

?***Hersilia miranda*** KOCH & BERENDT 1854

The holotype is an ?adult female in Baltic amber which relationships are doubtful to me.

MENGE in KOCH & BERENDT (1854: 50) described a ?conspecific male with long legs (leg I more than three times longer than the body), short tarsi, long posterior spinnerets and simple bulbus structures. Without more informations the relationships of this species remain doubtful and the male described by MENGE may be conspecific with one of the Hersillidae sp.1-3 reported below.

Hersiliidae sp. 1-3 Photos 91-93

According to the indetermined material studied by me – see below, figs. 20a-b in the book of WEITSCHAT & WICHARD and according to other material – the family Hersiliidae has been diverse in the Baltic amber forest; probably there were more than three genera. Without knowledge of the bulbus structures at present further descriptions on genus or species level are not useful in my opinion.

Material in Baltic amber: Hersiliidae sp.1: ♂, GPIUH1683; Hersiliidae sp.2: ♂, MZW 2892; Hersiliidae sp. 3: subad. ♂, F51/BB/AR/HER/CJW.

In these spiders a flexible zone of the metatarsi is absent and metatarsus I, II and IV is biarticulate. In sp.1 and 2 the bulbus structures are +/- hidden, in sp.2 the bulbus structures seem to be simple. In the three species the leg length is quite different: Species 1: Leg I about 20mm, tibia I about 5mm, femur IV about 6mm; species 2: Femur I about 3.2mm, tibia I about 3.5mm; species 3: Femora I-IV: 4.2/4.0/1.8/about 4.3.

(d) Taxa in copal from Madagascar (subfossil):

Nominal extant taxa of the family Hersiliidae from Madagascar are *Hersilia fossulata* KARSCH 1881, *H. insulana* STRAND 1907, *H. kauderni* STRAND 1908, *H. nossibeensis* STRAND 1915, *H. stumpfi* STRAND 1915 and H. *vinsoni* LUCAS 1869. Probably (some of) these species are not members of the genus *Hersilia*. The species which are described below are distinctly smaller than the species which are listed above and are not members of the genus *Hersilia*. - Some indet. fossil ♂♀ (CJW) are waiting for a study/description.

Hersiliopsis n.gen.

Diagnosis (♂; ♀ unknown): Legs long, metatarsus I, II and IV biarticulate similar to fig.1, without a flexible zone, metatarsus III with four long trichobothria (fig.8), eye region strongly raised, spinnerets unknown. Pedipalpus (fig. 9): Bulbus short, of medium size, simple, embolus of medium length, laying in a large conductor; no further bulbus sclerites.

Relationships: In *Murricia* SIMON 1882 (extant, Oriental Region) the eye region is lower and the bulbus structures are different. In *Hersilia* AUDOUIN 1826 and *Hersiliana* n. gen. the bulbus structures are different, in *Hersiliana* the legs are short, all metatarsi are entire. In *Promurricia* BAEHR & BAEHR 1993 (extant, Sri Lanka) the eye region is flat. *Chalinura* DALMAN 1826 – described in copal from ?Madagascar – is a dubious genus and perhaps a synonym of *Hersilia* AUDOUIN 1826, see SIMON (1893: 440-441) and BAEHR & BAEHR (1995: 107).

Type species: *Hersiliopsis madagascariensis* n.sp.

Distribution: Madagascar, subfossil, preserved in copal; ?South Africa.

Hersiliopsis madagascariensis n.gen.n.sp. (figs 8-9) Photos 86-87

Material: Holotypus ♂ in copal from N-Madagascar, F52/CM/AR/HER/CJW.

Preservation and syninclusions: The spider is incompletely preserved in a yellow and hard copal piece. The opisthosoma and parts of the legs are missing/cut off, the left leg I and the right leg III are complete, the right leg I has been cut off through its tarsus. The pedipalpi are completely and well preserved. – A small beetle, 2 small flies and 2 small ants are preserved in the same copal piece.

Diagnosis (♂; ♀ unknown): Pedipalpus as in fig. 9 (see below); see also the genus diagnosis.

Description (♂):
Measurements (in mm): Prosoma length 1.9, leg I: Femur 4.5, patella 0.8, tibia 3.8, metatarsus: Basal part 4.5, distal part +/- 2.3, tarsus +/- 0.6, leg III: Femur 1.5, patella 0.5, tibia +/- 1.2, metatarsus 1.2, tarsus 0.45.
Colour: Prosoma dark brown, legs medium brown, „annulated“ with white feathery and not feathery hairs.

Prosoma with a strongly raised caput and a long and deep fovea. Anterior median eyes of the same size as posterior median eyes. Chelicerae small, labium wider than long, sternum long as wide. - Legs I, II and IV long and slender, no metatarsal flexible zone, III very short, metatarsus I prodistally probably with 3 trichobothria, metatarsus III with 4 dorsal trichobothria in two rows (fig. 8). Bristles short and numerous on femora and tibiae, 2 dorsally on patellae, 0-3 on the metatarsi, femur I at least 7, tibia I 7 dorsally and lateraly, metatarsus III 1 ventrally-apically, tarsus III 1 ventrally in the middle. – Opisthosoma missing. – Pedipalpus (fig. 9) with short and robust articles, cymbium with 5 apical bristles, bulbus short, distally with a large and shining conductor, embolus thin and moderately bent, its position prolaterally of the conductor.

Relationships: I do not know another congeneric species with certainty but *Hersilia arborea* LAWRENCE 1928 – extant, South Africa - may be congeneric.

Distribution: N-Madagascar, in subfossil copal.

Hersiliana n. gen.

Diagnosis (♂; ♀ unknown): Legs short (especially the tarsi), all metatarsi entire and without a flexible area, with two trichobothria only, its position in a row (fig. 9b), clypeus short, eye region strongly raised (photo), apical article of the posterior spinnerets about twice as long as the basal article (fig. 9d); pedipalpus: Figs. 9e-f.

Type species: *Hersiliana brevipes* n. sp.

Relationships: In *Hersiliola* THORELL 1870 the legs are short, too, but the tarsi are relatively long, the apical article of the posterior spinnerets is only about as long as the basal article, the bulbus is flat and its structures are more simple. In *Hersilia* the matatarsi I, II and IV are biarticulate, the apical article of the posterior spinnerets is longer (in all species?) and metatarsus III bears 2 pairs of trichobothria. See also *Hersiliopsis* n. gen.

Distribution: N-Madagascar, subfossil, preserved in copal.

Hersiliana brevipes n. gen. n. sp. (figs. 9a-f) Photo 88

Material: Holotypus ♂, subfossil, in copal from N-Madagascar, F808/KM/AR/HER/CJW.

Preservation and syninclusions: The spider is completely and well preserved in a light yellow piece of copal, the bulbus sclerites are hard to observe. A tiny Acari larva is preserved right above the spider, furthermore present are 1 Diptera and 1/2 Coleoptera.

Diagnosis (♂; ♀ unknown): Small and short-legged spiders, body length 2.3mm (one of the smallest known Hersiliidae). Pedipalpus: Figs. 9e-f.

Description (♂):
Measurements (in mm): Body length 2.3, prosoma lenght 1.2, leg I: Femur 1.9, patella 0.5, tibia 1.45, metatarsus 1.95, tarsus 0.45, tibia II 1.35, tibia III 0.4, tibia IV 1.15, metatarsus III 0.48, tarsus III 0.33.
Colour mainly yellow brown, with redbrown areas, legs most probably not annulated.
Prosoma (photo) nearly wide as long, hairy, with a distinct fovea. Eye region distinctly raised, clypeus as short as 3/4 diameters of the anterior median eyes. 8 large eyes, anterior laterals smallest, lateral eyes close together. Basal cheliceral article stout. - Legs (photo, figs. 9a-c) short, III distinctly the shortest, order I/II/IV/III, all metatarsi entire and without a flexible area, tarsi short, bristles thin, femora 2 dorsally and few laterally, patellae 2 dorsally, tibiae with dorsal and lateral bristles, metatarsi with 3 bristles in the basal half and 2 unpaired trichobothria in the distal half, paired tarsal claws short. - Opisthosoma 1.35 times longer than wide, widest behind the middle, covered with hairs of medium length. Colulus large, apical article of the posterior spinnerets about twice as long as the basal article (fig. 9d). - Pedipalpus (figs. 9e-f): Patella and tibia stout, patella with 2 dorsal bristles, apical cymbial bristles slender, bulbus fairly convex, its structures hard to observe, position of the embolus questionable.

Relationships: See above.

Distribution: N-Madagascar, subfossil, preserved in copal.

2. Family Oecobiidae BLACKWALL 1862

Synonyms of several extant genera - the synonymy may be justified or not -: See BRIGNOLI (1983: 214): A Catalogue of Araneae.

