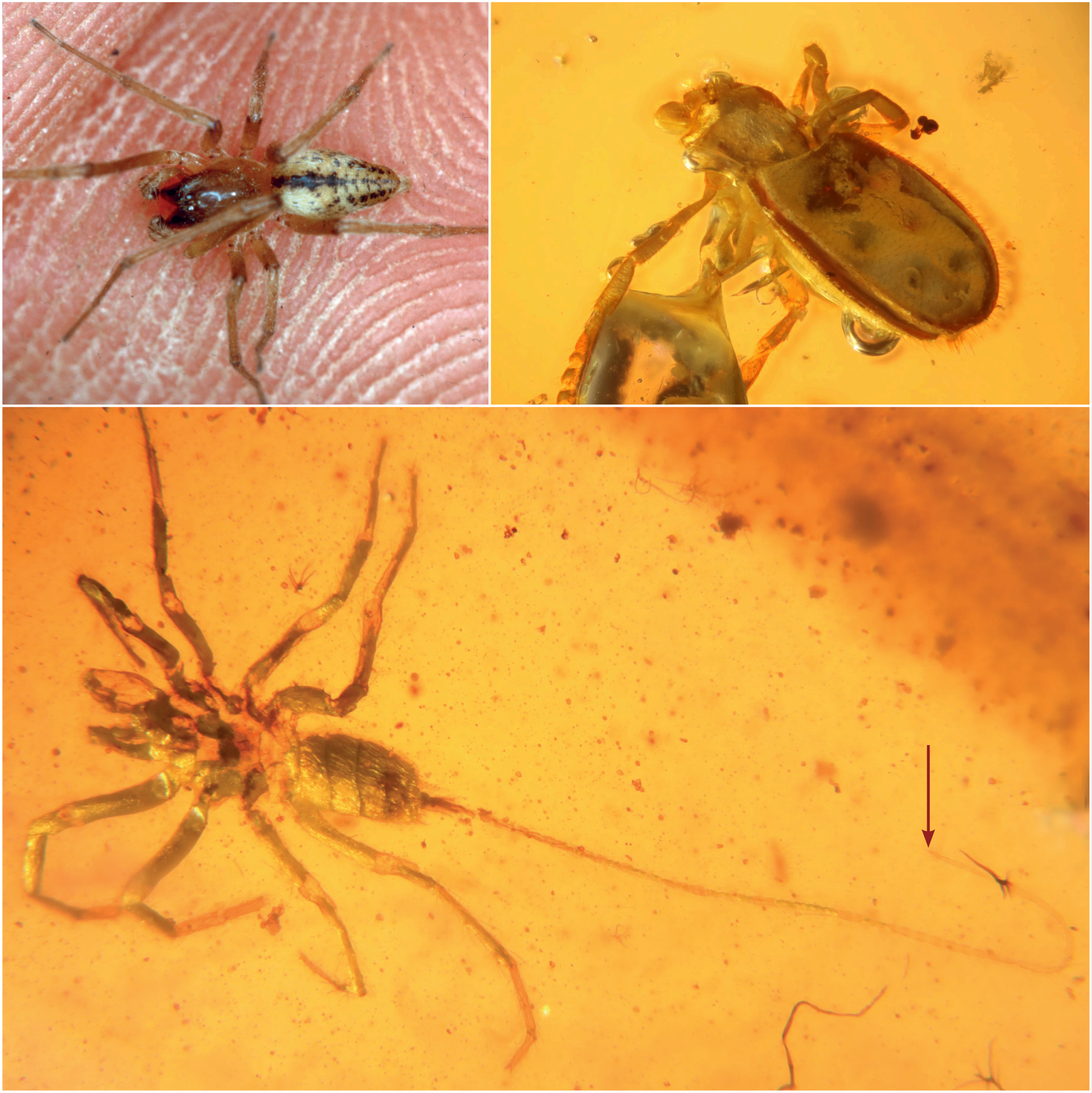
BEITR. ARANEOL., 15 (2022) **JOERG WUNDERLICH (ed.)**

FIVE PAPERS ON EXTANT SPIDERS (ARANEIDA) AS WELL AS ON FOSSIL SPIDERS AND RICINULEI



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FIVE PAPERS ON EXTANT SPIDERS (ARANEIDA) AS WELL AS ON FOSSIL SPIDERS AND RICINULEI

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Photos on the book cover:

Above left: A typical spider, a male Sac Spider (family Cheiracanthidae), from Portugal, body length 4.8 mm, dorsal aspect; see p. 123.

Above right: This is not a spider (spinnerets are absent) and not a mite! It is a juvenile member of the “Hooded Spiders” (order Ricinulei), preserved in Burmese amber, body length 1.5 mm. See p. 133

Below: This is a true spider - but a quite unusual one! It is a male member of the tiny extinct Tailed Spiders (family Chimerarachnidae), preserved in 100 million-year-old Cretaceous amber from Myanmar (Burma), body length without tail 2 mm. Note the very long tail which is three times the body length! A needle-shaped artefact is preserved near the tip (arrow) of the tail. The spinnerets at the base of the tail are only badly preserved and recognizable. See p. 131.

In this volume 15 of the Beitr. Araneol. a paper on extant West-Palaearctic spiders (Araneida: Araneae) and four papers on fossil arachnids (Araneida: Chimerarachnida and Araneae as well as Ricinulei) in Eocene Baltic amber, Cretaceous Burmese (Kachin) amber (Burmite) and in Early Miocene Mexican amber of Chiapas are united.

Personal note: Most EXTANT spiders treated in the present paper were collected - mainly by me - already twenty or more years ago, waiting quite a long time for investigation. During the last twenty years I concentrated on the investigation of numerous fascinating recently discovered FOSSIL spiders preserved in Baltic and Burmese amber but much less on the study of extant taxa. Numerous further spiders of my huge collection (CJW) - several specimens I already gave or will give to the SMF - may be studied in the future by colleagues. Humans' life span is (too) short ...

Acknowledgement: For correcting parts of the present manuscripts I thank very much my dear and patient wife Ruthild Schöneich. For some help and the layout I am very grateful to Angelika and Walter Steffan in Heidelberg.

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CONTENTS

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SOME SPIDERS (ARANEAE) OF THE WESTERN PALEARCTIC

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Key words: Algarve, Araneae, Azores, *Bassaniodes*, Canary Islands, caves, *Dictyna*, Dictynidae, El Hierro, *Emblyna*, endemics, Greece, La Palma, palaeoendemics, Portugal, radiation, sibling species, Spain, speciation, spiders, Thomisidae, troglobiontic, Turkey.

CJW = collection of Joerg Wunderlich, Germany,
SMF = Senckenberg Museum, Frankfurt a. M., Germany,
ULL = University of La Laguna, Tenerife, Spain.

In this paper I describe in four parts rare and up to now unknown spiders of ten families from the Western Palaearctic.

CONTENTS

(1) SPIDERS FROM THE CANARY ISLANDS

Acknowledgements: For fruitful discussions and the loan of material from the Canary Islands I thank Dr. Pedro Oromi of the University La Laguna, Tenerife (ULL).

Abstract: The genera *Dictyna* SUNDEVALL 1833 and *Emblyna* CHAMBERLIN 1933 (Dictynidae) as well as *Bassaniodes* POCOCK 1903 (Thomisidae) (Araneae) of the Canary Islands (Spain) are revised, and 8 new species are described; the genera *Dictyna* and *Bas-*

saniodes show a remarkable radiation on the Canary Islands. Notes on few Canarian spider species are added, and the troglobiontic Theridiidae *Rugathodes minioculatus* **n. sp**. is described.

