BEITR. ARANEOL., 16 (2023) JOERG WUNDERLICH

PAPERS ON EXTANT AND FOSSIL SPIDERS (ARANEIDA)

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BEITRAEGE ZUR ARANEOLOGIE (BEITR. ARANEOL.), 16 (2023)

ISBN 978-3-931473-23-6

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Print: Baier Digitaldruck GmbH, Heidelberg.

Photo on the front cover: Dorsal aspect of a beautiful preserved male spider (*Insecutor spinifer* WUNDERLICH 2004), of the extinct family Insecutoridae in Baltic amber, body length 4.5 mm.

Acknowledgements: I thank very much my wife Ruthild Schöneich for correcting a part of the manuscript, Alexander Beigel for taking most of the nice photos by the stacking method, using stackmaster, as well as A. Beigel and Patrick Müller for providing me with fossil spiders.

In this vol.16 of the Beitr. Araneol. a paper on extant spiders (Araneida: Araneae) of the Algarve, Portugal, two papers on fossil – Eocene (Baltic) and Upper (Mid) Cretaceous Kachin (Burmese) – spiders, a paper regarding the etymology of the Chimerarachnida (Arachnida: Araneida), some corrections regarding vol. 15 (2022) of the Beitr. Araneol., on the classification of biota, and two short papers on spiders' spinning organs are united.

BEITR. ARANEOL., 16 (2023)

CONTENTS

BEITR. ARANEOL., 16: 4-112 (2023)

CONTRIBUTION TO THE SPIDER (ARANEIDA) FAUNA OF THE ALGARVE, PORTUGAL, WITH NOTES ON THE PHYLOGENY OF THE SUPERFAMILY ARANEOIDEA AND THE DESCRIPTION OF THE NEW ARANEOID FAMILY FONTEFERRIDAE

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Abstract: The following spider (Araneida: Araneae) taxa from the Algarve, Portugal are described/treated: Oonopidae: *Orchestina fonteferrea* **n. sp**., and *O.* ?*simoni* DALAS 1916; Dysderidae: *Dysdera algarvensis* **n. sp**. and *D. algarvula* **n. sp.**; Eresidae: *Adonea algarvensis* WUNDERLICH 2017; Theridiidae: *Enoplognatha minuscula* **n. sp**., *Neottiura curvimana* (SIMON 1914), *Theridion modonatum* **n. sp**.; Linyphiidae: *Agyneta pseudorurestris* WUNDERLICH; *Frontinellina frutetorum* (C. L. KOCH 1875), *Gonatium hilare* (TORELL 1875), *Palliduphantes lancea* **n. sp.,** *Palliduphantes juliao* WUNDERLICH 2021, *Styloctetor romanus* (O. PICKARD-CAMBRIDGE 1871), *Walckenaeria corniculans* (O. PICKARD-CAMBRIDGE 1875); Fonteferridae **n. fam**. (Symphytognathidan branch): *Fonteferrea minutissima* **n. gen. n. sp**.; Araneidae: *Cyrtophora citricola* (FORSSKAL 1775); Zodariidae: *Zodarion brevicephalus* **n. sp**. (a sibling species of *Z. styliferum* (SIMON 1870)); Hahniidae: *Iberina harmae* **n. sp**.; Lycosidae: *Alopecosa albofasciata* (BRULLE 1832); Zoridae: *Zora manicatoides* **n. sp**.; Liocranidae: *Mesiotelus mauritanicus* (SIMON 1914), Gnaphosidae: *Algarvezelotes unidentatus* **n. gen. n. sp**., *Berlandina collisarenosa* **n. sp**., *Callilepis bifurc-*

ata **n. sp**., *Drassodes arenosus* **n. sp**., *Micaria* sp. indet., ?*Scotophaeus pregoensis* **n. sp**., *S.* ?*nanoides* WUNDERLICH 2011, *Zelotes baeticoides* **n. sp**., *Zelotes* (*Urozelotes*) *clarus* **n. sp**.; Thomisidae: ?*Ebrechtella patellamaculata* **n. sp**.; Philodromidae: *Thanatus virgulatipes* **n. sp**.; Salticidae: *Aelurillus quercussuber* **n. sp**., *Euophrys marusiki* **n. sp**. - New to the fauna of Portugal: *Orchestina longipes* DALSMAS 1916 (Oonopidae) and *Dictyna kosiorowiczi* (KEYSERLING 1863) (Dictynidae). - Synonymy and new combinations: Linyphiidae: *Algarveneta* WUNDERLICH 2021 is a juniour synonym of *Canariphantes* WUNDERLICH 1992; Gnaphosidae: ?*Synaphosus parviocoli* WUNDERLICH 2022 is transferred to *Zelotes* (**n. comb.**). *Urozelotes* MELLO-LEITAO 1938 is regarded as a subgenus of *Zelotes* GISTEL 1848 in the wide sense (**n. rank**), *mysticus* PLATNICK & MURPHY 1984 and *rusticus* are regarded as members of *Zelotes* s. l. - Salticidae: *Icius lamellatus W*UNDERLICH 2011 is synonymized with *Icius subinermis* SIMON 1837 (**n. syn**.).

Notes on various further taxa are provided as well as reflections on the origin of the orb web and the phylogeny of higher taxa of the superfamily Araneoidea: The apparently older cribellate orb web and the apparently younger ecribellate (araneoid) orb web are regarded to be of different origins; it is suggested that the webs evolved separately (convergently), and only a single time WITHIN the Araneoidea. The capture web of the Araneoidea is considered to be basically irregular (not an orb web), see fig. A p. 27. “Orbiculariae” is not considered to be a taxon but nothing else than a “descriptive term” of parts of the superfamilies Araneoidea and Deinopoidea. - Remarks are given regarding the splitting of the family Araneidae and on an erroneous Cretaceous report of the Nephilinae. - The unusual existence of hairs on the tegulum is reported in extant and fossil spider taxa of 5 families; see the family Fonteferridae n. fam. - A list is given to the remarkable small body size of several species of various families of the Algarve. - Due to the recently discovered rare and probably even endemic spider species of parts of the Algarve – valleys, sources small streams near Sao Bras de Alportel - are regarded as ”hot spots” of spider endemism. The “relic” fauna of such areas is urgently needed for their protection - e. g., as national reserves -, to preserve animals of an almost vanished fauna.

Selected key words: Algarve, Araneae, Araneoidea, body size, Fonteferridae, phylogeny, Portugal, Spain, spiders, Symphytognathidan branch, tegular hairs.

Most of the **material** is kept in the collection of Jörg Wunderlich (CJW) and will soon be given to the Zool. Inst. Hamburg, Dept. of Arachnology (Danilo Harms). Most of the previously described material from Portugal has already been given to the Zool. Inst. Hamburg and to Senckenberg (SMF, Peter Jäger) as well.

INTRODUCTION

During the last 10 years I have collected and described for the first time more than 30 spider species of 14 families in the beautiful Algarve in southern Portugal, recently seven new species, see WUNDERLICH (2022). The spider fauna of the southern part of the Algarve includes introduced elements like the North African genus *Adonea* (Eresidae), see WUNDERLICH (2017) and see below, as well as strange and peculiar taxa like *Fonteferrea minutissima* of the new described family Fonteferridae. The region of the southern Algarve turned out to be a "hot spot" of spider diversity which includes numerous endemics; see below, note (4). It is remarkable that the endemism of ancient ("primitive") spiders is relatively highest, so in members of the Mygalomorphae, in the Filistatidae (one of two species), in the Segestriidae (100% of the genus *Ariadna*), and in the Dysderidae: In the Algarve I discovered only two species and both were still undescribed. - Several not yet determined species of my collection, based on non adult or only female specimens - and the unsystematic way of collecting without the use of pit falls - indicate that an unknown high number of probably dozens of unknown spider species of this area is still waiting for discovery and description, mainly of the hiding Gnaphosidae as well as probably of the Agelenidae, Linyphiidae, Lycosidae, Theridiidae, Salticidae and the fast running Zodariidae. Due to their tininess – body length about 1 mm or even less in the male sex – some species like *Orchestina fonteferrea* n. sp., members of the genus *Lasaeola* s. l. and especially of the very tiny *Fonteferrea minutissima* n. sp. were apparently previously overlooked. According to my observations species of the genus *Ariadna* (Segestriidae), e. g., are not at all rare animals but are hidden in tubes (difficult to capture) and below stones and bark, the males quite short-living and the females difficult to determine. Specimens of *Ariadna* turned out to be most frequent spiders in the Algarve, similar to certain members of the Mygalomorpha whose members hide in tubes in the earth. The reason for spiders to be "hidden" in quite another way may be their tininess like members of *Lasaeola* or "hidden" by their strong similarity with already known species, like *Zodarion brevicephalus* n. sp. and certain species of *Lasaeola*.

In former years I collected Portuguese spiders mainly around Tavira, on the islands nearby of the nature park Ria Formosa: Barrill, Island of Fuseta (Fuzeta), Peninsula of Manta Rota. The spider fauna of the biotopes of these areas is still not completely known. I have been searching for spiders in the dunes of the Ria Formosa but recently more – ca. 20 km - in the Northwest, mainly around Sao Bras de Alportel, as I live in **a house with a small garden in Mesquita Alta**, 4 km east of Sao Bras de Alportel, in the low mountains, height ca. 315 m, N 37°09'11" W 07°50'29". A part of this garden is somewhat a "wilderness" which is covered by wild and garden flowers like numerous species of Compositae, *Oxalis pes-caprae, Narcissus* sp. and *Borago*, stones, walls, grasses, parched earth as well as various bushes and trees like carob (*Alpharroba*), *Ricinus*, *Oleander* and holly oaks – an area of various mosaic-like placed habitats. One can occasionally observe the hoopoe and hear the nightingale as well as the oriole; some years ago even a chameleon was observed in this garden where I also found two species of snakes, one of them is the peculiar Iberian worm snake *Blanus cinereus* (Typhlopidae) which looks like a giant earthworm and lives subterraneously.

In this small garden – about 25 x 35 m – I found about 60 spider species of 32 families (1); which include about half a dozen species which were new to science as well as few new records for the fauna of Portugal. Various of these species are members of the family Gnaphosidae whose members are fast runners and are most often nocturnal (not the ant-shaped species) and are quite dark coloured, e. g., members of the diverse genus *Zelotes* s. l. One of the most conspicuous and quite frequent larger species of this garden is the Jumping spider *Menemerus semilimbatus* of the family Salticidae which is frequently hunting in the sun on stones and walls (2). Remarkable further spider species are, e. g. (a) the dark coloured *Ariadna* ?*algarvensis* (Segestriidae), hidden, but quite frequent spiders, living, e. g., under stones, whose leg III is directed forewards (a unique family character in spiders!) whose females may live more than five years in contrast to the short-living and rarely collected males which die after a few weeks in Spring, (b) the poisonous *Loxosceles rufescens* (Sicariidae; frequent, under stones, also in the house) whose slender legs are directed sidewards, (c) the nocturnal *Dysdera algarvensis* n. sp. (Dysderidae) whose rare members hide at day time under stones (during 15 years I found only three specimens in a single locality), (d) *Theridion bernardi* (Theridiidae; not rare on bushes, described only few years ago), (e) the tiny dwarf spider *Diplocephalus toscanensis* (Linyphiidae; under stones), (f) the huge *Zoropsis spinimana* (Zoropsidae; not very rare, under stones) and (g) the fairly ant-like *Phrurolinillus flavitarsis* (Corinnidae; not rare, resting under stones, hunting in the sun) (3). - In the garden or not far from it I found, e. g., diverse Mygalomorpha indet., the tiny *Orchestina fonteferrea* n. sp. (Oonopidae), the nice *Zora manicatoides* n. sp. (Zoridae) and the large and beautiful Jumping spider *Philaeus chrysops* in which the male possesses a conspicuous red opisthosoma in contrast to the dark coloured female. In *Adonea algarvensis* from the Ria Formosa an unusual sexual colour dimorphism exists: The female opisthosoma is uniformly black but the male opisthosoma bears dorsally a quite different black and white pattern.

Gardens like the present one are refuges for animals like spiders which are more and more strongly endangered by plantations, sealing the soil, fires and drought. - Not far away from this garden, 3-4 km N and NE Sao Bras de Alportel, few sources exist as much more important refuges of spider species and endemics, along the Ribeira de Alportel (see the chapter "Protection ..." below), e. g., Tareja, about half a kilometre north of the **Fonte Tareja** (a source), 37.180232 – 7.875262. Here I collected spiders in a quite small area of about 30 square meters, by hand on a run way and mainly with the help of pit falls under cork oaks - and nearby flowering orchids of *Epipactis helleborinae* - in a thick layer of leaves and detritus, and I found numerous species of spiders like members of *Oecobius machadoi* and *Canariphantes* ?*zonatus* as well as some very rare ones and even half a dozen new described spider species of several families, like *Zodarion brevicephalus*, *Iberina harmae*, *Algarvezelotes unidentatus*, *Aelurillus quercussuber* and *Euophrys marusiki* - an extraordinary accumulation of apparently rare and probably endemic species! Furthermore I observed – but did not collect – a giant grey egg bearing female of the family Araneidae, and I collected a quite unusual juvenile of the Linyphiidae: Erigoninae, see below.

I COLLECTED spiders by hand, e. g., by beating from bushes on an umbrella, caught them in detritus, under stones and tiles or under bark on the ground; rarely I used pit falls, but the space below stones and tiles provides effective traps. Spiders not of interest and most juveniles were not collected, but unusual/remarkable nonadult specimens were kept alive and fed, usually with flies, ant-eating Zodariidae were fed with ants and spider-eating Mimetidae with spiders. This way I got few species new to science only from subadults, e. g., two males of *Enoplognatha minuscula* n. sp., the holotype of *Zelotes* (*Urozelotes*) *clarus* n. sp. as well as spiders of the genera *Palliduphantes* and *Theridion*.

Collecting spiders – not only in the Algarve - may be dangerous: Poisonous animals like snakes, scorpions, spiders like the Black widow may bite or sting you if they are disturbed. A large wasp attacked me and stung me immediately in the left arm. The pain was not the problem but much more the unpleasant allergic reaction like a swollen and reddened arm for more than ten days.

An unknown European spider species personally discovered/recognized is always a special and exciting event (4). Most often it takes long to find out that this species has really not been described formerly, even not under a wrong/old name which was erroneously synonymized or has been erroneously described in another genus.

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(1) Agelenidae, Anyphaenidae, Araneidae, Cheiracanthiidae, Clubionidae, Corinnidae, Dictynidae, Dysderidae, Filistatidae, Gnaphosidae, Hahniidae, Leptonetidae, Linyphiidae, Liocrandae, Lycosidae, Mimetidae, Oecobiidae, Oonopidae, Oxyopidae, Philodromidae, Pholcidae, Prurolithidae, Salticidae, Segestriidae, Sicariidae, Tetragnathidae, Theridiidae, Thomisidae, Titanoecidae, Uloboridae, Zodariidae and Zoropsidae.

(2) It is fun to watch the behaviour of these Jumping spiders; frequently the male moves its striking pedipalpi. I observed a male of this species on a rock in Mesquita Alta near Sao Bras de Alportel which detected a fly in a distance of about 3 cm at first in the position right of the spider. Shortly the spider moved back about one cm, turned left in a right angle to the back side of the fly before its very fast jumping attack; it failed. Probably due to the position of the eyes of the fly the attack of such a prey – which may react rapidly - from its back side may be more successful than from the anterior or lateral side. One year later, in May 2023, few km away, I observed the successful attack of a conspecific male on a wall: The spider detected a fly ca. 3-4 cm away in a position face to face. Slowly it moved sidewards up to the backside of the fly, jumped and seized it as its prey. The whole procedure took not more than half a minute. In June 2023 I observed – also in Mesquita Alta – a juv. female of the same spider species feeding on a larger fly which apparently was also captured from the back side of the fly. - Is this peculiar capturing behaviour – to attack a prey from the posterior side - innate or connected with learning by trial-and error? It is well-known that hunters like Jumping Spiders can improve their ability of prey capturing with time. Observations in open nature like the present ones are rather rare today because most investigations are carried out in laboratories, and the behaviour may be different.
Remarkable is also the behaviour of another Jumping spider species, of *Cyrba algerina* (LUCAS 1846): According to my observations at least adult spiders do not jump - even if disturbed -, in contrast to almost all other Salticidae. In Europe I furthermore know only species of the genus *Ballus* as never jumping Jumping Spiders.
In a “peaceful” environment like this garden one can well recognize that spiders and other animals are much more than the sequence of their nucleotides. Probably the behaviour of spiders in the field will soon be less known than their DNA or their behaviour in laboratories.

(3) Other ant-like spider species in this garden are *Zodarion* sp. and *Leptorchestes peres.* Not far from the garden I observed or collected numerous further spider species of not less than seven families which are fairly or even distinctly ant-like, members of the families Corinnidae, Gnaphosidae, Linyphiidae Phrurolithidae, Salticidae, Theridiidae and Zodariidae.

(4) In certain special localities of the Algarve one may even still discover several undescribed spider species. So I collected several species near Sao Bras de Alportel at the same place: *Theridion modonatum* n. sp. and *Palliduphantes lancea* n. sp. in Mesquita Alta and near Bico Alto, each pair within only 10 square meters. See also Fonte Tareja and the small garden near Sao Bras de Alportel which are described above. - The present events and localities were absolutely unexpected surprises to me in the Europe of the 21th Century; they indicate the existence of a very high number (I suppose even hundreds) of still undescribed spider species in low disturbed localities of southern Europe!

Protection of special important areas of the Algarve

During the last fifteen years I studied several valleys in the Algarve but no one impressed me as much as the small streams and valleys in the low mountains few kilometres north-east of Sao Bras de Alportel, **reaching from Fonte Ferrea to Fonte Tareja and further on**. I focused on the exploration of a group of small animals, spiders, which are known to be of great ecological value and important biological indicators. Here I found the extremely high number of about a dozen species of undescribed spiders (see this volume of the Beitr. Araneol., 16 (2023),– and even a new family – apparently living worldwide only here (as endemic). The presence of these peculiar spider species strongly indicates the existence of much more rare and endangered animals and plants in the biotopes along these small streams where I also observed turtles, frogs, snakes, a high diversity of insects like beetles and butterflies, as well as diverse flowering plants like orchids. In such valleys probably *a "relic" fauna* of an almost vanished world of a pre-roman era survived which has probably been eliminated elsewhere, destroyed by fires and human activities. The protection of such "*oases of biological diversity*" **as natural reserves** *for future generations* is urgently needed, being a quite important task to persons politically responsible in the Algarve. To my knowledge in the whole of Portugal still only very few strictly protected natural reserves exist in contrast to other European countries. For the "**hot spot of natural biological diversity**" of the area in question the continuous supply with water of the streams and sources is most necessary as well as the strong prevention of fires and the laborious push back of *Eucalyptus* trees.

Notes on the unusually relative small body size (and the prosomal length) of certain members of certain spider families which I collected in the Algarve – compared with the measurements reported by the World Spider Catalogue (WSC) in VI 2022 and previously by JW:

Clubionidae: *Microclubiona diniensis* (SIMON 1878) (= *Clubiona d., Porrhoclubiona d.*): According to the WSC the prosomal length of males is 2.0 mm, but recently (in III. 2022) near Sao Bras de Alportel collected males (CJW) are distinctly smaller, the prosomal length is 1.3 and 1.8 mm. The prosomal length of a female, collected by me 19. IV. 2022 in Juliao/Prego few km W Tavira, is only 1.6 mm. Are the present spiders really conspecific with *diniensis*?

Fonteferridae n. fam.: With a body length of 0.75 mm the male holotype of *Fonteferrea minutissima* n. sp., collected near Sao Bras de Alportel, is the second-tiny European species of the "symphytognathidan branch" of the superfamily Araneoidea besides *Anapistula atae-*

cina from a Portuguese cave (body length of the female 0.52 mm; the male is unknown).
Gnaphosidae: *Leptodrassex simoni* (DAHL 1919): The body length of a male, JW leg. In V. 2022 few km N Sao Bras de Alportel (CJW), is only 2.8 mm but the WSC reported 4 mm of the male sex.

Gnaphosidae: *Zelotes callidus* (SIMON 1878): The body length of a male, JW leg. In VI. 2022 in Mesquita Alta 4 km E Sao Bras de Alportel (R/239/CJW), is only 3.4 mm (prosomal length 1.6 mm) but the WSC reported a body length of 6-8.4 mm for males.

Linyphiidae: *Canariphantes corona* WUNDERLICH 2021: See below.

Linyphiidae: *Frontinellina frutetorum* (C. L. KOCH 1835): Body/prosoma length of a male from a garden in Mesquita Alta (locality see the introduction), JW leg in IV 2023, CJW) are only 3.5/1.6 mm, of two females 4.0/1.8 mm. In the literature, e. g. WSC, I found usually 5-6 mm for both sexes.

Philodromidae: *Pulchellodromus pulchellus* (LUCAS 1846): A male from the Algarve: Island of Tavira, possesses a body length of 2.0 mm; the WSC notes 3 mm.

Theridiidae: *Anatolidion gentile* (SIMON 1881): According to the WSC the body length/prosoma length is 2.0-2.5/0.8-0.9 mm, but a male from the area of Sao Bras de Alportel, (IV. 2022, CJW) is distinctly smaller: 1.6/0.65 mm.

Theridiidae: *Enoplognatha minuscula* n. sp. (see below) from the Algarve, based on two males, possesses a body length of 1.7 and 2.0 mm and a prosoma length of 0.8 and 0.95 mm; it is one of the smallest known European species of the genus *Enoplognatha*.

Theridiidae: *Lasaeola* (*Simonola*) *coracina* (C. L. KOCH 1837): 3 males, collected near Sao Bras de Alportel in IV 2022 (CJW), possess a body length of 1.3-1.5 mm. After WUNDERLICH (2015: 440) the body length of this species is 1.5-1.8 (2.0) mm.

Theridiidae: *Phycosoma inornata* (O. PICKARD-CAMBRIDGE 1861) (= *Euryopis i.*; see WUNDERLICH (2022: 32)): Male body length according to the WSC is 2.0 mm, a male from the Algarve 1.6 mm, its prosoma length is 0.7 mm.

DESCRIPTIONS OF THE TAXA and notes

I describe a spider family – Fonteferridae - and 21 species of 10 families for the first time, I synonymize one of my in 2022 described species, and I add notes on some characters like the orb web, the taxonomy and the distribution of selected further species.

Family OONOPIDAE

Orchestina SIMON 1882

The six-eyed (fig. 3), yellowish and tiny spiders of the European Oonopidae – body length usually 1 to 1.5 mm - are easily overlooked; their determination is not easy. European members of the genus *Orchestina* can not be mistaken by their strongly thickened femur IV (fig. 4) and their light yellowish colour of body and legs. I collected specimens of *Orchestina* in various countries under stones, in detritus and also – e. g., on the Canary Islands and in the Algarve – in higher strata of the vegetation, by beating bushes, so the very few specimens of the new species described below, which represents the fifth *Orchestina* species of the Iberian Peninsula. *O.* sp. indet. was collected under bark on the ground, *O. fonteferrea* in higher strata of the vegetation, both species in the same area near Sao Bras de Alportel of the Algarve. The single female of *O. longipes* DALMAS 1916 was collected in a higher stratum near Tavira.

Orchestina sp. indet. (*simoni* DALMAS 1916)? (fig. 1)

Material: S-Portugal, Algarve, Fonte Ferrea near Alportel, ca 4 km NNW Sao Bras de Alportel, under bark on the ground in an oak forest; 1♀ JW leg. 6. VI. 2023, R288/CJW. - Note: Both legs IV of the spider are lost, prosoma and opisthosoma are separated.

Measurements (in mm): Body length 1.2; prosoma: Length 0.5, width 0.4; femur I 0.4. Colour pale yellowish. Genital field (fig. 1) with a tiny circular opening within a wide pit which is limited posteriorly by a pair of transverse sclerotized borders, the prouches are fairly well observable.

The **relationships** are unsure. According to the similar genital organs *O. simoni* DALMAS 1916 – its type locality is in Southern France – may be most related or even conspecific. A male is needed for further conclusions.

Distribution: S-Portugal.

Orchestina longipes DALMAS 1916

Material: Portugal, Algarve, near Tavira, beaten from a needle tree, 1♀ JW leg. In IV 2011, det. ARNAUD HENRARD, 289/CJW.

Distribution (see WSC in IX. 2923): Italy, Spain (Balearctic Islands) and Portugal (new to its fauna).

***Orchestina fonteferrea* n. sp.** (figs. 2-12)

Etymology: The name of the species refers to the source Fonte Ferrea near Alportel north of Sao Bras de Alportel where I collected the female paratype (a) of the new species.

Material: S-Portugal, Algarve, near Sao Bras de Alportel; (1) Pegida, ca. 6 km E Sao Bras de Alportel, beaten from a bush near a stream, holotype ♂ JW leg. 2. V. 2022, R228/CJW. -- (2) Fonte Ferrea near Alportel, ca 4 km NNW Sao Bras de Alportel, beaten from a bush over floating water of a small stream, 1♀ paratype (a) JW leg. 26. V. 2022, R229/CJW. - (3) Ca. 12 km WNW Tavira near a small stream, 1♀ paratype (b) JW leg. In V. 2018, R246/CJW. - Notes: Most legs of the male are lost, two legs – apparently I and III- are loose, the right leg IV is completely preserved and fixed to the body like both pedipalpi. - The prosoma of paratype (a) is strongly injured (squeezed); only the right leg I and the left leg IV are still existing. - Paratype (b) is well preserved, the left leg II is lose.

Remarks: I collected three specimens on bushes in a distance of only ca. 10 km. I do not want to exclude that conspecific specimen live on the ground, too.

Diagnostic characters: Dorsal hairs of the opisthosoma up to 0.1 mm long; ♂-pedipalpus (figs. 6-9): Tibia only fairly thickened, embolus bearing complicated apical structures including several sclerotized "teeth". - Female genital area quite remarkable and epigyne conspicuous (fig. 10-12; see below). Vulva not studied.

Description:

Measurements (in mm): ♂: Body length 1.2; prosoma: Length 0.57, width 0.45; opisthosoma: Length 0.7, width 0.57, height 0.47; leg IV: Femur 0.52 (height 0.14), patella 0.16, tibia 0.35, metatarsus 0.41, tarsus 0.21; questionable tibia I 0.46. - ♀ (paratype a): Body length probably about 1.7; opisthosoma – apparently egg-bearing -: Length 1.0, width 0.7; length of the opisthosomal hairs about 0.1; leg I: Femur 0.4, patella squeezed, tibia 0.4, metatarsus 0.38, tarsus 0.2; leg IV: Femur 0.55 (height 0.15), patella 0.18, tibia 0.35, metatarsus 0.44, tarsus 0.2; pedipalpal tarsus 0.17. - ♀ (paratype b): Body length 1.6; prosoma: Length 0.6, width 0.45; opisthosoma: Length 0.95, width 0.7; patella I 0.15, tibia I 0.38.
Colour: Prosoma and legs yellow to yellowish-grey, eyes surrounded by black rings, opisthosoma reddish brown or yellowish grey (paratype b).
Prosoma (figs. 2-3) ca. 1.3 times longer than wide, dorsally not distinctly convex, fovea absent, 6 large eyes (fig. 3) in a position similar to *O. pavesii* (SIMON 1873), the large median eyes almost touching, clypeus short, bearing two pairs of long lateral hairs, further hairs are most probably rubbed off like the dorsal prosomal hairs. - Legs (figs. 4-5): Hairs long, femur IV distinctly thickened (leg IV is a jumping leg in members of this genus), most bristles are rubbed off, metatarsi III-IV bear few short bristles (paratype b), one bristle of this female is distinctly thickened, position of the long metatarsal III trichobothrium in 0.86. - Opisthosoma oval, ca. 1.4 times longer than wide, dorsal hairs up to 0.1 mm long. - ♂-Pedipalpus (figs. 6-9): Patella and tibia only fairly thickened, bulbus voluminous, embolus rather thick, bent, apically bearing complicated and partly sclerotized teeth-shaped structures. - ♀: Genital field (figs. 10-12) in a quite anterior position, oval, anteriorly with a thin bent sclerotized margin in front of a larger light pit, posteriorly with a large and strongly sclerotized and almost u-shaped structure which bears a posterior bulge. More posteriorly exists an indistinct transverse sclerotized “stripe”. A soft area exists between this “stripe” and the epigastral furrow which bears a pair of tiny and widely spaced questionable openings at its posterior margin. The function of these remarkable structures behind the sclerotized epigyne is unknown and reminds me on the conditions of the fossil species *Orchestina* sp. indet. in Eocene Baltic amber, in which the male bites in the female genital area during copulation, see WUNDERLICH (1981: 109-113, figs. 25-28).

Relationships: The apical part of its embolus is even more complicated than in *O. pavesii* and not pincer-shaped, see PEKAR & GAIDOS (2001); the epigyne of both species is quite different. In the female of *O. minutissima* DENIS 1937 (♂ unknown; Spain, Algeria) exist long hairs of the thorax and quite short hairs of the opisthosoma; the epigyne is quite different. - The peculiar copulatory structures may justify the erection of a new genus for the new species.

Distribution: S-Portugal.

Family DYSDERIDAE

Numerous species of this family have been described from the Iberian Peninsula, several from Portugal. In the Algarve I found one species of *Harpactea* and two new species of *Dysdera*. I collected these three species syntopic, see below, the description of *D. algarvensis* n. sp.

Dysdera LATREILLE 1804

Dysdera is the most diverse spider genus in Europe (and probably of the world), more than 200 species have been described – more than species of *Harpactea* (Dysderidae, too), far more than of the genus *Zodarion* of the family Zodariidae (see below) and *Pardosa* of the family Lycosidae which are quite reach in species, too -, and continually more species are discovered like the two species described below.

The six-eyed ground spiders of *Dysdera* hide frequently at day under stones, not rarely hidden in sacs of silk were they may be overlooked by collectors. At night they search for prey, many species feed on woodlice (Isoptera). In contrast to the almost worldwide distributed *Dysdera crocata* C. L. KOCH 1838 the majority of *Dysdera*-species exists in restricted areas, mainly of Europe and North Africa. According to REZAC et al. (2018) certain species – even sibling species (!) – occur in the same locality; based on differences of their DNA they are regarded as different species. See also *Zodarion brevicephalus* n. sp.

In *Dysdera* the fang furrow bears three large teeth and a median cheliceral lamella (fig. 13). According to the size of the dorsal opisthosomal bristles which may be species-specific exists usually a distinct sexual-dimorphism, see figs. 14-15.

***Dysdera algarvensis* n. sp.** (figs. 13-23), photo 1.

Etymology: The name refers to the type area of the new species, the Algarve.

Material: S-Portugal, SE-Algarve, 4 km East of Sao Bras de Alportel; (1) Mesquita Alta, height ca. 315 m, N 37°09'11" W 07°50'29", in a garden, under stones in the shadow, 2♂, 1♀ JW leg. 8.-10. I. 2023, 1♂ leg.12. II. 2023, 1♀ leg. 17. III. 2023; holotype ♂ R254/CJW (left pedipalpus separated); 2♀ paratype R255/CJW; 2♂ paratypes (the right leg IV of one ♂ is lost beyond the coxa by autotomy, its the prosoma has been split longitudinally during collecting), R256/CJW; (2) Bico Alto, below a stone in the shadow, 1♀ paratype, JW leg. 20. III. 2023, R266/CJW. - Note: At the same locality I collected recently – in III. 2023 - two males of *Harpacte tavirensis* WUNDERLICH 2020 under stones quite close to the specimens of *Dysdera algarvensis*, CJW. Also only few meters away I collected the holotype of *Dysdera algarvula* n. sp., see below.

Diagnostic characters: Fang furrow with three large teeth as in fig. 13, prosomal cuticula weakly granulate, leg bristles: Femora: Only IV most often with a pair of short dorsal-basal bristles (rarely a single one or none), tibia and metatarsus I-II bristle-less, tibia IV as in fig. 16, dorsal bristles of the ♂-opisthosoma (fig. 14) short, thick and blunt in contrast to the female (fig. 15), ♂-pedipalpus as in figs. 17-19, ♀-genital area (figs. 21-23) anteriorly with a fairly or strongly concave margin, more or less translucent. - Colour of the prosoma dark red-brown, length of the prosoma (♂ and ♀) 2.7 and 3.1-3.5 mm.

Description:
Measurements (in mm): ♂: Body length 6.0; prosoma: Length 2.7, width 2.1, fang 0.8, width of the eye field 0.45, diameter of a posterior median eye 0.1; opisthosoma: Length 3.4, width 1.7, length of the dorsal bristles of the middle of the opisthosoma 0.02-0.03; leg I: Femur 2.15, patella 1.4, tibia ca. 1.85, metatarsus 1.8, tarsus 0.5, tibia II 1.55, tibia III 1.0, tibia IV 1.6; pedipalpus: Femur 1.4, patella 0.7, tibia 0.6, tarsus (cymbium) 0.6. - ♀: Body length 7.3-10.0; prosoma: Length 3.1-3.5, width 2.4, fang 1.1; width of the eye field 0.55, diameter of a posterior median eye 0.12; opisthosoma: Length 6.5, width 2.9, length of the dorsal hairs of the middle of the opisthosoma 0.08-0.1; leg I: Femur 2.0, patella 1.4, tibia 1.6, metatarsus 1.7, tarsus 0.5, tibia II 1.6, tibia III 1.0, tibia IV 1.6; pedipalpus: Femur 1.3, patella 0.6, tibia 0.6, tarsus 0.8.
Colour: Prosoma dark red brown, legs orange brown, opisthosoma grey in the female, light in the males.
Prosoma (fig. 13, photo) 1.3 times longer than wide, anteriorly abruptly smaller, weakly granulate, bearing few indistinct short hairs, fovea absent, 6 large eyes, posterior row fairly procurved, posterior median eyes spaced by about 1/5 of their diameter, fangs long, basal cheliceral articles medially with three large teeth, median lamella well developed, coxae IV spaced by the sternum by about 1.5 of their diameter. - Tarsus of the female pedipalpus with a well developed claw. - Legs (fig. 16, photo) only fairly long, robust, order IV/I/II/III, patellae distinctly longer than the tarsi (as in the genus), hairs short, cleaning hair brush of metatarsus III-IV well developed, scopulae absent, claw tufts well developed, position of the metatarsal trichobothrium in ca.0.9. Bristles not frequent, femora: Only IV with a short dorsal-basal pair (rarely a single one), patellae and tarsi none, tibia and metatarsus I-II

none, tibia and metatarsus III-IV few or (most often) several bristles. - Opisthosoma (figs. 14-15, photo) distinctly longer than wide, cylindrical, hairs usually of medium length but dorsally in the middle of the male sex short, thick and blunt and only 0.02-0.03 mm long in contrast to the female in which they are 0.08-0.1 mm long, thin and pointed. Spinnerets not studied. Female genital area anteriorly with a concave margin (figs. 21-23) in contrast to the male (fig. 20). - ♂-pedipalpus (figs. 17-19): Articles not thickened, bulbus with a small tubercle (tooth), complicated apical structures and a tube-shaped embolus.

Relationships: *Dysdera alentejana* FERRANDEZ 1996 (locus typicus in the Alentejo, Portugal, female unknown) is most related; its bulbus apophyses are smaller and the apical structures of the bulbus are different. - Note: According to the structures of the bulbus *D. alentejana* in the sense of BARRIENTOS et al. (figs. see WSC) is not conspecific with *alentejana* but probably the member of an unnamed species.

Distribution: S-Portugal, SE-Algarve.

***Dysdera algarvula* n. sp.** (figs. 24-25)

Etymology: The name of the species refers to the Algarve, the southernmost part of Portugal, and to *Dysdera algarvensis* n. sp. from the same locality but is smaller body size, from -ulus (lat.) = small as suffix.

Material: Portugal, Algarve, Mesquita Alta, ca. 4 km E Sao Bras de Alportel, in a garden (see the introduction), in the shadow, below a stone, few meter away from the locus typicus of *Dysdera algarvensis* n. sp., holotype ♀ JW leg. in IV 2023, R283/CJW. - Note: The right leg I is lost beyond the coxa.

Diagnostic characters (♀; ♂ unknown): Colour of the prosoma medium red brown, prosoma very finally granulate, tibia and metatarsus I-II bristle-less, tibia IV as in fig. 24, genital area (fig. 25) with a large pair of strongly sclerotized structures in a transverse position behind a concave border and in front of a pair of low larger depressions near the epigastric furrow.

Description (♀):
Measurements (in mm): Body length 6.3; prosoma: Length 2.8, width 2.0, fang 1.0, diameter of an anterior eye 0.2; opisthosoma: Length 3.6, width 1.85; leg I: Femur 1.8, patella 1.2, tibia 1.5, metatarsus 1.5, tarsus 0.5, tibia II 1.4, tibia III 0.9, tibia IV 1.7; pedipalpal tarsus 0.6.
Colour: Prosoma including chelicerae medium red brown, margin small black, sternum a bit lighter, legs yellow brown, opisthosoma light yellow grey, spinnerets light grey.
Prosoma 1.4 times longer than wide, anteriorly distinctly smaller, bearing short and few longer hairs, thoracic fissure quite indistinct, cuticula very finally granulate. Basal cheliceral articles with some hair-bearing “granules”, 6 large eyes in a quite narrow field, posterior median eyes almost touching, anterior eyes largest, basal cheliceral articles large and distinctly

protruding, fangs quite long, fang margin with 3 large teeth and a median keel as in *D. algarvensis* n. sp., labium a free sclerite, like gnathocoxae and sternum distinctly longer than wide; claw of the pedipalpal tarsus short. - Legs (fig. 24) robust, order IV/I/II/III, hairs short, claw tufts well developed, scopulae absent, bristles: Femora: Only IV with a single dorsal-basal one, patellae smooth, tibiae and metatarsi I-II smooth, tibiae and metatarsi III-IV with numerous bristles but tibia III only 4-5, metatarsi III-IV bear a well developed preening brush, position of the metatarsal trichobothria in ca. 0.9. - Opisthosoma almost twice as long as wide, bearing thin dorsal hairs as in *D. algarvensis* n. sp., spinnerets short. - Genital area: See above.

Relationships: In most species of the Algarve and nearby prosoma/chelicerae are distinctly granutale, so in *D. alentejano* FERRANDEZ 1996 (near Porto, ♀ unknown) in which the (all?) tibiae bear ventral bristles or/and the prosomal colour is dark red brown or the position of the teeth of the fang furrow are different.

Distribution: Portugal, Algarve.

Family ERESIDAE

Adonea algarvensis WUNDERLICH 2017

Material: Portugal, Algarve, island of Fuzeta, 1♀ with egg sac and spiderlings, JW leg., previously CJW.

Notes: The female has still not been described. Many years ago it has been given as a loan to S. PEKAR. - The species is endemic to the Algarve.

In *Adonea algarvensis* exists a specific sexual colour dimorphism: The female opisthosoma is uniformly black but the male opisthosoma bears dorsally a quite different black and white pattern. A sexual colour dimorphism exists in several species of this family, e. g., in *Eresus*.

Family FONTEFERRIDAE n. fam.

Etymology: The family name refers to the locality of the holotype of the type species, Fonte Ferrea, see below.

Type genus (by monotypy): *Fonteferrea* n. gen.

Diagnostic characters (♂; ♀ unknown): Prosoma raised, clypeus short (figs. 26-27), opisthosoma quite high (fig. 26, photo), higher than long, 8 eyes, tibia I, II and IV bear two long dorsal bristles (fig. 26) (tibia III bears a single bristle), femur I bears 4 prolateral bristles (fig. 26), no further leg bristles, legs distinctly annulated (photo); pedipalpus (figs. 28-29): Bulbus quite simple (*), bearing few hairs (!) (**), without protruding sclerites but a small "fleshy" structure, embolus rather short; body length 0.75 mm. Capture web unknown.

(*) Quite simple, strongly reduced structures/sclerites of the bulbus (and embolus) exist in other families, too, e. g., in certain Oonopidae and also within taxa of the Araneoidea, e. g. in certain Tetragnathidae and Theridiidae like *Paratheridula* LEVI.

(**) To my knowledge the existence of **hairs of the bulbus/tegulum** is a quite rare character. The cymbium bears numerous hairs, but the existence of hairs of the bulbus are known to me in the families Tetrablemmidae: In the fossil *Eogamasomorpha rostratis* WUNDERLICH 2020: 147, figs. 94-95 in Mid Cretaceous Burmese (Kachin) amber from Myanmar, in the Fonteferridae: In *Fonteferrea minutissima* n. sp., extant, fig. 29, in in the Linyphiidae: In *Palaeophantes paracymbium* n. sp., in Eocene Baltic amber, in the Theridiidae: In *Enoplognatha minuscula* n. sp., fig. 41, and in the Uloboridae: In the fossil *Paramiagrammopes dexter* WUNDERLICH (2021: 242, fig. 272) in Burmese Kachin amber.
The exact insertion, the fine structure and the function of these hairs are still unknown.

Further characters of the Fonteferridae: Basal-dorsal bristles of the patellae replaced by hairs (fig. 26); sternal pits, clasping spines, stridulatory organs, constriction between tarsi and metatarsi, lateral tibial bristles, cheliceral keel (?) ending in a large tooth, femoral and long tibial III-IV trichobothria as well as comb of tarsus IV absent; probably pedipalpal self-amputation.

Relationships and remarks (see also below and the paper on spiders in Burmese amber in this volume, e. g., the genus *Myanmarmysmena*). I regard Fonteferridae to be a member of the **symphytognathidan branch** (*) s. l. (including the family Theridiosomatidae), which I call the "tiny orb web weavers".This branch contains mainly tropical taxa and is characterized by dwarfism, small or even tiny – body length 0.33 mm up to 2 (rarely 3) mm –, by the EXISTENCE of a single metatarsal tichobothrium, the – fully or partly existing - "triplet" of the spinnerets (it is difficult to recognize in some taxa), and - basically – of an orb web (it may be strongly modified or even absent like in the Micropholcommatidae) as well as by the ABSENCE of a cribellum and tarsal trichobothria. A retrobasal paracymbium - typical for almost all Araneoidea - is usually strongly reduced or even absent; a small but distinct retrobasal

paracymbium exists in the most basal family Theridiosomatidae (**). The legs bear not rarely "clasping spines" (figs. 36-38), see below. The bulbi are usually quite voluminous, the cymbium is wide or reduced, it may be modified.
I do not know a fossil or extant genus which is closely related to *Fonteferrea*; see, e. g., LOPARDO & HORMIGA (2015) and LIN & LI (2008). The structure of the basal cheliceral articles are similar to the family Synaphridae WUNDERLICH 1986 which are regarded as sister group of the Cyatholipidae by RAMIREZ et al. (2022). - The order of the families of the family key below may reflect the branchings of the symphytognathidan families. In the in my opinion most basal family Theridiosomatidae the largest spiders of this branch exist (besides quite small species), and certain taxa possess most spiny legs. I regard both characters as ancient patterns. The Early Cretaceous report of the Theridiosomatidae – *Eocoddingtonia eskovi* SELDEN 2010 – is the OLDEST report of the symphytognathoid branch in the geological sense. In contrast to the Fonteferridae the members of the Theridiosomatidae possess apomorphic sternal glands (fig. 30) which are uniquie in spiders. In the Anapidae, Comaromidae and Micropholcommatidae the opisthosoma is scutate or hardened/leathery. In the Symphytognathidae the basal articles of the chelicerae are +/- fused and leg bristles are absent. In the Synaphridae a medial cheliceral lamella exists which ends in a large tooth (fig. 38) – it is probably absent in the Fonteferridae –, the shape of the opisthosoma is globular or long oval but not higher than long, and the structures of the ♂-pedipalpus are quite different. In all (!) Mysmenidae clasping spines exist (fig. 37) – but see the paper on fossil spiders in Burmese amber in this volume – and frequently a femoral organ exists as well. - Apparently the family *Fonteferridae* is a strongly derived relic taxon.

Distribution: S-Portugal. - Notes: The only specimen of this family has been collected in one of the southernmost parts of Europe; the Iberian Peninsula is quite close to northern Africa. Further taxa of this - probably mainly tropical - family may occur in tropical regions of Africa Members of the probably fairly related family Synaphridae were first discovered in southern Europe and later found on Madagascar, too, see MILLER (2007).

(*) The frequently used term "symphytognathoids" is misleading to a superfamily Symphytognathoidea which does not exist.

(**) In this paper I regard the family Theridiosomatidae as the most basal member of the symphytognathidan branch s. l.; see WUNDERLICH (2018: 63, fig. C). RAMIREZ et al. (2022) regard Theridiosomatidae as sister family of the Araneidae. - See the enigmatic Micropholcommatidae: RIX & HARVEY (2010), and the dubious fossil tribe Biapophysini WUNDERLICH 215; see WUNDERLICH (2018: 42).

Fonteferrea **n. gen.**

Etymology: The name refers to the type locality, Fonte Ferrea, few km N of Sao Bras de Alportel in S-Portugal.

The gender of the name is feminine.

Type species (by monotypy): *Fonteferrea minutissima* n. sp.

Diagnostic characters, relationships and **distribution**: See above.

***Fonteferrea minutissima* n. gen. n. sp.** (figs. 26-29), photo 2.

Etymology: The species name refers to its tiny body size, from minutus (lat.) = tiny.

Material: S-Portugal, Algarve, ca. 4 km north of Sao Bras de Alportel, near a recreation area, beaten from a bush in the shadow at a small stream, JW leg. In X. 2021, R244/CJW. - NOTES: (1) the right pedipalpus is absent (see below). - (2) Originally the male was covered with tiny white grains which got lost; some of these grains are kept in a small tube, R244a/CJW. - (3) The prosoma of the holotype was dorsally depressed during its study. - (4) The holotype will most probably be given to the SMF soon after the publication of this paper.

Diagnostic characters and **relationships**: See above.

Description (♂):
Measurements (in mm): Body length 0. 75; prosoma: Length 0.35, width 0.3, height of the peltidium 0.2; opisthosoma: Length 0.4, width 0.4, height 0.48; leg I: Femur 0.4, patella 0.12, tibia 0.3, metatarsus 0.2, tarsus 0.23, tibia II 0.23, tibia III 0.13, tibia IV 0.19.
Colour (figs. 26-27, photo): Prosoma grey, medially with a large dark grey patch, lateral margin darkened, area of the eyes black; legs: Femora yellowish, patellae as well as the distal third of the tibiae and metatarsi distinctly darkened, opisthosoma grey with irregular dark patches, posteriorly whitish.
Prosoma (figs. 26-27, photo) 1.7 times longer than wide, profile high convex, dorsally bearing some quite long hairs, thoracic fissure absent, 8 eyes in two rows, anterior median eyes smallest, posterior row straight, posterior median eyes spaced by ca. ¾ of their diameter, clypeus short, basal cheliceral articles long, free, probably bearing a medial lamella ending in a large tooth (difficult to recognize), fangs of medium size, gnathocoxae large and converging, labrum without anterior spur, labium ca. two times wider than long, sternum convex, spacing the coxae IV by about their diameter. - Legs (fig. 26, photo) of medium length, order I/II/IV/III, hairs of medium length to long, no constriction between tarsus and metatarsus, bristles: Femur I bearing 4 prolateral bristles, patellae with a long dorsal-apical bristle and a dorsal-basal hair which replaces a bristle, sequence of the long dorsal tibial bristles 2/2/1/2, comb of tarsus IV absent, femoral and tarsal trichobothria absent, tibial and metatarsal – a single one? - trichobothria not studied, unpaired tarsal claw not elongated. - Opisthosoma (fig. 26, photo) egg-shaped, distinctly higher than long, bearing quite long hairs and four epiandrous gland spigots, colulus most probably tiny and bearing three hairs, anterior spinnerets largest. - Pedipalpus (figs. 28-29) with quite short basal articles, the cymbium may be wide, paracymbium unknown and probably absent, bulbus large and oval, fairly sclerotized,

bearing few hairs (see above) and no sclerites which stand out; embolus rather short, thin, bent, surrounded by an indistinct “fleshy” apophysis, its position close to the bulbus. - NOTE: The right pedipalpus is broken off beyond the patella (?) which bears long bristle-shaped hairs at the anterior margin. Its stump appears “healed”. I do not exclude that the right pedipalpus has been lost by self-amputation. Self-amputation of one of the pedipalpi by subadult males is known from the genera *Echinotheridion* LEVI 1963 and *Tidarren* CHAMBERLIN & IVIE 1934 of the family Theridiidae. Besides this behaviour and the shape of the opisthosoma the characters of these genera and other Theridiidae are quite different from *Fonteferria*.

Distribution: S-Portugal.

Key to the extant and extinct families of the symphytognathidan branch - in the wide sense, including Theridiosomatidae - of the superfamily Araneoidea:

In 2023 I know 10 families of the symphytognathidan branch which members may be recognized by the key below. The dubious family Cretamysmenidae WUNDERLICH 2018 – based on a probably inad. female) and the new extinct family Nanoaenigmatidae WUNDERLICH 2023 (this volume) are extinct. On family level the symphytognathidan branch is worldwide almost as diverse as the whole number of remaining families of the huge superfamily Araneoidea. The extant families Fonteferridae WUNDERLICH 2023 and Symphytognathidae HICKMAN 1931 are represented in Europe by only a single genus and a single species.

Notes: (1) Exceptions of some of the present characters may exist within certain families of this diverse branch. - (2) Usually 8 eyes exist (but, e. g., in *Comaroma* of the Comaromidae WUNDERLICH 2004 the lenses of the anterior median may be quite strongly reduced). Anapidae SIMON 1895 have 6 or 8 eyes, see also *Crassignatha*. Symphytognathidae have 4 or 6 eyes. - (3) The leg bristles are not well studied; to my knowledge they are absent in the Symphytognathidae; they are numerous in most Theridiosomatidae SUNDEVALL 1833 as well as in certain Anapidae and Mysmenidae PETRUNKEVITCH 1928. - (4) Clasping (mating) spines of the male tibia and/or metatarsus I (figs. 26-27) (rarely on tibia II) exist most often in the Mysmenidae (*) and frequently in the Anapidae. - (5) The extinct family Cretamysmenidae WUNDERLICH 2018 may be a part of the Anapidae. - (6) See also the dubious extinct tribe Biapophysini WUNDERLICH 2015; WUNDERLICH (2018: 42). - (7) A satisfying diagnosis of this branch is lacking; its retrobasal paracymbium ist stronlgy reduced or even absent. Splitting of the “symphytognathidan branch”: See RAMIREZ et al. (2022).

1 A pair of small sternal pits (outlets of sternal glands) in both sexes on the anterior margin of the sternum exists (fig. 30). 8 eyes. Tibia III and IV bear several very long trichobothria. Tarsi I-II not long, frequently shorter than metatarsi I-II. Sequence of the usually long dorsal tibial bristles most often 2/2/1/1, rarely 2/2/1/2 (e. g., in the extant *Coddingtonia discobulbus* (WUNDERLICH 2011)). Lateral tibial I-II, femoral and metatarsal bristles may exist. ♀-pedipalpus not reduced but it may be slender. Opisthosoma soft. Retrobasal paracymbium existing. - Mainly pantropical; in Europe today only *Theridiosoma gemmosum.* Fossil probably *Eocoddingtonia escovi* - the existence of its sternal pits is unsure - in Early Cretaceous stone of Russia; furthermore Cenozoic in Baltic, Bitterfeld and Dominican ambers ……..
…….. **Theridiosomatidae**

- Existence of sternal pits unknown. Prosoma (fig. 50) high, bearing an inclination between cephalic and thoracic parts. 8 large eyes. Tarsi distinctly longer than metatarsi. Sequence of the short dorsal tibial bristles probably 1/1/1/1. Pedipalpus of the probably adult female not reduced. ♂ unknown, holotype female probably not adult. Body length 0.6 mm. - Extinct, in Cretaceous Burmese amber: Only the quite dubious taxon *Cretamysmena fontana* WUNDERLICH 2018 …... **Cretamysmenidae**

- Sternal pits/organs absent. 4, 6 or 8 eyes. Tarsi frequently longer than metatarsi. ♂-leg I frequently modified. ♀-pedipalpus frequently reduced. Tibial bristles variable but not 2/2/1/1. Tibial trichobothria usually not very long. Retrobasal paracymbium absent …..................... 2

2(1) Opisthosoma more or less (frequently strongly) armoured - at least ventrally - or hardened …... 3

- Opisthosoma soft. Prosomal cuticula usually smooth. Tarsi frequently about as long as metatarsi. Labral spur absent. Metatarsal/tibial clasping spur absent or existing (in most Mysmenidae). Usually 8 eyes, occasionally 6 or only 4 eyes (Symphytognathidae) …......... 4

3(2) Prosoma not distinctly raised, not or only quite weakly punctuate. Labrum bearing an anterior spur (fig. 34) which may be difficult to recognize. Only a single dorsal tibial bristle. Cheliceral peg teeth absent. ♂-leg I modified in most fossil species of the fossil genus *Balticoroma* in Eocene Baltic amber. ♂-pedipalpus: Patellar and tibial apophyses absent, cymbium in extant species of *Comaroma* with a retroDISTAL "paracymbium" (fig. 32) or – in the single known fossil genus *Balticoroma* – with a large dorsal outgrowth which also exists in the extant SE-Asian *Balticoroma maculosa* (OI 1960) (fig. 33). Modified orb web. - World-wide in the Northern Hemisphere; in Europe today only *Comaroma simoni* ….. .... **Comaromidae** (*)

- Prosoma distinctly raised; punctuate – e. g., in the Taphiassinae - or not. Labral spur absent. Usually leg bristles strongly reduced or even absent, ♂-leg I not modified and clasping spines absent. Tarsi usually fairly short. Male cheliceral peg teeth of the cheliceral promargin and retrolateral stridulatory files of the ♂-chelicerae usually existing in the Micropholcommatinae. ♂-pedipalpus with patellar apophysis and frequently a quite long embolus. Sheet web or three-dimensional tangle-web (Micropholcommatinae). Three subfamilies including Textricellinae. - Extant a Gondwanan distribution: Chile, the Australian Region and probably South Africa; fossil in Europe, too: in Early Eocene Paris amber: *Cenotextricella simoni* .... **Micropholcommatidae**

- Prosoma usually strongly raised and distinctly corniculate/rugose. Labral spur (fig. 34) existing. Cheliceral peg teeth absent. Tarsi distinctly - frequently two times - longer than metatarsi. Leg bristles variable, frequently exist two dorsal tibial bristles. Frequently a metatarsal and/or tibial I "clasping spine" (e. g., figs. 35-36) existing (see Mysmenidae), and ♂-leg I modified. ♂-pedipalpus quite variable, patellar apophysis existing or absent. - Extant worldwide; in Europe *Pseudanapis*, fossil diverse in Eocene Baltic amber …................. **Anapidae**

4(3) 6 or 4 eyes (cave spiders may be eye-less). Basal cheliceral articles +/- fused at least at the base. Labium quite wide, usually at least 3 times wider than long. Fangs very short. - Mainly pantropical; in Europe only *Anapistula ataecina* in a cave in Portugal, body length of the female 0.52 mm (!), male unknown …........................….................. **Symphytognathidae**

- 8 eyes. Basal cheliceral articles free. Labium shorter, frequently not much wider than long. Fangs not very short ….. 5

5(4) ♂-tibia and/or metatarsus I (rarely tibia II) bear 1-2 prolateral or proventral "clasping spines" in all extant taxa (fig. 37) (see Anapidae and Comaromidae) (*) (**). Prosoma in almost all taxa - except *Isela* and *Kilifina* - strongly raised. A ventral-distal spot-like femoral-organ on legs I (II) - unique in this family – usually existing. - Extant worldwide, in Europe the genera *Mysmena* and *Trogloneta* *…..*….. **Mysmenidae**

- "Clasping spines" and femoral organ absent. Prosoma not STRONGLY raised …................ 6

6(5) All tibiae without dorsal bristles. Legs not annulated. No femoral bristles. Clypeus fairly long, opisthosoma globular or long oval. Basal cheliceral articles with a medial keel ending in a large tooth (fig. 38) (***), tarsi distally pseudosegmented or at least inclined. Bulbus with protruding sclerites and quite a long embolus, hairs absent, body length ♂ ca. 1 mm. - Extant, in Europe *Cepheia* and *Synaphris;* on Madagascar *Afrocepheia* MILLER 2007.. **Synaphridae**

- Sequence of the long dorsal tibial bristle 2/2/1/2 (fig. 26) or 2/2/2/2, tarsi not pseudosegmented or inclined, clypeus short, cheliceral keel and lanrge tooth unknown (probably absent), body length 0.65 and 0.75 mm …... 7

7(6) Sequence of the dorsal tibial bristles 2/2/1/2, legs distinctly annulated (fig. 26). Femur I bears 4 prolateral bristles (fig. 26). Bulbus (figs. 28-29) without protruding sclerites, hairy, embolus fairly short. Male body length 0.75 mm (female unknown). - Extant, Portugal, *Fonteferrea minutissima* n. gen. n. sp. ….. **Fonteferridae n. fam**.

- Sequence of the dorsal tibial bristles 2/2/2/2, legs not annulated. Femoral bristles absent. Bulbus bearing sclerites, embolus unknown. Male body length 0.65 mm (female unknown). - Fossil in Cretaceous Kachin amber from Myanmar (this volume), *Nanoaenigma pumilio* n. sp. …... **Nanoaenigmatidae n. fam**.

(*) See the paper by ESKOV & MARUSIK (in prep.) on the reviving of the family Comaromidae WUNDERLICH 2004 based on the talk "*Comaroma* is not an anapid spider" by these authors at the European Congress of Arachnology in Greifswald (Germany) 2022.

(**) FOSSIL genera described by WUNDERLICH (2004) under Anapidae: Mysmeninae are (a) *Palaeomysmena* WUNDERLICH 2004 in Eocene Baltic amber, (b) *Dominicanopsis*

WUNDERLICH 2004 in Miocene Dominican amber and (c) the enigmatic *Myanmarmysmena* n. gen. In the two latter genera clasping spines are absent. The relationships of the three genera have to be revised,

(***) A convergently evolved tooth exists in the six-eyed *Crassignatha haeneli* WUNDERLICH 1995 – described under Anapidae s. l.: Synaphrinae - which I now regard as a member of the Anapidae; but see LOPARDO & HORMIGA (2015). A similar tooth exists also in the six-eyed Eocene genus *Iardinidis* WUNDERLICH 2004 in Baltic amber which was also described under Anapidae s. l.: Synaphrinae and has to be revised.

Reflections on the relationships of the symphytogathidan branch and other branches of the superfamily Araneoidea as well as on the origin of the orb web

The relationships of the branches of the extremely diverse superfamily Araneoidea as well as the origin(s) and loss(es) of the orb web are strongly connected with each other and controversially discussed since a long time. During the last years several molecular-genetic studies were published. Recently PARALLEL LINES in the captures web of certain members of the Synspermiata as well of the Leptonetidae were reported, as well as STICKY DROPLETS (viscid silk) in capture webs of certain Synspermiata like Pholcidae and Telemidae see RAMIREZ et al. (2023). So the existence of sticky droplets in the capture web is a quite ancient character. Mainly the discovery of Mid Cretaceous spiders lead me to partly new conclusions on the phylogeny of higher taxa of the Araneoidea and on the origin of the orb web; see below and WUNDERLICH & MÜLLER (2018).
An **orb web** exists in most cribellate members of the Deinopoidea, e. g., in the Uloboridae as well as in certain members of the **e**cribellate superfamily Araneoidea, e. g., in the Araneidae. Several questions raises:

(1) Did the orb web originate (1) only a single time of an ancient cribellate species, evolving the extant taxa called “Orbiculariae”? Or (2) did the orb web originate separately (probably from a stem species as sister groups): As a cribellate web in the Deinopoidea (2a) and as an ecribellate web in the Araneoidea (2b)? Regarding (2b) one may ask: Exists the orb web basically as a synapomorphy of the Araneoidea? Or did it evolve later on, once and within this superfamily (see fig. A)? Or did it originate even several times within the Araneoidea?
As pointed out a long time ago I prefer possibility (1), and that the Deinopoidea may be related to the Oecobioidea. - Regarding the possibility (2): According, e. g., to RAMIREZ et al. (2022) the sister group of the Araneoidea *may* be the basically cribellate Nicodamoidea, but I prefer a bit the Leptonetoidea and more the Protoaraneoididae which are basically cribellate, too; some of the leptonetid taxa - and even all taxa of the Protoaraneoididae - possess a paracymbium, feathery hairs are absent; see WUNDERLICH & MÜLLER (2018). Sticky droplets of the capture web are not known from Nicodamoidea and from Leptonetoidea as well; regulary lines of the leptonetoid web have recently been reported by RAMIREZ et al.

(2023). Within the Araneoidea the orb web has been modified in the Symphytognathidan branch, and even lost several times, but to my knowledge the orb web was probably never completely replaced by an irregular web within the family Araneidae (see below). I did not get information regarding the capture web of the Micropholcommatidae and Synaphridae.
Could the 100 million year old Mid Cretaceous fossils in Burmite be helpful to answer the questions above? Here my observations (see also below):
(A) (Ecribellate) Araneoidea in Mid Cretaceous Burmite were not diverse on family level; I know only few families, e. g., families: Leviunguidae, Theridiidae and Zarqaraneidae, Theridiidae (also extant known), they build irregular capture webs. The relationships and the kind of the capture web of few other Mid Creataceous families – the enigmatic/dubious Cretamysmenidae WUNDERLICH 2018, Praearaneidae WUNDERLICH 2017 and Protoaraneoididae WUNDERLICH 2018 - are unknown; see also WUNDERLICH & MÜLLER (2021: 42, the dubious plesion Megasetidae and: 167, Araneidae).

(B) Sure araneoid orb web weavers in Burmite are unknown to me (!).

(C) Cribellate Deinopoidea in Burmite were very diverse, 10 families have been described, including the orb-weaver family Uloboridae which is also extant known, see WUNDERLICH & MÜLLER (2021).

(D) Probably few **e**cribellate Deinopoidea existed in Burmite, see WUNDERLICH & MÜLLER (2021: 107).

Diagnostic characters of the superfamily Araneoidea:

The knowledge of apomorphic and plesiomorphic characters of this superfamily depends on the identification of its sister group. Unfortunately its sister group is not surely known. Because, e. g., of their basically cribellate stage and the absence of a triad (triplet) of the spinnerets (unsure in the Protoaraneoididae) discussed are the Oecobioidea, the Deinopoidea, the Nicodamoidea (see RAMIREZ et al. (2022)), the extinct Protoaraneoididae WUNDERLICH 2018 (see WUNDERLICH & MÜLLER (2018)) and the Leptonetoidea. The loss of the pectunculus (*) and of the cribellum as well as the existence of a triad of the spinnerets can be regarded as three of the most important apomorphic characters of the Araneoidea. Following, e. g., SHEAR (1986) a (retrobasal) paracymbium is a further apomorphy (**). An entelegyn stage, the existence of an epigynal scape, probably the rosette-shaped position of the spinnerets, a position of the metatarsal trichobothrium in the basal half and a wide paracymbium can be added as derived characters, see fig. A. To my knowledge plumose cheliceral hairs are absent in contrast to the Protoaraneoididae, see WUNDERLICH & MÜLLER (2018: 141, fig. 60). If sticky droplets of the capture web are really absent in the ecribellate taxa of the Leptonetoidea, Nicodamoidea and extinct Protoaraneoididae (an ecribellate member of this family is not surely known) their existence in the Araneoidea can probably be considered as a further apomorphy, see above: The existence of sticky droplets already in certain members of the Synspermiata like Pholcidae, in which a retrolateral paracymbium (procursus) exists (!). The occurrence of these structures within spiders may indicate that the root of the Araneoidea goes back much further than usually suspected.

(*) A pectunculus exits in the extinct family Praearenidae WUNDERLICH 2017.

(**) The oldest retrobasal to -dorsal paracymbium - large, fused to the cymbium and more or less erect - has been reported from the Mid Cretaceous Zarqaraneidae; compare the Protoaraneoididae. The family Theridiidae - in which no retrobasal but a retrodistal or an intern paracymbium (!) at least in extant taxa exists – is a special remarkable family. The position of the paracymbium in Cretaceous taxa in Kachin amber (Burmite) is still unknown.

Plesiomorphic araneoid characters are in my opinion, e. g., the existence of an irregular capture web, the absence of feathery body and leg hairs, the absence of feathery and plumose cheliceral hairs, of a pectunculus, of tarsal trichobothria and the existence of not more than a single metatarsal trichobothrium.

Relationships of the superfamily Araneoidea (see also above and below):

In contrast to earlier suggestions – e. g. WUNDERLICH (2020) - I now separate Leptonetoidea from Protoaraneoididae and suppose retationships of Araneoidea and Protoaraneoididae in the sense of WUNDERLICH & MÜLLER (2018: 64, fig. D).

Conclusions, discussion:

(1) Today the superfamily Araneoidea is much more diverse than the superfamily Deinopoidea (or other spider superfamilies); in the Mid Cretaceous a reverse pattern existed, see, e. g., WUNDERLICH & MÜLLER (2018), (2021: 36, fig. B). I regard the much higher diversity of the fossil Deinopoidea in Burmite as hints that (a) the superfamily Deinopoidea may be much older than the Araneoidea, and (b) that also the cribellate capture orb web should be much or distinctly older than the ecribellate orb web, and so both kinds of orb webs originated probably independently from each other. The oldest fossil orb web known to me is a CRIBELLATE web which is preserved in Mid Cretaceous Kachin amber from Myanmar (Burma), probably spun by a member of the diverse family Uloboridae; see WUNDERLICH & MÜLLER (2018: 15-16, figs. 31-33, photo 10).

(2) If the sister group of the Araneoidea – probably Oecobioidea, Deinopoidea, Leptonetoidea, Nicodamoidea or Protoaraneoididae – is cribellate, the ecribellate stage could be an apomorphic character of the Araneoidea. This possibility is in accordance with the proof of *one* of the oldest surely known araneoid families, the ecribellate Theridiidae. Remarkably, this family is shown by RAMIREZ et al. (2022) as the most basal member of the Araneoidea. Theridiidae construct irregular capture webs.

(3) the araneoid orb web should have originated a single time or several times DURING the evolution of this superfamily, probably only once, see fig. A; but see, e. g., CODDINGTON (1986) and RAMIREZ et al. (2022). This means that (the ancestors of) families like Theridiidae and Linyphiidae never possessed an orb web; see, e. g., POCOCK (1895), WUNDERLICH (1986: 100) and WUNDERLICH & MÜLLER (2018: 63, fig. C). Remains of (modified) orb webs are COMPLETELY UNKNOWN in these families, and - “in reverse” - only VERY few members of the Tetragnathidae or of the quite diverse family Araneidae construct a strongly modified orb web – e. g. members of the genus *Cyrtophora* – or lost the orb web completely (e. g. members of the genus *Mastophora*). I do not know a taxon of the Araneidae which replaced the orb web by an irregular capture web completely (!). Certain *dwarf* members of the Symphytognathidan s. l. branch strongly modified the orb web.

Notes: The kind of capture webs of members of the Cretaceous Zarqaraneidan branch – and the Protoaraneoididae as well - is unknown; according to the tip of their tarsi as well as the shape of their body and legs it was - in my opinion - more likely an irregular web than an orb web. - The capture web of the Eocene Praetheridiidae WUNDERLICH 2004 and Protheridiidae WUNDERLICH 2004 is also unknown. In my opinion they may have been orb web dwellers like the Tetragnathidae; in these three families a median apophysis of the male pedipalpus is absent. In tiny members of the symphytognathidan branch losses of the orb web and its strong modifications may have been caused by dwarfism.

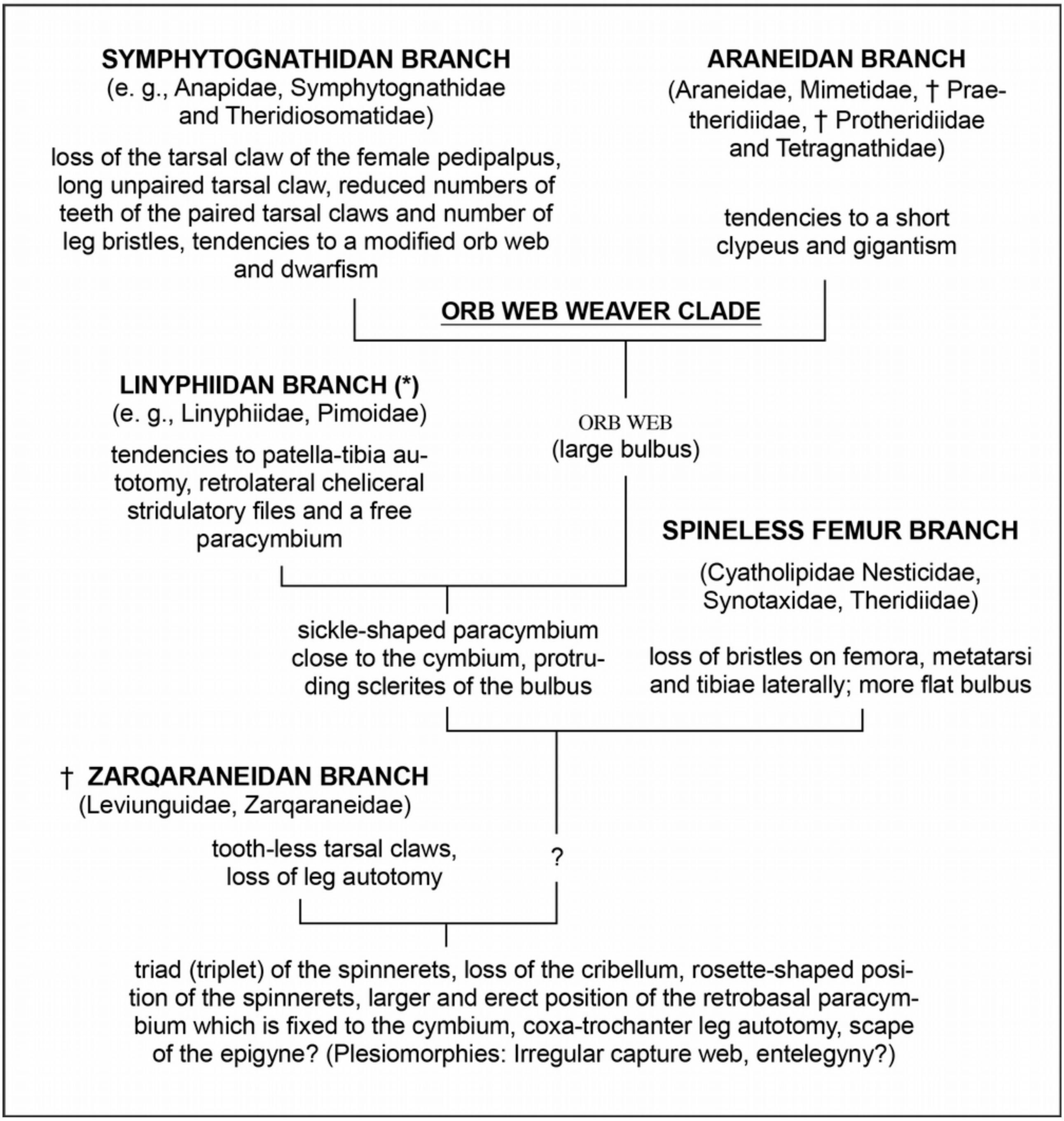

Fig. A. Supposed relationships of the **Symphytognathidan branch** and other extant or extinct main branches of the superfamily **Araneoidea** (**)

(*) See WUNDERLICH (2008: 117-129).

(**) Excluded are enigmatic taxa like the Cretaceous families Burmascutidae WUNDERLICH 2008 and Megasetidae WUNDERLICH 2021 as well as the Jurassic family Juraraneidae ESKOV 1984, probably the most ancient taxon of - or near – the superfamily Araneoidea.

NOTES:
(1) See the discussion on apomorphic and plesiomorphic characters above.
(2) See WUNDERLICH & MÜLLER (2018: 63, fig. C) which is partly different from the present figure in which, e. g., the family Theridiosomatidae was excluded from the Symphytognathidan branch.

Family THERIDIIDAE

All over the world Theridiidae is one of the most diverse and frequent spider family of higher strata of the vegetation. Numerous species, e. g., of the diverse genera *Lasaeola* s. l. and *Theridion* s. l. - as well of their relatives – are usually tiny, overlooked, difficult to determine and/or were misidentified. For example, a sure determination of *Lasaeola coracina* (see above) as well other congeneric species is impossible if the key of the World Spider Catalog is used; see WUNDERLICH (2015: 438-443, figs. 1-10) and WUNDERLICH (2011: 10-13, figs. 16-20).

Note: Correction regarding the list of the West-Palaearctic theridiid genera provided by WUNDERLICH (2011: 229-230): The sequence of the dorsal tibial bristles of *Enoplognatha* and *Robertus* is 2/2/1/1 but not 2/2/1/2.

Notes on *Anatolidion gentile* (SIMON 1881): (1) I now regard the alleged metatarsal bristle of this species to be nothing else as a strong and bristle-shaped HAIR. - (2) Body size: See above.

Enoplognatha PAVESI 1880

Besides the colour of the opisthosoma the size and the position of the cheliceral teeth as well as of the embolus and the length of the pedipalpal tibia are most characteristic for the male species; structures of the epigyne of some species are difficult to recognize but the structures of the vulva are species-specific.

Note (correction): In the list of selected theridiid characters provided by WUNDERLICH (2008: 374) the sequence of the dorsal tibial bristles of *Enoplognatha* is erroneously stated as 2/2/1/2 but the correct sequence is 2/2/1/1 as correctly noted p. 338 in the same paper. See also above.

About two dozen species of *Enoplognatha* are known from Europe, only *almeriensis* BOSMANS & VAN KEER 1999 and *minuscula* n. sp. are endemics of the Iberian Peninsula.

***Enoplognatha minuscula* n. sp.**(figs. 39-43)

Etymology: The name of the species refers to its small body size, from minusculus (lat.) = rather small.

Material: Portugal, SE-Algarve, Juliao/Prego ca. 10 km WNW Tavira, beaten from a bush in the bed of a small stream which was dry at that time; 2 subad. ♂ JW leg. 1. III. 2022; holotype adult 2. III. 2022, R224/CJW (its left pedipalpus has bee separated); paratype adult 10. III. 2022, R225/CJW. - Note: After the description the paratype has been dried out and its opisthosoma has been lost.

Diagnostic characters (♂; ♀ unknown): Body length only 1.7-2.0 mm, basal cheliceral articles (fig. 39, holotype) distally with two large/long teeth which are not widely spaced (*), opisthosoma basically black, in the holotype only dorsally in the anterior half with a pair of oval white spots, in the paratype additionally with posterior and lateral white spots; pedipalpus (figs. 41-43): Tibia rather short, embolus fairly short and only fairly bent, theridiid tegular apophysis long, conductor well developed. Habitat: Higher strata of the vegetation.

(*) In the paratype the two large teeth are absent (fig. 40) - in my opinion a malformation.

Description (♂):
Measurements (holotype/paratype in mm): Body length 2.0/1.7; prosoma: Length 0.95/0.8, width 0.8/0.65; opisthosoma: Length 1.15, width 0.75, height 0.8; leg I: Femur 1.1/0.9, patella 0.35, tibia 1.0, metatarsus 0.8, tarsus 0.5, tibia II 0.7, tibia III 0.65, tibia IV 0.87.
Colour: Prosoma dorsally medium grey brown, medially darkened, marginal small black, sternum dark brown, legs yellow brown, fairly or distinctly annulated, opisthosoma: See the diagnostic characters.
Prosoma (figs. 40-41) almost 1.2 times longer than wide, 8 larger eyes in two rows, posterior row procurved, posterior median eyes spaced by almost their diameter, clypeus short, prosomal-opisthosomal stridulatory organ well developed, basal cheliceral articles and fangs large like in other congeneric males, posterior "margin" of the fang furrow with two large/long teeth which are not widely spaced (see the diagnostic characters). Sternum protruding posteriorly, separates the coxae IV by half of their diameter. - Legs of medium length, order I/IV/II/III, sequence of te dorsal tibial bristles 2/2/1/1, position of the metatarsal trichobothrium I-III in ca. 0.5, teeth of the paired tarsal claws long but reduced on IV. - Opisthosoma 1.53 times longer than wide, dorsal hairs of medium length, spinnerets short, colulus not studied. - Pedipalpus (figs. 41-43; see also the diagnostic characters): Patella and tibia rather short, patella with a long dorsal-distal bristle, tibia with two trichobothria, subtegulum and tegulum bear retrolaterally some shorter and longer thin hairs, originating on small sockets (see the note (**) at the family Fonteferridae above), median apophysis and conductor large, embolus only fairly bent and only fairly long, basally thick; its position slightly distally of the middle of the bulbus.

Relationships: The shape of the tibia of the male pedipalpus and of the embolus are similar to *E. carinata* BOSMANS & VAN KEER (1999) from Algeria, in which the thoracal teeth and the structures of the bulbus like the conducor are different. In *E. diversa* (BLACKWALL1854) the posterior cheliceral teeth are similar but the body length of the male is 2.5 – 4.9 mm, the colour of the opisthosoma is different, the tibia of the male pedipalpus is distinctly longer and the structures of the bulbus are different. - In *E. almeriensis* BOSMANS & VAN KEER 1999 the body length of the male is 2.5-3.2 mm, the position of the metatarsal trichobothria is unknown to me and are not noted in the original description, the tibia of the male pedipalpus is longer, and the structures of the bulbus are different. In contrast to most other congeneric species *E. minuscula* lives in higher strata of the vegetation like in *E. ovata*.

Distribution: Portugal.

Lasaeola SIMON 1881

The following nine of the SMALLEST species of *Lasaeola* – body length usually 1-1.5 mm - are known from the European mainland: *Algarvensis* WUNDERLICH 2011, *armona* WUNDERLICH 2015, *convexa* (BLACKWALL 1870), *coracina* (C. L. KOCH 1837), *erythropus* (SIMON 1881), *inornata* (O. PICKARD-CAMBRIGE 1861), *minutissima* WUNDERLICH 2011, *octoginta* WUNDERLICH 2020 and *testaceomarginata* (SIMON 1881).

Selected characters in the tab. of these species – see WUNDERLICH (2020: 11) - may be helpful for their determination. In this tab. I will add (1) that I found the position of the metatarsal trichobothria in new material of *L. convexa* from the Algarve(CJW) to be in ca. 0.55, and (2) that I found in new material of *L. testaceomarginata* from the Algarve (CJW) the position of the metatarsal trichobothria in 0.85-0.9.

See also above (on the small body size): *Lasaeola coracina* (1837).

Lasaeola armona WUNDERLICH 2015 (fig. 44)

Only the male holotype was known up to now. The present females were collected in the same habitat as the male, only few km W from the locus typicus. Colour, chaetotaxy and trichobothriotaxy are as in the male which is a bit smaller and possesses dorsal prosomal furrows in contrast to the female (sexual dimorphism).

Material: SE-Portugal, Algarve, Park Ria Formosa, Island of Tavira (Barrill), within low plants in the dunes, 2♀ JW leg. 25. VI. 2022, R236/CJW. - The determination of several females around Tavira and Sao Bras de Alportel: R247/CJW is standing out, included are *L. armona* or *L. octoginta* - see WUNDERLICH (2020:12), - whose vulvae have still to be studied.

Description (♀; apparently egg-bearing):
Measurements (in mm): Body length 1.4; prosoma: Length 0.55, width 0.52, height 0.28; tibia I 0.25, tibia IV 0.43.
Colour as in the male, prosoma distinctly bicoloured, legs yellowish, opisthosoma black.

Prosoma high, dorsal furrows absent, bearing few long dorsal hairs in the middle, leg IV longest, opisthosoma egg-shaped, almost globular. Sequence of the dorsal tibial bristles 2/2/1/1, position of the very long metatarsal I-III trichobothria in ca. 0.95, none on IV. The area of the colulus bears a pair of long bristles. Epigyne (fig. 44) with a large pit near the epigastric furrow which is slightly wider than long, posterior margin of the pit fairly sclerotized, the large receptacula seminis are in an anterior position of the pit.

Distribution: SE-Portugal: Park Ria Formosa and probably other areas, see above.

Notes on *Neottiura curvimana* (SIMON 1914) (fig. 45)

Material: SE Portugal, Algarve, Island of Fuzeta (Barrill), in dunes within low plants, 1♂ JW leg. In IV 2023, CJW.

The body length of the male is 2.3 mm, its opisthosoma is 1.3 times longer than high, almost black and bears only few white patches (in contrast to the distinctly sexual-dimorphic female opisthosoma in which large light patches exist), all articles of the pedipalpus are black. The very thin embolus of this species is partly hidden and longer than the body. In contrast to most published figures the position of the tegular apophysis of the present male is remarkably closer to the position of embolus and conductor (fig. 45).

Remarks on myrmecomorphy: Observing the present male I mistook it as an ant before I recognized it hanging on a thread. According to the thin legs and other characteristics the males of this species look alive more ant-shaped than other congeneric species; the huge pedipapi bearing close together may well offer the illusion of a head of an ant and so a tripartite body similar to ants.

Theridion WALCKENAER 1805

Some members of this diverse genus are dwellers of higher strata of the vegetation, like *T. bernardi* LECIGNE 2017 (see below), other species are ground dwellers, e. g., *T. modonatum* n. sp. which I found below stones (*). So far known both species are endemics of the Algarve, and may exist in the same area like near Sao Bras de Alportel, but in quite different habitats – an example of intrageneric ecological separation.

(*) The type specimens of related *T. betteni* WIEHLE 1960 were collected at a wall in Germany; this species is not a dweller of higher strata of the vegetation.

Theridion bernardi LECIGNE 2017

The species is only known from the Algarve, Portugal.

<u>Material</u>: Portugal, Algarve, (1) Prego, ca. 6 km W Tavira, ♂♀ JW leg. in IV 2022, beaten from bushes, CJW; (2) around Tavira, ♂♀ beaten from bushes, JW leg. 2014-2020, CJW; (3) around Sao Bras de Alportel, e. g. beaten from bushes in a garden in Mesquita Alta (see the introduction), ♂♀ JW leg. in IV-V 2022, CJW.

<u>Note</u>: The colour of the opisthosoma is quite variable, and different in both sexes, too: The light dorsal band is widest anteriorly in some females, and in the white field between epigaster and spinnerets exists a small transverse band in the male sex but in a large square field in the female. In fresh specimens exist light reddish dorsal elements mainly in the anterior half of the opisthosoma. The colour of the prosoma is also quite variable, it may be darkened but light similar to *T. modonatum* n. sp., too.

Theridion modonatum **n. sp**. (figs. 46-50), photo 3.

<u>Etymology</u>: The name of the species refers to two paratypes which were captured as subadult specimens and moulted to adults in captivity, from modonatus (lat.) = just born.

<u>Material</u>: Portugal, SE-Algarve, (1) 4 km east of Sao Bras de Alportel, eastern margin of Mesquita Alta, 400 m east of a garden (see the introduction above), in the low mountains, ca. 300 m, at a deep slope which is exposed to the north, in the shadow under oaks, at a stack of stones, below stones, the same locality as *Palliduphantes lancea* n. sp. (see below), 4♂4♀ 3 juv. JW leg. at the end of II and the mid of III 2023; holotype ♂ R262/CJW; 3♂4♀ 3 juv. paratypes R263/CJW. <u>Note</u>: A left ♂-pedipalpus and a vulva are kept separately. - (2) ca. 3 km NE of Sao Bras de Alportel, ca. 300 m east of Bico Alto, low mountains, ca. 300 m, 2 subad. ♀ paratypes, JW leg. 28. III. 2023 and 2 ad. ♀ 25. IV. 2023, under stones at a shadowy place, R269/CJW.

