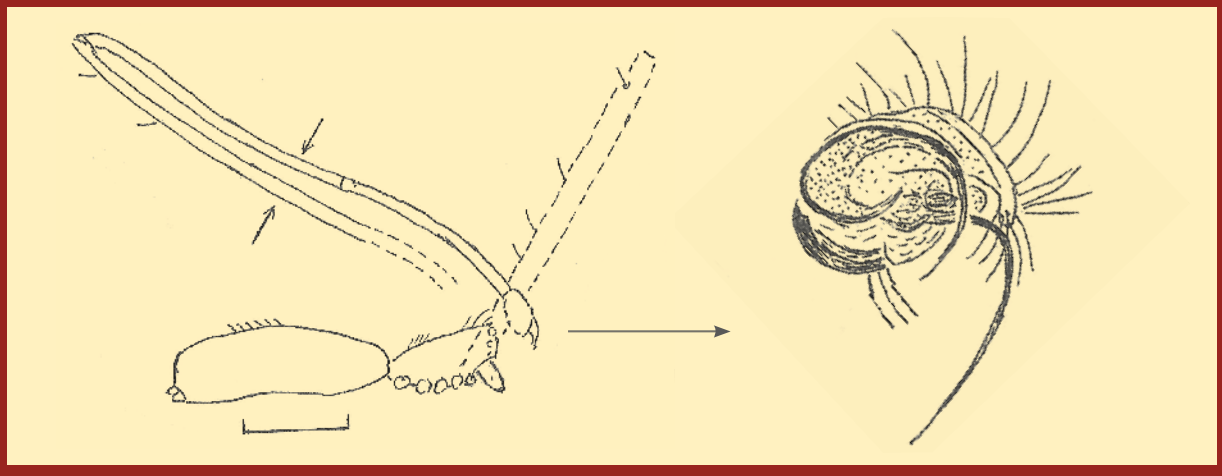
BEITR. ARANEOL., 14 (2021)

Joerg Wunderlich &
Patrick Müller

A PAPER ON CRETACEOUS FOSSIL SPIDERS FROM MYANMAR AND A PAPER ON EXTANT SPIDERS FROM PORTUGAL (ARACHNIDA: ARANEAE)



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A PAPER ON CRETACEOUS FOSSIL SPIDERS FROM MYANMAR AND A PAPER ON EXTANT SPIDERS FROM PORTUGAL (ARACHNIDA: ARANEAE)

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Photo and drawings on the book cover: The PHOTO shows the dorsal aspect of a fossil male of the family Uloboridae (Hackled Band Orb-weavers), *Paramiagrammopes curvatus* n. sp. preserved in Burmese (Kachin) amber, body length 2.1 mm, which lived 100 million years ago, see p. 148. - The DRAWINGS below show left the right aspect of the strange male spider *Longissipalpus impudicus* n. sp., 2.8 mm long, of the extinct family Pholcochyroceridae (see p. 73) whose extremely long and slender copulatory organs (pedipalpi, short arrows) are 3.6 times longer than the body. Its left anterior femur is drawn dotted, the terminal article of its right pedipalpus (enlarged, long arrow) documents the excellent preservation of the structures of the copulatory organ in the proper sense, which is most important for the determination.

In this volume 14 of the Beitr. Araneol. (Beiträge zur Araneologie) a short paper on extant spiders (Araneae) of Portugal, a large paper on fossil spiders in Cretaceous Burmese amber and a supplement on new synonymy/homonymy are united.

Acknowledgements: For correcting parts of the manuscript I thank very much my dear and patient wife Ruthild Schöneich.

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BEITR. ARANEOL., 14 (2021: 3-24)

FEW NEW, RARE OR SPECIAL SPECIES OF SPIDERS FROM THE ALGARVE, PORTUGAL (ARACHNIDA: ARANEAE)

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Abstract: *Algarveneta corona* **n. gen n. sp**. (Linyphiidae) and *Histopona litoralis* **n. sp**. (Agelenidae) (Araneae) are described from the East Algarve (Southern Portugal). Information is provided for species of five further spider families. *Euryopis sexalbomaculata* (LUCAS 1846) (Theridiidae), *Trachyzelotes adriaticus* CAPORIACCO 1951 (Gnaphosidae) and *Tmarus punctatissimus* (SIMON 1870) (Thomisidae) are new for the fauna of Portugal.

Key words: Agelenidae, Algarve, Araneae, Gnaphosidae, Linyphiidae, Philodromidae, Portugal, spiders, Synaphridae, Theridiidae, Thomisidae.

In this paper I treat some new, rare or special species of spiders of seven families from the Algarve (Portugal) – see, e. g., WUNDERLICH, (2020: 4-18) – which were mainly collected at the beginning of the bad era of the Corona virus pandemic in the Spring of 2020.

Corrections regarding the paper by WUNDERLICH, J. (2020):
Portugal: The species *Anatolidion gentile* and *Heliophanus ramosus* were first reported for the East Algarve but not for the whole of Portugal.

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Family LINYPHIIDAE

Agyneta pseudorurestris WUNDERLICH 1980

Material: S-Portugal, SE-Algarve, ca. 12 km WNW Tavira, under a stone in the shadow, 1 subad. ♂ JW leg. in VI 2020, adult 10. VII 2020, CJW.

Note on the present ♂: The sequence of the dorsal tibial bristles is 2/2/2/2, further leg bristles are absent. The colour of the body is uniformly dark brown to black.

Distribution: Europe.

Algarveneta **n. gen**.

Etymology: The name refers to the distribution of the spider, the Algarve in Portugal, and the second part to the name of the similar genus *Agyneta*.

The gender of the name is feminine.

Type species (by monotypy): *Algarveneta corona* n. sp.

Diagnostic characters: Chelicerae (fig.1) large, not diverging or smaller distally; ♂-pedipalpus (figs. 2-5): Patella with an indistinct dorsal bristle, tibia also with an indistinct dorsal bristle and retroapically bulging, cymbium unmodified and not raised, paracymbium with a single tooth, lamella characteristica long, slender, pointed and bent, shape and position of the embolus unsure. ♀: Pedipalpal tarsus (fig. 8) blunt (not pointed), claw absent; epigyne/vulva (figs. 9-11) with an outgrowth in front of the small and rounded scape.

Further characters: Prosoma slightly saddle-shaped (fig. 1), eyes quite similar to *Iberoneta nasewoa* DEELEMEN-REINHOLD 1985, anterior margin of the fang furrow with three (rarely two) teeth (fig. 7), posterior margin with a "serrated" border, trichobothrium on metatarsus IV absent, bristles: Femora: Only a single one prolaterally on I, tibiae: Dorsally 1/1, laterally: A pair on I, 1 retrolaterally on II, a single dorsal bristle on metatarsus I-III, trichobothrium on metatarsus IV absent, prosoma medium grey to dark brown, ♂/♀ ca. 0.6/0.75 mm long, opisthosoma medium dark grey to uniformly black.

Relationships: According to the taxonomic characters published by SAARISTO & TANASEVITCH (1996) – e. g. to the existence of FICKERT's gland - the species is a member of the subfamily Micronetinae; based on the shape of the prosoma, the low number of leg bristles and the absence of a tarsal claw of the ♀-pedipalpus I regard *Algarveneta* as a member of the tribe Micrometini although its male chelicerae are large and not diverging, the cymbium is not modified and the structures of the bulbus are peculiar. The shape of the prosoma and the pedipalpal tibia are similar to certain species of the diverse genus *Agyneta* HULL 1911 s. l. in which the basal cheliceral articles are usually small, narrowing distally as well as diverging, and the structures of the bulbus are different. The slender lamella characteristica is a bit similar to *Agyneta mollis* (0. PICKARD-CAMBRIDGE 1871) in which the cymbium is raised, the chelicerae are different, the lamella characteristica is broader and the structures of the bulbus and the epigyne are different. The lamella characteristica is also a bit similar - although broader - in *Improphantes turok* TANASEVITCH 2011 from SE-Europe in which the paracymbium and the structures of the bulbus are quite different. According to SAARISTO & TANASEVITCH (1996) metatarsi II-III are bristleless in *Improphantes* in contrast to *corona*. Chaetotaxy and trichobothriotaxy are as in *Iberoneta* DEELEMAN-REINHOLD 1984 of Spain, in which the chelicerae are quite similar, too, but in *Ibertoneta* a claw of the ♀-pedipalpal tarsus exists and the structures of the secondary genital organs are quite different.

Distribution: Portugal.

Algarveneta corona **n. gen. n. sp**. (figs. 1-11)

Etymology of the species name: The type material was collected at the beginning of the corona virus pandemic in the Spring of 2020 in an impressive landscape, almost free of humans at that time, beaches were closed, breeding birds were not shot or disturbed (e. g. by spider collectors).

Personal remarks by the author in XII 2020 regarding the naming of this species and the probable global development during the next month and years. One may question: Will the corona virus "help" to recover our planet a bit, slow down the climatic change? I fear the reverse will happen - without a totally different way of our neoliberal capitalistic economy and our materialistic, unhistorical, sense-free and consumption oriented life style depending on the power and political influence of numerous inhuman and/or incompetent political leaders ruling our largest countries, see, e. g., the publications by NOAM CHOMSKY; "big money" ("health for money"), huge trusts, BLACK ROCK, JP Morgan Chase, … the destruction of our planet will still grow. See WUNDERLICH (2017: 3, 355-356).

Material: S-Portugal, (1) East Algarve, (a) ca. 12 km ENE Tavira, Mata de Conceicao, road near a stream, beaten from a bush under a *Eucalyptus* tree, holotype ♂ JW leg. 4. III. 2020, R194/CJW; (b) ca. 12 km WNW Tavira, Juliao, near a ceramic factory, under stones, JW leg. in V-VI 2020, 2♂ paratypes, R195/CJW; (c) near Tavira, without locality, 2♀ paratypes, JW leg. in X 2018, R196/CJW; (2) West Algarve, near Aljezur, 3♂ JW leg. in VIII 2008, R197/CJW.

Diagnosis and relationships: See above.

Description:
Measurements (in mm): Body length 1.6-1.8 (♀); prosoma: Length 0.6-0.8 (♀), width 0.5-0.65 (♀); opisthosoma: Length 0.8-1.0 (♀), width 0.45-0.55; leg I (♂/♀): Femur +/- 0.75/1.0, patella 0.18/0.2, tibia 0.75/0.85, metatarsus 0.75/0.8, tarsus 0.55/0.58, tibia II 0.65 (♂), tibia III (♂) 0.48, tibia IV 0.75/0.8.
Colour: Prosoma medium grey to dark grey brown, legs yellowish, opisthosoma medium/dark grey with transverse light bands in the posterior half (distinct in the females) to uniformly black.
Prosoma (figs. 1, 7) ca. 1.2 times longer than wide, hairs indistinct, profile slightly saddle-shaped as well as raised behind the eye field which is protruding, thoracic furrow well developed, 8 larger eyes in two rows (see also above), posterior rows slightly recurved, posterior median eyes spaced by 0.6 of their diameter, basal cheliceral articles rather large, not diverging or more slender distally, lateral files well developed, fangs of medium size, anterior margin of the fang furrow with three (rarely two) larger teeth, posterior margin bearing a "serrated" border. - ♀-pedipalpus (fig. 8) blunt, tarsal claw absent. – Legs of medium length, bristles partly long, femora: Only I bears a single prolateral bristle in the distal half, tibiae dorsally 1/1, I addinionally with a lateral pair in the distal half, II with a retrolateral one, metatarsi I-III bear a dorsal bristle in the basal half, metatarsus I-III bear a trichobothrium, position on I-II in ca. 0.2. – Opisthosoma ca.1.8 times longer than wide, hairs short. ♂-pedipalpus (figs. 2-7; see also above): FICKERT's gland well developed. I did not identify the embolus with certainty;

it may bear a strongly sclerotized tip; a slender apophysis exists between the questionable embolus and the base of the slender lamella characteristica. – Epigyne/vulva (figs. 9 - 11) fairly protruding, folded, bearing an outgrouwth in front of the small and rounded scape, receptacula seminis oval and widely spaced.

Distribution: SE-Portugal, Algarve.

Diplocephalus toscanensis WUNDERLICH 2011 (figs. 12-19)

Material: S Portugal, E Algarve, around Tavira, beaten from bushes, 2♂ 1♀, 1 subad. 1♂, subad. ♀ JW leg. in IV-VI 2020; R192/CJW. - Note: The right pedipalpus of one of the males has been separated into two tiny parts, the epigyne has also been separated.

Notes: (1) Although the members of the species were collected in higher strata of the vegetation I do not want to exclude that they may basically be ground-living spiders, blown by the wind as aeronautics in higher strata of the vegetation like other typical ground spiders, e. g., *Pelcopsis* ssp. and *Microctenonyx subitaneum* (both Erigoninae, too) which I collected in higher strata of the vegetation not far from the areas of the new species. The holotype of the species – the hitherto only known specimen - was collected in detritus under a bush. – (2) In captivity spiders of both sexes and inad. specimens built small capture webs in which they hang upside-down.

Diagnostic characters refer to the shape of the male prosoma and the copulatory structures.

Description: (the female for the first time; male see also WUNDERLICH (2011: 295):
Measurements (♂/♀ in mm): Body length 1.15-1.2/1.6 mm prosomal length 0.65 mm, tibia I 0.4-0.6/0.5.
Colour: Body dark brown, legs yellow, anterior tibia slightly darkened in the male, female pedipalpus light grey.
Sequence of the dorsal tibial bristles 2/2/1/1 (shortened in the male sex) position of the metatarsal trichobothrium I-III in 0.35-0.4, absent on IV; posterior margin of the fang furrow with 4 teeth; prosoma slightly raised in the female; male (figs. 12-13): Cephalic lobe only fairly high, lateral grooves well developed and anteriorly large; ♂-pedipalpus (figs. 14-18): Tibia with a large and plate-shaped apophysis lying on the cymbium, without teeth or apophyses, cymbium bearing long hairs in the distal half, paracymbium simple, small and sickle-shaped, tegulum with a long, strongly sclerotized prolateral apophysis (L) which is widened distally and originating basally, a long further tegular apophysis (T) which is pointed and strongly sclerotized distally/apically; questionable embolus guided by a skinny conductor, strongly bent and sclerotized, bearing in the basal half a larger, sclerotized, pointed and toothed apophysis parallel to the distal part of the tegular apophysis (T). - Epigyne (fig. 19) posteriorly with a diverging structure, anteriorly with a transversal sclerotized structure, translucent receptacula seminis quite large.

Relationships: In the related *Diplocephalus graecus* (O.-PICKARD-CAMBRIDGE 1873) the shape of the prosoma and of the tibial apophysis of the male pedipalpus are quite similar but the structures of the bulbus are distinctly different and the body length is distinctly larger, 1.5-1.9 mm in the male, 1.8-2.2 mm in the female (WSC). The epigyne of *toscanensis* is very similar to the published epigyne of *graeca* (WSC). The pedipalpal tibial apophysis is similar to *Monocephalus* F. P. SMITH 1906 which is not related.

Distribution: Italy; Portugal (new to its fauna).

Family SYNAPHRIDAE

Synaphridae is mainly characterized by a KEEL of the basal cheliceral articles on the promargin of the fang furrow, which ends in a strong tooth, as well as by a very large pedipalpal tarsus in a VERTICAL position which is +/- depressed laterally - strongly in *Cepheia longiseta* (SIMON 1881) -, bearing a disc-shaped tegulum and a quite long embolus in a wide loop, quite similar in *Cephaia* and *Synaphris*. The leg bristles are quite variable: No tibial bristle and only a single long dorsal- distal patellar bristle exists in *Cepheia* (fig.21), a long dorsal tibial bristle in most *Synaphris* but no leg bristles are reported by LOPARDO et al. 2007 in *Synaphris saphrynis*, the position of the metatarsal I-III trichobothria is in 0.3-0.5, the position of the tarsal organ is in the middle of the article in both genera. Epigynal opening rounded, indistinct in *Cepheia* (fig. 23), introducing ducts very long and coiled in both genera, cymbium long and very slender in *Cepheia* (fig. 22) but large and bearing a retrobasal paracymbial outgrowth in *Synaphris*. The opisthosoma is leathery in *Cepheia* – apparently an adaptation to the dry and often very hot habitat of the spiders -, egg-shaped in lateral aspect (fig. 20) and more or less globular in egg-bearing females and bears longer dorsal hairs in both genera. Body length of the tiny spiders: 0.8-1.0 mm in the male, 1.0-1.2 mm in the female.
Distribution on the Iberian Peninsula: A single species of *Synaphis – saphrynis* LOPARDO et al. 2007 - has been described from Spain, *Cepheia longiseta* has been reported, e. g., from the Algarve by J. MURPHY.

Cepheia longiseta (SIMON 1881) (figs. 20-23)

Material: South-East Portugal, Algarve, ca. 10 km E Tavira, Cacela, Peninsula Manta Rota, ca. 25 m from the southern beach, in dunes, on the ground, in rotten plants and

detritus under a bush and low vegetation, 1♂ and 4♀, JW leg. 6. V. 2020, 2♀ JW leg. 6. III. 2020; CJW.

Notes on the frequency of the spiders: I collected seven specimens of *longiseta* within only a single square meter. Similar habitats are very frequent on the Peninsula Manta Rota as well as on other areas of the Algarve. Therefore I conclude that *longiseta* is a very frequent – probably the most frequent – species in certain habitats of the dunes at least in the Algarve, usually overlooked due to its tinyness. Remarkably, almost one and a half centuries ago E. SIMON already described – collected by himself? – this dwarf spider species.

Characters of the tiny spiders (See also bove): Body length ♂ ca. 1 mm, ♀ ca. 1.2 mm, prosomal length 0.35-0.45 mm, most parts of the body dark grey brown, 8 larger eyes in two rows, legs light to medium yellowish grey, rather slender, order IV/I/II/III, III relatively long, almost bristle-less but all patellae bear a quite long dorsal subapical bristle (fig. 21) position of the metatarsal trichobothrium I-II in 0.35-0.45, opisthosoma egg-shaped (fig. 20) to globular (dorsal aspect in the egg-bearing female), bearing not many longer (quite long according to SIMON (1881: 132) dorsal hairs, colulus well developed, cymbium (fig. 22) quite slender, epigynal opening (fig. 23) oval.

Remark: In the present specimens the dorsal opisthosomal hairs are not unusually long, and I do not want to exclude that more than a single species of *Cepheia* exist in the Mediterranea, similar to several closely related species of the genus *Synaphris*.

Distribution: Western Palaearctic, e. g., Austria, Portugal and North Africa.

Family THERIDIIDAE

Theridiidae is a diverse family worldwide and in Portugal as well, members of all extant subfamilies exist in in this country. Because of the similarity of their copulatory organs the determination of certain species of genera like *Lasaeola*, and *Theridion* is difficult. The copulatory structures of this family were excellently documented, e. g., by AGNARSSON – although in my opinion their convergences and regains will have to be discussed more closely in the future, and - surprisingly (for me hard to understand!) – two quite important taxonomical characters of the family Theridiidae - the leg chaetotaxy and the metatarsal trichobothriotaxy, see WUNDERLICH (2011: 229-230) - are still ignored by most investigators. Doubtlessly these characters - which have been used successfully for long in the family Linyphiidae - are not less important in the family Theridiidae than certain structures of the copulatory organs.
In the following I treat few and partly rarely collected species.

Anatolidion gentile (SIMON 1881) (figs. 24-27)

Material: S-Portugal, Algarve, between Alportel and Querenca, near Fonte Filipe, ca. 300 m, beaten from a bush, 1♂ JW leg. 1. V. 2020, CJW.

The body length of the male is 2.1 mm, its prosomal length and width is 0.7mm, the prosoma (fig. 24) is distinctly bicoloured, the sequence of the dorsal tibial bristles is 2/2/1/1, the position of the metatarsal trichobothria is in ca. 0.4; pedipalpus see figs. 25-27. – In the related genus *Neottiura* MENGE 1868 the bulbus is also quite large but the sequence of the dorsal tibial bristles is 2/2/1/2, the clypeus is ventrally strongly protruding and the cymbium is apically modified.

Distribution: Southern Europe.

Euryopis MENGE 1861

In my opinion this genus is not monophyletic; see, e. g., the variability of chaetotaxy and trichobothriotaxy. It is characterized, e. g., by its peculiar needle-shaped fangs (fig. 28), its distal position of the metatarsal trichobothrium (in adult spiders usually at least in 0.8) and its intrageneric - as well as partly intraspecific (*) - remarkably variable and frequently peculiar colouration of body and legs. Their legs are short, III is relatively long compared with the remaining legs, their long tarsi may be longer than the metatarsi and look like fused to the metatarsi (both articles in a straight position, building no angle). The legs may be spread sidewards in the resting position as well as killed and preserved in alcohol, as most of the present spiders. The opisthosoma is more or less pointed posteriorly.

(*) In adult specimens of *E. episinoides* (WALCKENAER 1847) the light basal part of metatarsus IV may be less distinct than in juveniles (fig. 29).

Euryopis sexalbomaculata (LUCAS 1846) (figs. 28-30)

Material: Southern Portugal, East Algarve, ca. 12 km WNW Tavira, under a stone, 1♀ JW leg. in VI 2020; R193/CJW.

Diagnostic characters: Colour (present ♀): Opisthosoma dark grey-brown, bearing silvery spots: dorsally 4 (!) pairs (the posterior one small and closely together) and a small spot above the spinnerets, ventrally a small pair anteriorly the spinnerets. Legs quite variable; present ♀: Mainly medium brown, tarsi I-III yellowish, femora dark brown in the distal half, yellowish in the basal half. Dorsal hairs of the opisthosoma (fig. 30) short, less than 0.1mm long (almost 0.3 mm long in *E. episinoides* (WALCKENAER 1847) which I collected also in the locality of *E. sexalbomaculata*).

Distribution: Mainly Mediterranean including Spain; new to the fauna of Portugal.

Lasaeola SIMON 1881

Southern Portugal seems to be a "hot spot" of the diversity of tiny *Lasaeola*: Half a dozen species were known, see, e. g., WUNDERLICH (2011: 254f) and (2015: 237-245). In this paper I report a further species of this region: *Lasaeola testaceomarginata* (SIMON 1881), see below.
According to my observation the tiniest species of *Lasaeola* – *minutissima* WUNDERLICH 2011 - occurs on the ground, under stones and in detritus, where they find the smallest prey like tiny ants – a typical prey of Dipoeninae – or/and probably juvenile Collembola. Larger *Lasaeola* species like *teataceomarginata* live in higher strata of the vegetation, e. g., on bushes. The reduced number of leg bristles in tiny species may be caused by their dwarfism.

Lasaeola convexa (BLACKWALL 1870)

Material: S-Portugal, Algarve, near Fuzeta, 2♀ JW leg. in VI 2020: 1♀ R187/CJW, 1♀ with a questionable parasitic worm-shaped animal coming out of the mouth, R190/ CJW.

The position of the metatarsal I-II trichobothrium exists in ca. 0.55.

Lasaeola testaceomarginata (SIMON 1881) (figs. 31-32)

Material: S-Portugal, Algarve, (1) between Alportel and Querenca, near Fonte Filipe, ca. 300 m, beaten from bushes, 1♂, 1 subad. ♂ and 1 subad. ♀; (2) near Tavira, Ilha

de Tavira (Barrill) in low vegetation on a dune, 1♂, JW leg. IV-V 2020; 1♂ 1 subad. ♀ R191/CJW.

The prosoma is distinctly bicoloured as in some other species, see WUNDERLICH (2011: 170-171, figs. 68, 78)), the sequence of the dorsal tibial bristles is 2/2/1/1, the position of the metatarsal I trichobothrium is in 0.85-0.9, the embolus is relatively long (figs. 31-32); compare figs. 76a-b given by Wunderlich (2011: 271).

Distribution: SW Europe, NW Africa.

Theridion genistae SIMON 1873 (figs. 33-35)

Material: Portugal, SE-Algarve, ca. 5 km SE Querenca, about 300 m, beaten fom a bush, 1♂ JW leg. 26. IV. 2020, R188/CJW.

The body length of the male is 1.4 mm, its clypeus (fig. 33) bears 3 hairs on tiny humps and a pair of small humps below these hairs, its basal cheliceral articles are distinctly bulging in the basal half. The embolus (fig. 34) is quite thin and very long (spirally), longer than 1 ½ loops, and longer than in other European species of *Theridion*, a bit difficult to recognize. The very long introductory ducts of the vulva (fig. 35) are in coincidence with the very long embolus.

Distribution: W Palaearctic including the Iberian Peninsula; new to Portugal.

Platnickina nigropunctata (LUCAS 1846)

Material: Portugal, SE-Algarve, ca. 12 km WNW Tavira, beaten from a bush. 2♂ JW leg. in III and V 2020, CJW.

The colour of body and legs of the present males is unusually light, the pigmentation is weaker than in most conspecific specimens known to me: The prosoma is dorsally yellow, the cephalic part is darkened only slightly light brown, bearing small dark spots in one of the males, the prosomal margin bears tiny black spots, the sternum is yellow, bears a tiny dark brown spot near its center, the margin is darkened slightly brown, the leg annulation and punctuation - e.g. ventrally on femur I - are weak, tibia I is darkened only slightly brown. The prosomal length is only 1.1 and 1.2 mm, the gnathocoxae are strongly converging, a small colulus exists.

Distribution: Mainly Mediterranean.

Family **AGELENIDAE**

Histopona THORELL 1869

The genus *Histopona* is mainly distributed in SE Europa, some species occur in Italy. The WSC (2020) lists 22 European species of this genus, none from the Iberian Peninsula. Here I describe a new species from SE Portugal, the westernmost report of the genus.

Histopona litoralis **n. sp**. (figs. 36-39)

Etymology: The species name refers to the locality – near a beach - where the holotype of the new species was collected, from litus (lat.) = beach.

Material: S-Portugal, SE-Algarve, Fabrica, ca. 12 km East of Tavira, margin of the beach in direction to Manta Rota, on a large artificial white wall, holotype ♂ JW leg. 28. IV. 2020, R183/CJW.

Note: For a closer study I amputated the left pedipalpus of the spider; the right pedipalpus was lost during the life time of the spider beyond the coxa probably by autotomy; dark brown remains on the stump indicate that it had "healed".

Diagnostic characters (♂; ♀ unknown): Pedipalpus (figs. 36-39): Cymbium, embolus and conductor very long, cymbium quite slender, retrodorsally-basally bearing a tiny pointed outgrowth, tibial apophysis fairly long, pointed, outside distinctly convex, tip bent to the cymbium, ventral margin bearing denticles.

Description (♂):
Measurements (in mm): Body length more than 7.2 mm (the opisthosoma: See below); Prosoma: Length 4.0, width 2.35 at the thoracal part, 1.4 at the cephalic part; opisthosoma (it is shrunk): Length more than 3.0 or even 5.0, width ca. 5.2; leg I: Femur 2.5, patella 1.4, tibia 2.15, metatarsus 2.8, tarsus 1.55; tibia II 2.15, tibia III 2.05, tibia IV 2.85; apical part of the posterior spinnerets 0.85.
Colour: Prosoma with a light longitudinal band between a pair of darker brown bands, laterally a pair of light bands, margin finelly dark, chelicerae dark brown, sternum light grey brown, legs yellow brown, femora III-IV ventrally and laterally dark grey annulaed, opisthosoa and spinnerets mainly dark grey.
Prosoma 1.7 times longer than wide, cephalic part strongly narrowed like in related species, basal cheliceral articles long and strong, thoracal fissure well developed,

fangs long, anterior margin of the fang furrow with few medial denticles, posterior margin with two large teeth, labium a free sclerite, wider than long, sternum hairy, not elongated between coxae IV. Legs fairly long, order IV/I/II/III, bearing long and thin bristles on femora to metatarsi, femora with 3 dorsal bristles in a row and 3 subapical bristles, patella I with 2 dorsal bristles and 1 prolaterally, tibia I with 2 dorsal, 2 prolateral and 2 pairs of ventral bristles, metatarsus I with 2 ventral pairs and 3 subapical bristles. 3 tarsal claws, paired claws with long teeth.- Opisthosoma deformed and apparently shrunk, bearing long and strong hairs. - Pedipalpus: See above. The femur bears three dorsal bristles.

Relationships: According to the structures of the ♂-pedipalpus - especially the tibial apophysis - *H. tranteevi* DELTSHEV 1978 (troglophilous) from Bulgaria and *H. thaleri* GASPARO 2005 (adult in September) from Greece are most related. In both species the pedipalpal tibial apophysis is more slender as well as bent in a different way, and the shape of the conductor is different. The existence of a retrodorsal-basal cymbial hump (fig. 36) in these species is unknown to me.

Distribution: South-Eastern Portugal (Algarve),

Family GNAPHOSIDAE

Gnaphosidae is one of the most diverse families in Portugal and worldwide. Several species of *Trachyzelotes* LOHMANDER 1944 have been reported from Portugal.

Trachyzelotes adriaticus (CAPORIACCO 1951)

Material: S-Portugal, East Algarve, 3 km E Fuzeta, on the border of a road and the marsh, under a stone below a hedge, 1♂ JW leg. 15. IV. 2020, R186/JW.

The body length of the male is 5.2 mm, its prosomal length 2.0 mm, ventral opisthosomal bristles are absent, only hairs exist.

Distribution: the SW-palaearctic species is new to Portugal and for the Iberian Peninsula and may well exist in Northern Africa, too.

Family **PHILODROMIDAE**

Pulchellodromus WUNDERLICH 2012

The small members of *Pulchelldromus* are frequent on bushes and trees of the Algarve (SEPortugal) around Tavira. I collected three species of this genus in both sexes mainly in V-VI 2018-2020 (CJW): *Pulchellodromus pulchellus* (LUCAS 1846), *Pulchellodromus simoni* MELLO-LEITAO 1929 as well as *Pulchellodromus bistigma* (SIMON 1870).

Note on *P. bistigma*: The ventral tibial apophysis of the ♂-pedipalpus (figs. 40-41) bears a prodistal skinny area and a further small and a bit hidden retrobasal skinny apophysis. The long embolus describes half a circle and bears a large skinny apophysis.

Family **THOMISIDAE**

Tmarus punctatissimus (SIMON 1870)

Material: SE-Portugal, Algarve, ca. 12 km ENE Fuzeta, beaten from a bush, 1♂ JW leg. in VI 2020, CJW.

This Southern European species has been reported from Spain; to my knowledge it is new to the fauna of Portugal.

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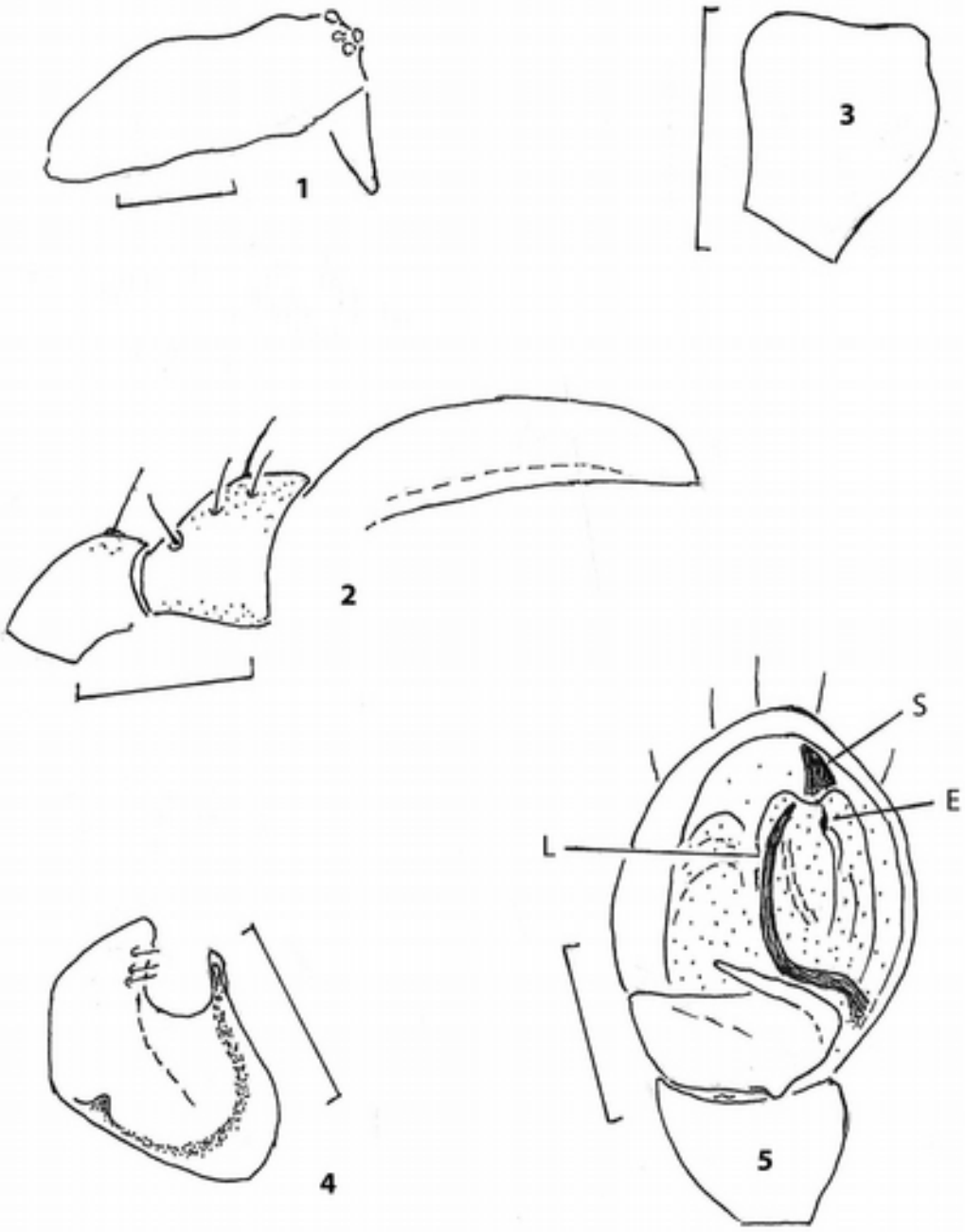
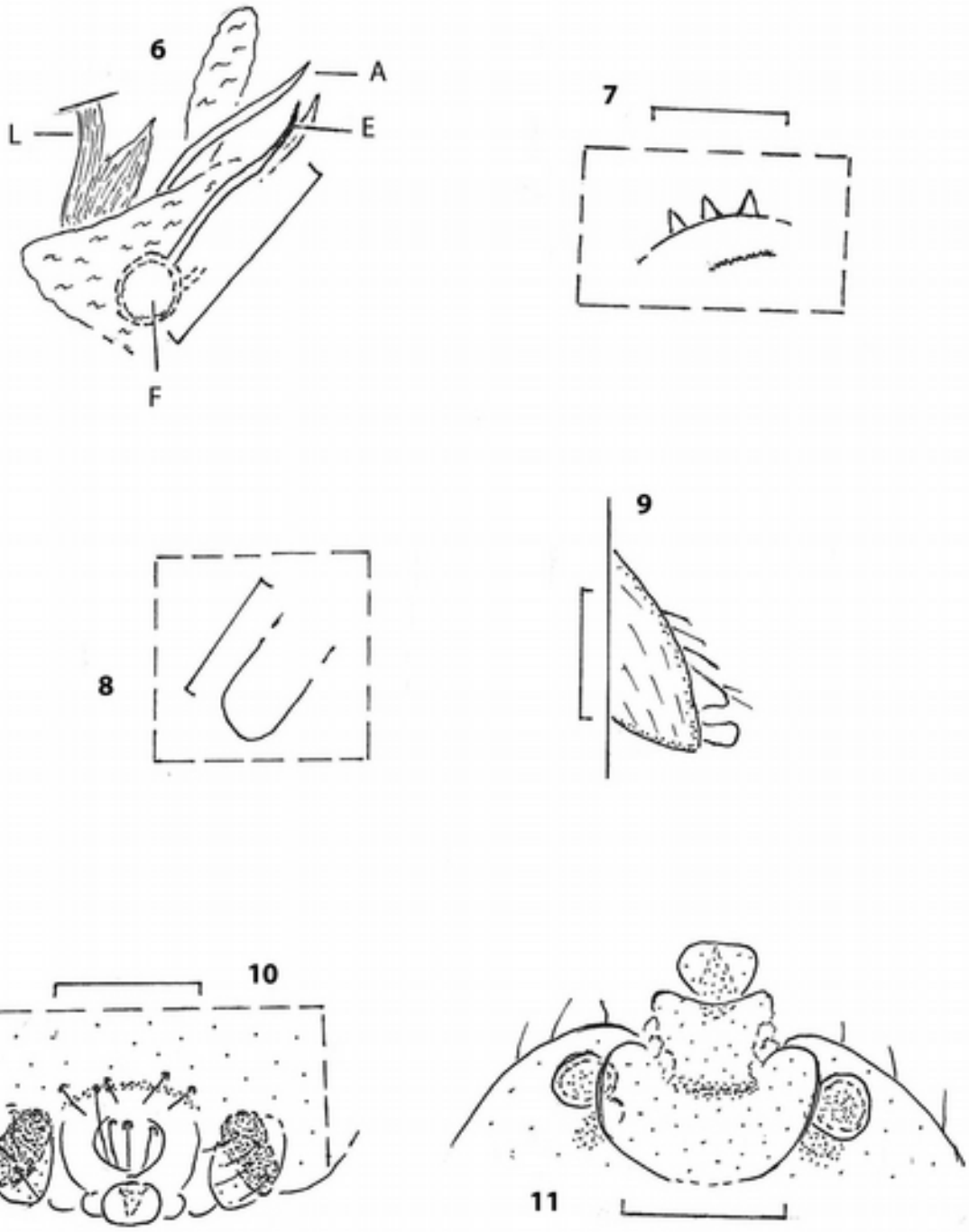
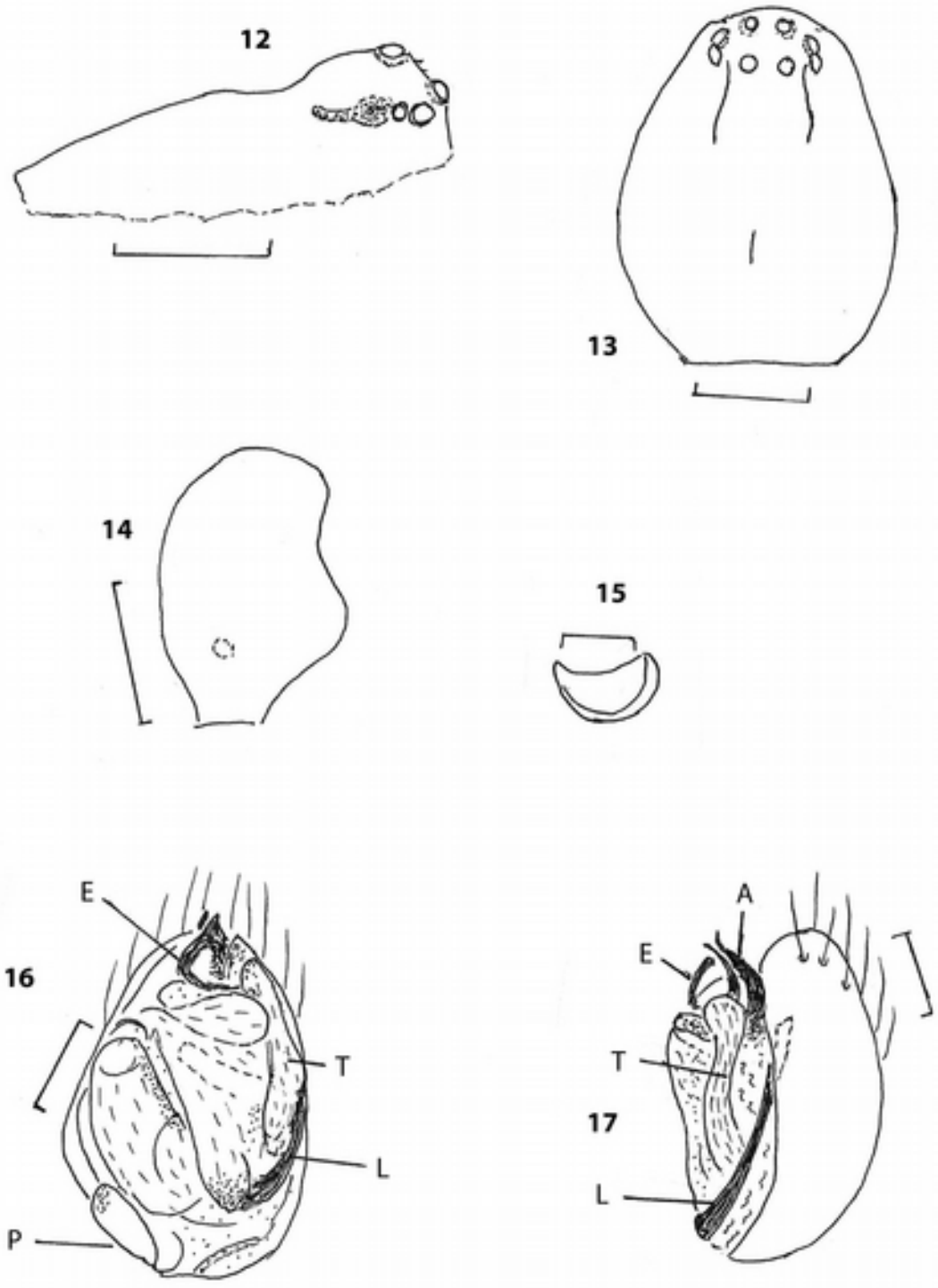


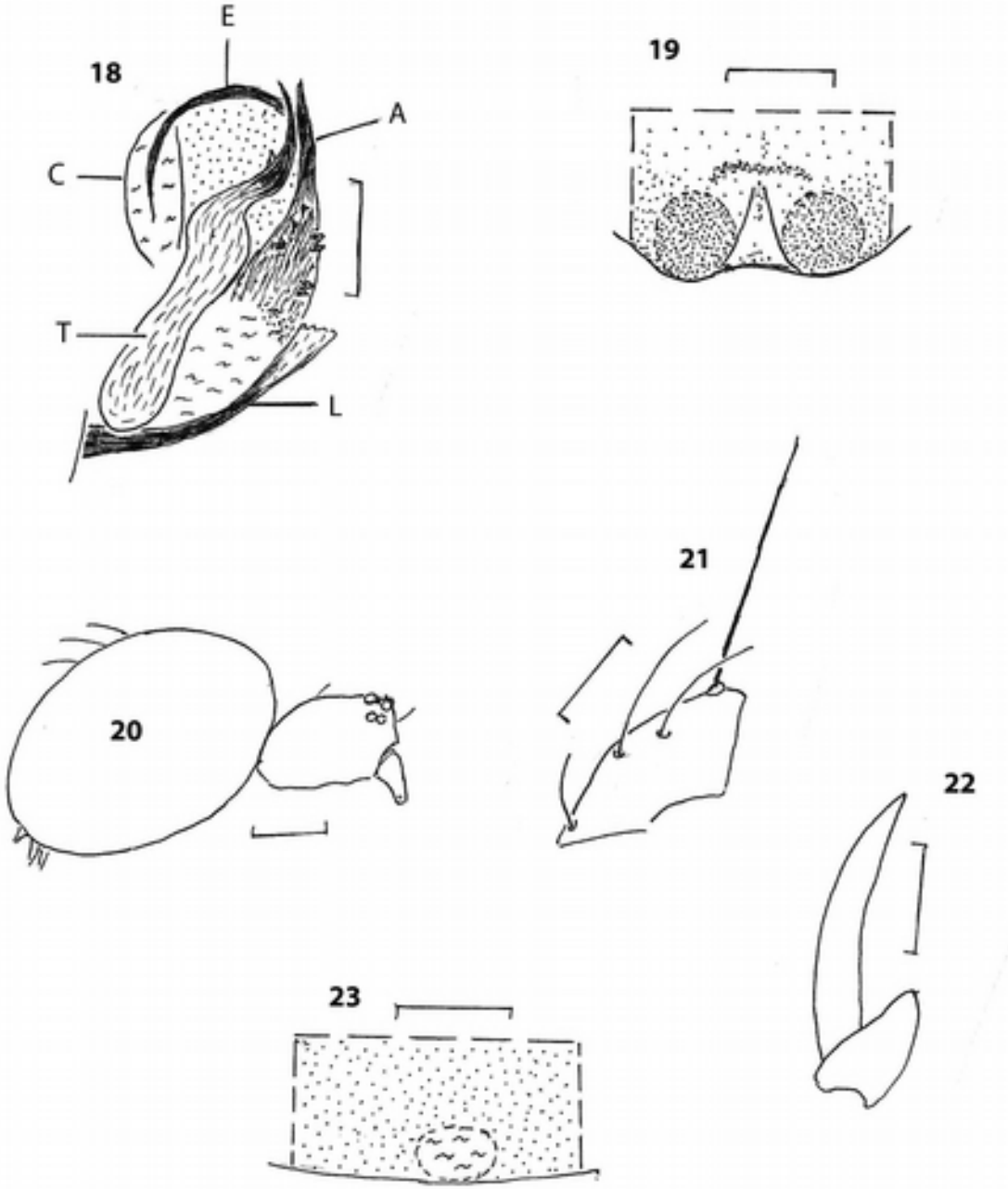
Figs. 1-5: *Algarveneta corona* **n. gen. n. sp.**: ♂; 1) lateral aspect of the prosoma, chelicerал files are not drawn; 2-5: Right pedipalpus; 2) retrolateral aspect of patella, tibia and cymbium; 3) dorsal aspect of the tibia; 4) retrolateral aspect of the cymbium; 5) ventral aspect of the pedipalpus;



figs. 6-11: *Algarveneta corona* **n. gen. n. sp.;** 6) ♂, part of the right bulbus; 7-11: ♀; 7) posterior aspect of the left fang furrow including the posterior serrated border. Note: One of the anterior teeth may be absent; 8) outline of the tip of the blunt and clawless pedipalpal tarsus, prolateral aspect; hairs are not drawn; 9-11) epigyne/vulva, lateral, ventral and aboral aspect. – A = slender apophysis, E = questionable embolus, F = FICKERT's gland, L = lamella characteristica, S = suprategular apophysis. – Scale bars (in mm): 0.2 in fig. 1, 0.1 in the remaining figs.;

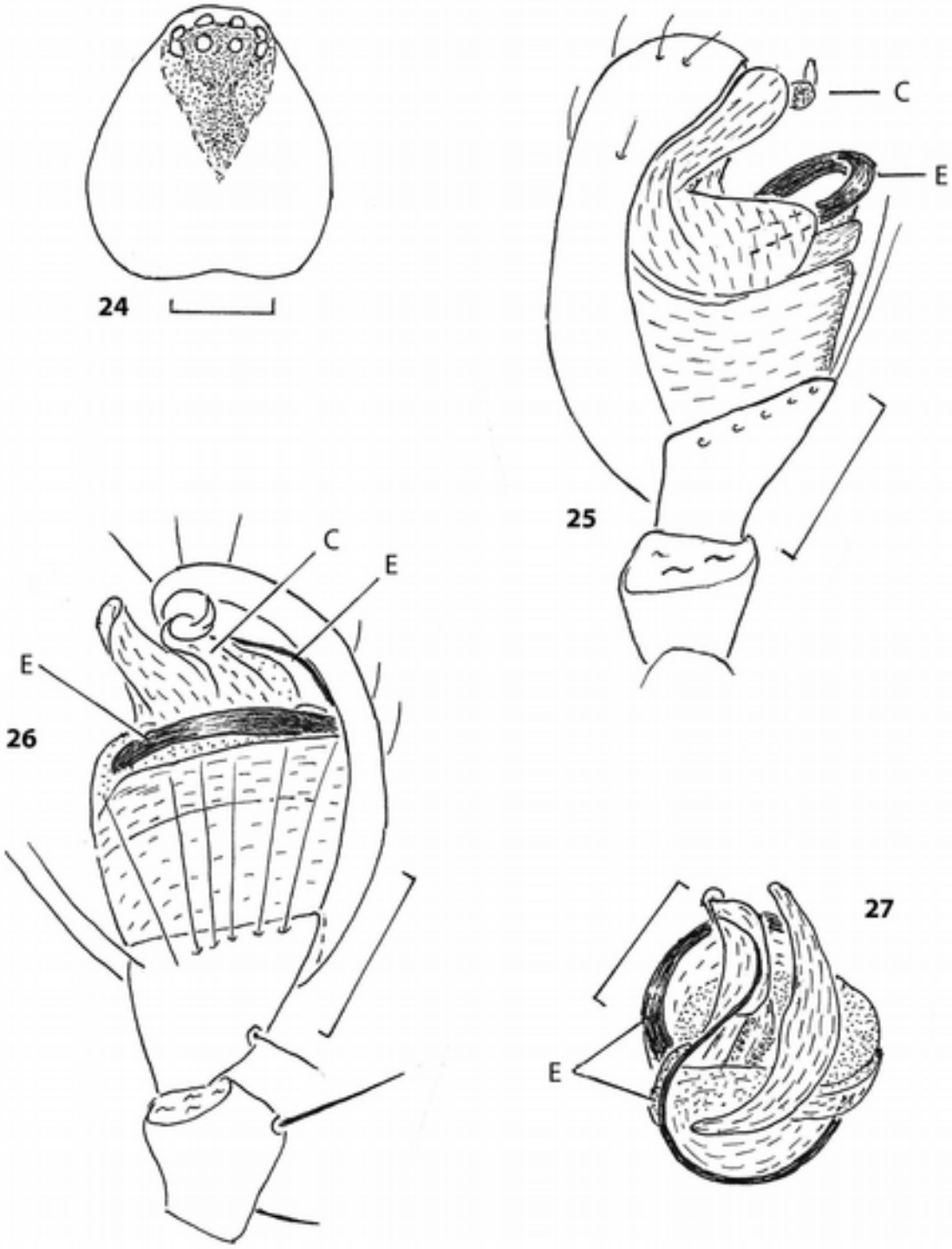


figs. 12-17: *Diplocephalus toscanensis* WUNDERLICH 2011; 12-18) ♂; 12-13) lateral and dorsal aspect of the prosoma; 14) dorsal aspect of the tibia of the right pedipalpus; 15) retrolateral aspect of the paracymbium of the right pedipalpus; 16-17) ventral and prolateral aspect of the right pedipalpus. – A = embolic apophysis, E = embolus, L = long sclerotized probasal tegular apophysis, P = paracymbium, T = tegular apophysis. – Scale bars: 0.2 in figs. 12-13, 0.1 infig. 14, 0.05 in figs. 15-17;



figs. 18-19: *Diplocephalus toscanensis* WUNDERLICH 2011; 18) ♂; retroventral-apical aspect oft the bulbus sclerites of the right pedipalpus; 19) ♀, epigyne. – A = embolic apophysis, C = conductor, E = embolus, L= long sclerotized probasal tegular apophysis, T = tegular apophysis;

figs. 20-23: *Cepheia longiseta* (SIMON 1881); 20) ♀, lateral aspect of the body. Only few hairs are drawn; 21) ♂♀, prolateral aspect of the left patella I. Note the long dorsal-distal bristle. These patellar bristles are the only leg bristles of this species; 22) ♂, dorsal aspect of the tibia and the long and slender cymbium of the right pedipalpus; ♀, genital area. – Scale bars 0. 2 in fig. 20, 0.1 in fig. 19, 0.05 in the remaining figs.;



figs. 24-27: *Anatolidion gentile* (SIMON 1881), ♂; 24) dorsal aspect of the prosoma; 25-26) prolateral and retroventral aspect of the left pedipalpus; 27) proapical aspect of the left bulbus. – C = conductor, E = embolus. Scale bars 0.2;

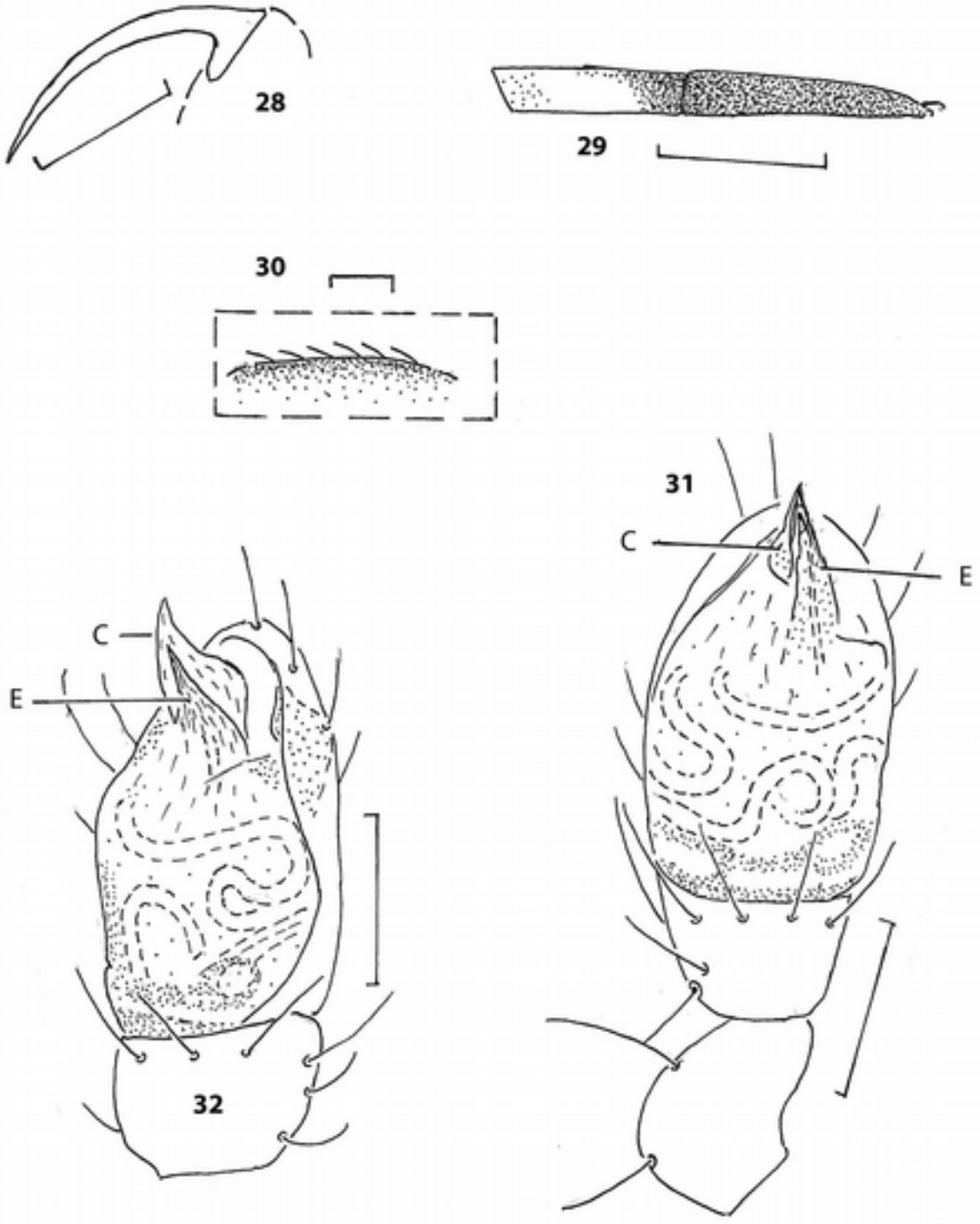
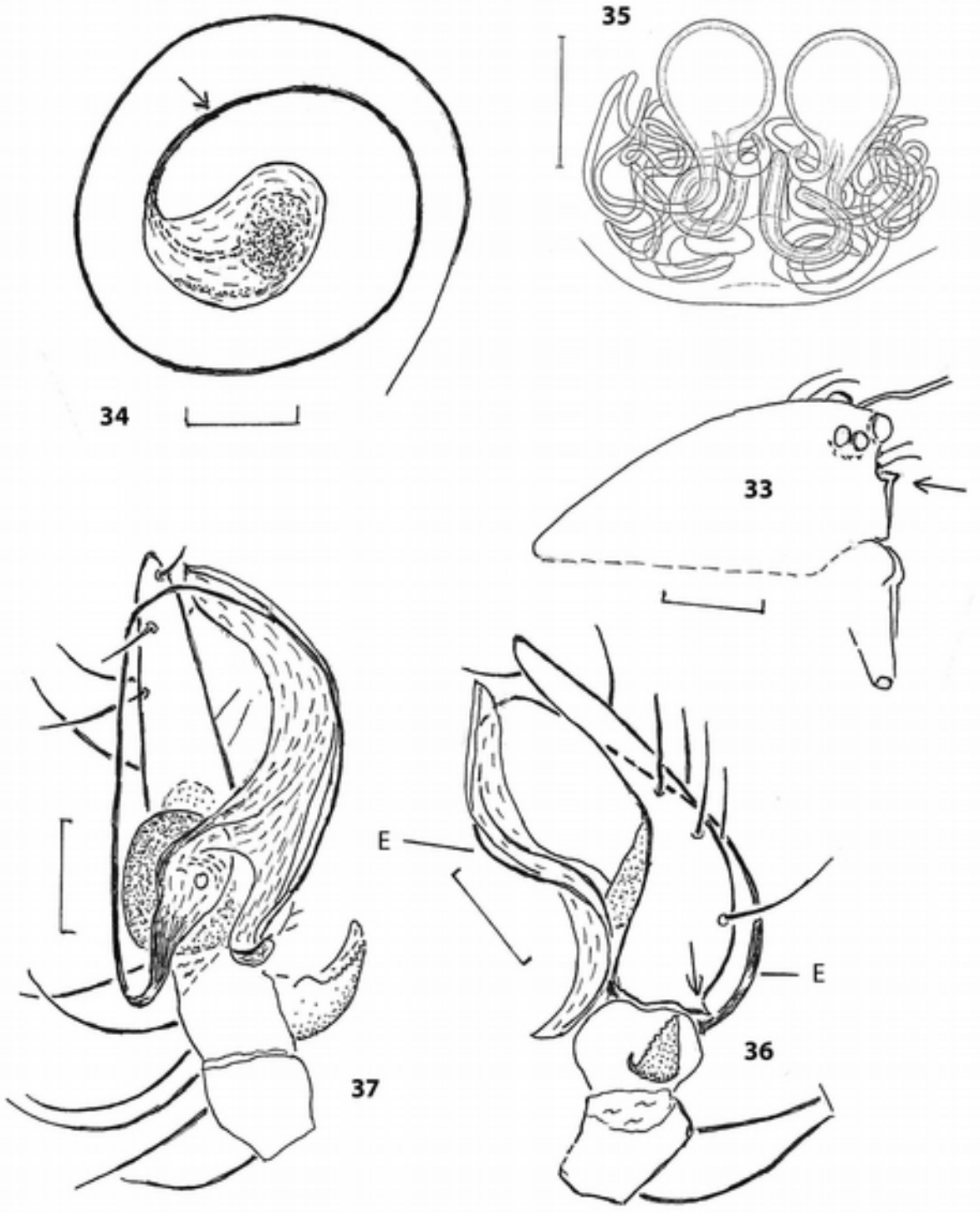


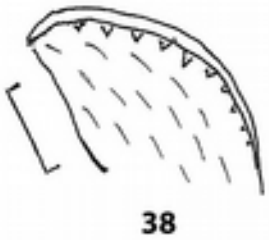
fig. 28) *Euryopis* sp., ♂♀, juv, ventral aspect of the left fang; 29) *Euryopis episinoides* (WALCKENAER (1847), small/young juvenile spider, prolateral aspect of the left tarsus and metatarsus IV; hairs are not drawn; 30) *Euryopis sexalbomaculata* (LUCAS 1846), lateral aspect of a short part of the opisthosoma;

figs. 31-32: *Lasaeola testaceomarginata* (BLACKWALL 1870), ♂, ventral and proventral aspect of the right pedipalpus. – C = conductor, E = embolus. Scale bars 0.05 in fig. 28, 0.2 in figs. 29-30, 0.1 in figs. 31-32;



figs. 33-35: *Theridion genistae* SIMON 1873; 33- 34) ♂ from the Algarve, Portugal; 33) lateral aspect of the prosoma. Note the pair of clypeal humps (arrow); 34) ventral aspect of the left pedipalpus. Without preparation the very long embolus is difficult to recognize in its whole length; 35) ♀, dorsal aspect of the vulva, taken from KNOFLACH et al. (2009). - Scale bars 0.5 and 0.1;

figs. 36-37: *Histopona litoralis* **n. sp**., ♂, retrolaterl and ventral aspect of the left pedipalpus. The arrow points to the cymbial hook. Only few hairs are drawn. – E = embolus. Scale bar 0.5;



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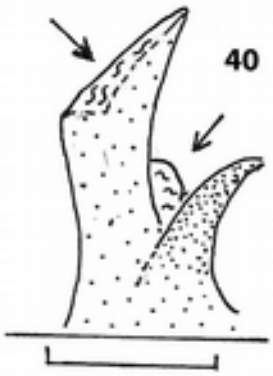

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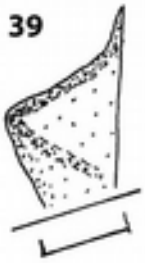

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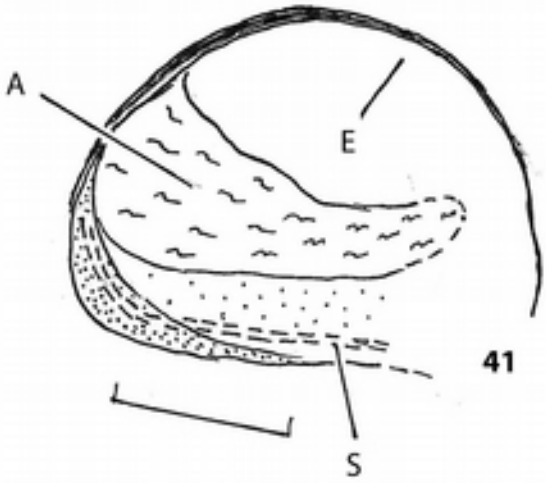

figs. 38-39: *Histopona litoralis* **n. sp**., ♂; 38) apical aspect of the tibial apophysis of the left pedipalpus; 39) basal aspect of the tip of the conductor of the left pedipalpus;

figs. 40-41: *Pulchellodromus bistigma* (SIMON 1870), ♂ from the Algarve, Portugal (R189/CJW); 40) ventral aspect of the tibial apophysis of the left pedipalpus. The arrows point to the skinny structures; 41) ventral-apical aspect of the separated structures of the right bulbus which are hidden in the not expanded pedipalpus. – A = skinny embolic apophysis, E = embolus, S = sperm duct. Scale bars 0.1.

BEITR. ARANEOL., 14 (2021: 25-262)

DESCRIPTION OF NEW FOSSIL SPIDERS (ARANEAE) IN LATE (MID) CRETACEOUS BURMESE (KACHIN) 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

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Abstract: Notes on araneophagy, sexual behaviour like cannibalism and self-amputation of the male pedipalpus as well as orb webs of fossil spiders, the diverse fauna of Cretaceous spiders (Araneae) as well as of taxonomy and phylogenetics of taxa in Kachin amber are provided. Identification keys to the genera of certain quite diverse (super)families are given. A parasitic fungus and remains of possible spermatozoa are reported from members of the family Tetrablemmidae. – Certain genera in Burmite are transferred from the Mongolarachnidae SELDEN et al. 2013 to the Pholcochyroceridae WUNDERLICH 2008, the family Mongolarachnidae has to be deleted from the list of spiders in Burmite. The plesion families Pilosarachnidae JIANG & LI 2020 and Gigarachnidae Jiang & LI 2020 are regarded as members of the Pholcochyroceroid--Deinopoid branch.

The following extinct spider (Araneae) taxa in Upper (Mid) Cretaceous Burmese amber from North Myanmar (Burma) are described:
(1) MYGALOMORPHA: A questionable member of the family Dipluridae: *Phyxioschemoides spicula* **n. gen. n. sp**.; Hexathelidae: A questionable member indet.;
(2) ARANEOMORPHA: Plesion: Megasetidae **n. fam**.: *Megasetae colphepeiroides* **n. gen. n. sp**.; Burmorsolidae: *Burmorsolus longitibia* **n. sp**.; Eopsilodercidae: *Propterpsiloderces similis* **n. sp**.; Tetrablemmidae: *Alticorona plenfemur* **n. gen. n. sp**., *Electroblemma spermaferens* **n. sp**., *Procerclypeus deformans* **n. gen. n. sp**., *Tenuicephalus penicillus* **n. gen. n. sp**.; Protoaraneoididae: *Proaraneoides lanceatum* **n. sp**.; Telemidae: ?*Telemophila ovalis* **n**. **sp**.; Leptonetidae: *Palaeoleptoneta fissura* **n. sp**.; Pholcochyroceridae: *Autotomiana brevisetosa* **n. sp**., *Longissipalpus impudicus* **n. sp**.; *L. cochlea* **n. sp**., *Kachinarachne oblonga* **n. gen. n. sp**.; Archaeidae: *Spiniarchaea aberrans* **n. gen. n. sp**.; Mecysmaucheniidae: *Palaeozearchaea depressa* **n. gen. n. sp**.; Micropalpimanidae: *Micropalpimnus gibber* **n. sp**.; Planarchaeidae (**n**. **stat**.): *Planarchaea incompleta* **n. sp**., *Platythele longicorpus* **n. gen. n**. **sp**.; Vetiatoridae: *Praetervetiator circulus* **n. gen. n. sp**., *Procervetiator fruticosus* **n**. **gen. n. sp**.; Crassicephalidae **n. fam**.: *Crassicephalus parvibulbus* **n. gen. n. sp**.; Dubiodeinopsidae **n. fam**.: *Dubiodeinopsis spinifemora* **n. gen. n. sp**.; Dubiouloboridae **n. fam**.: *Dubiouloborus praeta* **n. gen. n. sp**., *D. procerembolus* **n. gen. n. sp.**; *Dubiouloborix incompletus* **n. gen. n. sp**.; Salticoididae: *Burmadictyna crassembolus* **n. sp**., *B. fissura* **n. sp**., *B. similis* **n. sp**.; Scutuloboridae **n. fam**.: *Scutuloborus spiralembolus* **n. gen. n. sp.**, *Scutuloborella admirabilis* **n. gen. n. sp**., *Scutuloboroides pumilia* **n. gen**. **n. sp**.; Uloboridae: *Boavista crassifemora* **n. gen. n. sp**., *Microuloborus oblongus* **n**. **sp**., *Paramiagrammopes appendix* **n. sp**., *P. curvatus* **n. sp**., *P. furca* **n. sp**., *P. granulatus* **n. sp.**, *P. inaequalis* **n. sp**., *P. inclinatus* **n. sp**., *P. multifemurspinae* **n. sp.**, *P. paracurvatus* **n. sp**., *P. pilosus* **n. sp**., *P. pollex* **n. sp**., *P. semiapertus* **n. sp**., *P. simplex* **n. sp**., *P. sulcus* **n. sp.**, *P. unibrevispina* **n. sp**., *Propterkachin bispinatus* **n. sp**., *Pseudokachin tuberculatus* **n. gen. n. sp**., *Sipiniluloborus crux* **n. gen. n. sp**.; Theridiidae: *Cornutheridion concavum* **n. gen. n. sp**., Microtheridiinae **n. subfam**.: *Microtheridion longissispinae* **n. gen. n. sp**.; Zarqaraneidae: *Burmaspiralis trispinae* **n**. **gen. n. sp**., *Crassitibia sicilicula* **n. sp**., *Spinicymbium unispina* **n. sp**.;
RTA-CLADE: Eotibiaapophysidae WUNDERLICH 2018 (**n. stat**.) (from Eotibiaapomorphini) and Eoagelenomorphini **n. trib**.: *Eoagalenomorphus cretaceus* **n. gen. n. sp.**
Regarding the phylogeny of spiders (Araneae) the extinct family Eotibiaapophysidae represents the most important Cretaceous and Mesozoic taxon besides the family Chimerarachnidae (Chimerarachnida, see WUNDERLICH (2019)). In my opinion these recently discovered fossil spiders in Burmese (Kachin) amber indicate that …
(a) the RTA-clade in the sense of most recent authors is an assemblage of a paraphyletic group which I call **t**ibial **a**pophysis clade (TA-clade), and the derived higher taxa of the "RTA-clade" (like Salticidae) is not the sister group of another derived branch; (b) members of such a TA-clade existed already in the Mesozoic; (c) the root of the TA-clade goes back at least to the Cretaceous (probably even to the Jurassic or the Triassic); (d) a proof of the existence of derived taxa of the "RTA-clade" **s. str.** - like the "Dionycha" - of the Mesozoic is still absent; their diversification happened probably around the CT events. See WUNDERLICH (2020: 165-175).
Also of great phylogenetic interest are certain taxa of the superfamilies Araneoidea, the very diverse Deinopoidea, Palpimanoidea (= Archaeoidea) and Pholcochyroceroidea as well as of the enigmatic family Praearaneidae.
Interestingly, in certain spider families huge differences of our findings exist to the time table of moleculargenetic results. A quite rapid radiation during the Paleocene may be an explanation and may simulate a longer period of evolution.

Selected **Key words**: Agelenomorpha, Alteruloboridae, Araneae, Araneidae, Araneoidea, araneophagy, Archaeidae, Archaeoidea, bite marks, Baltic amber, Burmese amber, capture web, “connecting link”, Crassicephalidae Cretaceous, Deinopoidea, Dionycha, Dipluridae, Dubiodeinopidae, Dubiouloboridae, Eoagelenomorphini, Eodeinopidae, Eopsilodercidae, Eotibiaapophysidae, Evolvolution, Frateruloboridae, fungi, haemolymph, Hexathelidae, Kachin amber, Leviunguidae, Longissipalpini, Megasetidae, Miagrammopinae, Mongolarachnidae, Myanmar, orb web, palaeobehaviour, Palpimanoida, Pararchaeidae, parasites, Pedipalparaneinae, Pholcochyroceridae, Planarchaeidae, Praearaneidae, prey, RTA-clade, Salticoididae, Scutuloboridae, self-amputation, spermatozoa, sperm reservoir, spiders, TA-clade, Tetrablemmidae, Uloboridae, Vetiatoridae, Uloboridae.

Acknowledgments: For some comments I thank very much Ivan Magalhaes (Argentina) and Hannah Wood (USA). Hannah Wood I thank also for taking the photos 14-15 of an archaeid spider with prey. For collecting and selecting fossil spiders of high scientific importance, buying and transmitting to me almost all of the fossil spiders which are described in this paper as well as of taking the excellent photos with stacking technique I thank very much my highly estimated German friend and co-author Patrick Müller in Käshofen, a quite competent collector and investigator of fossils in Burmese amber.

Material: The origin of the Upper (Mid) Cretaceous (Cenomanian) Kachin amber (used as Burmese amber or Burmite in this paper) is North Myanmar (Burma), the Kachin State. It was bought by Patrick Müller and me from numerous dealers during ca. 15 years up to the year 2020.
Notes: (1) Recently I gave the holotype of *Telemofila crassifemoralis* WUNDERLICH 2017 (Araneae: Telemidae) (F2804/BU/CJW) in Burmese Kachin amber to the Institute of Zoology, Chinese Academy of Sciences in Beijing (IZCAS). - (2) Most of the Palpimanoidea (= Archaeoidea) og the coll. JW, including types, are given as a loan to Hannah Wood (USA). - (3) The following Holotypes I gave recently to the Geol.-Palaeont. Institut of the University Hamburg (Ulrich Kotthoff): (a) 56 holotypes (Araneae: div. families) in Baltic amber, see WUNDERLICH (2004), Beitr. Araneol., 4 (list see the GPIUH); (b) in Burmese (Kachin) amber: three holotypes: *Hirsutisoma bruckschei* WUNDERLICH 2015 (Ricinulei) (F2830/BU/CJW), *Primoricinuleus pugio* WUNDERLICH 2015 (Ricinulei) and *Parvithele muelleri* WUNDERLICH 2017 (Araneae) (F2635/BU/CJW); furthermore included is a Cyphophthalmi indet. (Opiliones) (F2538/BU/CJW) which is still undescribed. - CJW = collection of Joerg Wunderlich.

Note on the authorship: The author concerning the chapter on palaeobehaviour, ecology and evolution as well as of the described taxa is Joerg Wunderlich.

Note on the photos: If not otherwise noted the photos of the spiders were taken by Patrick Müller and concern holotypes in Burmese amber.

Contents

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INTRODUCTION

In the present paper I (JW) try to round off the “trinity of fossil spider faunas” of three vanished worlds in Dominican, Baltic and Burmese (Kachin) ambers (from ca. 22, 40 and 100 (!) million years ago), which I treated in about a dozen books concerning the most diverse group of predatory animals of this planet, the spiders (Araneae), see the references. We treat in short the cannibalism of few Cretaceous spiders and provide notes on their orb webs and focus on the spider fauna preserved in Burmese amber. Focussing on the family Tetrablemmidae of the Synspermiata as well as the superfamilies Pholcochyroceroidea (extinct), Palpimanoidea and Deinopoidea, altogether 5 new spider families (two other taxa get a new family rank), 24 new genera and 55 new species are described. I estimate the existence of probably more than 3000 spider species in Kachin amber.

Probably as the most important GENERAL RESULTS we found the Mid Cretaceous Burmese spider fauna to be at least as diverse as today in South Asia but composed by quite different groups of probably more than three thousand species, and - in contrast to most groups of insects - by numerous (more than 60%!) extinct families of which no species and apparently not a single genus survived.

A second IMPORTANT GENERAL RESULT: Ancient spider groups of the “Middle age of the Earth” (the Mesozoicum) were largely displaced by derived members of the Orb Weavers and their relatives (the Araneoidea) like the well-known Garden Spider and by spiders like Jumping Spiders, House Spiders and Wolf Spiders of the “RTA-clade” which are very frequent today, see the figs. A-B. The huge groups of these “modern” spiders evolved during an “explosive era of diversification” at the beginning of the “New age of the Earth” (the Neozoicum) mainly after the extinction of the dinosaurs 65 million years ago within probably only 20 or 30 million years, see WUNDERLICH (2020: 165-175). The unexpected discovery of the extinct peculiar family Eotibiaapophysidae provides hints to the relationships and the origin of the most derived and diverse extant families of the “Dionycha” like Jumping spiders (Salticidae) of the RTA-clade – which are all unknown from the Cretaceous and the whole Mesozoic. - Solving questions of the evolution and the phylogeny, too, certain fossils are without doubt tremendously important (*). Surely Eotibiaapophysidae is not a “missing link” but it may be called a “connecting or bridging link”; the origin of the RTA-clade remains unknown. Another “connecting link”: See the genus *Paramiagrammopes* WUNDERLICH (Uloboridae).

(*) Unfortunately the investigation of fossils is restricted for three reasons: (1) several taxonomical important characters are frequently hidden or lost, (2) molecular genetic studies are impossible and (3) the biology, behaviour, life style of the animals are usually hardly known or can only indirectly be recognized respectively be concluded by their morphology or by syninclusions. - Solving certain relationships is a detective-like task!

Note: The very high number of hurt/damaged fossil spiders - whose prosoma and/or opisthosoma is inclined probably by a beat – may indicate that these spiders were blown by a storm to the sticky resin. The high number of naturally heated amber pieces points at the existence of wide-spread fires in the vanished amber forest which may well have been caused by tremendous eruptions of vulcanos.

PALAEOBEHAVIOUR: Araneophagy, sexual cannibalism and pedipalpal self-amputation of males of Cretaceous spiders in Burmese (Kachin) amber

Most spiders are raptorial animals and are generalists - see FOELIX (2015) -, so flying insects are captured in (orb) webs, and only few - like certain Theridiidae - are kleptoparasites. Generally Araneae feed on various arthropods (few Thomisidae eat occasionally additionally pollen grains); their most frequent prey are insects. Certain spiders are specialized on peculiar prey, like *Dysdera* on Isopoda or Zodariidae and several Theridiidae on ants. Fossil spiders as the prey of spiders in Burmese amber were quite rarely reported, see below. Well-known specialized spider eaters - usually NOT cannibalists (see below) - are, e. g., most members of the superfamily Palpimanoidea (= Archaeoidea). Few members of the superfamily Araneoidea: Mimetidae are spider eater, too, but are unknown from Burmese amber. Palpimanoid spiders like Archaeidae were diverse already in the Cretaceous. Here we report this behaviour for the first time from the Cretaceous and the Mesozoic as well: A spider of the family Archaeidae – an indet. ?juv. member of the extinct genus *Burmesarchaea* WUNDERLICH 2008, F3341/BU/CJW -, which has captured and hold by its legs a spider probably of the extinct family Zarqaraneidae (Zarqaraneidae were frequent araneoid spiders in Burmite), see the photos 14-15. Archaeidae build no capture web; they are sit-and-wait predators. The body length of the present spider is 1.4 mm. Previously the oldest spider feeding palpimanoid spider, also a member of the family Archaeidae (*Archaea*? sp.), was reported from the Eocene Baltic amber forest, see WUNDERLICH (2004: 98, fig. 5, 567: photo 626).
A spider of the family Segestriidae as the probable prey of a mygalomorph spider has recently reported by WUNDERLICH & MÜLLER (2020: 73-74, figs. 57-58, photos 8-9). Bite marks of the predator's fangs are preserved at the leg of the segestriid spider.
SEXUAL CANNIBALISM by females is well-known in extant spiders of various Mygalomorpha and few members of other spider taxa like Theridiidae (superfamily Araneoidea): The Black Widow and related species of the genus *Latrodectus*. Mles are only an additional prey in these spiders. This behaviour has not yet been reported from a fossil spider of the Cretaceous or earlier. Recently I discovered two adult males of mygalomorph spiders which are strongly damaged and crumbled (photo 1), and I suppose that they have been the victim of a predator, in my opinion most likely the prey of a conspecific female. Extant aggressive mygalomorph females are well-known to kill their partners occasionally during courtship behaviour (praecopulatoric) or just after copulation (postcopulatoric). The first fossil example of such behaviour has been reported by WUNDERLICH & MÜLLER from a member of the family Theraphosidae, the holotype of *Protertheraphosa spinipes* WUNDERLICH 2020: 44-45, figs. 35-41, photos 6-7. The second example of such an event is reported in this paper; it concerns the holotype of *Alterphyxioschemoides spicula* n. gen. n. sp., a questionable Dipluridae, which is also strongly damaged and also preserved in Cretacious Burmese amber, see below and the photo 1. Questionable remains of digestive fluid of the predatory conspecific female is preserved near the prosoma of the deformed male.
The events of these spiders document that sexual cannibalism existed already 100 million years ago (and most likely quite longer). Why exists this peculiar behaviour COMMON and EXPLICITELY in these ancient MYGALOMORPH spiders? A special character of mygalomorph spiders may explain the sexual cannibalism: In contrast to the short-living males the conspecific females live usually several (up to ca. 30) years.

May a single copulation of a male (or very few copulations) be enough for the survival of the species, and may the males' body be welcome as an additional last meal before the females' egg-laying?
The long and almost leg-like male pedipalpi may well be evolved in connection with the aggressive behaviour - sexual cannibalism - of conspecific females (*). But at least in certain mygalomorph spiders their long pedipalpi do not protect the males quite well from their female partners' attack.
A case of probable self-amputation of a pedipalpus by a male spider is reported for the first time in fossil spiders, see below: *Microtheridion longissispina* n. sp. (questionable Theridiidae).

(*) Quite long or even longer male pedipalpi exist in certain members of the not related extinct family Mongolarachnidae, e. g., in the genus *Longissipalpus* WUNDERLICH see below. Mongolarachnidae were cribellate capture web builders of higher strata of the vegetation.

Note: For a certain time span I was not able to recognize the crumbled holotype of *Alterphyx-iochemoides spicula* (photo 1) as a mygalomorph spider, and a well-known arachnologist in Germany noted concerning this spider only "arachnida indet.". - Such badly preserved spiders demonstrate that seemingly worthless fossils may be of special interest and of scientific value.

The oldest described fossil orb webs

Capture webs of fossil spiders - even in amber - are usually not well preserved and not like their original shape (I do not know such a web in stone); the reconstruction of their shape and structure is difficult, see, e. g., WUNDERLICH (2008: Photos 54-58). The specific kind of the capture web – for example an irregular web or an orb web – may allow conclusions on the relationships of its producer, probably on its family.
Rarely – as a "highlight" of amber syninclusions - a larger part of a capture web is preserved in the same piece of amber together with its producer or even also with a captured prey like in the holotype of *Crassitibia sicilicola* n. sp. (Araneoidea; Zarqaraneidae). Here I treat in short fossil webs of the Mid Cretaceous in Burmese amber. In this kind of amber taxa of both basic kinds of webs are preserved, (a) of cibellate webs: Members of the superfamily Deinopoidea like Uloboridae and (b) of ecribellate members of the superfamily Araneoidea, of the Zarqaraneidae.
(a) Remains of an excellently preserved cribellate web including "wool" of spider threads - in my opinion most likely of an orb web and probably produced by a member of the Deinopoidea - was described by WUNDERLICH &MÜLLER (2018: 15-16, 34, 67, 91, figs. 31-33, photo 10): 15-16, 34).
(b) Remains of an ecribellate web including sticky droplets, produced by a member of the Araneoidea (the family Zarqaraneidae) is described in this paper, see below, *Crassitibia sicilicola* n. sp., and fig. 308 A beetle as a prey is attached at one of the spiders' threads. The treads may have been part of an irregular web but I will not exclude with certainty that it is a remain of an orb web. The sure report of an ecribellate orb web of the Cretaceous is absent.

NOTES ON FAUNA, LIFESTYLE, ECOLOGY AND EVOLUTION OF FOSSIL SPIDERS

See also below, the genus *Paramiagrammopes* (Uloboridae): Radiation on islands.

Today more than 300 spider species of about 55 families are reported from Burmese (Kachin) amber, see WUNDERLICH & MÜLLER (2020: 27-29). Including the present paper the following families have to be added to the former list (most are members of the superfamily Deinopoidea): Crassicephalidae n. fam., Dubiodeinopidae n. fam., Dubiouloboridae n. fam., Eotibiaapophysidae n. stat., Gigarachnidae JIANG et al. 2020, Megasetidae n. fam., Pilosarachnidae JIANG et al. 2020, Planarchaeidae n. stat. and Scutuloboridae n. fam. The family Mongolarachnidae SELDEN et al. Has to be deleted from this list. About 60% of the families are extinct; extinctions of certain higher taxa see below, the superfamily Deinopoidea. To my knowledge not a single species or even genus survived. The extant *Priscaleclercera spinata* DEELEMAN-REINHOLD 1995 sensu WUNDERLICH 2017: 150 turned out to be a member of the related South Asian genus *Leclercera* DEELEMAN-REINHOLD 1995, see MAGALHAES et al. (2020 b); so also *Priscaleclercera* is a strictly extinct genus.

Diversity and frequency: The most diverse FAMILIES are Archaeidae, Lagonomegopidae, Praeterleptonetidae, Tetrablemmidae, Pholcochyroceridae, Uloboridae and Zarqaraneidae.

Some of the most diverse GENERA (usually including the most frequent species) are:
Burmesarchaea WUNDERLICH 2015 (Palpimanoidea: Archaeidae),
Burmorchestina WUNDERLICH 2008 (Synspermiata: Oonopidae),
Furcembolus WUNDERLICH 2008 (Synspermiata: Tetrablemmidae),
Leviunguis WUNDERLICH 2018 (Araneoidea: Leviunguidae),
Longissipalpus WUNDERLICH 2015 (Pholcochyroceroidea),
Paramiagrammopes WUNDERLICH 2008 (Deinopoidea: Uloboridae) (>20 species!),
Priscaleclercera WUNDERLICH 2015 (Synspermiata: Psilodercidae).

Only about 10 families of about 55 families represent the majority of spider genera, species and specimens in Burmite (Kachin amber).

How many unknown spider species do exist in the Burmese (Kachin) amber?
In Kachin amber (Burmite) I found ca. 98-99% (!) undescribed spider species among well preserved males. That means that almost every newly discovered male spider in the Mid Cretaceous Kachin amber - whose copulatory structures are well preserved – cannot be identified as an already described species. A similar situation apparently exists in some families of beetles like Cantharidae. In the Eocene Baltic amber I found during the last years, contrarily, that about 90% (!) of newly discovered males are members of already known species. Based on these findings we know only a very

SMALL part of the spider species - and higher taxa, too! - of the Burmese spider amber fauna in contrast to the fauna of the Baltic amber.

The number of fossil spider species up to date known is:
(a) in Burmite few more than 300,
(b) in Baltic amber about 600 (480 accepted species + 75 nomina dubia + ca. 50 undescribed species in the coll. of JW).

I estimate the quota of still undescribed spider species in Burmite to be ca. 98-99 % and in Baltic amber only 10 %.

If these estimations are correct we may expect in Burmite (Kachin amber) further ca. 3270 to 3300 undescribed spider species but in Baltic amber only about 60 undescribed spider species because we are near the maximum number.
So the diversity of the fauna in amber on species level of the tropical Burmese rain forest MAY be about 55 times higher than in the amber of the subtropical to moderate Baltic forest. I estimate the number of spider families in Kachin amber to be probably 20% higher than the families in Baltic amber. Because of the extremely diverse faunas in tropical rain forest this is not a great surprise.

If spiders represent about 4% of arthropods in ambers - as estimated by me and several other authors - ca. 82 000 species of Arthropoda may be expected to be preserved in Burmese (Kachin) amber. To my knowledge today only about 1730 arthropod species are known in Burmite. This means (a) that almost 1/6 of the arthropod species which are described in Burmite is a spider species, and (b) that only ca. 0.02% of arthropod species in Burmite have been described up to now in contrast to ca. 11% of the spider species.

Surely these thoughts and extrapolations are quite speculative and provisional. I hope that at least the magnitude (dimension) is correct. The high numbers of taxa expected by me appears much to high by A. ROSS (person. commun.).

The striking **changes of fossil spider faunas** were treated, e. g., by WUNDERLICH (2015), (2019) and (2020) as well as WUNDERLICH & MÜLLER (2018). See also below, the tetrablemmid subfamilies. The faunal turnover between the Mesozoic and the Cenozoic as well as the Mesozoic-Cenozoic extinctions: See also MAGALHAES et al. (2020 a). In the present paper I (JW) will add some new aspects, see fig. A.
Based on their dominant groups I call …

- the Palaeozoic the “era of the Chimerarachnida and Mesothelae”,
- the Mesozoic the “era of the Synspermiata, Palpimanoidea and CRIBELLATE taxa of the Deinopoidea – Pholcochyroceroidea branch”,
- the Cenozoic the “era of the ecribellate Araneoidea and the RTA-clade” (mainly of the ecribellate “Dionycha”).

Each of the Mesozoic groups contain about ten families, Deinopoidea even more. The radiations of the two huge extant branches - the Araneoidea and the RTA-clade – happened mainly after the KT-events within the last 65 million years, apparently mainly in the Palaeogene; most extant higher taxa already existed in the Eocene Baltic amber

forest, see WUNDERLICH (2004). This means that the main diversification took only one sixth of the almost 400 million years of the complete spider evolution (!).
Synspermiata - including the apparently relatively young family Pholcidae which is (only still?) not reported from the Mesozioc - survived mainly in the tropics. Mesothelae, Palpimanoidea and Deinopoidea can be regarded as relic taxa if compared with their dominance in the Palaeozoic rsp. Mesozoic. The ancient Chimerarachnida was a relic taxon already in the Cretaceous Burmese amber forest.
Derived members of the superfamily Araneoidea displaced during the Palaeogene numerous taxa of the Deinopoidea, Palpimanoidea and Synspermiata. An example is the biogeographical change and extinction of taxa of the family Archaeidae which are extinct today in the whole Northern Hemisphere, were still not rare in the Eocene Baltic amber forest of the Northern Hemisphere, and survived in the Southern Hemisphere, see WUNDERLICH (2004). - According to my findings derived members of the RTA-clade displaced various predatory arthropod taxa - including spiders of the Synspermiata and Palpimanoidea - also during the Paleogene, see below.
– DID THE DIONYCHA REPLACE THE DIVERSE FAMILY LAGONOMEGOPIDAE?
Why did the members of the most diverse extant spiders evolve and diversify - compared with most other arthropods - SO LATE within their evolution? Probably the most important araneine "innovations" (*) - like the sticky droplets within the capture web of the Araneoidea and the ability for fast moving, jumping behaviour, ground-living and prey capturing without a capture web of the RTA-clade - did not happen before the Jurassic/Cretaceous or even partly in the Paleogene - in striking contrast to most diverse extant families of insects in which the most important "innovations" were completed MUCH EARLIER. This idea may also explain the fast radiation of the derived spider groups – probably mainly in the Paleocene.

(*) See WUNDERLICH (2015:33-34) (evolvolution/evolvability, innovations, self-organization as the "fifth dimension of the universe"). See also SMOLIN (1999: 348); I regard self-organization to be not "similar" to natural selection although both are closely connected with each other.

Note: Only the hard work - intensive and incredible time-consuming - study of thousands of fossil spider taxa - including the attempt of solving their relationships - lead me to the conclusions here treated, which are much more important than the species descriptions which are only a "necessary evil".

Ecology, life style: Most members of the ancient Chimerarachnida, Mesothelae and Mygalomorpha were/are ground-living spiders, dwellers of burrows and tubes, even using trap-doors like Mesothelae and Ctenizidae. This is well known as a very old hidden lifestyle of ancient Arachnida like Scorpions and Amblypygi. The more derived members of the Araneomorpha spread to higher strata of the vegetation, first the members of the ancient Hypochilidae and Austrochiloidea - which have not been reported from fossils yet (!) -, and later members of the Palpimanoidea, of the Pholcomorpha of the Synspermiata - see WUNDERLICH & MÜLLER (2020: 58) - of the orb-web dwelling Deinopidea, probably slightly later members of the partly orb-web dwelling Araneoidea, and latest members of the RTA-clade - see the family Eotibiaapophysidae below and WUNDERLICH & MÜLLER (2020: 53-56) - whose origin still lies in the dark. If the first members of the (R)TA-clade s. l. actually evolved in higher strata of the vegetation the members of this branch (like Salticidae and Gnaphosidae but not Lycosidae and its relatives) lost their unpaired tarsal claw and "turned back" to a soil-dwelling life style, with a reversal in certain Salticidae. (In certain Lycosidae the ancient use of self-made burrows was "regained").

	MAIN HIGHEST TAXA	MAINLY TAXA OF HIGHER STRATA (1)	MAINLY SOIL-DWELLING TAXA
CENOZOIC	**RTA-CLADE**	DIVERSE, e. g., Salticidae and Sparassidae of the "Dionycha"	DIVERSE, e. g., Salticidae, Sparassidae, Lycosidae
	ARANEOIDEA	DIVERSE, e. g., Araneidae, Linyphiidae, Theridiidae	
	MYGALOMORPHA		DIVERSE
MESOZOIC	**FIRST ARANEOIDEA** (2)	e. g., † Leviunguidae, † Zarqaraneidae	
	DEINOPOIDEA & PHOLCOCHYRO-CEROIDEA	DIVERSE, e. g., Uloboridae	
	SYNSPERMIATA	DIVERSE, e. g., Tetrablem-midae, Psilodercidae, Segestriidae (2), and Oonopidae	Oonopidae (hunters), Segestriidae
	PALPIMANOIDEA	DIVERSE, sit-and-wait hunters like Archaeidae, † Lagonomegopidae	
	MYGALOMORPHA		DIVERSE, e. g., Diploridae, Ctenizidae and Thera-phosidae
PALEOZOIC	FIRST ARANEOMORPHA AND MYGALOMORPHA? (3)	?	?
	MESOTHELAE		DIVERSE
	† CHIMERARACHNIDA (3)	?	† Chimerarachnidae (2, 3)

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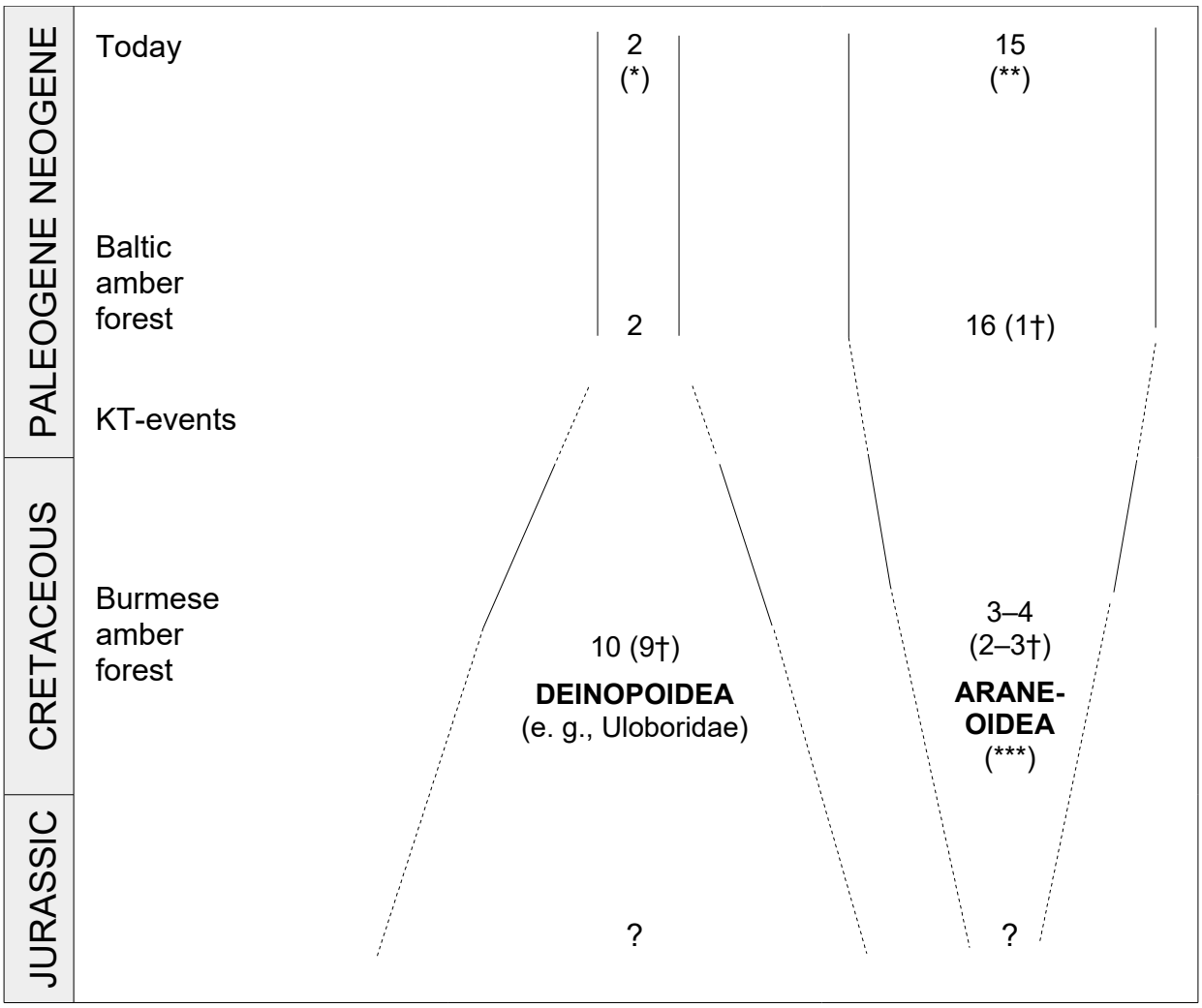
(1) Usually capture web dwellers.
(2) Hidden in tubes; probably, e. g., dwellers on/under bark of trees.
(3) No fossil proof from this period.

Fig. A. Changes of the spider fauna and the preferred strata of the vegetation during evolution, based on high taxa.
Note: Mesozoic taxa are mainly known in Mid Cretaceous amber from Myanmar; most Cenozoic taxa are known from Eocene Baltic amber, see the various papers by WUNDERLICH.



(*) Uloboridae survived.
(**) e. g., Araneidae, Linyphiidae and Theridiidae (Theridiidae survived).
(***) e. g., Zarqaraneidae.

Fig. B. Faunal turnover of of the highly diverse spider superfamilies - Araneoidea and Deinopoidea - of higher strata of the vegetation during the Mesozoic and Cenozoic based on the number of families today, in the Eocene Baltic amber forest (ca. 40 million years ago) and in the Mid Cretaceous amber forest of Myanmar (Burma) (ca. 100 million years ago). The numbers refer to the number of extant rsp. extinct (†) families.

Notes regarding the figs. A and B:

For a comparison I choose mainly the family but not the generic level. The results are quite preliminary in certain respect. The fossil faunas treated in this paper are predominantly based only on the taxa of two fossil forests of the Northern Hemisphere, the Eocene Baltic amber forest, see WUNDERLICH (2004, 2008), and the Mid Cretaceous forest of Myanmar (Burma), see WUNDERLICH (2008 to 2021). Large fossil amber faunas of the Southern Hemisphere are unknown. Therefore we know only a small part of the worldwide families of these eras. Both kinds of amber provide VERY diverse faunas; they include mainly taxa of higher strata of the vegetation, the main biotopes of the Synspermiata - mainly of the family Tetrablemmidae - as well as of the superfamilies Araneoidea, Deinopoidea and Pholcochyroceroidea. More than half the number of the extant and fossil deinopoid GENERA are reported from a single fossil amber forest, the Burmese amber forest.

Results shown in fig. B and discussion

During the last 100 million years – probably around the KT-events – the superfamily Deinopoidea (cribellate) was displaced (thrust aside) by the ecribellate superfamily Araneoidea. The number of deinopoid families has already dramatically decreased up to the Eocene from 10 to 2 families, only 1/5 of its families survived, which is the same number as today. During the same period the number of araneoid families increased tremendously by five times, from 3 (or probably 4) to 15 or 16 in a surprising “explosive diversification”, and the number has almost been stable since the Eocene up to today.
What are the reasons for the enormous change in the composition of the spider fauna of higher strata of the vegetation in which the ecribellate Araneoidea displaced so many taxa of the Deinopoidea? Surely the sticky dry cribellate “wool” in the capture web of the Deinopoidea is not less successful in prey capturing than the sticky droplets of the Araneoidea (although different effective in dry/hot rsp. humid/moderate habitats). Another difference of both superfamilies may explain the success of the Araneoidea: All members of the Deinopoidea are orb-web weavers whereas the life style of members of the Araneoidea is quite more diverse: An orb-web – it may be strongly modified – exists in only 7 families, “irregular” capture webs of different kinds exists in 6 families, and the capture web has been lost in 2 families.
The sparse number of families of the superfamily Araneoidea in Burmite may indicate a relatively late diversification - and probably a relatively late origin as well - of the Araneoidea - compared with the Deinopoidea - as well as of sticky droplets and the orb web.