List of fossil and extant higher taxa of the family Oecobiidae and their distribu-

tion:

OECOBIIDAE sp. indet., fossil in Cretaceous amber from New Jersey, comp. PENNEY in Meganeura, **2**: 25 (1998)

LEBANOECOBIINAE n. subfam. (Alt-Scheibennetzspinnen)

  Lebanoecobius n.gen., fossil in Cretaceous Lebanese amber, 1 species

MIZALIINAE THORELL 1869 (Bernstein-Scheibennetzspinnen)

  Mizalia KOCH & BERENDT 1854 (= *Paruroctea* PETRUNKEVITCH 1942), fossil in Tertiary Baltic amber, several species

UROECOBIINAE KULLMANN & ZIMMERMANN 1976 (Ur-Scheibennetzspinnen)

  Uroecobiini

    Uroecobius KULLMANN & ZIMMERMANN 1976, extant, South-Africa

  Urocteanini ROEWER 1961,

    ?*Urocteana* ROEWER 1961, 1 extant species, Africa

OECOBIINAE (Eigentliche Scheibennetz-Spinnen)

  Oecobiini (Eigentliche Scheibennetz-Spinnen im engen Sinne)

    Oecobius LUCAS 1846, fossil in Tertiary Dominican amber and extant nearly cosmopolitical in temperate to tropic regions, numerous species especially on the Canary Islands

    Paroecobius LAMORAL1981, extant, South-Africa, 2 species. Compare WUNDERLICH (1995)

    Platoecobius CHAMBERLIN & IVIE 1935, extant, North-America, 1 species

  Urocteini THORELL 1869 (Zeltdach-Spinnen)

    Uroctea DUFOUR 1820, extant, Europe, Asia, Africa, several species

Key to the fossil and extant higher taxa of the family Oecobiidae:

1 6 eyes, lenses of the posterior median eyes absent or nearly totally reduced (fig.16). A small and divided colulus present. Bulbus structures simple (fig.17).Uroecobiinae. Extant, South Africa. . . . . **_Uroecobius_**

- 8 eyes, lenses of the posterior median eyes indistinct (fig. 22). Cribellum (fig.18) and calamistrum present in the female, reduced or absent in the male. No colulus. Bulbus structures complicated (fig.21). Lanceolate hairs present on the margin of the male sternum only in this tribus (fig.23; not seldom +/- rubbed off). Extant and fossil: In Dominican amber. Oecobiini. 2

- 8 eyes, lenses of the posterior median eyes distinct (e.g. as in figs.15a, 20). Cribellum and calamistrum absent, undevided colulus present or absent (*Uroctea*). Bulbus relative simple in *Mizalia* (fig. 12) or complicated in *Uroctea* (similar to fig. 21). 4

- 8 eyes, lenses of the posterior median eyes distinct, cribellum and calamistrum (fig. 28) present, bulbus (fig. 30) simple. Lebanoecobiinae. Extint, in Lebanese amber. . . . .***Lebanoecobius***

2(1) calamistrum in one row in females, absent in males. Bulbus with short subtegulum. Extant, South-Africa. . . . . ***Paroecobius***

- calamistrum in two rows in females, often absent in males. Bulbus with long subtegulum. 3

3(2) no trichobothria on the metatarsi (?) (according to SHEAR). ♀: Calamistrum running entire the length of metatarsus IV. Extant, North-America . . . . ***Platoecobius***

- metatarsi with 1 or 2 (?) trichobothria. ♀ Calamistrum running two-thirds of the length of metatarsus IV. Fossil in Dominican amber and extant, numerous species. . ***Oecobius***
Photo 94

4(1) colulus large (fig. 11).♂-Pedipalpus (fig.13) with simple bulbus structures (fig. 12), epigyne (fig.14) usually a wide grove. Mizaliinae. Extinct, in Baltic amber. . . . . . .***Mizalia***
Photos 95-97

- a large colulus present (fig.19) or absent (*Uroctea*). ♂-Pedipalpus unknown (*Urocteana*) or complicated and similar to fig. 21. Extant. 5

5(1) posterior eye row +/- procurved, posterior lateral eyes not larger than posterior median eyes. Colulus absent. Larger spiders, body length of adults more than 5mm. Bulbus complicated, with median apophysis and stipes as in Oecobiinae, similar to fig. 21). Urocteini. Extant, Palearctic – Ethiopical - Oriental . . . . ***Uroctea***

- posterior eye row distinctly recurved (fig. 20), posterior lateral eyes distinctly larger than the posterior median eyes. A large colulus present (fig.19). Body length of the unknown adults probably about 2mm. Urocteanini. Ethiopical Region . . . . . . ***Urocteana***

Diagnoses of the higher taxa of the Oecobiidae: See the key and the cladogram.

Remarks on the Oecobiidae:(1) Protruding clypeus ("nose"): See fig. 15a. (2) The autotomy is unknown in Uroecobiinae and the basic patella-tibia autotomy has been lost in my opinion in Urocteini. In Mizaliinae in my opinion the patella-tibia autotomy also has been lost and a coxa-trochanter autotomy has been evolved which may be an adaptation to the life on the bark of trees which had an extensive resin production. (3) Web: See the paper on the superfamily Araneoidea in this volume.

Relationships of the Oecobiidae: According to numerous common apomorphic characters – the special prey capture behaviour by rapid circling, the wide shape of the prosoma, the flattened body, the narrow eye field, the long posterior spinnerets, the large anal tubercle and the apical cymbial bristles – Oecobiidae and Hersiliidae are closely related and sister groups in my opinion. Differences: See the cladogram.

Distribution: Nearly cosmopolitic but mainly tropic and subtropic; fossil in Cretaceous Lebanese amber, Tertiary Baltic and Dominican amber, see below and WUNDERLICH (1988).

REMARKS ON SELECTED TAXA AND DESCRIPTIONS OF NEW FOSSIL SPECIES

See the cladogram and the key to the higher taxa of the Oecobiidae.

Lebanoecobiinae n. subfam. (Alt-Scheibennetzspinnen)

Diagnosis (♂; ♀ unknown): Basal features of the Oecobiidae - e.g. cribellate and presence of patella-tibia autotomy - but parallel or divergent posterior spinnerets (fig. 29), compare the family diagnosis, and simple bulbus structures with a large conductor (fig. 30).

Further characters: Legs fairly long, streched sideward, with long bristles (fig. 28), anal tubercle large but special hairs not observable and probably absent, eyes not reduced, posterior row slightly recurved, embolus long and thin (fig. 30), conductor large, tegular apophysis not known (seemingly absent), web/retrait most probably present (fig. 31).

Relationships: The bulbus structures probably are more primitive than in the Mizaliinae; in Mizaliinae a tegular apophysis is present, Mizaliinae are ecribellate, apical cymbial bristles are absent, a coxa-trochanter autotomy is present. According to the primitive characters - the presence of cribellum and calamistrum, the not converging posterior spinnerets, the patella-tibia autotomy, the fairly large chelicerae, the long leg bristles, the thick palpal tibia and the simple bulbus structures - Lebanoecobiinae is the most primitive subfamily of the Oecobiidae, see the cladogram.

Type genus: *Lebanoecobius* n. gen. (extinct), the only known genus.

Distribution: Cretaceous Lebanese amber forest.

Lebanoecobius n.gen.

Diagnosis and **distribution**: See above.

Relationships: The only genus of the family Lebanoecobiinae, see above.

Type species: *Lebanoecobius schleei* n.sp.

Lebanoecobius schleei n.gen.n.sp. (figs. 26-31)

Material: Holotypus ♂ in a piece of Cretaceous amber from Lebanon which is preserved in artifical resin, leg. Mr. DIETER; State Museum of Natural History Stuttgart no. B-45.

Derivatio nominis: The species is named after Dr. DIETER SCHLEE, paleontologist and former curator at the State Museum of Natural History in Stuttgart.

Preservation and syninclusions: The amber piece has been preserved in artifical resin. The spider is fairly bad preserved, the opisthosoma, all legs, the chelicerae and the right pedipalpus are removed from the prosoma, the position of the loose sternum is between prosoma and opisthosoma, the prosoma with the eye region, the opisthosoma with spinnerets and anal tubercle are strongly deformed, the bulbus structures are difficult to observe, the left leg I is wanting behind the patella (autotomy), the right leg IV is broken off and missing after the base of the femur. - Remains of 3 Diptera - the prey of the spider? - and tiny plant particles also are preserved in the amber piece; one body length at the right side a loose insect antenna (?Diptera) is preserved and behind it few thin threads in a nearly parallel position and nearly 4mm long are preserved which may be signal threads of the spiders web (fig. 31).

Diagnosis (♂; ♀ unknown): Pedipalpus (fig. 30) with a long and thin embolus and a large conductor, tegular apophysis probably absent.

Description (♂):
Measurement (in mm): Body length about 1.7, prosoma 0.9 long and wide, opisthosoma 0.8 long and wide, femora: I 1.4, II 1.15, III 1.05, leg IV: Femur about 1.3, patella 0.3,

tibia 0.8, metatarsus 0.8, tarsus 0.5.
Colour yellow brown.
Prosoma flat, as long as wide. Eye field probably raised, 8 eyes, posterior row slightly recurved, posterior median eyes probably circular, not reduced, lateral eyes close together. Chelicerae (fig. 26) fairly large, teeth not observable, fang slender, sternum hairy, with large hair bases. - Legs (figs. 27-28) fairly long and slender, directed sideward, III nearly as long as II, autotomy between patella and tiba of the left leg I (fig. 27), bristles numerous, some are distinctly longer than the tibia diameter, on tibia IV up to 2 1/2 times longer than the tibia diameter; few bristles on the femora, 2 on the patellae (the basal one short) several bristles on the remaining articles, tibia I : 1 dorsally-basally, 2 retrolaterally, few apically, unknown number prolaterally, metatarsus III 1 dorsally, 3 ventrally and few apically, tarsus III-IV 2 short ventral bristles; tarsal claws short. Position of the metatarsal trichobothria near the end of the article. Metatarsus IV slightly bent, with short calamistrum hairs in about 2/3 of the length and ventrally with long hairs (fig. 28). - Opisthosoma (it is strongly deformed) with indistinct short hairs, long as wide, flat; anal tubercle hard to observe, fairly large; posterior spinnerets long and slightly divergent. - ♂-pedipalpus: See the diagnosis.