Notes on the biogeographic relationships of the Canary and other Macaronesian islands:

The biogeographic relationships - especially of the Araneae – of these Western Palearctic Atlantic islands were discussed, e. g., by WUNDERLICH (1987: 35-54), (1992: 132-193) and (1993) (cave spiders and their origin). According to the distinctive mediterranean distribution of genera like *Dysdera* LATREILLE 1804 (Dysderidae) and *Spermophorides* WUNDERLICH 1992 (Pholcidae) as well as certain species-groups of *Pholcus* WALCKENAER 1805 (Pholcidae), *Oecobius* LUCAS 1846 (Oecobiidae), *Bassaniodes* POCOCK 1903 (Thomisidae) and *Macaroeris* WUNDERLICH 1992 (Salticidae). I regard these islands as part of the Mediterranean Region. Even the spiders of the Azores show close relationships to mediterranean taxa but not to nearctic taxa besides few recently introduced taxa. In my opinion an inclusion of the Macaronesian spider faunas in the World Spider Catalogue is needed.

Notes on the speciation and on questionable subspecies of the Canary Islands:

Examples of speciation - including sibling species - exist in numerous spider genera of the Canary Islands, see WUNDERLICH (1979) as well as the list published by WUNDERLICH (1987: 36, 279-283) in which, e. g., the genera *Dysdera* (Dysderidae), *Spermophorides* and *Pholcus* (Pholcidae), *Oecobius* (Oecobiidae) and *Walckenaeria* (Linyphiidae) are treated; *Dendryphantes* (Salticidae) has to be replaced by *Macaroeris*; see WUNDERLICH (1992) and *Psammitis/ Proxysticus* (Thomisidae) by *Bassanoides*, see below; the genus *Lepthyphantes* (Linyphiidae) has been splitted. Some further genera like *Dictyna* (Dictynidae) have to be added, see below.

The unsure rank of taxa: species – or subspecies? or "ecomorphae"? - of the genus *Micaria* WESTRING 1851 (Gnaphosidae) of several Canary Islands was discussed by WUNDERLICH (1987: 247). Of special interest are two sibling species – or subspecies? - of the genus *Rugathodes* ARCHER 1950 from the Azores in which I failed to find differences in the copulatory structures; see the description of the troglobiontic *Rugathodes minioculatus* n. sp. from El Hierro below. Moleculargenetic and other studies are needed in this connection and may be helpful.
I like to attract the attention of future students to questions mentioned above, especially on questionable SUBSPECIES which apparently are rare – or are rarely well documented - in spiders of the genera mentioned above.

DESCRIPTIONS OF THE TAXA

Family SYNAPHRIDAE

Synaphris ?*franzi* WUNDERLICH 1987

Material: Tenerife, Las Teresitas near San Andres, under a stone at a slope near the beach, 1♀ JW leg. 28. VIII. 2000, CJW.

Only the female holotype of *S. franzi* has been reported from NW Tenerife (near Buenavista). The epigynal opening of the present female is long oval. A male of the same locality is needed for a sure determination.

Family THERIDIIDAE

Rugathodes ARCHER 1950

Only few species of *Rugathodes* are known from the Holarctic, two species from the Azores, one species from Madeira but none from the Canary Islands up to now. The troglobiontic *R. minioculatus* n. sp. is the first sure report of this genus from El Hierro and the Canary Islands as well. While on the Azores a troglobiontic species - *R. pico* (MERRETT & ASHMOLE 1989) and the epigean stem species species - R. acoreensis WUNDERLICH 1992 – exist is a hypothetoical stem species of *minioculatus* unknown.

***Rugathodes minioculatus* n. sp.** (figs. 1-3)

Linyphiidae indet. – OROMI et al. (1986: 150) (misidentification).

Etymology: The name of the new species refers to the tiny remains of the eye lenses of the holotype, from min- (lat.) = small and oculus (lat.) = eye.

Material: Spain: Canary Island El Hierro, Derrabado, MSS 3 trap, H. LOPEZ leg. 27. I. 2012, holotype ♀, Univ. La Laguna 26.260.

Diagnosis (♀; ♂) unknown): Pale spiders, eye lenses strongly reduced, labrum (fig. 2) quite long and bearing short apical teeth, epigyne (fig. 3) with large, thin-walled and apparently divided receptacula seminis laterally of an oval pit, posteriorly exists a triangular sclerotized structure below the skin.

Description (♀):
Measurements (in mm): Body length 1.5; prosoma: Length 0.65, width 0.55; opisthosoma: Length 0.95, width 0.6, height 0.65; leg I: Femur 0.75, patella 0.38, tibia 0.75, metatarsus 0.65, tarsus 0.5, tibia II 0.55, tibia III 0.45, tibia IV 0.75.
Colour (probably bleached): Prosoma and legs white, opisthosoma light yellowish.

Prosoma 1.18 times longer than wide, eye lenses (difficult to recognize) strongly reduced, stridulatory files apparently absent, anterior margin of the fang furrow (fig. 1) bearing a well developed tooth and few denticles, posterior margin with few denticles, fangs almost needle-shaped, labrum (fig. 2) quite long, bearing short apical teeth. - Pedipalpus with a smooth and well developed tarsal claw. - Legs long and slender, order IV/I/II/III, hairs short, all patellae with a long dorsal-apical bristles, sequence of the dorsal tibial bristles 2/2/1/2, metatarsus I-III with a long trichobothrium, its position in ca. 0.5, ventral comb of tarsus IV well developed, three tarsal claws, paired claws smooth. - Opisthosoma oval, 1.58 times longer than wide, hairs and spinnerets short, colulus absent. - Structures of the epigyne well recognizable, see the diagnosis; the anterior margin of the pit is indistinct.

Ecology, life style and evolution: The holotype of *minioculatus* has collected by a trap in which animals of a special underground fauna were captured (caves are absent in this area), see OROMI et a. (1986): “The experience was caried out in the volcanic land on the north slope of Hierro island, where the soils are quite recent … “. According to is strongly reduced pigmention and eye lenses as well as the slender and long (but not extremely long) legs *R. minioculatus* is a tronglobiontic species of the “mesocavernous shallow stratum”, see WUNDERLICH (1993: 685). A sure proof of a member of *Rugathodes* on the Canarian Island is absent; only quite questionable records of *R. instabilis* (= O. PICKARD- CAMBRIDGE 1870) on Tenerife exist, see WUNDERLICH (1992: 416). This epigean species is - according to its epigyne - not closely related to *minioculatus*, and also the remaining Macaronesian species of *Rugathodes* – *maderiensis* WUNDERLICH 1992 from Madeira as well as the Acorean species *acoreensis* WUNDERLICH 1992 and *pico* (MERRET & ASHMOLE 1989) - are not closely related. *R. minioculatus* is an outsider of the genus and may well be a palaeoendemic, see WUNDERLICH (1993). The two Azorean species are of special interest because on this archipelago exists a troglobiontic species (*pico*) as well an epigean one (*azoreensis*), the stem species of *pico*. The European species of *Rugathodes* occur on low plants and under stones in wet habitats in contrast to most other theridiid genera. I regard this life style to be the disposition for an underground rsp. cave living.