Notes on the Determination to the spider families in Burmese (Kachin) amber:

In 2015: 93-100 I published a key which includes up to 38 spider families known at that time. Today I know about 55 families and the key has to be emended. According to the growing number of family reports during the last years and the indet. taxa in my private collection I assume the existence of more than 60 families in Kachin amber although certain families probably have to be removed from the family list or have to be synonymized.
The families Deinopidae – see the superfamily Deinopoidea below -, Huttoniidae, Mongolarachnidae – see the family Pholcochyroceridae below -, Theridiosomatidae and Liphistiidae have to be removed from the list of spider families in Kachin amber.
The families Corinnidae, Nephilidae (= subfamily of the Araneidae), Palpimanidae, Sparassidae and Tetragnathidae are – partly with a question mark – listed in the report of fossil arachnids in Burmese (Kachin) amber by SELDEN and RON (2017) but their members are unknown to me from the Cretaceous.
Based on their worldwide rsp. tropical distribution today, their life-style and their partly high phylogenetic age a further report of taxa like Anapidae, Atypidae, Austrochiloidea, Hypochilidae, Ochyroceratidae, Pholcidae and Theridiosomatidae in Kachin amber appears likely to me, although the families Pholcidae and Theridiosomatidae may have evolved later than before or in Mid Cretaceous.
The following spider families were not included or marked as questionable in the previous key (still a question mark remains in certain Mygalomorpha):

(1) **Chimerarachnida**:
Chimerarachnidae WUNDERLICH (2019)
(2) **Mesothelae**:
Burmathelidae WUNDERLICH 2017
Cretaceothelidae WUNDERLICH 2017
Parvithelidae WUNDERLICH 2017
(3) **Mygalomorpha**:
Ctenizidae/Cyrtaucheniidae: See WUNDERLICH (2020)
Fossilcalcaridae WUNDERLICH 2018
Hexathelidae: Unsure report, see below
Idiopidae and Nemesiidae: See WUNDERLICH (2020)
Theraphosidae: See WUNDERLICH (2020)
(4) **Araneomorpha**:
Plesion: Megasetidae **n. fam**.
Aliendiguetidae WUNDERLICH 2020
Alteruloboridae WUNDERLICH 2018
Crassicephalidae **n. fam**.
Cretamysmenidae WUNDERLICH 2018
Dubiodeinopsidae **n. fam**.
Dubiouloboridae **n. fam**.
Frateruloboridae WUNDERLICH 2018
Gigarachnidae JIANG & LI 2020
Leviunguidae WUNDERLICH 2018
Parvosegestriidae WUNDERLICH 2020
Pilosarachnidae JIANG & LI 2020
Planarchaeidae **n. fam**.
Praearaneidae WUNDERLICH 2017
Praepholcidae WUNDERLICH 2017
Protoaraneoididae WUNDERLICH 2018
Scutuloboridae **n. fam**.
Zarqaraneidae WUNDERLICH 2008

DESCRIPTIONS OF THE TAXA

Notes: The order of families below follows usually the classification provided by WUNDERLICH in WUNDERLICH & MÜLLER (2019, 2020) which by far is not definitive; the relationships of the Pholcochyroceroidea are quite unsure, and the Leptonetoidea as well as the Palpimanoidea (= Archaeiodea) are regarded by certain authors to be closer to the Austrochiloidea. The family Tetrablemmidae is splitted by certain authors. The families Megasetidae and Gigarachnidae are regarded as plesions.

MYGALOMORPHA

Family DIPLURIDAE SIMON 1889

Adult male Dipluridae in Burmite are very rare in contrast to con-familiar juveniles, see WUNDERLICH & MÜLLER (2020: 35-36). Because of the bad preservation of most adult Dipluridae and other mygalomorph spiders their important taxonomical characters and relationships are frequently unsure. The spider described below is an example for that – its spinnerets are not and their eyes and chelicerae are badly preserved. The spider represents most probably a case of female sexual cannibalism.

Alterphyxioschmoides n. gen.

Etymology: The name refers to the probably related genus *Phyxioschemoides* WUNDERLICH 2015 as well as alter (lat.) = different.

Type species (by monotypy): *Alterphyxioschmoides spicula* n. sp.

The gender oft the name is feminine.

Diagnostic characters (♂; ♀ unknown): Trochanter to metatarsus I bear rows of pro- and retroventral bristles (fig. 2), the prosomal margin bears distinct teeth (fig. 1), pedipalpus (figs. 3-4) with very long articles, probably as long as leg I, tibia with long ventral hairs, bulbus quite small, embolus relatively long, slightly bent, body length ca. 5.5 mm.

Further characters: Unpaired tarsal claw existing, paired claws IV with 0/1 tooth, leg scopulae, claw tufts and dorsal opisthosomal scutum absent.

The **relationships** are unsure (certain important taxonomical characters are unknown), characters of the legs are similar to the family Dipluridae.

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

Alterphyxioschemoides spicula WUNDERLICH **n. gen. n. sp**. (figs. 1-4), photos 1-2

Etymology: The species name refers to the teeth of the prosomal margin and to the spines of leg I, from spiculum (lat.) = point.

Material: Holotype ♂ in Upper ("Mid") Cretaceous Burmite, F3606/BU/CJW.

Preservation and syninclusions: The spider is partly badly – deformed, damaged, crumbled (sucket ou?) and incompletely – preserved at the margin of a clear yellow-orange piece of amber which apparently was not heated, remains of the chelicerae and of the opisthosoma are preserved, the opisthosoma is strongly deformed and flattened, probably sucked out, turned upwards, its posterior part with the spinnerets is lost, most leg articles are folded, both pedipalpi and both legs I-II are complete and rather well observable. According to the preservation of the spider as well as the possible existence of digestive fluid (see below) it appears likely to me that the male has been the prey of a conspecific - cannibalistic – female, see above the chapter on palaeo-behaviour. – Syninclusions: A flattened and folded structure (originally probably a bubble), 4 mm long, is preserved right above the prosoma of the spider. It may well be the dried out remain of digestive fluid from the predatory female; see above. Also preserved are 1 Acari, 1 Coleoptera, spider threads at the margin of the piece of amber, small plant hairs and detritus.

Diagnostic characters: See above.

Description (♂):
Measurements (in mm): Body length ca. 5.5; prosoma: Length ca. 2.3, width almost 2.5; femur I: ca. 2.5, tibia I ca. 2.3; pedipalpal tibia ca. 2.3, bulbus with embolus 1.0.
Colour mainly medium brown, opisthosoma dark grey.

Prosoma probably wider than long, not wrinkled, bearing only few hairs, margin with strong teeth (fig. 1), probably 8 eyes which are partly hidden, fovea hidden, remains of the chelicerae strongly deformed, mouth parts and sternum hidden. – Legs of medium length, hairs indistinct, scopulae, mating spines, claw tufts and thickened trichobothria absent, few short bristles (most bristles may be rubbed off), trochanter to metatarsus I bear rows of pro- and retroventral bristles (fig. 2), unpaired tarsal claw existing, paired tarsal claws IV: proclaw smooth, retroclaw with a single long tooth. – Opisthosoma strongly deformed (see above), hairs short, dorsal scutum absent. - Pedipalpus (deformed, figs. 3-4, photo; see also above) with quite long and slender articles, leg-like, almost 1 ½ times as long as the body, only the tibia is fairly thickened, it bears long ventral hairs, cymbium apparently bilobed.

Relationships: See above.

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

Family **HEXATHELIDAE** SIMON 1892

A sure proof of the family Hexathelidae in Burmite is still absent. The rarity of adult spiders of this family and its unsure diagnosis are explanations for the uncertainty, see WUNDERLICH (2017: 33, 36-38). In the present specimen the posterior spinnerets are relatively short – shorter as in most extant Hexathelidae -, 3 pairs of spinnerets exist and the basal cheliceral articles are quite robust.

?Hexathelidae indet. (figs. 5-6), photo 3

Material: 1 juv. in Upper (Mid) Cretaceous Bumite, F3648/BU/CJW.

Preservation and syninclusions: The spider is well preserved in a clear yellow-orange piece of amber, the distal parts of both pedipalpi and of the left legs I-II are cut off, and most ventral parts of the prosoma including the mouth parts are hidden by an unknown particle which is partly cut off. – Syninclusions: A Coleoptera, few tiny plant hairs and particles of detritus.

Short description (juv.):
Measurements (in mm): Body length 2.6; prosoma: Length 1.4, width 1.0; opisthosoma: length 1.4, width 1.0; leg I: Femur at least 1.0, patella ca. 0.55, tibia ca. 0.95, metatarsus 0.55, tarsus ca. 0.55, tibia III ca. 0.5, tibia IV ca. 0.8; length of an anterior spinneret 0.15, length of a posterior spinneret 0.7.
Colour: Prosoma and legs dark brown, opisthosoma light grey.
Prosoma (fig. 5, photo) 1.4 times longer than wide, smooth, cephalic part only very slightly raised, fovea transverse and straight, 8 eyes in two rows in a wide field, basal cheliceral articles quite robust, distinctly protruding, rastellum absent. – Legs (photo) stout, hairs indistinct, bristles numerous, long and very thin, trichobothria not studied, unpaired tarsal claws well developed, paired claws toothed. – Opisthosoma (fig. 6, photo) 1.4 times longer than wide, fairly hairy, scuta absent, three pairs of spinnerets, the medians tiny, the posteriors fairly long.

Relationships and distribution: See above.

ARANEOMORPHA

PLESION: **MEGASETIDAE** WUNDERLICH **n. fam**. (figs. 7-10), photo 4

Etymology: See the type genus.

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

Diagnostic characters (♀; ♂ unknown): Unpaired tarsal claw (fig. 10) much larger than paired claws, legs without true bristles but bearing numerous quite strong setae (fig. 9, photo), at least metatarsus I bearing long ventral sensory hairs which may be trichobothria (fig. 9), claw of the pedipalpus well developed, spinnerets set forewards, number and position of most eyes unknown, feathery hairs, femoral and tarsal trichobothria, calamistrum, pectunculus and cheliceral condylus absent, prosoma modified (see below), like the opisthosoma bearing short bristles (fig. 7), opisthosoma (fig. 7, photo) distinctly wider than long, bearing paired humps and outgrowths, basal cheliceral articles bearing long and pointed apical hairs (fig. 8), body length 3.6 mm.

Basic characters: Cheliceral position araneomorph, ecribellate, position of the legs prograde, I do not want to exclude the existence of an onychium (fig. 10).

Close **relationships** of this peculiar taxon are enigmatic (besides the membership of the Araneomorpha). Unfortunately the eye region as well as the genital area are hidden, and a congeneric male is unknown. The following combination of characters may indicate relationships to the superfamily Araneoidea and less to the branch Synspermiata (in which the unpaired tarsal claw is reduced!): Absence of cribellum, feathery hairs, tarsal trichobothria and a pectunculus. True leg bristles are absent in several taxa of the Araneoidea, too, but also in the Synspermiata, especially in certain members of the Pholcomorpha, see WUNDERLICH (2020: 58). Short bristles of the body exist in the extant genus *Sicarius* WALCKENAER 1847 (family Sicariidae); in this genus the fangs are stout, the tarsal claw of the ♀-pedipalpus is reduced, the spinnerets are not set forwards and the structures of legs and opisthosoma are different.- The shape of the opisthosoma is strikingly similar to the extant North American *Colphepeira catawba* (BANKS 1911) of the family Araneidae of the superfamily Araneoidea (fig. 11), in which a cheliceral condylus ("boss") is absent, too, but other structures are quite different, and the opisthosoma is usually overhanging the prosoma. *Colphepeira* shows a remarkable case of convergent development. A modified and posteriorly wide opisthosoma evolved convergently in several Araneidae as well as in other spider families, e. g., in the Thomisidae of the RTA-clade. A modified opisthosoma also exists in certain members of the superfamily Deinopoidea in which all or almost all taxa are cribellate, see tab. 2 p. 107. – The huge unpaired tarsal claw (fig. 10) – existing on all legs of *Megasetae* – is of special interest. Remarkably, a distinctly enlarged UNPAIRED tarsal claw also exists in certain taxa of the superfamily Araneoidea, e. g., in the family Theridiidae, like in the subfamily Argyrodinae and in some Pholcommatinae. - Megasetidae may be the member of an ancient branch of araneomoph spiders which possesses certain characteristics/similarities of the superfamily Araneoidea.

Life style: The extreme rarity in amber may indicate that *Megasetae* was not a dweller of higher strata of the vegetation but a ground dweller – or it was a very old relic taxon of the Mid Cretaceous. Its anterior legs are fairly robust, and I do not want to exclude that it was a sit-and-wait predator. The function of the huge unpaired tarsal claw - existing on all legs - is unclear and may indicate more a capture web dwelling behaviour. This tarsal claw is quite different from the "raptorial" claw of only a paired claw of leg I of the extant Trogloraptoridae.

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

Megasetae WUNDERLICH **n. gen**.

Etymology: The name refers to the large cheliceral bristles and the strong leg hairs, from mega- (gr.) = large and seta (lat.) = hair, bristle.

The gender of the name is feminine.

Type species (by monotypy): *Megasetae colphepeiroides* n. sp.

Diagnostic characters, relationships and distribution: See above.

Megasetae colphepeiroides WUNDERLICH **n. gen. n. sp**. (figs. 7-10), photo 4

Etymology: The species name refers to the shape of the opisthosoma which is similar to the extant areneid taxon *Colphepeira catawba* (BANKS 1911) of North America (fig. 11).

Material: Holotype ♀ in Upper (Mid) Cretaceous Burmite, F3627/BU/CJW.

Preservation and syninclusions: The spider is complete and partly only fairly well preserved in a fairly clear yellow-orange piece of amber, its legs are strongly deformed and – except the left leg II – are bent under the body, the chelicerae are squeezed anteriorly by pressure of the fossil resin, the anterior part of the prosoma including most eyes – except the eyes in the anterior median position (fig. 7) – is hidden by an emulsion, few fissures in the amber exist on, below and near the spider's body. – Syninclusions are a tiny juv. and badly preserved Araneae indet., a tiny Coleoptera, a tiny Hymenoptera, a tiny worm-shaped questionable animal right to the spider's opisthosomal end, several tiny plant hairs, insect excrement and tiny particles of detritus.

Diagnostic characters and relationships: See above.

Description (♀):
Measurements (in mm): Body length 3.6; prosoma: Length 1.3, width 1.3; opisthosoma: Length 2.0, width 3.6; leg I: Femur ca. 1.0, patella ca. 0.55, tibia ca. 0.9, metatarsus ca. 0.9, tarsus ca. 0.5; leg II: Femur ca. 1.0, patella ca. 0.5, tibia ca. 0.9, metatarsus ca. 0.8 tarsus ca. 0.5; tibia III ca. 0.6, tibia IV ca. 0.8.
Colour medium brown, legs not annulated.
Prosoma (figs. 7-8, photo) as wide as long, not flattened, with a transversal depression behind the eye region and a longitudinal small thoracal furrow, covered with numerous quite short bristles, most eyes hidden, only a pair in a median position is fairly well observable, see the fig. Chelicerae large, depressed anteriorly by pressure of the fossil resin in an unnatural position; lateral files and position of a median lamella not observable; teeth of the fang furrow hard to observe, the anterior margin of the fang furrow may bear some thick teeth; anteriorly subapically long, slender, pointed and almost straight bristles ("megasetae") existing, fangs long and strong, most parts of the mouth parts and sternum hidden. – Pedipalpus rather large, tarsal claw well developed, difficult to observe. – Legs (figs. 9-10, photo) stout, prograde, order I/II/IV/III, I fairly robust, femur I not distinctly thickened, coxae IV very close together, tarsi distinctly shorter than metatarsi, bristles absent but numerous strong hairs ("megasetae") exist, feathery hairs, femoral and tarsal trichobothria absent, position of the metatarsal trichobothria unsure, probably near the middle (fig. 9). At least metatarsus I bears several long ventral sensory hairs (questionable trichobothria), onychium probably existing, serrated questionable "auxiliary" hairs exist, tarsal claws long, I did not observe the existence of teeth on the well observable left claw II, unpaired claw on all legs unusually large, much longer than the paired claws, and strongly bent. – Opisthosoma (fig. 7, photo)

1.8 times wider than long, bearing dorsally and ventrally numerous fairly thin and short bristles, not hairy, dorsally probably leathery and bearing at least three pairs of sigillae, posteriorly strongly widened and bearing a pair of lateral humps consisting of five pointed outgrowths; a second pair of lateral outgrowths exists in the middle of the length of the opisthosoma and a third – undivided – pair ventrally near the posterior spinnerets. Anal tubercle large, bearing a row of ca. 8 bristles. Three pairs of stout spinnerets which are partly hidden, close together, set forewards near the middle of the opisthosoma. Genital area partly hidden; I did not observe structures.

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

Family **BURMORSOLIDAE** WUNDERLICH 2015

With notes on the family Segestriidae

At least 8 species of this family occurred in the Burmese amber forest but according to indet. specimens the number of species was surely higher.
New material of the Burmorsolidae – especially the male of *Burmorsolus longitibia* n. sp. which possesses a dense claw tuft (fig. 18) and is regarded as the first known male of the genus *Burmorsolus* - lead me to new conclusions concerning this family:

(1) A sexual dimorphism based on different structures of the tarsal claws and their tufts does not exist; see below as well as WUNDERLICH & MÜLLER (2020: 81).

(2) In my opinion two genera exist: *Burmorsolus* WUNDERLICH 2017 (= *Pseudorsulus* **n. syn**.) in which dense claw tufts exist, figs. 16-18, and *Loxoderces* WUNDERLICH 2017 in which a dense claw tuft is absent, figs. 13-14.

(3) According to their chaetotaxy, the shape of the chelicerae and the structures of the male pedipalpus both genera are closely related and are not members of different subfamilies or tribes.

Emended diagnostic characters: Basal cheliceral articles (fig. 12) usually quite long, distinctly protruding, slender, not connected, diverging distally and without a medial lamina, fovea absent, paired tarsal claws with a single row of teeth, unpaired tarsal claw recognizable in *Loxoderces* (fig. 14), hidden by a tuft or probably absent in *Burmorsolus* (fig. 17), onychium with a strongly SCLEROTIZED STRUCTURE which may

bear dense tufts of hairs which may be more or less spatulate (*Burmorsolus*, figs. 16-18) or bear few hairs (in *Loxoderces*, figs. 12-13), leg bristles (fig. 15) usually (see below!) numerous, long and slender; pedipalpus (figs. 12, 19-20): Articles long and rather slender, CYMBIUM VERY LONG, bulbus simple (no conductor), attached basally on the cymbium, EMBOLUS DIRECTED BACKWARDS (basally) in the not expanded bulbus.

Further characters: Ecribellate, six eyes in a "segestriid position" (fig. 12), colour of body and legs light brown or orange-yellowish, anterior margin of the fang furrow bearing several large teeth, posterior margin with at least a single tooth, position of leg III variable due to the preservation, occasionally directed foreward but their position of living spiders remains unknown; leg bristles also quite variable: Usually few bristles in an irregular position but none on tibia and metatarsus I-II, e. g., in *Loxoderces longicymbium* WUNDERLICH 2017, leg scopulae absent, position of the metatarsal trichobothrium near the end of the article, tarsal organ not exposed, shape of the opisthosoma oval (not cylindrical), tarsus of the female pedipalpus with a well developed claw.

The **relationships** of the Burmorsolide are unsure. PROBABLY the extant family Trogloraptoridae GRISWOLD 2012 is related, and both families may be regarded as members of the superfamily Burmorsoloidea, see WUNDERLICH (2020). - Dense claw tufts within the Synspermiata exist also, e. g., in the extant family Orsolobidae in which the tarsal organ is exposed and the paired tarsal claws bear usually two rows of teeth, see FORSTER & PLATNICK (1985). - Members of the family Segestriidae are SIMILAR to the Burmorsolidae in certain respect but the colour of body and legs is dark in the Burmorsolidae, tibia and metatarsus I-II bear PAIRED ventral bristles, a distinctly sclerotized structure of the onychium is absent (*), the shape of the opisthosoma is cylindrical in extant Segestriidae but oval in Cretaceous confamiliar members in Burmite like in the Burmorsolidae (!). The position of leg III depends usually strongly from the preservation, it is rarely directed foreward in the Burmorsolidae, but it is clearly directed foreward, in certain fossil Segestriidae, e.g. in holotype and paratype of *Parvosegestria triplex* WUNDERLICH 2015, in Segestriidae indet. F2930/BU/CJW in Burmite, in the holotype of *Magnosegestria tuber* WUNDERLICH 2020 in Burmite as well in *Jordansegestria amissiocoli* (WUNDERLICH 2008) holotype and F2208/BU/CJW in Jordanian amber. The tip of the embolus is not directed backwards in the Segestriidae. Because of the great number of differences I regard the Burmorsolidae and the Segestriidae as not closely related. - The family Plumorsolidae WUNDERLICH 2008, known from Lebanese amber, is not related to the Burmorsolidae, see WUNDERLICH (2020: 81).

(*) Except the sclerotized structure of the onychium the tip of the tarsus of most Segstriidae - e.g., of *Parvosegestria* sp. indet., F3505/BU/CJW in Burmite, – is quite similar to members of the genus *Loxoderces* of the Burmorsolidae.

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

List of the taxa:

(a) *Burmorsolus*: *crassus* WUNDERLICH 2015 (♀) (under Plumorsolidae: Burmorsolini), *longitibia* n. sp. (♂), *nonplumosus* WUNDERLICH 2015 (♀) (under Plumorolid-

ae: Burmorsolini); (*nonplumosus*: WUNDERLICH 2017, ♀: F2898/BU/CJW and F2930/BU/CJW, sp. indet., ♀: F3659/BU/CJW (see below) and F3665/BU/CJW).

(b) *Loxoderces*: *curvatus* WUNDERLICH 2017 (♂), *globosus* (WUNDERLICH 2020) (♂) (under *Burmorosolus*), *longembolus* (WUNDERLICH 2020) (♂), *longibulbus* (WUNDERLICH 2020) (♂), *rectus* WUNDERLICH 2017 (♂) (under Eopsilodercidae); (sp. indet. (♀): F3501, F3502, F3504 and 3532/BU/CJW).

Burmorsolus longitibia WUNDERLICH **n. sp.** (figs. 18-20)

Etymology: The species name refers to the long pedipalpal tibia, from longus (lat.) = long.

Material: Holotype ♂ in Upper (Mid) Cretaceous Burmite, F3666/BU/CJW.

Preservation and syninclusions: The spider is incompletely and fairly well preserved in a clear yellow-orange piece of amber, the left tarsus and metatarsus II and the leftleg IV through the femur are cut off, most eyes are hidden by the right pedipalpus, bubbles cover both sides of the opisthosoma, the femur of the left pedipalpus is strongly lengthened by the preservation (fig. 20). - Syninclusions are remains of two small Diptera: Nematocera; one of these, ca. 1 mm long, is preserved between the left pedipalpal patella, the left tarsus III and the left tibia I. This insect may have been the prey of the spider; it is not spun in in spiders threads.

Diagnosis (♂; ♀ unknown): Pedipalpus (figs. 19-20): Tibia ca. 1.4 mm long, ca. 6.8-7.4 times longer than wide, embolus shorter than the bulbus.

Description (♂):
Measurements (in mm): Body length 2.6; prosomal length ca. 1.2; opisthosomal length 1.6; leg I: Femur 2.5 (diameter 0.27), patella 0.75, tibia 3.3, metatarsus ca. 3.0, tarsus ca. 0.8, tibia II ca. 2.5, tibia III 1.6, tibia IV ca. 2.0; right pedipalpus: Femur 1.5 (diameter 0.13), patella 0.5, tibia 1.3 (diameter 0.19); left pedipalpus: Femur 1.9 (diameter 0.08-0.13), tibia 1.4 (diameter 0.19).
Colour light brown, legs not annulated.
Prosoma (parts are hidden) longer than wide, bearing short hairs, basal cheliceral articles long and protruding, fangs well developed. - Legs (fig. 18) long and rather slender, order I/II/IV/III, I distinctly the longest, almost 4 times the length of the prosoma, hairs short and indistinct, bristles numerous and long, leg I: Femur 1 dorsally-basally 1, 1 pair in the middle and a distal pair, patella 1/1 hair-shaped dorsal bristles (like in the remaining patellae), tibia ca. 10 ventrally and laterally, metatarsus at least 8 dorsally, laterally and ventrally, tarsus none, position of the metatarsal trichobothria unknown, at least two tarsal claws (a third claw may be hidden by the claw tuft), claw tufts very dense, onychium with a sclerotized apophysis. - Opisthosoma partly hidden, bearing short hairs, most spinnerets hidden, the anteriors long. - Pedipalpus (figs. 19 -

20) deformed, with long articles (see above), bulbus pear-shaped, embolus thin, shorter than the bulbus.

Relationships: In the related species the the pedipalpal femur and patella are relatively and absolutely shorter.

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

Burmorsolus sp. indet.

Material: 1♀ in Upper (Mid) Cretaceous Burmite, F3559/BU/CJW.
The colour of body and legs of the spider are medium grey brown like in *B. crassus* WUNDERLICH 2015, probably darkened by natural heating, the body length is ca. 4 mm, the basal cheliceral articles are 0.4 mm long, the fangs are large, ca. 0.15 mm long, a small fovea exists apparently, tibia I bears three pairs of ventral bristles, the position of the trichobothrium of the right metatarsus II is in 0.95, the leg bristles are very long and strong, the paired tarsal claws bear at least a dozen partly quite long teeth, the claw tufts are very dense and divided medially, a sclerotized apophysis of the onychium exists

Family **EOPSILODERCIDAE** WUNDERLICH 2008

Propterpsiloderces WUNDERLICH 2012

In this genus exists a long proapical cymbial bristle in contrast to the retrolateral cymbial bristle of *Priscaleclercera* of the Psilodercidae. According to I. MAGALHAES (person. commun.) *Propterpsiloderces* may represent a stem lineage of the Scytodoidea.
Four species of this extinct genus in Burmite have been described; here a further species is described:

Propterpsiloderces similis WUNDERLICH **n. sp**. (figs. 20-21)

Etymology: The species name refesr to the similarity with *P. crassitibia* WUNDERLICH 2017, from simile (lat.) = similar.

Material: Holotypus ♂ in Upper (Mid) Cretaceous Burmite, F3552/BU/CJW.

Preservation and syninclusions: The spider is fairly well preserved in a clear yellow-orange piece of amber; the right leg I is loose preserved near a bubble of a boring shell right of the spider, the right leg II is lost by autotomy beyond the coxa, the peltidium is almost complete, the opisthosoma is strongly deformed and dorsally declined, the spinnerets are strongly deformed. – Syniclusions are an Acari, a part of an arthropod near a bubble of a boring shell and particles of detritus, e. g., above/behind the field of the eyes.

Diagnostic characters (♂; ♀ unknown): Pedipalpus (figs. 20-21): Tibia quite thick, cymbium bearing a small apical bristle, embolus strongly bent.

Description (♂):
Measurements (in mm): Body length 1.7; prosoma: Length ca. 0.9, width ca. 0.75; leg I: Femur 1.5, patella ca. 0.4, tibia 1.2, metatarsus ca. 1.2, tarsus ca. 0.45, tibia III ca. 0.75, tibia IV. 1.1.
Colour light brown, legs apparently not annulated.
Prosoma 1.2 times longer than wide, bearing several long and bristle-shaped hairs which are only fairly completely preserved on the left side of the cephalic part, fovea absent, eyes hidden, basal cheliceral articles quite large, fangs long, mouth parts deformed or hidden, sternum wide. – Legs rather long, hairs numerous, partly long and bristle-shaped, bristles absent, position of the metatarsal trichobothrium in ca. 0.75, three tarsal claws, paired claws toothed. – Opisthosoma incomplete, bearing long hairs. - Pedipalpus (figs. 20-21): Patella short, tibia strongly thickened, cymbium longer than wide, bearing a long prolateral bristle and a small apical-dorsal bristle, bulbus small, embolus strongly bent.

Relationships: In *P. crassitibia* WUNDERLICH 2020 the pedipalpal tibia is not so thick as in *similis*, an apical cymbial bristle is absent and the shape of the embolus is different.

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

Family **TETRABLEMMIDAE** O. PICKARD-CAMBRIDGE 1873 s. l.

See WUNDERLICH (2017: 116f), WUNDERLICH & MÜLLER (2020: 86f).

In this paper we regard the family in a wide sense but several authors - e. g., DEELEMAN-REINHOLD (1980) - consider both of its subfamilies - Pacullinae and Tetrablemminae - as families of their own.
Tetrablemmidae is a tropical family which is frequent today in South East Asia - see, e. g., the pioneer work by LEHTINEN (1981) -, and was already very frequent in the Cretaceous Burmese amber forest; I know 14 genera, see the list below. In Burmite the diversity of both subfamilies is similar to the fauna of today in which the subfamily Tetrablemminae is distinctly more diverse.
Tetrablemmidae are bristle-less and – most often, except two genera of the Pacullinae, see below! - strongly armoured spiders in which the opisthosoma bears dorsal, ventral AND LATERAL plates (figs. 23, 37, 54).
The lateral opisthosomal plates are usually fragmented (but see *Alticorona* n. gen., fig. 54); dorsally usually a large single scutum exists but very rarely only microplates exist like in *Perania* THORELL, see DEELEMAN-REINHOLD (1980: 66). Dorsal microplates and dorsal pits may even be absent, see below, the extinct tetrablemmine females sp. Indet. F2938/BU/CJW and F3464/BU/CJW. – Certain Tetrablemmidae are tiny spiders, body length only 0.9 mm in Burmite, almost 2 mm in extant species, the largest specimens in Burmite – a questionable sp. indet. of the genus *Furcembolus* (F3654, see below) – is ca. 5 mm long, the largest extant species is more than 13 mm long. Modifications of the prosoma (figs. 39, 51-55, 59, 66) are frequent in this family, more frequent in the Tetrablemminae.

In this paper I provide a key to the tetrablemmid genera in Burmese amber and describe three new genera and few females indet. as well.

Synonymy of genera in Burmite (Kachin amber):

Brignoliblemma WUNDERLICH 2017 = *Electroblemma* SELDEN et al. 2016,
Eoscaphiella WUNDERLICH 2011 = *Eogamasomorpha* WUNDERLICH 2008 (**n. syn**.), see below,
Praeterpaculla WUNDERLICH 2015 = *Furcembolus* WUNDERLICH 2008.

List of the genera and species of the family Tetrablemmidae in Kachin amber known at the end of 2020:

Alticoroma WUNDERLICH **n. gen**.
planfemur WUNDERLICH **n. sp**.
Bicornoculus WUNDERLICH 2015
granulans WUNDERLICH 2020, *levis* WUNDERLICH 2015
Cymbioblemma WUNDERLICH 2017
corniger WUNDERLICH 2017, *fusca* WUNDERLICH 2020, *hamoembolus* WUNDERLICH 2020
Electroblemma SELDEN et al. 2016 (= *Brignoliblemma* WUNDERLICH 2017)
bifida SELDEN et al. 2016, *bifurcata* WUNDERLICH 2020, *bizarre* WUNDERLICH 2017, *caula* WUNDERLICH 2020, *nala* WUNDERLICH 2017, *paranala* WUNDERLICH 2017, *pinnae* WUNDERLICH 2020
Eogamasomorpha WUNDERLICH 2008 (= *Eoscaphiella* WUNDERLICH 2011)
clara WUNDERLICH 2015, *hamata* WUNDERLICH 2017, *nubila* WUNDERLICH 2008, *ohlhoffi* (WUNDERLICH 2011) (n. comb.), *rostratis* WUNDERLICH 2020
Furcembolus WUNDERLICH 2008 (= *Praeterpaculla* WUNDERLICH 2015)
andersoni WUNDERLICH 2008, *armatura* (WUNDERLICH 2015), *biacutus* (WUNDERLICH 2015), *crassitibia* WUNDERLICH 2017, *dissolatus* (WUNDERLICH 2015), *equester* (WUNDERLICH 2015), *grossus* WUNDERLICH 2017, *longior* WUNDERLICH 2017, *tuberosus* (WUNDERLICH 2015), questionable sp. indet.: See below
Longissithorax WUNDERLICH 2017
myanmarensis WUNDERLICH 2017
Longithorax WUNDERLICH 2017
furca WUNDERLICH 2017
Palpalpaculla WUNDERLICH 2017
pulcher WUNDERLICH 2017
Procerclypeus **n. gen**.
deformans **n. sp**.
Saetosoma WUNDERLICH 2012
filiembolus WUNDERLICH 2012
Tenuicephalus **n. gen**.
penicillus **n. sp**.
Unicornutiblemma WUNDERLICH 2020
brevicornis WUNDERLICH 2020, *gracilicornis* WUNDERLICH 2020, *longicornis* WUNDERLICH 2020, *unicornis* WUNDERLICH 2017 **n. comb**. (under ?*Eogamasomorpha u.*)
Uniscutosoma WUNDERLICH 2015
aberrans WUNDERLICH 2015

Key to the genera of the family Tetrablemmidae in Burmese amber:

Notes: The females of most genera are not or only insufficiently known. In the present fossil genera only six eyes exist, (a) in a wide field (figs. 31, 42) or (b) in a compact group on a large erect outgrowth (figs. 51-55, *Alticorona* and *Electroblemma,* see no. 4).

1 Posterior half of the prosoma and anterior part of the opisthosoma dorsally covered with long hairs (fig. 34), body length 0.9 mm, ♂-pedipalpus with long and thin embolus (fig. 35). – *S. filiembolus* WUNDERLICH 2012. .....*Saetosoma*

- No long hairs in this position, body length 1-5 mm 2

2(1) Body length 3-5 mm, metatarsi 2-3 times longer than tarsi, the opisthosoma may bear small humps (fig. 23); ♂-pedipalpus as in figs. 26-28 (= *Praeterpaculla*). Nine species. ..... *Furcembolus*

- Body length ca. 1-2.3 mm, metatarsi rarely very much longer than tarsi, opisthosomal humps absent 3

3(2) Prosoma strongly raised to a stalk, bearing a compact eye field (figs. 51-55) 4

- Prosoma not strongly raised, bearing the eyes in a wide ("segestriid") field (figs. 31, 42) 5

4(3) ♂: Leg I: Femur thick, tibia with a single ventral clasping spur (fig. 54), cephalic outgrowth large (fig. 54), opisthosoma with a very large ventral scutum and a small posterior scutum (fig. 56); pedipalpus as in figs. 57-58. – *A. plenfemur* ……. *Alticorona*

- ♂: Leg I: Femur not thickened, tibia usually with a pair of ventral spurs (rarely a single spur) (fig. 49), cephalic outgrowth slender (figs. 51-52). (= *Brignoliblemma*) – Few species ……..……..…. *Electroblemma*

5(3) Opisthosoma dorsally not covered with an entire scutum but bearing numerous small plates (fig. 30), tarsi very short (as in *Furcembolus*), structures of the bulbus unknown. – *U. aberrans* (*) .....*Uniscutosoma*

- Opisthosoma usually completely covered with a dorsal scutum (fig. 37), only the anterior quarter may be free, length of the tarsi variable 6

6(5) Clypeus with two pairs of "horns" in a transverse row (fig. 45); ♂-pedipalpus (fig. 46) with a very thick tibia. - *C. corniger* .....*Cymbioblemma*

- Clypeus without or with a single pair of "horns" (fig. 66) 7

- Clypeus with a single "horn" (figs. 38, 40); pedipalpus as in figs. 39, 41 ..... …..... *Unicornutiblemma*

7(6) Clypeus bearing a pair of long "horns" which bear long setae (fig. 66); ♂-pedipalpus (fig. 67): Cymbium very long, bulbus with a long, slender and bent embolus. – *T. penicillus.* – Compare *Procercypeus,* figs. 62-65.....*Tenuicephalus*

- Clypeal "horns" absent. Embolus partly tube-shaped (fig. 48). - *P. pulcher* .... *Palpalpaculla*

- Clypeal "horns" absent. Embolus different 8

8(7) Embolus thin or almost so (**), additional sclerites absent (figs. 36, 44) 9

- Embolus thick, frequently bulbus bearing apophyses (figs. 33, 43) 10

9(8) Prosoma ca. 1.8 times longer than wide, cheliceral “horns” absent; ♂-pedipalpus as in fig. 44. - *L. myanmarensis* .....*Longissithorax*

- Prosoma up to 1.6 times longer than wide. (= *Eoscaphiella*) (**). – Several species. ..... *Eogamasomorpha*

10(8) Anterior lateral eyes placed on projections at least in *B. levis* (fig. 31); ♂-pedipalpus (fig. 33): Cymbium not strongly divided. – *B. granular* and *levis* …. *Bicornoculus*

- No such eye projections, prosoma very long and slender (fig. 42); ♂-pedipalpus (fig. 43): Cymbium strongly divided. – *L. furca* .....*Longithorax*

(*) in the original description of the holotype I noted and figured the existence of two pairs of clypeal “horns” which I now regard as artefacts.

(**) A distinctly protruding clypeus exists also in ?*Eogamasomorpha hamata* WUNDERLICH 2017 in which the embolus probably is deformed

SUBFAMILIES

The infrafamiliar taxonomic relationships of the Tetrablemmidae still appear not quite clear to me. Following the traditional use two subfamilies - Pacullinae and Tetrablemminae - are distinguished which are elevated to family rank by certain authors like DEELEMAN-REINHOLD (1980). In my opinion – according to the strong variability of the copulatory structures (see *Palpalpaculla* WUNDERLICH 2017 and *Procerclypeus* n. gen.), number and position of the eyes and the pattern of the opisthosomal scuta - a further unnamed high taxon - of a subfamily rank? - may exist.
Surely reported genera in Burmite are *Furcembolus* of the Pacullinae and, e. g., *Eogamasomorpha* of the Tetrablemminae. According to the provisional opinion of IVAN MAGALHAES - see WUNDERLICH & MÜLLER (2020: 87) - the genera *Palpalpaculla* and *Uniscutosoma* may be members of the Pacullinae but not of the Tetrablemminae.

SHEAR (1978: 4) and LEHTINEN (1981: 10-11) compared characters of both subfamilies. In my opinion most characters listed are variable and overlapping - see WUNDERLICH & MÜLLER (2020: 86-87) -, and not restricted to one of the subfamilies; a weak exception is the body size. The existence of lateral prosomal files (fig. 24) was not taken into consideration by LEHTINEN (1981), other characters like the deposition of the cocoon (egg sac) or modification of the clypeus - are incorrectly listed; the cocoon may be carried by females with their chelicerae in certain Pacullinae but are fixed in their web in others, e. g., by *Perania egregia*; see SCHWENDINGER (2013: 615). According to SHEAR (1978: 4) in the members of the Pacullinae - in contrast to the Tetrablemminae - the sternum bears posterior projections but such projections are completely absent in the paculline genus *Mirania* LEHTINEN 1981: 17 and in the Pacullinae indet. F3664 (see below); in *Perania* exists only a “round knob”. In fossil Pacullinae in Burmite I found distinct posterior sternal projections in males of *Furcembolus andersoni* (F2301) as well as in the holotypes of *crassitibia* and *longior*, in which the sternum is well observable.

To my current knowledge two characters are not overlapping, well linked with each other and therefore probably best to **diagnose provisionally these subfamilies**:
(a) the body size: 0.9 to 2.3 mm in the Tetrablemminae but most often 3 up to more than 13 mm in extant Pacullinae (rarely 2.4 mm - the probably adult fossil ♀ F3664 below – up to 5 mm: F3654, see below, in other present fossils).
(b) the existence of lateral (stridulatory?) files of the cephalic part (fig. 24) (*): Absent in the Tetrablemminae but - probably basically - existing (in my opinion lost in few taxa) and surely reported in the Pacullinae: The genera *Lamania, Perania* and *Sabahya* as well as in extinct Pacullinae: A questionable member of the genus *Furcembolus* of the Burmese amber forest, F3655/BU/CJW, see below (fig. 24).

(*) A counterpart to these files like prolateral picks of the pedipalpal femur is unknown; I did not find a counterpart in both sexes of the extant species *Lamania gracilis* SCHWENDINGER 1989 nor in the present fossils. Interestingly such prosomal - surely stridulatory - files exist in a quite similar position (!) in the extant genus *Citharoceps* CHAMBERLIN 1924 of the family Segestriidae which is a member of the Synspermiata, too; the function of these files in *Citharoceps* is linked with stridulatory picks of the pedipalpal femur.

USUALLY in the Pacullinae the body is stronger pitted than in the Tetrablemminae, and the position of the metatarsal trichobothrium is more distal, usually in the distal half but most often in the basal half in the Tetrablemminae; modifications (“horns”) of the prosoma are much rarer, anterior “horns” of the basal cheliceral articles are absent in the Pacullinae; 6 eyes exist in all taxa in a “segestriid position” of the Pacullinae as in fig. 40; in the Tetrablemminae 0, 2, 4 or 6 eyes in a wide field or in a compact group exist; the legs are longer and more slender in the Pacullinae, the tarsi - compared with the metatarsi - are shorter (see the new taxa below); the more slender legs and the relatively shorter tarsi may be caused by allometric growth; the structures of the bulbus are usually more complicated and the embolus thick but the embolus is USUALLY thin in the Tetrablemminae, the bulbus may be more simple and a conductor is frequently absent.

DESCRIPTIONS OF THE TAXA

(1) SUBFAMILY PACULLINAE

A typical subfamily character are the lateral prosomal files (fig. 24), see above and below: the description of a paculline female F 3655/BU/CJW.

The only known genus in Burmite is *Furcembolus* WUNDERLICH 2008. Nine species are described, see WUNDERLICH (2017: 128-131). According to the diverse opisthosomal scuta and the structures of the cuticula the genus is probably not monophyletic.

The relationships of *Furcembolus* are unsure. In the - apparently most related - Peranini LEHTINEN 1981 (the extant genera *Mirania* LEHTINEN 1981 and *Perania* THORELL 1890 from South Asia) the opisthosomal scuta are strongly reduced, the prosoma usually bears strong “horns”, the male leg I bears ventral spicules, the cymbium is unmodified, and the shape of the bulbus is similar but in *Furcembolus* the opisthosomal scuta are NOT STRONGLY reduced - see the female indet. F3654 below -, prosomal “horns” and leg spicules are absent.

Here we describe two females sp. indet. which are questionable members of *Furcembolus* and of a Paculline indet. F3664/BU/CJW.

F3654/BU/CJW, 1♀, photo 10. Most parts of the spider are very well preserved in a yellow-orange piece of amber; a 0.1 mm long beetle is preserved ventrally close to the chelicerae. This tiny Coleoptera indet. may be to small to be the prey of the spider and is not covered by threads. The female is a large specimen which possesses quite short tarsi compared with the metatarsi, see below. - Measurements (in mm): Body length 5.0, prosomal length 2.0; leg I: Tibia ca. 1.8, metatarsus ca. 1.8, tarsus 0.6; leg IV: Femur 2.8, patella 0.8. - The colour is dark brown, “horns” of the clypeus and of the chelicerae are absent, the position of the metatarsal trichobothrium is unknown. The dorsal opisthosomal scutum is large but absent in the anterior quarter in which tiny plates exist, the ventral part of the opisthosoma is partly deformed, a quite large scutum around the spinnerets exists. The genital area is strongly sclerotized and fairly protruding. – Relationships: According to the large body I regard the present female probably to be a member of the genus *Furcembolus* WUNDERLICH 2008 of the Paculline; see above, the relationships of *Furcembolus*.

F3655/BU/CJW, photo 11, 1♀-exuvia, apparently of a subad. specimen; see below, the strongly protruding genital area. The orange piece of amber is full of numerous tiny (microscopical) “bubbles”. The peltidium of the spider is placed behind the remains of the opisthosoma (photo), far behind the rest of the prosoma and most leg articles, the distal part of the left tarsus IV is lost, the right pedipalpus and most parts of the chelicerae and left pedipalpus are cut off, the peltidium is completely and very well preserved. – Measurements (in mm): Body length probably about 3.5, prosomal length 1.7, left leg II: Femur 1.5, patella 0.4, tibia 1.1, metatarsus 1.1, tarsus 0.55. – The light brown cuticula is finely corniculate, the cephalic part is only slightly raised, 6 large eyes exist in 3 diads, laterally a field of files exists (fig. 24) like in other Pacullinae and in *Citharoceps* (Segestriidae), see above. Probably these files possess a stridulatory function; a femoral stridulatory pick of the pedipalpus is not recognizable, probably absent, but the pedipalpus is badly preserved. The basal cheliceral articles bear a large promarginal-distal tooth (fig. 25). Legs fairly long, bristle-less, tarsi short, see above, position of the questionable metatarsal II trichobothrium in ca. 0.5. Pedipalpal claw absent. The shape of the remains of the opisthosoma is triangular, the genital area is strongly protruding. – Relationships: The only finely corniculate prosomal cuticula may indicate that the present female is probably not a member of *Furcembolus*.
Note: I did not recognize cephalic files nor femoral picks of the pedipalpus in male holotypes of *Furcembolus andersoni* (also not an the male F3301/BU/CJW sensu WUNDERLICH 2019), *armata, biacuta, crassitibialis, grossa* and *tuberosa*. Why are the prosomal files only known in this single specimen among the fossil Pacullinae in Burmite? The reasons are that these files are a bit hidden in a depression of the cephalic part as well as the excellent preservation of the almost translucent prosoma of the present female in contrast to most of the remaining known Pacullinae in Burmite which body most often is well preserved, darkened and/or deformed.

F3664/BU/CJW: 1♀ which I regard as adult because of its distinctly bulging genital area. The body length of the completely preserved spider is only 2.4 mm (!), lateral prosomal files are most probably absent, a posterior projection of the sternum is completely absent, the opisthosoma is covered with a thin emulsion, the lung covers are distinctly sclerotized but dorsal and lateral (!) opisthosomal scuta seem to be absent, the opisthosoma bears longer dorsal hairs. - Relationships: If the opisthosoma is really soft the present female may be a member of the tribe Peraniini LEHTINEN 1981 in which a sternal projection is strongly reduced; in *Mirania* LEHTINEN 1981 a posterior sternal projection is completely absent as in the present female.

(2) **SUBFAMILY TETRABLEMMINAE**

Alticorona WUNDERLICH **n. gen**.

Etymology: The name refers to the high cephalic part, from altus (lat.) = high and the crown-shaped eye humps, from corona (lat.) = crown.

The gender of the name is feminine.

Type species (by monotypy): *Alticorona plenfemur* n. sp.

Diagnostic characters (♂; ♀ unknown): Prosoma (figs. 54-55, photo) strongly raised, bearing the eyes on a pair of outgrowths, clypeus with a pair of "horns", each basal cheliceral article bearing a long UNDIVIDED "horn", femur I (fig. 55) strongly thickened, tibia I with a single ventral "clasping spur", opisthosoma ventrally bearing A SINGLE very large scutum; pedipalpus (figs. 57-58): Bulbus simple, bearing a long, flat and almost straight embolus.

Relationships: In *Electroblemma* SELDEN et al. 2016 in Burmite the cephalic part is raised in a similar way as in *Alticorona* and clypeal "horns" exist but femur I is not strongly thickened, tibia I bears A PAIR of ventral "clasping spurs" and the opisthosoma bears more than a single ventral scutum. In *Sinamma* LIN & LI 2014 (extant, China) the cephalic part is strongly raised and the femur I is strongly thickened like in *Alticorona* but clypeal "horns" are absent, tibia I is modified in a different way and the opisthosoma bears more than a single ventral scutum.

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

Alticorona plenfemur WUNDERLICH **n. gen. n. sp**. (figs. 54-58), photo 8

Etymology: The species name refers to the thick anterior femur of the holotype, from plenus (lat.) = strong.

Material: Holotype ♂ in Upper (Mid) Cretaceous Burmite, F3647/BU/CJW.

Preservation and syninclusions: The spider is incompletely and partly well preserved in a clear yellow-orange piece of amber; cut off are the tips of both areas of the eye humps as well as several articles of the legs at a layer within the amber, the pedipalpi are deformed. – Syninclusions are a 7 mm long very thin antenna and tiny articles of insects, bubbles, tiny plant hairs and particles of detritus.

Diagnostic characters and relationships: See above.

Description (♂):
Measurements (in mm): Body length 1.2; prosoma: Length 0.45, width 0.4, height 0.5; opisthosoma: Length 0.73, width 0.6, height 0.38; leg I: Femur 0.5, (width 0.14), patella 0.15, tibia >0.45; leg II: Tibia ca. 0.45, metatarsus ca. 0.28, tarsus ca. 0.24; leg IV: metatarsus 0.35, tarsus 0.32.
Colour medium brown, legs not annulated.
Prosoma (figs. 54-55, photo) 1.12 times longer than wide, finely rugose, hairs and fovea indistinct, cephalic part strongly raised, eyes cut off, probably 6 eyes in two groups, clypeus with two outgrowths which are close together, basal cheliceral articles widely hidden, anteriorly bearing a pair of long and bent "horns", fangs long and

slender, labium wide. – Legs (photo) only fairly long, slender, bristle-less, hairs not distinct, IV longest, III relatively long, femur I strongly thickened, tibia I with a single ventral "clasping spur" in the distal half, position of the metatarsal trichobothrium unknown, tarsal claws not studied. – Opisthosoma (fig. 56, photo) 1.2 times longer than wide, strongly armoured, ventrally bearing a single large scutum; I did not recognize a fragmentation of the lateral plates, hairs and spinnerets short. – Pedipalpus (figs. 57-58): Articles fairly thickened, deformed, tibia long, bulbus simple, bearing a long, flat and almost straight embolus.

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

Electroblemma SELDEN et al. (2016) (= *Brignoliblemma* WUNDERLICH 2017).

Electroblemma spermaferens WUNDERLICH **n. sp**. (figs. 59-61), photo 9

Etymology: The species name refers to its probably sperm-bearing bulbus, from sperma (lat.) = sperm, and ferens (lat.) = bear.

Material: Holotype ♂ in Upper (Mid) Cretaceous Burmite and a separated piece of amber, F3611/BU/CJW.

Preservation and syninclusions: The spider is incompletely preserved, and most parts - except the right bulbus, few leg articles and the outgrowths of the chelicerae - are badly preserved in a clear yellow-orange piece of amber which is – like the separated piece – full of detritus and tiny plant hairs. The left pedipalpus is deformed but the right pedipalpus is partly excellently preserved (fig. 60), its embolus is only weakly deformed, the bulbus contains a "ball" of questionable remains of spermatozoa and/or secretion - it needs a closer study - within a bubble-shaped structure which may be a sperm reservoir. The well preserved sperm duct originates at this bubble. In the tibia of the left pedipalpus remains of questionably haemolymph are preserved. The body and some leg articles are strongly deformed, the prosoma is difficult to reconstruct, one leg is loose, the opisthosoma is ventrally declined.

Diagnostic characters (♂; ♀ unknown): Anterior cheliceral outgrowths very long and undivided (fig. 59), cymbium (fig. 60) with a dorsal outgrowth which bears several strong hairs.

Description (♂):
Measurements (in mm): Body length 1.3; prosomal length 0.55; opisthosoma: Length 0.75, width 0.6; right tibia IV 0.7; anterior cheliceral outgrowths ca. 0.4.
Colour: Body dark brown, legs medium brown.

Prosoma – except the not divided cheliceral outgrowths and the right pedipalpus - strongly deformed. – Legs only fairly long, hairs indistinct, bristles absent, position of the metatarsal trichobothria unknown. – Opisthosoma strongly deformed, 1.25 times longer than wide. – Pedipalpus (figs. 60-61, photo), the right one is partly excellently preserved but the femur is strongly thickened by the preservation, tibia quite thick, cymbium with a dorsal outgrowth which bears some strong hairs, bulbus large, bearing questionable spermatozoa (see above), sperm duct well preserved, embolus fairly long, distally slender and strongly sclerotized.

Relationships: *E. pinnae* WUNDERLICH 2020 may be most related; in *pinnae* and other congeneric species the cheliceral outgrowths are shorten and a large bristle-bearing cymbial outgrowth is absent.

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

Eogamasomorpha WUNDERLICH 2008 (figs. 36-37)

(= *Eoscaphiella* WUNDERLICH 2011 **n**. **syn**.)

According to the simple structures of the ♂-pedipalpus including a thin embolus and the small body size of the type species *ohlhoffi* WUNDERLICH 2011 I regard *Eoscaphiella* WUNDERLICH 2011 as a junior synonym of *Eogamasomorpha* WUNDERLICH 2008 (**n. syn.**). ?*Eogamasomorpha unicornis* WUNDERLICH 2017 = *Unicornutiblemma unicornis* (WUNDERLICH 2020) (**n. comb**.).

Note on the male holotype of *Eogamasomorpha hamata* WUNDERLICH 2017:
Cymbial and cheliceral “horns” are absent, the eye region is deformed, its clypeus is long and protruding like in *Procerclypeus* n. gen. According to the shape of the embolus which is not needle-shaped I am strongly in doubt of the relationships of this species which MAY be a member of the Pacullinae.

Procerclypeus WUNDERLICH **n. gen**.

Etymology: The name refers to the distinctly protruding clypeus and the slender opisthosoma, from procerus (lat.) = slender, protruding.

The gender of the name is masculine.

Type species (by monotypy): *Procerclypeus deformans* n. sp.

Diagnostic characters: Clypeus strongly protruding and bearing basally a widely spaced pair of “horns” (fig. 60), cheliceral “horns” most probably absent; pedipalpus (figs. 64-65): Femur with a retrolateral OUTGROWTH, bulbus with long strongly sclerotized apophyses.

Relationships: According to the small body size, the only fairly long legs and the not shortened tarsi a member of the Tetrablemminae. I do not know a closely related genus.

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

Procerclypeus deformans WUNDERLICH **n. gen. n. sp**. (figs. 62-65), photo 12

Etymology: The species name refers to its deformed holotype, from deformis (lat.) = deformed.

Material: Holotype ♂ in Upper (Mid) Cretaceous Burmite, F3653/BU/CJW.

Preservation and syninclusions: The spider is fairly well and almost completely preserved in a yellow-orange piece of amber, only the tips of the left tarsi II and III are cut off, body and legs are distinctly deformed, the prosoma is laterally strongly depressed/inclined, from - or near from - the spinnerets some, organic material has apparently been secreted, the left femur II bears prolaterally a long and pointed artefact (fig. 63). – Syninclusions are numerous particles of detritus like legs of insects.

Diagnostic characters and relationships: See above.

Description (♂):
Measurements (in mm): Body length 1.9; prosomal length 0.9; opisthosoma: Length 1.2, width 0.45; leg I: Femur 0.9, patella 0.2, tibia ca.0.6, metatarsus II ca. 0.48, tarsus II ca. 0.27, leg IV: Femur 0.75, patella 0.2, tibia ca. 0.7, metatarsus 0.45, tarsus ca. 0.35.
Colour dark brown, legs not annulated.
Prosoma (fig. 62) distinctly deformed, corniculate, with a pair of long and widely spaced “horns” just in front of the anterior lateral eyes, lateral files absent, clypeus strongly protruding, cheliceral “horns” most probably absent, ventral part strongly deformed. – Legs (photo) only fairly long, IV longest, bristles absent, hairs quite long and distinct, tarsi not shortened, tibia I not modified, position of the metatarsal trichobothrium unknown, unpaired tarsal claw small, paired claws with long teeth. – Opisthosoma (photo) distinctly longer than wide, strongly armoured, dorsal scutum large and corniculate, ventrally with a large praeanal scutum, scutum around the short and deformed spinnerets apparently absent. – Pedipalpus (figs. 64-65; see also above): Articles not thickened, femur with a retrolateral outgrowth, prolaterally corniculate, cymbium long and undivided.

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

Tenuicephalus WUNDERLICH **n. gen**.

Etymology: The name refers to the relatively low/flat shape of the cephalic part of the holotype, from tenuis (lat.) = low.

Type species (by monotypy): *Tenuicephalus penicillus* n. sp.

The gender of the name is masculine.

Diagnostic characters (♂; ♀ unknown): 6 eyes in a wide field (fig. 66), prosoma (deformed) low, clypeus with a pair of "horns" which bear quite LONG SETAE, basal cheliceral articles - they are not well observable - unmodified, sternum almost smooth, tibia I unmodified; pedipalpus (fig. 67): Bulbus deformed, simple, embolus long, bent and fairly thin, questionable conductor slender.

Relationships: According to the small body size a member of the Tetrablemminae; I do not know a close genus.

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

Tenuicephalus penicillus WUNDERLICH **n. gen. n. sp**. (figs. 66-69), photo 13

Etymology: The species name refers to the brush of setae on the clypeal "horns", from (lat.) penicillus.

Material: Holotype ♂ in Upper (Mid) Cretaceous Burmite, F3652/BU/CJW.

Preservation and syninclusions: The spider is well and completely preserved in a yellow-orange piece of amber, the prosoma is deformed, depressed on both sides, a fissure runs transverse through the anterior part of the prosoma. – Syninclusion are 1 Coleoptera, 3 Acari (2 inad. Erythraeidae, 1 indet.), and tiny plant hairs. Very thin unfragmented fungal hyphae did grow out ventrally from an intersegmental skin between the left femur and patella II (figs. 68-69). HARRY EVANS - person. commun. in XI. 2020 - was not able to identify the fungus based on my drawings; he noted that in his opinion the fungus is an ectoparasite rather than an internal pathogen.

Diagnostic characters and relationships: See above.

Description (♂):
Measurements (in mm): Body length 1.7; prosoma: Length 0.9, width 0.67; opisthosomal length 0.92; leg I: Femur ca. 0.7, patella 0.23, tibia 0.6, metatarsus 0.36, tarsus 0.28, femur II 0.6, femur III 0.5, metatarsus IV 0.38, tarsus IV 0.3.
Colour dark brown, legs not annulated.

Prosoma (fig. 66, photo) 1.34 times longer than wide, deformed, not raised, lateral aspect hidden by fissures in the amber, strongly narrowed anteriorly, dorsally finely corniculate, hairs indistinct, fovea unknown, 6 eyes in a wide field (eye lenses partly covered with an emulsion and tiny bubbles), clypeus not high, bearing a pair of distinctly spaced “horns” which bear long apical setae, basal cheliceral articles apparently not modified, labium long, with a seam to the sternum which may be smooth, spacing the coxae IV by ca. half of their diameter. – Legs (photo) only fairly long, order IV/I/II/III, bristle-less, metatarsi fairly longer than tarsi, hairs of medium length, tibia I unmodified, position of the metatarsal trichobothrium unknown, unpaired tarsal claw short, paired claws with long teeth. – Opisthosoma (photo) oval, dorsally completely covered with a scutum, hairs of medium length, ventral parts difficult to recognize, probably with three scuta in the posterior half behind the larger anterior scutum. – Pedipalpus (fig. 67) partly deformed, tibia fairly thick, cymbium quite long, bulbus simple, deformed and apparently in an unnatural position, embolus long and bent, close to a slender sclerotized conductor.

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

Female indet.:

F2938/BU/CJW, see WUNDERLICH (2017: 135-136, under ?Tetrablemminae), a small spider which possesses quite long tarsi compared with the metatarsi, body length 2.2 mm, metatarsus IV 0.43, tarsus IV 0.4. The clypeus possesses a widely spaced pair of “horns”, the leg hairs are long, the position of the metatarsal IV trichobothrium is in 0.5. The anterior part of the opisthosoma - less than 1/5 of the length in front of the large dorsal scutum which is smooth and bears no pits or humps - looks skinny and is free even of tiny plates. The genital area is strongly protruding.

Family **PROTOARANEOIDIDAE** WUNDERLICH 2018

See WUNDERLICH & MÜLLER (2018: 47)

Four genera of this extinct Cretaceous family have recently been described, see WUNDERLICH & MÜLLER (2018: 47f). An erect horn-shaped paracymbium and a simple voluminous bulbus (fig. 71) are typical characters of this cribellate family.

Proaraneoides WUNDERLICH 2018

A single species of this genus, based on single male – *P cribellatum* WUNDERLICH 2018 –, has been described, in which a long and slender paracymbium exists. Here a second species of this genus is described.

Proaraneoides lanceatum WUNDERLICH **n. sp**. (figs. 70-71), photo 7

Etymology: The species name refers to its lanceolate paracymbium, from lanc- (lat.) = lanceolate.

Material: Holotype ♂ in Upper (Mid) Cretaceous Burmite, F3609/BU/CJW.

Preservation and syninclusions: The spider is completely and rather well preserved in a fairly clear yellow-orange piece of amber, the left leg II is loose, separated by autotomy between coxa and trochanter, the prosoma is partly hidden by an emulsion, caused by the preservation the prosoma has been dorsally inclined. – Syninclusions are tiny particles of detritus.

Diagnostic character (♂; ♀ unknown): Pedipalpus (fig. 71): Paracymbium long and straight, lanceolate.

Description (♂):
Measurements (in mm): Body length 1.5; prosoma: Length 0.8, width ca. 0.5; opisthosoma: Length 0.8, width 0.5; leg I: Femur 0.75, patella 0.2, tibia 0.68, metatarsus 0.58, tarsus 0.3, tibia II 0.53, tibia III 0.51, tibia IV 0.67.
Colour light yellowish, legs not annulated.
Prosoma (photo) 1.6 times longer than wide, most dorsal parts and the mouth parts are hidden, the stermum spaces the coxae IV by their diameter. - Legs(fig. 70) with numerous thin bristles, as in *P. cribellatum*; only the position of the metatarsal trichobothrium – ca. 0.9 in *cribellatum* – may be slightly more distally. – Opisthosoma 1.6 times longer than wide, bearing short hairs; spinnerets and cribellum strongly deformed. – Pedipalpus (fig. 71) with slender articles which are not spiny, tibia much longer than the patella, cymbium long and slender, paracymbium long, straight and pointed, bulbus voluminous, most parts of its sclerites are hidden.

Relationships: In *P. cribellatum* WUNDERLICH 2018 the pedipalpal articles are spiny, the paracymbium is shorter and fairly bent.

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

Family **TELEMIDAE** FAGE 1913

Fossil Telemidae are extremely rare; here we describe the second specimen and species of the Cretaceous and Mesozoic. Members of this tropical family are small, their body length is usually less than 2 mm (the present male is 0.7 mm long, it is the tiniest known spider in Burmite), their legs are long and slender, their cymbium is small and may bear a PROlateral paracymbium (fig. 72), their buLbus is quite voluminous. If observable in the fossil spiders the very large colulus is best for the recognition of this family, see WUNDERLICH (2017: 284, fig. 138). The unsure generic relationships of the Cretaceous species were discussed by WUNDERLICH (2017: 161).

Note: Recently I gave the holotype of *Telemofila crassifemoralis* WUNDERLICH 2017 (F2804/BU/CJW) to the Institute of Zoology, Chinese Academy of Sciences in Beijing (IZCAS).

?*Telemofila ovalis* WUNDERLICH **n. sp.** (fig. 72), photo 5

Etymology: The species name refers to the oval bulbus, from ovalis (lat.) = oval.

Material: Holotype ♂ in Upper (Mid) Cretaceous Burmite, F3607/BU/CJW.

Preservation and syninclusions: The spider is well and completely preserved in a clear yellowish piece of amber, bubbles hide parts of the prosoma including the eyes, most parts of the right pedipalpus are well observable; I regard a longer structure besides the embolus as an artefact. – Syninclusions are two tiny insects, a small Acari and few tiny plant hairs.

Diagnostic characters (♂; ♀ unknown): Femur I thickened (see below), pedipalpus (fig. 72) with the paracymbium well developed, cymbial bristles absent, bulbus oval, body length only 0.7 mm.

Description (♂):
Measurements (in mm): Body length 0.7; prosomal length 0.3; opisthosoma: Length 0.45, width ca. 0.35; Leg I: Femur ca. 0.58 (diameter 0.06), patella 0.12, tibia 0.5, metatarsus ca. 0.34, tarsus ca. 0.23, metatarsus III ca. 0.32, femuer IV ca. 0.5, diameter of femur II 0.45.
Colour of prosoma and legs light yellowish, legs not annulated, opisthosoma greyish.
Prosoma partly hidden, about as wide as long, most probably 6 eyes which are well developed, coxae IV widely spaced by the sternum. – Legs (photo) quite slender, fairly long, I longest, III distinctly the shortest, few long and thin bristles, femora bristle-less (if bristles are not rubbed off), patellae 1 dorsally-distally, tibiae 1 dorsally near the

middle, metatarsi and tarsi none, hairs short and indistinct, metatarsal trichobothria unknown, tarsal claws not studied. – Opisthosoma (photo) oval, bearing few long dorsal hairs, anterior spinnerets widely spaced, colulus very large, as in ?*Telemofila crassifemoralis* WUNDERLICH 2017: 264, fig. 136. – Pedipalpus (fig. 72): Articles slender, cymbium small, prolateral paracymbium well developed, bulbus large and oval, embolus rather long (the distal part is hidden).

Relationships: Thickened femur I and paracymbium as in ?*T. crassifemoralis* in which a bristle of femur I exists (see above), the opisthosomal hairs are short, the bulbus is almost globular and the embolus is shorter

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

Family **LEPTONETIDAE** SIMON 1890

Palaeoleptonetini WUNDERLICH 2012, see WUNDERLICH & MÜLLER (2018: 46, 59).

Palaeoleptoneta WUNDERLICH 2012.

The four already described species of this genus and tribe are only known in Upper (Mid) Cretaceous Burmese amber. In this paper a fifth species is described:

Palaeoleptoneta fissura WUNDERLICH **n. sp**. (fig. 73), photo 6

Etymology: The species name refers to the fissure in the piece of amber which runs dorsally longitudinally through the spider's body, from fissura (lat.) = fissure.

Material: Holotype in Upper (Mid) Cretaceous Burmite, F3608/BU/CJW.

Preservation and syninclusions: The spider is well and almost completely preserved (only the tip of the right tarsus I is cut off) in a clear yellow-orange piece of amber above a piece of detritus, its pedipalpi are partly strongly deformed, a fissure runs longitudinally through the spider's body (the fissure did not disappear after using benzylium benzoicum for some minutes). By a reflection this fissure causes a field of seemingly ten eyes. – Syninclusions are a larger flat orange structure of unknown origin, insect's excrement, tiny plant hairs and particles of detritus.

Diagnostic characters (♂; ♀ unknown): Pedipalpus as in fig. … and the photo, tegulum with strongly deformed structures, a small flat and translucent ventral structure and three long bristle-shaped apophyses (one may be the embolus).

Description (♂):
Measurements (in mm): Body length 1.4; prosoma: Length and width 0.6; opisthosoma: length 0.7, width 0.6; leg I: Femur 0.9, patella 0.2, tibia 0.95, femur II 0.8, tibia II ca. 0.8, metatarsus IV 0.8, tarsus IV 0.5.
Colour light brown, legs not annulated.
Prosoma (photo) as long as wide, cuticula finelly scaly, hairs short, thoracal furrow existing, 6 well developed distinctly deformed eyes, basal cheliceral articles large and diverging, fangs long, mouth parts and sternum hidden. – Legs (photo) slender, tarsimore than half as long as metatarsi, hairs short and indistinct, bristles thin and partly long, most femora bear a dorsal bristle in the middle, the right femur I additionally with 1 prolaterally and a pair of laterals in the distal half as well as half a dozen subapically, patellae with 1/1 dorsally, tibiae with several dorsal, lateral and ventral bristles, tarsi and metatarsi I-II bristle-less, metatarsi III-IV bear some bristles, position of the metatarsal trichobothria in ca. 0.95, three slender tarsal claws. – Opisthosoma (photo) 1.17 times longer than wide, bearing several long dorsal hairs, spinnerets and colulus hidden by a bubble. – Pedipalpus (see above) with slender articles, a long cymbium and a voluminous bulbus; the cymbial spoon is hidden. I did not try to name the tegular structures.

Relationships: In *P. crus* WUNDERLICH 2012 (= *cruz*: WUNDERLICH (2018: 61, lapsus) a large cymbial spur exists and a translucent tegular structure is absent.

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

Families **PHOLCOCHYROCERIDAE** WUNDERLICH 2008 and **MONGOLARACGNIDAE** SELDEN et al. 2013

In 2017: 153 I united the extinct families Mongolarachnidae (Jurassic of Mongoloia, presereved in stone) and Pholcochyroceridae (Mid Cretaceous, preserved in Kachin amber from Myanmar) to the superfamily Pholcochyroceroidea. According recently dis-

covered fossils in Kachin amber I do not exclude (1) that Mongolarachnidae is a part - probably a subfamily - of the Pholcochyroceridae and (2) that Pholcochyroceridae may not be a monophyletic taxon. I now suppose that (a) in ALL taxa – see the list of the genera below - the bulbus is attached ventrally on the long cymbium but not apically and (b) that the extremely long articles of the male pedipalpus may well be a basic character of the Pholcochyroceridae s. l. (including the Mongolarachnidae) but not a character of all genera, see the INTERMEDIATE character of *Kachinarachne* n. gen. (fig. 90) and the short articles of, e. g., *Autotomiana* (fig. 83) or *Spinicreber*. Here I transfer the genera *Longissipalpus* and *Pedipalparaneus* from the Mongolarachnidae to the Pholcochyroceridae (**n. relat**.). The justification of subfamilies - like Longissipalpinae WUNDERLICH 2015 - or of tribes within the Pholcochyroceoidea is not the subject of this study.
In the present paper I describe a new species of *Autotomiana*, two new species of *Longissipalpus,* the new genus *Kachinarachne* and some questionable taxa. The family Mongolarachnidae has to be deleted from the list of families in Kachin amber.

Diagnostic characters and relationships: Member of the entelegyne cribellate Pholcochyroceroid-Deinopoid branch, see WUNDERLICH & MÜLLER (2018: 12). In the ancient and extinct Pholcochyroceridae an entire cribellum exists, the posterior eye row is recurved (fig. 81) and the lateral eyes are distinctly spaced from each other, see WUNDERLICH (2017: 20), (2015: 156), similar to most Deinopoidea. Femoral trichobothria are absent. Usually a pectunculus exists (fig. 90b) like in the Deinopoidea; it may be reduced or probably rarely even absent. True apophyses of the articles of the male pedipalpus are absent in contrast to the Deinopoidea; rarely outgrowths exist: In *Autotomiana* and in *Pholcochyrocer*. The articles of the male pedipalpus are long or even extremely long (*) in certain taxa (figs. 76, 87), but short in other taxa (fig. 85). Frequently the tibia of the male pedipalpus is quite spiny (fig. 89, 90d). The bulbus is ventrally attached on the cymbium (apparently like in *Mongolarachne*) but not apically as supposed by me previously in *Longissipalpus*. I do not know a single apomorphic character of the very diverse Pholcochyroceridae – a situation quite unsatisfactory!

(*) I suppose the long male pedipalpal articles of *Mongolarachne* SELDEN et al. 2013 to have convergently evolved.

Note on the genus *Pedipalparaneus*: It was based on a single male of *P. seldeni* WUNDERLICH 2015. Mainly because of the very long articles of its male pedipalpus I regarded the taxon as a member of the Mongolarachnidae and supposed erroneously that the bulbus is attached at the end of the cymbium. In *Pedipalparaneus* a - reduced – pectunculus exists, the existence of a cribellum is unsure, feathery hairs and true femoral trichobothria (see below, *Pseudokachin tuberculatus*) were not found by me but the position of the eyes and the shape of the opisthosoma are quite similar to *Kachin* and *Propterkachin*, see below, the Uloboridae. In contrast to *Kachin* and *Propterkachin* in *Pedipalparaneus* the femora III-IV bear strong ventral bristles and the articles of the male pedipalpus are very long, apophyses are absent. Herewith I transfer the *Pedipalparaneus* from the Mongolarachnidae to the Pholcochyroceroidae, **n. relat**.

Note on the genus *Zhizhu* SELDEN et al. (2016): It was described as a plesion of the superfamily Deinopoidea, preserved in stone from the Mid Jurassic of China. A

pectunculus is absent. In my opinion it is probably related to the family Pholcochyroceridae or may even be a member of it.

List of the genera of the family Pholcochyroceridae in Burmese (Kachin) amber:
The unsure relationships of *Gigarachne* (Gigarachnidae JIANG & LI 2020) and *Pilosarachne* (Pilosarachnidae JIANG & LI 2020): See p . 111 (Deinopoidea).

Autotomiana WUNDERLICH 2015,
Kachinarachne n. gen.,
Longissipalpus WUNDERLICH 2015,
Parvibulbus WUNDERLICH 2018,
Pedipalparaneus WUNDERLICH 2015,
Pholcochyrocer WUNDERLICH 2008,
Spinicreber WUNDERLICH 2015,
Spinipalpus WUNDERLICH 2015.

Provisional key to the genera of the family Pholcochyroceridae in Burmese (Kachin) amber (mainly males):

1 Articles of the pedipalpus thin and extremely long (fig. 87) 2

- Articles of the pedipalpus short (fig. 76) or only fairly long (*Kachinarachne*, fig. 90) ...3

2 (1) Opisthosoma with hair-bearing humps, femora III-IV with long ventral bristles, pedipalpal patella distinctly shorter than the tibia. - *P. seldeni* .....*Pedipalparaneus*

- Opisthosomal humps and strong ventral femoral III-IV bristles absent, pedipalpal patella almost as long as the tibia (fig. 87), pedipalpus as figs. 87f .....*Longissipalpus*

3 (1) Pedipalpal femur with a distinct dorsal-distal comb of a teeth-shaped structure and bulbus with long spiny apophyses, see WUNDERLICH & MÜLLER (2018: Fig. 13) ..... *Pholcochyrocer*

- No such comb, different apophyses of the bulbus 4

4 (3) Pedipalpal patella with a distinct dorsal outgrowth (figs. 76, 83), frequently with patella-tibia autotomy .....*Autotomiana*

- No such outgrowth of the pedipalpal patella, no patella-tibia autotomy 5

5 (4) Opisthosoma ca. 2.4 times longer than high, tibiae distinctly annulated; pedipalpus (figs. 90h-i): Tibia rather long, cymbium and tegulum distinctly longer than wide. - *K. oblonga* n. gen. n. sp. .....*Kachinarachne*

- Opisthosoma, pedipalpal tibia, cymbium and tegulum shorter, structures of the bulbus different 6

6 (5) Legs – especially I – quite long and slender, femur I ca. 3 times longer than the prosoma. Pedipalpus: See WUNDERLICH (2015: figs. 181-182). - *S. vetus* .....*Spinipalpus*

- Legs shorter, structures of the pedipalpus different 7

7 (6) Metatarsi I-II bear apical bristles, pedipalpus (figs. 85-86): Bulbus with a long strongly sclerotized and sickle-shaped apophysis and with a large u-shaped apophysis ..... *Spinicreber*

- Apical bristles of metatarsi I-II absent, bulbus rather small, see WUNDERLICH & MÜLLER (2018: Fig. 11). - *S. incompletus* .....*Parvibulbus*

Descriptions of the taxa:

Autotomiana WUNDERLICH 2015

Autotomiana WUNDERLICH 2015: 178 has been described as the type genus of the Autotomianini WUNDERLICH 2015, and has - with hesitation - included in the family Praeterleptonetidae; later is has been transferred to the Pholcochyroceridae WUNDERLICH 2008, see WUNDERLICH (2017); on p. 156 *Autotomiana* has been transferred to the Pholcochyroceridae (erroneously under Ochyroceratidae).

Autotomiana is well diagnosed by its dorsal-apical patellar apophysis of the male pedipalpus (fig. 83), a quite long embolus in a spiral position, and by the patella-tibia autotomy (fig. 79). This kind of autotomy is rather rare in spiders; in Cretaceous spiders it exists also within the family Leptonetidae. In almost all congeneric specimens studied by me this kind of autotomy exists a single time or even two times, in the female F3615 leg autotomy is absent, in the female F3616 exists an additional coxa-trochanter autotomy.
Spiders of this genus are only known in Burmese amber and are rather rare. Their body length is ca. 3 up to 9 mm. Here I describe some further material including females which may be adult or not and may be conspecific with *A. brevisetosa* n. sp.;

structures of their genital area are not recognizable, and a sclerotized epigyne ist absent. In the new species the structures of the bubus are excellently preserved, much better than in the holotype of *A. hirsutipes* WUNDERLICH 2015 or the probably conspecific male of this species.
Near the female F3616 a long and apparently CRIBELLATE THREAD is preserved.

Autotomiana brevisetosa WUNDERLICH **n. sp**. (figs. 74-77)

Etymology: The species name refers to the relatively short leg hairs (compared with *hirsutipes*), from brevis (lat.) = short, hirsutus (lat.) = hairy and pes (lat.) = foot, leg.

Material: Holotype ♂ in Upper (Mid) Cretaceous Burmite, F3614/BU/CJW.

Preservation and syninclusions: The spider is partly well preserved – e. g. the pedipalpi – in a clear yellow-orange piece of amber, parts of the right leg IV are lost beyond the patella by autotomy, the dorsal part of the opisthosoma and most dorsal parts of the tibiae I-II are rubbed off within the amber. – Syninclusions: Remains of a small Hymenoptera at the margin of the piece of amber, tiny plant hairs and particles of detritus.

Diagnostic characters (♂; ♀ unknown but see the three congeneric females indet. below): Body length 3.8 mm, prosomal length 1.8 mm, leg hairs (fig. 74) relatively short; pedipalpus (figs. 76-77) with a leaf-shaped tegular apophysis which stands out and a slong embolus in a spiral position.

Description (♂):
Measurements (in mm): Body length 3.8; prosoma: Length 1.8, width 1.5; opisthosoma: Length 2.3, width 1.8; leg I: Metatarsus 1.7, tarsus 1.1, tibia II 1.5, femur IV 1.9.
Colour medium brown, legs probably not annulated.
Prosoma 1.2 times longer than wide, almost smooth (most hairs rubbed off?), fovea deep and almost circular, most eyes and chelicerae hidden, labium wider than long, not rebordered and with a seam to the sternum, gnathocoxae converging; the deformed sternum spaces the coxae IV only weakly. – Legs (figs. 74-75) only fairly long, I longest, III rather long, hairs of medium length, bristles numerous on femora to metatarsi, tbiae with 1/ dorsal as well as lateral and ventral bristles, tarsus III ventrally with ca. 3 short bristles (pectunculus), metatarsus IV slightly bent, calamistrum well developed, position of the metatarsal III trichobotrium in 0.88, long trichobothrium-like ventral hairs of femur IV absent, three well developed tasal claws. - Opisthosoma oval, 1.28 times longer than wide, bearing numerous hairs of mdium length, spinnerets short, area of the cribellum hidden. – Pedipalpus (figs. 76-77) with fairly slender articles but tibia rather thick, patella with a distinct bristle-bearing dorsal outgrowth, cymbium wide and hairy, bulbus simple, bearing a flattened tegular apophysis which stands widely out and a long embolus in a spiral position which describes at least two loops, its tip modified by denticles (if not artefacts).

Relationships: *Autotomiana hirsutipes* WUNDERLICH 2015 is distinctly larger, body length at least 7 mm, its leg hairs are distinctly longer, ventral trichobothria-like femoral hairs like in the holotype are absent and the tegular structures are different.

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

Females indet.

The females may be adult or subadult, so far as observable the genital area does not show any modifications/sclerotizations. I do not want to exclude that at least one of the females is conspecific with *A. brevisetosus* n. sp.

F2768/BU/CJW (see WUNDERLICH (2015: 180): The spider is very well preserved, its body length is 3.8 mm, the prosomal length is 1.7 mm, the opisthosoma is turned up-side-down, both anterior legs are autotomized beyond the patella, the right leg IV is lost - probably by autotomy, too - beyond the coxa, the cribellum is partly hidden, the calamistrum is well developed.

F3615/BU/CJW: The spider is well and completely preserved (no leg autotomy) in a clear yellow-orange piece of amber, its body length is 3.3 mm, the prosomal length is 1.6 mm, the leg hairs are short, the basal cheliceral articles are rather long, the clypeus is short, the pedipalpus is well developed and spiny, a tarsal claw exists, few ventral tarsal III-IV bristles exist, the position of the metatarsal trichobothria near is the end of the article, the metatarsus IV distinctly bent, the calamistrum is well developed (fig. 78), occupying almost 2/3 of the article, the genital area is hidden by a bubble, the cribellum is partly hidden.

F3616/BU/CJW: The spider is fairly well preserved in a large yellow-orange piece of amber, its body length is 3.7 mm, the prosomal length is 2.2 mm, the opisthosoma is distinctly deformed, the mouth parts are hidden, the eyes are well observable; autotomy: The left leg I between coxa and trochanter and the right leg IV (fig. 79) beyond the patella. The leg bristles are short, the position of the metatarsal trichobothria is near the end of the article, the legs bear numerous bristles, the calamistrum of the left metatarsus IV (fig. 80) is well observable, the metatarsus has a deep longitudinal depression and is not bent, both in contrast to the female F3615. – Syninclusions (in different layers as the spider) are 3 Coleoptera, 2 Diptera, 1 Hymenoptera, particles of detritus and an apparently cribellate thread in the same layer as the spider which is strongly deformed, turned three times within the piece of amber and ca 36 mm long.

Autotomiana ?*hirsutipes* WUNDERLICH 2015 (figs. 81-83)

Material: 1♂ in Upper Mid Cretaceous Burmite, F3563/BU/CJW.

Preservation and syninclusions: The spider is rather badly preserved in a partly clear yellow-orange piece of amber; the body is darkened by natural heating, the opisthosoma is distinctly deformed, the legs are incompletely preserved, the right legs III and IV are complete, the right leg I is complete except the patella, the right femora I and II remind on legs just before moulting, the pedipalpi are only partly better preserved than in the holotype. – Syninclusions: 1 Coleoptera, 1 Araci, 1 tiny questionable insect larva, detritus, remains of plants and a long and thin hair in a transverse dorsal position between pro- and opisthosoma.

Diagnostic characters: Legs I-II quite long, ca. 3.3 times the length of the body. One of the largest known araneomorph spider species in Burmese amber. Pedipalpus (fig. 83): Bulbus relatively small, tegulum (quite difficult to observe) bearing a hump-shaped outgrowth.

Description:
Measurements (in mm): Body length ca. 9.0; prosoma: Length 4.3, width 3.7; opisthosoma: Length ca. 4.5, width 2.5; leg I: Femur ca. 7.0, patella ca. 1.5, tibia 8.5, metatarsus 9.5, tarsus 3.7; femur II 7.0, tibia III ca. 3.5, tibia IV ca. 5.0.
Colour mainly dark brown (darkened by natural heating), legs probably not annulated.
Prosoma (fig. 81) 1.6 times longer than wide, almost smooth, feathery hairs absent, fovea quite long and deep, eyes difficult to observe, the anterior row similar to the araneid genus *Araneus*, posterior row distinctly recurved, lateral eyes widely spaced from each other, chelicerae apparently lost, mouth parts hidden, sternum distinctly deformed. – Legs (fig. 82) - especially I-II – quite long, order /I/II/IV/III, especially metatarsi and tarsi distinctly deformed, quite plumose/hairy, bristles numerous, fairly thin, existing from femora to tarsi, ca. half a dozen on femur I, tibia I with 3 ventral pairs (!) as well as 3 pro- and retrolaterally, tibia IV bears a dozen bristles, few short ventral bristles of the pectunculus III-IV are difficult to observe, paired claws with long teeth, unpaired claw rather long, tarsal trichobothria and feathery hairs absent, position of the metatarsal trichobothrium unknown, metatarsus IV almost straight, calamistrum well developed, reaching ca. 2/3 of the metatarsal length. – Opisthosoma 1.8 times longer than wide, distinctly deformed, hairs short, spinnerets short and partly hidden like the cribellum. – Pedipalpus (fig. 83): Articles fairly long, spiny, patella with a dorsal-apical outgrowth which is bent distally, tibia relatively thick, distinctly longer than wide, cymbium fairly stout, bulbus relatively small, tegulum bearing several apophyses which are difficult to observe, a blunt structure may be an apophysis or an artefact, embolus long and circular, in a clockwise position in the left pedipalpus.

Relationships: The present male is larger than the holotype (body length 7 mm), long trichobothria-like ventral hairs of femur IV are not observable or absent. The patellar pedipalpal apophysis is bent like in the holotype (in the holotype it was drawn in a slightly different aspect). The leg hairs are quite long like in the holotype. - The present male may well be the member of an undescribed species but parts of the male pedipalpus are distinctly deformed or hidden in both males.

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

Spinicreber WUNDERLICH 2015

Spinicreber sp. indet. (figs. 84-85)

Material: 1♂ and two separated pieces in Upper (Mid) Burmite, F3613/BU/CJW.

The spider is fairly well and almost completely preserved in a yellow-orange piece of amber which is full of tiny dark bubbles and detritus, parts of the left legs are cut off or missing. The body length of the spider is 2.6 mm, its prosomal length is 1.25 mm. Leg I see fig. 84, right pedipalpus fig. 85. *Spinicreber vacuus* WUNDERLICH 2020 may be most related, ♂-pedipalpus fig. 86.

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

Longissipalpus impudicus WUNDERLICH **n. sp**. (figs. 87-90)

Etymology: The species name refers to the extremely long articles of the male mating organ, from impudicus (lat.) = obscene.

Material: Holotype ♂ in Upper (Mid) Cretaceous Burmite, F3536/BU/CJW.

Preservation and syninclusions: The spider is very well preserved in a clear yellowish piece of amber, the legs are incomplete, the left legs are almost complete, only the tip of the first patella is cut off, chelicerae and mouth parts are fairly deformed. – Syninclusions are 1 tiny Diptera, 1 small Ephemeroptera (body length 1.7 mm) just below the spiders' opisthosoma; it is deformed, has probably sucked out as a prey of the spider. Also preserved are several thin questionable animal hairs of unknown origin as well as small remains of insects and plants.

Diagnostic characters (♂; ♀ unknown): Legs very long and slender, pedipalpal articles extremely long and slender, 3.6 times longer than the body, prosomal length 1.0 mm; pedipalpus (figs. 87-90): Articles extremely long, patella distinctly longer than the tibia.

Description (♂):
Measurements (in mm): Body length 2.8; prosoma: Length and width 1.0; opisthosoma: Length 1.8, width 1.0; leg I: Femur 3.4, patella 0.7, tibia 2.9, metatarsus ca. 3.7, tarsus II 1.0, tibia II ca. 2.1, tibia III ca. 0.9, tibia IV ca. 1.2; pedipalpus: Coxa and trochanter unknown, femur 4.5, patella 2.7, tibia 1.9, cymbium 0.4.
Colour light brown, legs not annulated.
Prosoma (fig. 87) as wide as long, hairs and fovea only fairly long, 8 eyes in 2 wide rows similar to *L. cochlea* WUNDERLICH 2017: 262, fig. 124, posterior row distinctly re-

curved, lateral eyes distinctly spaced from each other, clypeus hidden, chelicerae and mouth parts deformed, basal cheliceral articles not protruding, fangs only fairly long, mouth parts hidden, labium about as long as wide, sternum deformed. – Legs (figs. 87-88, photo): I-II very long and slender, III-IV distinctly shorter, hairs short, bristles numerous, about a dozen on tibia I, thin and partly long, existing on femora to metatarsi, bristles of the pectunculus apparently absent, metatarsal trichobothria unknown, metatarsus IV straight, calamistrum longer than half of the length of the article, 3 tarsal claws, paired claws toothed. - Opisthosoma (fig. 87) 1.8 times longer than wide, hairs and spinnerets short, cribellum wide, difficult to observe. - Pedipalpus (figs. 87, 89-90; see also above): Femur with 2 thin dorsal bristles in the distal half, cymbium small, quite hairy, tegulum with a long and strongly bent apophysis which may function as secondary conductor, embolus also long and strongly bent, partly hidden by the tegulum, in a circular position of probably more than two loops.

Discussion regarding the male copulatory organ, sexual dimorphism and palaeobehaviour. (The female – and so the size of its pedipalpus and a possible sexual-dimorphism – are unknown). In my opinion the cribellate spiders of *Longissipalpus* were hanging upside-down below their capture web (*). The leg-shaped articles of the male pedipalpus are so long that probably the pedipalpus was usually folded backwards during resting and moving, too (fig. 87). The function of the lengthened articles in question is unknown. To detect prey the long anterior legs are well usable. I prefer to assume the pedipalpal function connected with the mating behaviour which is well-known in some web-building spiders like Orb weavers (Araneidae): The male beats and pulls in a peculiar rhythm - using its anterior legs – on threads of the capture web of a conspecific female to prove if it is ready for mating, and to avoid an attack if mistaken as a prey. With the help of the elongated pedipalpal articles (fig. 87) the fossil male was able to beat and pull threads while keeping its body away from the female. - A similarly sized copulatory organ, long – but not EXTREMELY long is common in extant and fossil members of the ancient Mygalomorpha, see the description of *Anderphyxiochemoides* above. A very long male pedipalpus evolved convergently also in the extant genus *Epidius* THORELL 1877 of the family Thomisidae, which is a hunting spider and builds no capture web. Thomisid mating behaviour is totally different from the behaviour of web-building spiders. It is notable that bulbus and cymbium of Mygalomorpha, *Longissipalpus* (fig. 87) and *Epidius* are remarkably small; otherwise the use of the male pedipalpi would be difficult (**).
Probably it can be concluded that the female mating behaviour of long male pedipalpal species was more aggressive than the behaviour of such species in which shorter male pedipalpi existed. Triggered the aggressive female behaviour the behaviour and the pedipalpal length of conspecific males? Was the pressure of selection the reason for the evolution of extremely long male pedipalpi of the genus *Longissipalpus*?

(*) Almost all extant long-legged cribellate spiders build capture webs and are hanging upside-down below a sheet of the web.
(**) In male of dwarf spiders - e. g., of the families Oonopidae and Mysmenidae – exist voluminous bulbi as well as quite short pedipalpi.

Relationships: The pedipalpal articles of *L. impudicus* are distinctly longer, the legs are longer and more slender than in the other knonwn congeneric species. In *L. magnus* WUNDERLICH 2015 the prosomal length is 2.0 mm, femur I is 3.0 mm long and the pedipalpal femur is more than 5 mm long.

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

Longissipalpus cochlea WUNDERLICH **n. sp**. (figs. 90a-e)

Etymology: The species name refers to its screw-shaped embolus, from cochlea (lat.) = screw.

Material: Holotype ♂ in Upper (Mid) Cretaceous Burmite, F3675/BU/CJW.

Preservation and Syninclusions: The spider is well but incompletely preserved in a clear yellow-orange piece of amber, both legs I and the left leg II are cut off through their femora, the tarsus and the distal part of the left metatarsus II are preserved, both pedipalpi are cut off near the end of their femora up to the base of their tibiae, the eye lenses are deformed; “emulsions”: See below. - Syninclusions: A droplet of secretion exists at the tip of the screw-shaped structure which I consider to be the embolus; also preserved are a tiny Diptera: Nematocera just in front of the spiders mouth parts, a couple of small Diptera: Brachycera, few tiny plant hairs and numerous small particles of detritus.

Diagnosis (♂; ♀ unknown): Pedipalpus (figs. 90c-e): Tibia retroapically with 5 long and strong bristles, cymbium long, retrobasally with few strong bristles, tegular apophysis long, thin and almost straight, embolus with conductor screw-shaped.

Description (♂):
Measurements (in mm): Body length 2.9; prosoma: Length 1.4, width 1.05; opisthosoma: Length 1.6, width 1.0; femur II ca. 2.5, tibia II ca. 2.1, femur III 1.4, femur IV ca. 2.0; basal cheliceral articles: Length 0.15, width 0.7; pedipalpus (both are incompletely preserved): Femur >1.8, tibia >1.3.
Colour: Prosoma dark brown, legs and opisthosoma light to medium brown, legs not annulated.
Prosoma (fig. 90a) 1.33 times longer than wide, rather low, hairs rather short, fovea not distinct, 8 eyes, anterior medians largest, posterior row recurved, lateral eyes distinctly separated from each other, clypeus deformed and short, basal cheliceral articles long and slender, mouth parts and most parts of the sternum hidden by a light “emulsion”. - Legs (fig. 90b) long and slender, order I/II/IV/III, hairs short and indistinct, bristles numerous and rather short, existing from femora to metatarsi, femur II with a dorsal one near the middle and 3 near the end, femur IV bearing 2 dorsal bristles, patellae with a thin dorsal-apical bristle; tibiae with 1-2 dorsal bristles, IV additionally with a pairs of longer distal-lateral ones, metatarsi with several apical bristles; few ventral metatarsal III-IV bristles of the pectunculus, metatarsal trichobothria unknown, metatarsus IV straight, calamistrum weakly developed in the basal half, hairs short; 3 tarsal claws, paired claws with long teeth. - Opisthosoma 1.6 times longer than wide, hairs short, most spinnerets hidden by a light “emulsion”, anteriors widely spaced, cribellum apparently large. - Pedipalpus (see the diagnosis, figs. 90c-e): Articles very long and slender, partly cut off, see above.

Relationships: The distinctly screw-shaped embolus/conductor are different in the related species.

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

Kachinarachne WUNDERLICH **n. gen**.

Etymology: The name refers to the Kachin State of Myanmar (Burma), the origin of the Burmese (Kachin) amber, as well as to arachne (gr.) = spider.

The gender of the name is feminine.

Type species (by monotypy): *Kachinarachne oblonga* n. sp.

Diagnostic characters (♂; ♀ unknown): Pedipalpus (figs. 90h-i): Tibia long and spiny, patella short, cymbium and tegulum long, embolus also long, originating in a basal position of the tegulum, slightly bent, conductor in a distal position.

Further characters: Cribellate, bristles of the pectunculus absent, patellae (fig. 90f) with a pair of lateral bristles besides dorsal bristles (if not rubbed off), tibiae distinctly annulated (fig. 90g), opisthosoma (deformed!) long and slender.

Relationships: Mainly the long and spiny tibia of the pedipalpus as well as the absence of apophyses of the pedipalpal articles indicate the membership of the family of the Pholcochyroceridae but not of the Deinopoidea. In the other genera of the Pholcochyroceridae the proportions of the pedipalpal articles and the structures of the bulbus are different, see the key to the genera above.

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

Kachinarachne oblonga WUNDERLICH **n. gen. n. sp.** (figs. 90f-i)

Etymology: The species name refers to the long opisthosoma, the long pedipalpal tibia, the long cymbium and the long tegulum, from longus (lat.) = long.

Material: Holotype ♂ in Upper (Mid) Cretaceous Burmite (Kachin amber), F3676/BU/CJW.

Preservation and Syninclusions: The spider is well preserved in a clear yellow-orange piece of amber, the right half of the prosoma is cut off within the amber, parts of the right side of the opisthosoma and of the right leg I are cut off, parts of the strongly deformed right pedipalpus are cut off, the opisthosoma is distinctly deformed and partly darkened brown as typical for amber pieces which were naturally heated. - Syninclusions are few particles of insects excrement and tiny plant hairs.

Diagnostic characters and relationships: See the new genus.

Description (♂):
Measurements (in mm): Body length 3.2; prosoma: Length 1.4, height 0.7; opisthosoma: Length 1.9, height 0.8; leg I: Femur >1.5, patella 0.65, tibia 1.45, metatarsus 1.2, tarsus 0.6; leg IV: Femur 1.4, patella 0.45, tibia 1.15, metatarsus 1.1, tarsus 0.55; pedipalpus: Femur 0.9, patella probably 0.25, tibia 0.65.
Colour light brown, tibiae distinctly annulated.
Prosoma (it is incomplete): Hairs short, fovea well developed, eyes hidden or cut off, basal cheliceral articles long and slender, mouth parts and sternum hidden or cut off. - Legs (figs. 90f-g) fairly long and slender, hairs long, especially on the femora, bristles long and numerous, existing from femora to metatarsi, femora with ca. 5 dorsal and lateral bristles, patellae with 2 dorsal and a pair of lateral bristles, tibiae with half a dozen and laterals, metatarsi with 3-4 and apical bristles, bristles of the pectunculus absent, metatarsal trichobothria unknown, metatarsus IV straight, calamistrum long, hairs short, three tarsal claws, paired claws bearing long teeth, unpaired claw large, bent in a right angle. - Opisthosoma 2.4 times longer than wide, strongly deformed. - Pedipalpus: See the diagnosis.

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

Superfamily PALPIMANOIDEA (= ARCHAEOIDEA)

Note: Actually the older name Archaeoidea KOCH & BERENDT 1854 (under Archaeidae) should have priority over Palpimanoidea THORELL 1870, see WUNDERLICH (2015: 211).

The ancient superfamily Palpimanoidea was already very diverse in the Mesozoicum, in the Cretaceous and even in the Jurassic, see SELDEN et al. (2019). The enormous value of fossils for solving questions of the phylogeny is demonstrated by Jurassic

taxa - spiders preserved in stone of Mongolia and China - and by Cretaceous taxa, e. g., of the family Archaeidae, see SELDEN et al. (2019) and this paper.
The Palpimanoidea include at most ten families. Four or five families - probably Lagonomegopidae (it may be not a true Palpimanoidea, see below), Micropalpimanidae, Planarchaeidae, Spatiatoridae (also reported in Eocene Baltic amber) and Vetiatoridae - are extinct and only known from Cretaceous Burmese amber; Lagonomegopidae is also known from other Cretaceous deposits. The ancient AND EXTANT families Archaeidae and Mecysmaucheniidae are reported in Burmite. Further extant families are Huttoniidae, Palpimanidae (also known in Miocene Dominican amber) and Stenochilidae. (Pararchaeidae has turned out to be an Araneoidea but not a Palpimanoidea, a synonym of the Malkaridae). I include the extinct Cretaceous families in the provisional cladogram tab. 1. See below, WOOD (2012), WUNDERLICH (2015: 213), (2020: 43) and SELDEN et al. (2019). The relationships of extant and fossil Palpimanoidea are under revision of HANNAH WOOD.

Diagnostic characters of the Palpimanoidea (Lagonomegopidae see "further characters" and this family below): BASICALLY existence of very large and diverging basal cheliceral articles which bear "peg teeth" (*) (figs. 92, 122) and lateral stridulatory files (fig. 103, 175), an elevated cephalic part (figs. 91, 100, 108,), granulate prosomal cuticula, a distinct gap between chelicerae and mouth parts (figs. 91, 118), usually spatulate leg hairs (figs. 109, 116), basically leg bristles (figs. 96, 110) (lost in most extant and Cretaceous taxa), probably a scutate or hardened opisthosoma (fig. 91) - see SELDEN et al. (2019: 5) -, as well as - mainly marginal - long cymbial hairs.

(*) Actually these structures are movable BRISTLES but not fixed teeth which are outgrowths of the cuticula.

Further characters: Ecribellate, unpaired tarsal claw existing. Feathery hairs as in figs. 253 313 and tarsal trichobothria (fig. 102) as well as more than a single metatarsal trichobothrium exist only in the Lagonomegopidae; see below, WUNDERLICH (2017: 164-165), GUO et al. (2020). Number and position of the eyes: Usually exist 8 eyes, 6 eyes exist in certain Palpimanidae and in some Mecysmaucheniidae. Peculiar is the eye position of the Lagonomegopidae (figs. 99-101), remarkable is the strong variability of the eye position within the family Palpimanidae, see JOCQUE & DIPPENAAR-SCHOEMAN (2007: 197). Prey: See directly below.