Relationships and **distribution**: See above.

Oecobiini (Eigentliche Scheibennetz-Spinnen) **n. stat**. and **Urocteini** (Zeltdach-Spinnen), **n. stat**.

BAUM (1974) downgraded the traditional families Urocteidae and Oecobiidae to subfamly rank. According to the common characters of the genital organs both taxa are doubtless sister groups. According to the complicated male genital organs including stipes and a direct connection between copulatory and fertilazation ducts in my opinion both taxa are so close – and so far away from the remaining genera *Lebanoecobius*, *Mizalia*, *Uroecobius* and probably *Urocteana* (only juveniles are known in this genus!) - that I propose here the downgraded tribus status of Urocteini and Oecobiini of the subfamily Oecobiinae (**n. stat**.). Differences between both tribus: See cladogram and key.

Uroecobiinae KULLMANN & ZIMMERMANN 1976 (Ur-Zeltdachspinnen)

Material is missing.

Diagnosis: Cribellum and calamistrum absent but a colulus present which is wide and divided in *Uroecobius*, large and undivided in *Urocteana* (fig.19). 8 eyes or 6 (the posterior medians are absent – or nearly totally reduced - in *Uroecobius*). Genital organs (*Uroecobius*; these organs are not known in *Urocteana*): Cymbium long and with long bristles apically (fig.17); bulbus simple, only with embolus and conductor in a distal position; epigyne with a simple grove, vulva structures simple, with short ducts and without glands.

Relationships: See the key and the cladogram.

Tribus: Uroecobiini - see Uroecobiinae above - and probably Urocteanini (adults are unknown in this tribus).

Distribution: South Africa.

Urocteanini n.trib.

Diagnosis (juv.): Cribellum absent, a large and undivided colulus present (fig.19), posterior eye row strongly recurved, posterior lateral eyes largest (fig.20).

Relationships: Because of unknown adults the relationships are doubtful. In Uroecobini the colulus is wide and divided, the posterior eye row is not strongly recurved, the lenses of the posterior median eyes are strongly reduced, the posterior lateral eyes are smaller.

Type genus: *Urocteana* ROEWER 1961 (the only known genus of the tribus).

Distribution: South Africa.

Mizaliinae THORELL 1870 (sub Mizalioidae) (Bernstein-Scheibennetzspinnen)

Photos 95-97

Diagnosis: No calamistrum, a large and undivided colulus present (fig.11). Legs not annulated. Coxa-trochanter autotomy (photos). 8 eyes in a slightly procurved row, posterior median eyes oval (fig. 15a) in contrast to fig. 9 of PETRUNKEVITCH (1958); ♂-pedipalpus (figs.12-13,15): Cymbium short, bristles absent; bulbus relative simple, with embolus, conductor, radix apophysis and tegular apophysis (= „median apophysis“), these in a central position; no stipes. Epigyne a large grove which is usually wider than long (fig. 14), vulva unknown.

Relationships: Originally the type genus/species – up to now the only known genus – was described by KOCH & BERENDT (1854) in Theridiidae but listed by MENGE (1856) in Clubionidae s.l.. THORELL (1870) selected the genus *Mizalia* as type of its new family Mizalioidae and placed it in the vacinity of Urocteidae. LEHTINEN (1967: 249-250) transferred the family with hesitation to his superfamily Filistatoidea. WUNDERLICH (1986: 21) studied fossil material of the genus *Mizalia* and confermed the opinion of THORELL (1870) - relationships to the Oecobiidae - and downgraded the family to tribus rank. WUNDERLICH (1996: 218) placed *Mizalia* in the Urocteinae. After comparison with all other known taxa of the family Oecobiidae and recognizing the absence of a calamistrum in both sexes, the presence of a wide cymbium, the absence of apical cymbial bristles and the relatively simple bulbus structures I now regard *Mizalia* as the single known genus of the subfamily Mizaliinae (**n. stat**.) of the Oecobiidae. Lebanoecobiinae and Uroecobiinae may be the closest relatives, see the cladogram.

Type genus: *Mizalia* KOCH & BERENDT 1854 (extinct, in Baltic amber); the only known genus of the subfamily.

Distribution: Extinct, Tertiary Baltic amber forest.

Mizalia KOCH & BERENDT 1854 Photos 95-97

Synonym: *Paruroctea* PETRUNKEVITCH 1942; see WUNDERLICH (1986: 20).

Type species: *Mizalia rostrata* KOCH & BERENDT 1854.

Indet. material of *Mizalia* sp. (part.): 5♂3♀ CJW, 1♀ no. F49/BB/AR/OEC/CJW with a short left leg III (photo) which most probably is a regenerate; 1♂ coll. HOFFEINS in Hamburg; 1♂ coll. KERNEGGER in Hamburg; 2♂ MZW no. 12059 and 12698; 1♂ MNH NP no. 4567; 1♀ PIHUB no. MB.A.110, coll. THOMAS; 1♂ Univ. Göttingen no. B368; 1♂1♀ GPIH; numenour further specimens in several dealers collections.

Diagnosis, relationships and distribution: See above. Anal tubercle as in other Oecobiidae, compare fig. 18.

Autotomy: Autotomy between coxa and trochanter is frequent in this genus: In about 2/3 of the specimens I found loose or lost legs after the coxa, compare the photos; in 2/3 of these spiders more than one leg has been lost – an adaptation to the life on the bark of resin-producing trees? (In the Lebanoecobiinae and Oecobiini autotomy occurs between patella and tibia, in ?all members of the Urocteini autotomy is absent).

Synonymy of species: How many species have been described in Baltic amber? There is no definive answer because of the unsure synonymies, the ?loss of the holotype of the type species *M. rostrata*, the probably juv. status of the holotype of *M. blauvelti* PETRUNKEVITCH 1942 and the usually hidden bulbus structures. The ♂ described by PETRUNKEVITCH (1958) as „androtype" of *blauvelti* – fig. 15 - is probably not conspecific. I studied this specimen (PIHUB): Its pedipalpi are ventrally not observable and the bulbus structures are most probably not correctly reconstructed by PETRUNKEVITCH.

Two males may be conspecific with the male described by PETRUNKEVITCH (1958) sub *blauvelti*: 1♂ Bitterfeld, PIHUB no. MB.A.533, 1♂ in Baltic amber, CJW.

MENGE in KOCH & BERENDT (1854: 45) accepted of the nominal species of KOCH & BERENDT in *Mizalia* only *rostrata* and *pilosula*; the other two species are regarded as questionable Theridiidae. The same author regarded *rostrata* and *pilosula* as synonym but gave no good reasons for his opinion. A further *Mizalia* species – *truncata* - has been diagnosed by MENGE in KOCH & BERENDT (1854: 45) only after "mit abgestutztem Kopf und rauh behaarten Füßen". According to this short diagnosis – either the sex nor the size is noted - I am not able to identify this species with certainty. - In my private collection - F56/BB/AR/OEC/CJW - a female is deposited, in which dense leg hairs and an epigynal grove are present which is slightly longer than wide. Probably this ♀ is conspecific with *pilosula*.

***Mizalia gemini* n.sp.** (fig. 12),

Material: 2♂, holotypus and paratypus in the same Baltic amber piece, F53/BB/AR/OEC/CJW.

Preservation and syninclusions: Both spiders are preserved nearly in contact and face-to-face in the same amber layer but the paratype is distorted by 180°. The holotype bears a dorsal and the paratype a ventral emulsion. Both spiders are completely and well preserved. Dorsally of the holotype and dorsally of the opisthosoma of the paratype some larger bubbles are preserved. No stellate hairs.

Diagnosis (♂, ♀ unknown): Pedipalpus (fig. 12) (the bulbus is not observable in a direct ventral position!): Embolus thick, describing less than one circle, tegular apophysis large, conductor of medium size.

Description (♂):

Measurements (in mm): Body length 3.3-4.1, prosoma: Length 1.2, width 1.45, tibiae about 1.0, III slightly shorter, tibia of the regenerated left leg III of the holotype 0.4.

Colour: prosoma light brown, legs dark brown, opisthosoma yellow brown.

Body and legs as in the genus, eyes and protuding clypeus as in fig. 15a, legs robust, III slightly shorter than the other legs, numerous short leg bristles, femoral bristles distinctly shorter than the diameter of the article. One metatarsal trichobothrium in the distal half.The left leg III of the holotype is a shortened and bristle-less regenerate. Opisthosoma with short hairs. Spinnerets as in the family. ♂-pedipalpus: Compare above.

Behaviour: Because of the position of the two males face-to-face and nearly in contact - compare above and the photo - both may have been preserved when fighting against each other as rivals.

Relationships: See *M. spirembolus* n.sp.; in *spirembolus* and *blauvelti* sensu (!) PETRUNKEVITCH 1958 the embolus is thinner.

Distribution: Tertiary Baltic amber forest.

***Mizalia spirembolus* n.sp.** (Fig. 13) Photo 96

Material: 2♂ in Baltic amber, holotypus F54/BB/AR/OEC/CJW, paratypus F593/BB/AR/ OEC/CJW.