Diagnostic characters: Prosoma (photo) light yellow, medially with a small dark longitudinal band and a dark margin, opisthosoma (photo), dorsally usually with a pair of longitudinal zig zag bands but quite variable; red pigments absent; ♂-pedipalpus (figs. 46-49): Conductor and theridiid tegular apophysis large, embolus only fairly long, distinctly bent, the position of its large basal part near the subtegulum. ♀: Epigyne (figs. 48-49) anteriorly and posteriorly protruding, with a small sclerotized and anteriorly partly divided opening, vulva (fig. 50) with quite short introductory ducts and large, thin-walled receptacula semilis. - A ground dwelling species of shadowy habitats.

Description:
Measurements (in mm): ♂: Body length 2.5-3.0; prosoma: Length 1.0-1.3, width 0.9-1.1; opisthosoma (holotype): Length 1.8, width 1.5, height 1.5; leg I (holotype): Femur 1.6, patella 0.6, tibia 1.6, metatarsus 1.4, tarsus 0.6, tibia II 1.1, tibia III 0.55, tibia IV 0.9; pedipalpus: Femur 0.5, patella 0.15, tibia 0.2. - ♀: Body length ca. 2.4; prosoma: Length 1.0, width 0.95; opisthosoma: length 1.45, width 1.45, height 1.3; leg I: Femur1.7, patella 0.45, tibia 1.2, metatarsus 1.13, tarsus 0.6, tibia II 0.8, tibia III 0.43, tibia IV 0.7.
Colour (photo; see also the diagnostic characters): Black rings around posterior median eyes quite narrow, sternum light grey, legs light, more or less annulated, opisthosoma dorsally mainly dark grey, red pigments absent, with a wide pair of longitudinal zig zag bands, spinnerets black surrounded, white spots exist ventrally in front of the spinnerets.
Prosoma not much longer than wide, bearing dorsally some longer hairs including a pair between the anterior median eyes which are directed foreward, fovea fairly well developed, prosomal-opisthosomal stridulatory organ well developed, 8 small eyes, transverse diameter of a poster median eyes 0.06 mm, fangs slender, teeth of its furrow absent. - Legs (photos) only fairly long, order I/II/IV/III, hairs of medium length, bristles quite thin, patellae dorsally 1/1, sequence of the dorsal tibial bristles 2/2/1/2, femur I bears – mainly prolaterally in the middle third – at least half a dozen strong hairs which are stronger – almost bristle-shaped and up to 0.25 mm long – in the male sex (sexual-dimorphism). Position of the metatarsal I trichobothrium in 0.33; it is absent on IV. - Tarsal claw of the ♀-pdipalpus well developed. - Opisthosoma (photo) bearing rater few dorsal bristles of medium length, ♂-epigaster distinctly protruding, spinnerets short, colulus absent. - ♂-pedipalpus: See above, patella and tibia short. - Epigyne/vulva: See above.

Relationships: In the remaining species of the *T. melanurum*-group the position of the embolus is more distally, the shapes of the TTA and of the embolus are different; to my knowledge most of the related species are not living below stones but in higher strata of the vegetation like *Theridion bernardi* LECIGNE 2017 which is also frequent around Sa Bras de Alportel, and in which the conductor is distinctly smaller than in *modonatum*. According to the structures of the vulva - the relatively short introductory ducts and the thin-walled receptacula seminis - I regard *T. betteni* WIEHLE 1960 (see above) as most related to *T. modonatum*. In *modonatum* the structures of the epigyne are different, the introductory ducts are still shorter, the embolus is shorter and stronger bent.

Distribution:Portugal: Algarve. - Note: The south European specimens determined as *T. betteni* have to be checked and may be actually *T. modonatum* n. sp.

Family LINYPHIIDAE

This family is diverse in the Algarve. The taxonomy of certain taxa causes still serious problems, see, e. g., the members of the genera *Agyneta*, *Canariphantes* and *Palliduphantes.*

Agyneta pseudorurestris WUNDERLICH 1980 (figs. 53-56)

Material: S-Portugal, Algarve, e. g. Island of Tavira within plants in dunes; 4 km east of Sao Bras de Alportel, Mesquita Alta, beaten from a bush, ♂♀ JW leg. In III. 2023, CJW.

This frequent species is widely distributed in the Mediterranean and has recently reported from the Algarve, see WUNDERLICH (2022: 31, fig. 60); I found it from Tavira to Sao Bras de Alportel.

The present male has a prosomal length of 0.8 mm, its prosoma, opisthosoma and pedipalpus are uniformly back – a garden dart (in German "Schwärzling") -, darker than the usual colour of *A. pseudorurestris*; the leg articles are not darkened. The shape of the toothed lamella characteristica of this species is unique; its specific tooth is observable in the more ventral aspect (fig. 56) but not in the lateral aspect (fig. 55), and is absent in the related *A. rurestris.* Because of the mainly black colour of the pedipalpus the structures of the paracymbium (fig. 55) are very difficult to recognize, and its shape appears quite different in slightly different positions; at least two larger teeth exist.

The large dorsal hump of the cymbium bears in incision on its top (arrow in fig. 53) which may represent a special – sexual-dimorphic – organ which to my knowledge has still not studied. This structure exists also in species closely related to *A. pseudorurestris*.

Algarveneta WUNDERLICH 2021

Type species (by monotypy): *Algarveneta corona* WUNDERLICH 2021 (figs. 51-52).

New material: Portugal, Algarve, around Sao Bras de Alportel, e. g., Mesquita Alta, in a garden (see the introduction), numerous ♂♀ JW leg. in V 2022 and I-IV 2023 under stones and ballooning (adult specimens of both sexes in IV), CJW.

The body length of the present males is 1.0 mm, the basal articles of the chelicerae may fairly diverge, the position of the metatarsal I trichobothrium is in up to 0.33. The colour of spiders of some of the new material is darker than of the previously studied specimens: the legs may be distinctly darkened beyond the femora, the opisthosoma is uniformly black, the ♂-pedipalpus as well as tibia and tarsus of the ♀-pedipalpus may be black. A slightly to distinctly darkening of certain leg articles is not unusual in species of Micronetini like *Agyneta* and *Syedra*, not so frequent and distinct in the Lepthyphantini.

Synonymy: According to R. BOSMANS (unpublished, in litt.) *corona* is a member of *Canariphantes* WUNDERLICH 1992, and apparently a junior synonym of *Canariphantes zonatus* (SIMON 1884). In my opinion the new generic combination is well founded but I am not quite sure about the synonymy of the species; the shape of the paracymbium and of the vulva from Portugal provided by MACHADO (1949) appears different from type material of *corona*.

Distribution: (a) of *corona*: Portugal, (b) of *zonatus*: e. g., S-France, Iberian Peninsula.

Palliduphantes SAARISTO & TANASEVITCH 2001

Numerous ground-dwelling species of the diverse genus *Palliduphantes* are troglophilic or even troglobiontic. Especially the structures of their male copulatory organs are very complicated – see, e. g., fig. …. -; they are quite similar in closely related species and are usually not well studied. A revisional study of this genus is needed, and I suppose that several still undescribed "hidden" species exist mainly in Europe and North Africa. Here I describe the female of *P. juliao* for the first time and both sexes of a second species of the same genus. Both species were captured only 400 m away from each other but in different habitats.

Palliduphantes juliao WUNDERLICH 2022 (figs. 61-65)

New material: S-Portugal, Algarve, 4 km E Sao Bras de Alportel (see above), in a garden (see the introduction), below stones, 2♀1♂ JW leg. 14. V. 2022, and in II 2023, R259/CJW.

Diagnostic characters (the ♀ is described for the first time): Epigyne/vulva (figs. 62-65) strongly protruding, with a very long and slender scape which bears a long lateral sclerite and is rather distinctly widened posteriorly, stretcher (tongues) well developed, shape of the posterior plate rectangular; vulva with quite small and divided receptacula seminis.

Description (♀):
Measurements (in mm): Body length 2.0; prosoma: Length 0.9, width 0.7; opisthosoma: Length 1.2, width and height 0.75; leg I: Femur 1.1, patella 0.3, tibia 1.1, metatarsus 1.0, tarsus 0.7, tibia II 1.0, tibia III 0.8, tibia IV 1.0.
Colour: Prosoma dorsally not darked except the black eye field, sternum dark grey, patellae to tarsi of all legs completely and distinctly medium grey darkened (not annulated) (fig. 61) (in the males variable, light to darkened), pedipalpus basally yellow, tibia and tarsus darkened, opisthosoma mainly dark grey (almost black) but dorsally in the posterior half bearing small medium grey transverse bands, and grey around the pedicel.

Prosoma 1.3 times longer than wide, hairs indistinct, fovea shallow, fissure absent, 8 eyes of medium size, posterior row quite slightly procurved, posterior median eyes spaced by almost their diameter, clypeus slightly protruding, basal cheliceral articles large and not diverging, lateral stridulatory field quite long, fangs long, anterior margin of the fang furrow with 3 larger teeth, posterior margin with 5 denticles, coxae IV spaced by the sternum by almost their diameter. - Pedipalpus spiny. - Legs rather long and slender, I and IV almost equal in length, hairs short, bristles long and not numerous; femora: Only I bears a singe prolateral one in the distal half, patellae dorsally with a weak basal and a long subapical bristle, tibiae with 1/1 dorsal bristles, I bears additionally a lateral pair in the distal half, tibia II bears also a retrolateral bristle in the distal half, all metatarsi bear a single dorsal bristle in the basal half; position of the metatarsal bristle I in 0.23, absent on IV. Tarsal claws rather small, unpaired claws strongly bent, paired claws slightly bent, without long teeth. - Opisthosoma oval, 1.6 times longer than wide, hairs of medium length, colulus well developed, longer than wide, spinnerets not studied. Epigyne/vulva: See above.

Relationships: *P. cadiziensis* WUNDERLICH 1980 from S-Spain (♀ unknown, see below) is strongly related; in *cadiziensis* the paracymbium is quite similar but the apical branches of the lamella characteristica are not strongly diverging. According to the slightly different shape of the apical branches of the lamella characteristica and the shape of the posterior plate of the epigyne *P. cadiziensis* in the sense of BOSMANS (2006b) from Morocco (!) may be a different and unnamed species; its epigynal scape is as in my figs. 62-65 of *juliao*.
Note: Unfortunately - under *P. cadiziensis* - the ♂-pedipalpus is only shown based on material from Morocco but not from the holotype from Spain by the World Spider Catalog (WSC).
In the related *P. robertsi* BALLARIN & PANTINI 2022 from Italy the lamella characteristica bears a strongly bent additional branch in its middle. - See also *P. lancea* n. sp. below.

Distribution: S-Portugal, Algarve.

***Palliduphantes lancea* n. sp.** (figs. 66-75)

Etymology: The name of the species refers to the lanceolate structures of the bulbus, from lancea (lat.) = lance.

Material: S-Portugal, Algarve, 4 km east of Sao Bras de Alportel, 400 m east of a garden in Mesquita Alta (see the introduction above), in low mountains, ca. 300 m, at a deep slope which is exposed to the north, in the shadow under oak trees, at a stack of stones, below stones, in relatively high humidity of the microclimate, holotype, a complete ♂ (the left pedipalpus in two parts is kept separately), JW leg. 26. II. 2023, R260/CJW; paratypes: An adult ♀, same locality, JW leg. 20. IV. 2023, R284/CJW (the spider has almost been dried out for a short time and is fairly shrunk, prosoma and opisthosoma have been separated); a not completely developed ♀ (freshly moulted and incomplete, soft, parts are covered by the old cuticle; it was damaged during capturing), JW leg. 4. III. 2023 at the same locality, R261/CJW.; 2♂ Mesquite Alta and Bico Alto near Sao Bras de Alportel, JW leg. in the end of III 2023, R265/CJW.

Notes: (1) The reltively high humidity of the habitat in question indicates a troglophilic life style of *P. lancea* (like of the two spider species mentioned directly below); (2) in the same stack of stones I collected members of *Theridion modonatum* n. sp. and *Pholcomma gibbum* (WESTRING 1851); (3) not far from this locality specimens of *Tulipa* sp. ?*sylvestris* L.) (Liliaceae) were flowering – rather early at the end of February!

Diagnostic characters (♂; not fully developed ♀): ♂-pedipalpus (figs. 66-71): Lamella characteristica strongly sclerotized, long, slender and branched apically with the ventral branch shorter, two lanceolate ventral sclerites exist more medially; the paracymbium bears a lamellate part and 3 teeth; I did not discover the hidden embolus which may be short and only weakly sclerotized; epigyne (figs. 66-75) protruding (less than in *juliao*), with a wide and folded scape and a small and almost circular plate.

Description (♂):
Measurements (in mm): Body length 1.5-2.0 (holotype); prosoma: Length 0.7-0.9, width 0.55-0.7; opisthosoma: Length 1.15, width 0.7; leg I: Femur 1.2, patella 0.3, tibia 1.2, metatarsus 1.2, tarsus 0.8; tibia II 1.1, tibia III 0.8, tibia IV 1.1; diameter of a posterior median eye 0.06 (holotype).
Colour: Prosoma orange, margin weakly darkened, eyes partly black surrounded, sternum medium to dark grey, opisthosoma dark grey, dorsally in the anterior half bearing few indistinct light spots and patches, posteriorly bearing half a dozen small indistinct transverse bands, legs mainly orange, articles beyond the femora slightly darkened.
Prosoma ca: 1.6% times longer than wide, bearing few hairs of medium length, fovea indistinct, 8 eyes of medium size, posterior row straight, posterior median eyes spaced by almost their diameter, basal cheliceral articles of medium size, bearing a large field of lateral stridulatory files, anterior margin of the fang furrow with 3 larger teeth, sternum spacing the coxae IV by almost their diameter. - Legs long and slender, order I/IV/II/III, hairs short, bristles long and not numerous, femora: Only I bears a prolateral one in the distal half, patellae dorsally 1/1, tibiae dorsally 2/2/2/2, additionally I with a lateral-distal pair, II with a retrolateral bristle, all metatarsi with a dorsal bristle in the basal half; metatarsi I-III bear a trichobothrium, its position on I in ca. 0.17; paired tarsal claws well developed, bearing short teeth. - Opisthosoma 1.65 times longer than wide, dorsal hairs rather long, colulus well developed, spinnerets short. - Pedipalpus: See above; patella and tibia short, each bearing a long dorsal bristle (the tibial bristle longer), paracymbium standing out, bearing 3 teeth, bulbus sclerites numerous, course of the long sperm duct winding in various directions.

Description of the adult and fairly shrunk ♀: Colour as in the male, epigyne: See above. - Description of the not fully developed and damaged ♀: Length of the prosoma and of femur I each 0.9 mm, prosoma yellow, legs light grey, opisthosoma medium grey, dorsally with light transverse bands, prosoma and legs similar to the male; epigyne: Fig. 75.

Relationships: In the probably most related *P. bolivari* (FAGE 1931) from the Iberian Peninsula, too, the lamella characteristica is less sclerotized and the ventral-distal branch of the lamella characteristica is longer than the dorsal branch. Also related are *P. carusoi* (BRIGNOLI 1979) from Italy (Sicily) and *P. cernuus* (SIMON 1884) from France and Spain. See also *P. cadiziensis* (WUNDERLICH 1980) from Spain.

Distribution: S-Portugal, Algarve.

Diplocephalus toscanensis WUNDERLICH 2011

Material: Portugal, Algarve, Mesquita Alta, 4 km E Sao Bras de Alportel, N 37°09'11" W 07°50'29", in a garden, under stones partly below a bush, 1♂1♀ JW. leg. in IV 2022, CJW.
Distribution: Italy, Portugal; see WUNDERLICH (2021: 7-8).

Gonatium hilare (THORELL 1875)

Material: Algarve, 4 km E Sao Bras de Alportel, Mesquita Alta, in a garden (see the introduction), under a stone, 1♀ JW leg. In V. 2022; CJW.

Distribution: Central and southern Europe; new to the fauna of Portugal.

Note: Recently I reported the congeneric *G. rubens* (BLACKWALL 1833) from the Algarve, see WUNDERLICH (2022: 31).

Styloctetor romanus (O. PICKARD-CAMBRIDGE 1871) (figs. 57-60)

Material: Portugal, Algarve, Island of Tavira (Barrill), southern cost, at the beach, among low plants of *Artemis maritima*, 3♂ 2♀ 1juv. JW. leg. 1-10. IV. 2023, CJW.

Note: The cymbium of this species bears a distinct prodorsal furrow (fig. 57), the embolus is strongly fold and bears a small seam distally (fig. 58), the epigyne is quite variable (fig. 59), the receptacula seminis possess thin walls (fig. 60).

Distribution: Wide parts of the Northern Hemisphere.

Walckenaeria corniculans (O. PICKARD-CAMBRIDGE 1875)

Material: Algarve, 4 km E Sao Bras de Alportel, Mesquita Alta, in a garden (see the introduction), under tiles and stones, 1♂4♀ JW leg. In XII 2022 – II 2023; CJW.

Note: As in *W. corniculans* also in W. *atrotibialis* (O. PICKARD-CAMBRIDGE 1878) (= *W. melanocephala*) and *W. furcillata* (MENGE 1866) the cephalic part is strongly darkened, see WIEHLE (1960). In *W. atrotibialis* tibia I-II is distinctly darkened. - In the erigonine *Pelecopsis bucephala* O. PICKARD-CAMBRIDGE 1875 - which I found in the same locality as *corniculans* – exist also a darkened cephalic part; in this species the prosoma is distinctly tubercuate, even in non-adult specimens. In another erigonine species - *Trematocephalus cristatus* (WIDER 1834), which is still unknown from the Iberian Peninsula – not the hole cephalic part but a large area of the eyes is black darkened.

Distribution: Europe, Turkey, North Africa.

Erigoninae indet.

Material: Portugal, Algarve, ca. 4 km NE Sao Bras de Alportel, Fonte Tareja, in bark of a cork oak hanging on a tree two meters above ground, 1 subad. ♀ JW leg. 29. V. 2023, R279/CJW.

Taxonomical characters: Prosoma orange, legs and opisthosoma light yellow, legs not annulated, opisthosoma in the middle part of the anterior half light grey, thoracic fissure existing, 8 eyes in two rows, lateral cheliceral files indistinct, anterior margin of the fang furrow with 3 large teeth, posterior margin with 3 small teeth, sequence of the long dorsal tibial bristles 1/1/1/1, patellae dorsally with a short basal and a long distal bristle, further bristles absent, all metatarsi bear a long trichobothrium, its position on I in 0.8; measurements (in mm): Body length 2.2; prosoma: Length 0.85, width 0.78; opisthosoma: Length 1.5, width 1.2; tibia I 0.55, tibia IV 0.62.

Distribution: Portugal, Algarve.

Family ARANEIDAE

Notes on the splitting of the Araneidae (s. l.) and on fossil Nephilinae:

(1) I regard the splitting of the diverse family Araneidae s. l., in Araneidae, Nephilidae, Phonognathidae (including, e. g., the genera *Phonognatha* and *Zygiella*), as well as Paraplectanoididae, and also the term “Orbipurae” by KUNTNER et al. as not justified, see the recent papers by KALLAL & HORMIGA contra KUNTNER et al. According to the sexual

size dimorphism, the size of the chelicerae, the kind of the orb web and the structures of the copulatory organs of both sexes I am still in doubt about the relationships of the taxa in question, the use of *subfamilies* may still be best, and *Paraplectana* may remain as a plesion of the Araneidae: ?Araneinae. Nephilinae may probably be regarded as a subfamily of the Araneidae besides the Araneinae (in both taxa a distinct sexual size dimorphism exists). The copulatory structures of *Phonognatha* and *Zygiella* are quite different and in my opinion they are not members of the same subfamily.
(2) KUNTNER et al. (2019) regard the existence of Nephilinae already in the Cretaceous, based on the extinct genus *Geratonephila* POINAR & BUCKLEY 2012 in ca.100 million year old Kachin amber from Myanmar (Burma). KUNTNER et al. did not mention that – according to WUNDERLICH (2015: 58) – *Geratonephila* is considered to be a junior synonym of *Nephila* LEACH 1815, and I regard the type species of *Geratonephila* as a synonym of *Nephila tenuis* WUNDERLICH 1986, preserved in only ca. 20 million year old Miocene Dominican amber. To my knowledge a member of the Nephilinae has never been found in the Cretaceous. As I published in several papers the members of the Nephilinae - as well as of other Araneidae s. l. and of all (!) the families of the RTA-clade - have never been found in the Cretaceous; they are most probably not old families, and numerous – probably most - spider families are “typically” not older than most other arthropod families.

Araneus pallidus (OLIVIER 1789) (fig. 75a), photo 4

Material: Portugal, Algarve, Mesquita Alta (see the introduction) 4 km E of Sao Bras de Alportel, in a garden, beaten from a bush, 1 subad. ♂ and 1 subad. ♀ JW leg. 2. IV. 2023, ♂ adult 30. VI. 2023, CJW.

The opisthosomal colour (photo 4) of this small species is quite similar to the larger *Araneus diadematus*. The body length of the present ♂ is 3.9 mm, its prosomal length is 1.8 mm. The shape of the median apophysis is apparently quite variable, in the present ♂ as in fig. 75a. The body length of the subad. ♀ is 7.5 mm, its prosomal length 4 mm.

Distribution: France, Portugal, Spain and Algeria.

Cyrtophora citricola (FORSSKAL 1775)

Material: Portugal, Algarve, Fonte Tareja, ca. 3 km NE Sao Bras de Alportel, on the ground, 1 subad. ♂ JW leg. 18. IV. 2023, adult 29. IV. 2023; CJW.

The body length of the male is 2.5 mm, its paired posterior opisthosomal protuberances are stronger developed as in most conspecific males, in the present subadult male, too.

Citricola is the only species of this genus in Europe; it is widely distributed, e. g., in Southern Europe. The modified web - containing a horizontal “orb” - is unique.

Family TETRAGNATHIDAE

Tetragnatha intermedia KULCZYNSKI 1891 (figs. 76-77.)

<u>Material</u>: Portugal, SE-Algarve, Pedras del Ray (Barrill), Island de Tavira, among low plants in the dunes, 2♂ 1 juv. JW leg. 17. IV. 2022, CJW.

The body length of the males is 5 and 7 mm. The shape of embolus and conductor (fig. 77) cannot be mistaken. The colour of the sternum is intraspecific QUITE VARIABLE: Uniformly dark brown in some specimen like in the present juvenile, in some specimens with a light patch anteriorly, in other specimens medially light like I the present males (fig. 76), not unlike to *Tetragnatha extensa* and *pinicola*.

Family DICTYNIDAE

Dictyna kosiorowiczi SIMON 1873 (fig. 78)

<u>Material</u>: Portugal, Algarve, ca. 3 km N Sao Bras de Alportel, Fonte Ferrea, beaten from a bush at a small stream in the forest, 1♂ JW leg. 6. VI. 2023, R280/CJW; together with two females of *Mimetus laevigatus* (KEYSERLING 1863).

Measurements (in mm): Body length 2.6; prosoma: Length 1.2, width 0.9; tibia I 0.85, tibia IV 0.55.
Pedipalpus (fig. 78): Retrodorsal apophysis (ctenidium) stout and in a quite basal position, a retroapical apophysis exists additionally, the conductor is not twisted, its strongly sclerotized distalanterior branch is serrated and standing obliquely out from the tibia.

Distribution: France, Spain and Portugal; new to the fauna of Portugal.

Lathys mantarota WUNDERLICH 2022

New material: Portugal, SE-Algarve, Peninsula Manta Rota, area of the locus typicus of the species which description was based on a single pair, in dunes, in detritus in low plants, 1♀ JW leg. 1. V. 2022, R227/CJW.

Distribution: Portugal, Algarve.

Family HAHNIIDAE: HAHNIINAE

Iberina SIMON 1881

These tiny ground-living spiders are easily overlooked in the field. Three species of *Iberina* are recorded from the Iberian Peninsula including Portugal: *Candida* (SIMON 1875), *mazarredoi* SIMON 1881 (a cave spider) and *montana* (BLACKWALL 1841). Here I describe a third species from Portugal.

***Iberina harmae* n. sp.** (fig. 79)

Derivatio nominis: The name of the spider is dedicated to the German author MARIA HARM who revised the members of the German Hahniidae in an important paper.

Material: Portugal, Algarve, Fonte Tareja, ca 3 km NE Sao Bras der Alportel (see the introduction), under bark of an cork oak on the ground within detritus, ♀ holotypus JW leg. in IV 2023, R275/CJW. - Notes: Prosoma and opisthosoma have been separated, the epigyne/ vulva is kept in a small tube.

Diagnosistic characters (♀; ♂ unknown): Metatarsus III-IV without or with a single apical bristle, colour medium grey, opisthosoma with distinct chevrons (photo), epigyne with a weakly sclerotized square field, vulva (fig. 79) with globular thin-walled primary receptacula seminis which are spaced by their diameter, secondary receptacula large and slightly oval (egg-shaped), ducts apparently short. Tiny spiders, body length of the female 1.25 mm.

Description (♀):

Measurements (in mm): Body length 1.25; prosoma: Length 0.55, width 0.5; opisthosoma: Length 0.8, width 0.67; leg I: Femur 0.55, patella 0.14, tibia 0.45, metatarsus 0.34, tarsus 0.29; tibia II 0.36, tibia III 0.3, tibia IV 0.5.

Colour: Prosoma and legs medium grey, legs not annulated, opisthosoma medium to dark grey, dorsally with distinct light chevrons, ventrally and spinnerets light grey.

Prosoma (it is slightly deformed) 1.1 times longer than wide, cuticula almost smooth, most hairs apparently rubbed off, thoracic fissure short, 8 larger eyes in two rows, posterior row distinctly procurved, posterior median eyes spaced by two diameters, clypeus long and ventrally distinctly protruding, basal cheliceral articles large, fangs of medium size. - Legs robust, order IV/I/II/III, hairs of medium length, bristles few (some may be rubbed off); femora: Only I bears a prodistally a single one, patellae with a long dorsal-apical one, tibiae: I-II 1 in the basal half, tibiae III-IV with 2 dorsal bristles, metatarsi: Only right metatarsus IV with a single ventral-apical bristle, tarsi none. All tarsi bear a very long distal trichobothrium, its position on V in. 0.9 other trichobothria and tarsal claws not studied. - Opisthosoma 1.4 times longer than wide, bearing short hairs, spinnerets large, in a transverse position. - Epigyne/vulva: See the diagnostic characters.

Relationships: According the chaetotaxy *Iberina candida* (SIMON 1878) may be most related; *candida* is larger (body length 1.4-1.7 mm), its colour is pale yellow, the receptacula seminis are more oval, and long ducts are retrolaterally reaching anteriorly of the secondary receptacula seminis. In *Iberina montana* (BLACKWALL 1841) the colour of body and legs is similar to *harmae* but the spiders are larger, the number of apical metatarsal III-IV bristles is larger and the vulva is distinctly different.

Distribution: Portugal, Algarve.

Family LYCOSIDAE

Alopecosa albofasciata (BRULLE 1832) (Fig. 80)

Material: Portugal, Algarve, Fonte Ferrea, ca. 3 km NE Sao Bras de Alportel, 1♂ JW leg. In IV. 2023, R270/ CJW.

Notes: The body length of the present male is 8.0 mm, its prosomal length 4.4 mm, its opisthosoma bears ventrally a quite large yellow patch, the position of the basal part of the embolus is quite prolaterally (fig. 80).

Distribution: Mediterranean to Central Asia.

Family ZODARIIDAE

In the Algarve I collected specimens of *Selima reticulata* (SIMON 1870), collected various members of *Zodarion* (some females are still indet., CJW) and described few species of *Zodarion* for the first time. More than ten years ago I published a key to the European genera of the Zodariidae - see WUNDERLICH (2012), Beitr. Araneol., 7: 7-11 -, which has to be corrected in some respects and to be completed, see below.

Eight zodariid genera have been reported from the Mediterranean, three – *Amphiledorus, Selima* and the very diverse (monophyletic?) genus *Zodarion* – are known from the Iberian Peninsula including Portugal. Here I provide a **key** to the Mediterranean genera of this family and describe a new species of *Zodarion*.

Notes: (1) Distribution of a chilum - a small median sclerite at the base of the chelicerae which may be difficult to recognize - is not used in the key. It is absent in *Palaestina*, *Trygetus* and *Zodarion*, and is bipartite in *Selamia*. Pointing to the distribution may be helpful in some genera. - (2) The first two genera of the key are restricted to the Southern Mediterranean (North Africa to the Near East). - (3) The tiny members of the genera *Acathinozo-*

dium DENIS 1966 (NW Africa), *Ranops* JOCQUE 1991 (Near East) and *Zodariellum* ANDREEVA & TYSCHENKO 1968 (Tadzhikistan) are quite similar and strongly related to the probably not monophyletic genus *Zodarion* WALCKENAER 1847; they occur outside and near to the Mediterranean - (4) *Zodarion* is the only zodariid genus present in Germany (three species). About 150 species of this most diverse genus have been described from Europe, more than 100 from the Mediterranean. In this region more than 4/5 of the zodariid species are members of *Zodarion.* This and three strongly related genera - see above - are easily recognized by their eye position (fig. 81), see the key no. 3. What may be the reasons for the great success and the pronounced diversification/radiation of this genus in contrast to the remaining con-familiar genera?

key to the Mediterranean genera of this family Zodariidae:

1 Six eyes (anterior median eyes absent) or eight eyes with the anterior median eyes more or less reduced; eyes IN THE MEDIAN POSITION of *Trygetus* quite large; body length 1.5-2.5 mm, Southern Mediterranean …... 2

- Eight eyes (in *Zodarion*, no. 3, the posterior median eye lenses are frequently quite indistinct!); body length usually 1.5-15 mm …... 3

2(1) Chelicerae with strong short spines medially in their distal half, shape of the prosoma as in fig. 82; the posterior median eyes may be more or less reduced, rarely even absent …... ***Palaestina***

- Cheliceral bristles absent in this position, anterior median eyes completely absent …..........
….. ***Trygetus***

3(1) Position of the eyes (figs. 81,83): Posterior eye row strongly procurved <u>and</u> anterior median eyes distinctly the largest, the posterior median eye lenses frequently distinctly reduced, body length usually 1.5-4 mm, quite rarely up to ca. 7 mm. Colour of the opisthosoma very variable, bearing flattened iridescent hairs. More or less ant-shaped. More than 100 mediterranean species, numerous in the Algarve .... ***Zodarion***

- Position and shape of the eyes different, the anterior median eyes may even be the smallest, body size usually 5-15 mm …... 4

4(3) Anterior margin of the fang furrow with a single tooth, colour of the prosoma, usually yellow. Western Mediterranean …... ***Amphiledorus***

- anterior margin of the fang furrow with two teeth, colour of the prosoma yellow in *Lachesana* but red-brown or dark-brown in *Pax* and *Selamia*. Western or Eastern Mediterranean..5

5(4) Prosoma usually yellow, body length usually 10-15 mm (largest mediterranean Zodariidae), ♂-fangs bent in an unusual way (almost s-shaped), epigyne with a median septum between a pair of dark depressions. Eastern Mediterranean ….............. ***Lachesana***

- Prosoma red-brown to dark brown, body length usually less than 10 mm, ♂-fangs bent in the usual way, epigyne different. Eastern or Western Mediterranean …............................... 6

6(5) Clypeus short, not much longer than the length of the field of the median eyes, scutum of the ♂-opisthosoma absent. Western Mediterranean …... ***Selamia***

- Clypeus long, more than twice the length of the field of the median eyes, ♂-opisthosoma with a large dorsal scutum. South-Eastern Mediterranean …... ***Pax***

Zodarion alacre (SIMON 1870) (figs. 83-86)

Material: Portugal, Algarve; (1) ca. 300 m east of Bico Alto ca. 3 km NE of Sao Bras de Alportel, under a stone on a shadowy place at the margin of a small road, together with *Theridion modonatum* n. sp. and *Palliduphantes lancea* n. sp., 1♂ JW leg. 29. IV. 2023, R272/CJW; (2) Fonte Tareja ca. 3 km NE Sao Bras de Alportel, 2♂ JW leg. 16. V. 2023, CJW.

Characters and notes: The body length of the male from Bico Alto is 3.0 mm, body and legs are uniformly black brown, the tarsi are only slightly lighter, the prosomal cuticula is weakly rugose, the anterior median eyes are only fairly small (fig. 83), the opisthosoma is dorsally completely hardened and bears ventrally several hardened areas; pedipalpus (figs. 84 - 86): Tibial apophysis quite long and undivided appearing in the dorsal aspect, its widely spaced apical branches appear distinct in the retroventral aspect, the median apophysis bears a tiny prodistal tooth which is difficult to recognize.

Distribution: Iberian Peninsula, widely spread.

Zodarion styliferum (SIMON 1870) (fig. 87)

Material: Portugal, (1) Mesquita Alta, 4 km E Sao Bras de Alportel, in a garden (see the introduction), under stones, 2♂ JW leg. In II. 2023, CJW; (2) Fonte Tareja (see the introduction), pit falls (together with *Z. brevicephalus* n. sp.), 3♂ JW leg. In V. 2023, CJW.

The prosomal length of the two specimens from Mesquite Alta is 1.26 and 1.35 mm, fig. 87. The colour of the species is very variable; prosoma and femora of the present specimens are black brown, the remaining leg articles are light, the colour of the opisthosoma is mainly black but ventrally and partly laterally white, in the larger male it bears dorsally in the posterior half 5 white transverse bands, in the smaller male it bears only a larger white spot above the spinnerets. - The species is widely distributed, e. g., in the Iberian Peninsula. - Relationships to the closely related *Z. brevicephalus* n. sp. and the also strongly related or probably even synonymous *Z. parastyliferum* WUNDERLICH (2022).

Zodarion brevicephalus **n. sp**. (figs. 88-92)

Etymology: The name of the species refers to its short cephalic part, from brevis (lat.) = short and cephalus, the anterior pat of the spider prosoma..

Material: Portugal, Algarve, about 3 km NE Sao Bras de Alportel, Fonte Tareja (see the introduction), two pit falls close together within a thick layer of leaves and detritus under a cork oak, 5♂ 2 ♀ JW leg. in V. 2023, holotype ♂ R276/CJW, 4♂ 2 ♀ paratypes, R278/CJW. - Notes: (1) The epigynes and the part of an expanded left ♂-pedipalpus are kept separately in a small tube. - (2) Other species of *Zodarion* in the same pit falls: 3♂ of the sibling species *styliferum* (SIMON 1870) (CJW) and 1♂ of *alacre* (SIMON 1870) (R272/CJW).

Diagnostic characters: Shape of the prosoma (fig. 88): Ratio of the length of the prosomal length and width 1.10-1.122 with a relatively wide thoracal part; ♂-pedipalpus (fig. 89) as in *Z. styliferum* (SIMON 1870) (!), epigyne (figs. 90-91) with a pair of dark (strongly sclerotized) posterior structures and a pair of long bands of different position, vulva (fig. 92) with a pair of strongly sclerotized posterior structures and widely spaced almost triangular receptacula seminis.

Description:
Measurements (in mm): ♂: Body length 2.0-2.5; prosoma: Length 1.1-1.35, width 0.95-1.1; opisthosoma of a small male: Length 1.1, width 0.85; leg I of a small male: Femur 0.95, patella 0.37, tibia 0.77, metatarsus 0.93, tarsus 0.8; tibia II 0.67, tibia III 0.6, tibia IV 1.1. - ♀: Body length 2.9; prosoma: Length 1.4, width 1.2; opisthosoma: Length 1.5, width 1.1; leg I: Femur left 1.3, right 1.5, patella 0.4, tibia 0.9, metatarsus1.1, tarsus 0.8; tibia II 0.75, tibia III 0.7, tibia IV 1.2; diameter of a receptaculum seminis 0.04.
Colour not natural due to the preservation fluid.
Prosoma: 1.1-1.22 times longer than wide, thoracic fissure well developed, 8 large eyes, position as in *Z. stylifrons*, basal cheliceral articles robust, fangs stout, sternum ca. 1.12 times longer than wide, only slightly spacing the coxae IV.- Legs: Order IV/I/II/III, hairs of medium length, bristles absent. - Opisthosoma oval, bearing short hairs. - Genital organs: See the diagnostic characters.

Relationships: See below.

Observations/results:

(1) The species may live together in the same locality; I found – 5♂ 2♀ - of *brevicephalus* and 4♂ of *styliferum* – in two traps which were spaced only by a single meter.
(2) The colour of both species seems to be very variable; the males of *brevicephalus* may be darker but their colour has probably been changed by the preservation fluid.

(3) I found no difference of the average of the prosomal length of both species.
(4) The prosomal shape of both sexes is different: It is more stout in *brevicephalus* with the thoracal part relatively wider (fig. 88) but more slender in *styliferum* (fig. 87) and *parastyliferum* (*) even so in males of the same prosomal length. I found the prosomal ration of length and width 1.1-1.22 in *brevicephalus* but 1.35-1.5 (average 1.43) in *styliferum* and *parastyliferum*.
(5) I did not find differences in the structures of the ♂-pedipalpus (!).
(6) The epigyne of both species is variable and indistinct, see figs. 90-91 of *brevicephalus*) with a pair of distinct sclerotized posterior structures in *brevicephalus*.
(7) The vulva of both species is quite distinct: A pair of strongly sclerotized structures in a posterior position exists in *brevicephalus* (fig. 92) in contrast to *styliferum* and the shape of the receptacula seminis is more triangular (almost globular in *styliferum,* see BOSMANS (1994)) in which the position of the receptacula seminis is slightly more posteriorly.

Conclusions/relationships/discussion:

Brevicephalus is a member of the *Zodarion styliferum* species-group, according to the ♂-pedipalpus very close to *styliferum* (SIMON 1870) and *parastyliferum* WUNDERLICH 2022 (*). The shape of the prosoma and of the vulva are clearly different in *brevicephalus*.
According to the clear differences of the shape of the prosoma in both sexes, the distinct differences in the vulva, the occurrence – of *brevicephalus* and *styliferum* - in the same locality without crossings I regard *brevicephalus* as a species of its own but not as a "variability" or "prosomal morph" of *styliferum*.

Notes: (1) Remarkably a similar pattern, sibling species occurring in the same locality, based on their DNA in this cases - was reported by REZAC et al. (2018) in another quite diverse genus, in *Dysdera* LATREILLE 1804 of the family Dysderidae in Southern Europe. - (2) Sibling spider species distinguished by the female sex only are rarely reported. The male pedipalpi of *Walckenaeria antica* (WIDER 1834) and *alticeps* (DENIS 1952) (Linyphiidae) show only weak differences in contrast to the quite different vulvae.
Zodarion styliferum extraneum DENIS 1935: PEKAR et al. (2003) distinguished *extraneum* from *styliferum* by the colour of opisthosoma and legs as well by the caryotype (!), and regarded *extraneum* as "forma" of *styliferum*. According to the ratio of prosomal length and width of 1.36 – see PEKAR et al (2003: Fig. 3; see also the fig. In the present paper) the shape of the prosoma of *extraneum* is as in *styliferum*. The evaluation of the taxonomic rank of *extraneum* appears unsure to me; further studies are needed.

(*) In the original description of *parastyliferum* I published erroneously the prosomal ratio of length and width as 1.7 but actually it is 1.4.

Distribution: Portugal, Algarve.

Family ZORIDAE

Zoridae is in Europe a small family, only 10 species are known; the present one is the 7. one of the Iberian Peninsula. The two-clawed ground spiders of the genus *Zora* C. L. KOCH 1847 are easily recognizable by the brush of hairs on the anterior spinnerets and the dorsal pattern of the prosoma consisting of strong contrasting dark and light longitudinal bands (photo 5). The latter character is very helpful for the identification of most species because their copulatory/genital organs are quite similar (*). Furthermore the tibial apophysis of the male pedipalpus and the structures of the vulva are very different in slightly different aspects and the low pit of the epigyne is only weakly distinct and marked. Bristles of the male coxa IV (figs. 99-100) exist in *manicata, manicatoides* and *pardalis*.

(*) SIMON (1932: 931) wrotes regarding *Zora manicata* that the pedipalpus and the epigyne are as in *Zora spinimana* (!).

***Zora manicatoides* n. sp.** (figs. 100-106), photo 8

Zora manicata (part.), - in HEIMER & NENTWIG (1991: 210, fig. 1192.3b).
Zora manicata (part.), - URONES (2005, figs. 13 & 15).

Etymology: The name of the species refers to the similarity of the colour to *Zora manicata*, from -oid (gr.) = similar.

Material: (1) *Z. manicatoides*: S-Portugal, Algarve, near Sao Bras de Alportel; (a) Bengado, ca. 7 km E Sao Bras, near a small stream, on the ground in detritus, holotype ♂ JW leg. in IV 2022, R230/CJW; (b) Mesquita Alta, 4 km E Sao Bras de Alportel, Caminho Petheira, under a stone at the border of the road and a meadow, paratype ♀ JW leg. in V 2022, R231/CJW; (c) Bico Alto, 2 km N Sao Bras de Alportel, under a stone, paratype ♀ JW leg. 13. III. 2023, R264/CJW. - (2) *Z. manicata*: Austria, Dürnstein, 2♀ 6♂ (two loose pedipalpi), F. RESSL leg. in IV-VI 1987, R240/CJW. - *Note*: In most males the bristles of coxa IV are rubbed off now.

Notes: The specimens of the new species were collected only ca. 10 km from each other. - ♂: The left pedipalpus of the holotype is kept separately. During the description the bristles of both coxae IV have been completely rubbed off (their bases are well recognizable); ♀: The opisthosoma and the left pedipalpus are loose, the right leg IV is lost.

Diagnostic characters: Metatarsi I-II with 2 pairs of ventral bristles; pattern of the prosoma (photo 5): longitudinal dark medial bands distinctly wider than the white-yellow median band and wider than the white-yellow lateral bands, marginal dark bands well developed; ♂:

Coxae IV mainly in the medial half bearing ca. 2 ½ dozen fairly pointed bristles which are more slender in the distal half (fig. 100), 0.1-0.12 mm long; pedipalpus as in figs. 101-103, see below. - ♀: Epigyne/vulva (figs. 105-106): with a long and low pit (depression) which is widened anteriorly and low posteriorly, margin weakly marked; the thin-walled receptacula seminis are spaced by almost their diameter, the ducts are thick and bear medial structures which may be glands. The ducts run in a reverse u-shaped way laterally and curved than ventrally-anteriorly, ending ovally thickened.

Description:
Measurements (in mm): ♂: Body length 3.3; prosoma: Length 1.7, width 1.3; opisthosoma: Length 1.8, width 1.0; leg I: Femur 1.7, patella 0.7, tibia 1.6, metatarsus 1.35, tarsus 0.8, tibia II 1.5, tibia III 1.3, tibia IV 2.0; pedipalpus: Femur 0.65. patella 0.3, tibia 0.3, cymbium 0.6. - ♀: Body length 4.4-5.0; prosoma: Length 2.0, width 1.5; opisthosoma: Length 2.5, width 1.5; leg I: Femur 1.65, patella 0.9, tibia 1.7, metatarsus 1.3, tarsus 0.65; tibia II 1.5, tibia III 1.0, tibia IV 2.1; pedipapal tarsus 0.6.,
Colour (photo): Prosoma: See the diagnostic characters; sternum mainly yellowish, medially and laterally near the coxae darkened, in the female stronger darkened. Opisthosoma dorsally with a dark median band, ventrally mainly dark. Legs: Femora dark brown, remaining legs mainly yellowish, metatarsi annulated, distinctly stronger on III-IV and in the female. Femora I-II ventrally and laterally dotted in the male but strongly dotted in the female.
Prosoma 1.3 times longer than wide, anteriorly distinctly and abruptly narrowed, thoracic fissure thin, 8 eyes in a long field in 3 rows, anterior margin of the fang furrow with 3 teeth, posterior margin with 2 teeth, the wide labium is a free sclerite. - ♀-pedipalpus (fig. 104) with a distinctly bent claw in a more dorsal position which is hidden by hairs. - Legs: Order IV/I/II/III, III distinctly the shortest, bristles numerous, femora 3 subapically, 2 dorsally; prolaterally: I 1 (occasionally additionally 2 short ones), II 0-1, patellae dorsally 2 hair-shaped bristles, tibia I ventrally 7 pairs (URONES (2005) reported 5-7 pairs in *manicata*), I-II dorsally none and laterally very few quite short ones, metatarsi I-II bear 2 pairs of long ventral bristles, tibia and metatarsus III-IV bear numerous bristles, tarsal scopulae absent, claw tufts well developed, tarsi with more than a single row of long trichobothria, ♂-coxae IV (fig. 100) bear mainly in the medial half a field of ca. 2 1/2 dozen bristles, not dense, 0.1-0.12 mm long. ♀-coxae IV with normal (thin) hairs. During the description of the male the coxal bristles were completely rubbed off, only their bases remain. - Opisthosoma (photo) 1.66 (♀) to 1.8 (♂) times longer than wide; in the male the anterior spinnerets bear ventrally-medially striking long hairs which stand out in a right angle (similar to congeneric species). - Epigyne/vulva: see above. - ♂-pedipalpus (figs. 101-103) see the diagnostic characters): Cymbium apically bearing stronger hairs, median apophysis long, embolus long, thin and bent, conductor skinny and folded.

Relationships: In the closely related *Zora manicata* SIMON 1878 in the present sense (see below) of the West Palaearctic exist also two pairs of ventral metatarsal I-II bristles, the pattern of the prosoma is quite similar and bristles on the ♂-coxa IV exist but the bristles of *manicata* are more numerous, almost blunt and not distinctly smaller in the distal half (fig. 99); the epigynal pit is wide, the position of the ducts of the vulva is quite different, see HEIMER & NENTWIG (1991: fig. 1192.3a), URONES (2005: figs. 12, 14). I did not recognize differences in the structures of the ♂-pedipalpus of the two species although minor differences may exist
<u>Remarks</u>: I suppose that two species were mixed and published under *Zora manicata* by several authors; probably also SIMON (1932) mixed erroneously *manicata* and *manicatoides*. I did not have the opportunity to study type material of *manicata.* According to the apparently partly more northern distribution I regard *manicata* in the present sense.

URONES (2005) regarded the two “forms” of epigyne and vulva as variability of a single species (*manicata*), see below (distribution); but the material of *manicatoides* from Portugal and the material of *manicata* from Austria is distinctly and constantly different; the character in the male sex - shape of the bristles of coxa IV -, as well as in the female sex - ducts of the vulva - exist within the same populations, see the material listed above, and are correlated in both sexes.

Distribution: Iberian Peninsula: Portugal and probably Spain: I suppose that some specimens of *Zora manicata* in the sense of URONES (2005) from Spain actually are *manicatoides* n. sp. URONES did not note the origin of the females whose different genital organs are figured.

Family LIOCRANIDAE

The mediterranean members of the family Liocranidae possess pairs of long and strong ventral bristles on tibia and metatarsus I-II which may be less well recognizable than in fig. 93. Their eye field is more narrow than in the Clubionidae, their spinnerets are shorter than in the Gnaphosidae and a their posterior median eyes in almost all taxa – *Arabella* BOSSELAERS 2009 is an exception - are circular (not oval) in contrast to the Gnaphosidae. Some taxa are still insufficiently known, the key to the genera has to revise, see WUNDERLICH (2011: 108-120). In *Mesiotelus mauritanicus* SIMON 1909 (figs. 93-98), which is frequent in the Algarve, I did not recognize praecoxal triangles, I find the position of the posterior eye row quite variable, straight or even fairly recurved, and the posterior median eyes may be wider spaced from each other than from the posterior lateral eyes. Certain liocranid taxa are examples for such two-clawed spiders in which a claw tuft is absent. 14 European liocranid genera have been described.

Family GNAPHOSIDAE

Spiders of this family in the Algarve – the most diverse ground-living family of this area, especially regarding the genus *Zelotes* - are still not well-known. These mainly nocturnal spiders are fast runners and hard to capture by hand.

Algarvezelotes **n. gen.**

Etymology: The name of the genus refers to the type area of the generotype, the Algarve, as well as to the con-familiar genus *Zelotes*.

The gender of the name is masculine.

Type species (by monotypy): *Algarvezelotes unidentatus*.

Diagnostic characters (♂; ♀ unknown): Metatarsal III-IV preening combs well developed, dorsal opisthosomal scutum absent, colour of prosoma and legs light yellow-grey (photo), position of the posterior eye row (fig. 107) distinctly procurved, thoracal fissure small, posterior margin of the fang furrow (fig. 108) with a single small tooth, claw tufts well developed, leg scopulae, praecoxal triangles, trochanteral notches and most probably feathery hairs absent; pedipalpus (figs. 109-112): Patella and tibia short, tibia apophysis basally wide and distally slender, pointed, intercalary sclerite absent, median apophysis fairly large, sperm duct distally abruptly narrowed, conductor large, blunt and distally strongly bent, embolus straight, only fairly long.

Relationships: Member of the Zelotini in which a well developed metatarsal III-IV preening comb exists as well as usually a dorsal scutum of the male opisthosoma in contrast to *Algarvezlotes*. In *Civizelotes* SENGLE 2012, *Cryptodrassus* MILLER 1943 and *Heser* TUNEVA 2004 an intercalary sclerite is absent like in *Algarvezelotes*, and a dorsal scutum of the ♂-opisthosoma is also absent in *Heser*, but to my knowledge the posterior margin of the fang furrow bears more than a single tooth in these genera and the conformation of the structures of the bulbus is different, e. g., a long and strongly bent embolus exists.

Distribution: Portugal, Algarve.

Algarvezelotes unidentatus **n. gen. n. sp**. (figs. 107-112)

Etymology: The name of the species refers to the single tooth of the posterior margin of the fang furrow, from unus (lat.) = a single one, and dens (lat.) = tooth.

Material: Portugal, Algarve, ca.3 km NE Salo Bras de Alportel, Fonte Tareja, near a small stream, under a cork oak, under bark within a thick layer of leaves and detritus, ♂ holotype JW leg. 12. IV. 2023, R273/CJW. - Note: The left leg I of the male is lost beyond the coxa by autotomy, the left pedipalpus has been separated.

Diagnostic characters, relationships and d**istribution**: See above.

Description (♂) (see also the diagnosis):
Measurements (in mm): Body length 3.3; prosoma: Length 1.5, width 1.1; opisthosoma: Length 1.8, width 1.1; leg I: Femur 0.95 (height 0.33), patella 0.7, tibia 1.15, metatarsus 0.9, tarsus 0.5; tibia II 0.85,, tibia III 0.6, tibia IV 1.15.
Colour: prosoma and legs light yellow grey, legs not annulated, opisthosoma medium to dark grey.
Prosoma (figs. 107-108) 1.36 times longer than wide, covered with some longer and thin hairs, cuticula smooth, thoracic fissure rather small, 8 large eyes, posterior medians largest, posterior row procurved, anterior row in anterior aspect slightly procurved, clypeus quite short, basal cheliceral articles fairly long and slender, not protruding, bearing anteriorly and distally some long hairs, fangs long and slender, posterior margin of the fang furrow with a single tiny tooth, anterior margin with 2 small and rather widely spaced teeth as well as a tiny tooth within the furrow, labium about as wide as long, gnathocoxae longer than wide, not converging, ventrally only fairly depressed, serrula quite weakly developed, sternum slightly longer than wide, not elongated between coxae IV. - Legs only fairly long, order IV/I/II/III, hairs of medium length, rather dense, feathery hairs most probably absent, scopulae absent, claw tufts and preening combs of metatarsi III-IV well developed, claws with long teeth, claws III-IV distinctly longer than I-II, bristles only fairly long, femora I-II dorsally 1/1 as well as 1 prodistally, III-IV additionally with lateral and subapical bristles, patellae, tibiae and metatarsi I-II almost bristle-less, only the left metatarsus II bears a single retrodistal bristle, tibiae III-IV with several bristles, patellae III-IV with or without a single lateral bristle. - Opisthosoma 1.6 times longer than wide, scuta absent, hairs dense and of medium length, spinnerets long, the anteriors cylindrical and widely spaced. - Pedipalpus (figs. 109-112): Femur long, patella and tibia short, tibial apophysis basally wide, distally slender, pointed, cymbium with a prodistal bristle.

Aphantaulax trifasciata (O. PICKARD-CAMBRIDGE 1872) (= *seminigra* SIMON 1878)

Material: Portugal, SE-Algarve, Island of Fuzeta S of Fuzeta, in dunes, 1♀ JW leg., CJW.

Distribution: Widely distributed in Eurasia.

Berlandina DALMAS 1922

Two species of *Berlandina* were reported from the Iberian Peninsula: *cinerea* (MENGE 1872) and *plumalis* (O. PICKARD-CAMBRIDGE 1872). In the Algarve I collected numerous members of *plumalis* but only two females of a third new species which is described below.

***Berlandina collisarenosa* n. sp.** (figs. 119-121)

Etymology: The species name refers to the habitat of the species within low plants in dunes, from collis (lat.) = hill and arenarius (lat.) = sandy.

Material: SE-Portugal, Algarve, Island of Fuzeta near Fuzeta, under stones within low plants in dunes, 2♀ JW leg3. V. 2022; holotype R233/CJW, paratype R252/CJW: - Note: the epigynes of both specimens were separated.

Diagnostic characters (♀; ♂ unknown): Epigyne (figs. 119-120) with a slightly prominent longitudinal border within a depression; vulva (fig. 121) with large and quite thin-walled receptacula seminis in a posterior position and anteriorly with a large and wing-shaped pair of structures.

Description (♀):
Measurements (in mm): Body length 7.2-8.2; prosoma: Length 3.2, width 2.5; opisthosoma: Length 4.3, width 3.0: legs (holotypes), I: Femur 2.0, patella 1.25, tibia 1.5, metatarsus 1.4, tarsus 0.9; tibia II 1.4, tibia III 1.1, tibia IV 1.9.
Colour: Prosoma light to medium brown, medially v-shaped darkened in the holotype, bearing 3 pairs of dark lateral spots, posteriorly 2 dark spots, margin darkened, sternum medium brown, legs: Femora light brown, patellae to tarsi fairly darkened, opisthosoma medium grey, dorsally with a longitudinal light zigzag band which laterally is accompanied by dark bands, ventrally light.
Prosoma 1.28 times longer than wide, anteriorly fairly narrowed, covered with thin hairs, thoracic fissure short, 8 eyes in two rows, posterior row only fairly recurved and not much wider than anterior row, anterior lateral eyes largest, diameter 0.015 mm, posterior median eyes spaced by their diameter, basal cheliceral articles and fangs robust, cheliceral keel well developed, labium a free sclerite, 1.25 times longer than wide, gnathocoxae strongly converging, sternum 1.18 times longer than wide, not elongated between coxae IV. - Tarsus of the pedipalpus with a well developed claw. - Legs robust, order IV/I/II/III, tarsi I-II bear a dense scopula, metatarsi I-II bear a weaker scopula in the distal half. Bristles numerous, especially on III-IV but tarsi none; femora I-II dorsally 2 and 1 proapically, laterally none, III-IV bear numerous bristles, patellae dorsally 2 hair-shaped bristles, patellae III-IV: Retrolateral bristle existing, prolateral bristle absent; tibiae I-II: Dorsal and lateral bristles absent except a short proapical one on the right tibia II, ventrally exist few short bristles, metatarsi I-II with few short ventral bristles. - Opisthosoma 1.43 times longer than wide, bearing few short hairs. - Epigyne/vulva: See the diagnostic characters.
Relationships: In *B. nabozhenkoi* PONOMAREV & TSVETKOV 2006 (Turkey, Russia, Iran) the epigynal border is anteriorly wider and the pits are posteriorly wider. - In *B. plumalis* DALMAS the shape of the epigynal pit is quite different and bears a wide, bent and strongly sclerotized border. - In *Nomisia orientalis* DALMAS 1921 (Turkey) the epigyne is laterally inclined, the lateral depression is larger, the lateral margins are different and the ducts of the vulva are smaller.

Distribution: Portugal, SE-Algarve.

Callilepis WESTRING 1874

This genus is characterized by an unique combination of characters:

- an almost rectangular shape of the flat posterior median eyes as in fig. 122,
- a large medium lobe and 1-2 smaller lateral lobes of posterior margin of the fang furrow (fig. 123),
- a complete absence of a tibial apophysis of the male pedipalpus (figs. 124-125),

Furthermore the conductor is strongly bent and the shape of the tegulum is almost disc-shaped in some species (figs. 124-125).

HOYAS & FERRANDEZ (2022) reported 4 species from the Iberian Peninsula; here I describe a further species from Portugal.

***Callilepis bifurcata* n. sp.** (figs. 122-125)

Etymology: The name of the species refers to its distinctly bifurcate conductor, from furca (lat.) = fork and bi- (lat.) = two.

Material: Portugal, Algarve, (1) about 4 km NE Sao Bras de Alportel, Fonte Tareja (see the introduction), pit fall within a thick layer of leaves and detritus under a cork oak, ♂ holotype JW leg. 16. V. 2023, R277/CJW; (2) about 3 km N Sao Bras de Alportel, Fonte Ferrea, on a sand track in a forest, 1♂ paratype JW leg. 6. VI. 2023, R281/CJW. - Notes: The eye field of the holotypee is slightly deformed; the left pedipalpi of both males have been separated.

Diagnostic characters (♂; ♀ unknown): Retromargin of the fang furrow bearing two lobes (fig. 123); pedipalpus (figs. 124-125): Conductor distinctly forked, tegulum flattened and only fairly protruding, embolus describing a wide loop.

Description (♂):
Measurements (holotype in mm): Body length 4.7; prosoma: Length 2.1, width 1.85; opisthosoma: Length 2.8, width 1.8; leg I: Femur 1.5, patella 0.9, tibia 1.15, metatarsus 1.1, tarsus 0.9, tibia II 1.1, tibia III 1.0, tibia IV 1.4. Body length of the paratype 4.7.
Colour in alcohol: Prosoma light to medium brown, sternum and gnathocoxae yellowish legs: Coxa, metatarsi and tarsi light to medium brown, remaining articles dark brown, opisthosoma dark grey brown, epigaster light to medium brown, cymbium with a light field in the distal third.. - Prosoma (figs. 122-123) 1.14 times longer than wide, bearing numerous short white and some long a hairs, thoracic fissure long, caput and eye field narrow, 8 eyes, posterior row recurved, posterior lateral eyes largest, posterior median eyes flat and almost rectangular, basal cheliceral articles robust, fangs long, posterior margin of the fang furrow bearing a large blunt median lobe and a smaller blunt lobe in a retrolateral position, gnathocoxae

strongly converging, serrula well developed, labium a free sclerite, as wide as long, sternum 1.2 times longer than wide, only slightly elongated between the coxae IV, praecoxal triangles absent. - Legs robust, order IV/I/II/III, hairs dense, trochanteral notches absent, claw tufts and tarsal I-II scopulae well developed, I did not find feathery hairs, bristles numerous and long, femora dorsally 1/1 and subapicals, patellae dorsally none (only with a long distal hair), III-IV usually with a lateral pair, tibiae I-II with a prolateral and usually a pair of ventral bristles and apicals, tibiae III-IV with numerous – including dorsal – bristles, metatarsi I-II with two pairs of ventral bristles, tarsi none. - Opisthosoma 1.6 times longer than wide, hairs (except anteriorly) short, dorsally in the holotype with a dorsal scutum in the basal quarter but only leathery (!) in the paratype. - Pedipalpus (figs. 124-125): Tibia shorter than patella, without apophyis, dorsally with strong hairs, tegulum disc-shaped and only fairly protruding, conductor in a distal position, distinctly bifurcate, pointed, the posterior part bears a tiny tooth, embolus thin, bearing a seam, position in a wide loop.

Relationships: According to the structures of its pedipalpus I regard *C. cristinae* HOYAS & FERRANDEZ 2022 from Spain as most related; in *cristinae* the tegulum is stronger protruding and the conductor is not distinctly bifurcate (as in other congeneric species, too).
Callilepis concolor SIMON 1914 from the Algarve (♂): See figs. 126-127.

Distribution: Portugal, Algarve.

Drassodes WESTRING 1851

To my knowledge less than one dozen species of this difficult genus have been described from the Iberian Peninsula. The new species described below is the member of a species group in which a retrolateral tibial apophysis of the ♂-pedipalpus has been completely lost – a rare pattern of taxa of gnaphosid spiders and other members the RTA-clade, see below.

***Drassodes arenosus* n. sp.** (figs. 113-116)

Etymology: The species name refers to the sandy habitat, the dunes of the locus typicus, from arenarius (lat.) = sandy.

Material: S-Portugal, Algarve, (1) Island of Fuzeta South of Fuzeta, 1♂ 1♀ within low plants in dunes; holotype ♂ JW leg. in IV 2017, R248/CJW; 1♀ paratypes JW leg. in VI 2020, R249/CJW; (2) Island of Tavira near Barrill, within low plants in dunes, 1♂ 1♀ paratypes, JW leg. 25. III. 2023, R285/CJW.

Diagnostic characters: ♂: Teeth of the fang furrow (holotype, fig.113): Retromargin with two teeth, promargin usually with 5-7 teeth (one of the paratypes: anterior margin of the fang furrow with three larger teeth, posterior margin with two teeth at the right side and three teeth at the left side, the median tooth rather small); pedipalpus (figs. 114-115): Retrolateral tibial apophysis completely absent (a sclerotized margin exists), prolateral part of the sperm duct wide and close to the medial part of the duct, median apophysis small and hook-shaped, embolus rather long, only slightly bent. ♀: Epigyne (figs. 116-117) with more or less widely spaced sickle-shaped structures, vulva (fig. ….) with two pairs of thin-walled and rounded receptacula seminis.

Description:
Measurements (in mm). ♂: Holotype: Body length 6.8; prosoma: Length 3.0, width 2.0; thoracal fissure 0.45 long; opisthosoma: Length 4.0, width 1.6; leg I: Femur 2.5, patella 1.5, tibia 2.3, metatarsus 2.3, tarsus 1.4; tibia II 1.9, tibia III 1.6, tibia IV 2.3; pedipalpus: Femur 1.15, patella 0.6, tibia ca. 0.7, cymbium 0.8, embolus 0.19. Paratypes: Body length 5.5-9.0, prosomal length 2.5-4.2; large ♂: length of tibia I 3.3, pedipalpus (large ♂): Tibia 0.95, cymbium 0.9, embolus 0.2. - ♀: Body length 8.0-8.8; prosoma: Length 3.0-3.7, width 2.1-2.6; large ♀: opisthosoma: Length 5.7, width 3.3; leg I: Femur 2.6, patella 1.5, tibia 2.15, metatarsus 1.75, tarsus 1.15; tibia II 2.0, tibia III 1.7, tibia IV 2.5.
Colour yellow-brown, chelicerae medium brown.
Prosoma 1.4-1.5 times longer than wide, bearing short hairs, thoracic fissure well developed, 8 eyes in two wide rows, posterior row slightly (♂) to fairly procurved, posterior eyes oval, spaced by ca. their smallest diameter, fangs long, posterior margin of the fang furrow in both sexes with two teeth (fig. 113, but see above) which are widely spaced, anterior margin with 3-7 teeth in the holotype male (fig. 113), labium (♀) 1.25 times longer than wide, sternum 1.36 times longer than wide. Tarsus of the ♀-pedipalpus with a small tarsal claw. - Legs fairly long, order IV/I/II/III, hairs fairly short; bristles (holoype ♂): Femora with 2 dorsal bristles, I-II additionally with a prolateral bristle in the distal half, III-IV with a pair of dorsal-lateral bristles in the middle and three subapical bristles, patellae with 1/1 dorsal hair-shaped “bristles”, left tibia I with a single proventral bristle, right tibia I with 1/1 proventral bristles, left tibia II with 2 proventral bristles, right tibia II with a single ventral one, metatarsus I with a single ventral bristle in the basal half, metatarsus II with 1-2 ventral bristles, tibia and metatarsus III-IV with numerous bristles; ♀ (several bristles are rubbed off) apparently similar. All tarsi and metatarsus I-II with a distinct ventral scopula. - Opisthosoma slender, 1.73 (♀) to 2.5 times longer than wide, mainly covered with short hairs but anteriorly-dorsally with long hairs. - ♂-pedipalpus slender, tibia shorter than the cymbium, see the diagnostic characters and the measurements. - Epigyne/vulva: See above.

Relationships: Besides *D. arenosus* in several further European members of the genus *Drassodes* a retrolateral tibia apophysis of the ♂-pedipalpus is absent, so in *luteomicans* (SIMON 1878), *lutescens* (C. L. KOCH 1839) and *serratichelis* ROEWER 1928. In *Drassodes lutescens* - which I regard as most related to *arenosus* – the embolus is longer and stronger bent.

Distribution: Portugal, SE-Algarve.

Drassodes sp. indet.: S-Portugal (Algarve): (1) without exact locality (probably Island of Fuzeta), 1♀ JW leg., R250/CJW; (2) near Sao Bras de Alportel, 2♀ (in both specimens the opisthosoma is demaged) JW leg. in VI, R251/CJW.

Gnaphosa artaensis WUNDERLICH 2011 (fig. 128)

Syn.: *Gnaphosa monteserra* WUNDERLICH 2008.

Material: Portugal, SE-Algarve, Island of Fuzeta S Fuzeta, in dunes, 1♀, a subad. ♀, JW leg., CJW; 1♂ (left pedipalpus lost), JW leg. in IV 2020, R286/CJW).

The female of this species was described by WUNDERLICH (2017: 314, figs. 24-27). The prosomal length of the present females is 2.9 mm (the adult one) and 2.6 mm, the width of the posterior/anterior eye rows of the adult ♀ is 0.7/0.52 mm, index 1.32; that means that the anterior row is not very much smaller than the posterior row. The epigyne of the subad. female is only partly developed, the epigyne of the freshly moulted female is not fully sclerotized, a helm-shaped structure of the scape is absent; compare WUNDERLICH (2017: fig. 26). A retrolateral bristle of patella IV of the present females is absent, tibia I-II bears only a single proapical ventral bristle, their metatarsus I bears a single ventral bristle in the basal half, their metatarsus II bears a pair of ventral bristles in the basal half.
The body/prosomal length of the present ♂: 7.0/3.2 mm, the colour of prosoma and legs is light grey, of the opisthosoma dark grey, both metatarsi I and II bear a pair of ventral bristles in the basal half, an opisthosomal scutum is absent in contrast to the holotype; pedipapus (fig. 128): The median apophysis is strongly bent, the embolus is long and distinctly bent.

Distribution: Portugal.

Micaria WESTRING 1851

Micaria sp. indet., photo 5

Material: Portugal, Algarve, Fonte Tareja (see the introduction), pit fall in an oak forest near a small sandy road, 1♂ JW leg. in VI. 2023, CJW.

Diagnostic characters and short description:
Measurements (in mm): Body length 4.3; prosoma: Length 1.9, width 1.1. Colour as in *M. coarctata* (LUCAS 1846) (= *albimana O*. PICKARD-CAMBRIGE 1872), opisthosoma ventrally with a wide light longitudinal band (white hairs are rubbed off), tarsi of this unique male seemingly pseudo-articulate (photo) (I will not exclude that their shape may be a result of the preservation), pedipalpus quite similar to *coarctata*, see below, dorsal tibial hump quite small, sperm duct basally rather narrow, median apophysis (retinaculum) small and in a more distal position, embolus bent and basally thick.

Relationships: The prosomal ratio (length/width), the white ventral band of the opisthosoma and the structures of the pedipalpus, the small and distally bent RTA close to the cymbium which is not or only weakly observable in the ventral position of the pedipalpus, the sperm duct, the retinaculum (median apophysis), the embolus and the distal skinny structure (crescentence) are as in *M. coarctata* but in *coarctata* the tarsi are not strongly bent and not seemingly pseudo-articulate and the small dorsal "hump" of the pedipalpal tibia is larger.

Distribution: Wide parts of Central and South Europe, Russia, North Africa, Arabia.

<u>Nomisia</u> DALMAS 1922

Half a dozen species of *Nomisia* are described from the Iberian Peninsula. Here I provide short notes on two species regarding specimens from the Algarve.

Nomisia celerrima (SIMON 1914) (fig. 129)

<u>Material</u>: Portugal, SE-Algarve, Peninsula Manta Rota, 1♀ JW leg., CJW.

The colour of the female is mainly dark brown; the light median area of the epigyne (fig. 129) is ca. 0.2 mm wide, less than half the width of *exornata*.

Nomisia exornata (C. L. KOCH 1839)

<u>Material</u>: Portugal, SE-Algarve, numerous specimens, e. g., from the Island of Fuzeta near Fuzeta, CJW.
The prosomal coloration is quite variable, light to dark brown, the opisthosoma is mainly light with distinct dark marking but is may be dark grey brown with indistinct light markings. The light median area of the epigyne (fig. 129) is 0.45-0.5 mm wide.

Scotophaeus SIMON 1893

I collected only few specimens of this genus in the Algarve. Here I describe the questionable female of *S. nanoides* WUNDERLICH 2011 as well as a new species.

Scotophaeus ?nanoides WUNDERLICH 2011 (fig. 130)

Note: The female of *nanoides* was yet unknown.

Material: Portugal, SE-Algarve, 4 km E Sao Bras de Alportel, N 37°09'11", W07°50'29", under a piece of wood in a garden, JW leg, 12. IV. 2022, CJW.

Diagnostic characters (♀): Epigyne (fig. 130) longer than wide, bearing a sclerotised transverse bent rim in front of a longer light field (pit) which is wide anteriorly; receptacula seminis close together, near the epigastral furrow.

Description (♀):
Measurements (in mm): Body length 7.8; prosoma: Length 3.0, width 2.2; opisthosoma: Length 4.8, width 2.6; leg I: Femur 1.7, patella 1.0, tibia 1.25, metatarsus 1.0 tarsus 0.6, tibia II 1.2, tibia III 1.0, tibia IV 1.4.
Colour: Prosoma and legs dark red brown, legs I-II darker, opisthosoma dorsally dark grey, ventrally light grey.
Prosoma 1.36 times longer than wide, eyes as in the male. Posterior margin of the fang furrow with a tiny tooth, anterior margin with 3 small teeth. - Legs: Order IV/I/II/III, patellar bristles strongly reduced to hairs except one strong retrolateral bristle on III (such a bristle exists in the male on IV), bristles on tibia and metatarsus I-II absent, scopulae existing on tarsi and metatarsi I-II. - Opisthosoma 1.85 times longer than wide, covered densily with hairs of medium length. - Epigyne: See above.

The **relationships** of the female are unsure. Differences to the probably conspecific male of *nanoides* may be caused by sexual dimorphism or by intraspecific variability. In the male the colour of prosoma and legs are light brown, patella IV (not III) bears a retrolateral bristle and tibiae I-II bear usually 3 pairs (!) of ventral bristles.

Distribution: Portugal, Algarve.

?***Scotophaeus pregoensis* n. sp.** (figs. 131-132)

Etymology: The species name refers to its locus typicus quite near the village Prego.

Material: Portugal, Algarve, Prego, ca 7 km W Tavira, in a garden, under a stone, holotyp ♀ JW leg. in V 2017, R252/CJW.

Diagnostic characters (♀; ♂ unknown): Posterior margin of the fang furrow tooth-less, epigyne (fig. 131) with a small hood in front of a pair of large sickle-shaped sclerotized structures, vulva (fig. 132) with two pairs of receptacula seminis.

Description (♀):
Measurements (in mm): Body length 6.0; prosoma: Length 2.8, width 2.0; opisthosoma: Length 3.2, width 2.0; leg I: Femur 1.8, patella 1.1, tibia 1.4, metatarsus 1.0, tarsus 0.8; tibia II 1.2, tibia III 0.9, tibia IV .7.
Colour: Prosoma and legs light brown, opisthosoma mainly medium grey, but dorsally in the anterior half light grey.
Prosoma 1.4 times longer than wide, hairs indistinct, thoracic fissure well developed, 8 eyes in a wide field, posterior row fairly procurved, anterior median eyes largest, posterior median eyes spaced by their largest diameter, posterior margin of the fang furrow tooth-less, anterior margin with 3 teeth, gnathocoxae long and not converging, serrula strongly reduced, labium and sternum distinctly longer than wide. - Legs: Order IV/I/II/III, bristles long and thin, femora usually dorsally 1/1, I-II also with prolateral bristles, III-IV with lateral and subapicals, metatarsi I-II and tibia I bristle-less, tibia II with 1 or 1/1 ventral bristles in the distal half, tibia III and IV with numerous bristles, patellae with quite thin dorsal bristles, III-IV with a well developed retrolateral bristle, tarsi and metatarsi I-II bear a distinct scopula, paired tarsal claws IV ca. 1.3 times longer than the claws I. - Opisthosoma 1.6 times longer than wide, bearing numerous thin longer hairs. - Epigyne/vulva: See the diagnostic characters.

Relationships: According to the position of the eyes and the gnathocoxae, the teeth of the fang furrow as well as the leg spination I regard *pregoensis* with some hesitation to be a member of *Scotophaeus*. In *S*. ?*nanoides* WUNDERLICH 2011 the posterior margin of the fang furrow bears a small tooth and the structures of the epigyne are quite different.

Distribution: Portugal: Algarve.

Zelotes GISTEL 1848 s. l.

Zelotes s. l. is very diverse taxon, in the Algarve, too, and has most probably to split up; see *Civizelotes* SENGLET 2011, *Marinarozelotes* PONOMAREV 2020 (see below) as well as *Urozelotes* MELLO-LEITAO 1938: See below, *Zelotes clarus*. These taxa may be regarded as genera or as subgenera of *Zelotes* in the wide sense - as I prefer in this paper - or as species-groups. What is the taxonomical value of the intercalary sclerite? - ?*Synaphosus parviocoli* WUNDERLICH 2022 is transferred here to *Zelotes* s. l. (**n. comb.**). *Trachyzelotes* LOHMANDER 1944 was elevated from the subgeneric to generic rank by PLATNICK & MURPHY (1984), and – except *pedestris* (C. L. KOCH 1837 – are listed now under *Marinarozelotes,* see below.

Here I describe two species for the first time as well as some notes and a single sp. indet.; several undetermined females from the Algarve are kept in my private collection.

***Zelotes baeticoides* n. sp**. (figs. 133-137)

Etymology: The name of the species refers to the strong relationships to *Zelotes baeticus* SENGLET 2011, from -oid (gr.) = similar.

Material: S-Portugal, Algarve, 4 km east of Sao Bras de Alportel, Mesquita Alta, N 37°09'11" W 07°50'29", in a garden, fairly shadowy, under a stone, holotype ♂ JW leg. 28. V. 2022, R232/CJW. - Note: The left pedipalpus of the male was separated and slightly mechanically expanded.

Diagnostic characters (♂; ♀ unknown): Marginal teeth of the fang furrow as in fig. 133; pedipalpus (figs. 134-137): Tibial apophysis proapically with a tiny tooth, medial apophysis partly hidden in the ventral position, prolaterally originates a long and bent tegular apophysis which bears a seam, embolus strongly bent.

Description (♂):
Measurements (in mm): Body length 4.8, prosoma: Length 2.35, width 1.8; opisthosoma: Length 2.4, width 1.4; leg I: Femur 1.6, patella 1.0, tibia 1.4, metatarsus 1.0, tarsus 0.8; tibia II 1.1, tibia III 1.0, tibia IV 1.5; anterior eye row 0.36 wide, posterior eye row 0.42 wide, diameter of the lenses of the anterior lateral eyes 0.09, of the anterior median eyes 0.055, of the posterior median eyes 0.07 x 0.04.
Colour: Prosoma medium grey, margins small black, sternum yellowish, femora yellow grey, remaining articles grey, patellae and tibiae distinctly darkened, tarsi and most metatarsi slightly darkened.
Prosoma (fig. 133) 1.3 times longer than wide, anteriorly not abruptly narrower, thoracic furrow small, eyes quite small (see above), posterior row straight anterior lateral eyes largest, anterior median eyes smallest, basal cheliceral articles anteriorly-medially with half a dozen bristle-shaped hairs, fangs of median length, anterior margin of the fang furrow (fig. 133) with a large and 6 quite small teeth, posterior margin with a larger blunt median tooth and 3 smaller teeth, labium a free sclerite, distinctly longer than wide, sternum 1.3 times longer than wide, not elongated between the coxae IV. - Legs only fairly long, order IV/I/II/III, bristles numerous, femora 2 dorsally, additionally 1 prolaterally on I-II in the distal half, III-IV 2 lateral pairs, patellae with 2 long dorsal hair-shaped “bristles”, tibiae I-II with few ventral bristles, tibiae III-IV with numerous bristles, metatarsi I-II with with few ventral bristles, metatarsi III-IV with numerous bristles, metatarsal preening comb well developed. - Opisthosoma

1.7 times longer than wide, most hairs of medium length but dorsal-anterior hairs long, dorsally with 1 short anterior and 2 longer and narrow posterior sigillae, length of the dorsal scutum less than 1/3 of the opisthosomal length. - Pedipalpus: See the diagnostic characters, femur prodorsally with 3 bristles in the distal half; the cymbium bears a tiny retrobasal tooth.

Relationships: The strongly related *Z. baeticus* SENGLET 2911 and *Z. hispaliensis* SENGLET 2011 build together with *Z. baeticoides* n. sp. a group which I call the *Zelotes baeticus* species-group. This Iberian group is characterized by the special dentition of the margins of the fang furrow, the long tegular apophysis and the pattern of the embolic division.

Distribution: Portugal, Algarve.

Zelotes barbarella WUNDERLICH 2022 (fig. 138)

This species was based on a single male from the Algarve, Portugal. New material: Algarve, ca. 7 km WNW Tavira, in a swimming pool, 1♂ JW leg. in X 2017, CJW.

The prosoma of the spider is 2.9 mm long, the colour of prosoma and legs is medium brown like in the holotype, its median apophysis (fig. 138) is thicker than in the holotype.

Zelotes callidus (SIMON 1878)

Material: Portugal, SE-Algarve, Mesquita Alta ca. 4 km E Sao Bras de Alportel, under a stone in a garden, 1♂ JW leg. 21. VI. 2022, R239/CJW.

***Zelotes* (*Urozelotes*) *clarus* n. sp.** (figs. 139-144)

Etymology: The name of the species refers to the light colour of its prosoma - but see below -, from clarus (lat.) = light.

Material: S-Portugal, 4 km E Sao Bras de Alportel, ca. 315 m, N 37°09'11" W 07°50'29", in a garden, below a stone, 1 subad. ♂ JW leg. in V 2022, adult and put in alcohol 28. VII 2022;

holotype, exuvia and both lose pedipalpi R243/CJW. - Note: The bulbus of the right pedipalpus is expanded.

Diagnostic characters (♂; ♀ unknown): Pedipalpus (figs. 141-144) Tibia apophysis long and straight, terminal apophysis fairly stout, bearing a long, thin and bent retrolateral outgrowth reaching the tip of the questionable stout embolus, tegular apophsis stout and pointed, median apophysis claw-shaped. Intercalary sclerite existing but hidden by the cymbium and probably partly fused to the subtegulum.

Description (♂):
Measurements (in mm): Body length 5.2; prosoma: Length 2.6, width 1.9; opisthosoma: Length 2.6, width 1.6; leg I: Femur 2.0, patella 1.2, tibia 1.6, metatarsus 1.25, tarsus 1.1; tibia II 1.25, tibia III 1.0, tibia IV 1.8.
Colour: Prosoma and legs light yellowish, distal articles of legs I-II fairly darkened, opisthosoma dorsally dark gre (almost black), ventrally medium grey. - Note: The spider was killed freshly moulted. The light colour of prosoma and legs was apparently the result of this fact, and the colour of older spiders is most probably much darker.
Prosoma 1.37 times longer than wide, anteriorly distinctly smaller, hairs rather short, thoracic fissure indistinct, 8 eyes in two rows of a narrow field (fig. 139), posterior row straight, fangs of medium size, teeth of the fang furrow as in fig. 140, sternum 1.28 times longer than wide, not elongated between the coxae IV, laterally bearing long hairs. - Legs: Order IV/I/II/III, hairs short, bristles only fairly long, numerous on III-IV; femora I-II 2 dorsally and 1 prolaterally in the distal half, no apically; all patellae dorsally with two long hairs instead of bristles, patella III with a retrolateral bristle, tibiae I-II with few ventral bristles, metatarsus I with 0-1 proventrally in the basal half, metatarsus II with 5 ventral bristles; tarsal claws with few longer teeth, metatarsal III-IV comb well developed. - Opisthosoma oval, 1.6 times longer than wide, anteriorly bearing long hairs, remaining hairs of medium length, dorsal scutum absent but in the freshly moulted holotype probably still not developed, anterior spinnerets rather long. - Pedipalpus (see above): Tibia dorsally with two irregular rows of each ca. 4 trichobothria, cymbium with strong apical hairs.

Relationships: The shape of the tibia apophysis and the structures of the bulbus are similar to the related *Zelotes* (*Urozelotes*) *mysticus* (PLATNICK & MURPHY 1984) (**n. comb**., sub *Urozelotes m*.) from Italy. I agree with the opinion of GRIMM (1985: 221) who regarded the also - but less - related *rusticus* as a member of *Zelotes*; see also above. - In contrast to *mysticus* and *rusticus* a retrolateral outgrowth of the terminal apophysis is absent. Also other sclerites of the bulbus are different; furthermore in *rusticus* the tibia apophysis of the male pedipalpus is much stouter.

Distribution: Portugal, Algarve.

Zelotes fulvopilosus (SIMON 1878) (figs. 149-154)

Material: SE-Portugal, Algarve, Mesquita Alta E Salo Bras de Alportel, N 37°09'11" W 07°50' 29", in a garden, fairly shady, 1♂2♀ JW leg. in V. 2022, R234/CJW. - Note: The left pedipalpus of the male and one of the epigynes have been separated.

Diagnostic characters: Colour of body and legs mainly dark brown (almost black), posterior eye row straight, length of the thoracal fissure 0.38 mm,tibia I-II bristle-less, pedipalpus as in figs. 149-151. Epigyne/vulva: Figs. 153-154. the left pedipalpus of one of the females has been amputated beyond the femur and the stump is caked and apparently has been healed (fig. 152). Measurements: ♂: Body length 5.3 mm, prosomal length/width 2.6/2.0 mm; ♀: Body length 5.0, prosomal length/width 2.1/1.65.

Close **relationships** are unknown to me.

Distribution: SW-Europe.

Zelotes parviocoli (WUNDERLICH 2022) (**n. comb**.) (figs. 145-146)

2022 ?*Synaphosus parviocoli* WUNDERLICH, Beitr. Araneol., 15: 41, figs. 82-86.

This species was recently described as a questionable member of the genus *Synaphosus* PLATNICK & SHADAB 1980; it was based on a single female from SE-Portugal. Here I present a new combinarion of the species and I add drawings of metatarsus III which bears a ventral "brush" of hairs in the distal half (fig. 145) as well as an apical preening comb of bristles and I add a drawing of the vulva (fig. 146).

Mainly the long ventral hairs of metatarsus III-IV – they hide partly the apical metatarsal comb in lateral aspect and are unusual in *Zelotes* – lead me in 2022 to misplace this species as a questionable member of *Synaphosus*, although - in contrast to *Synaphosus* - the gnathocoxae in *parvioculi* are not converging and the paired tarsal claws IV are only ca. 20% longer than the claws I. Therefore *parviocoli* is transferred here from *Synaphosus* to *Zelotes* (**n. comb**.). Close relationships of the species are unknown to me; its male sex is still unknown. The genus *Synaphosus* has to be deleted from the list of Iberian spider genera.