Relationships: According to its characteristics – chaetotaxy, trichobothriotaxy, teeth of the fang furrow, lacking colulus, SMOOTH paired tarsal claws and thin-walled receptacula seminis - I regard *minioculatus* as a member of the genus *Rugathodes* ARCHER 1950, see WUNDERLICH (2008: 375, 394). In the other congeneric species – see also directly above, “Ecology ...”- the epigynal pit is wider and anteriorly frequently divided, the receptacula seminis are undivided in a more anterior position.

Distribution: Spain: Canary Island El Hierro.

Family **LINYPHIIDAE**

Tenuiphantes SAARISTO & TANASEVITCH 1996

Tenuiphantes palmensis (WUNDERLICH 1992) (figs. 4-5)

(synonym: *Palludiphantes* - lapsus for *Palliduphantes* SAARISTO & TANASEVITCH 1992 - *baeumeri* WUNDERLICH 2020 **n. syn**. & **n. comb**.)

Material (leg. by JW more than 20 years ago): Spain, Canary Island La Palma; (1) N Santa Cruz, wet forest, under stones, 2♂1♀ leg. at the end of IV, CJW; (2) centro, Cumbre Nueva, 1000 m, under stones, 2♀ leg. in IV, CJW.

The species was first described under *Lepthyphantes palmensis* WUNDERLICH 1992 from La Palma, based on a single female, see WUNDERLICH (1992: 380, figs. 426-428). In 2020: 9, figs. 12-16 I described the species - under *Palludiphantes baeumeri* n. sp. - from La Palma based on a single male which opisthosoma is uniformly grey as in *Palliduphantes*. More than twenty years ago I collected *palmensis* in both sexes IN THE SAME place - see above – but did not study these spiders more closely at that time. In contrast to the holotype of *baeumeri* the present spiders possess opisthosomal markings as in *Tenuiphantes,* and I recognized (1) that the holotype of *baeumeri* WUNDERLICH 2020 represents actually the hitherto unknown male of *palmensis* WUNDERLICH 1992; therefore *baeumeri* is a junior synonym of *palmensis* WUNDERLICH 1992 (**n. syn**.), and (2) that the species is a member of *Tenuiphantes* SAARISTO & TANASEVITCH 1996 (**n. comb**.).
Notes: (1) The number of paracymbial bristles of *palmensis* is variable; (2) the sclerites of its bulbus (figs. 4-5) appear rather different even in slightly different positions.

Ecology: All specimens were collected under stones in IV-V.

Relationships: In *T. rubens* (WUNDERLICH 1987) from La Palma (under *Lepthyphantes* and in *T. tenerifensis* (WUNDERLICH 187) from Tenerife (under *Lepthyphantes*) the ventral branch of the lamella characteristica is longer than the dorsal branch in contrast to *palmensis*. The epigyne is different; in *rubens* the colour of living specimens is reddish.

Distribution: Spain: Canary Island La Palma.

Family **DICTYNIDAE**

Dictynidae include cribellate and ecribellate genera; all of the Canarian taxa are cribellate. In the cribellate European Dictynidae metatarsus IV is straight (not bent as in the Uloboridae) and bears a calamistrum which is almost as long as the article (usually in the male sex, too); the cribellum is most often entire; see below. Determination to the cribellate West-european genera: See "WUNDERLICH (1992: 421) (*Devade* from Fuerteventura is not included)."

Diversity: Dictynidae is represented by 16 species (13 are endemics) of 6 genera on the Canary Islands: *Altella* (2 species), *Devade* (1 species), the most frequent *Dictyna* (= *Brigittea*) (6 species), *Emblyna* (2 species), *Lathys* (3 species) and *Nigma* (2 species). The hirsute *Devade indistincta* O. PICKARD-CAMBRIDGE 1872 (= *hirsutissima*) has to add to the key of the Canarian genera, see WUNDERLICH (1992: 241). This species as well as *Lathys dentichelis* and *Nigma puella* (SIMON 1870) have been introduced to the Canarian Islands probably by humans. *Emblyna canadas* n. sp. has apparently been introduced from Tenerife to Gran Canaria.

The radiation of the Canarian *Emblyna* and especially *Dictyna* is remarkable but by far not as distinct as in *Dysdera, Pholcus, Spermophora* or *Oecobius*. According to my findings all species of the Canarian *Dictyna* and *Emblyna* are Canarian endemics; with the exception of *D. guanchae* all are “island endemics”, most often even “local endemics”. From Fuerteventura and Tenerife I know more than a single species; because of their unsufficient knowledge and only relatively few collected specimens I expect some more still undiscovered or not recognized species. Most Canarian *Dictyna* are tiny spiders – a case of “island dwarfism”? Members of *Emblyna* are larger than members of *Dictyna*, see below.

Colonization: Endemic dictynid Canarian species are known from *Dictyna, Emblyna. Lathys* and *Nigma*; so Dictynidae colonized the Canarian Islands at least four times. The highest mountains - e. g. the more than 3 km high Teide on Tenerife - probably functioned as “catcher of aeronautic spiders” like the two endemics of *Emblyna* which live in altitudes between 1800 and 2400 m. See WUNDERLICH (1992: 194f) and below.

Ecology: Most species live in higher strata of the vegetation, usually on plants, the holotype of *Dictyna_guanchae* has been collected on a wall similar to *D. civica* (LUCAS 1850), the species of *D. betancouria* has been collected in traps on the ground. The two species of *Emblyna* (from La Palma and Tenerife) are only known from altitudes between 1800 and 2400 m.

Note on the synoymy: *Brigittea* LEHTINEN 1967 was separated from *Dictyna* SUNDEVALL 1833 by MARUSIK et al. (2015: 135) mainly according the bipartite cribellum, but a cribellum may exist or it may be absent within the same genus, e. g., in *Nigma* (absent in *puella*). Therefore I doubt the strong taxonomical value of a bipartite or entire cribellum in these genera and regard *Brigittea* – based on the similar copulatory structures, too - as a junior synonym of *Dictyna* SUNDEVALL 1833. *Brigittea guanchae* = *Dictyna guanchae* SCHMIDT 1968. See also WUNDERLICH (1992: 429).

Dictyna SUNDEVALL 1833 and ***Emblyna*** CHAMBERLIN 1948

Emblyna and *Dictyna* are closely related; sexually dimorphic modified male basal cheliceral articles (fig. 37) exist in both genera, and tibial ctenidia (short spines) in the basal half of a prodorsal outgrowth of the male pedipalpus (figs. 7, 39) exist in almost all species (reduced in few *Dictyna*, (fig. 15), absent in *Emblyna teideensis*, figs. 11-12), a small retrolateral tibial apophyses exists and a large tegular apophysis which is twisted apically and functions as a conductor (fig. 13). Differences of both genera: In *Emblyna* the embolus is relatively thick and its tip is modified, not pointed (fig. 9) in contrast to *Dictyna* in which the embolus is more slender, the tip is unmodified and pointed (figs. 18, 22). The distal articles of the ♀-pedipalpus may be thickened or slender (fig. 19) in *Dictyna*, slender in *Emblyna*. Not a single relevant difference between *Dictyna* and *Emblyna* has been listened by LEHTINEN (1967: 358). UBICK et al. (2017: 110-111) did not differenciate the females of both genera but separated the males based by characters listed above. The inner structures of the vulvae of the Canarian species have not yet been studied.
The Canarian members of *Emblyna* - *palmesis* and *teideensis* - are larger - prosomal length 0.9-1.4 mm - than the Canarian members of *Dictyna* (prosomal length 0.5-0.9 mm), and they occur in higher altitudes than the members of *Dictyna*.