Preservation and syninclusions: The holotype is only partly preserved, already in the amber large right body parts and right legs have been lost, parts of the legs have later been cut off within the amber on a layer. Numerous loose hairs and a loose leg – detached after the coxa - show that the spider did try to get free from the resin. The left pedipalpus is loose and very well preserved. – In the amber piece also stellate hairs, large parts of a web with droplets with a spider (?juv. Theridiidae), a notparasitic Acari: ?Tydeidae (det. M. Judson) and a questionable Fungus (fig. 13a) - which is nearly 0.8 mm long - are preserved. - The paratype is fairly well preserved, parts of the lefs I and II and of the dorsal surface of the opisthosoma are cut off, a bubble is preserved ventrally on the opisthosoma; few stellate hairs.

Diagnosis (♂, ♀ unknown): Pedipalpus (fig. 13): Embolus long and describing 1 1/2 circles, fairly thin, tegular apophysis fairly large, conductor large, wide distally, arising at the centre.

Description (♂):
Measurements (holotype, in mm): Body length about 3.5, metatarsus I 1.0, leg IV: Tibia 0.95, me-tatarsus 1.1, tarsus 0.65.
Most parts of body and legs are lost, compare above. Legs with numerous short bristles. Pedipalpus: See above.

Relationships: In *blauvelti* sensu PETRUNKEVITCH 1958 (fig.15) (?= *blauvelti*) and *geminus* n.sp. the conductor is smaller and most parts are hidden by the embolus; in both species the embolus is shorter, in *gemini* it is also distinctly thicker.

Distribution: Tertiary Baltic amber forest.

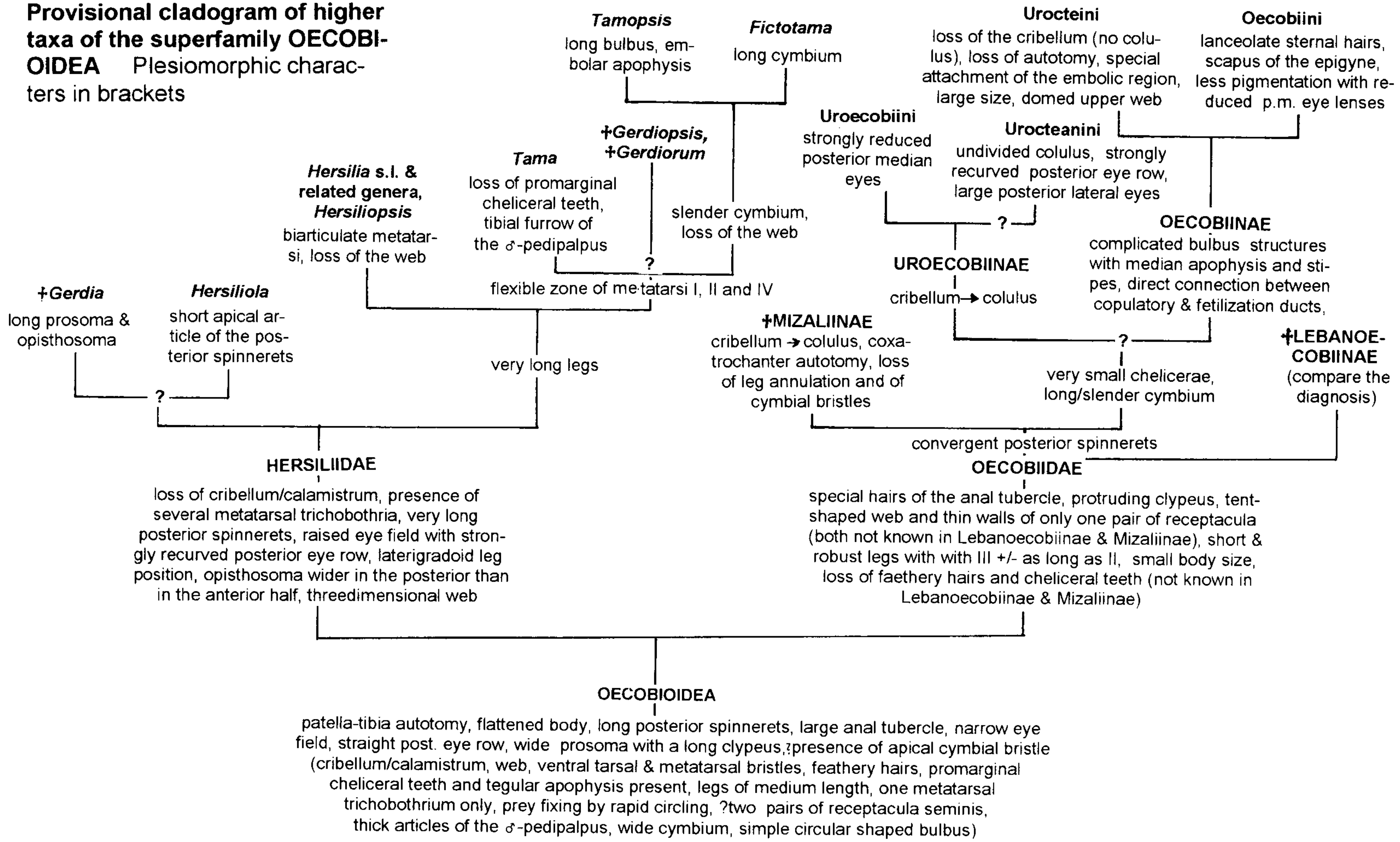
EVOLUTION AND CLADOGRAM

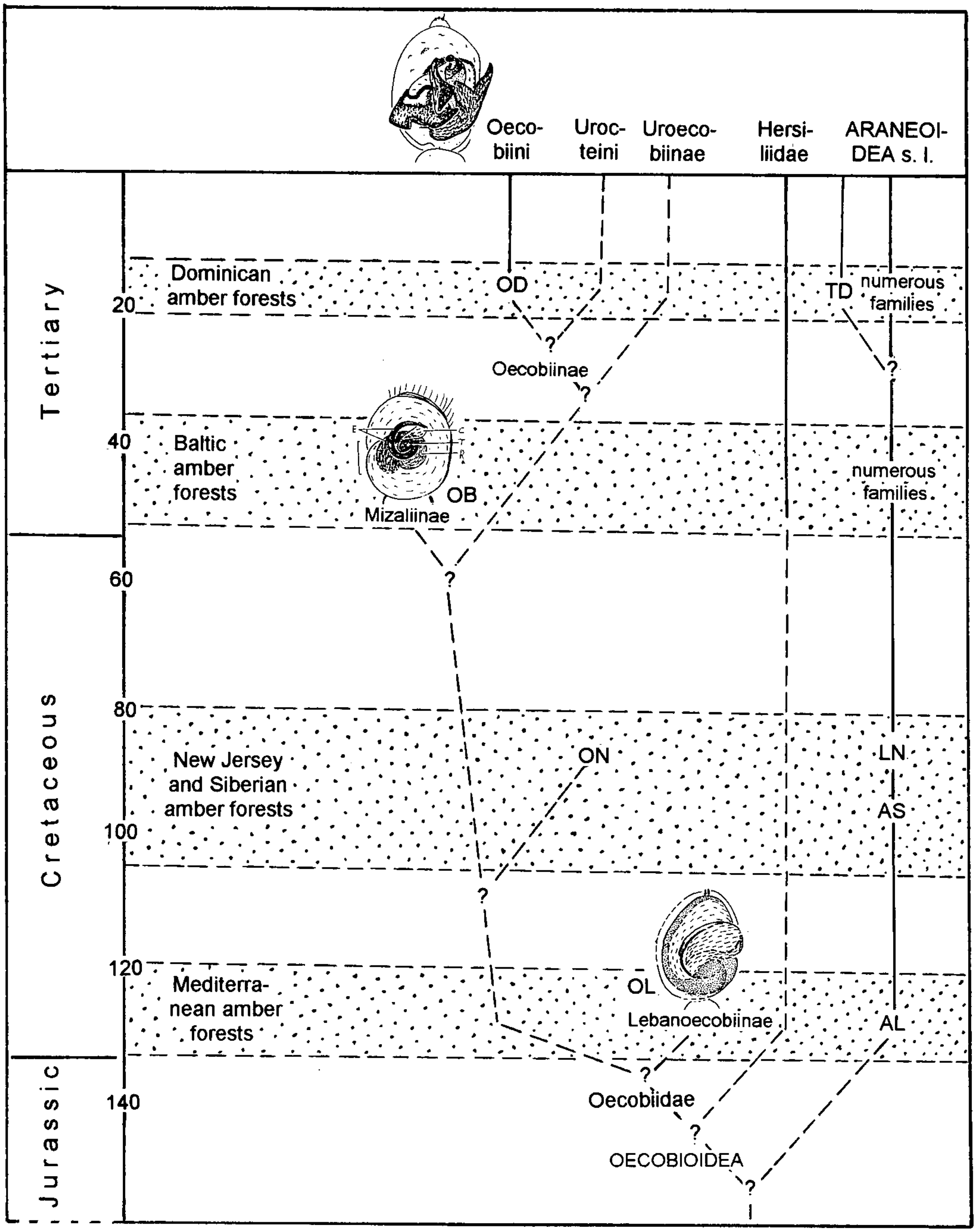
See BAEHR & BAEHR (1993: 79-87).