The subgenus *Marinarozelotes* PONOMAREV 2020 of *Zelotes* s. l. of the Iberian Peninsula

(figs. 155-165)

Most species of *Marinarozelotes* were previously listed under *Zelotes* or *Trachyzelotes,* but *pedestris* (C. L. KOCH 1837) remains in *Trachyzelotes* rsp. *Zelotes*. PLATNICK & MURPHY (1984) included *pedestris* in *Trachyzelotes*.

The structures of the bulbus are most important for the identification of the males of this taxon. The bulbi have to be expanded for a closer study and comparison with related species.

Half a dozen species of *Trachyzelotes* are known from the Iberian Peninsula (*adriaticus*: See below, *lyonneti*): *Barbatus* (L. KOCH 1866), *fuscipes* (L. KOCH 1866), *holosericeus* (SIMON 1878), *lyonneti* (AUDOUIN 1827), *minutus* (CRESPO 2018) (only known from Portugal) and *mutabilis* (SIMON 1878).

I collected the following species of *Zelotes*: *Marinarozelotes* in the Algarve (CJW):

Z. fuscipes: ♂♀ near Tavira. - Embolus: Fig. 165. - Note: In my opinion in fig. 32 by PLATNICK & MURPHY (1984) the embolus is incorrectly drawn.

Z. holosericeus: ♂♀ near Tavira. - Embolus and median apophysis: Fig. 158.

Z. lyonneti: See below.

NOTE: *Trachyzelotes adriaticus* (CAPORIACCO 1953) in the sense of WUNDERLICH (2021: 14), Betr. Araneol., 14: Misidentification; = *lyonneti*.
New material: ♂♀ near Tavira, JW leg., CJW.
After a revision and new material I correct my previous identification; the male published by me as *M. adriaticus* is a member of *lyonneti* (AUDOUIN 1827), see figs. 160-161. The name *adriaticus* has to be deleted from the list of spiders of the Iberian Peninsula.

Key to the males of *Marinarozelotes* of the Iberian species and *adriaticus:*

1 Terminal apophysis with a pointed (claw-shaped) *pro*lateral outgrowth (figs. 155, 160)..... 2

- No such outgrowth (e. g., fig. 162) ….. 3

2(1) Outgrowth smaller (fig. 160), embolus thicker .... ***lyonneti***

- Outgrowth larger (fig. 155), embolus thinner. - Not known from the Iberian Peninsula .... ***adriaticus***

3(1) Pedipalpal tibial apophysis wide in its whole length (fig. 159) and not pointed, body length only ca. 2.4-3 mm. - Only reported from Portugal .... ***minutus***

- Pedipalpal tibial apophysis narrowed in the distal half, more or less pointed, e.g., fig.161. 4

4(3) Loop of the embolus reaching far basally, position of the hook-shaped median apophysis clearly in the basal half (arrow in fig. 164), embolus twisted (arrow in fig. 164) .... ***fuscipes***

- Position of the loop of the embolus in the distal half of the bulbus, position of the median apophysis in the distal half or in the middle (figs. 156-157, 162), embolus not twisted …..... 5

5(4) Tibial apophysis slightly shorter than the diameter of the tibia, ….................... ***mutabilis***

- tibial apophysis longer than the diameter of the tibia (e. g., fig. 163) ….............................. 6

6(5) Embolus distally thickened (T in fig. 158) ….. ***holosericeus***

- Embolus not thickened in this position …..7

7(6) Embolus distally in a transverse position its loop small (figs. 156-156a) .... ***barbatus***

- Embolus distally in an oblique position, its loop wide (figs. 162-163) ….................. ***costatus***

***Zelotes* sp. indet.** (figs. 147-148)

<u>Material</u>: SE-Portugal, Algarve, Mesquita Alta E Sao Bras de Alportel, N 37°09'11" W 07°50' 29", in a garden, fairly shady, 1♀ JW leg. in V. 2022, R235/CJW. - <u>Note</u>: The epigyne has been separated.

Diagnostic characters (♀): Length of the thoracic fissure 0.27 mm, colour of body and legs dark brown (almost black), epigyne (fig. 147) slightly wider than long, helm-shaped stuctures well developed, bearing a slightly prominent median structure between longitudinal grooves, vulva: Fig. 148.

Description (♀):
Measurements (in mm): Body length 6.2; prosoma: Length 2.6, width 2.0; opisthosoma: Length 3.7, width 2.2; leg I: Femur 1.75, patella 1.15, tibia 1.3, metatarsus 1.0, tarsus 0.8. Tibia I-II are bristle-less. Epigyne/vulva: See above.

Relationships: I do not know a closely related species.

Distribution: Portugal, SE-Algarve.

Family THOMISIDAE

16 genera of this taxonomical and ecological diverse family are known from the Iberian Peninsula.

Ebrechtella DAHL 1907

The widely distributed *E. tricuspidata* (FABRICIUS 1775) (= *Misumenops t.*) is the only known species of this genus which is known from the Iberian Peninsula and even from Europe. Here I describe a species which may belong to *Ebrechtella*, too.

?***Ebrechtella patellamaculata*** **n. sp**. (figs. 166-170), photo 6

Etymology: The species name refers to the ventral spot of the patellae I-II, from maculatus (lat.) = spot.

Material: S-Portugal, Algarve, south part of Mesquita Alta, 4 km E Sao Bras de Alportel, at the margin of a small road, beaten from a bush in the shadow, male holotype JW leg. 20. VI. 2022, R242/CJW. - Notes: (1) The left pedipalpus is kept separately, the right leg III and one of the legs I-II are lost, one of the legs I-II are lose. (2) An apparently conspecific egg-bearing female was observed with the male but not collected.

Diagnostic characters (♂; ♀ unknown): Anterior prosomal aspect as in fig. 166, condyle boss, carina) and a ventral spot of the patellae I-II (fig. 167) existing, only few leg bristles, femur II 1.76 times longer than the prosoma; pedipalpus (figs. 168-170): Ventral tibial apophysis small and strongly bent (fig. 169), Cymbium rather long and slender, embolus describing 1 ¼ loops, bearing a hook in the distal position (fig. 168).

Description (♂):
Measurements (in mm): Body length 3.2; prosoma: Length 1.42, width 1.42; opisthosoma: Length 2.1, with 1.2; leg I: Femur 2.2, patella 0.8, tibia 1.7, metatarsus 1.7, tarsus 0.65; femur II 2.5, femur III 0.8, femur IV 0.9.
Colour: Prosoma (photo) yellowish, with smaller grey bands behind the anterior median eyes anteriorly with a large transverse white band (carina) of guanin (fig. 166), opisthosoma

uniformly yellowish, legs mainly yellowish, patellae I-II ventrally-basally with a black spot (fig. 167), brown darkenings on I-II: Apically on the femora, in the distal half of the patellae, almost on the distal half of the tibiae, in the distal two thirds of the metatarsi and weakly in the distal half of the tarsi.
Prosoma (fig. 166, photo) as wide as long, condyle well developed, dorsally scarcely covered with short hairs in the middle, short bristles in the lateral part and a dense row of short marginal bristles, fovea low, 8 small eyes in two rows, posterior row distinctly recurved, quadrangle of the median eyes posteriorly distinctly wider than anteriorly, basal cheliceral articles robust, fangs fairly slender, margins of the fang furrow tooth-less, bearing long hairs (not drawn). - Legs: Order II/I/VI/III, I and II distinctly longer than III and IV, scopulae and claw tufts absent but tarsi III-IV bear ventrally longer and strong hairs; bristles quite few: I-II only 4 apically on the metatarsi; III-IV: Femora dorsally with 3 and apicals, patellae none, tibiae dorsally 2 and apicals, metatarsi with half a dozen bristles and apicals, paired tarsal claws with few large teeth. - Opisthosoma 1.75 times longer than wide, dorsally scarcely covered with short spines in longitudinal rows which are up to 0.1 mm long, bearing three pairs of sigillae and a single anterior one, spinnerets short. - Pedipalpus (figs. 166-170) (see also above): Patella and tibia robust, tibia with half a dozen bristles, retrolateral apophysis long and undivided, the prolateral part of the embolus is hidden.

Relationships: In *Ebrechtella* sp. indet in the sense of LEHTINEN (2004) from Tenerife (Canary Islands) the colour of the prosoma, the ventral pedipalpal tibial apophysis and the slender cymbium are similar but the embolus is different. - In *E. tricuspidata* the ventral pedipalpal tibial apophysis is longer, the retrolateral tibial apophysis is furcate, the bulbus is more compact, the embolus is different, a prosomal condyle is absent and the colour is different. - A prosomal carina in species of *Ebrechtella* is unknown to me; therefore I regard *patellamaculata* as a questionable member of this genus.

Distribution: S-Portugal, Algarve.

Family PHILODROMIDAE

<u>Thanatus</u> C. L. KOCH 1837

The elongate opisthosoma of the species of *Thanatus* bear dorsally a charactristic laceolate heart mark (photo 7). The spiders live on or near the groung, not only on sandy habitats (but see *Thanatus virgulatipes* n. sp.). A dozen species of his genus were known until 2022.

***Thanatus virgulatipes* n. sp.** (figs. 171-174), photo 7

Etymology: The name of the species refers to the stripes (bands) of certain articles of the legs (lat. = pes) and virgulatus (lat.) = bearing stripes.

Material: S-Portugal, Algarve, ca. 10 km NE Tavira, beaten from a bush, holotype ♂ JW leg. in V 1919, R241/CJW. - Note: Both pedipalpi of the holotype are kept separately.

Diagnostic characters (♂; ♀ unknown): Femora and tibiae (less distinct) of all legs bear dorsally a pair of longitudinal dark stripes (fig. 172). Pedipapus (173-174): Retrolateral tibial apophysis quite short, tibia ventrally with a longitudinally border which originates at the base of the retrolateral apophysis, embolus very large, distally strongly bent. Teeth of the fang furrow as in fig. 171. Body length 6.2 mm.

Description (♂):
Measurements (in mm): Body length 6.2; prosoma: Length 3.0, width 2.0; opisthosoma: Length 3.6, width 2.2; leg I: Femur 3.8, patella 1.5, tibia 3.5, metatarsus 3.0, tarsus 2.0, femur II 4.0, femur III 3.5, femur IV 4.0; pedipalpus: Patella 0.5, tibia 0.4, cymbium 0.9.
Colour (photo) mainly medium brown, prosoma laterally widely darkened, medially small darkened between large longitudinal yellow brown bands, legs medium brown, stripes see above and below.
Prosoma (fig. 171, photo) about wide as long, hairs short, thoracic fissure indistinct and short, 8 small eyes in two strongly recurved rows which are not placed on elevations, posterior lateral eyes largest, eyes of the posterior row equidistant, fangs robust (fig. 171), anterior margin of the fang furrow with two unequal large teeth, gnathocoxae strongly converging, labium a free sclerite, sternum not elongated between coxae IV. - Legs (fig. 172, photo) only fairly long, I shortest, IV longest, hairs short, all femora and tibiae (less distinct) dorsally with a pair of longitudinal dark stripes which are broken near the middle. Bristles numerous and partly long, existing on femora to metatarsi, femur I bears 9 bristles, patellae with dorsal, perolateral and retrolateral bristles, tibiae I-II ventrally with 2 pairs of long and 1 pair of shorter apical bristles as well as dorsal and lateral bristles, metatarsi I-II bear 2 pairs of long ventral bristles as well as a a basal-lateral pair; all tarsi and metatarsi bear dense scopulae, all tarsi bear dense claw tufts. - Opisthosoma (photo) 1.64 times longer than wide, dorsal hairs of medium length, spinnerets quite short. - Pedipalpus: See above.

Remark on the ecology/habitat: Although the single known male of the new species was beaten from a bush the conspecific spiders may usually well live on the ground.

Relationships: In *T. atratus* SIMON 1875 and *T. vulgaris* SIMON 1870 stripes (bands) of femora and tibiae are absent, the tibal apophyses of the ♂-pedipalpus are differerent, a ventral border is absent, and the embolus is smaller, their body is smaller, both species live on the ground (see above). - In *T. rayi* SIMON 1875 - originally described from the more northern part of France (Aube) (♂ unknown), reported allegedly also from southern Europe - exist – according to SIMON (1932) - special leg bristles, the posterior median eyes are less spaced from each other than from the posterior lateral eyes and stripes of leg articles are not mentioned. - Stripes (bands) of leg articles – see fig. 172 - exist also in other species of the genus *Thanatus*, e. g., in *lineatipes*, see SIMON (1932: 863; mentioned only for the female). Apparently these stripes evolved several times convergently.

Distribution: Portugal: Algarve.

Family SALTICIDAE

<u>Aelurillus</u> SIMON 1885

Aelurillus quercussuber **n. sp**. (figs. 175-176), photo 9

<u>Etymology</u>:The name of the species refers to the habitat of its holotype near/below an oak tree (*Quercus suber*).

<u>Material</u>: Portugal, Algarve, ca 600 m N of the Fonte Tareja, ca. 3 km NE Sao Bras de Alportel (see the introduction), pit fall, ♂ holotype JW. leg. 1. V. 2023, R271/CJW.

Diagnostic characters (♂; ♀ unknown): Clypeus long, anterior median eyes close together, opisthosoma (photo) dark brown, with a quite small light median band which bears white hairs and small lateral light bands; pedipalpus (figs. 175-176): Tibia apically with two quite long diverging apophyses, the retrodorsal one fairly flattened, cymbium retrobasally with a slender apophysis parallel to the tibial apophyses, embolus long, thin, describing a short spiral, without seam.

Description (♂):
Measurements (in mm): Body length 4.1; prosoma: Length 2.15, width 1.5; opisthosoma: Length 2.1, width 1.4, height 0.7, posterior median eyes spaced by 0.8, diameter of an anterior median eye 0.38; leg I: Femur: Length 1.0, height 0.55, patella 0.6, tibia: Length 0.65, metatarsus 0.45, tarsus 0.3; tibia II 0.6, tibia III 0.55, tibia IV 0.9, femur IV 1.4.
Colour (photo) mainly dark brown, clypeus bearing dense white hairs, dorsal prosomal hairs rubbed off, opisthosoma dark brown, with a quite small light median band which bears white hairs and small lateral light bands, ventrally medium grey, spinnerets dark grey, legs dark brown, not annulated, tarsi III-IV slightly lighter, pedipalpal femur and patella bear white hairs.

Prosoma (photo) 1.4 times longer than wide, with a long clypeus which bears a dense field of white hairs continuing laterally on the prosoma, anterior median eyes close together (almost touching), thoracic fissure absent, basal cheliceral articles and fangs small.
- Legs (photo) robust, order IV/I/II/III, hairs fairly long, claw tufts well developed, scopulae absent, bristles numerous, partly rubbed off, long, existing from femora to metatarsi but patellae I-II smooth; leg I: Femur dorsally 1/1/1 and 3 subapically, patella none, tibia 3 ventral pairs, metatarsus 2 ventral pairs; patella III-IV bear a pair of lateral bristles, tibia and metatarsus III-IV bear numerous bristles but dorsal bristles absent. - Opisthosoma (photo) 1.5 times longer than wide, completely covered with a scutum, hairs rather long. - Pedipalus (figs. 175-176, see also the diagnostic characters) (both are expanded): Femur fairly slender, slightly bent, without humps.

Relationships: *A. luctuosus* (LUCAS 1846) (Southern Europa, including the Iberian Peninsula) may be most related; in *luctuosus* the tibial apophyses of the pedipalpus are shorter and the embolus bears a seam.

Distribution: Portugal, Algarve.

<u>Euophrys</u> C. L. KOCH 1837

Euophrys marusiki **n. sp.** (figs. 177-183)

<u>Derivatio nominis</u>: The species is dedicated to my friend for many years, YURI MARUSIK, who described even many years ago several species, e. g., of the salticid genus *Chalcoscirtus* (see below). We had a short rewarding discussion about the relationships of *Chalcoscirtus* and *Euophrys*.

<u>Material</u>: Portugal, Algarve, about 4 km NE Sao Bras de Alportel, Fonte Tareja (see the introduction), pit fall within a thick layer of leaves and detritus under a cork oak, ♂ holotype JW leg. 16. V. 2023, R274/CJW. - <u>Notes</u>: The bulbi of both pedipapi are expanded. During the description the body and the left pedipalpus of the holotype were dissected.

Diagnostic characters: (♂; ♀ unknown): Opisthosoma with an epigastric and a dorsal scutum which are fairly well developed (fig. 177); pedipalpus (figs. 179-183): Tibia with a distinct ventral outgrowth and a long and needle-shaped retrolateral apophysis, tegulum not much longer than wide (ratio 1.2), embolus long and in a circular position of 1 ½ loops; legs partly - especially metatarsus IV - annulated, body length 2.35 mm.

Description (♂):
Measurements (in mm): Body length 2.35; prosoma: Length 1.45, width ca. 1.4; opisthosoma: Length 1.1, width 0.9; dorsal scutum: Length 0.63, width 0.53, epigastric scutum: Length in the middle 0.38, width 0.6; leg I: Femur 0.68, patella 0.36, tibia 0.48, metatarsus 0.3, tarsus 0.3; tibia II 0.37, tibia III 0.35, tibia IV 0.55; cymbium: Length 0.38, width 0.25; tegulum: Length 0.28, width 0.23.
Colour mainly dark (it has been changed after the preservation by fluid, many hairs are rubbed off!), the clypeus bears remains of white hairs, white hairs of the cymbium apparently absent, prosoma anteriorly dark brown, thoracic part and sternum lighter brown, femora to metatarsi I-II dark brown, femur IV light brown, tarsi and metatarsi light brown to yellowish, metatarsus IV in the distal half dark brown, opisthosoma medium brown, articles of the pedipalpus dark.
Prosoma not much longer than wide, quite similar to *E. nigripalpis.* - Legs (fig. 178) robust, order IV/I/II/III, femora and tibia I thickened, tibiae I-II with strong, dense and long ventral hairs, scopulae absent, claw tufts dense, claws smooth, bristles partly rubbed off, numerous, femora with some dorsal ones, tibiae I-II apparently with 2 long ventral pairs, metatarsi I-II also with 2 long ventral pairs. - Opisthosoma 1.2 times longer than wide, hairs of medium length, bearing a large dorsal scutum (fig. 177) and a large epigastric scutum, both are fairly well developed. - Pedipalpus: See above. A long paracymbium is fixed to the cymbium; it exists in related species, too.

The **relationships** are unsure: According to the needle-shaped pedipalpal tibial apophysis and the structures of the bulbus (like the shape of the embolus) certain species of *Euophrys* C. L. KOCH 1837 are most related, especially *E. nigripalpis* (SIMON 1937) (France, Iberian Peninsula). Opisthosomal scuta are absent to me in all known members of *Euophrys* but exist in males of *Chalcoscirtus*. BERTKAU 1880. In some species of *Chalcoscirtun* a ventral hump-shaped tibial outgrowth of the ♂-pedipalpus exists like in *E. marusiki*, and the terminal part of the retrolateral pedipalpal tibia apophysis is flattened but not needle-shaped like in *Euophrys*. In *E. nigripalpus* a ventral tibial outgrowth of the male pedipalpus and opisthosomal scuta are absent, the clypeus bears red-orange hairs and the length/width ratio of the tegulum is ca. 1.5 like in the also related *E. frontalis* (WALCKENAER 1802) and *E. herbigrada* (SIMON 1871) (1.2 in *marusiki*) which are larger spiders and in which the colour of body and legs is also different. - In my opinion the combination of the mixed taxonomical characters of *marusiki* point to very close relationships of *Euophrys* and *Chalcoscirtus*.

Distribution: Portugal, Algarve.

Heliophanus agricola WESELOWSKA 1986 (fig. 184-185)

Material: Portugal, Algarve, Island of Tavira, in low plants in the dunes, 1♂ JW leg. 11. VI. 2023, R282/CJW.

The prosomal length of the male is 2.1 mm. Certain structures of the pedipalpus of this male are more variable than shown in the figures of the original decription of *agricola*: The smaller (proventral) apophysis of the pedipalpal femur may be long and pointed in this species or blunt or even blunt and rather small (fig. 185), and the embolus (fig. 184) may be stronger bent, so in the present male.

Distribution: Iberian Peninsula, North Africa.

Icius SIMON 1876 (figs. 186-194)

Six European species of this difficult genus have been described, see ALICATA & CANTARELLA (1993). In this paper I synonymize one of these species and provide a key to the male European members of *Icius*, based on the shape of their pedipalpal tibia apophysis and the embolus. Males of this genus are well recognizable by their prodistal bristles of femur I (e. g., as in fig. 186) (The number, position and size of the prodistal femoral bristles turned out to be variable), their large bipartite tooth of the anterior margin of the fang furrow (fig. 187), their strongly bulging retrolateral cheliceral lamella (fig. 187), and their longitudinal ventral depression and furrow of the pedipalpal femur (fig. 188). The position of the left embolus is clockwise (fig. 190) (straight in *servinus* SIMON) in contrast to genera like *Macaroeris* WUNDERLICH in which its it counter-clockweise. Besides a well developed retrodistal tibial apophysis exists usually a second small distal retroventral tooth-line apophysis (fig. 191) which is small in *subinermis* SIMON. - Shape and length of the embolus and the shape of the retrodistal pedipalpal tibial apophysis are important for the determination of the species.

Icius lamellatus WUNDERLICH 2011 = *Icius subinermis* SIMON 1937 **(n. syn.).**

New material: SE-Portugal, Algarve, near Tavira, 1♂ and 1♂ near Sao Bras de Alportel, JW leg., CJW.

The investigation of two further males of *I. lamellatus* from the Algarve and a restudy lead me to the opinion that *lamellatus* WUNDERLICH 2011 is a junior synonym of *subinermis* SIMON 1937 (**n. syn**.).

Key to the males of *Icius* in Europe:

1 Embolus straight. Russia. ….. *cervinus* SIMON 1878

- Embolus bent (e. g. figs. 189, 194) …..:.... 2

2(1) Length of the embolus ca. 0.15 mm (fig. 189) .... *hamatus* (C. L. KOCH 1846)

- length of the embolus ca. 0.07 mm (fig. 190) .... *crassipes* (SIMON 1868)

- length of the embolus 0.03-0.05 mm (figs. 192, 194) …... 3

3(2) Retrolateral pedipalpal tibial apophysis larger and wide (figs. 191-192), usually less sclerotized …..........…... *congener* (SIMON 1871)

- Retrolateral pedipalpal tibial apophysis more slender (figs. 193-194), usually stronger sclerotized. (= *lamellatus* WUNDERLICH 2011), embolus quite short …. *subinermis* SIMON 1937

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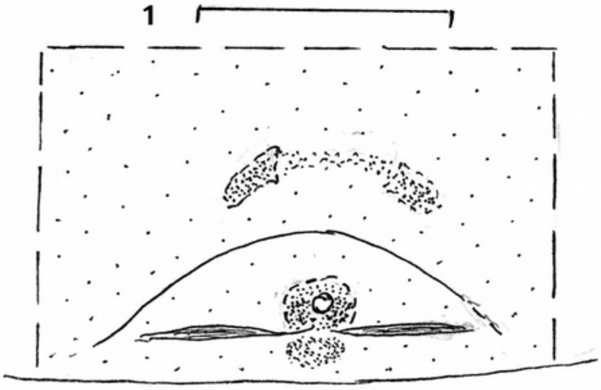
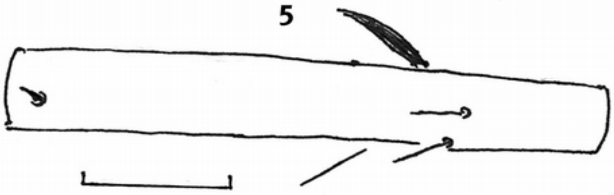
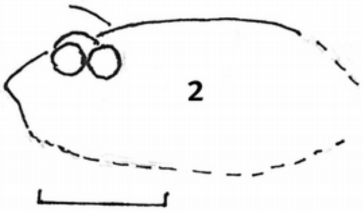
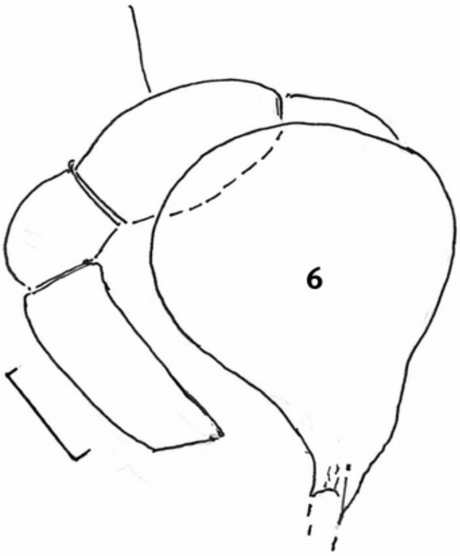
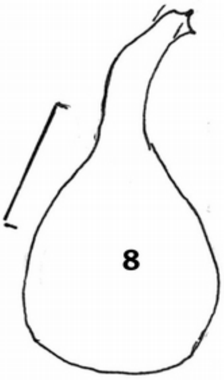
INDEX

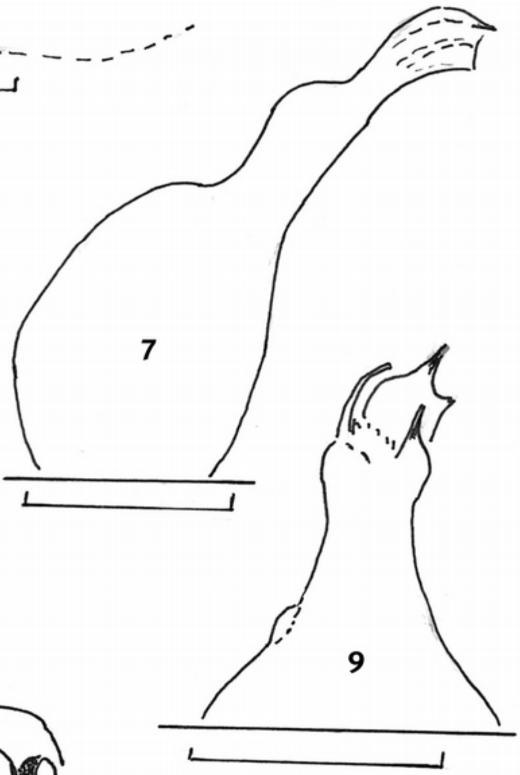


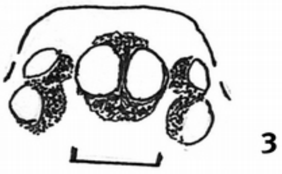






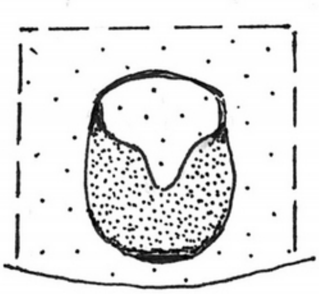






Fig, 1) <u>*Orchestina*</u> sp. indet. (*simoni* DALMAS 1916?), ♀, genital field. Scale = 0.1 mm.

Figs. 2-9: <u>*Orchestina fonteferrea*</u> **n. sp.**., ♂ holotype figs. 4, 6-9, ♀ paratype b) figs. 2-3, 5; 2) lateral aspect of the prosoma; 3) dorsal aspect of the eyes; 4) prolateral aspect of the right femur IV; 5) dorsal aspect of the right metatarsus III. Note the long and thickened prolateral bristle and the tiny sub-apical bristle. Only 3 hairs are drawn; 6) retrolateral aspect of the right pedipalpus; tip of the embolus: See fig. 9); 7) prodorsal aspect of the left bulbus and embolus; 8) dorsal aspect of bulbus and embolus of the right pedipalpus; 9) dorsal aspect of the left embolus. - Scale: 0.2 in figs. 2) and 4), 0.1 in the remaining figs.



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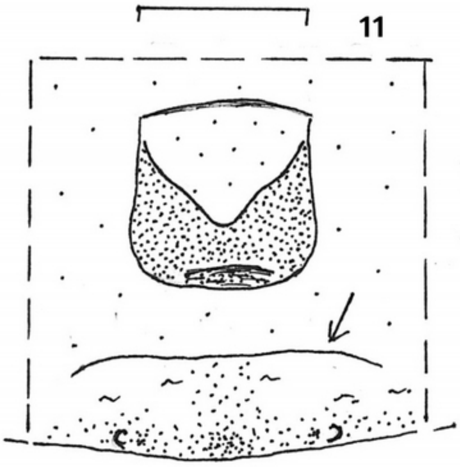

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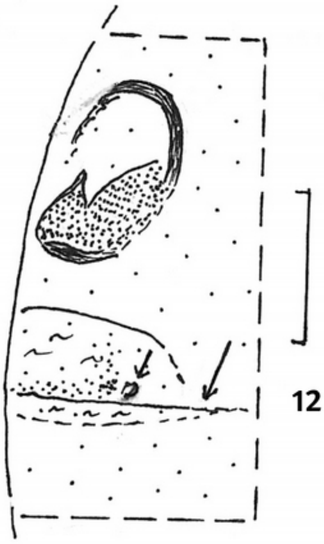

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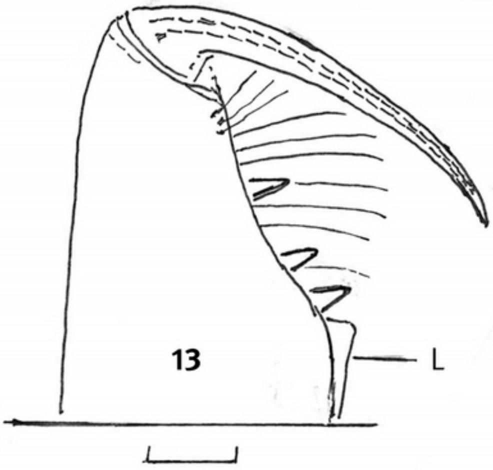

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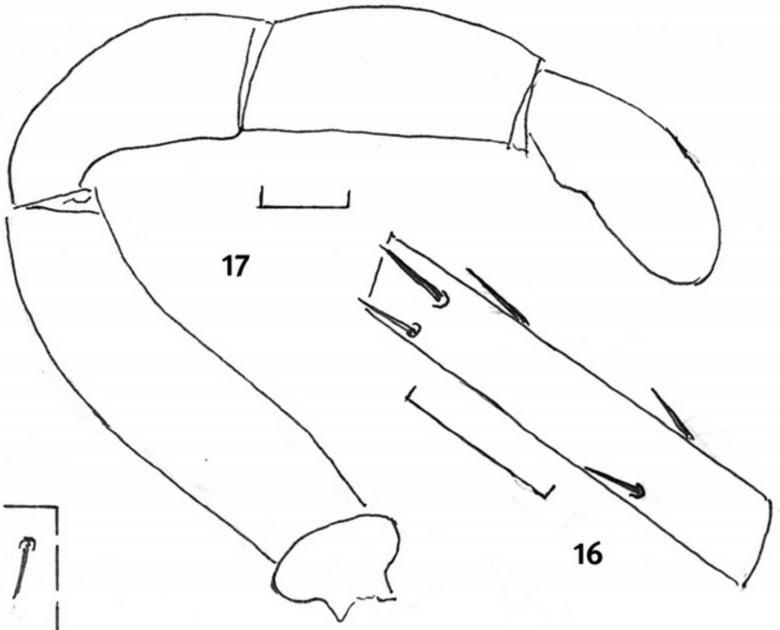

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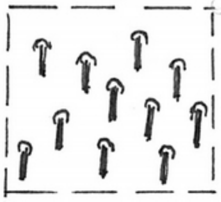

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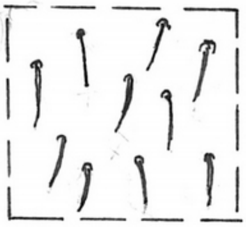
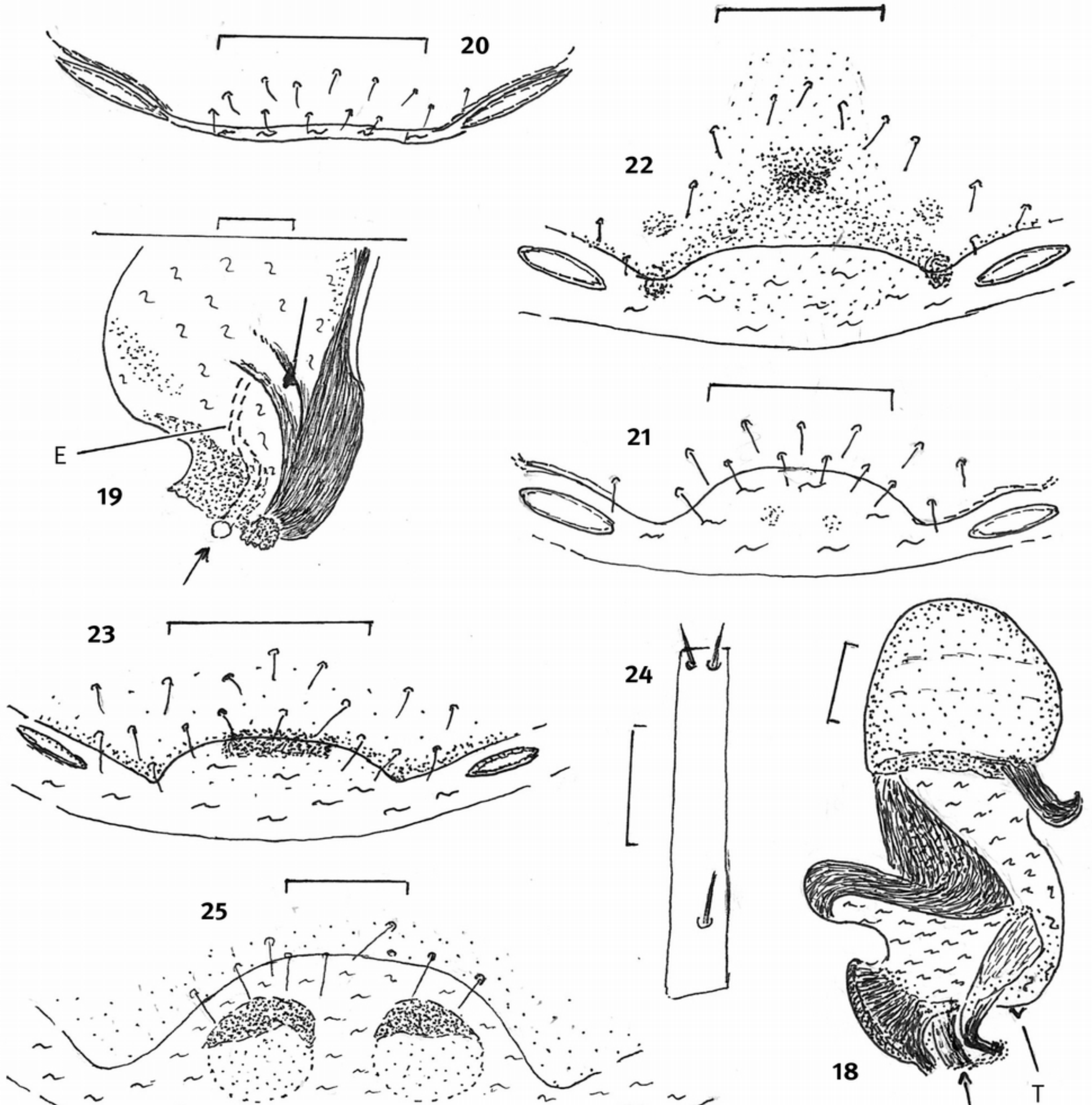


15

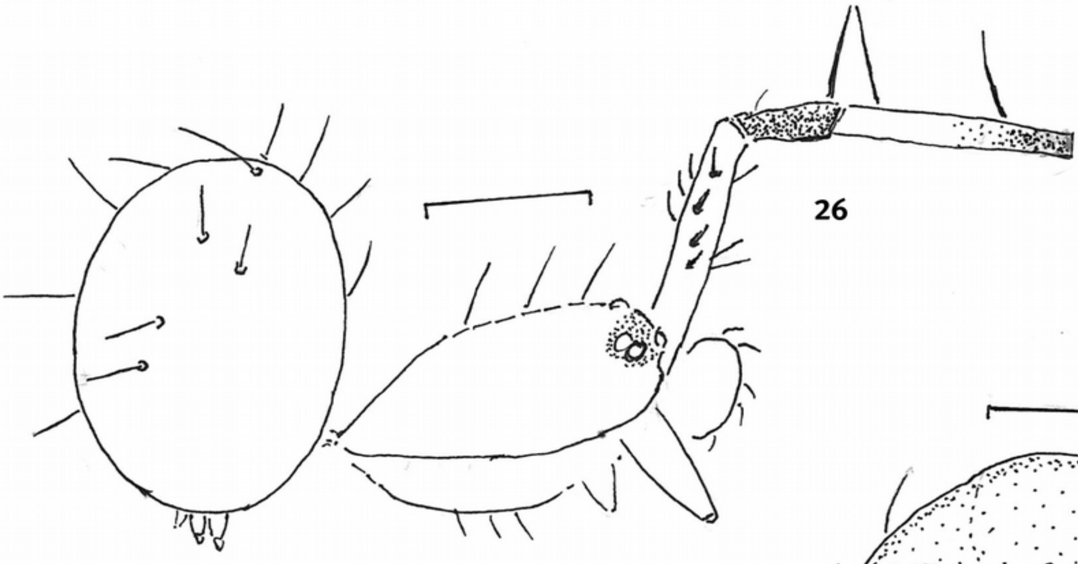
Figs. 10-12: *Orchestina fonteferrea* **n. sp.**, ♀; 10) paratype a, 11-12 paratype b; 10) ventral aspect of the genital field; 11) ventral and slightly posterior aspect of the genital field. The arrow points to the thin sclerotized “stripe” in front of the soft area; 12) retroventral aspect of the genital field. The long arrow points to the epigastric furrow, the short arrow points to the questionable opening of unknown function. - Scales = 0.1;

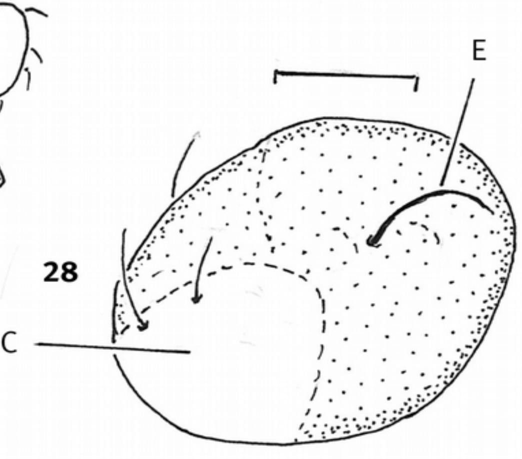
figs 13-17) *Dysdera algarvensis* **n. sp.**; figs 13, 15 -16: ♀, 14, 17: ♂; 13) ventral aspect of the distal part of the left chelicera (L= lamella), only few hairs are drawn; 14) dorsal bristles of the middle of the opisthosoma; 15) dorsal bristles of the middle of the opisthosoma; 16) retroventral aspect of the left tibia IV; hairs are not drawn; 17) prolateral aspect of the articles of the left pedipalpus. - Scales 0.2 in most figs. but 0.5 in 16) and no scales in 14-15.

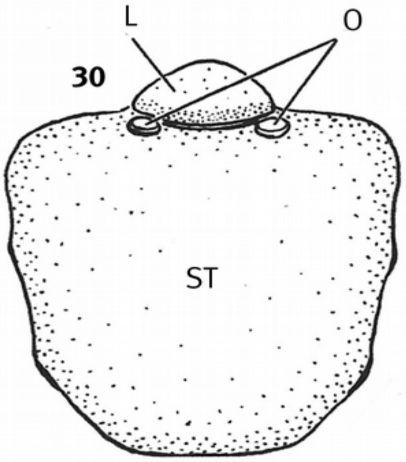


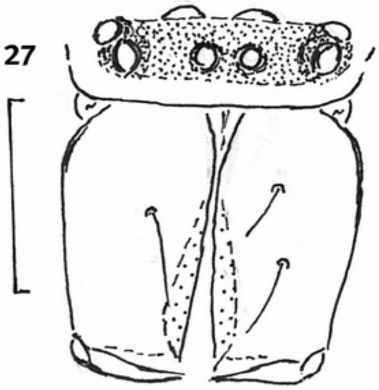
Figs. 18-23: *Dysdera algarvensis* **n. sp.**; figs. 18-20: ♂; 21-23: ♀ paratypes from Mesquita Alta and Bico Alto (fig. 23); 18) prolateral aspect of the left pedipalpus. The arrow points to the tip of the embolus; T = tooth of the bulbus; 19) retrolateral aspect of the tip of the distal part of the left pedipalpus. The arrow points to the tip (opening) of the embolus (E); 20) genital field and anterior pair of lung slits near the epigastric furrow; 21-23) genital field, lung slits and epigastric furrow. - Scales: 0.2 in fig. 18, 0.1 in 19, 0.5 in the remaining figs.;

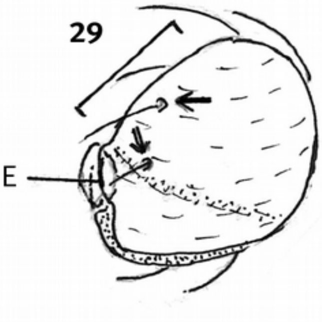
figs. 24-25: *Dysdera algarvula* **n. sp.**, ♀; 24) (retro)ventral aspect of the left tibia IV, hairs are not drawn; 25) genital field. - Scales 0. 5 and 0.2;





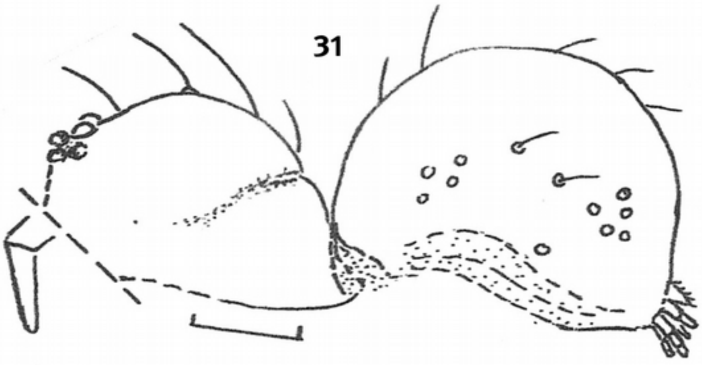


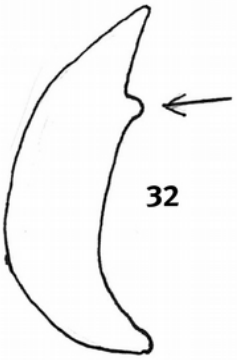


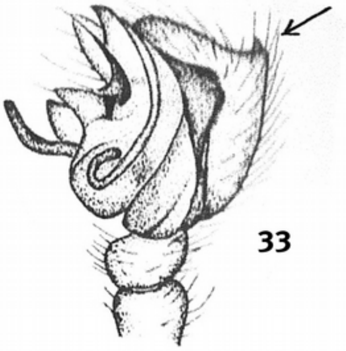


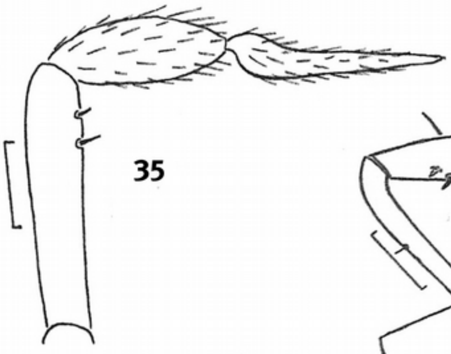
figs. 26-29: *Fonteferrea minutissima* **n. gen. n. sp.**, Fonteferridae **n. fam.**, ♂; 26) lateral aspect of the body and parts of the left leg I. The chelicerae possess an unnatural position. Only few hairs are drawn. Note the 4 prolateral femoral bristles; 3 long ventral and 3 dorsal hairs are also drawn; 27) anterior aspect of the prosoma; 28) prolateral aspect of the left pedipalpus. Only few hairs are drawn; 29) retroapical aspect of the left bulbus. The arrows point to two hairs of the bulbus (!). - C = cymbium, E = embolus. Scales: 0.1 mm in figs.27 and 29, 0.2 mm in 26 and 28;

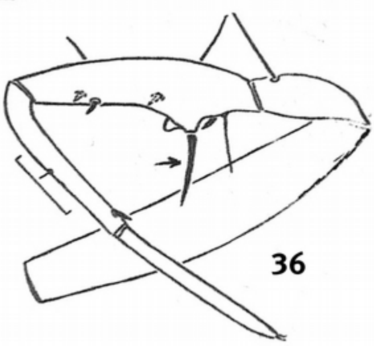
figs. 30) Theridiosomatidae sp., ventral aspect of the sternum (ST); L = labium, O = openings of the sternal glands. No scale.

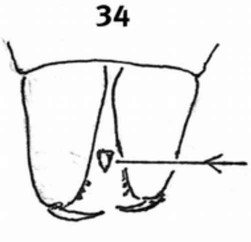


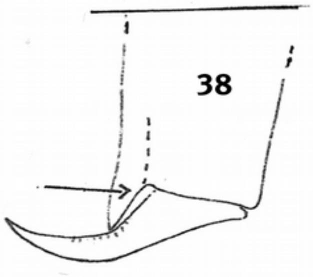


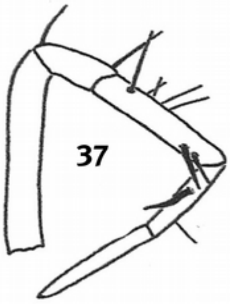




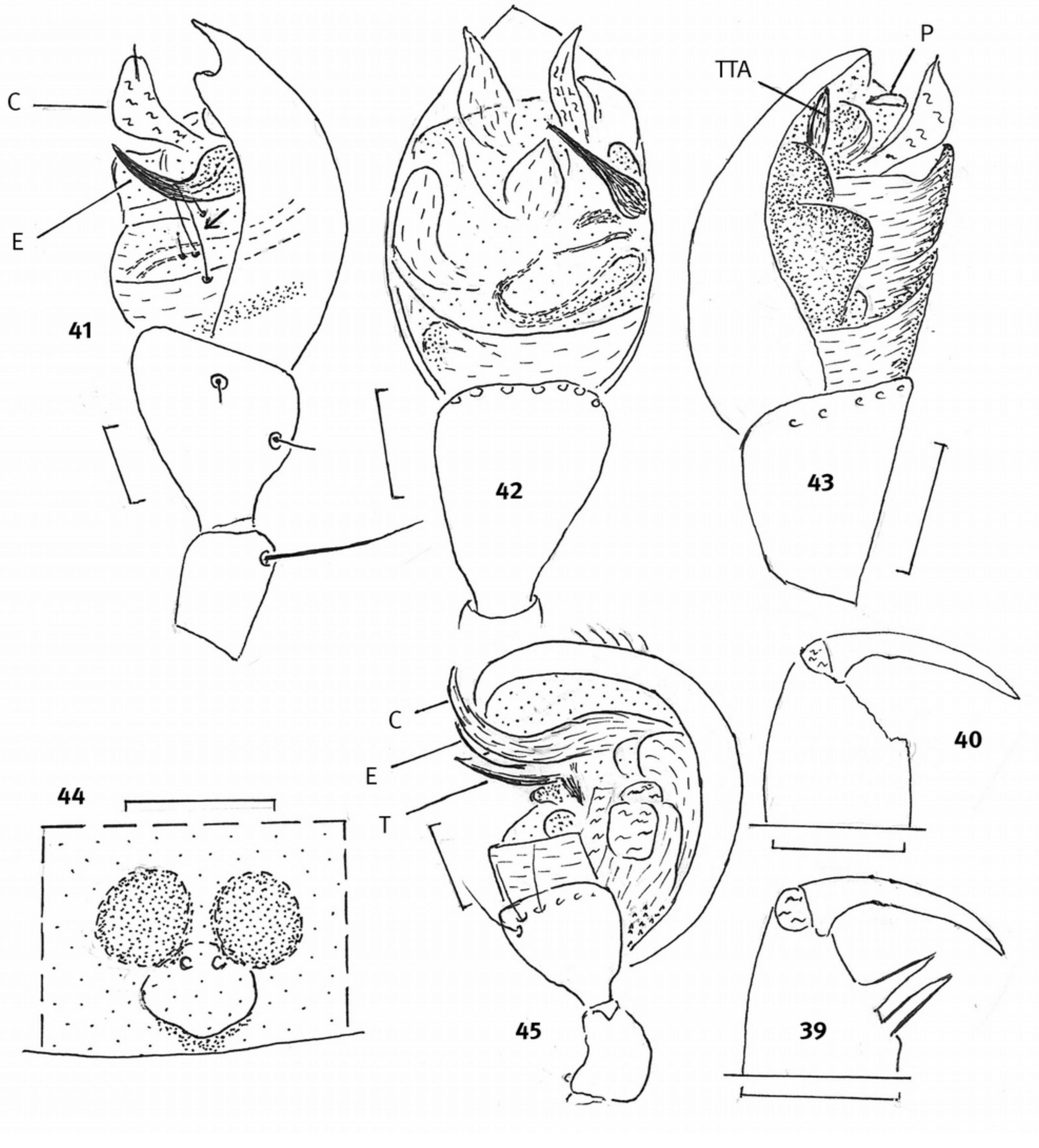








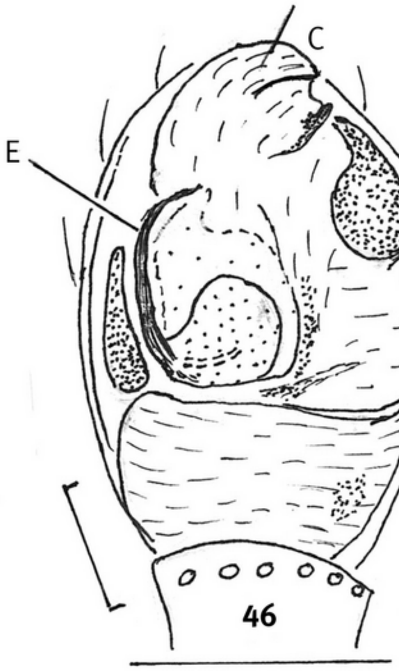
31) *Cretamysmena fontana* WUNDERLICH 2018 in Burmese (Kachin) amber (Cretamysmenidae), probably ad. ♀, lateral aspect of the body and distal part of the left pedipalpus; 32) *Comaroma simoni* BERTKAU 1889 (Comaromidae), ♂, dorsal aspect of the cymbium of the right pedipalpus with the retrodistal paracymbial hook; 33) *Balticoroma maculosa* (OI 1960) (Comaromidae), ♂, retrolateral aspect of the left pedipalpus. The arrow points to the dorsal outgrowth of the cymbium. Taken from OI (1960); 34) Anapidae indet., anterior aspect of the chelicerae. The arrow points to the spur of the labrum; 35-36) Anapidae indet. In Eocene Baltic amber, modified male legs I of two species. The arrow points to the clasping (mating) spine of the tibia of fig. 36; 37) *Mysmena jobi* KRAUS 1967 (Mysmenidae), prolateral aspect of the left leg I. Note the mating spines. Taken from KRAUS (1967); 38) *Synaphris dalmatensis* WUNDERLICH 1980 (Synaphridae), ♀, anterior aspect of the left chelicera. The arrow points to the large apical tooth. - Scale in fig 31 = 0.1 mm, no scale in the remaining figs.;

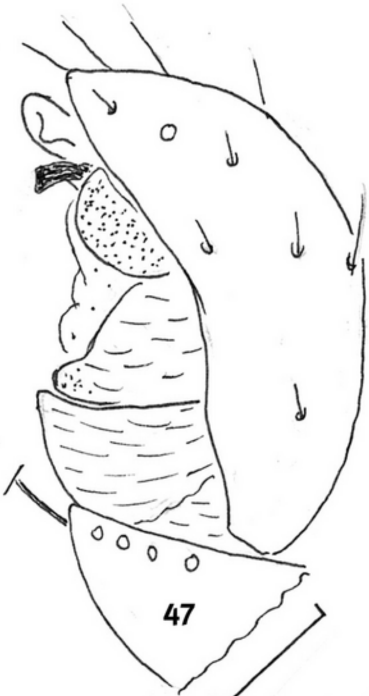


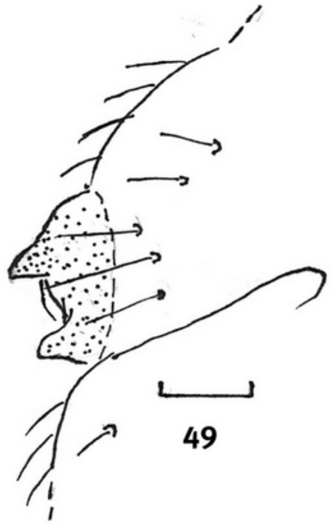
figs. 39- 43: *Enoplognatha minuscula* **n. sp.**, ♂, 40) paratypus, remaining ♂ holotypus; 39-40) ventral aspect of the distal part of the right chelicera; 41) retrolateral aspect of the left pediplpus. The arrow points to 3 hairs of the tegulum and subtegulum (further hairs exist but are not drawn); 42-43) ventral and retrolateral aspect of the right pedipalpus;

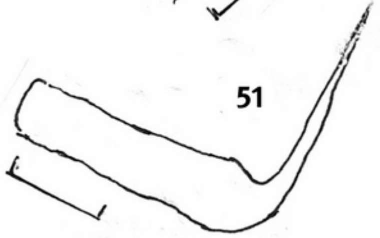
fig. 44) *Lasaeola armona* WUNDERLICH 2015, ♀ (R236/CJW), epigyne;

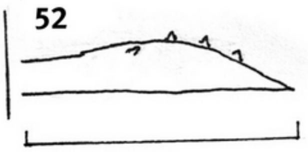
fig. 45) *Neottiura curvimana* (SIMON 1914), ♂, retroventral aspect of the left pedipalpus. - C = conductor, E = embolus, P = paracymbium, TTA = theridiid terminal apophysis. Scales: 0.2 mm in figs. 39-40, 43 and 45, 0.1 mm in the remaining figs.;

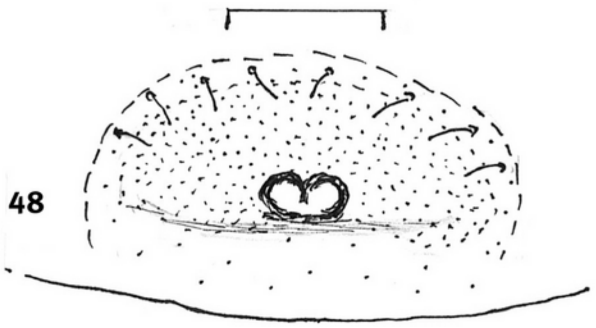


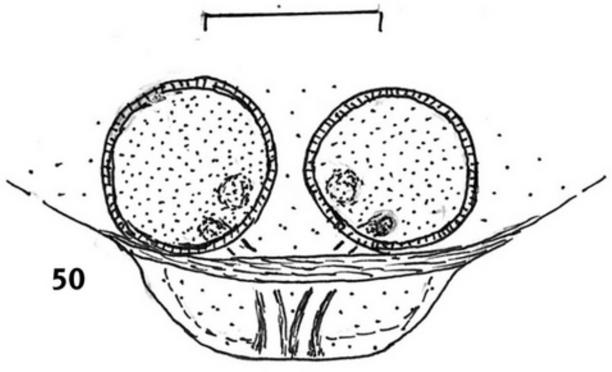








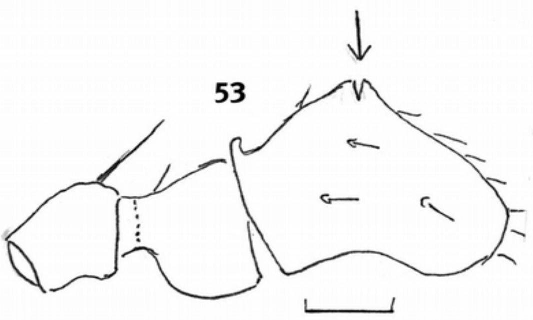




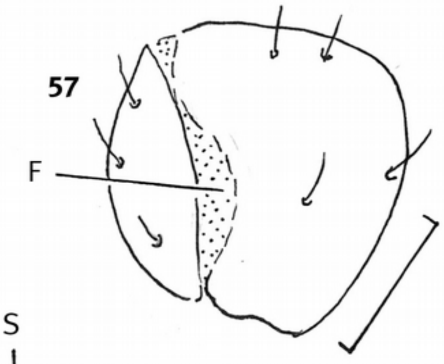
figs, 46-50: *Theridion modonatum* **n. sp**.; 46-47) ventral and retrolateral aspect of the left ♂-pedipalpus; 48-49) ♀, ventral and lateral aspect of the epigyne; 50) vulva. - C = conductor, E = embolus. Scales: 0.1 mm;

figs. 51-52: *Canariphantes* (?) *zonatus* (SIMON 1884); 51-52) ♂ from the Algarve, ventral aspect of the left lamella characteristica and its distal part. - Scale: 0.05 mm;

53



57



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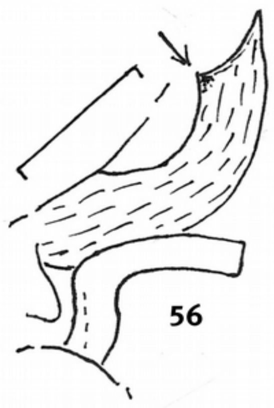

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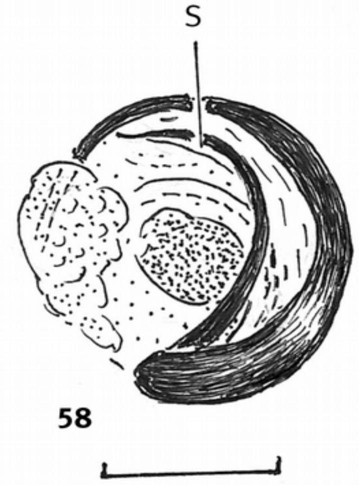

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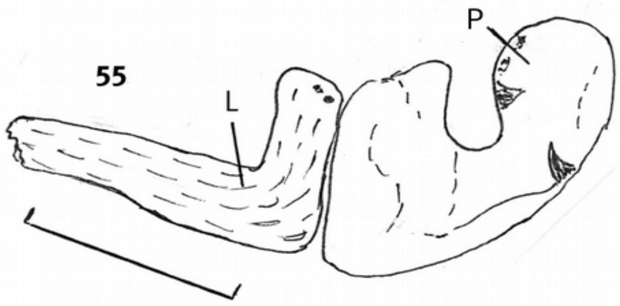

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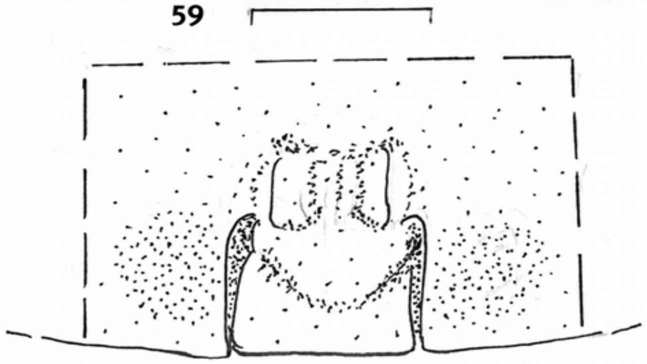

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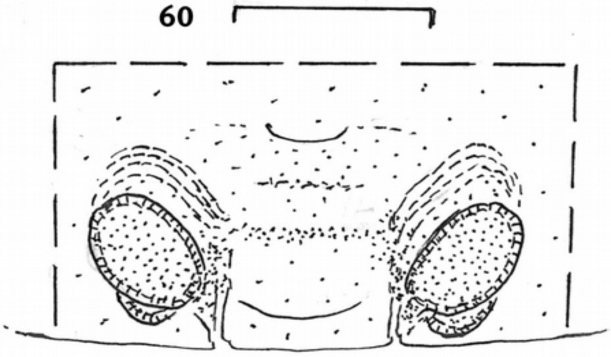
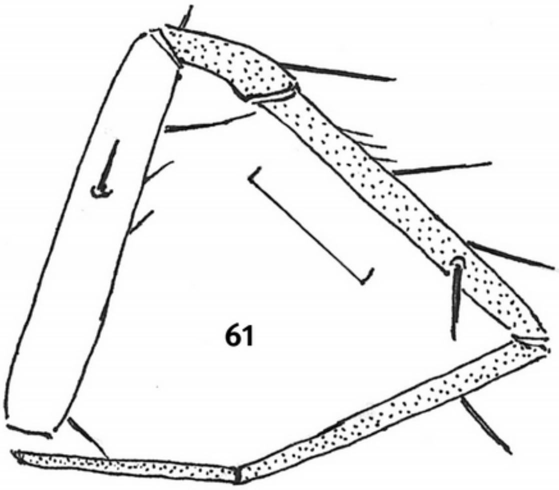
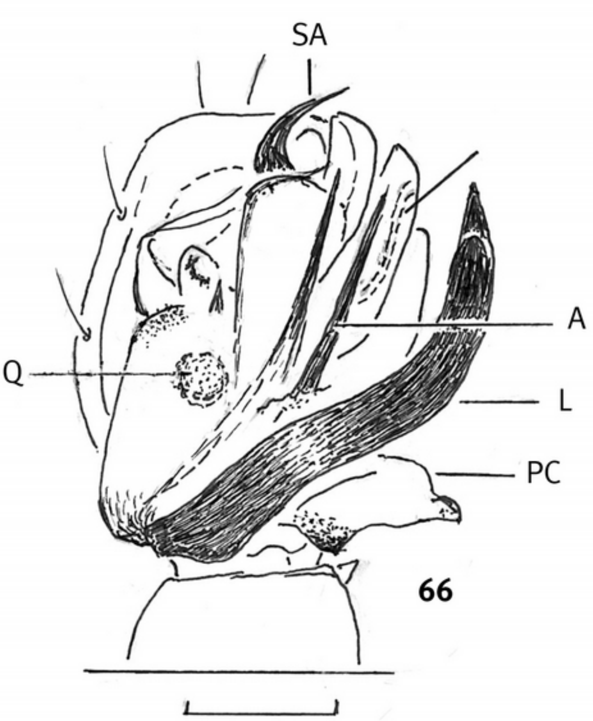
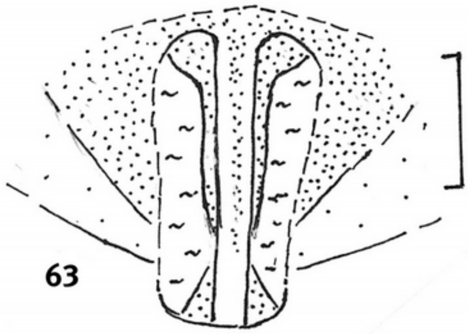


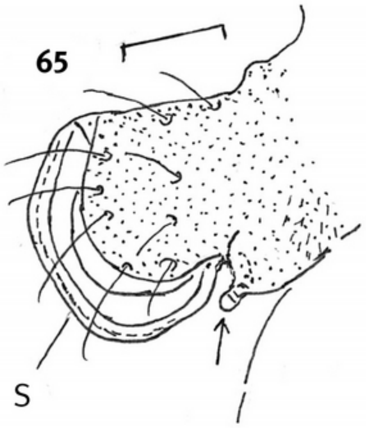
figs. 53-56: Agyneta pseudorurestris WUNDERLICH 1980, ♂; 53) prolateral aspect of patella, tibia and cymbium of the left pedipalpus. The arrow points to the incisium of the cymbium; 54) dorsal aspect of tibia, cybium and paracymbium of the left pedipalpus; 55) retrolateral aspect of lamella characteristica (L) and paracymbium (P) of the left pedipalpus; 56) ventral aspect of lamella characteristica and paracymbium of the left pedipalpus. The arrow points to the ventral tooth of the lamella characteristica. - Scales: 0.1 mm;

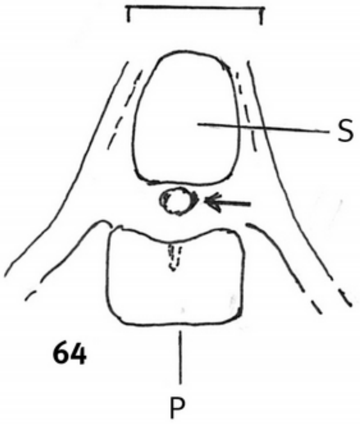
figs. 57-60: Styloctetor romanus (O. P.-CAMBRIDGE 1871); 57-58) ♂; 57) dorsal aspect of the divided cymbium of the right pedipalpus; 58) apical aspect of the left pedipalpus; 59-60) ♀, epigyne and dorsal aspect of the vulva. - F = prodorsal furrow of the cymbium, S = seam of the distal part of the embolus. Scales: 0.1 mm;

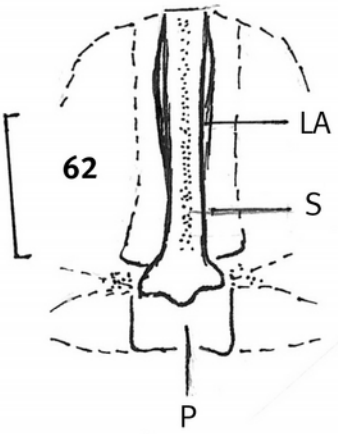






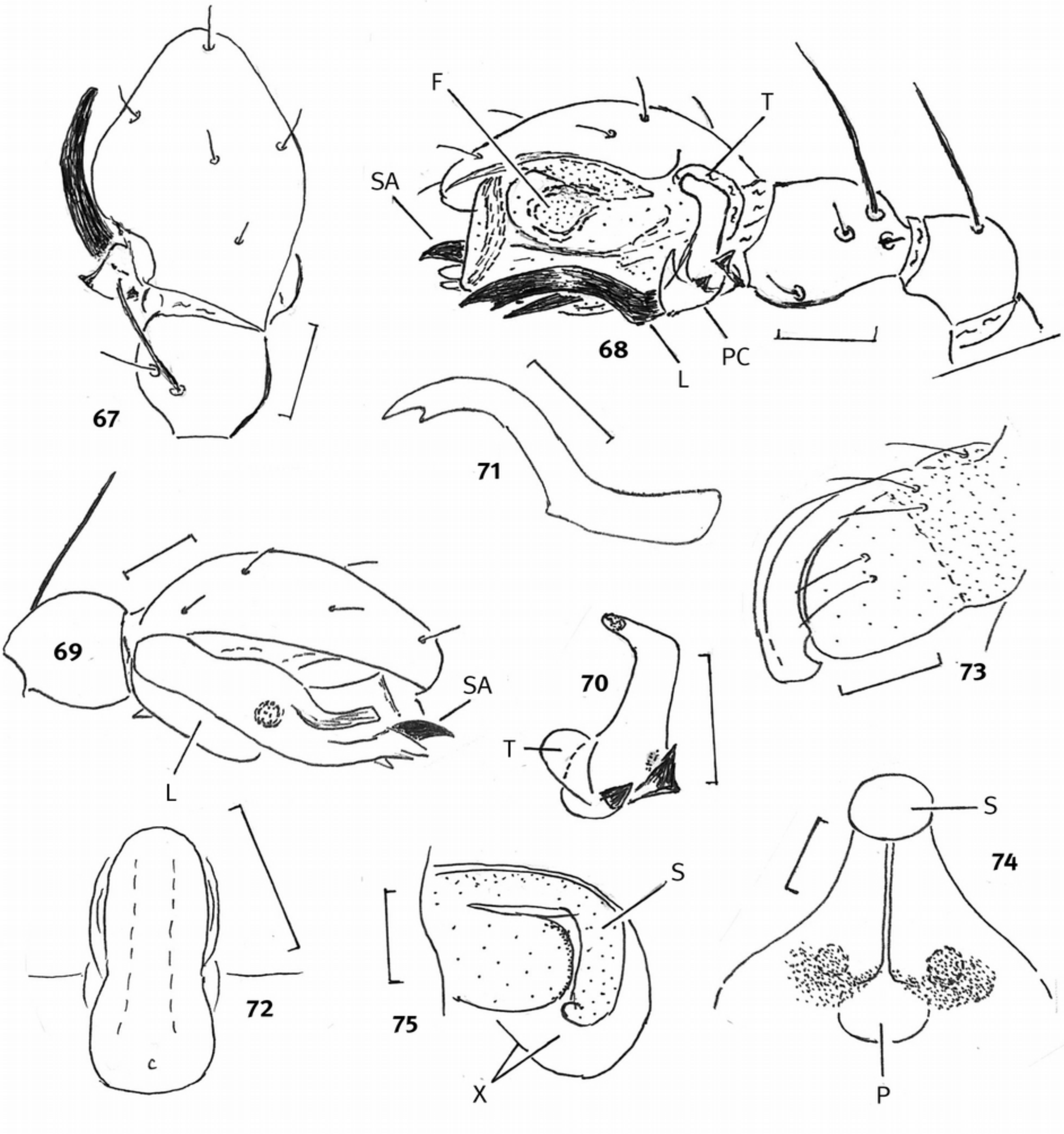




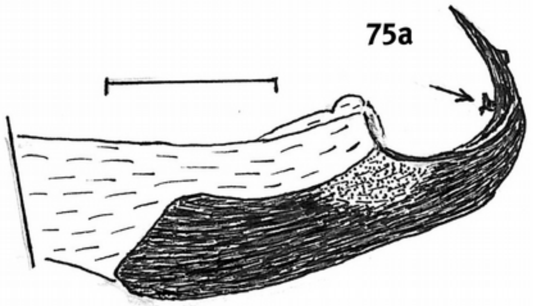


figs. 61-65: *Palliduphantes juliao* (WUNDERLICH 2021), ♀; 61) prolateral/distal aspect of the left leg I; 62-64) ventral and more or less posterior aspect of the epigyne; 65) lateral aspect of the epigyne; the arrows point to the stretcher. - LA = lateral seam of the scape, P = posterior epigynal plate, S = scape. Scales: 0.5 mm in fig. 61, 0.1 mm in the remaining figs.;

fig. 66) *Palludiphantes lancea* **n. sp.**, ♂, ventral aspect of the left pedipalpus. - A = lanceolate apophysis, D = sperm duct, F = FICKERT's gland, L = lamella characteristica, LA = lateral seam of the scape, P = posterior plate of the epigyne, PC = paracymbium, SA = supra-tegular apophysis, Q = questionable gland, T = translucent part of the paracymbium;



Figs 67-75: Palliduphantes lancea **n. sp.**; 67-71: ♂; 67-69) dorsal, retrolateral and prolateral aspect of the left pedipalpus; 70) retrolateral and slightly dorsal aspect of the left paracymbium; 71) retrolateral aspect of the left lamella characteristica (outline); 72-75: ♀; 72-74) ventral, lateral and posterior aspect of the epigyne; 75) lateral aspect of the epigyne of a freshly moulted specimen with the cover of the scape (X). - Remaining abbreviations: See above. Scale: 0.1 mm.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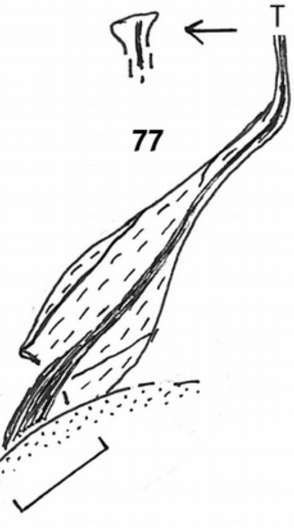
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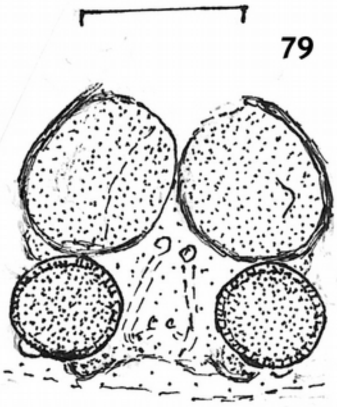
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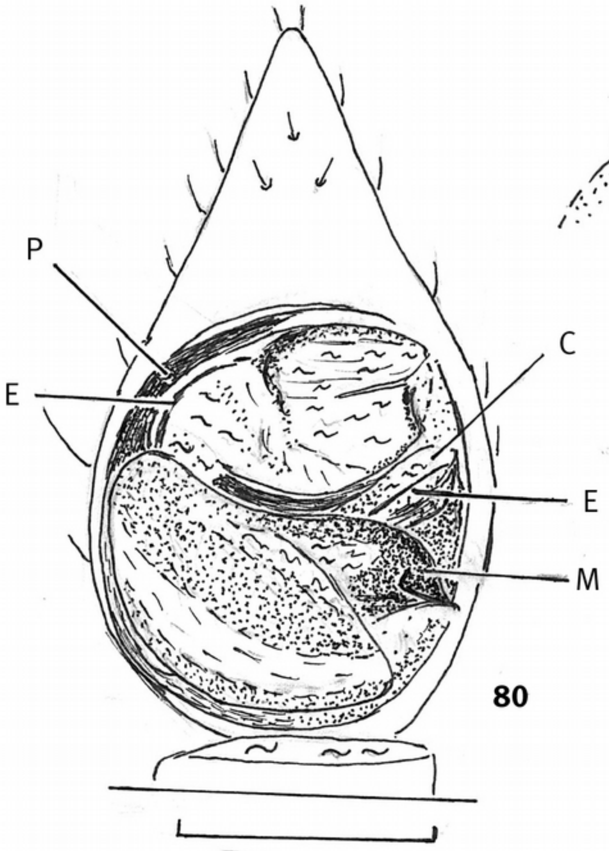
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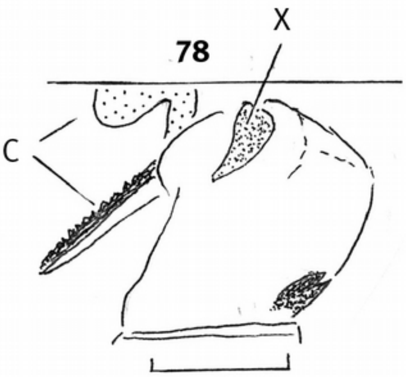
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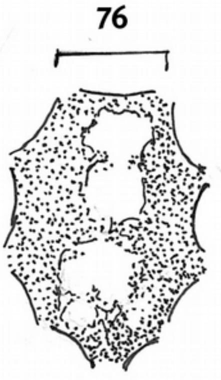
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Fig. 75a) *Araneus pallidus* (OLIVIER 1789), ♂, prolateral aspect of the median apophysis of the left pedipalpus. The arrow points to the tiny divided tooth. - Scale: 0.1 mm;

figs. 76-77: *Tetragnatha intermedia* KULCZYNSKI 1891, ♂; 76) sternum; 77) retroventral aspect of embolus and conductor of the right pedipalpus whose tip is enlarged.- Scale 0.5, 0.1;

figs. 78) *Dictyna kosiorowiczi* SIMON 1873, ♂, retrodorsal aspect of tibia and conductor of the left pedipalpus. - C = conductor, X = thin retrodistal apophysis. Scale: 0.1 mm;

fig.79) *Iberina harmae* **n. sp.**, ♀, dorsal aspect of the vulva. Parts are hidden or injured by the preparation; the ducts are badly recognizably. - Scale: o.1 mm;

80) *Alopecosa albofasciata* (BRULLE 1832), ♂ from the Algarve, ventral aspect of the left pedipalpus. Only few hairs are drawn. - C = conductor, E = embolus, P = prodistal sclerotized apophysis. Scale: 0.5 mm;

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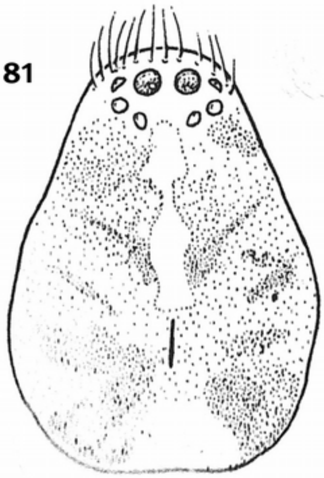

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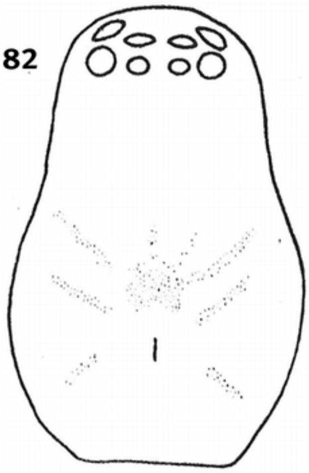

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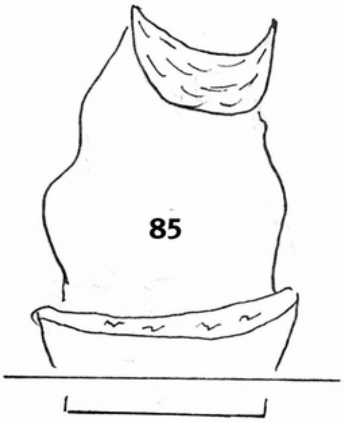

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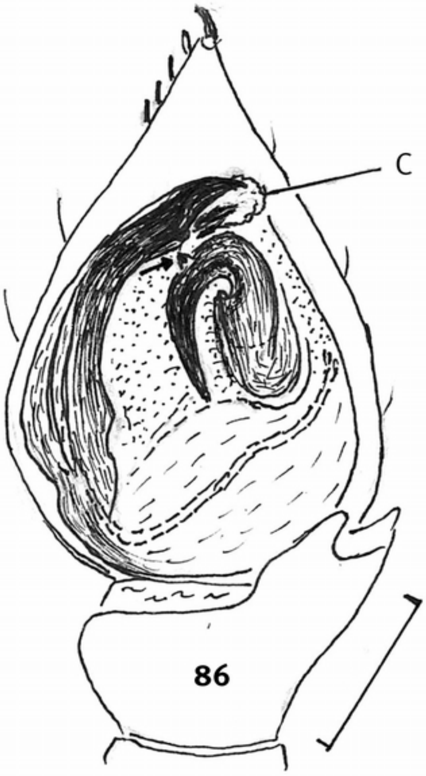

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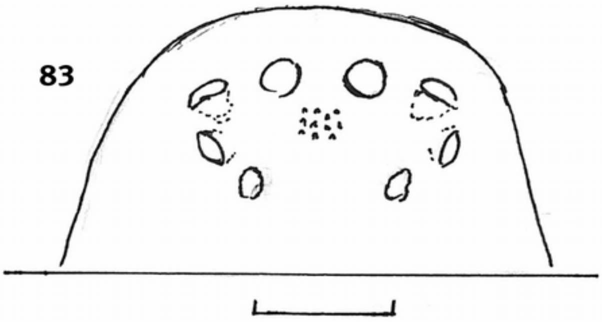

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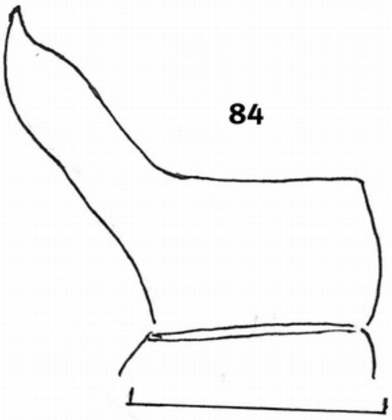

fig. 81-82: Dorsal aspect of the prosoma of _Zodarion_ sp. and _Palaestina exposita_ O. P.-CAMBRIDGE 1872. - No scale;

fig. 83-86: _Zodarion alacre_ SIMON 1870 from the Algarve; 83) ♀, dorsal aspect of the anterior part of the prosoma; 84-86) ♂; 84) retrodorsal aspect of the tibia of the left pedipalpus; 85) retroventral aspect of the tibia apophysis of the left pedipalpus; 86) ventral aspect of the left pedipalpus. The small arrow points to the tiny tooth of the median apophysis. - C = translucent conductor. Scale = 0.2 mm;

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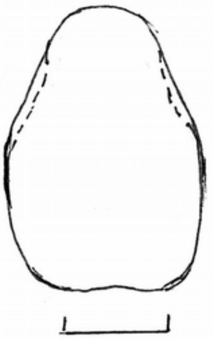

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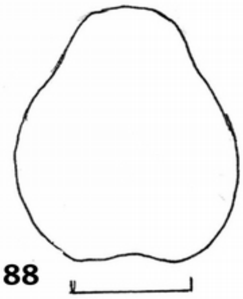

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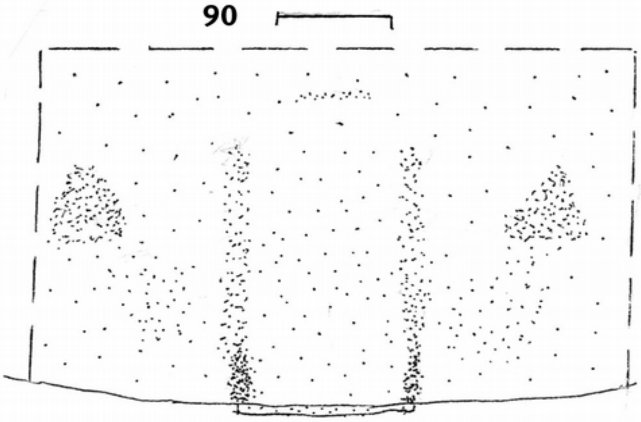

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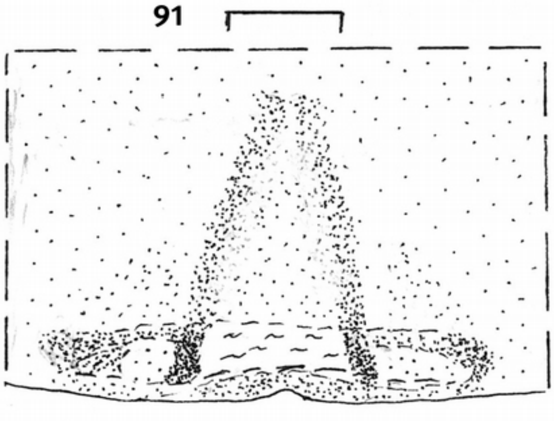