Key to the Canarian species of *Dictyna* and *Emblyna*:

The distribution of the island endemics and their ecology - see above - are an important help for the identification of the species, only *D. guanchae* is widely distributed on the Central and - only some? - Western Canary Islands. Length and colour of the prosoma are important, too, the intraspecific colour of the opisthosoma is quite variable. The tiniest species – prosomal length 0.5-0.6 mm – are *aguasverdes* and *fuerteventurensis*, both from Fuerteventura. The epigyne is intraspecific quite variable; the vulvae have still to investigate. The structures of the male pedipalpus – e. g., tibial ctenidia, size and shape of the embolus, the large basal part of the embolus and the sperm ducts - are unique in each species.

1 ♂-pedipalpus: Ventral-distal cymbial bristles existing (figs. 8, 13), embolus thick and apically modified (fig. 17). ♀: Epigyne as in figs. 18, 22. In high mountains (1800- 2400 m) of Tenerife and La Palma. *Emblyna* …..….. 2

- Cymbial bristles absent, embolus thin and apically pointed (fig. 18). Epigyne different, quite variable.*Dictyna* ….. 3

2(1) ♂-pedipalpus (figs. 11-13): Tibial bristles (ctenidia) completely absent. Epigyne (fig. 14) bearing a pair of sickle-shaped “pockets”. Tenerife: Canadas: La Fortaleza …......... ….. *E. teidenensis*

- ♂-pedipalpus (figs. 7-8): Tibial bristles well developed. Epigyne (fig. 10) very wide. La Palma and Tenerife: Canadas ….. *E. canadas*

3 (1) ♂-pedipalpus (figs. 30-31): Cymbium and bulbus quite slender, cymbium long beyond the bulbus, tibial clenidia quite short, not placed on an outgrowrth. Epigyne (figs. 33-34) quite variable. Prosomal length 0.6-0.9 mm. Central and Western Canary Islands (but see below) .... *D. guanchae*

- ♂-pedipalpus (e. g., fig. 40): Cymbium and bulbus less slender, cymbium distally shorter, tibial ctenidia usually large and placed on a large outgrowth, with the exception of *aguasverdes* (key no. 6). Body length variable. Eastern Canary Islands (Fuerteventura and Lanzarote) …... 4

4(3) ♂-pedipalpus as in (figs. 39-40) with a quite large (bulbal) basal part of the embolus. ♀ unknown. Lanzarote ….. .. *D. lanzarotensis*

-♂-pedipalpus different. Fuerteventura …... 5

5 (4) Prosomal length 0.5-0.6 mm …... 6

- Prosomal length 0.75-0.8 mm. Quite large receptacula seminis (figs. 33-35) …......................... 7

6(5) ♂-pedipalpus (figs. 23-28): Ctenidia short, not observable in the ventral aspect of the pedipalpus. Epigyne as in figs. 20-21. Aguasverdes. …......................... ...... _D. aguasverdes_

- ♂-pedipalpus (fig. 28): Ctenidia large, well observable in the ventral aspect of the pedipalpus. Epigyne as in fig. 29. Taralajejo …...................................... ..... _D. fuerteventurensis_

7(5) ♂-pedipalpus (fig. 22) with the distal part of the embolus strongly bent. Epigyne (figs. 31-33) with small pits in a more anterior position and oval receptacula seminis. Betancuria ….. ... _D. betancuria_

- ♂ unknown. Epigyne (figs. 26-27) with large pits in a more posterior position. Fuerteventura and probably Alegranza ….. .... _D. cofete_

**Emblyna** CHAMBERLIN 1948

Two species are known from the Canary islands:

teideensis WUNDERLICH 1992 from Tenerife and *canadas* n. sp. from La Palma and Tenerife. Both live in high altitudes of 1800-2400 m.

Emblyna canadas **n. sp.** (figs. 6-10)

Etymology: The species name refers to the area Las Canadas on Tenerife, the origin of most specimens of the type material.

Material: Spain, Canary Islands; (1) La Palma, W Los Muchachos, 1800 m (in Pine forest, under a stone) to 2400 m, 2♂ 1 subad. ♂, beaten from a bush and leg. under a stone, JW leg. 1999; holotype ♂ R205/CJW: 1♂ (right pedipalpus without embolus); paratypes: Right

♂-pedipalpus (the remaining parts of the specimen are lost) and 1 subad. ♂, R206/CJW. - (2) Further paratypes: Tenerife, Canadas; (a) 2♀ A. CAMACHO leg. 13. V. 1996, ULL no. 26C/AN (6256); (b) 1♂1♀ A. CAMACHO leg. 1. V. 1996, ULL no. 24C/AN (5144); (c) 2♀ A. CAMACHO leg., ULL no. 18C/AN (11368); (d) 1♀ A. CAMACHO leg., ULL no. 24C/AN (9654); e) 1♀ P. OROMI leg. 2. VI. 1995, ULL no. 26C/AN (6558); f) 1♀ A. CAMACHO leg. 29. VI. 1996, ULL no. 6C/AN (11551).

Diagnosis: Pedipalpus (figs. 7-9): Tibial ctenidia large, tip of the embolus widened and flattened; epigyne/vulva (fig. 10) very wide, pits well developed, sclerotised lateral rims quite widely spaced, receptacula seminis not touching.

Description:
Measurements (in mm): Body length 1.9-2.6; prosoma: Length ca. 1.0-1.1, width ca. 0.8; opisthosoma (holotype ♂): Length 1.5, width 0.9; leg I (holotype): Femur 1.0, patella 0.37, tibia 0.95, metatarsus 0.7, tarsus 0.47, tibia II 0.7, tibia III 0.48, tibia IV 0.6.
Colour (fig. 6): Prosoma dark brown, legs distinctly annulated, opisthosoma yellowish, usually dorsally medially with a longitudinal dark band and with dark spots, ventrally with a longitudinal dark band between a yellowish field.
Prosoma quite similar to *E. teideensis* WUNDERLICH 1992; margins of the fang furrow with 2/2 teeth and denticles. - Legs only fairly long, bristles absent, hairs short, tarsal trichobothria absent, length of the calamistrum ca. 4/5 of metatarsus IV. - Opisthosoma oval, hairs short, cribellum entire. - Pedipalpus (figs. 9-11): Tibia longer than wide, prodorsally-basally with a well developed outgrowth which bears a pair of large ctenidia, embolus: See the diagnosis. - Epigyne/vulva: See above.

Relationships: See E. *teideensis* below.

Distribution: Spain, Canary Islands Tenerife: Canadas (but not Las Raices), and La Palma (the holotype) (probably introduced from Tenerife).

Emblyna teideensis WUNDERLICH 1992 (figs. 11-14)

Material: Spain, Canary Island Tenerife, Canadas, Las Raices, 2000 m. Still only three type specimens are known.

Diagnosis: ♂-pedipalpus (figs. 11-13: Tibial spines (ctenidia) completely absent (a small basal outgrowth exists), distal part of the cymbium with bristles besides hairs, apical part of the embolus not yet studied. Epigyne (fig. 22) with a pair of sickle-shaped “pockets”. Prosomal length 1.2-1.4 mm.

Relationships: In *E. canadas* n. sp. from La Palma and Tenerife (Las Canadas, too) the colour of body and legs is quite similar and cymbial bristes exist, too, but the tibia of the male pedipalpus is a bit longer and bears a pair of well developed ctenidia on a distinct outgrowth, the epigyne of both species is distinctly different.