The male genital structures in the fossil and extinct Hersiliidae and Oecobiidae are simple, more simple than in most extant confamiliar taxa. In extant taxa of both families there exist simple as well as complicated bulbi, compare figs. 12 and 17 with figs. 21, 24-25. The simple bulbi in the ecribellate extinct genus *Mizalia* and the ecribellate extant genus *Uroecobius* are quite different, see figs. 12 and 17 and both genera are surely not closely related. – An important question is: Are the simple bulbi primarily primitive or reduced secondary? In my opinion the simple bulbi of the Early Tertiary spiders (figs. 7, 12) are more likely primitive, and such structures as the „median apophysis“ (= tegular apophysis) evolved several times independently in this superfamily, see my paper „Intrafamiliar evolution...“ in this volume. This opinion fits well with the findings of the primitive fossils in Lebanese and Baltic amber. Probably the simple bulbi of *Lebanoecobius* (Oecobiidae, fig. 30) and *Gerdiorum* (Hersiliidae, fig.7a) – similar in *Mizalia* (Oecobiidae, fig.12) - are models for the basic male genitalia in the Oecobioidea. Genera in which the bulbus structures are very complicated – some *„Hersilia“*, *Tamopsis*, *Uroctea*, *Oecobius* (figs.21, 24-25) – seem to be „modern/young“ taxa which are absent in the old Cretaceous Lebanese and Early Tertiary Baltic ambers but one "modern" taxon is present in the younger Dominican amber (*Oecobius*), see WUNDERLICH (1988). Probably the taxa besides Lebanoecobiinae evolved not before the Early or even Middle Tertiary. According to BAEHR & BAEHR (1987: 401) the genera *Tamopsis* and *„Hersilia“* (s.l.) did not arrive Australia before the Miocene.

According to BAUM (1974: 151) the bulbus structures of the Oecobiinae (= Oecobiidae sensu BAUM) correspondend with the general structures of the Araneae-pedipalpus and there are no synapomorphies. In 1974 BAUM did not know the simple bulbi of *Lebanoecobius* n. gen. and *Uroecobius* KULLMANN & ZIMMERMANN 1976 and apparently also did not know the simple bulbus of the fossil genus *Mizalia* KOCH & BERENDT 1854. The bulbi of several genera of the Oecobioidea – *Oecobius*, *Uroctea*, some *„Hersilia“* – possess some of the most complicated structures in „prae-RTA-clade“ spiders. The bulbus structures of these taxa are quite different and there is no indication that these are all of the same basic type. If the evolution would have been

Provisional cladogram of higher taxa of the superfamily OECOBIOIDEA Plesiomorphic characters in brackets





Possible CHRONOcladogram of higher taxa of the superfamily Oecobioidea and selected taxa of the Araneoidea which are known extant and from amber.
Compare the figs. of the simple bulbi of the fossil Lebanoecobiinae and Mizaliinae with the complicated bulbus of the extant Oecobiinae: Oecobiini.
AL = Araneidae indet. in Lebanese amber, AS = Araneidae indet. in Siberian ambers,
LN = Linyphiidae indet. in amber from New Jersey, OB = Oecobiidae: Mizaliinae in Baltic ambers,
OD = Oecobiidae: Oecobiinae: Oecobiini in Dominican ambers,
ON = Oecobiidae indet. in amber from New Jersey, TD = Tetragnathinae in Dominican ambers

directed from complicated to simple bulbi in the Oecobioidea we must suppose about a dozen lineages of simplifications. In my opinion this hypothesis is highly unlikely: **In the Early Tertiary Baltic amber spiders complicated bulbus structures of the Oecobioidea are completely absent!** To my knowledge in the fossil Young Tertiary Dominican amber spiders of the genus *Oecobius* (Oecobiini) complicated bulbus structures appaered for the first time in the superfamily Oecobioidea.

The relationships of the genera of the Hersiliidae are more unsure to me than the relationships of the genera of the Oecobiidae, see my cladogram and the cladogram in the paper of BAEHR & BAEHR (1993: 83). The extinct genus *Gerdia* and the extant genus *Hersiliola* are perhaps no sister groups, the long-oval shaped prosoma of *Gerdia* – see fig. 2; correctly drawn by MENGE (1869)? – and the short apical article of the posterior spinnerets in *Hersiliola* <u>may be</u> plesiomorphic characters.
The often flexible or biarticulate metatarsus I, II and IV in most Hersiliidae seem to be an adaptation to the long legs. In the more short-legged - and probably most primitive - genera *Gerdia* and *Hersiliola* the metatarsi I, II and IV are not flexible or biarticulate and similar to metatarsus III.

Autotomy is diverse in the superfamily Oecobioidea. The special kind of autotomy between patella and tibia in all legs in all taxa of the family Hersiliidae probably also is an adaptation to the long legs. Already in the primitive Cretaceous Lebanoecobiinae a patella-tibia autotomy is present. In the extant Urocteini - which do not have long legs - autotomy is absent (pers. observ.). Most taxa of Oecobiini feed on ants and loss of their leg articles after the patella often happens (pers. observ. in extant spiders). Ants are aggressive animals and possess powerful mouth parts; so the special kind of patella-tibia autotomy in *Oecobius* and related genera (Oecobiini) as well as the coxa-trochanter autotomy in the Early Tertiary Mizaliinae may be adaptations to their dangerous prey, photo 96.

Cribellum and **calamistrum** are lost at least four times in the Oecobioidea: In Hersiliidae, Mizaliinae, Uroecobiinae, Urocteini (also a colulus is absent) and probably separately in the genus *Urocteana* (?Uroecobiinae). In *Mizalia* (C in fig. 11) the colulus is large and as wide as a cribellum. According KRAUS & KRAUS (pers. commun.) this structure is not a cribellum.

A straight **position of the posterior eye row** seems to be a plesiomorphic character in the Oecobioidea, a strongly recurved posterior eye row evolved two times in this superfamily: As apomorphies of the Hersiliidae and of the Urocteanini.

<u>Addendum during press</u>: The results of WU CHEN et al. (2002), Acta arachnol. Sinica, <u>11</u> (2) "does not support the *Uroctea* and *Oecobius* being placed in the same family. These authors used the "third domain of 12S rRNA gene sequence analysis". The results of these authors are in strict contrast to my findings as this is not unusual when genetic and morphological results are compared. It is a pity that some authors of genetics are not firm with the morhology of their subjects - animals but not molecules! - of their investigation.

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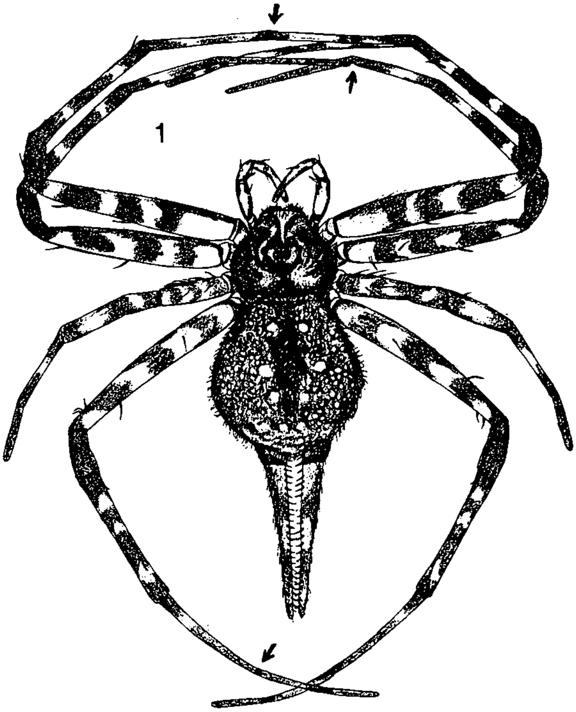
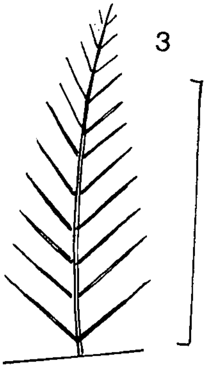
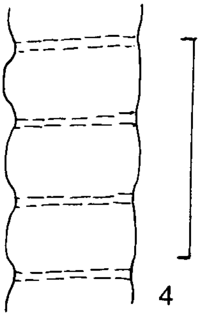