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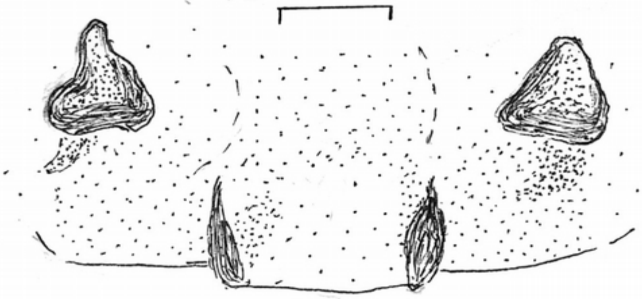
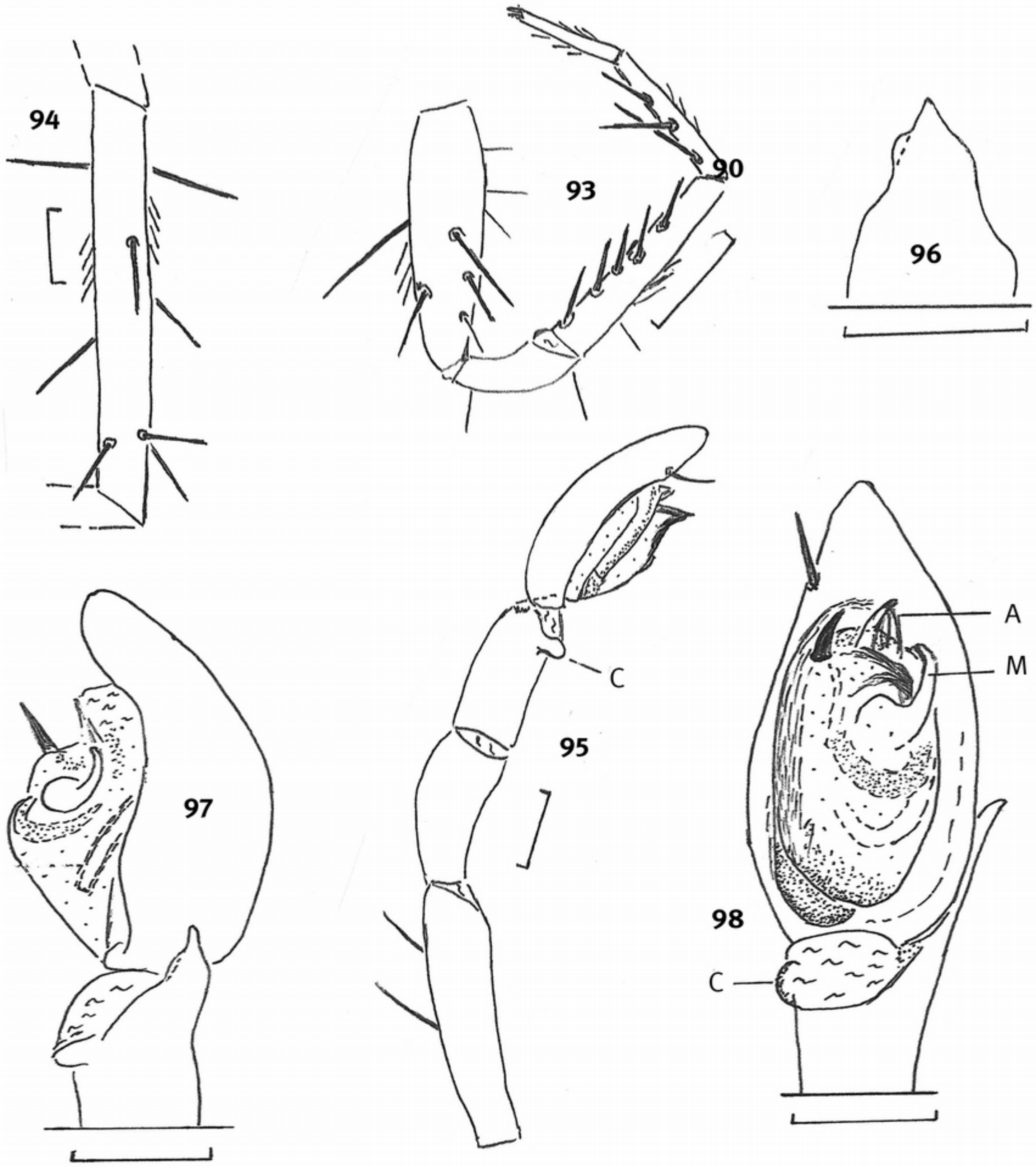
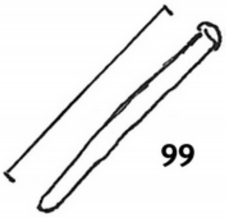


fig. 87) <u>*Zodarion styliferum*</u> (SIMON 1870), ♂♀, dorsal aspect of the prosoma, outline, most frequent shape. Dotted: Shape of the prosoma of *Zodarion styliferum extraneum* DENiS 1935, after PEKAR et al. (2003, fig. 3);

figs. 88-92) <u>*Zodarion brevicephalus*</u> **n. sp.**; 88) ♂♀, dorsal aspect pf the prosoma, outline; 89) retrolateral-apical aspect of the tip of embolus and conductor of the left pedipalpus; 90-91) ♀, epigyne; 92) dorsal aspect of the vulva. The ducts are difficult to recognize and are not drawn. - Scales: figs. 87-88) 0.5, 89) 0.05; 0.1 in the remaining figs.;



figs. 93-98: *Mesiotelus mauritanicus* SIMON 1909; ♀: figs. 93-94), ♂: remaining figs.; 93) prolateral aspect of the right leg I. Only the prolateral row of tibial and metatarsal bristles are drawn; the number of the femoral bristles is quite variable; 94) retrolateral aspect of the right tibia IV; 95) prolateral aspect of the left pediplpus; 96) retrolateral and slightly dorsal aspect of the retrolateral tibial apophysis of the left pedipalpus; 97-98) retrolateral and ventral aspect of the left pedipalpus. - A = apical tegular apophyses, C = club-shaped tibial process, M = median apophysis. Scales: 0.5 mm in figs. 93-94), 0.2 mm in the remaining figs.;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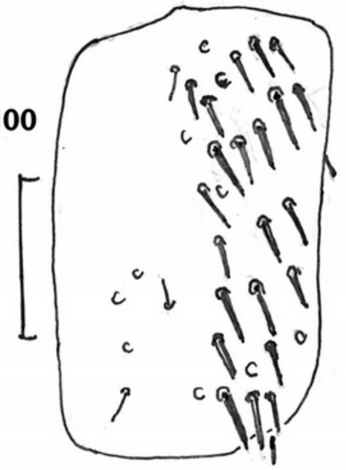
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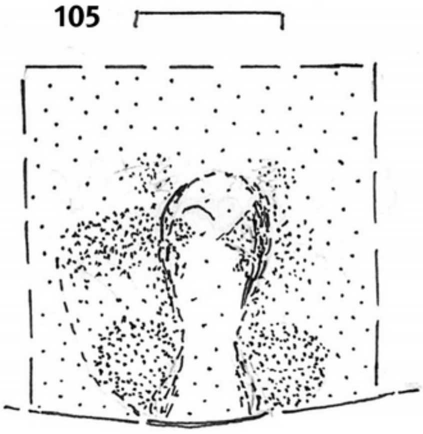
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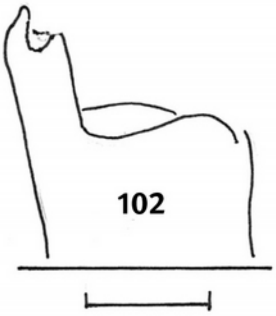
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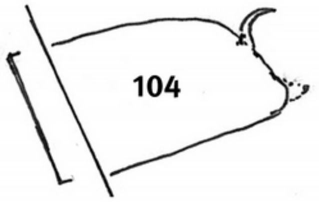
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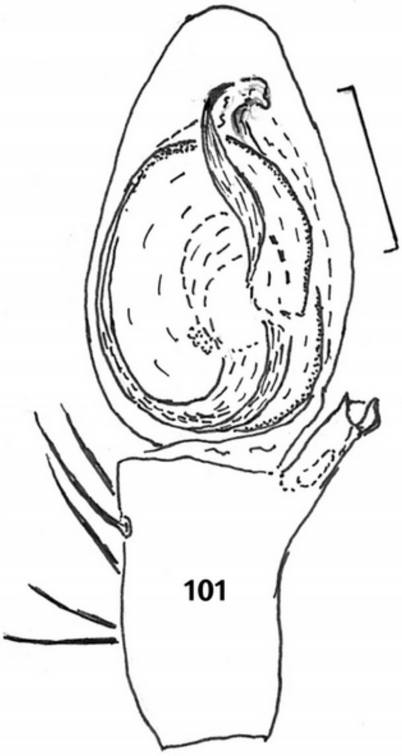
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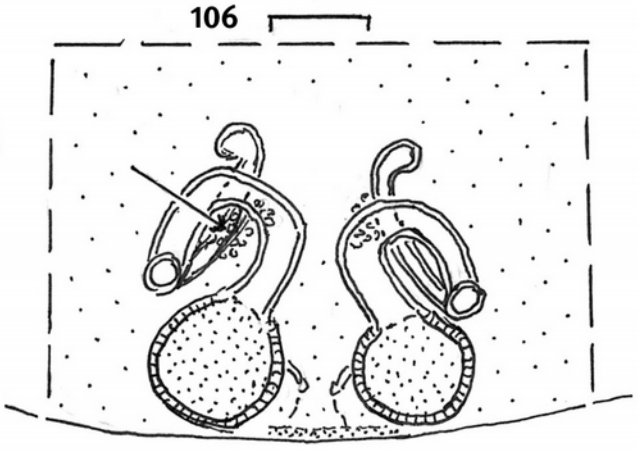
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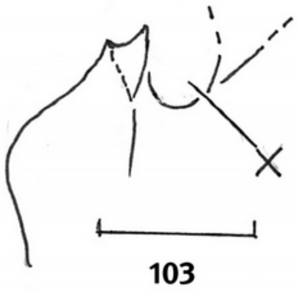
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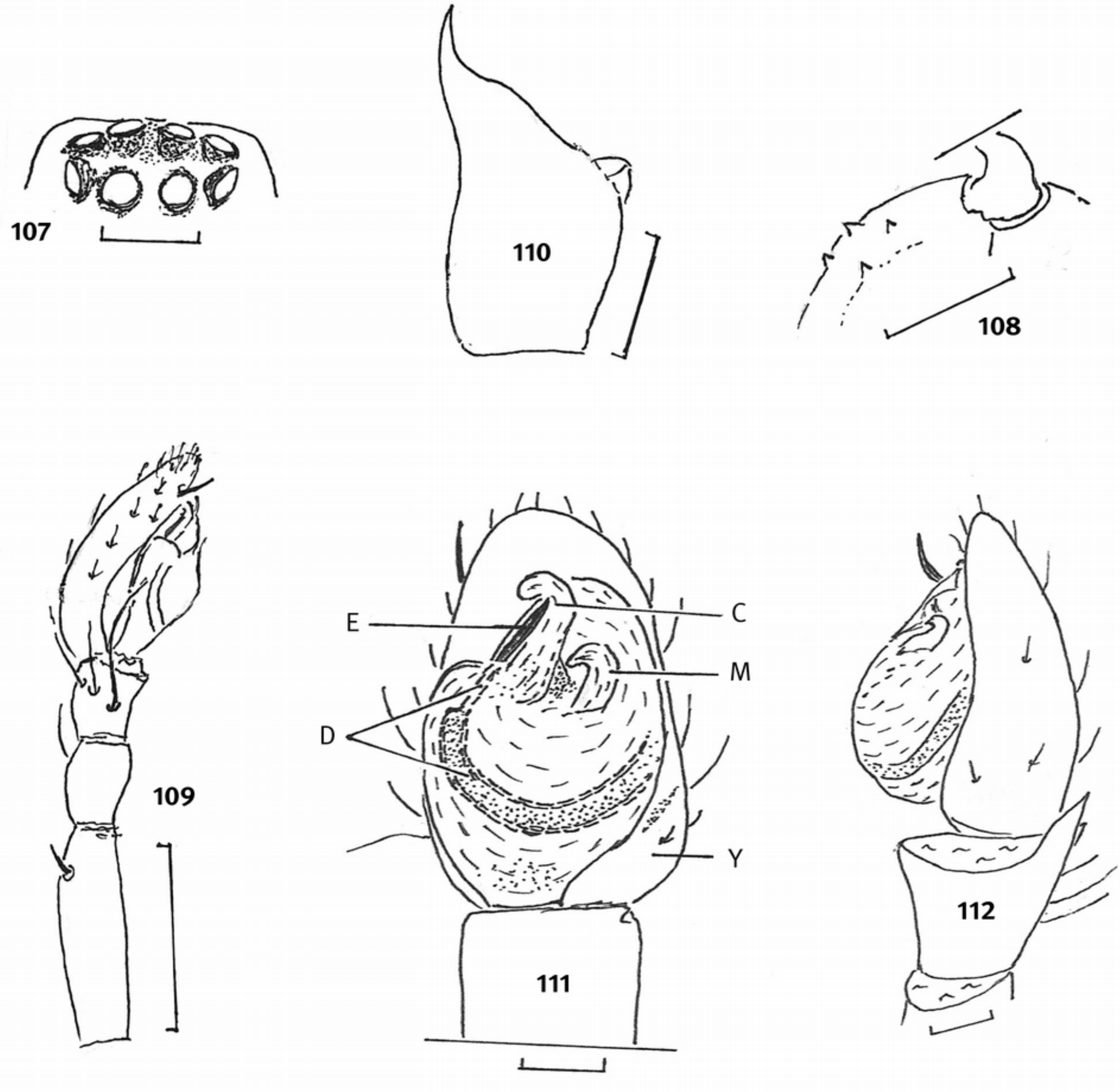
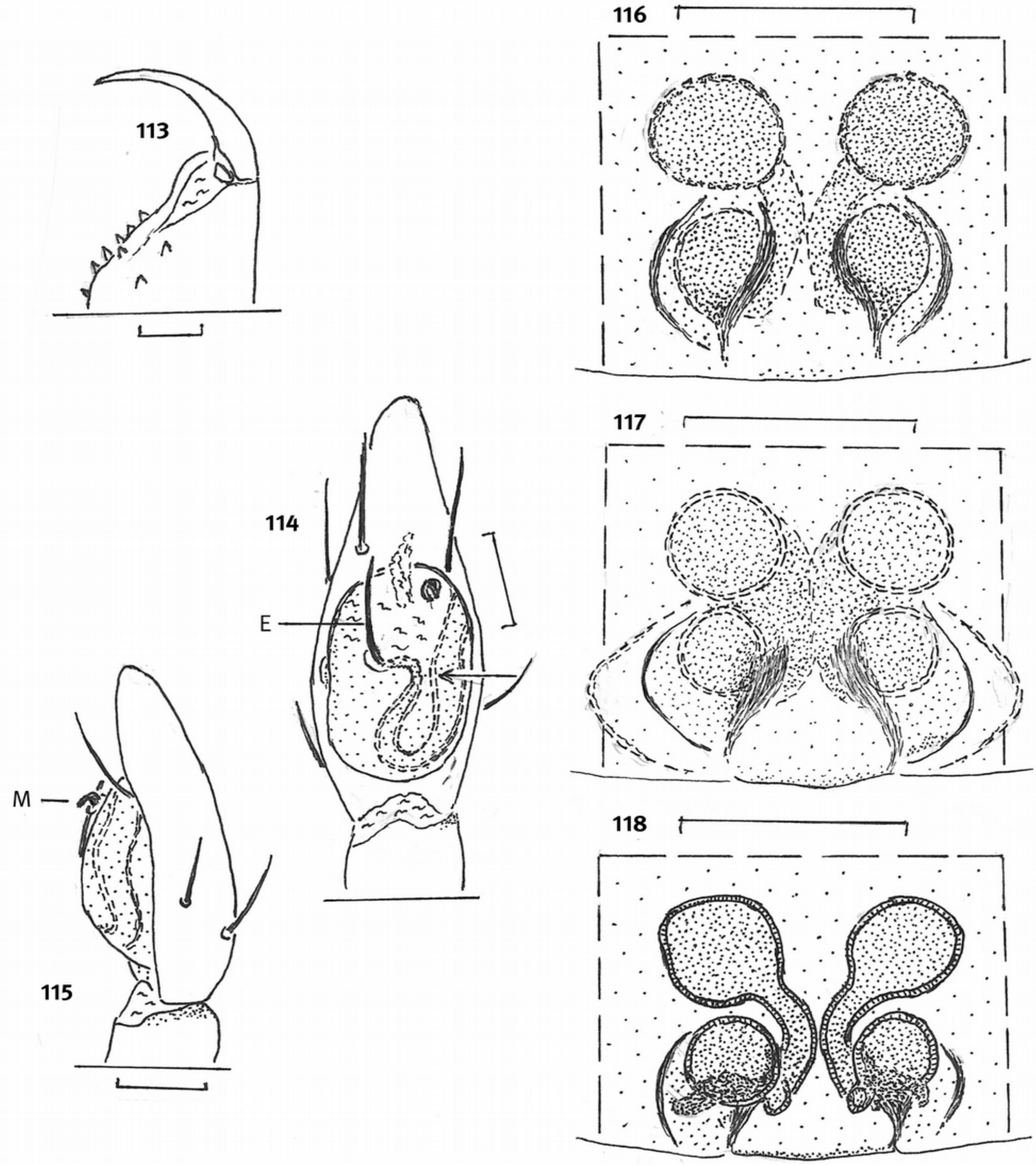
fig. 99) <u>*Zora manicata*</u> SIMON 1878, ♂ (from Austria), bristle of the right coxa IV;

figs. 100-106: <u>*Zora manicatoides*</u> **n. sp.**; 100) ♂, ventral aspect of the right coxa IV. Some bristles are rubbed off; 101) ♂, ventral aspect of the left pedipalpus; hairs are not drawn; 102) ♂, dorsal aspect of the distal part of the left pedipalpal tibia; 103) ♂, retrolateral aspect of the left pedipalpal tibial apophysis and the retrobasal bulging of the paracymbium (x); 104) ♀, retrolateral aspect of the right pedipalpus with its usually hidden claw. Hairs are not drawn; 105) ♀, epigyne with its pit and longitudinal depression which is only weakly marked; 106) ♀, dorsal aspect of the vulva. The arrow points to questionable glands. The vulva was lightened with the help of olive oil. - Scales 0.2 in figs. 99-100), 0.1 in the remaining figs.;

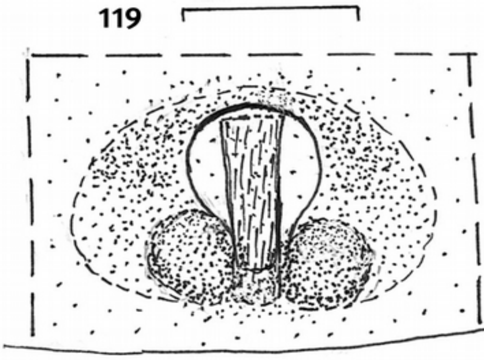


figs. 107-112: *Algarvezelotes unidentatus* **n. gen. n. sp.**, ♂; 107) dorsal aspect of the eyes; 108) retroventral aspect of the distal part of the left chelicera and the basal part of its fang; 109) prolateral aspect of the left pedipalpus; 110) dorsal aspect of the tibia of the left pedipalpus; 111) ventral aspect of the left pedipalpus; only few hairs are drawn; 112) retrolateral aspect of the left pedipalpus. - C = conductor, D = sperm duct, E = embolus, M = median apophysis, Y = cymbium. Scyaes: 0.2 in fig. 107), 0.5 in 109), 0 .1 in the remaining figs.;



figs. 113-118: *Drassodes arenosus* **n. sp.**; 113-115) ♂; holotype; 113) ventral-medial aspect of the distal part of the left chelicera; 114-15) ventral and retrolateral aspect of the left pedipalpus; 116-118) paratypes ♀ from Fuzeta island; 116-117) variability of the epigyne; 118) dorsal aspect of the vulva after clearing in clove oil. - E = embolus, M = median apophysis. Scales: 0.2 mm;

119



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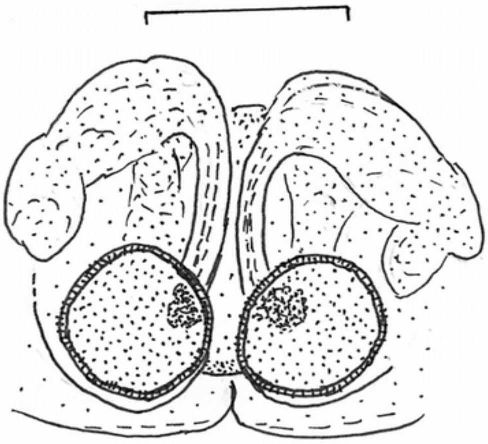

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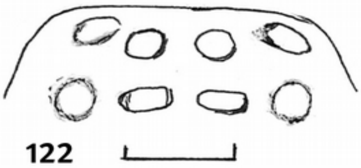

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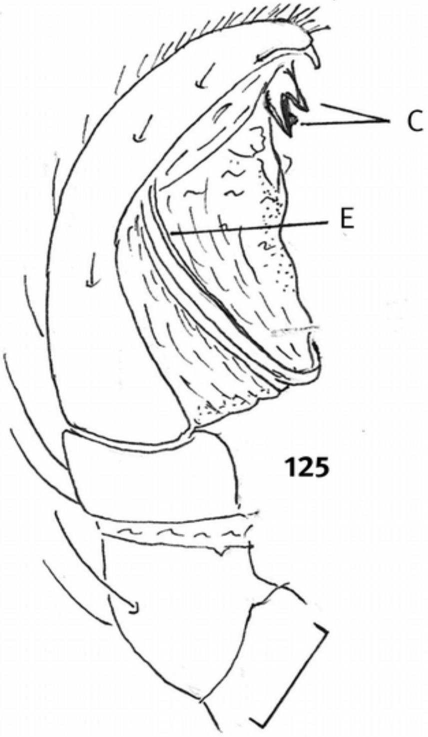

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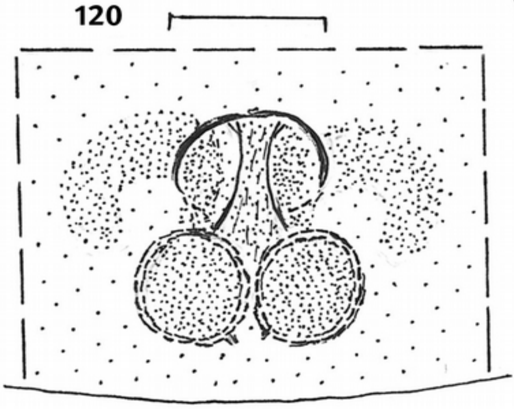
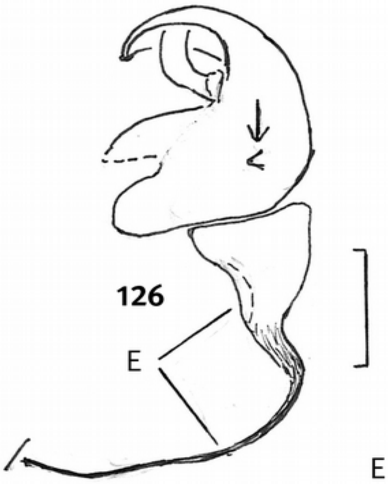


figs. 119-121: *Berlandina collisarenosa* **n. sp.**, ♀; 119-120) holotype and paratype, epigyne; 121) holotype, dorsal aspect of the vulva after lightening with the help of clove oil;

figs. 122-125: *Callilepis bifurcata* **n. sp.**, ♂; 122) dorsal aspect of the eyes; 123) ventral and slightly median aspect of the right chelicera and the lobes of the posterior margin of the fang furrow; 124-125) ventral and prolateral aspect of the left pedipalpus. - C = conductor, E = embolus with its seam. Scales: 0.2 mm in figs. 119-122, 0.1 mm in the remaining figs.;

126



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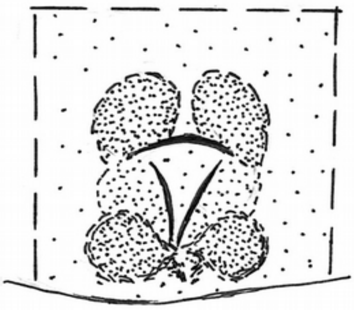

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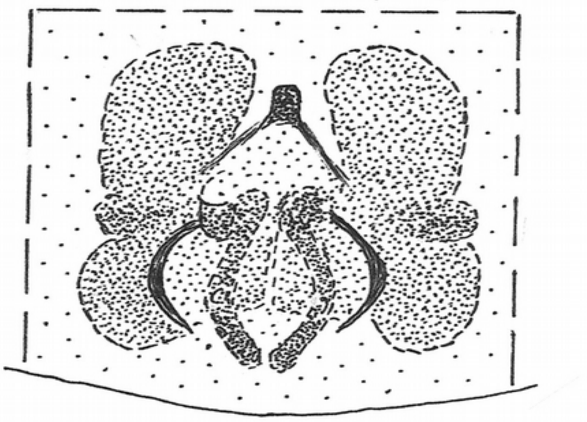

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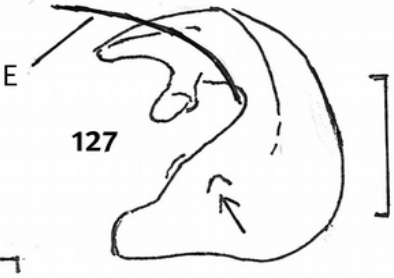

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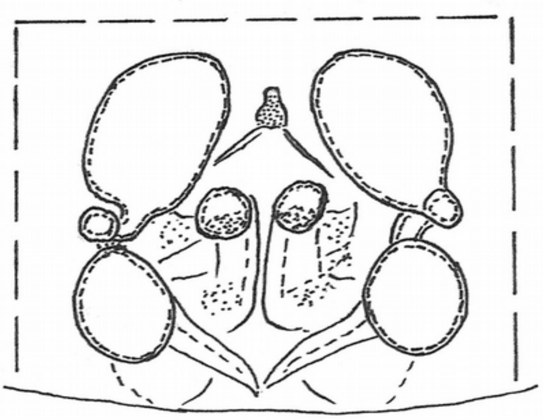

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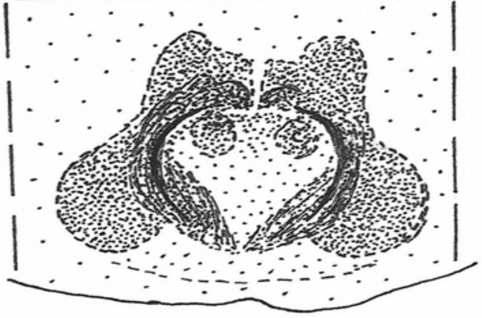

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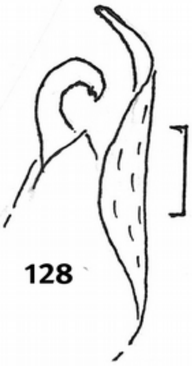


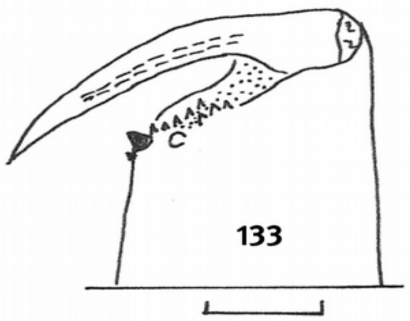
figs. 126-127) <u>Callilepis concolor</u> SIMON 1914, ♂ (S-Portugal, near Sao Bras); 126) ventral and slightly prolateral aspect of embolus and conductor of the left pedipalpus; 127) retrolateral aspect of the left embolus E and conductor. The distal part of the embolus is not drawn;

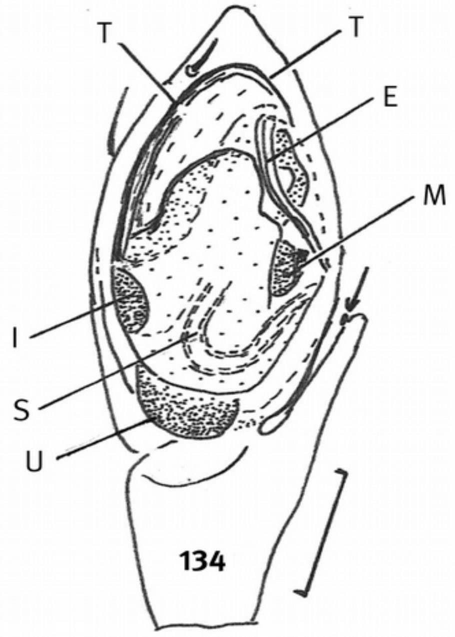
fig. 128) <u>Gnaphosa artaensis</u> WUNDERLICH 2011), ♂, ventral aspect of embolus and median apophysis;

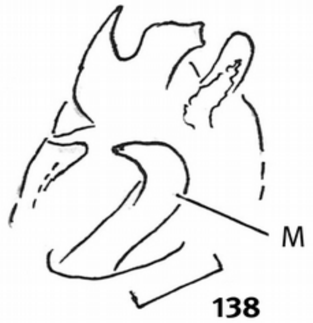
fig. 129) <u>Nomisia celerrima</u> (SIMON 1914) ♀, epigyne;

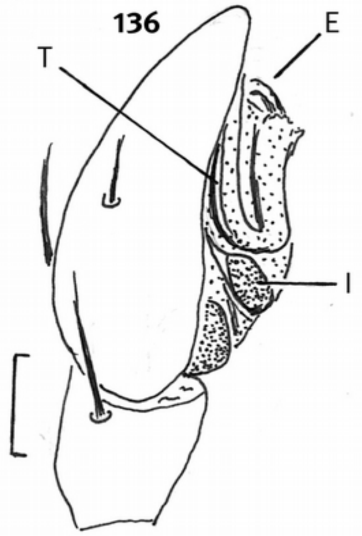
fig. 130) <u>Scotophaeus</u> ?<u>nanoides</u> WUNDERLICH 2011, ♀ (R226/CJW9), epigyne;

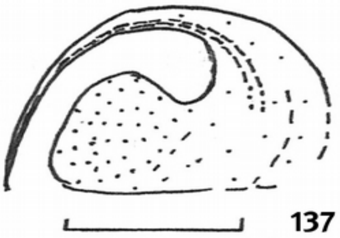
figs. 131-132) ?<u>Scotophaeus pregoensis</u> **n. sp.**, ♀, epigyne and dorsal aspect of the vulva. - Scales 0. 1 mm in fig. 128), 0.2 mm in the remaining figs.;

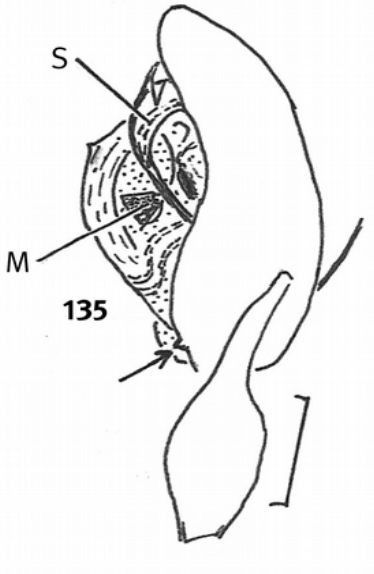






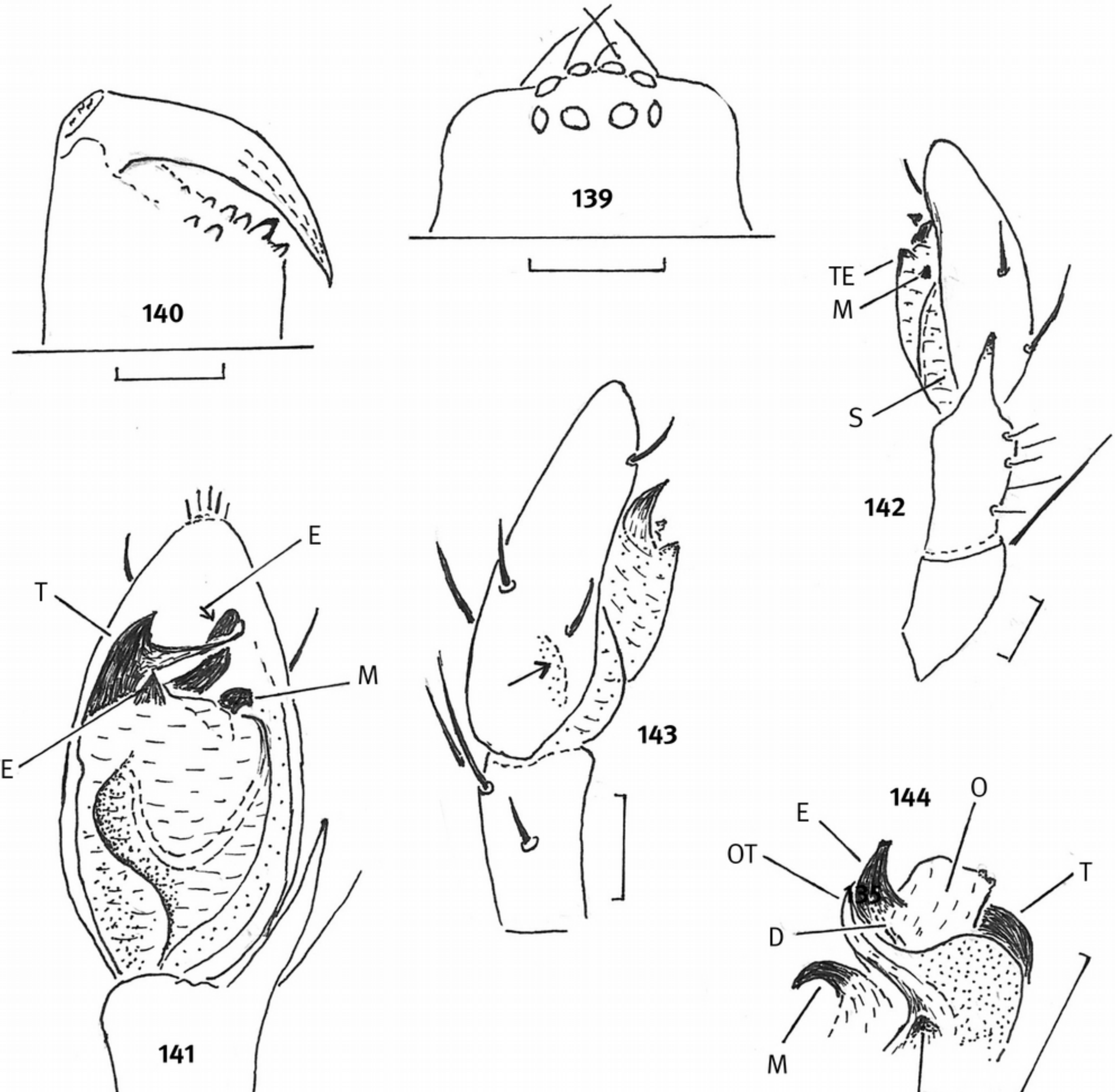






figs. 133-137: *Zelotes baeticoides* **n. sp.**, ♂; 133) ventral aspect of the distal part of the left chelicera;134-136) ventral, retrolateral and prolateral aspect of the left pedipalpus; the arrow in134) points to the tiny apical tooth of the tibial apophysis; 137) retrodorsal aspect of the embolic division of the left pedipalpus. Only the distal part of the sperm duct is observable;

138) *Zelotes barbarella* WUNDERLICH 2022, ♂, retroventral aspect of the median apophysis and the distal sclerites of the left bulbus. - E = embolus, I = intercalary sclerite, M = median apophysis, S = sperm duct, T = long tegular apophysis with its seam, U = subtegulum. Scales: 0.1 mm in figs. 133) and 138), 0.2 mm in the remaining figs.;



figs. 139-144: Zelotes (Urozelotes) clarus **n. sp.**, ♂; 139) dorsal aspect of the anterior part of the prosoma. Black pigment is not shown.; 140) ventral aspect of the distal part of the right chelicera; 141-143) ventral, retrolateral and prolateral aspect of the left pedipalpus; the arrow in fig. 143) points to the hidden margin of the intercalary sclerite; 144) ventral aspect of the sclerites of the expanded right pedipalpus. - D = questionabe sperm duct, E = questionable embolus, M = median apophysis, O = outgrowth of the tegulum; OT = outgrowth of the tegular apophysis (T), S = intercalary sclerite, TE = terminal apophysis. Scales = 0.2 mm;

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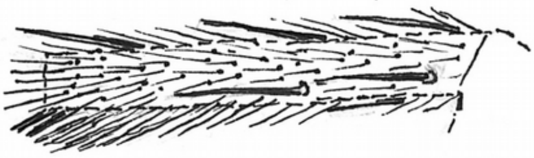

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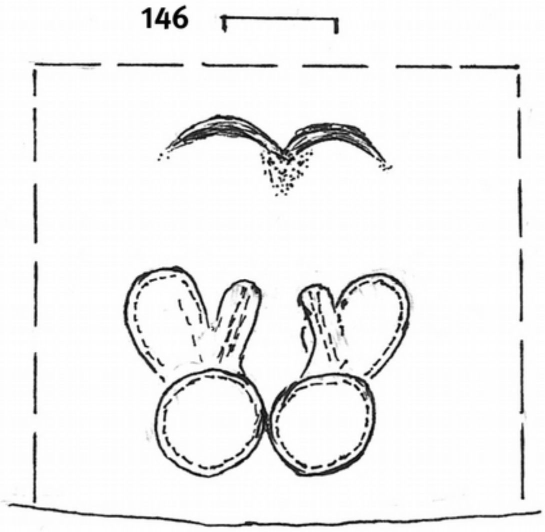

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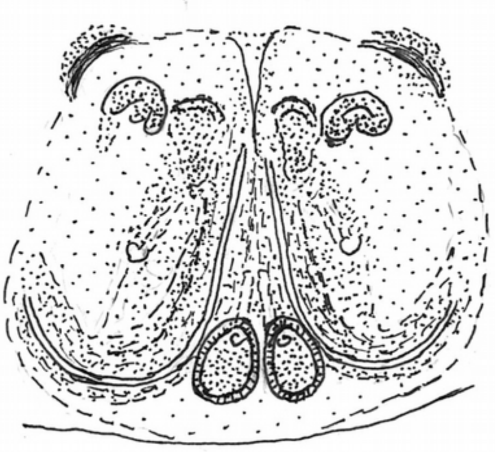

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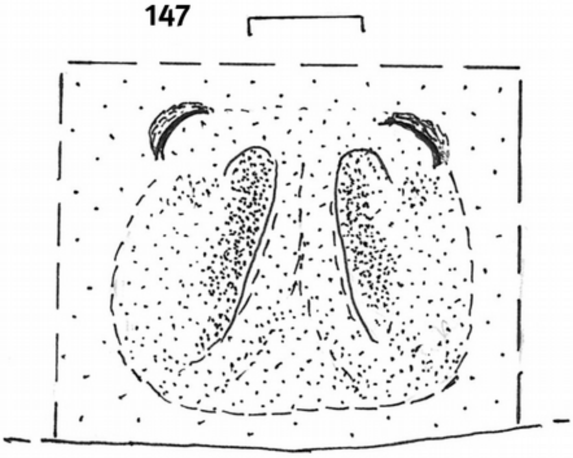
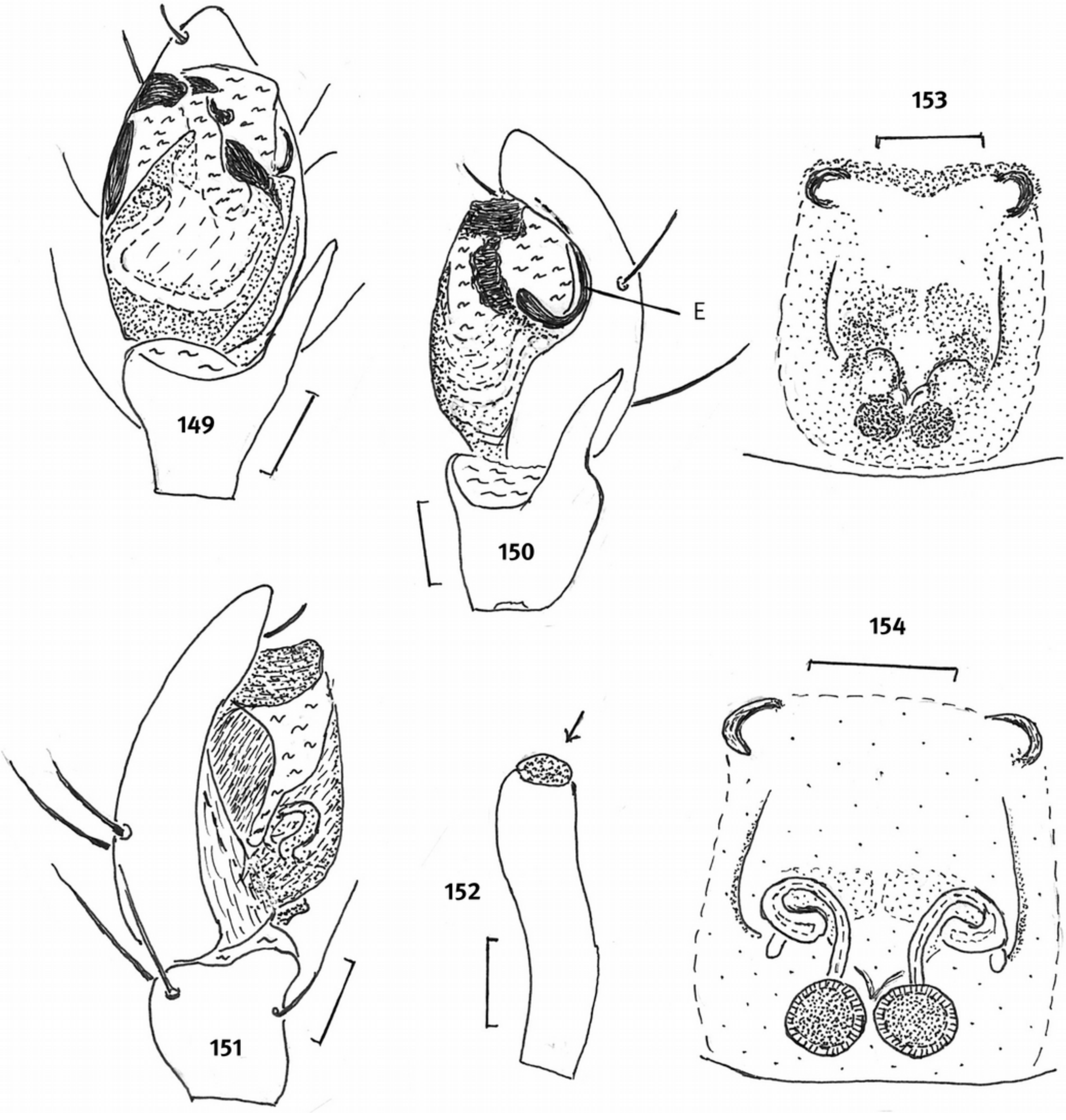
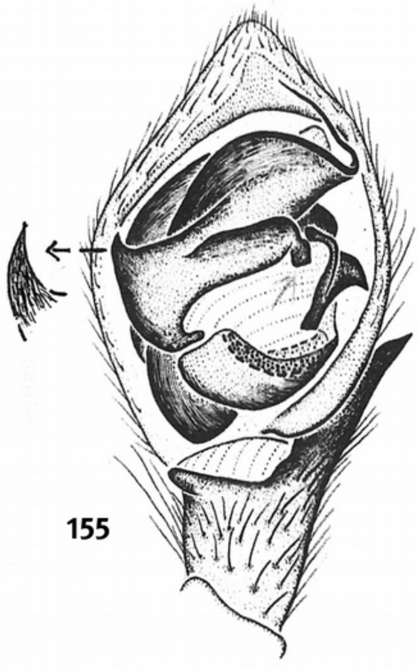


figs. 145-146: Zelotes parvioculi (WUNDERLICH 2022), holotype ♀; 145) retrolateral aspect of the right metatarsus III. Note the long ventral brush of hairs; 146) dorsal aspect of the vulva; the receptaculy seminis are strongly sclerotized;

147-148: *Zelotes sp. indet*., ♀, epigyne and dorsal aspect of the vulva. - Scale = 0.2 mm;



figs. 149-154: *Zelotes fulvopilosus* (SIMON 1878); 149-151) ♂, ventral, retrolateral and prolateral aspect of the left pedipalpus; 152-154) ♀; 152) ventral aspect of the amputated left pedipalpus; 153-154) epigyne and dorsal aspect of the vulva. - E = embolus, scales 0.2 mm;



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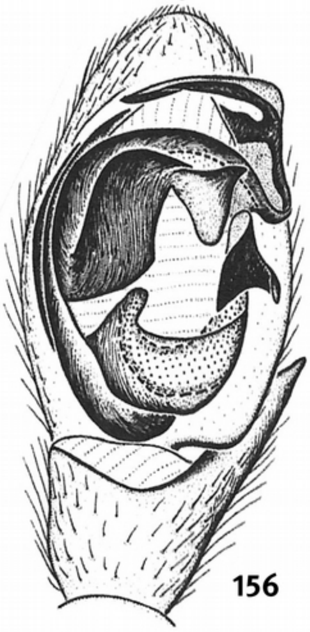

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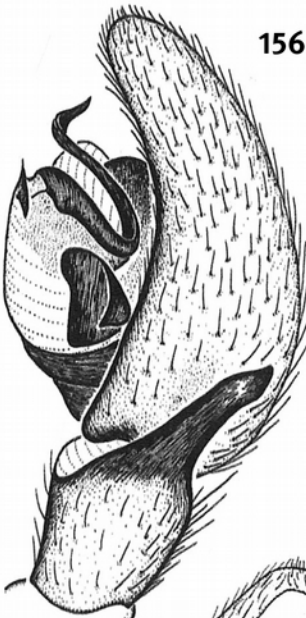

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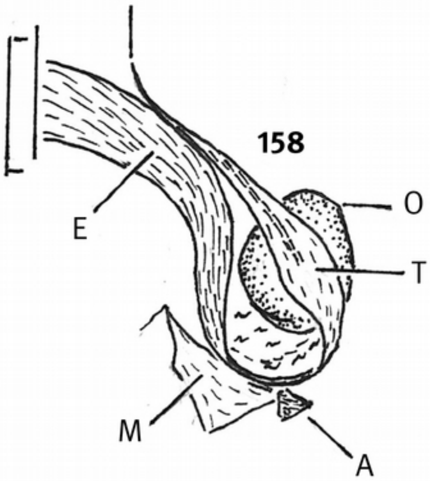

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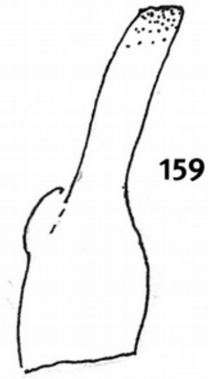

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figs. 155: Zelotes (Marinarozelotes) adriaticus CAPORIACCO 1953, ♂, ventral aspect of the left pedipalpus;

156-156a) Zelotes (Marinarozelotes) barbatus (L. KOCH 1866), ♂, ventral and retrolateral aspect of the left pedipalpus;

157-158) Zelotes (Marinarozelotes) holosericaeus (SIMON 1878), ♂; 157) ventral aspect of the left pedipalpus; 158) retrolateral aspect of the left pedipalpus; median apophysis and embolus apper a bit shortened in this aspect;

159) Zelotes (Marinarozelotes) minutus (CRESPO 2010), ♂, retrolateral aspect of the tibia of the left pedipalpus. - A = apophyis E = embolus, I = tip of the embolus, M = median apophysis, O = egg-shaped outgrowth of the embolus, T = thickened part of the embolus. Scale in fig. 158) 0.2 mm; no scale in the remaining figs.;

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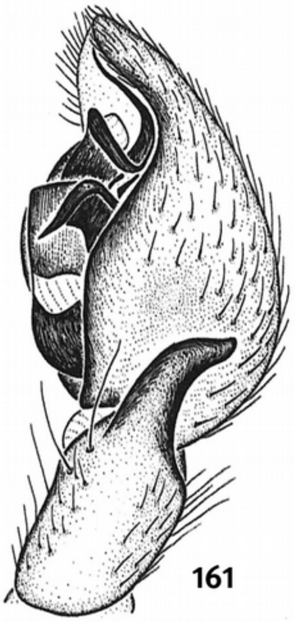

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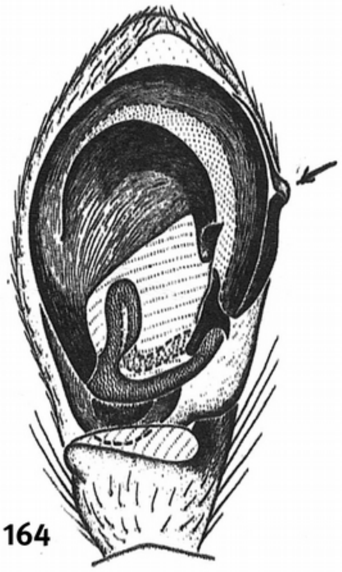

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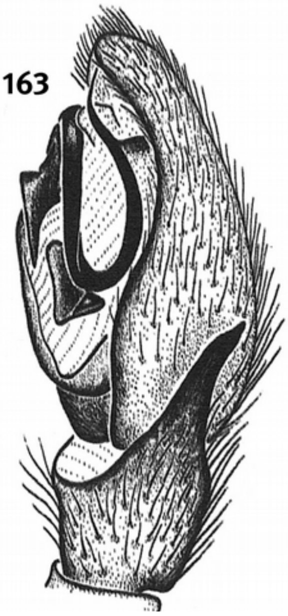
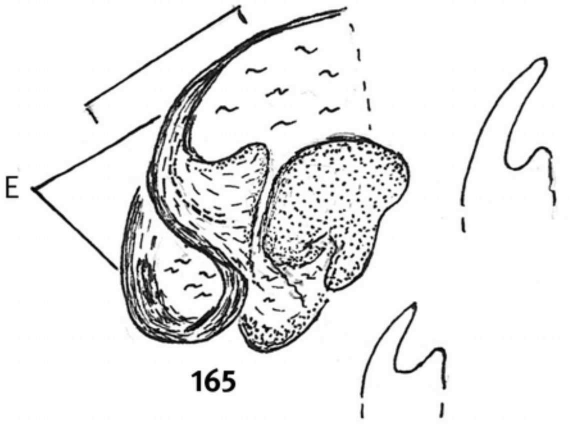


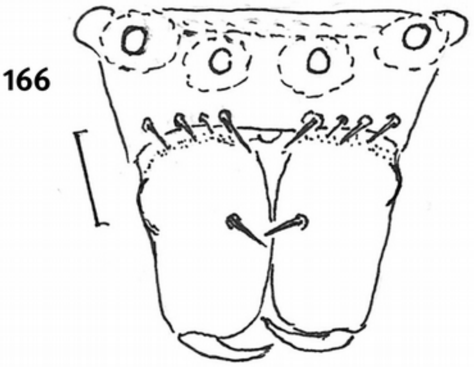


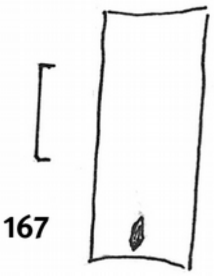
165

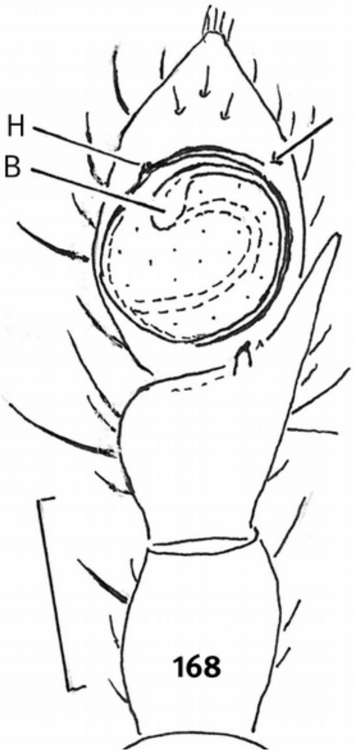
figs. 160-161: _Zelotes_ (_Marinarozelotes_) _lyonneti_ (AUDOUIN 1827), ♂,

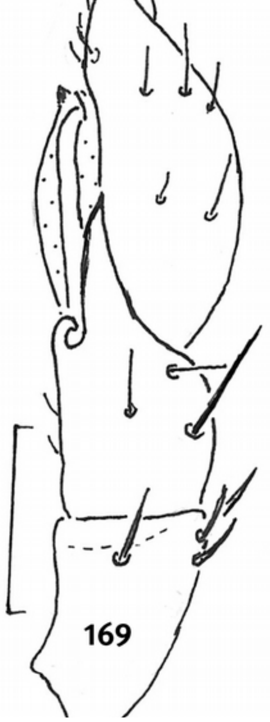
figs. 162-163) _Zelotes_ (_Marinarozelotes_) _costatus_ DENIS 1952, ♂, ventral and retrolateral aspect of the left pedipalpus;

figs. 164-165: _Zelotes_ (_Marinarozelotes_) _fuscipes_ (L. KOCH 1866), ♂; 164) ventral aspect of the left pedipalpus; 165) retrodorsal aspect slightly expanded left pedipalpus: Embolus and dorsal tegular sclerites; scale 0.2 mm. The figs. at the right show the variability of the distal part of the embolus. - Figs. 155-157 and 160-164 are taken from PLATNICK & MURPHY (1986);

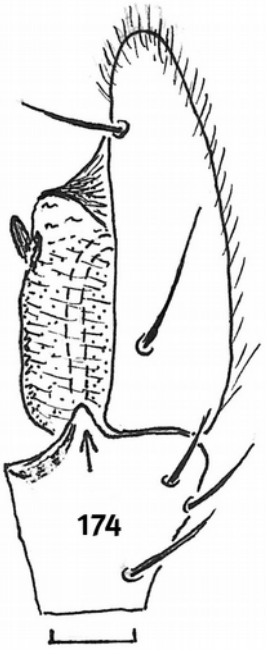


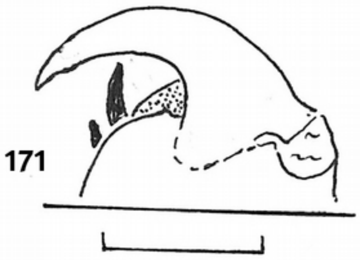


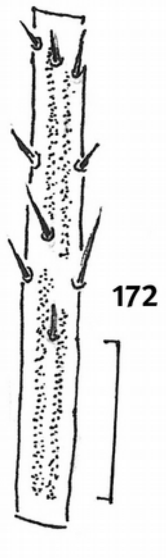


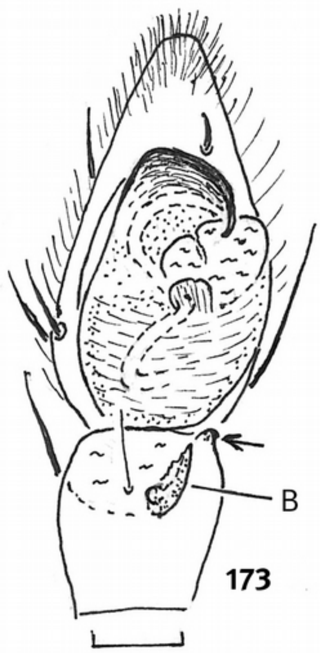


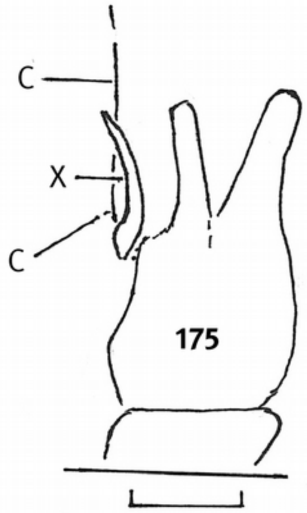
figs. 166-170: ?*Ebrechtella patellamaculata* **n. sp.**, ♂; 166) anterior aspect of the prosoma. Not all bristles are drawn. The eyes of the posterior row are not observable in this position; 167) ventral position of patella I. Note the black basal spot; 168-170) ventral, retrolateral and dorsal aspect of the left pedipalpus. The arrow in fig. 168) points to the tip of the embolus. - B = basal part of the embolus, H = hook. Scales: 0.2 mm;

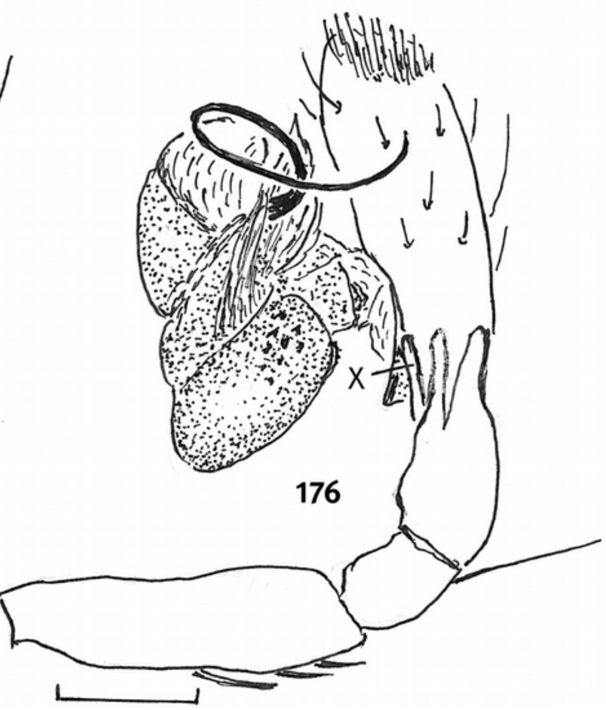






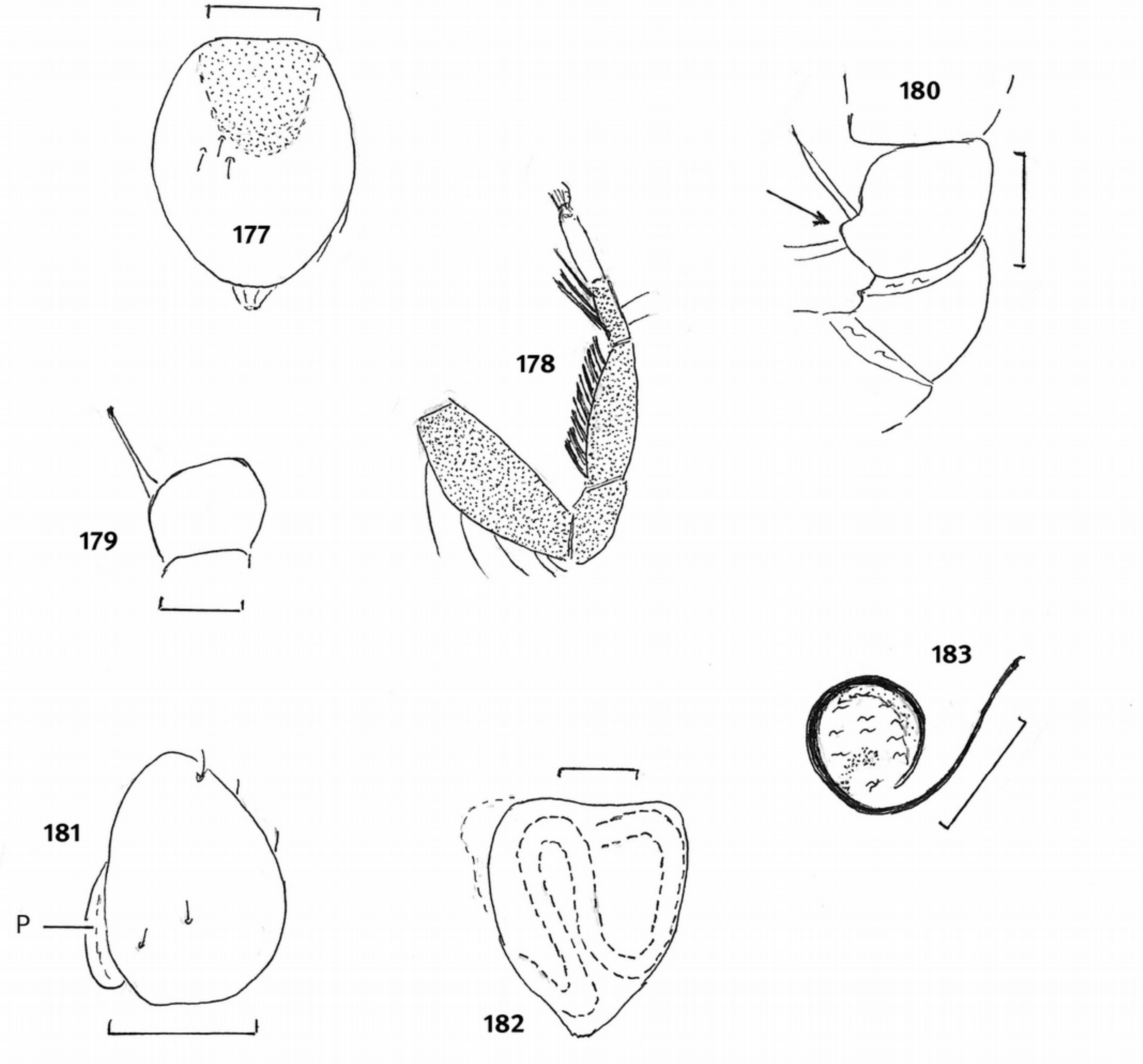




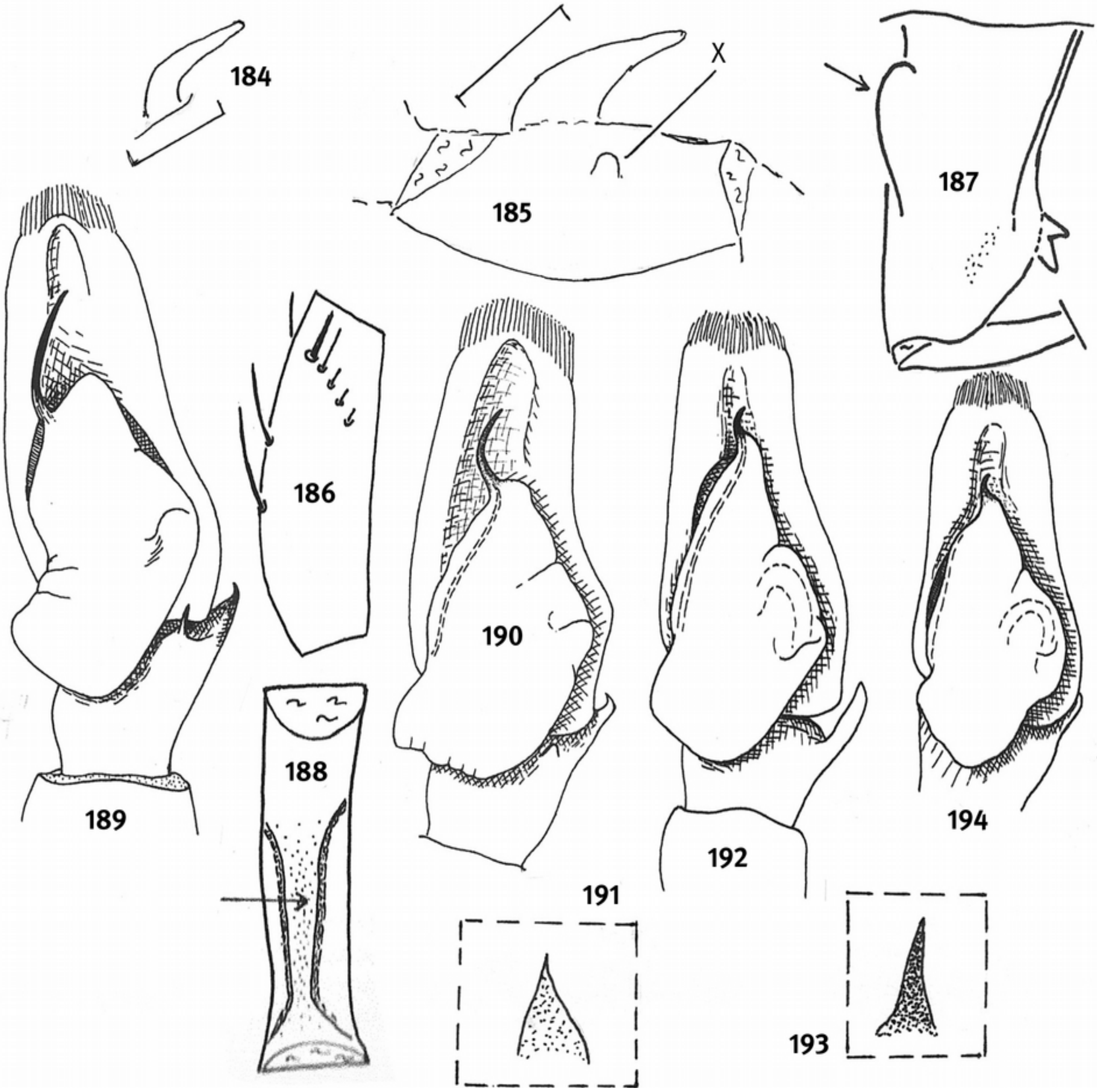


figs. 171-174: <u>*Thanatus virgulatipes*</u> **n. sp.**, ♂; 171) ventral aspect of the distal part of the left chelicera; 172) dorsal aspect of the left femur I. Note the pair of dark longitudinal stripes; 173-174: ventral and retrolateral aspect of the left pedipalpus. The arrow points to the retrolateral tibial apophysis;

figs. 175-176) <u>*Aelurillus quercussuber*</u> **n. sp.**, ♂; 175) retrodorsal aspect of the left pedipalpal tibia; 176) retrolateral aspect of the expanded left pedipalpus. - C = margin of the cymbium, X = retrobasal apophysis of the cymbium. Scales: 1.0 mm in fig. 172), 0.2 mm in the remainings figs.;



figs. 177-183: *Euophrys marusiki* **n. sp.**, ♂; 177) dorsal aspect of the opisthosoma. Note the scutum of its anterior part; 178) prolateral aspect of the right leg I; 179) dorsal aspect of the tibia of the left pedipalpus; 180) prolateral aspect of patella and tibia of the right pedipalpus. Note the distinct outgrowth of the tibia (arrow); 181) dorsal and slightly retrobasal aspect of cymbium and paracymbium (P) of the left pedipalpus; 182) ventral aspect of the tegulum with the sperm duct of the left pedipalpus; 183) embolus of the left pedipalpus. - No scale in fig. 178), 0.5 mm in fig. 177), 0.1 mm in the remaining figs.;



figs. 184-185: Heliophanus agricola WESOLOWSKA 1986, ♂; 184) ventral aspect of the embolus of the left pedipalpus; 185) prolateral aspect of the left pedipalpus. Note the small and blunt proventral apophysis (X). - Scales: 0. 05 and 0.2 mm;

figs. 186-194: Icius sp., ♂;
186-188) I. subinermis SIMON 1937; 186) prolateral aspect of the left femur I. Note: size, number and position of the bristles are variable; 187) anterior aspect of the right chelicera. The arrow points to the large retrolateral lamella (crest); 188) ventral aspect of the r. pedipalpal femur. The arrow points to the furrow;

fig. 189) I. hamatus (C. L. Koch 1846) ventral aspect of the left pedipalpus;

fig. 190) I. crassipes (SIMON 1868) ventral aspect of the left pedipalpus;

figs. 191-192) I. congener (SIMON 1871); 191) retrolateral aspect of the tibia apophysis of the left pedipalpus; 192) ventral aspect of the left pedipalpus;

figs. 193-194) I. subinermis SIMON 1937; 193) ventral aspect of the tibia apophysis; 194) ventral aspect of the left pedipalpus. - No scales in figs. 186-194).

Figs. 189-190), 192) and 194) are taken from ALICATA & CANTARELLA (1993).

BEITR. ARANEOL., 16: 113-161 (2023)

CONTRIBUTION TO THE FOSSIL SPIDER (ARANEIDA) FAUNA IN EOCENE BALTIC AND ROVNO AMBER

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Abstract: The following **new taxa** are described: Agelenidae: *Unguistegenaria sinemammillae* **n. gen. n. sp**.; Anapidae: *Balticonopsis duplo* **n. sp**., Cybaeidae: *Eocryphoeca amputata* **n. sp**., *Eocryphoeca laesa* **n. sp**., *Succinaria lingua* ***n. gen. n. sp*.**, *Succinaria adcoccinoidea* **n. gen. n. sp**., *Scutcybaeus brevitricha* **n. gen. n. sp**.; Insecutoridae: *Insecutor angustidentes* **n. sp**., *Insecutor cymbiumseta* **n. sp**.; Linyphiidae: *Palaeophantes paracymbium* **n. gen. n. sp**.; Liocranidae: *Spinatibia curvitibia* **n. gen. n. sp**.; Pisauridae: *Esuritor duospinae* **n. sp**., *Esuritor nonincisio* **n. sp**., *Esuritor rovnoensis* **n. sp**.; Scytodidae: *Scytodes daniloharms* **n. sp.**; Uloboridae: *Opellianus fissura* **n. sp.** - **Synonymy and n. comb.**: The monotypic genus *Balticocryphoeca* WUNDERLICH 2004 - type species *B. curvitarsis* WUNDERLICH 2004, described in the Dictynidae s. l.: Cryphoecinae - is regarded as a junior synonym of the genus *Esuritor* PETRUNKEVITCH 1942, and is transferred to the family Pisauridae (**n. comb. & n. relat**.). The dubious *Textrix lineata* KOCH & BERENDT 1854 in Baltic amber is transferred to the genus *Esuritor* PETRUNKEVITCH 1942 of the Pisauridae (**n. comb**.).

Key words: Agelenidae, Anapidae, Araneae, Araneida, Baltic amber, Cybaeidae, Dictynidae, gigantism, Hahniidae, Insecutoridae, Linyphiidae, Liocranidae, Pisauridae, Scytodidae, spiders, Uloboridae.

Acknowledgements: For taking the nice photos I thank very much my friend ALEX BEIGEL, for providing me fossil amber spiders I thank very much the dear JONAS DAMZEN.

The **material** is kept in the collection of JÖRG WUNDERLICH (CJW) and will later be given to an institution/museum like the SMF or the University of Hamburg.

In the present paper 15 fossil spider species of 8 families in Eocene Baltic amber are described for the first time.

DESCRIPTIONS

Family SCYTODIDAE

The ancient members of the unusual family Scytodidae possess unusual and unique somatic and behavioural characters. The spiders may first be recognized by their prosoma which is fairly (fig. 3) or even – most often – strongly domed (fig. 4). The domed prosoma contains large poison glands which are modified to spinning organs – unique in spiders. With the help of threads the prey is fixed by these "Spitting Spiders" on a base like a wall. The ecribellate spiders possess 6 eyes in diads (fig. 5), lateral cheliceral stridulatory files may exist, the slender legs are usually bristle-less, their position is prograde, an unpaired tarsal claw exists or is absent (e. g., in *Dictis*), their body length is 4-11 mm. Most spiders are nocturnal slow moving or sit-and wait hunters, mainly tropical; some probably build capture webs.
In my opinion the diverse genus *Scytodes* LATRAILLE 1804 is not a monophyletic taxon.

Eocene or even Cretaceous taxa of this family - see the paper on spiders in Kachin Burmese amber in this volume - are extremely rare. In Eocene Baltic amber a single species has been described and named: *Scytodes weitschati* WUNDERLICH 1993 (based on a single male). A related new species of *Scytodes* LATREILLE 1804 s. l. (both sexes) and a not determined inad. specimen are described in this volume, both also from the Baltic amber forest.

Scytodes daniloharms n. sp. (figs. 1-2), photos 10-11

Derivatio nominis: It is a pleasure for me to name the new species after Danilo Harms, head of the Arachnology of the Arachnolog. department and curator of Arachnida of the Museum of Nature Hamburg.

Material: Holotype ♂ (F3728/BB/CJW) and paratype ?subad. ♀ (F3729/BB/CJW).

Preservation and syninclusions: The male holotype is well preserved in a yellow-orange and 4 cm long piece of amber, the left leg I is cut off at the base of the metatarsus, both legs II are lost beyond the coxa by autotomy, the body is partly covered with a white emulsion. - Syninclusions are numerous tiny bubbles, few stellate plant hairs and five Diptera; one of these insects is preserved just in front of the spider's prosoma in a different layer. - The paratype is well and almost completely preserved in a 2.7 cm long yellow-orange piece of amber; only parts of both anterior tarsi, parts of the right side of prosoma and the ventral side of the opisthosoma are covered with a white emulsion. - Syninclusions are numerous tiny bubbles as well as 1 ½ Diptera, few remains of insects but no plant hairs.

Diagnostic characters (♂, ?subad. ♀): Prosoma (figs. 1, 3, photo) fairly domed and only scarcely covered with hairs, legs (photos) quite long and slender, unpaired tarsal claw existing, tarsal claw of the ♀-pedipalpus most probably absent; ♂-pedipalpus (fig. 2): Cymbium and embolus long (its tip hidden).

Description:

(1) Holotype (♂):

Measurements (in mm): Body length 4.0; prosoma: Length 2.0, dorsal hairs up to 0.15; opisthosoma: Length 2.0, height 1.2; leg I: Femur 5.5, patella 0.6, tibia ca. 6.7, metatarsus 7.1, tarsus 1.0, tibia III 2.1, leg IV: Femur 3.1, patella 0.55, tibia 3.2, metatarsus 3.2, tarsus 0.75.
Colour light brown, legs not annulated.
Prosoma (fig. 1, photo) fairly domed, dorsal hairs apparently partly rubbed off, not numerous, 6 eyes in diads, clypeus short (most eyes, chelicerae, mouth parts and sternum hidden). - Legs (photo) quite long and slender, order I/II/IV/III, bristle-less, hairs short, position of the metatarsal trichobothrium in ca. 0.95, tarsal claws more or less hidden, unpaired claws existing. - Opisthosoma (photo) 1.6 times longer than high. - Pedipalpus (fig. 2): Articles fairly thickened, cymbium and embolus long, tip of the embolus hidden.

(2) Probably subad. ♀:

Measurements (in mm): Body length 2.5; prosoma: Length 1.2, height 0.65; opisthosoma: length 1.3, width 0.85; leg I: Femur 2.4, patella 0.12, tibia 2.3, metatarsus ca. 2.3, tibia II 2.3, tibia III 1.0, tibia IV 1.35.
Colour light brown, legs not annulated.
Prosoma (fig. 3, photo): As far as observable body and legs quite similar to the holotype, tarsal claw of the pedipalpus most probably absent, position of the metatarsal trichobothrium

in ca. 0.95, paired tarsal claws toothed, not closely studied, unpaired claw small and bent in a right angle. Opisthosoma (photo) 1.52 times longer than wide.

Note: The female is notably smaller than the male – prosomal length 1.2 and 2.0 mm -, but such intraspecific differences of the body size are not rare in adult spiders, and the shape of body and legs is quite similar. The fundamental problem in fossil amber spiders is that we very rarely find both sexes of a species enclosed in the same piece of amber.

Relationships: According to its characters (see above) I regard *daniloharms* as a member of the diverse - and probably not monophyletic – genus *Scytodes* LATREILLE 1804 s. l. which is widely distributed today, and probably existing already in the Cretaceous. In the only other named species in Baltic amber, *S. weitschati* WUNDERLICH 1993 (figs. 4-5), the prosoma is strongly domed in the thoracal region, its dorsal hairs are shorter and more numerous, the embolus is shorter, and elongated to a needle. See also below, *Scytodes* indet.

Distribution: Eocene Baltic amber forest.

Scytodes sp. indet. (photo 12)

Material: 1 ?ad. ♀ in Eocene Baltic amber, F2239/BB/CJW.

Preservation and syninclusions: The spider is well and almost completely preserved in a yellowish piece of amber, placed on a layer in the amber; only the left leg I is cut off near the end of the tibia, the opisthosoma is covered with a white emulsion. - Syninclusions are few stellate plant hairs.

Diagnostic characters (probably adult ♀): Prosoma (photo) strongly domed in the thoracal part, dorsal prosomal hairs long and thin, fairly numerous, legs (photo) only fairly long, femur I 1.35 mm long.

Description:
Measurements (in mm): Body length 3.0; prosoma length 1.25, width ca. 1.25, dorsal hairs up to 0.15; opisthosomal length 1.8, femur I 1.35.
Colour of prosoma and legs light brown, legs not annulated.
Prosoma (photo) about as long as wide, strongly domed, dorsal hairs rather long and not numerous, 6 eyes in diads. Legs (photo) only fairly long, position of the metatarsal trichobothrium in ca 0.92, tarsal claws hidden. Opisthosoma (photo) oval.

Relationships: The prosoma is strongly domed like as in *S. weitschati* WUNDERLICH 1993 (figs. 4-7) in which the dorsal prosomal hairs are dense and shorter; the prosomal hairs are longer than in *S. daniloharms* n. sp. in which the prosoma is only fairly raised. In both species the legs are longer than in *S.* sp. indet. According to the combination of characters the present specimen may well be the member of an undescribed species.

Distribution: Eocene Baltic amber forest.

Family ULOBORIDAE

***Opellianus fissura* n. sp.** (fig. 8), photo 13

Etymology: The name of the species refers to the fissures on a layer within the piece of amber just right of the spider, from (lat.) fissura.

Material: Holotype ♂ in Eocene Baltic amber, F3766/BB/CJW.

Preservation and syninclusions: The spider is completely and only fairly well preserved in a flat yellowish piece of amber; the opisthosoma is completely covered with a white emulsion. - Syninclusions are few small stellate plant hairs. Fissures: See above.

Diagnosis (♂; ♀ unknown): Tibia I without dorsal depression. The structures of the pedipalpus (fig. 8) are difficult to recognize and partly hidden see below.

Description (♂):
Measurements (in mm): Body length 3.3; prosomal length 1.3; opisthosoma: Length 2.0, height 1.35; leg I: Femur 2.9, patella 0.65, tibia ca. 2.5, metatarsus 2.4, tarsus 0.7; tibia III 0.7, tibia IV ca. 1.1.
Colour of prosoma and legs medium brown, legs not annulated.
Prosoma (photo) partly hidden, not raised, fovea well developed, feathery hairs existing, 8 eyes in two rows. - Legs (photo): Order I/IV/II/III, I distinctly the longest, III distinctly the shortest, femoral trichobothria existing, calamistrum apparently absent, bristles: Femora dorsally 1-2, femur I at least 2 lateral pairs additionally, patellae dorsally 1/1, tibia I ca. 1 dozen, metatarsus I at least 8, tarsi III-IV with few ventral bristles. - Opisthosoma hidden by a white emulsion. A dorsal convexity in the middle may be a part of the emulsion but I do not want to exclude that it is a hump. - Pedipalpus: See above; tip of the cymbium with few longer hairs. The questionable embolus is blunt and possesses a basal outgrowth.

Relationships: A member of the genus *Opellianus* WUNDERLICH 2004. *O. kasimirasi* WUNDERLICH 2004 may be related, its copulatory structures are different. In the frequent and related *O. excellens* WUNDERLICH 2004 exists a dorsal-basal depression of tibia I.

Distribution: Eocene Baltic amber forest.

Family ANAPIDAE

In the partly subtropical Eocene Baltic amber forest - probably even in its main part - the family Anapidae was diverse, 8 genera were known, see WUNDERLICH (2004) (under Anapinae). The genus *Balticonopsis* WUNDERLICH 2004 is only known from Eocene Baltic amber where it was rather diverse. Today in Europe exist only two genera (one is introduced), and only four species. The opisthosoma of the Anapidae is usually strongly armoured, the prosoma is more or less doted, patella and/or tibia bear usually apophyses.
Note: *Balticoroma* is not an anapid spider but the member of the family Comaromidae.

***Balticonopsis duplo* n. sp.** (figs. 9-17), photo 14

Etymology: The name of the species refers to the existence of two conspecific type males in the same piece of amber, from duplo (lat.) = double.

Material: 2♂ in the same piece of Eocene Baltic amber: The holotype is partly cut off on the left side, the paratype is strongly covered with a white emulsion; F3767/BB/CJW.

Preservation and syninclusions: The spiders are preserved in a distance of 8 mm from each other in different layers of the clear yellow-orange piece of amber; the left ventral side of the body and some leg articles of the holotype are cut off, except the scutum the opisthosoma is covered with a white emulsion; the paratype is completely preserved, most parts of the body (not the opisthosomal scutum) and some leg articles are covered with a white emulsion. - Syninclusions are a larger member of the Diptera: Brachycera and few stellate plant hairs.

Diagnostic characters (♂; ♀ unknown): Caput (figs. 9-10) strongly elevated, position of the large ventral spine of tibia I in the basal half near the middle, additional ventral spines are 2 in the basal and 2 in the distal half besides a prolateral one, metatarsus I (figs. 13-14) strongly bent, bearing a pair of longer ventral-apical spines (one may be hard to observe) and 1/1 shorter ventral spines in the distal half; pedipalpus (figs. 15-17) with a long embolus which forms probably three loops and is widely elongated beyond the tip of the cymbium (if the embolus lies in its natural position).

Description (♂):
Measurements (in mm): Body length 1.5; prosomal length and height ca. 0.6; opisthosoma: Length 1.05, width 0.8, height 1.0. Legs: Holotype: Femur ca. 0.85, patella 0.37, tibia 0.85, tibia II 0.7, tibia III 0.5, tibia IV 0.6; tarsus and metatarsus I of the paratype each ca. 0.55; eye field 0.25 wide.
Colour mainly dark brown, opisthosoma except the dark brown dorsal scutum dark grey.

Prosoma (figs. 9-10) partly hidden, about as long as high, fairly dotted, caput strongly elevated and protruding, 6 larger eyes but the anterior median eyes small and close together, clypeus very long, basal cheliceral articles well developed. - Legs (figs. 11-14, photo) only fairly long, order I/II/IV/III, hairs short, tibia I distinctly thickened, metatarsus I strongly bent, bristles not long, usually 1/1 on tibiae and patellae, spines of tibia and metatarsus I see above. - Opisthosoma 1.3 times longer than wide, dorsal scutum very large, fairly dotted, bearing short hairs, spinnerets short, anal tubercle bearing dorsal scuta. - Pedipalpus (figs. 15-17; see also above) with slender articles, a very long femur, short patella and tibia and a cymbium which is slender elongated; I do not want to exclude, that a questionable retroventral-apical apophysis which is observable on the left patella of the paratype may be an artefact.

Relationships: In *B. duplo* the distal free part of the embolus is longer than in other known congeneric species. According to the longest ventral spine of the male tibia I *B. duplex* is closest to *B. dunlopi* WUNDERLICH 2017 in which tibia I is stouter and the embolus is shorter, describing less loops. In *B. ceranowiczae* WUNDERLICH 2004 the position of the longest ventral spine of the male tibia I is more basally and the number of other tibial I spines is different. In *B. holti* WUNDERLICH 2004 the position of the long ventral tibia I spine is in the middle of the length of the article.

Distribution: Eocene Baltic amber forest.

Family LINYPHIIDAE

This family is characterized by the following UNIQUE COMBINATION of characters: (1) a patella-tibia leg autotomy (photo 14), (2) the existence of retrolateral cheliceral stridulatory files (with *very* few exceptions) and (3) a special kind of paracymbium which is a “free” sclerite (*). Each of the characters in question (rarely two) exist in certain families of other spiders but never all the three characters together.
Furthermore – as in various other taxa, e. g., members of the superfamily Araneoidea – cribellum/calamistrum and tarsal trichobothria are absent, a single metatarsal trichobothrium and a special tiny “triplett” of the spinnerets exist.

(*) That means it is scinny, more or less movable connected with the cymbium, and stands usually not widely out from the close cymbium (figs. 19-20) (*very* few exceptions), in contrast, e. g., to members of the family Nesticidae.

In the Eocene European fossil resins - like the Baltic, Bitterfeld and Rovno (Ukrainean) ambers – the sister group of the family Linyphiidae, the Pimoidae, as well as the ancient linyphiid subfamilies Linyphiinae and Micronetinae have been reported in contrast to the derived and relatively young subfamily Erigoninae. Pimoidae and Linyphiidae are not (yet?) known from Cretaceous or older deposits.

In Baltic amber the members of 8 linyphiid genera have been described, see WUNDERLICH (2004: 1298-1376). In this paper I describe a further – monotypic - genus.

Palaeophantes **n. gen.**

Etymology: The name of the genus refers to palaeo- (gr.) = old, and a part of the name of the confamiliar genus *Lepthyphantes.*

The gender of the name is masculine.

Type species (by monotypy): *Palaeophantes paracymbium* n. sp.

Diagnostic characters (♂; ♀ unknown): Metatarsus I-II with a single dorsal bristle which is placed in the basal half; pedipalpus (figs. 18-20): Cymbium without outgrowth, paracymbium with a large ventral outgrowth (larger than in related taxa), tegulum bearing few longer hairs, a fringed lamella and a bent apophysis on a "tegular disc", suprategular apophysis of medium size and slightly bent, embolic division complicated, questionable embolus stout.