Distribution: Canary Island Tenerife: Canadas: Las Raices.

<u>Dictyna</u> SUNDEVALL 1833

Diversity and distribution of species of Canarian *Dictyna* to my recent knowledge:

Dictyna represents the most diverse dictynid genus of the Canarian Island; 6 species are known from:

<u>Lanzarote</u>: *lanzarotensis* n. sp. (♀ unknown);

<u>Fuerteventura</u>: *aguasverdes* n. sp., *betancuria* n. sp., *cofete* n. sp. (♂ unknown) and *fuerteventurensis* SCHMIDT 1976;

<u>Gran Canaria</u>: *agaetensis* WUNDERLICH 1987 and *guanchae* SCHMIDT 1968;

<u>Tenerife</u>: c*anadas* and *guanchae* SCHMIDT 1968;

<u>La Gomera</u>: *guanchae* SCHMIDT 1968;

<u>La Palma</u>: *canadas* and probably *guanchae*;

<u>El Hierro</u>: -?

Description of the taxa of *Dictyna*:

Dictyna aguasverdes n. sp. (figs. 15-21)

Etymology: The species name refers to its locus typicus Aguas Verdes on Fuerteventura.

Material: Spain, Canarian Island Fuerteventura, Aguas Verdes, 2♂ 4♀ JW leg. in III more than 20 Years ago; holotype ♂ (the left pedipalpus is expanded), R201/CJW, 1♂ 4♀ paratypes including a loose male pedipalpus, R202/CJW; 1♂ paratype (the right pedipalpus is missing), ULL, Tenerife.

Diagnosis: ♂-pedipalpus (figs. 15-18): Position of the small tibial ctenidia in a more RETROLATERAL position and not observable in the ventral position of the pedipalpus, distal part of the embolus hidden by the conductor; epigyne (figs. 20-21) quite variable, with a pair of receptacula seminis just behind fairly large pits which are close together. One of the tiniest species of *Dictyna* of the Canary Islands, body length 1.2-1.3 (♀) mm, prosomal length 0.5-0.6 mm. Prosoma yellowish light grey, margin small black.

Description:
Measurements (in mm): Body length 1.2-1.3 (♀); prosoma: Length 0.5-0.6, width 0.43-0.5; opisthosoma: Length 0.6-0.72, width 0.5-0.6; leg I (♀): Femur 0.48, patella 0.15, tibia 0.33, metatarsus 0.25, tarsus 0.22 (another ♀: Metatarsus and tarsus 0.21 each), tibia II 0.26, tibia III 0.2, tibia IV 0.27; ♂: Tibia I 0.47, tibia IV 0.4
Colour: Prosoma yellowish light grey, margin small black, opisthosoma medium grey, rarely with distinct irregular dark markings, legs yellow with small apical annulations on tibiae and metatarsi.
Prosoma distinctly longer than wide, fovea absent, rowed dorsal white hairs existing but partly rubbed off, 8 rather small eyes, posterior row fairly recurved, posterior median eyes spaced by about their diameter, basal cheliceral articles retrobasally with a hump in both sexes, in the male sex anteriorly concave and medially distinctly diverging (concave), fang furrow frequently with at least one larger tooth and few denticles, fangs robust, labium wider than long, a free sclerite. - ♀-pedipalpus (fig. 19) with slender articles. - Legs fairly short, order I/IV/II/III, hairs of medium length, bristles absent, metatarsus IV straight in both sexes, calamistrum well developed, almost as long as the article, I did not recognize tarsal trichobothria. - Opithosoma oval, hairs fairly short, cribellum entire. - ♂-pedipalpus and epigyne: See the diagnosis. A pair of bent sclerotized lateral epigynal structures may exist.

Relationships: *D. fuerteventurensis* SCHMIDT 1976 is also known from Tenerife and also as tiny as *aguasverdes* but - according to the drawings by SCHMIDT (1976) - the structures of the copulatory organs of both sexes are distinctly different, and the colour of the thoracic part is darker. In the tiny *D. guanchae* SCHMIDT 1968 from the Central and Western Canary Islands the cymbium is more slender and its distal part is longer, the receptacula seminis and the epigynal pits are different.

Distribution: Spain, Canary Island Fuerteventura: Aguas Verdes.

Dictyna betancuria **n. sp.** (fig. 22-24)

Etymology: The species name refers to the locus typicus Betancuria of the holotype on Fuerteventura.

Material: Spain, Canary Island Fuerteventura, (1) N of Betancuria, traps on the ground in a dry bed of a brook 3♂2♀ JW leg. in I 1999; holotype ♂ (both pedipalpi are expanded), R199/CJW, 2♂2♀ paratypes, R200/CJW; (2) Los Molinos, within low herbs, JW leg. in I 1999, R204/CJW.

Diagnosis: ♂-pedipalpus (fig. 22): Tibia longer than wide, with a larger prodorsal outgrowth which bears a pair of only fairly large spines (ctenidia), circular base of the embolus relatively small, basal and apical parts of the embolus free observable in ventral aspect, retrolateral part of the embolus STRAIGHT; epigyne (figs. 23-24) variable: Pits small, close together and in an anterior position, seemingly absent to well developed/recognizable, receptacula seminis large and oval, quite close together. Prosomal length 0.7-0.8 mm, prosomal colour greyish to dark grey brown.

Description:
Measurements (in mm): Egg-bearing ♀: Body length 2.4-2.7 (but ♀ from Los Molinos only 2.2); prosoma: Length ca. 0.8, width 0. 55-0.65; opisthosoma: Length 1.3-1.8, width 0.9-1.5 (egg-bearing female); leg I: Femur 0.65, patella 0.22, tibia 0.55, metatarsus 0.5, tarsus 0.36, tibia II 0.46, tibia III 0.37, tibia IV 0.55; ♂: Body length 1.7-1.8; prosoma: Length 0.7-0.75, width 0.5-0.56; leg I: Femur 0.6, patella 0.22, tibia 0.55, metatarsus 0.5, tarsus 0.37, tibia II 0.43, tibia III 0.35, tibia IV 0.4.
Colour: Prosoma greyish to dark grey brown, legs light yellowish brown, tibiae and metatarsi apically small darkened, opisthosoma dorsally medially and ventrally medially dark grey, with white lateral bands each.
Prosoma, ♀-pedipalpus, legs and opisthosoma quite similar to *D. aguasverdes* n. sp.; margins of the fang furrow usually with few teeth rsp. denticles but smooth in the ♀ from Losmolinos (!). - ♂-pedipalpus and epigyne: See above.

Relationships: ♀: See *D. cofete* n. sp. ♂: The large basal part of the embolus is smaller than in other Canarian species and the retrolateral part of the embolus is straight but not bent.

Distribution: Spain, Canary Island Fuerteventura, N Betancuria (locus typicus) and Los Molinos.

***Dictyna cofete* n. sp.** (figs. 26-27)

Etymology: The species name refers to the locus typicus Cofete of the holotype on Fuerteventura.

Material: Spain, (1) Canary Island Fuerteventura, Cofete, beaten from a bush, holotype ♀ JW leg. in III more than 20 years ago, R203/CJW. - (2) Canary Island Alegranza, Caldeira Lobos, 1 probably conspecific female, P. OROMI leg. 6. V. 1992, ULL 25413 (439/AR).