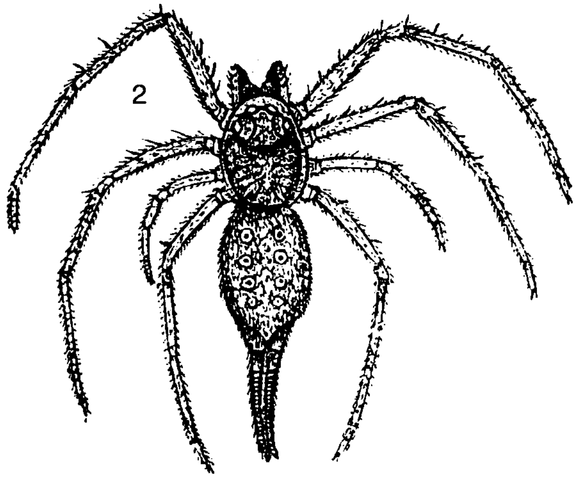
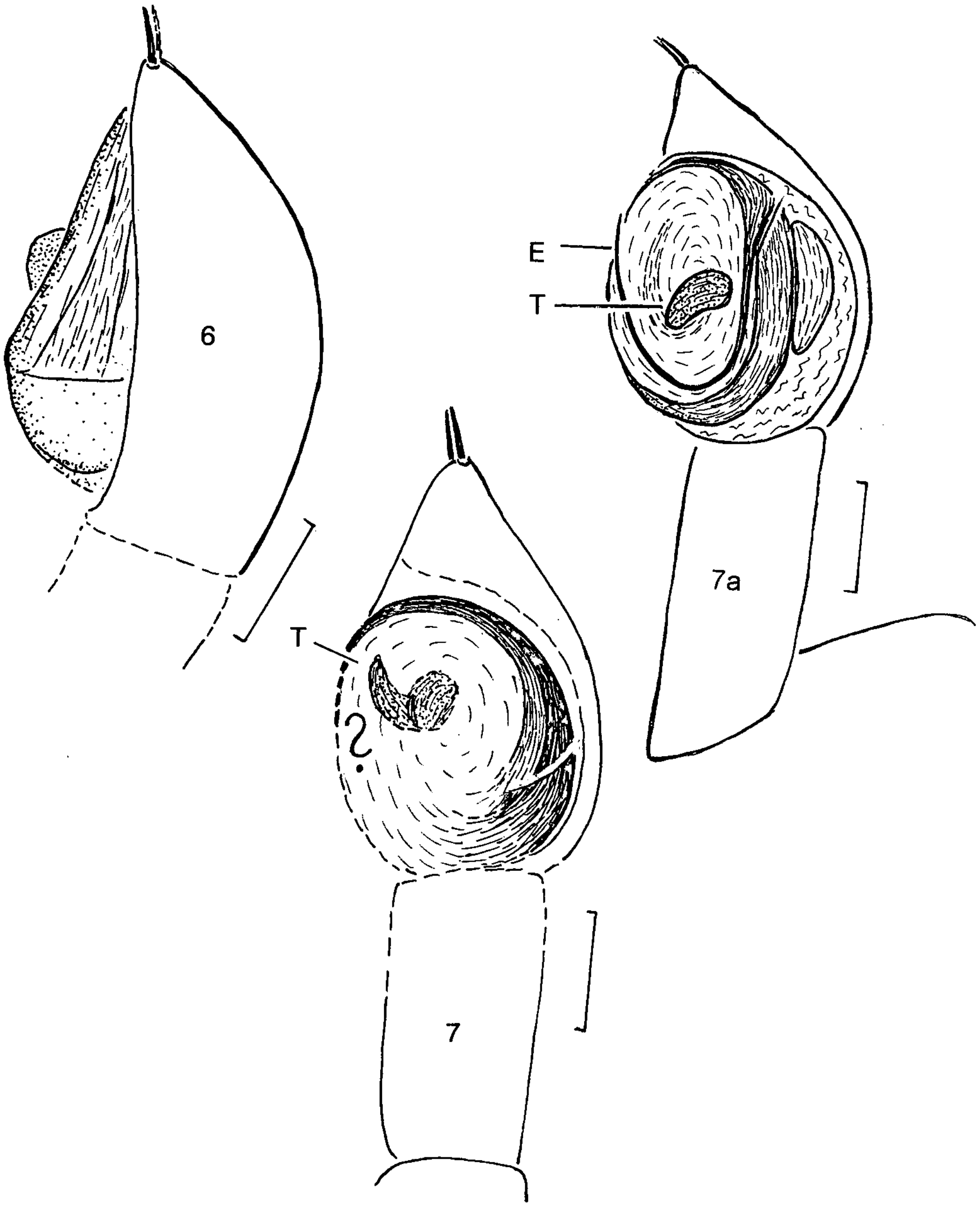


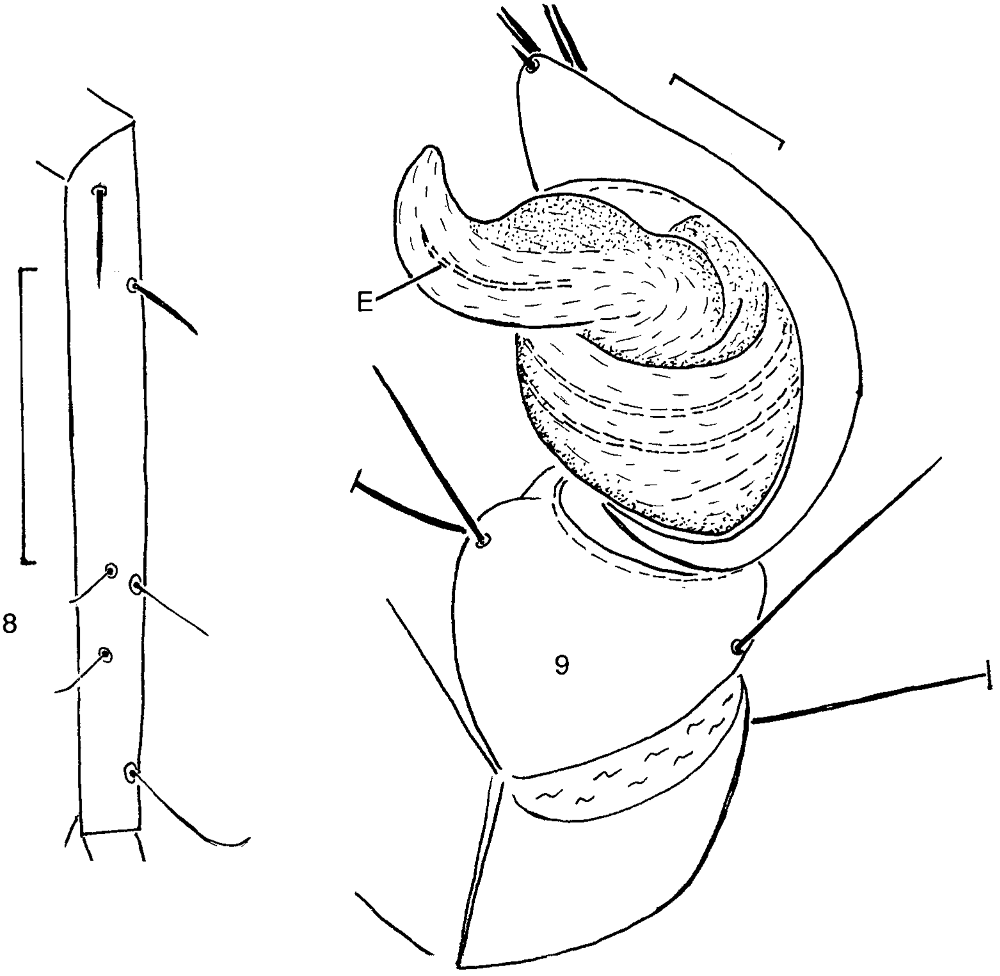
Fig. 1: ***Hersilia*** sp., ♀, extant, body dorsally. The arrows indicate the biarticulate legs I. II and IV. Taken from DIPPENAAR-SCHOEMAN & JOCQUE (1998: Fig. 82a);

fig. 2: ***Gerdia myura*** MENGE 1869, ♀, extinct, in Baltic amber, body dorsally. Taken from MENGE (1869: Fig. 2);