Phylogenetics (see also the next paragraph): Very large basal cheliceral articles bearing "peg teeth", a raised cephalic part, spatulate leg hairs and leg bristles were already existing in the Jurassic taxa, see SELDEN et al. (2019). The distribution of leg bristles is of special interest: They were very frequent in the Jurassic taxa but are quite rare in Cretaceous and extant taxa: Few leg III-IV bristles exist in the extant family Huttoniidae (but not in the strongly related Vetiatoridae). Few bristles on legs III-IV exist also in the extinct Cretaceous Micropalpimanidae (but - to my knowledge - not in the strongly related Miocene and extant Palpimanidae) as well as in *Spiniarchaea* n. gen. (questionable Mecysmauchaniidae) (figs. 95-96). Because of this "SPORADIC" existence of FEW leg bristles in the three taxa in question - and their different pattern in *Spiniarchaea* - I suppose that leg bristles became lost probably in the late Jurassic and were "regained" independently in the Cretaceous in these three taxa. The existence of

feathery hairs in certain Lagonomegopidae (see below) - as well as of tarsal trichobothria in this family – may also be “regains”; see WUNDERLICH (2011: 567-590).
What does the prey tell about phylogeny and evolution of the Palpimanoidea? Most extant palpimanoid spiders except most Mecysmaucheniidae feed on spiders, but the members of the extinct and old family Lagonomegopidae (see below) fed on Diptera. Has the prey of the oldest - Triassic and some Jurassic - palpimanoid spiders NOT been spiders although they possessed cheliceral “peg teeth” and a foramen? (See the Mecysmaucheniidae!). A spider as the prey of a Cretaceous member of the genus *Burmesarchaea* WUNDERLICH 2008 (photos 14-15) is documented here as the oldest report of this behaviour and usual kind of palpimanoid prey, see above, the paragraph Palaeobehaviour.

Notes on the cladogram p. 82, the variability, and the family Lagonomegopidae:
(1) SPATULATE HAIRS on legs I(II) (figs. 109, 116) may be indistinct or even be absent: In the families Mecysmaucheniidae, in the Planarchaeidae, the dubious - apparently araneoid - Pararchaeidae and in few extinct Archaeidae, in *Eoarchaea* FORSTER & PLATNICK 1984 and *Spiniarchaea* n. gen. In my opinion they are LOST in these taxa (in contrast to related taxa). Such hairs are also absent in the related family Lagonomegopidae in which quite long leg hairs exist.
(2) Few thin LEG BRISTLES (mainly on III-IV) exist in the Huttoniidae, Micropalpimanidae (figs. 109-110), juvenile Lagonomegopidae as well as – very rarely – *Spiniarchaea* n. gen. (questionable Mecysmaucheniidae) (figs. 95-96) and Palpimanidae.
(3) CHELICERAL “PEG TEETH” are lost in the Stenochilidae and Vetiatoridae.
(4) A LOW CEPHALIC PART exists in the Huttoniidae, Planarchaeidae and Vetiatoridae, in my opinion as a synapomorphic “reversal”. A continuously raised cephalic part without a step evolved in the dubious Eocene genus *Eoarchaea* FORSTER & PLATNICK 1984 of the Archaeidae.
(5) In the Lagonomegopidae (see below) FEATHERY HAIRS and TARSAL TRICHOBOTHRIA exist in contrast to the (remaining) families of the Palpimanoidea and spatulate leg hairs are absent like in the Jurassic genus *Patarchaea* SELDEN et al. 2008. The relationships of this family are still debated. If Lagonomegopidae turns out (not) to be a member of the Palpimanoidea - but a superfamily of its own, see GUO et al. (2020) - the diagnosis of this superfamily would change strongly.
Six families are well diagnosed as pairs, see tab. 1. The relationships of the extinct family Spatiatoridae and its branching remain enigmatical; it MAY be close to Huttoniidae + Vetiatoridae. - In the dubious taxon *Seppo koponeni* SELDEN & DUNLOP 2014 exists - true? - cheliceral “peg teeth” (but see WUNDERLICH (2015: 61)) and apparently a remarkable tibia-patella autotomy exists like in the Oecobioidea.

Relationships: Palpimanidoidea is recently regarded as sister group of the Entelegynae, see SELDEN et al. (2019: 2) and WUNDERLICH (2020: 48).

Distribution in space and time; fossils: Worldwide, reported since Jurassic but most probably much older; several extinct genera of unknown families are reported from the Jurassic by SELDEN et al. (2019).

Family ARCHAEIDAE C. L. KOCH & BERENDT 1854 (figs. 90-98)

Synonymy: Lacunaucheniinae WUNDERLICH 2008 = Archaeinae, see WUNDERLICH (2017: 166).

The relic Archaeidae was a quite diverse family in the Mesozoic and is restricted today to the Southern Hemisphere: Africa, Madagascar and Australia. The genus *Burmesarchaea* WUNDERLICH 2008 was diverse in the Cretaceous and frequent in Burmese amber, see WUNDERLICH (2017: 171-184); these spiders fed already on spiders (photos 14-15), see above, the paragraph Palaeobehaviour. In this paper I describe a new subfamily which is based on the unusual type taxon.

Diagnostic characters and relationships: See below, SELDEN et al. (2019), tab. 1 and the family Mecysmaucheniidae.

To my knowledge **secure fossil** reports started at least with the Cretaceous; the extinct genus *Patarchaea* SELDEN et al. (2008) is lined down up to the Middle Jurassic. The roots of the extinct genera *Archaea*, *Baltarchaea* and *Myrmecarchaea* - both reported in Eocene Baltic amber - are lined down at least to the Uper Jurassic in the cladogram by SELDEN et al. (2019), and the Cretaceous genus *Burmesarchaea* being younger than the Eocene genera (!). According to the existence of a sclerotizised ring around the spinnerets and the existence of two pairs of spinnerets the dubious *Archaemecys arcantiensis* SAUPE & SELDEN 2009 – subad. ♂ in Early Cretaceous amber from France, described under Mecysmaucheniidae – may in my opinion well be a member of the family Archaeidae although the median spinnerets (really?) are absent. Spatulate leg hairs of *Archaemecys* - they are absent in the Mecysmaucheniidae - were not reported but such hairs may QUITE indistinct in the Archaeidae.

SPINIARCHAEINAE WUNDERLICH **n. subfam.**

Etymology: See the type genus.

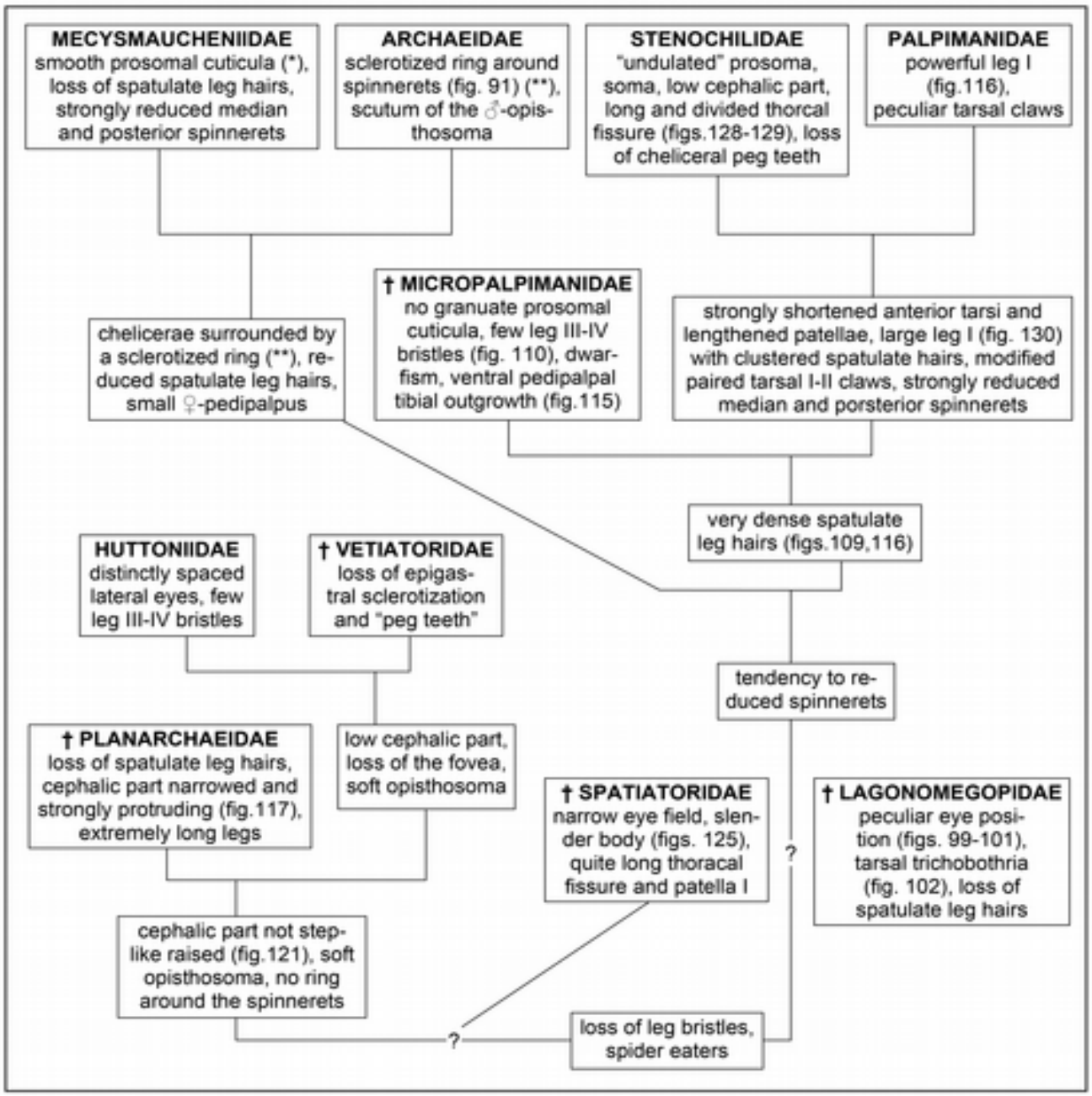
Type genus (by monotypy): *Spiniarchaea* n. gen.

Diagnostic characters (♂; ♀ unknown): Existence of few leg bristles (figs. 95-96): A short bristle on all femora and a single long one on metatarsus IV; cheliceral stridulatory files, spatulate leg hairs and – most probably – a sclerotized ring around the spinnerets absent; pedipalpus (figs. 97-98): Tibia bearing strong retroapical spine-shaped bristles, cymbium long and slender, bulbus with a long basal apophysis, questionable embolus long and strongly bent.

Further characters: Prosoma (figs. 92-94, photos 16-17) not rugose but bearing numenous hair-bearing pustules, 8 eyes, colour light to medium brown, bearing a high and wide cephalic elevation, basal cheliceral articles very long, protruding and bearing long "peg teeth", not diverging, surrounded by a long sclerotized ring at a large foramen.

Relationships: The subfamily characters are a mixture of characters (a) of the family Archaeidae: A long and slender cymbium as well as complicated structures of the bulbus (long tegular apophysis, long embolus), and (b) of the family Mecysmaucheniidae: Absence of spatulate leg hairs as well as most probably of a sclerotized ring around the spinnerets, and the structures of the male pedipalpus: A large and wide cymbium as well as a simple bulbus with a hidden embolus; see *Palaeozearchaea* n. gen., fig. 107. Apomorphic characters of the Spiniarchaeinae are the existence of leg bristles, of strong retroapical spine-shaped bristles of the male pedipalpal tibia as well as the losses of cheliceral stridulatory files, spatulate leg hairs and - most probably - a sclerotize ring around the spinnerets. According to the structures of the ♂-pedipalpus - the shape of the slender cymbium, the complicated structures of the bulbus - indicate close relationship to the remaining Archaeidae (probably a basal position): The long basal tegular apophysis is similar to certain members of *Burmesarchaea* WUNDERLICH 2008 (Archaeidae) in which the colour of the prosoma is darker brown, the body is stronger sclerotized, a sclerotized ring around the spinnerets and cheliceral stridulatory files exist, and leg bristles as well as apical bristles of the tibia of the ♂-pedipalpus are absent. In the Spiniarchaeinae some leg bristles exist - which are completely absent in other taxa of this family as well as in most other Palpimanoidea (= Archaeoidea) except Huttoniidae and Micropalpimanidae (and in juvenile Lagonomegopidae) which are all not strongly related to the Archaeidae. The leg bristles of *Spiniarchaea* may be regain or a "remain" of its ancient (Jurassic?) predecessor in which leg bristles existed, see SELDEN et al. (2019). The distribution of leg bristles in other Palpimanoidea - Huttoniidae and Micropalpimanidae (on legs III and IV only) - is quite different from *Spiniarchaea* in which femoral bristles exist. – Spatulate leg hairs are also absent in the Eocene (Baltic amber) archaeid genus *Eoarchaea* FORSTER & PLATNICK 1984 and in the family Planarchaeidae (see below) which – according to the shape of the body and other characters are not closely related.

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



existence of cheliceral "peg teeth" (figs. 92, 122), raised cephalic part (figs. 91, 100), spatulate leg I(II) hairs (fig. 109) and hardened/scutate opisthosoma/epigaster

(*) The cuticula of the Mecysmaucheniidae is rarely granulate, e. g., in *Mesarchaea*.
(**) A sclerotized ring around the spinnerets and spatulate leg hairs are absent in the enigmatic Eocene genus *Eoarchaea*, the prosomal cuticula is not granulate as in most Mecysmauchniidae; see FORSTER & PLATNICK (1984: 26).

Tab. 1. Possible cladogram of the families of the Palpimanoidea, Cretaceous to extant, based on only few selected characters.

Spiniarchaea WUNDERLICH **n. gen**.

Etymology: The first part of the name refers to the spines/bristles on some leg articles and on the tibia of the ♂-pedipalpus, from spin- (lat.) bearing thorns, bristles; the second name refers to the genus name Archaea of the related family Archaeidae.

The gender of the name is feminine.

Type species (by monotypy): *Spiniarchaea aberrans* n. sp.

Diagnostic characters, relationships and distribution: See above.

Spiniarchaea aberrans WUNDERLICH **n. gen. n. sp**. (figs. 92-98), photos 16-17

Etymology: The species name refers to its unusual characters (see the genus), from aberration (lat.) = provided with unusual or aberrant characters.

Material: Holotype ♂ in Upper (Mid) Cretaceous Burmite, F3610/BU/CJW.

Preservation and syninclusions: The spider is only partly well preserved – so the peltidium, the chelicerae, some leg articles and the pedipalpi - on a flat light brown, translucent structure in a partly clear piece of amber, the prosoma is strongly depressed probably by pressure of the preservation, the basal cheliceral articles are stretched forewards in an unnatural position (figs. 92-94, photos), the opisthosoma is strongly deformed, crumbled and folded upwards, and so partly hiding the posterior part of the prosoma. Therefore I do not exclude that the male has become the prey of an unknown animal; I did not find bite marks of the fangs of a spider. Metatarsus and tarsus of the right leg II and some other leg articles are lost rsp. cut off, the mouth parts and most parts of the spinnerets are hidden. – Synclusions: A small distal part of a small antenna of an insect just behind and above the sternum of the spider and small particles of detritus.

Diagnostic characters and relationships: See above.

Description (♂):
Measurements (in mm): Body length ca. 3.5; prosoma: Length ca. 1.5, width ca. 1.1, basal cheliceral article 1.2; opisthosoma unknown; leg I: Femur ca. 1.5, patella ca. 0.4, tibia 1.7, metatarsus 1.7, tarsus 0.8, metatarsus III 0.7, pedipalpal tibia 0.7.
Colour of prosoma and legs light to medium brown, legs not annulated.

Prosoma (figs. 92-94, photos) ca 1 ½ times longer than wide, cephalic part distinctly raised, slender anteriorly, bearing numenous hair-bearing pustules, 8 eyes, the anterior medians largest and widely spaced, the laterals contiguous, clypeus quite short, basal cheliceral articles large and strongly excavated distally, lateral stridulatory files most probably absent, “peg teeth” numerous and partly long, in three irregular rows (one on the posterior margin of the small fang furrow), basally quite dense, I did not recognize a gland mound, fangs long, weakly bent and quite slender in the distal half, sternum wide. – Legs (figs. 95-96, photos) slender and rather long, I longest, dorsal femoral humps absent, hairs short, spatulate hairs, feathery hairs and tarsal trichobothria absent, metatarsal trichobothria difficult to recognize, few bristles exist: A short retroapical one on all femora and a retrobasal one on metatarsus IV. A garland of apical bristle-shaped hairs exists on metatarsus III-IV. Three tarsal claws, the paired claws are toothed and strongly bent. - Opisthosoma strongly crumbled, folded upwards and so partly hiding the thoracal part, dorsal scutum not recognizable but probably absent, sclerotized ring around spinnerets most probably absent, too, spinnerets stongly deformed, one stout pair is recognizable, at least a further pair may exist. - Pedipalpus (figs. 97-98) with long and slender articles, femoral stridulatory teeth absent, tibia with at least two long dorsal trichobothria and several strong retroapical bristles, cymbium well developed, long and slender, bearing – especially probasally – long hairs, bulbus (it is deformed) not protruding, only fairly large, tegulum with several apophyses in the distal half including a strongly sclerotized bent one which bears some denticles; a long, pointed and almost straight tegular apophysis is directed to the pedipalpal tibia; questionable embolus long and strongly bent.

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

Family **HUTTONIIDAE** SIMON 1893

Diagnostic characters: Cheliceral “peg teeth” and few legs III-IV leg bristles exist, the prosoma is low, see tab. 1.

Close **relationships** exist probably to the Vetiatoridae (see below) in which the epigaster is not sclerotized and cheliceral “peg teeth” are absent in contrast to the Huttoniidae.

Distribution: Today the Huttoniidae is only known from the Australian Region. To my knowledge no sure fossil report of this family exists; see, e. g., WUNDERLICH (2015).

Family LAGONOMEGOPIDAE ESKOV & WUNDERLICH 1995 (figs. 99-102)

Synonyms: Grandoculidae PENNEY 2011 and Archaelagonomegopinae WUNDERLICH 2012 (no subfalies are considered); see WUNDERLICH (2015: 237-238).

See GUO et al. (2020), PARK et al. (2019) and WUNDERLICH (2015: 236-265).

Diagnostic characters: Peculiar position of the eyes (figs. 99-101) in a wide and long field of four rows with huge anterior (*) median eyes in a lateral position near the prosomal margin, remaining eyes quite small, “peg teeth” of the promargin of the fang furrow (fig. 101 B) and diastema existing, retromargin with - *Odontomegops* GUO et al. 2020 - or without - all remaining taxa? - true teeth; legs (fig. 102): Several tarsal (**), several metatarsal and several tibial trichobothria existing, bristles absent at least in adult spiders, feathery hairs existing at least in a single species - see GUO et al. (2020) -, spatulate hairs absent but numerous long and thin hairs existing, three pairs of spinnerets. Biology, prey: Flying insects, see below.

(*) regarded as anterior median eyes by WUNDERLICH (2015: 240, figs. A-B) but as POSTERIOR median eyes by PARK et al. (2019) and GUO et al. (2020) based on the structure of the tapetum. I disagree with this hypothesis. According to FOELIX (2015: 115) the tapetum of the “secondary eyes” varies strongly in different spider families, and in the huge eyes in lateral position of the Lagonomegopidae evolved probably convergently a peculiar tapetum similar to “main eyes”. If the huge eyes of the Lagonomegopidae actually are the posterior median eyes – are the anterior lateral eyes in the sense of fig. 101 actually the anterior median eyes? And what about the posterior median eyes in this fig.? This hypothesis appears not plausible to me.

(**) The existence of tarsal trichobothria has to be added to the emended family diagnosis by GUO et al. (2020: 2).

Relationships: In the Lagonomegopidae FEATHERY HAIRS (rarely) and TARSAL TRICHOBOTHRIA exist in contrast to the (remaining) families of the Palpimanoidea and spatulate leg hairs are absent like, e. g., in the Jurassic genus *Patarchaea* SELDEN et al. 2008 (see above, Palpimanoidea). Cheliceral “peg teeth” (more correctly bristles) exist like in most families of the Palpimanoidea (see tab. 1) but such bristles exist also in other families like Mimetidae (a family character) as well as in a single Theridiidae: *Borneoridion spinifer* DEELEMAN & WUNDERLICH 2011: 605, fig. 3 (bristles quite similar to “peg teeth”) (both Araneoidea) – see also the family Pararchaeidae - and in few Thomisidae. The relationships of the Lagonomegopidae are still debated. If Lagonomegopidae turns out not to be a member of the Palpimanoidea - but of a superfamily of its own, see GUO et al. (2020) - the diagnosis of the superfamily Palpimanoidea

would change, see the characters above. I suppose that the existence of feathery hairs of the Lagonomegopidae – in only a single species?! – may a **REGAIN** like the existence of leg bristles of Micropalpimanidae, Huttoniidae and a single Archaeidae (*Spiniarchaea* n. gen.). The existence of tarsal trichobothria (and more than a single metatarsal trichobothrium as well) may be "apomorphic regains" of the family Lagonomegopidae which probably branched most basally in the cladogram of tab. 1 or earlier.

Distribution in space and time: Widely spread in the Northern Hemisphere, North America and Eurasia in lowest to upper Cretaceous (almost 140 to 100 or even ca. 85 million years ago), preserved in amber and in stone, see WUNDERLICH (2012: 201) and (2015: 243); Korea has to be added to this map; see also PARK et al. (2019). By far most genera of the family are known from the Upper (Mid) Cretaceous Burmese amber.

Biology: Ecology and behaviour of this ecribellate and quite diverse family have been discussed by WUNDERLICH (2015: 241-242) and (2017: 191-194). According to the very variable size, the shape and the coloration of body (fig. 99) and legs - the quite differing hairs of the legs (short/long/sparse/dense/pseudoscopulate) - the life style of these fossil spiders has been very diverse, and a pronounced intrafamiliar ecological separation existed: Most species lived apparently on trees, some probably as night-active sit-and-wait predators like extant Archaeidae, and thus were frequently captured by the sticky resin. Other species were probably vagile hunters and few (which are rarely preserved in the amber) short-legged species were probably vagile soil-dwelling hunters. According to its mediograde leg position and the quite long and dense hairs of the anterior legs I do not want to exclude a gliding ability of *Lineaburmops hirsutipes* WUNDERLICH 2015 like certain extant members of the spider family Selenopidae (RTA-clade) of South America, see WUNDERLICH (2017: 192) and certain Insecta: Hymenoptera: Myrmicinae: *Cephalotes squamosus* in the Miocene Dominican amber forest. - Lagonomegopidae fed apparently not on spiders but on flying insects; my collection contains few Lagonomegopidae with Diptera as prey, e. g., a male of ?*Paxillomegops* sp. indet., F3150/BU/CJW; see also *Archaelagonomegops* sp. indet. in Burmite, WUNDERLICH (2015: 248). Did certain spiders like the hairy *Lineaburmops* capture their flying prey directly from the air with the help of their hairy anterior legs?

Extinction (see WUNDERLICH (2015), (2017: 190, 194) and (2019: 24-25): Lagonomegopidae was a very diverse and "successful" family which was widely distributed in the Northern Hemisphere (see above) for probably far more than 70 million years in the Cretaceous and in my opinion already in the Jurassic. It disappeared at about the same period around the KT-events like the dinosaurs. Apparently around the KT-events ca. 65 million years ago was the era of the strong radiation of members of the RTA-clade. Certain members of this clade - like Sparassidae and Thomisidae - were sit-and-wait predators on trees like apparently most members of the Lagonomegopidae and probably displaced this family. But - on the other hand - numerous members of the Archaeidae - sit-and-wait predators, too – survived; they were diverse on the Northern Hemisphere in the Eocene Baltic amber forest as well as in the Mid Cretaceous Burmese (Kachin) amber forest

Family **MECYSMAUCHENIIDAE** SIMON 1895 (figs. 103-107)

Diagnostic characters: See tab. 1. Six or eight (subfamily Zearchaeinae) eyes in a wide filed, cuticula smooth; spinnerets: In extant taxa only the posterior lateral pair is well developed but see below (*Palaeozearchaea*).

Relationships (see tab. 1, *Archaemecys* and *Palaeozearchaea* below): The family Mecysmaucheniidae is usually regarded to be most related to the Archaeidae. Main differences:
- The retrolateral stridulatory files (fig. 103) are widely spaced in contrast to to the Archaeidae in which the files are closely packed in a small field;
- A sclerotized ring around the spinnerets is absent but existing in almost all members of the Archaeidae;
- ♂-pedipalpus (fig. 107): Cymbium large/wide but quite slender in the Archaeidae; bulbus simple with a short embolus, but complicated, with conspicuous sclerites and a long embolus (fig. 98 of *Spiniarchaea*).

Distribution: In contrast to former times Mecysmaucheniidae – similar to the family Archaeidae - is restricted today to the Southern Hemisphere, reported from South America and the Australian Region. - According to the existence of a sclerotizised ring around the spinnerets and the existence of two pairs of spinnerets the dubious *Archaemecys arcantiensis* SAUPE & SELDEN 2009 – subad. (!) ♂ in Early Cretaceous amber from France, described under Mecysmaucheniidae – may in my opinion well be a member of the family Archaeidae (see above) but not of the Mecysmaucheniidae.

Here I describe the new genus *Palaeozearchaea* which possesses typical characters of the family Mecysmaucheniidae and is to my knowledge the oldest surely known member of this family, the first one in Burmite and from the Mesozoic.

Palaeozearchaea WUNDERLICH **n. gen**.

Etymology: The name refers to the old/ancient existence of the new genus, from palae- (gr.) previously and the mecysmaucheniid genus name Zearchaea.

The gender of the name is feminine.

Type species (by monotypy): *Palaeozearchaea depressa* n. sp.

Diagnostic characters (♂; ♀ unknown; the prosoma is strongly deformed): 8 eyes, only two cheliceral "peg teeth" were recognized by me, metatarsus II with a weak brush of hairs (fig. 105), opisthosoma apparently with a dorsal scutum, at least anterior and posterior spinnerets (fig. 106) well developed; pedipalpus (fig. 107) with thick/stout articles, sclerites of the bulbus simple, embolus hidden..

Relationships: Like in other Mecysmaucheniidae the cheliceral stridulatory files are widely spaced (fig. 103), leg bristles and spatulate leg hairs are completely absent, and a sclerotized ring around the spinnerets is also absent, but a dorsal opisthosomal scutum exists apparently, and at least two pairs of spinnerets are well developed. Like in the extant members of the subfamily Zearchaeinae from Chile and New Zealand exist 8 eyes, a strongly reduced number of cheliceral "peg teeth" and simple structures of the bulbus, but in the extant members of the Zearchaeinae an opisthosomal scutum is absent, the spinnerets are strongly reduced and the articles of the ♂-pediplpus are more slender.

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

Palaeozearchaea depressa WUNDERLICH **n. gen. n. sp**. (figs. 103-107), photo 18

Etymology: The species name refers to the strongöy depressed prosoma, from depressus (lat.) = low, dorso-ventrally depressed.

Material: Holotype ♂ in Upper (Mid) Cretaceous Burmite, F3639/BU/CJW.

Preservation and syninclusions: The spider is mainly well reserved in a mainly clear yellow-orange piece of amber, the opisthosoma is dorso-ventrally distinctly depressed and deformed, the opisthosoma is also (less) deformed an covered by tiny bubbles and probably with an emulsion. - Syninclusions are few Collembola, few tiny plant hairs and particles of detritus.

Diagnostic characters, relationships and distribution: See above.

Description (♂):
Measurements (in mm): Body length 1.8; prosoma (deformed): Length 0.85, width ca. 0.7; opisthosoma: Length 1.0, width almost 0.6; leg I: Femur 1.0, patella 0.45, tibia 0.85, metatarsus 0.5, tarsus 0.5, tibia II 0. 75, tibia IV 0.95, metatarsus IV 0.63, tarsus IV 0.58.
Colour: Prosoma dark red brown, legs medium brown, not annulated, opisthosoma light grey, the questionable dorsal scutum dark brown.
Prosoma (fig. 103, photo) dorso-ventrally distinctly depressed, the cephalic part was originally probably distinctly raised, hairs short, indistinct and probably rubbed off, fovea absent, 8 deformed and partly hidden eyes in two not wide rows, chelicerae and mouth parts partly hidden and deformed, basal cheliceral articles robust, bearing later-

ally a large and widely spaced field of stridulatory files, fangs stout, I recognized only two “peg teeth” of the anterior margin of the left fang furrow, gnathocoxae long and fairly converging above the labium, sternum wide, distinctly spacing the coxae IV. Legs (figs. 104-105) only fairly long, order IV/I/II/III, patellae relatively long, hairs short and indistinct, bristles and spatulate hairs absent but metatarsus III-IV bearing a garland of strong and almost bristle-shaped hairs, metatarsus II bearing dorsally-apically a weak brush of hairs, trichobotria long, existing on tibiae and metatarsi, three well developed tarsal claws, the paired claws toothed, their position on I 0.5 (right) rsp. 0.43 (on the left article), on IV in 0.72, tarsus I with long, erect and straight sensory hairs which are – according to their shape – not trichobothria. – Opisthosoma (fig. 106, photo) deformed, hairs short, dorsally in the middle apparently with a dark brown scutum which is partly hidden by a questionable emulsion; epigaster and most spinnerets hidden. – Pedipalpus: see above.

Family **MICROPALPIMANIDAE** WUNDERLICH 2008 (figs. 108-116)

Only a single extinct genus and species – *Micropalpimanus poinari* WUNDERLICH 2008 – has been described in Burmite, although more (“hidden”) species may exist as, e. g., the quite variable sclerotization of the opisthosoma may indicate. In this paper I describe a second species of this family and genus and list some new material of *Micropalpimanus*.

Diagnostic characters: Prosoma not granulate, strongly raised in both sexes (fig. 108), distal leg articles bearing numerous spatulate hairs (fig. 109), tibia III, e. g., frequently (!) bearing a prodistal bristle which is well developed (fig. 110), few additional leg III-IV bristles may exist, epigaster strongly sclerotized, frequently dorsal parts of the opisthosoma hardened, rarely even scutate, ♂-pedipalpus (e. g. figs. 114-115): Tibia with a large ventral outgrowth, bulbus bearing a median apophysis, a terminal apophysis and a bent apical conductor; the position of the embolus is not sure. Body length usually 1.5-2 mm.

Further characters: Retrolateral stridulatory cheliceral files existing (fig. 108), pedipalpal femur with several prolateral stridulatory teeth (fig. 113).
Note: Tarsal trichobothria and more than a single metatarsal trichobothrium are absent, spatulate leg hairs exist on leg I-II; these patterns contra WUNDERLICH (2015: 266).

Relationships: See tab. 1. I consider the family to be the sister group of Palpimanidae + Stenochilidae. In the family Huttoniidae - which is not strongly related - exists few leg (III-IV) bristles, too.

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

Micropalpimanus gibber WUNDERLICH **n. sp**. (figs. 111-115), photo 19

Etymology: The species name refers to the ventral outgrowth of the pedipalpal tibia, from gibber (lat.).

Material: Holotype ♂ in Upper Cretaceous Burmite, F3649/BU/CJW.

Preservation and syninclusions: The spider is well and almost completely preserved in a slightly muddy piece of amber, the right metatarsus and tarsus I are cut off, the prosoma is laterally fairly compressed, the eyes are deformed, the right pedipalpus is very well preserved. – Syninclusions are tiny droplets.

Diagnostic characters (♂; ♀ unknown): Dorsal prosomal hairs (fig. 111) quite long; pedipalpus (figs. 113-115): Femur with two ventral humps and several prolateral stridulatory teeth, tibia with a long ventral outgrowth.

Description (♂):
Measurements (in mm): Body length 2.0; prosomal length 0.95; opisthosomal length 1.1; patella I 0.25, tibia I 0.45, femur II 0.85; length of the dorsal prosomal hairs up to 0.2.
Colour: Prosoma and legs dark brown, legs not annulated, opisthosoma grey.
Prosoma (fig. 111, photo) slender, cephalic part strongly raised and bearing dorsally long erect hairs, 8 deformed eyes in two rows, basal cheliceral articles fairly large, “peg teeth” hidden, mouth parts hidden by a bubble. – Legs (fig. 112) slender, only fairly long, patellae relatively long, tarsi slightly longer than metatarsi, hairs long, true bristles absent but metatarsus IV bears apically a garland of bristle-shaped hairs, and tarsi III-IV bear ventrally-distally shorter bristle-shaped hairs, tarsi and metatarsi I prolaterally with numerous spatulate hairs, position of the long trichobothrium on metatarsus IV in 0.8, unpaired tarsal claws well developed and bent in a right angle, paired claws toothed. – Opisthosoma oval, hairs of medium length, epigaster distinctly sclerotized, posterior spinnerets long. - Pedipalpus (figs. 113-115): Femur with two ventral humps and prolaterally with several deformed stridulatory teeth, patella short, tibia ventrally with a longer and divided apophysis which is directed to the large cymbium which bears long and strong retrolateral hairs, bulbus bearing a large subtegulum, well developed median an terminal apophyses and apically a bent conductor, the embolus is hidden, its shape and position are unsure.

Relationships: In *Micropalpimanus poinari* WUNDERLICH 2008 (and sp. indet, see below) the shape of the conductor is quite similar but the ventral tibial outgrowth of the pedipalpal tibia is shorter, and the dorsal prosomal hairs are also shorter.

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

Short notes on new material of *Micropalpimanus* indet.: 3♂ in Upper (Mid) Cretaceous Burmite:

F3638/BU/CJW is excellently preserved, the slender pedipalpi, too, the opisthosoma is distinctly deformed.
F3640/BU/CJW is well preserved, the left pedipalpal tibia is thickened, most probably caused by the preservation.
F3641/BU/CJW is very well preserved, the tip of the cephalic part is cut off, the right basal cheliceral article possesses a retrolateral outgrowth which is apparently caused by the preservation.

The three pairs of spinnerets are well observable in F3640, the anterior and the posterior spinnerets are well observable in F3641. Few leg III and/or IV bristles exist in all specimens.

Family **PALPIMANIDAE** THORELL 1870 (fig. 116)

Today the spider feeding members of the Palpimanidae exist mainly in tropical and subtropical parts of the world, excluding Australia. Fossils are reported from Miocene Dominican amber and recently by MATTHEW & SELDEN (2019) (Internet) in stone from the Cretaceous (115 Ma) of Brazil, the Crato formation.

Diagnostic characters and relationships: See tab. 1 and the related family Stenochilidae. Rarely few leg bristles exist.

Family **PLANARCHAEIDAE** WUNDERLICH 2017 **n. stat.**

Planarchaeini WUNDERLICH 2017: 186.

Synonymy: Lacunaucheniinae WUNDERLICH 2008 = Archaeinae, see WUNDERLICH (2017: 166): Its type genus, *Lacunauchenius* WUNDERLICH 2008, is regarded as a synonym of *Burmesarchaea* WUNDERLICH 2008.

Note: In the dubious genus *Eoarchaea* FORSTER & PLATNICK 1984 (preserved in Eocene Baltic amber, male unknown) the cephalic part is not step-like raised, a sclerotized ring around the spinnerets as well as – probably – spatulate leg hairs are absent like in the Planarchaeidae (and in the Mecysmaucheniidae). Several characters of *Eoarchaea* MAY indicate relationships to the Archaeidae, see FORSTER & PLATNICK (1984: 26).

Type genus: *Planarchaea* WUNDERLICH 2017. – Further genera: *Eomysmauchenius* WUNDERLICH 2008, *Filiauchenius* WUNDERLICH 2008, *Planarchaea* WUNDERLICH 2015 and *Platychelae* n. gen.

Diagnostic characters (see tab. 1): Cephalic part strongly narrowed and protruding (apomorphy), not step-like elevated (figs. 118, 121), prosomal cuticula not granulate, legs extremely long (photos 20-21) (apomorphy), loss of spatulate leg hairs (apomorphy), opisthosoma soft, bulbus quite small (fig. 119).

Relationships (see tab. 1): Probably Huttoniidae + Vetiatoridae is the sister group, but - according to the close position of the lateral eyes and the absence of a sclerotized epigaster as well as of leg bristles Vetiatoridae may be more related than Huttoniidae.

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

Key to the genera of the family Planarchaeidae:

1 Leg III not distinctly the shortest leg, ♀-pedipalpus much longer than the prosoma, only few cheliceral “peg teeth”, ♂ unknown. - *F. paucidentatus* ..... *Filiauchenius*

- Leg III distinctly the shortest, ♀-pedipalpus not (much) longer than the prosoma (fig. 121), numerous “peg teeth” (fig. 122). 2

2(1) Anterior spinnerets contiguous and quite stout, almost as wide as long (fig. 124). ♂ unknown. – *P. longicorpus* n. sp. ..... *Platychelae*

- Anterior spinnerets distinctly spaced and of usual shape 3

3(2) Opisthosoma oval, ca. 1.3-1.4 times longer than high or wide. Pedipalpus of the questionable male of E. dubius: See WUNDERLICH (2017). 3 species..... ..... *Eomysmauchenius*

- Opisthosoma more than twice as long as wide (figs. 117-118). ♂-pedipalpus figs. 119-120. 4 species ..... *Planarchaea*

Taxa of the family Planarchaeidae:

Eomysmauchenius WUNDERLICH 2008
dubius WUNDERLICH 2017 (♂) (in my opinion its congenerity is not sure)
ovata (WUNDERLICH 2017) (♀) (**n. comb**.) according to the oval shape of the opisthosoma
septemtrionalis WUNDERLICH 2008 (?ad. ♀)

Filiauchenius WUNDERLICH 2008
paucidentatus WUNDERLICH 2008 (♀)
kopp WUNDERLICH 2015 (♀)
longissipes (WUNDERLICH 2015) (= *Lacunauchenius l*.) (♂), see WUNDERLICH (2017: 166)
oblonga WUNDERLICH 2017 (♀)
(*ovata* WUNDERLICH 2017: See *Eomysmauchenius o*.)

Planarchaea WUNDERLICH 2015
incompleta **n. sp**. (♂)
kopp WUNDERLICH 2015 (♀)
longissipes (WUNDERLICH 2015) (= *Lacunauchenius l*.) (♂) (see WUNDERLICH 2017: 166)
oblonga WUNDERLICH 2017 (♀)
(*ovata* WUNDERLICH 2017: See *Eomysmauchenius o*.)

Platychelae **n. gen**.
longocorpus **n. sp**.

Planarchaea WUNDERLICH 2015: 187

4 species, see the list above.

Diagnostic characters (see the key above and WUNDERLICH (2017: 186)); legs, opisthosoma (more than twice as long as wide) and pedipalpal articles very long (figs. 117-120, photos 20-21), ♂-pedipalpus as in figs. 119-120.

Relationships: In *Eomysmauchenius* the opisthosoma is only 1.3-1.4 times longer than wide; see the key above.

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

Planarchaea incompleta WUNDERLICH **n. gen. n. sp**. (figs. 117-120), photo 20

Etymology: The species name refers to the incompletely body of the holotype, from (lat.) incompletus.

Material: Holotype ♂ in Upper (Mid) Cretaceous Burmite, F3647/BU/CJW.

Preservation and syninclusions: The spider is incompletely preserved in a fairly muddy yellow-orange piece of amber, the opisthosoma is completely absent, all right legs and the left leg II are cut off through their femora, most parts of the left patella IV, mainly the left tibia II and the left tarsus I are cut off, the right tarsus and metatarsus I are preserved.- Syninclusions are a spider thread in front of the prosoma of the holotype, 1 Thysanoptera, 1 Hymenoptera, 3½ Coleoptera, tiny plant hairs and particles of detritus.

Diagnostic characters (♂; ♀ unknown): Prosoma (figs. 117-120) similar in some respect to *Platythelae longicorpus*, femur I ca. 7 mm long, ca. 1.7 times longer than the body; pedipalpus (figs. 119-120) with very long and slender articles, bulbus protruding, its sclerites difficult to recognize, see below.

Description (♂):
Measurements (in mm): Body length (the opisthosoma is lost) probably about 4.4; prosoma: Length 1.7, width 0.95; leg I: Femur ca. 7.0, patella ca. 0.7, femur II ca.4.8, metatarsus III ca. 2.0, tarsus III ca. 1.0, tibia IV 2.8, pedipalpal femur ca. 1.5.
Colour: Prosoma dark brown, with longitudinal bands of lighter hairs, legs medium to dark brown, not annulated.
Prosoma (figs. 117-118, photo) with a large foramen, cephalic part not step-shaped raised, long and narrowed, thoracal part much wider, not corniculate, hairs short, fovea large/wide but low, 8 eyes in two wide rows, anterior median eyes largest, lateral eyes contiguous, basal cheliceral articles long and slender, lateral stridulatory files most probably absent, “peg teeth”, fangs and most mouth parts hidden because of the spider’s position. – Legs (photo) very long and slender, similar to long-legged Opiliones, order I/II/IV/III, I distinctly the longest, ca. 5 ½ times of the length of the body, III distinctly the shortest, bristle-less, hairs short and indistinct, patellae quite short, metatarsi much longer than the tarsi, position of the metatarsal trichobothria un-

known, the tiny tarsal claws were not studied. – Pedipalpus (figs. 119-120) with very long and slender articles and very small terminal parts, femoral stridulatory picks absent, cymbium relatively long, fairly wide, bulbus protruding, tegulum bearing at least two apophyses, embolus unknown.

Relationships: In the remaining congeneric species the legs are distinctly shorter and the structures of the bulbus are different.

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

Platythelae WUNDERLICH **n. gen**.

Etymology: The name refers to the stout/wide anterior lateral spinnerets, - in a figurative sense - from thel- (= spinnerets - in the Mesothelae - and platy (gr.) = wide.

The gender of the name is feminine.

Type species (by monotypy): *Platythelae longicorpus* n. sp.

Diagnostic characters (♀; ♂ unknown): Anterior lateral spinnerets large, stout and contiguous (fig. 124), legs extremely long (photo 21).

Relationships: To my knowledge in the remaining confamiliar genera the anterior lateral spinnerets are more slender and not contiguous.

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

Platythelae longicorpus WUNDERLICH **n. gen. n. sp**. (figs. 121-124), photo 21

Etymology: The species name refers to the long and slender body of the holotype, from longus (lat.) = long, and corpus (lat.) = body.

Material: Holotype ♀ in Upper (Mid) Cretaceous Burmite, F3647/BU/CJW.

Preservation and syninclusions: The spider is rather well preserved in a fairly clear light orange piece of amber, both pedipalpi are placed close to the prosoma, the prosoma is laterally, the opisthosoma dorsally depressed, the distal articles of all left legs and the medial articles of the right legs I-II are cut off, the left metatarsus IV bears basally a bubble and - like the left posterior spinneret - is strongly deformed. – Syninclusions are a small Coleoptera, a Thysanoptera, a tiny Acari near the right tarsus IV, the

tiny leg of an insect above the spider's opisthosoma and tiny scales - probably of a Lepidoptera – right of the spider's prosoma.

Diagnostic characters and relationships: See above.

Description (♀):
Measurements (in mm): Body length 4.2; prosomal length 1.9; opisthosoma: Length 2.4, width 1.0; leg I: The femora are distally cut off, preserved are 4.3 mm of the right femur which may have been 5-6 mm long, I estimate the length of the patella 0.6-0.7, of the tibia ca. 5.0, of the partly preserved metatarsus ca. 5.0, tarsus (it is only partly preserved) ca. 1.4, femur II 3.5, leg III: Femur 2.1, patella 0.4, metatarsus 1.4, tarsus 0.85, femur IV ca. 3.0.
Colour: Prosoma dark brown, legs and opisthosoma medium brown, legs not annulated.
Prosoma (figs. 121-123, photo) slender, prosomal part gradually raising, 8 eyes in two wide rows, anterior medium eyes largest, lateral eyes contiguous, clypeus short, foramen large, basal cheliceral articles long, slender and distally distinctly diverging, bearing long "peg teeth"; I did not recognize lateral files (nor stridulatory bristles on the pedipalpal femur), fangs long, gnathocoxae long and slender, serrula well developed, labium distinctly longer than wide, coxae IV distinctly spaced by the sternum. – Pedipalpus (fig. 121) long and slender, not spiny, tarsal claw apparently absent. – Legs (photo) extremely long and slender, order I/II/IV/III, I distinctly the longest, its femur distinctly longer than the body, III distinctly the shortest, patellae quite short, hairs short and indistinct, metatarsus III bears apically a garland of longer hairs, bristles, scaly and feathery hairs absent, position of the metatarsal trichobothria unknown, three tarsal claws which are well developed. – Opisthosoma (fig. 124, photo) 2.4 times longer than wide, soft, sclerotized ring around the spinnerets absent, hairs short, questionable spiracles are preserved near the three pairs of spinnerets which are well developed; the left posterior spinneret is strongly deformed, anterior lateral spinnerets contiguous, very thick, almost as wide as long (!), anal tubercle large, I did not recognize the lung covers, genital area only slightly protruding, sclerotized, the structures of the vulva may be well preserved.

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

Family **SPATIATORIDAE** PETRUNKEVITCH 1942 (figs. 125-127)

Diagnostic characters and relationships (see tab. 1 and below): Body slender, cephalic part raised (fig. 125), narrow eye field, anterior median eyes large, cheliceral "peg teeth" well developed, leg bristles absent, spatulate leg hairs existing, opisthosoma dorsally hardened, epigaster sclerotized, three pairs of spinnerets; ♂-pedipalpus

figs. 126-127. The branch Planarchaeidae + Huttoniidae + Vetiatoridae is PROBABLY the sister group.

Distribution: This extinct family is known from Eocene Baltic amber - see WUNDERLICH (2004: 757, 767, 806-807, figs. 48-56 p. 807), (2006) - and Upper Cretaceous amber in Burmite: *Spatiator putescens* WUNDERLICH 2015. The only known genus is *Spatiator* PETRUNKEVITCH 1942 but in my opinion - according to the different structures of the bulbus and the quite long patellae (patella I much longer than femur or tibia I (!)) IN THE EOCENE TAXA) - the Cretaceous and the Eocene species are not congeneric.

Family **STENOCHILIDAE** THORELL 1873 (figs. 128-130)

Stenochilidae is known from India, South East Asia and the Australian Region, see LEHTINEN (1982); fossils are unknown.

Diagnostic characters and relationships: See figs. 128-130 and tab. 1. Stenochilidae is supposed to be related to the Palpimanidae (see above) but the cephalic part is low, cheliceral “peg teeth” are absent and leg I is less powerful (fig. 130).

Family **VETIATORIDAE** WUNDERLICH 2015 (figs. 131-138)

Two genera of this extinct family have been described in Burmite: *Vetiator* WUNDERLICH 2015 and *Pekkachilus* WUNDERLICH 2017. Here I describe two further genera in Burmite: In *Praetervetianus* certain structures of the bulbus like the embolus are very well observable; in *Procervetianus* the mouth parts fig. 135) and the spinnerets (fig. 137) are very well preserved and observable.

Diagnostic characters and relationships: The cephalic part is not raised, cheliceral “peg teeth” and an epigastric sclerotization are absent, see tab. 1. Huttoniidae MAY probably be most related. Like in the Planarchaeidae - in contrast to Spatiatoridae and

Huttoniidae - the epigaster is not sclerotized in the Vetiatoridae; in my opinion this sclerotization has been lost.

Notes: (1) Cheliceral “peg teeth” are absent within the Palpimanoidea in the Stenochilidae, in the Vetiatoridae as well as in adult Lagonomegopidae. – (2) In the Huttoniidae the anterior and the posterior lateral eyes are distinctly spaced in contrast to the Vetiatoridae (in the Vetiatoridae the eye field is variable: Narrow in *Vetiator*, wide in *Procervetiator*), the alveolus is deep and the bulbus is strongly protruding in the Huttoniidae. - (3) Leg bristles and a true metatarsal “preening comb” are absent in the Vetiatoridae. In contrast to the Vetiatoridae in the Huttoniidae few thin leg bristles exist like in the Micropalpimanidae (figs. 109-110), in certain species of the family Archaeidae (*Spinarchaea* n. gen., fig. 96) and in Jurassic palpimanoid taxa, see SELDEN et al. (2019). - (4) Spatulate leg hairs exist in the Vetiatoridae (contra WUNDERLICH (2017)) although I did not recognize such hairs in the present holotypes of *Praetervetianus* and *Procervetiator*. These hairs may be quite tiny and difficult to observe like in the family Archaeidae.

Praetervetianus WUNDERLICH **n. gen**.

Etymology: The name refers to the related genus name Vetiator - its gender is masculine - and to praeterior (lat.) = except.

The gender of the name is masculine.

Type species: *Praetervetiator circulus* n. sp.

Diagnostic characters (♂; ♀ unknown): Prosomal cuticula distinctly granutale (fig. 131), embolus (fig.133) in a circular position.

Relationships: According to the low cephalic part, the absence of a fovea and cheliceral “peg teeth” as well as the large cymbium I regard *Praetervetiator* as a member of the family Vetiatoridae. In the other Cretaceous con-familiar genera the granules of the prosomal cuticula are only weakly developed and – as known so far – the shape of the embolus is different.

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

Praetervetiator circulus WUNDERLICH **n. gen. n. sp**. (figs. 131-133), photo 23

Etymology: The species name refers to the circular shape of the embolus, from circulus (lat.) = circular.

Material: Holotype ♂ in Upper (Mid) Creataceous Burmite, F3568/BU/CJW.

Preservation and syninclusions: The spider is very well preserved in a small yellowish piece of amber, the whole opisthosoma and the right side of the legs are densely covered with tiny bubbles, the distal articles – including most tarsi – of the right leg I and the left legs I, II and IV are cut off. – Syninclusions are absent; a fissure exists laterally on the prosoma.

Diagnostic characters, relationships and distribution: See above.

Description (♂):
Measurements (in mm): Body length 2.5; prosomal length 1.0; opisthosoma: Length 1.2, width 0.6; leg I: Femur 0.9, patella 0.2, tibia ca. 0.85, femur III 0.85; leg IV: Femur > 0.7, patella 0.2, tibia 0.94, metatarsus 0.85, tarsus 0.4.
Colour medium to dark brown.
Prosoma (fig. 131, photo) distinctly longer than wide, distinctly narrowing anteriorly, profile fairly convex, fovea absent, cuticula distinctly granulate, 8 eyes in two rows are partly hidden, clypeus short, basal cheliceral articles long, lateral stridulatory files and area of the “peg teeth” not observable, fangs only fairly long, mouth parts and most parts of the sternum hidden.- Legs (fig. 132, photo): Order IV/I/II/III, slender, III distinctly the shortest, patellae and tarsi short, bristles and metatarsal III-IV “preening comb” absent, position of the metatarsal trichobothrium I-IV in +/- 0.88, unpaired tarsal claw existing; I did not find spatulate leg hairs. – Opisthosoma (photo; most parts are hidden) twice as long as wide. – Pedipalpus (fig. 133) with slender articles, tibia with a retrodistal bristle, cymbium large, bearing some long retromarginal hairs, bulbus with a sclerotized abpophysis and a circular embolus in a distal position.

Procervetiator WUNDERLICH **n. gen**.

Etymology: The genus name refers to the quite long and slender prosoma, from procerus (lat.) = slender.

The gender of the name is masculine.

Type species (by monotypy): *Procervetiator fruticosus* n. sp.

Diagnostic characters (♂; ♀ unknown) **and relationships**: According to the low cephalic part, the absence of a fovea and cheliceral “peg teeth” as well as the large cymbium I regard *Procervetiator* as a member of the family Vetiatoridae. The long and very slender prosoma (fig. 134), the quite long labium, the very long gnathocoxae which are only slightly converging (fig. 135), the brush of longer prodistal hairs of metatarsus I (fig. 136) as well as - partly - the wide eye field (fig. 134) separates *Procervetiator* from the remaining confamiliar genera. Longer hairs of the cymbium are

absent, bulbus strongly deformed (fig. 138). I did not find spatulate leg hairs. Because of its characters *Procervetiator* is an unusual member of the family Vetiatoridae.

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

Procervetiator fruticosus WUNDERLICH **n. gen. n. sp**. (figs. 134-138), photo 22

Etymology: The species name refers to the shrubby hairs at the end of metatarsus I, from fruticosus (lat.) = shrubby.

Material: Holotype ♂ in Upper (Mid) Cretaceous Burmite, F3636/BU/CJW.

Preservation and syninclusions: The spider is completely preserved in a clear flat yellow-orange piece of amber, the opisthosoma is dorsally widely inclined, probably by a beat, the legs and the pedipalpi are partly deformed (probably by natural heating), the left bulbus is strongly deformed in two parts. – Syninclusions are some spider threads just behind the spinnerets as well as left below the spinnerets and the opisthosoma, 1 Coleoptera left of the spider's legs, remains of several arthropods, numerous tiny plant hairs and particles of detritus; several stony particles exist, too, one is preserved to the right of the legs of the spider.

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

Description (♂):
Measurements (in mm): Body length 1.8; prosoma: Length 0.85, width 0.47; opisthosoma: Length 1.0, width 0.55; leg I: Femur ca. 0.75, patella 0.3, tibia 0.55, metatarsus more than 0.35, tarsus 0.4; tibia II ca. 0.52, tibia III 0.3, tibia IV 0.5, metatarsus IV 0.45, tarsus IV 0.4.
Colour dark brown, legs not annulated.
Prosoma (figs. 134-135, photo) 1.8 times longer than wide, low, cephalic part strongly narrowed and only slightly elevated, cuticula weakly rugose, hairs indistinct, fovea and feathery hairs absent, 8 eyes in a wide field, anterior median eyes quite widely spaced and distinctly the largest, posterior row strongly procurved, anterior and posterior eyes close together, clypeus short, basal cheliceral articles robust, not or not distinctly diverging, fangs long, teeth of the fang furrow not surely observable but "peg teeth" are most probably absent, gnathocoxae very long and slender, slightly converging, serrula well developed, labium also very long and slender, fused to the sternum which is finely rugose, spacing widely the coxae IV. – Legs (fig. 136, photo) long and slender, I not distinctly the longest, III distinctly the shortest, bristles and feathery hairs absent, but few strong and almost bristle-shaped hairs exist, e. g., ventrally near the end of the left tibia and metatarsus IV; I did not find spatulate hairs, hairs quite indistinct except for tarsi and metatarsi, tarsus and metatarsus I ca. equal in length, metatarsus IV longer than tarsus IV (see above), position of the long metatarsal I trichobothrium in 0.68, onychium existing, unpaired tarsal claw well developed and bent in a right angle, paired claws probably smooth. Metatarsus I bears a proapical brush of longer hairs, tarsus III ventrally with stronger hairs but no preening comb. – Opisthosoma (fig. 137,

photo) 1.8 times longer than wide, apparently dorsally and ventrally hardened but not scutate, epigaster not or not distinctly sclerotized, ring around spinnerets absent, hairs quite indistinct and placed on tiny humps, feathery hairs absent, anal tubercle large, colulus absent (a questionable artefact exists), three pairs of well developed spinnerets (the area is deformed and partly hidden). – Pedipalpus (fig. 138) with slender articles, bristles absent, cymbium large, longer hairs absent, bulbus strongly deformed in two parts, probably expanded, bearing a tiny claw-shaped structure, embolus unknown.

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

Superfamily DEINOPOIDEA s. l.

Within this superfamily several important characters are quite variable (see tab. 2): A cribellum and femoral trichobothria – their existence are family characters of all EXTANT TAXA OF THE ULOBORIDAE – exist or are absent in Cretaceous fossil taxa, at least in the male sex and probably even in certain Uloboridae.
Most probably members of Cretaceous Deinopoidea already used orb webs - see the new family Eodeinopidae and WUNDERLICH & MÜLLER (2018: 15) (*). Extant genera which are strongly related to the extinct genus *Paramiagrammopes* WUNDERLICH 2008 - like *Miagrammopes* O. PICKARD-CAMBRIDE 1869 – build orb webs.
On the generic and family level Deinopoidea is one of the most diverse superfamilies of spiders in Burmite, in the Cretaceous and in the whole Mesozoic as well; in the Burmese amber forest it was apparently the most diverse superfamily of entelegyne spiders on these levels, see WUNDERLICH (e. g. 2015). As shown in this paper more than ten deinopoid families existed 100 million years ago in a single forest, the Burmese amber forest of South Asia, compared with only 2 families and about two dozen genera – 3-4 of the Deinopidae, almost twenty of the Uloboridae – today worldwide. Uloboridae – at least 7 genera – was the most diverse family at that time and *Paramiagrammopes* – more than 20 species - was the most diverse genus, see below.
To my knowledge all genera and almost all suprageneric taxa of the Deinopoidea are extinct; the still existing family Uloboridae is an exception. The “crown taxon” Uloboridae of the Deinopoidea existed already in the Mid Cretaceous Burmese amber forest; they possessed femoral trichobothria. Contrarily, the typical Cretaceous taxa of the Deinopidae were still absent in that period, see below. It is remarkable that 11 of ca. 12 families (80%) of the Deinopoidea are extinct. Within the also very diverse Synspermiata only 25% of the families are extinct, within the Palpimanoidea 40%. The reasons for the high rate of family extinction of the Deinopoidea may be the restriction to high strata of the vegetation and the capturing only by orb webs in contrast to the diverse lifestyle of the Synspermiata and Palpimanoidea. The displacement of most higher

taxa of Deinopoidea through the very diverse superfamily Araneoidea mainly after the KT-events may be another reason.
The most remarkable new findings of fossils of this superfamily concern patterns of the eyes and of the existence or absence of femoral trichobothria: (a) Regarding size and position of the eyes - not enlarged posterior median eyes in two rows - the Cretaceous Deinopoidea like members of the family Eodeinopidae (see below) possessed plesiomorphic characters in contrast to the peculiar patterns of the extant taxa which possess very large posterior median eyes (fig. 139). The plesiomorphic size and position of the eyes of the Cretaceous *Eodeinopes longipedes* WUNDERLICH 2017 are quite different from extant related taxa, and the members of the extant Deinopidae may be called a "crown taxon". - (b) Femoral trichobothria exist in all extant members of the family Uloboridae and in most or even all Cretaceous uloborid taxa (figs. 206, 223) but in certain (questionable) Cretaceous Uloboridae femoral trichobothria are strongly reduced like in the tiny *Microuloborus* (probably caused by dwarfism); see also the dubious new genus *Pseudokachin*. Were these sensory hairs still absent in certain ancient taxa or were they lost – or both in different taxa? Existence/absence of femoral trichobothria in the remaining families: See tab. 2 as well as (4) under "diagnostic characters" below.
By far most extinct deinopoid families are only known by very few specimens, frequently by not more than one or two taxa and/or even specimens. Much more - and well preserved - material is needed to recognize the cribellum as well as the structures of the male pedipalpus, and to find out more close relationships of fossil taxa of the Deinopoidea; see, e. g., the genus *Deinopedes* WUNDERLICH 2017 (Eodeinopidae) and the dubious *Pseudokachin tuberculatus* n. gen. n. sp.
In this paper the new families Crassicephalidae, Dubiodeinopsidae, Dubiouloboridae, Eodeinopidae and Scutuloboridae as well as several further taxa (genera and species) - mainly of the family Uloboridae – are described: The new genera *Boavista* and *Pseudokachin* as well as new species of the genera *Kachin*, *Microuloborus*, *Paramiagrammopes* and *Propterkachin*. Tab. 2 below may be helpful for the determination of families, subfamilies and genera. Most males of these taxa are easy to identify by the structures of their pedipalpus. *Mesozygiella* (in amber from Spain) as well as the recently described new families Pilosarachnidae and Gigarachnidae in Burmite: See below and the Pholcochyroceridae.

(*) Numerous extant members of the diverse ECRIBELLATE superfamily Araneoidea construct orb webs, too, but the proof of an araneoid orb web from the Cretaceous is still wanting; see WUNDERLICH & MÜLLER (2018), the family Zarqaraneidae.

Diagnostic characters of the superfamily Deinopoidea in a wide sense which is used in this paper, including extant and fossil taxa: Besides the CRIBELLATE orb web I don't know a single (apomorphic) character which has not convergently been evolved (with)in an another superfamily. To my knowledge Deinopoidea actually can only be defined by a COMBINATION of characters, which all - one, two or even three (!) - characters can be lost in the same supraspecific taxon. COMMENTS AND NOTES ON THE VARIABLITY: See below and tab. 2.

(1) Basically cribellate (a plesiomorphic character). Cribellum and calamistrum are reduced or even lost (so in several extinct taxa) at least in the male sex, see, e. g., the

Crassicephalidae, the Dubiouloboridae n. fam. and probably certain Uloboridae like the dubious taxon *Pseudokachin tuberculatus* n. gen. n. sp.

(2) Existence of an orb web (probably an apomorphic character, perhaps separately evolved in the Araneoidea). The orb web of the cribellate Deinopoidea contains - besides non-sticky threads - very fine sticky “cribellate” and “wool-shaped” threads in its capture area, see, e. g., WUNDERLICH & MÜLLER (2018: 15, figs. 31-33, photo 10), but sticky DROPLETS exist - solely - in the capture area of members of the Araneoidea and Pholcidae. The existence of an orb web in most families of fossil Deinopoidea is unsure but it existed probably in members of the fossil (and extinct) Uloboridae - see WUNDERLICH (2018) - in which extant related members build this kind of capture web. In the extant family Deinopidae the orb web is strongly modified; in the genera *Deinopedes* WUNDERLICH 2017 and *Eodeinopis* WUNDERLICH 2017 (Eodeinopidae n. fam.) probably a strongly modified orb web existed, too.

(3) Apophyses of the male pedipalpal articles - except probably existing hidden apophyses of coxa and trochanter - are absent, e. g., in *Boavista* n. gen. and apparently in *Microuloborus* of the Uloboridae, in the Crassicephalidae n. fam., in the Deinopidae (extant), Eodeninopidae, Scutulobridae, at least in certain Salticoididae and in *Dubioulobotix* of the Dubiouloboridae; their existence in the Frateruloboridae is unknown. See the families Pilosarachnidae and Gigarachnidae above and tab. 2. In most extant uloborid taxa exist apophyses of the BASAL pedipalpal apophyses, and apophyses of distal articles have apparently been lost usually except in few taxa: A large dorsal tibial apophysis exists, e. g., in *Miagrammopes latens* BRYANT, see OPELL (1979: fig. 90).

(4) The existence of femoral trichobothria (fig. 206, 223) may be an apomorphy or a synapomorphy of the Frateruloboridae and the Uloboridae. They may be strongly reduced or even absent in certain Uloboridae; see *Microuloborus* and *Pseudokachin*. Such hairs are difficult to recognize, and were previously overlooked by me in some taxa, see the genus *Paramiagrammopes* below;

(5) A pectunculus - see PETERS (1982) - exists in almost all deinopoid taxa (fig. 189) (a plesiomorphic character of the Deinopoidea). Rather short (rarely longer) ventral bristles on tarsus/metatarsus III (IV), the pectunculus, exist also in the superfamily Oecobioidea and in certain Pholcochyroceroidea. A pectunculus is absent (lost) within the Deinopoidea, e. g., in certain Dubiouloboridae (rsp. strongly reduced) probably in the Praeareneidae, in certain Uloboridae: In the dubious taxon *Pseudokachin tuberculatus* as well as apparently in *Microuloborus*. See also above, the Pilosarachnidae.

(6) Existence of a circular, spiral or even screw-shaped embolus (figs. 160, 166, 182; also existing ín the Pilosarachnidae). In my opinion this is a plesiomorphic character. Such kind of embolus may be hidden in certain extant Uloboridae.

(7) Frequently (!) posterior eye row strongly recurved and anterior and posterior lateral eyes clearly spaced from each other like in all Uloboridae (probably an apomorphy of this family or even of the whole Deinopoidea) (figs. 293, 230); see tab. 2. The position of the eyes is different in the families Alteruloboridae WUNDERLICH 2018 (but see below, fig. 149), Crassicephalidae, Dubiouloboridae (fig. 161), Frateruloboridae, Praearaneidae and Salticoididae in which the lateral eyes are close together and the posterior eye row is usually not - or not distinctly – recurved.

(8) Feathery hairs (fig. 256) (see tab. 2) are apparently a plesiomorphic character of the extant Deinopidae, the extinct family Pilosarachnidae, the dubious family Gigarachnidae, the dubious extinct genus *Pseudokachin* and the (really all?) Miagrammopinae of the Uloboridae. Feathery hairs are quite difficult to recognize in certain fossil taxa, and - like femoral trichobothria - can easily be overlooked.

(9) Frequently in extant species – occasionally in fossil taxa - the opistosoma bears humps and/or is more or less elongated beyond the spinnerets (e. g., figs. 221, 228).

(10) A scutate opisthosoma exists only in the families Frateruloboridae (weakly) and Scutuloboridae (figs. 190, 198) (strongly). A leathery opisthosoma evolved also in *Spiniuloborus crux* of the family Uloboridae.

(11) There is no evidence of leg autotomy within members of the Deinopoidea.

The **relationships and the limits** of the Deinopoidea are unsure, see also above (diagnostic characters), the probably related superfamily Pholcochyroceroidea (see above), and WUNDERLICH in WUNDERLICH & MÜLLER (2018: 24). I regard the existence of a cribellum, feathery hairs and a pectunculus as plesiomorphic characters which already exist in the ancient superfamilies Pholcochyroceroidea and Oecobioidea in which femoral trichobothria are absent, and the position of the eyes as well as the shape of the prosoma are quite different. In contrast to the Araneoidea the spinnerets are not in a rosette-shaped position (including short posterior spinnerets) in the Deinopoidea, and an “araneoid retrobasal paracymbium” - like in most members of the ecribellate Araneoidea - which are partly orb-web weavers, too - is absent. Some deinopoid characters like the shape of the prosoma and the position of the eyes are similar to certain members of the superfamily Araneoidea, see the families Alteruloboridae, Crassicephalidae and Eodeinopidae.

Distribution: Cosmopolitical, at least since Jurassic.

List of the deinopoid families and genera known to me in 2020 in Burmese amber (Gigarachnidae JIANG & LI 2020: See above, below and Pholcochyroceridae):

Alteruloboridae WUNDERLICH 2018
  Alteruloborus WUNDERLICH 2018

Crassicephalidae **n. fam**.
  Crassicephalus n. gen.

Dubiodeinopsidae **n. fam**.
  Dubiodeinopsis n. gen.

Dubiouloboridae **n. fam**.
  Dubiouloborus n. gen.
  Dubiouloborix n. gen.

Eodeinopidae **n. fam**.
  Deinopedinae n. subfam.
    Deinopedes WUNDERLICH 2017
  Eodeinopinae n. subfam.
    Eodeinopis WUNDERLICH 2017

Fraterulobоridae WUNDERLICH 2018
    Fraterulobоrus WUNDERLICH 2018

?Pilosarachnidae JIANG & LI 2020
    Pilosarachne JIANG & LI 2020

?Praearaneidae WUNDERLICH 2017
    Praearaneus WUNDERLICH 2017

Salticoididae WUNDERLICH 2008
    Burmadictyna WUNDERLICH 2008

Scutuloboridae **n. fam**.
    Scutuloborella n. gen.
    Scutuloboroides n. gen.
    Scutuloborus n. gen.

Uloboridae THORELL 1869
  Uloborinae THORELL 1869
    Boavista n. gen.
    Burmasuccinus WUNDERLICH 2018
    Kachin WUNDERLICH 2017
    Microuloborus WUNDERLICH 2015
    Propterkachin WUNDERLICH 2017
    Spiniuloborus n. gen.
  Miagrammopinae O. PICKARD-CAMBRIDGE 1871
    Paramiagrammopes WUNDERLICH 2008
  Dubious taxon
    Pseudokachin n. gen.

Taxa of unsure relationships, dubious taxa:

Palaeoluloborus SELDEN 1990 and *Macryphantes* SELDEN 1990 in Cretaceous stone of Spain: See WUNDERLICH (2015: 330-331): In my opinion a member of the Deinopoidea, probably of the Uloboridae.

Mesozygiella PENNEY & ORTUNO 2006 - described from Lower Cretaceous amber of Spain - is quite similar to the family Araneidae and was considered by me to be a member of this family, see WUNDERLICH (2015: 338); but after knowing the high diversity of Cretaceous Deinopoidea I now think this genus is more likely a member of

the superfamily Deinopoidea and not of the Araneoidea. Its “free” paracymbium possesses a PRObasal position instead a retrobasal position of the Araneoidea.

The monotypic dubious genera *Bicalamistrum* WUNDERLICH 2015 (Uloboridae?), *Burmuloborus* WUNDERLICH 2008, see the long and slender opisthosoma (figs. 221-222) (three species, Uloboridae: *Paramiagrammopes*? sp.), *Ocululoborus* WUNDERLICH 2012 and *Pseudokachin* n. gen. (see below under Uloboridae) are not known by adult males; their relationships are quite unsure. I did not find femoral trichobothria nor feathery hairs in these taxa.

Eodeinopes WUNDERLICH 2017 and *Deinopedes* WUNDERLICH 2017: See the new family Eodeinopidae.

The family **Pilosarachnidae** (p. 32, 107-111) and the dubious family **Gigarachnidae**: See above, below and the Pholcochyroceridae.

Palaeomicromenneus PENNEY 2003 in Lebanese amber: The genus was first described as a member of the family Deinopidae, transferred by me (2015: 313) to the Salticoididae and treated - under Burmadictynidae – by me (2017: 220-221). Mainly because of its elongated leg I it is here regarded as a probably member of the Deinopoidea, of unsure family relationships, apparently an ancient/primitive member of the Deinopidoidea. See also below, under Eodeinopidae.

Praearaneidae: See p. 166 (Araneoidea).

Eotibiaapophysis WUNDERLICH 2018: See below, the family Eotibiaapophysidae of the RTA-clade s. l., p. 179 f.

Note on the family Leviunguidae WUNDERLICH 2018: Although a retrobasal paracymbium is absent (*) I regard the Leviunguidae as a member of the superfamily Araneoidea, see WUNDERLICH (2018: 101) but not of the Deinopoidea; a cribellum, a pectunculus, feathery hairs and femoral trichobothria are absent. In the Theridiidae - which MAY be related to the Leviunguidae - a retrobasal paracymbium (RBP) is absent and the tibia of the male pedipalpus is elongated, too, but in the Theridiidae – a member of the “spineless femur-clade” – femoral, metatarsal and lateral tibial bristles are absent and the tibia of the male pedipalpus is not extremely elongated but widened distally and bears a row of long subapical bristle-shaped hairs in a transverse position. In the known Cretaceous genera of the Theridiidae a long and coiled embolus does not exist, see below. In my opinion the RBP of the predecessor of the Leviunguidae has been lost convergently to the Theridiidae because (1) a theridiid RBP has been lost WITHIN the “spineless femur-clade” and (2) – according, e. g., to the structures of the male pedipalpus and of the chaetotaxy – the Cretaceous Theridiidae are not close to the Leviunguidae.

(*) A small retrobasal cymbial hump may exist in the Leviunguidae, see WUNDERLICH (2018: 100). – Note: On the same page has to delete “(well observable in *Leviunguis thilo* n. sp.)”; *thilo* refers to the the genus *Palaeoleptoneta* p. 61 of the same paper.

Family/genus	cribellum (calamistrum) (figs.149, 174b)	femoral trichobothria (fig. 206)	posterior eye row (*)	feathery hairs (fig. 189)	pectunculus (fig. 172)	Pedipalpal apophyses
Alteruloboridae	+	-	+	-	-	+
Crassicephalidae	-	-	-	-	weak	-
Deinopidae	+	-	+	+	+	-
Dubiodeinopsidae	+	-	+	-	+ (?)	+
Dubiouloboridae	+?	-	-	-	+	+
Eodeinopidae	+ (?)	-	+	-	+	-
Frateruloboridae	+	+	+	-	+	?
Pilosarachnidae?	+	-	-	+	-	-
Praearaneidae?	- (?)	-	-	-	- (?)	-
Salticoididae	+	-	-	-	+	- (+?)
Scutuloboridae	+	-	+	-	+	-
Uloboridae	+ (-)	+ (-)	+	+/-	+	+ (-)
Boavista	+	+	+	-	+	-
Burmasuccinus	?	- (!)	+	+	+	+
Kachin	+	+	+	-	+	-
Microuloborus	+	+ (red.)	+	-	-	- (?)
Paramiagrammopes	+	+	+	+	+	+
Propterkachin	+	+	+	-	+	+
Pseudokachin (♀)	- (!)	+	+	+	-	?
Spiniuloborus (♀)	+	+ (?)	+	+ (?)	+	?

(*) distinctly recurved and anterior and posterior lateral eyes distinctly apart from each other (fig. 203); only in Alteruloboridae, Pilosarachnidae and Frateruloboridae the lateral eyes are close together. See also above and below, key no. 6, the dubious family Gigarachnidae.

Tab. 2: Selected characters of the families and uloborid genera of the Deinopoidea in Burmese amber as well as the extant family Deinopidae

Remarks: (1) The characters are partly based on the male sex, *Pseudokachin* is based on the female sex only. *Pseudokachin* is surely ECRIBELLATE, its opisthosoma bears humps (figs. 286-287); the taxon is excluded from the key below. – (2) Certain taxonomic characters of the spiders in question may have to be corrected after the knowledge of further specimens.

Notes on selected further characters and taxa: (1) The ♂-opisthosoma is dorsally hardened in the Frateruloboridae and armoured in the Scutuloboridae (figs. 190, 198). (2) Reduced leg bristles: Erect leg bristles are completely absent in *Microuloborus* (Uloboridae) but numerous macrosetae exist (fig. 218); leg bristles are almost absent in *Scutuloborella* (Scutuloboridae). Femoral bristles are absent in *Eodeinopis* (Eodeinopidae), Frateruloboridae and Scutuloboridae.

KEY to the supraspecific Cretaceous taxa of the superfamily Deinopoidea in Burmese amber, partly based mainly on the male sex

See tab. 2 as well as the notes and remarks above and below.

1 ♂-pedipalpus: Tibia distinctly wider than long. Larger spiders, body length ♂ 3.5-5.5 mm. *Praearaneus.* Relationships QUITE unsure, see p. 166 .... **PRAEARANEIDAE**

- Tibia of the ♂-pedipalpus - usually distinctly - longer than wide (figs.145,158,183).....2

2(1) Area of the anterior median eyes strongly projecting (fig. 140) (*), metatarsus I almost twice as long as tibia I, dense hairs existing on tarsus and metatarsus I, femoral trichobothria, feathery hairs and pectunculus absent, see tab. 2. ♂-pedipalpus (fig. 142): Femur thickened, dorsally with a long and strongly bent basal apophysis and an erect apical apophysis which bears a bent claw. *Alteruloborus* . **ALTERULOBORIDAE**

- Cephalic part not distinctly projecting, metatarsus I shorter, dense hairs absent, femoral trichobothria, feathery hairs and pectunculus existing or absent. ♂-pedipalpus different 3

3(2) Erect leg bristles completely absent but femora – especially I – dorsally with numerous macrosetae which are not standing out from the article (fig. 218). ♂-pedipalpus figs. 217, 219. Body length ca. 1 mm. Uloboridae part 1, see nos. 6 and 10 ....***Microuloborus* n. gen**.

- Erect leg bristles usually existing except on the femora of certain taxa, see the notes above and no. 4; numerous strong dorsal femoral macrosetae absent. ♂-pedipalpus different. Body usually larger, only ca. 1 mm in certain species of the Scutuloboridae (see no. 5) and in *Paramiagrammopes of the Uloboridae* (see no. 10) 4

4(3) Femoral bristles absent in *Eodeinopes* or existing; in *Deinopedes*, leg I at least three times longer than the body, opisthosoma soft, ♂-pedipalpus (fig. 169: Articles without apophyses. DEINOPEDINAE: *Deinopedes* ..... **EODEINOPIDAE** (part 1)

- Femoral bristles absent, leg I distinctly shorter than three times of the body, ♂-opisthosoma dorsally scutate (figs. 190, 198), tibial bristles absent 5

- femoral bristles existing, leg I three times longer than the body. ♂-pedipalpus as in figs. 160-167, articles without apophyses. EODEINOPINAE: *Eodeinopes* .... **EODEINOPIDAE** (part 2)

- Femoral bristles existing, leg I long or short, opisthosoma soft except in the tiny *Spiniuloborus crux* of the Uloboridae (photo 50). ♂-pedipalpus different, frequently the patella bears long dorsal apophyses 6

5(4) Metatarsi I-III with a long dorsal bristle close to the article (fig. 173), femoral trichobothria existing (fig. 174), lateral eyes close together (fig. 170). ♂-pedipalpus (figs. 175

- 176): Cymbium strongly elongated, questionable embolus straight. *Frateruloborus* .... **FRATERULOBORIDAE**

- Metatarsi with distinctly shorter bristles which stand out from the article (fig. 188) or are almost absent, femoral trichobothria absent, lateral eyes distinctly spaced (fig. 187). ♂-pediplpus (figs. 192, 197, 200): Cymbium not elongated, embolus very long and in a screw-shaped position, tegulum usually with a very long apophysis or bristle. *Scutuloborella*, *Scutuloboroides* and *Scutuloborus* .....**SCUTULOBORIDAE**

6(4) Posterior eye row distinctly recurved (**), anterior and posterior lateral eyes distinctly apart from each other (figs. 222, 230, 253), femoral trichobothria (figs. 223, 263, 278) usually existing (see tab. 2) (they are frequently difficult to recognize). 6 genera and *Microuloborus* (see no. 3). The genera *Pseudokachin* and *Spiniuloborus* are not included, see above, below and tab. 2 …….. **ULOBORIDAE** part 2 10

- Posterior eye row also distinctly recurved but lateral eyes close together rsp. situated on a common tubercle (see key no. 2, too): Two families which were recently described (see also above): The **PILOSARACHNIDAE** which possesses a circular embolus on a flat tegulum as well as a large “conductor” in a distal position. The dubious plesion **GIGARACHNIDAE** which possesses a strongly protruding eye position and a huge body length of ca. 14 mm in the male sex, probably Pholcochyroceridae.

- Posterior eye row more or less straight, lateral eyes close together (fig. 140, 143, 156), femoral trichobothria absent 7

7(6) ♂-femur I bearing ventrally in the basal half numerous strong bristles (figs. 147-148), pedipalpus as in figs. 152-155. *Dubiodeinopsis* ..... **DUBIODEINOPSIDAE**

- No such strong bristles, pedipalpus different 8

8(7) ♂-pedipalpus (figs. 157-160, 164-165): Tibia with a long and slender apophysis lying on the bulbus near the wide cymbium, embolus quite thick. *Dubiouloborus* n. gen. and *Dubiouloborix* n. gen. ..... **DUBIOULOBORIDAE**

- ♂-pedipalpus different, e. g. figs. 145, 237, 243; no such tibia apophysis 9

9(8) Legs bearing numerous strong bristles (fig. 144), cephalic part wide (fig. 143), cymbium and bulbus quite small (fig. 145), embolus unknown. *Crassicephalus* .... **CRASSICEPHALIDAE**

- Legs bearing less and distinctly weaker bristles, cephalic part narrower, cymbium larger, embolus extremely long, crew-shaped (figs. 142-143. *Burmadictyna* .... **SALTICOIDIDAE**

10(6) ULOBORIDAE. ♂-pedipalpus: Patella with an erect outgrowth which bears a distinct claw (figs. 232, 239) or a pair of claw-bearing outgrowths (figs. 236, 242, 256), femur frequently also with ventral outgrowths. Feathery hairs existing (fig. 256) (they may be difficult to observe even by large magnification). The most diverse and frequent deinopoid genus in Burmese amber .....***Paramiagrammopes***

- ♂-pedipalpus (fig. 212): Patellar outgrowth and claws absent, a small apical tibia apophysis exists. Feathery hairs existing ..... ***Burmasuccinus***

- ♀: Opisthosoma (figs. 286-287) elongated beyond the spinnerets and bearing a pair of well developed humps behind the middle. Feathery hairs existing (fig. 289). *P. tuberculatus* n. sp. (♂ unknown)..... ***Pseudokachin***

- ♂-pedipalpus different but see *Dubiouloborus praeta* (Dubiouloboridae, no. 8) (fig. 158): Claws existing on the FEMUR, as well as *Propterkachin bispinatus* (fig. 284, no. 12) in which STRAIGHT patellar spines exist which are not placed on an outgrowth as in *Paramiagrammopes*. In both taxa the eye position and the structures of the pedipalpus are different and feathery hairs are absent, like in the following genera 11

11(10) Legs - especially the femora (figs. 207-208) - robust. ♂-pedipalpus (figs. 209-210: Patella with three long dorsal bristles ..... ***Boavista***

- Legs slender (fig. 281). ♂-pedipalpus different, tegulum with long apophyes (figs. 283-285), opisthosoma with humps in *Kachin* 12

12 (11) Anterior median eyes large, opisthosomal hair brushes absent. ♂-pedipalpus (figs. 283-285): Patella not longer than the tibia. *P. bispinatus* n. sp. …. ***Propterkachin***

- Anterior median eyes not enlarged, opisthosoma with few hair-bearing humps. ♂-pedipalpus: Patella distinctly longer than the tibia ..... ***Kachin***

(*) Like in the large Gigarachnidae (questionable Deinopoidea) in which the body length in the male sex is about 14 mm, see the key no. 6.

DESCRIPTIONS OF THE TAXA and remarks:

Recently the new families **Gigarachnidae** JIANG & LI 2020 and **Pilosarachnidae** JIANG & LI 2020 were described in Burmese (Kachin) amber. Both families were not assigned to a higher clade of araneomorph taxa; that means they are regarded as plesions. Their diagnoses provide no important apomorphic characters but are mainly defined by a combination of plesiomorphic characters like the existence of a cribellum (unsure in the Gigarachnidae), of feathery hairs, eight eyes, a close position of anterior and posterior lateral eyes as well as the absence of femoral trichobothria and of a retrobasal paracymbium. The existence of special apical opisthosomal hairs of the Gigarachnidae is hardly a sufficient diagnostic character with regard to a family. I do not want to exclude that the protruding eye region of the Gigarachnidae is caused by the preservation rsp. by natural heating or by drying out of the dead spider previous to the preservation. I am quite unsure about “the traces of struggle near the legs of the spider … (Figs. 5A-B)” (p. 273). To my experience such deformations of the eye region

- as well as of the body, the legs and the structures of the pedipalpus - are frequently caused by the preservation. If not caused by the preservation the strongly flattened body of the Gigarachnidae may be a substantial diagnostic family character.
In both dubious families the posterior eye row is recurved like in most Deinopoidea and the anterior and posterior eyes are close together as in certain Deinopoidea, see tab. 2. Ventral tarsal III-IV bristles of a pectunculus are not reported from the Pilosarachnidae (really not overlooked?) but apparently existing in the Gigarachnidae, although not explicitly specified as a pectunculus. A long embolus in a circular position like in the Pilosarachnidae exists in numerous taxa of the Deinopoidea - see the descriptions below -, e. g., in the Dubiouloboridae, Scutuloboridae and certain Uloboridae like *Opellianus* sp. in Eocene Baltic amber, see WUNDERLICH (2004: 884-885, figs. 41, 44) but exist also in certain Pholcochyroceridae. A quite hairy body and legs, including feathery hairs, is a typical character of numerous Deinopoidea, including Uloboridae. I regard Pilosarachnidae as a questionable member of the Deinopoidea.
In short: In my opinion the families Pilosarachnidae and probably Gigarachnidae, too, are members of the Pholcochyroceroid-Deinopoid branch in the sense of WUNDERLICH, see WUNDERLICH & MÜLLER (2018). We are still far from providing a cladogram of the numerous families of the superfamilies Deinopoidea and the extinct Pholcochyroceroidea which were very diverse in former times.

Remarks on the descriptions of the families Gigarachnidae and Pilosarachnidae by JIANG & LI (2020):
(1) In the introduction taxa like Mesothelae and Synspermiata are erroneously assigned to members of “araneoid clades”.
(2) P. 267: The family Pilosarachnidae is distinguished from the Synspermiata by their presence of anterior median eyes but anterior median eyes exist in several taxa of the Synspermiata like Plectreuridae as well as several members of the Caponiidae and Pholcidae.
(3) P. 268 and 272: Pilosarachnidae are distinguished from Deinopidae and Uloboridae by the (actual?) absence of ventral tarsal bristles but such bristles of the pectunculus are absent in several deinopoid families and genera, see tab. 2.
(4) P. 271, fig. 3B: A seam of the embolus - called “pars pendulus” by the authors - exists in numerous taxa of the Deinopoidea, see the descriptions below. – The sclerite called “conductor” is far away from the distal part of the embolus; its function as a conductor appears unlikely to me.

Family **ALTERULOBORIDAE** WUNDERLICH 2018 (figs. 140-142)

A cibellum exists in this family which is known by a single male; a pectunculus is absent, the posterior eye row is strongly recurved, the lateral eyes are close together, the area of the anterior median eyes is strongly projecting (fig. 140), and metatarsus I is almost twice as long as tibia I (!) – a quite unusual character of the Deinopoidea. Pedipalpus (figs. 141-142): Femur thick, dorsally with a long and strongly bent basal apophysis and an erect apical apophysis which bears a bent claw, the patella bears

small apophyses. I add here the existence of dense hairs of tarsus and metatarsus I on all sides. Except the existence of a cribellum and a pectunculus exist remarkable similarities with certain members of the Araneoidea - in which a retrobasal paracymbium exists -, e. g., in the absence of femoral trichobothria and feathery hairs, the shape of the prosoma and the position of the eyes. See tab. 2.

Family **CRASSICEPHALIDAE** WUNDERLICH **n. fam**.

Etymology: The name refers to the thick cephalic part of the taxon, from crassus (lat.) = thick and cephalus (gr.) = head.

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

Diagnostic characters (♂; ♀ unknown): Prosoma (fig. 143) stout, cephalic part wide, 8 eyes in two wide rows, lateral eyes close together, femoral trichobothria and feathery hairs absent, pectunculus weakly developed; pedipalpus (figs. 145-146) with a small bulbus and stout and spiny articles which bear no apophyses, tibia retrodorsally with some erect sensory hairs (in my opinion not trichobothria), bulbus (most parts are hidden) not protruding, its structures probably simple.

Further/basic characters: Cribellate (calamistrum well developed), three-clawed, clypeus quite short, basal cheliceral articles robust/large, legs stout and spiny, body length 4.6 mm.

Close **relationships** are quite unsure. In my opinion *Crassicephalus* fits in no superfamily except Deinopoidea. Other genera in which the lateral eyes are close together see tab. 2 p. 107. In the Praearaneidae WUNDERLICH 2017 the shape of the prosoma, the position of the eyes and the structures of the embolus are quite different.

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

Crassicephalus WUNDERLICH **n. gen**.

Etymology: See above.

The gender of the name is masculine.

Type species (by monotypy): *Crassicephalus parvibulbus* n. sp.

Diagnostic characters, relationships and distribution: See above.

Crassicephalus parvibulbus WUNDERLICH **n. gen. n. sp**. (figs.143-146), photos 24-25

Etymology: The species name refers to the small bulbus of the species, from parvus (lat.) = small.

Material: Holotype ♂ in Upper (Mid) Cretaceous Burmite, F3628/BU/CJW.

Preservation and syninclusions: The spider is incompletely and fairly well preserved in a yellow-orange piece of amber; the right patellae I and II and the retrobasal half of the right metatarsi I and II are cut off, the opisthosoma is fairly deformed, flattened and apparently shrunked. I regard a small apical “hump” of the right pedipalpal tibia being an artefact. – Syninclusions are a loose elytron of a beetle below the opisthosoma of the spider, a small loose basal leg article of an Arthropoda below the left tibia I, a small part of a leaver moss, plant hairs, insect excrement and numerous particles of detritus.

Diagnosis and relationships: See above.

Description (♂):
Measurements (in mm): Body length 4.6; prosoma: Length 2.3, width 2.0; opisthosoma: Length 2.8, width 2.2; femur I ca. 2.0, tibia I ca. 2.0, metatarsus II 1.9, metatarsus IV 1.4, tarsus IV 0.9, width of femur I 0.6, of femur IV 0.35; pedipalpus: Femur 1.0, cymbium ca. 0.65.
Colour: Prosoma medium brown, legs light brown, probably not annulated, opisthosoma medium grey brown.
Prosoma (fig. 143, photo) 1.15 times longer than wide, hairs short and indistinct, few bristles, feathery hairs absent, cephalic part quite wide and slightly raised, area of the fovea hidden, 8 large eyes in two very wide rows, posterior row recurved, lateral eyes close together, anterior median eyes spaced by ca. their diameter, area of the anterior median eyes only slightly protruding, clypeus quite short, basal cheliceral articles large/ robust, anteriorly bearing few hairs, lateral files absent, fangs large, posterior margin of the fang furrow bearing few stout teeth, labium wider than long, apparently not rebordered, a free sclerite, sternum hairy, wide, spacing distinctly the coxae IV. – Legs (fig. 144, photo) stout, order I/II/IV/III, I-II – especially the femora – distinctly larger than III-IV, hairs of medium length, feathery hairs absent, tarsi relatively long, spines numerous and partly long, existing on femora to metatarsi; leg I: Femur ca. 1 dozen, patella a lateral pair, dorsally with a hairs-shape and a strong distal one, tibia ca. 1 dozen, too, metatarsus at least ten including of a garland of at least four apical bristles. Femoral trichobothria and feathery hairs absent, position of the metatarsal trichobothrium unknown, metatarsus IV straight, bearing a well developed calamistrum at least in the basal half, metatarsus IV bears few short ventral bristles of the pectun-

culus, unpaired tarsal claw existing, paired claws apparently toothed. – Opisthosoma (photo) deformed, oval, dorsal hairs short, cribellum and most spinnerets hidden. – Pedipalpus (figs. 145-146): Articles without apophyses, spiny, the right femur bears a proapical bristle, the left femur bears a dorsal-apical bristle, patella with two bristles, tibia with three long bristles and 5 erect trichobothria-like sensory hairs originating on small bothria, which I – because of their small bothria - do not regard as trichobothria, cymbium wide, without modifications, bulbus (most parts are hidden) ventrally not protruding, bearing one or two flat apical apophyses.

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

(**Family DEINOPIDAE**: See the family Eodeinopidae below and tab. 2 p. 107).

Family DUBIODEINOPSIDAE WUNDERLICH **n. fam**.

Etymology: See the type genus.

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

Diagnostic characters (♂; ♀ unknown): Femur I with numerous stout ventral bristles in the basal half (figs. 147-148), eyes (the eye region is deformed): Posterior row distinctly recurved and lateral eyes distinctly spaced from each other; calamistrum (fig. 149) consisting of short hairs in the basal third. Pedipalpus (figs. 151-155): Articles slender, tibia with a large, erect and divided retrobasal-dorsal apophysis, tegulum with a large divided erect median apophysis in a basal position, and a divided tegular apophysis in the distal half of the tegulum, conductor unknown, embolus surrounding the tegulum in a wide basal circular spiral, its distal - and partly basal - parts are hidden.

Further characters: Entelegyne, three-clawed, clypeus short, condylus absent, teeth of the anterior margin of the fang furrow, position of the metatarsal trichobothrium and leg autotomy unknown, leg bristles besides femur I rather slender, pectunculus (?), feathery hairs, femoral and tarsal trichobothria absent, bristles of pedipalpal patella and tibia absent, cymbium large and unmodified. I regard a tiny and not bent retrobasal structure of the cymbium (fig. 152) not as an “araneoid paracymbium” and probably as an artefact.

Relationships: According to the position of the eyes, the existence of a cribellum and a (reduced) pectunculus as well as a tibial apophysis of the male pedipalpus I regard the Dubiodeinopsidae as a member of the Deinopoidea. Similarities to certain Araneidae: See below, the superfamily Araneoidea. According to the bristles of femur I

in a VENTRAL position as well as to the structures of the pedipalpus I do not find close relationships of the Dubiodeinopsidae, see the tab. 2 above.

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

Dubiodeinopsis WUNDERLICH **n. gen**.

Etymology: The name refers to rather dubious relationships of this taxon within the superfamily Deinopoidea, from dubius (lat.) = doubtful.

Tye species (by monotypy): *Dubiodeinopsis spinifemora* n. sp.

The gender of the name is feminine.

Diagnostic characters, relationships and distribution: See above.

Dubiodeinopsis spinifemora WUNDERLICH **n. gen. n. sp**. (figs. 147-149), photo 26

Etymology: The species name refers to the spiny anterior femora, from spina (lat.) = spine, bristle.

Material: Holotype ♂ in Upper (Mid) Cretaceous Burmite, F3626/BU/CJW.

Preservation and syninclusions: The spider is almost completely and fairly well – the pedipalpi excellently – preserved in a clear yellow-orange piece of amber, prosoma and opisthosoma are strongly deformed, both tarsi and metatarsi I are cut off. - Syninclusions are remains – mainly wings and legs – of two insects near the spider which may have been a prey of the spider, remains of a Coleoptera at the surface of the piece of amber, two tiny Thysanoptera, few tiny plant hairs and numerous small bubbles.

Diagnostic characters and relationships: See above.

Description (♂):
Measurements (in mm): Body length ca. 2.5; prosomal length ca. 1.3; opisthosomal length ca. 1.4; leg I: Femur ca. 4.5, patella 0.65, tibia more than 4.0, tibia II 2.4, tibia III ca. 1.1, tibia IV ca. 1.35.
Colour light to medium brown, legs not annulated.
Prosoma strongly deformed, hairs short, 8 eyes of medium size in a deformed area, posterior row distinctly recurved, lateral eyes distinctly spaced from each other, basal cheliceral articles robust, condylus absent, fangs long, teeth of the fang furrows hidden, mouth parts and most parts of the sternum hidden, too. - Legs (figs. 147-149, photo) long, order I/II/IV/III, I distinctly the longest, III distinctly the shortest, hairs short; bristles: Femur I ventrally with numerous stout bristles in the basal half and longer

bristles more distally, femur II bears more than a dozen bristles which are not stout, femur III-IV bearing only few bristles, patellae with a pair of lateral and two dorsal bristles, tibia I bears a dozen and metatarsus I bears half a dozen bristles and apicals; metatarsus IV slightly bent, hairs of the calamistrum short, bent, placed in the basal third, bristles of the pectunculus absent or strongly reduced, femoral and tarsal trichobothria and feathery hairs absent, position of the metatarsal trichobothrium unknown, three small tarsal claws. – Opisthosoma strongly deformed, hairs short, area of the cribellum hidden, posterior spinnerets (fig. 158) fairly long and slender.

Relationships and pedipalpus: See above.

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

Family DUBIOULOBORIDAE WUNDERLICH n. fam.

Etymology: The name refers to the unsure relationships of the new family which may be related with the family Uloboridae, from dubius (lat.) = unsure, and the related family Uloboridae.

Type genus: *Dubiouloborus* n. gen. – Further genus: *Dubiouloborix* n. gen.

Diagnostic characters (♂; ♀ unknown): Probably ecribellate (calamistrum absent at least in the male sex), femoral trichobothria and feathery hairs absent, lateral eyes close together (fig. 156), loss of the dorsal-basal bristle of all patellae (fig. 160a) (apomorphy), pedipalpus (figs. 157-160f): Tibia bipartite, with a wide basal part and a quite long and slender distal part of retroapical origin (apomorphy) lying on the subtegulum, cymbium quite wide, tegulum quite large and flat, bearing a single long and slender conductor, embolus long and very thick, with a large base, building a two-dimensional spiral, which describes at least 1 ½ loops and ends in a small free tip.

Further characters: Based on its characters surely entelegyne, cephalic part wide, clypeus short, bristles existing from femora to metatarsi, lateral and basal dorsal bristle(s) of all patellae absent, pectunculus (ventral bristles on tarsi/metatarsi III/IV) existing at least in *Dubiouloborus procerembolus*, structures of the spinnerets and capture web unknown; in *Dubiouloborus* the pedipalpal femur bears long apophyses (fig. 158) in contrast to *Dubiouloborix* (fig. 164); paracymbium absent.

According to the unusual combination of characters the **relationships** of the Dubiouloboridae are quite unsure (their spinnerets are badly preserved): The modified articles of the male pedipalpus in *Dubiouloborus* and the absence of a paracymbium in *Dubiouloborus* and *Dubiouloborix* are similar to the Deinopoidea and different to the

Araneoidea. Mainly according to the position of the eyes the families Alteruloboridae and Salticoididae show relationships, see tab. 2 above. - In certain members of the Leviunguidae (superfamily Araneoidea; see directly below) the shape of the embolus is a bit similar but the cephalic part is raised and narrowed anteriorly, the clypeus is long, the number of leg bristles is lower (only a single bristle exists on femur I, metatarsal bristles are absent), a dorsal-basal patellar bristle exists, the tibia of the male pedipalpus is not divided, the tegulum is more or less protruding and bears several apophyses, the position of the embolus is not two-dimensional, a paracymbium is absent.

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

Dubiouloborus WUNDERLICH **n. gen**.

Etymology: See the new family.

The gender of the name is masculine.

Type species: *Dubiouloborus praeta* n. sp.; further species: *D. procerembolus* n. sp.

Diagnostic characters (♂; ♀ unknown): ♂-Pedipalpus (figs. 159-161c): Femur with a pointed basal retrodorsal apophysis and near the end with a dorsal-apical pair of large claw-shaped bristles; conductor slender.

Relationships: In *Dubiouloborix* n. gen. apophyses of the articles of the ♂-pedipalpus are absent, the shape of the cymbium is different and the conductor is larger.

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

Dubiouloborus praeta WUNDERLICH **n. gen. n. sp.** (figs. 156-160), photo 27

Etymology: The species name refers to its status as a prey, from praeta (lat.) = prey.

Material: Holotype (♂) in Upper (Mid) Cretaceous Burmite, F3622/BU/CJW.

Preservation and syninclusions: The spider is preserved in a clear yellow-organge piece of amber; both pedipalpi are excellently preserved, the prosoma is deformed, dorsally deeply inclined, chelicerae and mouth parts are deformed, the legs are almost completely and fairly well preserved, the right patella I is cut off, both legs IV are badly

preserved and broken, only small and dissected questionable remains of the opisthosoma are preserved behind left of the holotype. In my opinion the spider has been the prey of a spider, probably of the member of the Mygalomorpha. – Syninclusions are dissected remains of a tiny spider near the surface of the piece of amber, a small remain of a flat arthropod in front of the holotype, a spider thread near the right patella II, insects' excrement, few plant hairs and particles of detritus.

Diagnosis characters: See above.

Description (♂):
Measurements (in mm): Body length of the incomplete spider probably ca. 2.3; prosoma: Length ca. 1.2, width 1.0; leg I: Femur 1.7, patella 0.45, tibia 1.4, metatarsus ca. 2.6, tarsus ca. 1.0.
Colour medium (legs) to dark (prosoma) brown, legs not annulated.
Prosoma (it is strongly deformed), probably as wide as long, 8 eyes of medium size in two rows, lateral eyes (fig. 156) contiguous, clypeus rather short, basal cheliceral articles rather stout, fangs of medium size; I did not recognize teeth of the fang furrow but few bent plumose hairs. – Legs fairly long, I distinctly the longest, III distinctly the shortest, hairs short and indistinct, feathery hairs and femoral trichobothria absent, bristles of medium length, numerous, existing on femora to metatarsi I-IV, probably partly rubbed of and quite similar to *Dubiouloborix inclompletus*, legs IV are badly preserved, short ventral bristles on tarsus/metatarsus III-IV not observed, 3 tarsal claws. – Opisthosoma: See above. – Pedipalpus (figs. 157-160; see also above; the patella of the left pedipalpus is strongly deformed (lengthened), the tibia is also deformed): Femur distally thickened, patella stout, bearing 5 bristles, tibia bipartite, the basal part wide, the retrodistal part slender and bent distally, cymbium wide and hairy, tegulum wide and flat, conductor slender, embolus thick and coiled, describing probably only 1 ½ loops, possessing probably a seam, tip free.