Diagnosis (♀; ♂ unknown): Epigyne/vulva (figs. 26-27): Pits large and distinctly spaced, near the large and almost globular receptacula seminis which are almost contiguous. Prosoma length 0.8 mm, prosomal colour dark grey.

Description (♀, holotype):
Measurements (in mm): Body length 1.85; prosoma: length 0.8, width 0.55; opisthosoma: Length 1.05, width 0.8; leg I: Femur 0.6, patella 0.17, tibia 0.45, metatarsus 0.4, tarsus 0.23, tibia II 0.38, tibia III 0.27, tibia IV 0.46.
Colour: Prosoma dark grey, legs yellow, opisthosoma light grey with a dark longitudinal medium band and irregular lateral dark grey markings.
Prosoma, pedipalpi, legs (except the colour) and opisthosoma as in *D. betancuria* n. sp. - Epigyne/vulva: See the diagnosis.

Female from Alegranza: Prosomal length 0.8 mm, colour similar to the holotype; epigyne/vulva (figs. 34-35) also quite similar to the holotype.

Relationships: In the closely related *D. betancuria* n. sp. (Fuerteventura, too) the receptacula seminis and the epigynal pits are different, see above and the key.

Distribution: Spain, Canary Island Fuerteventura and probably Alegranza.

Dictyna fuerteventurensis SCHMIDT 1976 (figs. 28-29)

Type material was not available for me.

Diagnosis: Prosomal length only ca. 0.5 mm, colour of the prosoma light, thoracal part darkened, ♂- pedipalpus (fig. 28) - it has probably drawn from a squeezed preparation by SCHMIDT- with large tibial ctenidia as well relatively long cymbium, bulbus and embolus. Epigyne as in fig. 29.

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

Distribution: Spain, Canary Island Fuerteventura: Tarajalejo. On Lanzarote - see WUNDERLICH (1992: 423) - exists *Dictyna lanzarotensis* n. sp., see below.

Dictyna guanchae SCHMIDT 1968 (fig. 30-36)

Material is kept, e. g., in the Univ. La laguna (Tenerife), the SMF and the CJW (Tenerife: Las Galletas (SMF 62190), 2♂2♀ Igueste de Candelaria).

Notes: I regard a female from La Gomera, Valley Gran Rey - colour yellowish, prosomal length 1 mm, G. SCHMIDT leg. and det. 1973 as *Dictyna guanchae*, SMF 28765 - as a misidentified *Nigma* sp. indet. - A second female of the same locality, G. SCHMIDT leg. 1976 and det.1977 as *Dictyna guanchae*, prosomal length 0.8 mm, SMF 29472, may be correctly determined, but the structures of the vulva appear different from *guanchae* and a male from the same locality is needed for a sure determination. - All figs. are taken from specimens from Tenerife, and - except fig. 41 of the holotype - are taken from specimens of the CJW.

Diagnostic characters: ♂-pedipalpus (figs. 30-32): Cymbium and bulbus quite slender, cymbium long beyond the bulbus, tibial clenidia quite short, not placed on an outgrowth, distal part of the sperm duct thinner than in related species. Epigyne (figs. 33-36) quite variabel, with large pits. Body length 1.4 - (egg-bearing female) 1.9 mm, prosomal length 0.65-0.9 mm, legs of medium length, prosomal colour usually medium brown, dorsal opisthosomal markings usually indistinct.

Relationships: See the key above.

Distribution: Probably Central and Western Canary Islands, but see above (“notes”); locus typicus on Tenerife.

***Dictyna lanzarotensis* n. sp.** (figs. 37-40)

Etymology: The species name refers to the Canary Island Lanzarote where the holotype has been collected.

Material: Spain, Canary Island Lanzarote, Las Cabreras, beaten from a low plant, holotype JW leg. in III more than 20 years ago, R198/CJW.

Diagnosis: (♂; ♀ unknown): Pedipalpus (figs. 39-40): Tibia only as long as wide, prodorsally-basally with a larger outgrowth which bears a pair of well developed spines (ctenidia), base of the embolus large, basal and apical parts of the pointed embolus hidden in the ventral aspect. Prosomal length 0.58 mm, colour of the prosoma dark grey brown.

Description (♂):
Measurements (in mm): Body length 1.2; prosoma: Length 0.58, width 0.45; leg I: Femur 0.52, patella 0.14, tibia 0.4, metatarsus 0.33, tarsus 0.28; tibia II 0.29, tibia III 0.23, tibia IV 0.35.
Colour: Prosoma dark grey brown, legs yellow, tibiae and metatarsi darkened, opisthosoma light grey, especially laterally and ventrally grey darkened.
Prosoma (figs. 37-38) not high, cephalic part long, fovea absent, 8 only fairly large eyes, posterior row straight, posterior median eyes slightly the largest, spaced by about their diameter, basal cheliceral articles robust, with retrobasal hooks, anteriorly concave, medially strongly concave, margins of the fang furrow bearing two humps. - Legs only fairly long, bearing longer hairs, bristles absent, tarsal trichobothria absent, metatarsaus IV almost straight, calamistrum almost as long as the article. - Opisthosoma covered with only fairly long hairs, cribellum well developed, entire. - ♂-pedipalpus: See the diagnosis.

Relationships: The colour of the prosoma of *D. betancuria* n. sp from Fuerteventura is similar but *betancuria* is larger and the structures of the ♂-pedipalpus - like the embolus - are distinctly different. The body size of *D. aquasverdes* n. sp. from Fuerteventura is similar but its prosomal colour is light and the structures of the ♂-pedipapus are different.

Distribution: Spain, Canary Island Lanzarote: Las Cabreras.

Family HAHNIIDAE

Only a single genus and species of this family has been reported from the Canary Islands: The endemic *Hahnia linderi* WUNDERLICH 1992: 2♀ from Lanzarote. In this paper I describe the male sex of this species for the first time which has been collected on Fuerteventura, the neighbour island of Lanzarote. Secondly the first Canarian member of the genus *Iberina* SIMON 1881, *Iberina candida* (SIMON 1875), is reported from Gran Canaria.
Hahnia C. L. KOCH 1841 and *Iberina* SIMON 1881 are similar spiders and closely related. Main differences: In *Hahnia* the clypeus possesses a vertical position and is not observable from above, the shape of bulbus/tegulum is oval (fig. 51) and the embolus is much shorter than one loop; in *Iberina* the clypeus is distincty protruding: it is well observable from above and the ventrally protruding clypeus is also well recognizable in the lateral aspect, the bulbus/tegulum has a circular shape and the embolus describes two or even more loops.

Hahnia linderi WUNDERLICH 1992 (figs. 41-43)

Material: Spain, Canary Island Fuerteventura, dry valley north of Betancuria, 2♂ JW leg. in pit falls in I 1999, CJW.

Diagnosis: Prosoma and legs yellowish, prosoma - at least the cephalic part between the eyes and the thoracal furrow - occasionally irregularly darkened; ♂-pedipalpus (figs. 49-51): Tip of the tibial apophysis distinctly spaced from the tibial body, cymbium dorsally spiny, distinctly longer than the tegulum; ♀: Prosomal length 0.75 mm, vulva: See WUNDERLICH (1992: 587, fig. 632).

Description of the male (see the diagnosis; general characters as in the female, see WUNDERLICH (1992: 429-430)):
Measurements (in mm): Body length 1.3; prosoma: Length 0.7, width 0.52; opisthosoma: Length 0.8, width 0.6; leg I: Femur 0.55-0.6, patella 0.25, tibia 0.45, metatarsus 0.42, tarsus 0.25, tibia II 0.4, tibia III 0.31, tibia IV 0.45.
Fang furrow with a large median tooth, both margins with 3 small teeth. ♂-pedipalpus: See the diagnosis.