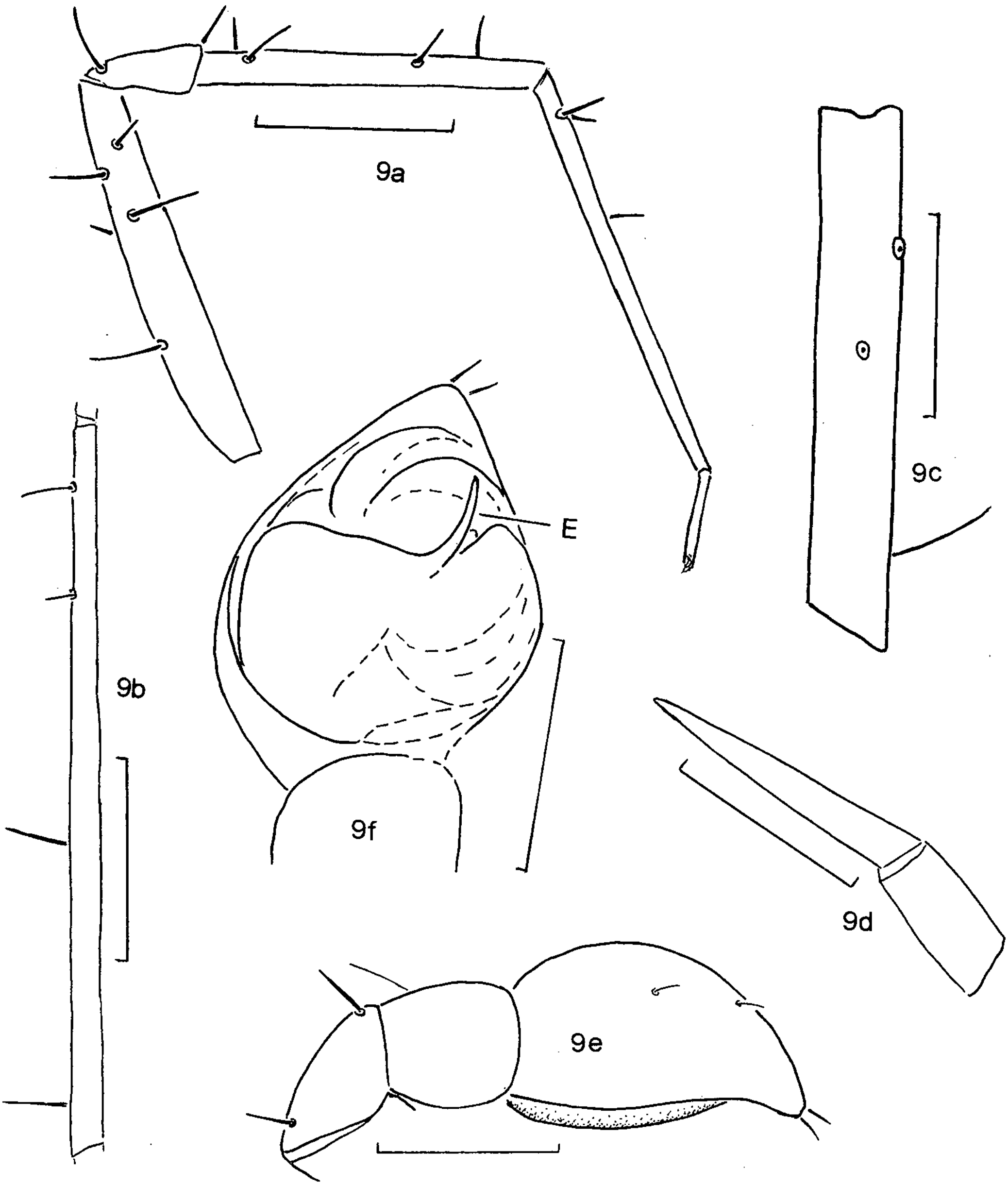


figs. 3-7: ***Gerdiopsis infrigens* n.gen.n.sp.**, ♂, extinct, in Baltic amber; 3) feathery hair from the margin of the prosoma; 4) small part from the middle of the right metatarsus I with pseudosegments; 5) left tarsus and metatarsus III retrolateral with 2 pairs of trichobothria in distal position; 6-7) l. pedipalpus retrolaterally and ventrally (partly hidden and reconstructed). – T = tegular apophysis. M = 0.05mm in fig. 5, 0.1 in fig.3 and 0.2 in the remaining figs.;

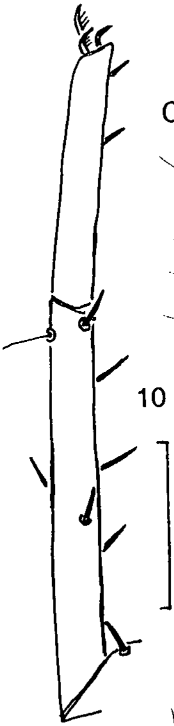
fig.7a: ***Gerdiorum inflexum* n.gen.n.sp.**, ♂, extinct, in Baltic amber, l. pedipalpus retroventrally. - E = embolus, T = tegular apophysis. M = 0.2;



figs. 8-9: ***Hersiliopsis madagascariensis* n.gen.n.sp.**, subfossil in copal from Madagascar ♂; 8) r. metatarsus III retrolaterally; 9) l. pedipalpus retroventrally. M = 0.5mm in fig.8, 0.2 in fig.9;



figs. 9a-f: ***Hersiliana brevipes* n.gen.n.sp**., subfossil in copal from Madagascar, ♂, 9a) l. leg I with bristles prolaterally; 9b) r. metatarsus IV with two bristles in the basal half and two trichobothria in the distal half retrolaterally; 9c) l. metatarsus III with a basal bristle and two trichobothrial bothria retrolaterally and slightly basally (hairs are not drawn); 9d) outine of the l. posterior spinneret ventrally; 9d) l. pedipalpus prolaterally and slightly basally; 9e) r. pedipalpus ventrally-basally.- E = embolus. M = 1.0mm in fig. 9a), 0.5 in 9b) and d), 0.2 in the remaining figs;



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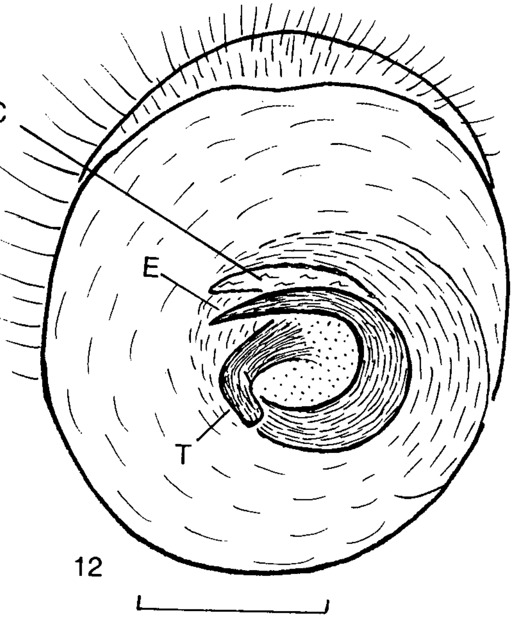

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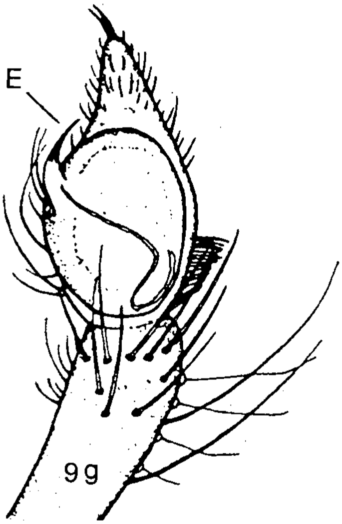

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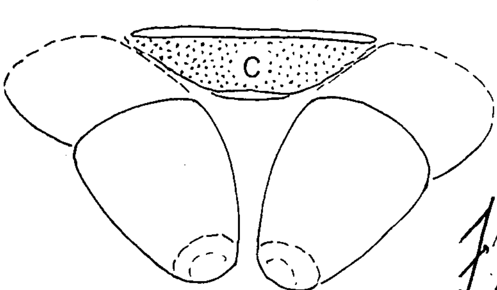

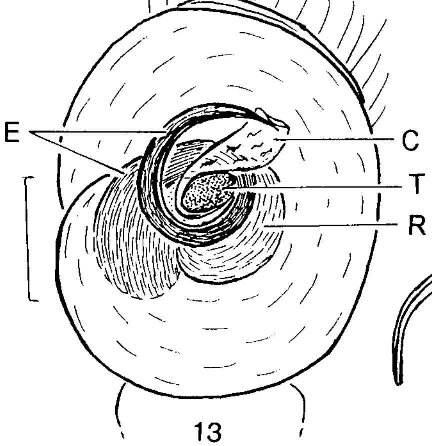

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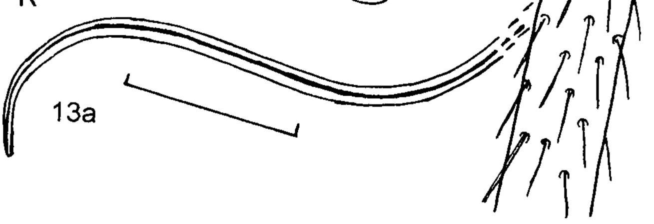

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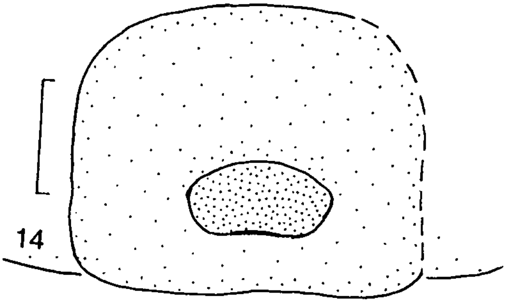
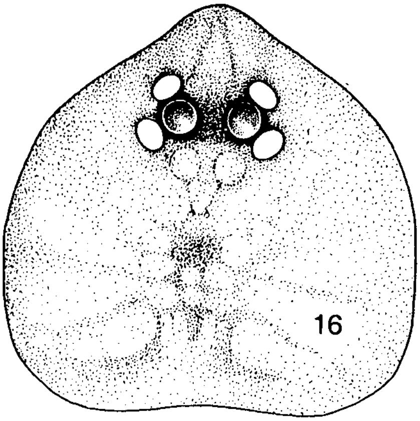
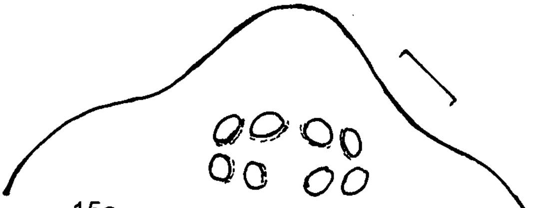
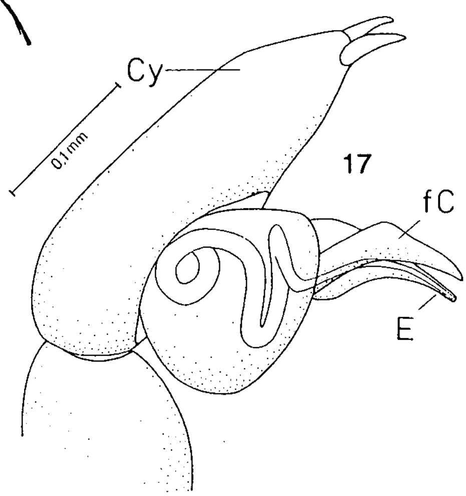
fig. 9g: ***Tama edwardsi*** (LUCAS 1846) (extant), ♂, l. pedipalpus ventrally. Taken from RIBERA et al. (1986: Fig. 3);

fig. 10: ***Mizalia*** sp., ♂, fossil in Baltic amber, left tarsus and metatarsus I retrolaterally;
fig. 11: ***Mizalia*** sp., ♀ (F49/BB/AR/OEC/CJW), spinnerets and calamistrum (C) ventrally. M = 0.5 in fig.10 and 0.2 in fig.11;
fig. 12: ***Mizalia gemini* n.sp.**, ♂, holotype, r. pedipalpus ventrally-apically. M = 0.2mm;
fig. 13**:** ***Mizalia spirembolus* n.sp.**; ♂ (holotype), l. pedipalpus ventrally. M = 0.2. C = conductor, E = embolus, R = radix, T = tegular apophysis;
fig. 13a: A questionable Fungus hypha on a loose metatarsus of the holotype of *Mizalia spirembolus* n. sp.