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

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

Dubiouloborus procerembolus WUNDERLICH **n. gen. n. sp**. (figs. 160a-c), photos 28-29

Etymology: The species name refers to the relatively slender embolus, from procerus (lat.) = slender.

Material: Holotype ♂ in Upper (Mid) Cretaceous Burmite, F3674/BU/CJW.

Preservation and syninclusions: The spider is fairly well and almost completely preserved in a clear yellow-orange piece of amber, the left leg I is cut off through the base of the metatarsus, the left pedipalpus is lost after the patella, prosoma and opisthosoma are strongly deformed and dorsally inclined, the right pedipalpus is very well preserved. - Syninclusions are several thin longer spider threads in a parallel position left

of the spider's body, a tiny Hymenoptera, body length 0.15 mm, is preserved above the spider's opisthosoma, several tiny plant hairs exist, too.

Diagnosis (♂; ♀ unknown): Pedipalpus (figs. 160b-c): Femur with a strong claw-shaped and strongly sclerotized basal-dorsal apophysis, prodorsal claw of the dorsal femoral apophysis longer than the retrodorsal claw, patella ventrally-apically with a claw-shaped apophysis, embolus relatively slender, describing ca. 1 ½ loops.

Description (♂):
Measurements (in mm): Body length ca. 2.5; prosomal length 1.2; remains of the opisthosoma 1.1 long; leg I: Femur 1.6, diameter 0.15, patella 0.4, tibia 1.45, metatarsus 1.6, tarsus 1.2, left femur IV 1.0, height (strongly flattened) 0.4, right femur IV 1.1, height 0.09.
Colour light brown, legs distinctly annulated.
Prosoma deformed and incomplete at the right side, covered by numerous short and few long anterior hairs, 8 eyes, lateral eyes separated by only the diameter of their lenses, chelicerae and mouth parts apparently lost. - Legs (fig. 160a) slender, I clearly the longest, bristles numerous and short, existing from femora to metatarsi, metatarsus and tarsus I bear dorsally several long, strong and erect hairs, femur III bears several long erect ventral sensory hairs similar to trichobothria, tarsi III-IV with 2-3 short ventral bristles of the pectunculus, feathery hairs, femoral trichobothria and calamistrum absent, metatarsal trichobothria unknown. - Opisthosoma strongly deformed, bearing longer hairs. - Pedipalpus (see the diagnosis) (figs. 160b-c): Cymbium large, conductor small.

Relationships: In *D. praeta* n. sp. the prodorsal claw of the pedipalpal femur is shorter, a ventral patellar outgrowth exists in a more basal position and the embolus is clearly thicker.

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

Dubiouloborix WUNDERLICH **n. gen**.

Etymology: The name refers to the unsure relationships of the genus, from dubius (lat.) = unsure, and an arbitrary combination of letters.

The gender of the name is masculine.

Type species (by monotypy): *Dubiouloborix incompletus* n. sp.

Diagnostic characters (♂; ♀ unknown): Pedipalpus (figs. 164-165) with slender articles which bear no apophyses (but see the tibia!), conductor large/wide and folded, embolus thick.

Relationships: See *Dubiouloborus* n. gen.

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

Dubiouloborix incompletus WUNDERLICH **n. gen. n. sp**. (figs. 161-165), photo 30

Etymology: The species name refers of the incomplete preservation of the holotype, from incompletus (lat.)= incomplete.

Material: Holotype ♂ in Upper (Mid) Cretaceous Burmite, F3621/BU/CJW.

Preservation and syninclusions: The spider is incompletely preserved in a muddy piece of amber; both pedipalpi are very well preserved, the prosoma is posteriorly inclined, the tip of the left tarsus I is cut off, the ventral part of the body is cut off within the amber above a half bubble in the amber. – Syninclusions are a tiny Coleoptera, a tiny Diptera, few plant hairs and few small particles of insects' excrement.

Diagnosis characters: See the diagnosis.

Description (♂):
Measurements (in mm): Body length 2.7; prosoma: Length 1.4, width 1.25; opisthosoma: length 1.3, width 1.0; leg I: Femur 1.6, patella 0.4, tibia 1.6, metatarsus 2.0, tarsus 1.05, tibia II 1.1, tibia III 0.5, tibia IV 0.85.
Colour light brown, legs not annulated.
Prosoma (fig. 161, photo) 1.3 times longer than wide, not raised, cephalic part not narrowed, hairs and fovea indistinct, 8 eyes in two rows are badly preserved, posterior row probably straight, lateral eyes close together, clypeus apparently short, most parts of the chelicerae, mouth parts and sternum cut off. – Legs (figs. 162-163, photo) only fairly long, order I/II/IV/III, I distinctly the longest, III distinctly the shortest, stretched laterally, hairs short and indistinct, bristles numerous, existing on femora to metatarsi; leg I: Femur 2 prolaterally and 2 dorsally, patella 1 long dorsally-apically (like on the remaining patellae), tibia half a dozen, metatarsus 3 and apicals, bristles of the pectunculus of tarsi and metatarsi III-IV apparently absent, position of the metatarsal trichobothria unknown, 3 tarsal claws.- Opisthosoma (fig. 161) 1.3 times longer than wide, oval, narrowing posteriorly, hairs short and indistinct, spinnerets hidden. – Pedipalpus (figs. 164-165) with slender articles, patella short, tibia bipartite and partly lying on the cymbium and the subtegulum, basal part stout, flat and bearing a long apical hair, distal part long, slender and almost straight, cymbium wide and hairy, tegulum flat, bearing a long, slender and bent apophysis, embolus long, thick and coiled, distally hidden by a sclerotized structure of unknown origin, conductor large/wide and folded.

Relationships and distribution: See above.

Family **EODEINOPIDAE** WUNDERLICH **n. fam.**

Etymology: See *Eodeinopis*.

Type genus: *Eodeinopis* WUNDERLICH 2017.

Subfamilies: Eodeinopinae **nov**. - *Eodeinopis longipes* WUNDERLICH 2017 (under Burmadictynidae) and Deinopedinae **nov**. - *Deinopedes tranquillus* WUNDERLICH 2017 (under ?Deinopidae).

Diagnostic characters (♂; ♀ unknown) (s. tab. 2): Probably cribellate, femoral trichobothria and feathery hairs absent, posterior eye row strongly recurved, anterior and posterior lateral eyes distinctly spaced, pectunculus existing, pedipalpus (figs. 166, 169): Apophyses of the articles absent, structures of the bulbus quite variable.

Relationships: Based on its characters - see tab. 2 – I regard Eodeinopidae as a member of the Deinopoidea. According to the differing legs (see below) and the quite diverse structures of the ♂-pedipalpus of the subfamilies the family is probably not monophyletic. The very long leg I – as well as the ALSO quite long leg II in *Deinopedes* reminds on the legs of members of the extant and Eocene family Deinopidae C. L. KOCH 1850. (In *Eodeinopis* and *Palaeomicromenneus* PENNEY 2003 - preserved in Cretaceous Lebanese amber - leg II is distinctly shorter than I). The cribellate Deinopidae possesses a very special modified capture web and a peculiar position of the eyes with strongly enlarged posterior median eyes (fig. 139). The unspecialized eye position of the very rare taxa in Burmese amber is quite different from the Deinopidae and is apparently a plesiomorphic character. Femoral trichobothria are absent in these probably cribellate fossil taxa, like in the Deinopidae but feathery hairs exist (remained) in the Deinopidae. In extant deinopid spiders the long legs I AND II are used to hold the special - modified orb - capture web. Did the Cretaceous members of *Deinopedes* possess already the same behaviour of holding the capture web, and in *Eodeinopis*, too? – See also above, the relationships of the family Salticoididae.

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

(1) **Subfamily EODEINOPINAE** WUNDERLICH **nov. subfam.**

Type genus (by monotypy): *Eodeinopis* WUNDERLICH 2017: 224.

Diagnostic characters and relationships: See above, tab. 2 and Deinopedinae below. In *Eodeinopis* legs I (especially) and II are quite long, femoral bristles are absent

and the embolus has a screw-shaped position (figs. 166-167). - In 2017: 224 I regarded *Eodeinopis* (**n. comb**.) with some doubt as a member of the Burmadictynidae in which mainly the position of the eyes and the structures of the male pedipalpus are different.

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

(2) **Subfamily DEINOPEDINAE** WUNDERLICH **n. subfam**.

Type genus (by monotypy): *Deinopedes* WUNDERLICH 2017: 218.

Diagnostic characters and relationships: Most important taxonomic characters are as in the Eodeinopinae, see tab. 2. Legs I and II very long, II almost as long as I, femoral bristles exist and the cymbium bears a long retrolateral bristle (fig. 169) in contrast to *Eodeinopis*. – In 2017: 218 I regarded *Deinopedes* (**n. comb**.) as a doubtful member of the family Deinopidae C. L. KOCH 1850 in which the position of the eyes and the structures of the male pedipalpus are quite different. The extant Deinopidae is not known from Burmese amber nor from other Mesozoic deposits; its oldest report is the Eocene Baltic amber.

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

Family **FRATERULOBORIDAE** WUNDERLICH 2018

The only known taxon is *Fraterulobolus bulbosus* WUNDERLICH 2018: 36-37, figs. 35-43, photo 11. See the new figs. 170-176 and photo 31.

Diagnostic characters (♂; ♀ unknown): Cribellum large, femoral trichobothria (fig. 174b) long, in more than a single row and existing on all femora, opisthosoma completely covered with a dorsal scutum (apomorphy), posterior eye row distinctly recuerved, lateral eyes close together (figs. 170-171), legs stout, feathery hairs absent; bristles: Absent on the femora, metatarsus I-III with a dorsal bristle (fig. 171) which is as long as the article, originates basally and lies close to the tibia (it was overlooked by me in the original description) (apomorphy), all metatarsi and tarsi ventrally with 2-4 bristles (fig. 172); pedipalpus (figs. 175-176): Apophyses of its articles unknown, cym-

bium quite long, slender and unmodified, bulbus voluminous, questionable embolus only fairly long and almost straight, further sclerites unknown.

Relationships: Like in the family Uloboridae exist femoral trichobothria (fig. 174) and the posterior eye row is distinctly recurved, but the lateral eyes are distinctly spaced, the opisthosoma is not hardened or scutate (see the Scutuloboridae), metatarsus IV is usually dorsally concave and the structures of the bulbus/tegulum are more complicated.

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

Family **SALTICOIDIDAE** WUNDERLICH 2008

(= Burmadictynidae WUNDERLICH 2017 **n. syn**.)

In the special genus *Burmadictyna* WUNDERLICH 2008 exists a peculiar embolus which is coiled in a spiral of at least 8 but even about a dozen loops (fig. 182) and possesses a “break point” near its tip in certain species, see fig. 179 and WUNDERLICH (2015: 315-317, 402, figs. 350-351).
In the present paper three new species are described.

Synonymy (see also below): According to the chaetotaxy, the trichobothriotaxy, the thin dorsal-basal tibial I-II bristles, the pedipalpal patellar hump, the probasal cymbial peak, the shape of the embolus and the position of the not sclerotized median apophysis (see the diagnosis) I regard the Burmadictynidae WUNDERLICH 2017 as a junger synonym of the Salticoididae WUNDERLICH 2008 (**n. syn**.), contra WUNDERLICH (2017: 225). See also below (*, **).

In 2008: 647 I regarded *Burmadictyna* WUNDERLICH 2008 - based on an only fairly well preserved female in Burmite and with some doubt - as a member of the family Dictynidae. Two juveniles in Upper Cretaceous New Jersey amber spiders were reportet by PENNEY (2002: 717-720, pl. 3, figs. 1-3, text-fig. 6) as Dictynidae indet. (based on its body length of ca. 2 mm in my opinion the larger specimen is probably an adult spider). PENNEY placed these spiders – without doubt! - in the family Dictynidae because of their small body length, the existence of a wide cribellum, an uniseriate calamistrum, an unpaired tarsal claw and 8 eyes in two rows; tarsal and metatarsal trichobothria were not recognized. Although knowing that the combination of these characters exists in several spider families the publication of these spiders misslead me in 2008 to regard a female of my coll. in Burmite as a member of the Dictynidae, too (and probably three further specimens in my coll.). Males of this taxon were un-

known to me in 2008. Based on its characters and several quite similar specimens in Burmite (see below) I regard the specimen NJ-502 published by PENNEY (2002) not as a member of the family Dictynidae – this family is unknown to me in all Cretaceous kinds of amber based by adult males -, but as a member of the Salticoididae (**n. relat**.) which existed also in Burmese ambers, Jordanian and most likely in amber from New Jersey, see above.

Genera (in Cretaceous ambers): *Salticoididus* WUNDERLICH 2008: 629, the type genus in Jordanian amber, *Burmadictyna* WUNDERLICH 2008: 647 in Burmite (Kachin amber) and an unnamed genus in amber from New Jersey: According to the shape of the prosoma, the long and strong (bristle-shaped) prosomal setae and the short calamistrum in contrast to *Burmadictyna* and *Salticoididus* I regard a female (see below) as a member of an unnamed genus of the Salticoididae.

Diagnostic characters (♂; ♀ (*)): Femoral trichobothria and feathery hairs (**) absent, two dorsal tibial bristles; at least the basal bristle on I-II thin (hair-shaped) in contrast to well developed bristles III-IV, tarsal trichobothria absent, position of the single metatarsal trichobothrium in 0.7-0.8; ♂-pedipalpus (figs. 172f): Patella with a dorsal-apical hump/outgrowth (in *Burmadictyna similis*, fig. 183), cymbium with a probasal peak, median apophysis in an apical position, erect, not sclerotized, embolus describing ca. 3-9 loops in a longer three-dimensional - screw-shaped cylindrical – structure, distally frequently possessing a “break point” (fig. 179).

(*) Females: The female F3061/BU/CJW sensu WUNDERLICH (2017: 223) possesses lateral patellar bristles and strong dorsal tibial I-II bristle and relatively thick legs; it is not a member of the Salticoidoidea but probably of the TA-clade (see below). – I regard another possibly adult female in Burmite, F3505/BU/CJW, to be most probably a member of *Burmadictyna*. Its body length is 2.0 mm, the leg bristles are as in *Burmadictyna*, its genital area possesses a transverse slit but no outgrowth.

(**) In 2008 (fig. 109 p. 670, fig. 109) I figured a hair of the holotype of *Salticoididus kaddumiorum* WUNDERLICH 2008, the family type, similar to a feathery hair in some respect, but now I regard it NOT to be a true feathery hair. Numerous true feathery hairs exist in a juvenile indet. spider (2008: Fig. 113) but now I regard THIS specimen as a member of a different family, probably of the Oecobiidae but more likely of the RT(A)-clade, see below.

Further/plesiomorphic characters: Based on its characters entelegyne, cribellum existing, undivided, length of the calamistrum in both sexes ca. ¾ of the metatarsal length, legs (photo) rather short with leg I not elongated, unpaired tarsal claw and ventral tarsal III-IV bristles (pectunculus) existing, lateral patellar bristles and feathery hairs absent (*), 8 eyes in two parallel rows of a wide field (fig. 184) with the anterior and posterior lateral eyes almost contiguous, cephalic part distinctly narrowed (fig. 184), no true “preening comb” (similar bristles may exist); ♂-pedipalpus (figs. 178f): Articles slender, apophyses absent except on the patella, see above, paracymbium absent. Legs distinctly annulated at least in *Burmadictyna*. I observed autotomy only in the holotype of *Burmadictyna pecten* WUNDERLICH 2008: Once between patella and tibia and twice between coxa and trochanter (in the same specimen!).

Relationships and phylogenetics: At first sight the family Salticoididae fits hardly in one of the large branches of the Entelegynae, see WUNDERLICH (2020:48). Peculiar is not a single character of the family but the COMBINATION of its characters: Tarsal trichobothria are absent and a pectunculus exists like in the Eresoid-Oecobioid branch as well as in the Deinopoidea. Besides the THREE-dimensional spiral of the embolus - see fig. 182 - the conformation of the structures of the bulbus of the Salticoididae are basically quite simple, and are quite similar to the conformation of certain members of the Deinopoidae, see WUNDERLICH (2015: 400, figs. 336 and 339) (in which a "break point" of the embolus may exist like in certain Salticoididae) as well as of the Eresidae and of ancient/extinct Oecobiidae and Hersiliidae, see WUNDERLICH in WUNDERLICH & MÜLLER (2020: 139, 43 and 45); see the HYPOTHETICAL pedipalpus of an extinct ancient taxon (fig. 177). In members of the Eresoid-Oecobioid branch the cribellum is divided and the articles of the male pedipalpus are thickened in contrast to the Salticoididae. In EXTANT Oecobiidae and Hersiliidae evolved complicated structures of the tegulum. In the Salticoididae evolved a long cylindrical three-dimensional embolic spiral (*) similar but longer as in certain Deinopoidea, e. g., in the Deinopidae. I regard the entire cribellum and the slender articles of male pedipalpus of the Salticoididae as derived compared with the Eresoid-Oecobioid branch. In most members of the Deinopoidea the posterior eye row is usually distinctly recurved, the anterior and posterior eyes are most often distinctly separated in contrast to the Salticoididae – as well as to the enigmatic Alteruloboridae WUNDERLICH 2018 and the family Dubiouloboridae n. fam. -, the anterior legs are elongated, and apophyses of various articles of the male pedipalpus exist. - To sum it up: In spite of their relatively short legs and the not elongated anterior legs I regard the family Salticoididae as likely to be a member of the Deinopoidea, as an ancient branch near the root of this superfamily, in which the plesiomorphic position of the eyes – two parallel rows with the anterior and posterior eyes close together – still exists, feathery hairs are lost and femoral trichobothria – like in almost all Deinopoidea - are still absent. According to the position of the eyes the families Alteruloboridae and Dubiouloboridae are similar and may be most related; see also above, the family Eodeinopidae and tab. 2 p. 107.

(*) As well-known a spiral shape of the embolus evolved in numerous entelegyne families, much more frequent in two than in pronaunced three dimensions.

Distribution: During the whole Cretaceous the family Salticoididae was widely distributed in the Northern Hemisphere. It is known in Lower Cretaceous amber from Jordan (*Salticoididus*), in Upper (Mid) Cretaceous Burmese amber (*Burmadictyna*) and most probably in Upper Cretaceous amber from New Jersey (genus unnamed, see above).

Salticoididus WUNDERLICH 2008

Only the type species, *Salticoididus kaddumiorum* WUNDERLICH 2008 of this genus has been described in amber FROM JORDAN.

Diagnostic characters (♂; ♀ unknown): Anterior median eyes quite large, the embolus describes ca. 3-4 loops, see WUNDERLICH (2008: 670, figs. 108, 111). TRUE feathery hairs are absent in the holotype female of *Salticoididus kaddomiorum*, see (2008: 670: Fig. 109) but existing in the juv. of ?Salticoididae indet., see (2008: 670: Fig. 113) which is a member of an unknown superfamily.

Relationships: See *Bumadictyna* below.

Distribution: Early Cretaceous Jordanian amber forest.

Burmadictyna WUNDERLICH 2008

Up to now 4 species were described: *clava* WUNDERLICH 2015, *excavata* WUNDERLICH 2015, *pecten* WUNDERLICH 2008 (the generotype) and *postcopula* WUNDERLICH 2017. In this paper I describe three further species in Burmite.

Diagnostic characters (♂; ♀ see the family diagnosis): Anterior median eye not strongly enlarged, embolus describing ca. 6-9 loops in a LONG cylindrical spiral (figs. 179, 182-183) and frequently distally a “break point”.

Relationships: In *Salticoididus* WUNDERLICH 2008 (see above) the anterior median eyes are distinctly larger and the embolus describes only ca. 3-4 loops in a shorter spiral.
Note: In the tab. p. 221 by WUNDERLICH (2017) the median apophysis of *Burmadictyna* is erroneously called as not distinct but it is well developed like in *Salticoididus*.

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

Burmadictyna crassembolus WUNDERLICH **n. sp**. (fig. 178)

Burmadictyna sp. indet.: WUNDERLICH (2017: 223, photos 111-112).

Etymology: The species name refers to the thick embolus, from crassus (lat.) = thick.

Material: Holotype ♂ in Upper (Mid) Cretaceous Burmite, F2959/BU/CJW.

Preservation: See WUNDERLICH (2017: 223). Note: I now regard the “mating plug” as absent but not as lost. – Syninclusions are the part of a slender leg of an insect, remains of plants and detritus.

Diagnostic characters (♂; ♀ unknown): Pedipalpus (fig. 178): Distal part of the embolus thick, its diameter ca. 0.02 mm at the base of the observable part.

Description (♂):
Measurements (in mm): Body length 2.8; prosoma: Lenth 1.3, width 0.95; opisthosoma: Length 1.6, width 1.4; leg I: Femur 1.25, patella 0.5, tibia 1.2, metatarsus 1.0, tarsus 0.7, tibia II 1.0, femur II 1.2, femur III 0.9, femur IV ca. 1.15.
Colour: Prosoma dark brown, opisthosoma grey brown, legs distinctly annulated.
Prosoma 1.32 times longer than wide, cephalic part distinctly narrowed, few hairs of medium length (other hairs may be rubbed off), feathery hairs absent, fovea a wide depression, two wide eye rows, posterior row slightly procurved, anterior median eyes largest, lateral eyes close together, basal cheliceral articles of medium length, bearing a pair of long bristles in the basal half like in *similis* n. sp., fangs, mouth parts and most parts of the sternum hidden, sternum spacing the coxae IV by less than their diameter.- Legs only fairly long, order I/II/IV/III, I not much longer than II, III not much shorter than IV, hairs short, feathery hairs absent, bristles numerous and rather long, femora with a single dorsal and with lateral bristles, patellae with a quite thin dorsal-basal bristle only, tibiae dorsally with 1/1 bristles which are well developed except the basal ones on I-II which are almost hair-shaped, with few lateral and ventral bristles, metatarsi with lateral bristle and a garland of subapical bristles, ventral tarsal III-IV bristles not observable, probably existing. Position of the trichobothrium on the right metatarsus II in 0.8, calamistrum not well observable, paired tarsal claws with long teeth, unpaired claw well developed. – Opisthosoma 1.14 times longer than wide, feathery hairs absent, hairs of medium length, cribellum well developed, 3 pairs of spinnerets, the laterals stout, anal tubercle well developed. – Pedipalpus (fig. 178) with slender articles, dorsal hump of the patella well developed, embolus thick (see above), a “break point” is not recognizable, number of its loops unknown, probably more than 8 loops, “mating plug” absent.

Relationships: In the remaining congeneric species the diameter of the distal part of the embolus is only up to ca. 0.01 mm.

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

Burmadictyna fissura WUNDERLICH **n. sp.** (figs. 179)

Etymology: The species name refers to the fissure which runs in a transverse position through the piece of amber and the body of the holotype, from fissum (lat.).

Material: Holotype ♂ in Upper (Mid) Cretaceous Burmite, F3667/BU/CJW.

Preservation and syninclusions: The spider is fairly well and almost completely preserved in a clear yellow-orange piece of amber, the opisthosoma is dorsally depressed, the tip of the left tarsus I and the dorsal-distal part of the right tarsus I are cut off, a fissure runs in a transverse position through the body of the spider and the piece of amber. - Syninclusions are a small Coleoptera, a small Thysanoptera and 1 ½ small Diptera: Nematocera.

Diagnosis (♂; ♀ unknown): Pedipalpus (fig. 179) with a quite large median apophysis and a slightly s-shaped embolus which is thickened in its distal part, at a possible "break point".

Description (♂):
Measurements (in mm): Body length ca. 3.0; prosoma: Length 1.4, width 1.2; opisthosoma length ca 1.8; leg II: Femur ca. 1.5, patella ca. 0.35, tibia ca. 1.4, metatarsus 1.0, tarsus ca. 0.8.
Colour: Prosoma and legs medium brown, legs not or slightly annulated, opisthosoma light grey.
Prosoma 1.17 times longer than wide, hairy, area of the fovea hidden, 8 eyes in two rows, posterior row straight, anterior median eyes largest, lateral eyes spaced by less than their diameter, main parts of the basal cheliceral articles hidden, fangs long, a questionable poison duct is recognizable within the left fang, labium free, rebordered, 1.25 times wider than long, gnathocoxae distinctly converging, laterally distinctly concave, serrula well developed, sternum 1.15 times longer than wide, distinctly spacing the coxae IV. - Opisthosoma deformed, bearing short hairs, cribellum and most spinnerets hidden. - Legs of medium length, hairs short, bristles numerous and short; leg I: Femur dorsally 3 near the middle and 3 subapically, patella 1 retrodorsally, tibia half a dozen dorsally, ventrally and laterally, metatarsus half a dozen, too, all metatarsi bear an apical garland a bit similar to a "preening comb", metatarsus IV ventrally with 2 longer bristles, dorsally slightly concave, calamistrum well developed, all tarsi bristleless, position of the metatarsal trichobothria unknown. - Opisthosoma oval, hairs short, most spinnerets and area of the cribellum hidden. - Pedipalpus (fig. 179): Cymbium and median apophysis large, embolus describing at least 8 loops, bearing a large and scinny seam, distally slightly s-shaped bent and slightly thickened in a possible "break point".

Relationships: In the remaining congeneric species the median apophysis is smaller, the shape of the embolus and its "breaking point" are different.

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

Burmadictyna similis WUNDERLICH **n. sp**. (figs. 180-183), photo 52

Etymology: The species name refers to the similarity of the new species with *B. postcopula* WUNDERLICH 2017, from similis (lat.) = similar.

Material: Holotype ♂ in Upper (Mid) Cretaceous Burmite, F2604/BU/CJW.

Preservation and syninclusions: The spider is completely and fairly well preserved in a yellowish piece of amber, the left pedipalpus is excellently preserved, the opisthosoma is partly covered with a thin white emulsion. – Syninclusion are particles of pyrite, tiny air bubbles mainly near the spider's legs, tiny plant hairs and tiny particles of pebble at the surface of the piece of amber which indicates that the fluid fossil resin has fallen down to the ground probably near a stream.

Diagnostic characters (♂; ♀ unknown): Pedipalpus (figs. 180-183): Embolus describing at least 6 or even 8 loops, its distal part slender and long. Largest known species of *Burmadictyna*, body length 3.5 mm.

Description (♂):
Measurements (in mm): Body length 3.5; prosoma: Length ca. 1.5, width 1.1; opisthosoma: Length ca. 2.3, width ca. 1.7; leg I: Femur ca. 1.9, patella 0.6, tibia 1.8, metatarsus 1.5, tarsus 1.0, femur II ca. 1.7.
Colour mainly medium grey brown, legs distinctly annulated, opisthosoma grey.
Prosoma (fig. 180) 1.36 times longer than wide, cephalic part distinctly narrowed, thoracal part not elevated, cuticula weakly but distinctly tuberculate, cephalic part with few long hairs, fovea a large depression, 8 eyes in two parallel rows, posterior row slightly procurved, anterior median eyes slightly the largest, lateral eyes almost contiguous, clypeus quite short and not protruding, basal cheliceral articles fairly large, bearing a pair of longer bristles in the basal half, fang furrow with at least two anterior teeth, mouth parts and sternum hidden. – Legs only fairly long, order I/II/IV/III, I not much longer than II, III not much shorter than IV, hairs short, feathery hairs absent, bristles numerous and rather long, femora with a single dorsal and with lateral bristles, I with at least 7 bristles, patellae with a quite thin dorsal-basal bristle only, tibiae dorsally with 1/1 bristles which are well developed except the basal one on I-II, tibia I shows 5 bristles in the prolateral aspect, metatarsus I with at least 3 bristles in the basal half and a subapical garland of few bristles, metatarsus IV almost straight, hairs of the calamistrum indistinct, the left tarsus I bears a short ventral bristle in the distal half, ventral tarsal III-IV bristles of the pectunculus hidden or absent, position of the left metatarsal I trichobothrium in 0.77, tarsal and femoral trichobothria absent, three tarsal claws, the paired claws bear long teeth. – Opisthosoma 1.35 tomes longer than wide, soft, oval, bearing short hairs, most spinnerets hidden or covered with an emulsion. – Pedipalpus (figs. 180-183) with slender articles, patella with a dorsal-apical hump which bears a bristle, tibia long, bearing long prolateral hairs, cymbium wide, bearing a probasal peak, median apophysis well developed, embolus: See the diagnosis, a "break point" is not recognizable.

Relationships: In the strongly related *B. postcopula* WUNDERLICH 2020 (figs. 185-186) the distal part of the embolus is also not modified but the number of the embolic loops is apparently lower and the body length - 2.3 mm – is also lower.

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

Family **SCUTULOBORIDAE** WUNDERLICH **n. fam**.

Etymology: See the nominate genus below.

Type genus: *Scutuloborus* n. gen. Further genera: *Scutuloborella* n. gen. and *Scutuloboroides* n. gen.

Diagnostic characters (♂; ♀ unknown): Cribellum existing (see *Scutuloborella*), opisthosoma with a dorsal scutum (figs. 190, 198) (apomorphy), femoral bristles, femoral trichobothria and feathery hairs absent, pedipalpus (figs. 191f, 199-200): Articles to my knowledge without apophyses, tegulum flat, bearing a long distal apophysis or bristle which may be absent in *Scutuloboroides*, embolus long, thin and spirally, partly bearing a seam or enclosed in a conductor.

Further characters: Tibiae with very few (fig. 199) or several bristles (fig. 189), metatarsal bristles absent (fig. 199) or existing (fig. 188), no, a single or few bristles of the reduced pectunculus (fig. 189), the metatarsal comb may be strongly reduced, position of the metatarsal I trichobothrium in *S. spiralembolus* in 0.22 (fig. 188), wide eye field with the posterior row distinctly recurved and the lateral eyes distinctly spaced from each other (fig. 187), opisthosomal humps absent, three tarsal claws, paired claws quite long, pedipalpus: Patella and tibia bearing hairs but no bristles, patella longer than the tibia, cymbium large, with numerous long hairs exist in *Scutuloborus*.

Relationships (see the tab. 2 above): According to the widely spaced lateral eyes, the distinctly recurved posterior eye row, the existence of a - reduced - pectunculus and the structures of the pedipalpus I regard the Scutuloboridae to be a member of the superfamily Deinopoidea. A spirally embolus is widely distributed within the Deinopoidea (like in numerous other spider families). A dorsally hardened opisthosoma exists in the family Frateruloboridae WUNDERLICH 2018, too, but femoral trichobothria exist in this family, and the structures of the bulbus are QUITE different.

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

Scutuloborus WUNDERLICH **n. gen**.

Etymology: The name refers to the existence of an opisthosomal scutum and the name Uloborus, a fairly related genus.

The gender of the name is masculine.

Type species (by monotypy): *Scutuloborus spiralembolus* n. sp.

Diagnostic characters: Legs slender, tibiae and metatarsi with numerous bristles (fig. 188), pedipalpus (figs. 191-194): Tegulum with a long dorsal apophysis.

Relationships: in the remaining genera the legs are more slender, the number of leg bristles is lower, the structures of the pedipalpus are different and their body is distinctly smaller, only 1 mm.

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

Scutuloborus spiralembolus WUNDERLICH **n. gen. n. sp**. (figs. 187-194), photo 55

Etymology: The name of the species refers to the shape of the spirally embolus, from spira- (gr.) = twisted, spirally.

Material: Holotype ♂ in Upper (Mid) Cretaceous Burmite, F3625/BU/CJW.

Preservation and syninclusions: The spider is quite well - the structures of the bulbus excellently - and almost completely preserved in a clear yellow-orange piece of amber, bubbles cover, e. g., parts of the pedipalpi, most hairs of the body are covered with a thin emulsion. – Syninclusions: 1 small Thysanoptera, particles of detritus and few tiny plant hairs.

Diagnostic characters, retationships and distribution: See above.

Description (♂):
Measurements (in mm): Body length 2.4; prosoma: Length 1.2, width ca. 0.85, height 0.6; opisthosoma: Length 1.25, width 0.75; leg I: Femur ca. 1.5, patella 0.45, tibia 1.4, metatarsus 1.85, tarsus 0.72; tibia II 0.8, tibia III ca. 0.3, tibia IV ca. 0.6.
Colour light grey brown, legs not annulated.
Prosoma (fig. 187, photo) distinctly longer than wide, thoracal part raised but without “shoulders”, fovea well developed, 8 eyes in two rows in a wide field which are rather small, posterior row strongly recurved, lateral eyes spaced from each other by at least one diameter, hairs short, clypeus short, basal cheliceral articles rather long, like the mouth parts and the sternum widely hidden. - Legs (figs. 188-189 photo) fairly long, order I/II/IV/III, I distinctly the longest, III and IV short, hairs indistinct, bristles long and thin, absent on the femora, existing on patellae to metatarsi, patellae dorsally with 1/1 bristles which are hair-shaped on I, tibia I bears ca. 7 bristles, metatarsus I bears 3 bristles and at least 4 apically, all metatarsi bear a garland of 4 long subapical bristles, ventral bristles of the pectunculus exist on tarsus III-IV, position of the metatarsal I trichobothrium in 0.22, metatarsus IV straight, calamistrum apparently absent, three tarsal claws, paired claws large and toothed. – Opisthosoma (fig. 190) almost 1.7 times longer than wide, hairs short, dorsally bearing a scutum which apparently is hidden except basally, area of the cribellum and partly of the spinnerets – they exist in a terminal position -, also hidden.- Pedipalpus (figs.191-104): Articles fairly stout, bristles

and apparently apophyses absent, tibia with long hairs and two small apical humps, cymbium wide and hairy, subtegulum large and bearing loop-shaped structures, tegulum flat, bearing a long, slender and blunt apophysis which originates dorsally and stands widely out as well as ventrally in the middle with a questionable median apophysis, embolus describing probably three wide loops, bearing partly a seam.

Scutuloborella WUNDERLICH **n. gen**.

Etymology: The species name refers to the new family Scutuloboridae combined with the arbitrary ending “ella”.

The gender of the name is masculine.

Type species (by monotypy): *Scutuloborella admirabilis* n. sp.

Diagnosis (♂; ♀ unknown): Anterior median eyes huge (fig. 195), leg bristles strongly reduced; pedipalpus (figs. 196-197): Tegulum (!) bearing a long bristle, embolus long and winding, guided by a long and bent conductor.

Relationships: In the tiny *Scutuloboides* n. gen. the dorsal opisthosomal scutum is shorter posteriorly (but this may be the result of intraspecific variation), a tegular bristle is apparently absent and the chaetotaxy is different. In the distinctly larger genus *Scutuloborus* a great number of leg bristles exists and a tegular apophysis exists instead of a slender tegular bristle.

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

Scutuloborella admirabilis WUNDERLICH **n. gen. n. sp.** (figs. 195-197)

Etymology: The species name refers to its unusually large anterior median eyes, from admirabilis (lat.).

Material: Holotype in Upper (Mid) Cretaceous Burmite, F3669/BU/CJW.

Preservation and syninclusions: The spider is well and almost completely preserved near the margin of a clear yellow-orange piece of amber, only the tips of the left tarsi I and III are cut off. - Syninclusion: A tiny member of the Coccinea.

Diagnosis and relationships: See above.

Description (♂):
Measurements: Body length ca. 1.0; prosomal length ca. 0.4; opisthosoma: Length 0.65, width 0.4; femur I 0.4, leg IV: Femur 0.3, patella 0.12, tibia 0.2, metatarsus 0.18, tarsus 0.19.
Colour: Prosoma and legs medium brown, legs not annulated, opisthosomal scutum dark brown.
Prosoma (fig. 195) (most parts - including most eyes - are hidden): Anterior median eyes (although covered with bubbles) in my opinion quite large and protruding, clypeus rather short, basal cheliceral articles of medium size, bulging in the basal half, mouth parts and sternum hidden. - Legs rather short, hairs only fairly long, bristles absent except a quite thin one dorsally-distally on the left tibia I, bristles of the pectunculus and femoral trichobothria absent, position of the metatarsal trichobothria unknown, metatarsus IV straight, calamistrum quite long. - Opisthosoma oval, 1.6 times longer than wide, hairs short, dorsally completely covered with a distinct scutum, three pairs of spinnerets, anteriors and posteriors well developed, cribellum well recognizable, wide and undivided. - Pedipalpus (figs. 196-197): See above; articles slender, most parts hidden.

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

Scutuloboroides WUNDERLICH **n. gen**.

Etymology: The name refers to the similarity to the genus *Scutuloborus* n. gen., from oid- (gr.) = similar.

The gender of the name is masculine.

Type species (by monotypy): *Scutuloboroides pumilio* n. sp.

Diagnostic characters (♂; ♀ unknown): Legs stout (fig. 199, photo), bearing few bristle, all tibiae and all patellae dorsally two, no further bristles except ventrally on metatarsus IV. Pedipalpus (figs. 200-202): Tegulum without a dorsal apophysis.

Relationships: The tiny *Scutuloborella* n. gen. is most related, see above. The holotype of *Scutuloborus* is much larger, 2.3 mm, the legs are more slender and much more spiny, the tegulum bears a long dorsal apophysis.

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

Scutuloboroides pumilio WUNDERLICH **n. gen. n. sp**. (figs. 198-202), photo 54

Etymology: The species name refers to the tiny holotype, from pumilio (lat.) = dwarf.

Material: Holotype ♂ in Upper (Mid) Cretaceous Burmite, F3650/BU/CJW.

Preservation and syninclusions: The spider is completely and well preserved in a small yellow-orange piece of amber. Two fissures run obliquely through the body of the spider which pedipalpal structures are excellently preserved. – Syninclusions are numerous oval questionable pollen grains just behind the spider, partly directly behind the anus (!), 0.01 mm long.

Diagnostic characters, relationships and distribution: See above.

Description (♂):
Measurements (in mm): Body length 1.0; prosoma length ca. 0.4; opisthosoma: Length 0.65, height 0.38; leg I: Femur 0.37, patella 0.13, tibia 0.25, metatarsus 0.25, tarsus 0.16, tibia IV 0.23, femur III 0.24, femur IV 0.35.
Colour light grey, legs not annulated.
Prosoma (most parts are hidden): Eyes apparently as in *Scutoloborus spiralembolus* n. sp. - Legs (fig. 199) robust, III distinctly the shortest, hairs not distinct; bristles: tibiae and patellae dorsally 2, further bristles absent except a single ventral bristle in the distal half of metatarsus IV, calamistrum absent, femoral trichobothria absent, tibiae with several long dorsal trichobothria, metatarsal trichobothria unknown, tarsal claws not studied. – Opisthosoma (fig. 198) 1.7 times longer than high, oval, hairs short, dorsally except above the anal tubercle completely covered with a large scutum, ventrally probably soft, region of the cribellum and spinnerets hidden except a single spinneret.- Pedipalpus (figs. 198-202): Articles stout, bristles and probably apophyses absent, cymbium large/wide, it may guide the distal part of the embolus, tegulum with a long and thin dorsal apophysis, embolus thin, spirally, very long and partly bearing a seam, its loops are difficult to recognize.

Family **ULOBORIDAE** THORELL 1869

See also above, the superfamily Deinopoidea above and tab. 2 above.

Questionable/unsure taxa: See above, the superfamily Deinopoidea.

Extant members of this basically cribellate (*) family are well **diagnosed** by the absence of poison glands and the existence of femoral trichobothria (figs. 206, 223) (*). A strongly recurved posterior eye row with distinctly spaced lateral eys (fig. 203) is a further character of the family Uloboridae. Apophyses of articles of the male pedipalpus (figs. 212, 232) exist in several deinopoid families, see tab. 2 above. The apophyses of articles of the male pedipalpus (besides unknown apophyses of coxa and trochanter) are absent in *Boavista* n. gen., *Kachin* WUNDERLICH 2017and *Microuloborus*, see tab. 2 p. 107. In extant uloborid taxa exist apophyses of the BASAL pedipalpal apophyses, and apophyes of distal articles have apparently usually been lost except in few taxa: A large dorsal tibial apophysis exists, e. g., in *Miagrammopes latens* BRYANT, see OPELL (1979: fig. 90). Large patellar apophyses of the male pedipalpus (figs. 232, 256) exist in all species of *Paramiagrammopes*.
Remains of an orb web of a questionable Uloboridae in Burmite: See WUNDERLICH in WUNDERLICH & MÜLLER (2018: 15). Feathery hairs (fig. 256) exist in (all?) members the subfamily Miagrammopinae and in the dubious *Pseudokachin* n. gen. (fig. 289) but are absent in the Uloborinae so far known to me.
The limits and the relationships of the family Uloboridae are not clear if such extinct taxa are included in which a cribellum and/or femoral trichobothria are absent. Such extinct taxa may possess quite unusual structures of the male pedipalpus. In the family Frateruloboridae WUNDERLICH 2018 – see above - exists similar characters, see tab. 2 above, but the male opisthosoma is leathery hardened and leg bristles exist only on tarsi and metatarsi.
18 extant genera were described from this diverse tropical family, 6 genera are now reported from a single forest of South Asia, the Burmese amber forest, which existed 100 million years ago.
Note on the dubious monotypic genus *Ocululoborus* WUNDERLICH 2012: I regard the only known, badly and incompletely preserved ?juv. female as a questionable member of the family Uloboridae. Feathery hairs are absent, femoral trichobothria have not been recognized by me, bristles exist on the tibiae and metatarsi but not on the femora, similar to the new family Scutuloboridae, metatarsus IV is strongly concave and bears a well developed calamistrum, the large eyes of the holotype may be an artefact. – A dubious genus is also *Bicalamistrum* WUNDERLICH 2025 which possesses SEMINGLY a double-rowed calamistrum.
In this paper I describe 14 new species of *Paramiagrammopes* of the subfamily Miagrammopinae as well as the new genus *Boavista*, a new species of *Microuloborus*, a new species of *Propterkachin*. and the dubious taxon *Pseudokachin tuberculatus*.
Body size: The body length of the tiny spiders of *Microuloborus* is only ca. 1 mm in both sexes, certain species of *Paramiagrammopes* are not much larger (1.1 mm in the male sex). The smallest EXTANT Deinopoidea are members of the Uloboridae with a body length of 2 mm. Dwarfism existed in the Uloboridae already in the Mid Cretaceous.

(*) The existence of poison glands is difficult to proof in fossils. Femoral trichobothria are hard to recognize in certain fossil spiders. These thin sensory hairs may have been overlooked by me in some fossil taxa, and such hairs may exist although they were not reported. In certain fossil taxa of the Uloboridae these hairs may be actually absent, see tab. 1. In the MALE sex of extant and fossil spiders cribellum and calamistrum may be reduced or even absent. Apparently in certain extinct taxa cribellum and calamistrum became lost in BOTH sexes. In most taxa we unfortunately know only the male sex. - See also below (p. 162) the surely ECRIBELLATE FEMALE of *Pseudokachin*

tuberculatus n. gen. n. sp. (♂ unknown) in which femoral trichobothria and feathery hairs exist and which I regard with hesitation as a member of the Uloboridae.

Boavista WUNDERLICH **n. gen.**

Etymology: The name refers (1) to the name of Boavista (portug. = nice view), a village not far from the place I described the new genus, and (2) to the large eye lenses of the new generotype which apparently abled it to a quite well view.

The gender of the name is feminine.

Type species (by monotypy): *Boavista crassifemora* n. sp.

Diagnostic characters (♂; ♀ unknown): Legs – especially femur I (fig. 207) – quite robust, eye lenses very large (fig. 205); pedipalpus (figs. 209-210): Patella with 3 bristles, conductor long, in an apical position of the flat tegulum, directed opposing to the embolus which is long, thin and describes less than one loop in a retrolateral position of the tegulum.

Further characters: Feathery hairs and probably calamistrum absent, femoral trichobothria existing, posterior (and remaining) eyes not on humps, thoracal "shoulders" indistinct or absent, shape of the opisthosoma long oval, spinnerets in a terminal position, apophyses of the pedipalpal articles apparently (so far observable) absent.

Relationships: According to the existence of femoral trichobothria AND the absence of feathery hairs I regard *Boavista* to be a member of the subfamily Uloborinae. In most members of the Uloborinae the eye lenses are smaller or even distinctly smaller. The conformation of the structures of the bulbus appear similar to *Uloborus* LATREILLE 1806 in which male the cephalic part is distinctly narrowed.

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

Boavista crassifemora WUNDERLICH **n. gen. n. sp**. (figs. 205-210), photo 32

Etymology: The species name refers to its thick anterior femora, from crassus (lat.) = thick.

Material: Holotype ♂ in Upper (Mid) Cretaceous Burmite, F3623/BU/CJW.

Preservation and syninclusions: The spider is almost completely and partly well preserved at the corner of a yellow-orange piece of amber which is full of tiny particles/bubbles; the apical part of the right femur I and the right patellae I-II are cut off, the distal articles of the right legs III and IV are broken and lost off and lost, a white emulsion covers parts of the prosoma, especially the eye lenses. – *Syninclusions* are a tiny hairy damaged Diptera at the margin of the peace of amber, and a fissure right and partly behind the spider which looks a bit like the web of a spider, an artefact.

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

Description (♂):
Measurements (in mm): Body length 2.3; prosomal length 1.0; opisthosoma: Length 1.3, width 0.9; leg I: Femur 1.0 (diameter 0.3), patella 0.45, tibia 0. 55 (diameter ca. 0.2), metatarsus + tarsus (partly hidden) probably ca. 1.5; leg I: Tibia ca. 0.42 (diameter ca. 0.11), metatarsus 0.6, tarsus 0.4; diameter of an anterior median eye ca. 0.1.
Colour light brown.
Prosoma almost as wide as long, cephalic part not distinctly narrowed, hairs, fovea and thoracal shoulders" indistinct, 8 large eyes (fig. 205) in two rows, posterior row strongly recurved, lateral eyes spaced from each other by almost their diameter, not placed on humps, chelicerae, mouth parts and sternum hidden. – Legs (figs. 206-208, photo) robust, order I/IV/II/III, I distinctly the longest, III distinctly the shortest, femur I srongly thickened, femoral trichobothria existing, long and hard to recognize, on femur II apparently in more than a single row, hairs indistinct, bristles numerous and thick, existing on femora to metatarsi, leg I (so far recognizable): Femur dorsally and prolaterally 4 in the distal half, patella dorsally-subapically a strong/long bristle, dorsally-basally a tiny and hair-shaped bristle as well as a lateral pair, tibia ca. 8, metatarsus at least 3; ventral bristles of the pectunculus of metatarsus IV long, calamistrum apparently absent, position of the metatarsal trichobothrium unknown, unpaired tarsal claw existing. – Opisthosoma 1.44 times longer than wide, longoval, hairs short, humps absent, most parts of the spinning organs hidden, spinnerets in a terminal position, apparently close together. – Pedipalpus (figs. 209-210; see above) with stout articles, patella bearing dorsally-subapically 2 strong/long and a small retrolateral bristle(s), tegulum flat and structures simple, cymbium wide. I did not identify a tegular apophysis – or did it function as a conductor?

Relationships and distribution: See above.

Burmasuccinus WUNDERLICH 2018

Burmasuccinus bulla WUNDERLICH 2018 (figs. 211-212), photo. 33

The relationships of this monotypic genus are quite unsure, see WUNDERLICH (2018: 29-30) and tab. 2. Here I add to the original description the drawing of the spiny apical article of the posterior spinnerets (fig. 211). Femoral trichobothria are absent in *bulla*,

the existence of a cribellum is unsure, feathery hairs exist like in *Paramiagrammopes* WUNDERLICH 2008, the position of the eyes and the bristles of the pectunculus are as in the Uloboridae; pedipalpus (fig. 212): The tibia bears a small dorsal apical apophysis, the tegulum bears at least a single long and pointed apophysis.

(***Furcembolus*** WUNDERLICH 2017 = *Paramiagrammopes*, see below).

Kachin WUNDERLICH 2017

Three species of *Kachin* are known, see WUNDERLICH (2017: 226-229) and (2018: 32-33).
Characters of the genus: See tab. 2 p. 107.

Microuloborus WUNDERLICH 2015

In the cribellate genus *Microuloborus* (see tab. 2 p. 107) leg bristle are absent but long and strong dorsal hairs exist on femur I (fig. 215), feathery hairs are absent, questionable trichobothria exist (fig. 213) or are strongly reduced; articles of the ♂-pedipalpus apparently without apophyses, embolus long, describing a circle or an oval, body length ca.1 mm, smallest known member of the family Uloboridae (only few *Paramiagrammopes* species are almost as tiny; extant Uloboridae are at least 2 mm long) and of the whole superfamily Deinopoidae. Only very few adult spiders in Burmese amber are smaller than *Microuloborus*.
Up to date only the type species - *birmanicus* WUNDERLICH 2015 - of *Microuloborus* has been described. In this paper I describe a second species and briefly the hitherto unknown female of the genus.

Microuloborus oblongus WUNDERLICH **n. sp**. (figs. 218-219), photo 34

Etymology: The species name refers to its shape of the long-oval embolus, from oblongus (lat.) = longish.

Material: Holotype ♂ in Upper (Mid) Cretaceous Burmite, F3624/BU/CJW.

Preservation and syninclusion: The spider is incompletely and party very well preserved under a layer of small bubbles in a clear yellow-orange piece of amber, the left pedipalpus and the left leg I through the tibia are cut off. – A thin spider thread exists left below the spider.

Diagnostic characters (♂; ♀ unknown): Pedipalpus (fig. 219) with an oval shape of the embolus; apophyses of the articles absent.

Description (♂):
Measurements (in mm): Body length ca. 1.0; leg I: Femur 0.5, patella 0.2, tibia 0.4, metatarsus 0.3, tarsus ca. 0.15.
Colour mainly medium grey-brown, legs not annulated.
Prosoma (most parts are hidden) bearing 8 large eyes, posterior row strongly recurved, posterior median eyes widely spaced, lateral eyes distinctly apart from each other, clypeus and basal cheliceral articles long, sternum wide, bearing long hairs. – Legs (fig. 218) only fairly long, bristle-less, partly covered with quite long and strong hairs (macrosetae), especially dorsally on femur I which bears ventrally longer sensory hairs and proventrally some questionable trichobothria in a row on small bothria, not bent to the base of the article like most trichobothria, pectunculus absent, calamistrum difficult to recognize, position of the metatarsal trichobothrium unknown. – Opisthosoma oval, hairs of medium length, cribellum entire, spinnerets not studied. The genital area bears a pair of small sclerotized structures. – Pedipalpus (fig. 219) with slender articles which apparently bears no apophyses, embolus long oval, basally thick, probably describing two loops.

Relationships: In *M. birmanicus* WUNDERLICH 2015 the embolus is shorter and its shape is more circular.

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

Microuloborus sp. indet. (fig. 220)

Material: 1♂ 1♀ in Upper (Mid) Creaceous Burmite, F3629/BU/JCW.

The spiders are very well and completely preserved in a clear yellow-orange piece of amber, the prosoma and the left pedipalpus of the male are deformed, the spiders are 0.5 mm part from each other, their body length is 0.9 mm (♂) and 1.0 mm, their colour is mainly medium grey brown, the ♀-metatarsus IV is ca. 0.3 mm long, dorso-ventrally depressed, and bears a well developed calamistrum in ca. 2/3 of its length, the ♀-pedipalpus is rather large. Cymbium and bulbus of the left ♂-pedipalpus are strongly deformed, lengthened probably by the preservation (fig. 220). The right pedipalpus is apparently less deformed, bulbus and cymbium appear shorter.

Paramiagrammopes WUNDERLICH 2008

Members of the family Miagrammopinae O. PICKARD-CAMBRIDGE 1871 are quite frequent in Burmite although only the extinct genus *Paramiagrammopes* WUNDERLICH 2008 has been reported. At least 21 species of this diverse genus are known today including 14 new species. Three, four or even more species groups may exist. *Paramiagrammopes* is the most diverse genus of extinct Deinopoidea and even one of the most diverse spider genera in Burmite. All species of *Paramiagrammopes* are known from A SINGLE specimen only; this fact - and numerous specimens indet. (CJW, coll. PM) as well as some probable synonyms of questionable genera like *Burmuloborus* (see above and below) - indicate the existence of a large number of still undescribed congeneric species. Did *Paramiagrammopes* partly RADIATE on vanished ISLANDS within the ancient Burmese amber forest? A distinctive radiation of extant spider genera – e. g. *Dysdera, Oecobius, Pholcus* and *Spermophorides* - within relatively few million of years has been reported by WUNDERLICH (1992) from the Macaronesian Archipelago, e. g., mainly from the Canary Islands. A distinctive radiation of certain fossil spiders existed in the family Theridiidae of the Eocene Baltic amber forest, see WUNDERLICH (2008: 140-49).

Note: The existence of expanded bulbi in almost all males of this genus indicate that they were searching for females and explain their frequency in the fossil resin; the congeneric females – waiting in their capture web - are apparently relatively rarely preserved.

Type species: *Paramiagrammopes cretaceus* WUNDERLICH 2008.

Diagnostic characters: *Paramiagrammopes* is well diagnosed by structures of the femur and - mainly - of the patella of the male pedipalpus (e. g., figs. 225, 229, 239): The femur bears 2-3 ventral apophyses, the patella possesses an erect dorsal apophyses which bears an APICAL CLAW; the apophysis may be divided and TWO claws may exist. 8 eyes exist in a wide field (figs. 230, 253), the POSTERIOR MEDIAN EYES ARE WIDELY SPACED, distinct humps of the eyes are absent.

Variability and further characters (see also tab. 2 and the key below): Eyes (figs. 230, 253): Posterior row more or - usually - less recurved, lateral eyes widely spaced from each other. Bristles: Number quite variable, at least femur I bears a single distal bristle, all tibiae bear two dorsal bristles, III-IV may bear more bristles, lateral tibial I-II bristles usually absent (but see *P. inaequalis* n. sp.), the pedipalpal trochanter bears an apophysis at least in certain species like *P. curvatus* n. sp. (fig. 231) or even in all species, the tibia of the pedipalpus bears usually a blunt retrobasal apophysis (figs. 225, 227, 232). The shape of the opisthosoma is oval in small species (photos) but long and slender in larger species (fig. 280). The body length is 1.1-2.6 mm.

Note: The number of femoral trichobothria, the existence of the cribellum, of the feathery hairs and the position of the 8 eyes are frequently difficult to recognize in members of *Paramiagrammopes*. Leg bristles may be broken off or hidden, their number may not correct recognizable in the fossils. The calamistrum is usually more or less reduced like in most males of other Deionopoidea, the pectunculus may be strongly reduced.

Relationships: *Paramiagrammopes* is a member of the subfamily Miagrammopinae in which feathery hairs (fig. 253) exist (like in some other taxa of the Deinopoidea, see tab. 2). Apophyses of the male pedipalpus exist in several Uloboridae and other Deinopoidea but claw-bearing apophyses are rare: In *Propterkachin bispinatus* n. sp. (Uloboridae) (figs. 284-285) exists a pair of stout dorsal-apical patellar claws of the ♂-pedipalpus which are not situated on a large dorsal outgrowth. In the fossil Deinopoidea: Dubiouloboridae exist claw-bearing apophyses of the pedipalpal FEMUR (fig. 158); in the extant *Miagrammopes latens* BRYANT a CLAWLESS TIBIAL apophysis of the male pedipalpus exists, see OPELL (1979: Fig. 90). EYES: In the extant genus *Miagrammopes* O. PICKARD-CAMBRIDGE 1869 the eyes of the anterior row are absent. In *Eomiagrammopes* WUNDERLICH 2004: See p. 265-266 in Eocene Baltic amber the eyes of the anterior row are strongly reduced. These eyes are completely lost in the extant genus *Miagrammopes* but were still well developed in the Cretaceous genus *Paramiagrammopes*. These are three remarkable stages of morphological eye reduction during 100 million years.

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

Synonymy:

(1) *Furculoborus* WUNDERLICH 2017 = *Paramiagrammopes* WUNDERLICH 2008 (**n. syn**.). Type species: *Furcembolus patellaris* WUNDERLICH 2017 = *Paramiagrammopes patellaris* (WUNDERLICH 2017) (**n. comb**.).
In *patellaris* feathery hairs exist as well as claws of the patellar apophyses like in the remaining species of *Paramiagrammopes*. I did not recognize a ventral apophysis of the ♂-pedipalpus in *patellaris* which may be hidden.

(2) *Palaeomiagrammopes* WUNDERLICH 2008 = *Paramiagrammopes* WUNDERLICH 2008 (**n. syn**.). Type species (female): *Palaeomiagrammopes vesica* (WUNDERLICH 2008) (**n. comb**.). Knowing the huge intrageneric variability of new material of *Paramiagrammopes* I include *vesica* in this genus.

(3) *Jerseyuloborus longisoma* WUNDERLICH 2011 (figs. 203 - 204) in Upper Cretaceous amber from New Jersey may be related to *Paramiagrammopes* although feathery hairs of this taxon were not reported (not recognized by me).

(4) *Palaeouloborus* SELDEN 1990 in stone from Spain, Cretaceous: See WUNDERLICH 2008: 633.

(5) Questionable synonymy: *Burmuloborus* WUNDERLICH 2008: See p. 106, figs. 221-222.

List of species of the genus *Paramiagrammopes* known in the end of 2020:

See above (Deinopoidea): *Burmuloborus* WUNDERLICH 2008, a questionable synonym of *Paramiagrammopes*, which include three species known only by females.

Appendix n. sp., *cretaceus* WUNDERLICH 2008, *curvatus* n. sp., *furca* n. sp., *granulatus* n. sp., *inaequalis* n. sp., *inclinatus* n. sp., *longiclypeus* WUNDERLICH 2015, *multifemurspinae* n. sp., *paracurvatus* n. sp., *patellaris* (WUNDERLICH 2017), *patellidens* WUNDERLICH 2015, *pilosus* n. sp., *pollux* n. sp., *pusillus* WUNDERLICH 2018, *semiapertus* n. sp., *simplex* n. sp., *sulcus* n. sp., *texter* n. sp., *unibrevispina* n. sp., *vesica* (WUNDERLICH 2008).

Provisional key to the species of *Paramiagrammopes* in Burmite (♂):

P. vesica (WUNDERLICH 2008) (figs. 227-229) is only known in the female sex and is not included. See also few lines above: Three species of *Burmuloborus*.

Notes: Number, size, shape and position of the patellar apophyses of the pedipalpus as well as their claws (spines) and bristles have turned out to be the most important taxonomical characters of *Paramiagrammopes*; the femoral and metatarsal trichobothria (fig. 223) are usually difficult to recognize, some of the dorsal femoral bristles may be hidden or lost, the structures of the bulbus are usually more or less deformed. The dorsal part of the prosoma is also more or less deformed so that in some cases I am not sure about the existence of a natural inclination/depression or of an unnatural deformation caused, e. g., by the preservation. Because of the rare conspecific material the body length is only a rough specification.

I. Species possessing special/striking characters:
(See also *P. granulatus*, key no. 3)

- Cephalic part with a transverse FURROW in front of the fovea (fig. 269), opisthosoma twice as long as high, body length 2.4 mm; pedipalpus: Figs. 270-271 ..... *sulcus*

- Pedipalpus (figs. 224-227): Patella with a large PROapical apophysis besides a pair of claw-bearing dorsal apophyses; opisthosoma twice as long as wide, number of femoral bristles quite low: Only I bears a single bristle, body length 1.5 mm..... *appendix*

- Pedipalpus (figs. 253-255): Patella with a short RETROventral apophysis besides a pair of short claw-bearing dorsal apophyses, opisthosoma ca. 1.5 times longer than wide (*), few femoral bristles like in *appendix*, body length 2.0 mm ..... *patellaris*

II. Further species:

1 Dorsal apopysis of the pedipalpal patella undivided, bearing a single apical claw (figs. 228,265, 268, 274). Body length 1.1-1.4 mm, opisthosoma ca. 1.4-1.5 times longer than wide 2

- Dorsal apophysis of the pedipalpal patella also bearing a single claw, additionally retrolaterally with a long hair which is placed on a tube-shaped socle (figs. 239. 266). Body length 1.2-1.3 mm, opisthosoma 1.3 and 1.6 times longer than wide or high 3

- Dorsal apophysis of the pedipalpal patella bearing a single claw or two claws, the apophysis may me divided (figs. 236, 242, 250). Body length 1.5-2.6 mm, opisthosoma slender, ca. twice as long as wide or high 4

2(1) Femur I bearing numerous long ventral hairs (fig. 273). Pedipalpus as in figs. 274-276 ..... *unibrevispina*

- Pedipalpus (figs. 264-265): Cymbium with an apical claw, claw of the patellar apophysis quite long ..... *pusillus*

- Pedipalpus (figs. 228-229): Bulbus with a quite long tegular (median?) apophysis .... *cretaceus*

- Pedipalpus (fig. 268) with a wide/stout patellar apophysis ..... *simplex*

3(1) Patellar hair-shaped bristle extremely long (fig. 239), prosomal cuticula distinctly granulate (fig. 238). Opisthosoma ca. 1.33 times longer than wide ..... *granulatus*

- Patellar hair-shaped bristle shorter (fig. 266), prosomal cuticula not granulate. Opisthosoma ca. 1.6 times longer than wide ..... *semiapertus*

4(1) Body length ca. 1.5 mm. Pedipalpus (figs. 242-244): Retrodorsal patellar apophysis and its claw strongly bent ..... *inaequalis*

- Body length usually 1.9-2.6 mm 5

5(4) Probably only femur I bears dorsal bristles (1 in the basal half and 1 subapically, fig. 235). Pedipalpus (figs. 236-237) with a quite large median apophysis ..... *furca*

- Usually several femora bear dorsal bristles (some may be lost!). Pedipalpus different 6

6(5) Pedipapus (figs. 250-259): Dorsal patellar apophysis with TWO claws which are not widely spaced 7

- Pedipalpus (figs. 232, 245, 256, 260, 272): Dorsal patellar apophysis with only a single APICAL claw 8

7(6) Clypeus strongly protruding (fig. 246), pedipalpus as in figs. 247-248, body length 2.6 mm ..... *longiclypeus*

- Clypeus protruding, pedipalpus as in fig. 250, body length 1.9 mm .... *multifemurspinae*

- Clypeus less protruding, pedipalpus as in fig. 259, body length 1.9 mm ..... *pilosus*

8(6) Apical claw of the patellar apophysis strongly bent up to a right angle (figs. 232, 252, 256, 260) 9

- Apical claw of the patellar apophysis only fairly bent (figs. 245, 272) 11

9(8) Pedipalpus (figs. 232-234): Dorsal patellar apophysis with a single apical claw which is VERY long and strongly bent ..... *curvatus*

- Pedipalpus (fig. 252, 256, 260): Dorsal patellar apophysis with a second large claw in the basal half, blunt basal hump of the tibia strongly developed. See the diagnoses and the key no. 11 10

10 (9) Pedipalpus as in fig. 252 ..... *paracurvatus*

- Pedipalpus as in fig. 260 ..... *pollex*

- Pedipalpus as in fig. 256 ..... *patellidens*

11(8) Pedipalpus (fig. 245): Dorsal patellar outgrowth with two claws and a strong bristle in a retroBASAL position of the patellar apophysis. Compare the related species *paracurvatus* and *pollex*, key no. 10 ..... *inclinatus*

- Pedipalpus (fig. 272): Dorsal patellar outgrowth with a single apical claw and a bristle in the middle of the patellar apophysis ..... *texter*

DESCRIPTIONS OF THE TAXA

Remaining species: See the key and the list above.

Paramiagrammopes appendix WUNDERLICH **n. sp**. (figs. 223-227), photo 36

Etymology: The species name refers to the long proapical appendage of the pedipalpal patella, from appendix (lat.) = appendage.

Material: Holotype ♂ in Upper (Mid) Cretaceous Burmite, F3656/BU/CJW.

Preservation and syninclusions: The spider is completely and deformed preserved in a clear yellow-orange piece of amber. – Syninclusions are few tiny plant hairs and particles of detritus.

Diagnostic characters (♂; ♀ unknown) (see the key): Pedipalpus (figs. 224-227): Patella with a large proapical apophysis besides a pair of claws on a divided dorsal outgrowth., femur bristles: Only I with a single distal bristle, opisthosoma twice as long as wide, body length 1.5 mm.

Description (♂):
Measurements (in mm): Body length 1.5; prosomal length and width ca. 0.57; opisthosoma: length 1.0, width 0.5; leg I: Femur 0.8, patella 0.25, tibia 0.63, metatarsus 0.62, tarsus 0.32, tibia II 0.33, tibia III 0.25.
Colour: Prosoma and legs light brown, legs probably slightly annulated, opisthosoma medium grey.
Prosoma (photo) as long as wide, hairs fairly short, thoracal part largely depressed (partly deformed?), fovea well developed, 8 large eyes, posterior row distinctly recurved, median eyes widely spaced, lateral eyes widely spaced from each other, clypeus and basal cheliceral articles of medium length, mouth parts hidden. – Legs (fig. 223, photo) slender, of medium length, order I/II/IV/III, hairs indistinct, bristles numerous and fairly short; femora: Only 1 distally on I, all patellae 1 dorsal-apically, all tibiae with 1/1 dorsal bristles, metatarsus I 1 prolaterally in the middle, II 1-2 prolaterally, III-IV an apical garland, tarsi: I none, II 2 ventrally, III none, IV, the left tarsus IV bears 5 long ventral bristles of the pectunculus, metatarsus IV straight, calamistrum absent. Femoral trichobothria (fig. 223) difficult to recognize, position of the metatarsal trichobothria in ca. 0.25, tarsal claws not studied – Opisthosoma (photo) twice as long as wide, hairs of medium length, spinnerets deformed, cribellum hidden. – Pedipalpus (figs. 224-227; see the diagnosis and the key above): Both pedipalpi deformed and their bulbi expanded, femur with a ventral apophysis (further apophyses may exist), patella with two long hair-shaped bristles, tibia with a retrobasal outgrowth; the distal part of the questionable median apophysis is recognizable.

Relationships: The long proapical apophysis of the patella is almost unique with in the genus, it is shorter in *semiapertus* n. sp.; see the key above.

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

Paramiagrammopes cretaceus WUNDERLICH 2008 (figs. 228-229)

Diagnostic characters (♂; ♀ unknown): Pedipalpus (figs. 228-229): Femur with a quite long ventral apophysis, dorsal patellar apophysis bent, bearing a longer claw, tegular (median?) apophysis long. Opisthosoma 1.5 times longer than wide, all femora bear a dorsal bristle, body length ca. 1.2 mm.

Relationships: In the tiny *P. pusillus* WUNDERLICH 2018 and *P. inaequalis* n. sp. the pedipalpal structures are different, a long tegular apophysis is absent.

Paramiagrammopes curvatus WUNDERLICH **n. sp**. (figs. 230-234), photos 37-38

Etymology: The species name refers to the strongly bent apical claw of the dorsal outgrowth of the pedipalpal patella, from curvatus (lat.) = bent.

Material: Holotypus ♂ in Upper (Mid) Cretaceous Burmite, F3659/BU/CJW.

Preservation and syninclusions: The spider is almost completely and excellently preserved in a clear yellow-orange piece of amber, only the left metatarsus and tarsus I and the tips of the left tarsi II and IV are cut off, both bulbi are more or less expanded. - Syninclusions are 1 Diptera, ½ arthropod and few tiny plant hairs.

Diagnostic characters (♂; ♀ unknown): Pedipalpus (figs. 231-234): Dorsal outgrowth of the patellar apophysis with a single large claw which is bent in a right angle (no further claws), all femora with 1/1 dorsal bristles, opisthosoma 1.75 times longer than wide, body length 2.1 mm.

Description (♂):
Measurements (in mm): Body length 2.1; prosoma: Length 0.7, width 0.8; opisthosoma: Length 1.4, width 0.8; leg I: Femur 1.3, patella (deformed) 0.4, tibia 1.15, metatarsus 1.15, tarsus 0.5, tibia II 0.6, tibia III ca. 0.45, tibia IV 0.6.
Colour: Prosoma and legs medium brown, legs not annulated, opisthosoma light grey brown.
Prosoma (fig. 230, photo) (it is fairly deformed) 1.15 times wider than long, hairs short, bearing a distinct wide transverse furrow, 8 small eyes in a wide field, anterior median eyes largest, clypeus very long and concave, basal cheliceral articles very short, labium wider than long, with a seam to the wide sternum which spaces the coxae IV by about their diameter. - Legs (photo) slender, I distinctly the longest, III distinctly the shortest, hairs only fairly long, bristles numerous and of fairly length, 1/1 on all femora, patella 1/1 (the basal one quite thin), tibiae dorsally 1/1, I bearing additionally 2 prolaterally and 2 retrolaterally in contrast to the remaining tibiae, metatarsus I with 2 bristles near the middle of the article, 1 dorsally in the distal half and 2 apically, metatarsi II-IV with 1 dorsal bristle in the basal half and 3 apically, bristles of the pectunculus reduced or hidden, metatarsus IV slightly bent, calamistrum well developed in the basal half,

metatarsal trichobothria unknown, long femoral II trichobothria are well observable, tarsal claws not studied. - Opisthosoma (photo) 1.75 times longer than wide, hairs short, anterior spinnerets long, widely spaced and converging, cribellum hidden. - Pedipalpus (figs. 231-234): Trochanter bearing a ventral-apical outgrowth, femur with an apical-ventral divided outgrowth, erect dorsal patellar apophysis hairy and quite long, bearing a long claw which is bent in a right angle, no further apophyses or claws, basal tibial hump not well developed, cymbium large and divided, widely protruding prolaterally, bulbus with several large and blunt apophyses including two median apophyses, embolus unknown.

Relationships: See *P. sulcus* n. sp. *P. pollex* n. sp. is also related, see below. In *P. paracurvatus* n. sp. The prosomal inclination is distinctly smaller and the dorsal patellar outgrowth of the pedipalpus bears a further claw in the basal half like in *P. inclinatus* n. sp.

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

Paramiagrammopes furca WUNDERLICH **n. sp**. (figs. 235-237), photo 39

Etymology: The species name refers to the furcate patellar apophyses of the pedipalpus, from furca (lat.) = fork.

Material: Holotype ♂ in Upper (Mid) Cretaceous Burmite, F3633/BU/CJW.

Preservation and syninclusions: The spider is partly well preserved in a clear yellow-orange piece of amber, the structures of the left pedipalpus are very well preserved, the distal/apical parts of some legs are cut off, the clypeus and the opisthosoma are injured/deformed. – Syninclusions are a female Auchenorrhyncha with a large ovipositor, the small larva of a questionable Hemiptera, few tiny plant hairs and numerous bubbles.

Diagnostic characters (♂; ♀ unknown) (see the key): Pedipalpus (figs. 236-237): Patella with a pair of long and bent apophyses which each bears a relatively short claw; femoral bristles: Only I bears two dorsal bristles (fig. 235), opisthosoma 2.3 times longer than high, body length 2.5 mm.

Description (♂):
Measurements (in mm): Body length 2.5; prosoma: Length 1.0, height 0.35; opisthosoma: Length 1.6, height 0.7; leg I Femur ca. 1.1, patella ca. 0.37, tibia 1.1, metatarsus ca. 1.2, tarsus ca. 0.55, tibia III 0.65, tibia IV 1.1.
Colour medium brown, legs not annulated.
Prosoma (photo) slender and low (not raised), distinctly longer than wide, partly deformed or hidden, hairs of medium length, feathery hairs existing, posterior eye row recurved, clypeus fairly long, chelicerae, mouth parts and sternum hidden. – Legs (fig. 235, photo) long and slender, III distinctly the shortest, hairs not distinct, bristles rather short (some bristles may be hidden of broken off), existing from femora to metatarsi;

leg I: 1 dorsal in the in the basal half and 1 short distally (remaining femora bristleless), patella dorsally 1/1 (the basal one short), tibia probably 1/1 (at least 1 dorsally in the basal half), metatarsus 1 basally and 1 subapically, tibia IV at least 4, metatarsus IV at least 3, number of the ventral bristles of tarsus and metatarsus IV (pectunculus) quite few, calamistrum indistinct, position of the metatarsal trichobothrium unknown, unpaired tarsal claw well developed. – Opisthosoma (photo) slender, 2.3 times longer than high, hairs short, anterior and posterior spinnerets well developed. – Pedipalpus (figs. 236-237): Femur slender, bearing long dorsal hairs, ventral outgrowths partly hidden, patella with a pair of long dorsal outgrowths which bear well developed and rather shorts claws, the retrolateral one is a bit longer than the protaleral one, tibia deformed/hidden, cymbium large, not domed, bulbus with a large and strongly sclerotized questionably tegular apophysis and a large and well sclerotized questionable median apophysis which is strongly widened apically; most parts of a structure which may be the embolus are hidden, too.

Relationships: See the key. The shape of the median apophysis is different from other congeneric species.

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

Paramiagrammopes granulatus WUNDERLICH **n. sp**. (figs. 238-241, photo 40

Etymology: The species name refers to the granulate prosomal cuticula, from granulatus (lat.) = granulate.

Material: Holotype ♂ in Upper (Mid) Cretaceous Burmite, F3643/BU/CJW.

Preservation and syninclusions: The spider is completely and partly well preserved in a clear yellow-orange piece of amber; during the preparation I noticed that this piece is harder than material of most other pieces handled by me. The prosoma is fairly deformed, the opisthosoma is covered by a thin white emulsion. – Syninclusions are some tiny plant hairs and particles of detritus.

Diagnostic characters (♂; ♀ unknown): Prosoma (fig. 238) distinctly granulate, pedipalpus (figs. 239-241): Bristle of the retrolateral outgrowth of the patella extremely long and rather thin (hair-shaped), apical claw slender, tegular apophysis distinctly bent. Only femur I bears a single distal bristle, opisthosoma 1.33 times longer than wide, body length 1.2 mm.

Description (♂):
Measurements (in mm): Body length 1.2; prosoma: Length 0.6, width ca. 0.43; opisthosoma: Length 0.8, width 0.6; leg I: Femur 1.0, patella 0.2, tibia 0.55, metatarsus ca. 0.6, tarsus 0.35, femur II >0.45, femur III ca. 0.35, femur IV 0.58.
Colour: Body light grey brown, legs brown, apparently not annulated.
Prosoma (fig. 238, photo) 1.4 times longer than wide, cuticula distinctly granulate, 8 deformed and partly hidden eyes, posterior row distinctly recurved, lateral eyes widely spaced from each other. – Legs (photo) slender and fairly long, I distinctly the longest,

III distinctly the shortest, hairs indistinct, bristle thin (some may be lost), only femur I bears a single bristle in a distal position, patellae 1 short basally and 1 long distally, tibiae dorsally 1/1 (III probably only a single one), metatarsi with few bristles, pectunculus apparently reduced, I did not find femoral or metatarsal trichobothria on the deformed leg articles. – Opisthosoma (photo) 1.33 times longer than wide, hairs short. – Pedipalpus (figs. 39-241) deformed, see the diagnosis, tibia with a hump near its base like in other congeneric species.

Relationships (see the key): In *P. semiapertus* the hair-shaped bristle of the pedipalpal patella is distinctly shorter.

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

Paramiagrammopes inaequalis WUNDERLICH **n. sp**. (figs. 242-244)

Etymology: The species name refers to the unequal size and shape of the patellar outgrowths of the pedipalpus, from inaequal (lat.) = unequal.

Material: Holotype ♂ in Upper (Mid) Cretaceous Burmite, F3645/BU/CJW.

Preservation and syninclusions: The spider is only fairly well preserved in a mainly clear yellow-orange piece of amber, the opisthosoma is lateral deformed (inclined), ventral parts of the prosoma are replaced by a bubble, the mouth parts are lost, several leg articles are deformed or separated from the prosoma. – Syninclusions are remains of a Diptera and few tiny plant hairs.

Diagnostic characters (♂; ♀ unknown): Pedipalpus (figs. 242-244): Retrolateral outgrowth of the patella much larger than the prolateral one and - like the claw - strongly bent; leg bristles numerous (see below), all femora with several bristles, opisthosoma almost twice as long as heigh, body length 1.5 mm.

Description (♂):
Measurements (in mm): Body length 1.5; prosomal length 0.65; opisthosoma: Length 1.0, height 0.52; leg I: Femur 1.1, patella almost 0.3, tibia 0.9, metatarsus 1.0, tarsus 0.43, tibia IV 0.5.
Colour light brown, legs not annulated.
Prosoma (it is only partly preserved and deformed), apparently exist 8 eyes. – Legs fairly long, order I/II/IV/III, hairs short and indistinct, bristles numerous and quite thin, existing on all femora, patellae and metatarsi; pectunculus on tarsi and metatarsi III-IV well developed, tarsus IV with 5 long ventral bristles; leg I: Femur 2 dorsally and 1 prodistally, patella 1/1, tibia 2 dorsally, 2 prolaterally and 3 retrolaterally, metatarsus 5 dorsally/laterally and 2 apically, metatarsus IV dorsally concave, calamistrum apparently well developed, femoral and metatarsal trichobothria unknown. - Opisthosoma almost twice as long as heigh, hairs short, spinnerets strongly deformed. - Pedipalpus (figs. 242-244; see the diagnosis; parts are deformed): Tibia apparently short/stout.

Relationships: See the key. The patellar apophyses and claws of the pedipalpus are unique in this species.

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

Paramiagrammopes inclinatus WUNDERLICH **n. sp**. (fig. 245)

Etymology: The species name refers to the strongly deformed/inclined body, from (lat.) inclinatus.

Material: Holotype ♂ in Upper (Mid) Cretaceous Burmite, F3634/BU/CJW.

Preservation and syninclusions: The spider is almost completely preserved, strongly deformed/folded (probably it has been dried out) in a partly clear yellow-orange piece of amber, parts of both tarsi IV are cut off, the pedipalpal patellae are fairly well preserved. - Syninclusions are numerous Diptera, few Thysanoptera and Hymenoptera as well tiny plant hairs and particles of detritus.

Diagnostic characters (♂; ♀ unknown): Pedipalpus (fig. 245): Patella with a bent retrobasal bristle near a dorsal hump, a large claw near the middle of the article and a large apical claw; all femora bear 1/1 dorsal bristles, opisthosoma almost 1.4 times longer than wide, body length 2.2 mm.

Description (♂):
Measurements (in mm): Body length 2.2; prosomal length 0.75; opisthosoma: Length< 1.2, width ca. 0.5; leg I: Femur 1.4, patella 0.25, tibia 1.05, metatarsus ca. 1.1, tarsus 0.42, femur IV ca. 1.15.
Colour: Prosoma medium brown, legs light brown, not annulated, opisthosoma light grey brown.
Prosoma strongly inclined, probably as wide as long, bearing 8 eyes. - Legs only fairly long, slender, hairs indistinct, bristles numerous, all femora, patella and tibiae bear 1/1 dorsal bristles, tibiae and metatarsi bear further lateral and apical bristles, bristles of the pectunculus reduced, metatarsus IV straight, calamistrum indistinct, femoral trichobothria and unpaired tarsal claws existing, metatarsal trichobothria unknown. - Opisthosoma almost 1.4 times longer than wide, hairs short. - Pedipalpus (see also above): Femur with three ventral outgrowths; tibia and tarsus strongly deformed.

Relationships: In *P. texter* n. sp. The apical claw of the patellar pedipalpal apophysis is also only slightly bent but a second claw is absent. In the most related *P. paracurvatus* n. sp. The apical patellar claw is shorter and strongly bent, the claw in a more basal position is also shorter and both claws are wider spaced from each other; the shape of the median apophysis 1 of both species is quite similar.

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

Paramiagrammopes longiclypeus (WUNDERLICH 2015) (figs. 246-247a), photo 41

(= *Palaeomiagrammopes longiclypeus*)

Diagnostic characters (♂; ♀ unknown): Pedipalpus (figs. 247-247a): Dorsal patellar apophysis very long and slender, bearing a claw which is strongly bent, a second apophysis exists in a more basal position, median apophysis quite long and strongly bent. Clypeus strongly protruding (fig. 246), opisthosoma ca. 2.5 times longer than wide, all femora bear at least a single bristle, body length 2.6 mm.

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

Paramiagrammopes multifemurspinae WUNDERLICH **n. sp**. (figs. 248-250)

Etymology: The species name refers to the larger number of bristles on the first femur I, from multi- (lat.) = numerous and spina (lat.) = spine, bristle.

Material: Holotype ♂ in Upper (Mid) Cretaceous Burmite, F3672/BU/CJW.

Preservation and syninclusions: The spider is fairly well and completely preserved near the margin of a clear yellow-orange piece of amber, the left tarsus I, patella, tibia and metatarsus of the right leg IV as well as the opisthosoma are cut off, the prosoma and several leg articles are strongly deformed. - Syninclusions are a small dissected Diptera: Brachycera close to the right side of the spider which probably was the prey of the spider, two tiny Thysanoptera and a small Coleoptera.

Diagnosis (♂; ♀ unknown): Pedipalpus (fig. 250): The divided dorsal apophysis of the patella bears two claws which near the end are strongly bent, opisthosoma 2.9 times longer than wide, all femora (fig. 248-249) with bristles (some may be lost), body length 1.9 mm.

Description (♂):
Measurements (in mm): Body length 1.9; prosomal length 0.7; opisthosoma: length 1.3, width ca. 0.45; leg I: Femur 1.9, patella 0.35, tibia 1.05, metatarsus 1.0, tarsus 0.4; femur II 0.85, femur III 0.7, femur IV 1.0.
Colour: Prosoma and legs brown, legs not annulated, opisthosoma light grey brown.
Prosoma strongly deformed, bearing 8 eyes, clypeus long and distinctly protruding. - Legs (figs. 248-249) of medium length, I distinctly the longest, hairs rather short, bristles apparently incompletely preserved, of medium length, all femora with dorsal bristles, the right femur I bears 4, the left femur I only 2 bristles, patellae with 1 dorsal-apical bristle, sequence of the dorsal tibial bristles /2/2/1?/2, lateral bristles absent, metatarsi I bear 2 rsp. 0 bristles besides apicals, tarsus IV bears 6 short ventral bristles of the pectunculus, trichobothria and feathery hairs not studied. - Opisthosoma incomplete (spinnerets cut off), 1.9 times longer than wide, bearing short hairs. -

Pedipalpus (fig. 250) deformed, see the diagnosis, patellar apophysis with three strong retrodorsal hairs, tibia with a pointed dorsal-basal outgrowth which may be deformed.

Relationships: *P. pilosus* n. sp. is strongly related; in *pilosus* the patellar pedipalpal claws are not strongly bent near their end, the opisthosoma is more slender and the number of femoral bristles is probably lower.

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

Paramiagrammopes paracurvatus WUNDERLICH **n. sp**. (figs. 251-252), photo 42

Etymology: The species name refers to the similarity with *P. curvatus* n. sp., from para (lat.) in the sense of quite similar.

Material: Holotype ♂ in Upper (Mid) Cretaceous amber from Myanmar, F3662/BU/JCW.

Preservation and syninclusions: The spider is almost completely and well preserved in a piece of amber full of detritus; only the tip of the right tarsus I is cut off, the prosoma is fairly deformed, the opisthosoma is fairly depressed dorso-ventrally and ventrally completely caved out. - Syninclusions are 1 Acari, half a dozen Diptera, tiny plant hairs and particles of detritus.

Diagnostic characters (♂; ♀ unknown): Pedipalpus (figs. 251-252): Dorsal apophysis of the patella with an apical claw which is bent in a right angle as well as a retroventral more basal claw and a retroventral-basal bristle; tibia with a blunt retrobasal apophysis. Prosoma quite similar to *P. curvatus* n. sp., opisthosoma 1.75 times longer than wide, at lest femora I-II bear 1/1 dorsal bristles, body length 2.3 mm.

Description (♂):
Measurements (in mm): Body length 2.3; prosoma: Length 0.85, width 0.85; opisthosoma (it is fairly flattened): Length 1.5, width 0.85; leg I: Femur 1.5, patella 0.37, tibia 1.1, metatarsus 1.1, tarsus 0.5, tibia II 0.57, tibia III 0.28, tibia IV 0.58.
Colour: Prosoma and legs medium brown, legs not annulated, opisthosoma light brown.
Prosoma (photo) as wide as long, bearing a quite long transverse inclination and eyes like in *P. curvatus* n. sp.; most dorsal and ventral parts are covered with an emulsion. - Legs (photo) rather long and slender, hairs and bristles of medium length, femora I-II with 1/1 dorsal bristles, III-IV apparently with only a single dorsal-distal bristle, patellae dorsally 1/1 (the basal one hair-shaped), tibiae dorsally 1/1, other bristles absent, metatarsi with a garland of apical bristles, I additionally with a dorsal one near the middle of the article, metatarsus IV straight, calamistrum indistinct, number of the bristles of the pectunculus strongly reduced, trichobothria and tarsal claws not stdied. - Opisthosoma (photo) incomplete (see above), 1.75 times longer than wide, hairs quite short. - Pedipalpus (figs. 251-252): Femur ventrally with at least one basal and two ap-

ical outgrowths as well as prolateral files, patella and tibia: See the diagnosis, median apophysis slender, embolus unknown.

Relationships: See the key. In the closely related *P. inclinatus* n. sp. the apical claw of the patellar apophysis is longer and less bent, the basal claw is also longer, its position nearer to the apical claw. In *P. semiapertus* n. sp. exists a similar basal outgrowth of the pedipalpal tibia like in other species. See also *P. pollex* n. sp.

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

Paramiagrammopes patellaris (WUNDERLICH 2017) (figs. 253-255)

(under *Furculoborus patellaris*, see above)

Diagnostic characters (♂; ♀ unknown): Pedipalpus (fig. 253-255): Patella with a short retroventral outgrowth besides a pair of apical claws of a short dorsal outgrowth. Opisthosoma ca. 1.5 times longer than wide, position as in fig. 253, few femoral bristles, body length 2.0 mm.

Relationships: *P. pollex* n. sp. is closely related, see below.

Paramiagrammopes patellidens WUNDERLICH 2015 (fig. 256), photo 43

Diagnostic characters (♂; ♀ unknown): Pedipalpus (fig. 256): Dorsal patellar apophysis quite long, bearing a short apical claw which is bent in a right angle; a further short apophysis exists in a retrobasal position. Opisthosoma 2.5 times longer than high, femur bristles numerous (3 in I), body length 2.2 mm.

Relationships: *P. pollex* n. sp. is closely related, see below.

Paramiagrammopes pilosus WUNDERLICH **n. sp**. (figs. 257-259), photos 44-45

Etymology: The species name refers to the hairy outgrowth of the pedipalpal patella, from pilosus (lat.) = hairy.

Material: Holotype ♂ in Upper (Mid) Cretaceous Burmite, F3660/BU/CJW.

Preservation and syninclusions: The spider is completely and excellently preserved in a yellow-orange piece of amber which is full of bubbles which prevent partly the ventral aspect of the spider. - Syninclusions are the small leg of a spider and numerous tiny plant hairs as well as particles of detritus.

Diagnostic characters (♂; ♀ unknown): Pedipalpus (fig. 259): Dorsal patellar outgrowth long, bearing a larger blunt retrobasal outgrowth, apically bearing a pair of claws and several distal long hairs; leg I twice as long as the body, leg bristles numerous (fig. 258), all femora bear bristles, opisthosoma ca. twice as long as wide, body length 1.9 mm.

Description (♂):
Measurements (in mm): Body length 1.9; prosoma: Length and width 0.6; opisthosoma: Length 1.25, width 0.6; leg I: Femur 1.3, patella 0.27, tibia 0.9, metatarsus 0.92, tarsus 0.4; femur II 0.65, femur III ca. 0.45, femur IV 0.75.
Colour light brown, legs not annulated.
Prosoma (fig. 257, photo) as long as wide, hairs rather short, fovea well developed, with a transverse part, 8 small eyes, posterior row fairly recurved, posterior median eyes widely spaced, clypeus very long, concave and slightly protruding, mouth parts hidden, sternum distinctly spacing the coxae IV. - Legs (fig. 258, photo) fairly slender, spiny, order I/II/IV/III, I quite long, twice as long as the body, hairs short, bristles numerous, all femora with a prodistal bristle, I-II additionally with a dorsal bristle near the middle of the article, all patellae and tibiae dorsally 1/1, tibia I additionally with 3 lateral and 3 distal ones, metatarsus I with 5 lateral and 3 subapical bristles, tibiae III-IV with few additional bristles, tarsus IV with 5 long ventral bristles of the pectunculus, on the left femur IV 6 very long prodorsal trichobothria are observable, metatarsal trichobothria unknown, metatarsus IV straight, calamistrum indistinct, three tarsal claws. - Opisthosoma (photo) about 2.1 times longer than wide, hairs short, anterior and posterior spinnerets long. - Pedipalpus (see the diagnosis; partly – e. g. the bulbus – strongly deformed): Femur with a distal-ventral outgrowth, further outgrowths may be hidden.

Relationships: *P. multifemurspinae* n. sp. is most related, see above. In *P. longiclypeus* WUNDERLICH 2015 the clypeus is less protruding, the dorsal outgrowth of the pedipalpal patella is less hairy and the position of its claws is a bit different. *P. longiclypeus* is distinctly larger, body length 2.6 mm.

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

Paramiagrammopes pollex **n. sp.** (fig. 260)

Etymology: The species name refers to the thumb-shaped dorsal-basal apophysis of the pedipalpal tibia, from pollex (lat.) = thumb.

Material: Holotype ♂ in Upper (Mid) Cretaceous Burmite, F3670/BU/CJW.

Preservation and syninclusions: The spider is completely and very well preserved in a clear yellow-orange piece of amber, both bulbi are strongly deformed, most parts of the right pedipalpus are well preserved. - Syninclusions are a thin, 9 mm long antenna of an insect right of the spider, several tiny plant hairs and numerous tiny bubbles.

Diagnosis (♂; ♀ unknown): Pedipalpus (fig. 260): Femur bearing only a ventral-apical HUMP, dorsal apophysis of the patella with a short apical claw which is strongly bent, with a retrobasal straight spine-shaped claw as well as a strong retrobasal bristle, tibia with a dorsal-basal thumb-shaped apophysis; opisthosoma 2.3 times longer than high, at least femora I-II bear 2 dorsal bristles, body length 2.1 mm.

Description (♂):
Measurements (in mm): Body length 2.1; prosomal length 0.9; opisthosoma: Length 1.4, height 0.6; leg I: Femur 1.3, patella 0.35, tibia 1.0, metatarsus 0.95, tarsus 0.4, femur II 0.9, femur III 0.7, femur IV 0.8, tibia IV 0.55.
Colour medium grey brown, legs not annulated, opisthosoma dorsally with 4 pairs of dark grey spots.
Prosoma hairy, feathery hairs existing, dorsally with a large thoracal depression, 8 eyes of rather similar size in a wide field, posterior row recurved, lateral eyes distinctly spaced, clypeus long and fairly protruding, chelicerae, mouth parts and sternum hidden. - Legs only fairly long, order I/II/IV/III, hairs not distinct, feathery hairs numerous, bristles rather short, sequence on the femora most probably 2/2/1/1 (the basal bristle is absent on III-IV), patellae with a dorsal-apical bristle which is well developed, sequence of the dorsal tibial bristles 2/2/1?/2, lateral bristles absent, metatarsi (besides apical bristles): I 2, II 1-3, III-IV none, few ventral bristles of the pectunculus on III-IV, metatarsus IV straight, calamistrum not distinct, femoral trichobothria well developed, especially on III, metatarsal trichobothria unknown. - Opisthosoma 2.3 times longer than high, hairs rather short, feathery hairs existing, spinnerets of medium size, area of the cribellum hidden. - Pedipalpus (fig. 260): See the diagnosis; the femur bears long hairs, especially dorsally.

Relationships: *P. patellidens* n. sp. is closely related; in *patellidens* exists a pointed ventral femoral apophysis and the basal (retrolateral) claw is bent. The patellar pedipalpal apophysis of *P. sulcus* is also similar.

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

Paramiagrammopes pusillus WUNDERLICH 2018 (figs. 261-265), photo 46

Diagnostic characters (♂; ♀ unknown): Pedipalpus (figs. 264-265): Cymbium bearing a short apical claw, apical claw of the dorsal patellar apophysis quite long. Opisthosoma 1.5 times longer that wide, femoral bristles probably absent, tarsal bristles of the pectunculus fig. 262, prosoma fig. 261, body length 1.1 mm.

Relationships: See the key and the structures of the male pedipalpus of *P. brevispina* and *P. cretaceus* which are tiny species, too.

Paramiagrammopes semiapertus WUNDERLICH **n. sp**. (fig. 266), photo 47

Etymology: The species name refers to the incomplete and open body of the holotype which left half is lost, from semi (lat.) = half. and apertus (lat.) = open.

Material: Holotype ♂ in Upper (Mid) Cretaceous Burmite, F3644/BU/CJW.

Preservation and syninclusions: The spider is incomplete preserved in a clear yellow-orange piece of amber, the left half of prosoma and opisthosoma are cut off on a layer within the amber so that the body appears open. – Syninclusions: A tiny juv. Araneae indet., tiny plant hairs, particles of detritus and pyrite.

Diagnostic characters (♂; ♀ unknown): Pedipalpus (fig. 266): Patellar hair-shaped bristle long, placed on a long socle, claw of the single patellar outgrowth long, bulbus with a large tegular apophysis, quite few leg bristles, femur I with 1 prodorsal-distal bristle, remaining femora bristle-less, opisthosoma 1.6 times longer than high, body length 1.3 mm.

Description (♂):
Measurements (in mm): Body length 1.3; prosomal length 0.6; opisthosoma: length 0.8, height 0.5; leg I: Femur ca. 0.8, patella ca. 0.2, tibia 0.4, metatarsus ca. 0.65, tarsus ca. 0.35.
Colour light brown.
Prosoma (photo) incompletely and deformed preserved, hairy. – Legs (photo) only fairly long, I longest, III distinctly the shortest, hairs and bristles of medium length, femur I with 1 prodorsal-distal bristle, remaining femora bristle-less, patellae dorsally 1/1, tibiae dorsally 1/1, further bristles absent, hidden or broken off, femoral and metatarsal trichobothria unknown, few bristles of the pectunculus existing, tarsal claws not studied. – Opisthosoma incomplete (see above), 1.6 times longer than high, bearing short hairs. – Pedipalpus (fig. 266; see also the diagnosis): Femur with a ventral-distal apophysis, embolus unknown.

Relationships: See the key and *P. granulatus* n. sp. in which the hair-shaped bristle of the pedipalpal patella is even longer. The blunt dorsal outgrowth of the pedipalpal tibia is similar to *P. paracurvatus* n. sp.

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

Paramiagrammopes simplex **n. sp**. (figs. 267-268)

Etymology: The species name refers to its simple dorsal outgrowth of the pedipalpal patella, from simplex (lat.) = simple.

Material: Holotype ♂ in Upper (Mid) Cretaceous Burmite, F3671/BU/CJW.

Preservation and syninclusions: The spider is only fairly well and completely preserved in a clear yellow-orange piece of amber, the prosoma is deformed and covered with bubbles, the opisthosoma is dorsally depressed, both bulbi are strongly deformed or hidden. - Syninclusions are 1 Diptera: Brachycera, excrement of an insect and tiny plant hairs.

Diagnosis (♂; ♀ unknown): Pedipalpus (fig. 268): Dorsal patellar apophysis stout, bearing a short claw and two thin retrolateral bristle-shaped hairs; other claws apparently absent; opisthosoma 1.5 times longer than wide, all femora with 1-2 dorsal bristles, body length 1.4 mm.

Description (♂):
Measurements (in mm): Body length 1.4; prosomal length 0.6; opisthosoma: Length 0.9, width 0.6; leg I: Femur 1.0, patella 0.25, tibia 0.6, metatarsus 0.6, tarsus 0.35, tibia II 0.37, tibia III 0.3, tibia IV 0.34.
Colour: Prosoma and legs light brown, legs not annulated, opisthosoma light grey.
Prosoma (it is deformed and partly hidden) bearing 8 eyes. - Legs (fig. 267) of medium length, hairs not distinct, I distinctly the longest, order I/II/IV/III, bearing few short bristles, femora dorsally 1-2, patella 1 dorsally-apically, sequence dorsally on the tibiae 2/2/1?/2, at least I additionally with 1 proventrally in the basal half, metatarsi with an apical garland of bristles, at least I additionally with 3 laterally in the basal half, ventral tarsal bristles of the pectunculus III-IV well developed, metatarsus IV straight, calamistrum indistinct, feathery hairs and trichobothria not studied. - Opisthosoma 1.5 times longer than wide, hairs of medium length, spinnerets and area of the cribellum hidden. - Pedipalpus (fig. 268) (most parts are deformed or hidden): Dorsal patellar apophysis simple and stout, claw rather short; retrolaterally exist two bristle-shaped hairs.

Relationships: In the strongly related *P. unibrevispina* n. sp. the chaetotaxy and the shape of the simple pedipalpal patellar apophysis are similar but its femur I is stouter and ventrally quite hairy, the hairs stand out from the article in a rectangular position, the dorsal patellar apophysis is more slender and bears only a single hair.

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

Paramiagrammopes sulcus WUNDERLICH **n. sp**. (figs. 269-271)

Etymology: The species name refers to the large transverse prosomal furrow of the holotype, from sulcus (lat.) = furrow.

Material: Holotype ♂ in Upper (Mid) Cretaceous Burmite, F3673/BU/CJW.

Preservation and syninclusions: The spider is fairly well preserved in a clear yellow-orange piece of amber, most right parts of the prosoma, the right patella and femur II and the left tarsus IV are cut off, the right side of the opisthosoma is inclined, both bulbi are expanded and deformed, two fissures are running through body and legs of the spider. - Syninclusions are the small larva of a Rhaphidioptera, insects excrement, tiny plant hairs and particles of detritus.

Diagnosis (♂; ♀ unknown): Prosoma (fig. 269) with a transverse furrow in front of the fovea; pedipalpus (figs. 270-271): Dorsal patellar outgrowth long and slender bearing a large claw; at the base of this outgrowth exists a second shorter retrolateral outgrowth which bears a large claw, too, tibia with a large blunt dorsal-basal outgrowth; opisthosoma two times longer than high, 1/1 dorsal femoral bristles exist on all legs, body length 2.4 mm.

Description (♂):
Measurements (in mm): Body length 2.4; prosomal length 0.8; opisthosoma: Length 1.6, height 0.8; leg I: Femur 1.0, patella 0.3, tibia 1.1, metatarsus 1.0, tarsus 0.45; leg IV: Femur 0.85, patella 0.28, tibia 0.65.
Colour: Prosoma dark brown, legs medium brown, not annulated, opisthosoma light grey brown.
Prosoma (fig. 260) with a distinct transverse furrow in front of the fovea, hairs short, 8 eyes of medium size, posterior row slightly recurved, clypeus long, position almost vertical, not protruding, chelicerae, mouth parts and most parts of the sternum hidden. - Legs slender, I longest, hairs short, bristles also short, not numerous, femora with 1/1 dorsal bristles, patellae 1 dorsally-apically, tibiae dorsally 1/1 (probably only 1 on III), no laterals, metatarsi 2-3 and apicals, few short ventral bristles of the pectunculus on tarsus III, metatarsus IV straight, calamistrum well developed, position of the left metatarsus I trichobothrium in 0.13, femoral trichobothria well developed, feathery hairs and tarsal claws not studied. - Opisthosoma two times longer than high, hairs short, anterior and posterior spinnerets large and deformed, cribellum small. - Pedipalpus (figs. 270-271): See the preservation and the diagnosis.