Relationships: The chaetotaxy and the existence of a fringed tegular lamella are as in *Custodela* PETRUNKEVITCH 1942 and *Custodelela* WUNDERLICH 2004 but in *Custodelela* and some species of *Custodela* a dorsal-basal cymbial outgrowth exists and a bent tegular apoppysis is absent, hairs of the tegulum are apparently absent; in *Custodelela* the suprategular apophysis is stout, in the most related *Custodela* this apophysis is very long.

Distribution: Eocene Baltic amber forest.

Palaeophantes paracymbium **n. gen. n. sp**. (figs. 18-20), photos 15-16

Etymology: The name of the species refers to the special shape of its paracymbium which bears a quite large outgrowth.

Material: Holotype ♂ in Eocene Baltic amber, F3765/BB/CJW.

Preservaton and syninclusions: The spider is very well and almost completely preserved in a mainly clear yellow-orange piece of amber, only the apical part of the right tibia I is dorsally cut off, the left legs I and II are broken off beyond the patella by autotomy, the distal articles of one of these legs are preserved left below the spiders' prosoma, weak emulsions exist ventrally, a bubble covers ventrally the anterior part of the opisthosoma. The spider is preserved on a layer within the piece of amber. - Syninclusions are some spiders' threads behind the spinnerets, 1 Acari which is covered with a white emulsion, and few stellate plant hairs.

Diagnostic characters and **relationships**: See the genus.

Description (♂):
Measurements (in mm): Body length 2.0; prosoma: Length 1.0, width 0.75; opisthosoma: Length 1.2, width 0.75; leg I: Femur 1.5, patella 0.28, tibia 1.55, tibia II 1.35, leg IV: Femur ca. 1.45, patella 0.25, tibia 1.1, metatarsus ca. 1.25, tarsus 0.5.
Colour: Prosoma and legs light brown, legs not annulated, opisthosoma light grey.
Prosoma (photo) 1.35 times longer than wide, caput slightly raised, 8 eyes of medium size, posterior row procurved, posterior median eyes spaced by less of their diameter, clypeus quite long, not protruding, basal cheliceral articles large, bearing a small promedial tooth in the distal half, retrolateral stridulatory files well developed, fangs hidden, gnathocoxae converging, sternum spacing the coxae IV by less than a diameter. - Legs long and slender, order I/II/IV/III, hairs short, bristles long, femora I-II 1 dorsally, patellae dorsally 1/1, tibiae I-II dorsally 1/1 and 1 retrolaterally in the distal half, III-IV with apical bristles, all metatarsi with a dorsal bristle in the basal half, position of the metatarsal trichobothrium in 0.2, tarsal claws not studied, autotomy well developed. - Opisthosoma (photo) 1.6 times longer than wide, covered with short hairs. - Pedipalpus (see also above, figs. 18-20): Patella and tibia short, both bearing a long dorsal bristle, tibia ventrally bulging.

Distribution: Eocene Baltic amber forest.

Family PISAURIDAE

See WUNDERLICH (2004: 1532-1546) and fig. A.

Pisauridae is another quite diverse and heterogenous family; distinct trochanteral notches are usually existing (absent in *Esuritor*), the opisthosoma is usually long and and frequently widest in the anterior half, the eyes of the posterior row possess a recurved position and are usually quite large (fig. 28, photo), the tarsi are frequently bent/flexible and quite short (fig. 23), the tarsal trichobothria exist in more than a single row or are scattered and the bristles of tibia and metatarsus I-II (figs. 29,33) are close to the articles at least in the Eocene taxa in Baltic amber and in their usual position. Furthermore at least the extant members of the Pisauridae possess a special brood-care behaviour.
Based on the large eyes of the posterior row, the leg bristles and the bent tarsi of – the new species described below belong to *Esuritor*.

In the related Lycosidae and Trechaleidae the brood-care behaviour is different, the eyes of the posterior row are usually wider spaced and the structures of the male pedipalpus are different.

In some respect the families Agelenidae and – especially - the Insecutoridae (extinct family, see above and below) are similar to the Pisauridae but the tarsi are straight and the posterior median eyes are usually smaller in the Agelenidae (not in *Textrix*) and Insecutoridae, their ventral tibial and metatarsal I-II bristles are usually standing +/- widely out from their articles, see fig. 40, 68 (their position is close to the article in the Pisauridae, fig. 33), the unpaired tarsal claw is usually tooth-less (in the Pisauridae it bears usually 1-2 teeth). In most Agelenidae the tarsi bear trichobothria in a single row increasing in length, the posterior spinnerets are long, their distal article bears - besides apical spinules - additional spigots in a ventral-medial position, similar to fig. 54.

Most extant Pisauridae live on the ground or in low strata of the vegetation and are larger spiders. Because of their usually larger size - but mainly of their life style - their rarity in fossil resins is not a surprise. Pisaurid members – like most other taxa of the RTA-clade - are still unknown from the Cretaceous; adult specimens are very rare in Baltic amber. Members of the families Lycosidae and Trechaleidae have not been reported in Eocene European ambers.

Here I describe very rare adult fossil males of the Pisauridae, and – to my knowledge - the smallest known species of this family: The body length of the males is only 3.3 - 3.8 mm in *Esuritor* and 4.0 mm in *Eotrechalea annulata*. The extant Pisauridae – body length usually 8-30 mm - are distinctly larger than con-familiar spiders of the Palaeogene: Eocene. Probably this “intrafamiliar body enlarging” – including gigantism - in (or during?) the Neogene is similar to other families like the Theridiidae, see WUNDERLICH (2008) and Araneidae. On the other hand dwarfism developed in the Neogene is well known, too, e. g. in the subfamily Erigoninae of the Linyphiidae. Close studies of this interesting phenomenon and and ideas of its reason are needed.

Key to the sure genera of the family Pisauridae in Eocene European ambers:

Based on my knowledge in X 2023.

1 Legs annulated, trochanters III-IV distinctly notched, pedipalpal femur without apophyses, tibia of the pedipalpus with a large dorsal and a large ventral apophysis. - Only *E. annulata* of the subfamily Eotrechaleinae WUNDERLICH 2004 .... ***Eotrechalea***

- Legs not annulated (in all species?), trochanters not or only slightly notched, pedipalpal femur at least in some species with ventral apophyses and long ventral hairs (fig. 27), pedipalpal tibia without a ventral apophysis only. - Six species .... ***Esuritor***

Character	Pisauridae	Cybaeidae	Agelenidae	Insecutoridae
posterior lateral spinnerets	short	medium	long	short
position of the ventral tibial/metatarsal I-II bristles	CLOSE to the articles, figs. 22, 23	+/-long and standing out figs. 46, 62	(very) long & standing widely out from the articles, fig. 40	fig. 68
tarsi	more or less BENT, fig. 23	straight	straight	straight
position of the posterior eye row	recurved, figs. 21, 26	procurved (*), figs. 45,49	procurved,	more or less straight
colulus	variable (reduced)	reduced (absent)	variable (wide, divided)	absent
genera	*Esuritor*, *Eotrechalea*	*Eocryphoeca*, ?Eocryphoecara*,* *Scutcybaeus* *Succinaria*	*Agelena*, *Tegenaria, Unguistegenaria*	*Insecutor*

(*) Except the dubious *Eocryphoecara bitterfeldensis* WUNDERLICH 2004.

Fig. A. **Selected characters** of four three-clawed ecribellate families of the RTA-clade (Agelenoidea, Pisauridae) in Eocene European - Baltic, Bitterfeld and Rovno – ambers, which possess a similar habitus and frequently convergently evolved strongly protruding bulbi (figs. 26, 66).

Notes: The present characters are chosen because they are easily recognizable in fossil spiders. - Feathery hairs (fig. 37) exist in certain genera of the Agelenidae, e. g., in *Tegenaria*. - Members of the family Insecutoridae, the listed genera of the Cybaeidae and Pisauridae as well as *Unguistegenaria* n. gen. of the Agelenidae are extinct.

Esuritor PETRUNKEVITCH 1942

Type species: *Esuritor spinipes* PETRUNKEVITCH 1942 (juv.).

Synonymy, n. comb. and n. relat.: According to the bent tarsi, the existence of ventral-apical apophyses of the pedipalpal femur, the chaetotaxy and the pattern of the eyes the monotypic genus *Balticocryphoeca* WUNDERLICH 2004 - type species *B. curvitarsis* WUNDERLICH 2004, described in the Dictynidae s.l.: Cryphoecinae - is regarded as a junior synonym of the genus *Esuritor* PETRUNKEVITCH 1942, and is transferred to the family Pisauridae (**n. comb. & n. relat**.). - According mainly to the large eyes and the ventral bristles of the anterior leg I now regard *Eotrechalea annulata* WUNDERLICH 2004 in Baltic amber - subfamily Eotrechaleinae WUNDERLICH 2004: 1546) as a member of the Pisauridae, see the key to the genera above. - In 2004: 1533, 1544 I regarded the dubious juv. fossil *Textrix lineata* KOCH & BERENDT 1854 in Baltic amber to be a questionable member of the family Pisauridae; now I transfer *lineata* to the genus *Esuritor* (**n. comb**.). - In 2004: 1534 I regarded the dubious genus *Linoptes* KOCH & BERENDT 1854 to be a nomen nudum, a questionable member of the Pisauidae or Trechaleidae, and I described in short some unnamed juveniles. Its trochanters are slightly notched, and I still regard its relationships as unsure, more likely not being a member of the Pisauridae. - According to the tibial and metatarsal I-II bristles which stand distinctly out from their articles, the genus *Eopisaurella* PETRUKEVITCH 1958 – an adult specimen is unknown -, may well be the member of the family Agelenidae; in the type species *E. valdepinosa* the posterior eye row is strongly recurved. This taxon was placed in the Pisauridae only provisionally by PETRUNKEVITCH. It was regarded by me as a questionable member of *Linoptes* MENGE 1854 rsp. a questionable member of the Pisauridae or Trechaleidae; see WUNDERLICH (2004: 1534). More material – especially well preserved males – is needed. - See also above: *Unguistegenaria* n. gen. (Agelenidae).

Diagnostic characters (♂; ad. ♀ unknown): Position of the eyes as in figs. 21, 28 and the photo, eyes large, tibia I usually with pairs – but see *duospinae* and *rovnoensis* - of long ventral bristles (fig. 22), metatarsi I-II with pairs of long ventral bristles, trochanters not or only weakly notched; pedipalpus (e. g.,figs. 25-27): Femur at least in *nonincisio* with ventral-apical apophysis, tibia short, bearing an erect dorsal apophysis, cymbium rather long and slender elongated, bearing no bristles but usually a pair of small apical claws, median apophysis and conductor large, embolus long, describing at least half a loop.

Relationships: (see also above and fig. A): According to the combination of characters – the short spinnerets, the shapes of the opisthosoma, of the BENT tarsi and of the cymbium, the position of the large eyes, the leg bristles and the leg trichobothria as well as the existence of apical cymbial bristles – I regard the extinct genus *Esuritor* to be a member of the family Pisauridae - although their trochanters are not or not distinctly notched in contrast to most Pisauridae -, but not as a questionable member of the Trechaleidae, in contrast to my opinion in 2004. The mentioned characters exist also in the juvenile female generotype of the genus *Esuritor* PETRUNKEVITCH 1942 – see WUNDERLICH (2004: 1543f, figs. 1-3). A closely related genus is unknown to me. Extant species are distinctly larger, see above.

Distribution: Eocene Baltic and Rovno amber forests.

The number of the usually paired (*) ventral bristles of tibia I and metatarsus I of the species of *Esuritor*:

aculeata PETRUNKEVITCH 1958	5 and 4,
curvitarsis (WUNDERLICH 2004)	6 and 3,
duospinae n. sp. (fig. 29)	2 (*) and 2,
lineata (KOCH & BERENDT 1854)	?
nonincisio n. sp.	5 and 2,
rovnoensis n. sp. (fig. 33)	2 and 2 (**),
spinipes PETRUNKEVITCH 1942	4 and 3.

(*) In *duospina* only two (*pro*)ventral tibial bristles exist in the distal half) (fig. 29)! See (**).

(**) In *rovnoensis* tibia I bears two (*pro*)ventral bristles but metatarsus I bears an additional prolateral bristle (fig. 33); the existence of retroventral bristles is unknown in this species.

Esuritor nonincisio **n. sp.** (figs. 21-27)

Etymology: The species name refers to the absence of trochanteral notches, from none (lat.) and incisio (lat.) = notch.

Material: Holotype ♂ in Eocene Baltic amber, F3771/BB/CJW.

Preservation and syninclusions: The spider is completely and well peserved in a larger and fairly flat yellow piece of amber, 3.8 cm long, which contains several layers and fissures; the ventral side is partly covered with a white emulsion. - Syninclusions are a small winged insect (probably a Coccoidea), few ballets of insects excrement and tiny particles of detritus. I did not find stellate plant hairs.

Diagnostic characters (♂; ♀ unknown): Eyes – including the anterior medians – large (fig. 21, tibia I with 2 pairs of ventral bristles besides dorsal bristles, metatarsus I with 2 ventral pairs, too; pedipalpus (figs. 25-27): Tibia with a long and erect dorsal apophysis, cymbium slender elongated, bearing no bristles but a pair of apical claws, median apophysis and conductor large, embolus rather long, describing more than half a loop.

Description (♂):
Measurements (in mm): Body length 3.8; prosoma: Length 1.5, width 1.25; opisthosoma: Length 2.3, width 1.3; leg II: Patella 0.55, tibia 1.4, metatarsus 1.2, tarsus 0.5, tibia IV 1.5; diameter of a posterior median eye 0.1.
Colour: Prosoma and legs medium to dark brown, legs not annulated, opisthosoma light grey.
Prosoma (fig. 21) 1.2 times longer than wide, anteriorly distinctly smaller, hairs indistinct, feathery hairs absent, thoracal fissure long, two rows of large eyes, both rows recurved, posterior median eyes largest, clypeus not long, basal cheliceral articles long, fangs basally thick, teeth of the fang furrow, most mouth parts and the wide sternum hidden by an emulsion and bubbles. - Legs (figs. 23-24): I, II and IV almost equal in length, III shortest, tarsi

bent and shorter than the metatarsi, hairs not distinct, short; trochanteral notches, tibial suture, feathery hairs, scopulae and claw tufts absent, tarsal trichobothria in more than a single row or scattered, bristles numerous and partly long, existing from femora to metatarsi, femora dorsally 1/1 as well as very few distally and laterally, patellae 1/1 dorsally, tibiae and metatarsi I-II see above, unpaired tarsal claws with a single tooth (recognizable on the right tarsus III), paired claws well developed, bearing ca. 8-10 long teeth. - Opisthosoma 1.7 times longer than wide, widest anteriorly, covered with short hairs, anal tubercle large, spinnerets hidden, short, anteriors apparently close together. - Pedipalpus (figs. 25-27): Femur with long ventral hairs and a ventral-apical apophysis, tibia with a long and erect dorsal apophysis, cymbium slender elongated, bearing no bristles but a pair of apical claws, bulbus strongly protruding, median apophysis and conductor large, embolus rather long, describing more than half a loop.

Relationships: See *E. duospinae* n. sp., and the tab. above. In *E. aculeata* the ventral bristles of tibia I are as in *nonincisio*, but the number of the ventral metatarsal I bristles is higher and the anterior median eyes of *aculeata* are smaller as in *duospinae*.

Distribution: Eocene Baltic amber forest.

***Esuritor duospinae* n. sp.** (figs. 28-31), photo 17

Etymology: The name of the species refers to the two ventral bristles of its tibia I, from duo (lat.) = two and spina (lat.) = bristle.

Material: Holotype ♂ in Eocene Baltic amber, F3770/BB/CJW.

Preservation ans syninclusions: The spider is completely and very well preserved in a 4.5 cm long and mainly clear yellow-orange piece of amber, placed on a layer; the ventral side of the spider is partly covered with a white emulsion. A syninclusion is a six-legged Acari; plant stellate hairs are absent.

Diagnostic characters (♂; ♀ unknown): Anterior median eyes distinctly smaller than the other eyes, diameter 0.085 mm (fig. 28), tibia I (fig. 29) with only two (unpaired) (*pro)*ventral bristles in the distal half and two quite thin dorsal bristles; pedipalpus (figs. 30-31): Femur slender, patella distinctly bent, tibia dorsally with an erect apophysis, cymbium wide, with a slender elongation, without bristles but with a pair of small apical bristles (they are observable in the ventral position of the cymbium), bulbus strongly protruding, embolus long and wide, describing about a single loop, structures of the tegulum hidden.

Description (♂):
Measurements (in mm): Body length 3.8; prosomal length 2.0, diameters of the anterior median eyes 0.085, of the posterior median eyes 0.2; opisthosoma: Length 1.6, height 1.1; leg I: Femur 2.0, patella 0.6, tibia 1.9; leg IV: Femur ca. 2.o, patella 0.5, tibia 1.85, metatarsus 1.9, tarsus ca. 0.8.
Colour: Prosoma and legs dark brown, legs not annulated, opisthosoma light grey.

Prosoma (fig. 28, photo) distinctly longer than wide, anteriorly distinctly narrowed, thoracic part fairly raised, hairs quite short, cuticula almost smoorh, fovea well developed, 6 quite large eyes and anterior median eyes small, posterior row distinctly recurved, eyes not widely spaced, clypeus, chelicerae, mouth parts and sternum hidden. - Legs (fig. 26, photo) fairly long, I and IV about equal in length, claw tufts and scopulae absent, hairs short and indistinct; bristles on leg I distinctly reduced: Femur 1 dorsally in the basal half, dorsal tibial bristles quite thin, ventrally only two (1/1) (pro)ventrally (no retroventrally!) in the distal half, metatarsi 2 ventral pairs in the basal half (no additional prolateral one), tibia II ventrally with 5 pairs of very long bristles and 1/1 bristles which are well developed, femora II-IV with a dorsal bristle in the basal half, patellae with a dorsal-distal bristle which is well developed, tibia and metatarsus III-IV with several brisles, tarsi short and bent, bearing few trichobothria, claws not studied. - Opisthosoma 1.45 times longer than high, fairly narrowing posteriorly, bearing quite short hairs and two pairs of sigillae, spinnerets short and partly hidden. - Pedipalpus: See above.

Relationships: The number of ventral bristles of tibia I (1/1) is lower than in most of the remaing known congeneric species, see tab. above, especially *E. rovnoensis* n. sp., in which the dorsal bristles of tibia I are thinner but see *E. rovnoensis*.

Distribution: Eocene Baltic amber forest.

***Esuritor rovnoensis* n. sp.** (figs. 32-36)

Etymology: The name of the species refers to the area of Rovno, the origin of the Eocene Ukrainian amber, which includes the present holotype.

Material: Holotype ♂ in Eocene Ukrainian amber from Rovno; the exact locality of the amber is unknown. The amber piece was bought from the Lithunian amber dealer Jonas Damzen; F3775/UB/CJW.

Preservation and syninclusions: The spider is preserved in a larger yellowish piece of amber, placed with partly spread legs on a layer and fissure. It is completely preserved, the opisthosoma is shrunk and deformed, most dorsal and ventral parts are covered with a white emulsion. - Organic syninclusions like stellate plant hairs and detritus are absent.

Diagnostic characters (♂; ♀ unknown): Few proventral bristles of leg I as in fig. 33, retroventral tibial bristles absent; pedipalpus (figs. 34-36): Tibia with a retrolateral-basal outgrowth which bears an apical bristle, retrolateral tibial apophysis of medium length, embolus bearing a seam, describing a wide loop; body length 3.3 mm.

Description (♂):
Measurements (in mm): Body length 3.3; prosoma: Length 1.6, width 1.5; opisthosomal length ca. 1.8; leg I: Femur 1.85, patella 0.75, tibia 2.0, metatarsus ca. 1.65, tarsus ca. 0.6, femur II 1.7, femur III ca. 1.45, femur IV 1.9, metatarsus IV 1.8.
Colour: Prosoma and legs dark brown, legs apparently not annulated, opisthosoma light grey.

Prosoma (fig. 32) almost as wide as long, bearing indistinct hairs, fovea well developed, 6 large eyes plus the anterior median eyes which apparently are small, postrerior row strongly recurved, clypeus, chelicerae, mouth parts and sternum hidden. - Legs relatively robust, order IV/I/II/III, tarsi short and slightly bent, unpaired claw existing, scopulae and claw tufts absent, trichobothria not studied, bristles only partly recognizable, only few on leg I (fig. 33), femora bristle-less, patellae dorsally 1/1 (the distal one tiny or absent), tibia I: dorsal bristles completely absent, proventrally 1/1 in the distal half, retroventrally apparently none (difficult to observe), metatarsus I 2 ventral pairs in the basal half as well as at least 1 prolaterally, legs III-IV with several bristles. - Opisthosoma strongly deformed, soft, bearing short hairs. - Pedipalpus: See above. The existence of an apical claw of the cymbium is unknown (the area is hidden).

Relationships: See E. *duospinae* n. sp. and the tab. Above. Smallest fossil (and extant) known member of the family Pisauridae.

Distribution: Eocene Ukrainian amber forest of Rovno.

Family **AGELENIDAE**

See WUNDERLICH (2004: 1483-1488).

Agelenidae is a diverse and heterogene family; its relationships and limits are unclear, a single sure apomorphic character is unknown.

Basic characters are: Entelegyne, ecribellte, member of the RTA-clade, 8 eyes, unpaired tarsal claw existing, claw tufts and leg scopulae absent, ventral bristles of tibia and metatarsus I-II standing out from their articles.

Various "typical" further characters which may be absent or may exist (an example is the typical sheet web including a funnel-shaped retreat which exists also in certain related families):

- long, slender and widely spaced posterior lateral spinnerets with apical segments narrowing towards tip (probably the most typical character)
- PROLATERAL (ventral-medial) spigots of the posterior lateral spinnerets besides apical spigots; they exist, e. g., in certain taxa of the Cybaeidae, too (fig. 54). Such spigots exist in more ancient ecribellate Oecobioidea (Hersiliidae) (!) but may be restricted within the RTA-clade to the Agelenoidea;
- the COLULUS is quite wide in certain taxa, frequently bilobed, reduced or even absent, see *Scutcybaeus* n. gen. below;
- a special kind of leg autotomy - through the patella – may exist but – to my knowledge - a coxa-trochanter autotomy in the Agelenidae in contrast, e. g., to the Cybaeidae, see below;
- feathery hairs exist only in *Tegenaria* (fig. 37) and related genera;

- notches of trochanters III-IV exist or are absent;
- VENTRAL tarsal bristle – especially on III-IV – exist in several taxa;
- apical cymbial bristle are usually absent and only known to me in the extinct *Unguistegenaria* n. gen. (figs. 41-42) which relationships are unsure.

In the probably related extinct family Insecutoridae (see below) exists a single (?) row of tarsal trichobothria and the ventral bristles of tibia and metatarsus I-II stand out from their articles like in the Agelenidae (fig. 40) but the spinnerets are different: "the anterior pair is conciderably stouter and appreciably longer than the posterior pair", see PETRUNKEVITCH (1942: 241).

Agelenidae build capture webs including tubes usually near the ground; this may be one reason for their rarity in amber. Furthermore most the extant - and some fossil - Agelenidae are larger spiders; such spiders were surely extremely rarely captured by the fossil resin.

In this paper I provide a key to the genera for males in Baltic amber, and describe the new monotypic and dubious fossil genus *Unguistegenaria*.

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

1 Apical article of the posterior spinnerets distinctly longer than the basal article. Weakly known species, relationships unsure, see below ....
….. ... ?***Agelena*** *tabida* KOCH & BERENDT 1854

- Apical article of the posterior spinnerets not or only slightly longer than the basal article . . 2

2(1) Pedipalpus (figs. 39-42a): Tibia short, cymbium with an apical pair of bristles, embolus very long and s-shaped …... ***Unguistegenaria* n. gen.**

- Pedipalpus (fig. 38): Tibia distinctly longer than wide, apical bristles of the cymbium absent, embolus long and not s-shaped, feathery hairs (fig. 37) existing …..................... ?***Tegenaria***

Agelena tabida KOCH & BERENDT 1854

Only the holotype - a probably adult female - (not seen) is known, which according to MENGE in KOCH & BERENDT (1854) is a member of the genus *Agelena* WALCKENAER 1805. Its spinnerets are long, especially the posterior laterals whose apical article is slender and pointed but it legs are only of median length. I never found this fossil taxon.

Tegenaria LATREILLE 1804 (figs. 37-38)

See WUNDERLICH (2004: 1485-1488).

The questionable members of this genus possess very long legs, very long long posterior lateral spinnerets, a very long male pedipalpal tibia and long embolus (fig. 38). Feathery hairs on their legs (fig. 37) may be difficult to recognize in fossil specimens.

Unguistegenaria **n. gen.**

Etymology: The name refers to the apical claws (lat. = unguis) of the cymbium and to the genus *Tegenaria* LATREILLE 1804 of the family Agelenidae which is similar in certain respect.

The gender of the name is feminine.

Type species (by monotypy): *Unguistegenaria sinemammillae* n. sp.

Diagnostic characters (♂; ♀ unknown): Prosoma anteriorly distinctly narrowed (fig. 39), eyes (fig. 39) relatively small, posterior row very slightly recurved, coxae III-IV not notched, tibial I bristles (fig. 40) standing widely out from the article, lateral bristles of the patellae absent, tibia (fig. 40) and metatarsus I with 2 pairs of long ventral bristles (and few additional distal bristles), ventral tarsal III-IV bristles absent, I did not find feathery hairs, tarsal trichobothria probably in a single row; pedipalpus (figs. 41-42a): Tibia shorter than the patella, prodistally elongated, retrolaterally bearing a claw-shaped apophysis as well as a small medial apical tooth, CYMBIUM APICALLY WITH A PAIR OF LONG CLAWS, median apophysis apparently existing (difficult to recognize in the pedipalpal position), embolus long, s-shaped and – except distally – guided by a long conductor.

The **relationships** are quite unsure, the spinnerets and the exact position of the tarsal trichobothria are unknown; the position of the eyes, the leg bristles and the pedipalpus is similar to certain Agelenidae. In extant and fossil taxa of the Agelenidae exist ventral bristles of tarsi III-IV and apical claws of the cymbium are absent; cymbial claws exist in certain members of the Lycosoidea in which the position of the eyes are different; a tibial apophysis of the male pedipalpus is absent in the Lycosidae. In *Esuritor* (Pisauridae, see below) exist apical cymbial bristles, too, but the position of the bristles of tibia and metatarsus I is close to their articles, eyes, chaetotaxy and male pedipalpus are quite different. - I regard *Unguistegenaria* as a questionable member of the Agelenidae.

Distribution: Eocene Baltic amber forest.

***Unguistegenaria sinemammillae* n. gen. n. sp.** (figs. 39-42a), photo 18

Etymology: The name of the species refers to the absence of spinnerets of the holotype which are cut off.

Material: Holotype ♂ in Eocene Baltic amber, F3733/BB/CJW.

Preservation and syninclusions: The spider is preserved in a clear yellow-orange piece of amber, size 20x6x5 mm; cut off are the posterior third of the opisthosoma and parts of most tarsi, the left legs II-IV and the right leg I are complete, the opisthosoma is dorsally shrunked, prosoma and opisthosoma are ventrally partly covered with a white emulsion. - Syninclusions are tiny bubbles and tiny particles of detritus.

Diagnostic characters and relationships: See above.

Description (♂):
Measurements (in mm): Body length ca. 3.5; prosoma: Length 2.0, width 1.4; opisthosoma: Unknown; leg I: Femur ca. 2.0, patella ca. 0.4, tibia ca. 0.16.
Colour: Prosoma and legs medium brown, legs probably annulated, opisthosoma light grey.
Prosoma (fig. 39, photo) 1.5 times longer than wide, anteriorly distinctly narrowed, most hairs short, feathery hairs absent, fovea long and well developed, 8 eyes of medium size in two wide rows, posterior row very slightly recurved, clypeus not long, basal chelicerae of medium length, fangs, mouth parts and most parts of the sternum hidden. - Legs (fig. 40, photo): All legs similar in length, hairs quite short and indistinct, feathery hairs not found, tibial suture, scopulae and claw tufts absent, trochanters most probably not notched, most bristles long, *standing distinctly out* from most articles, existing from femora to metatarsi as well as ventrally on tarsi III-IV, femora with 2 dorsally and few subapicals, I additionally with a prolateral one in the distal half, tibiae with 2 dorsal bristles, tibia and metatarsus I-II with 2 ventral pairs and some in an irregular position, patellae dorsally 1/1 (lateral bristles absent), tarsal trichobothria probably in a single row, unpaired tarsal claw existing, paired claws not long, bearing ca. 8 longer teeth. - Opisthosoma incomplete, remaining parts partly deformed, anterior third widest. - Pedipalpus: See above. The femur bears 3 dorsal bristles, the cymbium bears a probasal bristle, the right pedipalpus bears an additional distal bristle.

Distribution: Eocene Baltic amber forest.

Family CYBAEIDAE

WUNDERLICH (2004: 1382) listed *Eocryphoeca* PETRUNKEVITCH 1946 under Dictynidae s. l.: Cryphoecinae. See Cryphoecinae: SIMON (1897) of his Agelenidae, and Cryphoecinae: LEHTINEN (1967:362-364) of his Hahniidae. Some recent authors regard the genus *Cryphoeca* THORELL 1870 as a member of the family Cybaeidae, and I regard *Eocryphoeca* and *Eocryphoecara* as well as *Scutcybaeus* n. gen. provisionally as members of this family. The leg autotomy exists between coxa and trochanter in ?*Succinaria adcoccinea* n. sp., *Scutcybaes brevitricha* n. sp. and *Eocryphoeca* sp. indet., see below.
See Cybaeinae: WUNDERLICH (2004: 1525) under Dictynidae s. l. and tab. A above (Pisauridae). The family relationships of *Myro extinctus* PETRUNKEVITCH 1958: 130 (under Cybaeinae) are quite unsure; its cymbium and bulbus are very small. *Balticocryphoeca* WUNDERLICH 2004: See the family Pisauridae above.

In the paper I describe two new genera as well as two new species of *Eocryphoeca*.

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

1 Tarsal trichobothria quite short (fig. 53), eye field compact, opisthosoma (photo) most probably bearing a large dorsal scutum, pedipalpus as in figs. 55-56 ….......... ***Scutcybaeus***

- Tarsal trichobothria long and fairly increasing in length (figs. 58,62), eye field (figs. 45, 49) wide, opisthosomal scutum absent …... 2

2(1) Pedipalpus as in figs. 44, 52, tegular apophysis very long and directed basally, embolus slender …...…..................... ***Eocryphoeca***

- Pedipalpus of the generotype as in figs. 63-65 tegular apophysis only fairly long, directed apically, embolus basally distinctly thickened (fig. 65) .... ***Succinaria***

Eocryphoeca PETRUNKEVITCH 1946

A revision of the diverse extinct genus *Eocryphoeca* is needed. In *Eocryphoeca* tiba and metatarsus I bear only 1-2 pairs of ventral bristles of medium length which stand only fairly wide out from their article (figs. 46, 50), the tarsi bear a single row of trichobothria increasing in length, the posterior eye row is procurved (fig. 45) (in the dubious genus *Eocryphoecara* WUNDERLICH 2004 recurved), a dorsal-basal apophysis of the pedipalpal tibia is absent and the cymbium is only fairly elongated (figs. 45, 51). See tab. A above (Pisauridae).

WUNDERLICH (2004: 1394-1403) – under Dictynidae s. l.: Eocryphoecinaee - treated almost ten species of the Eocene genus *Eocryphoeca*. In this paper I describe two further species of this genus and a sp. indet.

***Eocryphoeca amputata* n. sp.** (figs. 43-44), photo 19

Etymology: The name of the spider refers to the amputation of two of its tarsi, from (lat.) amputatio.

Material: Holotype (♂) in Eocene Baltic amber, F3807/BB/CJW).

Preservation and syninclusions: The spider is almost completely preserved in a large yellow-orange piece of amber which pessesses oxidated fissures on its surface; the left tarsi I and IV are lost, probably by amputation, the dorsal side of the spider and parts of the spinnerets are covered with a thick layer of a white emulsion. – Syninclusions are about a dozen Diptera: Nematocera; stellate plant hairs are absent.

Diagnostic characters (♂; ♀ unknown): Pedipalpus (figs. 43-44): Retrolateral tibial apophysis apparently small but most parts hidden by a white emulsion, tegular apophysis large, standing out ventrally and directed probasally, median apophysis also large, bearing distally a strongly bent outgrowth, questionable conductor concave, guiding the tip of the embolus which is wide basally.

Description (♂; ♀ unknown):
Measurements (in mm): Body length 4.8; prosoma: Length 2.4, width ca. 1.8; opisthosoma: Length ca. 2.7, width 1.4; Leg I: Femur ca. 1.8, patella ca. 0.6, tibia 1.5, metatarsus 1.6, tarsus 1.0, tibia II 1.5, tibia III 1.3, tibia IV 1.8.
Colour: Prosoma and legs medium brown, legs probably annulated, opisthosoma light grey brown.
Prosoma (photo; most parts – especially of the dorsal side - are covered with a white emulsion) 1.33 times longer than wide, 8 fairly large eyes in two rows, posterior row procurved, posterior median eyes spaced by more that their diameter, clypeus distinctly longer than the diameter of the anterior median eyes, basal cheliceral articles robust, mouth parts hidden, sternum slightly small spaced by coxae IV. - Legs (photo) robust, order IV/I/II/III, hairs short

to long, femur I bears long retro-ventral hairs, bristles only fairly long, existing from femora to metatarsi, most ventral tibial and metatarsal bristles I-II distinctly standing out from their articles; leg I: Femur dorsally 1/1/1, 2 prodistally and few apically, patella dorsally 1/1 (III-IV bear also a lateral pair), tibia at least ventrally 1/1 or 2 pairs, metatarsus 2 ventral pairs and apicals, tibia and metatatarsus III-IV with several bristles, several tarsal trichobothria increasing in length, claw tufts absent, paired tarsal claws with a least half a dozen long teeth, unpaired claw strongly bent, trochanters not notched. - Opisthosoma (photo) ca. 1.9 times longer than wide, hairs short and indistinct, colulus completely absent, most articles of the spinnerets hidden by a white emulsion, apical articles retracted, anterior median spinnerets close together, posterior spinnerets widely spaced. - Pedipalpus: See the diagnostic characters; articles short, cymbium wide.

Relationships: In the other congeneric species the RTA is larger and the tegular apophysis is smaller.

Distribution: Eocene Baltic amber forest.

***Eocryphoeca laesa* n. sp.** (figs. 45-48), photos 20-21

Etymology: The name of the species refers to the partly damaged body of the holotype, from laedere (lat.) = damage.

Material: Holotype ♂ in Eocene Baltic amber, F3776/BB/CJW.

Preservation and syninclusions: The spider is fairly well preserved in a clear yellow-orange piece of amber, placed directly on a convex and long questionable drop of amber within the amber (photo). Half of the drop was apparently cut longitudinally on its previous surface and enclosed by another fluid of amber which enclosed the spider, too. The left legs II and IV of the spider are broken off irregularly near their base, the left tarsus and metatarsus II are separately preserved left of the spider on the drop, the lose left tarsus IV is preserved on the droplet behind the spider. Prosoma and opisthosoma are distinctly deformed and the dorsal parts of the left coxae III and IV are lost – fed by an insect? - Syninclusions are remains of a second long questionable drop of amber in the amber, preserved right above the spider; further organic inclusions like stellate plant hairs are absent.

Diagnostic characters (♂; ♀ unknown): Leg I bears only few and relatively short bristles (fig. 46); Pedipalpus (figs. 47-48): Retrolateral tibial apophysis long and laterally depressed, bulbus apically with a pair of spine-like structures.

Description (♂):
Measurements (in mm): Body length ca. 4.3; prosoma: Length 2.1, width ca. 1.65; opisthosoma: Length ca. 2.3, width ca. 1.3; leg I: Femur ca. 2.5, patella 0.9, tibia 2.2, metatarsus 2.5, tarsus 1.45, femur II 2.3, femur III 2.1, leg IV: Femur 2.75, patella 0.9, tibia ca. 2.4, metatarsus 3.0, tarsus 1.6.
Colour: Prosoma medium brown, legs (fig. 46, photo) distinctly annulated, opisthosoma medium brown.

Prosoma (fig. 45, photo) strongly deformed, 1.27 times longer than wide, hairs short, feathery hairs absent, fovea well developed, 8 eyes of medium size, posterior row distinctly procurved, clypeus not protruding, basal cheliceral articles well developed and not protruding or diverging, mouth parts and sternum hidden. - Legs (fig. 46, photo) slender, order IV/I/II/III, hairs not long, bristles also not long, not numerous, standing fairly out from leg I, femora: Dorsally 1/1 in the basal half and near the middle and with a sub-apical pair, patellae dorsally 1/1, patella IV with an additional retrolateral bristle, tibia I only a single ventral pair near the middle, left metatarsus I 3 ventral pairs, on the only partly preserved right metatarsus I exist 4 ventral pairs; legs III-IV with several bristles. Scopulae, feathery hairs and claw tufts absent; I did not find long tarsal trichobothria but see *E. amputata*, most tarsal claws are hidden. - Opisthosoma strongly deformed, soft, dorsally bearing numerous longer hairs, anal tubercle very large, similar to *E. gracilipes* (KOCH & BERENDT 1854), see WUNDERLICH (2004: 1454, fig. 6h), posterior spinnerets widely spaced. - Pedipalpus: See above; the patella bears a ventral hump and a long dorsal-apical bristle, embolus long, in a circular position.

Relationships: According to the partly similar structures of the ♂-pediplpus *E. ligula* WUNDERLICH 2004 may be most related.

Distribution: Eocene Baltic amber forest.

Eocryphoeca sp. indet. (figs. 49-52)

Material: Holotype ♂ in Eocene Baltic amber, F3732/BB/CJW.

Preservation and syninclusions: The spider is preserved in a 4.5 cm long, mainly clear piece of amber which contains several bubbles and fissures/layers. The opisthosoma and ventral parts of the prosoma and legs are partly covered with a white emulsion, the left femur IV and the left dorsal side of the prosoma are deformed, the left legs II and III are lost beyond the coxa by autotomy, droplets of blood exist on their stumps. - Syninclusions are a tiny plant hairs, a member of Trichoptera, a questionably tiny member of Collembola, a 0.9 mm long female member of the Araneae: Telemidae: *Telema moritzi* WUNDERLICH 2004 in front of the holotype.

Diagostic characters (♂; ♀ unknown): Position of the eyes as in fig. 49, posterior row slightly procurved, posterior median eyes large, leg II as in fig. 50 , lateral patellar bristles existing (fig. 50), notch of trochanter III-IV weakly developed; pedipalpus (figs. 51-52): Tibia shorter than the patella, with a small prodorsal apical and a small retroapical-ventral apophysis (the RTA), tegulum with a large ventral apophysis which stands distinctly out and originates in the basal half, as well as with a long embolus which originates also in the basal part of the tegulum and describes an apical spiral.

Description (♂):
Measurements (in mm): Body length 5.0; prosoma: Length 2.5, width 1.9; opisthosoma: Length 2.8, width 2.0; leg I: Femur 2.0, patella 0.9, tibia 1.85; metatarsus IV 2.45, tarsus IV 1.15.

Colour: Prosoma and legs dark brown, legs not annulated, opisthosoma light grey.
Prosoma (fig. 49) 1.3 times longer than wide, anteriorly distinctly narrowed, hairs short to medium long, feathery hairs absent, fovea well developed, 8 eyes in two rows, posterior row procurved, posterior median eyes largest (lenses covered with bubbles!), clypeus short, basal cheliceral articles rather large, fangs, mouth parts and sternum hidden. - Legs (fig. 50) only fairly long, order IV/I/II/III, hairs short to long, feathery hairs absent, bristles numerous, existing from femora to metatarsi, tibia II with two pairs of ventral bristles (as well few short apically), metatarsus I-II wit three pairs of long ventral bristles and few apicals, as well as at least on II with a long prolateral bristle in the basal half, tibiae and metatarsi III-IV with numerous bristles, femora usually with 2 dorsal bristles and 3 subapicals, patellae with 2 dorsal as well as lateral bristles, right trochanter III weakly notched (difficult to observe), tarsal trichobothria unknown apparently with a single dorsal row, unpaired tarsal claw existing, paired claws bearing at least 8 long teeth. - Opisthosoma oval, 1.4 times longer than wide, hairs short, spinnerets hidden, the posterior ones apparently only fairly long. - Pedipalpus (figs. 51-52) spiny, see above.

The **relationships** are not sure to me.

Distribution: Eocene Baltic amber forest.

Scutcybaeus **n. gen.**

Etymology: The name refers to the dorsal opisthosomal shield, from (lat.) scutum, which is quite unusual in the family Cybaeidae, and the cybaeid genus name *Cybaeus*.

The gender of the name is masculine.

Type species (by monotypy): *Scutcybaeus brevitricha* n. sp.

Diagnosis (♂; ♀ unknown): Trichobothria reduced in size and number, not increasing in length (fig. 53), tarsus I with long (almost bristle-shaped) dorsal hairs (fig. 53), opisthosoma most probably with a large dorsal scutum (photo), eye field compact, posterior eyes row straight or slightly procurved; pedipalpus (figs. 55-56) with complicated tibial apophyses. Coxa-trochanter autotomy.

The **relationships** are unsure, see *Succinaria* n. gen. and above. I regard *Scutcybaeus* with some hesitation to be a member of the Cybaeidae.

Distribution: Eocene Baltic amber forest.

***Scutcybaeus brevitricha* n. gen. n. sp.** (figs. 53-56), photo 22

Etymology: The name refers to the quite short leg trichobothria, from brevis (lat.) = short, and trich- (gr.) = hair.

Material: Holotype ♂ in Eocene Baltic amber, F3808/BB/CJW.

Preservation and syninclusions: The spider is preserved in a clear part of a yellow orange piece of amber which has been heated, the ventral side is covered with a white emulsion, the left leg IV is lost beyond the coxa by autotomy, the right leg IV is cut off through the tibia. - Syninclusions are a 7 mm long incomplete Coleoptera, a 0.8 mm long leg-less insect larva preserved below and near the right pedipalpus of the spider as well as some small stellate plant hairs.

Diagnostic characters (♂; ♀ unknown): See above.

Description (♂):
Measurements (in mm): Body length 4.5; prosomal length 2.3; opisthosoma: Length 2.2, width 1.3; leg I: Femur 1.9, patella 0.7, tibia 1.9, metatarsus 1.8, tarsus1.2; femur II 1.85, femur III 1.7, femur IV 2.0, a posterior lateral spinneret 0.3.
Colour: Prosoma and opisthosoma dorsally dark brown, legs medium brown, probably not annulated.
Prosoma (photo) distinctly longer than wide and distinctly narrowed anteriorly, hairs indistinct, fovea short, 8 eyes in a rather compact group, posterior row straight, posterior median eyes spaced by almost their diameter, chelicerae and ventral side hidden ba a white emulsion. - Legs (fig. 53, photo) only fairly long and slender, hairs short, bristles thin, existing from femora to metatarsi, femora usually dorsally 1/1 and a distal lateral pair, patellae dorsally 1/1 as well as at least on the left patella III with a retrolateral bristle, tibia I-II dorsally 1/1, two ventral pairs as well as a prolateral bristle on I, metatarsi I-II with two ventral pairs and apicals, legs III-IV bear some additional bristles. Tarsus I bears a row of long and strong dorsal hairs, tarsal trichobothria few and short, scopulae and claw tufts absent, paired tarsal claws well developed and bearing long teeth, unpaired claw short. - Opisthosoma (fig. 54, photo) ca. 1.7 times longer than wide, bearing dorsally not many long hairs and apparently a large scutum although I do not want to exclude with certainly that it may be an artefact caused by heating during the preservation; posterior lateral spinnerets robust, bearing large apical and prolateral spigots, apical article short. - Pedipalpus: See above; the articles bear several bristles and strong hairs.

Relationships: See above.

Distribution: Eocene Baltic amber forest.

Succinaria **n. gen.**

Etymology: The name is a combination of parts of (a) Baltic amber (succinit), in which the present spiders are preserved and (b) of the agelenid genus *Tegenaria*.

The gender of the name is feminine.

Type species: *Succinaria lingua* n. sp.
Further species: ?*Succinaria adcoccinoidea* n. sp.

Diagnostic characters (♂; ♀ unknown; mainly based on the generotype *S. lingua*): Tarsal trihobothria increasing in length (figs. 58, 62.); pedipalpus (figs. 63-65: Holotype): Tibia quite short, bearing a ventral and a retrolateral apophysis, tegular apophysis of medium length, bent and directed retrobasally, median apophysis and conductor seemingly fused, embolus basally thick but distally thin.

Relationships: The general characters are as in the family Cybaeidae, see above. In *Scutcybaeus* n. gen. the eye field is more compact, its few tarsal trichobothria are quite short (fig. 53), not increasing in length, a dorsal opisthosomal scutum exists most probably (photo) and the structures of the bulbus are different.

Distribution: Eocene Baltic amber forest.

Succinaria lingua **n. gen. n. sp.** (figs. 61-65), photo 23

Etymology: The name of the species refers to the tongue-shaped tegular apophysis, from (lat.) lingua = tongue.

Material: Holotype ♂ in Eocene Baltic amber and a small piece of amber which has been split up., F3809/BB/CJW.

Preservation and syninclusions: The spider is well and almost completely preserved in a partly clear yellow-orange piece of amber which was heated, the medium part of the left leg III and the tip of the left leg II are cut off, mainly parts of the body are covered with a white emulsion. - Syninclusions are tiny particles of detritus as well as some bubbles; stellate plant hairs are absent in the 2 cm long piece of amber.

Diagnostic characters (♂; ♀ unknown): Pedipalpus (figs. 61-65): Tibia with a large apically slightly inclined retrolateral apophysis, further small apophyses may exist, tegular apophysis strongly bent, embolus basally thick, guided by a long and protruding conductor which may be fused with the median apophysis.

Description (♂):
Measurements (in mm): Body length ca. 4.2; prosomal length ca. 2.0; opisthosoma: Length 2.3, width 1.35; leg I: Femur 1.9, patella 0.7, tibia 1.8, tarsus 1.1; tibia II 1.8, tibia III 1.35, tibia IV ca. 2.1; width of the eye field ca. 0.8.
Colour: Prosoma and legs medium to dark brown, opisthosoma probably light grey brown.
Prosoma (photo) partly hidden, distinctly longer than wide, smooth, fovea long and deep, 8 small eyes in two rows similar to *S. adcoccinoidea* n. sp. (fig. 57), posterior row procurved, posterior eyes spaced by more than their diameter, chelicerae, mouth parts and parts of the sternum hidden, sternum small spacing the coxae IV. - Legs (figs. 61-62, photo) of medium length, III distinctly the shortest, hairs fairly short, bristles erect on I-II, thin, existing from femora to metatarsi, femora with few dorsal as well as lateral bristles, patellae dorsally 1/1, tibiae dorsally 1/1, I-II additionally ventrally 2/2 or 1/1, few tarsal trichobothria increasing in length, probably in a single row, scopulae and claw tufts absent, tarsal claws not studied. - Opisthosoma (photo) 1.7 times longer than wide, covered with hairs of medium length, spinnerets partly covered with a white emulsion, posteriors fairly short. - Pedipalpus see above, with short patella, tibia and cymbium.

Relationships: In *S. adcoccinoidea* n. sp. body and legs are quite similar but the structures of the bulbus are different and the pedipalpal retrolateral tibial apophysis is apically blunt.

Distribution: Eocene Baltic amber forest.

?***Succinaria adcoccinoidea* n. gen. n. sp**. (figs. 57-60)

Etymology: The name of the species refers to the existence of a member of the Coccinoidea (from lat. ad) close to the spider holotype.

Material: Holotype ♂ Eocene Baltic amber, F3810/BB/CJW.

Preservation and syninclusions: The spider is well preserved in a partly clear yellow orange piece of amber, fissures hinder the view of parts of the spider, the left pedipalpal patella is deformed, the tip of the right tarsus IV is cut off, the left leg I is cut off through the tibia, the left leg II is lost beyond the coxa by autotomy, parts of the ventral side of the body are covered with a white emulsion. - Syninclusions are a winged member of the Coccinoidea, a tiny Acari larva, tiny bubbles and detritus. A tiny thread originates from a spigot of the left posterior spinneret.

Diagnostic characters (♂; ♀ unknown): Pedipalpus (figs. 59-60; only parts are observable): RTA long and blunt, conductor and median apophysis strongly bent.

Description (♂):
Measurements (in mm): Body length 4.8; prosomal length ca. 2.4; opisthosoma: Length ca. 2.8, height 1.5; leg I: Femur ca. 3.0. patella ca. 0.8, tibia ca. 2.4, metatarsus ca. 2.3, tarsus

1.3; tibia II ca. 2.3, tibia III ca. 2.0, tibia IV ca. 2.5; posterior lateral spinnerets: Basal article ca. 2.5, distal article ca. 0.2.
Colour: Prosoma and legs dark brown, legs not annulated, opisthosoma medium grey.
Prosoma partly hidden (photo) longer than wide, bearing short and some long dorsal hairs, 8 eyes in a wide field, posterior row straight or slightly procurved, clypeus fairly long, basal cheliceral articles long. - Legs partly cut off (fig. 58, photo) robust, order IV/I/II/III, hairs rather long, existing from femora to metatarsi, apparently quite similar to *S. lingua* n. sp., trochanter III not notched, tarsi with several trichobothria only fairly increasing in length, paired tarsal claws bearing ca. 6 long teeth, unpaired claw strongly bent. - Opisthosoma 1.87 times longer than high, bearing long dorsal hairs, posterior lateral spinnerets not long, see above. - Pedipalpus: see above; patella and tibia about as wide as long.

Relationships: Probably a member of *Succinaria*; in *S. lingua* n. sp. the number of the shorter trichobothria is fewer and the structures of the pedipalpus are different.

Distribution: Eocene Baltic amber forest.

Family **INSECUTORIDAE** PETRUNKEVITCH 1942

Insecutoridae is an monogeneric extinct family which is only known from Eocene European Baltic amber; its adult female is unknown. In 2004: 1524 I provided a family diagnosis, and I wrote – under "further characters" - regarding the tarsal claws erroneously "two-clawed" instead of correctly "three-clawed".
Typical – and easily recognizable - characters of this family – see also above - are the long opisthosoma (photos 23-24), the quite short spinnerets with stout basal articles, the relatively long leg III which is not much shorter than leg IV, the long cymbium (fig. 70; similar to the Agelenidae) which bears a DORSAL-BASAL OUTGROWTH (figs. 69-70), the large and erect dorsal pedipalpal tibia apophysis, several tegular apophyses including a quite large VENTRAL one (fig. 66). Furthermore a cribellum, a colulus, feathery hairs, leg scopulae and claw tufts are absent; the position of the tarsal trichobothria is in a single row and the trochanters are not notched, the posterior eye row is slightly procurved to slightly recurved, the legs may be distinctly annulated. See the extant diverse and probably related Pisauridae above (tab. A) in which the position of the bristles of tibia and metatarsus I-II is close to the articles (fig. 33) in contrast to the Insecutoridae (fig. 68).

Questionable synonymy of the family type genus *Insecutor* PETRUNKEVITCH 1942: According to WUNDERLICH (2004: 1526) *Thyelia* KOCH & BERENDT 1854 in Baltic amber may be an older synonym.

In this paper I describe two new species and add some notes on the male of *Insecutor spinifer* WUNDERLICH 2004. The shape of their pedipalpal tibial apophyses may be used for their determination although they look quite different in an only slightly different position.

<u>List of the species of the genus *Insecutor*</u>:

aculeatus PETRUNKEVITCH 1942 (type species, based on a juv. ♀),
angustidentes n. sp.,
cymbiumseta n. sp.,
mandibulatus PETRUNKEVITCH 1942 (*),
pecten WUNDERLICH 2004,
rufus PETRUNKEVITCH 1942,
spinfer WUNDERLICH 2004.

(*) The species was based on a ?juv. ♀. The conspecifity of the male of *mandibulatus*: PETRUNKEVITCH 1946 is quite unsure, see WUNDERLICH (2004: 1526); it may well be the member of an unnamed species.

Insecutor spinifer WUNDERLICH 2004 (fig. 66), photo 24

<u>Material</u>: 1♂ in Eocene Baltic amber, F3777/BB/CJW.

The spider (photo 24) is well preserved, parts of the left legs are cut off, the body length is 4.5 mm, the legs are distinctly annulated. The left ♂-pedipalpus of the holotype is shown in fig. 66.

***Insecutor angustidentes* n. sp.** (fig. 67-70), photo 25

<u>Etymology</u>: The name of the species refers to the close position of the teeth of the anterior margin of the fang furrow, from angustus (lat.) = close together, and dens (lat.) = tooth.

<u>Material</u>: Male holotype in Eocene Baltic amber, F3778/BB/CJW.

<u>Preservation and syninclusions</u>: The spider is very well preserved on a layer in a clear yellow-orange piece of amber, its ventral sides of the body and of the right pedipalpus are partly covered with a white emulsion, some leg articles and the dorsal side of the right pedipalpus are cut off, femora I-II are laterally compressed.

Diagnostic characters (♂; ♀ unknown): Teeth of the promargin of the fang furrow as in fig. 67; pedipalpus (figs. 69-70) with complicated dorsal tibial apophyses, structures of the sclerites of the bulbus partly hidden.

Description (♂):
Measurements (in mm): Body length 5.5; prosomal length 2.3; opisthosoma: Length 3.0, width 1.4; tarsus I 1.4, leg II: Femur ca. 3.3, patella 1.0, tibia 3.5, metatarsus 3.9, tarsus 1.4, tibia III 2.9, tibia IV 3.1.
Colour light yellow-brown, legs not annulated.
Prosoma (fig. 67, photo) low, not much longer than wide, hairs indistinct, fovea a quite large furrow, 8 eyes of medium size in two rows, posterior row slightly recurved, lateral eyes widely spaced from each other, posterior median eyes spaced by their diameter, clypeus not long and not protruding, basal cheliceral articles slender and fairly diverging, condylus well developed, fangs long and strongly bent, anterior margin of the fang furrow bearing 3 larger and 2 short teeth close together, posterior margin, mouth parts and sternum hidden. - Legs (fig. 68, photo) long and slender, order probably IV/I/II/III, III not much shorter than IV, feathery hairs, scopulae and claw tufts absent, hairs indistinct, bristles long, numerous and strongly standing out from their articles, existing from femora to metatarsi, femora dorsally 1/1, additionally at least on I 1 prolaterally in the distal half, as well as a lateral-subapical pair, patellae dorsally with a small basal and a long subapical bristle, laterally none, tibiae dorsally 1/1, I-II additionally with 2 ventral pairs, a lateral pair in the distal half and a pair of short apical-ventral pair, metatarsi I-II with ca. 6 long ventral and lateral as well as short subapical bristles, legs III-IV with numerous bristles, tarsi with long dorsal trichobothria which are not distinctly increasing in length, paired tarsal claws with numerous very long teeth, unpaired claw well developed, bent in a right angle, apparently smooth. - Opisthosoma (photo) 2.14 times longer than wide, slender, not depressed, bearing few indistinct hairs, feathery hairs absent, spinnerets hidden, apparently quite short. - Pedipalpus: See above.

Relationships: According to the pedipalpal tibial apophyses *I. spinifer* WUNDERLICH 2004 may be most related.

Distribution: Eocene Baltic amber forest.

***Insecutor cymbiumseta* n. sp.** (figs. 71-72)

Etymology: The name of the species refers to the long bristle of its cymbium, from (lat.) = seta.

Material: Male holotype in Eocene Baltic amber, F3779/BB/CJW.

Preservation and syninclusions: The spider is incompletely and badly preserved in a yellow-orange piece of amber, parts of its left and ventral side are covered with a white emulsion, its right side is hidden by a fissure and emulsions, most leg articles and dorsal parts of the left cymbium are cut off, the left leg IV is completely preserved, the opisthosoma is laterally depressed. - Further organic inclusions are absent.

Diagnostic characters (♂; ♀ unknown): Position of the eyes and teeth of the fang furrow unknown; pedipalpus as in figs. 71-72 cymbium with a large retrolateral bristle.

Description (♂):
Measurements (in mm): Body length ca. 5.3; prosomal length ca. 2.3; opisthosoma: Length ca. 3.1, height 0.9; leg I: Metatarsus 4.0, tarsus 1.6, metatarsus IV 3.5.
Prosoma and most parts of the legs – they may be similar to *I. angustidentes* n. sp. - are hidden by a white emulsion or cut off; pedipalpus: See above.

Close **relationships** are unsure to me; the structures of the bulbus are similar to other congeneric species.

Distribution: Eocene Baltic amber forest.

Family LIOCRANIDAE

Liocranidae is a composition of quite different genera; an apopmorphic character of this famiy is unknown to me. Some Liocranidae are examples for those two-clawed taxa in which a claw tuft is absent like in the new genus described below.
In Eocene Baltic amber members of two genera were known: *Apostenus* WESTRING 1851 (extant and Eocene) and *Palaeospinisoma* WUNDERLICH 2004 in Baltic amber. See WUNDERLICH (2004: 1623-1635). Here I add a third genus in Baltic amber.

Spinatibia n. gen.

Etymology: The name of the genus refers to the spine (lat. = spina) of the pedipalpal tibia.

The gender of the name is feminine.

Type species (by monotypy): *Spinatibia curvitibia* n. sp.

Diagnostic characters (♂; ♀ unknown): Leg I as in fig. 73, trochanters quite short and not notched, feathery hairs, claw tufts and scopulae absent; pedipalpus (figs. 75-76): Patella with a large retrolateral apophysis, tibia with a spine-shaped retrolateral apophysis, median apophysis stout, tegular apophysis long, questionable embolus long, in a distal position.

The **relationships** are unsure. According to the absence of claw tufts and fairly similar structures of the bulbus *Liocranum* WESTRING 1851 may be related, in which a patellar pedipalpal apophysis is absent.

Distribution: Eocene Baltic amber forest.

***Spinatibia curvitibia* n. gen. n. sp.** (figs. 73-76), photos 26-27

Etymology: The name of the species refers to the curved pedipalpal tibia, from curvatus (lat.) = bent.

Preservation and syninclusions: The spider is completely preserved in a 4 cm long piece of amber which is full of fissures and tiny bubbles; its dorsal side and its mouth parts are covered with a white emulsion. - Syninclusions are half a dozen Diptera: Nematocera, 1 Collembola, 1 Formicidae, 1 Arthropoda indet., remains of a juv. Araneae indet., several parts of earth as well as several ballets of excrement of insects but I did not find plant stellate hairs.

Material: Holotypus ♂ in Eocene Baltic amber, F3768/BB/CJW.

Diagnosis and **relationships**: See above.

Description (♂; ♀ unknown):
Measurements (in mm): Body length 4.0; prosoma: Length ca. 2.2, width ca. 1.65, width of the posterior eye row ca. 0.5, diameter of a posterior median eye ca.0.1; opisthosoma: Length 2.0, width 1.2; leg I: Femur ca. 1.75, patella ca. 0.7, tibia ca. 1.6, metatarsus ca. 1.3, tarsus ca. 1.0; metatarsus IV ca. 2.3.
Colour medium to dark brown, legs not annulated, opisthosoma light grey except the brown epigaster.
Prosoma (photos) 1.5 times longer, than wide, strongly covered with a white emulsion, cuticula almost smooth, dorsally covered with thin hairs, anteriorly not distinctly narrowed, 8 eyes (so far recognizable) in two rows, only fairly large, posterior row straight, posterior median eyes spaced by almost their diameter, thoracal fissure indistinct, fangs long and slender, labium wider than long, gnathocoxae slightly converging, longer than wide, ventrally not inclined, sternum 1.28 ties longer than wide, not elongated between the coxae IV. - Legs (fig. 73, photos) only fairly long, strong, order IV/I/II/III, femora thick, coxae long, trochanters quite short and not notched, feathery hairs, claw tufts and scopulae absent, hairs not distinct, bristles – so far recognizable – numerous on III-IV, femora several, patellae probably none, tibia I-II 3 ventral pairs, metatarsus I-II 2 ventral pairs, trichobothria not studied, tarsal claws with long teeth. - Opisthosoma oval, 1.7 times longer than wide, epigaster probably sclerotized, most probably 3 pairs of spinnerets, anterior pair (fig. 74) fairly long, not widely spaced, bearing long spigots, colulus absent. - Pedipalpus (see also above): Cymbium short, bulging retrobasally, hairs short.

Distribution: Eocene Baltic amber forest.

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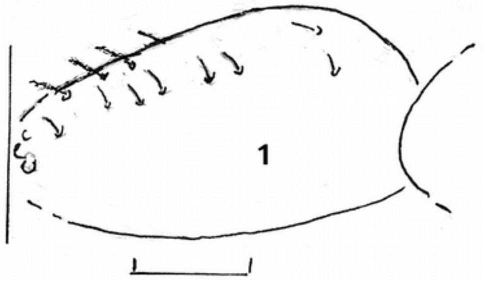
INDEX



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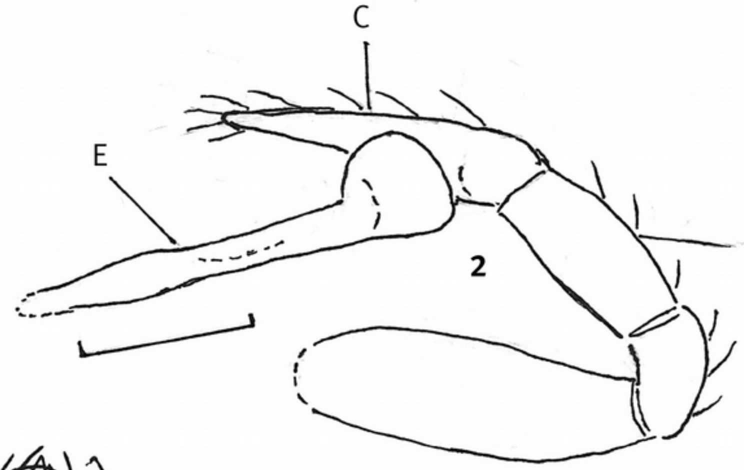

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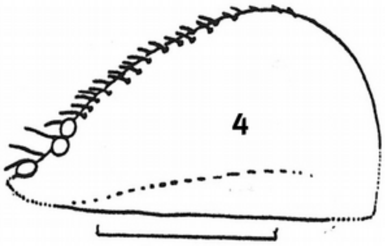

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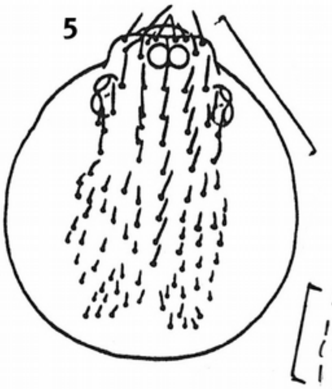

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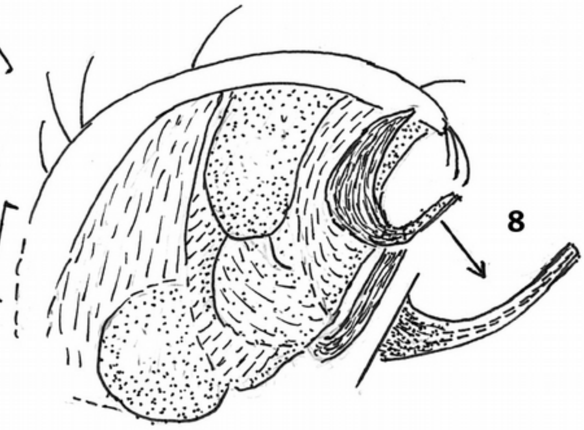

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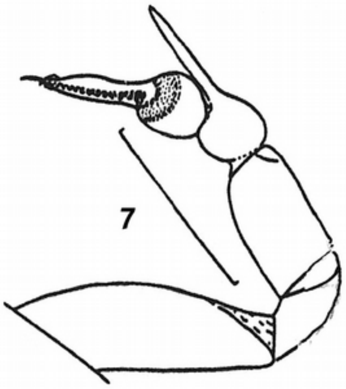

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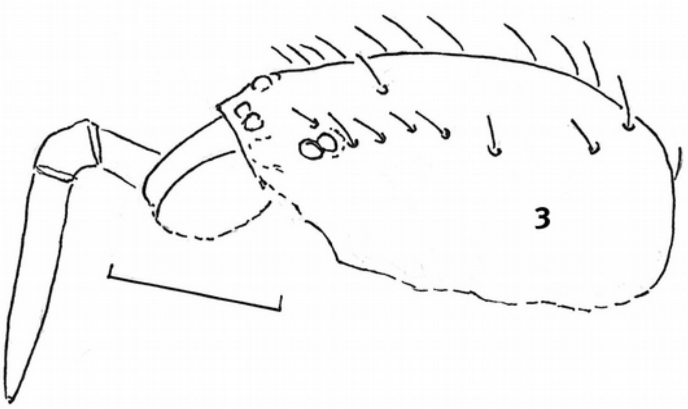

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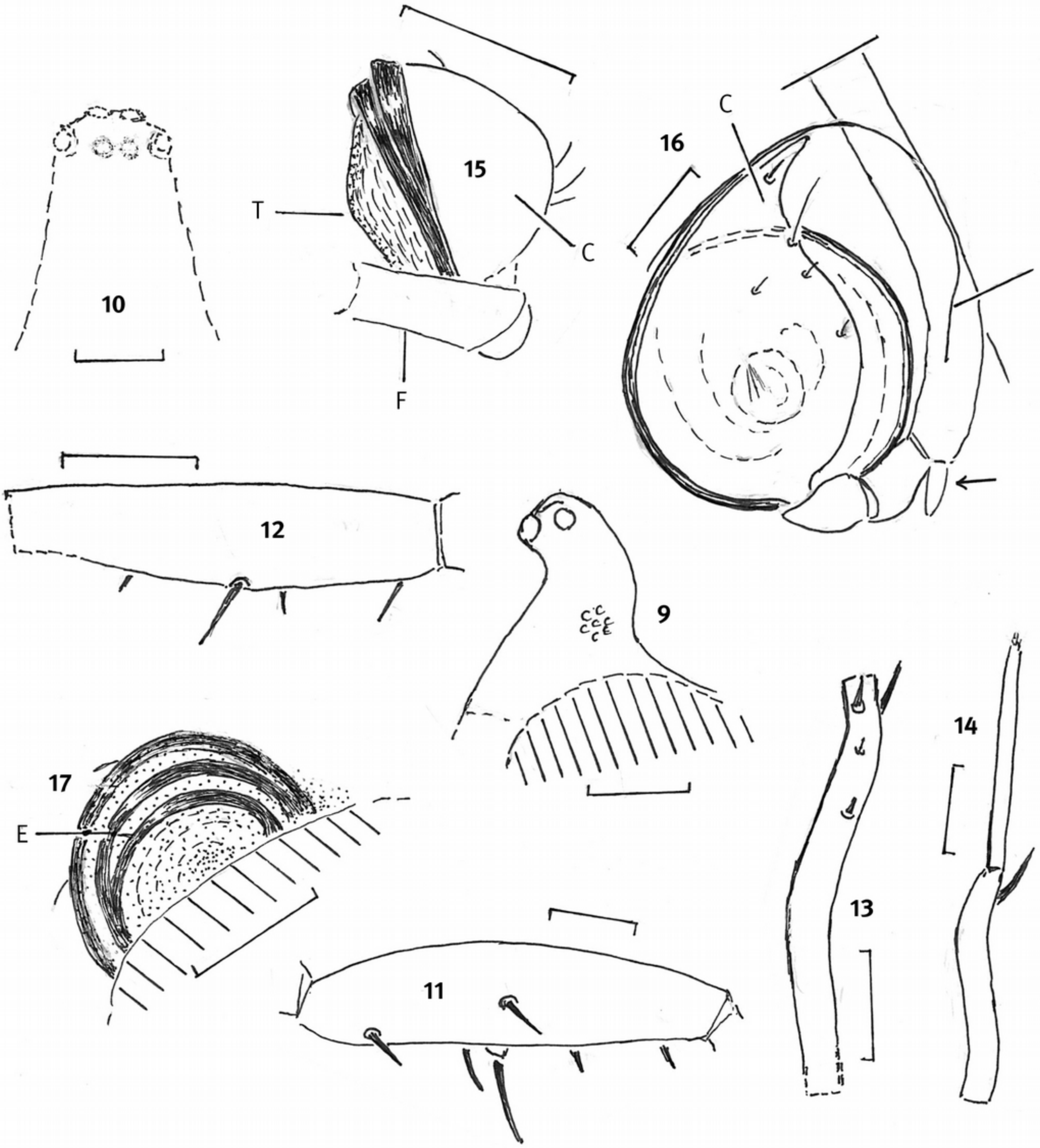
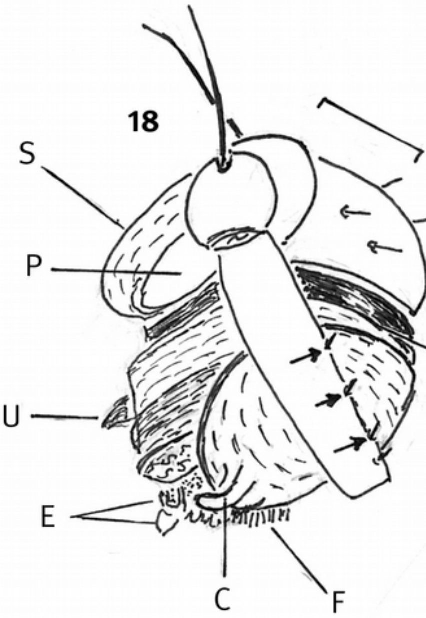
Figs. 1-3: *Scytodes daniloharms* **n. sp.** (Scytodidae); 1-2) ♂ holotype; 1) lateral aspect of the prosoma which is partly hidden; 2) retrolateral aspect of the left pedipalpus. The tip of the embolus is covered with a white emulsion; 3) paratype, ?subad. ♀, lateral aspect of prosoma and left pedipalpus. Not all hairs are drawn. - C = cymbium, E = embolus;

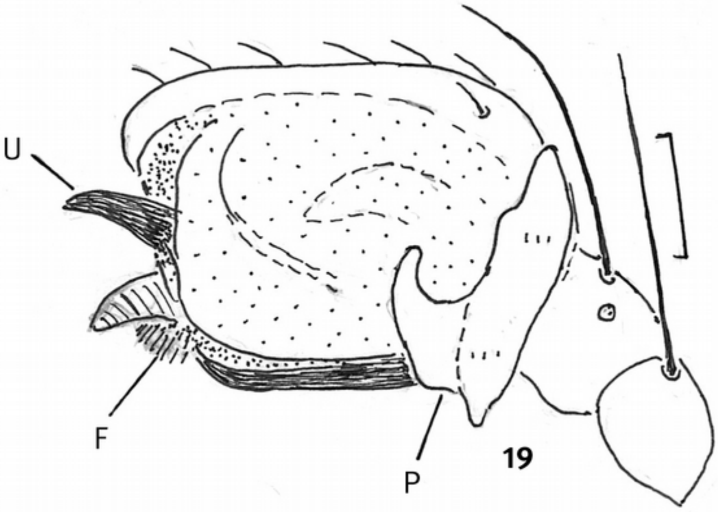
4-7: *Scytodes weitschati* WUNDERLICH 1993 (Scytodidae), ♂ holotype; 4-5) lateral and dorsal aspect of the prosoma; 6-7) dorsal and retrolateral aspect of the left pedipalpus;

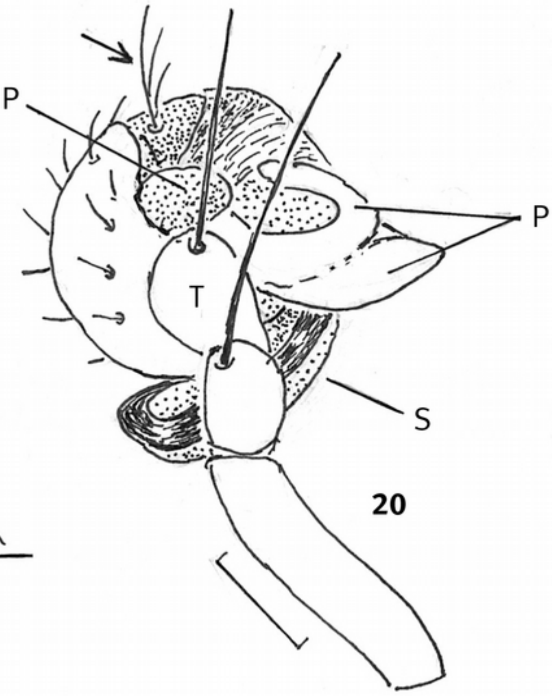
8) *Opellianus fissura* **n. sp.** (Uloboridae), ♂, retrolateral aspect of the right pedipalpus. Parts are hidden by emulsions and a fissure in the amber. The questionable embolus is enlarged (arrow). - Scales: 1.0 mm in figs. 4-5), 0.2 in 2), 0.1 in 1), 0.5 in the remaining figs.;

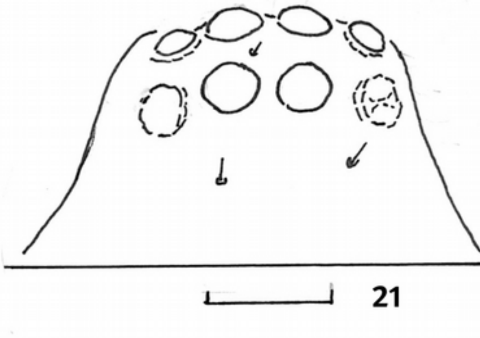


figs. 9-17: *Balticonopsis duplo* **n. sp**. (Anapidae), ♂; holotype figs. 9, 11, 13, 15-17, remaining: paratype; 9) lateral-basal aspect of the prosoma which is retroventrally cut off; 10) anterior aspect of the prosoma which is partly hidden by a white emulsion; 11) proventral aspect of the left tibia **I**; 12) proventral aspect of the right tibia **I**; 13) ventral-distal aspect of the left metatarsus **I**; 14) dorsal aspect of the left tarsus and metatarsus **I**; 15) retrolateral aspect of the left pedipalpus; 16) retrolateral aspect of the right pedipalpus with dorsal aspect of the cymbium. The structures of the bulbus are shining through the cymbium. The arrow points to the dorsal-apical femoral apophysis. - C = cymbium, E = embolus, F = femur, T = tegulum. Scales: 0.1 mm in fig. 16), 0.2 mm in the remaining figs.;



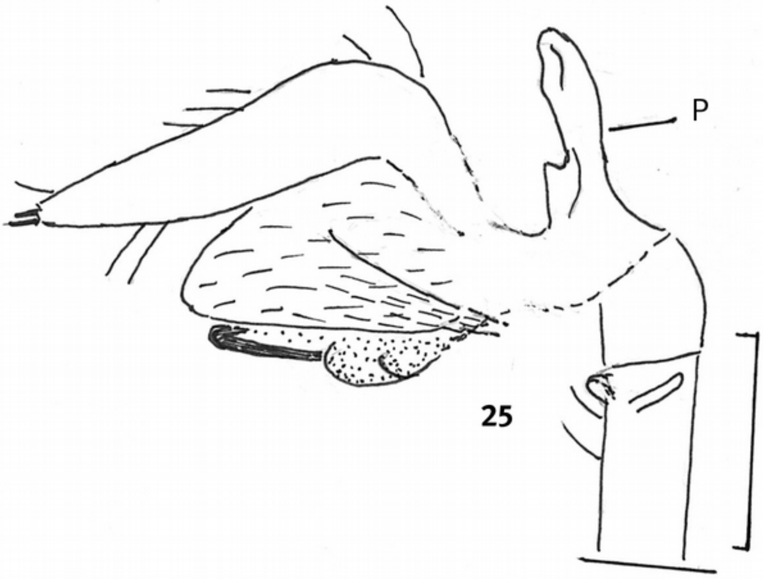






figs. 18-20: *Palaeophantes paracymbium* **n. gen. n. sp.** (Linyphiidae), ♂; 18) dorsal-basal aspect of the left pedipalpus; 19) retrolateral aspect of the left pedipalpus; 20) retrodorsal-basal aspect of the right pedipapus. The arrow points to few longer hairs of the tegulum. - C = claw-shaped apophysis of the tegulum, E = embolic division, F = fringed suprategular apophysis, P = paracymbium, S = subtegulum, T = tibia, U = suprategular apophysis. Scales: 0.1 mm;

figs. 21-22: *Esuritor nonincisio* **n. sp**. (Pisauridae), ♂; 21) dorsal aspect of the anterior part of the prosoma. Both posterior lateral eyes are covered with emulsions; 22) prodorsal aspect of the left tibia I. Only few hairs are drawn. - Scales 0.2 and 0.5 mm;



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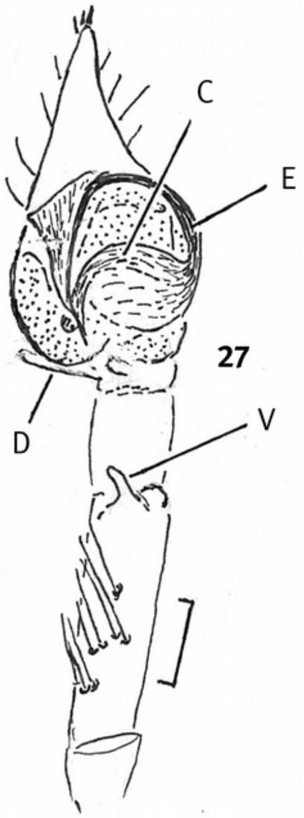

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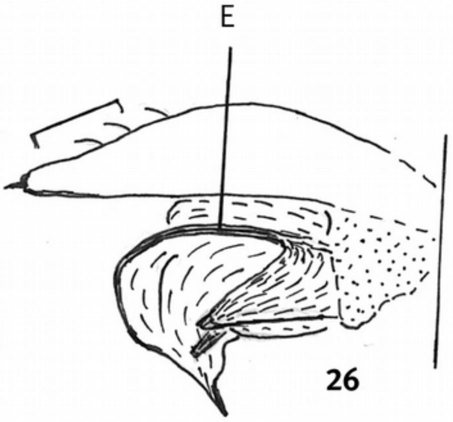
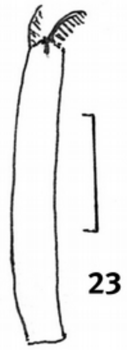


26



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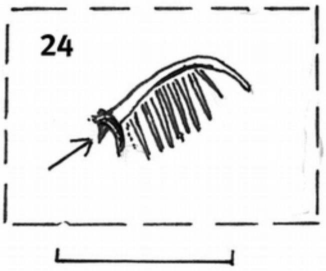
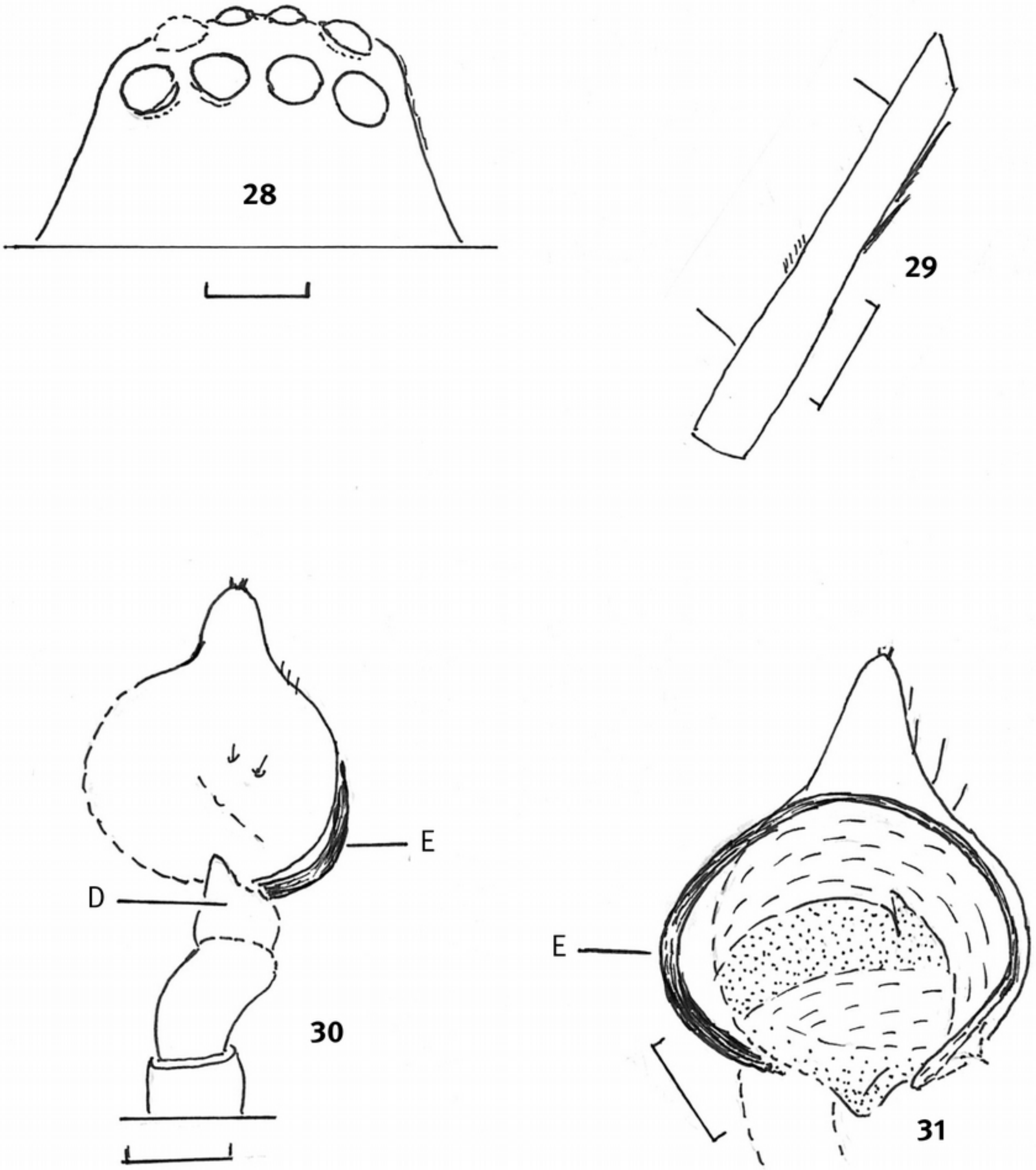
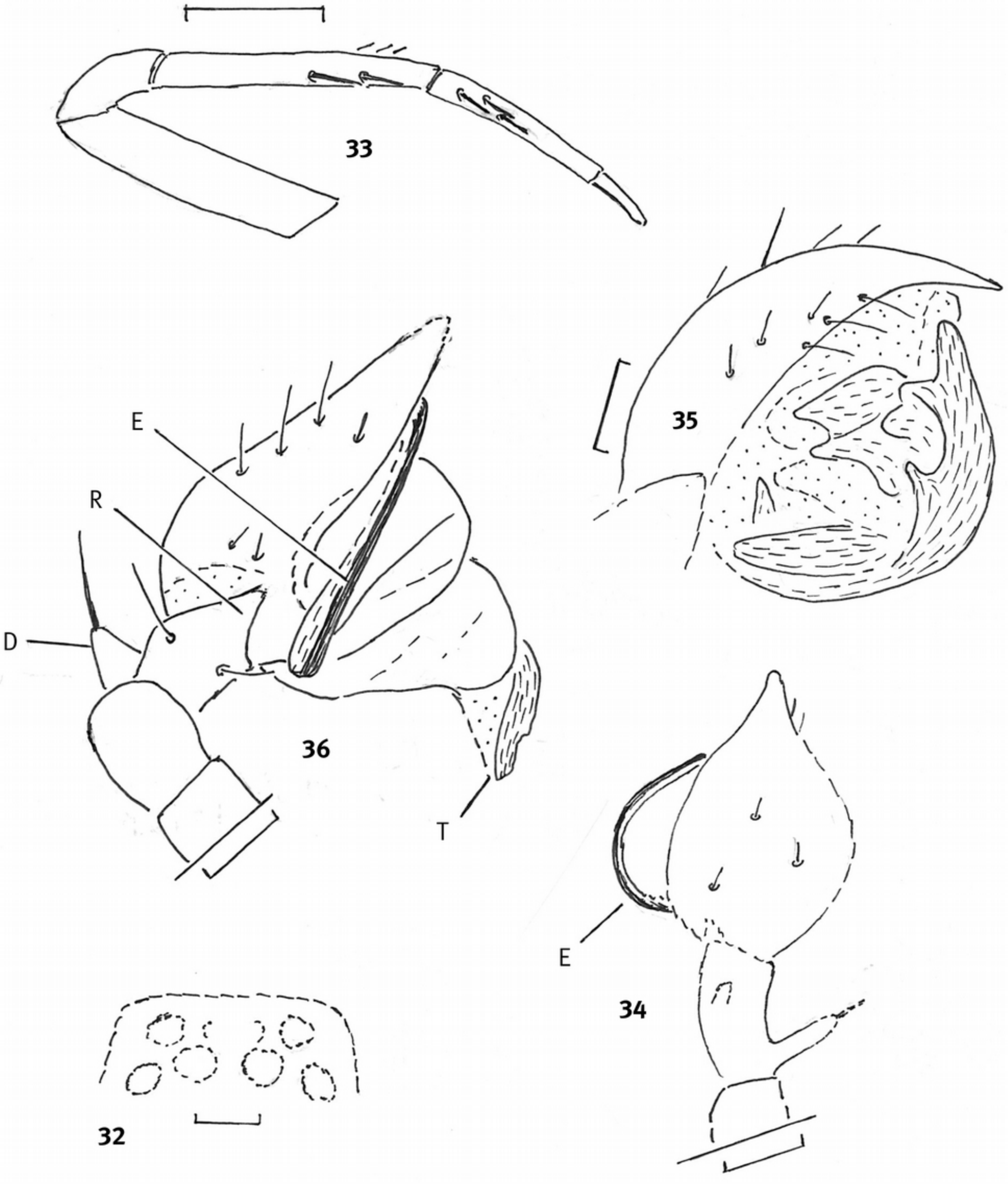