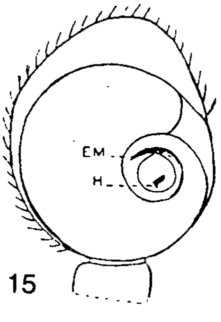
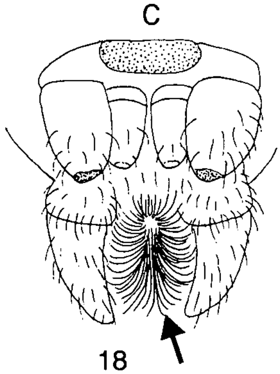


fig. 14: **Mizalia** sp., ♀, (CJW), epigyne; a bubble in the opening of the epigyne has not been drawn. M = 0.2;

fig. 15: **Mizalia ?blauvelti** sensu PETRUNKEVITCH 1958, ♂, r. pedipalpus ventrally. Taken from PETRUNKEVITCH (1958: Fig. 8);
fig.15a: **Mizalia** sp.,♂, (F55/BB/AR/OEC/CJW), position of the eyes dorsally. M = 0.2;

figs. 16-17: **Uroecobius ecribellatus** KULLMANN & ZIMMERMANN 1976, ♂ (extant); 16) prosoma dorsally; 17) l. pedipalpus prolaterally. Cy = cymbium, fC = functional conductor. - Taken from KULLMANN & ZIMMERMANN (1976: Figs. 2 and 7);



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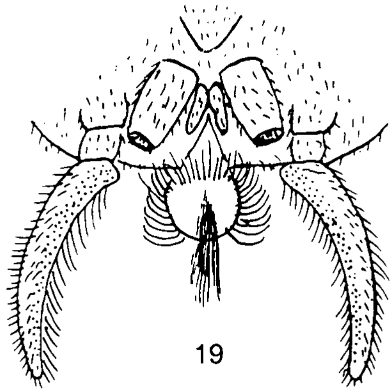

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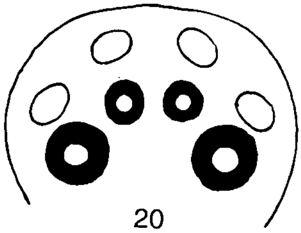

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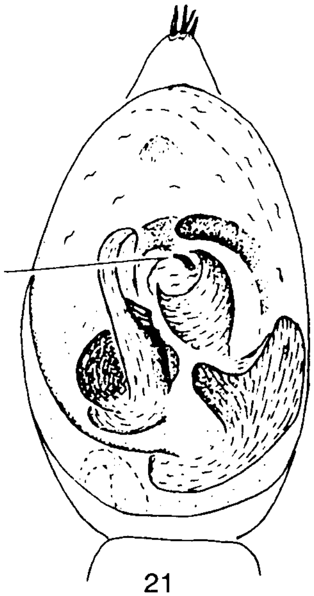

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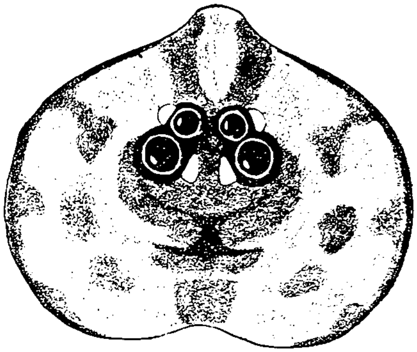

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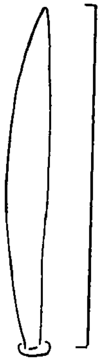

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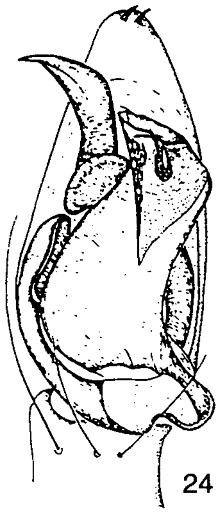
fig. 18: **Oecobiini** sp., extant, spinnerets and anal tubercle (arrow) ventrally. Taken from DIPPENAAR-SCHOEMAN & JOCQUE (1997);

figs. 19-20: ***Urocteana poecilis*** ROEWER 1961, juv., extant; 19) spinnerets, colulus and anal tubercle ventrally; 20) eye position dorsally. Taken from ROEWER (1961: Figs. 4c,a);

fig. 21: ***Oecobius*** sp., ♂, extant, r. pedipalpus ventrally (E = embolus);
fig. 22: ***Oecobius*** sp., extant, prosoma dorsally. Taken from SHEAR (1970: Fig. 22):
fig. 23: ***Oecobius*** sp., ♂, extant, lanceolate hair of the margin of the sternum. M = 0.1: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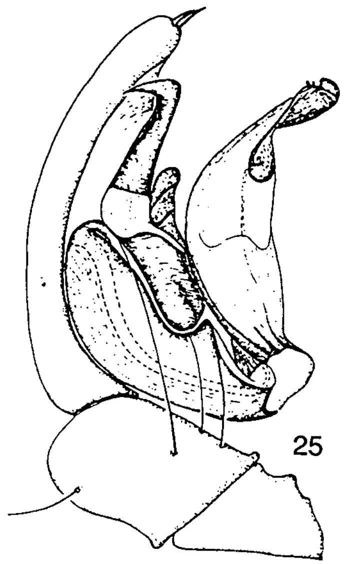
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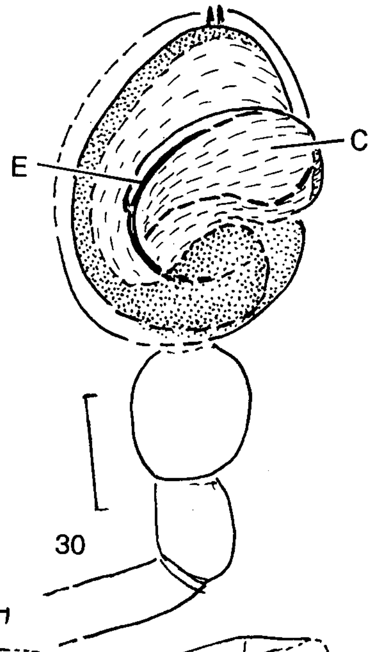

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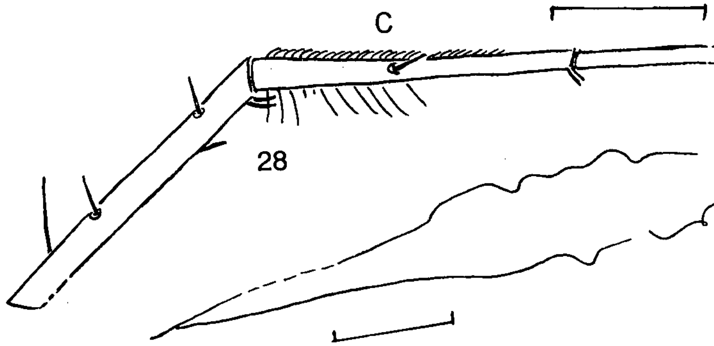

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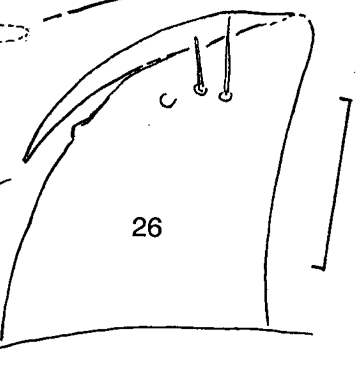

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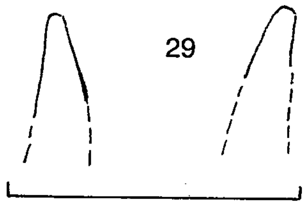
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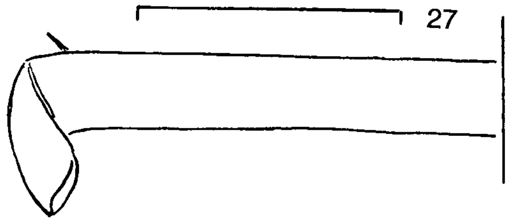
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figs. 24-25: ***Tamopsis*** sp., ♂, extant, Australia, complicated r. pedipalpus ventrally and retrolaterally. Taken from BAEHR & BAEHR (1987: Figs. 2d-e);

figs. 26-31: ***Lebanoecobius schleei*** **n.gen.n.sp**., ♂; 26) l. chelicera ventrally; 27) l. patella and distal part of the tibia I ventrally, with loss of the distal leg articles by autotomy; 28) distal articles of the left leg IV retrolaterally with the metatarsal calamistrum (C); 29) outline of the posterior spinnerets ventrally; 30) l. pedipalpus proventrally and apically; (C = conductor, E = embolus); 31) two ?signal threads of the web near the male. M = 0.5mm in figs. 27-28, 0.1 in the other figs.

These two books introduce to the diversity of fossil spiders which are mainly preserved in Baltic amber; they open a "window to a vanished world". Fossil spiders in old amber and young copal are compared with now-living relatives. These volumes are addressed to scientists as well amateurs which are interested in the fascinating inclusions of fossil resins which go back up to 130 million years, the era of dinosaurs.

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