Relationships: According to the dorsal patellar outgrowths of the pedipalpus *P. curvatus* n. sp. is most related; in *curvatus* a transverse furrow of the prosoma is absent, the pedipalpal patellar outgrowths are different in shape and position and a strong additional basal-retrodorsal bristle exists. *P. texter* n. sp. is also close to *sulcus*.

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

Paramiagrammopes texter WUNDERLICH **n. sp**. (fig. 272)

Etymology: The species name refers to the existence of a part of a spider web in the same piece of amber, from texter (lat.) = weaver.

Material: Holotype ♂ in Upper (Mid) Cretaceous Burmite, F3661/BU/CJW.

Preservation and syninclusions: The spider is fairly well and almost completely (except the tip of the left tarsus II which is cut off) preserved in a mainly clear and 3.2 cm long piece of amber. - Syninclusions are some light translucent and leaf-shaped structures of unknown origin, larger bubbles cover the right side of prosoma and opisthosoma, several irregular ecribellate spider threads which bear few droplets exist near the spider, tiny plant hairs are also preserved.

Diagnostic characters (♂; ♀ unknown): Pedipalpus (fig. 272): Dorsal outgrowth of the patella bearing a long and almost straight claw, a long and slender bristle exists in a retrolateral position of the patella; all femora bear 1/1 dorsal bristles, opisthosoma ca. twice as long as wide, body length 2.2 mm.

Description (♂):
Measurements (in mm): Body length 2.2; prosoma: Length and width 0.65; opisthosoma: Length 1.5, width 0.72; leg I: Femur 1.35, patella 0.3, tibia 1.1, metatarsus 1.0, tarsus 0.42, tibia IV 1.15.
Colour: Prosoma and legs medium to light brown, legs not annulated, opisthosoma light grey brown.
Prosoma as wide as long, a large depression exists between the cephalic and the high thoracic part, 8 eyes, posterior row recurved, posterior median eyes widely spaced, clypeus long and concave, basal cheliceral articles short, mouth parts partly hidden by a small dark brown particle. - Legs slender and rather long, order I/IV/II/III, hairs short, bristles rather frequent, all femora, patellae and probably tibiae bear 1/1 dorsal bristles, metatarsi with 1-2 dorsal-apical bristles, tarsus IV bears several ventral bristles of the pectunculus, metatarsus IV straight, calamistrum indistinct, trichobothria and tarsal claws not studied. - Opisthosoma almost twice as long as wide, spinnerets very well preserved, cribellum partly hidden by an emulsion. - Pedipalpus (fig. 272): Trochanter with an apical apophysis, femora bearing very long dorsal hairs and ventrally an apophysis in the middle of the article as well as a pair of apical apophyses, patella see the diagnosis, tibia with a blunt dorsal-basal hump, cymbium and bulbus of a median apophysis large, distal part of the median apophysis 1 slender, tegular apophysis with two longer hairs, bulb of a median apophysis bearing short hairs, a part of the sperm duct is recognizable, embolus unknown.

Relationships: See the key, *P. inclinatus* n. sp. and *P. sulcus* n. sp.

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

Paramiagrammopes unibrevispina WUNDERLICH **n. sp**. (figs. 273-276), photo 48

Etymology: The species name refers to the short claw of the single apophysis of the pedipalpal patella, from unus (lat.) = a single, brevis (lat.) = short and spina (lat.) = spine.

Material: Holotypus ♂ in Upper (Mid) Cretaceous Burmite, F3642/BU/CJW.

Preservation and syninclusions: The spider is very well – the pedipalpi even excellently – and almost completely preserved in a partly clear yellow-orange piece of amber, only the right tarsus and metatarsus IV are cut off. – Syninclusions: 1 ½ Acari, 1 arthropod exuvia, 1 Coccina, 1 Collembola, numerous tiny plant hairs and particles of detritus. A piece of amber containing a tiny Acari indet. was separated, F3642a/BU/CJW.

Diagnostic characters (♂; ♀ unknown): Pedipalpus (figs. 273-276): Existence of only a single dorsal patellar apophysis of the pedipalpus which bears a short claw; femur I ventrally quite hairy (fig. 273), with a single prodorsal-distal bristle, remaining femora bristle-less, opisthosoma ca. 1.45 times longer than wide, body length 1.3 mm.

Description (♂):
Measurements (in mm): Body length 1.3; prosoma: length 0.55, with 0.45; opisthosoma: Length 0.8, width 0.55; leg I: Femur 0.8, patella 0.2, left tibia ca. 0.6, right tibia ca. 0.7, metatarsus 0.7, tarsus 0.35, tibia IV ca. 0.4.
Colour medium grey, legs not annulated.
Prosoma (photo) 1.2 times longer than wide, dorsally not inclined, hairs indistinct, thoracal fissure well developed, 8 eyes in two wide rows which are partly covered with bubbles, posterior row distinctly recurved, clypeus fairly long, basal cheliceral articles of medium size, fangs slender, mouth parts hidden. – Legs (fig. 273, photo) slender, order I/II/IV/III, hairs indistinct, thin, bristles: Femur I 1 prodorsally-distally, remaining femora bristle-less; patellae dorsally 1/1, tibiae dorsally 1/1, metatarsus I with 2 pairs, metatarsus III-IV with few bristles, metatarsus IV straight, calamistrum indistinct or even absent, femoral and metatarsal trichobothria unknown, femur I with long ventral hairs in two rows, tarsal bristles of the pectunculus well developed, tarsal claws not studied. – Opisthosoma (photo) ca. 1.45 times longer than wide, hairs short, anal tubercle large, three pairs of spinnerets. – Pedipalpus (figs. 273-276; see the diagnosis): Femur with a ventral-apical hump and a ventral apophysis in the distal half, tibia distinctly deformed, cymbium and tegulum large, long tegular apophyses apparently absent, embolus not surely known, probably a short hook-shaped structure may be part of the embolus.

Relationships: See the key, *P. simplex* n. sp. and *P. pusillus* WUNDERLICH 2018.

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

Paramiagrammopes sp. indet. 1

Material: 1♂ in Upper (Mid) Cretaceous Burmite, F3635/BU/CJW.

Short description: The spider is fairly well preserved, several parts of the pedipalpi are hidden. Measurements (in mm): Body length 1.5, prosomal length 0.63, opisthosoma: Length 0.92, height 0.45, femur I 0.92. Femur I bears a prodistal bristle. The prosoma is dorsally strongly inclined, the pedipalpal patella bears a large erect claw-bearing apophysis.

Paramiagrammopes sp. indet. 2, F3657/BU/CJW, body length 2.1 mm and
Paramiagrammopes sp. indet. 3, F 3658/BU/CJW, body length 2.1 mm.

Propterkachin WUNDERLICH 2017

Here I describe a second species of this extinct genus in Burmite *besides P. magnoculus* WUNDERLICH 2017: 229. In the new species I found numerous femoral trichobothria in contrast to the generotype but also no feathery hairs. Its anterior median eyes are not unusually large; the large anterior median eyes - not well preserved and only SEEMINGLY large in the generotype - are not a diagnostic character of the genus.
In *Paramiagrammopes* WUNDERLICH 2008 exist similar patellar macrosetae of the male pedipalpus but these spines are bent, the legs bear a lower number of bristles (lateral tibial bristles are absent), feathery hairs exist and the structures of the bulbus are different.

Propterkachin bispinatus WUNDERLICH **n. sp**. (figs. 280-285), photo 49

Etymology: The specis name refers to the two spines of the pedipalpal patella, from bi- (lat.) = two and spina (lat.) = spine, bristle.

Material: Holotypue ♂ in Upper (Mid) Cretaceous Burmite, F3620/BU/CJW.

Preservation and syninclusions: The spider is well – the pedipalpi excellently – preserved, the body is partly deformed and almost completely preserved in a clear yellow-orange piece of amber, most parts of the left tarsus I are cut off, the structures of both pedipalpis are partly deformed. The femur of the left pedipalpus is seemingly divided by an artefact, similar some leg articles. – Syninclusions are parts of an insect like a larger part of a leg which bears two large claws.

Diagnostic characters (♂; ♀ unknown): Pedipalpus (figs. 283-285): Patella with a pair of straight spines (macrosetae), questionable embolus bearing two apophyses, its distal part rather short.

Description (♂):
Measurements (in mm): Body length at least 2.6; prosoma: Length ca. 1.1, width 1.0; opisthosoma: Length 1.8, width 0.8, height 0.55; leg I: Femur 2.0, patella 0.5, tibia 1.45, metatarsus ca. 1.5, tarsus ca. 0.65, tibia II 0.8, tibia III ca. 0.5, tibia IV 0.95.
Colour medium grey brown, legs not annulated.
Prosoma (photo) 1.1 times longer than wide, hairs short, fovea deep, 8 eyes in two rows in a wide field which are partly hidden, posterior row distinctly recurved, anterior median eyes not (much) larger than the other eyes, clypeus fairly long, chelicerae, mouth parts and sternum deformed. – Legs (figs. 281-282, photo) fairly long, order I/IV/II/III, I distinctly the longest, III distinctly the shortest, hairs short, I did not find feathery hairs, bristles thin, fairly numerous, all femora dorsally 1/1, 1 lateral-distal pair and a single subapical one, patellae dorsally with a tiny basal and a larger distal one, all tibiae dorsally 1/1, I additionally 3 lateral pairs, metatarsus I with 2 lateral pairs as well as apical bristles; tarsi: I bristle-less, II with a ventral-distal one, III-IV, IV with strong ventral hairs, metatarsus IV only slightly bent, with 3 long retroventral bristles (the pectunculus?), a prolateral one as well as apical bristles, calamistrum probably existing in the basal third, femoral trichobothria long and numerous in at least one row, I did not recognize the position of the metatarsal trichobothrium, 3 large tarsal claws, ventral-apical accessory hairs well developed. – Opisthosoma (fig. 280) flattened, about 2.3 times longer than wide, hairs and spinnerets short, cribellum probably existing and wide. – Pedipalpus (figs. 283-285): Patella apically with a pair of straight spines, tibia with a subapical bristle, cymbium large and hairy, tegulum with 3 large flat and pointed apophyses, the questionable embolus is only fairly long and bears a long and strongly sclerotized basal apophysis (EA2) as well as a small and hump-shaped apophysis (EA1).

Relationships: In the probably well related *P. magnoculus* WUNDERLICH 2017 femoral trichobothria were not found by me but they should exist, too, the opisthosoma is only 1.33 times longer than wide (more than twice as long as wide in *bispinatus*), the pedipalpal patella bears three longer bristles and the questionable embolus is longer. – See also above.

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

Pseudokachin WUNDERLICH **n. gen.**

Etymology: The name refers to the similar opisthosoma of the genus *Kachin*, from pseudo (gr.) = similar.

The gender of the name is masculine.

Type species (by monotypy): *Pseudokachin tuberculatus* n. sp.

Diagnostic characters (?ad. ♀; ♂ unknown): Ecribellate: A calamistrum is clearly absent, the spiny metatarsus IV is straight and not compressed, most parts of the area of the cribellum are hidden. Femoral trichobothria (fig. 288) and dense feathery hears (fig. 289) of body and legs exist. Pectunculus absent. Opisthosoma (figs. 286-287) elongated beyond the spinnerets and bearing a pair of well developed humps behind the middle.

Relationships: Without knowing the male sex the relationships are unsure; regarding the combination of characters they are quite special and "irritating". In species of *Kachin* and *Propterkachin* - in which only males have been described - the opisthosoma is elongated beyond the spinnerets as in the present female, femoral trichobothria exist most probably and the position of the eyes is similar, but feathery hairs are absent and a pectunculus may exist; in *Kachin* the opisthosoma bears several only SMALL hair-bearing humps. In my opinion the different size of these opisthosomal humps may be a case of sexual dimorphism. According to WUNDERLICH (2017) the existence of a cribellum in *Kachin* and *Propterkachin* is not sure. If a cribellum is really absent in the two genera in question they would be quite rare members of the family Uloboridae in which this structure usually exists, lost already at least 100 million years ago, similar to *Pseudokachin*. *Pseudokachin tuberculatus* is a larger species than members of *Kachin* WUNDERLICH 2017 and *Propterkachin* WUNDERLICH 2017, body length ca. 4.5 mm; the body length of the known males (females are unknown) of *Kachin* and *Propterkachin* is less than 3 mm. See tab. 2 p. 107.
The COMBINATION of characters of the female of *Pseudokachin tuberculatus* – ecribellate, femoral trichobothria (*) and feathery hairs existing, pectunculus absent, the position of the eyes (fig. 286) – is unique within the Deinopoidea and I do not want to exclude with certainty relationships of *Pedipalparaneus seldeni* and *Pseudokachin tuberculatus*; both species may be closer related to the Deinopoidea than to the Mongolarachnidae and other Pholcochyroceroidea (see also above) which are cribellate, do not possess femoral trichobothria and possess different structures of the male pedipalpus.
Further Cretaceous deinopoid taxa besides *Pseudokachin tuberculatus* in which the opisthosoma is elongated beyond the spinnerets are the cribellate genera *Burmuloborus* WUNDERLICH 2008 and *Palaeomiagrammopes* WUNDERLICH 2008 in Burmite as well as *Jerseyuloborus* WUNDERLICH 2011 in amber from New Jersey. Females of these genera are unknown; in the male sex opisthosomal humps are absent.

(*) In *Pseudokachin tuberculatus* and in *Pedipalparaneus seldeni* I did not recognize bothria of these thin sensory hairs which I called "trichobothria-shaped hairs" in *seldeni*. The position of these hairs is VENTRALLY in the male of *seldeni* but retrodorsally to retrolaterally in the female of *tuberculatus* on femur II (fig. 288), similar to the genus *Uloborus*.

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

Pseudokachin tuberculatus WUNDERLICH **n. gen. n. sp**. (figs. 286-291), photo 50

Etymology: The species name refers to the opisthosomal tubercles/humps, from tuber (lat.) = humpy.

Material: Holotype, female which may be adult, in Upper (Mid) Cretaceous Burmite, F3269/BU/CJW.

Preservation and syninclusions: The spider is partly well preserved in a clear piece of amber, parts of the left legs III-IV are cut off, the opisthosoma is partly deformed and bears inside a large bubble, the spinnerets and the mouth parts are hidden. – Syninclusions are some bubbles and particles of detritus. A fissure runs left of the opisthosoma through the piece of amber.

Diagnostic characters: See above.

Description (probably adult ♀):
Measurements (in mm): Body length ca. 4.5; prosoma: Length 1.6, width 1.15; opisthosoma (deformed): Length ca. 3.5, width 1.9, height ca. 1.4; leg I: Femur 2.1, patella 0.5, tibia ca. 2.3, metatarsus 2.15, tarsus ca. 1.25; tibia II ca. 1.9, tibia III ca. 0.8, tibia IV 1.4.
Colour light brown, legs not annulated.
Prosoma (fig. 286, photo) ca. 1.4 times longer than wide, cephalic part distinctly narrowed, densely covered with feathery hairs, fovea deep, 8 eyes in two rows, posterior row strongly recurved, lateral eyes widely spaced from each other, clypeus short, basal cheliceral articles slender, fangs long and oblique, mouth parts hidden. – Pedipalpus well developed and spiny, tarsal claw bearing some teeth. – Legs (figs. 288-290) rather long, order I/II/IV/III, I distinctly the longest, III distinctly the shortest, hairs short and indistinct, tarsal trichobothria absent, femoral trichobothria existing, they are well observable retrolaterally to retrodorsally on the right femur II in about two rows, position of the metatarsal trichobothria unknown, metatarsus IV spinose, straight and not compressed, calamistrum absent, ventral bristles of a pectunculus of tarsus and metatarsus III-IV absent, bristles numerous and thin, leg I: Femur 1 ventrally in the distal half, 2 prolaterally, 2 dorsally, 4 retrodorsally and few apically, patella dorsally 1 long basally and1 short distally and a lateral pair (like the remaining patellae), tibia dorsally 2, laterally 3 pairs, metatarsus about a dozen, tarsus none. – Opisthosoma (figs. 286-287, photo) deformed, distinctly longer than wide, elongated beyond the mainly hidden spinnerets, bearing short as well as numerous feathery hairs, and a distinct pair of hair-bearing humps behind the middle of the length; probably small additional humps in the anterior half exist.

Relationships: See above.

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

Spiniuloborus WUNDERLICH **n. gen**.

Etymology: The name refers to the spiny legs, from spina (lat.) = bristle, and the well-known genus name Uloborus of the family Uloboridae.

The gender of the name is masculine.

Type species (by monotypy): *Spiniuloborus crux* n. sp.

Diagnostic characters (♀; ♂ unknown): Cribellate, metatarsus IV dorsally distinctly concave, femoral trichobothria not found by me, feathery hairs not surely found, clypeus very short, tarsi relatively long, bristles (fig. 291) numerous, partly very thin and quite long, existing on all femora (three on I) and on tibiae even laterally, OPISTHOSOMA DORSALLY LEATHERY OR EVEN SCUTATE, dorsally bearing a cross of white hairs, body length 1.35 mm.

Relationships: Mainly according to the position of the eyes and the dorsally concave metatarsus IV I suppose that *crux* is a member of the family Uloboridae in which the clypeus usually is longer and a leathery/scutate opisthosoma is/was unknown.

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

Spiniuloborus crux WUNDERLICH **n. gen. n. sp**. (fig. 291), photo 51

Etymology: The name refers to the dorsal cross of white hairs of the opisthosoma, from crux (lat.) = cross.

Material: Holotype ♀ in Upper (Mid) Cretaceous Burmite, F3631/BU/CJW. In my opinion the female may well be adult.

Preservation and syninclusions: The spider is excellently and completely preserved in a clear yellow-orange piece of amber; the left anterior dorsal part of the opisthosoma is inclined, probably by a beat. – Syninclusions are a larger part of a leaf directly below the spider and few particles of detritus.

Diagnostic characters and relationships: See above.

Description (♀) (see also the diagnostic characters):
Measurements (in mm): Body length 1.35; prosoma: Length 0.65, width ca. 0.5; opisthosoma: length 0.8, width 0.66, height ca. 0.25; leg I: Femur 0.6, patella 0.2, tibia 0.45, metatarsus 0.42, tarsus ca. 0.33, tibia IV 0.3; length of the leg bristles up to 0.2.
Colouration (photo) dark brown, legs not annulated, prosoma dorsally medially with a small longitudinal band, opisthosoma dorsally with an incomplete cross of white hairs and half a dozen paired spots of white hairs.

Prosoma (photo) ca. 1.3 times longer than wide, rather flat, distinctly narrowed anteriorly, posteriorly with a deep and wide “inclination” (fovea?), hairs short, feathery hairs existing, 8 eyes of medium size, posterior row strongly recurved, anterior and posterior eyes widely spaced from each other, clypeus deformed, apparently quite short, basal cheliceral articles large, ca. 0.22 mm long, anteriorly in the basal half with a pair of long bristles, fangs of medium length, gnathocoxae large, serrula well developed, labium ca. as long as wide, coxae IV widely spaced by the coxae IV. – Pedipalpus rather large, spiny, its tip is hidden. – Legs (fig. 291, photo) of medium length, order I/II/IV/III, I and II similar in length, III distinctly the shortest, metatarsi and tarsi relatively long, hairs short to long, bristles numerous and partly quite long and thin, existing on all femora (three long bristles on I) to metatarsi, on tibiae dorsally and laterally, pectunculus strongly reduced to a single ventral bristle on metatarsus III, femoral trichobothria and feathery hairs not surely observed by me, femur III bears retroventrally several long and STRAIGHT hairs which are not bent like trichobothria, metatarsus IV dorsally distinctly concave, calamistrum well developed, occupying ca. 2/3 of the length of the article, position of the metatarsal trichobothrium unknown, unpaired tarsal claws existing. – Opisthosoma (photo) 1.2 times longer than wide, flattened, dorsally leathery hardened (or even scutate?), hairs short, feathery hairs existing, three pairs of spinnerets, the anterior and the posterior pair long, anterior pair widely spaced, cribellum well developed, undivided, genital area partly hidden, with a 0.18 mm wide sclerotized epigyne which is not strongly protruding.

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

Superfamily ARANEOIDEA

Only three - or probably - four families of this superfamily, which is very diverse today, are surely known from the Cretaceous. A sure proof of an orb web in the Cretaceous is unknown; see *Crassitibia sicilicula* n. sp. below. Here I describe four new species of two families and add some notes on other taxa.

Note on the enigmatic family Praearaneidae WUNDERLICH 2017, see p. 108. The male HOLOTYPES of *bruckschi* WUNDERLICH 2017 and *araneoides* WUNDERLICH 2020 are most likely ecribellate, an unpaired tarsal claw exists, a pectunculus of metatarsi and tarsi III-IV is absent, I did not find feathery hairs nor femoral or tarsal trichobothria. The position of the VENTRAL (as well as dorsal) tibial I-II bristles in the resting position is close to the articles (but NOT standing out like in the Araneoidea); this character may well indicate relationships to the RTA-clade (see below) but not to the Araneoidea or the Deinopoidea although a RTA is absent. With great hesitation Praearaneidae is here provisorically included in the superfamily Deinopoidea, see above.

Notes on the family **ARANEIDAE** SIMON 1895

Araneidae is a very diverse family which is worldwide distributed today. Several taxa from the Eocene Baltic amber forest were described by WUNDERLICH (2008: 103-109).
A sure Cretaceous proof of this family is unknown to me. *Geratonephila* POINAR & BUCKLEY 2012: See WUNDERLICH (2015: 58). *Mesozygiella* PENNEY & ORTUNO 2006 - described from Lower Cretaceous amber of Spain - is quite similar to the family Araneidae and was considered by me to be a member of this family, see WUNDERLICH (2015: 338); but after knowing the high diversity of Cretaceous Deinopoidea I now think this genus is more likely a member of the superfamily Deinopoidea (see above) and not of the Araneoidea. Its "free" paracymbium possesses a PRObasal position instead a retrobasal position of the Araneoidea. See also the new family Megasetidae (plesion) above. The relationships of the Cretaceous genus *Cretaraneus* SELDEN 1990 - preserved in stone of Brazil and Spain - are still quite unsure to me.
Extant members of the ecribellate araneoid family can be recognized by the following COMBINATION OF CHARACTERS which usually exist: Clypeus short, basal cheliceral articles robust, condylus more or less well developed, teeth of the anterior margin of the fang furrow thick/stout, posterior eye row rarely recurved, usually straight, procurved in the Argiopinae (!), median eyes most often closer to each other than to lateral eyes, spinnerets stout, in a rosette-like position (as in most other Araneoidea), existence of an orb web which bears partly sticky droplets, males frequently distinctly smaller than females, certain articles of their legs I and/or II frequently modified by spine-shaped strong bristles or thickened, coxa-trochanter autotomy.
Note: At first sight the structures of the bulbus - e. g. the large basal median apophysis which stands widely out from the bulbus - of *Dubiodeinopsis spinifemora* n. gen. n. sp. (Deinopoidea: Dubiodeinopsidae, see above) looks similar to members of the Araneidae, subfamily Argiopinae, but a closer study - and differences in other characters like the position of the eyes and the shape of the relatively long and slender posterior spinnerets - indicate that it is a member of the Deinopoidea. I regard a tiny structure in the position of a retrobasal paracymbium to be not an "araneoid paracymbium".

Family **THERIDIIDAE** SUNDEVALL 1833

Taxa of the Theridiidae (superfamily Araneoidea) are very rare in Burmese amber; previously only two genera, species and specimens of the extinct ancient ("primitive") subfamily Cretotheridiinae WUNDERLICH 2015 were known: *Cretotheridion* WUNDERLICH 2015 and *Burmatheridion* WUNDERLICH 2018. Here I describe the third genus - *Cornutheridion* - of this subfamily in Burmite as well as a taxon of another extinct subfamily, the Microtheridiinae which relationships are quite unsure. This subfamily is based on the most tiny male member of the family Theridiidae and most of its rel-

atives; furthermore it is the most tiny adult fossil spider species in Burmite, body length of the adult male 0.7 mm. The holotype of this species possesses only a single pedipalpus.

Subfamily CRETOTHERIDIINAE WUNDERLICH 2015

The three genera of ths subfamily are characterized by ventral cusps or thorns of leg. I, see, e. g., fig. 295 and the structures of the male pedipalpus. - See the theridiid subfamily Microtheridiinae below and the family Leviunguidae above.

Cornutheridion WUNDERLICH **n. gen.**

Etymology: The name refers to its clypeal “horn”, from latin cornu = horn, and the confamiliar genus name *Theridion*.

The gender of the name is neuter.

Type species (by monotypy): *Cornutheridion concavum* n. sp.

Diagnostic characters (♂; ♀ unknown): Clypeus (fig. 292) with a slender “horn” (but see below), only few thin - patellar and tibial (no lateral) - leg bristles (figs. 293-295), femur, tibia and metatarsus I with ventral hair-bearing “thorns” (fig. 295); pedipalpus (figs. 296-297): Tibia distinctly elongated and not widened distally, bulbus bearing several apophyses including a large distal one which bears denticles, embolus not surely known, probably long and in a counter-clock position which is not surely recognizable in the right pedipalpus.

Relationships: As in other members of the family Theridiidae the labium is NOT REBORDERED (fig. 292), femoral and tarsal trichobothria are absent, the metatarsi bear only a single trichobothrium (fig. 295; see also below), the leg bristles are thin and restricted to patellae and tibiae (only dorsally) (fig. 293)), the slender pedipalpal tibia is quite long and bears long apical bristles, and a retrobasal paracymbium IS ABSENT. As in other taxa of the subfamily Cretotheridiinae certain articles of leg I bear ventral “thorns” (fig. 295), teeth of the paired tarsal claws, a ventral comb of tarsus IV, posterior prosomal stridulatory files as well as a retrodistal paracymbium are absent. In contrast to the two already known genera of the Cretotheridiinae (see above) in *Cornutheridion* the clypeus bears a “horn” (fig. 292; but see below!), ventral “thorns” of leg I exist additionally on the femur, the chaetotaxy, the shape of the pedipalpal tibia and the structures of the bulbus are different.

Distribution: Upper (Mid) Cretaceous Burmese amber forest.

Cornutheridion concavum WUNDERLICH **n. gen. n. sp**. (figs. 292-297), photo 58

Etymology: The species name refers to the distinctly concave shape of the basal cheliceral articles, from concavus (lat.) = concave.

Material: Holotype ♂ in Upper (Mid) Cretaceous Burmite, F3612/BU/CJW.

Preservation and syninclusions: The spider is very well preserved in a clear yellow-oragnge piece of amber, some leg articles are more or less deformed, parts of the left tibia and metatarsus II are cut off, the left bulbus/tegulum are strongly deformed. – Syninclusions are some tiny ?air bubbles.

Diagnostic characters, relationships and distribution: See above.

Description (♂):
Measurements (in mm): Body length 2.0; prosomal length 0.8; opisthosoma: Length 1.35, height 0.8; leg I: Femur 1.9, patella 0.45, tibia 1.45, metatarsus 1.15, tarsus 0.5; tibia III 0.35, tibia IV ca. 0.63.
Colour light brown, patellae, tibiae and metatarsi apically darkened.
Prosoma (fig. 292) partly hidden, bearing few hairs, cuticula finally scaly, cephalic part not raised, 8 large eyes in two rows, lateral eyes apparently distinctly spaced, posterior stridulatory files most probably absent, clypeus fairly long, dorsally bearing a “horn” (*) which is standing out; I am fairly sure that it is not an artefact caused by the preservation; basal cheliceral articles fairly deformed, long and distinctly concave anteriorly, fangs long and slender, teeth of the fang furrow hidden, gnathocoxae strongly deformed, labium long and not rebordered, coxae not widely spaced by the sternum. – Legs (figs. 293-295, photo) long and slender, order I/II/IV/III, I distinctly the longest, III distinctly the shortest, hairs short, bristles thin, on I-II indistinct or lost, on III-IV 1/1 dorsally, long and thin; patellae: Bristles indistinct or absent on I-II, a thin retrolateral and a stronger dorsal subapical bristle exist on III-IV. Femur, tibia and metatarsus of leg I bear hair-bearing “thorns” in 1-2 irregular rows which are strongest developed on the tibia, the femur bears additionally short dorsal and lateral “thorns”. The right metatarsus I bears a trichobothrium in ca. 0.25, the left metatarsus IV bears three long sensory hairs which may be trichobothria; at least two of them are apparently malformations, see WUNDERLICH (2004: 159, fig. 2). Tarsus IV comb absent, 3 well developed tarsal claws, the paired claws smooth, the unpaired claw bent in a right angle. - Opisthosoma (photo) 1.6 times longer than height, bearing few short hairs, epigaster not protruding, spinnerets hidden. - Pedipalpus with slender articles; see the diagnosis of the genus; the structures of the bulbi are difficult to observe, the right pedipalpus is much better preserved than the left one.

(*) A sexual dimorphic “horn” exists also in certain extant and Eocene male Theridiidae, see WUNDERLICH (2008: Figs. p. 150-152) as well as in certain Cretaceous Tetrablemmidae, see above.

Subfamily MICROTHERIDIINAE WUNDERLICH **n. subfam**.

Etymology: The below.

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

Diagnostic characters (♂; ♀ unknown): Legs and opisthosoma covered with very long bristles (figs. 298-299), spinnerets set foreward, body length 0.7 mm; pedipalpus (figs. 301-302) (parts are hidden): Retrolateral paracymbium absent, tegulum with several apophyses including a pair of pointed ones, questionable embolus long, thin and bent in a semicircle.

Further characters (besides family characters): Shape of the opisthosoma oval, all patellae with a single very long dorsal-apical bristle, all tibiae dorsally with 1/1 very long bristles (fig. 299), further leg bristles absent, labium hidden, femoral and tarsal trichobothria absent, tibial and metatarsal trichobothria unknown, cymbium (fig. 300) quite large, recognizable paracymbium absent. Probably pedipalpal self-amputation, see below.

Relationships: According to its characters as well as the existence of remains of sticky droplets on threads of – apparently its – capture web the taxon is a member of the ecribellate superfamily Araneoidea; according to the few leg bristles - restricted dorally (not laterally) on patellae and tibiae - it is a member of the “spineless-femur clade”, in my opinion most probably of the family Theridiidae, which is very diverse today but very rare in the Cretaceous. In contrast to the related families Cyatholipidae, Nesticidae and Synotaxidae a retrobasal paracymbium is absent in *Microtheridion*. Unfortunately the labium and the pedipalpal tibia - both structures possess a typical theridiid shape - are hidden. The characters of the only other theridiid subfamily known from the Cretaceous and from Burmite, Cretotheridiinae WUNDERLICH 2015, are quite different from the Microtheridiinae, see above. - Within inclusions in amber I found extremely seldom male fossil spiders owing only a single pedipalpus. It is quite remarkable that in certain extant Theridiidae: Theridiinae - like *Tidarren* CHAMBERLIN & IVIE 1934 - a unique behaviour exists: The adult males possess only a single pedipalpus – the second pedipalpus is lost by self-amputation. In members of *Tidarren* exists a male sexual dimorphic dwarfism; the male of *Microtheridion* is a TINY member of the same family and the unknown female may be much larger. A further congeneric male of this taxon in Burmite may confirm a behaviour like in *Tidarren*.

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

Microtheridion WUNDERLICH **n. gen**.

Etymology: The genus name refers to the tiny body, from micro- (gr.) = small and the well-known name of the spider genus *Theridion* of the family Theridiidae.

The gender of the name is neuter.

Type species (by monotypy): *Microtheridion longissispinae* n. sp.

Diagnosis and relationships: See above.

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

Microtheridion longissispinae WUNDERLICH **n. gen**. **n. sp**. (figs. 298-302), photo 59

Etymology: The species name refers to the long bristles of the legs and the opisthosoma, from longus (lat.) = long and spina (lat.) = bristle, spine.

Material: Holotype ♂ in Upper (Mid) Cretaceous Burmite, F3663/BU/CJW.

Preservation and syniclusions: The spider is almost completely and fairly well preserved in the corner of a small and clear yellow-orange piece of amber, the opisthosoma is deformed, dorsally distinctly inclined; the right patella I dorsally and the dorsal parts of the right patella as well as the basal part of the tibia of the right leg II are cut off; the right pedipalpus is lost (see above), most eyes and most mouth parts are hidden. - Syninclusions: Few spider threads - probably from the capture web of the holotype - exist left in front of the spider, bearing remains of some sticky droplets which are dried out. Several small bubbles are also preserved.

Diagnosis and relationships: See above.

Description (♂; ♀ unknown):
Measurements (in mm): Body length 0.7; prosoma: Length 0.42, width 0.33; opisthosoma (it is deformed): Length 0.34, width 0.32, height 0.3; leg I: Femur 0.35, patella 0.13, tibia 0.23, metatarsus 0.19, tarsus 0.23, tibia II 0.2, tibia III ca. 0.11, tibia IV ca. 0.16.
Colour light brown, legs not annulated.
Prosoma 1.27 times longer than wide, partly hidden by small bubbles, 8 larger eyes, posterior row apparently recurved, clypeus fairly long, basal cheliceral articles rather long, anteriorly slightly concave, stridulatory files absent, most mouth parts hidden, gnathocoxae converging, posterior margin of the sternum spacing the coxae IV by more than their diameter. - Legs (fig. 299) of medium length, order I/II/IV/III, hairs not

distinct, bristles few and very long, 1 dorsally-apically on all patellae and 1/1 dorsally on all tibiae, other bristles absent, feathery hairs as well as femoral and tarsal trichobothria absent, metatarsal trichobothria unknown, tarsal claws not studied. - Opisthosoma (fig. 298) deformed, soft, ventrally not bulging, bearing dorsally and laterally very long bristles, area of the spinnerets strongly deformed, they are set forward ca. one quarter of the opisthosomal length. - Pedipalpus (figs. 301-302) (only the left one is completely preserved, partly hidden): Articles not thickened, cymbium very large, a paracymbium is not observable, bulbus apparently expanded, tegulum with several apophyses including a pair of claw-shaped ones, questionable embolus long, thin, bent counter-clockwise.

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

Family **ZARQARANEIDAE** WUNDERLICH 2008

In the tiny to small species of this extinct araneoid family the labium is not rebordered, like in the family Theridiidae. This very diverse Cretaceous taxon may be not monophyletic, see WUNDERLICH in WUNDERLICH & MÜLLER (2018: 69-98). Here I describe three new species in Burmite including a new genus.
The larger piece of amber containing the holotype of *Crassitibia sicilicula* n. sp. is of special interest: It includes a larger part of a capture web – probably an orb web - which threads bear sticky droplets (fig. 308, photo) as well as – in contact with the web - a Coleoptera as the prey of the spider. See also above (the oldest orb webs).

Burmaspiralis WUNDERLICH n. gen.

Etymology: The name refers (1) to the deposit of the amber, Myanmar (= Burma) and (2) to the spiral shape of the embolus, from spiralis (lat.) = spirally.

The gender of the name is neuter.

Type species (by monotypy): *Burmaspiralis trispinae* n. sp.

Diagnostic characters (♂; ♀ unknown): Order of the dorsal tibial bristles 2/2/1/2, tibia I thickened, femur bristles existing, metatarsal bristles absent, opisthosoma armoured,

pedipalpus (figs. 303-305): Patella with three dorsal bristles, tibia with apical apophyses including a skinny one, paracymbium divided, embolus very long, describing at least two loops, legs not annulated, body length 1.2 mm.

Relationships: The tab. to the zarqaraneid genera - see WUNDERLICH & MÜLLER (2018: 77) - leads to the genus *Burmaforceps* WUNDERLICH 2018 (the strongly scutate opisthosoma, the chaetotaxy and the thickened tibia I are identical), which may be most related, but in *Burmaforceps* the pedipalpal patella bears only two dorsal bristles, a skinny tibia apophysis is absent, the paracymbium is not divided, the tegular apophyses are different, and the embolus is apparently shorter (if not hidden).

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

Burmaspiralis trispinae WUNDERLICH **n. gen. n. sp**. (figs. 303-305)

Etymology: The species name refers to the existence of three bristles of the pedipalpal patella, from tri (lat.) = three and spina (lat.) = bristle.

Material: Holotype ♂ and a larger separated piece of amber in Upper (Mid) Cretaceous Burmite, F3619/BU/CJW.

Preservation and syninclusions: The spider is almost completely - only the left patella I is cut off – and well preserved in a clear small piece of amber which has been split off dorsally of the spider, prosoma and opisthosoma are deformed, probably by the preservation, the opisthosoma is ventrally strongly inclined, the left tibia, metatarsus and tarsus IV are strongly shrunk by the preservation. – Syninclusions: (a) in the piece which includes the holotype: Several plant hairs, particles of detritus and dark brown remains of unknown origin; (b) in the separated piece: 1 Blattaria larva, 1 Acari, particles of detritus and remains of plants and insects' excrement.

Diagnostic characters, relationships and distribution: See the diagnosis.

Description (♂):
Measurements (in mm): Body length 1.2; prosoma: Length 0.57, width ca. 0.67; opisthosoma (it is also deformed): Length ca. 0.6, width ca. 0.7; leg II: Femur 0.8, patella 0.22, tibia 0.35, metatarsus 0.6, tarsus 0.25.
Colour light bown, legs apparently not annulated.
Prosoma deformed, probably wider than long, bearing few short hairs, fovea indistinct, 8 deformed eyes in two rows, clypeus and basal cheliceral articles fairly short, labium wider than long, not rebordered, gnathocoxae stout. – Legs only fairly long, I longest, III distinctly the shortest, tibia and femur IV distinctly thickened in the basal half, most bristles very long, existing on femora to tibiae, sequence dorsally on the tibiae 2/2/1/2, tibiae bearing a pair of long apical bristles, I with a long prolateral bristle, femora I-II with a dorsal bristle in the distal half, I additionally with a prolateral brisrle in the distal half. Position of the metatarsal trichobothrium unknown, three tarsal claws. – Opisthosoma completely covered with a dorsal scutum, bearing short hairs, spinnerets hidden.

- Pedipalpus (figs. 303-305; see also above): Patella without outgrowth, bearing dorsally three thin and long bristles: A single one and a pair more distally, tibia thick, bearing two prolateral/dorsal outgrowths and a flat and skinny apical apophysis, depending from its aspect the shape of the paracymbium varies strongly, bulbus distinctly protruding, tegular apophysis existing, hard to observe, the basal part of the long and spirally embolus is not observable.

Crassitibia WUNDERLICH 2015

To date three species of *Crassitibia* have been described in which the male tibia I is thickened or not like in the new species.

Crassitibia sicilicula WUNDERLICH **n. sp**. (figs. 306-308), photo 56

Etymology: The species name refers to the sickle-shaped embolus, from sicilicola (lat.) = small sickle.

Material: Holotype ♂ in Upper (Mid) Cretaceous Burmite, F3617/BU/CJW.

Preservation and syninclusions: The spider is well and almost completely preserved in a partly clear piece of amber, the dorsal part of the opisthosoma is rubbed off at a layer within the piece. - Syninclusions are a large part of a capture web of the spider which includes numerous sticky droplets (diameter 0.12-0.35 mm) which at least partly have been enlarged by the preservation (fig. 308, photo), some droplets are burst; the largest thread directly in front of the spider runs ca. 15 mm through the piece of amber, is placed in the same layer of the spider and is bent two times. The remains of the web are not well preserved (*). Further syninclusions: 3 mm left of the holotype a Coleoptera indet., body length almost 2 ½ mm, in contact with a sticky thread, which apparently has been the prey of the present spider, 2 loose wings of a Diptera, a lump of 21 tiny dark brown questionable eggs near spiders “wool” in front of the spider, tiny hyphae in front of the spider, plant hairs and numerous particles of detritus.

(*) It seems quite different to reconstruct the original shape of this web. It may originate from an irregular web but I do not want to exclude with certainty that it originates from an orb web. I did not find connecting radia of the two largest threads which bear sticky droplets and not all remains are preserved in the same layer of the amber. - Parts of a capture web including small sticky droplets of the same family, a Zarqaraneidae indet. ♀; F3086/BU/CJW, were already described by WUNDERLICH & MÜLLER (2018: 96, photo 40 p. 174: Left and right in front of the spider. Spider threads bearing sticky droplets in Burmite were already described by WUNDERLICH

(2008: 535-536, photos 52-55). – The producer of a questionable orb web bearing sticky droplets, a member of the family Araneidae, which was reported by POINAR & BUCKLEY (2011) under *Geratonephila burmanica* POINAR & BUCKLEY 2011 in Cretaceous Burmese amber, has turned out to be a member of the genus *Nephila* LEACH, most probably *N. tenuis* WUNDERLICH 1986 in Miocene Dominican (!) amber, see WUNDERLICH (2015: 58). The family Araneidae has never been reported from Burmite or other Cretaceous deposits. In the Internet - e. g. WIKIPEDIA - in IV 2020 this misidentification has not yet been corrected.

Diagnostic characters (♂; ♀ unknown): Tibia I not thickened, pedipalpus (figs. 306-307): Patella with a single dorsal bristle, embolus distinctly bent (sickle-shaped) in the distal half.

Description (♂):
Measurements (in mm): Body length 1.4; prosoma: Length and width ca. 0.6; opisthosoma (it is deformed): Length and width ca. .0; Leg I: Femur 0.8, patella 0.25, tibia ca. 0.42, metatarsus ca. 0.6, tarsus ca. 0.38, tibia III 0.2, tibia IV 0.4.
Colour: prosoma and legs medium brown, legs not annulated, opisthosoma light grey.
Prosoma (photo 56) deformed, as long as wide, 8 eyes, clypeus fairly long, labium apparently not rebordered. – Legs (photo) only fairly long, order I/II/IV/III, III distinctly the shortest, tibia I not thickened, hairs quite indistinct, bristles quite long on I-II, existing on femora (very few), patellae and tibiae: Dorsally 2/2/2/2, lateral pair at least on I-II and an apical pair, position of the metatarsal III trichobothrium in 0.32, three small tarsal claws. – Opisthosoma (photo) About as long as wide, hairs not frequent, indistinct, three pairs of spinnerets are very well preserved and recognizable, colulus well developed, slightly longer than wide. – Pedipalpus (figs. 306-307) with slender articles, patella with a single dorsal-apical bristle and some long hairs, tibia hidden, cymbium large, bearing long hairs, paracymbium pointed and wide basally, structures of the tegulum hidden, embolus (if the named structure is really the embolus but not a tegular apophysis) sickle-shaped, basally wide, strongly bent in the distal half.

Relationships: The tab. p. 72 of the zarqaraneid genera lead to the genus *Crassitibia,* see WUNDERLICH & MÜLLER (2018: 72). In the closely related *C. baculum* WUNDERLICH 2018 tibia I is slender, too, but the embolus is distinctly less bent in the distal half.

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

Spinicymbium WUNDERLICH 2018

In this genus the cymbium bears a single bristle (in *unispina* n. sp.) or two bristles (in *curvimanus* WUNDERLICH 2018, *curvimetatarsus* WUNDERLICH 2018 and *falcatum* (WUNDERLICH 2015), like in the genus *Hypertheridiosoma* WUNDERLICH 2012 in which clypeus and leg bristles are short in contrast to *Spinicymbium*.

Spinicymbium unispina WUNDERLICH **n. sp**. (figs. 309-311), photo 57

Etymology: The species name refers to the singla bristle of the cymbium, from un (lat.) = single and spina (lat.) = spine, bristle.

Material: Upper (Mid) Cretaceous Burmite, holotype ♂ F3618/BU/CJW.

Preservation and syninclusions: The spider is completely and very well preserved in a clear yellow-orange piece of amber, the prosoma – especially the eye field – is fairly deformed. – Syninclusions are 1 Coleoptera, 1 Acari, 1 plant hair, few particles of detritus and several tiny bubbles.

Diagnostic characters (♂; ♀ unknown): Only few leg bristles (fig. 309; they are absent on femora and metatarsi), sequence dorsally on the dorsal 2/2/1/2, tibia I slender, legs not annulated, opisthosoma distinctly hardened or even scutate, corniculate; pedipalpus (figs. 310-312): Cymbium with a single bristle.

Description (♂):
Measurements (in mm): Body length 1.0; prosoma: Length 0.5, width 0.43; opisthosoma: Length 0.7, width 0.6, height 0.3; leg I: Femur 0.52, patella 0.18, tibia 0.35, metatarsus 0.38, tarsus 0.22, tibia III 0.15, tibia IV 0.23.
Colour light to medium brown, legs not annulated.
Prosoma (photo) 1.16 times longer than wide, deformed, not raised, hairs indistinct, 8 eyes in two rows, posterior row recurved, clypeus long, basal cheliceral articles only fairly large, slightly diverging, bulging basally-anteriorly, margins of the fang furrow bearing few teeth, fangs long, labium wide, coxae IV spaced by the sternum by their diameter. – Legs (fig. 309, photo) fairly long and slender, order I/II/IV/III, hairs indistinct, tibia I slender, bristles partly long, existing on patellae (dorsally 1/1) and tibiae: Sequence dorsally 2/2/1/2, I-II with a pair of apical bristles, I additionally with 1prolaterally, position of the metatarsus trichobothrium unknown, 3 tarsal claws. – Opisthosoma (photo) 1.28 times longer than wide, at least dorsally sclerotized, hairs indistinct, dorsally distinctly corniculate, genital area distinctly sclerotized, spinnerets stout, colulus existing. – Pedipalpus (figs. 310-312) with slender articles, patella with a dorsal-apical outgrowth, tibia longer than wide, bearing at least one trichobothrium, cymbium bearing long hairs and a thin long bristle, paracymbium fairly bent, bulbus strongly protruding, tegulum with a needle-shaped strongly sclerotized dorsal apophysis, embolus fairly long and slightly bent.

Relationships: In the remaining known congeneric species the cymbium bears two dorsal bristles, in *curvimetatarsus* metatarsus I is distinctly bent, in *falcatum* the paracymbium is more slender.

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

TA-CLADE (RTA-CLADE s. l.) and RTA-clade s. str.

Only very few - extinct - Cretaceous and Mesozoic taxa have been known so far which are near the root of the **r**etrolateral **t**ibial **a**pophysis clade (RTA), see WUNDERLICH & MÜLLER (2018: 123). During more than ten years we searched for such taxa and studied thousands of Cretaceous spiders. Thanks to Patrick Müller I recently got two very interesting pieces in Burmese amber which I regard as members of the RTA-clade: (a) parts of two legs of a quite unusual taxon - F3665/BU/CJW - which tarsi bear long trichobothria (fig. 328). This taxon is different from all other taxa treated here and is regarded by me (JW) to be a member of the clade Agelenomorpha, see the end of this chapter. - (b) a male of the new genus *Eoagelenomorphus*, which is fairly well and completely preserved and which I regard as confamiliar with remains (sternum, a pedipalpus and some leg articles only) of a male in Burmite: *Eotibiaapophysis reliquus* WUNDERLICH 2018: 28, which I considered previously with hesitation erroneously to be a member of the family Uloboridae. The characters of the new discovered male of *Eoagelenomorphus* lead me to the conclusion that the two genera in question are the only known members of the extinct Cretaceous family Eotibiaapophysidae **n. stat**., upgraded here from the tribe Eotibiaapophysini WUNDERLICH 2018. See also the dubious family Praearaneidae, p. 166.

Among a huge number of spiders I found half a dozen more or less questionable members of the RTA-clade - taxa of their “Trionycha” - in Burmese amber, each based on a single specimen and frequently incomplete. These facts may indicate that these spiders lived on the ground and thus were only rarely be captured by the sticky resin.
Remarkably spiders of indet. taxa treated here possess an unpaired tarsal claw, bear feathery hairs on their legs, and - probably except F3665 (see below) - are cribellate.
I regard the extremely rare fossil Eotibiaapophysidae - as well as certain other quite rare taxa dealt with here – as relatives of ancient spiders which were previously missed in the sure Mesozoic record and which gave rise to large branches of advanced spiders (of the RTA-clade). Members of the RTA-clade are very diverse and well-known today, (a) the three-clawed “Trionycha”, e. g., Wolf spiders (Lycosidae) and Funnel Weavers (Agelenidae, see below, the fossil no. F3665). (b) Today even more diverse than families of this group are members of the two-clawed “Dionycha”: Jumping spiders (Salticidae), Crab spiders (Thomisidae), Sac spiders (Clubionidae) and numerous other families. In members of these families the unpaired tarsal claw, the cribellum and the capture web have been lost. Their paired ventral bristles of tibia I-II and - less distinct - on metatarsus I-II possess a position close to the leg articles in the resting position; they are not standing out from their articles. Such ecribellate spiders are still completely unknown from Burmese amber (see below, sp. indet. F3210) and the whole Mesozoicum; they diversified (or even originated) probably relatively late, around the KT-events 65 million years ago, possibly not earlier than during the Palaeocene. The ancient cribellate two-clawed Zoropsidae - they possesses a similar position of the leg bristles - may be a member (relic) of the sister group of the Dionycha.

Selected members of the RTA-clade described by me previously:
See the Nicodamoidea, WUNDERLICH (2020: 54) as a part of the Agelenomorpha.

- ?Salticoididus indet.: WUNDERLICH (2008: 630, figs. 112-113), juv. In Early Cretaceous JORDANIAN amber; ERMNH ZRA no. 295.
Main characteristics: Legs fairly robust, bearing numerous feathery hairs (similar fig. 313) and strong bristles, femoral and tarsal trichobothria absent. - I do not want to exclude that the spider is a member of the RTA-clade (s. l.) and probably of the Agelenomorpha but not of the Salticoididae (see above) of the superfamily Deinopoidea.

- 1 probably adult ♀ under *Burmadictyna* sp. indet., F3061/BU/CJW, see WUNDERLICH (2017: 223): Body length 3.2 mm, cribellate, leg hairs dense and short, feathery hairs existing, femoral and tarsal trichobothria absent, bristles numerous,standing out from their articles, even few short ventral ones on the tarsi and laterally on the patellae.

- 1 subad. ♂ in Burmite, F3021/BU/CJW, under ?RTA-clade, see WUNDERLICH (2017: 238-239, figs. 246-248, photo 127): Body length 3.6 mm, cribellate, hairs short, feathery hairs existing on legs, femoral and tarsal trichobothria absent, bristle numerous and standing out from their articles,

- 1 juv. ♀ in Burmite, F3210/BU/CJW, body length 2.5 mm, length of the basal cheliceral articles 0.7 mm, length of tibia I 1.5 mm.
In 2018: 123-124, photo 56, I described an inad. cribellate spider in Burmite, see WUNDERLICH & MÜLLER (2018) which was not named. The cribellum is insufficiently observable, probably undivided, the claw of the pedipalpus is well developed and bears large teeth. The quite long calamistrum, the eye position and the absence of tarsal trichobothria are similar to the family Eotibiaapophysidae but feathery hairs are well recognizable e. g. on the right femora. In the present female metatarsus III bears a ventral-apical transverse row of longer bristles similar to a “preening comb” (fig. 314); similar bristles (less regularly) exist on metatarsi I-II, too, and exist, e. g., also in *Burmadictyna* WUNDERLICH 2008 (Deinopoidea: Salticoididae) in Burmite in which feathery hairs are absent. The position of the ventral tibial I-II bristles is FAIRLY CLOSE to their articles. According to the existence of feathery hairs as well as stout articles of the legs the present female is in my opinion it not a member of the family Eotibiaapophysidae but probably of an - at least from Burmite - unknown family of the RTA-clade. An adult male of the fossil taxon in question is needed for further conclusions. - The Nicodamoidea may be related, see WUNDERLICH & MÜLLER (2020: 55) but in Nicodamoidea feathery hairs are unknown and the ventral tibial I-II bristles are standing out. I do not want to exclude relationships to another old taxon of extant ground-living spiders, the Amaurobiidae.

- The dubious and enigmatic family Praearaneidae: See p. 166.

Family **EOTIBIAAPOPHYSIDAE** WUNDERLICH 2018 **n. stat.**

The monotypic taxon Eotibiaapophysini WUNDERLICH in WUNDERLICH & MÜLLER 2018: 27 was regarded as questionable dubious taxon oft the Uloboridae.

Two tribes: Eotibiaapophysini WUNDERLICH 2018 and Eoagelenomorphini n. trib.

Diagnostic characters (♂; ♀ unknown): Leg trichobothria reduced in size and probably in number, most probably absent on the tarsi (but see below, *Eoagelenomorphus cretaceus*!), feathery hairs absent, leg bristles (figs. 315, 319) long, numerous and building a metatarsal garland, 1-4 short ventral bristles of tarsus IV (fig. 315); pedipalpus (figs. 316, 323-326) with several – partly long and retroventrally – tibial apophyses, a short cymbium and complicated structures of the bulbus including a median apophysis; the embolus is not surely known.

Basic characters: Cribellate (calamistrum: Fig. 315), three pairs of short spinnerets (fig. 322), entelegyne, unpaired tarsal claw existing (fig. 321), 8 eyes in two rows (fig. 317).

Further characters: Prosoma distinctly narrowed in front in *Eoagelenomorphus* (fig. 317), fovea unknown, eyes of median size and posterior eye row (fig. 317) recurved at least in *Eoagelenormorphus*, fangs long and slender, gnathocoxal serrula fine (badly preserved) in Eoagelenomopha, legs fairly slender, III relatively long, paired ventral bristles of tibia I-II, claw tuft, scopulae and tibial suture absent, metatarsus IV only slightly bent, calamistrum uniserrate (fig. 315), opisthosoma at least in *Eoagelenomorphus* not scutate, cribellum deformed or not preserved, tibia of the ♂-pedipalpus with long bristle(s) (fig. 323), cymbium with a retrobasal hump (fig. 326), conductor existing at least in *Eoagelenomorphus.*

Note on the life style: Most cribellate spiders are capture web dwellers but exceptions like Amaurobiidae and Zoropsidae live in retreats or tubes. According to the relatively long leg III I think that Eotibiaapophysidae were not capture web builders; certain eyes are not large like in numerous hunting spiders. Probably the spiders lived in retreats on the ground like numerous members of the extant agelenormorph spiders of the RTA-clade s. l. in the sense of WUNDERLICH (2018: 48). This life style is in agreement with the extreme rarity of these spiders in the fossil resin. – Probably these ancient members of the RTA s. l. clade lived hidden during the Early and Mid Cretaceous similar to ancient members of placental mammals.

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

Relationships (see also above): According to the cribellate stage, the position of the eyes, the structures of the male pedipalpus which bears several tibial apophyses including ventral and lateral ones as well as other characters I regard the Eotibiaapopysidae as a member of the TA-clade (see below), most probably of the Agelenomorpha of the RTA-clade s. l., see WUNDERLICH in WUNDERLICH & MÜLLER (2020: 27, 48) and the taxon below (based on F3665), but it possesses strongly reduced leg trichobothria. In most taxa of this clade the leg trichobothria are long, usually numerous and exist usually on the tarsi, too (fig. 318), the cymbium is frequently distinctly longer than the bulbus and/or the posterior spinnerets may be long like in the Agelenidae. - The relic South African cribellate family Penestomidae is similar in certain characters of the male pedipalpus and may be related; in members of the Penestomidae tarsal trichobothria and feathery hairs are absent like in the Eotibiaapophysidae, a similar position of the eyes, a long calamistrum and quite similar tibial apophyses of the male pedipalpus exist, the cymbium is short, the conformation of the structures of the bulbus are similar. In contrast to the Eotibiaapophysidae (besides the leg trichobothria) the shape of the prosoma is quite different (it is not distinctly narrowed anteriorly) in the Penestomidae, a suture of the male tibiae exists, and leg III is short compared with the remaining legs. - In the Nicodamoidea of the Agelenomorpha tarsal trichobothria are absent, too, but other leg trichobothria are long and the tibial apophyses of the male pedipalpus are quite different, see WUNDERLICH & MÜLLER (2020: 53). - In the Amaurobiidae s. l. and in der Dictynidae leg trichobothria are long. Tarsal trichobothria are absent in certain Dictynidae in which the leg bristles are usually thin, the prosoma is frequently elevated, a median apophysis is absent, and usually a long tegular apophysis guides the embolus in a retrolateral position. The retrolateral cymbial margin of the Amaurobiidae is often modified. - In the Zodariidae a gnathocoxal serrula is absent, the fangs are stout and the leg trichobothria are long. - The Deinopoidea (see above) are usually cribellate, too, the anterior and posterior lateral eyes are distinctly separated, leg III is distinctly shorter than I which is usually rather long, femoral trichobothria may exist and a tibial apophysis of the male pedipalpus is most often absent (it may exist in *Miagrammopes* and *Paramiagrammopes* of the Uloboridae), a long patellar apophysis may exist.

Phylogenetics: Reflecting the diversity of the branchings of the so-called RTA-clade in the common sense and the diversity of the tibial apophyses of the male pedipalpus one may question the monophyly of this clade and may ask (a) what are the functions of these apophyses: only anchoring the pedipalpus to the epigyne and locking structures of the expanded pedipalpus during copulation? (b) What is plesiomorphic: Numerous tibial apophyses - including ventral and dorsal apophyses, see figs. 323-324 - or a single apophysis? (And: How many reversals do exist?). In the predecessor of the TA-clade (= RTA-clade s. l. in the sense of WUNDERLICH & MÜLLER (2020: 27) (*), see below) a single tibial apophysis of the male pedipalpus may have existed before such apophyses “multiplied”. In this connection it is remarkable (1) that in fossil Deinopoidea EVERY article of the male pedipalpus – rarely of the tibia (!) - may bear an apophysis or outgrowth in contrast to the extant Deinopidae and Uloboridae. A reduction during evolution exists in numerous structures of spiders, e. g., in the number of eyes, of leg trichobothria (**), bristles as well as receptacula seminis. (2) In several spider families of the TA-clade which are regarded as relatively “primitive” (ancient) – e. g. Amaurobiidae and Agelenidae – SEVERAL tibial apophyses of the male pedipalpus exist but within several spider families the number of such apophyses is reduced secondarily even to a single one or two - mainly in a RETROAPICAL position, e. g., in

Gnaphosidae and Salticidae of the Dionycha. A reverse evolutionary direction appears unlikely to me in contrast to a reversal of the reversal.
In my opinion the recently discovered fossil spiders of the Eotibiaapophysidae and the Agelenomorpha indet. (F3665, see below) in Burmite indicate that …
(a) the RTA-clade (s. l.) in the sense of most recent authors is an assemblage of a paraphyletic group which I like to call **t**ibial **a**pophysis clade (TA-clade) (**new term**) (= RTA-clade **s. l**. sensu WUNDERLICH & MÜLLER (2020)), and the derived higher taxa of the "RTA-clade s. str." (like Salticidae) is not the sister group of a basal/ancient branch like the Eotibiaapophysidae; (b) members of such a TA-clade existed already in the Mesozoic and apparently were rare in the Cretaceous Burmese amber (but probably existing on the ground of the Burmese amber forest); (c) the root of the TA-clade goes back at least to the Cretaceous (probably even to the Jurassic or the Triassic); (d) it is well understandable that a proof of derived and today very diverse taxa of the RTA-clade (s. str.) like the three-clawed Wolf spiders (Lycosidae) or the two-clawd Jumpings spiders (Salticidae), Sac spiders (Clubionidae) and Crab spiders (Thomisidae) during the Mesozoic - at least in the Late/Mid Cretaceous - is still absent; their diversification happened probably around the K-Pg events or later. See WUNDERLICH (2020).
Regarding reported fossils we know only "fragments" of the numberless branches during more than three hundred million years of spider evolution. The ancient family Eotibiaapophysidae and the taxon below based on F3665 open only tiny "windows to the past" and most likely we will find more of such "connecting fossil taxa", see above: The taxa indet. and the Salticoididae. In my opinion we do not need suprafamiliar NAMES for all of those taxa - they may be regarded as sister groups or not - of a longer "evolutionary row". As the oldest known taxon of this row the family Eotibiaapophysidae and the Agelenomorpha indet. (see below) may be called plesions and the numbers one and two of the TA-clade known so far, Nicodamoidea and Zodarioidea, may bear numbers three and four of such a row, etc., and the Dionycha in the sense of WUNDERLICH (2020: 48) would represent the most derived branch of this row (if it is not splitted).

(*) Hopefully a fossil of this unknown predecessor will be found in the future!
(**) In my opinion the strong reduction of leg trichobothria of the Eotibiaapophysidae is surely an apomorphic character of this family. A multiplication of leg trichobothria, their regains and losses within other taxa of the RT-clade are still discussed.

Note on the simultaneous origin of sister groups: Certain/most authors believe that an extant taxon should have originated at the same time as its closest extinct sister taxon (*). As an example: If the Late (Mid) Cretaceous family Eotibiaapophysidae was regarded as the sister group of the "RTA"-clade in the common/recent sense this clade would have originated (at the latest) in the Late/Mid Cretaceous, too, but - if taxa like Nicodamioidea or Zodaioidea are regarded as separate branchings of the TA-clade - the RTA-clade s. str. (Lycosoidea + Dionycha) are not at all the sister group of the Eotibiaapophysidae.

(*) Birds surely did not originate the at same time as its "sister group" - "the" dinosaurs -, originated!

EOTIBIAAPOPHYSINI WUNDERLICH 2018 (figs. 315-316)

Type genus (by monotypy): *Eotibiaapophysis* WUNDERLICH 2018. Single species: *Eotibiaapophysis reliquus* WUNDERLICH 2018 (F3220/BU/CJW).

Diagnostic characters (incomplete ♂; ♀ unknown; see also above and WUNDERLICH (2018: 27-29, figs. 16-17, photo 5): Pedipalpus (fig. 316, photo 62): Tibia with a strongly bent pointed retrolateral apophysis ("RTA") (its position of the incompletely preserved tibia may be not retroapically but more retroBASALLY, see fig. 316), a pair of ventral-apical outgrowths and at least one strong dorsal bristle, tegulum with a large apophysis which may be the median apophysis.

Note: The pedipalpus and the mouth parts near the pedipalpus of the single known male are badly and incompletely preserved.

Relationships: In the Eoagelenomorphini the legs are more slender – the diameter of its tibia IV is 0.1 mm in contrast to 0.18 mm -, the pedipalpal tibial apophyses and the structures of the bulbus are QUITE different, see the figs.

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

EOAGELENOMORPHINI WUNDERLICH **n. trib**. (figs. 317-326), photos 60-61

Etymology: See below.

Tye genus (by monotypy): *Eoagelenomorphus* n. gen.

Diagnostic characters (♂; ♀ unknown): Pedipalpus (figs. 317-326; its ventral aspect is hidden): Tibia long, with a large blunt retroventral apophysis originating near the middle of the article, and with two apical apophyses, tegulum with a long, slender and strongly sclerotized apophysis which is directed to the tibia, apparently with a median apophysis, a strongly sclerotized questionable embolus, guided by a questionable conductor.

Relationships: See above.

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

Eoagelenomorphus WUNDERLICH **n. gen**.

Etymology: The name refers to the Agelenomorpha in the sense of WUNDERLICH (2020) in which certain structures are similar to the new family, as well as to some ancient characters, from Eo(s) (gr.) = early and morph- (gr.) = shape.

The gender in masculine.

Diagnostic characters, relationships and distribution: See the tribe.

Eoagelenomorphus cretaceus WUNDERLICH **n. gen. n. sp**. (figs. 317-326), photos 60-61

Etymology: The species name refers to the Cretaceous period, the origin of the species.

Material: Holotype ♂ in Upper (Mid) Cretaceous Burmite, F3569/BU/CJW.

Preservation and syninclusions: The spider is preserved in a clear yellowish piece of amber, the thoracal part, the dorsal part of the opisthosoma and some articles of the legs are cut off at a layer within the amber, both leg pairs I-II are broken mainly at the end of the femur, the left leg I is broken between femur and patella, and a large bubble of haemolymph has come out (see the photo), an emulsion hides ventral parts of the spider, the spinnerets are strongly deformed. – Syninclusions are a tiny mite, a questionable midge, plant hairs and detritus.

Diagnostic characters, relationships and distribution: See above.

Description (♂):
Measurements (in mm): Body length 2.7; prosoma: Length 1.9, width 1.4; opisthosoma: Length 1.3, width1.1; femora II-IV ca. 1.5, leg I: Femur ca. 1.5, patella ca. 0.5, tibia 1.2, metatarsus 1.6, tarsus 0.8; tibia II ca. 1.2, metatarsus III 1.4, metatarsus IV 1.6; diameter of tibia IV 0.1, length of the basal cheliceral articles 0.5.
Colour mainly medium brown, legs not annulated.
Prosoma (fig. 317, photo) 1.36 times longer than wide, anteriorly distinctly narrowed, cuticula smooth, few hairs, fovea unknown, 8 fairly large eyes in two rows, posterior row recurved, lateral eyes almost contiguous, clypeus deformed, quite short, basal cheliceral articles fairly large, condylus existing, fangs long and slender, badly preserved, mouth parts deformed or hidden, gnathocoxal serrula fine, keel-shaped, sternum wide. – Legs (figs. 318-321, photo) incompletely preserved, fairly long and slender, order IV~I/II/III, III almost as long as II (see above), hairs of medium length, tibial suture, scopulae, claw tufts and feathery hairs absent, bristles numerous and long, tarsus III-IV with a single short bristle, all femora bear 1-3 bristles, patellae

dorsally with a thin basal and a long distal bristle, tibiae with dorsal, lateral and ventral bristles, ventral bristles not paired, metatarsi with 5-7 bristles and with a garland of long subapical bristles which stand widely out and are stronger developed on III-IV, metatarsus IV as in *Eotibiaapophysis reliquus* (fig. 315) only slightly bent, calamistrum long; trichobothria reduced in size and probably in number, difficult to observe, most probably absent on tarsi, probably only a single one on the metatarsi, tibiae probably with one or two rows of tiny trichobothria, three tarsal claws, paired claws with a single row of long teeth, unpaired claw well developed, below this claw exists an outgrowth like in *Eotibiaapophysis*. – Opisthosoma (photo; most dorsal parts are cut off) 1.18 times longer than wide, soft, hairs not dense and of medium size; three pairs of deformed stout spinnerets, the posteriors (fig. 327) smaller than the anteriors, cribellum difficult to observe. – Pedipalpus (figs. 317, 323-326): Tibia longer than the patella, bearing three long bristles, retroventrally with a long and blunt apophysis near the middle of the article, apically with two – a slender and a wide – dorsal apophyses, cymbium with an indistinct retrobasal hump, bulbi deformed, (the left one expanded), bearing a long, slender and strongly sclerotized tegular apophysis which is directed to the tibia; questionable embolus slender and strongly sclerotized, probably guided by a conductor.

Agelenomorpha indet. (figs. 327-328)

Material: Parts of two legs - tarsi, metatarsi, part of a tibia - probably of the right legs I and II, probably of a juvenile spider, in Upper (Mid) Cretaceous Burmite (Kachin amber), F3665/BU/CJW.

NOTE: Not restudied was a questionable exuvia in Burmite, OSA no. B-A-1-16, G. POINAR jr. coll., body length probably 4-5 mm, metatarsus I probably ca. 1.6 mm, numerous leg bristles standing out from their articles, several trichobothria on tarsi (!) and metatarsi, existence of a cribellum unknown.

Preservation and syninclusions: The articles of the two legs are very well preserved in a clear yellow-orange piece of amber, one of the metatarsi is cracked and bent ventrally distinctly near its end. - Syninclusions are an indet. male spider of the genus *Eogamasomorpha* WUNDERLICH 2008 (Tetrablemmidae), body length ca. 1 mm, and particles of detritus.

Diagnostic characters (leg articles only): Cribellate or ecribellate, legs (figs. 327-328) slender (not so stout as in most Dictynidae and Mygalomorpha), scopulae, claw tufts, onychium and metatarsal preening combs absent, metatarsi and tibiae bearing numerous long and slender bristles which are standing widely out from their article (not close to their article as in members of the Dionycha), legs with numerous feathery hairs similar to fig. 313, tarsi with long dorsal trichobothria in a single row which are not distinctly increasing in length towards the tip of the article (their length not distinctly increasing like in the Agelenidae), three well developed tarsal claws, paired claws bear-

ing at least five long teeth. According to the structures of the legs the spiders were most probably capture web dwellers.

Further characters: The length of a tarsus is ca. 0.8 mm; I estimate that the body length of the spider may have been 3.5 – 4 mm. Legs (figs. 327-328) not annulated, hairs not distinct, metatarsal and tibial trichobothria not studied, unpaired tarsal claw smooth.

Relationships (see the diagnosis): The combination of the leg characters of this taxon are unique, different from all spider taxa in Burmite known to me. Long tarsal trichobothria exist in the extinct family Lagonomegopidae, too, but the tarsi bear more than a single row of trichobothria and leg bristles are absent. The leg characters of the taxa described above like the Eotibiaapophysidae – characters, e. g., of the tarsal trichobothria – are quite different, they are short or absent. In the Pisauridae, the Eocene Insecutoridae, Lycosidae and related families exist more than a single row of tarsal trichobothria. Agelenidae may be most related but in this family the row of tarsal trichobothria is - usually? - distinctly increasing towards the tip of the article. Agelenoidea is a part of the diverse Agelenomorpha in the sense of WUNDERLICH & MÜLLER (2020: 27) or may even represent a member of a subclade of its own. See the paragraph “Agelenoidea or Dictynoidea” in UBICK (2017: 25). In most Dictynidae the leg articles are stouter than in the present taxon. If confirmed the present taxon would be – in the geological sense – the oldest proof of the superfamily Agelenoidea.

Note: Spiders of this taxon were probably so rare in Burmese amber because they built capture webs near or on the ground of the forest but not in higher strata of the vegetation. Therefore the spiders were only rarely captured by the sticky resin.

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

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SUPPLEMENENT, SYNONYMY

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(1) I am grateful for the hint from Kate Fuller – by e-mail 14. X. 2020 – that the genus name *Burmesia* – see WUNDERLICH (2020), Beitr. Araneol., 13: 39: *Burmesia* WUNDERLICH 2020 – of the family Nemisiidae is a junior homonym of *Burmesia* HEALEY 1908 (Mollusca). Herewith I substitute the name *Burmesia* WUNDERLICH 2020 by *Burmesiana* **nom. nov**. The gender of the new name is feminine, its generotype is *Burmesia sordida* WUNDERLICH 2020 in Burmese amber.

(2) Recently PENNEY (2020: 139) introduced the new genus name *Balticososybius* **n. gen**. ("= *Sosybius* C. L. KOCH & BERENDT 1854, = *Adamator* PETRUNKEVITCH 1942, = *Adulatrix* PETRUNKEVITCH 1942") of the family Trochanteriidae in Baltic amber.
According to MENGE (1854) the type species of *Sosybius* is *Sosybius minor* KOCH & BERENT 1854, designated as a female by MENGE (1854: 70, footnote) but not specified as adult OR inadult; its body length is noted as about 3,5 mm. Based on the relatively extensive description – and the excellent knowledge of fossil spiders by MENGE -, I am not in doubt about the congenerity of *minor* with *Sosybius*. Therefore *minor* should not be regarded as a dubious member of the genus *Sosybius* but only as a dubious SPECIES of this genus which is well characterized. In my opinion the base of PENNEY's (2020: 27, 142) argumentation is not correct, the name *Balticososybius* is superfluous, a junior synonym of *Sosybius*, and the name *Sosybius* KOCH & BERENDT 1854 has to be restored (**nom. rest**.) (*).
Another – but in my opinion not proper - possibility in this case is the following: PENNEY (2020: 139) accepted the synonymy of *Adamator* with *Sosybius*; see WUNDERLICH (1986: 24). As pointed out by me on the same page – contra the erroneous statement by PETRUNKEVITCH (1942: 344) - cribellum and calamistrum are absent in the female holotype (body length 9.6 mm!) of the generotype *Adamator succineus* PETRUNKEVITCH 1942, in which the prosoma is "low" and the legs are laterigrade like in all species of *Sosybius* which are probably the largest spiders known in Baltic amber. If accepting this synonymy no need exists to replace the name *Sosybius* by the

new name *Balticososybius* but the younger name *Adamator* can substitute the name *Sosybius*.

(*) If we started to replace generic names of fossil spiders which are based on species of not quite sure relationships WITHIN THEIR GENUS we would have to substitute numerous genus names like *Archaea, Clya, Mizalia* …, we would lose the nomenclatory stability and would go ahead to a chaotic situation in this field.

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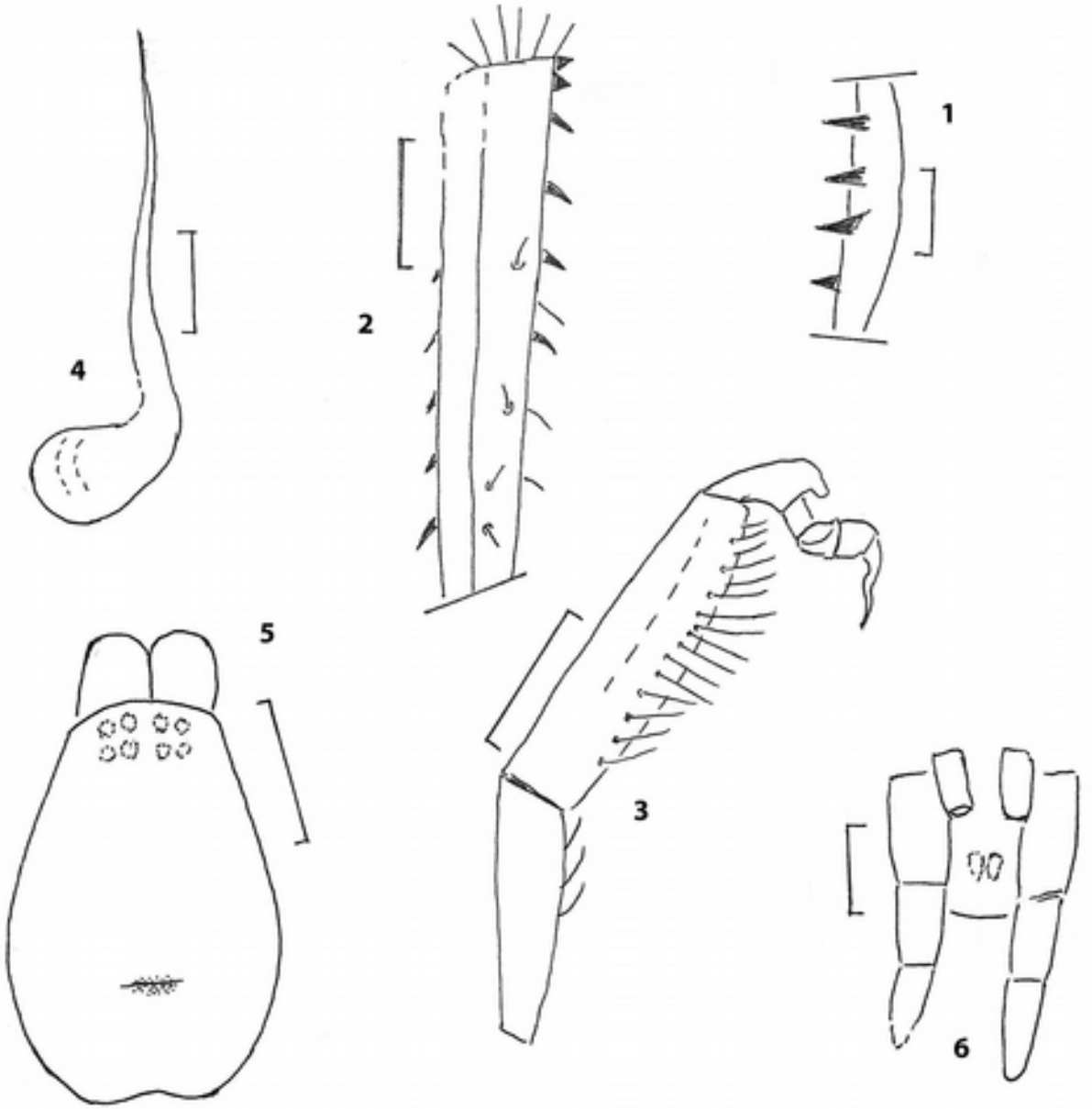
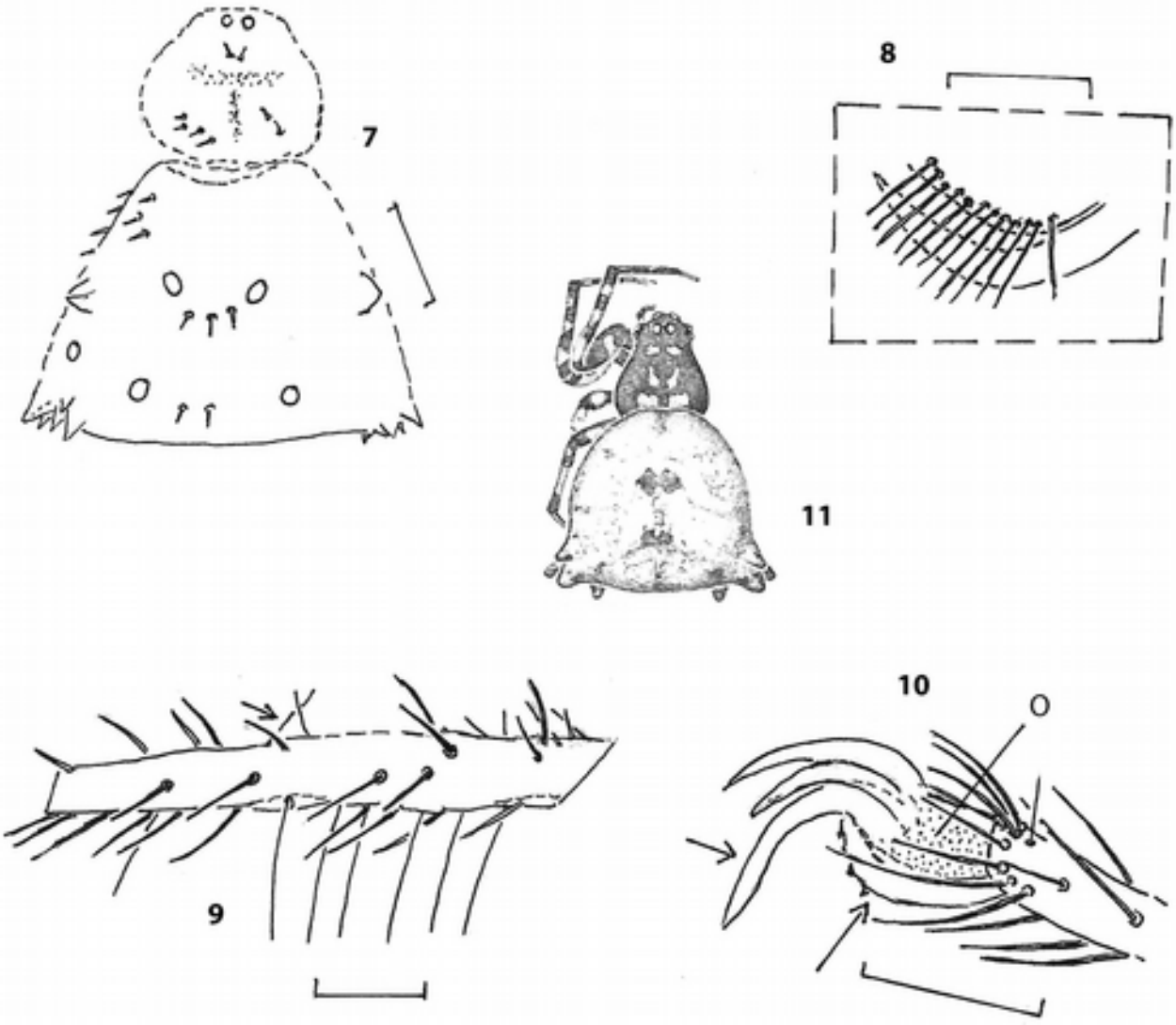


Figs. 1-4: *Alterphyxioschemoides spicula* **n. gen. n. sp.**, ?Dipluridae, ♂; 1) 4 strong “teeth” (spines) of the deformed right margin of the prosoma in an unnatural folded position; 2) ventral aspect of a part of the strongly deformed left femur I. Only the prolateral spines are well observable in this position; 3) prolateral aspect of the deformed left pedipalpus. Not all hairs are drawn; 4) dorsal aspect of the right bulbus and embolus. - Scales (in mm): 1.0 in fig. 3, 0.5 in fig. 2, 0.2 in figs. 1 and 4;

figs. 5-6: ?Hexathelidae indet., juv. (F3648/BU/CJW); 5) dorsal aspect of the prosoma. The eyes are partly hidden and difficult to observe; their real position may be different; 6) ventral aspect of the spinnerets. Mainly the median spinnerets are deformed; the limits of the articles are difficult to recognize and are probably not correctly drawn. - Scales 0.5 and 0.2;



figs. 7-10: *Megasetae colphepeiroides* **n. gen. n. sp**., Megasetidae **n. fam**., ♀; 7) dorsal aspect of the body which partly is hidden or deformed. Only few of the numerous short bristles are drawn; 8) anterior aspect of the distal part of the left chelicera; 9) retrolateral aspect of the deformed left metatarsus I. Note the long ventral sensory hairs, questionable trichobothria and the dorsal questionable trichobothrium; fig. 10) retrolateral aspect of the distal part of the left tarsus II. The short arrow points to the huge unpaired claw, the long arrow points to the questionable retrolateral serrated "auxiliary" claw (hair). Not all hairs are drawn. - O = questionably onychium. Scales: 1.0 in fig. 7, 0.2 in figs. 8-9, 0.1 in fig. 10;

fig. 11) *Colphepeira catawba* (BANKS 1911), Araneidae, extant (North America), ♀, dorsal aspect of the body. Note the unusual shape of the opisthosoma which is similar to the extinct *Megasetae colphepeiroides* n. gen. n. sp. (fig. 7). - Taken from UBICK et al (2017);

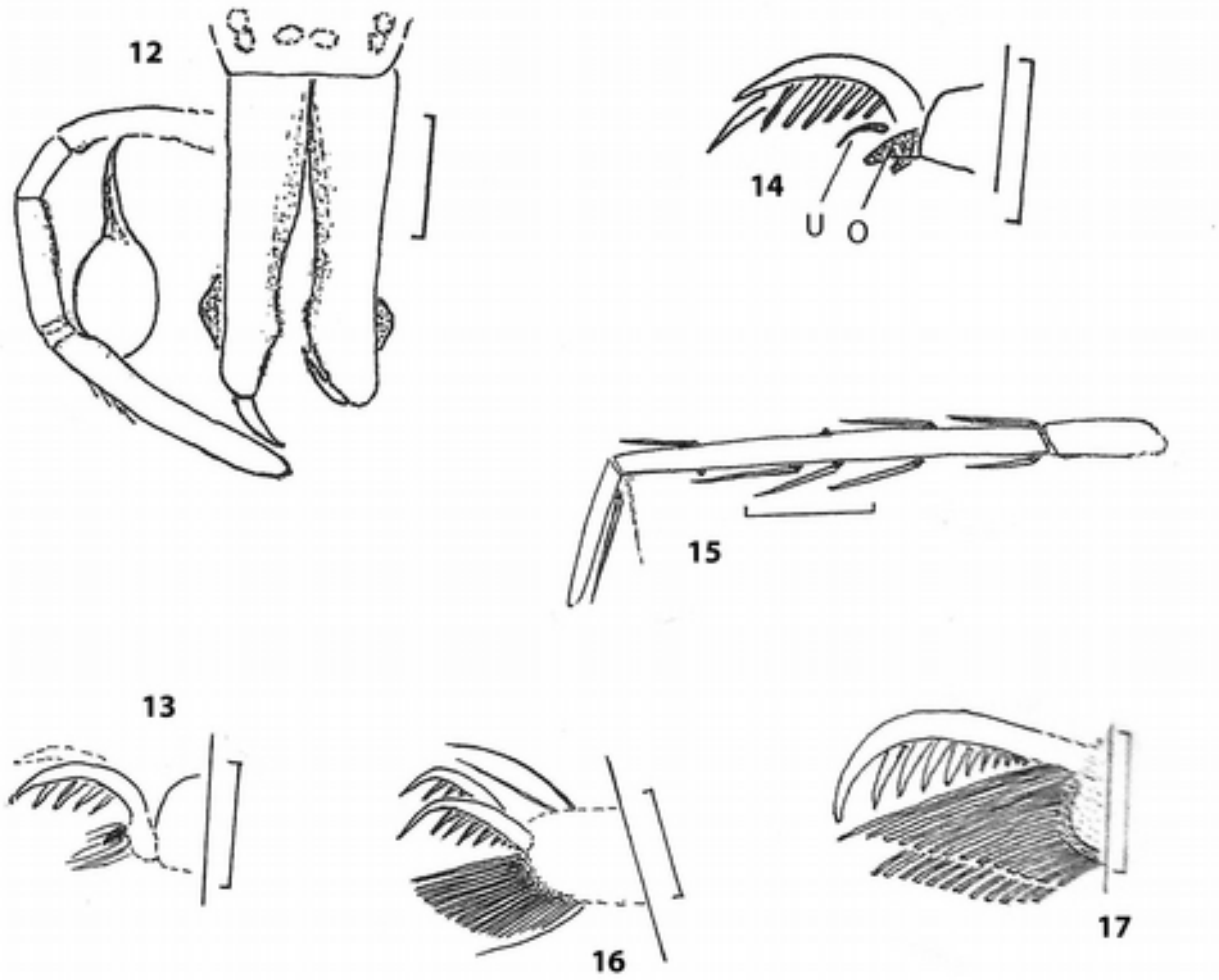
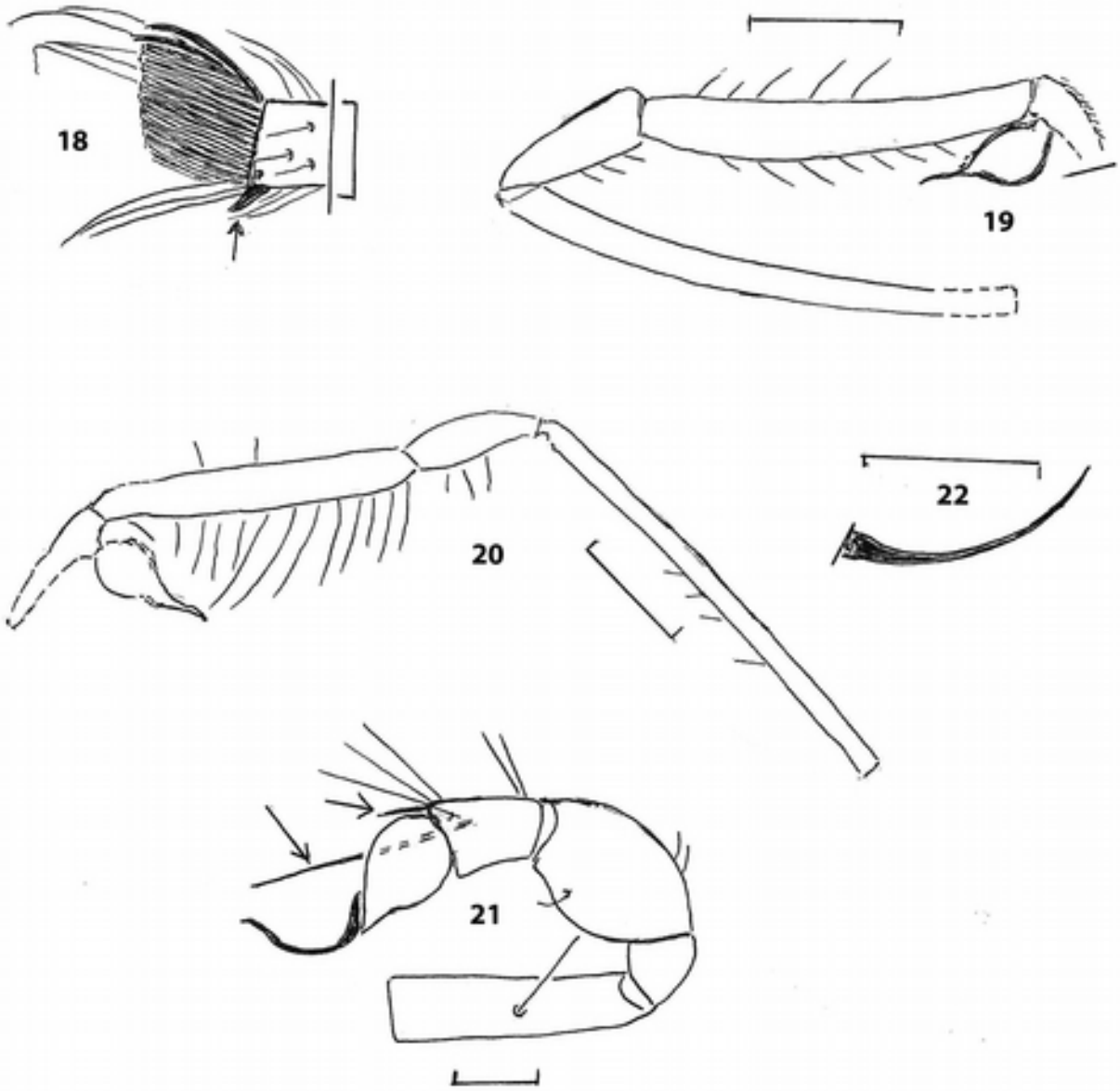


fig. 12) *Loxoderces* sp. indet., Burmorsolidae, ♂, anterior aspect of the prosoma and the right pedipalpus. - Scale = 0.2;

fig. 13) *Loxoderces longembolus* (WUNDERLICH 2020), Burmorsolidae, ♂ (holotype), prolateral aspect of the claws of the right leg III. Basal hairs hide the sclerotized parts of the onychium.- Scale = 0.05;

fig. 14) *Loxoderces longicymbium* WUNDERLICH 2017, Burmorsolidae, ♂ (holotype), retrolateral aspect of the tip of the left tarsus III. - O = sclerotized outgrowth of the onychium, U = unpaired claw. Scale = 0.1;

15-17: *Burmorsolus crassus* WUNDERLICH 2015, Burmorsolidae, ?ad. ♀ (holotype); 15) retrolateral aspect of the left leg I, patella to the basal part of the metatarsus; 16) retrolateral aspect of the tip of the left tarsus III. Only the retrolateral row of the claw tuft hairs is drawn; 17) retrolateral aspect of the tip of the left tarsus I. - Scales 1.0, 0.1 and 0.1;



figs. 18-20: *Burmorsolus longitibia* **n. sp.**, Burmorsolidae, ♂; 18) retrolateral aspect of the tip of the left tarsus IV. The paired tarsal claws are partly hidden by the very dense tuft. Note the sclerotized ventral outgrowth which I regard as part of the onychium. The tarsus is preserved ventrally of the mouth parts of the spider; 19) retrolateral aspect of the right pedipalpus. 20) retrolateral aspect of the left pedipalpus which femur is strongly lengthened and thinned by the preservation. Only few hairs are drawn. - Scales 0.05 in fig. 18, 0.5 in figs. 19-20;

figs. 21-22: *Propterpsiloderces similis* **n. sp**., Eopsilodercidae, ♂; 21) retrolateral and slightly dorsal aspect of the left pedipalpus. The short arrow points to the short apical cymbial bristle, the long arrow points to the long retrolateral cymbial bristle; 22) prolateral aspect of the left embolus. - Scales 0.1;

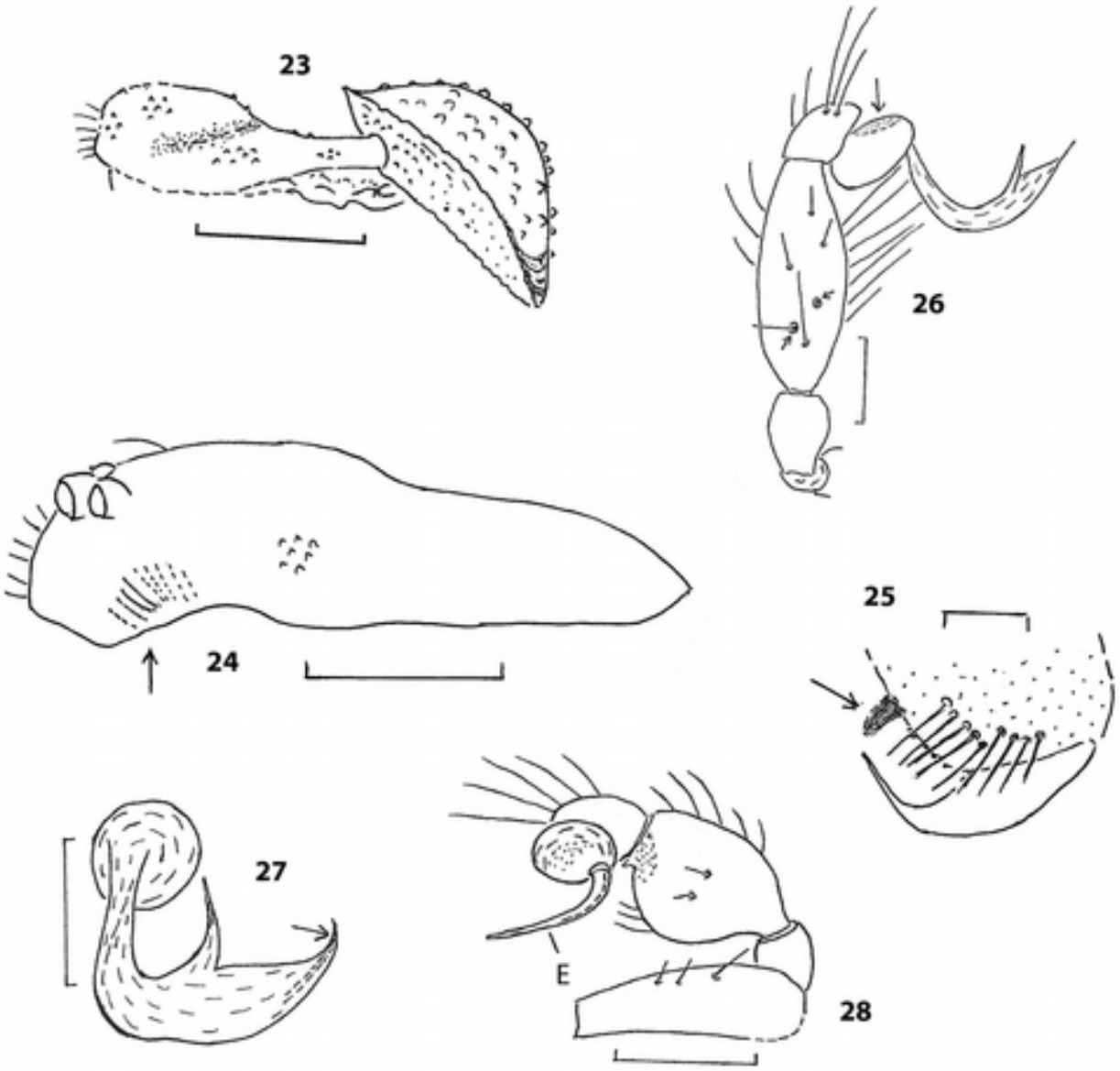
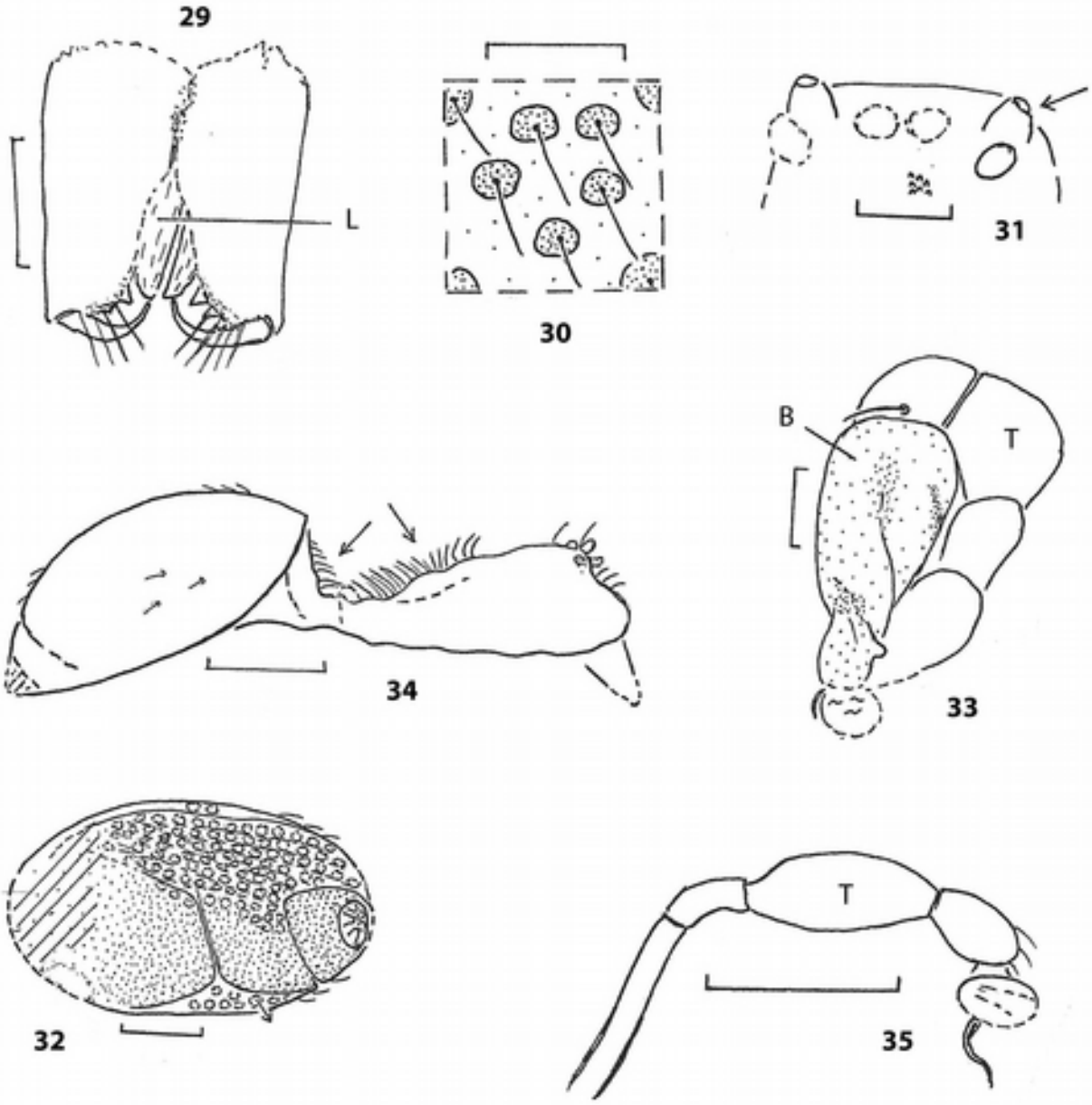


fig. 23) *Furcembolus longior* WUNDERLICH 2017, Tetrablemmidae, ♂ (holotype), lateral aspect of the prosoma. Only few wrinkles are drawn. - Scale = 0.1;

figs. 24-25: ?*Furcembolus* sp. indet., Tetrablemmidae, ♀-exuvia (F3655/BU/CJW); 24) lateral aspect of the prosoma. The arrow points to the small area of distinct files in a shallow depression; 25) anterior aspect of the distal part of the left chelicera. Note the long bristle-shaped hairs and the large tooth (arrow). The fang is apparently deformed. - Scale = 0.1;

figs. 26-27: *Furcembolus biacuta* (WUNDERLICH 2015) (under *Praeterpaculla*), Tetrablemmidae, ♂ (holotype); 26) retrolateral aspect of the right pedipalpus; 27) apical aspect of the left bulbus and its sclerites. The arrow points to the tip of the embolus. - Scale in fig. 26 = 0.2;

fig. 28) *Furcembolus equester* (WUNDERLICH2015) (under *Praeterpaculla*), Tetrablemmidae, ♂ (holotype), retrolateral aspect of the left pedipalpus. - E = embolus. Scale = 0.2;



figs. 29-30: *Uniscutosoma aberrans* WUNDERLICH 2015, Tetrablemmidae, ♂ (holotype); 29) anterior aspect of the chelicerae; 30) some dorsal plates of the opisthosoma. - L = lamella. Scales: 0.2 nd 0.1;

figs. 31-33: *Bicornoculus levis* WUNDERLICH 2015, Tetrablemmidae, ♂ (holotype); 31) dorsal aspect of the eyes; the arrow points to the stalked right anterior lateral eye; 32) left-ventral aspect of the opisthosoma; 33) retrolateral aspect of the left pedipalpus. - B = bulbus, T = tibia. Scale : 0. 2, 0.1 and 0.1;

figs. 34-35: *Saetosoma filiembolus* WUNDERLICH 2012, Tetrablemmidae, ♂ (holotype); 34) lateral aspect of the deformed body. The arrows point to the long dorsal hairs; 35) retrolateral aspect of the reconstructed right pedipalpus. - T = tibia. Scales 0.2 and 0.1;