24

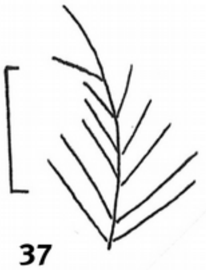
figs.23-27: _Esuritor nonincisio_ **n. sp**. (Pisauridae), ♂; 23) retroventral aspect of the right tarsus III. Hairs and trichobothria are not drawn; 24) retroventral aspect of the paired pro-claw and the unpaired claw of the right tarsus III; 25) retrolateral (femur more ventral) aspect of the left pedipalpus; 26) prolateral aspect of the right pedipalpus; 27) ventral aspect of the right pedipalpus. - C = conductor, D = dorsal tibial apophysis, E = embolus, M ?= median apophysis, V = ventral-apical femoral apophysis. Scales: 0.1 mm in fig. 24), 0.2 mm in the remaining figs.;



figs. 28-31: *Esuritor duospinae* **n. sp**. (Pisauridae), ♂; 28) dorsal aspect of the eyes; 29) prolateral aspect of the left tibia **I**; 30) dorsal (cymbium more basal) aspect of the left pedipalpus; 31) ventral aspect of the left pedipalpus. Parts are hidden. Only few hairs are drawn. - D = dorsal apophysis of the tibia, E = embolus. Scale = 0.2 mm;



figs. 32-36: *Esuritor rovnoensis* **n. sp**. (Pisauridae), ♂; 32) dorsal aspect of the eyes. The anterior median eyes are completely covered with a emulsion; 33) prodorsal (femur more ventral) aspect of the left leg I. The long dorsal-apical patellar bristle of this leg is broken off; 34) dorsal aspect of the right pedipalpus. Parts are hidden by an emulsion; 35) retrolateral aspect of the right pedipalpus. Parts are hidden; 36) prolateral and slightly basal aspect of the left pedipalpus. Parts are hidden. - D = dorsal tibial apophysis, E = embolus, R = retroapical tibial apophysis, T = tegular apophysis. Scales: 1.0 mm in fig. 33), 0.2 mm in the remaining figs.;



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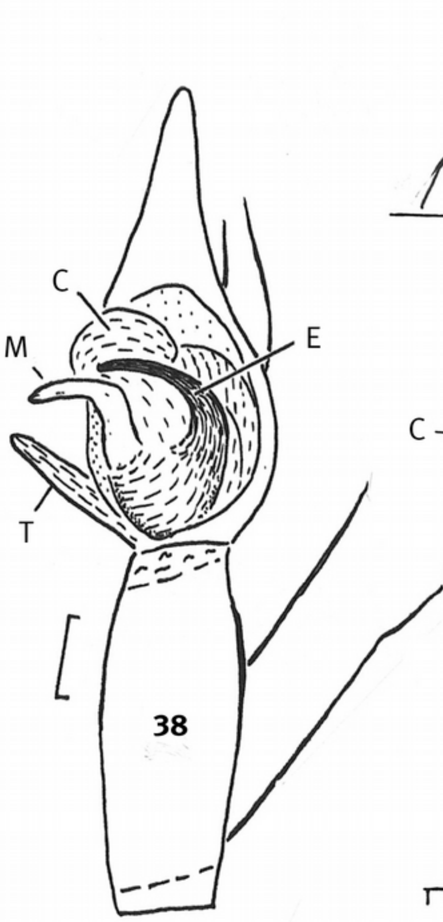

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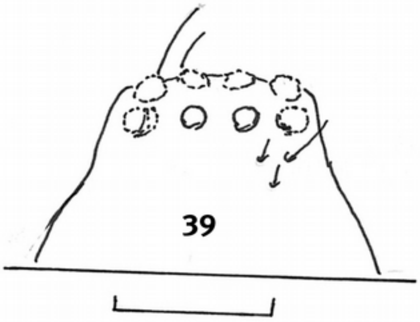

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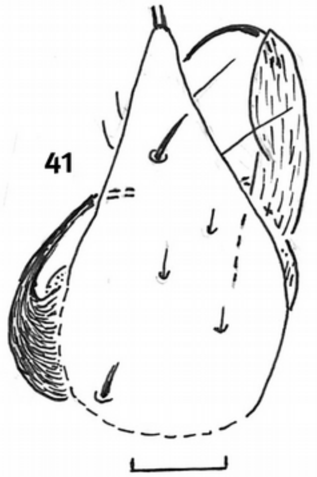

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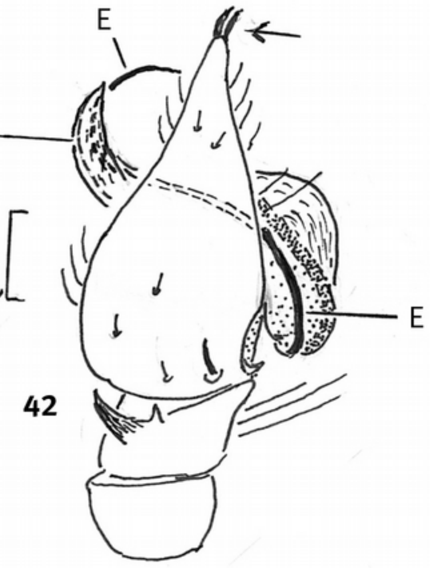

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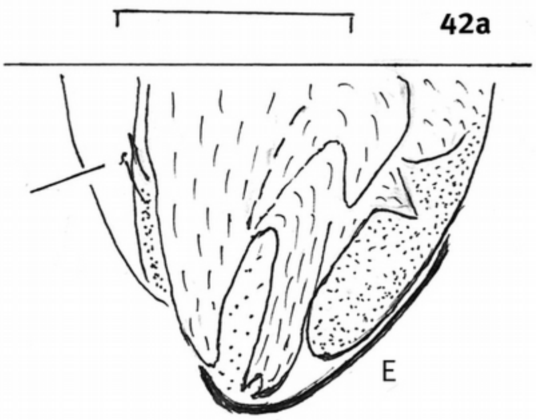

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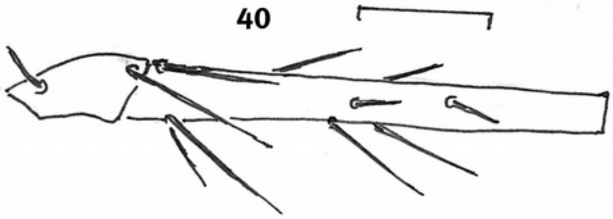
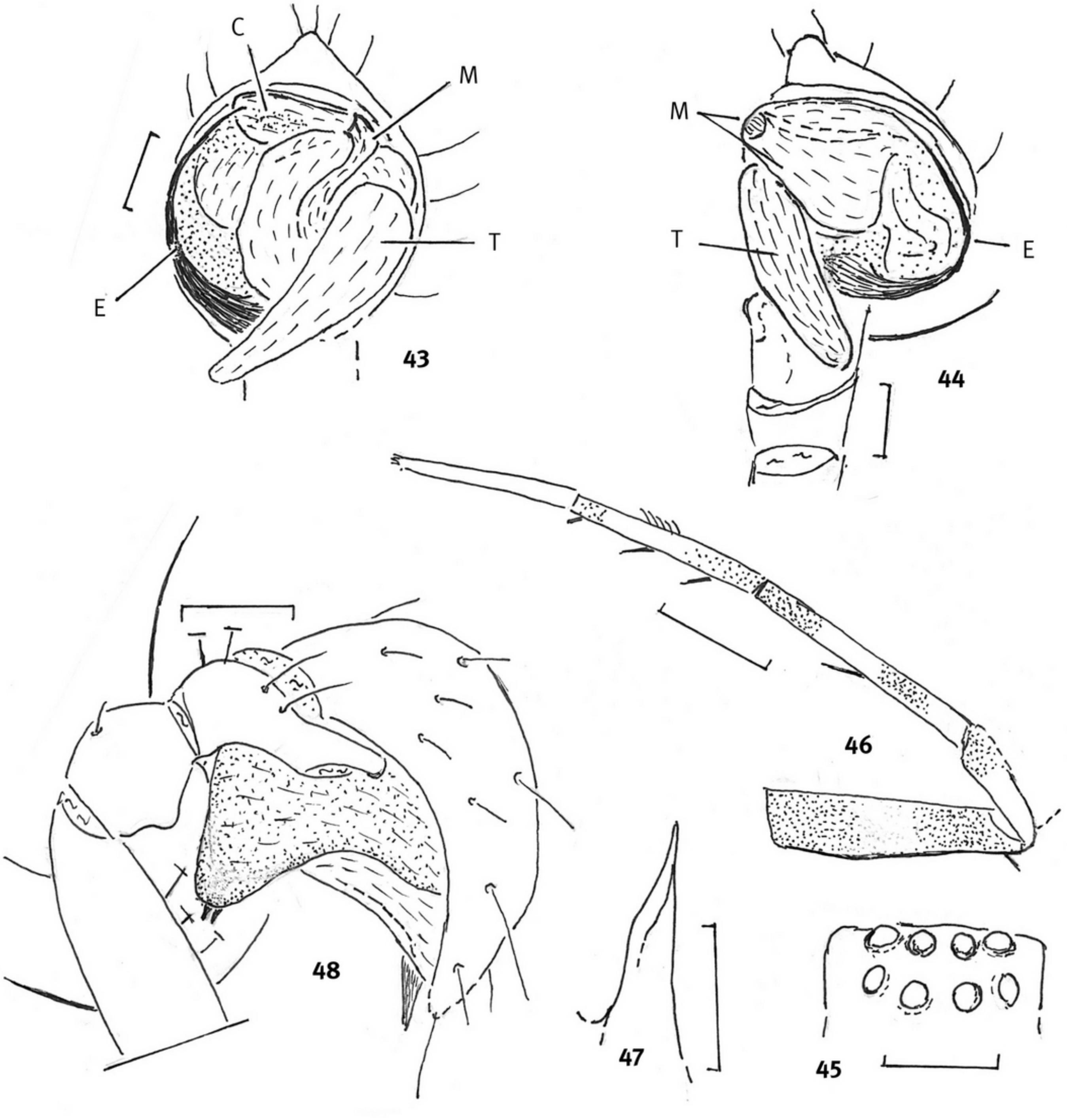


40

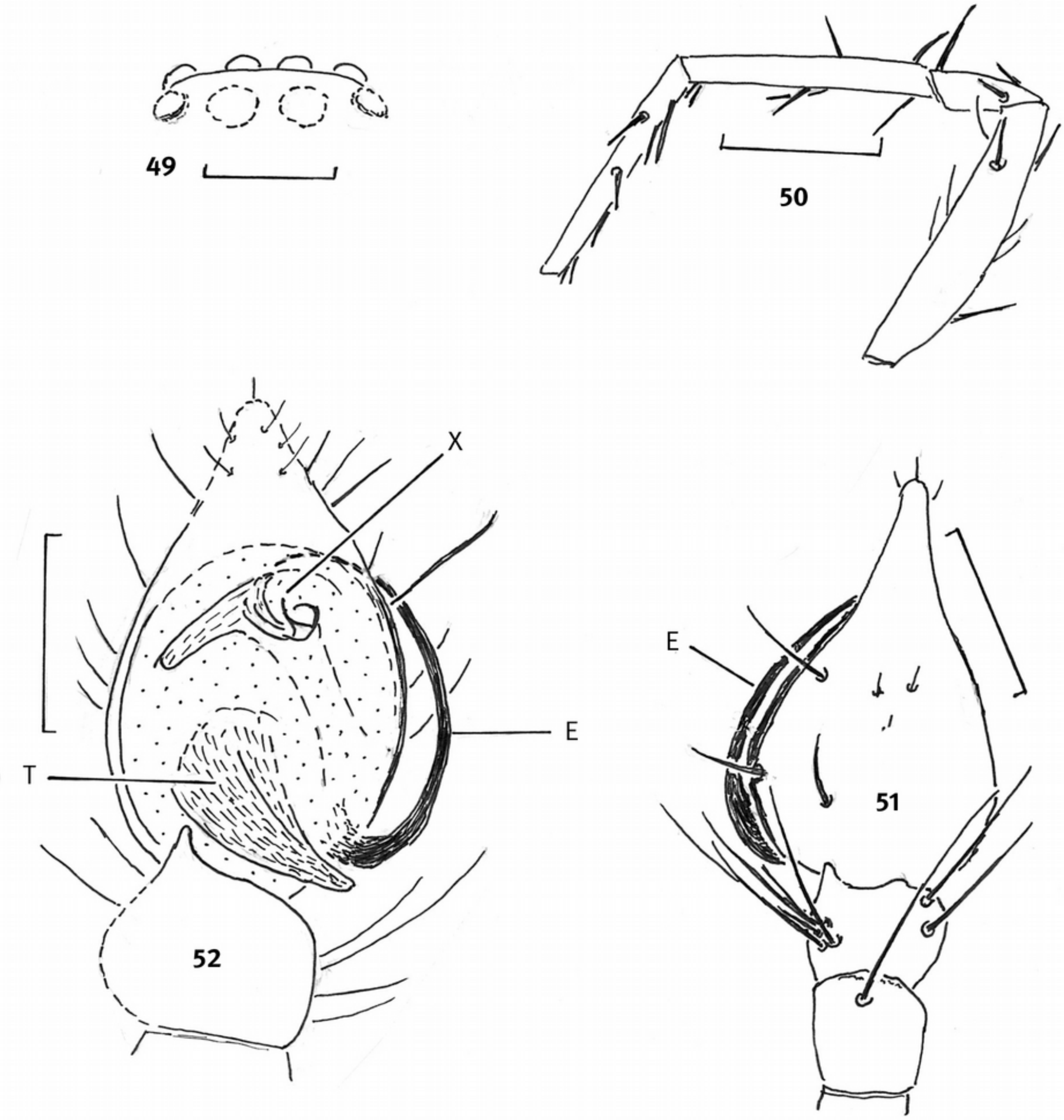
fig. 37) Feathery hair of an extinct ?*Tegenaria* sp. (Agelenidae) in Baltic amber; 38) ?*Tegenaria obtusa* WUNDERLICH 2004, proventral aspect of the right pedipalpus;

figs. 39-42a: *Unguistegenaria sinemammillae* **n. gen. n. sp.** (Agelenidae), ♂; 39) dorsal aspect of the eyes which are partly covered with a white emulsion; 40) prolateral aspect of the left patella and tibia I. Not all bristles and no long hairs are drawn; 41) dorsal aspect of the right cymbium, embolus and conductor; 42) prodorsal aspect of the left pedipalpus. The arrow points to the apical cymbial claws; 42a) ventral aspect of the distal bulbus structures of the right pedipalpus. - C = conductor, E = embolus, M = median apophysis, T = tegular apophysis. Scales: 0.1 mm in fig. 37), 0.5 mm in figs. 39-40), 0.2 mm in the remininhg figs.;

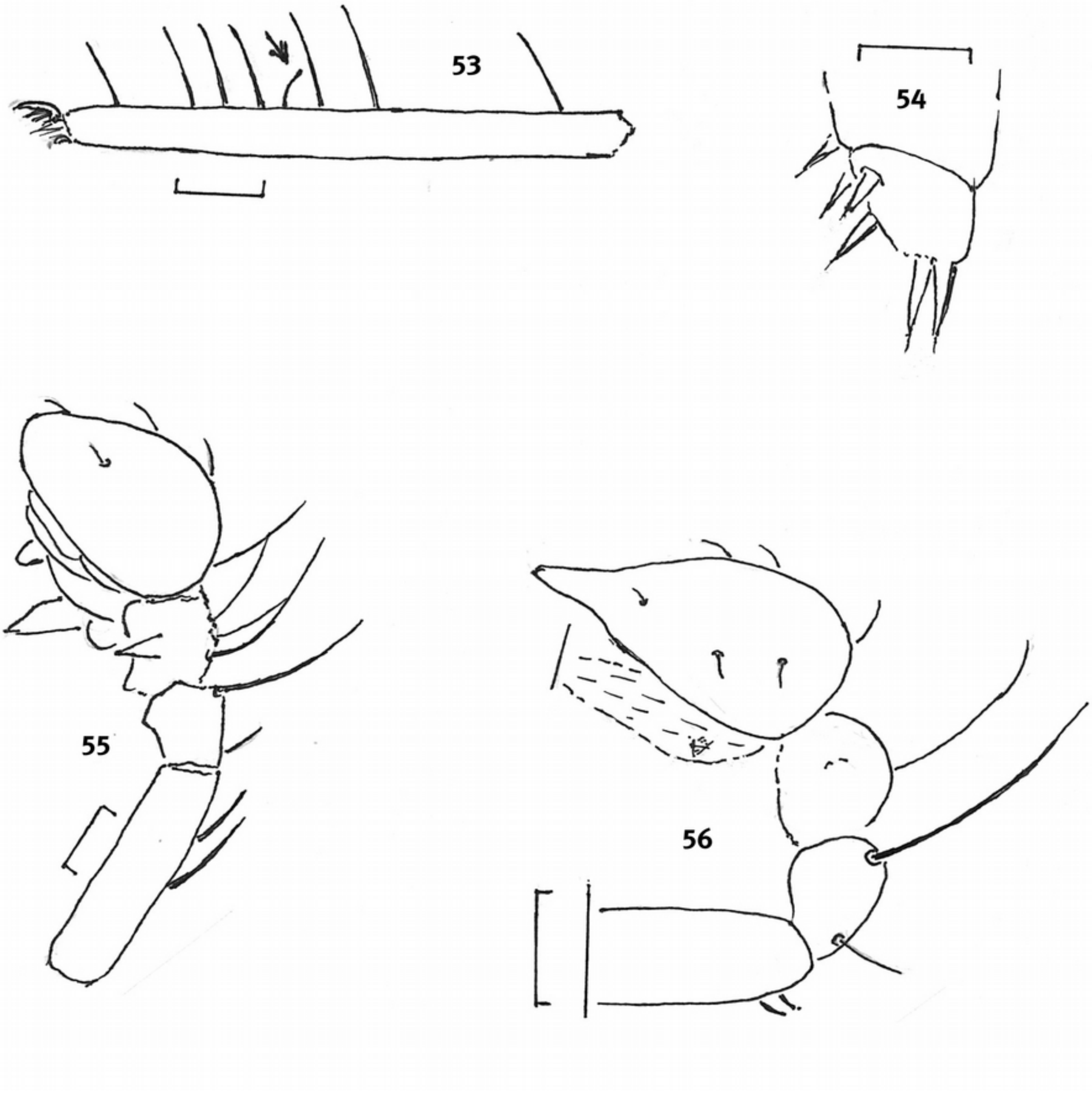


figs. 43-44: *Eocryphoeca amputata* **n. sp.** (Cybaeidae), ♂; 43) ventral aspect of the left pedipalpus; 44) ventral-apical aspect of the right pedipalpus;

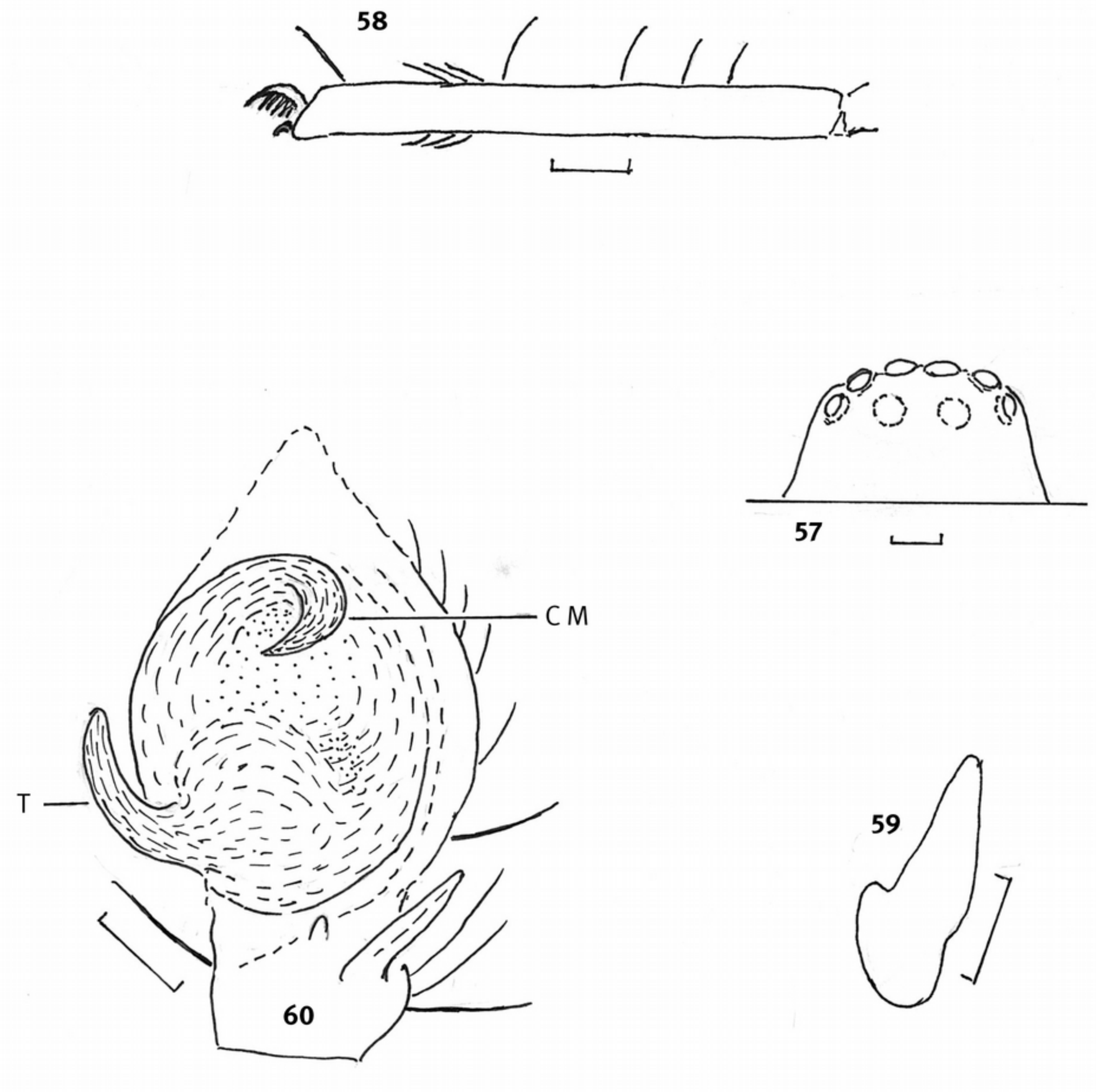
figs. 45-48: *Eocryphoeca laesa* **n. sp**. (Cybaeidae), ♂; 45) dorsal position of the eyes; 46) retrodorsal aspect of the left leg I. In this position only a single femoral bristle is observable; 47) ventral aspect of the retrolateral tibial apophysis of the left pedipalpus; 48) retrolateral aspect of the right pedipalpus. - C = questionable conductor, E = embous, M = median apophysis, T = tegular apophysis. Scales: 1.0 mm in fig. 46), 0.5 mm in fig. 45), 0.2 mm in the remaining figs.



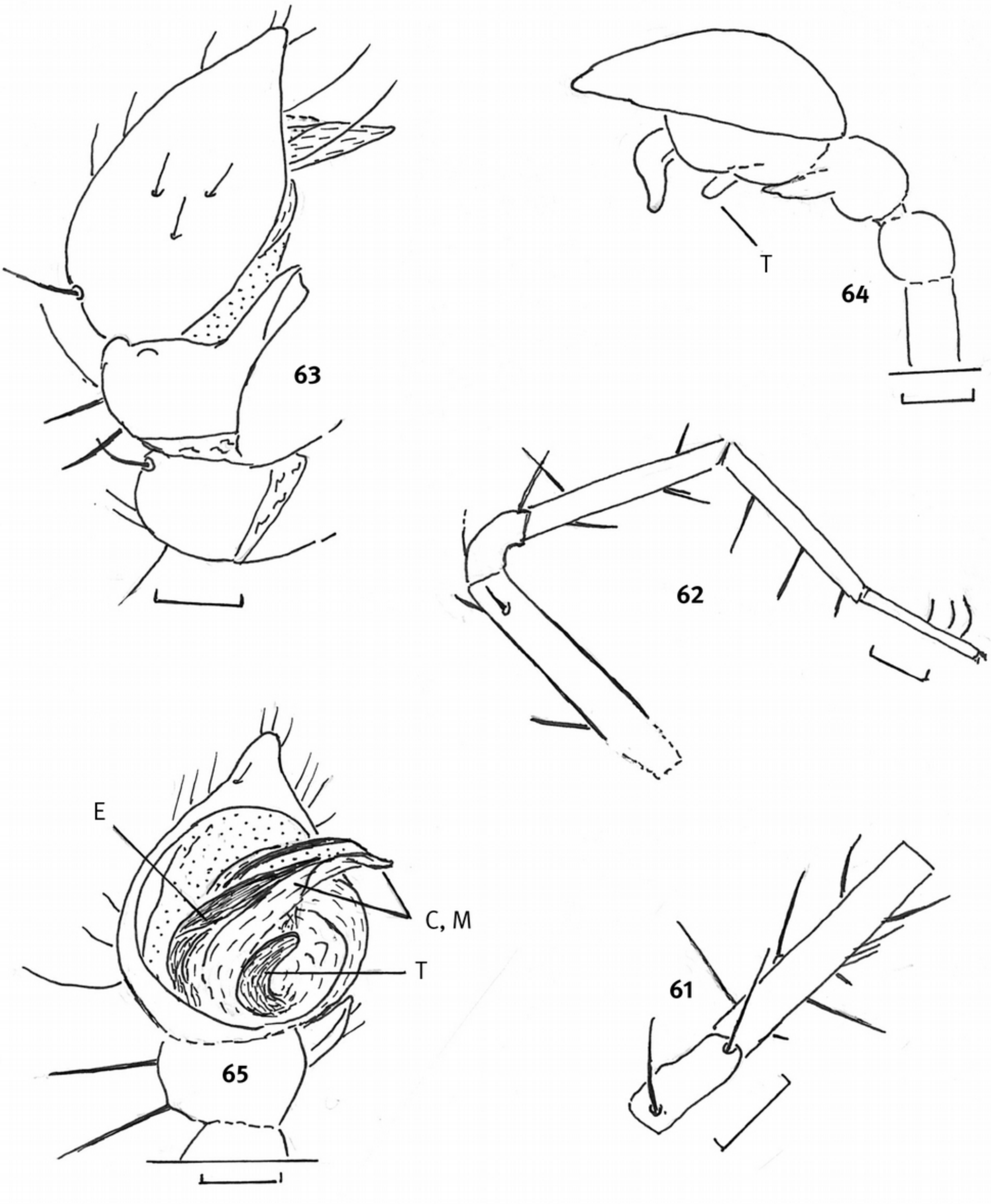
figs. 49-52: Eocryphoeca sp. indet. (Cybaeidae), ♂; 49) dorsal aspect of the eyes which are partly covered with an emulsion; 50) prolateral aspect of femur to metatarsus of the right leg II; figs. 51-52) dorsal and ventral aspect of the right pedipalpus. Parts of the bulbus are hidden by a white emulsion. - E = embolus, T = erect ventral tegular apophysis, X = tip of the spirally structure. Scales: 1.0 mm in fig. 50), 0.5 mm in fig. 49), 0.2 mm in figs. 51-52);



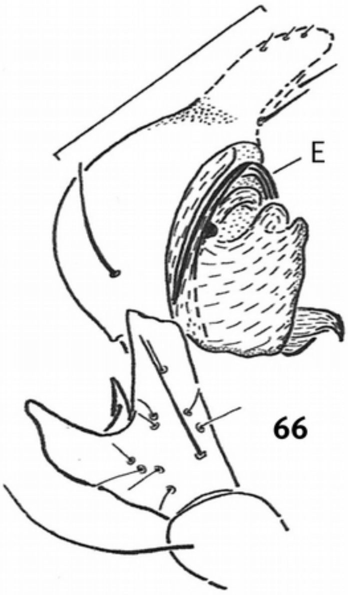
figs. 53-56: Scutcybaeus brevitricha **n. gen. n. sp**. (Cybaeidae), ♂; 53) prolateral aspect of the right tarsus I. The arrow points to one of the few short trichobothria. Note the long and almost bristle-shaped dorsal hairs; other hairs are not drawn; 54) dorsal aspect of the distal part of the right posterior lateral spinneret. Hairs are not drawn; 55) retrodorsal and slightly basal aspect of the left pedipalpus; 56) prolateral aspect of the right pedipalpus which bulbus is mainly hidden in this position. - Scale: 0.1 mm in fig. 54), 0.2 mm in the remaining figs.



figs. 57-60: ?*Succinaria adcoccinoidea* **n. gen. n. sp**. (Cybaeidae), ♂; 57) dorsal aspect of the eyes whose lenses are fairly deformed; 58) retrolateral aspect of the left tarsus IV; 59) ventral aspect of the tibia apophysis of the left pedipalpus; 60) retroventral-basal aspect of the left pedipalpus. Parts are hidden. - C = conductor/median apophysis, T = tegular apophysis. Scales = 0.2 mm;



figs. 61-65: *Succinaria lingua* **n. gen. n. sp**. (Cybaeidae), ♂; 61) dorsal aspect of the left patella and tibia III. Only few hairs are drawn; 62) retrolateral aspect of the right leg I. Three tarsal trichobothria are drawn; 63) retrodorsal aspect of the right pedipalpus; 64) retrolateral aspect of the left pedipalpus, outline; 65) ventral and slightly prolateral aspect of the left pedipalpus which may be slightly expanded. - CM = conductor/median apophysis, E = embolus, T = teguar apophysis. Scales = 0.2 mm;



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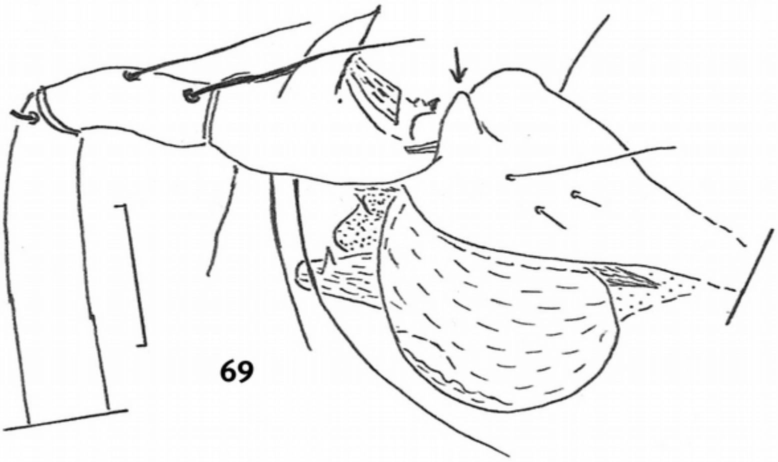

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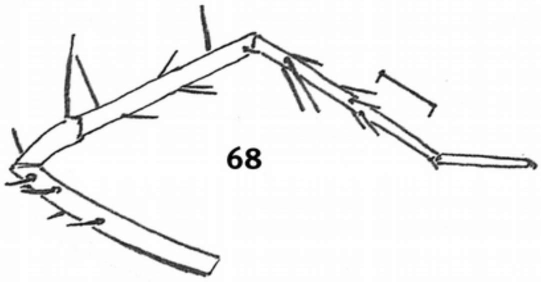

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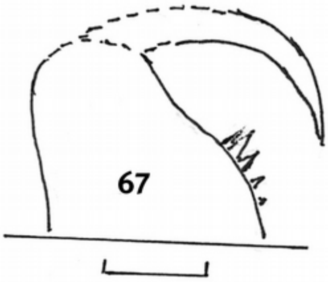

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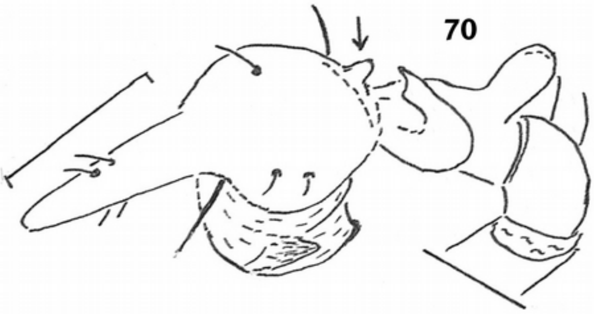

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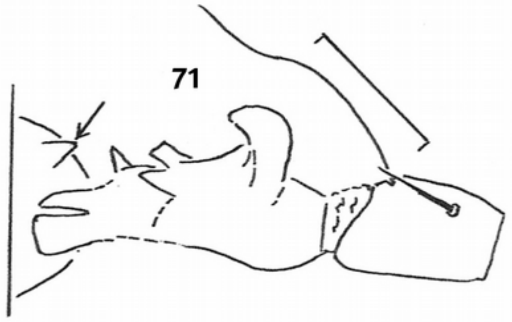
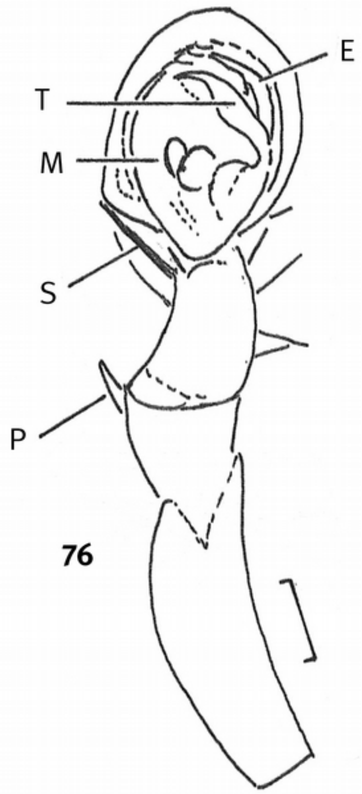
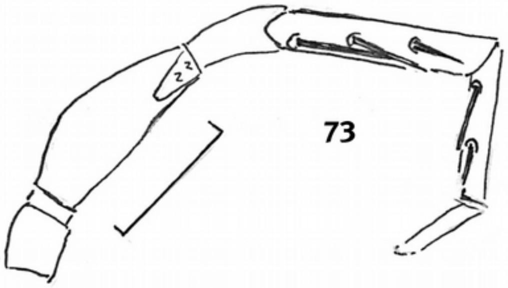
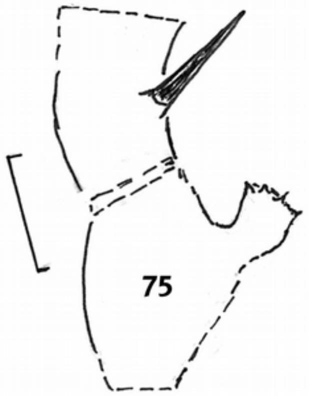
figs. 66: _Insecutor spinifer_ WUNDERLICH 2004 (Insecutoridae), ♂, prolateral and slightly basal aspect of the left pedipalpus;

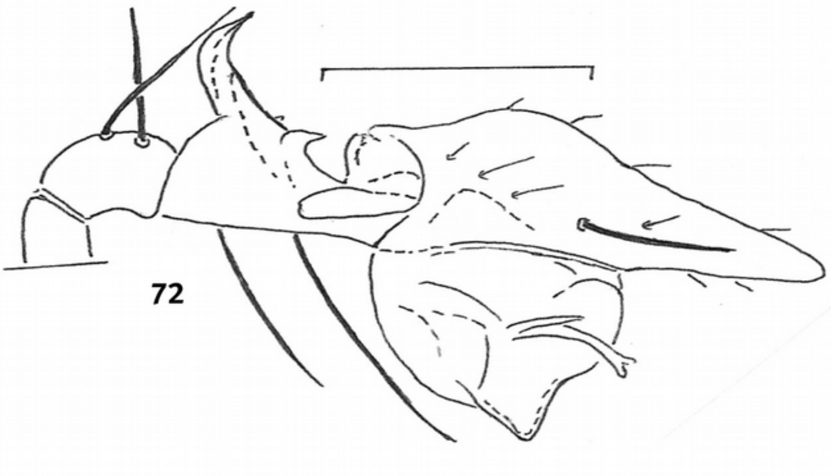
figs. 67-70: _Insecutor angustidentes_ **n. sp**. (Insecutoridae), ♂; 67) anterior aspect of the distal part of the left chelicera; 68) prolateral aspect of the left leg II. Not all bristles are observable in this position; 69) retrodorsal-basal aspect of the left pedipalpus. The arrow points to the basal outgrowth of the cymbium; 70) retrodorsal-distal aspect of the left pedipalpus.- E = embolus. Scale: 1.0 mm in figs. 66) and 68), 0.5 mm in figs. 69-70), 0.2 in fig. 67);

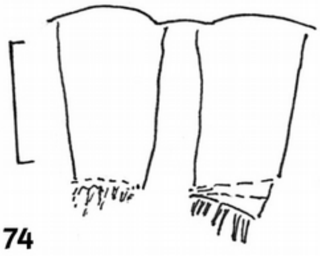












figs. 71-72: *Insecutor cymbiumseta* **n. sp**. (Insecutoridae), ♂; 71) retrodorsal aspect of patella, tibia and basal part of the cymbium of the left pedipalpus. The arrow points to the small cymbial outgrowth; 72) retrolateral aspect of the right pedipalpus. Parts are hidden;

figs. 73-76: *Spinatibia curvitibialis* **n. gen. n. sp.** (Liocranidae), ♂; 73) retrolateral (femur ventral) aspect of the right leg II; 74) ventral aspect of the anterior spinnerets; 75) dorsal aspect of patella and tibia of the right pedipalus; 76) ventral aspect of the right pedipapus. - E = questionable embolus, M = median apophysis, P = patellar apophysis, S = spine-shaped retrolateral tibia apophysis, T = tegular apophysis. Scales: 1.0 mm in fig. 73), 0.5 mm in figs. 71-72), 0.2 mm in the remaining figs.

BEITR. ARANEOL., 16: 162-215 (2023)

CONTRIBUTION TO THE SPIDER (ARANEIDA: ARANEAE AND CHIMERARACHNIDA) FAUA IN UPPER (MID) CRETACEOUS BURMESE (KACHIN) AMBER

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ABSTRACT: The following spider taxa (order Araneida) in Upper (Mid) Cretaceous Burmese (Kachin) amber (Burmite), 100-110 million years old, are described: **(1)** Suborder CHIMERARACHNIDA: Chimerarachnidae: *Chimerarachne patrickmueller* **n. sp.**, *C. alexbeigel* **n. sp**. and *C. spiniflagellum* **n. sp.**; **(2)** Suborder ARANEAE: Scytodidae: ?S*cytodes nonalta* **n. sp.**; Tetrablemmidae: *Electroblemma retroflectum* **n. sp.**, *Kachinblemma constrictum* **n. gen. n. sp.**; Uloboridae: *Parakachin pectunculus n. gen. n. sp.*; Protoaraneoididae: *Spinipalpitibia occulta* **n. sp.**; Megasetidae: *Parvimegasetae araneoidea* **n. gen. n. sp.**; ?Mysmenidae: *Myanmarmysmena grandipalpus* **n. gen. n. sp.**; Nanoaenigmatidae **n. fam.**: *Nanoaenigma pumilio* **n. gen. n. sp.**; Zarqaraneidae: *Curvitibia pellucidus* **n. sp.**, ?*Cornicaraneus unuspedipalpus* **n. sp.**, *Gibberaraneoid furcula* **n. gen. n. sp**. - *Parachimerarachne* WUNDERLICH 2022 is regarded as a junior synonym of *Chimerarachne* WANG et al. (2018) (**n. syn**.). Ideas regarding phylogeny and relationships of the suborder Chimerarachnida - including a revised diagnosis and the new term METACYMBIUM -, as well as of the high taxa Araneae, Araneida, Araneoidea and the symphytognathidan branch are presented. - The Cretaceous taxa represent a remarkable and unique MIX OF TAXA PRESERVED IN AMBER OF THE SAME DEPOSIT: (1) Both suborders of spiders (Araneae and Chimerarachnida), (2) the high branches Mesothelae, Mygalomorpha and Araneomorpha, and (3) ancestors of the RTA-clade as well as members of the very large branches Araneoidea, Deinopoidea and Synspermiata. - The present fossils offer keys (a) to the phylogeny of spiders (Araneida), and (b) to the knowledge of the origin(s) of the orb web; see the paper on extant spiders of the Algarve in this volume.

Selected key words: Amber, Annelida, Arachnida, Araneae, Araneida, autotomy, Burmite, Chimerarachnida, Cretaceous, evolution, fossils, fungal spores, healing, moulting, Nanoaenigmatidae, orb web phylogeny, regeneration, spiders, spider threads, symphytognathidan branch.

Acknowledgements: For providing me material of most fossil spiders and taking the photos of *Chimerarachne patrickmueller* n. sp. together with JOACHIM HAUG in Munic (München) - using the special camera KeyenceVHX 6000 - I thank very much PATRICK MÜLLER in Käshofen. For providing me selected fossil spiders and taking most photos (using stackmaster) I thank very much ALEXANDER BEIGEL in Aachen.

The **material** of the Upper (Mid) Cretaceous Burmese (Kachin) amber (Burmite) comes from the Kachin State of North Myanmar (Burma), mainly from various Chinese dealers via German dealers and friends, is kept in the collection of Jörg Wunderlich (CJW), and will later be given to an institution like Senckenberg in Frankfurt a. M. (SMF) or to the University of Hamburg.

INTRODUCTORY REMARKS

In this paper three further species of the recently discovered, most prominent and exciting extinct spider suborder Chimerarachnida ("Tailed spiders") - the family Chimerarachnidae - of the order Araneida, a fascinating "evolutionary footprint", are described and discussed. The discovery of these spiders was the unexpected "lucky accident" of a Mid Cretaceous taxon which can well be regarded to be a "living fossil" already of that period. Chimerarachnida may be called the "ARCHAEOPTERYX AMONG SPIDERS".

About 55 spider families in Kachin amber are known, plus the Mysmenidae (questionable), which is reported as a named fossil taxon in this paper for the first time, see WUNDERLICH & MÜLLER (2021: 38). Furthermore few dubious taxa exist. Why "about" 55 families? (1) The real number of families of the very diverse fauna in question is still unknown – almost every year at least a single further family is reported for the first time; a huge number of undescribed taxa exists in collections all over the world, in my private collection, too. (2) Certain extinct taxa regarded actually as families – e. g., of the superfamilies Araneoidea and Deinopoidea – may turn out not to be monophyletic or derived taxa or synonyms of already described families after the closer study of already known or new material.

DESCRIPTIONS

(1) **Suborder CHIMERARACHNIDA** WUNDERLICH 2018

figs. 2-28, photos 28-36

The rare and extinct (Mid Cretaceous) spider suborder Chimerarachnida is known by the single family Chimerarachnidae WUNDERLICH 2018. These unusual “Tailed Spiders” (photos 28-36) are regarded by me as the sister taxon of the second suborder of the Araneida, the Araneae; see WUNDERLICH (2018; 2019; 2021: 17; 2020: 27; 2022: 129).
Araneae lost the “tail” (pygidium and flagellum) and includes all fossil and extinct extant spider taxa of the order Araneida besides the Chimerarachnida (see fig. A): (1) the segmented Mesothelae and (2) the Opisthothelae which includs (a) the Mygalomorpha - e. g., Atypidae and Theraphosidae -, and (b) the Araneomorpha, which is the most diverse and most evolved higher spider taxon. Araneomorpha includes, e. g., the families Araneidae, Dysderidae, the ancient Filistatidae and Hypochilidae, Linyphiidae, Lycosidae, Pholcidae and Salticidae – which remarkably all have <u>not</u> been found in Kachin (Burmese) amber -, as well as numerous other families like the frequent tropical extant Archaeidae and Tetrablemmidae, and also several extinct Cretaceous families like the interesting Protoaraneoididae and the quite frequent and unusual Lagonomegopidae.

<u>Preliminary diagnostic characters (most often likely apomorphies)</u> of the Chimerarachnida (the female is still unknown) (see photos 28-36 and fig. A):
- <u>Six eyes</u> in a compact group (figs. 3, 20) (*),
- absence (loss) of the anterior median eyes,
- basal cheliceral (fig. 2) articles <u>directed down</u>-<u>wards</u>,
- <u>thin leg bristles</u> (fig. 6) of the fairly slender legs (photo 35),
- <u>a single row</u> of 3-6 ventral bristles on tibia I-II,
- <u>absence of teeth</u> of the three tarsal claws,

- absence of tarsal trichobothria,
- reduction of metatarsal trichobothria to a single long one (fig. 21) on I-IV, in the position of 0.6-0.8 (see *P. spiniflagellum* n. sp.),
- probably existence of a tarsal organ (see *P. alexbeigel* n. sp.),
- existence of a quite thin flagellum (fig. 33) which is ca. three times the length of the body,
- a coxa-trochanter leg autotomy (photo 36),
- a pedipalpus (e. g., figs. 12-13) proper for sperm transfer, metatarsus fused with the cymbium (**) to a long "METACYMBIUM", cymbial part *widely* bipartite, bulbus very small, bearing a questionable conductor, a large translucent prolateral shield and a needle-shaped embolus,
- quite small animals, body length (without pygidium and flagellum) only about 1½ - 2½ mm,
- dweller of higher strata of the vegetation.

(*) This position is similar to the eye position of the Mesothelae and basal Mygalomorpha and contradicts an original eye position of triads of the Araneida but see KRAUS & KRAUS.

(**) Contra WUNDERLICH (2022); see also below: *Parachimerarachne patrickmueller* n. sp.

Plesiomorphic characters - see the photos 28-36 as well as fig. A - are, e. g., the existence of 10 tergites (see *P. alexbeigel* n. sp.), two pairs of lungs, absence of sternal sigilla (see *P. spiniflagellum* n. sp.), existence of a pygidium (4 segments), a long multi-segmented flagellum, three pairs of opisthosomal spinnerets: Two pairs of multi-segmented laterals (about equal in length) as well as a posterior median pair (figs. 35-36, WANG et al (2018)), a finely granulate cuticula (fig. 5) of prosoma, legs and pedipalpal articles, the existence of an unpaired tarsal claw (fig. 8) and a well developed onychium. WANG et al. (2018) reported furthermore the existence of a tarsal pulvillus.

Unknown or not surely known (see fig. A) are still the existence of VENOM GLANDS, of a tarsal organ (but see fig. 22), of spermatophores, of an epiandrous spinning apparatus, of a basal haematodocha, the shape of the female pedipalpus – especially the existence of a free metatarsus -, of a capture web, and of a ballooning ability. I did not recognize epiandrous gland spigots although I will not exclude their existence in this suborder. The proof of the existence of venom glands – they may be very small like in the Mesothelae and restricted to the basal cheliceral articles like in the Mygalomorpha - needs special methods of study.

Relationships and discussion (see fig. A and below):

(1) A "tail" (flagellum and pygidium) and a segmented opisthosoma bearing dorsal plates (tergites) are ancient characters of the Arachnida and have been lost several times, e. g., in the orders Acari, Opiliones and Pseudoscorpions as well as in the spider suborder Araneae of the Araneida. A "tail" of a segmented opisthosoma exists in the ancient scorpions and in the probable sister order of the Araneida, the extinct Uraraneida. In the Uraraneida true (segmented) spinnerets near the end of the opisthosoma or ventrally are absent. Uraraneida can be characterized by having silk-producing *spigots* (not spinnerets) which are not situated ventrally at the end of the opisthosoma, see DUNLOP & PENNY (2011). Unknown in Uraraneida are, e. g., the existence of a male pedipalpus proper for sperm transfer - which is one of the main characters of spiders (Araneida) including the suborder Chimerarachnida - as well as the shape of the pedipalpal metatarsus/cymbium.

(2) Besides the Chimerarachnida within the order Araneida a divided cymbium also in the infraorder Mesothelae exists (and probably also in the ancient Palaeocribellata). In the Mesothelae the retrolateral branch of the cymbium is distinctly shorter than the prolateral branch but in the Chimerarachnida both branches are usually about equal in length. I regard the retrolateral branch of the cymbium of the Mesothelae not as a "paracymbium" as it is usually considered (!) but more likely the "cumulus" may be homologue.

(3) Is Chimerarachnida more related to Araneae (fig. A) or sister of the Mesothelae? If the latter was correct (a) the loss of pygidium and flagellum would have happened two times: In the Mesothelae as well as in the Opisthothelae, and (b) fossils of the Opisthothelae – of the Mygalomorpha and probably of the Araneomorpha, too - should have been found in the Palaeozoic but not first in the Mesozoic.

I think (see fig. A) that the anterior median spinnerets – most probably – got lost in the Chimerarachnida as well as in the Opisthothelae; in the Mesothelae they exist basically. In the ecribellate Mygalomorpha of the Opisthothelae the following structures *basically* exist in contrast to the Araneomorpha: Dorsal plagula of the chelicerae, see KRAUS & KRAUS (1993), sternal sigillae, orthognathy with powerful basal cheliceral articles, and – in the ancient/basal Atypoidea – dorsal opisthosomal scuta as remains of a segmentation and tergites.

Notes and reflections on functions and losses of the tail of the Chimerarachnida and certain other animals

The length of the slender flagellum of the Chimerarachnida is about three times of its body length (usually not completely preserved), longer than in Uropygi: Telephonida or Palpigradi in which it is also thin but usually not longer than the body. In the – probably quite unnatural – position of the flagellum in the known chimerarachnid fossils - carried straight behind the body, photo 33 -, it would endanger the spiders when attacked by enemies. Carried above the body it would reach far in front of the spider and could well function as a "feeler" to detect prey. See also below, the supposed life style of the Chimerarachnida.

A "tail" is a very old/basal body part of the Arachnida, existing already in the ancient scorpions and also in extinct sea scorpions, AQUATIC relatives of the arachnids. Used for locomotion, the existence of a "tail" makes sense in aquatic animals but what is its function in terrestrial animals (besides in the sting-bearing poisonous scorpions)? Several high groups of arachnids like harvestmen, mites and Pseudoscorpions lost the "tail" without any exception but spiders (Araneida) are an exception: "Tailed spiders" (suborder Chimerarachnida) possess these appendage (pygidium and flagellum) of the opisthosoma, uniquely, and only in the single genus *Chimerarachne*. This structure is retained from its predecessor, the extinct ancient order Uraraneida, see DUNLOP & PENNEY (2012: 21, 107). - Why did the "tail" became lost in the second suborder, the "tail-less spiders", the Araneae? The main reason for the loss may be their free movable opisthosoma whose spinnerets are less hindered by the "tail" in their various functions.

In general a "trend" in terrestrial animals to reduce or lose the tail exists, e. g. - besides arachnids – in frogs, birds and humans and their kin (Hominoidea). Frogs are jumpers – in contrast to their predecessors, the reptiles -, and the existence of a "tail" makes no sense in these animals. In birds a bony tail may be useful in gliders – fossil birds - in contrast to basically active flyers, the birds of today. The loss of a superfluous bony tail in frogs and modern birds saves body weight. Apes – like most other mammals – basically possess a tail. The tail became lost in Gibbons which are specialized dwellers of higher strata of the vegetation where they mainly use their quite long arms for locomotion. Pongidae/Hominidae are more or less ground-living animals with the exception of the Orang Utan. - Note: The loss of a tail in ground-living apes evolved convergently in other animals like the Magot of the long-tailed monkeys as well as in certain dwellers of higher forest strata – like in some Loris - whose tail is strongly reduced (rudimentary).

The hidden paths of spider (Araneida) evolution, the geological age of the Chimerarachnida, its origin, extinction and life style

The recently discovered members of the suborder Chimerarachnida has been an unexpected "lucky accident", opens a small "window to the past" to the early spider evolution, and provide the opportunity to add and revise some important taxonomical characters of this suborder. Between the few discovered taxa of the relic Chimerarachnida in the ca. 100-110 million year-old Mid Cretaceous Kachin Burmese amber (known from NE Myanmar (Burma) and NW China)) - and the supposed origin of this suborder probably almost 400 million years ago - a huge gap of the fossil report of probably almost 300 million years exists, without any known fossils in amber, in stone or in coal (!), see DUNLOP & PENNEY (2011: 21) and below. Chimerarachnidae can well be regarded as a "living fossil" already of the Mid Cretaceous. What caused this gap of the proof, when - in which period - did the Chimerarachnida originate and when – as well as why – did they die out? The fossil gap may well have been caused by the life style of the Chimerarachnida whose members apparently lived in higher strata of the vegetation but not on the ground; they were not very rare in the Kachin Burmese amber forest, I know of almost a dozen specimens. Therefore their preservation in layers of old stones - before the existence of larger amber deposits – can be considered unlikely.

Evolution and origin. According to DUNLOP & PENNEY (2011: 21) the diversification of the higher taxa of the Araneae and most of their relatives happened mainly in the Carboniferous but the report of the spider related order Uraraneida - extinct and tailed arachnids, too - goes back to the Lower Devonian, almost 400 (!) million years ago. So the origin of the Chimerarachnida - as well as of its sister group Araneae and the whole order Araneida, too – may go back already to the Devonian or even to the Silurian. - The high number of possible apomorphic characters of the Chimerachnida indicates a high number of branchings in the early – palaeozoic - evolution of spiders (Araneida) but not only the existence of a single unknown extinct branch as shown in fig. A.

Extinction of the Chimerarachnida: The point of time of their extinction is unknown. The CT-events did not only cause the extinction of the dinosaurs (except birds) but also of numerous spider families like the diverse Cretaceous Lagonomegopidae. The extinction of many spider families which are preserved in Kachin Burmese amber may have been caused by the Palaeogene "explosion of diversity" of taxa of the RTA-clade and of the superfamily Araneoidea as well after the CT-events. "Modern" members of families like Sparassidae and Salticidae (RTA) as competitors – not known from the Cretaceous – were probably superior and displaced certain ancient taxa including the Chimerarachnida. Competition of members of the ancient Hersiliidae – see their life style directly below - was probably a further (but not important) reason for their extinction. See also, e. g., WUNDERLICH (2017: 80-82) and (2019: 24). The special pattern of their chelicerae – not strongly protruding basal articles combined with a "mediograde" (plagiognath) position of the fangs (figs. 2, 4) may be a further reason for the chimerarachnid extinction.

Frequency and life style: Members of the suborder Chimerarachnida were not as rare as believed some years ago: In X. 2023 I know of the existence of almost a dozen specimens – but why only males? The legs of the spiders are rather long and slender, the eyes are large and both pairs of the lateral spinnerets are remarkably large, too – why? The combined existence of a long tail *and* a three-dimensional capture web would make no sense. The larger eyes and the rather long legs may point to their raptorial life style as fast moving animals. Long posterior lateral spinnerets – they led out swathing silk - exist also in members of the family Hersiliidae. Numerous members of this family are – and were most probably already in the Cretaceous Burmese amber forest – hunters on the bark of trees, running around their prey while fixing it with a band of silk. I can imagine a similar life style of the Chimerarachnida.
Note: The thin threads far away from the holotype of *Parachimerarachne patrickmueller* n. sp. may originate more likely from a spider not preserved in thesame amber piece.

Distribution: Only known from the Upper (Mid) Cretaceous amber forest of Myanmar (Burma).

Family **CHIMERARACHNIDAE** WUNDERLICH 2018

Diagnosis, relationships and distribution: See above.

Type genus: *Chimerarachne* WUNDERLICH 2018; synonymous: *Parachimerarachne* WUNDERLICH 2022 (**n. syn**.).

Synonymy: After the study of structures like the flagellum and the male pedipalpus of several specimens and new species I regard *Parachimerarachne* WUNDERLICH 2022 as a younger synonym of *Chimerarachne* WANG et al. 2018 (**n. syn.**).

Species: *Chimerarachne yingi* WANG et al. 2018: Holotype only, see directly below, *Chimerarachne longiflagellum* (WUNDERLICH 2022) (**n. comb**.), *C. alexbeigel* n. sp., *C. patrickmueller* n. sp. and *C. spiniflagellum* n. sp.

Notes on *C. yingi*: According to differences of the branches of the cymbium - which are of equal length in the holotype in contrast to the paratype - and of the different shape of the segments of the flagellum (spindle-shaped in the holotype) the paratype does not appear to be conspecific with the holotype. A “telescopic” - WANG et al. (2018) - arrangement of its segments appears quite unlikely to me, see fig. 14. Besides the embolus the structures of the bulbus of these males are unknown. - The number of metatarsal trichobothria has been reported as a single one in the paratype by WANG et al., but – in my opinion erroneously, see above – as several ones in the holotype.

<u>Species diversity</u>: It is quite remarkable that all the six chimerarachnid specimens I know more closely are all members of species of their own; the paratype of *Chimerarachne yingi* WANG et al. 2018 turned out – according to the different shape of the segments of the flagellum - to be more likely the member of a probably undescribed species, *not conspecific* with the holotype.
I regard this pattern of *Chimerarachne* as a (further) hint for an incredible diversity of the spider fauna of the tropical Mid Cretaceous Burmese amber forest, on species level, too, which existed for more than ten million years in different areas of the Kachin State of NE-Myanmar and probably in other countries like NW-China, too. In Kachin amber I expect the existence of about 3 ½ thousand spider species, and in the amber forest still many more species; see WUNDERLICH & MÜLLER (2021: 32-33).

<u>Frequency and life style</u>: See above.

<u>**Key** to the taxa of the Chimerarachnida, mainly based on the shape of the segments of the middle part of the flagellum and the shape of the cymbium</u>

1 Alternating long and short segments exist in the middle part of the flagellum (fig. 14 holotype). Shape of the paracymbium (fig. 15) similar to *P. alexbeigel* .... *<u>yingi</u>*

- Segments of the flagellum equal in length (figs. 10-11, 16-17, 23, 25-26) 2

2(1) Segments of the flagellum – especially beyond the middle – quite spiny (fig. 26). Branches of the cymbium strongly diverging, and retrolateral branch much shorter (fig. 28) …... *<u>spiniflagellum</u>*

- Segments of the flagellum in or beyond the middle less spiny (figs. 17, 25). Branches of the cymbium less or not diverging (figs. 12, 19) ….. 3

3(2) Segments in the middle part of the flagellum about as long as wide (fig. 11). Pedipalpal tibia basally distinctly thickened (fig. 13) …... *<u>patrickmueller</u>*
- Segments in the middle part of the flagellum distinctly longer than wide (figs. 16, 23). Pedipalpal tibia basally not distinctly thickened 4

4(3) Segments in the middle part of the flagellum widened apically (fig. 23). Smallest species of the Chimerachnidae. Body length of the single male 1.4 mm. Cymbial branches (fig. 24) similar to *C. yingi,* equal in length ....…... *<u>alexbeigel</u>*

- Segments in the middle part of the flagellum not widened apically (fig. 16). Body length of the single male 2.0 mm. Cymbial branches (fig. 19) not equal in length …...... *<u>longiflagellum</u>*

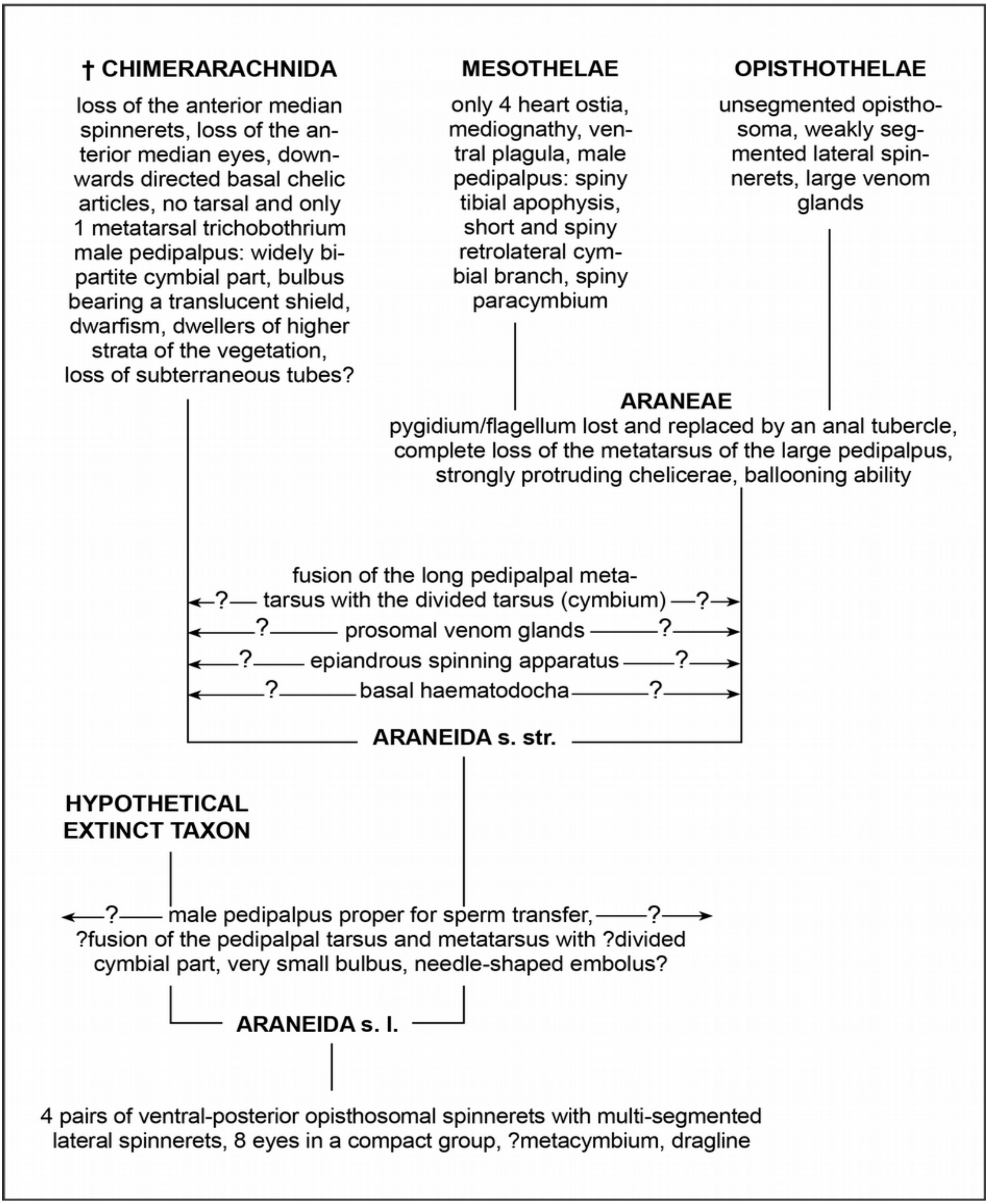

Fig. A. Supposed cladogram of the highest taxa of the order Araneida.
It includes the suborders Chimerarachnida and Araneae; Araneae includes the infraorders Mesothelae and Opisthothelae.

Usually apomorphies are listed. The origin of several characters is unsure. - Plesiomorphic characters are, e. g., plagiognathy, protruding basal cheliceral articles, existence of: A segmented opisthosoma/tergites, pygidium, flagellum, 4 pairs of spinnerets, ?tarsal and metatarsal trichobothria, a free pedipalpal metatarsus, an undivided cymbial part, a coxa-trochanter autotomy, a subterraneous life in tubular burrows closed with a trap door?

(*) Opisthothele includes the ecribellate branch (Microorder) MYGALOMORPHA and the basically cribellate Mocroorder ARANEOMOPHA, see WUNDERLICH (2020: 27). The latter includes the Palaeocribellatae: Hypochilomorpha as well as the Neocribellatae (the remaining spiders). In the Hypochilomorpha remains, e. g., plagiognathy, two pairs of lungs, a divided paracymbium and the copulatory position of more ancient spider taxa.

***Chimerarachne patrickmueller* n. sp.** (figs. 3-13), photos 28-32

Derivatio nominis: It is a great pleasure to me to name this species after my dear friend PATRICK MÜLLER in Käshofen, who selected the beautifully preserved male holotype for my study from the material of a dealer.

Material: Holotype ♂ in Upper (Mid) Cretaceous Kachin (Burmese) amber from Myanmar, F3803/BU/CJW.

Preservation and syninclusions: The spider is excellently and almost completely preserved in a clear yellow-orange piece of amber, it is slightly decomposed, prosoma and opisthosoma as well as some pedipalpal and leg articles are weakly separated, the distal part of the flagellum is broken off with the amber, the tarsus of the right leg II has been injured or amputated near its end and is apparently healed: The clump of a dark substance exists apically; the right leg III is shortened (photo) and preserved only up to the end of the short patella. The shortening may have been caused by problems during moulting as it is well-known in spiders. - Syninclusions are few short and thin spider threads preserved on articles of insect legs far away from the spider, 3 Coleoptera including 2 Aenictopecheidae (det. Via Patrick Müller), 1 larger Hemiptera, 2 tiny Hymenoptera, 2 Diptera, 1 Collembola, remains of Blattaria and other insects, parts of bark and leaves as well as few small plant hairs of different shape and size.
Note: Only rarely in spiders the eyes, the spinnerets as well as the structures of the pedipalpus are all together so well preserved as in the present specimen.

Diagnostic characters (♂; ♀ unknown): Segments of the basal articles of the flagellum (fig. 10) short (almost globular) and distinctly thickened distally, shape of the articles near the middle (fig. 11) oval; pedipalpus (figs. 12-13): The basally thickened tibia only two times longer than wide, the unequal cymbial branches slightly converging, the retrolateral branch is longer.

Description (♂):
Measurements (in mm): Body length 2.3; prosoma: Length 1.1, width 0.75; opisthosoma: Length 1.1, width 0.6; pygidium 0.5, flagellum (incomplete) 3.2; Leg I: Femur 0.8, patella 0.3,

tibia 0.58, metatarsus 0.4, tarsus 0.32; femur II 0.8, left femur III 0.65, right femur III (regenerate) ca. 0.5; femur IV ca. 0.7, tibia IV 0.75; pedipalpus: Femur ca. 0.35, tibia 0.38 long, 0.18 high.

Colour (photo): Prosoma and legs light brown, opisthosoma medium brown.

Prosoma (figs. 3-5, photos) 1.67 times longer than wide, anteriorly distinctly narrowed, cuticula finely granulate, hairs indistinct, fovea absent, 6 well developed eyes in a compact group which is not raised, posterior row distinctly recurved, anterior median eyes probably the largest, spaced by about their diameter, median eyes close together, clypeus not long and not protruding, basal cheliceral articles of medium size, weakly protruding, angled downwards by ca. 45°, lateral stridulatory files (and prick of the pedipalpal femur as well) absent, fangs long and slender, teeth of the margins of the cheliceral furrow hidden, but long and strong hairs exist, gnathocoxae large and not converging, labium a free and wide sclerite, sternum 1.3 times longer than wide, posteriorly not elongated, coxae IV spacing by about their diameter, existence of sigillae unknown. - Pedicel lost. - Legs (figs. 6-8, photos) of medium length and fairly slender, articles not thickened (except femur IV which is slightly thickened), order IV/I/II/III, cuticula finely granulate, hairs indistinct/short, mating spines absent, bristles thin, existing from femora to metatarsi, femora usually bearing 5 dorsal bristles, patellae with 1/1 indistinct dorsal bristles, tibiae and metatarsi variable, with several ventral (in a single row), dorsal and lateral bristles which are more strongly developed on III-IV, tarsal trichobothria absent, all metatarsi bear a single long trichobothrium, position in 0.65-0.75, on I 0.35 mm long, paired tarsal claws toothless, III-IV distinctly longer than I-II, unpaired claw (fig. 8) small, toothless and strongly bent, pulvillus not studied. - Opisthosoma (figs. 9-11, photos) 1.83 times longer than wide, bearing 7 observable tergites and short hairs, lung covers not or difficult to recognize, pygidium consisting of 4 segments, ca. 45 segments of the incomplete flagellum remains, basal segments short (almost globular) and wide distally, segments of the middle part of the flagellum longer, oval. Spinnerets: Two pairs of long anterior/posterior lateral spinnerets situated at the posterior part of the opisthosoma, consisting of 12/13 articles as well as a pair of hairy posterior median spinnerets in a close position between the lateral spinnerets (fig. 9). The questionable transverse anal opening ventrally in front of the pygidium is observable. I did not identify epiandrous gland spigots. 0.5 mm anteriorly of the epigastric fold exists a transverse row of 10 longer hairs. - Pedipalpus (figs. 12-13, see above): Questionable conductor longer than the cymbium, bulbus small, translucent shield large, embolus long and needle-shaped.

Relationships: In *C. patrickmueller t*he eye group (fig. 3) is as compact as in *longiflagellum* WUNDERLICH 2022 and the length of the cymbial branches is unequal in both species, too, but the segments of the flagellum are longer/more slender in *longiflagellum* and the cymbial branches are different, too, slightly converging in *patrickmueller* (fig. 12) but diverging in *longiflagellum* (fig. 19). *C alexbeigel* n. sp. is only 1.4 mm long, the shape of the segments of its flagellum and the position of the branches of the cymbial branches are different.

Distribution: Upper (Mid) Cretaceous amber forest of Myanmar (Burma).

Notes on *C. longiflagellum* (WUNDERLICH 2022): (1) A part of the pedipalpal structure supposed to be a bubble – see WUNDERLICH (2022: 163, fig. 4) - is actually a questionable conductor. - (2) I now regard the alleged pedipalpal metatarsus of the Chimerarachnida not to be a free sclerite – see figs. 18-19 of *longiflagellum* –, but to be the long basal part of a sclerite which I herewith call "metacymbium", and which is fused with the bipartite paracymbiual part. I now consider the seemingly separating lines between the badly preserved pedipalpal metatarsus and "cymbium" of *longiflagellum* as artefacts, and the structure called "paracymbium" to be an artefact, too.

***Chimerarachne alexbeigel* n. sp**. (figs. 20-24), photos 33-34

Derivatio nominis: The species is named after my dear friend ALEXANDER BEIGEL in Aachen, who made the present holotype available for my study.

Material: Holotype ♂ in Upper (Mid) Cretaceous Kachin (Burmese) amber from Myanmar, F3806/BU/CJW.

Preservation and syninclusions: The spider is almost completely preserved in a clear yellow-orange piece of amber, body and legs are deformed the distal part of the flagellum is broken off with amber, the left leg II is broken off beyond the coxa by autotomy and loose, its femur is artificially thickened by the preservation (photos).- Syninclusions are a ?gas bubble below the sternum, 1 Acari, 1 pseudoscorpion and small particles of detritus.

Diagnostic characters (♂; ♀ unknown): Anterior eyes distinctly largest (fig. 20), segments of the middle part of the flagellum (fig. 23, photos) widened apically; pedipalpus (fig. 24): Tibia rather slender, 2 ½ times longer than wide, both branches of the cymbial part about equal in length (the retrolateral branch slightly longer), in an almost parallel position.

Description (♂):
Measurements (in mm): Body length 1.4; prosoma: Length 0.8, width 0.65; opisthosoma: Length 0.75, width ca. 0.55; leg I: Femur 0.55, patella ca. 0.25, tibia ca. 0.5, metatarsus ca. 0.35, tarsus ca. 0.27; length of the metatarsal trichobothrium I-III ca. 0.2; remains of the flagellum 1.18; pedipalpus: Femur 0.35, tibia: Length 0.26, width 0.1.
Colour (photo): Body medium brown, legs light brown, not annulated.
Prosoma (fig. 20, photos) 1.23 times longer than wide, hairs short, fovea indistinct, 6 eyes, anteriors largest, posterior row distinctly recurved, basal cheliceral articles rather large, knee-shaped directed downwards, fangs quite slender, orthognath, mouth parts strongly deformed or hidden. - Pedicel strongly deformed. - Legs (figs. 21-22, photos) rather slender, order probably I/II/IV/III, hairs short and indistinct, bristles quite thin, almost hair-shaped, existing from femora to metatarsi, femur II bears 3 dorsal and few apical bristles, patellae dorsally 1/1, tibiae (ventrally a single row) and metatarsi with few bristles, a single long trichobothrium exists at least on metatarsus I-III in position of ca. 0.65, tarsal organ probably existing near the end of the article, tarsal claws deformed, quite thin and tooth-less. - Opisthosoma (fig. 23, photo) ca. 1.36 times longer than wide, bearing short hairs, spinnerets relatively short, strongly deformed, ca. 30 segments of the incomplete flagellum exist, the segments of the middle part of the flagellum are widened distally. - Pedipalpus fig. 24): Articles bristle-less, tibia rather slender, ca. 2 ½ times longer than wide, branches of the cymbial part almost equal in length (the retrolateral branch is slightly longer), paracymbium absent, conductor about as long as the cymbial branches, translucent shield well developed, embolus needle-shaped.

Relationships: Smallest member of the family Chimerarachnidae, body length 1.4 mm (remaining members 2-2.42 mm); the shape of their cymbial branches and of the segments of their flagellum are specific, see the key.

Distribution: Upper (Mid) Cretaceous Burmese amber forest of Myanmar (Burma).

Chimerarachne spiniflagellum **n. sp.** (figs. 25-28), photos 35-36

Etymology: The name of the species refers to the partly long and strong hairs of the flagellum, from lat. = spina.

Material: Holotype ♂ in Upper (Mid) Cretaceous Kachin (Burmese) amber from Myanmar, F3811/BU/CJW.

Preservation and syninclusions: The spider is quite well and almost completely preserved in a clear yellow-orange piece of amber, fairly – especially the ventral part of the opisthosoma – deformed, the distal segments of the flagellum are cut off. - Syninclusions are 2 tiny Acari larvae, 1 small Diptera: Nematocera, tiny plant hairs and small particles of detritus.

Diagnostic characters (♂; ♀ unknown): Segments of the flagellum (figs. 25-26, photo 36) bearing long hairs in the middle and in the distal half but short hairs in the basal quarter; their shape is shorter and widened distally in the basal part of the flagellum but long oval and widened in the middle in the remaining part of the flagellum; pedipalpus (fig. 28): the cymbial branches are distinctly diverging, its retrolateral part is distinctly shorter.

Description (♂):
Measurements (in mm): Body length 2.1; prosoma: Length 1.0, width 0.7; opisthosoma: Length ca. 1.3, width 0.6; femur I 0.8; leg IV: patella 0.3, tibia 0.73, metatarsus 0.62, tarsus ca. 0.6; anterior lateral spinneret 0.72, its basal article 0.2; pygidium > 0.2, remains of the flagellum ca. 5.0; pedipalpal femur ca. 0.32.
Colour dark brown.
Prosoma (photos) 1.43 times longer than wide, weakly granulate or scaly, hairs probably rubbed off, I found no feathery hairs, most parts of chelicerae and mouth parts hidden, labium a free sclerite, wider than long, sternum 1.47 times longer than wide, weakly granulate, anteriorly wide, not elongated between coxae IV, sigillae absent. - Legs (photos) fairly slender, order IV/I/II/III, hairs not long, bristles thin, existing from femora to metatarsi, femora dorsally 1/1/1 and few distally-laterally, patellae dorsally 1/1 and at least in III-IV a lateral pair, tibiae dorsally none, ventrally 3 in a single row, tibia and metatarsus III-IV with numerous bristles including several subapically, strong (bristle-shaped) hairs exists additionally, position of the metatarsal IV trichobothrium in ca. 0.8, 3 thin and smooth tarsal claws which are well developed, onychium large. - Opisthosoma (figs. 25-27, photos) ca. 2.2 times longer than wide, partly deformed,ventrally inclined, bearing 9 observable tergites and 3 pairs of spinnerets (anterior median spinnerets absent), supposed posterior median spinnerets large/wide, anterior lateral spinnerets quite large/long, originating not far behind the middle of the opisthosoma, consisting of 11 or 12 articles, basal article quite long, about as long as

the following 4 articles, pygidium with 3 or 4 segments, flagellum (incomplete, see above) with about 75 remaining segments.

Relationships: See the key above; structures of the bulbus difficult to observe.

Distribution: Upper (Mid) Cretaceous Burmese amber forest of Myanmar (Burma).

(2) **Suborder ARANEAE**

Family SCYTODIDAE

The ancient members of the unusual family Scytodidae may be recognized first by their prosoma which is fairly (fig. 29) or even strongly domed (fig. 30). The domed prosoma contains large poison glands which are modified to spinning organs – unique in spiders. With the help of threads the prey is fixed by these “Spitting Spiders” on a base like a wall. The ecribellate spiders possess 6 eyes in three diads (fig. 30), lateral cheliceral stridulatory files may exist, the slender legs are usually bristle-less, their position is prograde, an unpaired tarsal claw exists or is absent (e. g., in *Dictis*).

Eocene or even Cretaceous members of this family are extremely rare: A single species each has been described and named: The Eocene *Scytodes weitschati* WUNDERLICH 1993 (based on a single male in Baltic amber) – a related species is described in this volume, also from the Baltic amber forest -, and the Cretaceous ?*Scytodes hani* WUNDERLICH 2012 in Jordan amber (not adult). Here I name the first member in Cretaceous Kachin amber from Myanmar (Burma), based on a probably adult female.

Extant species of this family are distributed almost worldwide, mainly in the tropics. Most members are slow moving hunters or prowl in the dark other species use webs for prey capturing. Their habitats are very diverse; some live on the ground, e. g., under stones, or under the bark of trees.

?***Scytodes nonalta* n. sp.** (figs. 29-30)

2018 Scytodidae indet., – WUNDERLICH, Beitr. Araneol., 11: 124, figs. 1-2, photo 2.
2020 Scytodidae indet., – WUNDERLICH, Beitr, Araneol., 13: 110.

Etymology: The species name refers to its only fairly domed prosoma, from non (lat.) = not and altus (lat.) = high.

Material: Holotype, a probably inadult ♀ and a separated piece of amber in Mid Cretaceous Kachin amber from Myanmar (Burma); F3228/BU/CJW.

Preservation and syninclusions: The spider is pyritized and fairly well preserved in a small, clear yellowish piece of amber, the left leg II is lost beyond the coxa by autotomy, parts of both anterior legs are cut off, distal articles of the left leg I are preserved in front of the prosoma, the opisthosoma is fairly deformed. - Syninclusions are 1 Coleoptera, 1 Diptera: Nematocera and some bubbles of a boring shell at the margin of the piece of amber.

Diagnosis (probably inadult ♀; ♂ unknown): Prosoma only fairly domed (fig. 29), dorsally covered with long hairs, eyes as in fig. 30, legs only fairly long, see WUNDERLICH (2018: Photo. 2).

Description:
Measurements (in mm): Body length 1.7; prosoma: Length 0.85, width ca. 0.7; opisthosoma: Length 1.0, width ca. 0.5; femur I ca. 1.35, femur IV ca. 1.2.
Colour (the spider is pyritized) dark grey brown.
Prosoma (figs. 29-30) 1.2 times longer than wide, only fairly domed, most dorsal hairs long, fovea absent, 6 small eyes in 3 widely spaced diads, clypeus short and protruding, most parts of the basal cheliceral articles, the fangs and the mouth parts hidden, coxae IV spaced by the sternum by about their diameter.- Pedipalpus slender, tip hidden. - Legs only fairly long, slender, position prograde, order I/IV/II/III, bristles absent, hairs well developed, position of the trichobothrium of metatarsus I in ca. 0.85, paired tarsal claws large and toothed, unpaired claw (recognizable on the left leg IV) tiny. - Opisthosoma twice as long as wide, hairs short, ventrally hidden/pyritized.

The **relationships** are unsure, its family characters see above (an adult male is needed). Today in East and Southeast Asia the genus *Stedoces* ONO 1995 (less frequent) and the diverse and probably not monophyletic genus *Scytodes* LATREILLE 1804 are widely distributed. In both genera an unpaired tarsal claw exists like in ?*S. nonalta* n. sp. which may be a member of one of these genera, probably of the diverse genus *Scytodes* s. l.. In *Dictis* L. KOCH 1872, contrarily, an unpaired tarsal claw is absent. ?*Scytodes hani* WUNDERLICH 2012, based on a badly preserved inadult specimen from Jordan, existed ca. 30 million years earlier than ?*S. nonalta*. Its prosomal hairs (fig. 31) are shorter and more dense than in *nonalta*.

Distribution: Mid Cretaceous Kachin amber from Myanmar (Burma).

Family TETRABLEMMIDAE

Electroblemma SELDEN et al. 2016

(= *Brignoliblemma* WUNDERLICH 2017; see WUNDERLICH (2020: 86-98)

***Electroblemma retroflectum* n. sp.** (figs. 37-38), photo 37

Etymology: The name of the species refers to its large dorsal prosomal outgrowth which is distinctly directed backwards, from retro (lat.) = backwards, and flecto (lat.) = bent.

Material: Holotype (♂) in Mid Cretaceous Kachin amber from Myanmar (Burma), F3757/BU/CJW.

Preservation and syninclusions: The spider is completely and partly – e. g., legs, prosoma and bulbus – more or less deformed, preserved at the corner of a small yellow-orange piece of amber. - Syninclusions are few plant hairs and particles of detritus.