Relationships: Because of the existence of a single metatarsal III-IV bristle (in contrast to other Western Palearctic species), the tiny body size, the light prosomal colour and the existence on an eastern Canary island like the type specimens I regard the present males as members of *H. linderi*. In the remaining species of the region in question the cymbium is usually shorter and not spiny, and the body is larger, with the exception of *H. pusilla* C. L. KOCH 1871.

Distribution: Spain, Canary Islands Lanzarote and Fuerteventura (new to Fuerteventura).

Iberina candida (SIMON 1875)

Material: Spain: Canary Island Gran Canaria, quite frequent, more than 100 specimens have been collected on several localities in pit falls and are bleached by the preserving fluid (except (1) and (2); (1) Barranco (valley) de Moya, 600 m, not compact Laurisilva, 1♀ (epiyge separat) P. NABAVI leg. in X 1997 under a stone, CJW; (2) East part of the island, 1♀ (epigyne lost) P. NABAVI leg. in X 1997, CJW; (3) exact locality unknown to me, numerous specimens P. NABAVI leg. in 1999, CJW; (4) exact locality unknown to me, ♀♂♂ P. NABAVI leg., ULL; (5) 19 tubes of different localities, numerous specimens P. NABAVI leg. in 1997-2000, CJW.

Determination: The mainly yellowish prosoma of the species is usually only 0.5-0.6 mm long, metatarsi III-IV bear only a single short proventral-distal bristle, the copulatory organs correspond to the figs. presented by HARM (1966).

Distribution: Europe, Morocco, Israel; new to the Canary Islands. - Notes: Probably the species has been introduced - as an aeronaut? - from Morocco to this island. Its high frequency may be the result of low competition on Gran Canaria in which it is the only member of the family Hahniidae and probably no other tiny ground-living spider taxa exist.

Family CHEIRACANTHIDAE (OR CLUBIONIDAE?)

Cheiracanthium algarvense WUNDERLICH 2012 (photo 1)

2012 *Cheiracanthium algarvense* WUNDERLICH, Beitr. Araneol., 8: 184-185, figs. 1-3.

Material: Spain, Canary Island Lanzarote, Playa Famaya, collected from plants in dunes, 1♂ JW leg. in IV more than twenty years ago, CJW.

Only a single species of *Cheiracanthium* C. L. KOCH 1839 – *C. pelasgicum* (C. L. KOCH 1837) – has been reported (and correctly determined?) from Lanzarote. This species is unknown from other Canary Islands.
C. algarvensis has been described from S-Portugal in 2012, based on a single male; the female sex is still unknown. The body length of the present male (CJW, photo 1) is 4.8 mm, its prosomal length is 2.2 mm. The most important diagnostic characters of the male are the BENT distal part of the divided pedipalpal tibial apophysis which tip is directed retrolaterally as well as the large and strongly sclerotized tegular apophysis which is much smaller in the related *C. canariense* in which a darkened dorsal band of the opisthosoma is absent.

Ecology: Both specimens of *algarvensis* were collected on low plants in dunes.

Distribution: S-Portugal (Agarve) and Spain: Canary Island Lanzarote; new to the Canary Islands and Spain. The species has probably been introduced from the Iberian Peninsula to Lanzarote.

Family THOMISIDAE

Thomisidae is fairly diverse on the Canarian Inslands but most of the 8 Canarian endemic species were only extremely seldom collected. Their rarity may be a result of the enviromentan destruction. Tin the genus *Bassaniodes* exists a remarkable radiation.

List of the species of the Canarian Islands:

Bassaniodes: 8 species (all are Macaronesian endemics, 6 are Canarian endemics <see below>, *lanzarotensis* is also known from the Islas Selvagem, *squalidus* is also known from Madeira);
Misumena: 1 species (endemic);
Ozyptila: 2 species (1 Macaronesian endemic and 1 Canarian endemic, see below);
Synema: 1 species;
Thomisus: 1 species;

Xysticus: 3 species (including 1 Canarian endemic).

Bassaniodes POCOCK 1903

Endemic species of *Bassaniodes* exist on all Canary Islands. The genus shows a remarkable radiation, probably going back to a single colonization. It includes about half of the Canarian thomisid species (see also above):

canariansis (WUNDERLICH 1987) (under *Psammitis*), Western Canary Islands, fig. 44,
clavulus (WUNDERLICH 1987) (under *Psammitis*), Gran Canaria, fig. 45;
falx n. sp., (♀ unknown), Fuerteventura, figs. 46-47;
fuerteventurensis (WUNDERLICH 1992) (under *Proxysticus*) (♀ unknown), Fuerteventura, fig. 48;
hariaensis n. sp. (♀ unknown), Lanzarote, figs. 49-51;
lanzarotensis (WUNDERLICH 1992) (under *Proxysticus*) (♀ unknown), Lanzarote, Islas Selvagem, fig. 52;
pinocorticalis (WUNDERLICH 1992) (under *Proxysticus*) (♂ unknown), El Hierro;
squalidus (SIMON 1883), Central and Western Canary Islands, Madeira, ?Morocco. Synonym: *Xysticus oromii* SCHMIDT 1975, see WUNDERLICH (1992: 501). Fig. 53.

Determination: ♂: See the figs. of the pedipalpi and the distribution. ♀: See the epigynae/vulva published by WUNDERLICH (1992) and the distribution.

DESCRIPTIONS OF THE TAXA:

***Bassaniodes falx* n. sp.** (figs. 46-47)

Etymology: The species name refers to the sickle-shaped small tegular sclerite/apophysis, from falx (lat.) = sickle.

Material: Spain, Canary Island Fuerteventura, Center, Bco. Agua de Bueyes, under a stone, holotype ♂ JW leg. in III 1999, R208/CJW.
Note: The right pedipalpus of the holotype is lost, the left pedipalpus has been separated.

Diagnosis (♂; ♀ unknown): Pedipalpus (fig. 47): Small tegular sclerite sickle-shaped, embolus quite thin, dorsal opisthosomal bristles fairly thickened (fig. 48).

Description (♂):
Measurements (in mm): Body length 2.7; prosoma: Lenght 1.4, width 1.3; opisthosoma: Length 1.3, width 1.5; leg I: Femur 1.3, patella 0.55, tibia 0.95 (diameter 0.24), metatarsus 1.0, tarsus 0.5, tibia II 0.9, tibia III 0.5, tibia IV 0.55.
Colour: Prosoma mainly dark brown, medially yellow brown, most leg articles yellow brown, with numerous dark brown spots, tarsi light yellowish, opisthosoma light brown, with dark brown spots and transverse dark bands.
Prosoma almost as wide as long, bearing short dorsal bristles, clypeus with longer bristles which are only slightly thickened, 8 eyes in a wide field, posterior row strongly recurved, anterior lateral eyes largest, posterior median eyes closer together than spaced from the lateral eyes, fangs stout, margins of the fang furrow smooth. - Opisthosoma wider than long, dorsal bristles (fig. 46) fairly thickened and bearing tiny teeth. - Legs only fairly long, femur I bears 6-7 bristles, tibia and metatarsus I with 3 pairs of ventral bristles and lateral ones. - Pedipalpus: See above.