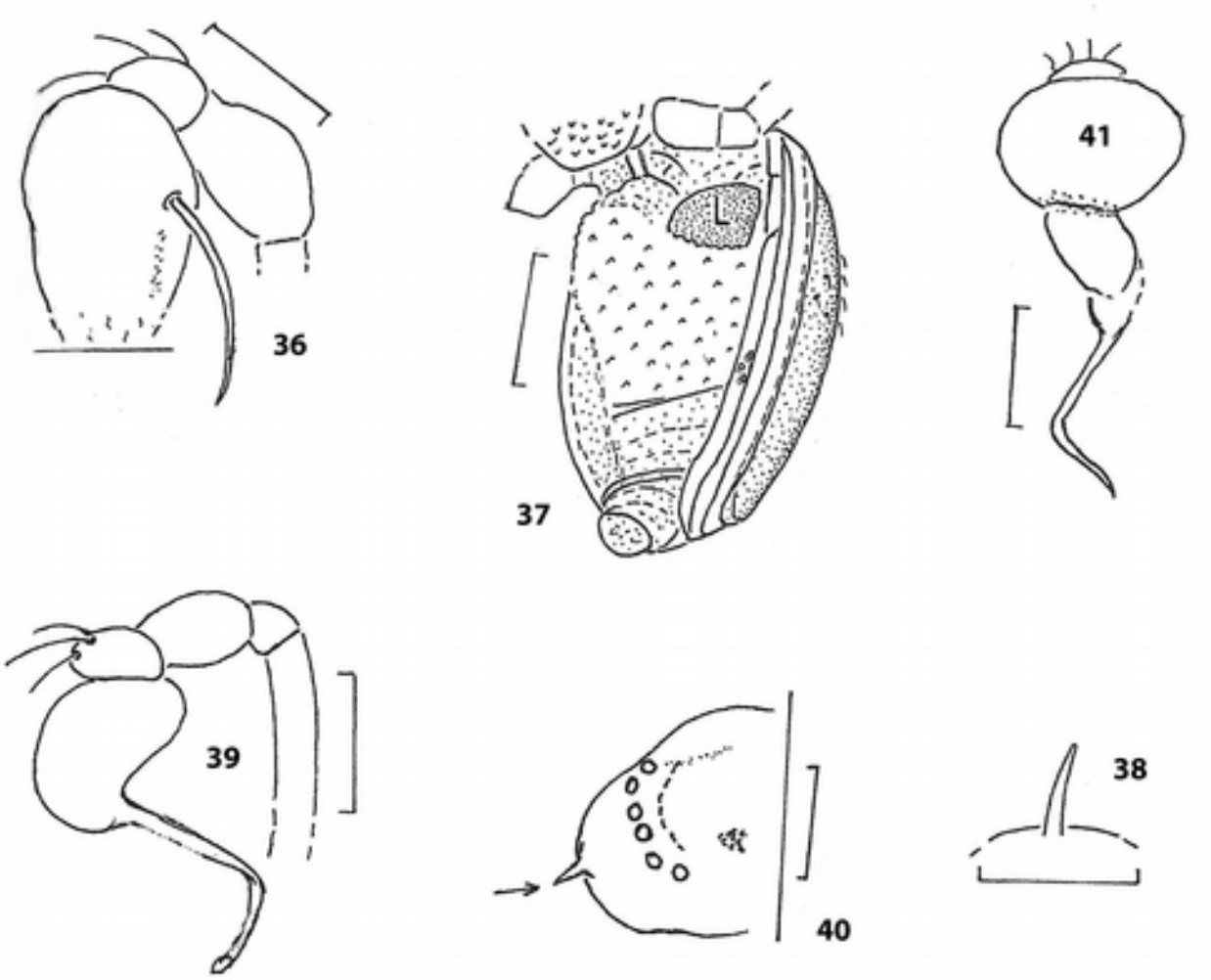


fig. 36) *Eogamasomorpha rostratis* WUNDERLICH 2020, Tetrablemmidae, ♂ (holotype), retrolateral aspect of the left pedipalpus. - Scale = 0.1;

fig. 37) ?*Eogamasomorpha clara* WUNDERLICH 2015, Tetrablemmidae, ♂ (holotype), ventral-lateral aspect of the opisthosoma.- L = lung cover. Scale = 0.2;

figs. 38-39: *Unicornutiblemma gracilicornis* WUNDERLICH 2020, Tetrablemmidae, ♂ (holotype); 38) dorsal aspect of the clypeus which bears a slender “horn”; 39) retrolateral aspect of the left pedipalpus. - Scales = 0.1;

fig. 40) *Unicornutiblemma unicornis (*WUNDERLICH 2017) (under ?*Eogamasomorpha u*.), Tetrablemmidae, ♂ (holotype), dorsal-left aspect of the anterior part of the prosoma. The arrow points to the clypeal “horn”. - Scale =0.2;

fig. 41) *Unicornutiblemma brevicornis* WUNDERLICH 2020, Tetrablemmidae, ♂ (holotype), dorsal aspect of the right bulbus and embolus. - Scale = 0.1;

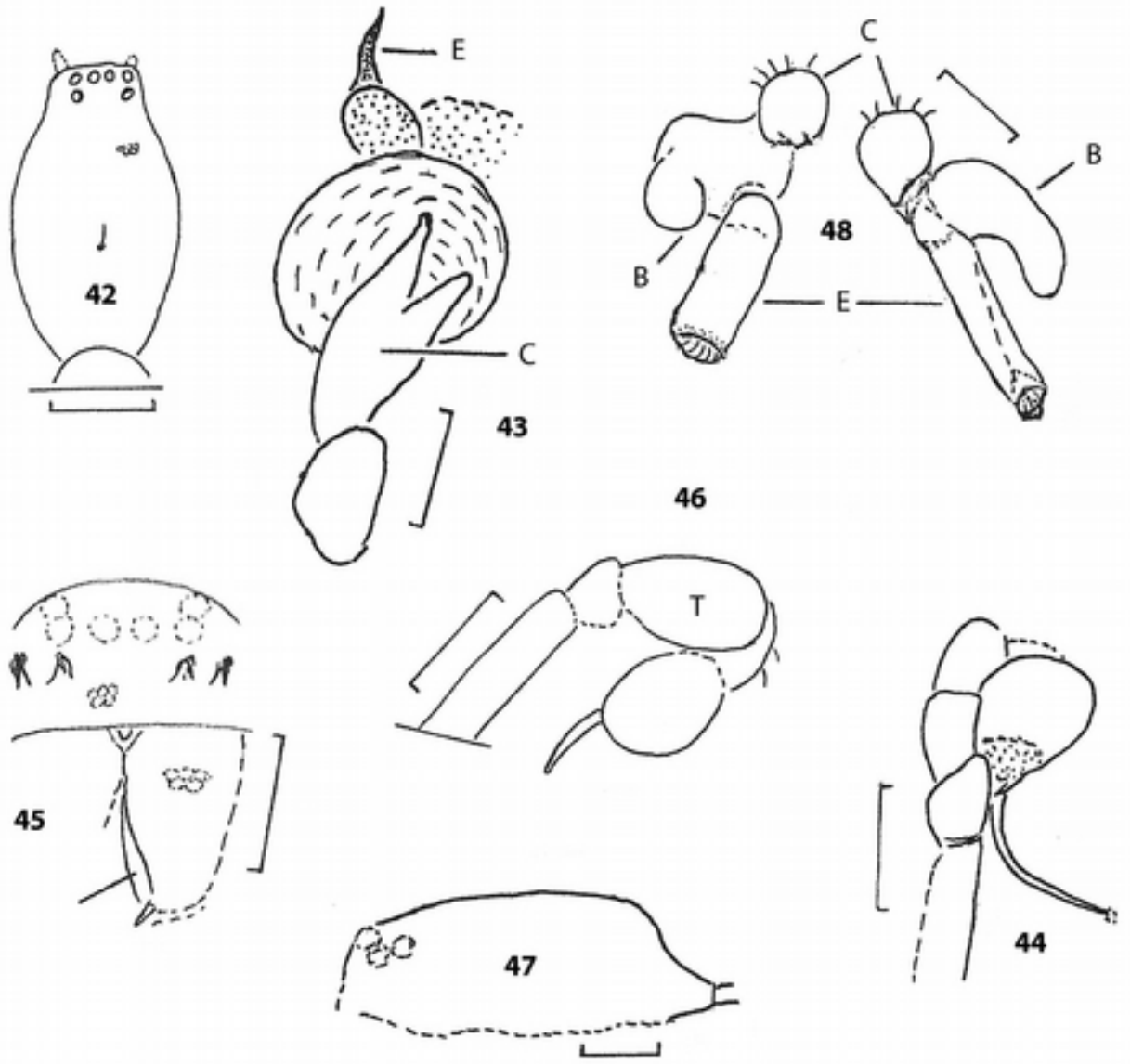
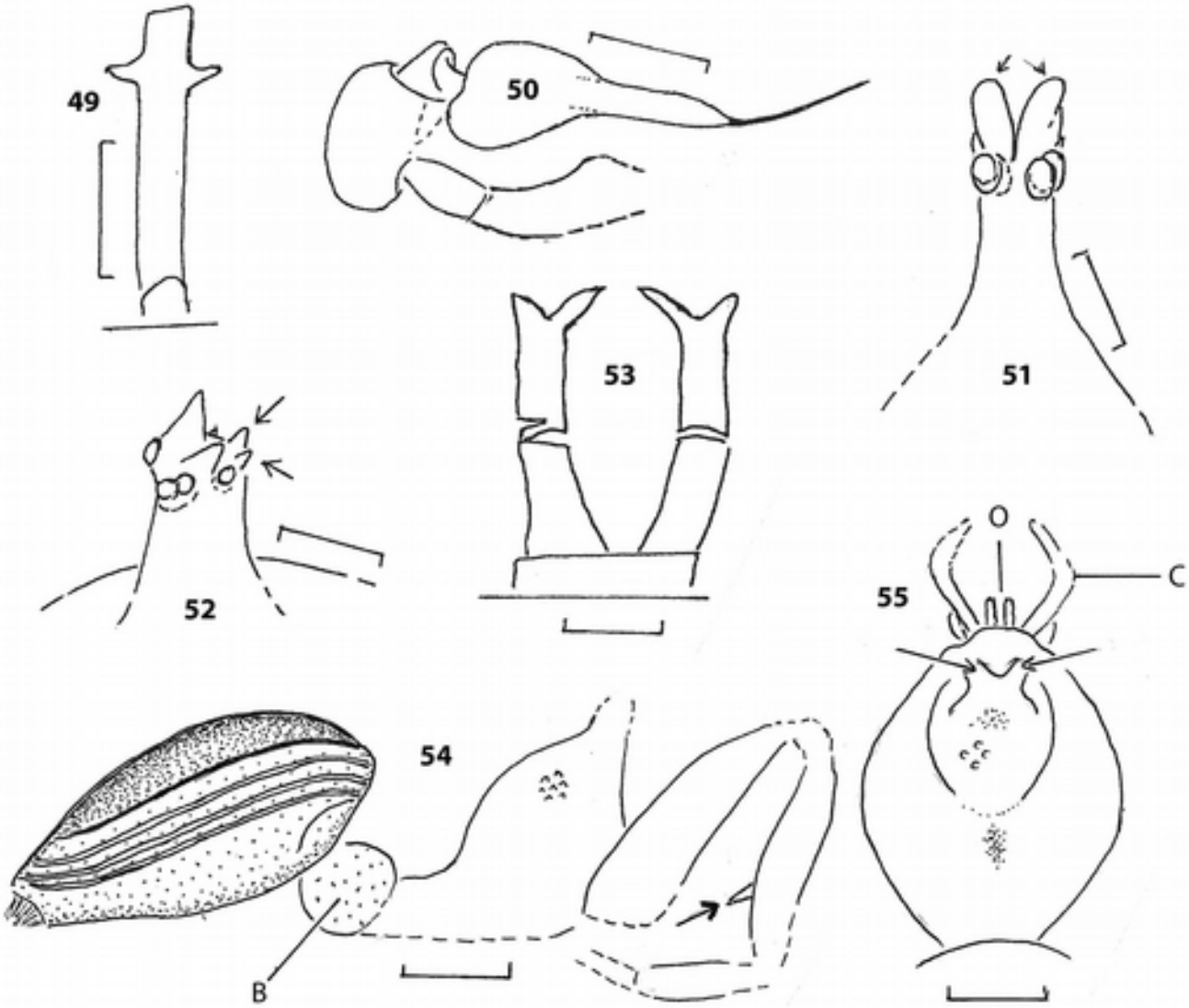


fig. 42-43: *Longithorax furca* WUNDERLICH 2017, Tetrablemmidae, ♂ (holotype); 42) dorsal aspect of the prosoma. The clypeal “horns” may be artefacts; 43) dorsal aspect of the left pedipalpus. - C = cymbium, E = embolus. Scales 0.2 and 0.1;

fig. 44) *Longissithorax myanmarensis* WUNDERLICH 2017, Tetrablemmidae, ♂ (holotype), dorsal aspect of the right pedipalpus but retrolateral aspect of the bulbus. - Scale = 0.05;

figs. 45-46: *Cymbioblemma corniger* WUNDERLICH 2017, Tetrablemmidae, ♂ (holotype); 45) anterior aspect of the prosoma. Note the four deformed “horns”; 46) mainly dorsal aspect of the left pedipalpus (ventral aspect of the bulbus). - L = cheliceral lamella, T = tibia. Scales 0.2;

figs. 47-48: *Palpalpaculla pulcher* WUNDERLICH 2017, Tetrablemmidae, ♂ (holotype); 47) lateral aspect of the prosoma; 48) both pedipalpi viewed from the ventral side of the spider in fairly different positions, so that the structures of the right pedipalpus appear shortened. - B = bulbus, C = cymbium, E = embolus. Scales = 0.2;

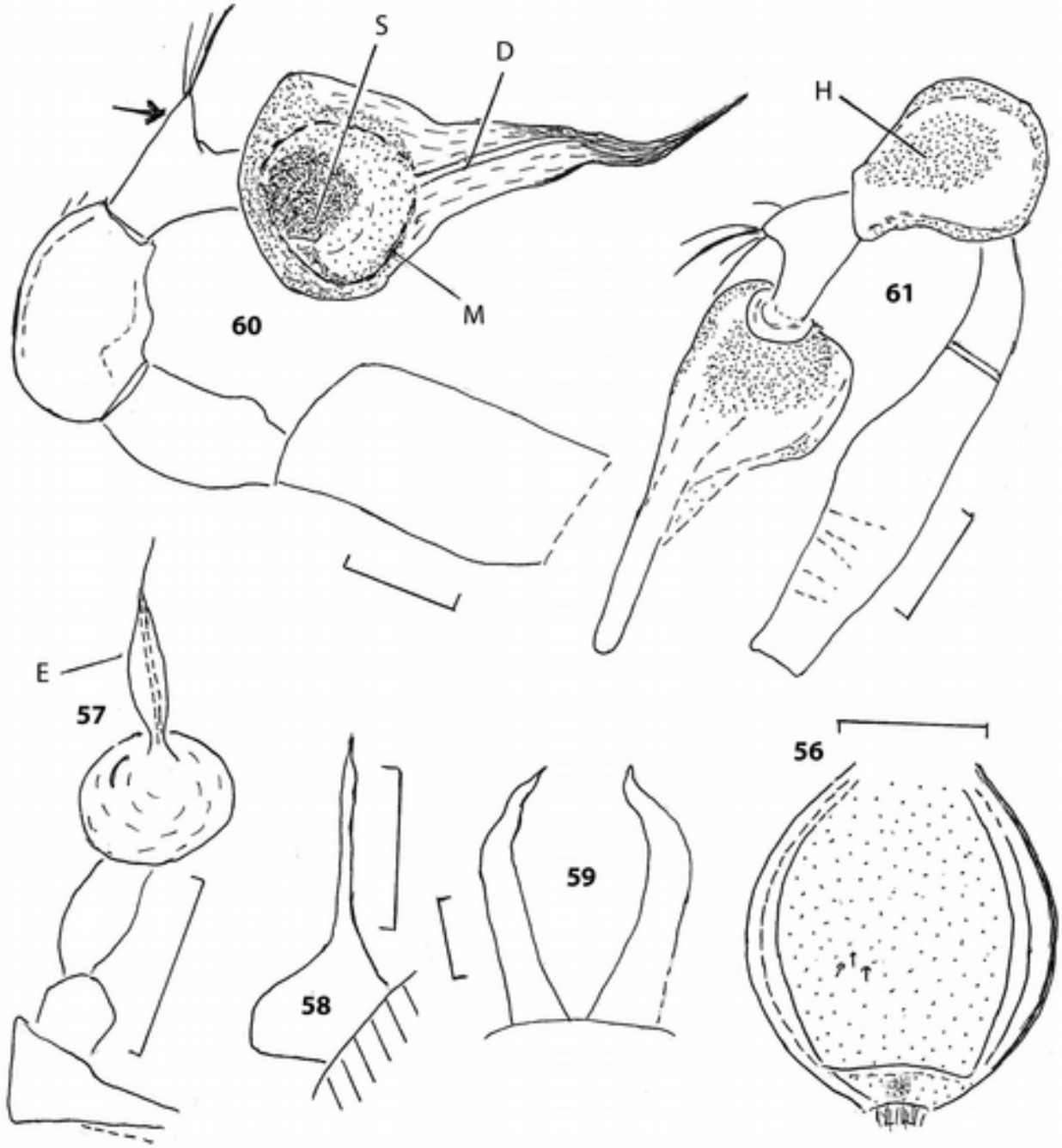


figs. 49-50: *Electroblemma caula* WUNDERLICH 2020, Tetrablemmidae, ♂ (holotype); 49) dorsal aspect of the right tibia I. Note the pair of “clasping spurs”; 50) retrolateral aspect of the right pedipalpus. - Scales = 0.1;

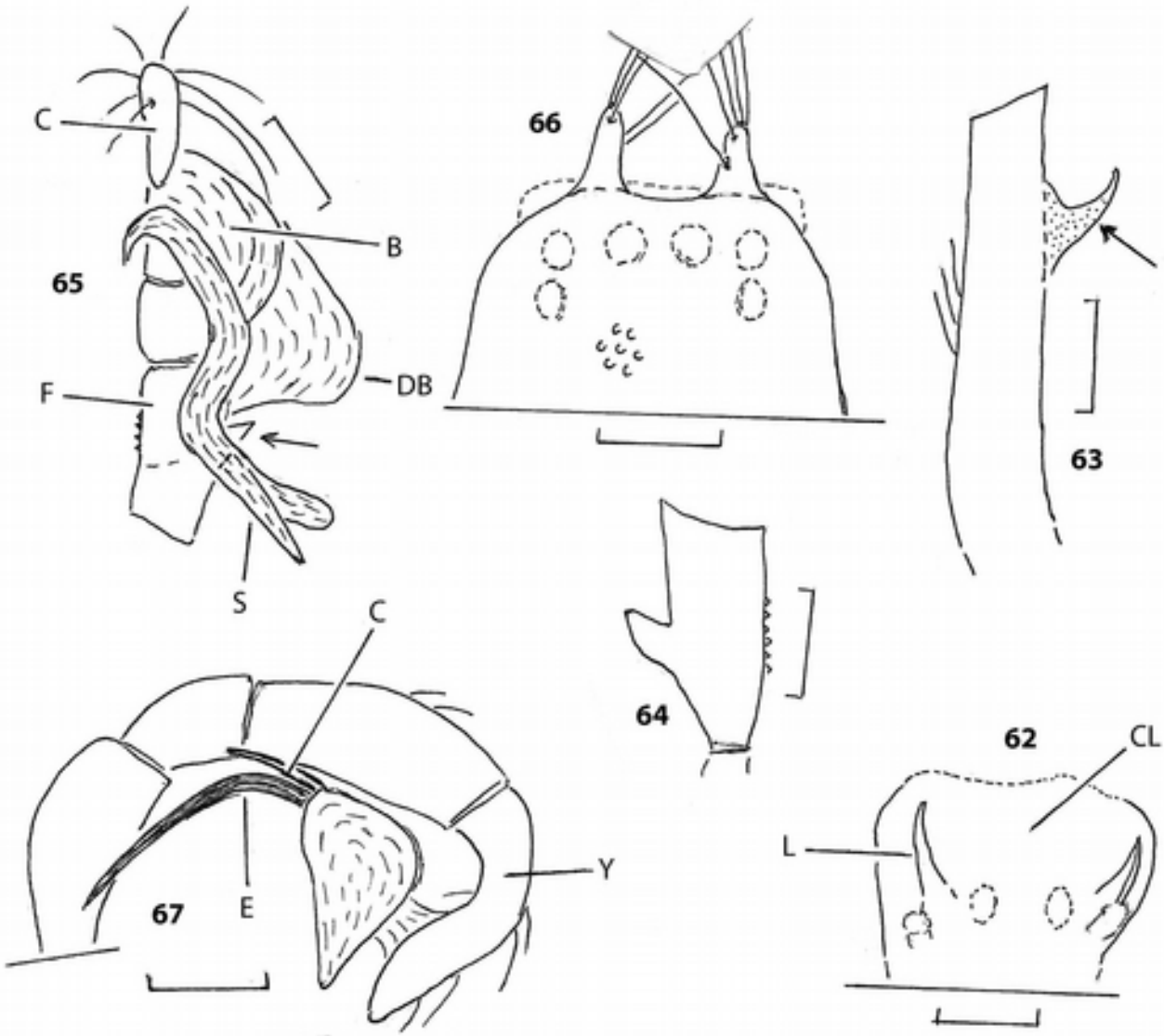
figs. 51-52: *Electroblemma pinnae* WUNDERLICH 2020, Tetrablemmidae, ♂ (holotype); 51) anterior and dorsal-left aspects of the eye projection and their outgrowths (arrows).- Scale 0.1;

fig. 53) *Electroblemma bifurcata* WUNDERLICH 2020, Tetrablemmidae, ♂ (holotype), dorsal aspect of the anterior cheliceral outgrowths which both are broken in the middle. - Scale = 0.1;

figs. 54-58: *Alticorona plenfemur* **n. gen. n. sp**., Tetrablemmidae, ♂; 54) lateral aspect of the body and the right leg I. The arrow points to the ventral “clasping spur” of the tibia. Because of a fissure parts like the eyes are hidden; 55) dorsal aspect of the prosoma. The arrows point to the area of the eyes whose tip is cut off at a layer within the amber; 56) ventral aspect of the opisthosoma; 57) ventral aspect of the right pedipalpus. Femur and patella are strongly deformed; 58) retrolateral aspect of the right embolus and part of the deformed bulbus. - B = bubble, C = right cheliceral “horn”, E = embolus, O = clypeal outgrowths. Scales = 0.2;

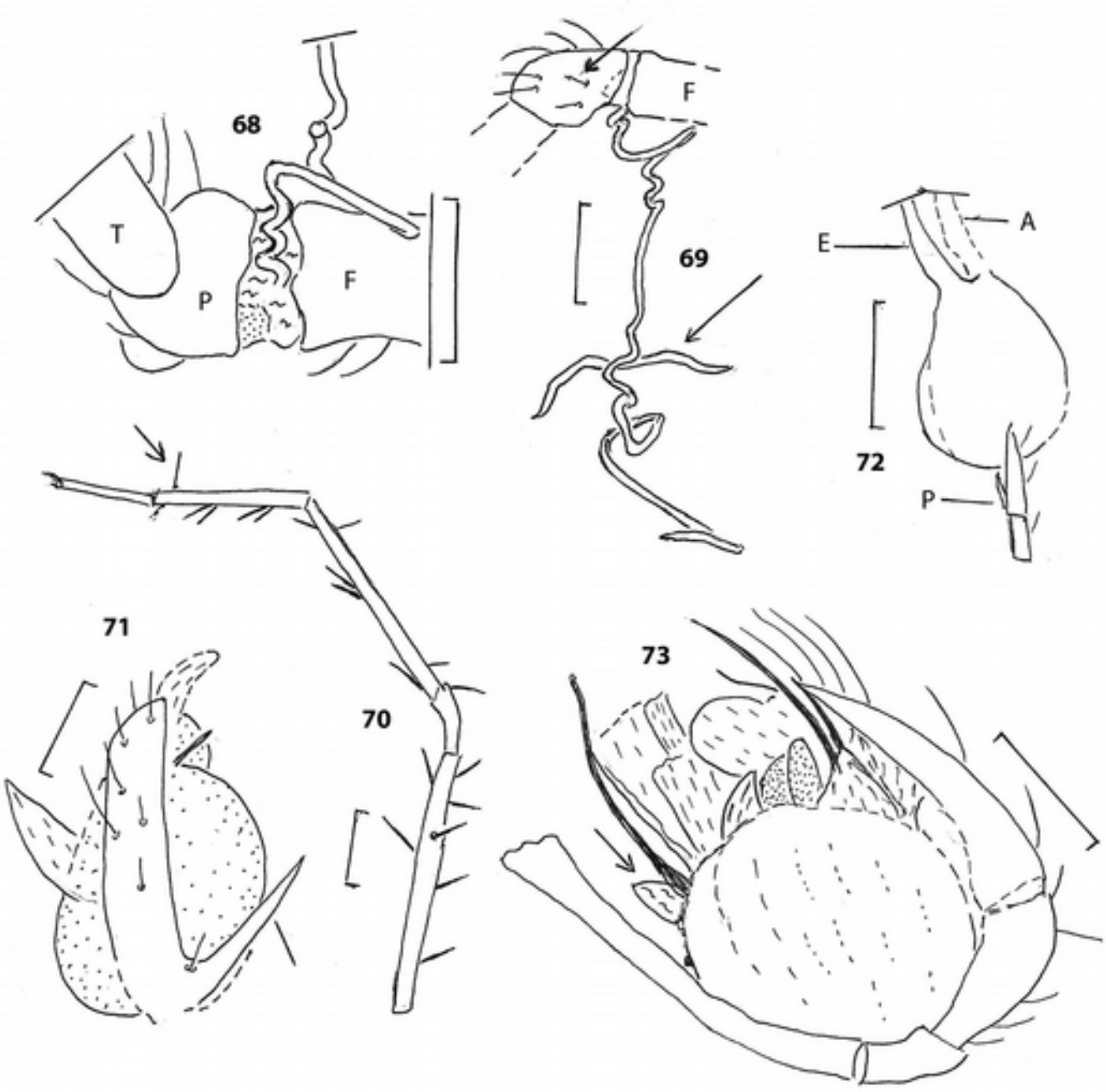


figs. 59-61: *Electroblemma spermaferens* **n. sp.**, Tetrablemmide, ♂; 59) ventral aspect of the fairly deformed anterior cheliceral outgrowths; 60) retrolateral aspect of the right pedipalpus. The femur has been thickened by the preservation, the arrow points to the bristle-bearing cymbial outgrowth. The bulbus - including questionable sperm in a reservoir - and the embolus are extraordinary well preserved in this pedipalpus; 61) retrolateral aspect of the left pedipalpus. Especially bulbus and embolus are distinctly deformed. - D = sperm duct, H = questionable remains of haemolymph within the tibia, M = margin of the questionable sperm reservoir, S = questionable sperm. Scales = 0.1;



figs. 62-65: *Procerclypeus deformans* **n. gen. n. sp**, Tetrablemmidae, ♂; 62) dorsal aspect of the anterior part of the deformed prosoma. Only few eye lenses are drawn; 63) dorsal aspect of the left femur II. Note the prolateral artefact (arrow). Only few hairs are drawn; 64) dorsal-apical aspect of the femur of the left pedipalpus. Note the strong retrolateral outgrowth and the granulations of the prolateral margin; 65) deformed left pedipalpus: Ventral aspect of the femur and dorsal aspect of the structures of the bulbus; the arrow points to the retrolaterl apophysis of the femur. - B = bulbus, C = cymbium, CL = deformed protruding clypeus, DB = strongly deformed part of the bulbus (it is not deformed in the right pedipalpus), F = femur, L = left clypeal "horn", S = s-shaped tegular apophysis. Scales: 0.2 in fig. 63, 0.1 in figs. 62, 64 and 65;

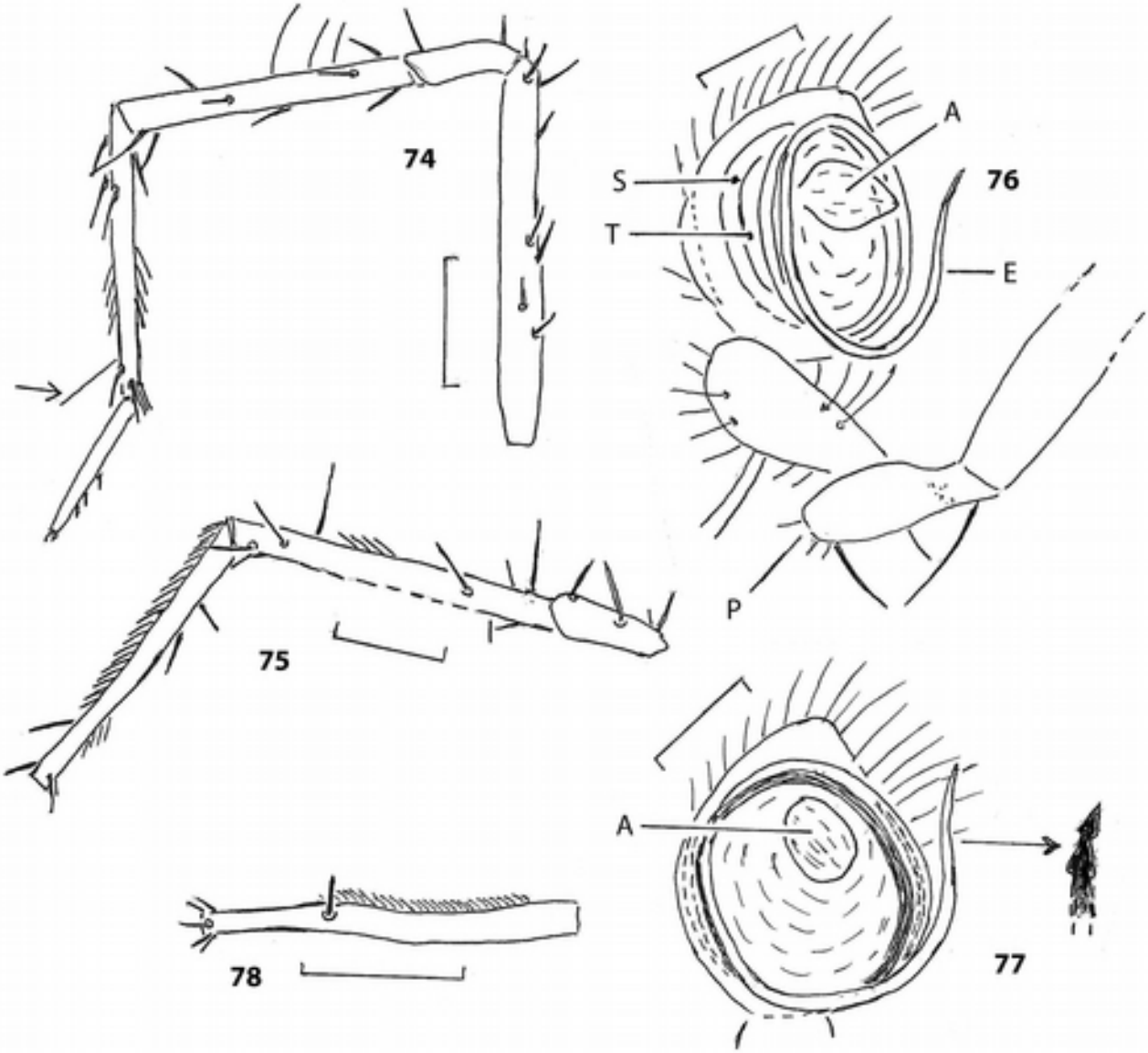
figs. 66-69: *Tenuicephalus penicillus* **n. gen. n. sp**., Tetrablemmidae, ♂; 66) dorsal aspect of the anterior part of the prosoma. The eye lenses are deformed; 67) retrolateral aspect of the deformed right pedipalpus. The bulbus is apparently expanded. Only few hairs are drawn; 68-69: hypha coming out from the intersegmental skin between femur and patella of the left leg II; 68) ventral aspect; 69) retrolateral aspect. The short arrow points to the patella, the long arrow points to the separate(ted?) hypha. Only few hairs are drawn. - C = questionable conductor, E = embolus, F = femur, P = patella, T = tibia, Y = cymbium. Scales = 0.1;



figs. 70-71: *Proaraneoides lanceatum* **n. sp**., Protoaraneoididae, ♂; 70) retrolateral aspect of the left leg I. The arrow points to the metatarsal trichobothrium. Some bristles – like the basal one on the patella – have been rubbed off; 71) dorsal aspect of the right pedipalpus; parts are hidden. - P = paracymbium. Scales 0.2 and 0.1;

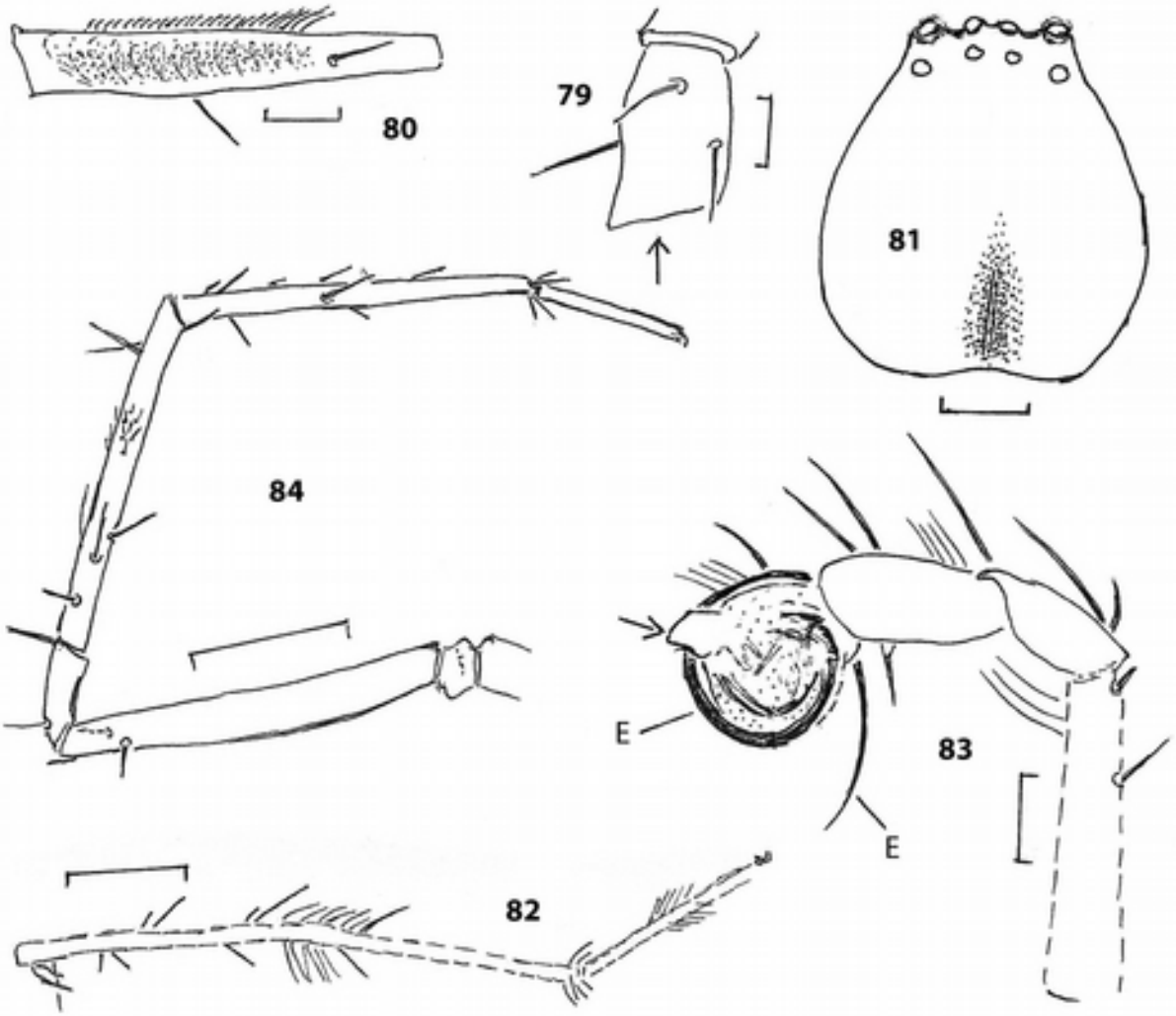
fig. 72) ?*Telemophila ovalis* **n. sp**., Telemidae, ♂, dorsal aspect of the right pedipalpus. The tip of the embolus is hidden. - A = questionable artefact, E = embolus, P = paracymbium. Note: the cymbium is longer than observable in the present aspect. Scale = 0.1;

fig. 73) *Palaeoleptoneta fissura* **n. sp**., Leptonetidae, ♂, prolateral aspect of the partly distinctly deformed right pedipalpus. The arrow points to a translucent tegular structure. - Scale = 0.2;



figs. 74-77: *Autotomiana brevisetosa* **n. sp**., Pholcochyroceridae, ♂; 74) mainly prodorsal aspect of the right leg III. Only few hairs are drawn. The arrow points to the long metatarsal trichobothrium. Three of the tibial trichobothria are drawn, only some of the long metatarsal hairs are drawn as well as three of the short ventral bristles of the pectunculus; 75) retrolateral aspect of the left patella, tibia and metatarsus IV. A ventral part of the tibia is hidden. Only few hairs and no trichobothria are drawn; 76) retroventral aspect of the right pedipalpus; 77) ventral aspect of the right pedipalpus. The arrow points to the enlarged distal part of the embolus. Only few hairs are drawn. - A = tegular apophysis, E = embolus, P = patellar outgrowth, S = subtegulum, T = tegulum. Scales: 0.5 in figs. 74-75, 0.2 in figs. 76-77;

fig. 78) *Autotomiana* indet., Pholcochyroceridae, ♀ F3615/BU/CJW, prolateral aspect of the right metatarsus IV which bears a calamistrum. - Scale = 0.2;



figs. 79-80: *Autotomiana* sp. indet, Pholcochyroceridae, ♀ F3616/BU/CJW; 79) dorsal aspect of the right patella IV in which the leg articles are lost beyond the patella by autotomy; 80) dorsal-basal (!) aspect of the left metatarsus IV. Note the long calamistrum and the large/long depression;

figs. 81-83: *Autotomiana* ?*hirsutipes* WUNDERLICH 2015, Pholcochyroceridae, ♂ F3563/BU/CJW; 81) dorsal aspect of the prosoma; 82) dorsal aspect of the distinctly deformed/shrunk right tarsus and metatarsus I. Probably not all metatarsal bristle are preserved or observable. Only few of the numerous dense hairs in two areas are drawn; 83) retrolateral aspect of the deformed and darkened left pedipalpus. The arrow points to an unsure structure. Only few hairs are drawn. - E = embolus. Scales: 2.0 in fig. 82, 1.0 in figs. 81 and 83;

figs. 84-85: *Spinicreber* sp. indet., Pholcochyroceridae, ♂ F3613/BU/CJW; 84) retrolateral aspect of the right leg I. Some bristles may be hidden or broken off. Only very few hairs are drawn (on the tibia); 85) retrolateral aspect of the slightly deformed right pedipalpus. Only few hairs are drawn. - S = slender tegular apophysis, ST = subtegulum, U = u-shaped tegular apophysis. Scales 1.0 and 0.2;

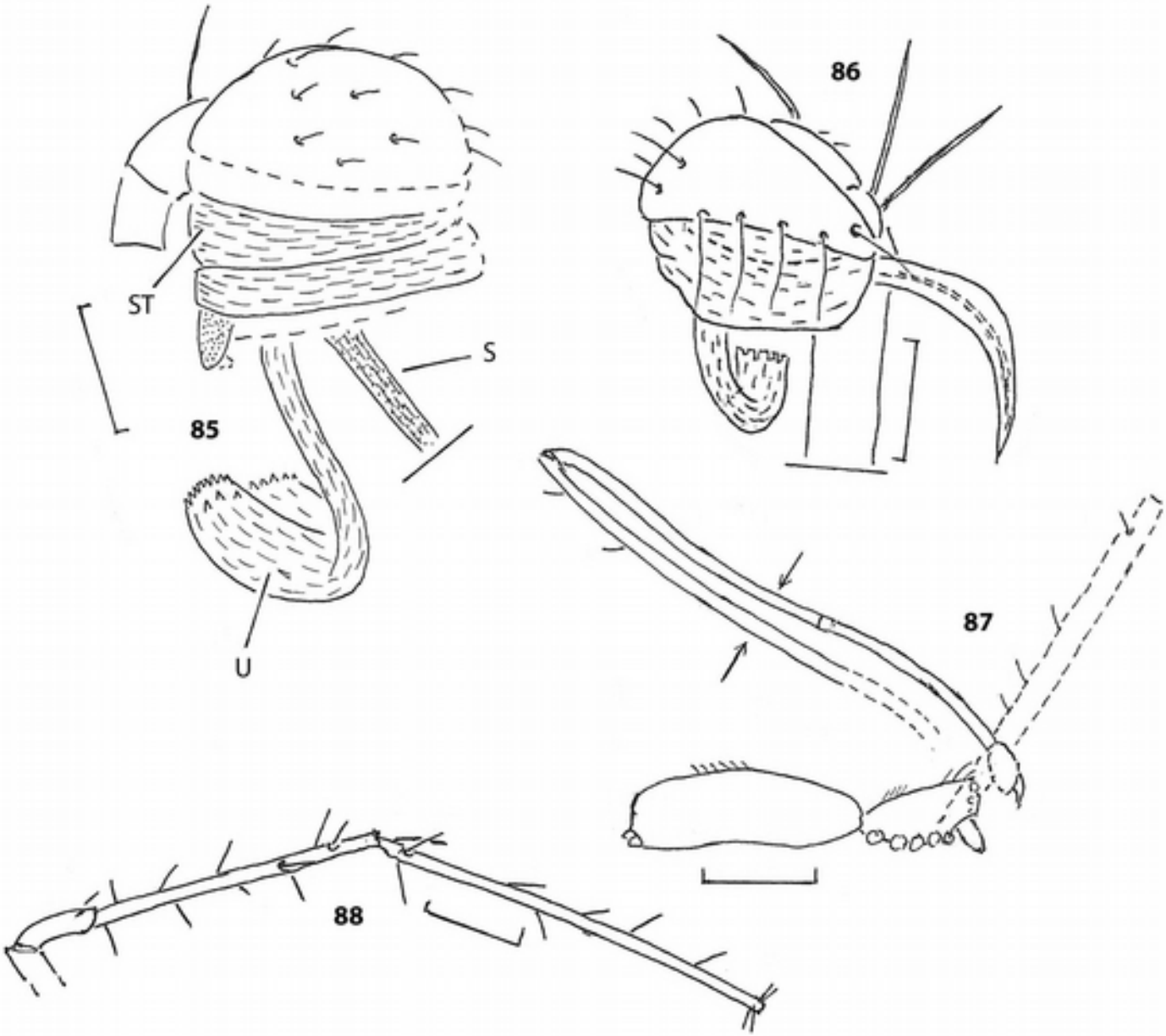
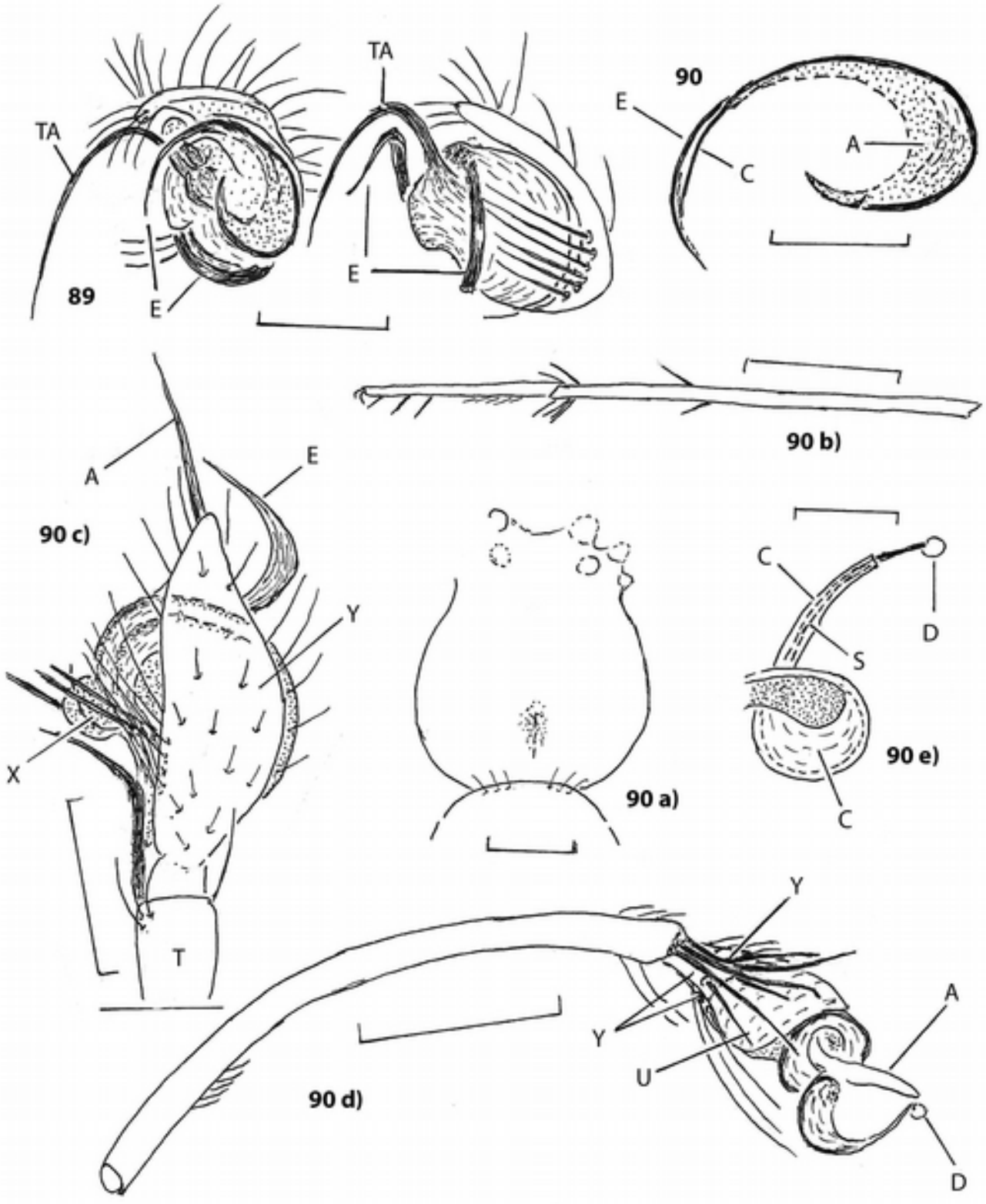
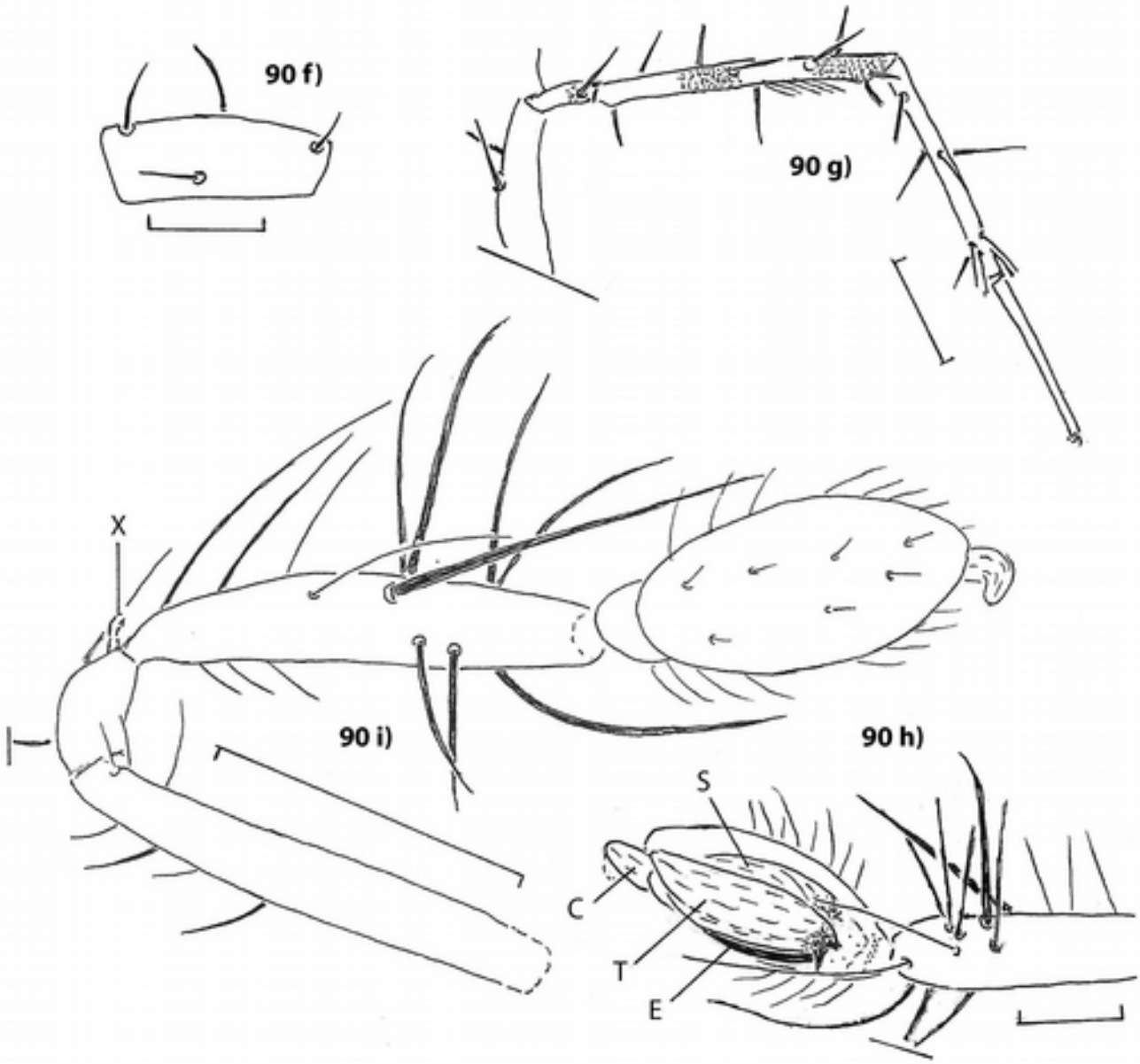


fig. 86) *Spinicreber vacuus* WUNDERLICH 2018, Pholcochyroceridae, ♂ (holotype), dorsal aspect of the right pedipalpus. - Scale = 0.2;

fig. 87-90: *Longissipalpus impudicus* **n. sp**., Mongolarachnidae, ♂; 87) lateral aspect of the body, the right pedipalpus (arrows; its basal part is hidden) and the left femur I (dotted). The small ventral circles of the prosoma represent the bases of the right legs and the pedipalpus. Note the backwards directed and “folded” position of the extremely long pedipalpal articles and the quite small cymbium and bulbus; 88) prolateral aspect of the left patella, tibia and metatarsus I; 89) ventral-frontal aspect of the right pedipalpus and retroventral aspect of the left pedipalpus in their natural position. Not all hairs are drawn; 90) retroapical aspect of embolus and conductor of the right pedipalpus. - A = questionable artefact and/or seam of the embolus, C = conductor, E = embolus, TA = tegular apophysis. Scales: 1.0 in figs. 87-88, 0.2 in fig. 89 and 0.1 in fig. 90;



figs. 90a-e: *Longissipalpus cochlea* **n. sp**., Pholcochyroceridae, ♂; a) dorsal aspect of the pro soma. The eye lenses are deformed or hidden; b) proventral aspect of the right tarsus and



metatarsus IV; c) dorsal aspect of the left pedipalpus. In this position three cymbial bristles and a single large retroapical bristle of the tibia are observable: d) retrolateral aspect of the right pedipalpus. Only few hairs are drawn; e) retrodorsal aspect of embolus and conductor of the right pedipalpus. - A = tegular apophysis C = conductor, D = droplet of secretion at the tip of the embolus, E = embolus, S = sperm duct, X = artefact, Y = cymbium. Scales: 1.0 in fig. b), 0.5 in a) and d), 0.2 in c) and 0.1 in e);

figs. 90f-i: *Kachinarachne oblonga* **n. gen. n. sp.**, Pholcochyroceridae, ♂; f) retrodorsal aspect of the left patella I which bears 4 thin bristles; g) prolateral aspect of the right leg IV. Note the tibial annulation; h) retrolateral aspect of the left pedipalpus; i) prolateral/dorsal aspect of the left pedipalpus. - C = questionable conductor, E = questionable embolus, S = subtegulum, T = tegular apophysis, X = possible artefact. Scales: 0.5 in g) and i), 0.2 in f) and h);

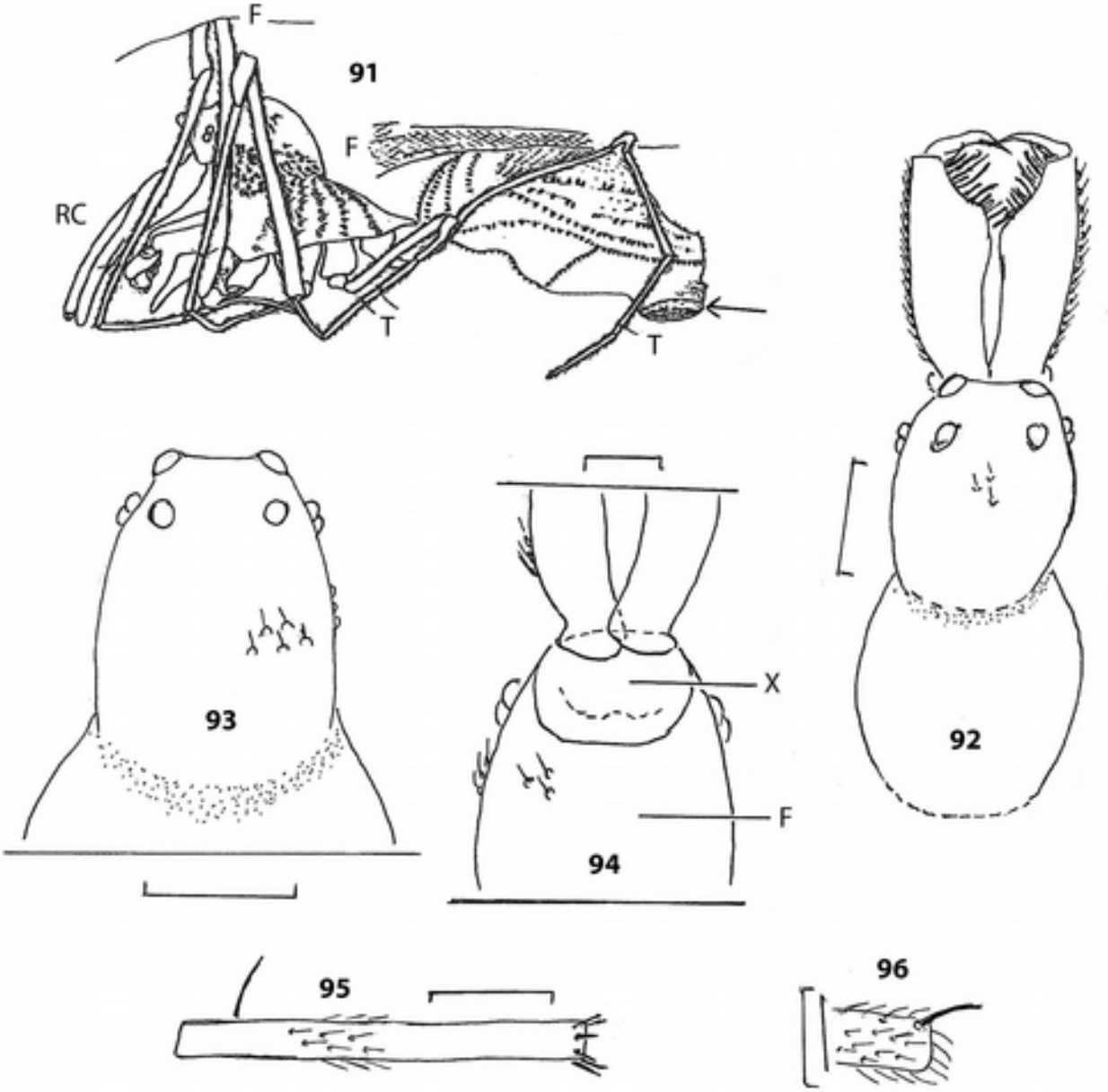


fig. 91) *Burmesarchaea grimaldii* (PENNEY 2003), Archaeidae, ♂, lateral aspect of the spider. The opisthosoma is distinctly deformed. The arrow points to the sclerotized ring around the spinnerets. - T = trichobothrium. Taken from PENNEY (2003);

figs. 92-98: *Spiniarchaea aberrans* **n. gen. n. sp**., Archaeidae, ♂; 92) dorsal aspect of the prosoma. The chelicerae are stretched foreward in an unnatural position caused by the preservation; 93) dorsal and slightly posterior aspect of the cephalic part. Only few of the hair-bearing pustules are drawn and fairly enlarged; 94) ventral aspect of the cephalic part and basal part of the chelicerae in an unnatural position (see fig. 93); 95) prodorsal-apical aspect of the left metatarsus IV; 96) dorsal aspect of the distal part of the left femur I showing the retroapical bristle; 97) retroventral aspect of the partly deformed right pedipalpus. Only few hairs are drawn; 98) prolateral aspect of the right pedipalpus. The thin arrows point to the tibial trichobothria, the thick arrow points to the enlarged toothed tegular apophysis. - B = strong apical tibial bristles, E = questionable embolus, F = foramen, T = basal tegular apophysis, X = torn area. Scales: 1.0 in fig. 98, 0.5 in figs. 92-93, 0.2 in figs. 94-97;

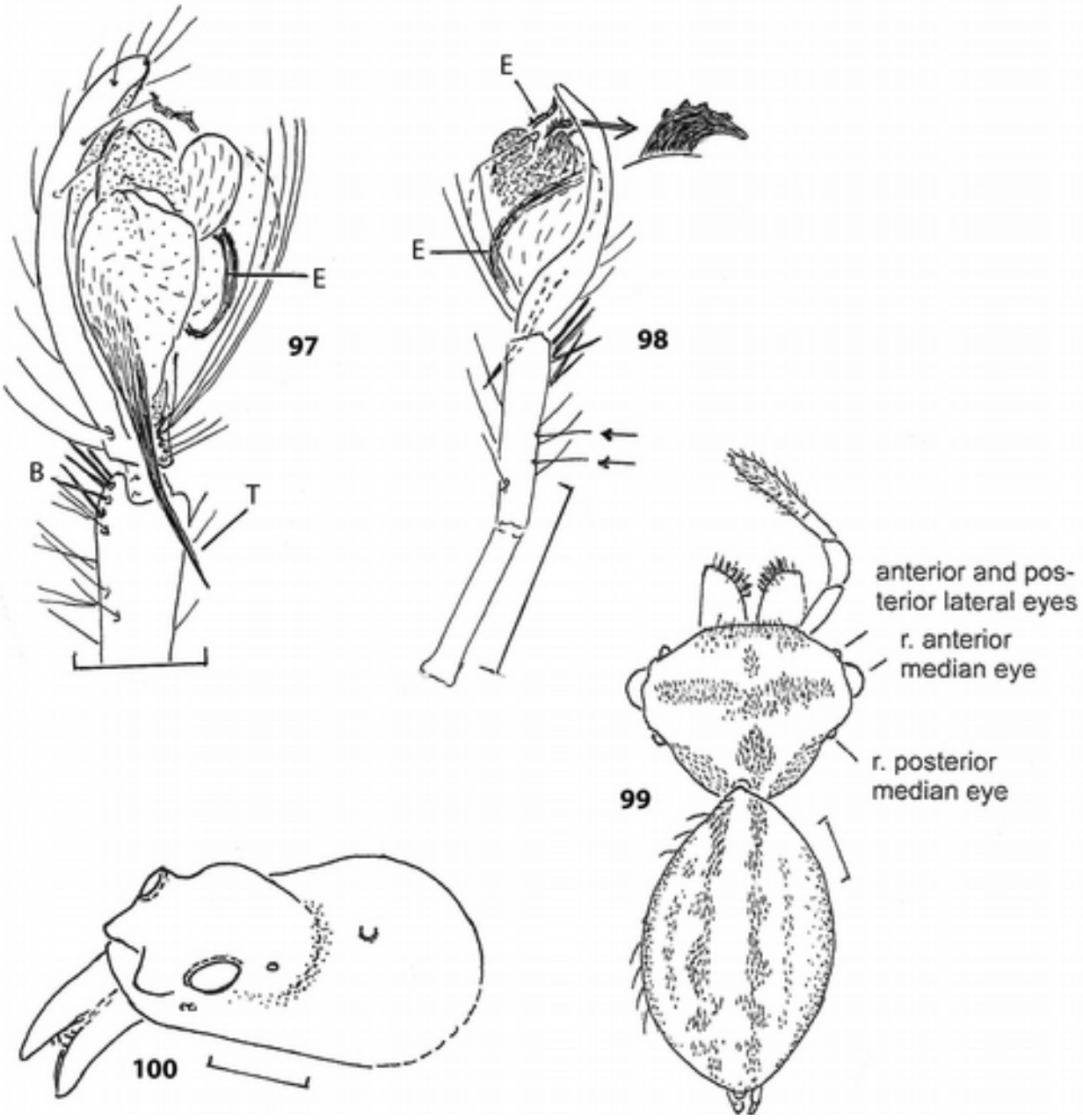
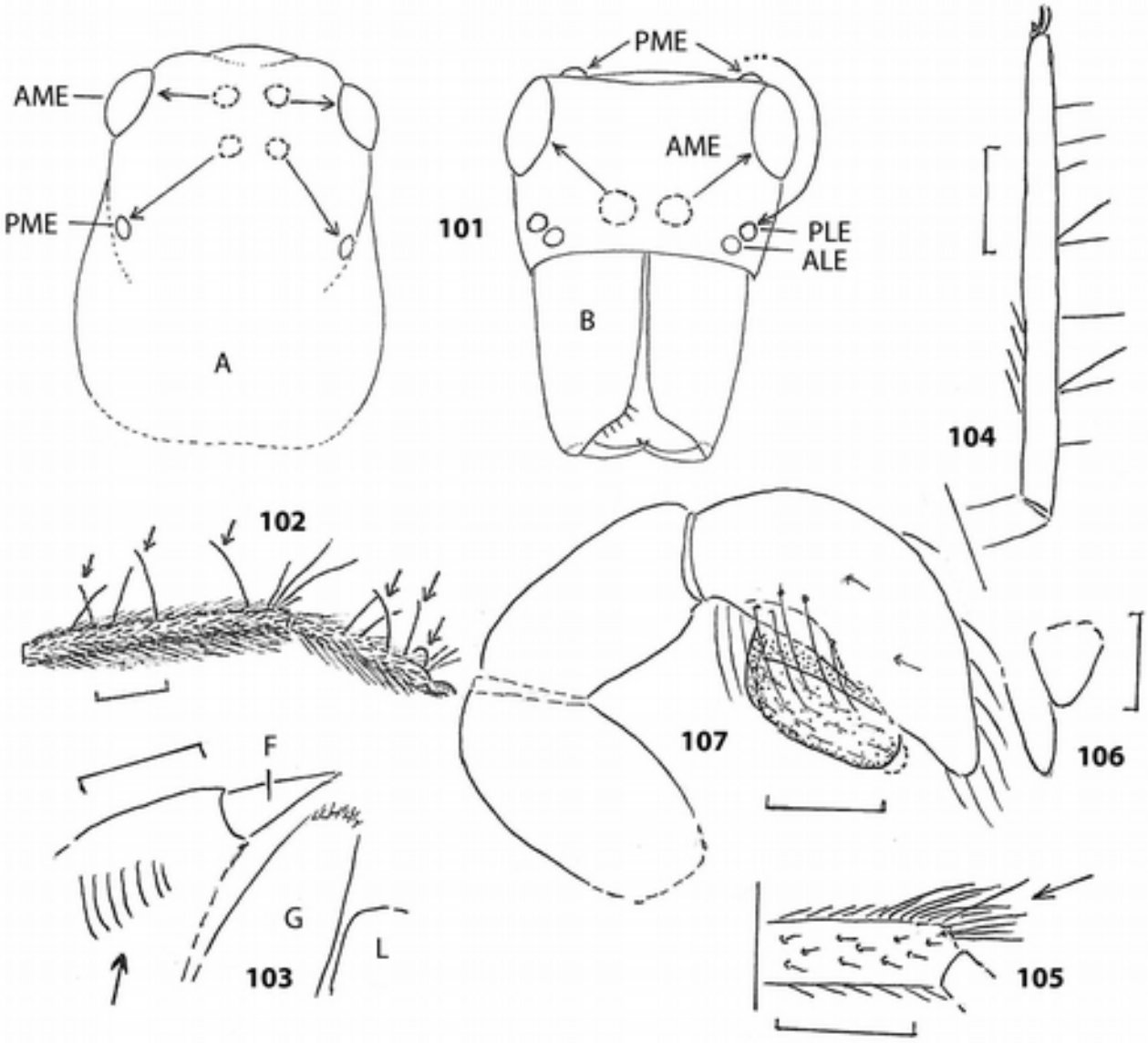


fig. 99) *Picturmegops signatus* WUNDERLICH 2015, Lagonomegopidae, ♀, dorsal aspect of the body and the right pedipalpus. - Scale = 0.5;

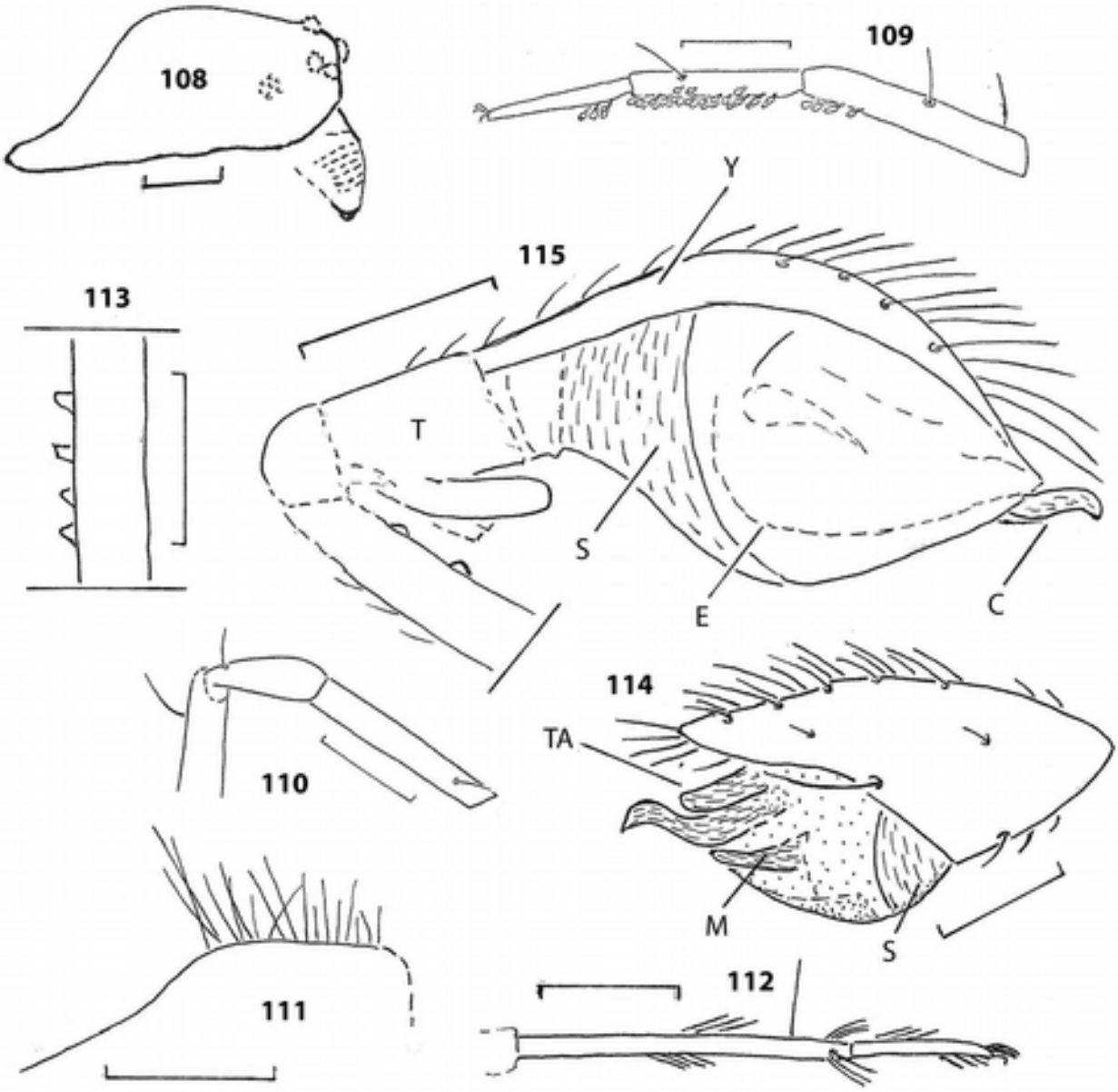
fig. 100) ?*Paxillomegops cornutus* WUNDERLICH 2017, Lagonomegopidae, ♂, dorsal anterior-left aspect of the prosoma. - Scale = 0.5;



figs. 101 A - B: The - in my opinion - likely translocation of the eyes of the hypothetical precursor of a lagonomegopid spider (dotted) towards a Cretaceous member of the family Lagonomegopidae; (A) dorsal and (B) anterior aspects. In fig. B the hypothetical position of the PLEs is not shown, they are hidden. - ALE = anterior lateral eyes, AME = anterior median eyes, PLE = posterior lateral eyes, PME = posterior median eyes. Taken from WUNDERLICH (2015: 240). - Note: Following the opinion of GUO et al. (2020) and PARK et al. (2019) the anterior median eyes of the present figs. should actually represent the posterior median eyes (and the anterior lateral eyes should actually represent the anterior median eyes!?);

fig. 102) *Picturmegops signatus* WUNDERLICH 2015, Lagonomegopidae, ♀, prolateral aspect of the left metatarsus and tarsus I. The arrows point to the trichobothria. - Scale = 0.5;

figs. 103-107: *Palaeozearchaea depressa* **n. gen. n. sp.**, Mecysmaucheniidae, ♂ (holotype); 103) ventral aspect of the right chelicera, gnathocoxa and labium. The arrow points to the retrolateral cheliceral stridulatory files; 104) prodorsal aspect of the left tarsus I. Note the long dorsal sensory hairs which - according to their shape – are in my opinion not trichobothria. Only few ventral normal hairs are drawn; 105) prolateral aspect of the distal aspect of the left metatarsus II. The arrow points to the weak apical-dorsal hair brush; 106) outline of the left anterior and posterior spinnerets; 107) prolateral aspect of the left pedipalpus. Only few hairs are drawn. - F = fang, G = gnathocoxa, L = labium. Scales: 0.05 in fig. 106, 0.1 in the remainings;



figs. 108-110: *Micropalpimanus poinari* WUNDERLICH 2008, Micropalpimanidae, ♂ (holotype); 108) lateral aspect of the prosoma; 109) prolateral aspect of the right leg II; 110) prolateral aspect of the left tibia, patella and the distal part of the femur I. Note the three quite thin bristles. - Scapes = .2;

figs. 111-115: *Micropalpimanus gibber* **n. sp**., Micropalpimanidae, ♂ (holotype); 111) dorsal part of the prosoma. Not all hairs and no eyes are drawn; 112) retrolateral aspect of tarsus and metatarsus of the right leg IV. Only few hairs are drawn; 113) ventral aspect of the middle part of the right pedipalpal femur showing four deformed stridulatory teeth, 114) prolateral aspect of the right pedipalpal cymbium and bulbus; 115) retroventral aspect of the right pedipalpus. Most parts of the bulbus and of the questionable embolus are hidden by an emulsion. Only few hairs are drawn. - C = conductor, E = questionable embolus, S = subtegulum M = median apophysis, T = tibia, TA = terminal tegular apophysis, Y = cymbium. Scales 0.2 in figs. 111-112 and 0.1 in figs. 113-115;

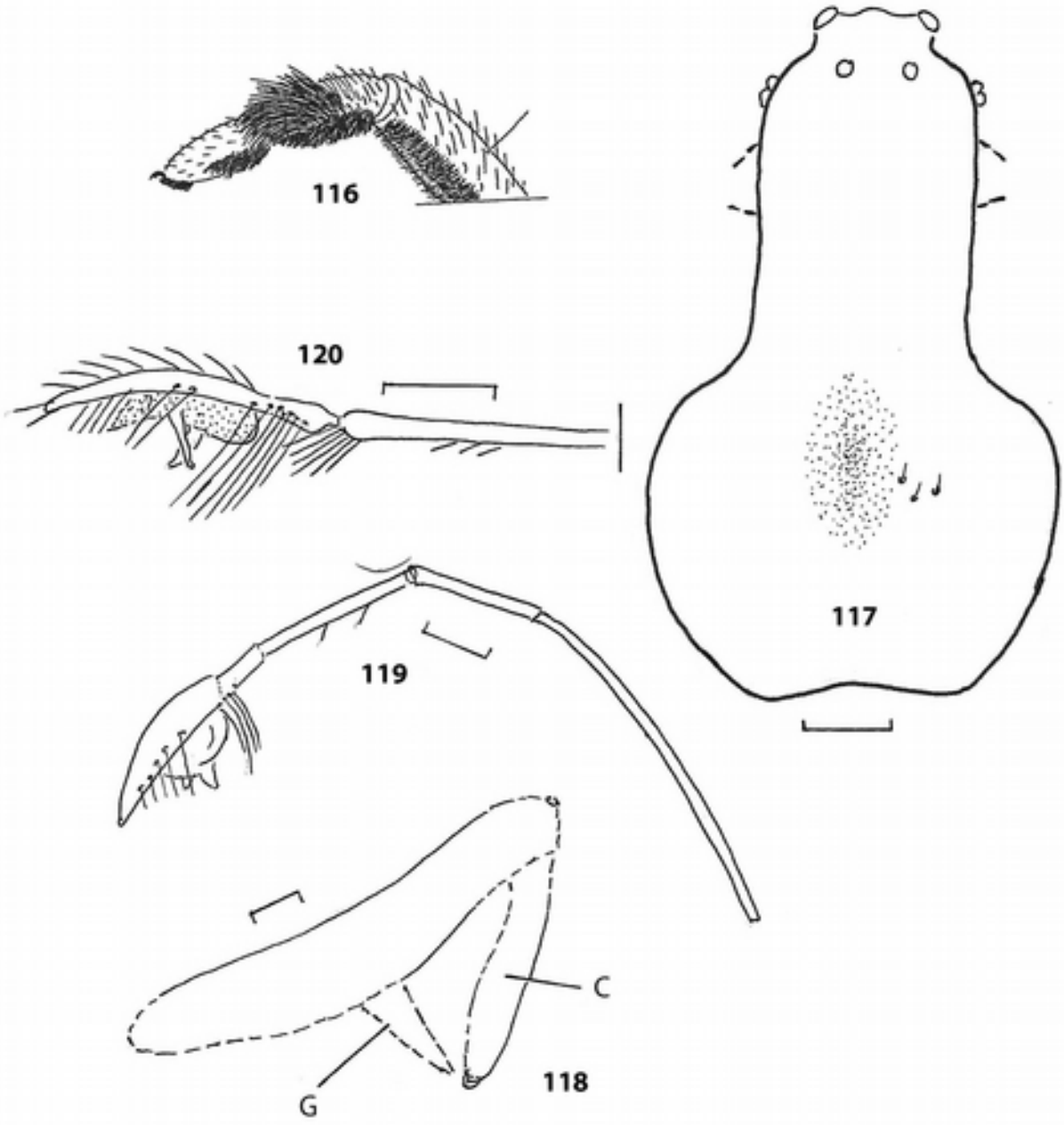
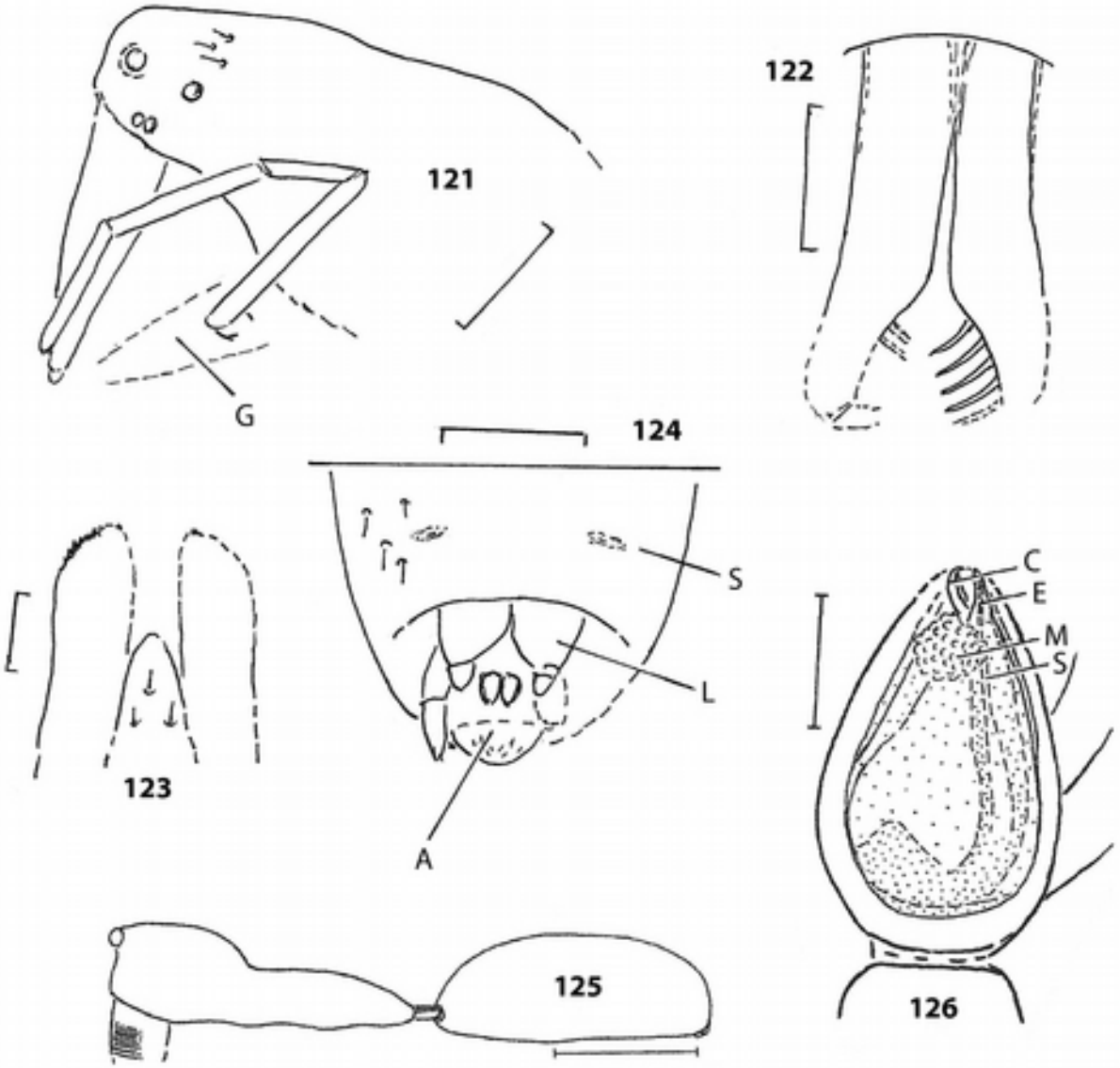


fig. 116) *Palpimanus* sp., Palpimanidae, extant (Europe), ♂, prolateral aspect of the distal articles of the right leg I. Note the extremely dense hairs;

figs. 117-120: *Planarchaea incompleta* **n. sp**., Planarchaeidae **n. fam**.; ♂, 117) dorsal aspect of the prosoma; 118) lateral aspect of the prosoma, outline. Most eyes are hidden by the muddy amber; 119) prolateral aspect of the right pedipalpus. Parts of the bulbus are hidden. Only few hairs are drawn; 120) retrolateral aspect of the left pedipalpus. - C = chelicera, G = gnathocoxa. Scales = 0.2;



figs. 121-124: *Platythelae longicorpus* **n. gen n. sp**., Planarchaeidae **n. fam**., ♀; 121) retrodorsal aspect of the deformed and partly hidden prosoma; 122) anterior aspect of the chelicerae which are partly hidden; 123) ventral aspect of gnathocoxae and labium which are partly hidden; 124) ventral aspect of the posterior part of the opisthosoma. The left posterior spinneret is strongly deformed and apparently incomplete. Only few hairs are drawn. - A = anal tubercle, G = gnathocoxa, L = left anterior spinneret, S = questionable left spiracle. Scales: 0.5 in fig. 121 and 124, 0.4 in fig. 122, 0.2 in fig. 123;

figs. 125-126: *Spatiator martensi* WUNDERLICH 2006, Spatiatoridae, Baltic amber (Eocene) ♂; 125) lateral aspect of the body. Only a single eye is drawn; 126) ventral aspect of the right pedipalpus. - Scales = 1.0 and 0.2;

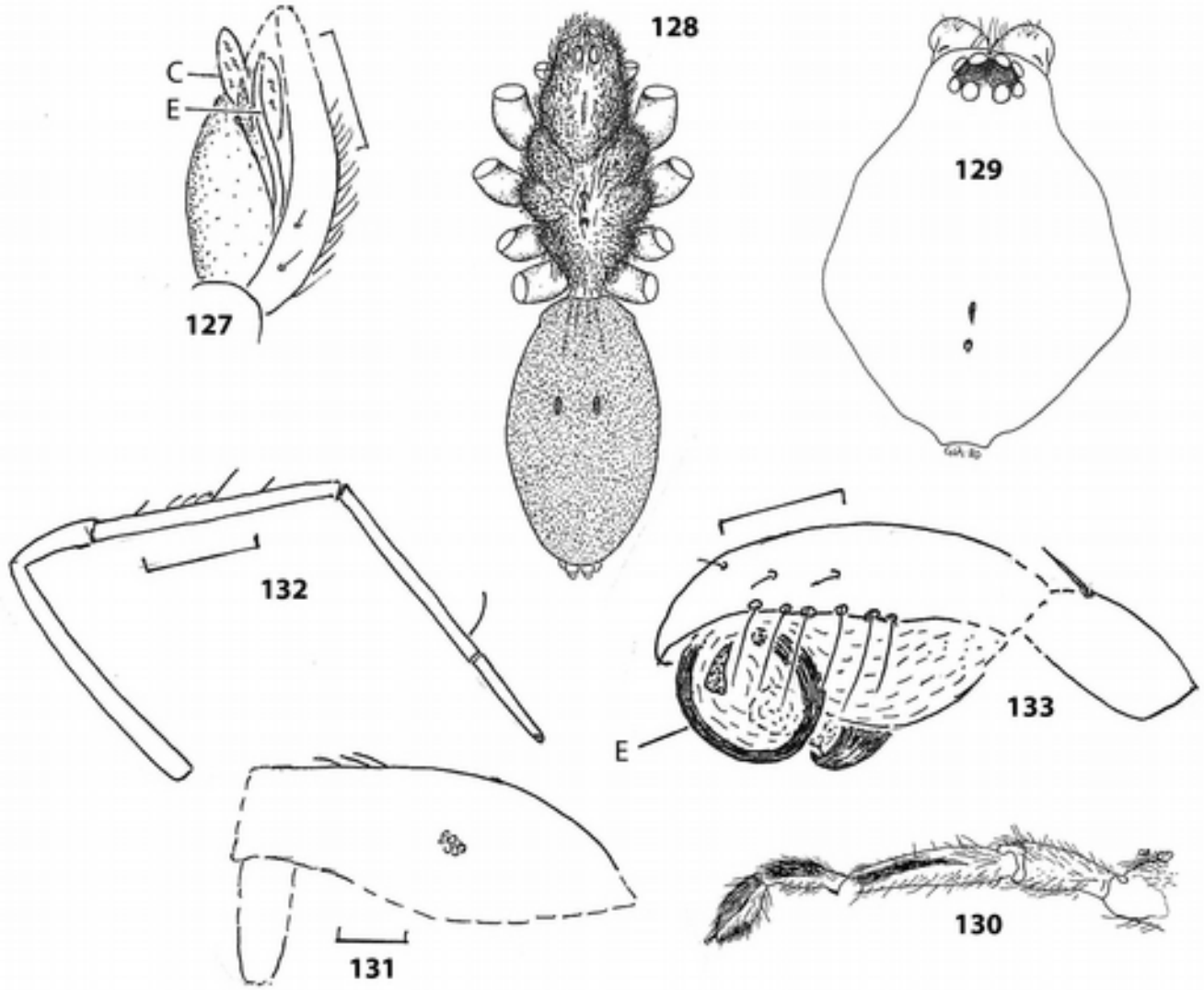


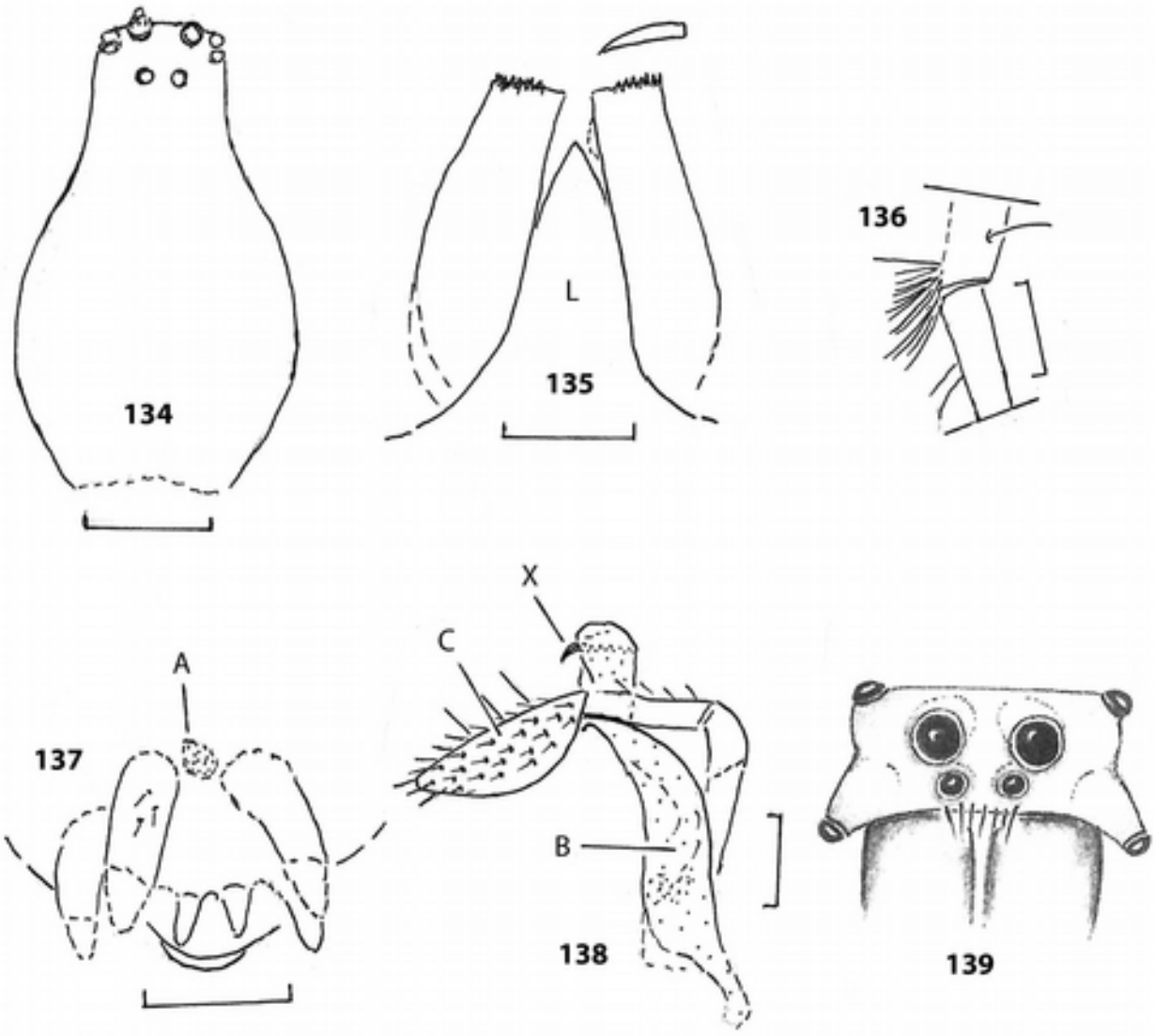
fig. 127) *Spatiator putescens* WUNDERLICH 2015, Spatiatoridae, ♂, retrolateral aspect of the left pedipalpus. - C = conductor, E = embolus. Scale = 0.2;

fig. 128) *Stenochilus* sp., Stenochilidae, extant, ♀, dorsal aspect of the body. - Taken from JOCQUE & DIPPENAAR-SCHOEMAN (2007);

fig. 129) *Colopea* sp., Stenochilidae, extant (New Guinea), ♀, dorsal aspect of the prosoma. Note the bipartite thoracic fissure. - Taken from LEHTINEN (1982);

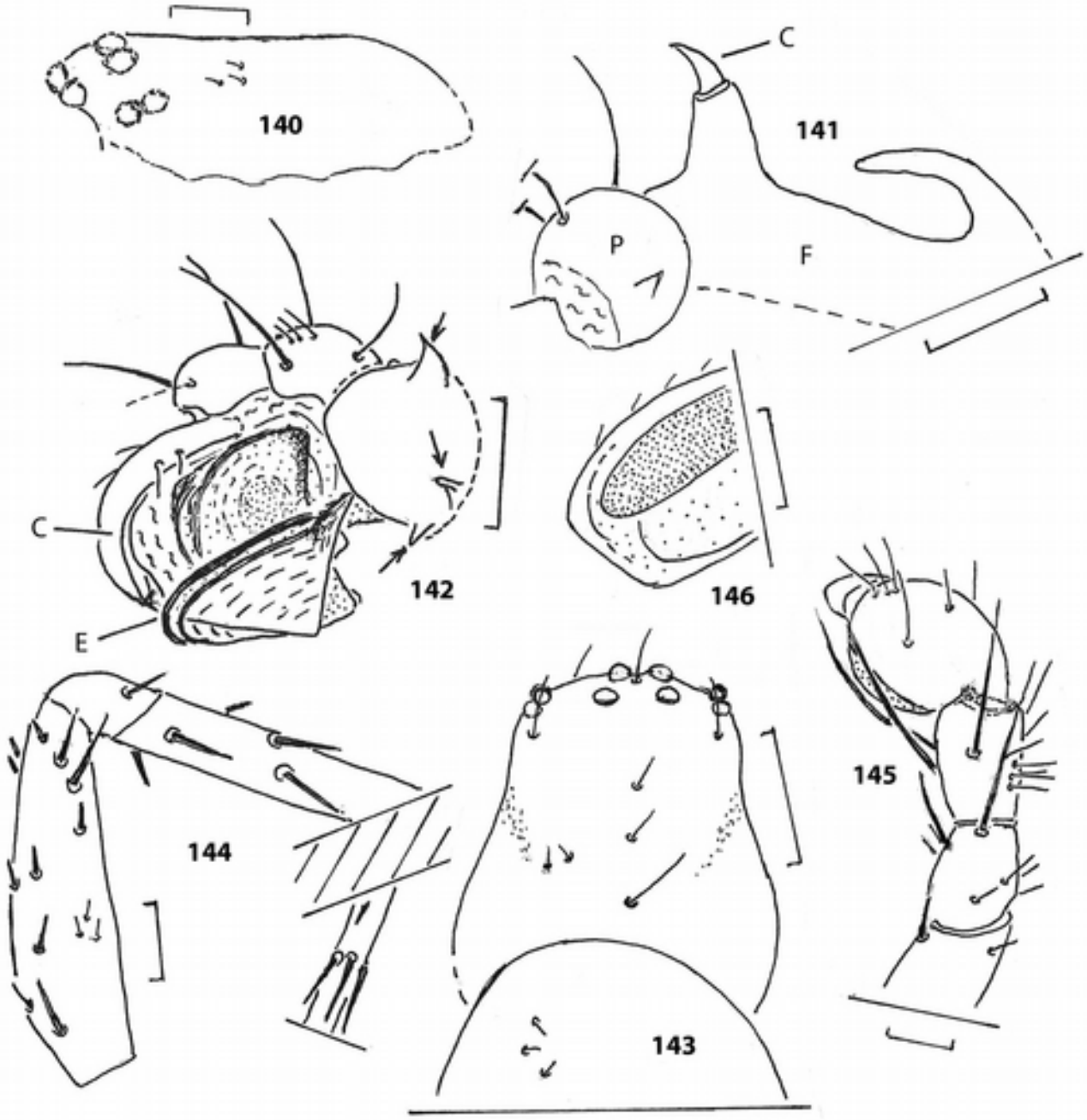
fig. 130) *Colopea* sp., Stenochilidae, extant, ♂, prolateral aspect of the right leg I. - Taken from LEHTINEN (1982);

figs. 131-133: *Praetervetiator circulus*. **n. gen. n. sp**., Vetiatoridae, ♂; 131) outline of the prosoma, lateral aspect. Parts like the eyes are hidden. Only few hairs and granules are drawn; 132) retrolateral aspect of the right leg II. Note the long metatarsal trichobothrium. The tibia bears at least a single longer trichobothrium; 133) retrolateral and slightly apical aspect of the left pedipalpus. - E = embolus. Scales: 0.5 in fig. 132, 0.1 in figs. 131 and 133;



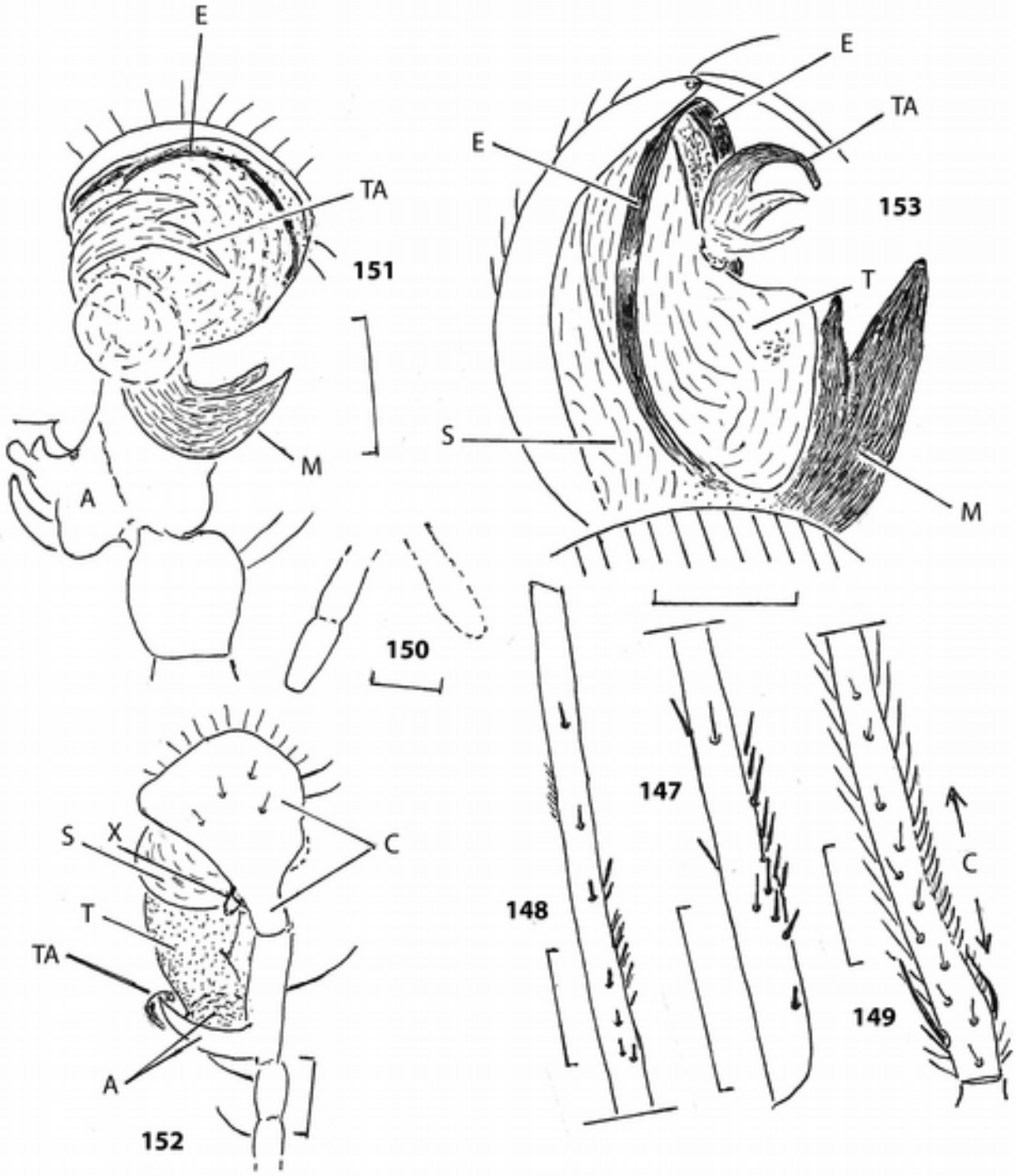
figs. 134-138: *Procervetiator fruticosus* **n. gen. n. sp.**, Vetiatoridae, ♂; 134) dorsal aspect of the prosoma. Some eyes are deformed; 135) ventral aspect of the deformed labium, gnathocoxae and the left fang; 136) dorsal aspect of the distal part of the left metatarsus which bears a proapical brush of hairs, and the basal part of the tarsus of leg I. Normal hairs are not drawn; 137) ventral aspect of the deformed spinnerets. Their articulation is partly hidden; 138) retrolateral aspect of the left pedipalpus which bulbus is strongly deformed in an unnatural position. - A = questionable artefact, B = bulbus, C = cymbium, L = labium, X = claw-shaped structure. Scales: 0.2 in fig. 134, 0.1 in the remaining figs.;

fig. 139) *Menneus* sp., Deinopidae, extant, anterior aspect of the prosoma. - Taken from JOCQUE & DIPPENAAR-SCHOEMAN (2007);