Diagnosis (♂; ♀ unknown): Dorsal prosomal outgrowth (fig. 37, photo) distinctly directed backwards, cheliceral “horns” long, almost straight, inclined medially and bulging laterally in the distal half. Mating spur of the legs unknown; pedipalpus (photo) deformed. with a large/long embolus.

Description (♂):
Measurements (in mm): Body length 1.35; prosoma: Length 0.6, width 0.5; opisthosoma: length 0.83, width 0.63; femur I 0.7, tibia II ca. 0.5, tibia III ca. 0.42, tibia IV 0.5.
Colour light medium grey brown.
Prosoma (figs. 37-38, photo) 1.2 times longer than wide, deformed, dorsal outgrowth long and distinctly directed backwards, eyes not well observable, “horns” of the clypeus hidden or absent, cheliceral “horns” long, almost straight, inclined medially and bulging laterally in the distal half. - Legs (photo) slender, hairs fairly long, bristles absent, mating spurs absent, position of the metatarsal IV trichobothrium in 0.35. - Opisthosoma (photo) 1.3 times longer than wide, dorsally completely covered with a scutum, ventral side and spinnerets hidden by an emulsion. - Pedipalpus (photo) deformed, femur slender, patella slightly longer than wide, tibia long and thick, bulbus large and oval, embolus long.

Relationships: In *E. paranala* (WUNDERLICH 2017) the shape of the cheliceral “horns” are bulging in a more basal position.

Distribution: Mid Cretaceous Kachin amber from Myanmar (Burma).

***Kachinblemma* n. gen.**

Etymology: The name of the genus refers to the origin of its type species, amber from the Kachin State of N-Myanmar (Burma), and to a part of the genus name Tetrablemma.

The gender of the name is neuter.

Type species (by monotypy): *Kachinblemma constrictum* n. sp.

Diagnosis (♂; ♀ unknown): Clypeal and cheliceral “horns” absent, tibia II bearing a proventral “mating spur” (fig. 33), probable modification of femur I: See below; pedipalpus (figs. 35 - 36): Cymbium long and entire, embolic division quite complicated.

Relationships: According to the absence of clypeal and cheliceral “horns” and the long and entire cymbium *Claspingblemma* WUNDERLICH 2022 (Tetrablemminae) in Kachin amber is most related; in *Claspingblemma* strong prolateral hairs on femur I exist and the structures of the embolic division are different. - Note on fig. 16 of *Claspingblemma* in WUNDERLICH (2022: 165): “A” points to a spine-shaped ventral structure of the embolus, and the number 13 at the base of the bulbus has to be deleted. - In ?gen. sp. of the Tetrablemminae in Kachin amber – see WUNDERLICH (2015: 170, 374, fig. 123) - the cymbium is divided, and the complicated embolic division is shorter and differing.

Distribution: Mid Cretaceous Kachin amber from Myanmar (Burma).

***Kachinblemma constrictum* n. gen. n. sp.** (figs. 32-36), photos 38-39

Etymology: The name of the spider refers to the constriction of femur I (fig. 32), from constrictum (lat.).

Material: Holotype ♂ in Mid Cretaceous Kachin amber from Myanmar (Burma), F3758/BU/CJW.

Preservation and syninclusions: The spider is completely and very well preserved in a yellow-orange piece of amber, some leg articles are deformed, the bulbi are deformed and probably expanded. - Syninclusions are 1 Acari, numerous remains of insects (mainly Diptera) and their excrement, plant hairs and numerous particles of detritus.

Diagnosis: See the genus

Description (♂; ♀ unknown):
Measurements (in mm): Body length 1.8; prosoma: Length 0.9, width 0.7; opisthosoma: Length 1.05, width 0.7; femur I (deformed) ca. 0.75, metatarsus IV ca. 0.55, tarsus IV ca. 0.37.
Colour: Prosoma, legs and ventral scuta of the opisthosoma dark brown, opisthosoma dorsally dark grey brown.
Prosoma (photos) 1.13 times times longer than wide, finely wrinkled, cephalic part fairly convex, hairs and fovea indistinct, 6 eyes of medium size in a “segestriid position”, clypeal and cymbial “horns” absent, mouth parts hidden, sternum not elongated between coxae IV. - Legs (figs. 32-33, photos) of medium length, order probably I/IV/II/III, hairs fairly long, bristles absent, tibia II with a large proventral mating spur near the middle which is observable on both
tibiae, femur I constricted in the basal half of the left femur, even broken on the right femur in the same position (artefacts?), position of the metatarsal IV trichobothrium in ca. 0.38, three tarsal claws, the unpaired one small, the paired ones large. - Opisthosoma (fig. 34, photos) 1.4 times longer than wide, bearing not many long hairs, bearing a large dorsal scutum and a large sclerotized ring around the retracted spinnerets; ventral scuta see fig. 34, photo). - Pedipalpus (figs. 35-36) apparently deformed, and bulbus probably expanded; femur fairly stout, patella and tibia almost globular, tibia quite large, cymbium elongated, not divided, embolic division quite complicated.

Relationships: See above.

Distribution: Mid Cretaceous Kachin amber from Myanmar (Burma).

Family ARCHAEIDAE

***Burmesarchaea* sp. indet.**

Material: 1 ♂ in Mid Cretaceous Kachin amber from Myanmar (Burma), F3756/BU/CJW.

The male is similar and apparently related to *Burmesarchaea grimaldii* (PENNEY 2003), see WUNDERLICH (2017: 179). Its body length is 1.8 mm, its prosomal length is 0.8 mm.

Preservation: The spider is completely and well preserved in a small yellowish piece of amber.

Syninclusions are two Diptera: Nematocera, a small incomplete winged insect, plant hairs and detritus. Between the chelicerae of the spider ca. 20 white, tiny and oval objects are preserved whose surface appears smooth in a magnification of 150x. Their size is most often 0.03-0.06 mm. The nature of these objects is enigmatic to me; they are distinctly variating in size and not globular but oval. I do not want to exclude their nature being spores of a fungus. Closer studies are needed.

Family ULOBORIDAE

Uloboridae of the Mid Cretaceous Burmese amber forest was a quite diverse family; in 2021: 134-166 I treated – including the dubious genus *Spiniuloborus* WUNDERLICH 2021 – 8 genera. Here I describe a further genus.
Note: In the key to the genera – see WUNDERLICH (2021: 108-119) – *Spiniuloborus* is not included.

Parakachin **n. gen.**

Etymology: The name of the genus refers to its relationships to the genus *Kachin* WUNDERLICH 2017, from para – (gr.) = beside.

The gender of the name is masculine.

Type species (by monotypy): *Parakachin pectunculus* n. sp.

Diagnostic characters (♂; ♀ unknown): Metatarsus III (fig. 40) and IV with long ventral bristles of the pectunculus, eyes as in fig. 39, opisthosoma (photo 39) long oval and without humps, cribellum, calamistrum, femoral trichobothria and feathery hairs apparently absent; pedipalpus (fig. 41): Apophyses of the articles absent, tegulum with a larger claw-shaped apophysis, questionbable embolus long and curved.

Relationships: In *Propterkachin* n. sp. WUNDERLICH 2017 exists a lower number of less strong ventral metatarsal bristles of the pectunculus and the pedipalpal patella bears 2-3 spine-shaped dorsal bristles.

Distribution: Late (Mid) Cretaceous amber forest.

***Parakachin pectunculus* n. gen. n. sp.** (figs. 39-41), photo 39a

Etymology: The name of the species refers to te strongly developed pectunculus of metatarsus III-IV.

Material: Holotype ♂ in Mid Cretaceous Burmese (Kachin) amber, F3772/BU/CJW.

Preservation and syninclusions: The spider is completely and fairly well preserved in a flat yellow-orange piece of amber, prosoma and opisthosoma are deformed/inclined, some leg articles are deformed. - Syninclusions are an Acari and numerous particles of detritus.

Diagnostic characters and **relationships**: See the genus.

Description (♂):
Measurements (in mm): Body length 2.9; prosoma: Length 1.3, width 1.15; opisthosoma: Length 1.75, height 0.85; leg I: Femur ca. 1.65, patella ca 0.4, tibia ca. 1.5, metatarsus ca. 1.8, tarsus ca. 0.9; femur II 1.1, femur III 0.85, femur IV 1.3.
Colour: Prosoma and legs light to medium brown, legs not annulated, opisthosoma light grey.
Prosoma (fig. 39, photo) 1.13 times longer than wide, strongly deformed, 8 eyes in a wide field, anterior median eyes not enlarged, anterior and posterior lateral eyes widely separated from each other, hairs indistinct, feathery hairs not found by me, clypeus, chelicerae and mouth parts hidden. - Legs (fig. 40, photo) slender but femur I thickened, I distinctly the longest, III distinctly the shortest, feathery hairs, femoral trichobothria and calamistrum apparently absent, metatarsus III and IV with long ventral bristles of the pectunculus, III (fig. 40) bearing 4 basal bristles and 2 *pairs* distally, metatarsal trichobothria and tarsal claws not studied. Further bristles: Femora with a long bristle in the basal half near the middle, additional subapical bristles exist mainly on III-IV, patellae usually with a long dorsal-apical bristle, tibiae dorsally 1/1, III-IV with numerous additional bristles, metatarsus I-II with several lateral bristles, III-IV (see above), III additionally with a dorsal-distal bristle, tarsus IV with short and indistinct ventral bristles. - Opisthosoma (photo) twice as long as high, hairs short, shape long oval, spinning apparatus deformed and hidden. - Pedipalpus (see the diagnostic characters of the genus): Articles not thickened, cymbium large.

Distribution: Late (Mid) Cretaceous amber forest.

Family **PROTOARANEOIDIDAE** WUNDERLICH 2018

Four genera of this family are known and keyed out; see WUNDERLICH & MÜLLER (2018: 47-48) and below.

***Spinipalpitibia occulta* n. sp.** (figs. 42-45), photos 40-41

Etymology: The name of the species refers to the probably existing but hidden existence of a cribellum, from lat. accultus = hidden.

Material: Holotype ♂ in Upper (Mid) Cretaceous Kachin amber (Burmite) from Myanmar (Burma), F3812/BU/CJW.

Preservation and syninclusions (photo): The spider is very well and almost completely preserved in a clear yellow-orange piece of amber, only the left leg III is lost beyond the coca by autotomy; small ?air bubbles cover both pedipalpi distally.- Syninclusions are a questionable spider thread and small particles of detritus.

Diagnosis (♂; ♀ unknown): Colulus absent, questionable cribellum probably existing (I prefer this suggestion); its area (photo) is probably hidden by a fold, and may be tipped over backwards; pedipalpus (figs. 44-45): Paracymbium bipartite, with a long and pointed retrolateral part and a short and pointed prolateral part, questionable embolus claw-shaped.

Description (♂):
Measurements (in mm): Body length 1.5; prosoma: Length 0.7, width 0.6; opisthosoma: Length 0.65, width 0.45; leg I: Tibia 0.8, metatarsus 0.77, tarsus 0.42; tibia IV 0.85.
Colour: Prosoma and legs medium brown, legs not annulated, opisthosoma medium grey.
Prosoma (fig. 42, photos) 1.17 times longer than wide, finely rugose, hairs indistinct, fovea probably large, 8 large eyes in two wide rows, posterior row slightly procurved, posterior median eyes spaced by more than their diameter, clypeus and mouth parts hidden, basal cheliceral articles rather small and not diverging, sternum slightly longer than wide, spacing the coxae IV by less than their dimeter. - Legs (fig. 43, photos) slender and fairly long, hairs indistinct, bristles numerous and long, existing from femora to metatarsi, femur I dorsally 4-5 and subapically 3, patella dorsally 1/1 and 1 retrolaterally, tibia dorsally 1/1, ventrally 2 pairs, retrolaterally 1/1, metatarsus 2 lateral pairs and 5 apicals, tibia IV see the fig., calamistrum absent, position of the metatarsal I trichobothrium in 0.7, paired tarsal claws bearing long teeth, unpaired claw small. - Opisthosoma (photos) 1.44 times longer than wide, hairs rather short, genital area bearing a wide and strongly sclerotized plate as in *Spinipalpitibia hirsuta* WUNDERLICH (2018: 140, fig. 55), colulus absent, posterior lateral spinnerets long and widely spaced, cribellum probably existing (see the diagnosis). - Pedipalpus (figs. 44-45) (see also above) with slender and spiny articles, bulbus large, structures partly hidden by bubbles.

Relationships: A wide and strongly sclerotized structure of the genital area (see above) and a long pedipalpal tibia exist also in the cribellate *Spinipalpitibia hirsuta* WUNDERLICH 2018 in which the paracymbium is larger and probably not divided. In a further male, F3110/BU/CJW, in which only a single cymbial branch exists, a wide and strongly sclerotized structure of the genital area exists, too. Therefore this special structure may be an apomorphic character of the genus *Spinipalpitibia* WUNDERLICH 2018 or even of the whole family Protoaraneoididae.

Distribution: Upper (Mid) Cretaceous amber forest of Myanmar (Burma).

Family **MEGASETIDAE** WUNDERLICH 2021 (superfamily Araneoidea?) ?

Only a single taxon of the ecribellate family Megasetidae – *Megasetae colphepeiroides* WUNDERLICH 2021 – in Kachin (Burmese) amber has been described, based on the female sex. In this paper I describe the first male of a second genus which I regard – with some hesitation – as con-familiar. The body length of this dwarf male is only 1 mm, and I do not want to exclude that the unknown female may be much larger - sexual size dimorphism, dwarfism in the male sex - like in most species of the family Araneidae and probably in *Megasetae colphepeira,* too, and existing also within certain further families like Theridiidae, in *Latrodectus* WALCKENAER 1805.

Parvimegasetae **n. gen.**

Etymology: The name refers (a) to the very small body of the holotype, from parvus (lat.) = small and (b) to the family type genus *Megasetae* WUNDERLICH 2018.

The gender of the name is feminine.

Type species (by monotypy): *Parvimegasetae araneoides* n. sp.

Diagnostic characters (♂; ♀ unknown): Cephalic part wide and not raised (figs. 46-47, photo 42), eyes (fig. 47, photo) in a wide field (araneidae-like), leg bristles absent, body length only 1 mm; pedipalpus (figs. 48-49): Femur slender, patella distinctly thickened, cymbium large and distinctly raised, paracymbium most probably absent, bulbus bearing several long, slender and partly pointed sclerites, embolus unknown, it may be the longest sclerite of the bulbus.

The **relationships** are unsure. According to the complete absence of leg bristles and the wide eye field I regard *Parvimegasetae* with some hesitation as a member of the extinct family Megasetidae WUNDERLICH 2021 in Kachin amber, too, which is only known from a single female of its type genus - see above -, which is much larger, prosomal length 1.3 mm, and the shape of prosoma and opisthosoma is quite different; number and position of the eyes are most probably similar, except the position of the anterior median eyes which are spaced by about a single diameter but two diameters in *P. araneoides*. Furthermore the long and erect ventral hairs of the female metatarsus I of *Megasetae* – see WUNDERLICH (2018: 196, fig. 9) – are absent in the male of *P. araneoides*. - In the enigmatic family Burmascutidae WUNDERLICH 2018, in Kachin amber, too, leg bristles are absent and the eye field is very wide like in the Megasetidae, but – at least in the family type species *Bur-*

masctutum aenigma WUNDERLICH 2018 – the position of the spinnerets is anterior and the structures of the ♂-pedipalpus are quite different. - A wide eye field exists also in *Proxiaraneus* WUNDERLICH 2018 of the extinct family Zarqaraneidae in Kachin amber, in which leg bristles are well developed, a strong paracymbium exists and the cymbium is not raised.

Distribution: Upper (Mid) Cretaceous amber forest of Myanmar (Burma).

***Parvimegasetae araneoides* n. gen n. sp**. (figs. 46-49), photo 42

Etymology: The name of the species refers to its eye position which is similar (gr. -oid) to the typical position of the family Araneidae.

Material: Holotype ♂ in Upper (Mid) Cretaceous Kachin (Burmese) amber, F3802/CJW.

Preservation and syninclusios: The spider is completely and fairly well preserved in a clear yellow-orange piece of amber which was heated; its body was probably a bit flattened between two layers of the amber, legs and pedipalpi are distinctly deformed, the dorsal hairs of the opisthosoma bear tiny (?air) bubbles. - Syninclusions are remains of a Diptera: Nematocera, few small plant hairs, thin threads and numerous particles of detritus.

Diagnostic characters and relationships: See the genus.

Description (♂):
Measurements (in mm): Body length 1.0; prosoma: Length 0.47, width 0.38; opisthosoma: Length 0.6, width 0.5; legs (deformed): I: Patella ca. 0.13, tibia ca. 0.23, metatarsus ca. 0.23, tarsus ca. 0.21; femur IV ca. 0.38.
Colour (photo): Prosoma and legs medium brown, legs not annulated, opisthosoma light grey.
Prosoma (figs. 46-47, photo) 1.23 times longer than wide, not raised, weakly rugose, anterior part and field of the 8 larger eyes wide, hairs short, area of the fovea hidden, lateral eyes close together, anterior median eyes spaced by ca. two diameters, posterior median eyes widely spaced, posterior row recurved, clypeus and basal cheliceral articles short, mouth parts hidden, sternum deformed, spacing widely the coxae IV. - Legs (photo) not long, order probably I/II/IV/III, tarsi not much shorter than metatarsi, hairs well and partly almost bristle-like (but bent) developed, position of the metatarsal trichobothrium unknown, tarsal claws long, teeth unknown. - Opisthosoma (photo) 1.2 times longer than wide, oval, dorsally probably hardened, bearing two or three pairs of sigillae and short hairs or spines, most of the short spinnerets are hidden. - Pedipalpus: See above.

Distribution: Upper (Mid) Cretaceous amber forest of Myanmar (Burma).

Family MYSMENIDAE?

Most members of the fairly diverse family Mysmenidae live in leaf litter or in low vegetation, in humid habitats; some species are kleptoparasites in the capture webs of spiders. This life style may be the reason for the rarity of these tiny spiders in amber. The spiders build more or less modified orb webs. The kind of the capture webs of the Cretaceous families Cretamysmenidae – see the key below -, Leviunguidae and Zarqaraneidae (in my opinion more likely an irregular web) is unknown.

Fossil Mysmenidae have been recorded in Miocene Dominican amber, in Eocene Baltic amber (see below) as well as subrecent in young copal from Madagascar. In my opinion the present species represents a fairly (!) sure taxon of this family from the Cretaceous. Below I provide a key to most families of the "symphytognathidan branch" of the superfamily Araneoidea.

***Myanmarmysmena* n. gen.**

Etymology: The name of the genus refers (1) to its type locality, Myanmar (Burma), and (2) to its probably confamiliar genus *Mysmena*.

The gender of the name is feminine.

Type species (by monotypy): *Myanmarmysmena grandipalpus* n. sp.

Diagnostic characters (♂; ♀ unknown): Few thin leg bristles on patellae and tibiae (fig. 51), tarsi about as long as metatarsi, clasping leg spines absent, legs not annulated, opisthosoma egg-shaped (photo); pedipalpus (figs. 52-53): Articles without apophyses and bristles, bulbus large, cymbium large and divided, paracymbium unknown, structures of the tegulum quite complicated, terminal apophysis sickle-shaped, embolus unknown, body length 1.1 mm.

The **relationships** are unsure. According to the absence of a calamistrum, femoral and tarsal trichobothria, ventral tarsal and metatarsal III-IV bristles, apophyses of the pedipalpal articles as well as the existence of an unpaired tarsal claw, the tiny body size and complicated structures of the large bulbus I regard the taxon as a member of the "symphytognathidan branch" of the superfamily Araneoidea, and as a questionable member of the family Mysmenidae although I will not exclude close relationships to the Theridiosomatidae in whose extant members long tibial III-IV trichobothria exist, see the key to the families below. I do not know a closely related fossil or extant genus; see, e. g., LOPARDO & HORMIGA (2015) and LIN & LI (2008) and the dubious family Cretamysmenidae WUNDERLICH 2018, see the key below. In the Anapidae, Comaromidae and Micropholcommatidae the opisthosoma is scutate or hardened, in the Symphytognathidae the basal articles of the chelicerae are +/- fused and leg bristles are absent, in the Synaphridae a medial cheliceral lamella ending in a large tooth exists, in the Fonteferridae WUNDERLICH 2023 - see the paper on spiders of the Algarve in this volume – the prosoma is not distinctly raised, femur I bears 4 proventral bristles and no prolateral tibial I bristle, and protruding sclerites of the simple bulbus are absent. In ALL (!) extant males of the Mysmenidae clasping spines in contrast to *Myanmarmysmena* exist. Therefore I will not exclude that *Myanmarmysmena* may be the member of an undescribed mysmenid subfamily in which clasping spines were not yet evolved. Clasping spines are also absent in two dubious extinct genera of the Tertiary, see (**) below. See also *Nanoaenigma* n. gen.

Distribution: Mid Cretaceous amber forest of Myanmar (Burma).

***Myanmarmysmena grandipalpus* n. gen. n. sp.** (figs. 51-53), photo 43

2022 Mysmenidae indet., – Beitr. Araneol., 15: 123.

Etymology: The species name refers to its large bulbus, from grandis (lat.) = large.

Material: Holotype ♂ in Mid Cretaceous Burmese (Kachin) amber from Myanmar, F3730/BU/CJW.

Preservation and syninclusions: The completely preserved spider is placed near the surface of a mainly clear yellow-orange piece of amber which is 11 mm thick. Because of the thick piece of amber - which I did not cut – the ventral side of body, legs and bulbi are difficult to observe, the bulbi are distinctly darkened and therefore difficult to recognize. - Syninclusions are 2 Coleoptera (one is quite tiny), a tiny winged insect, remains of insects, two tiny spider legs, tiny plant hairs and particles of detritus.

Diagnostic characters, relationships and distribution: See above.

Description (♂; ♀ unknown):
Measurements (in mm): Body length 1.1; prosoma: Length 0.44, width 0.54; opisthosoma: Length 0.75, width and height ca. 0.5; leg I: Femur ca. 0.55, patella ca. 0.17, tibia ca. 0.35, metatarsus ca. 0.12, tarsus ca. 0.12, femur II 0.5, femur III 0.3, femur IV 0.4.
Colour (photo): Body mainly medium grey, legs light grey, not annulated.
Prosoma (photo) partly covered with numerous tiny bubbles, lateral and ventral aspects - without cutting the piece of amber – not observable, 1.23 times wider than long, strongly raised, hairs indistinct, eyes partly hidden, probably 8 eyes in a wide field, fovea unknown, clypeus long, basal cheliceral articles large, free, distinctly diverging, fangs and most of the small teeth of the fang furrow hidden, a medial lamella and a large apical tooth are absent. -

Legs (figs. 51, photo) rather short and stout, order I/II/IV/III, tarsi about as long as metatarsi, clasping spines, ventral tarsal and metatarsal III-IV bristles as well as calamistrum absent, hairs not distinct, bristles few, thin and partly long, existing on patellae and tibiae, sequence of the dorsal tibial bristles 2/2/1/2, tibia I bears a prolateral bristle (a retrolateral bristle is not recognizable but may exist), I did not find further lateral tibial bristles, position of the metatarsal trichobothria probably in ca. 0.75, no long trichobothria on tibiae III and IV, tarsal claws badly recognizable, not studied in detail. - Opisthosoma (photo) soft, oval, hairs thin and fairly short, most of the short spinnerets hidden. - Pedipalpus (figs. 52-53) see above; articles slender, spines and apophyses absent, patella short, tibia wide; I did not recognize a paracymbium which may be hidden or absent

Family NANOAENIGMATIDAE n. fam.

Etymology: The name refers to the tiny body of the holotype, based on nanus (lat.) = dwarf as well as its enigmatic relationships, from aenigma (lat.) = enigma.

Type genus (by monotypy): *Nanoaenigma* n. gen.

Diagnostic characters (♂; ♀ unknown): Prosoma (fig. 54, photo) not raised, clypeus rather short and not protruding, 8 large eyes in a wide field and almost equal in size (fig. 54, photo), lateral eyes close together, leg bristles (fig. 55): Patellae dorsally 1/1, sequence of the long dorsal tibial bristles 2/2/2/2, tarsi about as long as metatarsi, opisthosoma (flattened by the preservation) (photo) soft, bearing long and strong (bristle-shaped) dorsal hairs; pedipalpus (figs. 56-58): Cymbium and bulbus large, tegulum strongly elongated, bearing a rounded and other sclerites, paracymbium and embolus unknown.

Further characters: Ecribellate, unpaired tarsal claw existing, basal cheliceral articles free, cheliceral teeth unknown, tarsal pseudosegmentation, clasping leg spines, femoral and tarsal as well as long tibial III trichobothria absent, tiny spiders, body length (♂) only 0.65 mm.

Relationships (see the key below): According mainly to its entelegyne stage, the absence of cribellum/calamistrum, femoral and tarsal trichobothria as well as the existence of an unpaired tarsal claw and short spinnerets I regard *Nanoaenigma* to be a member of the superfamily Araneoidea and furthermore – based, e. g., on the soft opisthosom, long tarsi and the tiny body size – being a member of the symphytognathidan branch. Synaphridae may be the most related genus; to my knowledge in this family tibial bristles are completely absent and the tarsi are distally pseudo-segmented or - at least – inclined. (The chelicerae are not well observable in the holotype; therefore a probably existing medial cheliceral keel end a large distal tooth are not recognizable). - In almost all taxa of the Mysmenidae clasping leg spines exist, the prosoma is more or less raised and the pedipalpal structures are different. In *Myanmarmysmena* n. gen. (see directly above) - in which the relationships are not quite sure – clasping leg spines are absent, too, the legs are rather stout, the sequence of the dorsal tibial bristles is 2/2/1/2 and the structures of the male pedipalpus are distinctly different.

Distribution: Upper (mid) Cretaceous Kachin amber from Myanmar (Burma).

Notes on some tiny members of the symphytogtathidan branch: This branch includes tiny spiders, see WUNDERLICH (2004: 1080-1111). The smallest fossil species of this branch is *Dominicanopsis grimaldii* WUNDERLICH 2004, a questionable member of the family Mysmenidae in Miocene Dominican amber. The tiniest spiders – extant and fossil – are extant members of the family Symphytognathidae, described by R. R. FORSTER from New Zealand in 1959, e. g., *Patu marplesi*, body length 0.3 mm, the tiniest spider species known. - Besides the dubious *Cretamysmena fontana* WUNDERLICH 2018 (fig. 55) – the body size of the probably inadult female is 0.6 mm –, *Nanoaenigma pumilio*, is the smallest member of the symphytognathidan branch in Kachin amber.

Nanoaenigma **n. gen.**

Etymology: The name refers to the tiny body of the holotype, based on nanus (lat.) = dwarf as well as its enigmatic relationships, from aenigma (lat.) = enigma.

The gender of the name is neuter.

Type species (by monotypy): *Nanoaenigma pumilio* n. sp.

Diagnostic characters, relationships and distribution: See above (the new family) and below.

Nanoaenigma pumilio **n. gen. n. sp.** (figs. 54-58), photos 44-45

Etymology: The name of the species refers to the very small body size of the holotype, from pumilio (lat.) = small.

Material: Holotype ♂ in Upper (Mid) Cretaceous Kachin amber from Myanmar (Burma), 3782/BU/CJW.

Preservation and syninclusions: The spider is completely and only partly well preserved, deformed and dorsoventrally compressed in a clear yellow-orange piece of amber. - Syninclusions are a 0.6 mm long, slender and strongly sclerotized Acari just behind the spider, a tiny Collembola, 2 tiny Diptera: Nematocera, few thin legs of insects and few tiny plant hairs. From this piece of amber I separated a small piece of amber which includes a 1 mm long **Annelida**: Oligochaeta: ?Enchytraeidae (photo 46), F3781/BU/CJW. It may be the first report of this taxon in Upper (Mid) Cretaceous Burmese (Kachin) amber.

Notes on a rare fossil Annelida in Baltic amber: A questionable member of the Lumbricida – F3814a/BB/CJW – in Eocene Baltic amber, ca. 12 mm long, is not very well preserved together with an indet. male of the family Anapidae – F3814b/BB/CJW -, both specimens will be separated in the future. The anterior end of the Annelida is narrowed, the posterior end is cut off with the amber; its segments are distinctly longer than in the Baltic amber annelid specimens shown by GRÖHN (2015: 79, photos above, 102). A remarkable questionable Lumbricida has been published by BACHOFEN-ECHT (1949: 21-22, fig. 17).

Diagnosis and relationships: See above.

Description (♂; ♀ unknown):
Measurements of the deformed and complessed spider (in mm): Body length 0.65; prosoma: Length ca. 0.3, width ca. 0.25; opisthosoma: Length 0.4, width ca. 0.35; leg I: Femur 0.28, patella ca. 0.08, tibia ca. 0.22, metatarsus ca. 0.22, tarsus ca. 0.22; femur IV 0.25; dorsal-basal bristle on tibia IV 0.23.
Colour (photo) light to medium brown, legs not annulated.
Prosoma (deformed; fig. 54, photo) distinctly wider than long, not raised, very finelly rugose, hairs probably rubbed off, fovea probably absent, 8 large eyes in two rows in a wide field, almost equal in size (anterior medians largest), posterior row slightly recurved, anterior median eyes spaced by their diameter, clypeus fairly protruding, longer than the diameter of the anterior median eyes, basal cheliceral articles robust, its teeth, mouth parts and sternum partly hidden or deformed, pits of the sternal glands probably absent. - Legs (fig. 55, photo) of medium length, I and II longest, III distinctly shortest, tarsi and metatarsi equal in length or tarsi slightly longer, tarsi distally not inclined or segmented, ventral tarsal bristles or serrated hairs on tarsus IV absent, hairs indistinct, few partly very long bristles, existing only dorsally, 1/1 on all patellae and tibiae, unpaired tarsal claw existing, teeth of the claws not studied, position of the metatarsal trichobothrium unknown. - Opisthosoma (photo) deformed, soft, oval, longer than wide, bearing dorsally some quite long bristles, sigillae apparently absent, spinnerets hidden/deformed, apparently quite short. - Pedipalpus (see above): Articles not thickened, bristles absent.

Distribution: Upper (Mid) Cretaceous Kachin amber from Myanmar (Burma).

Key to the extant and extinct families of the "symphytognathidan branch" - in the wide sense, including Theridiosomatidae - of the superfamily Araneoidea:

In 2023 I know 10 families of the symphytognathidan branch (s. l.) which members may be recognized by the key below. The dubious family Cretamysmenidae WUNDERLICH 2018 –

based on a probably not adult female - and the new extinct family Nanoaenigmatidae WUNDERLICH 2023 are extinct. On family level the symphytognathidan branch is worldwide almost as diverse as the whole number of remaining families of the huge superfamily Araneoidea. The extant families Fonteferridae WUNDERLICH 2023 and Symphytognathidae HICKMAN 1931 are represented in Europe by only a single genus and a single species.

Notes: (1) Exceptions of some of the present characters may exist within certain families of this diverse branch. - (2) Usually 8 eyes exist (but, e. g., in *Comaroma* of the Comaromidae WUNDERLICH 2004 the lenses of the anterior median may be quite strongly reduced). Anapidae SIMON 1895 have 6 or 8 eyes, see also *Crassignatha*. Symphytognathidae have 4 or 6 eyes. - (3) The leg bristles are not well studied; to my knowledge they are absent in the Symphytognathidae; they are numerous in most Theridiosomatidae SUNDEVALL 1833 as well as in certain Anapidae and Mysmenidae PETRUNKEVITCH 1928. - (4) Clasping (mating) spines of the male tibia and/or metatarsus I (rarely on tibia II) exist most often in the Mysmenidae (fig. 64) (*) and frequently in the Anapidae (fig. 63). - (5) The extinct family Cretamysmenidae WUNDERLICH 2018 (fig. 50): See above - (6) See also the dubious extinct tribe Biapophysini WUNDERLICH 2015, WUNDERLICH (2018: 42). - (7) A satisfying diagnosis of this branch is lacking, several losses exist, see fig. A in the paper on spiders of the Algarve (this volume); its retrobasal paracymbium is small (reduced) or even lost. Splitting of the “symphytognathidan branch”: See RAMIREZ et al. (2022).

1 A pair of small sternal pits (outlets of sternal glands) in both sexes on the anterior margin of the sternum exists (fig. 59). 8 eyes. Tibia III and IV bear several very long trichobothria. Tarsi I-II not long, frequently shorter than metatarsi I-II. Sequence of the usually long dorsal tibial bristles most often 2/2/1/1, rarely 2/2/1/2 (e. g., in the extant *Coddingtonia discobulbus* (WUNDERLICH 2011)). Lateral tibial I-II, femoral and metatarsal bristles may exist. ♀-pedipalpus not reduced but it may be slender. Opisthosoma soft. Retrobasal paracymbium existing. - Mainly pantropical; in Europe today only *Theridiosoma gemmosum.* Fossil *probably Eocoddingtonia eskovi* - the existence of its sternal pits is unsure – in an Early Cretaceous stone of Russia; furthermore Cenozoic in Baltic, Bitterfeld and Dominican ambers .... **Theridiosomatidae**

- Existence of sternal pits unknown. Prosoma (fig. 50) high, bearing an inclination between cephalic and thoracic parts. 8 large eyes. Tarsi distinctly longer than metatarsi. Sequence of the short dorsal tibial bristles probably 1/1/1/1. Pedipalpus of the probably adult female not reduced. ♂ unknown, holotype female probably not adult. Body length 0.6 mm. - Extinct, in Cretaceous Burmese amber: Only the quite dubious taxon *Cretamysmena fontana* WUNDERLICH 2018 .... **Cretamysmenidae**

- Sternal pits/organs absent. 4, 6 or 8 eyes. Tarsi frequently longer than metatarsi. ♂-leg I frequently modified. ♀-pedipalpus frequently reduced. Tibial bristles variable but not 2/2/1/1. Tibial trichobothria usually not very long. Retrobasal paracymbium absent 2

2(1) Opisthosoma more or less (frequently strongly) armoured - at least ventrally - or hardened …... 3

- Opisthosoma soft. Prosomal cuticula usually smooth. Tarsi frequently about as long as metatarsi. Labral spur absent. Metatarsal/tibial clasping spur absent or existing (in most Mysmenidae). Usually 8 eyes, occasionally 6 or only 4 eyes (Symphytognathidae) …......... 4

3(2) Prosoma not distinctly raised, not or only quite weakly punctuate. Labrum bearing an anterior spur (fig. 60) which may be difficult to recognize. Only a single dorsal tibial bristle. Cheliceral peg teeth absent. ♂-leg I modified in most fossil species of the fossil genus *Balticoroma* in Eocene Baltic amber. ♂-pedipalpus: Patellar and tibial apophyses absent, cymbium in extant species of *Comaroma* with a retroDISTAL "paracymbium" (fig. 61) or – in the single known fossil genus *Balticoroma* – with a large dorsal outgrowth which also exists in the extant SE-Asian *Balticoroma maculosa* (OI 1960) (fig. 62). Modified orb web. - Worldwide in the Northern Hemisphere; in Europe today only *Comaroma simoni* ….. **Comaromidae** (**)

- Prosoma distinctly raised; punctuate – e. g., in the Taphiassinae - or not. Labral spur absent. Usually leg bristles strongly reduced or even absent, ♂-leg I not modified and clasping spines absent. Tarsi usually fairly short. Male cheliceral peg teeth of the cheliceral promargin and retrolateral stridulatory files of the ♂-chelicerae usually existing in the Micropholcommatinae. ♂-pedipalpus with patellar apophysis and frequently a quite long embolus. Sheet web or three-dimensional tangle-web (Micropholcommatinae). Three subfamilies including Textricellinae. - Extant a Gondwanan distribution: Chile, the Australian Region and probably South Africa; fossil in Europe, too: in Early Eocene Paris amber: *Cenotextricella simoni* .... **Micropholcommatidae**

- Prosoma usually strongly raised and distinctly corniculate/rugose. Labral spur (as in fig. 60) existing. Cheliceral peg teeth absent. Tarsi distinctly - frequently two times - longer than metatarsi. Leg bristles variable, frequently exist two dorsal tibial bristles. Frequently a metatarsal and/or tibial I "clasping spine" (e. g., fig. 63) existing (see Mysmenidae), and ♂-leg I modified. ♂-pedipalpus quite variable, patellar apophysis existing or absent. - Extant worldwide; in Europe *Pseudanapis*, fossil diverse in Eocene Baltic amber …................. **Anapidae**

4(3) 6 or 4 eyes (cave spiders may be eye-less). Basal cheliceral articles +/- fused at least at the base. Labium quite wide, usually at least 3 times wider than long. Fangs very short. - Mainly pantropical; in Europe only *Anapistula ataecina* in a cave of Portugal, body length of the female 0.52 mm (!), male unknown; a parthenogenetic species? ... **Symphytognathidae**

- 8 eyes. Basal cheliceral articles free. Labium shorter, frequently not much wider than long. Fangs not very short …... 5

5(4) ♂-tibia and/or metatarsus I (rarely tibia II) bear 1-2 prolateral or proventral "clasping spines" in all extant taxa (fig. 64) (see Anapidae and Comaromidae). Prosoma in almost all taxa - except *Isela* and *Kilifina* - strongly raised. A ventral-distal spot-like femoral-organ on legs I (II) - unique in this family – is usually existing. - Extant worldwide, in Europe the genera *Mysmena* and *Trogloneta*; fossil *Palaeomysmena* WUNDERLICH 2004 in Eocene Baltic amber, the new genus *Myanmarmysmena* n. gen. (a questionable Mysmenidae) in Mid Cretaceous Burmese amber, and in Miocene Dominican amber the dubious *Dominicanopsis grimaldii* WUNDERLICH 2004 which has to be revised, body length ♂ 0.35 mm (!) ….......... .... **Mysmenidae**

- “Clasping spines” and femoral organ absent. Prosoma not STRONGLY raised …................ 6

6(5) All tibiae without dorsal bristles. Legs not annulated. No femoral bristles. Clypeus fairly long, opisthosoma globular or long oval. Basal cheliceral articles with a medial keel ending in a large tooth (fig. 65) (*), tarsi distally pseudosegmented or at least inclined. Bulbus with protruding sclerites and quite a long embolus, hairs absent, body length ♂ ca. 1 mm. - Extant, in Europe *Cepheia* and *Synaphris;* on Madagascar *Afrocepheia* MILLER 2007.. **Synaphridae**

- Sequence of the long dorsal tibial bristle 2/2/1/2 (fig. 66) or 2/2/2/2, tarsi not pseudosegmented or inclined, clypeus short, cheliceral keel and large tooth unknown (probably absent), body length 0.65 and 0.75 mm …... 7

7(6) Sequence of the dorsal tibial bristles 2/2/1/2, legs distinctly annulated (fig. 66, photo 2). Femur I bears 4 prolateral bristles (fig. 66). Bulbus (figs. 67) without protruding sclerites, hairy, embolus rather short. Male body length 0.75 mm (female unknown). - Extant, Portugal …....…... **Fonteferridae** (***)

- Sequence of the dorsal tibial bristles 2/2/2/2, legs not annulated. Femoral bristles absent. Bulbus (figs. 56-58) bearing sclerites, embolus unknown. Male body length 0.65 mm (female unknown). - Fossil in Cretaceous Kachin amber from Myanmar, *Nanoaenigma pumilio* n. sp. ….. **Nanoaenigmatidae n. fam**.

(*) A convergently evolved tooth exists in the six-eyed *Crassignatha haeneli* WUNDERLICH 1995 – described under Anapidae s. l.: Synaphrinae - which I now regard as a member of the Anapidae; but see LOPARDO & HORMIGA (2015). A similar tooth exists also in the six-eyed Eocene genus *Iardinidis* WUNDERLICH 2004 in Baltic amber which was also described under Anapidae s. l.: Synaphrinae and has to be revised.

(**) See the paper by ESKOV & MARUSIK (in prep.) on the reviving of the family Comaromidae WUNDERLICH 2004 based on the talk “*Comaroma* is not an anapid spider” by these authors at the European Congress of Arachnology in Greifswald (Germany) 2022.

(***) The extant monotypic new family, based on *Fonteferrea minutissima,* is described by me in this volume.

Family ZARQARANEIDAE WUNDERLICH 2008

Most genera of this quite diverse extinct family – probably it is not monophylelic - in Burmese amber were described 8 years ago, see WUNDERLICH (2015), and were revised by WUNDERLICH & MÜLLER (2018); few taxa were added by me in 2020, 2021 and 2022. Here I describe three further new species including a new genus.

Curvitibia WUNDERLICH 2015

Revised diagnostic characters (♂; ♀ unknown): Prosomal 0.75 mm long, profile strongly convex and eyes – especially the anterior medians quite large, clypeus long to fairly long (in *pellucidus*, fig. 68, photo), legs (fig. 69, photo 47) only fairly long, probably not annulated, sequence of the dorsal tibial bristles 2/2/2/2, metatarsi bristle-less, opisthosoma (photo) egg-shaped; pedipalpus (e. g., figs. 70-71): Patella dorsally bulging (in *pellucidus*) or with an outgrowth, cymbium very wide, paracymbium long, dorsally widened and with an inclination, tegular apophysis large, embolus long, thin and bent.

(*) Metatarsal bristles are absent but some hairs are quite long and similar to bristles!

Note: The modified anterior tibia and metatarsus I of the genotype *C. tenuimanus* WUNDERLICH 2015 are absent in *C. pellucidus*; therefore this pattern is not a diagnostic character of the genus *Curvitibia*.

Relationships: See WUNDERLICH (2015: 187) and (2018: 77).

Distribution: Mid (Upper) Cretaceous amber forest of Myanmar (Burma).

***Curvitibia pellucidus* n. sp.** (fig. 68-71), photo 47

Etymology: The name of the species refers to the translucent pattern of the body, from pellucidus (lat.) = translucent.

Material: Holotype ♂ in Mid (Upper) Cretaceous amber from Burma (Myanmar), F3773/BU/CJW.

Preservation and syninclusions: The spider is completely and partly well - but translucent - preserved in a clear yellow-orange piece of amber. The right tarsus III and the right tarsus and metatarsus IV are deformed, distinctly thinned, the opisthosoma is dorsally anteriorly inclined, probably by a beat. - Syninclusions are remains of two winged arthropods, a tiny plant hair and particles of detritus.

Diagnostic characters (♂; ♀ unknown): Anterior median eyes (fig. 68) very large, diameter ca. 0.11 mm, prosoma (fig. 68) strongly convex; pedipalpus (figs. 70-71): Patella dorsally bulging, cymbium very wide, paracymbium long and dorsally widened, tegular apophysis quite long, bearing a small blunt apophysis near its end, embolus long, thin and strongly bent.

Description (♂):
Measurements (in mm): Body length 1.5; prosomal length ca. 0.75, diameter of an anterior median eye ca. 0.11; opisthosomal length ca. 0.8; leg I: Femur ca. 0.8, patella 0.3, tibia 0.6, metatarsus ca. 0.6, tarsus 0.4, metatarsus II 0.6.
Colour of the translucent spider mainly light grey, legs probably not annulated.
Prosoma (fig. 68, photo): Profile strongly convex, bearing short hairs and 8 large eyes, the anterior medians even very large, clypeus and basal cheliceral articles long, mouth parts hidden. - Legs (fig. 69, photo) only fairly long, bearing partly fairly long hairs but especially metatarsi partly bearing rather long and almost bristle-shaped, tibiae I-II not thickened, bristles long and numerous, existing on femora to tibiae, femora: At least I with a dorsal one and 3 subapicals, patellae dorsally with a short basal and a long apical one, sequence of the dorsal tibial bristles 2/2/2/2, additional lateral bristles existing, metatarsus I not modified, metatarsal trichobothria and tarsal claws not studied. - Opisthosoma (photo) egg-shaped, soft, bearing short hairs, spinnerets short. - Pedipalpus: See the diagnostic characters.

Relationships: The structures of the ♂-pedipalpus – paracymbium, tegular apophysis and embolus - are similar to the holotype of *Curvitibia*, *C. tenuimana* WUNDERLICH 2015, the only congeneric species known up to now -, in which the dorsal part of the prosoma with the eyes is cut off. In *tenuimana* tibiae I-II are thickened basally-ventrally, metatarsus I is depressed dorsally-basally, the tibia of the ♂-pedipalpus bears probably a pointed prolateral apophysis, a blunt outgrowth of the tegular apophysis is absent and the embolus is probably longer.

Distribution: Mid (Upper) Cretaceous amber forest of Myanmar (Burma).

<u>Cornicaraneus</u> WUNDERLICH 2018: 77, 82-84.

Only the generotype, *Cornicaraneus scutatus* WUNDERLICH 2018, was known up to now. The leathery - in the new species - or even scutate opisthosoma is a special character of this genus; the sequence of the dorsal tibial bristles is 2/2/2/2 as written in the original genus diagnosis (p. 82) but not 2/2/1/1 as erroneously noted p. 77. The shape of the wide labium of the new species is quite different from the shape of the generotype, see below.

?***Cornicaraneus unuspedipalpus*** **n. sp.** (figs. 72-75), photo 48

<u>Etymology</u>: The name of the species refers to the single pedipalpus of the holotype (the left one is broken off and lost), from unus (lat.) = one, a single.

Material: Holotype ♂ in Upper (Mid) Cretaceous Burmese (Kachin) amber; F3774/BU/CJW.

Preservation and syninclusions: The spider is almost completely and very well preserved in a clear yellow-orange piece of amber; the left pedipalpus is lost (broken off) beyond the femur and lost; the opisthosoma is dorsally inclined, probably by a beat. - Syninclusions are remains of two Diptera in different layers from the holotype and particles of detritus.

Diagnostic characters (♂; ♀ unknown): Labium (fig. 72) wider than long and strongly rebordered, legs of medium length and distinctly annulated (photo), sequence of the dorsal tibial bristles 2/2/2/2, sequence of the metatarsal bristles 2/2/1/1, all femora dorsally bristleless, opisthosoma dorsally apparently leathery hardened; pedipalpus (figs. 74-75), see below.

Description (♂):
Measurements (in mm): Body length 2.5; prosomal length 1.4; opisthosoma: Length 1.5, width 1.2; legs: Femur I 1.9; leg II: Femur 1.3, patella ca. 0.3, tibia 0.9, metatarsus 1.05, tarsus 0.6, femur III 0.9, femur IV 1.1.
Colour: Prosoma and legs light to medium brown, legs distinctly annulated (photo), opisthosoma light grey.
Prosoma (photo): Profile fairly convex, hairs of medium length, fovea hidden, 8 eyes of medium size (bearing bubbles), posterior row slightly recurved, posterior median eyes spaced by about their diameter, clypeus of medium length, basal cheliceral articles large, fangs long and slender, teeth of the fang furrow hidden, labium (fig. 72) a free sclerite, wider than long, strongly rebordered. - Legs (photo) long and slender, order I/II/IV/III, hairs not long, bristles long and not numerous, sequence of the dorsal tibial bristles 2/2/2/2, sequence of the dorsal metatarsal bristles 2/2/1/1 (in a basal position), femora: Dorsal bristles absent, I: 1 prolaterally in the distal half and a subapical pair, II-IV bristle-less; tibia I bears 1/1 prolateral bristles and 1 retrolaterally besides the dorsal ones, position of the metatarsal trichobothria unknown, paired tarsal claws quite long and smooth (tooth-less), unpaired claw strongly bent. - Opisthosoma (photo) 1.25 times longer than wide, oval, dorsally leathery, bearing short hairs and 3 pairs of sigillae, spinnerets short, colulus (fig. 73) rectangular, wider than long. - Pedipalpus (figs. 74-75): Patella apically bulging, tibia with several long and thin bristles, paracymbium long, bent and fairly slender, bulbus strongly protruding, embolus long, partly hidden.

Relationships: Like in the holotype of *Cornicaraneus scutatus* WUNDERLICH 2018 the sequence of the tarsal tibial bristles is 2/2/2/2, the sequence of the metatarsal bristles is 2/2/1/1, the legs are distinctly annulated, and a long paracymbiums exists, but in *scutatus* the labium is distinctly elongated, an opisthosomal scutum is well developed, the pedipalpal tibia bears strong dorsal bristles, the paracymbium is stouter and the number of femur I bristles is different: 1 dorsal and 2 prolateral bristles exist and no apicals. Because of these differences I regard *unuspedipalpus* only as a questionable member of *Cornicaraneus*.

Distribution: Mid (Upper) Cretaceous amber forest of Myanmar (Burma).

Gibberaraneoid n. gen.

Etymology: The name of the genus refers to the hump-shaped raised opisthosoma, from gibber (lat.) = hump, and part of the name of the spider superfamily Araneoidea.

The gender of the name is masculine.

Type species (by monotypy): *Gibberaraneoid furcula* n. sp.

Diagnosis (♂; ♀ unknown): Opisthosoma (fig. 76) strongly raised above the spinnerets, leg bristles (fig. 77) thin, metatarsi only with apical bristles; pedipalpus (figs. 78-80): Tibia long and apically furcate, patella short and bearing a ventral hump, cymbium with a blunt retro-basal and fixed paracymbium, tegulum with a long and bipartite apophysis which is directed to the tibia.

Relationships: The tooth-less paired tarsal claws as well as shape and position of the paracymbium may indicate the membership of the family Zarqaraneidae. The bifurcate tibial apophysis of the pedipalpus is unique in the known members of this family. A bifurcate pedipapal tibia apophysis of a different shape exists also in the aenigmatic Biapophysini WUNDERLICH 2015 (?family; see WUNDERLICH (2018: 42)), in which strong leg bristes exist, the shape of the opisthosoma is oval, a paracymbium is absent (lost?), and a long embolus in a circular position exists. This taxon probably has to be regarded as a plesion of the superfamily Araneoidea.

Distribution: Mid (Upper) Cretaceous amber forest of Myanmar (Burma).

Gibberaraneoid furcula **n. gen. n. sp**. (figs. 76-80), photo 49

Etymology: The name of the species refers to the apically furcate pedipalpal tibia, from (lat.) = furca.

Material: Holotype ♂ in Upper (Mid) Cretaceous Kachin Burmese amber from Myanmar, F3801/BU/CJW.

Preservation and syninclusions: The spider is completely preserved in a clear, flat and yellowish piece of amber; especially both bulbi are deformed. - Syninclusions are a strongly deformed female spider, body length ca. 1.4 mm (I do not exclude that it is con-specific with the present holotype), a tiny Acari, few tiny remains of insects and larger parts of leaves.

Diagnosis, relationships and **distribution:** See above.

Description (♂; ♀ unknown):
Measurements (in mm): Body length 1.3; prosoma: Length 0.63, width 0.57; opisthosoma (deformed): Length ca. 0.55, width ca. 0.5; leg I: Patella 0.21, tibia 0.67, metatarsus 0.48, tarsus 0.37; femur IV 0.67.
Colour: Prosoma and legs dark brown, opisthosoma grey brown.
Prosoma (photo) 1.1 times longer than wide, fovea well developed, hairs indistinct, 8 large eyes in two rows, anterior median eyes smallest, spaced by their diameter, posterior row straight, posterior median eyes spaced by about their diameter, clypeus only fairly long, not protruding,, basal cheliceral articles of medium length, fangs long, mouth parts hidden, sternum about as long as wide, not elongated between coxae IV. - Legs (fig. 77, photo) rather long and slender, III shortest, I, II and IV about equal in length, hairs indistinct, bristles thin, most often existing from femora to metatarsi, femora I-II dorsally 1 near the middle, III-IV smooth, patellae dorsally 1/1, all tibiae with several bristles which are stronger on III-IV, tibiae dorsally 1/1, right tibia I additionally with a ventral-distal pair, tibia II with a prodistal bristle (further bristles may be rubbed off), metatarsi only with few apical bristles, position of the metatarsal trichobothria unknown, tree tarsal claws, paired claws long and tooth-less. - Opisthosoma (fig. 76, photo) deformed, heigh, raised above the spinnerets which are hidden, hairs short, dorsal side probably leathery or even scutate. - Pedipalpus (see above): Articles slender and bristle-less, patella short, tibia long and furcate, cymbium wide, embolus apparently hidden.

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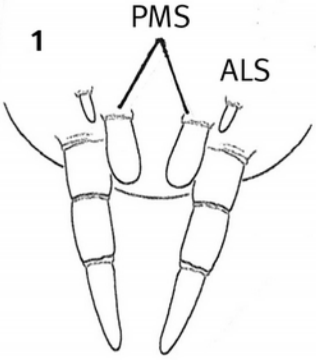
– (2020): New and already described fossil spiders (Araneae) of 20 families in Mid Cretaceous Burmese amber with notes on spider phylogeny, evolution and classification. – Beitr. Araneol., 13: 22-164.

– (2021): Descriptions of new fossil spiders (Araneida: Araneae) in Late (Mid) Cretaceous Burmese amber with focus on the superfamilies Palpimanoidea and Deinopoidea and members of the RTA-clade, as well as remarks on palaeobehaviour, palaeofauna, taxonomy and phylogenetics. – Beitr. Araneol., 14: 25-262.

– (2022): Some spiders in Cretaceous amber from Myanmar (Araneida: Chimerarachnida and Araneae). – Beitr. Araneol., 15: 119-173.

INDEX

1



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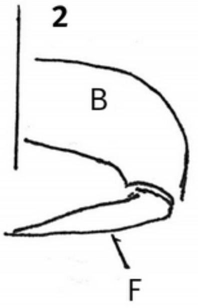

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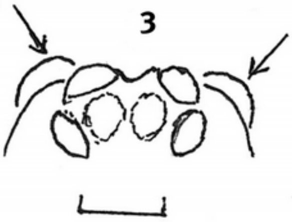

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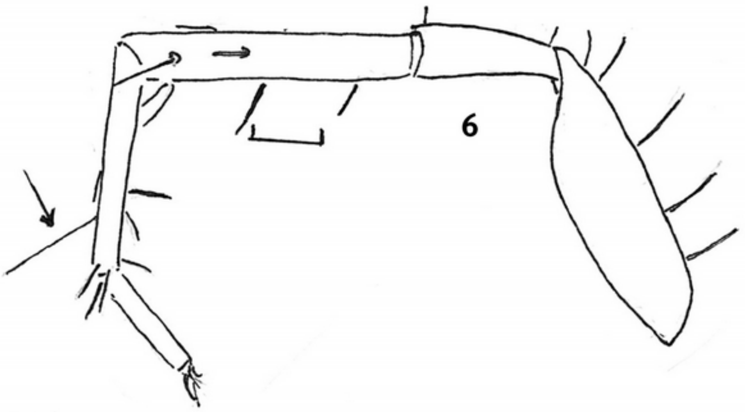
6



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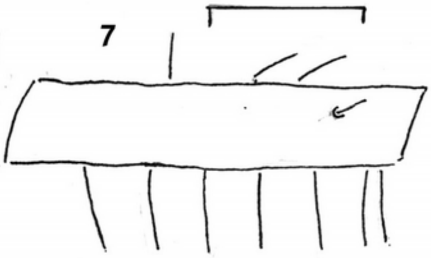
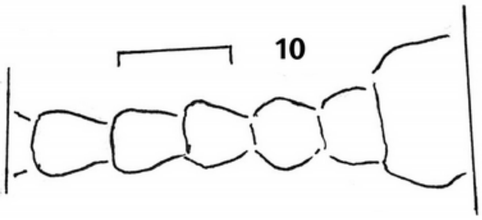


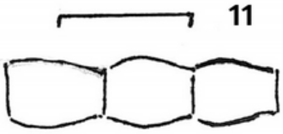
8

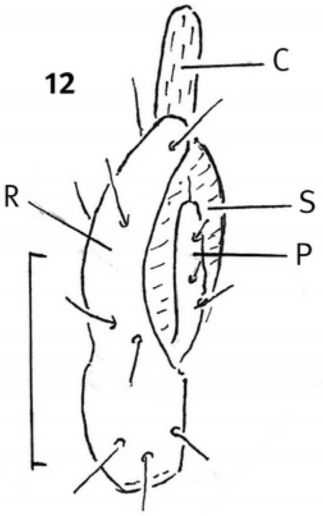
Fig. 1: *Aliatypus* sp. (Antrodiaetidae, extant), ventral aspect of the spinnerets. - ALS = anterior lateral spinneret, PMS = posterior median spinnerets. No scale. Taken from UBICK et al. (2017);

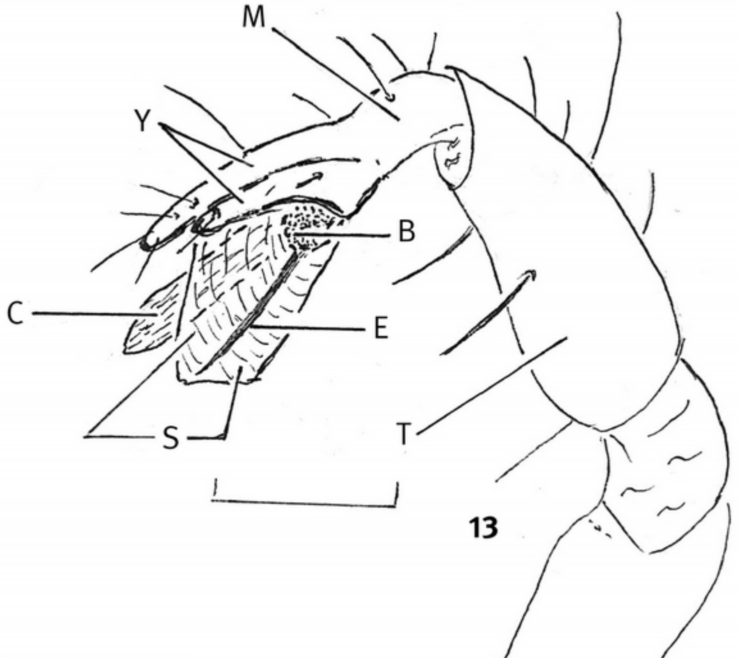
fig. 2: Hypothetical position of the right basal cheliceral article (B) and the fang (F) of a *Chimerarachne* sp. (Chimerarachnida), lateral aspect. - No scale;

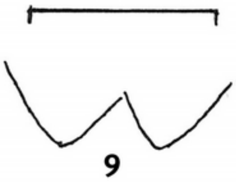
figs. 3-8: *Chimerarachne patrickmueller* **n. sp**. (Chimerarachnidae), ♂; 3) dorsal aspect of the eyes. A thin emulsion covers some lenses. The arrows point to the base of the basal cheliceral articles; 4) ventral aspect of the left fang; 5) fine granulate cuticula of the prosoma; 6) prolateral aspect of the right leg IV. - Note the long metatarsal trichobothrium. Hairs are not drawn; 7) prolateral aspect of te left tibia I. - Note the long and erect ventral hairs. Other hairs are not drawn; 8) retrolateral aspect of the unpaired claw of the left tarsus III. - Scales: 0.02 mm in figs. 5) and 8), 0.1 in figs. 3-4), 0.2 in figs. 6-7), no scale in figs. 1-2);



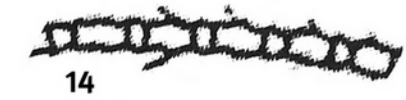


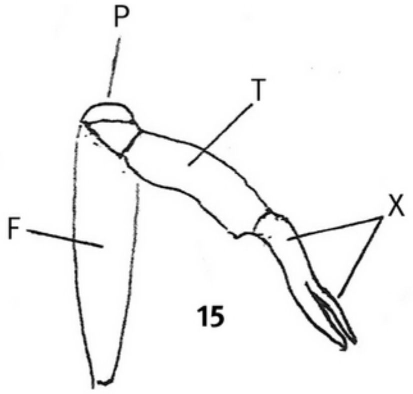


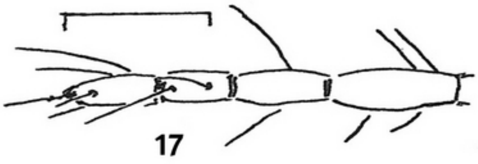


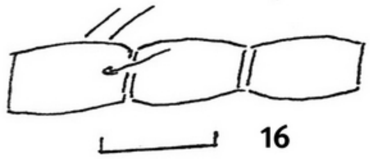


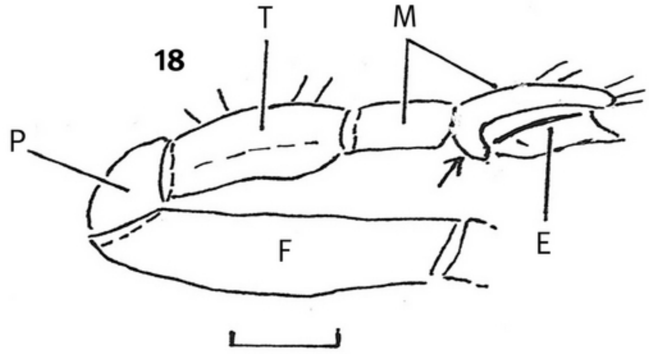
figs. 9-13: *Chimerarachne patrickmueller* **n. sp**. (Chimerarachnidae), ♂; 9) ventral aspect of a paired structure which may represent the posterior median spinnerets; 10) dorsal aspect of the 5 basal segments of the flagellum beyond the pygidium (at the right). Hairs are not drawn; 11) dorsal aspect of 3 segments of the middle part of the flagellum. Hairs are not drawn; 12) dorsal-apical aspect of the left pedipapus. Only few hairs are drawn; 13) prolateral aspect of the right pedipalpus. - B = bulbus, C = questionable conductor, E = embolus, M and Y = fused metatarsal and cymbial part of the metacymbium, P and R = prolateral and retrolateral branch of the cymbial part, S = translucent shield, T = tibia. Scales: 0.1 mm in figs. 9-11), 0.2 mm in figs. 12-13);

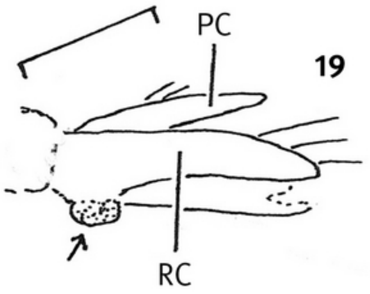






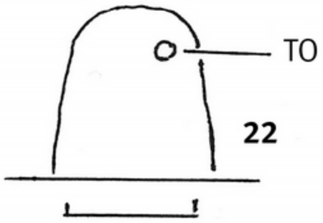


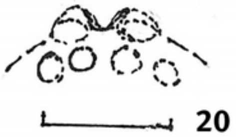


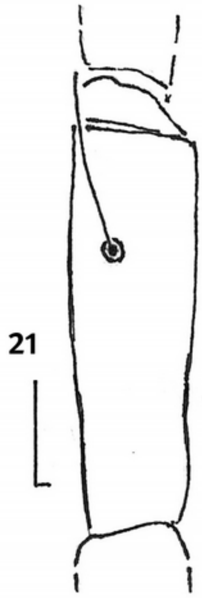


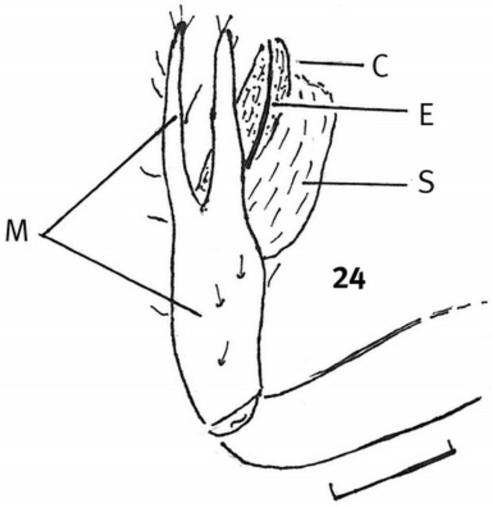
figs. 14-15: *Chimerarachne yingi* WANG et al. 2018 (Chimerarachnidae), ♂ holotype; 14) 5 segments of the medium part of the flagellum; 15) prolateral aspect of the left pedipalpus. Figs. taken from WANG et al. (2018);

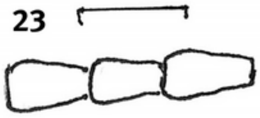
figs. 16-19: *Chimerarachne longiflagellum* (WUNDERLICH 2022) (Chimerarachnidae), ♂ holotype; 16) ventral aspect of 3 segments of the flagellum just behind the middle. Only few hairs are drawn; 17) ventral aspect of 4 distal segments of the flagellum. Only few hairs are drawn; see photo 36; 18) retrodorsal aspect of the right pedipalpus. The arrow points to a questionable artefact; 19) retrodorsal aspect of the cymbial branches of the right pedipalpus. - E = embolus F = femur, M and X = metacymbium, P = patella, PC and RC = prolateral and retrolateral cymbial branches, T = tibia. Scales: 0.1 mm in figs. 16-19), no scale in 14-15);

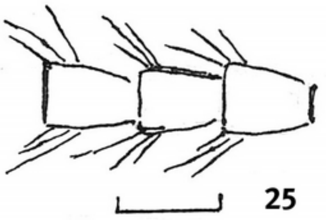


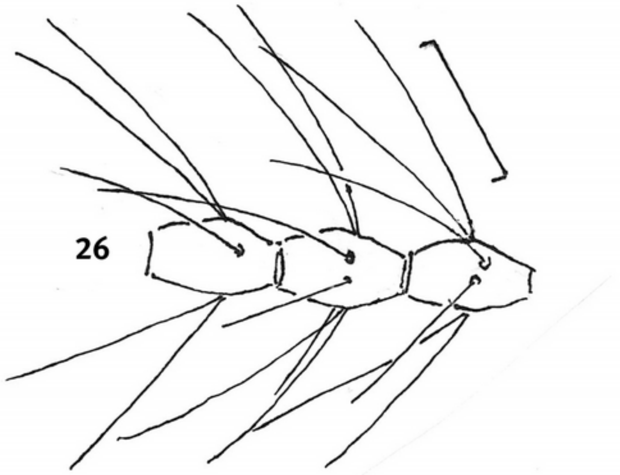






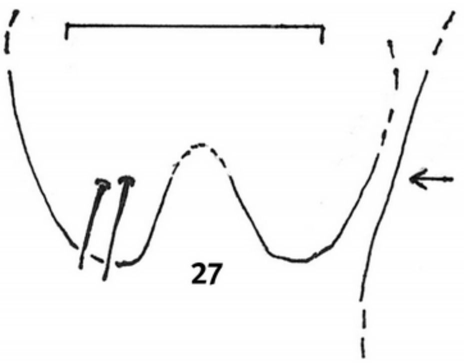


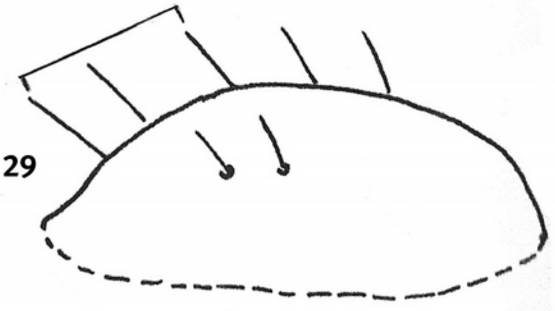


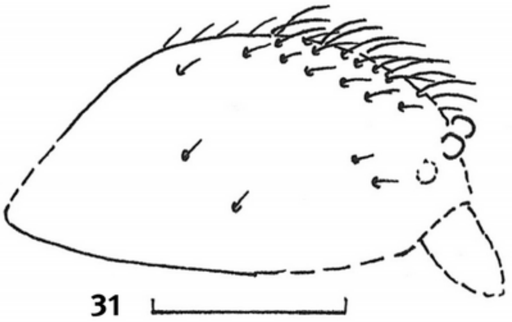


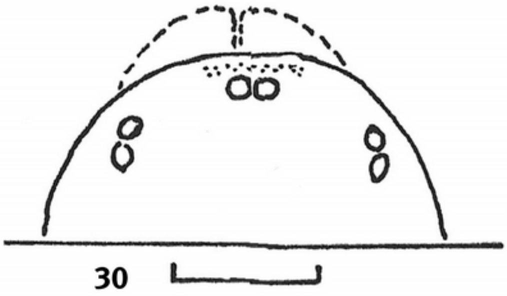
figs. 20-24: *Chimerarachne alexbeigel* **n. sp.** (Chimerarachnidae), ♂; 20) dorsal aspect of the eyes which are partly covered with an emulsion; 21) dorsal aspect of the slightly deformed left metatarsus I. Note the quite long trichobothrium. Hairs are not drawn; 22) prodorsal aspect of the distal part of the left tarsus I. Note the position of the questionable tarsal organ. Hairs and claws are not drawn; 23) 3 segments of the middle part of the flagellum, dorsal aspect. Hairs are not drawn; 24) dorsal and slightly prolateral aspect of the fairly deformed left pedipalpus. Only few hairs are drawn;

figs. 25-26: *Chimerarachne spiniflagellum* **n. sp**. (Chimerarachnidae), ♂; 25) 3 segments of the end of the basal quarter of the flagellum, dorsal aspect; 26) 3 segments of the middle part of the flagellum, ventral aspect. - C = conductor, E = embolus, M = metacymbium, S = shield, T0 = questionable tarsal organ. Scales: 0.5 mm in fig. 22), 0.2 in fig. 23), 0.1 in the remaining figs.;





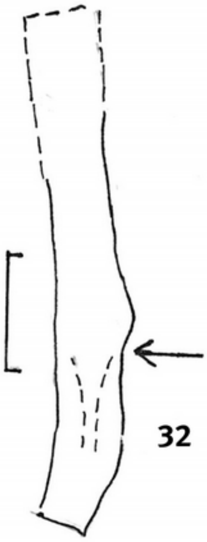




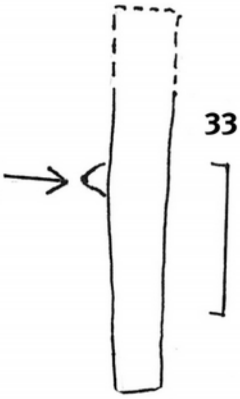
figs. 27-28: Chimerarachne spiniflagellum **n. sp**. (Chimerarachnidae), ♂; 27) ventral aspect of the larger, blunt and and adpressed pair of structures which I regard to be the posterior median spinnerets. Two of several questionable spigots (or strong hairs?) are drawn. The arrow points to the prolateral margin of the left anterior spinneret; 28) dorsal aspect of the left cymbium. Hairs are not drawn:

figs. 29-30: ?Scytodes nonalta **n. sp**. (Scytodidae), ?ad. ♀; 29) lateral aspect of the prosoma. The eyes are hidden; 30) dorsal aspect of the anterior part of the prosoma;

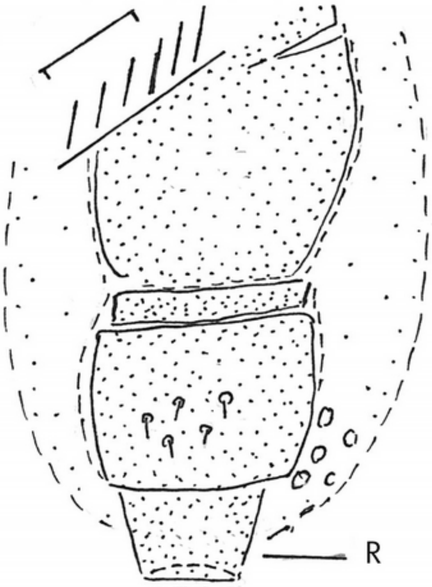
fig. 31: ?Scytodes hani WUNDERLICH 2012 (Scytodidae from Jordan), lateral aspect of the prosoma. - Scales: 0.1 mm in figs. 27-28), 0.2 mm in figs. 29-31);



32

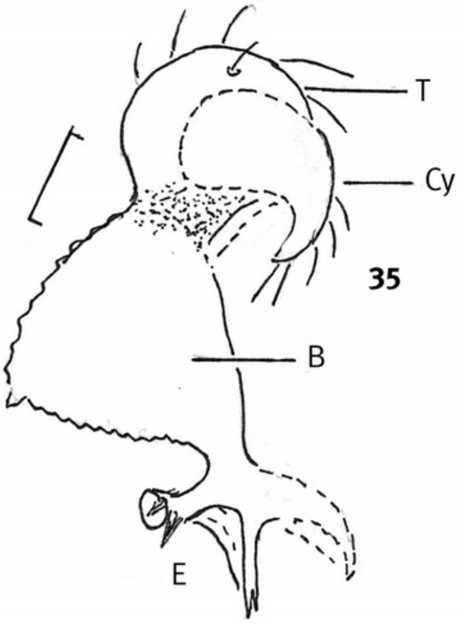


33

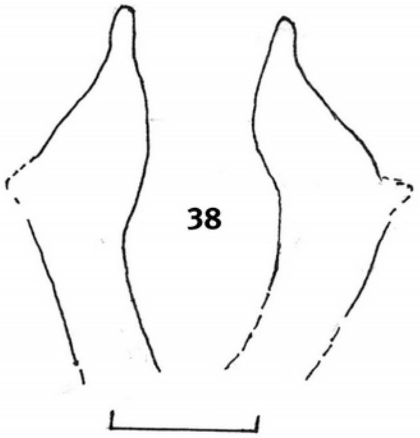


34

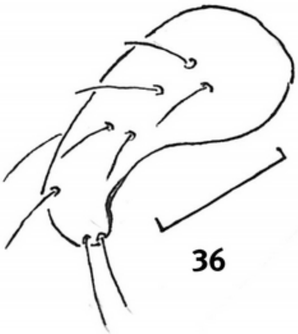
37



35



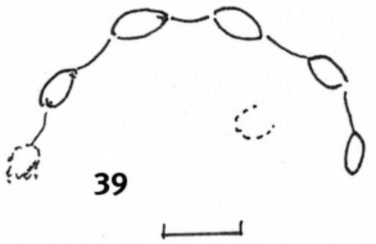
38

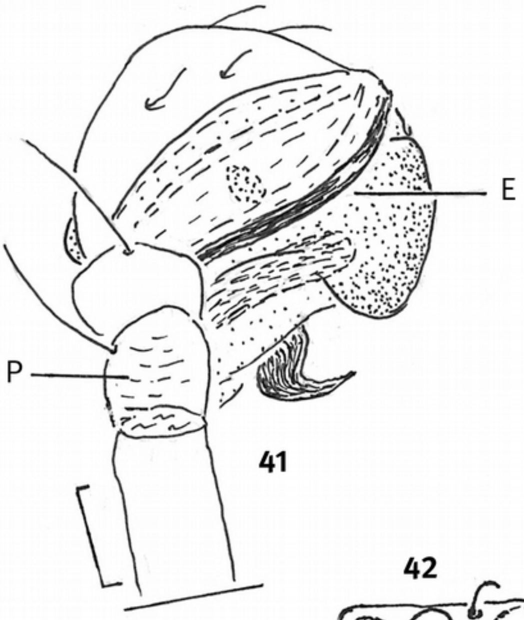


36

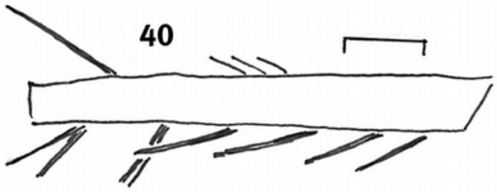
figs. 32-36: *Kachinblemma constrictum* **n. sp**. (Tetrablemmidae), ♂; 32) ventral aspect of the left femur II. Note the constriction in the basal half (arrow); 33) Dorsal aspect of the left tibia II. The arrow points to the mating spur; 34) ventral aspect of the opisthosoma with the sclerotized ring around the retracted spinnerets (R). Only few of the tiny lateral sclerotized plates are drawn; 35) dorsal aspect of the right pedipalpus which was heated, is deformed and probably expanded. Only few hairs are drawn; 36) dorsal aspect of the left cymbium;

figs. 37-38: *Electroblemma retroflectum* **n. sp**. (Tetrablemmidae), ♂; 37) anterior-dorsal aspect of the deformed and partly hidden part of the dorsal prosomal outgrowth; 38) dorsal aspect of the cheliceral outgrowths. - Scales 0.2 mm in figs. 33-34), 0.1 in the remaining figs.;


39



41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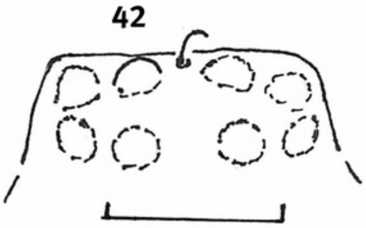
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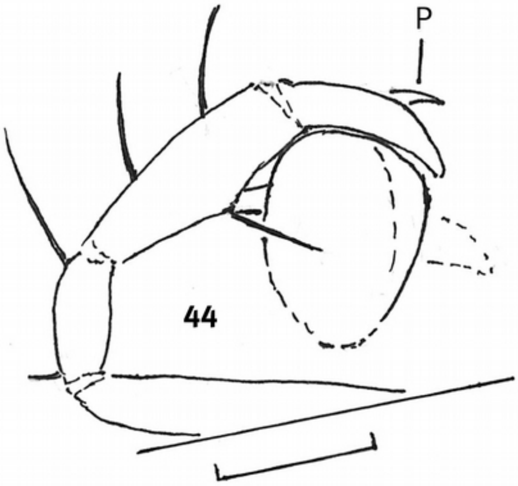
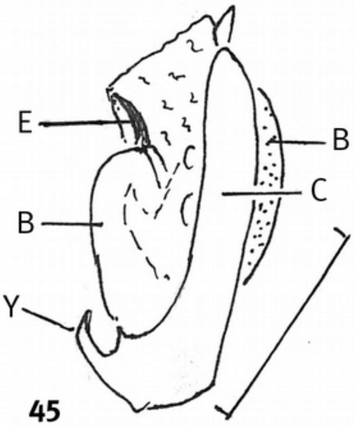


44

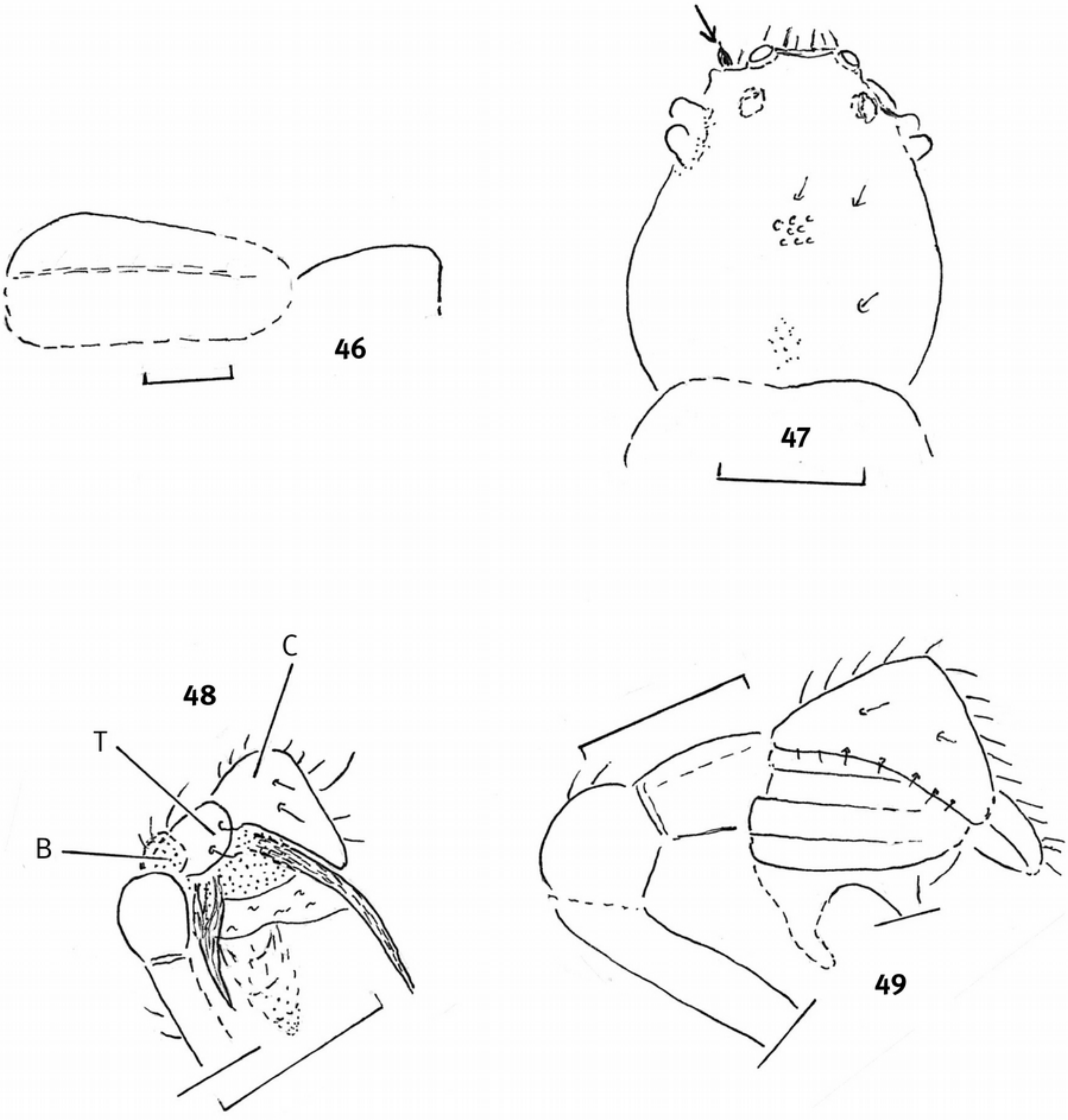

43



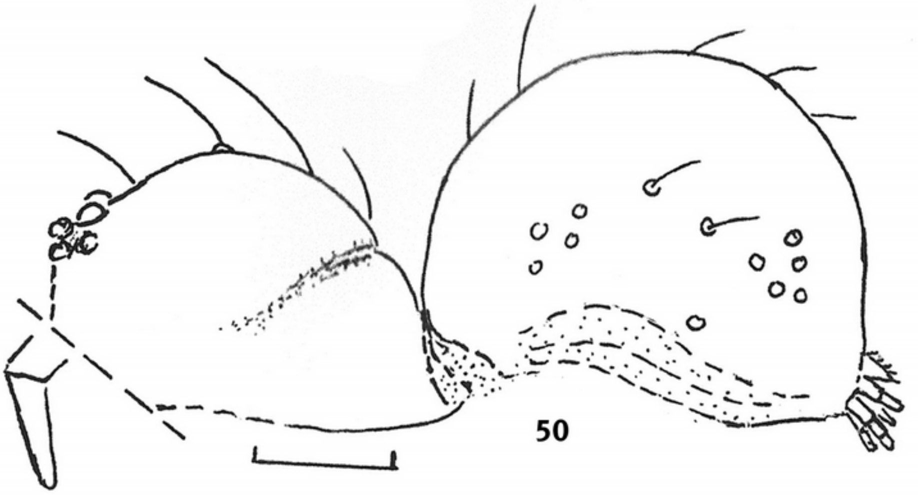
45

figs. 39-41: *Parakchin pectunculus* **n. sp.** (Uloboridae), ♂; 39) dorsal aspect of the eyes. The posterior median eyes are hidden and deformed; 40) prolateral aspect of the right metatarsus III. Only few hairs are drawn; 41) retroletaral aspect of the right pedipalpus;

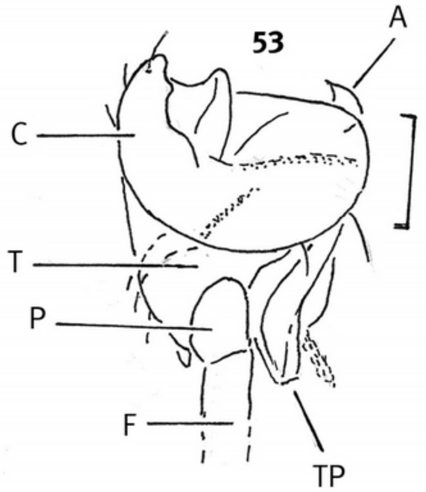
figs. 42-45: *Spinipalpitibia occulta* **n. sp.** (Protoaraneoididae), ♂; 42) dorsal aspect of the eyes. The lenses are partly covered with an emulsion; 43) dorsal aspect of the right tibia IV; 44) retrolateral aspect of the right pedipalus. Parts are hidden and only few bristles are recognizable; 45) dorsal aspect of the distal art of the left pedipalpus. Hairs are not drawn. - B = bulbus, C = cymbium, E = embolus, P= patella, Y = cymbium. Scales: 0.1 mm in figs. 39-41), 0.2 mm in figs. 42-45);



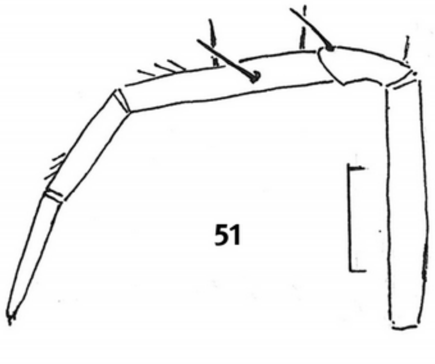
figs. 46-49: Parvimegasetae araneoides **n. gen. n. sp**. (Megasetidae), ♂; 46) outline of the body which is partly hidden; 47) dorsal aspect of the prosoma. Mainly the eyes are deformed and covered with an emulsion. The arrow points to a questionable artefact; 48) prolateral aspect of the strongly deformed left pedipalpus; 49) retrolateral aspect (cymbium and bulbus in a more apical aspect) of the deformed right pedipalpus. - B = bubble, C = cymbium, T = tibia. Scales: 0.2 mm in figs. 46-47), 0.1 mm in figs. 48-49);



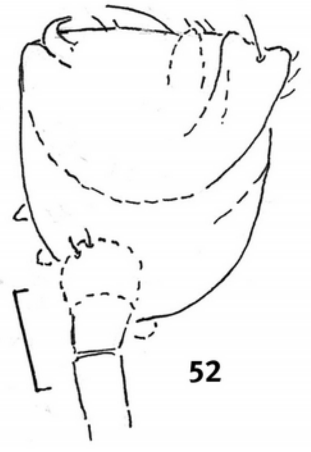
50



53



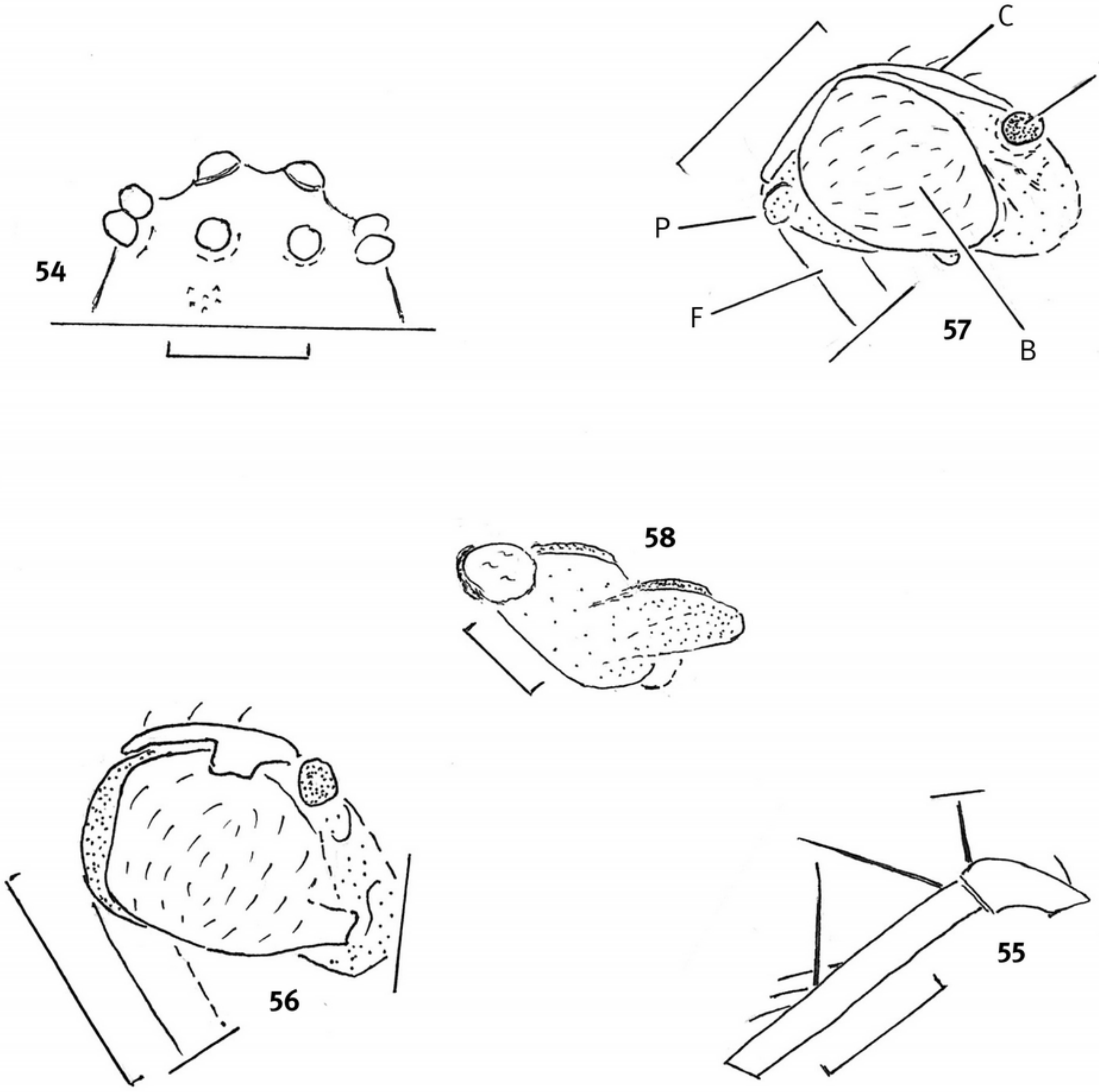
51



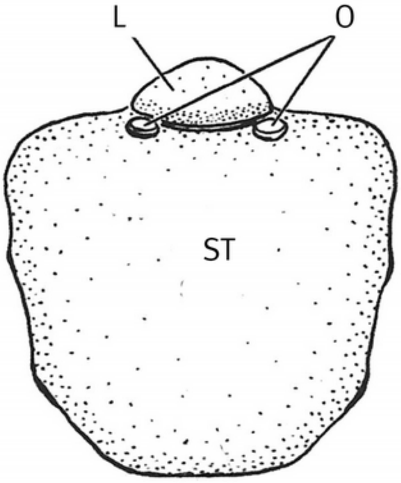
52

fig. 50: Cretamysmena fontana WUNDERLICH 2018 (Cretamysmenidae), ?ad. ♀, lateral aspect of the body and of the distal part of the left pedipalpus:

figs. 51-53: Myanmarmysmena grandipalpus **n. gen. n. sp**. (?Mysmenidae), ♂; 51) prolateral aspect of the right leg I; the prodistal femoral bristle is absent on this leg; 52) dorsal aspect of the left pedipalpus; 53) dorsal aspect of the right pedipalpus. - C = cymbium, F = femur, P = patella, T = tibia, TP = tegular process. Scales: 0.2 mm in fig. 51), 0.1 mm in the remaining figs.;

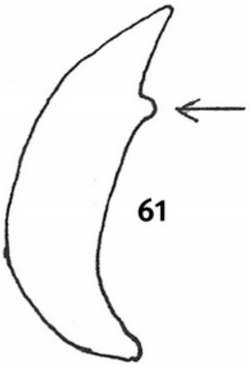


figs. 54-58: *Nanoaenigma pumilio* **n. gen. n. sp.** (Nanoaenigmatidae **n. fam**.), ♂; 54) dorsal aspect of the eyes which are covered with an emulsion; 55) prodorsal and fairly apical aspect of the right tibia and patella I. The distal part of the long distal patellar bristle is broken off. Only few hairs are drawn; 56-57) retrodorsal and retrolateral aspect of the right pedipalpus; parts are hidden; 58) dorsal aspect of the right pedipalpus, outline. - B = bulbus, C = cymbium. F = femur, M = median apophysis, P = questionable paracymbium, T = tegular apophysis. Scales = 0.1 mm;

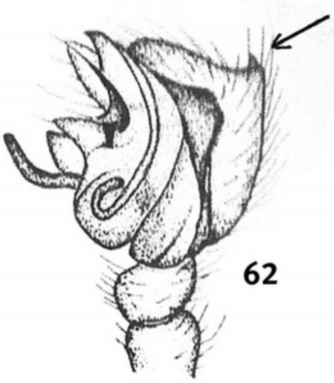


59

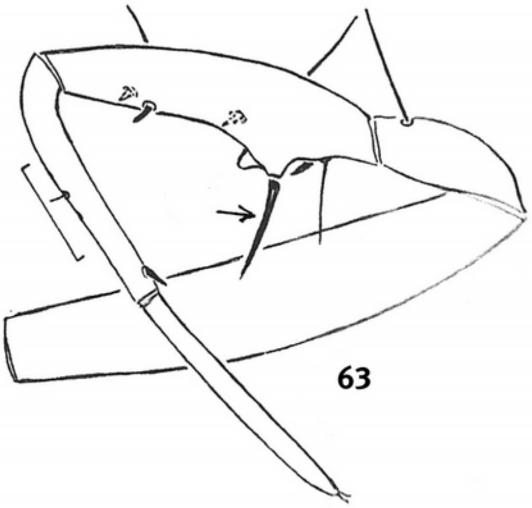
60



61



62



63

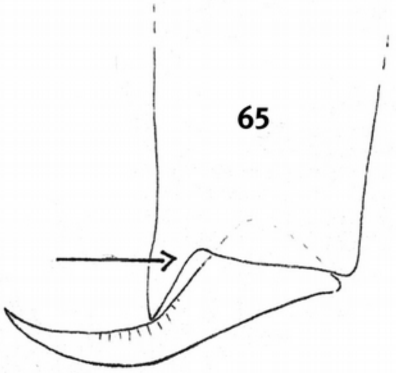
fig. 59) Theridiosomatidae sp., extant, ventral aspect of the sternum (ST) with the sternal openings (O) and the labium (L);

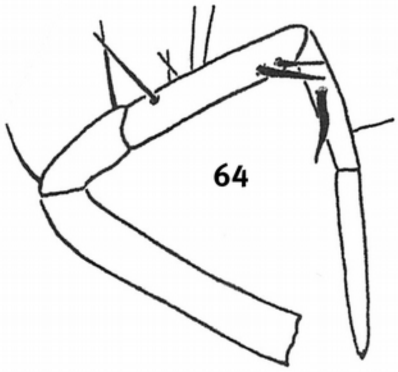
fig. 60) Anapidae sp., extant, anterior aspect of the chelicerae with the labral spur (L);

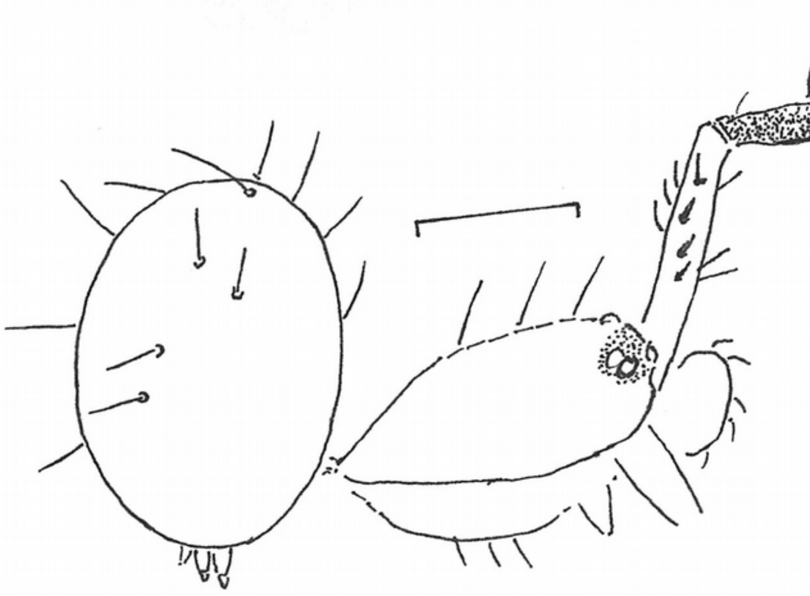
fig. 61) *Comaroma simoni* BERTKAU 1889 (Comaromidae), extant, ♂, dorsal aspect of the cymbium of the right pedipalpus with the retrodistal cymbial hook (arrow);

fig. 62) *Balticoroma maculosa* (OI 1963) (Comaromidae), extant, ♂, retrolateral aspect of the left pedipalpus. The arrow points to the cymbial outgrowth. - Taken from OI (1960);

fig. 63) *Balticonopsis* sp. (Anapidae), fossil in Eocene Baltic amber, ♂, lateral aspect of leg I. The arrow points to the ventral tibial clasping (mating) spine. - Scales: 0.2 mm in fig. 63), no scale in the remaining legs;







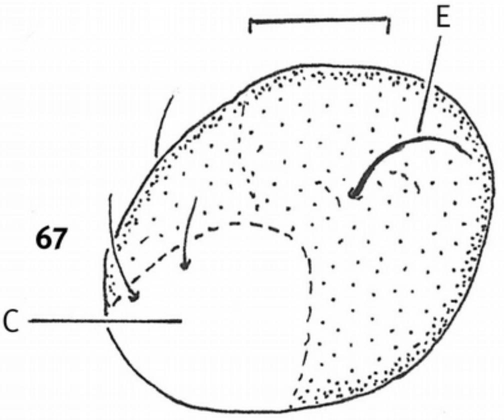
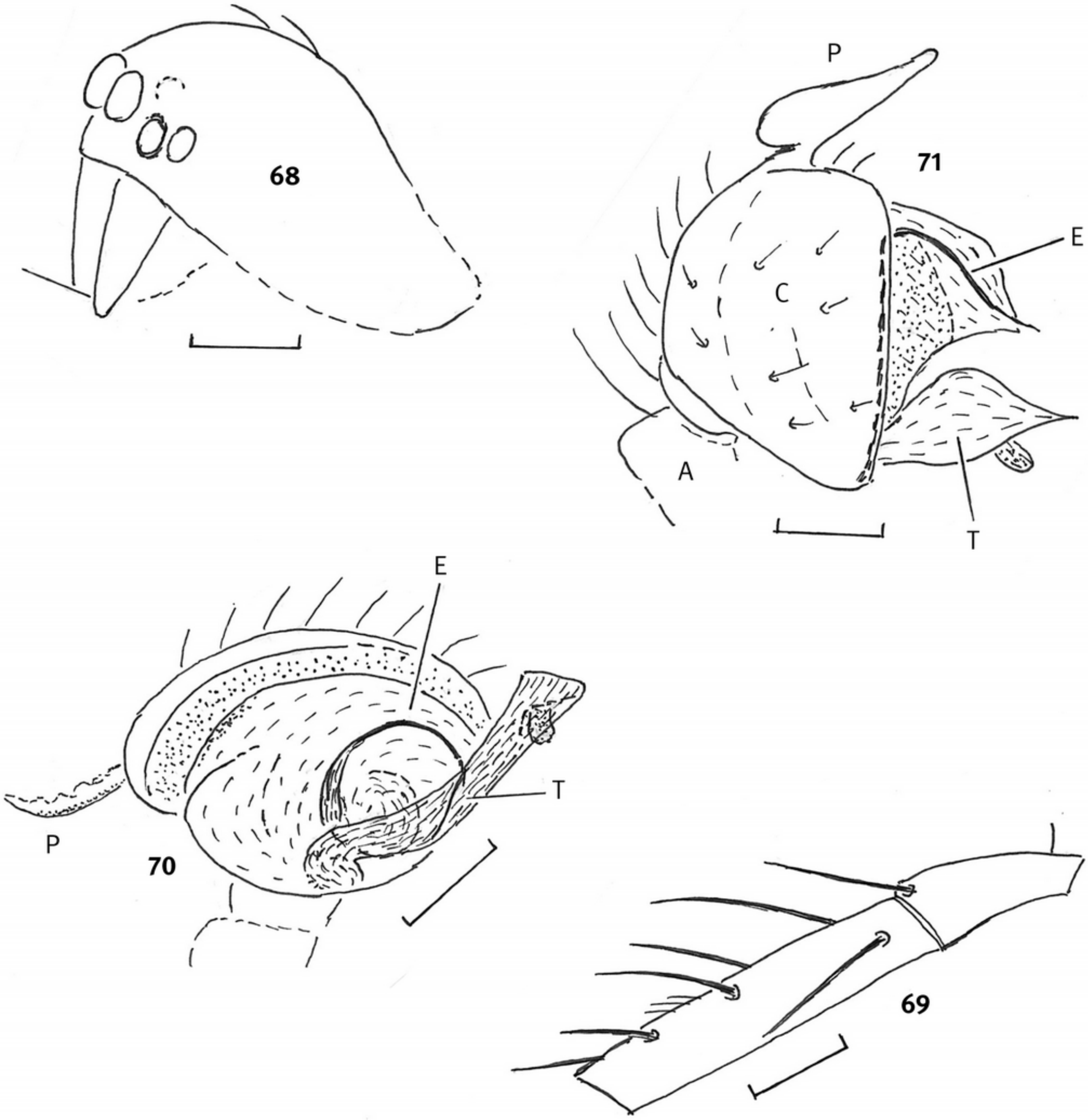


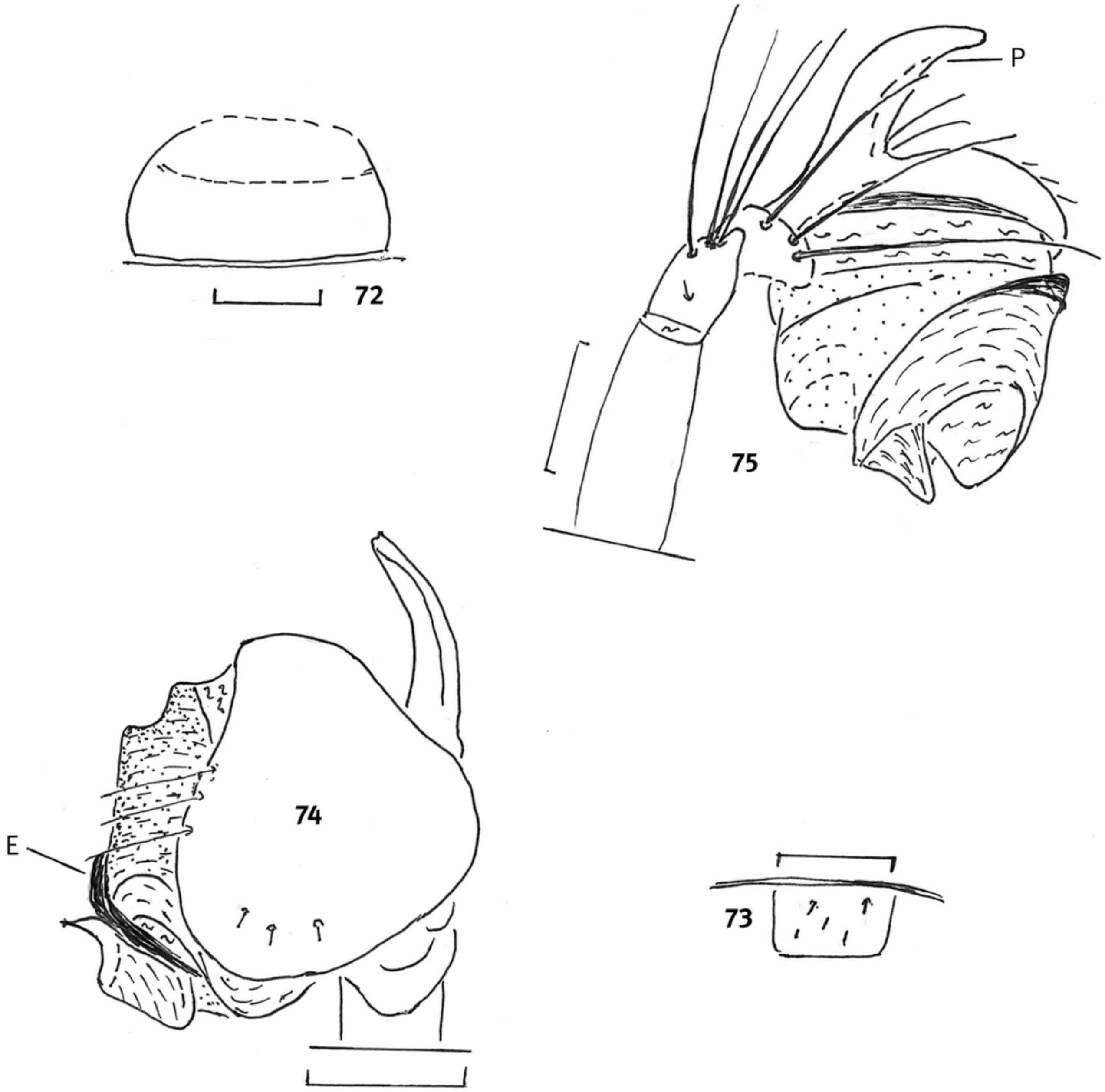
fig. 64) _Mysmenella jobi_ (KRAUS 1967) (Mysmenidae), extant, ♂, prolateral aspect of the left leg I with strong clasping (mating) spines;

fig. 65) _Synaphris dalmatensis_ WUNDERLICH 1980 (Synaphridae), extant, ♀, anterior aspect of the left chelicera. The arrow points to the large apical tooth;

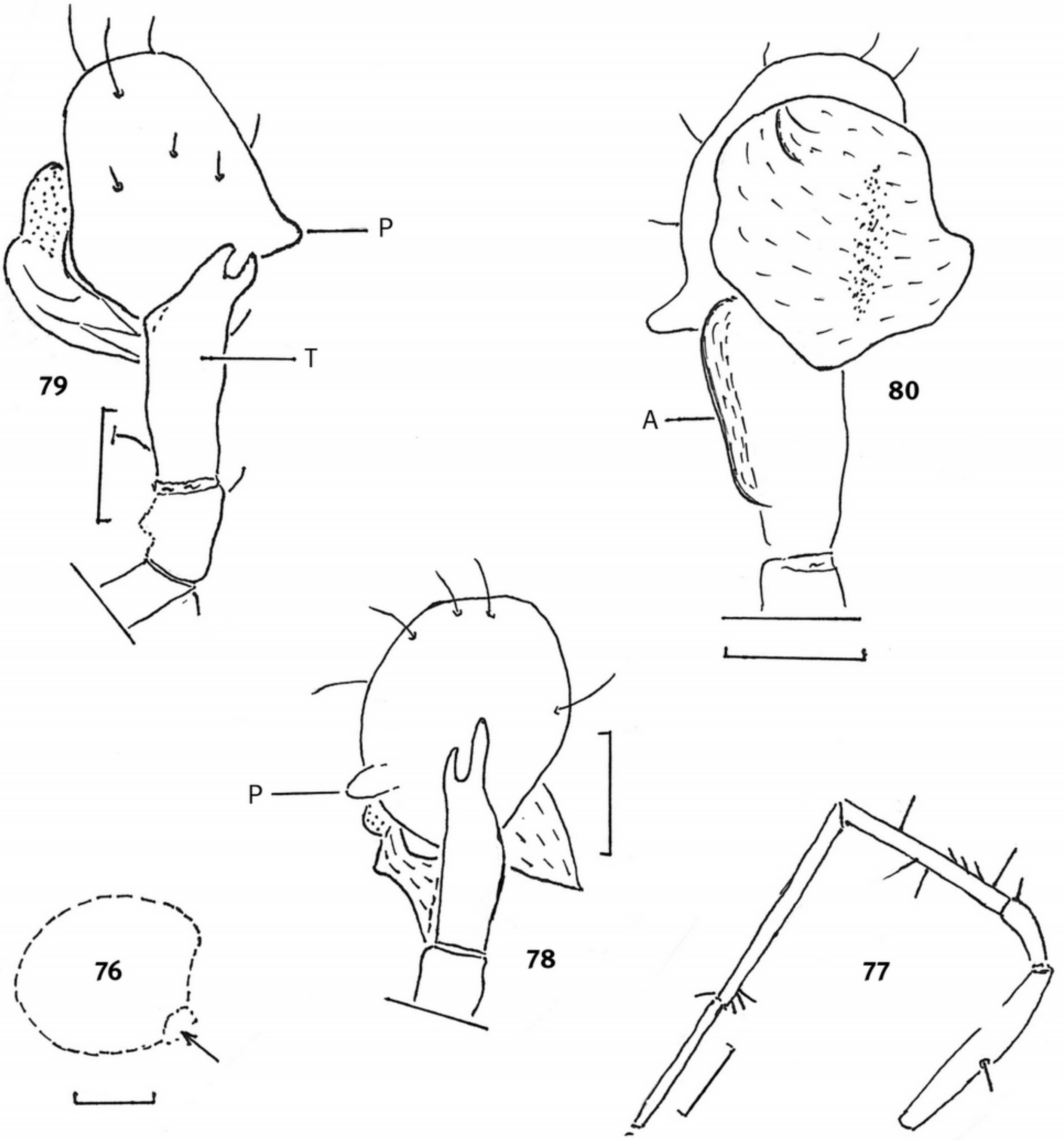
figs. 66-67) _Fonteferrea minutissima_ WUNDERLICH 2023 (Fonteferridae), extant, ♂; 66) right aspect of the body, parts of the left leg I and of the left pedipalpus. The chelicera possesses an unnatural position. Note the 4 prolateral femoral bristles and the 3 long dorsal bistles on patella and tibia. Only few hairs are drawn; 67) prodorsal aspect of the left pedipalpus. Only few hairs are drawn.- C = cymbium, E = embolus. Scales: 0.2 mm in fig. 66), 0.5 mm in fig. 67), no scales in figs. 64-65);



figs. 68-71: *Curvitibia pellucidus* **n. sp.** (Zarqaraneidae), ♂; 68) retrolateral and slightly anterior aspect of the prosoma which is partly hidden, e. g., the posterior median eyes; 69) retrodorsal aspect of the left patella and tibia I; 70) ventral aspect of the right pedipalpus. The paracymbium is not well observable in this position. Only few hairs are drawn. - A = tibia, C= cymbium, E = embolus, P = paracymbium, T = tegular apophysis. Scales: 0.2 mm in figs. 68-69), 0.1 mm in figs. 70-71);



figs. 72-75: ?*Cornicaraneus unuspedipalpus* **n. sp**. (Zarqaraneidae), ♂; 72) labium which is strongly rebordered; 73) colulus; 74) proventral position of the right pedipalpus. Only few hairs are drawn; 75) retrolateral and slightly dorsal aspect of the right pedipalpus. - E = embolus, P = peracymbium. Scales: 1.0 mm in fig. 72), 0.05 mm in fig. 73), 0.2 mm in figs. 74-75);



figs. 76-80: *Gibberaraneoid furcula* **n. gen. n. sp**. (?Zarqaraneidae), ♂ ; 76) lateral aspect of the opisthosoma, outline. The arrow points to the area of the spinnerets which are hidden; 77) prolateral aspect of the right leg I. Only few hairs are drawn; 78) dorsal-basal aspect of the deformed left pedipalpus; 79) prodorsal aspect of the right pedipalpus; 80) ventral aspect of the deformed right pedipalpus. - A = tegular apophysis, P = paracymbium, T = tibia. Scales: 0.2 mm in figs. 77-78), 0.1 mm in the remaining figs.

BEITR. ARANEOL. 16 (2023: 216-217)

THE *THREE* KINDS OF SPINNING ORGANS OF SPIDERS (ARANEAE)

A short note

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Abstract: The three quite different kinds of spinning organs of spiders (Araneae) are treated in short.

See also FOELIX (1996 f) and the following paper of this volume.

(1) The "SPINNING GLAND ORGAN"

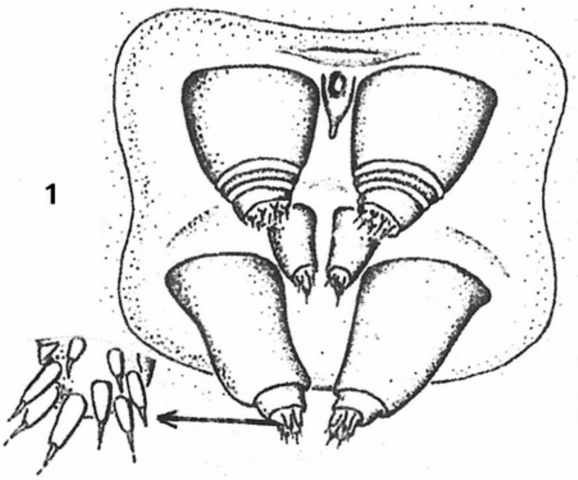
The well-known spinnerets exist in both sexes of all spiders near the end of the opisthosoma. The threads are emitted by spigots of spinnerets (fig. 1) or of a flat field, the cribellum. Several kinds of glands produce different kinds of silk which are used for various purposes like sticky and non sticky threads of capture webs, threads of building egg sacs, safety threads and aeronautic threads.

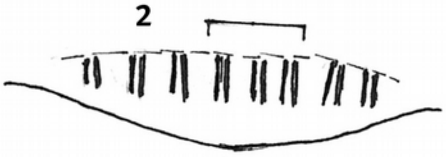
(2) The "EPIANDROUS GLAND SPINNING ORGAN"

exists solely in the male sex and is only used for reproduction. The particular epiandrous glands in the opisthosoma produce a secretion which is led to entire spigots (fig. 2), which exist in numerous species, to build threads of a small "sperm web" which overtakes droplets of sperm. - See MARPLES (1967), FOELIX (1996: 180) and (2015: 237, figs. 7.4c and 75.a-b).

(3) The "POISON GLAND SPINNING ORGAN"

exists in both sexes solely of the family Scytodidae and is used only for prey capturing. The posterior part of the prosomal poison glands produces a secretion. This secretion is ejected by the fangs (!). It hardens to silk and fixes the prey, here a fly, on a substratum (fig. 3). - See FOELIX (1996: 41, fig. 38), (2011: 53, figs. 3.5 and3.6), (2015: 62-63, figs. 3.5 and 3.6).





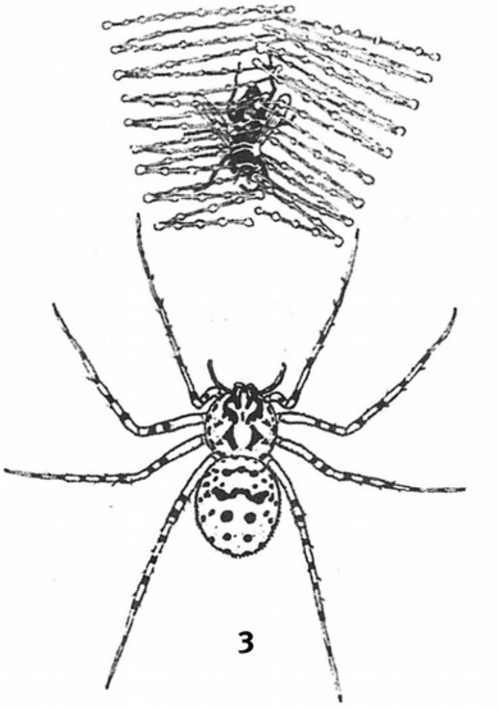


Fig. 1) Ventral aspect of the spinning field of a *Segestria* sp. (Segestriidae). Note the small colulus (O) between the anterior spinnerets and the enlarged bipartite spigots (left) of the apical article of the right posterior spinneret. - Taken from FOELIX, after GLATZ, modified.

Fig. 2) 8 pairs of epiandrous gland spigots in front of the epigastric furrow of a male of *Loxosceles rufescens* (DUFOUR 1820) (Sicariidae: Loxoscelinae), ventral aspect. The spigots are stronger and blunt in contrast to the pointed hairs which are not drawn.- Scale = 0.1 mm.

Fig. 3) A member of the genus *Scytodes*, (Scytodidae), body length 5 mm has fixed its prey, a fly, with the help of sticky threads ejected from its fangs. - After BRISTOWE.

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BEITR. ARANEOL. 16 (2023: 218-224)

DIE *DREI* ARTEN VON SPINNAPPARATEN DER SPINNEN (ARANEAE)

bei fossilen und heutigen Arten

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Ein Spinnvermögen ist bei Gliederfüßern weit verbreitet. Bei Insekten produzieren z. B. bestimmte Mückenlarven der Gattung *Arachnocampa* (Name!) mit Klebtröpfchen besetzte Fangfäden, die von Höhlendecken herabhängen. Bei Spinnentieren – den Achtbeinern unter den Gliederfüßern - ist Spinnvermögen mehrfach unabhängig voneinander und an verschiedenen Körperstellen entwickelt worden: Außer bei Spinnen existiert es z. B. auch bei Spinnmilben (an der Oberlippe austretende Fäden) und einigen Pseudoskorpionen (an den beweglichen Chelicerenfingern austretende Fäden). Bei den erwähnen Tieren existieren allerdings keine FangNETZE. Eine Ausnahme existiert bei Insekten: Wasserlebende Larven bestimmter Köcherfliegen weben raffinierte Fangnetze, die denjenigen der (Web)spinnen gleichkommen. Siehe die ausführliche Darstellung durch SAUER & WUNDERLICH (1997: 286-293).

Spinnapparate, Spinnwarzen (Abb. 1-9), Spinnvermögen und die Fähigkeit Fangnetze zu bauen existieren bekanntlich bei Spinnen in beiden Geschlechtern (siehe unten, 1). Aber wussten Sie, dass männliche Spinnen noch einen zweiten Spinnapparat besitzen (siehe unten, 2), das im weiblichen Geschlecht fehlt? Oder dass bestimmte Spinnen ihre Beutetiere an die Wand „SPUCKEN“ können? (Siehe unten, 3).

Bei Spinnen haben sich Organe zur Erzeugung von Spinnfäden DREIMAL unabhängig von einander entwickelt. Es existieren Verhältnisse und Möglichkeiten Beutetiere zu überwältigen, die in der Natur einmalig sind:

(1) SPINNFÄDEN VERSCHIEDENSTER FUNKTION wie Fangfäden (siehe weiter unten).
Die allen Lesern bekannten „gewöhnlichen“ Spinnwarzen (Abb. 1-3) existieren in *beiden* Geschlechtern mit mehr oder weniger deutlichen - auch geschlechtlichen – Unterschieden. Die Bezeichnung „Warzen“ ist allerdings ganz unpassend, denn sie sind fingerartig und be-

weglich. Ihre Position ist bekanntlich unten und meist weit hinten am Ende des Hinterkörpers der Spinnen. Sie sind nach Form und Funktion bei einzelnen Verwandtschaftsgruppen der Spinnen sehr verschiedenartig.
Ursprünglich existieren bei Spinnen 2 Paar seitliche große und GEGLIEDERTE Spinnwarzen sowie 1 oder 2 Paar mittlere kleine und meist funktionslose „Spinnwarzen“ (Abb. 3). Ihre Anzahl kann reduziert sein, sogar bis auf ein einziges Paar: bei einer Art von Längskieferspinnen (Mygalomorpha) Europas. Die mittleren „Spinnwarzen“ erzeugen gewöhnlich keine Spinnfäden; lediglich bei Jungspinnen der urtümlichen Gliederspinnen (Mesothelae) können alle 4 Paare funktionsfähig sein. Im Gegensatz zu den ursprünglichen Längskieferspinnen (z. B. den Vogelspinnen) existiert bei den „modernen“ Querkieferspinnen (z. B. Radnetzspinnen und Springspinnen) an Stelle der vorderen mittleren Spinnwarzen entweder ein „Spinnsieb“, (Abb. 6-7, siehe unten) oder ein kleines und oft lappen-ähnliches Gebilde, ein „Colulus“ (Abb. 2), aus dem keine Spinnfäden austreten. Oder es fehlen beide wie etwa bei den Vogelspinnen und anderen Längskieferspinnen).

Wie ist dieser Spinnapparat aufgebaut? Im Folgenden muss ich dem wissbegierigen Leser einige geistige Anstrengungen zumuten. Von mehreren (bis zu 8!) Paaren von SpinnDRÜSEN unterschiedlicher Funktion, die den Hinterkörper bei der Kreuzspinne sogar bis zur Hälfte ausfüllen können, werden Sekrete produziert. Diese werden durch die Spinnwarzen hindurch zu röhrenartigen SpinnSPULEN (Abb. 2) geleitet (diese werden manchmal als Spinnröhren oder Spinndüsen bezeichnet). Sie bestehen aus einem dickeren und anschließend einem langen dünneren Abschnitt, der am Ende je eine winzige Pore trägt. Aus diesen Poren tritt ein meist noch flüssiges Sekret ähnlich wie aus Düsen aus, das spätestens an der Luft rasch zu fädiger SpinnSEIDE erhärtet. Die Spinnspulen stehen überwiegend auf einem Feld auf dem Endglied der Spinnwarzen. Bei nicht wenigen Spinnen (nicht bei den Kreuzspinnen und ihren Verwandten) existieren allerdings noch zusätzliche Spinnspulen AN DEN SEITEN der Spinnwarzen: So sind die Spinnspulen der besonders wichtigen HINTEREN Spinnwarzen bei manchen Spinnen über das ganze letzte Glied verteilt. Beispiele sind die Hausspinnen und die Kreiselspinnen (Abb. 4) (Familien Agelenidae und Hersiliidae; mehrere Arten sind auch vom Baltischen Bernstein bekannt): Auf ihren außergewöhnlich langen hinteren Spinnwarzen stehen lange und auffällige Spinnspulen. Sie sind zur Mitte gerichtet und können in einer Längsreihe angeordnet sein. - Ist jetzt die (begriffliche) Verwirrung vollständig und alle Klarheit beseitigt? Glücklicherweise befinden wir uns nicht in der Schule und müssen „das alles“ auswendig wiederholen, sondern können es noch einmal lesen, und die zugehörigen Abbildungen mit ihren Legenden in aller Ruhe vergleichen, um die Funktion dieses einzigartigen Apparates vollständig zu verstehen.

Die Radnetze bauenden Kreuzspinnen und zahlreiche ihrer Verwandten bauen mit Klebtröpfchen besetzte KLEBFÄDEN in den „fängigen“ Teil ihres Fangnetzes ein, also in die „Fangspirale“ des Radnetzes. Die Klebtröpfchen sind ähnlich einer Perlenkette aufgereiht (Abb. 8); im Bernstein sind sie nicht selten aufgequollen. Spinnen mit dieser Fähigkeit nennt man „Klebfadenweberinnen“. Daneben können diese Spinnen – innerhalb wie ausserhalb des Fangnetzes - auch trockene Fäden für andere Funktionen erzeugen, die aus andersartigen Drüsen und anderen Spinnwarzen stammen. Beispiele sind der Bau von (Eier-)Kokons, für die Flugfäden der Luftsegler sowie für die Wegfäden, die alle Spinnen unentwegt als „Sicherheitsfäden“ hinter sich herziehen. Diese sind auch bei manchen fossilen Spinnen erhalten und bei stärkerer Vergrößerung sowie entsprechender Beleuchtung erkennbar (Abb. 5).

Bei anderen Spinnen existiert ein grundsätzlich andersartiges System von Spinnfäden und ihrer Erzeugung: Die „Kräuselfadenweberinnen“ produzieren trockene hauchdünne KRÄUSELFÄDEN (Abb. 9) als Fangfäden in ihrem Fangnetz, die auf einem Feld kleiner Spinnspulen vor den Spinnwarzen, dem „SPINNSIEB“ (Cribellum) (Abb. 6-7) erzeugt werden. Diese „Kräuselfäden“ sind aufgrund ihrer Feinstruktur und physikalischen Eigenschaft (Van der Waals-Kräfte) ebenfalls äusserst klebrig. Neben diesen „Fangfäden“ aus dem SpinnSIEB produzieren die SpinnWARZEN derselben Spinnen auch nicht-klebrige Spinnfäden etwa für den Kokonbau oder für Wegfäden. Für den Netzbau werden bei den meisten Kräuselfadenweberinnen die Spinnfäden mit Hilfe einer Reihe kurzer gebogener Härchen des Kräuselkamms (Calamistrum) heraus gezogen, der auf dem vorletzten Glied der Hinterbeine sitzt (Abb. 10). Dieses kammartige „Organ“ ist auch – wenigstens bei manchen Weibchen der fossilen „Kräuselfadenweberinnen“ - bei stärkerer Vergrößerung zu erkennen.

Anmerkungen: Reste des ältesten Radnetzes einer Kräuselfadenweberin sind in Burmesischem Bernstein erhalten; siehe WUNDERLICH & MÜLLER (2018: S. 15, Abb. 31-32, Foto 10). - Die Fangnetze verschiedener - auch im Bernstein erhaltener – Spinnengruppen, wie diejenigen der Trichterspinnen (Agelenidae), enthalten weder Klebtröpfchen noch Kräuselfäden, vgl. die Fotos in WUNDERLICH (2004).
ZUM EINWICKELN DER BEUTE werden bei beiden Gruppen der erwähnten Spinnen die austretenden Spinnfäden verlängert indem sie - meist mit Hilfe von Borsten der Hinterbeine - aus den Spinnspulen heraus gezogen werden.

(2) SPERMANETZE. Die Begattung bei Spinnen ist ein kompliziertes und in der Natur einmaliges Geschehen. Da den Männchen ein Penis fehlt, ist eine INDIREKTE Sperma-Übertragung erforderlich: Die Männchen weben zunächst ein spezielles kleines Netz, ein „Spermanetz“ und setzen anschließend darauf einen Samentropfen ab, der aus ihren Hoden stammt. Anschließend saugt das Männchen den Tropfen mit der hohlen Spitze seines Kiefertasters (dem Embolus des Pedipalpus, Abb. 1) auf. Erst dann ist es zur Paarung bereit, zur Übertragung der Samenzellen in die weibliche Geschlechtsöffnung.
Die Erzeugung der Fäden dieses Spermanetzes ist von besonderem Interesse: Bei vielen männlichen Spinnenarten wird ein Sekret zur Erzeugung besonderer Fäden zu seinem Bau in speziellen (“epiandrischen”) Drüsen (*) produziert. Das Sekret tritt gewöhnlich aus Poren am Ende röhrenartiger und meist sehr kleiner Spinnspulen aus, die am Bauch vor der Querfurche in der Nähe der unscheinbaren Geschlechtsöffnung liegen (Abb. 1). Nach dem Austritt erhärtet das Sekret zur Bildung von Spinnfäden dieses besonderen, kleinen Netzes. Diese Spinnspulen ähneln denjenigen auf den Spinnwarzen (Abb. 2); sie sind allerdings eingliedrig, meist unscheinbar und wenig zahlreich. Daher ist es schwierig, sie zu identifizieren, insbesondere bei fossilen Spinnen. Eigentliche (gegliederte) SpinnWARZEN (Abb. 2-3) fehlen an dieser Stelle vollständig. Dieser Spinnapparat existiert AUSSCHLIEßLICH BEI MÄNNLICHEN Spinnen, vermutlich bei allen Spinnenarten. Im Gegensatz zu den Weibchen besitzen somit die Männchen ZWEI völlig unterschiedliche Arten von Spinnorganen, die sich zwar beide im bzw. am Hinterkörper befinden, allerdings an ganz verschiedenen Stellen! Dieser Spinnapparat – Drüsen und das zugehörige winzige Spinnfeld, der „epigastrische Spinnapparat“ (*) - sind ein in der Natur einzigartiger Geschlechtsunterschied und selbst den meisten Biologen - wie auch den meisten Spinnentierforschern - kaum bekannt, obwohl dieses Organ bei der Fortpflanzung der Spinnen offenbar unabdingbar ist!

(3) Besondere klebrige FANGFÄDEN. Extreme „Sonderlinge“ unter den Spinnen sind die Speispinnen (Familie Scytodidae), die KEINE Fangnetze bauen. Bei ihnen produzieren die modifizierten und zweiteiligen Giftdrüsen im Vorderkörper einen Faden-ziehenden Leim, den die Spinnen blitzschnell aus den Giftklauen der Kiefer (Cheliceren) über die Beute „SPUCKEN“, wo er erstarrt, und die Beute an den Untergrund fesselt (Abb. 12) (**). Sowohl die

Giftdrüsen als auch die Giftklauen haben hier eine doppelte Funktion! - Diese nächtlich aktiven Spinnen besitzen nur 6 Augen und einen hoch-gewölbten Vorderkörper (Abb. 11). Sie leben in vielen Wohnungen auch in Deutschland. Schaltet man das Licht an, kann man gelegentlich eine Speispinne an der Wand überraschen. Fossilien – in Baltischem (Abb. 11) (s. in diesem Band), Burmesischem (s. in diesem Band), Jordanischem und Dominikanischen Bernstein – sind extrem selten gefunden worden. In welcher Sammlung mögen unerkannte Speispinnen schlummern?

(*) Siehe FOELIX (2015) S. 237.

(**) Siehe FOELIX (2015: 6 f) sowie SAUER & WUNDERLICH (1997: Foto S. 45)

Funktion und Lage der Spinnorgane bei Spinnen; Zusammenfassung in Stichworten:

(1) Nur zur FORTPFLANZUNG: Spermanetze. Ausschließlich im Hinterkörper beim Männchen aller Spinnenarten existierender „epigastrischer Spinnapparat“. Siehe oben (2);

(2) VIELFÄLTIGE ANDERSARTIGE FUNKTIONEN in beiden Geschlechtern:

(a) Klebrige Fäden für den Beutefang, die aus modifizierten Giftdrüsen im Vorderkörper stammen und aus Öffnungen der Kieferklauen abgegeben werden. Nur bei Speispinnen. Siehe oben (3);

(b) Klebrige oder nicht-klebrige Fäden aus Spinndrüsen im Hinterkörper in Verbindung mit Spinnwarzen am Ende des Hinterkörpers. Vielfältige Funktionen wie Bau von Fangnetzen und Kokons sowie Erzeugung von Wegfäden und Flugfäden. Bei allen Spinnen existieren wenigstens zwei dieser Funktionen. Siehe oben (1).

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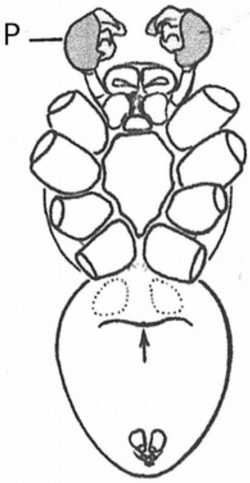

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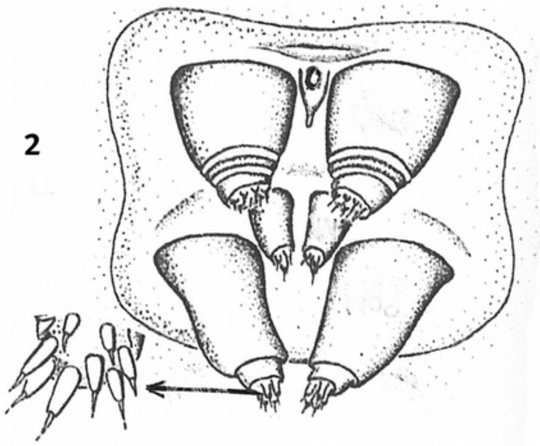

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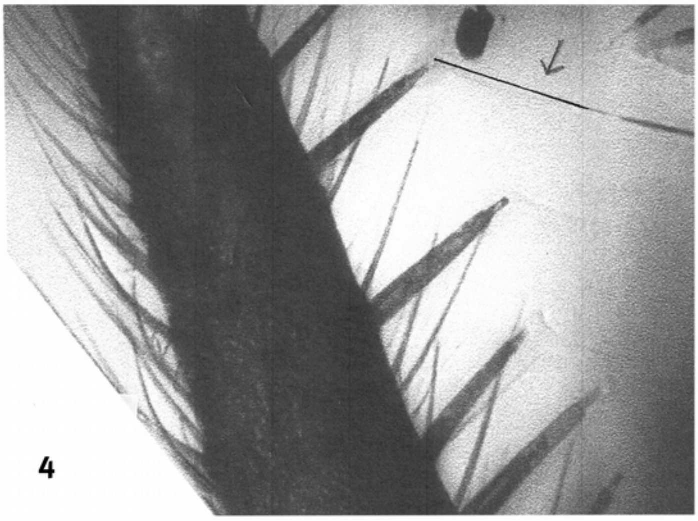

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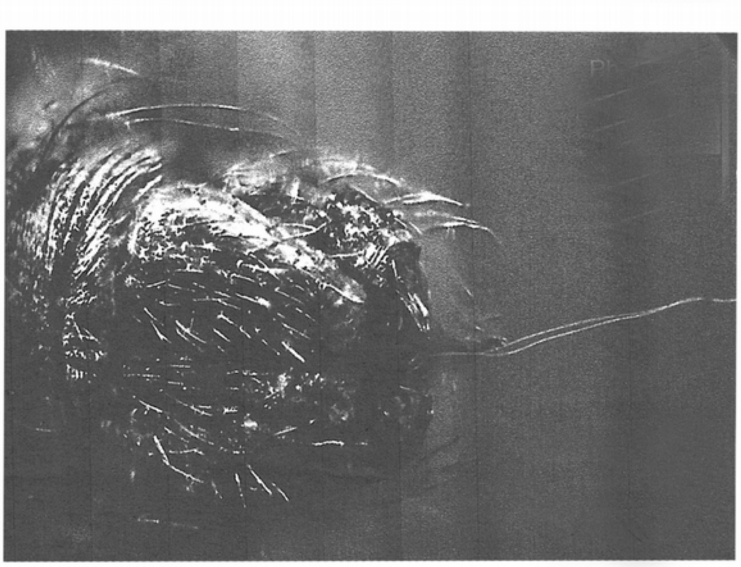

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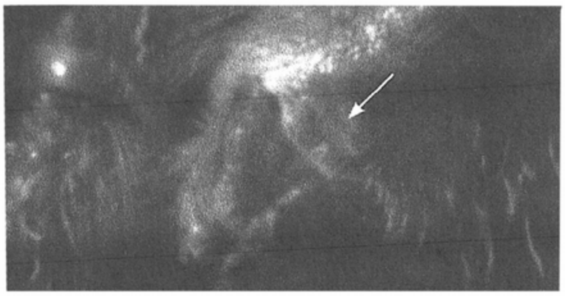

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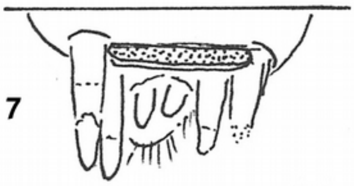

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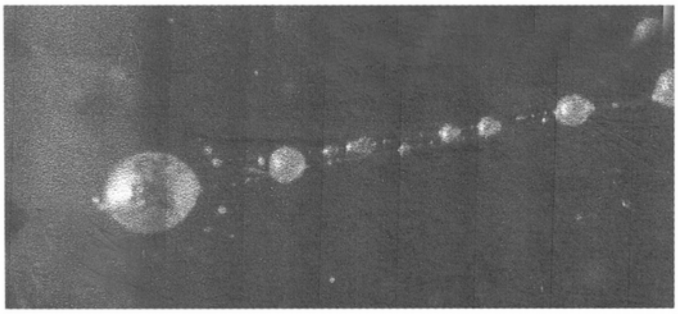

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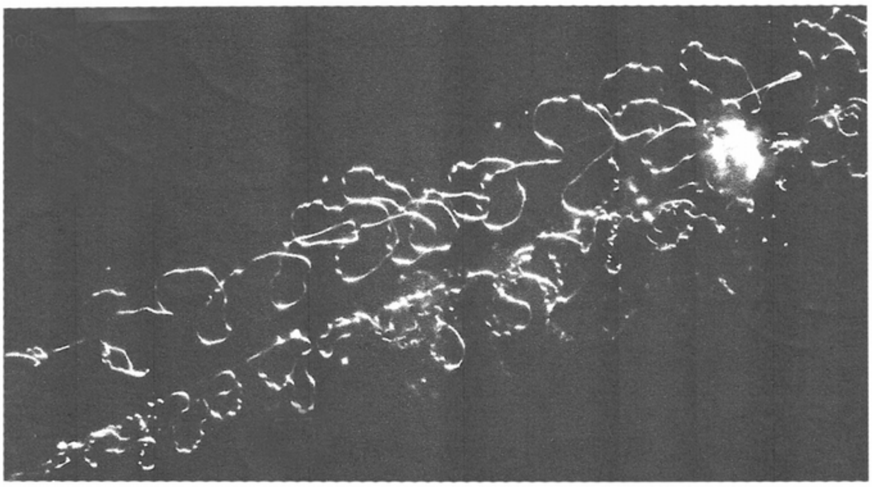

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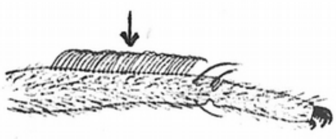

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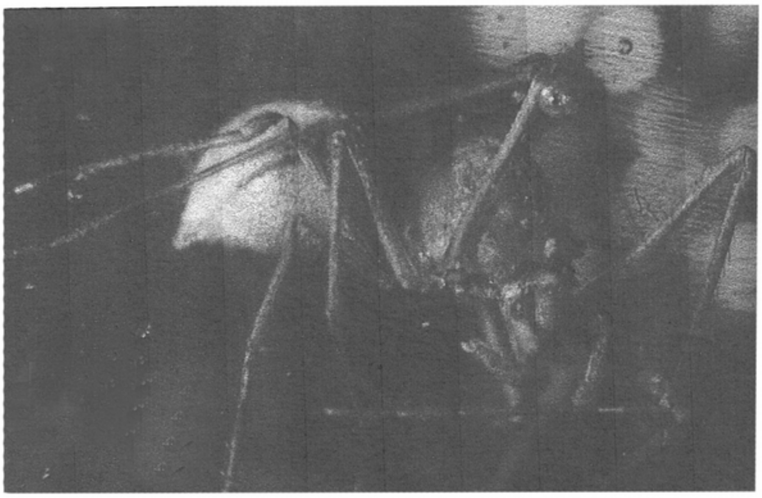

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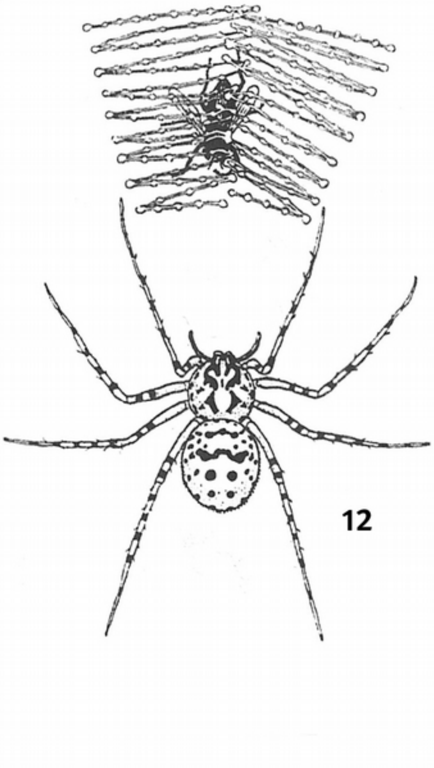

12

Abb. 1) Körper einer männlichen Kreuzspinne von unten. Man beachte das große Endglied der beiden Paarungsorgane (Pedipalpen) (P) und die Bauchfurche (Epigastralfurche) (Pfeil). Vor der Bauchfurche liegen in der Mitte die oft winzigen unscheinbaren und hier nicht gezeichneten Spinnspulen, die nur im männlichen Geschlecht existieren. Die „gewöhnlichen“ Spinnwarzen liegen am Ende des Hinterkörpers. - Aus FOELIX, nach GRASSHOFF.

Abb. 2) Feld der Spinnwarzen einer Fischernetzspinne der Gattung *Segestria* von unten. Man beachte den kleinen Colulus (O) zwischen den vorderen Spinnwarzen und die links vergrößert dargestellten zweiteiligen Spinnspulen auf dem Endglied der rechten hinteren Spinnwarze. - Aus FOELIX, nach GLATZ, verändert.

Abb. 3) Hinterkörper einer urlümlichen Gliederspinne (Mesothelae) von unten. Man beachte die zwei Paar großen geringelten seitlichen und die zwei Paar kleinen mittleren Spinnwarzen.

Abb. 4) Ein halbes Dutzend zur Mitte gerichteter Spinnspulen auf einer der hinteren Spinnwarzen einer fossilen Kreiselspinne (Familie Hersiliidae) im Baltischen Bernstein. Aus dem kurzen Endstück einer der Spinnspulen ist ein ausgetretener Spinnfaden (Pfeil) erhalten und deutlich erkennbar. - Aus WUNDRLICH (2004: Foto 93).

Abb. 5) Doppelter Wegfaden einer fossilen Springspinne (Familie Salticidae) im Baltischen Bernstein. Der Spinnfaden tritt aus einer der vorderen Spinnwarzen aus. - Aus WUNDERLICH (2004: Foto 566).

Abb. 6) Hinterer Abschnitt des Hinterkörpers einer fossilen Wolfspinnenähnlichen Kammspinne (Familie Zoropsidae) in Baltischem Bernstein von unten. Man beachte das zweiteilige Spinnsieb (Cribellum) vor den Spinnwarzen. - Aus WUNDERLICH (2012: Foto 22).

Abb. 7) Breites einteiliges Spinnsieb (Cribellum) vor den Spinnwarzen einer fossilen Spinne im Burmesischen Bernstein von unten.

Abb. 8) Fossiler Spinnfaden mit einer Reihe von Klebtröpfchen (der linke ist stark aufgequollen), der möglicherweise von einer Radnetzspinne (Familie Araneidae) stammt. Baltischer Bernstein. - Aus WUNDERLICH (2004: Foto 548).

Abb. 9) Fossiler doppelsträngiger gekräuselter (cribellater) Fangfaden, der möglicherweise aus dem Netz einer Wolfspinnenähnlichen Kammspinne (Zoropsidae) stammt. Baltischer Bernstein. - Aus WUNDERLICH (2004: Foto 534).

Abb. 10) Kräuselkamm (Calamistrum) (Pfeil) auf dem vorletzten Glied eines der Hinterbeine.

Abb. 11) Junge fossile Speispinne (Familie Scytodidae) in Baltischem Bernstein, Körperlänge 2 mm, Seitenansicht. Man beachte den hoch-gewölbten Vorderkörper, auf dem rechts 2 der 6 Augen erkennbar sind. - Aus WUNDERLICH (2004: Foto 39).

Abb. 12) Eine heutige Speispinne der Gattung *Scytodes*, Körperlänge 5 mm, hat eine Beute, eine Fliege, mit Hilfe klebriger Fäden am Untergrund fixiert. Die Fäden wurden aus den Giftklauen der Spinne geschleudert. - Nach BRISTOWE.

BEITR. ARANEOL. 16 (2023: 225-227)

NOTES ON ETYMOLOGY AND CLASSIFICATION: *CHIMERARACHNE* OR *CHIMAERARACHNE*? WHAT ARE “TRUE” SPIDERS (ORDER ARANEIDA) AND WHAT ARE “TRUE” BIRDS (ORDER AVES OR AVIALAE?)?

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Abstract: If strictly viewed - based on its Greek origin chimaira the well establiehd names of the subtaxa of the arachnid order Araneida would have to be replaced: suborder Chimerachnida WUNDERLICH 2018 by Chimaerarachida, family Chimerarachnidae WUNDERLICH 2019 by Chimaerarachnidae WUNDERLICH 2019, and the genus *Chimerarachne* WANG et. at. 2018 by *Chimaerarachne* WANG et al. 2018.

Discoveries of new extinct taxa and new suggestions may modify dramatically the classification of various biota. Recently, e. g., – based on the spectacular new discovered extinct genus *Chimerarachne* WANG et al. 2018, the most ancient known taxon of spiders – I proposed a new classification of the arachnid order Araneida CLERCK 1757 (*) (used in a new sense), including the suborders Chimerarachnida WUNDERLICH 2018 and Araneae CLERCK 1757 (new rank), see WUNDERLICH (2019). Although this new classification modified the previous classification, the taxon Araneae is still kept in its traditional range, including the infraorders Mesothelae and Opisthothelae which previously were regarded as suborders.

(*) Note: DARRELL UBICK - by e-mail in I. 2023 – drew my attention to a note by PETRUNKEVITCH (1955: P128) that CLERCK (1757) used not the name Araneida but Aranei: “Order ARANEIDA CLERCK 1757 <nom. correct. DALLAS, 1864 (pro Araneides LATREILLE,

1801; pro Aranei CLERCK, 1757)> <= Araneae auct. (CLERCK's name validated by action of Internat. Zool. Congress, Paris, 1948)> <Type: *Araneus* CLERCK, 1757>."
To my knowledge the name Aranei is much less in use than Araneida.

ETYMOLOGY:

WANG et al. (2018) created the new name *Chimerarachne* unambiguously and explicitly to the Greek mythology - and noted the Greek letters -, taken from (gr.) chimaira (chimaera); but the authors wrote erroneously *Chimerarachne* instead of the correct Greek name which is adequate to *Chimaerarachne.* As a consequence the correct names of the subtaxa of the order Araneida in question should be: suborder Chimaerachnida WUNDERLICH 2018 but not Chimerarachida, family Chimaerarachnidae WUNDERLICH 2019 but not Chimerarachnidae WUNDERLICH 2019, and genus *Chimaerarachne* WANG et. at. 2018 but not *Chimerarachne* WANG et al. 2018. In my opinion anglicisms are not justified in these cases.
The question rises: What is the sense of etymological foundation?

CLASSIFICATION:

Today the classification of biota is undergoing a serious – partly a "revolutionary" – changing which is partly based on new discoveries/interpretations of fossils. Birds (Aves), e. g., should be taken no more as a class of the Vertebrates but only as a branch (Avialae) of the dinosaurs. Will Mammalia, in a further step, be taken as a branch of a special group of "reptiles"? Are such new classifications really justified and meaningful? And: What is actually a bird and what is a mammal?

Cretaceous fossils modify strongly phylogenetics as well as diagnoses of families, superfamilies and even suborders and orders of various biotas like spiders and other animals. How far should such finds, results and suggestions influence the classification? Will important new - "key" fossils - endlessly modify the classification of biota? In my opinion exists wishful thinking as well as a fundamental misunderstanding: a meaningful and usable classification can never – and must not - reflect the numerous and diverse phylogenetic branching!

How to define best/meaningful – and probably "finally" - the order spiders (ARANEIDA)? In my opinion the most important apomorphic characters of the Araneida (other characters may to be added in the future) are (1) the existence (of 4 pairs) of spinnerets near the end of the opisthosoma, and (2) the existence of a male pedipalpus proper for sperm transfer. Both characters existed already in the extinct suborder Chimaerarachnida (*), but only one of them - the most ancient apomorphy during the long evolution of Araneida -, can unambiguously (and finally?) define the taxon Araneida. To my suggestion more likely the existence of spinnerets is the older (most ancient) apomorphic character of the order Araneida because a spinning behaviour (but no spinnerets) existed (already) in the order Uraraneida, which is regarded as the sister taxon of the Araneida. So we can expect the existence of a further extinct and still unnamed branching of the Araneida; a branching older than the branching of Chimerarachnida and Araneae, see WUNDERLICH (2019). To preserve the classification this twig must not get a new rank besides its name.

In birds (AVES), see above, the situation appears much more complicated than in spiders due to the quite high number of branching of related extinct taxa. How may the Aves be defined and which was the first/oldest relevant apomorphy during the evolution of the dinosaurs? In my opinion the name "Aves" has to stand for this branch and vertebrate class, and the name "Avialae" may be used for a "sampling group" which range is still debated. - Will we have two or more kinds of classification in the future?

(*) The extinct family Chimerarachnidae has been published in ca. 100 million years old Mid Cretaceous Burmese (Kachin) amber, but – according to its plesiomorphic characters like a "tail" (flagellum) - members of this ancient taxon existed already in the Carboniferous, more than 400 million years ago. In all eras before the Mid Cretaceous they still have to be discovered.

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PETRUNKEVITCH, A. (1955): Arachnida. 42-162. In MOORE, R. C. (ed.) Treatise on invertebrate Paleontology. Part P, Arthropoda 2. – Geolog. Soc. America. 181 pp.

WANG, B. et al. (2018): Cretaceous arachnid *Chimerarachne yingi* gen. et sp. nov. illuminates spider origin. – Nat. Ecol. Evol., 2 (4): 614-622.

WUNDERLICH, J. (2019): "What is a spider"? -- Beitr. Araneol., 12: 1-32.

BEITR. ARANEOL. 16 (2023: 228)

Corrections regarding vol. 15 (2022) of the Beitr. Araneol.

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A. ROSS – e-mail in XII 2022 - kindly sent me notes on two errors of the vol. 15:

(1) p. 139: The type species *Claspingblemma* WUNDERLICH (n. gen.) is *C. duospinae* WUNDERLICH 2022 (n. sp.) (line 4 from below) but not *C quadrispina* (nomen nudum) as erroneously written line 6.

(2) p. 142, line 5: The name of the genus is *Eogamasomorpha* but not *Eogamasomopha* (lapsus).

BEITR. ARANEOL. 16 (2023: 229)

Epilog: Notes on naming spider species after humans

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Frequently spiders – like other animals – are named after their special characters or the locality they were collected or the circumstances of their collecting. Other species are named after - or dedicated to - a friend or a scientist or a well-known human. Bad examples of naming are, e. g., political leaders like A. Hitler (a beetle), D. Trump (a moth) or W. Putin; see *DER SPIEGEL*, no. 49: 57 (2022).
In 2015 I dedicated a fossil spider of the family Oecobiidae in Burmese amber to NOAM CHOMSKY, one of the most important and influential living intellectual humans.
In former times I named spider species after my sons Erik and Sven and few women, most of which collected spiders with me in various countries.

The PHOTOS

1) Extant spiders from the Algarve (Portugal): Tafeln 1-2

(2) Fossil spiders in Eocene Baltic and Eocene Rovno (Ukrainean) ambers: Tafeln 3-5

(3) Fossil spiders in Cretaceous Kachin (Burmese) amber from Myanmar: Tafeln 6-10

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1) *Dysdera algarvensis* **n. sp**. (Dysderidae), ♂, body length 6 mm, dorsal aspect.

2) *Fonteferrea minutissima* **n. gen. n. sp**. (Fonteferridae **n. fam**.), ♂, body length 0.75mm, lateral aspect.

3) *Theridion modonatum* **n. sp**. (Theridiidae), body length 2.7 mm, dorsal aspect.

4) *Araneus pallidus* (OLIVIER 1789) (Araneidae), ♂, body length 3.9 mm, dorsal aspect.


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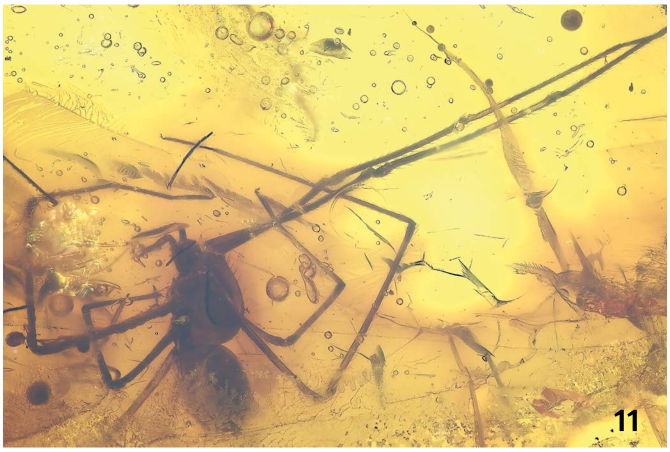
5) *Micaria* sp. indet. (Gnaphosidae), ♂, body length 4.3 mm, dorsal aspect.

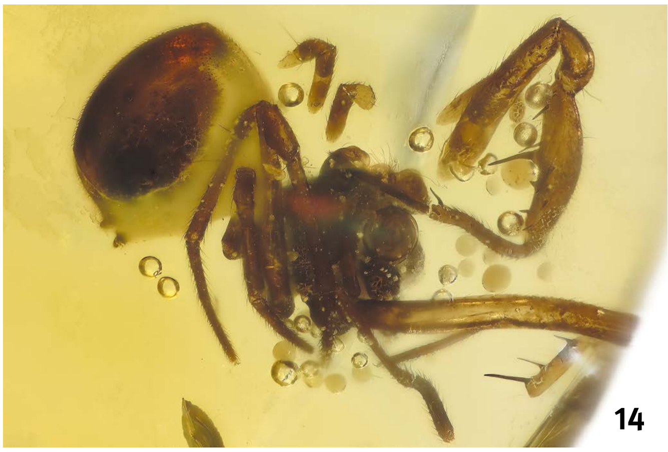
6) ?*Ebrechtella patellamaculata* **n. sp.** (Thomisidae), injured ♂, body length 3.2 mm, and a separated leg I.

7) *Thanatus virgulatipes* **n. sp.** (Philodromidae), ♂, pedipalpi separated, body length 6.2 mm, dorsal aspect.

8) *Zora manicatoides* **n. sp.** (Zoridae), ♂, left pedipalpus separated, body length 3.3 mm, dorsal aspect.

9) *Aelurillus quercussuber* **n. sp.** (Salticidae), ♂, body length 4.1 mm, ventral aspect.





10) *Scytodes daniloharms* **n. sp**. (Scytodidae), ♂ (holotypus), body length 4.0 mm, lateral aspect.

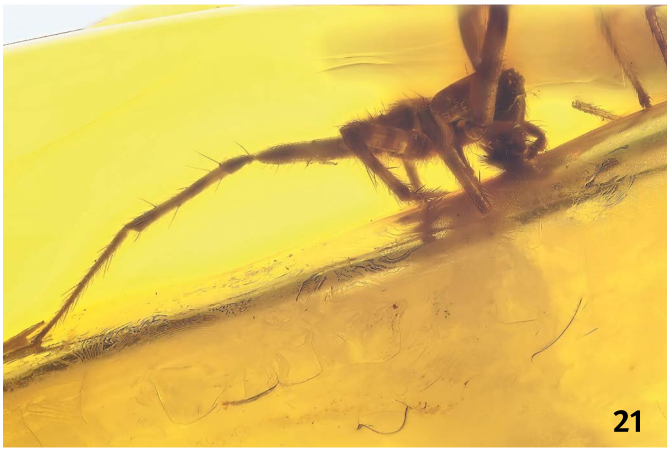
11) *Scytodes daniloharms* **n. sp**. (Scytodidae), ?subad. ♀ (paratype), body length 2.5 mm, dorsal-lateral aspect.

12) *Scytodes* sp. indet. (Scytodidae), ?ad. ♀, body length 3.0 mm, dorsal aspect.

13) *Opellianus fissura* **n. sp.** (Uloboridae), ♂, body length 3.3 mm, lateral aspect.

14) *Balticonopsis duplo* **n. sp**. (Anapidae), ♂ (holotype), body length 1.5 mm, retrodorsal.

15) *Palaeophantes paracymbium* **n. gen. n. sp.** (Linyphiidae), ♂, body length 2.0 mm, retrodorsal aspect.



16) *Palaeophantes paracymbium* **n. gen. n. sp.** (Linyphiidae), ♂, body length 2.0 mm, retrodorsal aspect, enlarged.

17) *Esuritor duospinae* **n. sp.** (Pisauridae), ♂, body length 3.8 mm, retrodorsal aspect.

18) *Unguistegenaria sinemammillae* **n. gen. n. sp.** (?Agelenidae), ♂, body length 3.5 mm, dorsal aspect.

19) *Eocryphoeca amputata* **n. sp.** (Cybaeidae), ♂, body length 4.8 mm, ventral aspect.

20-21) *Eocryphoeca laesa* **n. sp.** (Cybaeidae), ♂, body length ca. 4.3 mm, dorsal and lateral aspect. The male is preserved on a long amber drop within the amber.

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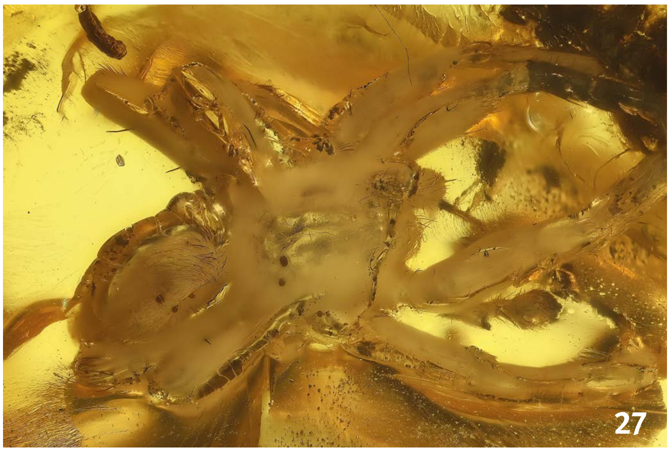

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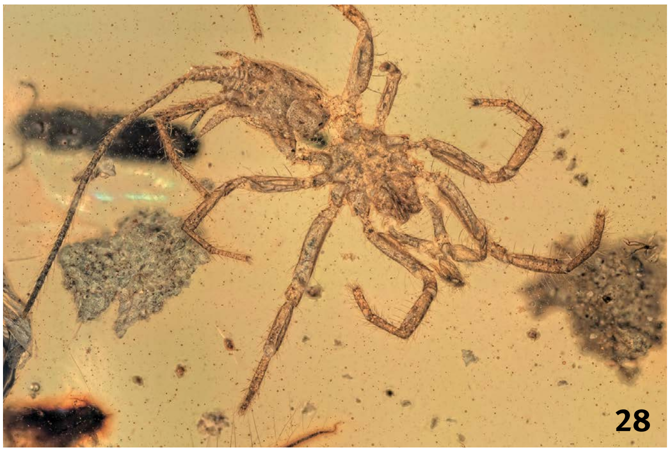
22) *Scutcybaeus brevitricha* **n. gen. n. sp**. (Cybaeidae), ♂, body length 4.5 mm, dorsal aspect. The left leg IV is lost beyond the coxa by autotomy.

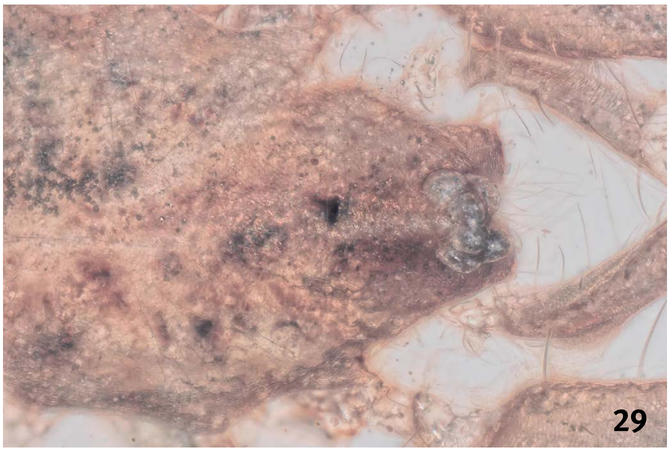
23) *Succinaria lingua* **n. gen. n. sp**. (Cybaeidae), ♂, body length ca. 4.2 mm, dorsal aspect.

24) *Insecuror spinifer* WUNDERLICH 2004 (Insecutoridae), ♂, body length 4.5 mm, dorsal aspect.

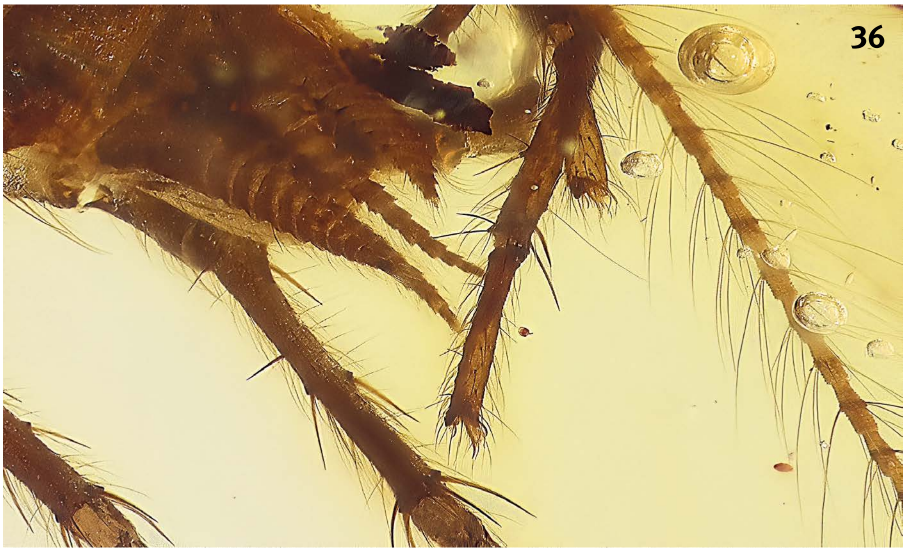
25) *Insecutor angustidentes* **n. sp.**, ♂ (nsecutoridae) body length 5.5 mm, dorsal aspect.

26-27) *Spinatibia curvitibia* **n. gen. n. sp**. (Liocranidae), ♂, body length 4.0 mm, ventral and dorsal aspect. The dorsal side is strongly covered with a white emulsion.





28-32) *Chimerarachne patrickmueller* **n. sp.** (Chimerarachnidae), ♂, body length without tail 2.3 mm; 28) ventral aspect of the body; 29) dorsal aspect of the anterior part of the prosoma with eyes; 30) ventral aspect of spinnerets, pygidium and flagellum; 31) ventral aspect of tarsus IV and spinnerets; 32) ventral aspect of chelicerae and pedipalpi.



33-34) *Chimerarachne alexbeigel* **n. sp.** (Chimerarachnidae), ♂, body length without tail 1.4 mm, dorsal and enlarged anterior aspect.

35-36) *Chimerarachne spiniflagellum* **n. sp.** (Chimerarachnidae), ♂, body length 2.1 mm, dorsal aspect and ventral aspect of the posterior body part.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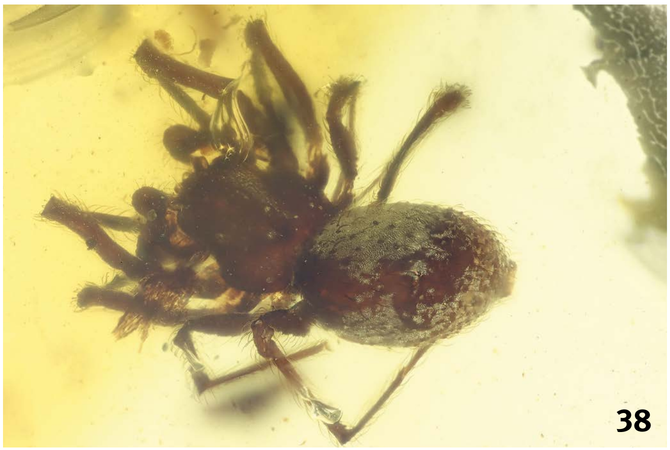
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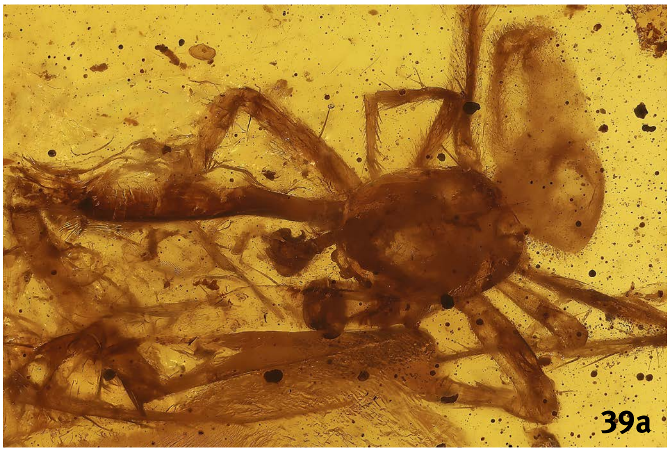
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37) *Electroblemma retroflectum* **n. sp**. (Tetrablemmidae), ♂, body length 1.35 mm, dorsal.

38-39) *Kachinblemma constrictum* **n. gen. n. sp.** (Tetrablemmidae), ♂, body length 1.8 mm, dorsal and ventral aspect.

39a) *Parakachin pectunculus* **n. gen. n. sp**. (Uloboridae), ♂, body length 2.9 mm, dorsal.

40-41) *Spinipalpitibia occulta* **n. sp**. (Protoaraneoididae), ♂, body length 1.5 mm, dorsal and ventral aspect.

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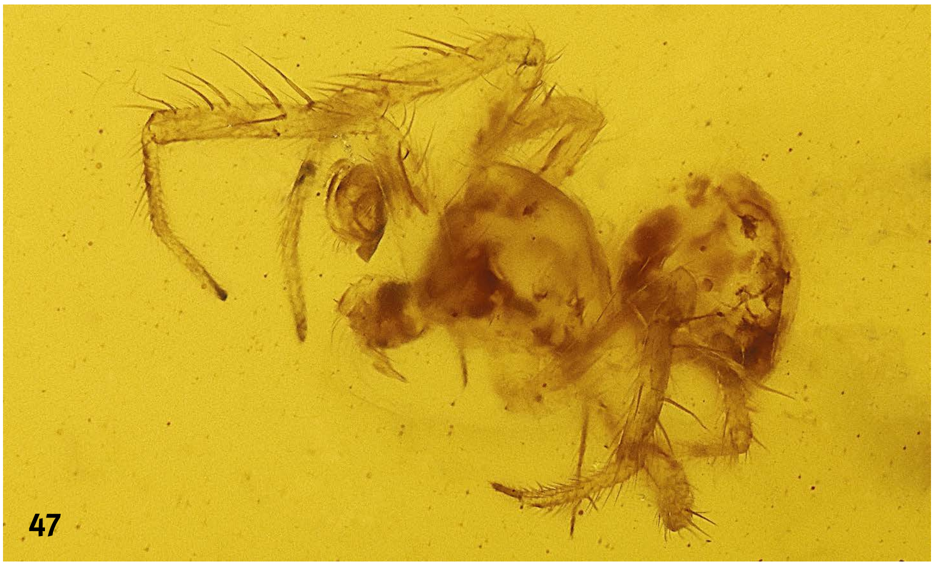
42) *Parvimegasetae araneoides* **n. gen. n. sp**. (?Megasetidae), ♂, bodyy length 0.6 mm, dorsal aspect.

43) *Myanmarmysmena grandipalpus* **n. gen. n. sp**. (?Mysmenidae), ♂, body length 1.1 mm, dorsal aspect.

44-45) *Nanoaenigma pumilio* **n. gen. n. sp**. (Nanoaenigmatidae **n.fam**.), ♂, body length 0.65 mm, dorsal and ventral aspect.

46) Annelida; ?Enchythraeidae indet., body length 1 mm; see *Nanoaenigma pumilio*. sp.



47) Curvitibia pellucidus **n. sp**. (Zarqaraneidae), ♂, body length 1.5 mm, lateral aspect.

48) ?Cornicaraneus unuspedipalpus **n. sp**.(Zarqaraneidae), ♂, body length 2.5 mm, dorsal aspect. The left pedipalpus is lost.

49) Gibberaraneoid furcula **n. gen. n. sp**. (?Zarqaraneidae), ♂, body length 1.3 mm, dorsal aspect.

ISBN 978-3-931473-23-6