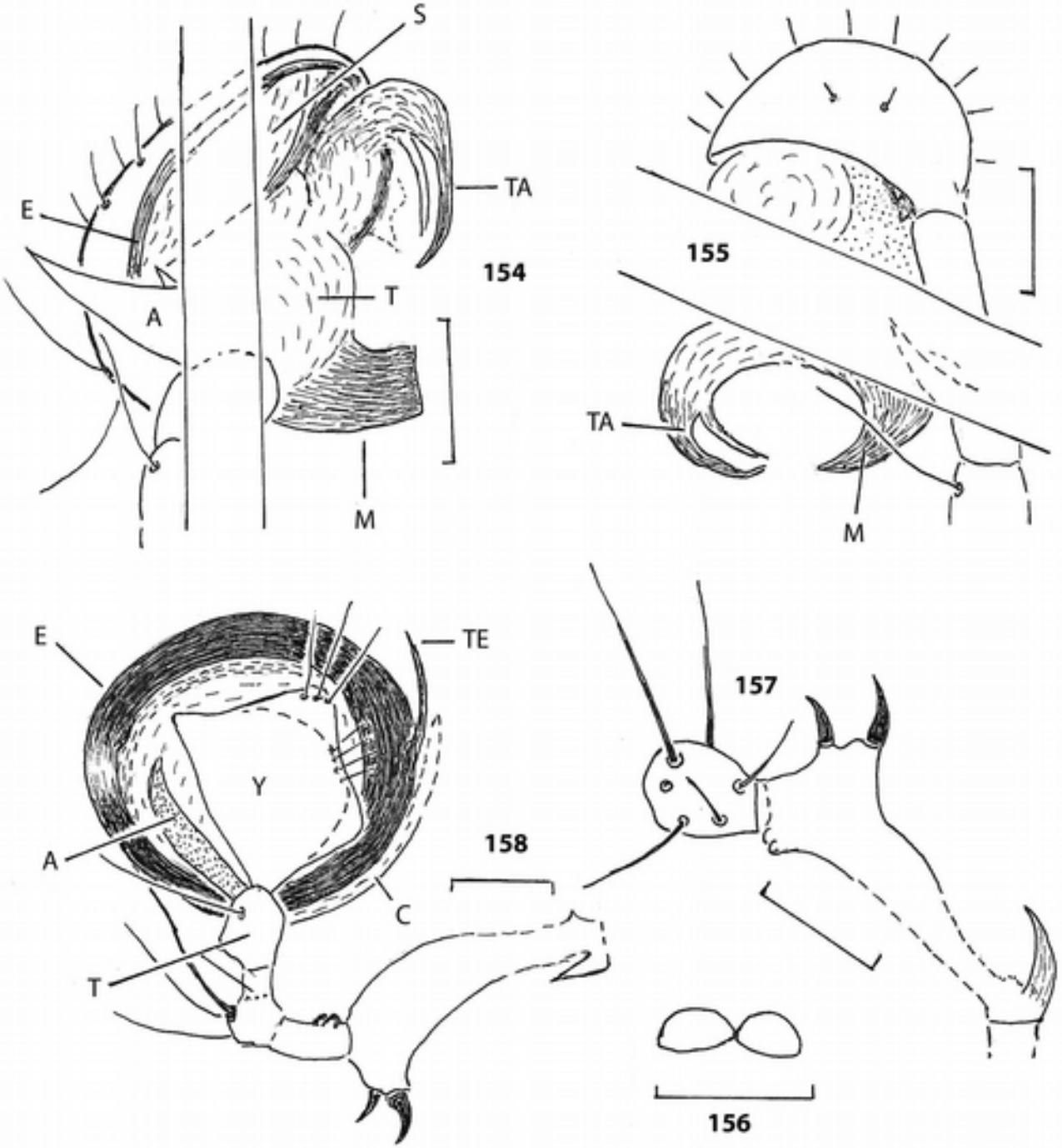


figs.140-142: *Alteruloborus araneoides* WUNDERLICH 2018, Alteruloboridae (Deinopoidea), ♂ (holotype); 140) lateral aspect of the prosoma; 141) retrolateral aspect of the left pedipalpal femur and patella; 142) retrolateral aspect of the left pedipalpus. The arrows point to the petallar apophyses. - C = claw, E = embolus, F = femur, P = patella. Scales: 0.2 in fig. 140, 0.1 in figs. 141-142;

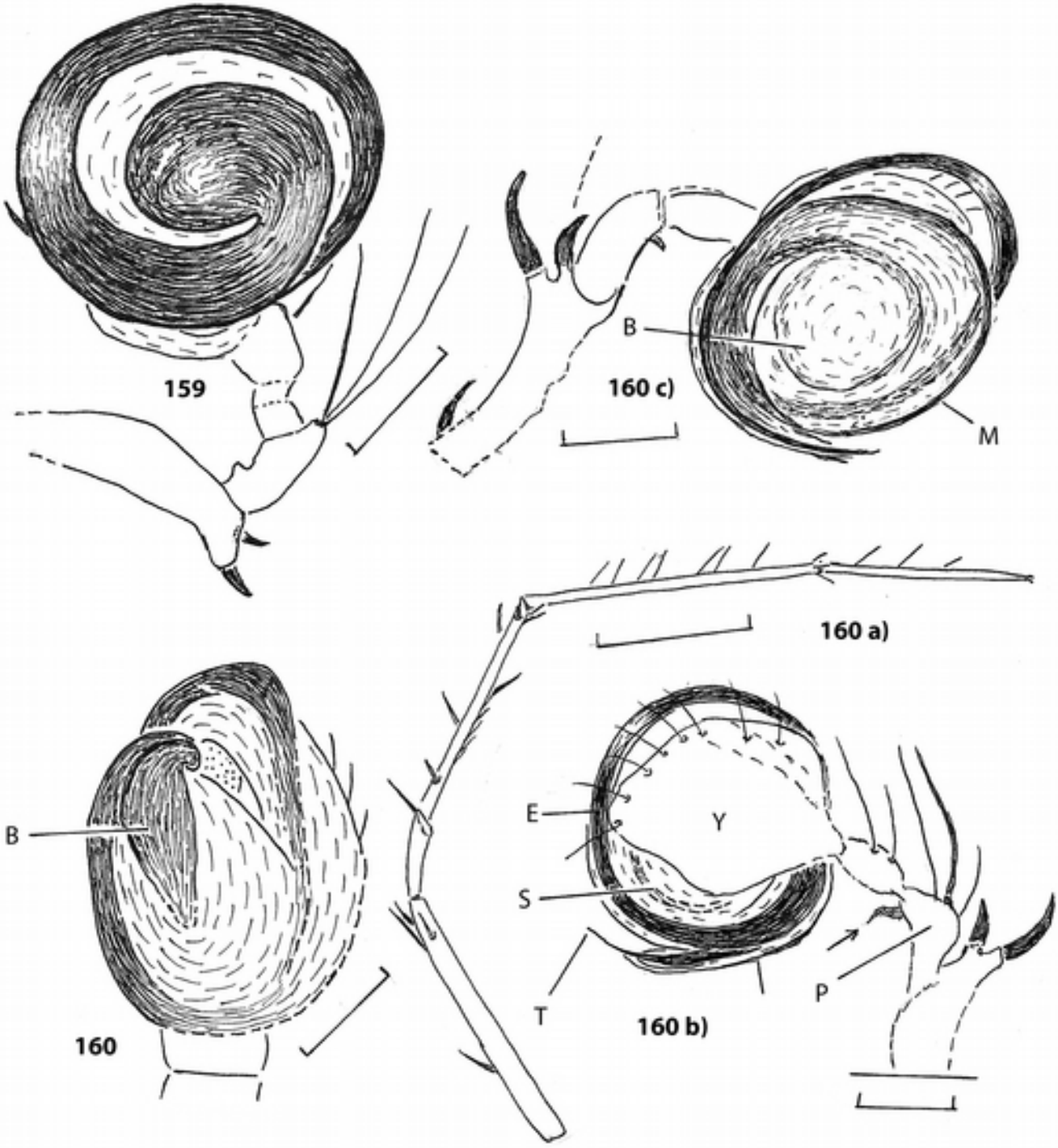
figs. 143-146: *Crassicephalus parvibulbus* **n. gen. n. sp.**, Crassicephalidae **n. fam**. (Deinopoidea), ♂; 143) dorsal aspect of the prosoma which is basally hidden by the opisthosoma; 144) oblique dorsal (femur more apical) aspect of the left leg I. Parts are hidden. Only three of the indistinct hairs are drawn. Some of the strong bristles are probably hidden in this position of the leg; 145) dorsal aspect of the right pedipalpus. Note the dense erect retrolateral trichobothria-like sensory hairs of the tibia; 146) ventral aspect of the basal part of the right pedipalpus which is difficult to observe; the distal part is hidden. - Scales: 1.0, 0.5, 0.2 and 0.2;



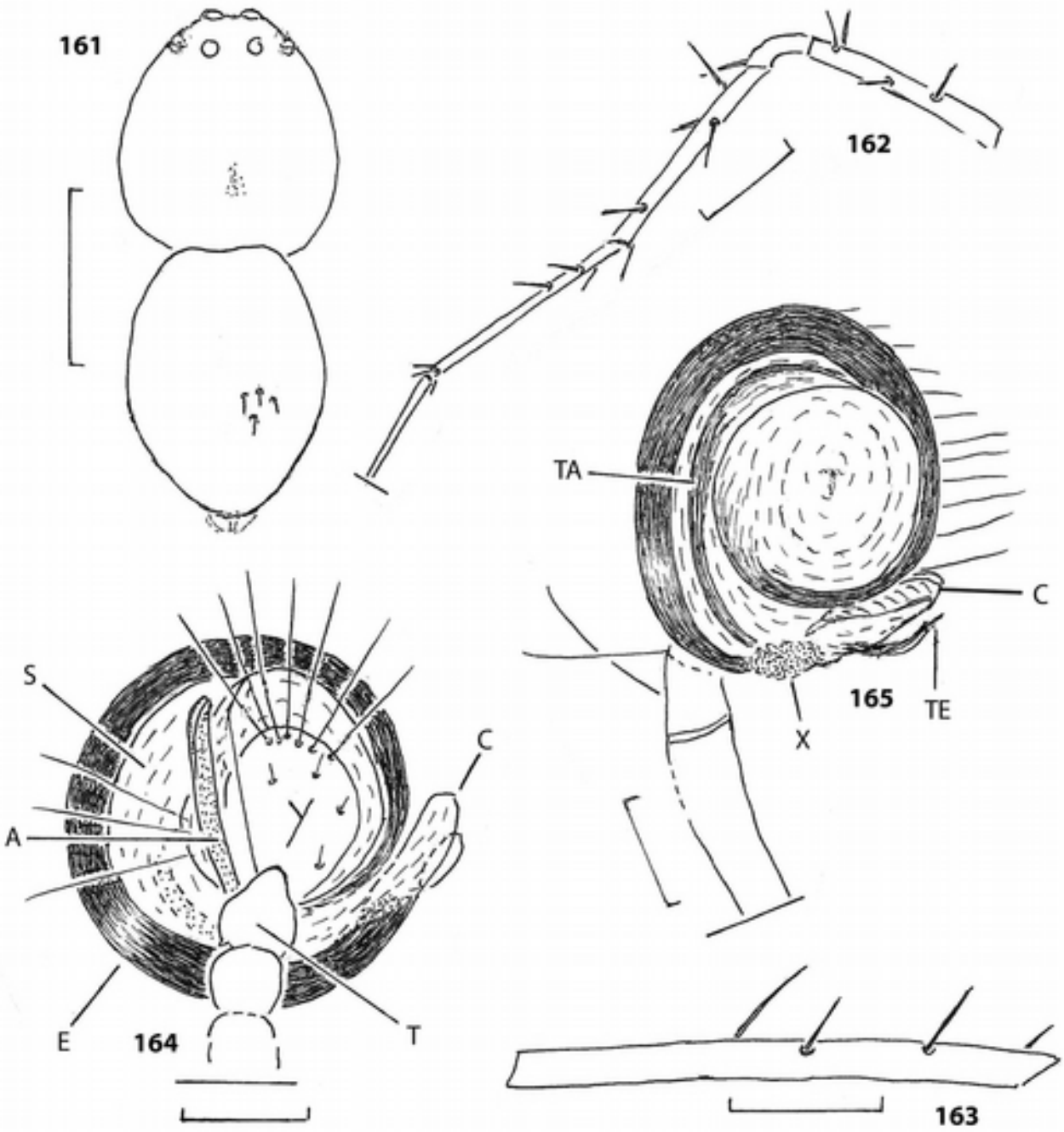
figs.147-155: *Dubiodeinopsis spinifemora* **n. gen. n. sp.**, Dubiodeinopsidae **n. fam.**, ♂ ; 147) retrolateral aspect of the basal third of the right femur I; 148) prolateral aspect of the left femur I. Note the numerous short bristles. Only few hairs are drawn; 149) prodorsal aspect of the basal part of the right metatarsus IV. Note the bent short hairs of the calamistrum; 150) outline of the badly preserved posterior spinnerets, ventral aspect; 151) retrobasal and slightly apical aspect of the right pedipalpus; 152) dorsal aspect of the partly deformed left pedipalpus which bulbus may be partly expanded; 153) retrolateral aspect of the right pedipalpus which basal part is hidden; 154) retrodorsal and slightly basal aspect of the right pedipalpus which is partly hidden by the right femur II; 155) retrobasal aspect of the left pedipalpus which is partly hidden by the right femur I. The tibial apophysis (dotted) is hidden. - A = tibial apophysis, C = calamistrum, E = embolus, M = median apophysis, S = subtegulum, T = tegulum, TA = tegular apophysis. Scales: 1.0 in figs. 147-149, 0.2 in figs. 151-155, 0.1 in fig. 150;



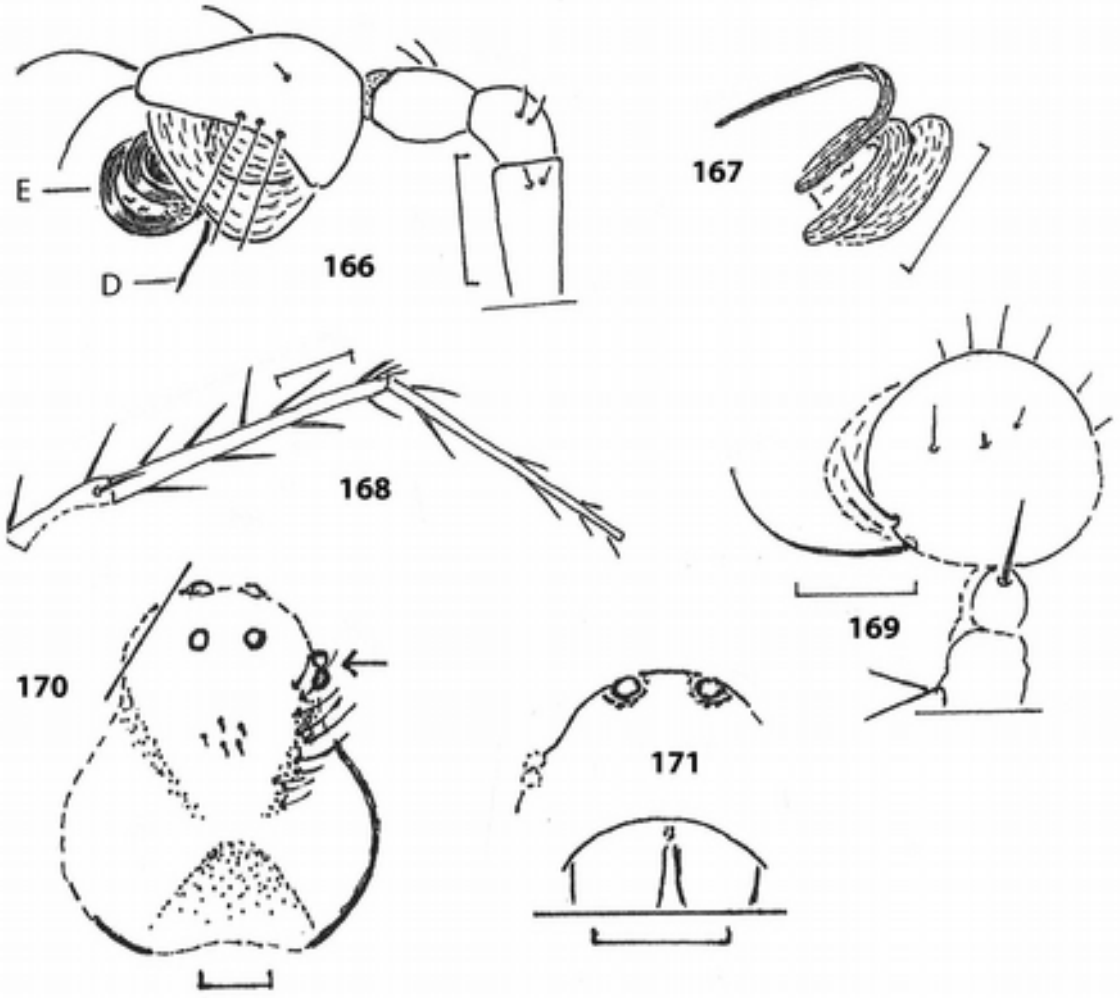
figs. 156-160: *Dubiouloborus praeta* **n. gen. n. sp.**, Dubiouloboridae **n. fam**., ♂; 156) anterior-right aspect of the left lateral eyes; 157) prodorsal aspect of femur and patella of the right pedipalpus. The basal part of the femur is deformed; 158) dorsal aspect of the left pedipalpus. The patella is strongly deformed, the femur ist partly deformed. Only few hairs are drawn; 159) ventral aspect of the left pedipalpus; 160) proventral aspect of the right pedipalpus. Certain ventral and prolateral parts are hidden. - A = tibial apophysis, B = basal part of the embolus, C = conductor, E = embolus, T = tibia, TE = tegular apophysis, Y = cymbium. Scales = 0.2;



figs. 160a-c: *Dubiouloborus procerembolus* **n. gen. n. sp**., Dubiouloboridae **n. fam**., ♂; 160a) retroletarel aspect of the right leg I. Note the long and thin strong erect hairs on tarsus and metatarsus. Only few normal hairs are drawn; 160b) oblique prodorsal aspect of the right pedipalpus. The arrow points to the ventral-apical apophysis of the patella. Only few hairs are drawn; 160c) oblique retroventral aspect of the right pedipalpus. - B = basal part of the embolus, C = conductor, E = embolus, M = sclerotized margin of the tegulum, S = sperm duct, T = tip of the embolus, Y = cymbium. Scales: 1.0 in fig. 160a, 0.2 in figs. 160b-c);



figs. 161-165: *Dubiouloborix incompletus* **n. gen. n. sp**., Dubiouloboridae **n. fam**., ♂; 161) dorsal aspect of the body. The lenses of the lateral eyes are badly recognizable; 162) prodorsal aspect of the right leg I. Note: Some bristles may be broken off and lost or not observable in the present aspect; see the next figure; 163) prolateral and apical aspect of the left femur I; 164) dorsal and slightly basal aspect of the left pedipalpus. Only few hairs are drawn; 165) ventral aspect of the right pedipalpus. - A = tibial apophysis, C = conductor, E = embolus, S = subtegulum, T = tibia, TA = tegular apophysis, TE = tip of the questionable embolus, X = unknown structure, Y = cymbium. Scales 1.0 in figs. 161-162, 0.5 in 163, 0.2 in 164-165;



figs. 166-167: *Eodeinopis longipes* WUNDERLICH 2017, Eodeinopidae, ♂; 166) prolateral aspect of the right pedipalpus; 167) retrodorsal aspect of the distal part of the right embolus. - D = distal part and tip of the right embolus (E). Scales = 0.2;

figs. 168-169: *Deinopedes tranquillus* WUNDERLICH 2017, Eodeinopidae, ♂; 168) retrolateral aspect of the left patella (deformed), tibia and metatarsus II; 169) dorsal aspect of the left pedipalpus. - Scale = 0.5;

figs. 170-176: *Frateruloborus bulbosus* WUNDERLICH 2018, Frateruloboridae, ♂ (holotype); 170) dorsal aspect of the prosoma which is partly hidden. Only few of the long hairs are drawn on the right side. The arrow points to the right lateral eyes; 171) anterior aspect of the prosoma which is partly hidden; 172) prolateral aspect of the right metatarsus (part) and tarsus I. Hairs are not drawn; 173) prolateral-apical aspect of the left tibia I. Note the very long dorsal tibial bristle in a position close to the article. Hairs are not drawn; 174) prolateral-apical aspect of the right femur I. Not all trichobothria are drawn; 174 a) retrodorsal-basal aspect of the left metatarsus IV. Note the dense calamistrum and some of the long dorsal hairs in the distal half; 174 b) ventral aspect of the anterior spinnerets and the undivided cribellum; 175) dorsal aspect of the left pedipalpus. Note the very large bulbus; 176) retrolateral and slightly apical aspect of the left pedipalpus. - C = cymbium, E = embolus, ? = hidden area. Scales: 0.1 in fig. 174 a), 0.2 in the remaining figs.;

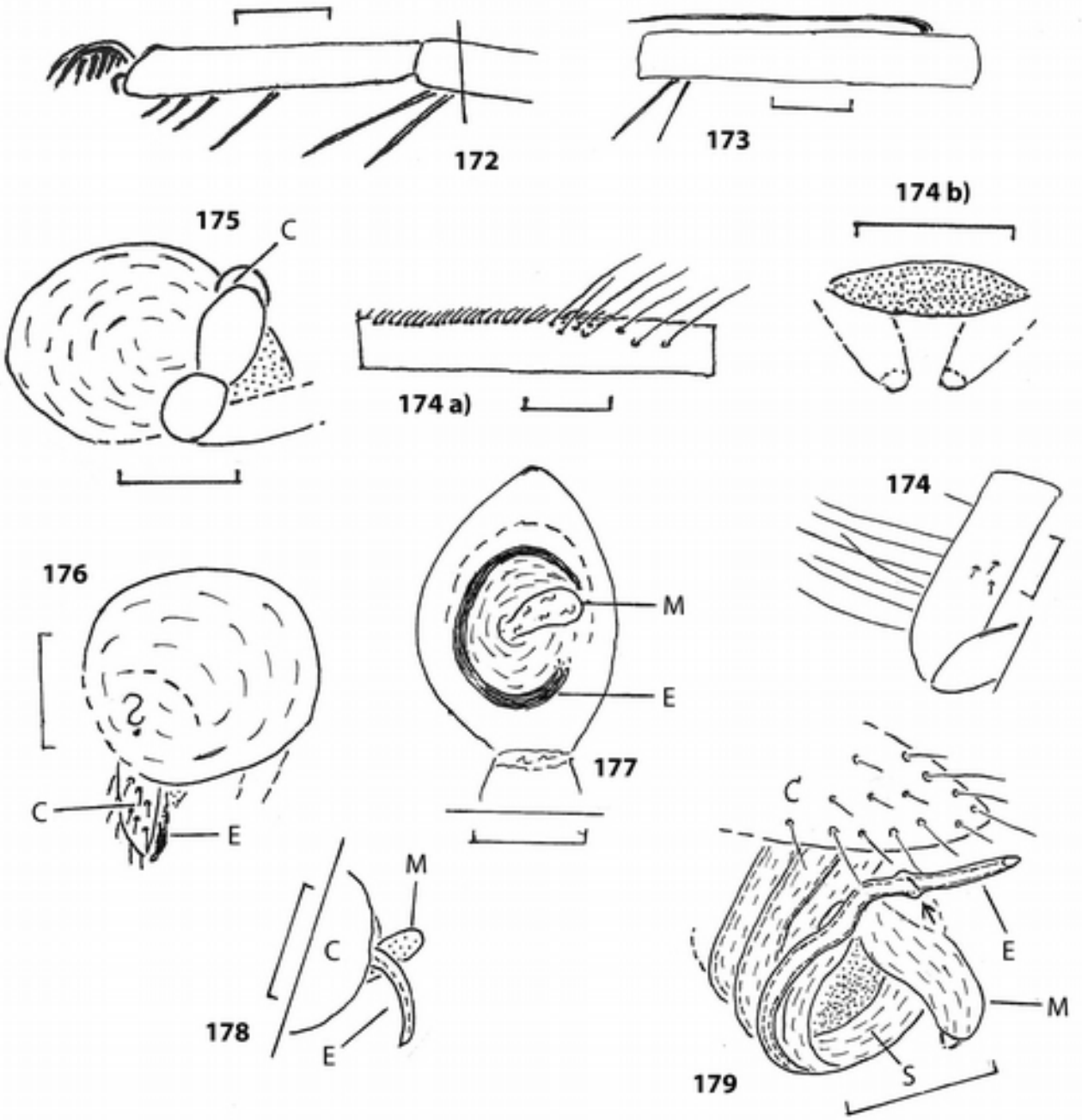
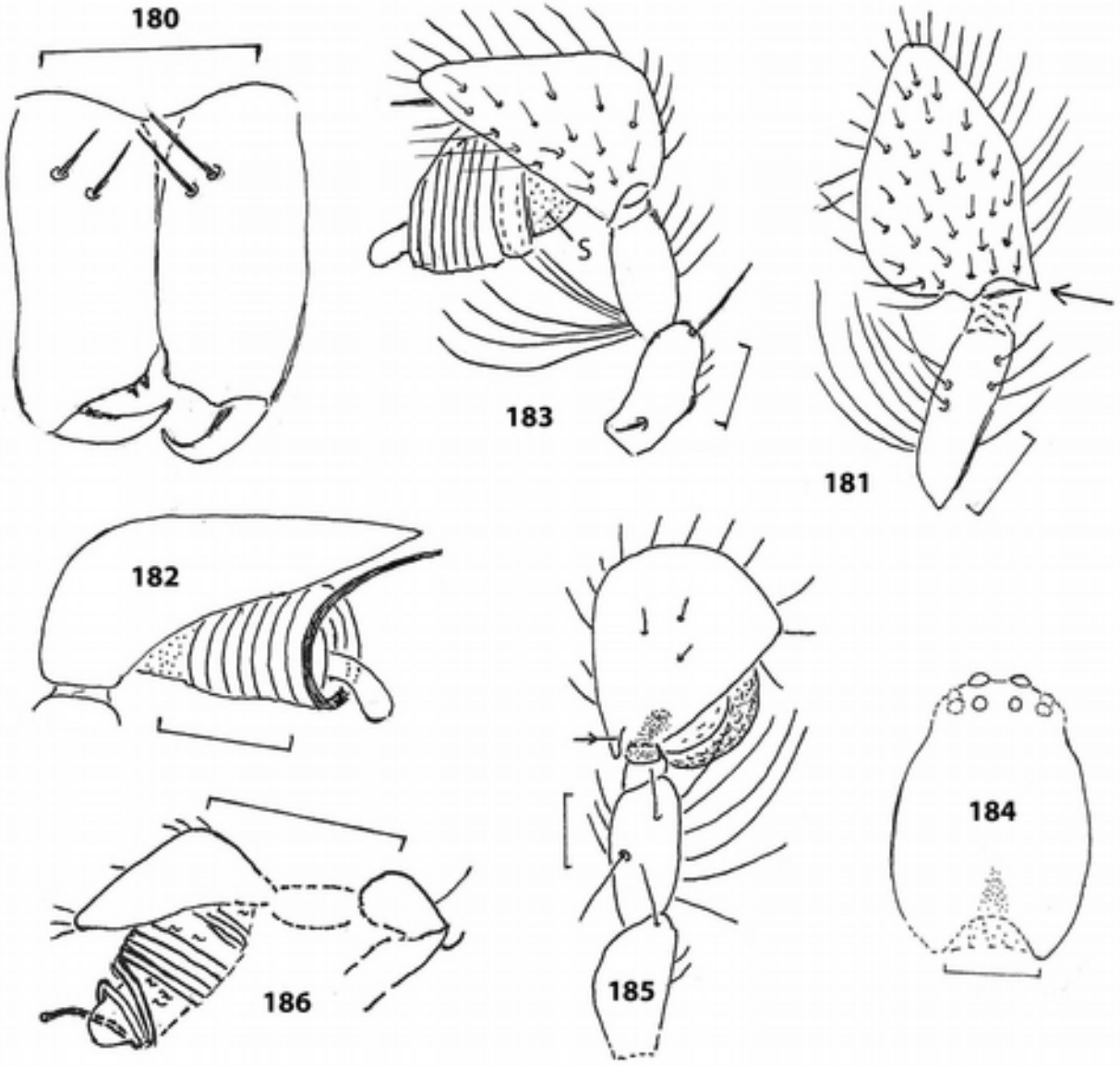


fig. 177) Ventral aspect of the left ♂-pedipalpus of the hypothetical ancient taxon of the family Salticoididae. - E = embolus, M = median apophysis. Scale = 0.2. - Compare the ♂-pedipalpus of an Eocene member of the family Oecobiidae in Baltic amber, see WUNDERLICH in WUNDERLICH & MÜLLER (2020: 139, fig. 43);

fig. 178) *Burmadictyna crassembolus* **n. sp**., Salticoididae, ♂, dorsal aspect of the distal part of the right pedipalpus. - C = cymbium, E = embolus, M = median apophysis. Scale = 0.1;

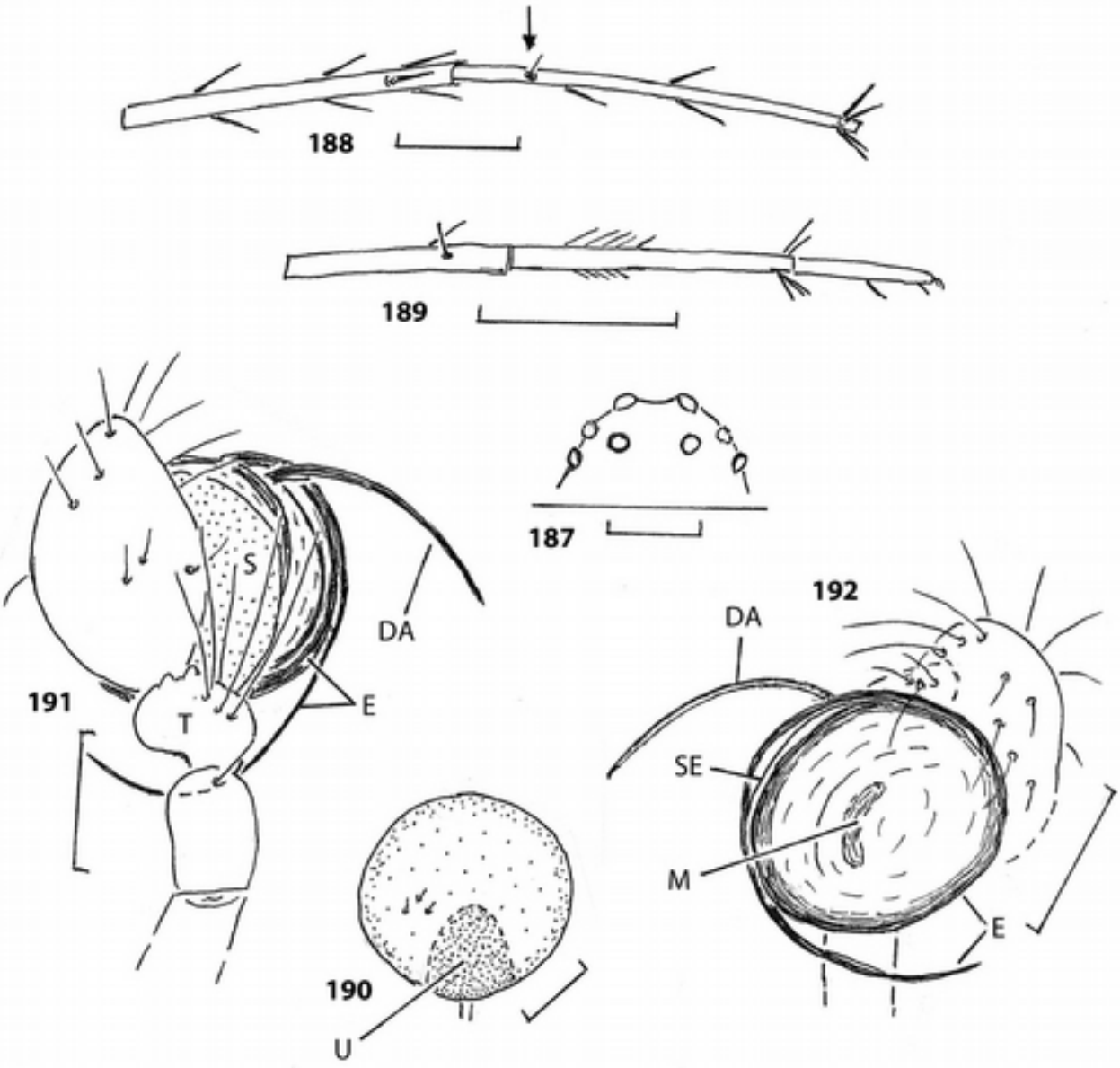
fig. 179) *Burmadictyna fissura* **n. sp**., Salticoididae, ♂, retrolateral aspect of the distal part of the left pedipalpus. The arrow points to the thickened "break point" of the embolus. - C = cymbium, E = embolus, M = median apophysis. Scale = 0.1;



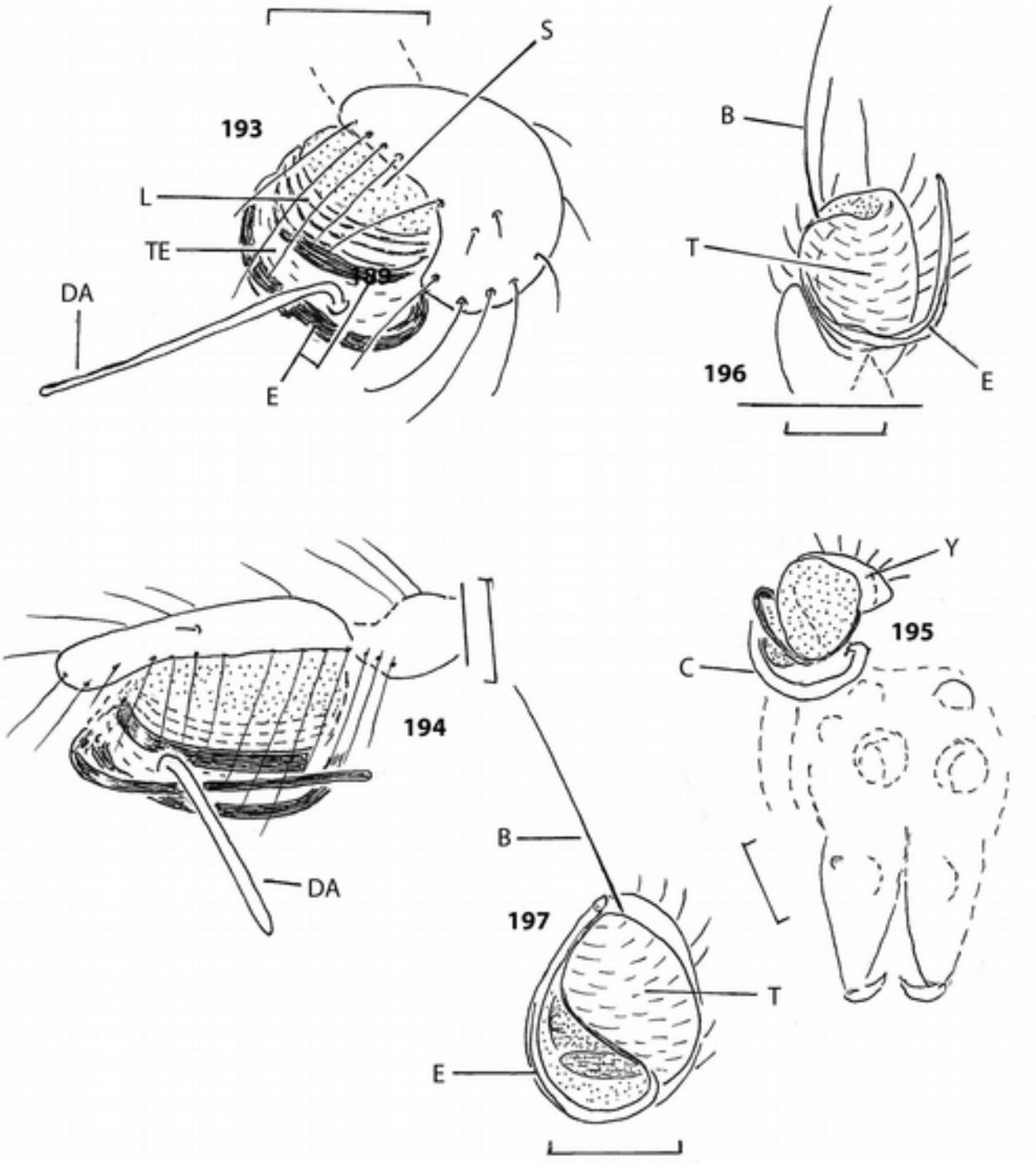
figs. 180-183: *Burmadictyna similis* **n. sp.**, Salticoididae, ♂; 180) anterior aspect of the chelicerae; 181) dorsal aspect of the left pedipalpus. The arrow points to the probasal point of the cymbium. Only some of the numerous hairs are drawn; 182) prolateral aspect of the left pedipalpus. Hairs are not dawn; 183) retrolateral aspect of the left pedipalpus. - S = subtegulum. Scales: 0.5 in fig. 180, 0.2 in the remaining figs.;

184) *Burmdictyna excavata* WUNDERLICH 2020, Salticoididae, ♂, dorsal aspect of the prosoma. - Scale = 0.5;

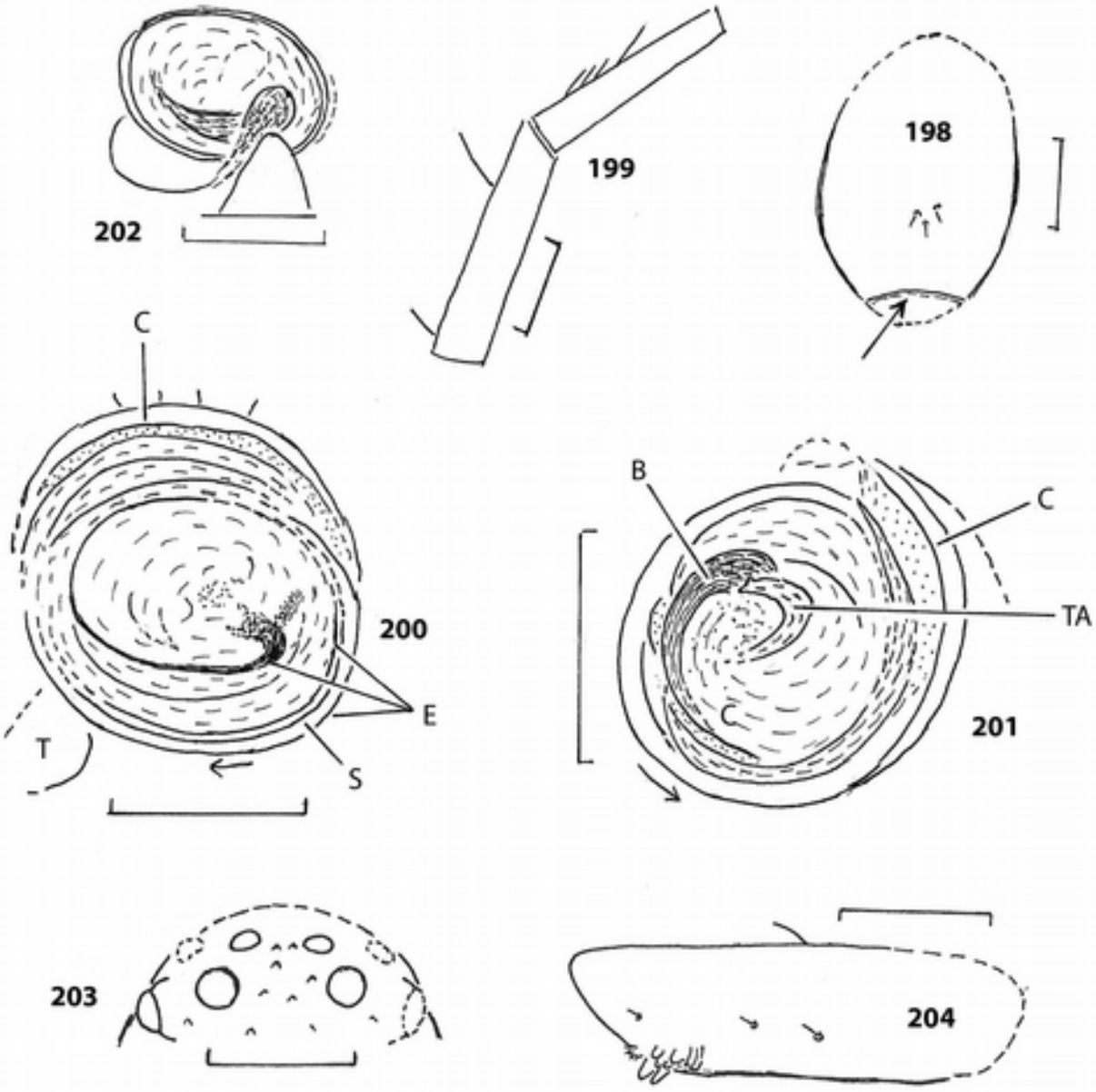
185-186: *Burmadictyna postcopula* WUNDERLICH 2017, Salticoididae, ♂; 185) dorsal aspect of the right pedipalpus. The arrow points to the probasal point of the cymbium; 186) retrolateral aspect of the left pedipalpus. - Scale: 0.2 and 0.5;



figs. 187-194: *Scutuloborus spiralembolus* **n. gen. n. sp**., Scutuloboridae **n. fam**., ♂; 187) dorsal aspect of the eyes; 188) retrodorsal aspect of the right tibia and metatarsus I. The arrow points to the metatarsal trichobothrium. Hairs are not drawn; 189) retrolateral aspect of tibia, metatarsus and tarsus of leg IV. Only few hairs are drawn; 190) anterior aspect of the opisthosoma which bears an anterior dorsal scutum (U) which may actually be much larger because it partly is covered which an emulsion; 191) dorsal aspect of the right pedipalpus; 192) retrolateral and slightly apical aspect of the right pedipalpus; 193) retrodorsal and slightly apical aspect of the right pedipalpus; 194) retrolateral aspect of te left pedipalpus. Few parts are hidden, only few hairs are drawn. - DA = dorsal tegular apophysis, E = embolus, L = loops within the subtegulum, M = median apophysis, S = subtegulum, SE = seam of the embolus, T = tibia, TE = tegulum, U = scutum. Scales: 0.5 in figs. 188-189, 0.2 in the remaining figs.;

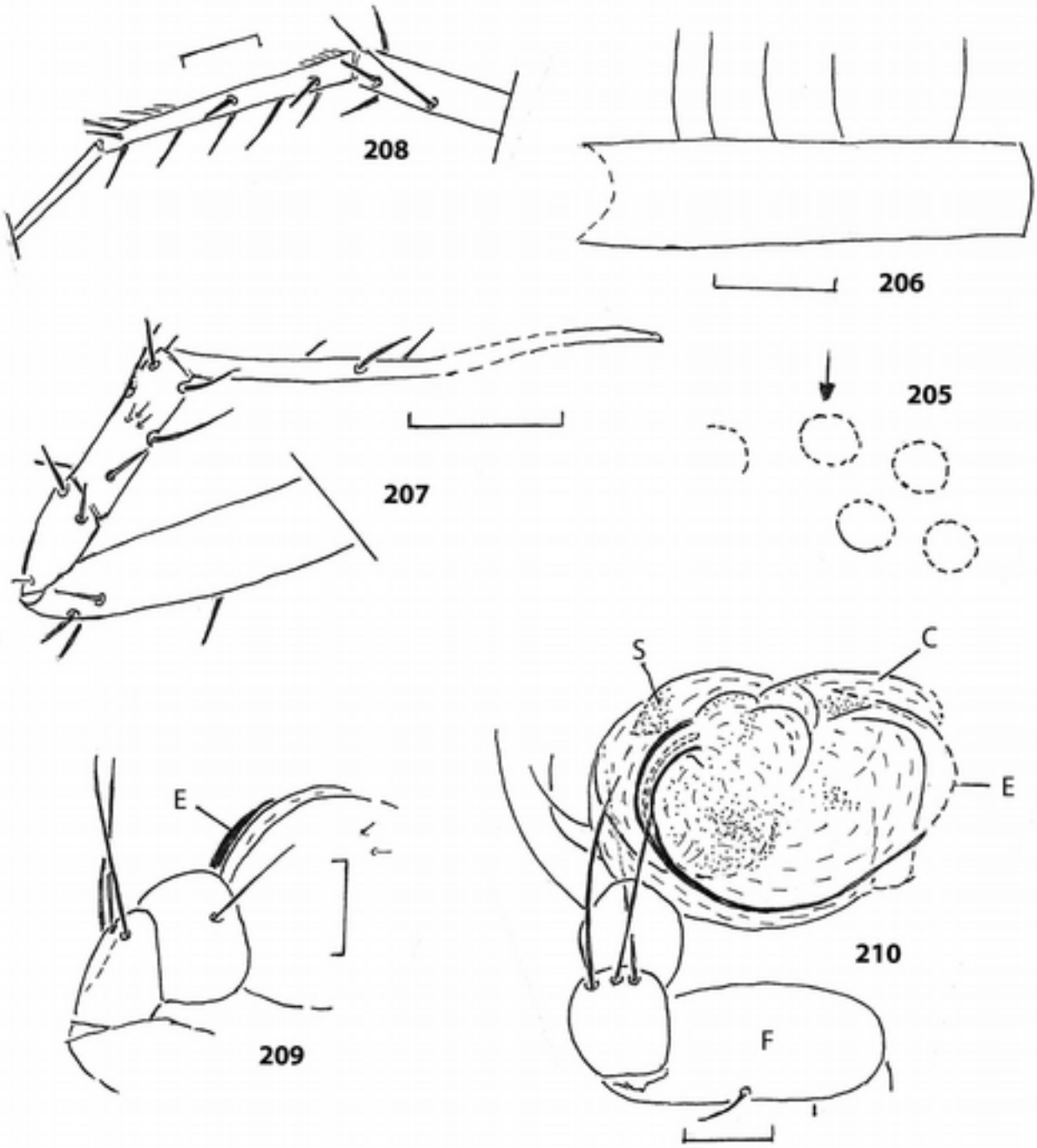


figs. 195-197: *Scutuloborella admirabilis* **n. gen. n. sp**., Sutuloboridae **n. fam**., ♂; 195) anterior - and sligtly from right - aspect of the prosoma and the right pedipalpus; parts are hidden; 196) ventral aspect of the right pedipalpus; 197) retrolateral aspect of the left pedipalpus. - B = tegular bristle, E = embolus within the conductor (C), T = tegulum, Y = cymbium. Scales = 0.1;

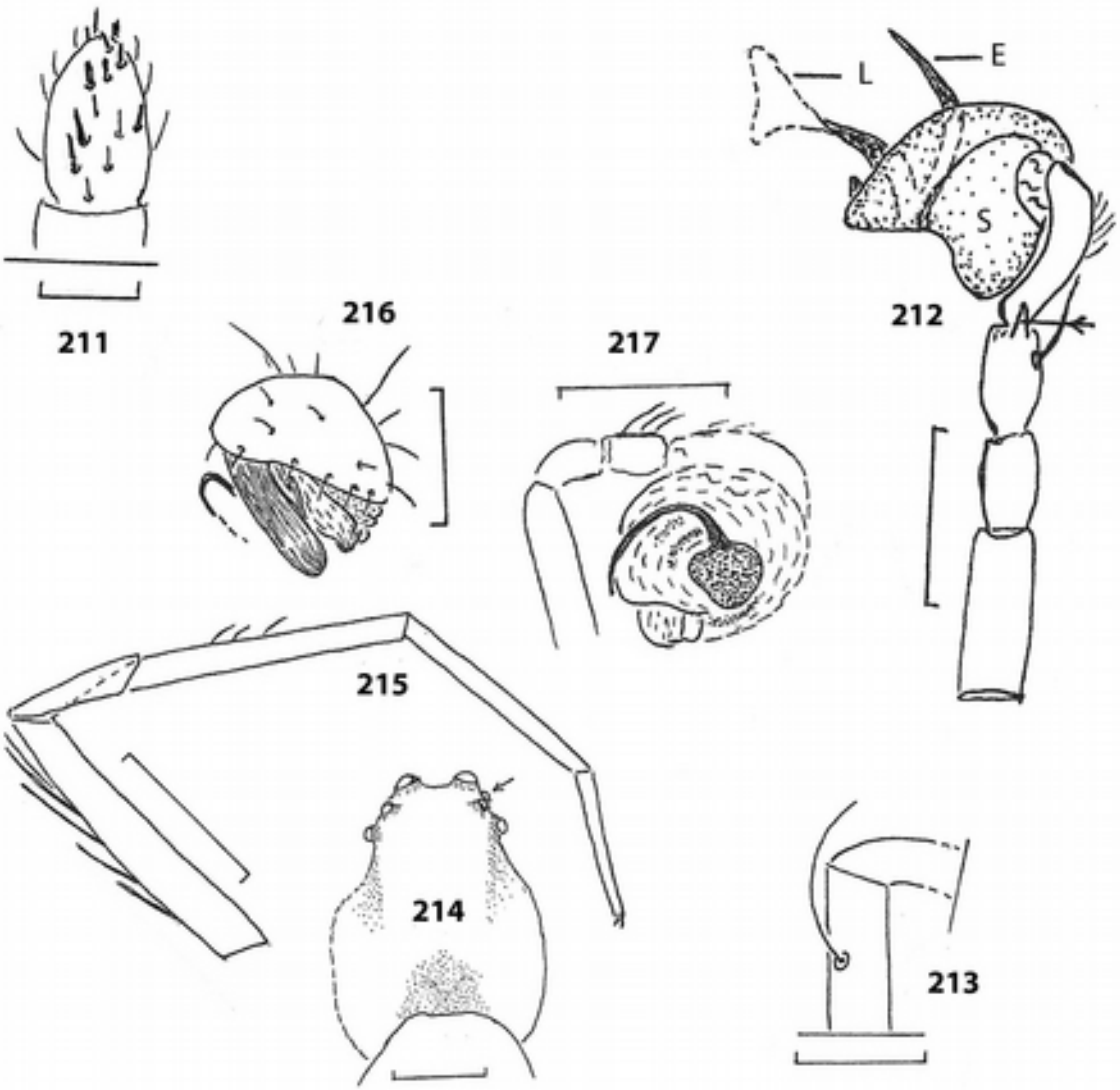


figs. 198-202: *Scutuloboroides pumilio* **n. gen. n. fam**., Scutuloboridae **n. fam**., ♂; 198) dorsal aspect of the opisthosoma. Parts are hidden. The arrow points to the posterior margin of the large scutum. Only few hairs are drawn; 199) retrolateral aspect of the right tibia and metatarsus I. The tibia bears two thin bristles, a metatarsal trichobothrium has not been observed, only few hairs are drawn; 200) "ventral" aspect of the left pedipalpus. Parts of the embolus and of the tegulum are hidden. - B = base of the embolus, C = cymbium, E = embolus, S = seam of the embolus, T= tibia, TA= tegular apophysis. Scales: 0.2 in fig. 198, 0.1 in the remaining figs.;

figs. 203-204: *Jerseyuloborus longisoma* WUNDERLICH 2011, Uloboridae, ♀, holotype; 203) dorsal spect of the eyes; 204) lateral and slightly ventral aspect of the opisthosoma. - Scales: 0.2 and 0.5;

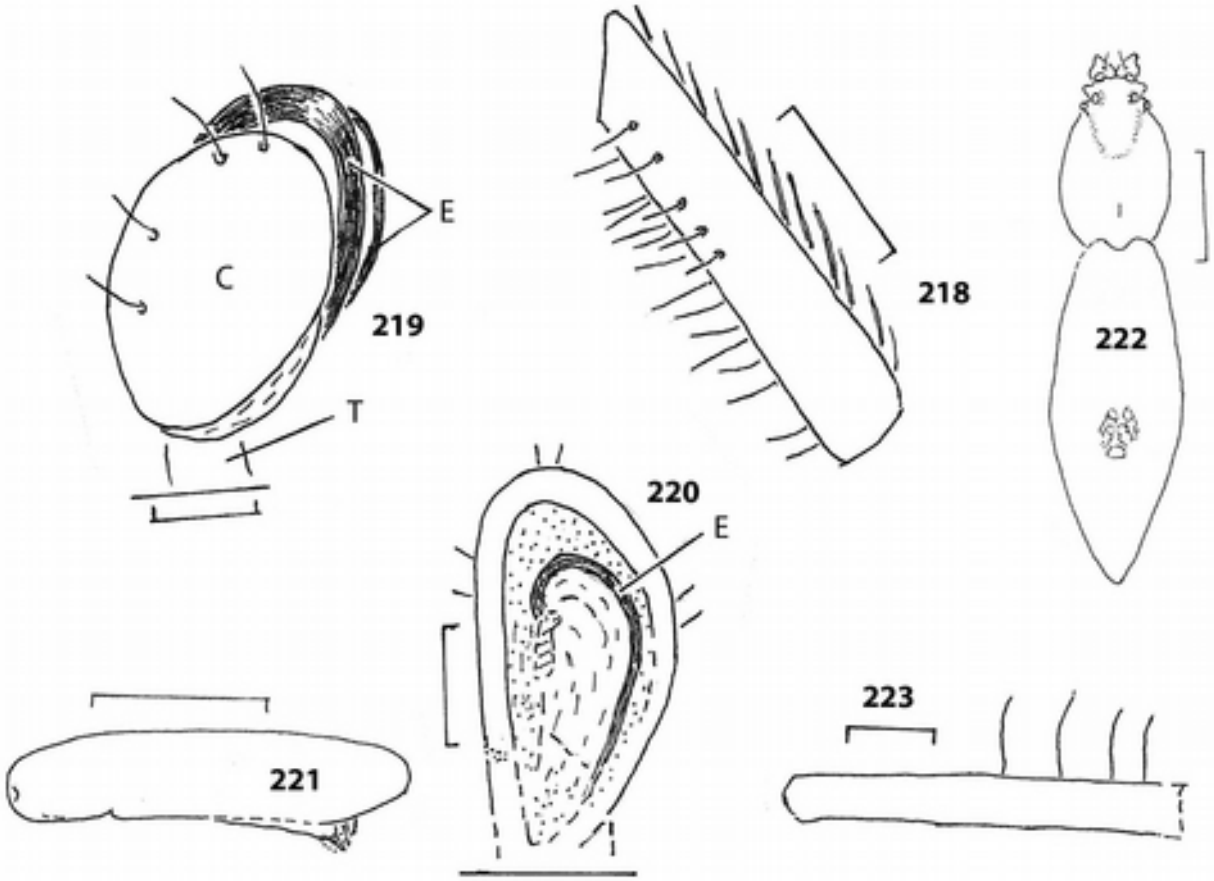


figs. 205-210): *Boavista crassifemora* **n. gen. n. sp.**, Uloboridae, ♂; 205) dorsal-right aspect of the right eyes which lenses are partly hidden by an emulsion; atempt at a reconstruction. The diameter of an anterior median eye (arrow) is ca. 0.1 mm; 206) dorsal aspect of the right femur II. Only some of the trichobothria are drawn; 207) prolateral aspect of the left leg I. Parts are hidden, only few hairs are drawn; I did not recognize femoral trichobothria; 208) prolateral aspect of parts of the right leg IV. Note the long ventral bristles (pectunculus) of the metatarsus. Only few hairs are drawn; 209) prodorsal aspect of the left pedipalpus: Patella, tibia as well as femur and cymbium; 210) retrolateral and slightly dorsal aspect of the right pedipalpus. Distal-parts of conductor and embolus are hidden. - C = conductor, E = embolus, F = femur, S = sclerotized plate. Scales except fig. 205: 0.5 in fig. 207, 0.2 in 208), 0.1 in the remaining figs.;



figs. 211-212: *Burmasuccinus bulla* WUNDERLICH 2018, ?Uloboridae, ♂ holotype; 211) prolateral aspect of the apical article of the left posterior spinneret. Note the half dozen well developed bristles; 212) dorsal (the bulbus retrodorsal) aspect of the left pedipalpus. The arrow points to the tibial outgrowth/apophysis. The bulbus is deformed. - E = embolus, L = leaf-shaped tegular apophysis, S = subtegulum. Scales: 0.05 and 0.2;

figs. 213-217: *Microuloborus birmanicus* WUNDERLICH 2015, Uloboridae, ♂ holotype; 213) proventral aspect of the left femur IV which bears a long trichobothrium; 214) dorsal aspect of the slightly deformed prosoma. The arrow points to the questionable position of the right anterior lateral eye; the left anterior lateral eye is hidden; 215) retrolateral aspect of the right leg I. Only few hairs are drawn; 216) prodistal aspect of the left pedipalpus, 217) retrolateral aspect of the right pedipalpus. Parts of the bulbus are hidden but the embolus is well observable. - Scales: 0.2 in figs. 214-215, 0.1 in the remaining figs.;



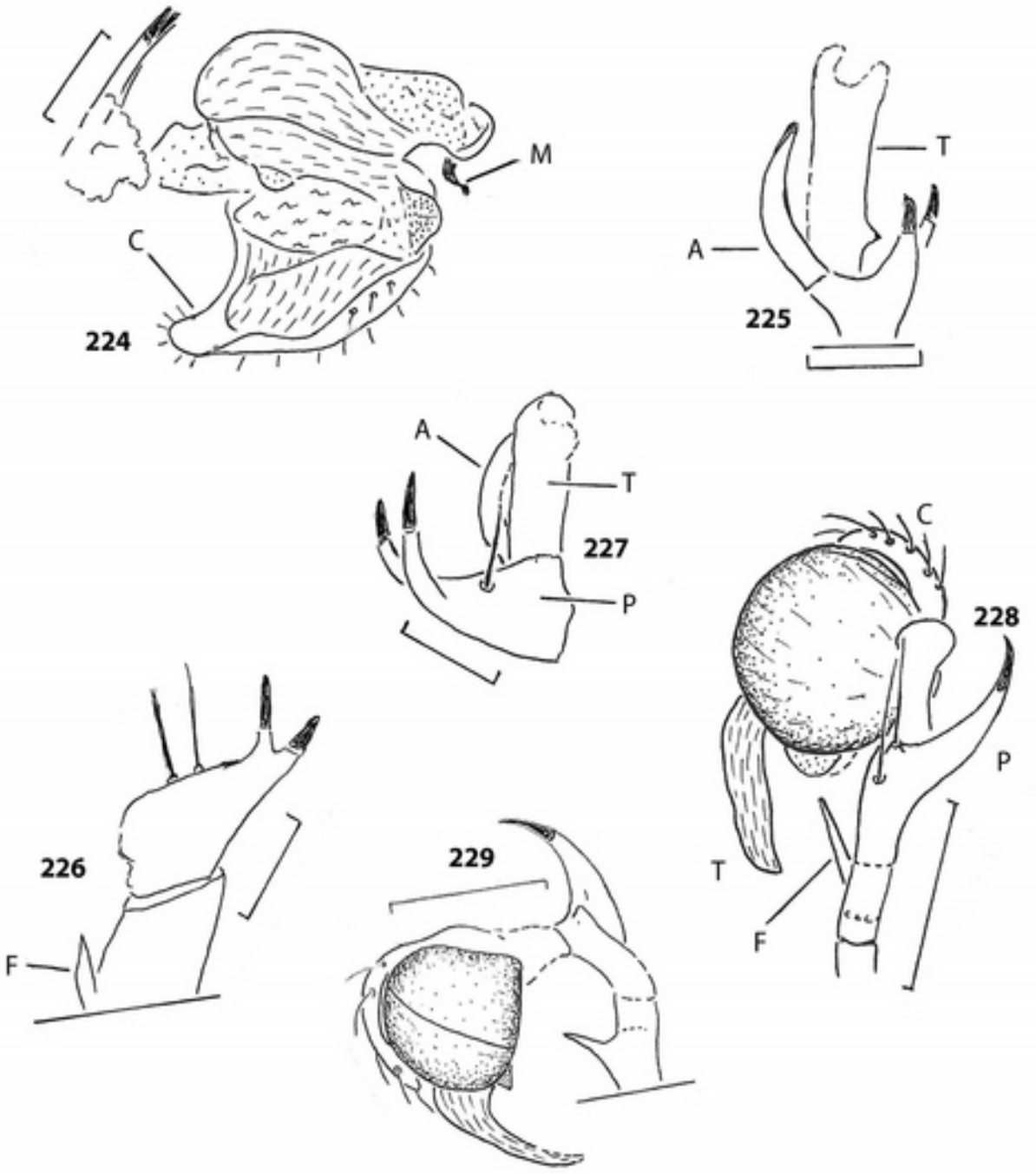
figs. 218-219: *Microuloborus oblongus* **n. sp**., Uloboridae, ♂; 218) Prolateral aspect of the right femur I. Note the strong dorsal hairs, the long ventral hairs and the questionable proventral trichobothria. Not all hairs are drawn; 219) retrodorsal aspect of the right pedipalpus. Only few hairs are drawn. - C = cymbium, E = embolus. Scales: 0.2 and 0.05;

fig. 220) *Microuloborus* sp. indet., Uloboridae, ♂, ventral aspect of the strongly deformed left pedipalpus. Parts are hidden. - Scale =0.05;

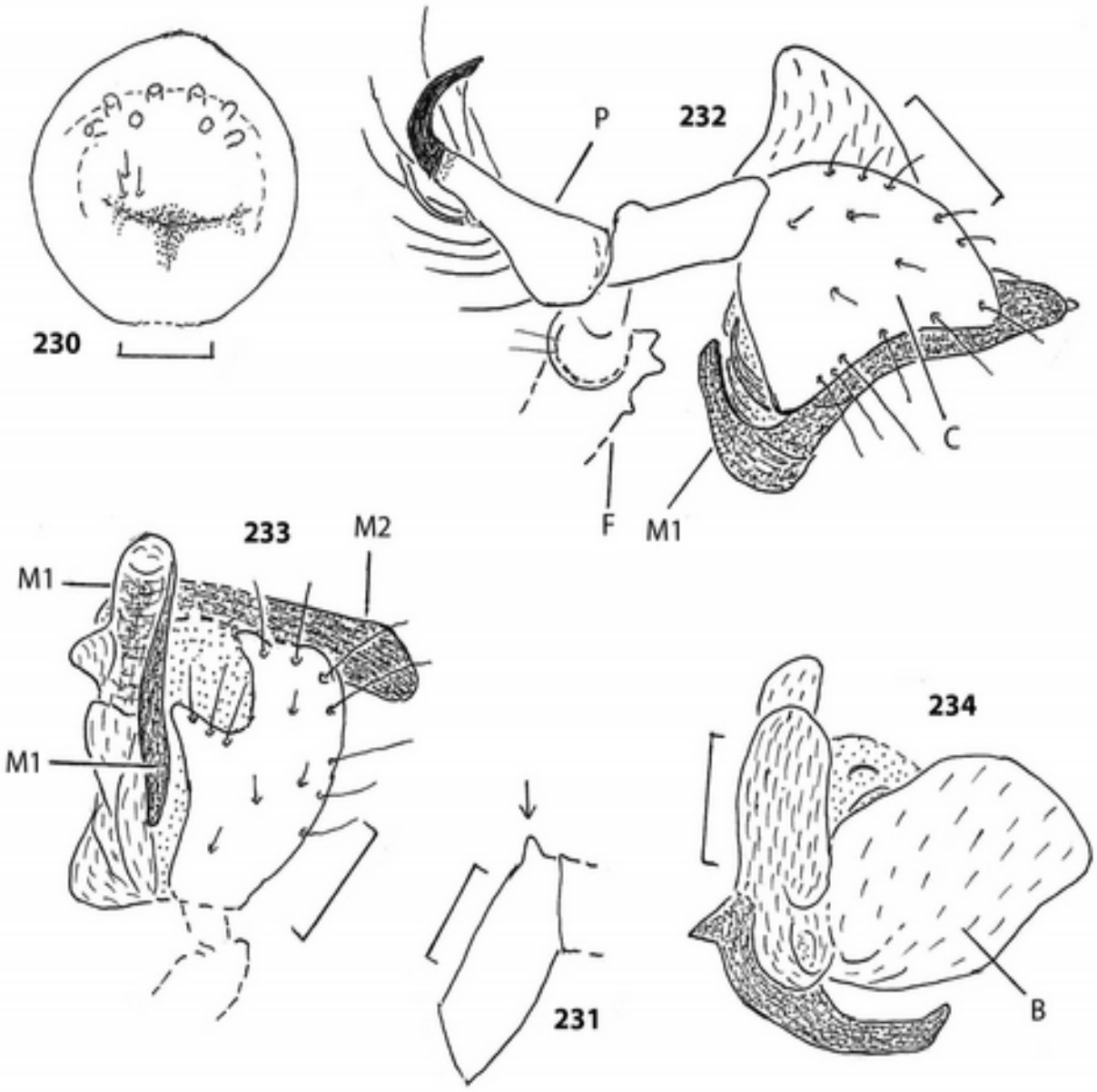
fig. 221) *Burmuloborus antefixus* WUNDERLICH 2015, Uloboridae, ♂ holotypus, lateral aspect of the opisthosoma. - Scale = 0.5;

fig. 222) ?*Burmuloborus prolongatus* WUNDERLICH 2015, juv. ♀, holotypus, dorsal aspect of the body. The position of the spinnerets - which are hidden in this position - is outlined. - Scale = 0.5;

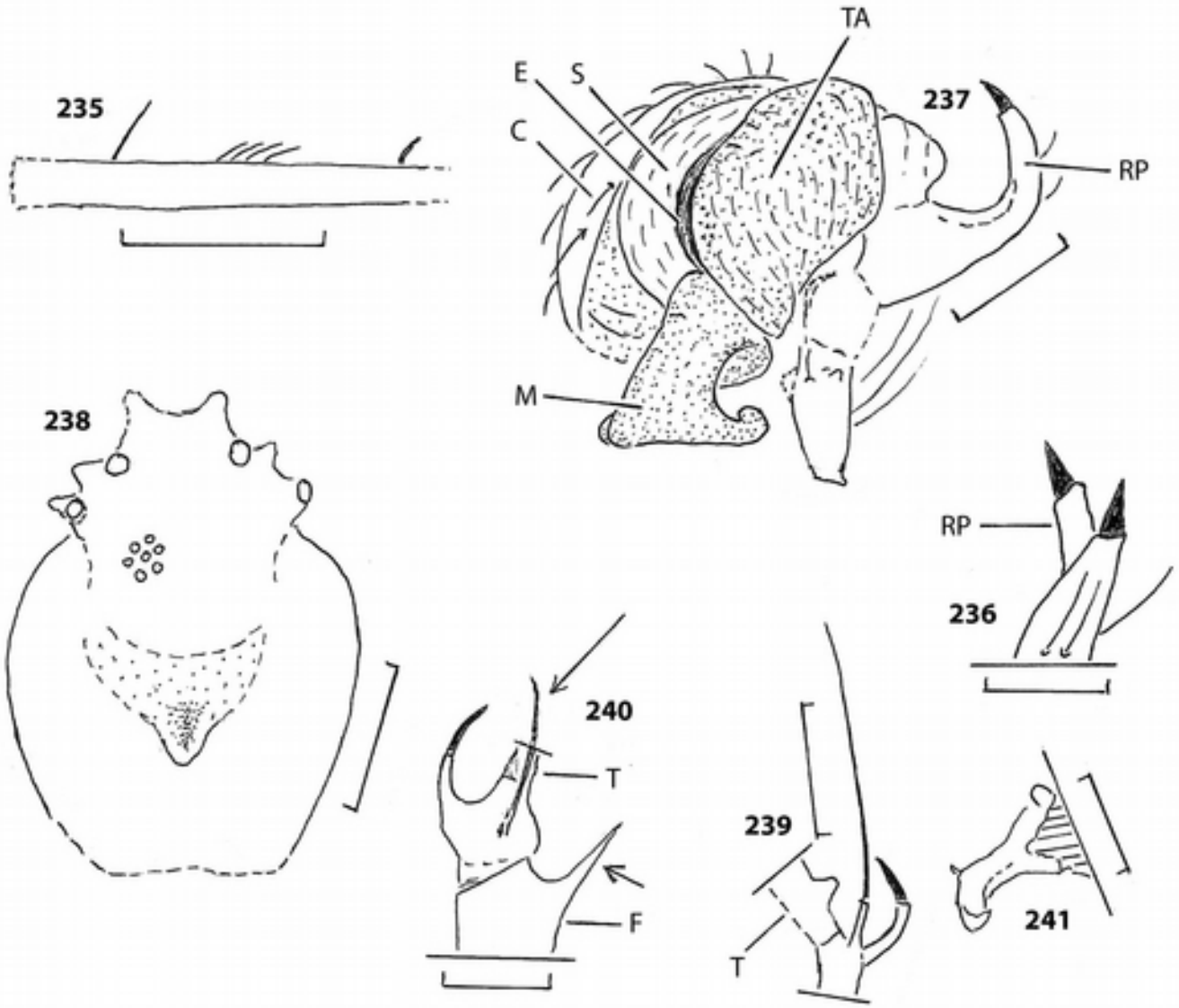
figs. 223-227: *Paramiagrammopes appendix* **n. sp**., Uloboridae, ♂; 223) dorsal aspect of the left femur III; 224) retrolateral aspect of the expanded and deformed right pedipalpus; 225) prodorsal aspect of the right pedipalpal tibia and patella with its apophyses; 226) retrolateral aspect of the distal part of the femur and of the patella of the left pedipalpus; 227) retrodorsal aspect of patella and tibia of the right pedipalpus. - A = proapical apophysis (appendix) of the patella which partly is hidden, C = cymbium, F = femoral outgrowth, M = apical part of the questionable median apophysis, P = patella, T = tibia. Scales = 0.1;



figs. 228-229: *Paramiagrammopes cretaceus* WUNDERLICH 2008, Uloboridae, ♂ holotype; 228) retrodorsal aspect of the left pedipalpus which articles are more or less deformed; 229) retrolateral aspect of the left pedipalpus. - C = cymbium, F = ventral femoral outgrowth, P = prodorsal patellar apophysis, T = tegular apophysis. Scale = 0.2;

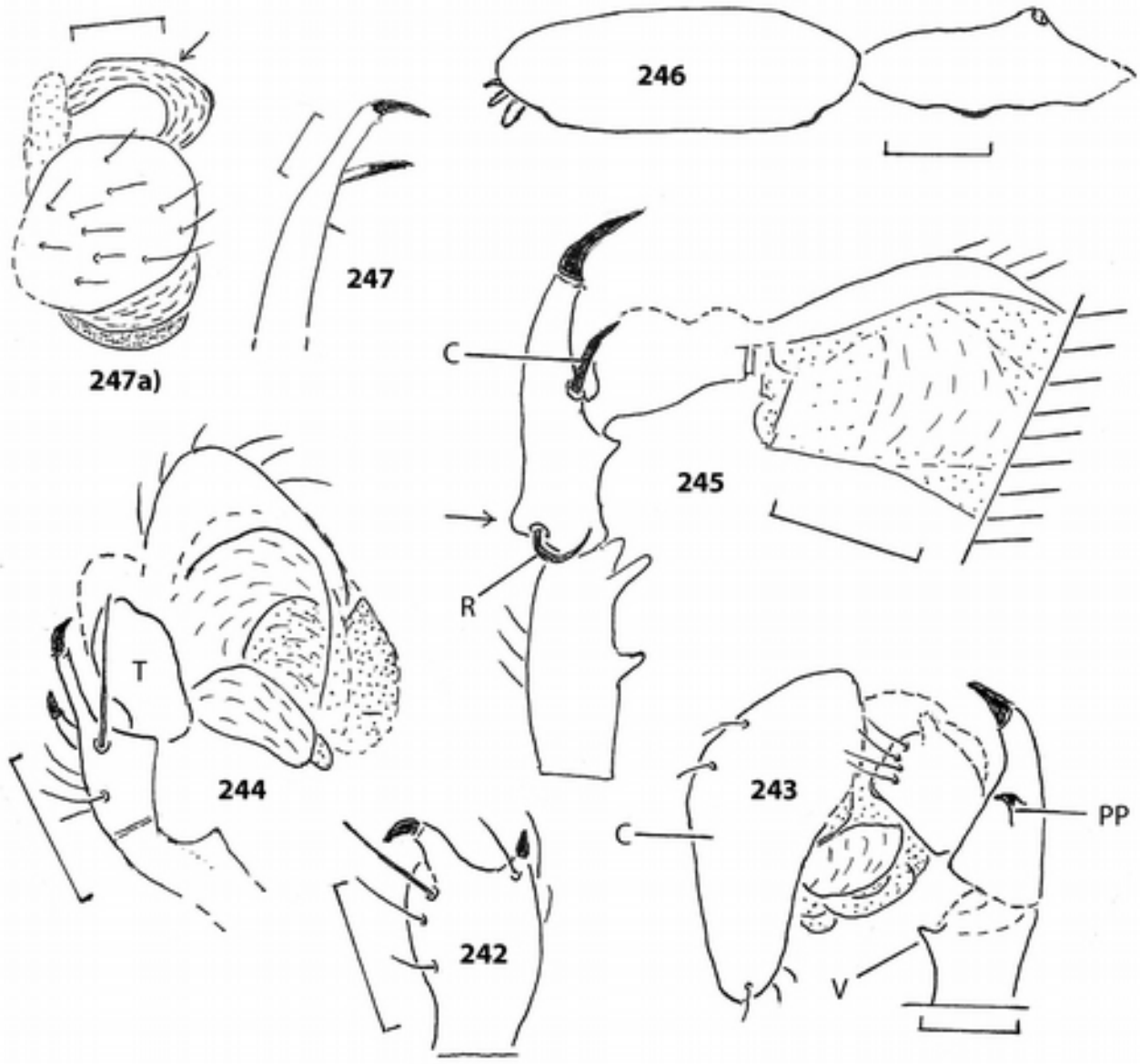


figs. 230-234: *Paramiagrammopes curvatus* **n. sp**., Uloboridae, ♂; 230) dorsal aspect of the prosoma; 231) prolateral aspect of the right pedipapal trochanter. The arrow points to the ventral-apical outgrowth; 232) dorsal aspect of the left pedipalpus. Only few hairs are drawn; 233) prolateral aspect of the right pedipalpus; 234) ventral aspect of the deformed sclerites of the left bulbus which may be expanded. - B = bulbus of a median apophysis, C = cymbium, F = femur, M1, M2 = median apophyses, P = patella. Scales: 0.1 in fig. 231, 0.2 in the remaining figs.;



figs. 235-237: *Paramiagrammopes furca* **n. sp**., Uloboridae, ♂; 235) retrolateral aspect of the right femur I. Only few hairs are drawn; 236) prolateral aspect of the distal part of the right pedipalpal patella; 237) retrolateral aspect of the left pedipalpus. Only few hairs are drawn. - C = cymbium, E = embolus, M = questionable median apophysis, RP = retrolateral patellar apophysis (the prolateral apophysis is hidden), S = subtegulum, TA = questionable tegular apophysis. Scales: 0.5 in fig. 235, 0.1 in figs. 236-237;

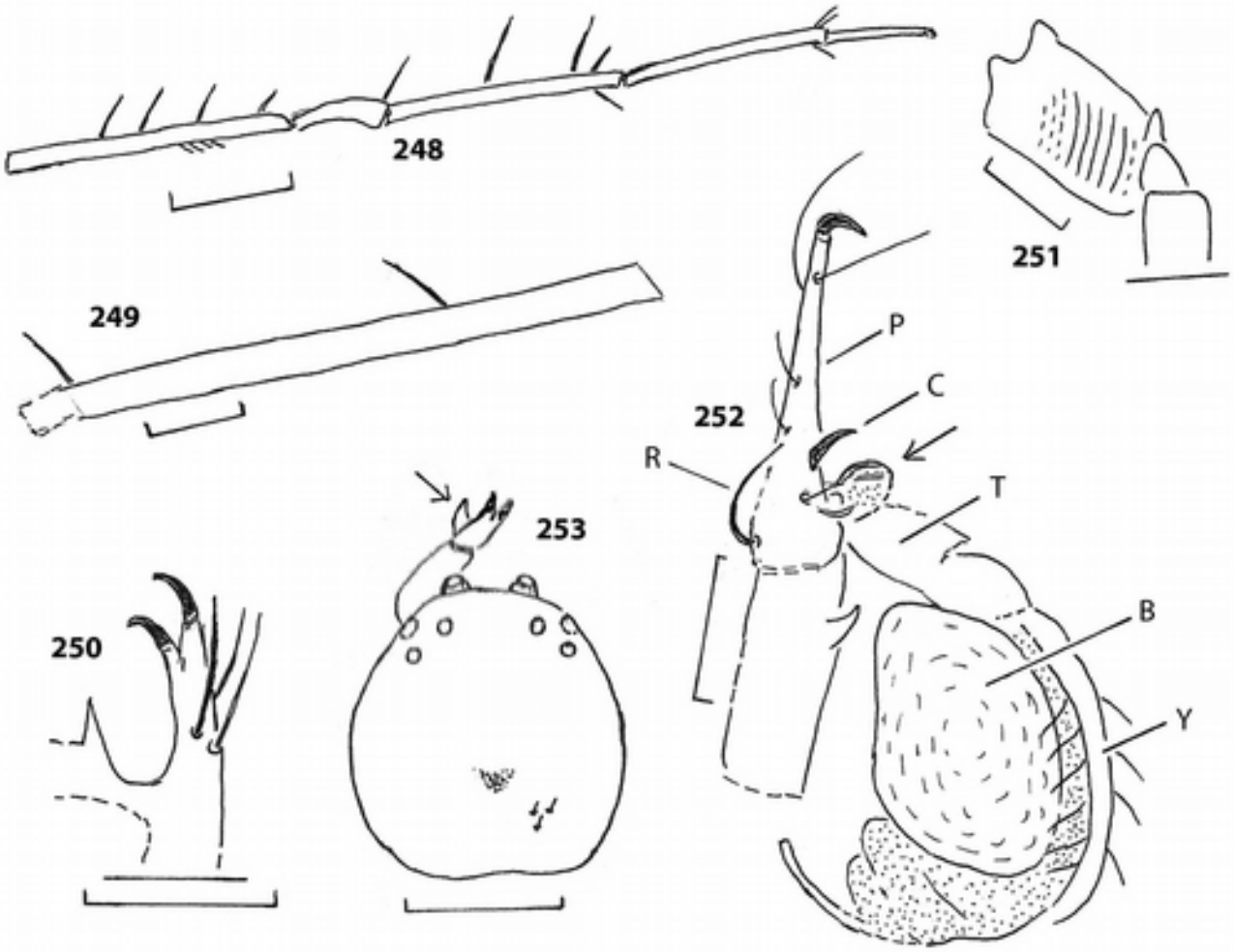
figs. 238-241: *Paramiagrammopes granulatus* **n. sp.**, Uloboridae, ♂; 238) dorsal aspect of the prosoma. Note the granules (only 7 are drawn) and the deformed eye region; 239) retrolateral aspect of the left pedipalpal patella and the basal part of the tibia. Note the long and thin bristle of the retrolateral patellar apophysis; 240) retrodorsal aspect of the patella and the distal part of the femur of the right pedipalpus. The short arrow points to the deformed ventral apophysis of the femur, the long arrow points to the bristle of the retrolateral apophysis of the patella which appears shortened in this position; 241) prolateral aspect of the tegular apophysis of the right pedipalpus. - F = femur, T = tibia. Scales 0.2 in fig. 238, 0.1 in the remaining figs.;



figs. 242-244: P*aramiagrammopes inaequalis* **n. sp**., Uloboridae, ♂; 242) dorsal and slightly retrolateral aspect of the patella of the left pedipalpus; 243) prolateral and slightly dorsal aspect of the right pedipalpus. Parts are deformed; 244) retrodorsal aspect of the right pedipalpus. Parts are hidden or probably deformed. Note: In this position the cymbium appears seemingly domed. - C = cymbium, PP = prolateral patellar apophysis, T = tibia, V = ventral femoral outgrowth. Scales = 0.1;

fig. 245) *Paramiagrammopes inclinatus* **n. sp**., Uloboridae, ♂, retrolateral aspect of the deformed right pedipalpus which distal part is hidden. The arrow points to the blunt dorsal-basal outgrowth. - C = retrolateral (basal) claw of the patella, R = strong retrobasal bristle of the patella. Scale = 0.2;

figs. 246-247a): *Paramiagrammopes longiclypeus* WUNDERLICH 2015, Uloboridae, ♂ holotype; 246) lateral aspect of the body. Only a single eye is drawn; 247) prolateral aspect of the dorsal apophysis of the left pedipalpal patella. Hairs are not drawn; 247a) dorsal aspect of the right pedipalpus. Note the long median apophysis (arrow). - Scales: 0.2 in fig. 246, 0.1 in 247-247a);



figs. 248-250: *Paramiagrammopes multifemurspinae* **n. sp**., Uloboridae, ♂; 248) retrolateral aspect of the right leg I. Some bristles are probably lost. Only few hairs are drawn; 24) retrolateral aspect of the left femur I; the apical part is deformed. Probably some bristles are lost; 250) dorsal aspect of the patella and the basal part of the tibia of the deformed left pedipalpus. - Scales: 0.5 in fig. 248, 0.2 in fig. 249 and 0.1 in fig. 250;

figs. 251-252: *Paramiagrammopes paracurvatus* **n. sp**., Uloboridae, ♂; 251) probasal aspect of the femur and the basal part of the trochanter of the right pedipalpus. Note the probasal files. - B = bulb of a median apophysis, C = retrobasal claw of the dorsal apophysis, P = patella, R = retrobasal bristle of the patella, T = deformed tibia, Y = cymbium. Scales 0.1 and 0.2;

figs. 253-255: *Paramiagrammopes patellaris* WUNDERLICH 2017 (under *Furcembolus p.*), Uloboridae, ♂ holotype; 253) dorsal aspect of the prosoma as well as the left pedipalpal femur and patella. The arrow points to the ventral patellar apophysis; 254) retrolateral and slightly basal aspect of the left pedipalpus. The short arrow points to the domed cymbium, the long arrow points to the paired dorsal patellar apophyses. In the present aspect femur and patella appear more slender than in reality; 255) median apophysis of the left bulbus, distal aspect. - M = median apophysis. Scales: 0.5 in fig. 253, 0.2 in fig. 254 and 0.1 in fig. 255;

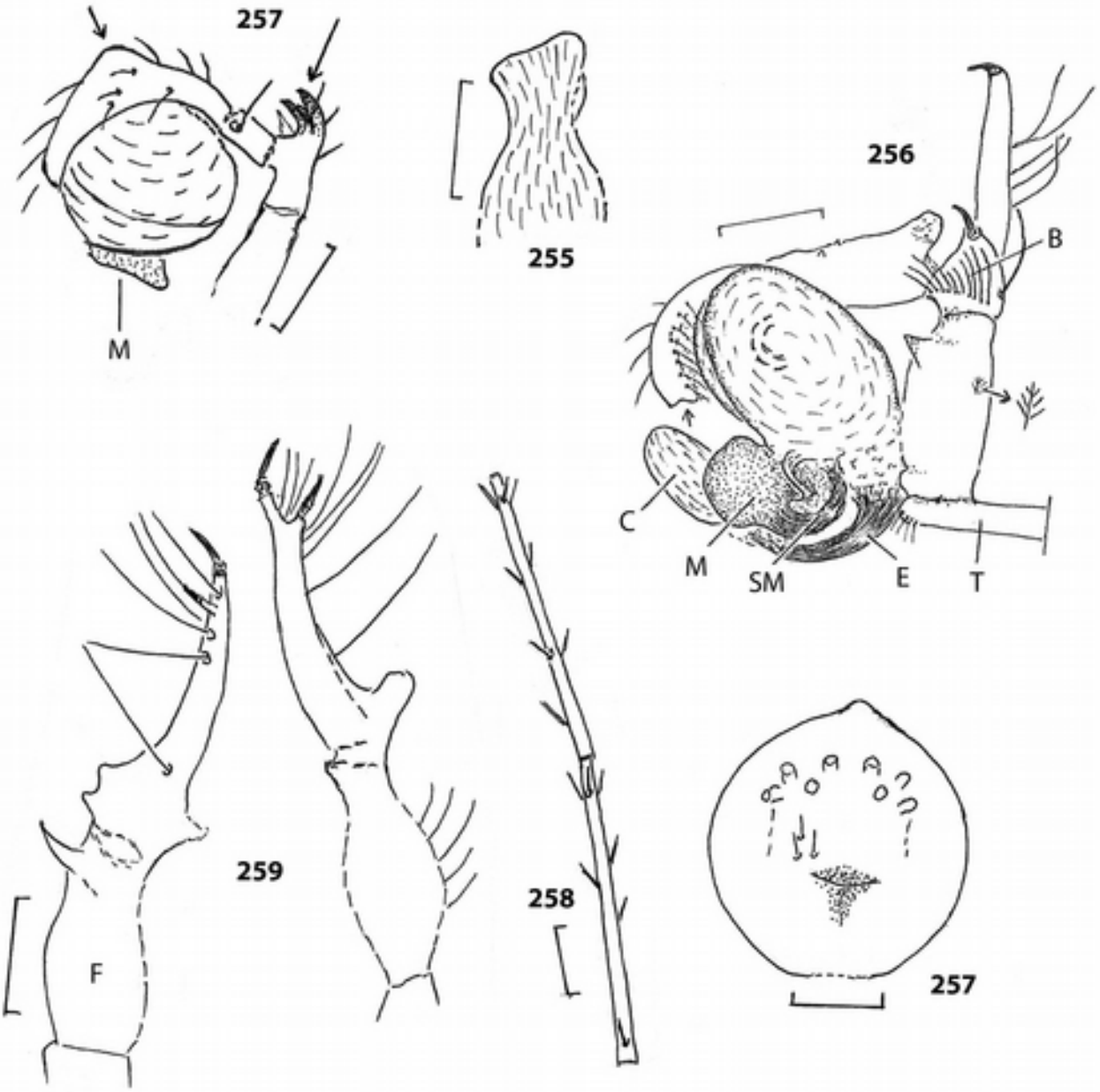


fig. 256) *Paramiagrammopes patellidens* WUNDERLICH 2015, Uloboridae, ♂ holotype, retrolateral aspect of the left pedipalpus. The short arrow points to the cymbial notch, the long arrow points to an enlarged feathery hair of the femur. - B = brush of plumose hairs, C = questionable conductor, E = embolus, M = median apophysis, SM = spur of the median apophysis, T = trochanter. Scale = 0.2;

figs. 257-259: *Paramiagrammopes pilosus* **n. sp**., Uloboridae, ♂; 257) dorsal aspect of the prosoma which eyes are deformed; 258) dorsal aspect of tibia and metatarsus of the left leg I; 259) dorsal aspect of femur and patella of both deformed pedipalpi. - F = femur. Scales: 0.1 in fig. 259, 0.2 in figs. 257-258;

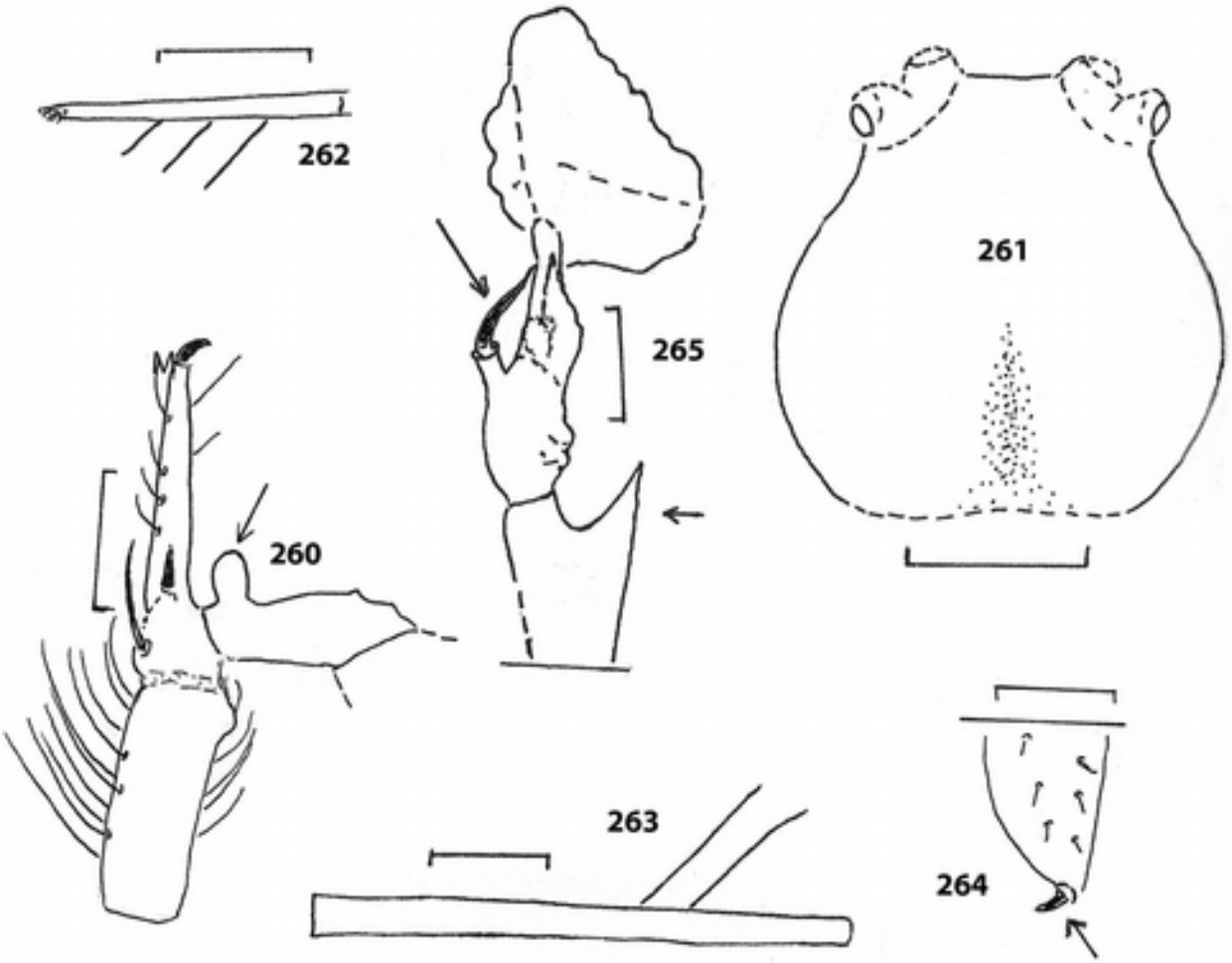


fig. 260) *Paramiagrammopes pollex* **n. sp**., Uloboridae, ♂, retrolateral aspect of the right pedipalpus. The strongly deformed cymbium and bulbus are not drawn. The arrow points to the dorsa-basal apophysis of the tibia. - Scale = 0.2;

figs. 261-265: *Paramiagrammopes pusillus* WUNDERLICH 2018, Uloboridae, ♂ holotype; 261) dorsal aspect of the prosoma. Note the strong humps of the partly hidden eyes which may be caused by the preservation; 262) retrolateral aspect of the left tarsus IV. Note the quite long ventral bristles of the pectunculus; 263) proventral aspect of the left femur IV. Note the two long trichobothria; probably further trichobothria exist. Normal hairs are not drawn; 264) prolateral aspect of the distal part of the right cymbium. The arrow points to the apical claw. Only few hairs are drawn; 265) dorsal aspect of the right pedipalpus. The short arrow points to the ventral femoral apophysis, the long arrow points to the long claw of the dorsal patellar apophysis. Cymbium and bulbus are strongly deformed. - Scales 0.05 in fig. 264, 0.1 in fig. 265, 0.2 in figs. 261-263;

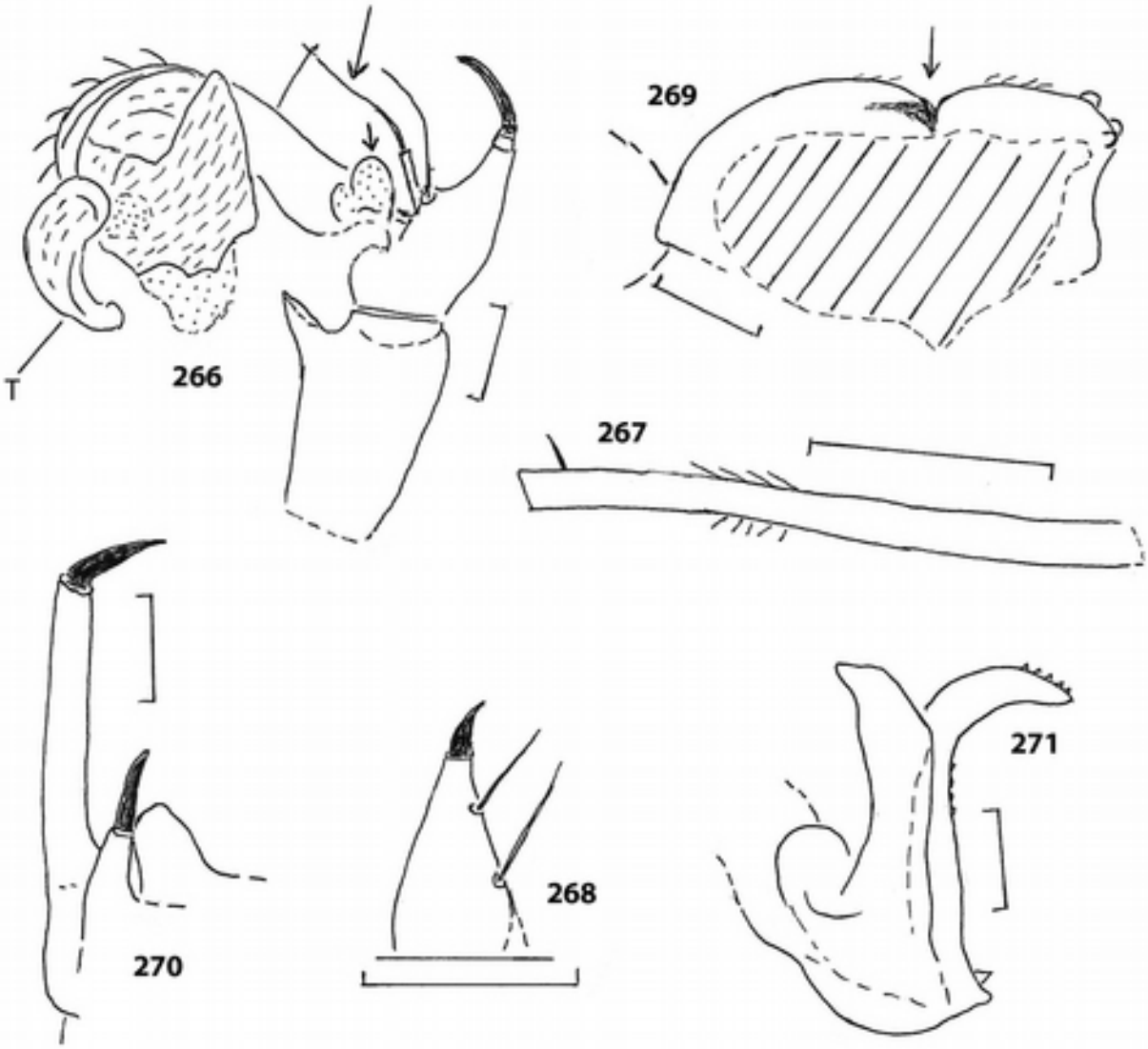


fig. 266) *Paramiagrammopes semiapertus* **n. sp**., Uloboridae, ♂, retrolateral aspect of the deformed left pedipalpus. The femur is flattened by the preservation. The long arrow points to the hair-shaped patellar bristle which is placed on a long sucle, the short arrow points to the retrobasal hump of the tibia. - T = tegular apophysis. Scale = 0.1;

figs. 267-268: *Paramiagrammopes simplex* **n. sp**., Uloboridae, ♂; 267) prolateral aspect of the right femur I. Only few hairs are drawn; 268) prolateral aspect of the dorsal outgrowth of the right pedipalpal patella. - Scale = 0. 2 and 0.1;

fig. 269-271: *Paramiagrammopes sulcus* **n. sp**., Uloboridae, ♂; 269) oblique lateral aspect of the prosoma. Parts are cut off, most eyes are hidden. The arrow points to the transverse furrow in front of the questionable fovea; 270) retrolateral aspect of the dorsal patellar outgrowths of the right pedipalpus; 271) tegular apophyses of the deformed left pedipalpus. - Scales 0.2 in fig. 269, 0.1 in figs. 270-271:

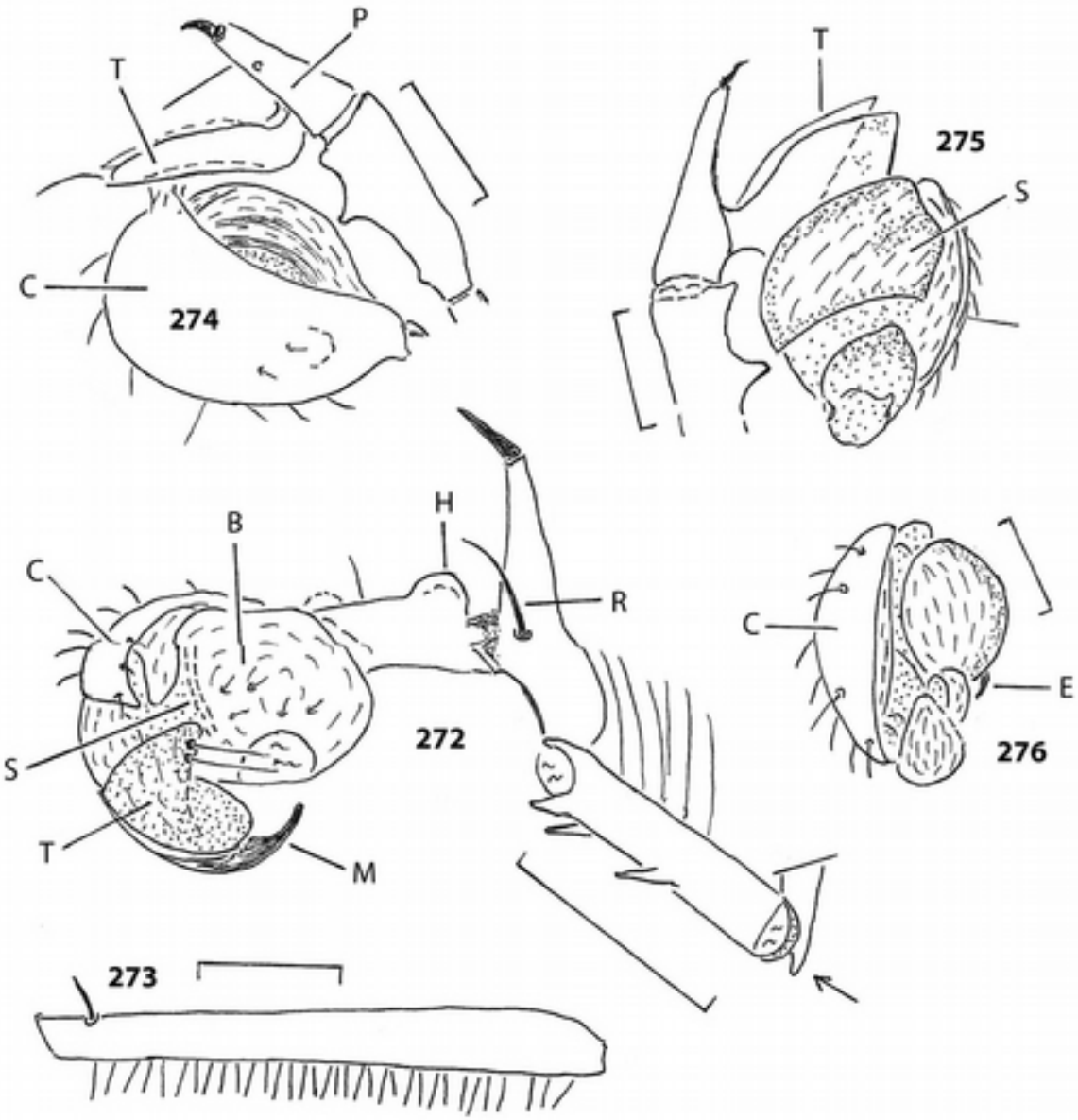
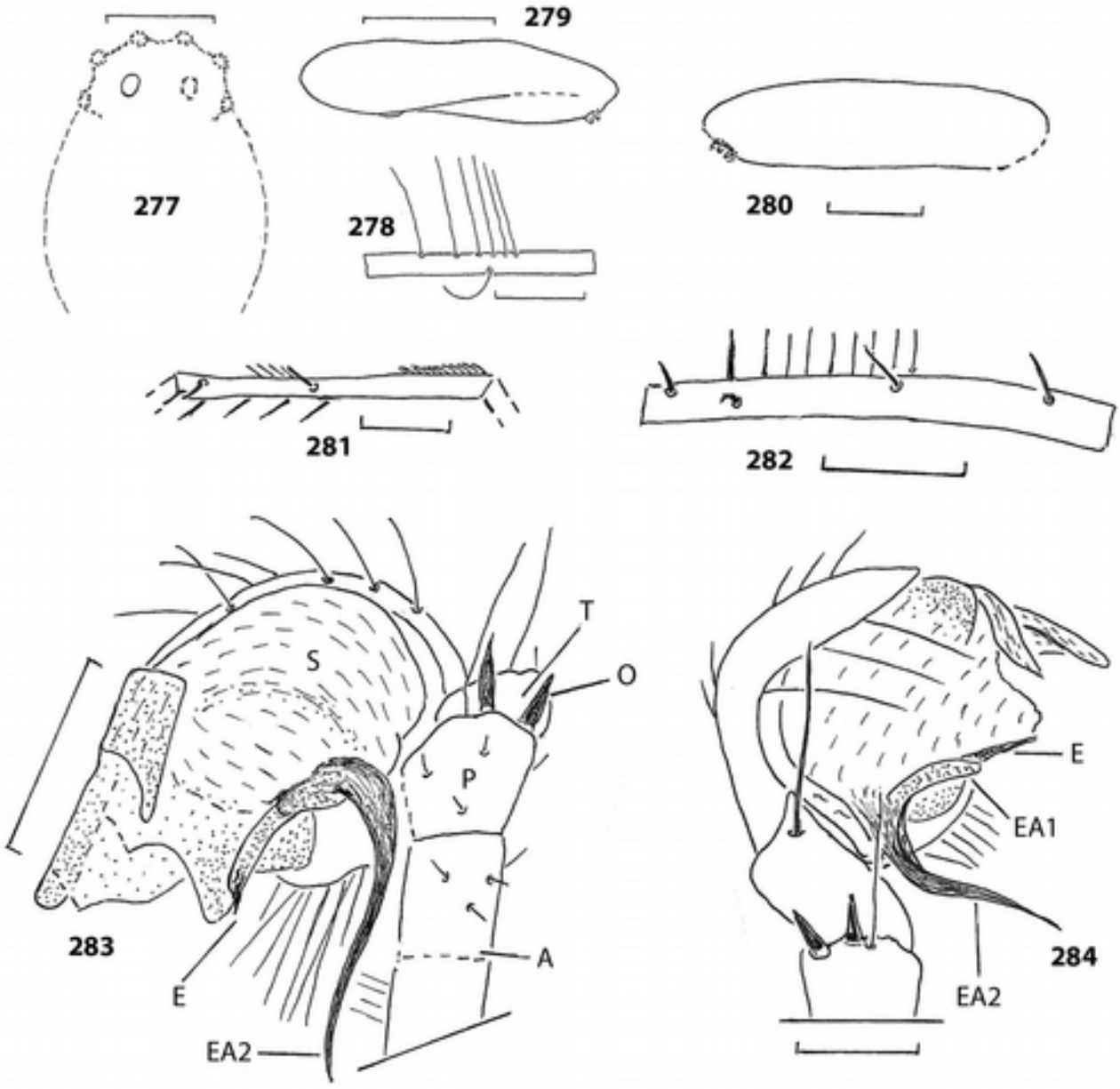


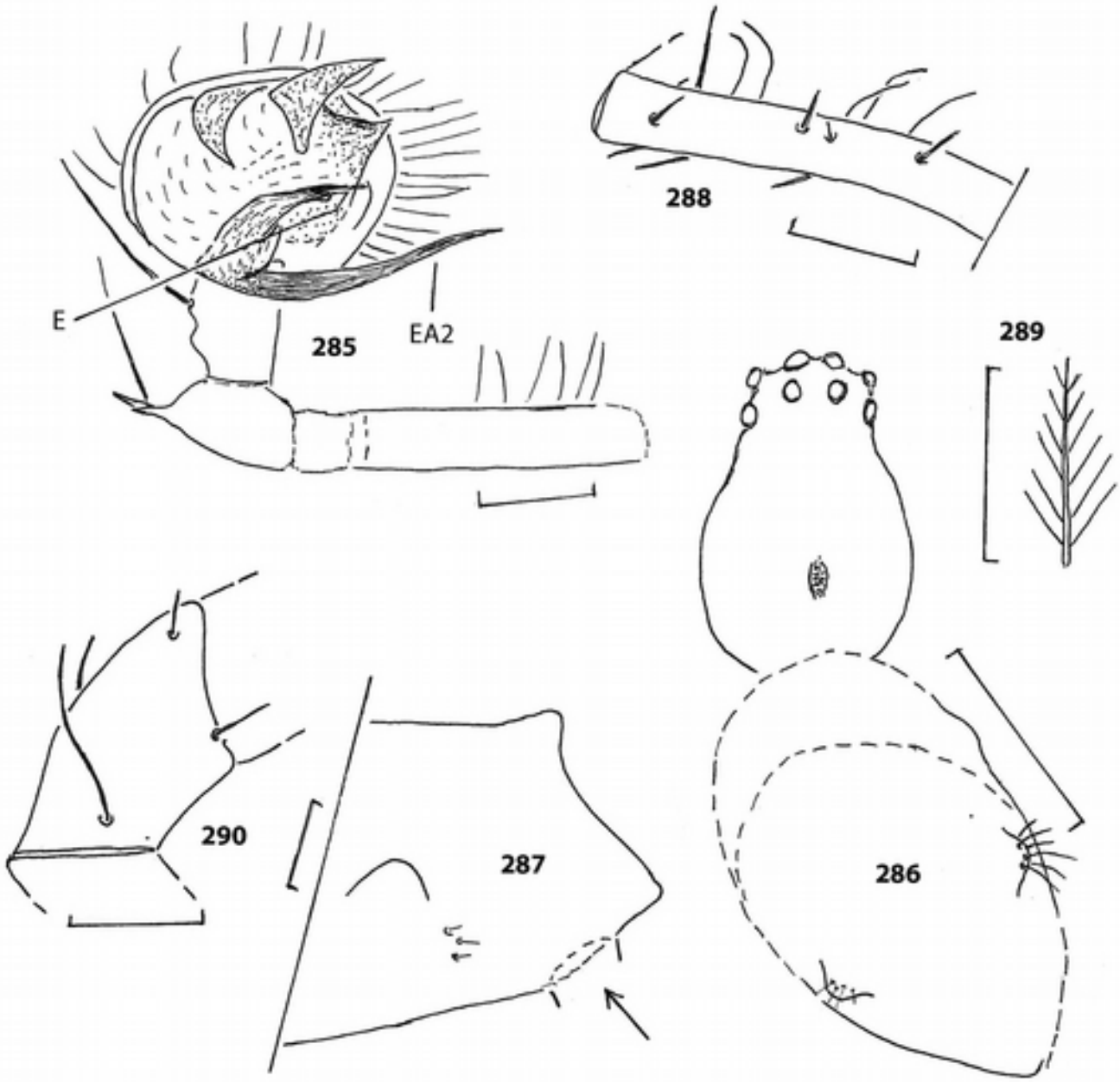
fig. 272) *Paramiagrammopes texter* **n. sp**., Uloboridae, ♂, retrolateral aspect of the left pedipalpus. Note the two longer hairs on the tegular apophysis and the short hairs of the bulb of the median apophysis. Hairs of tegular strucures are quite rare. - B = bulb of the median apophysis, C = cymbium, H = dorsal hump of the tibia, M = median apophysis, R = retrolateral bristle of the patellar apophysis, S = sperm duct, T = tegular apophysis. Scale = 0.2;

figs. 273-276: *Paramiagrammopes unibrevispina* **n. sp**., Uloboridae, ♂; 273) prolateral aspect of the right femur I; 274) prolateral aspect of the fairly deformed right pedipalpus; 275) retrolateral aspect of the right pedipalpus. The tibia is strongly deformed; 276) retrodorsal-apical aspect of the left pedipalpus. - C = cymbium, E = questionable embolus, P = patella, S = subtegulum, T = tibia. Scales: 0.2 in fig. 273, 0.1 in the remaining figs;



figs. 277-279: *Paramiagrammopes vesica* (WUNDERLICH 2008), ?juv. ♀; 277) dorsal aspect of the prosoma; 278) dorsal-left aspect of the deformed opisthosoma; 279) dorsal aspect of the left femur III. - Scales: 0.5 in fig. 278, 0.2 in figs. 277 and 279;

figs. 280-285: *Propterkachin bispinatus* **n. sp**., Uloboridae, ♂; 280) lateral aspect of the opisthosoma, outline; 281) prolateral aspect of the right metatarsus IV. Note the fairly thin ventral bristles of the pectunculus. Only few hairs are drawn; 282) retrodorsal aspect of the left femur IV. Some of the - only 8? - trichobothria are recognizable; 283) ventral aspect of the bulbus and dorsal aspect of other articles of the left pedipalpus; 284) retrolateral-basal aspect of the bulbus and dorsal aspect of patella and tibia of the right pedipalpus; 285) retrolateral aspect of the right pedipalpus. Only few hairs are drawn. - A = artefact, E = questionable embolus, EA1, EA2 = apophyses of the questionable embolus, O = prolateral spine of the patella, P = patella, S = subtegulum, T = tibia. Scales = 0.5 in figs. 280 and 282, 0.2 in the remaining figs.;



figs. 286-290: *Pseudokachin tuberculatus* **n. gen. n. sp**., ?Uloboridae), ♀; 286) dorsal aspect of the body; 287) dorsal-left and slightly posterior aspect of the posterior part of the opisthosoma. The arrow points to the hidden area of the spinnerets; 288) dorsal and fairly apical aspect of the distal part of the right femur II. Only 5 trichobothria are drawn; 289) feathery hair of the middle of the opisthosoma. Note: Most of such hairs on the opisthosoma are incomplete; 290) retrodorsal-basal aspect of the right patella III. Hairs are not drawn. Note the long and thin dorsal-basal bristle and the strongly reduced and hair-shaped pair of lateral as well as the dorsal-subapical bristle(s) which are quite similar on the left patella. - Scales: 1.0 in fig. 286, 0.5 in figs. 287-288, 0.1 in fig. 289 and 0.2 in fig. 290;

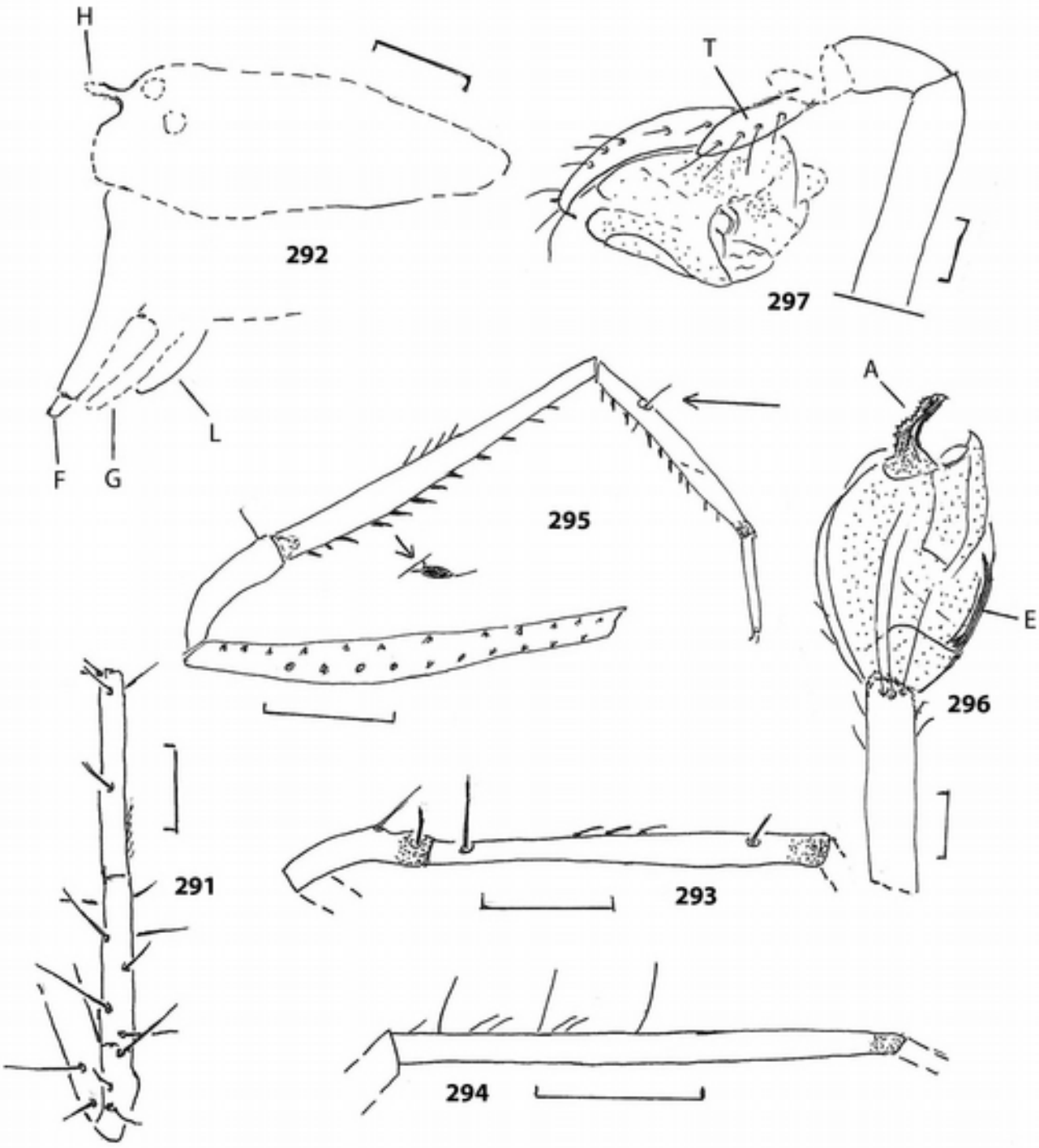
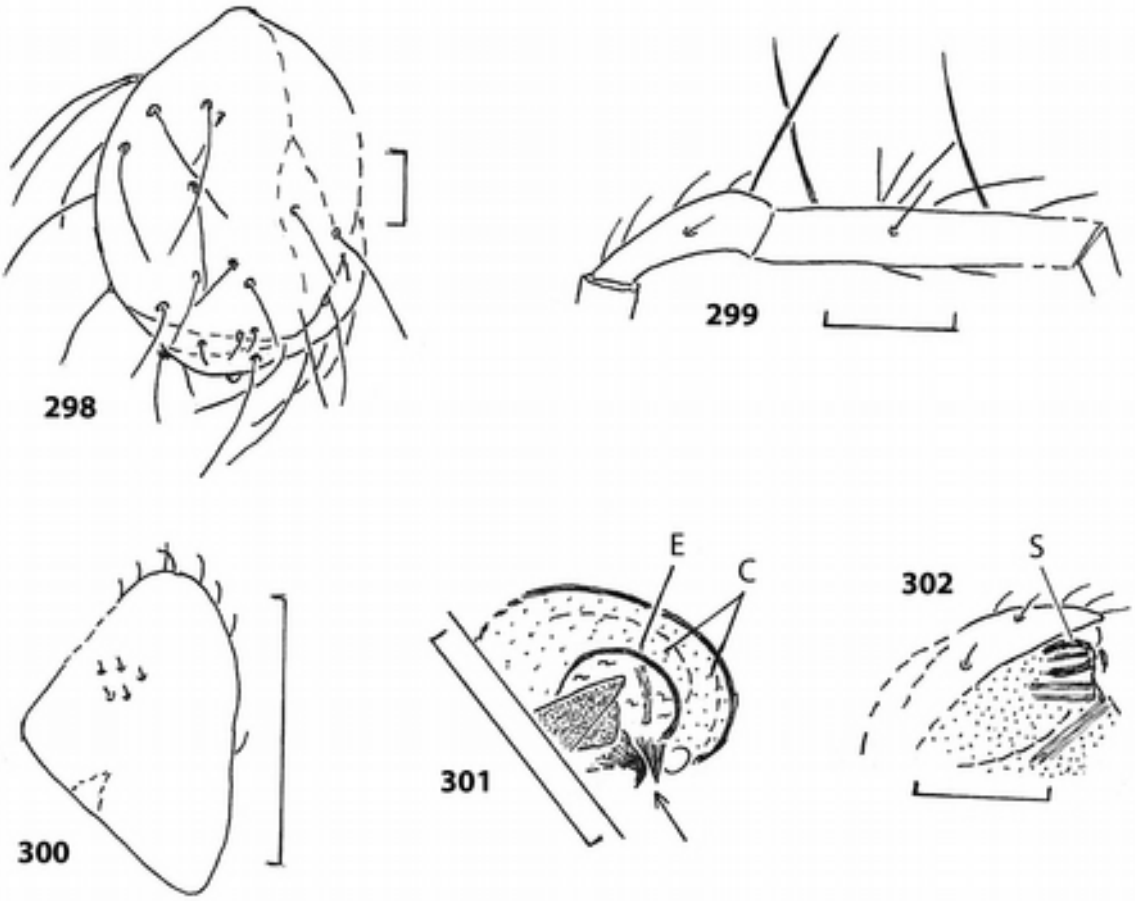


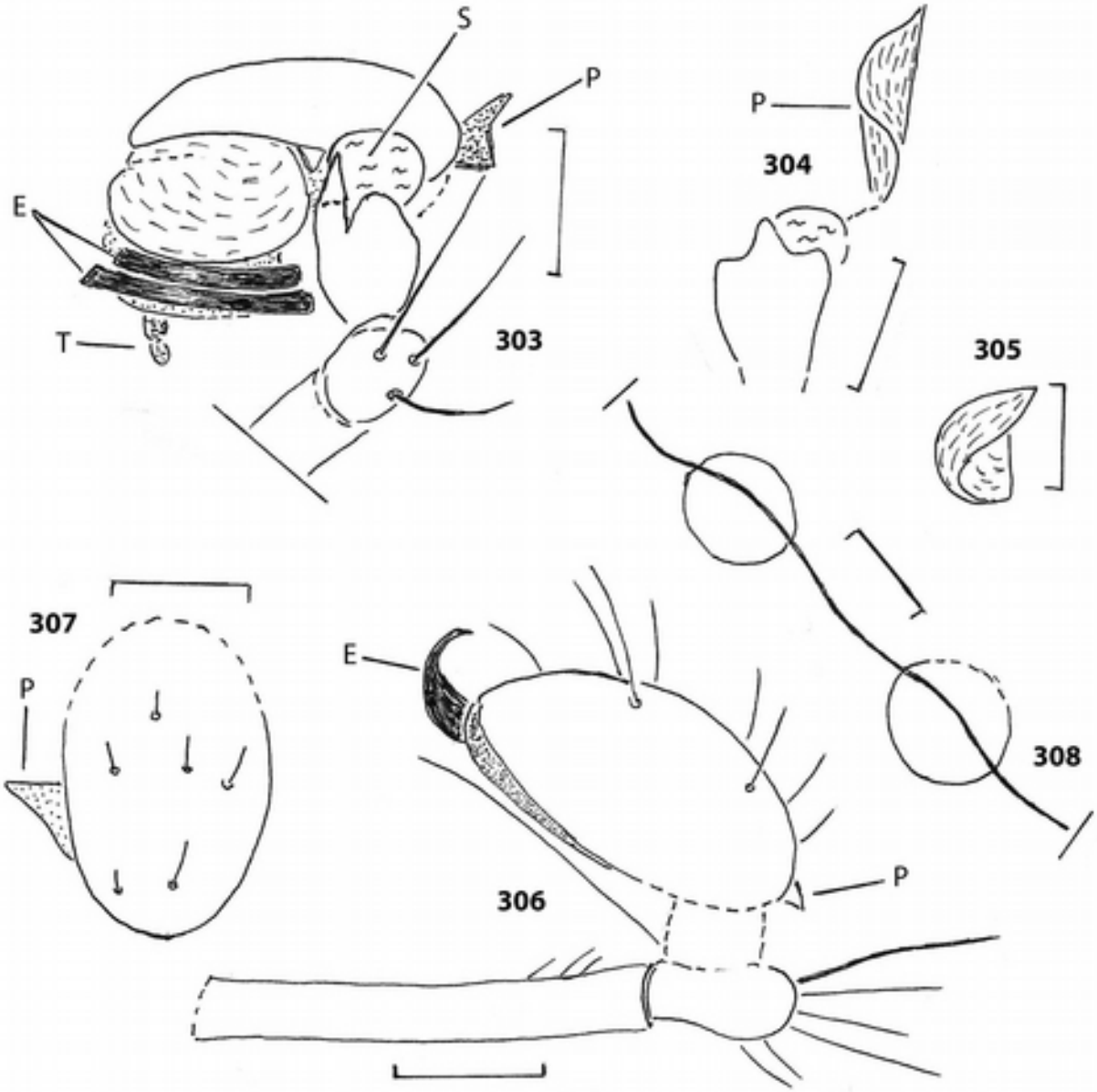
fig. 291) *Spiniuloborus crux* **n. gen. n. sp**., Uloboridae, ♀, prodorsal aspect of most parts of the right leg I. Only few hairs are drawn. Note the partly quite long and thin bristles.- Scale 0.2;

figs. 292-297: *Cornutheridion concavum* **n. gen. n. sp.**, Theridiidae, ♂; 292) Lateral aspect of the prosoma. Most eye lenses are hidden; 293) prodorsal aspect of the patella and the fairly



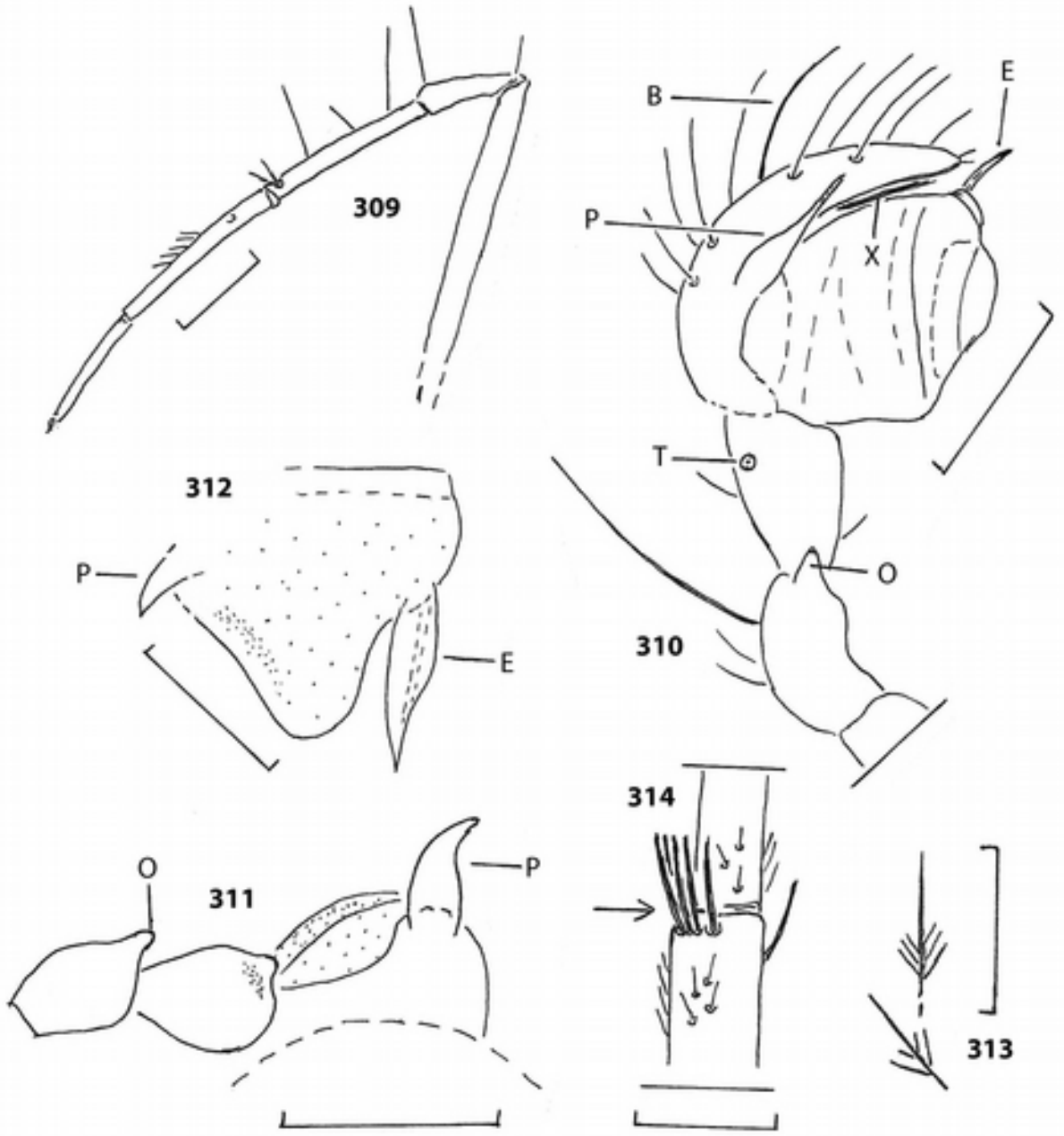
deformed tibia of the left leg IV. Only three hairs are drawn. Note the dark apical annulations of patella and tibia: 294) prodorsal-basal aspect of the left metatarsus IV. Note the three long sensory hairs which may be trichobothria or a malformation; I did not observe such long hairs on other metatarsi. Only few normal hairs are drawn; 295) retrolateral - the femur retroventral - aspect of the right leg I. The leg articles are partly thickened by the preservation and shortened in the present aspect, especially metatarsus and tarsus. Note the thin patellar bristle. The long arrow points to the metatarsal trichobothrium, the short arrow points to an enlarged hair-bearing “thorn”; 296) retroventral aspect of the right pedipalpus. Most structures are darkened and badly recognizable; 297) retrolateral aspect of the left pedipalpus which bulbus structures as well as the apical part of the patella and the basal part of the tibia (apparently broken) are strongly deformed. - A = tegular apophysis, E = questionable embolus, F = fang, G = deformed gnathocoxa, H = “horn” of the cymbium which tip is hidden, L = labium, T= tibia. Scales: 0.5 in fig. 295, 0.2 in figs. 292-294, 0.1 in figs. 296-297;

figs. 298-302: *Microtheridion longissispinae* **n. gen. n. sp**., probably family Theridiidae, ♂; 298) dorsal aspect of the deformed opisthosoma. Not all bristles are drawn or preserved; 299) prolateral aspect of the left leg I. Only few hairs are drawn; 300) dorsal aspect of the left cymbium. Only few hairs are drawn; 301) proventral aspect of the left pedipalpus which is partly hidden and may be partly expanded. The arrow points to the pair of claw-shaped tegular apophyses; 302) prodorsal aspect of the left pedipalpus which partly is hidden. - C = cymbium, E = questionable embolus, S = subtegulum. Scales = 0.1;



figs. 303-305: *Burmaspiralis trispinae* **n. gen. n. sp**., Zarqaraneidae, ♂ ; 303) prolateral aspect of the right pedipalpus. Hairs are not drawn; 304) retrolateral aspect of tibia and patella of the left pedipalpus; 305) retroapical aspect of the paracymbium of the left pedipalpus. - E = embolus, P= paracymbium, S = scinny tibial apophysis, T = tegular apophysis. Scales 0.1, 0.1, 0.05;

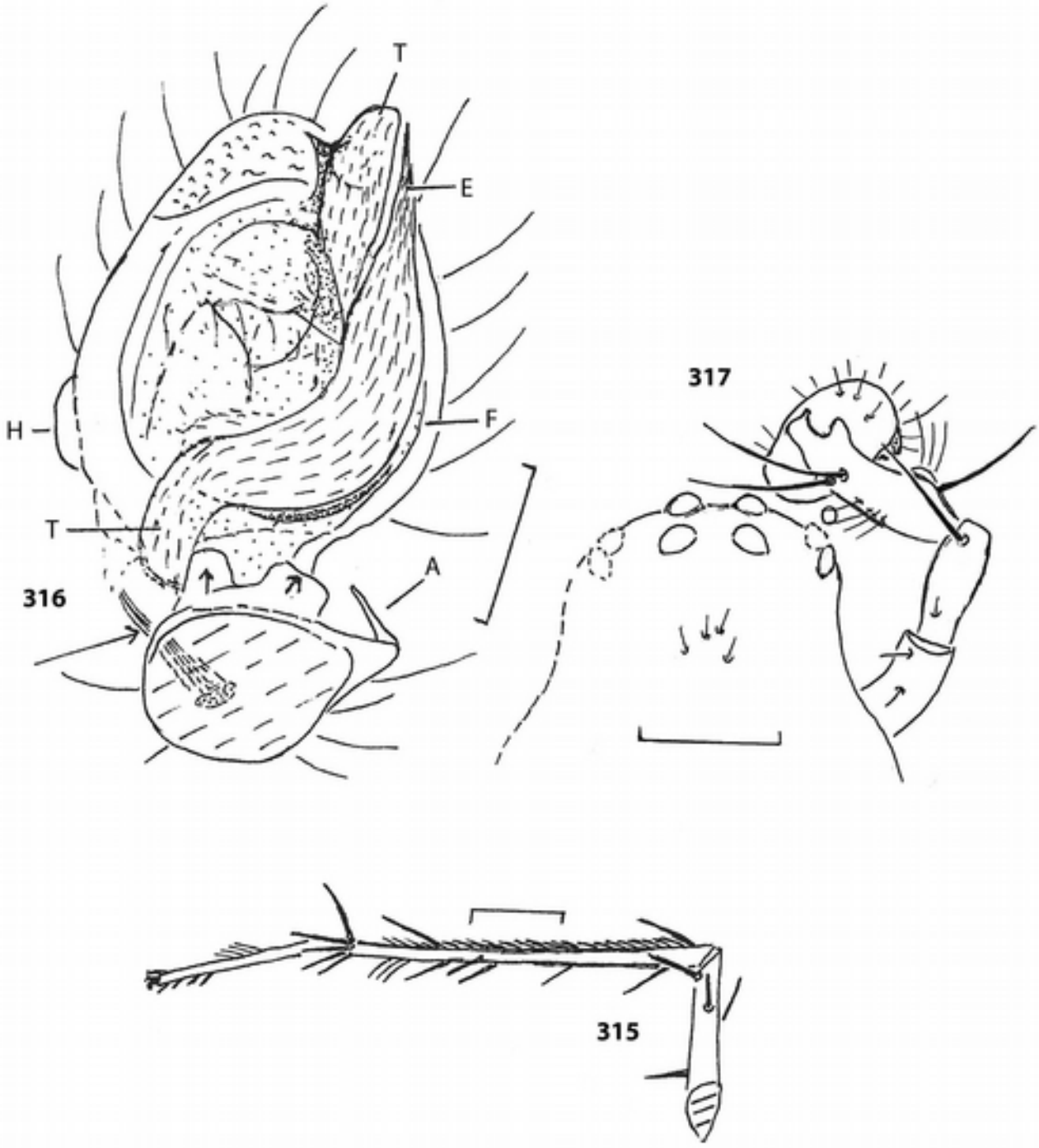
figs. 306-308: *Crassitibia sicilicula* **n. sp**., Zarqaraneidae, ♂; 306) prodorsal aspect of the right pedipalpus. Parts of the tibia are hidden, only few hairs are drawn; 307) dorsal aspect of the left cymbium and paracymbium; 308) two of the best preserved sticky droplets - apparently enlarged by the preservation - as part of the capture web near the body of *Crassitibia sicilicula*. - E = embolus, P = paracymbium. Scales: 0.1 in figs. 306-307, 0.2 in fig. 308;



figs. 309-312: *Spinicymbium unispina* **n. sp**., Zarqaraneidae, ♂; 309) retrolateral aspect of the left leg I. Only few hairs are drawn; 310) retrolateral aspect of the right pedipalpus. Only few hairs are drawn; 311) dorsal aspect of the left pedipalpus. Parts are hidden by the right cymbium. Bristles and hairs are not drawn; 312) distal part of the left pedipalpus. - B = cymbial bristle, E = embolus, O = outgrowth of the patella, P =paracymbium, T = trichobothrium, X = needle-shaped tegular apophysis. Scales: 0.2 in fig. 309, 0.1 in figs. 310-312;

fig. 313) Two feathery hairs. Scale = 0.1;

fig. 314) Araneae indet. (RTA-clade) in Burmite, ?juv. ♀ (F3210/BU/CJW), prolateral aspect of the distal part of the metatarsus and the basal part of the tarsus of the right leg III. The arrow points to the strong bristles of the "preening comb". Scale = 0.2;



figs. 315-316: *Eotibiaapophysis reliquus* WUNDERLICH 2018, Eotibiaapopysidae, ♂; 315) prolateral aspect of the right leg IV; 316) ventral aspect of the probably left pedipalpus. The basal part of the tibia is cut off, the long arrow points to the strong dorsal tibial bristle, the short arrows point to the ventral tibial apophysis. A = (?) retrolateral tibial apophysis, E = questionable embolus, F = cymbial fold, H = cymbial hump, T = tegular/median apophysis. Scales 0.5 and 0.2;

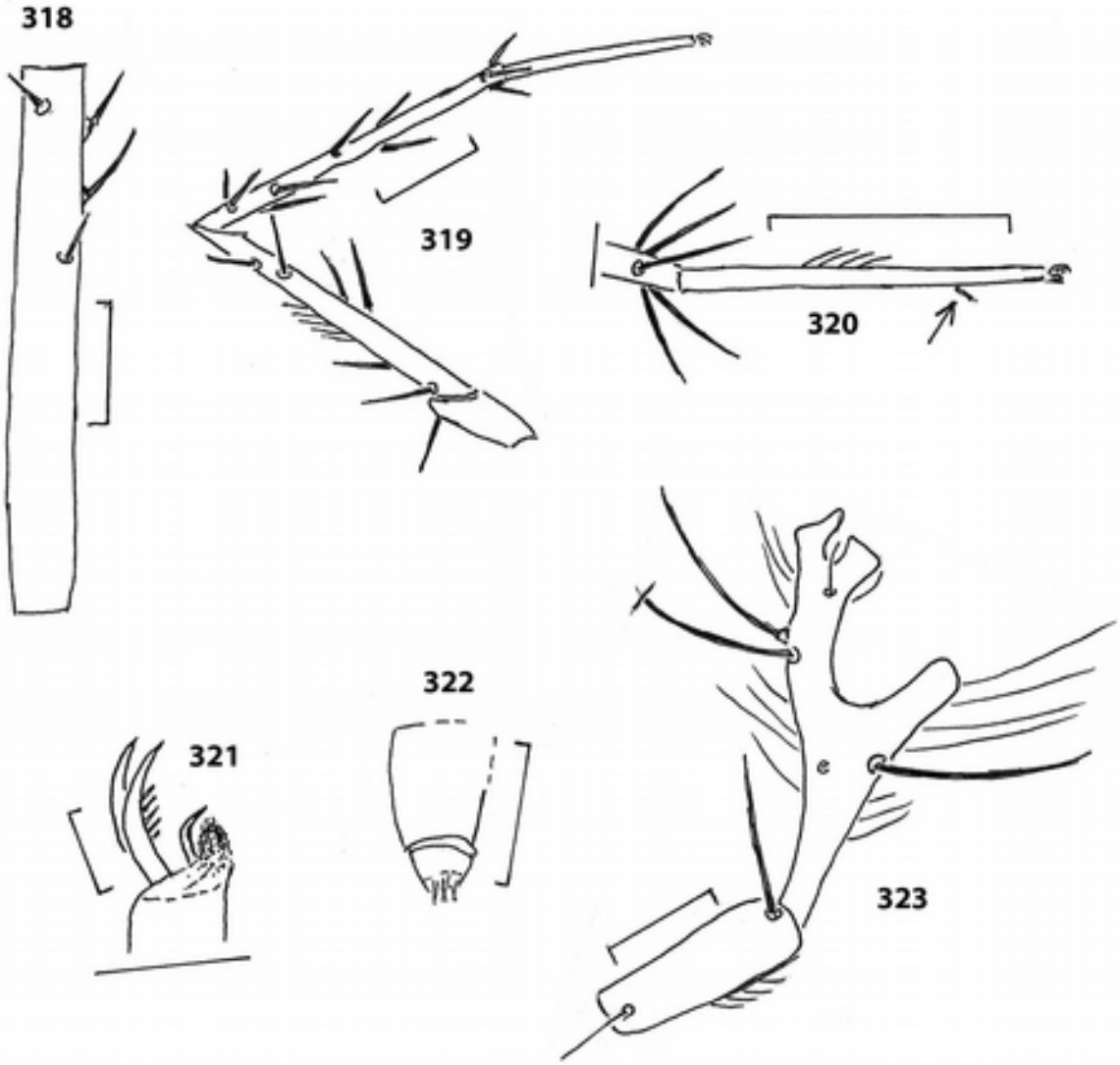
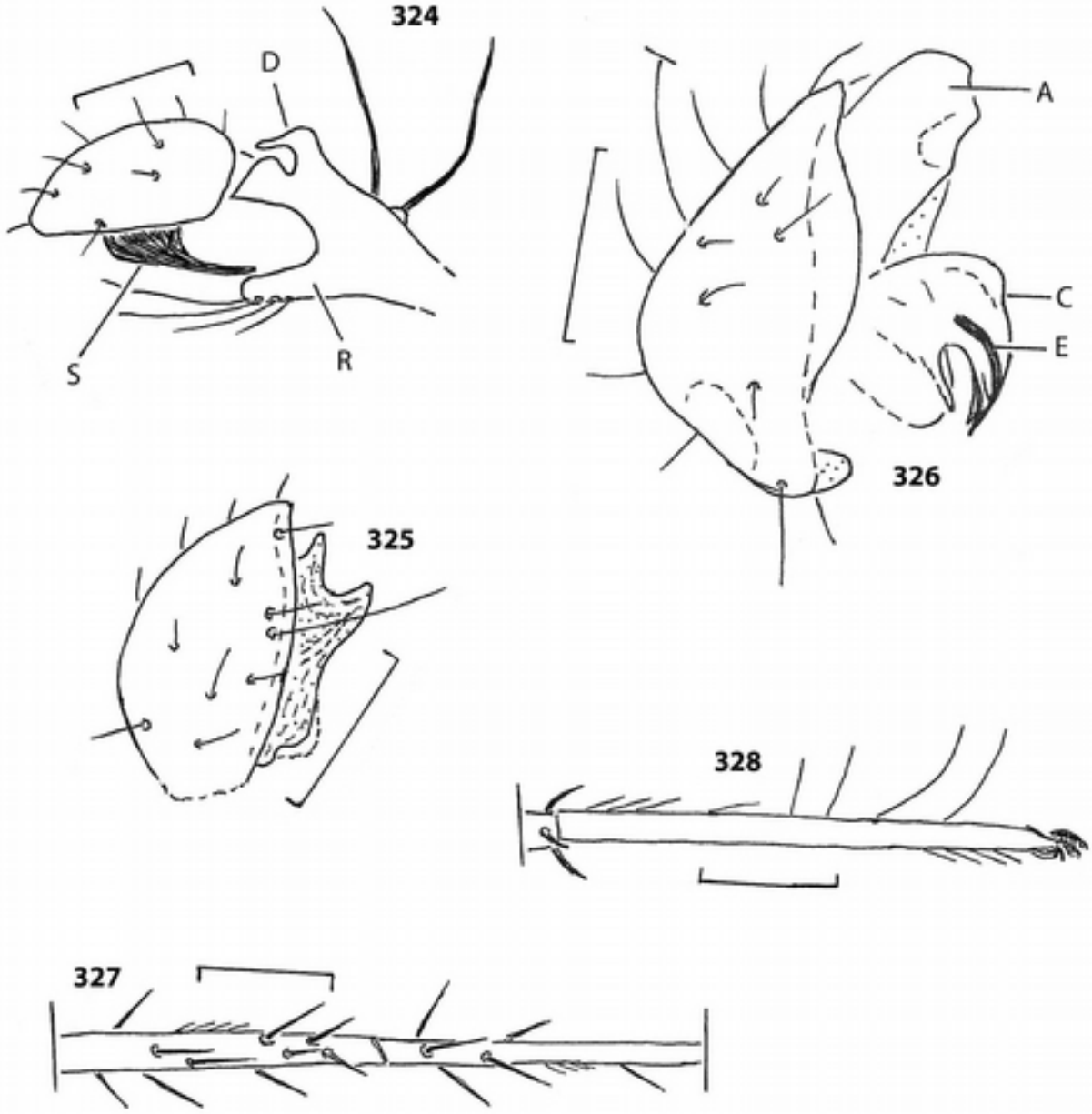
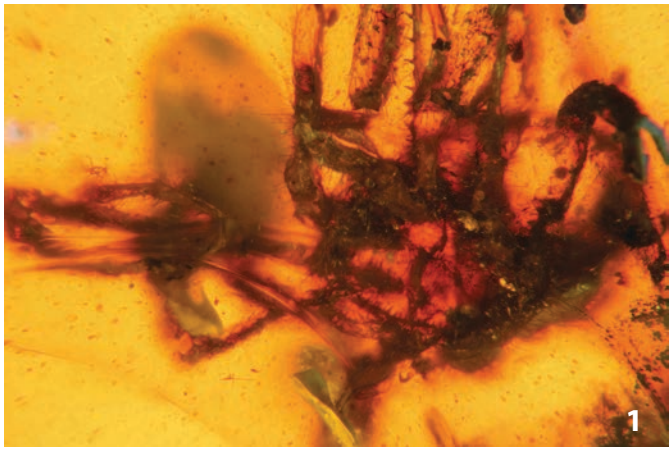
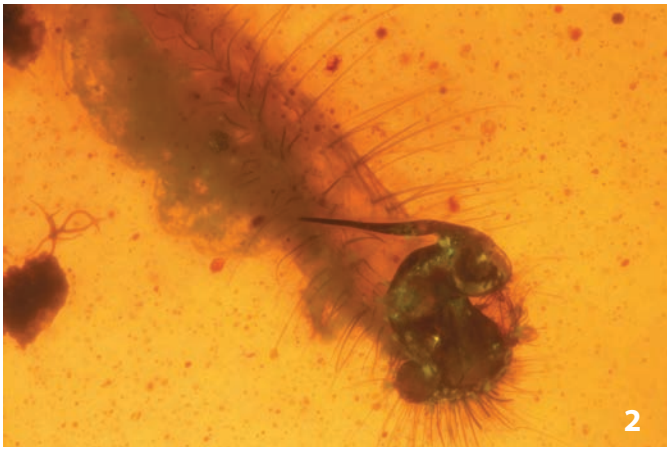


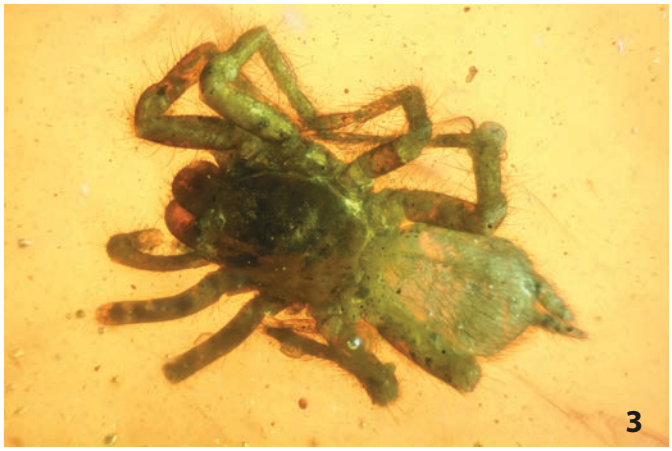
fig. 317-326: *Eoagalenomorphus cretaceus* **n. gen. n. sp**., Eotibiaapophysidae, ♂; 317) dorsal aspect of the anterior part of the prosoma and the right pedipalpus; 318) dorsal aspect of the left femur I; 319) retrolateral aspect of the right leg II. Only few hairs are drawn; 320) prolateral aspect of the left tarsus and apical part of the metatarsus IV; the arrow points to the ventral tarsal bristle; 321) prolateral aspect of the tip of the tarsus of the left leg III; 322) ventral aspect of the right posterior spinneret; hairs are not drawn; 323) dorsal aspect of the right pedipalpal patella and tibia which is fairly depressed laterally; 324) retrodorsal aspect of the left pedipalpus; 325) retrolateral and slightly apical aspect of the left pedipalpus. Only few hairs are drawn; 14) retrolateral and slightly distal aspect of the expanded and deformed left pedipalpus. – A = questionable artefact, C = questionable conductor, D = small dorsal apophysis, E = questionable embolus, S = slender tegular apophysis. Scales 1.0 in fig. 319, 0.5 in figs. 316, 318, 320; 0.3 in figs. 317, 324-325, 0.2 in fig. 326 , 0.1 in figs. 322-324, 0.05 in fig. 321;

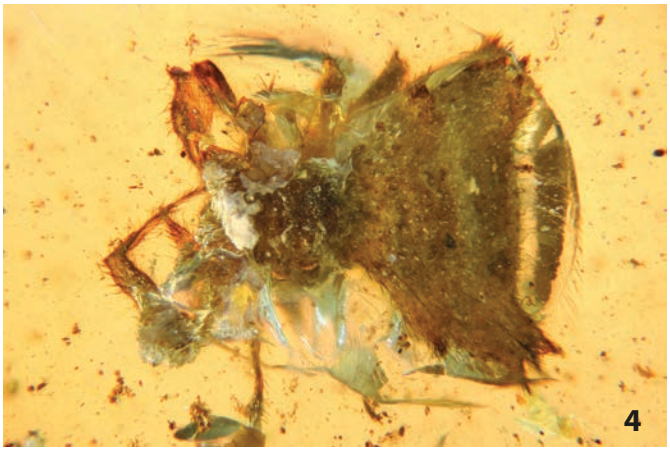


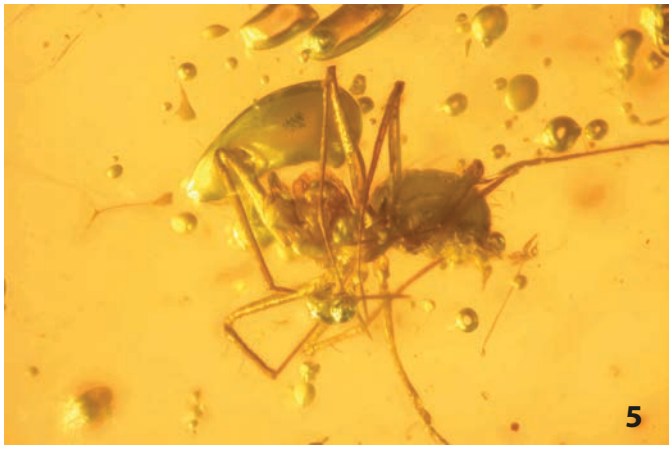
figs. 327-328: Agelenomorpha indet. of the RTA-clade, F3665; 327) dorsal aspect of most parts of tibia and metatarsus. Feathery hairs, trichobothri and most hairs are not drawn; 328) lateral aspect of a tarsus. Note the long dorsal trichobothria. Only few hairs are drawn. - Scales 0.5 and 0.2.

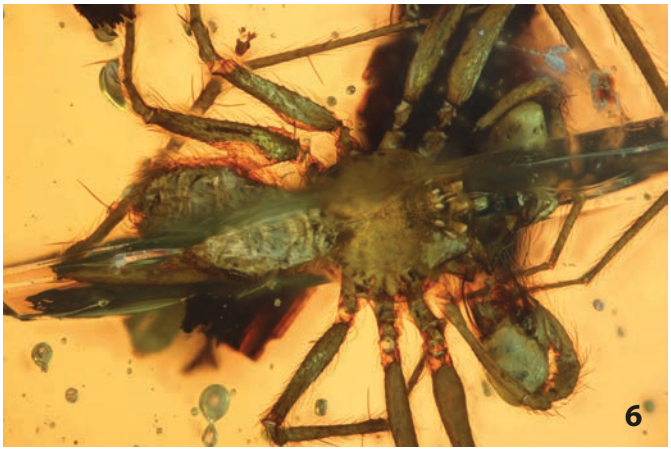












1) *Alterphyxioschemoides spicula* **n. gen. n. sp**. ?Dipluridae, ♂, body length 5.5 mm, ventral aspect of the incomplete and strongly deformed spider. Note the long right pedipalpus which is widely stretched out.

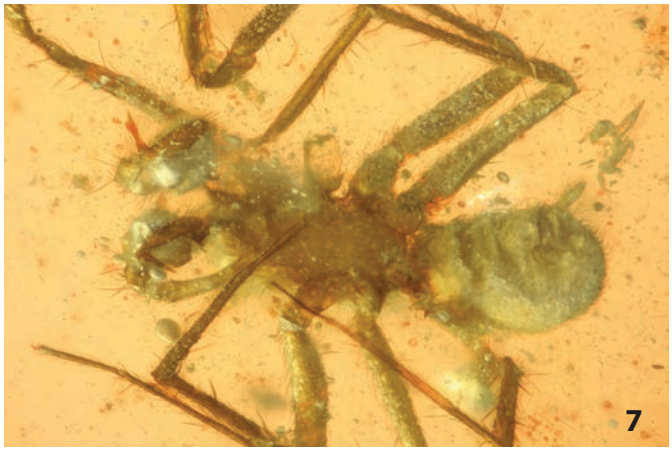
2) The same spider, right pedipalpus.

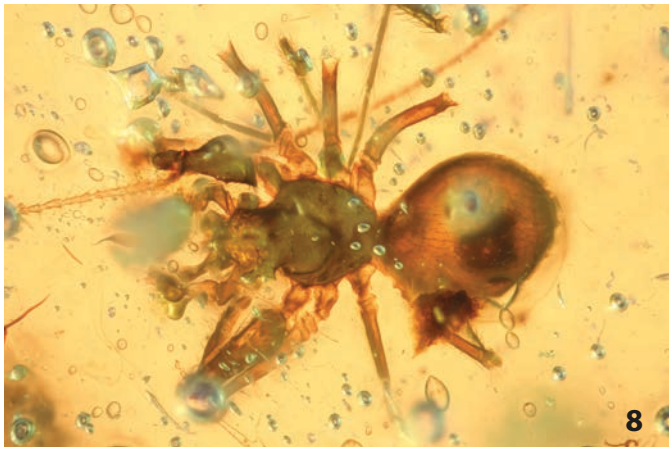
3) ?Hexathelidae indet., juv., body length 2.6 mm, dorsal aspect.

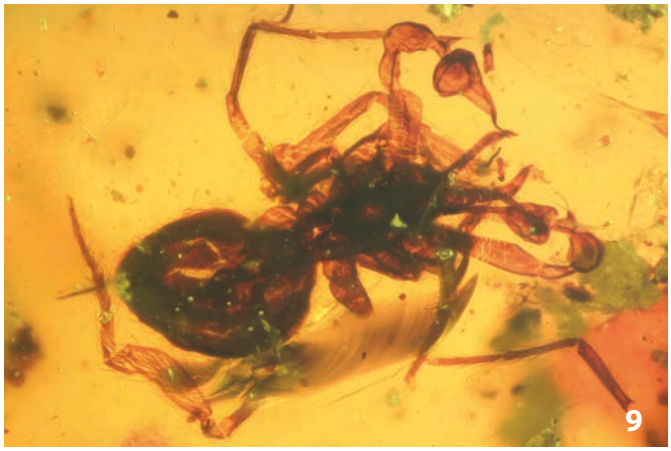
4) *Megasetae colphepeirotypoides* **n. gen. n. sp**., Megasetidae **n. fam**., ♀, body length 3.6 mm, dorsal aspect. Note the posterior-lateral outgrowths of the wide opisthosoma.

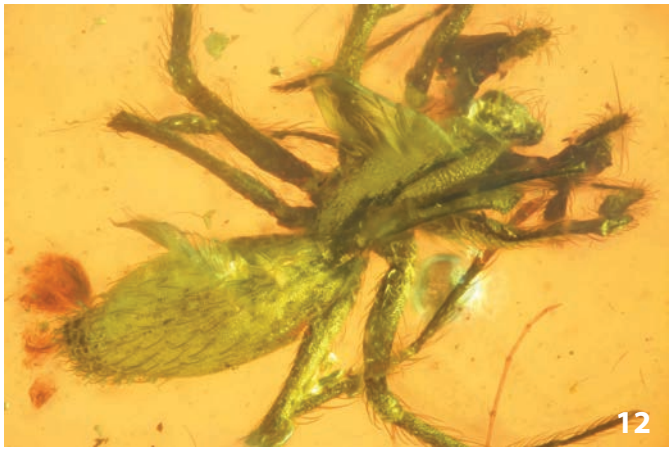
5) ?*Telemophila ovalis* **n. sp**., Telemidae, ♂, body length 0.7 mm (one of the tiniest fossil spiders), ventral aspect. Note the large bubble above the prosoma.

6) *Palaeoleptoneta fissura* **n. sp.**, Leptonetidae, ♂, body length 1.4 mm, dorsal aspect. A fissure runs longitudinally through the body of the spider.









7) *Proaraneoides lanceatum* **n. sp.**, Protoaraneoididae, ♂, body length 1.5 mm, ventral aspect. Note the large pedipalpi and the loss of the left leg II between coxa and trochanter by autotomy, a synapomorphy of this family and the related Praeterleptonetidae.

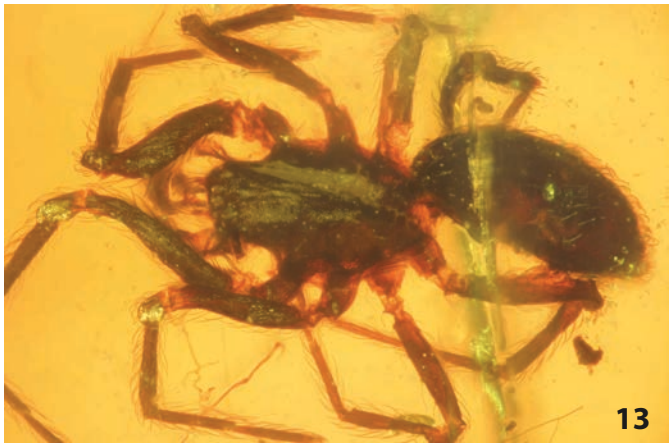
8) *Alticorona plenfemur* **n. gen. n. sp.**, Tetrablemmidae, ♂, body length 1.2mm, dorsal aspect.

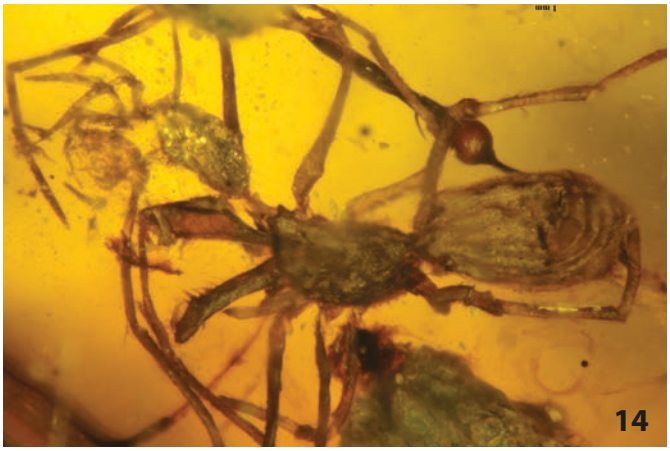
9) *Electroblemma spermaferens* **n. sp.**, Tetrablemmidae, ♂, body length 1.3 mm, ventral aspect.

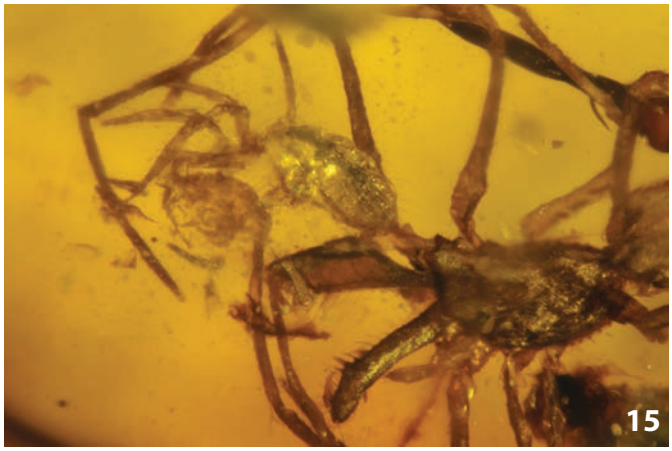
10) ?*Furcembolus* sp. indet., Tetrablemmidae, ♀, F3654, body length 5.0 mm, dorsal aspect.

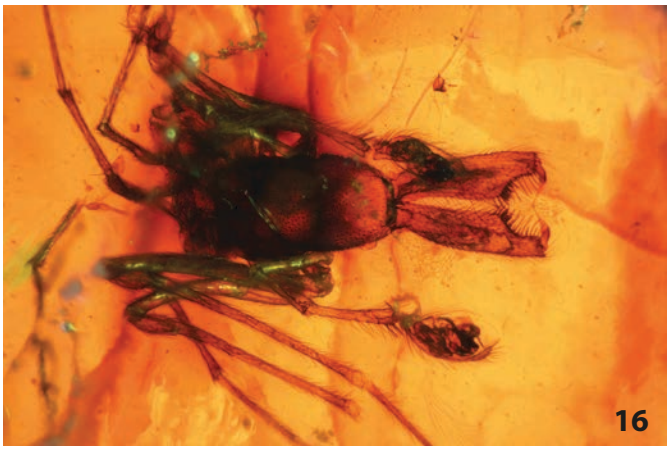
11) ?*Furcembolus* sp. indet. (F3655), Tetrablemmidae, ♀-exuvia, prosomal length 1.7 mm.

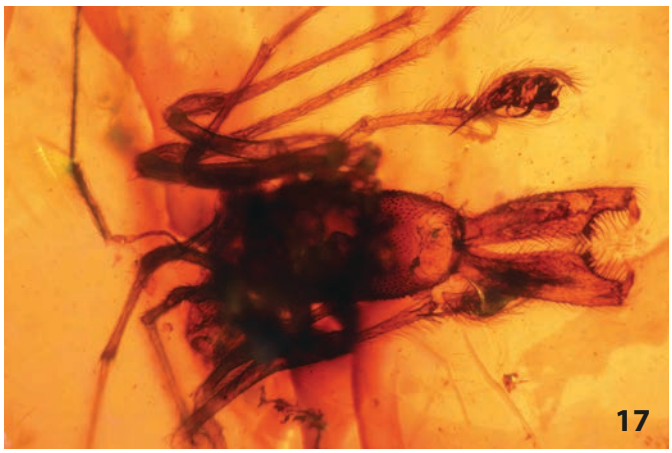
12) *Procerclypeus deformans* **n. gen. n. sp.**, Tetrablemmidae, ♂, body length 1.9 mm, dorsal aspect. The prosoma is laterall strongly compressed.

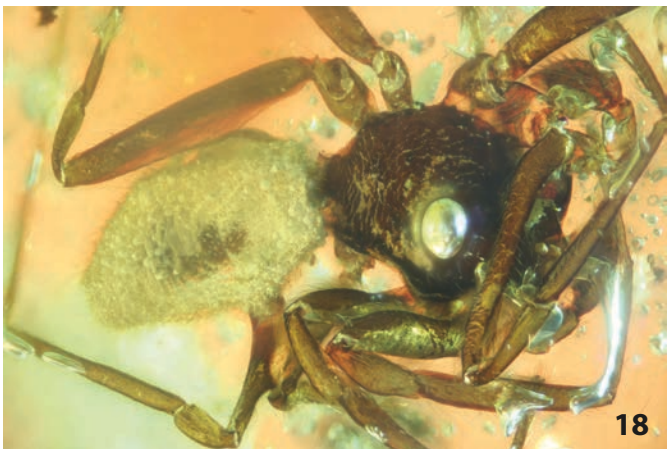












13) *Tenuicephalus penicillus* **n. gen. n. sp.**, Tetrablemmidae, ♂, body length 1.7 mm, dorsal.

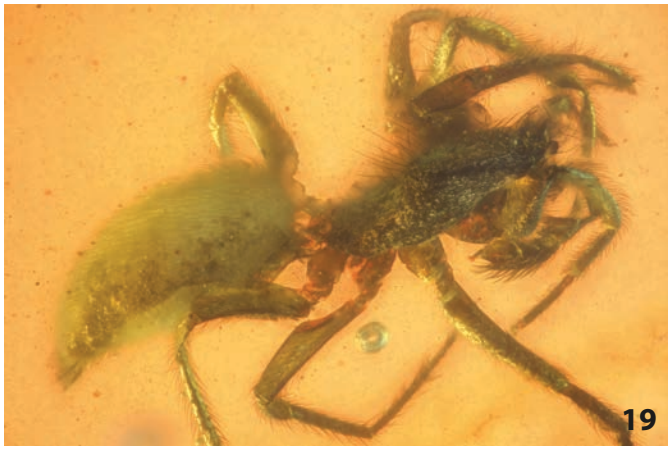
14) *Burmesarchaea* sp. indet. (F3341/BU/CJW), Archaeaidae, ?juv., body length 1.4 mm, with prey, a spider probably of the extinct araneoid family Zarqaraneidae, lateral aspect, see the chapter “Palaeobehaviour ...”.

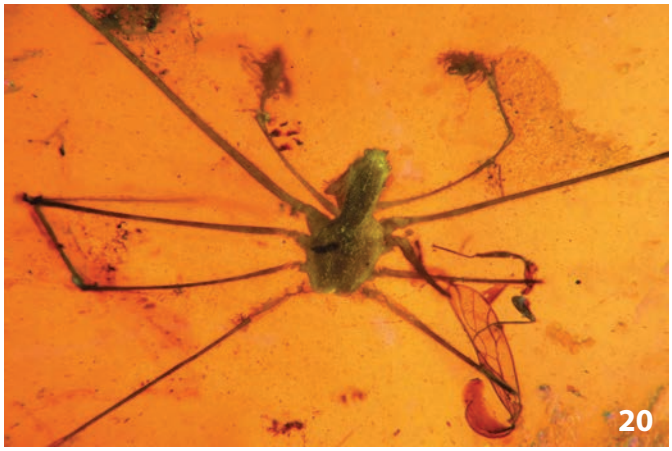
15) The same objects, enlarged.

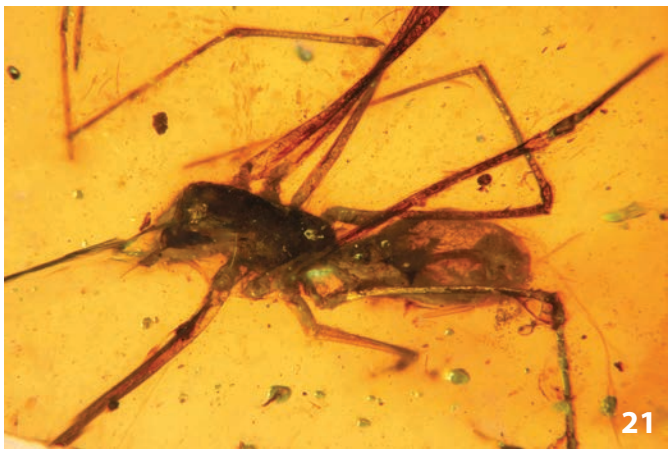
16) *Spiniarchaea aberrans* **n. gen. n. sp.**, Archaeidae, ♂, body length 3.5 mm, prosoma, pedipalpi and some legs, dorsal aspect. The “spiny” chelicerae are stretched forewards in an unnatural position.

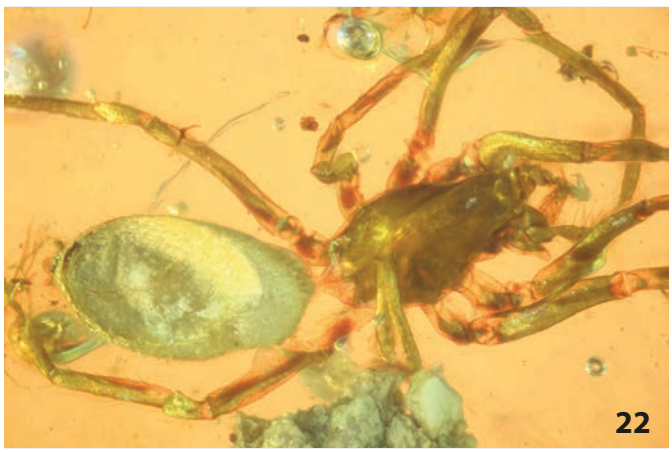
17) The same spider, ventral aspect.

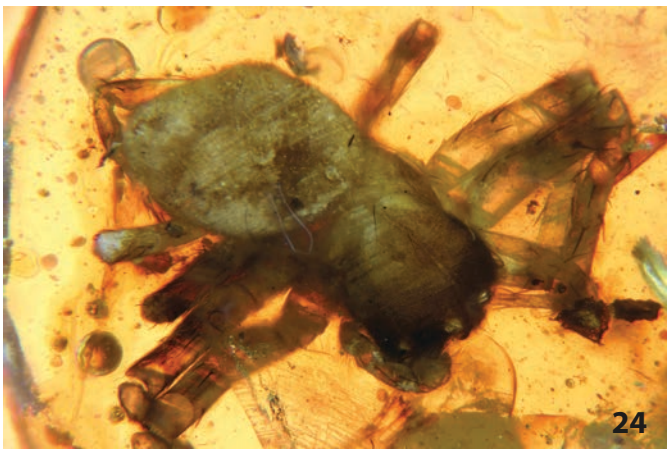
18) *Palaeozearchaea depressa* **n. gen. n. sp.**, Mecysmaucheniidae, ♂, body length 1.8 mm, dorsal aspect.











19) *Micropalpimanus gibber* **n. sp.**, Micropalpimanidae, ♂, body length 2.0 mm, dorsal-right aspect.

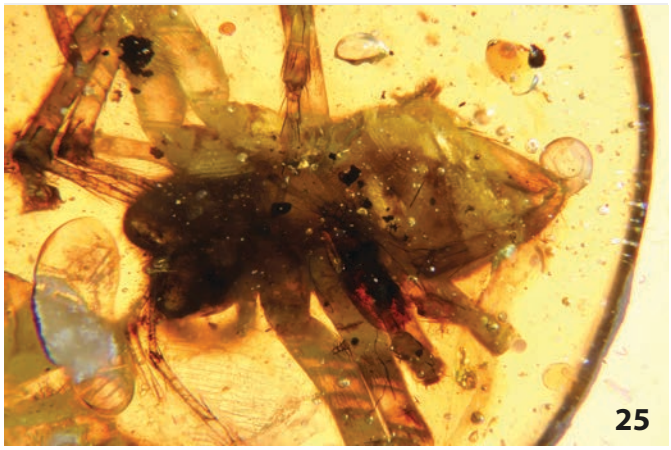
20) *Planarchaea incompleta* **n. gen. n. sp.**, Planarchaeidae, ♂, prosomal length 1.7 mm, dorsal aspect. The opisthosoma is lost. Note the extremely long and slender legs.

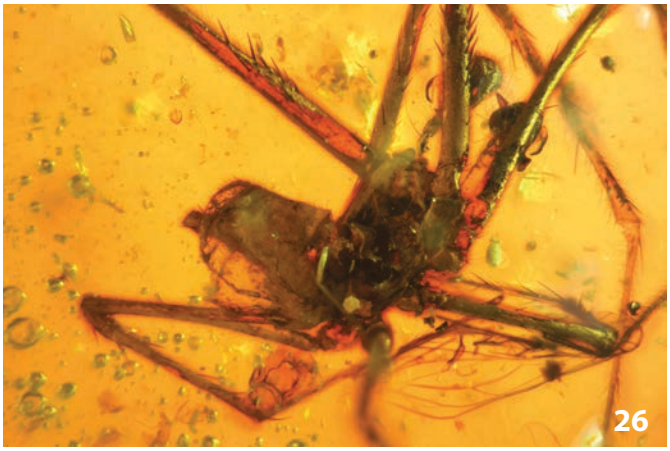
21) *Platythelae longicorpus* **n. gen. n. sp**., Planarchaeide, ♂, body length 4.2 mm, dorsal.

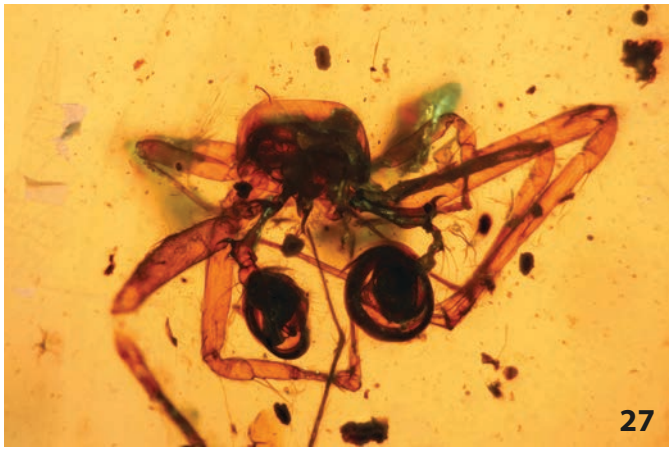
22) *Procervetiator fruticosus* **n. gen. n. sp.**, Vetiatoridae, ♂, body length 1.8 mm, dorsal.

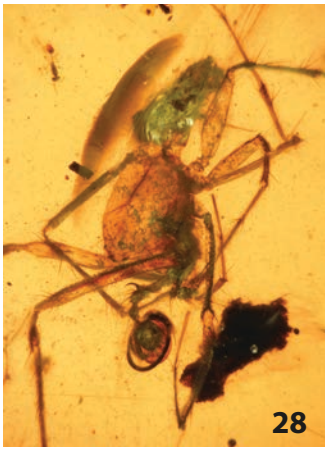
23) *Praetervetiator circulus* **n. gen. n. sp**., Vetiatoridae, ♂, body length 2.5 mm, left aspect.

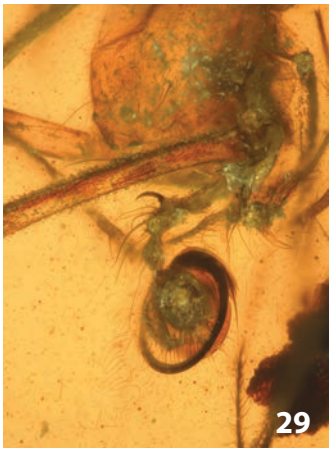
24) *Crassicephalus parvibulbus* **n. gen. n. sp**., Crassicephalidae, ♂, body length 4.6 mm, dorsal aspect.

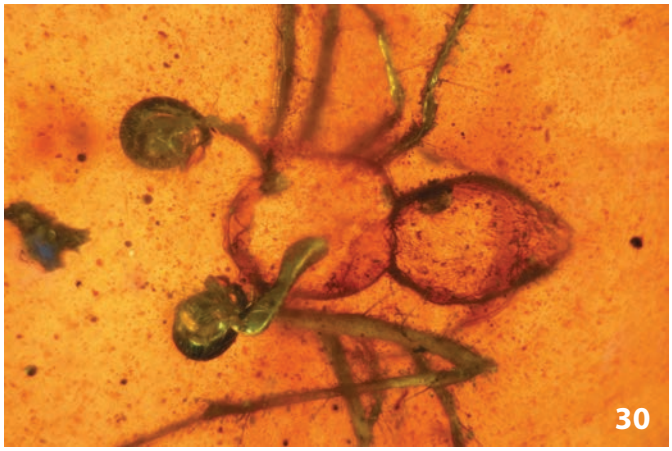


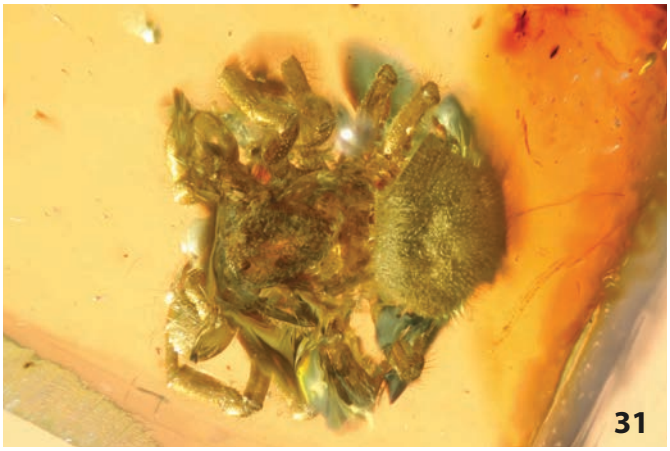












25) The same spider, ventral aspect.

26) *Dubiodeinopsis spinifemora* **n. gen. n. sp.**, Dubiodeinopsidae, ♂, body length 2.5 mm, dorsal aspect. The body is distinctly deformed.

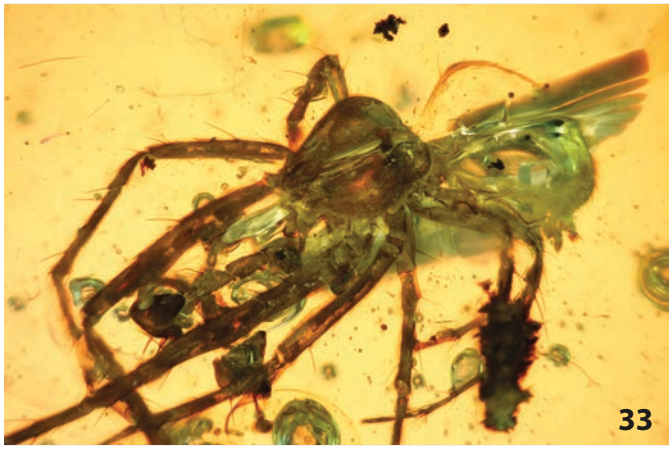
27) *Dubiouloborus praeta* **n. gen. n. sp.**, Dubiouloboridae, ♂, body length 2.6 mm, anterior aspect.

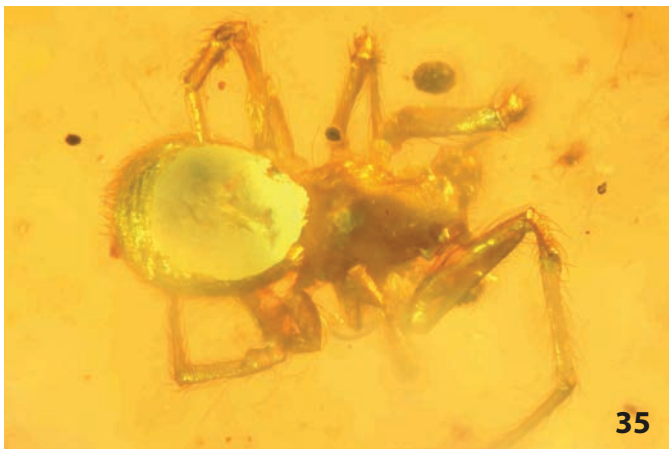
28) *Dubiouloborus procerembolus* **n. gen. n. sp**., Dubiouloboridae, ♂, body length ca. 2.5 mm, dorsal-left aspect.

29) The same spider, enlarged.

30) *Dubiouloborix incompletus* **n. gen. n. sp**., Dubiouloboridae, ♂, body length 2.3 mm, dorsal.

31) *Frateruloborus bulbosus* WUNDERLICH 2018, Frateruloboridae, ♂, body length 2.0 mm, dorsal aspect.





32) *Boavista crassifemoralis* **n. gen. n. sp.**, Uloboridae, ♂, body length 2.3 mm, dorsal aspect.

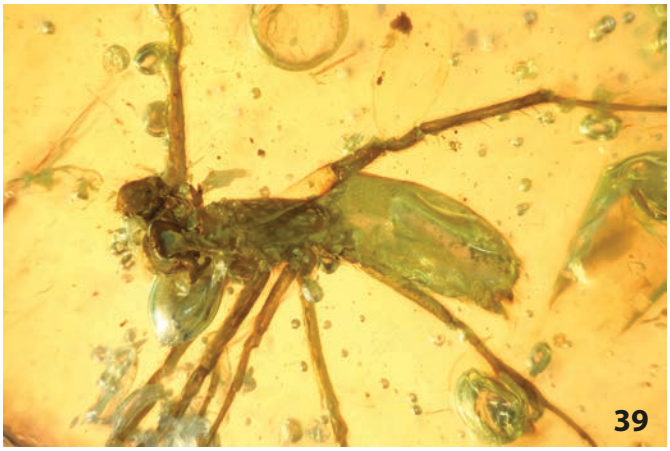
33) *Burmasuccinus bulla* WUNDERLICH 2018 , Uloboridae, ♂, body length 2.5 mm, dorsal-left aspect.

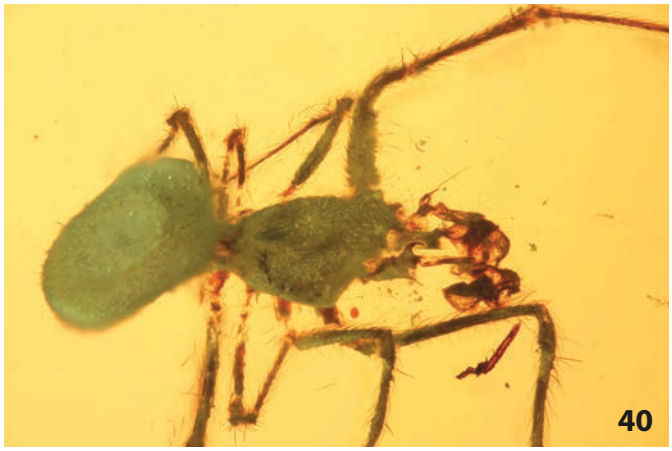
34) *Microuloborus oblongus* **n. gen. n. sp.**, Uloboridae, ♂, body length ca. 1.0 mm, anterior aspect.

35) *Microuloborus birmanicus* WUNDERLICH 2015, Uloboridae, ♂, body length 0.9 mm, dorsal aspect, tiniest known member of the family Uloboridae.

36) *Paramiagrammopes appendix* **n. sp.**, Uloboridae, ♂, body length 1.5 mm, left aspect.

37) *Paramiagrammopes curvatus* **n. sp.**, Uloboridae, ♂, body length 2.1 mm, dorsal aspect.





38) *Paramiagrammopes curvatus* **n. sp**., Uloboridae, ♂, body length 2.1 mm, ventral aspect.

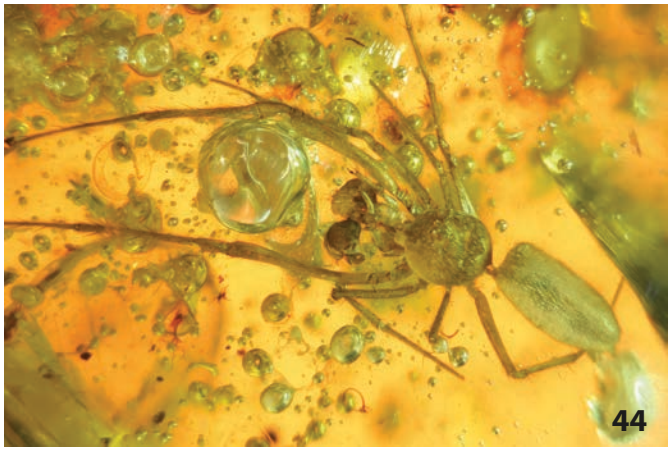
39) *Paramiagrammopes furca* **n. sp**., Uloboridae, ♂, body length 2.5 mm, dorsal aspect.

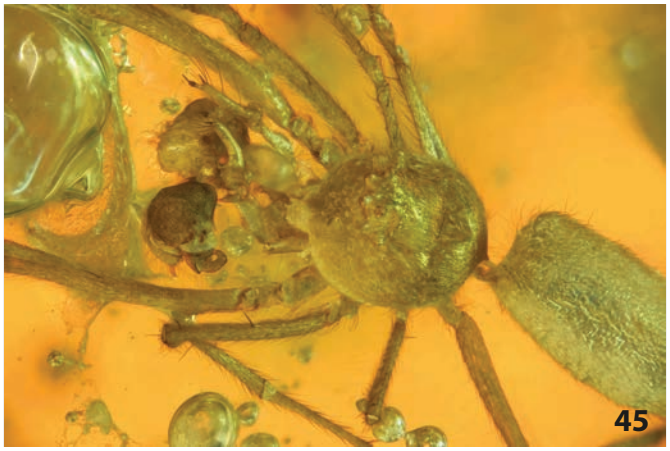
40) *Paramiagrammopes granulatus* **n. sp**., Uloboridae, ♂, body length 1.2 mm, dorsal aspect.

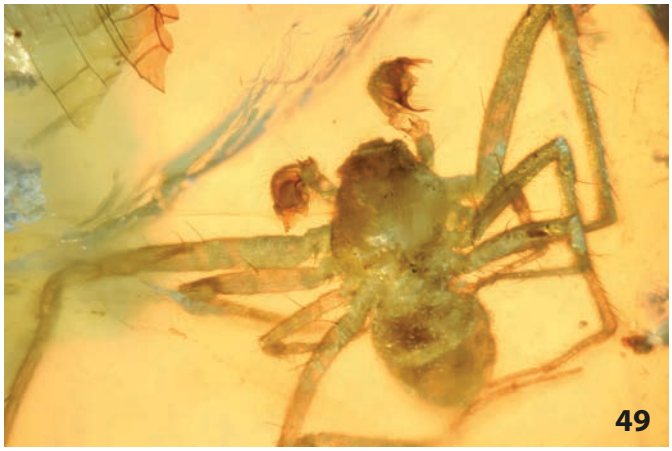
41) *Paramiagrammopes longiclypeus* **n. sp.**, Uloboridae, ♂, body length 2.6 mm.

42) *Paramiagrammopes paracurvatus* **n. sp**., Uloboridae, ♂, body length 2.3 mm, dorsal.

43) *Paramiagrammopes patellidens* WUNDERLICH 2015, Uloboridae, ♂, body length 2.2 mm, left aspect.







44) *Paramiagrammopes pilosus* **n. sp**., Uloboridae, ♂, body length 1.85 mm, dorsal aspect.

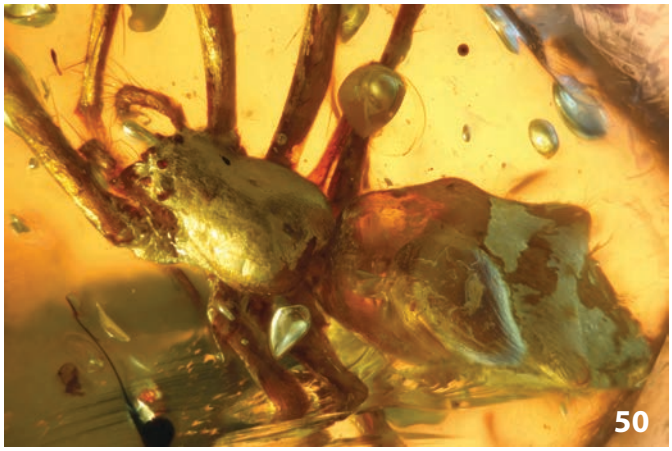
45) The same spider, enlarged.

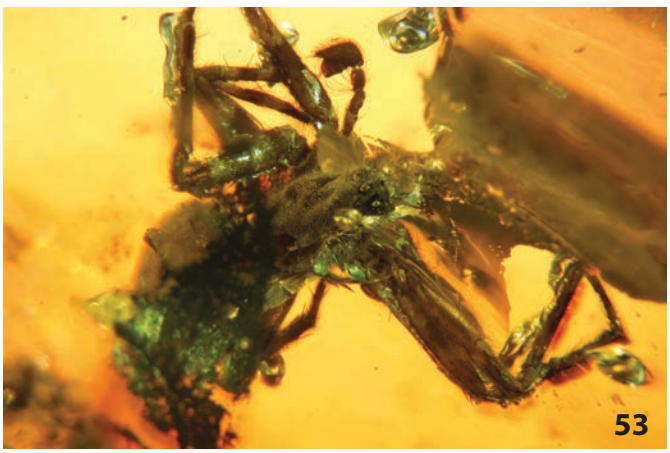
46) *Paramiagrammopes pusillus* WUNDERLICH 2018, Uloboridae, ♂, body length 1.1 mm, dorsal aspect.

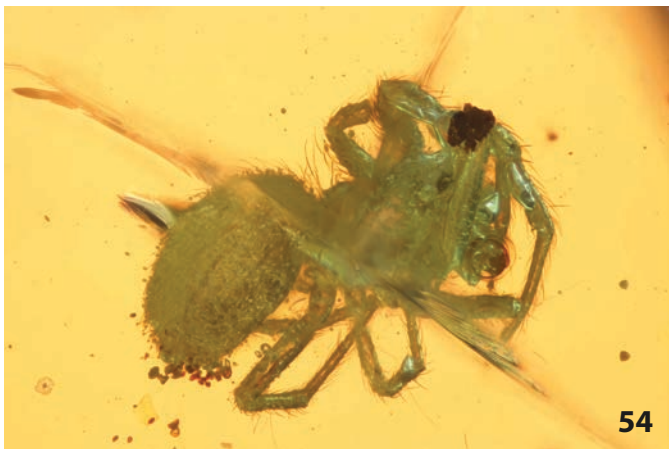
47) *Paramiagrammopes semiapertus* **n. sp**., Uloboridae, ♂, body length 1.3 mm, left aspect. Note the excavated body.

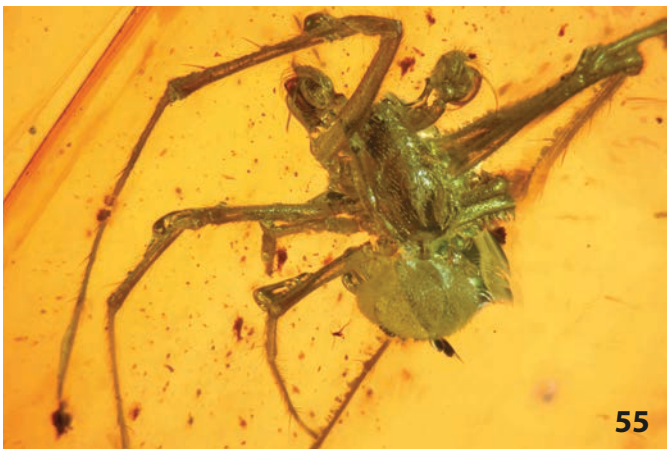
48) *Paramiagrammopes unibrevispina* **n. sp**., Uloboridae, ♂, body length 1.3 mm, dorsal.

49) *Propterkachin bispinata* **n. gen. n. sp**., Uloboridae, ♂, body length 2.5 mm, dorsal aspect.









50) *Pseudokachin tuberculatus* **n. gen. n. sp.**, Uloboridae, ♀, body length 4.5 mm, dorsal aspect. Note the opisthosomal humps.

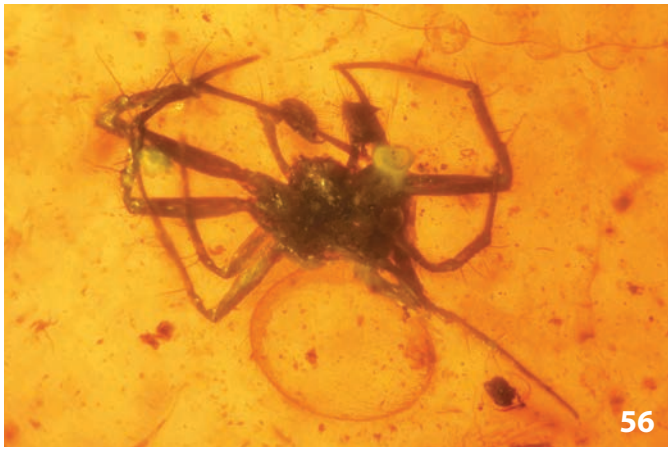
51) *Spiniuloborus crux* **n. gen. n. sp.**, Uloboridae, ♀, body length 1.35 mm, dorsal aspect. Note the cross-shaped mark on the opisthosoma.

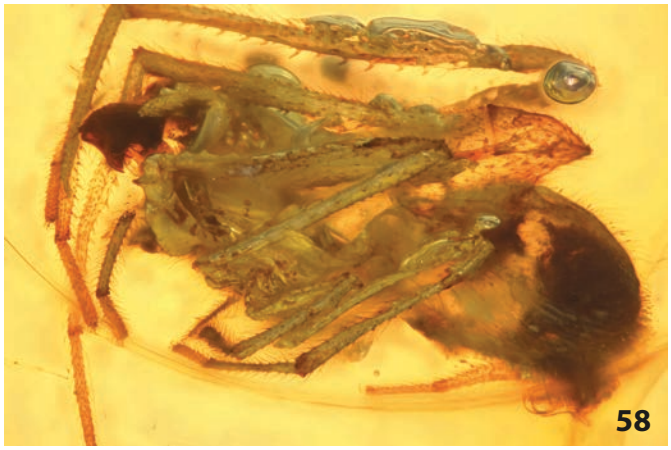
52) *Burmadictyna crassiembolus* **n. sp.,** Salticoididae, ♂, body length 2.8 mm, dorsal aspect. Note the distinctly annulated legs.

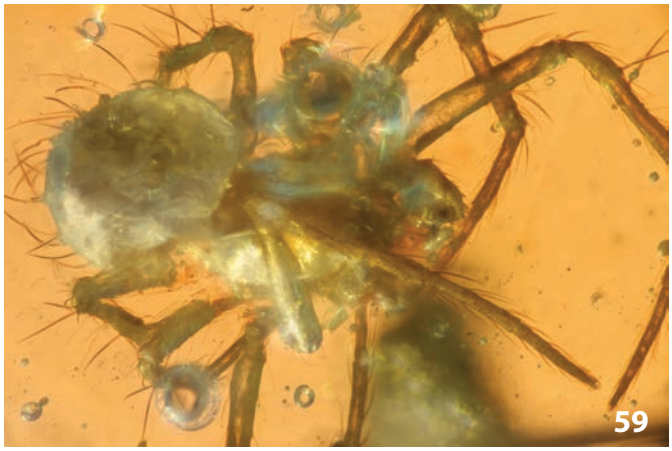
53) *Burmadictyna similis* **n. sp.**, Salticoididae, ♂, body length 3.5 mm, dorsal aspect.

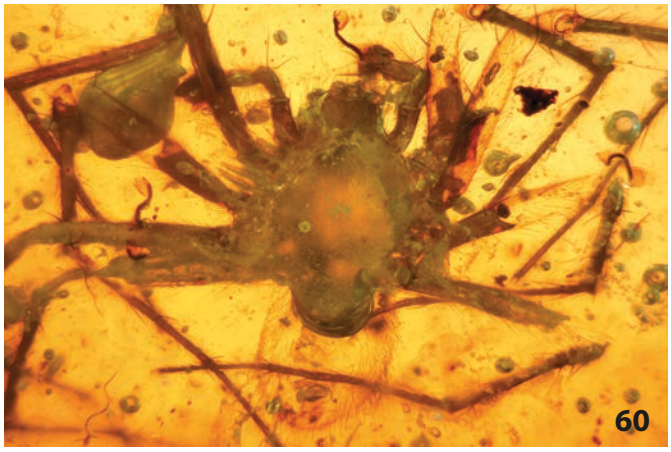
54) *Scutuloboroides pumilia* **n. gen. n. sp.**, Scutuloboidae, ♂, body length 1.0 mm, dorsal.

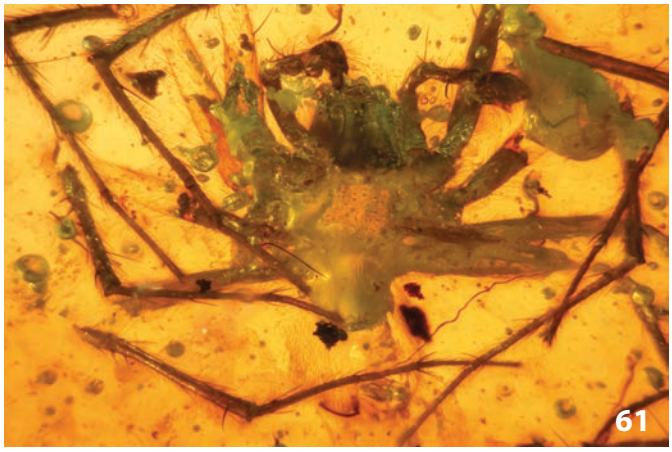
55) *Scutuloborus spiralembolus* **n. gen. n. sp.**, Scutuloboroidae, ♂, body length 2.3 mm, dorsal aspect.

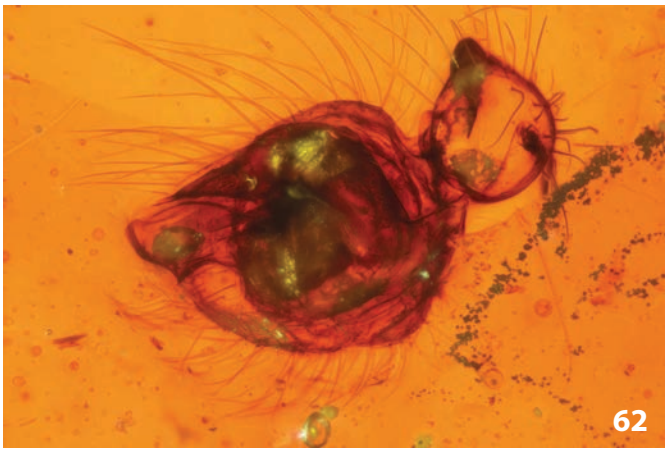












56) *Crassitibia sicilicula* **n. sp.**, Zarqaraneidae, ♂, body length 1.4 mm, dorsal aspect. Note the sticky droplets on a spider thread in front of the spider.

57) *Spinicymbioseta unispina* **n. sp.**, Zarqaraneidae, ♂, body length 1.0 mm, left aspect.

58) *Cornutheridion concavum* **n. gen. n. sp.**, Theridiidae, ♂, body length 2.1mm, left aspect.

59) *Microtheridion longissispina* **n. gen. n. sp.**, ?Theridiidae, body length 0.7 mm, dorsal aspect. Smallest known spider species in Burmese (Kachin) amber.

60) *Eoagelenomorphus cretaceus* **n. gen. n. sp.**, Eotibiaapophysidae, ♂, body length 2.7 mm, dorsal aspect.

61) The same spider, ventral aspect.

62) *Eotibiaapophysis reliquus* WUNDERLICH 2018, Eotibiaapophysidae, ♂, loose left pedipalpus which is cut through the tibia, ventral aspect.

A PAPER ON CRETACEOUS FOSSIL SPIDERS FROM MYANMAR AND A PAPER ON EXTANT SPIDERS FROM PORTUGAL (ARACHNIDA: ARANEAE)

BEITR. ARANEOL., 14 (2021)

Joerg Wunderlich (ed.)

In this paper I (JW) try to round off the "trinity of fossil spider faunas" of three vanished worlds: of the Dominican, Baltic and Burmese (Kachin) ambers (from ca. 22, 45 and 100 (!) million years ago), which I treated in about a dozen volumes concerning the most diverse group of predatory animals of this planet, the spiders (Araneae). We treat in short the cannibalism of few Cretaceous spiders and provide notes on their orb webs. The focus of this study is the diverse fauna of the higher strata which is preserved in Burmese (Kachin) amber. Probably as the most IMPORTANT GENERAL RESULTS I found the Mid Cretaceous Burmese spider fauna to be at least as diverse as the fauna of today but composed by quite different groups and – in contrast to most groups of insects - by numerous (more than 60 %) extinct families of which apparently not a single genus survived. I identified and described ca. 300 species (55 families) of spiders in Burmese (Kachin) amber and estimate that probably more than three thousand spider species lived 100 million years ago in this ancient forest which was a tropical rain forest. What will be the number of spider species (and other animals) that survives the next 100 years in the endangered rain forest of today in Myanmar? A second IMPORTANT GENERAL RESULT: probably during the last 60-70 million years ancient spider groups of the "Middle age of the Earth" (the Mesozoicum) were largely displaced by derived members of the Orb weavers like the well-known Garden Spider (as well as other members of the superfamily Araneoidea) and by spiders like Jumping Spiders, House Spiders and Wolf Spiders (members of the "RTA-clade") which are very diverse and frequent today. This "modern" spiders evolved apparently during an "explosive era of diversification" near the beginning of the "New age of the Earth" (the Neozoicum) mainly after the extinction of the dinosaurs 65 million years ago.

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