Relationships: In the remaining congeneric Canarian species size and position mainly of the small tegular apophyses are different, the distal part of the embolus is thicker. According to the tegular apophyses and the shape of the dorsal opisthosomal bristle *B. Lanzarotensis* (WUNDERLICH 1992) is most related.

Distribution: Spain: Canary Island Fuerteventura.

***Bassaniodes hariaensis* n. sp.** (figs. 49-51)

Etymology: The species name refers to its type locality which is close to Haria.

Material: Spain, Canary Island Lanzarote, mountains S Haria, within pine needles on the ground, together with 1♀ of *Ozyptila atlantica* DENIS; ♂ holotype JW leg. In III 1999, R207/ CJW.

Diagnosis (♂; ♀ unknown): Pedipalpus (figs. 50-51): Two tegular apophyses, the large median apophysis strongly bent, the small tegular apophysis hook-shaped and blunt.

Description (♂):
Measurements (in mm): Body length 2.7; prosoma: Length and width 1.35; leg I: Femur 1.25, patella 0.55, tibia 0.95, metatarsus 0.95, tarsus 0.6, tibia II 0.95, tibia III 0.55, tibia IV 0.55.
Colour: Prosoma and legs mainly dark brown, legs partly yellowish, tarsi yellow, opisthosoma yellow brown, with dark spots.
Prosoma as wide as long, further characters and legs as in *B. falx*. - Opisthosoma slightly longer than wide, dorsal bristles (fig. 49) only slightly thickened, bearing numerous tiny teeth. - Pedipalpus: See above.

Relationships: According to the tegular sclerites and the shape of the distal part of the embolus *B. lanzarotensis* WUNDERLICH 1992) from Lanzarote, too, is most related.

Distribution: Spain: Canary Island Lanzarote.

Ozyptila SIMON 1864

Members of *Ozyptila* were extremely seldom collected on the Canary Islands: I know and collected *O. atlantica* DENIS 1963 from Fuerteventura and Lanzarote and *O. tenerifensis* WUNDERLICH 1992 from Tenerife.

Ozyptila atlantica DENIS 1963

Ozyptila atlantica, – WUNDERLICH (1992: 494, figs. 788-789;), ♀ from Lanzarote and the Islas Selvagem.

Material: Fuerteventura, Bco.de Penita, under a stone, 1♀ JW leg. in III, coll. JW.

Note: The male of the species is still unknown.

Distribution: Canary Islands Lanzarote and (first report) Fuerteventura; Islas Selvagem.

Ozyptila tenerifensis WUNDERLICH 1992 (figs. 54-57)

Ozyptila tenerifensis, – WUNDERLICH (1992: 494-495, figs. 790-792) (♀).

Material: Canary Island Tenerife, Las Canadas: 1♀ M. ZURITA leg. 10. V. 1995, ULL no. 10C/AN 6200; 1♂ A. CAMACHO leg. 15. X. 1995, ULL no. 176/AN 3770. Note: The right leg III of the male is lost beyond the coxa by autotomy, the right leg IV is fairly shortened.

In 1992 I described a single female of *tenerifensis* from Las Raices, ca. 1000 m. Here I add a male and a female from Las Canadas. Most characters of the present female are as in the holotype.

Description of the hitherto unknown male:
Measurements (in mm): Body length 2.3; prosoma: Length 0.9, width1.0; opisthosoma: Length 1.2, width 1.2; leg I: Femur 0.9, patella 0.4, tibia 0.6 (diameter 0.17); metatarsus 0.52, tarsus 0.4, tibia II 0.55, tibia III 0.35, tibia IV 0.35.
Colour: Prosoma dark brown, skinny margin white, legs medium brown, opisthosoma light brown, with irregular dorsal spots. - Legs stout, tibia I 3 ½ times longer than wide, tibia I (fig. 62) bears 2 pairs of ventral bristles, metatarsus I bears 3 pairs of ventral bristles. - Dorsal opisthosomal bristles fairly thickened as in the females, see WUNDERLICH (1992: Fig. 780). - Pedipalpus (figs. 54-57): Tibia with a divided ventral apophysis and a divided retrolateral apophysis, tegulum with a large and three small pointed apophyses, embolus long, bearing a probasal apophysis (arrow).

Relationships: The structures of the bulbus of *O. perplexa* SIMON 1873 of the Western Mediterranea are fairly similar.

Distribution: Spain, Canary Island Tenerife.

(2) SPIDERS FROM THE ALGARVE, PORTUGAL AND IBIZA, SPAIN

For more than ten years I have occasionally collected spiders mainly in the Southeastern part of the Algarve, to complete the list of spiders of the Portuguese fauna, see, e. g., WUNDERLICH (2020: 4-18) and (2021: 3-24). This mediterranean - almost subtropical - area contains reptiles like a species of chameleon and a member of the spider family Eresidae - the genu *Adonea* – which both occur in North Africa (Morocco), too, and are exceptional for the European fauna.

Apparently only weakly studied in this area are still (**a**) the beds of streams, e. g., in the areas of Tavira and Sao Bras de Alportel: On the ground as well as in higher vegetation. Under stones I recently collected several members of the former genus *Lepthyphantes* s. l. like *Palliduphantes juliao* n. sp. as well as ?*Lepthyphantes* sp. indet. In higher vegetation I collected quite tiny and remarkable spiders - body length ca. 0.8 mm (!) - of two different families indet. of the superfamily Araneoidea: A subadult male and an adult female, (**b**) the dunes of various islands like the island of Fuzeta and the Peninsula Manta Rota where I collected several new species, e. g., of *Zodarion*, and (**c**) the autumn and winter aspects of the spider fauna. I now concentrate my invesigations on such biotopes.

Both biotopes in question - (a) and (b) - are only weakly destroyed by fire, cultivation and the lowering of the groundwater level. So parts of their natural faunas have apparently survived here outside natural reserves; such reserves are extremely rare in Portugal.

The fauna of the dunes on the low islands will be strongly endangered in the next decades, and surely these islands – Natural Reserves - will be partly destroyed: The global warming will raise the temperature by 2–2.5° C, and the sea level will also raise, after the Copernicus report in the mediterranean region even by 2.5 cm per decade (!).

Family THERIDIIDAE

?***Euryopis inornata*** (O. PICKARD-CAMBRIDGE 1861)

<u>Material</u>: S-Portugal, Algarve, Alportel, Fonte Ferrea, ca. 5 km N Sao Bras de Alportel,

beaten from a bush near a stream, 1♂ JW leg. 14. XI 2021, CJW.

Notes: (1) The generic relationships of the species are not clear, its opisthosoma is posteriorly only slightly narrowed, the cymbium is apically not modified like in most species of *Euryopis* MENGE. I regard *inornata* with some doubt as a member of *Euryopis* as did PAVESI (1873). - (2) The body length of *inornata* is noted as 2.0 mm in the World Spider Catalog (XI 2021) but the present male is only 1.6 mm long, its prosomal length is 0.7 mm.

Distribution: Europe, Turkey, Azerbeijan; new for the fauna of Portugal.

Lasaeola SIMON 1881 s. l.

Phycosoma O. PICKARD-CAMBRIDGE 1879 may be an older synonym but – until a woldwide revision of this very diverse taxon is carried out and the relationships of certain groups of *Diploena* s. l. are clear – I still use the name *Lasaeola*, see WUNDERLICH (2020: 10-13).

Lasaeola braccata (C. L. KOCH 1841) (= *Dipoena b.*) (figs. 58-59)

Material: S-Portugal, SE-Algarve, (1) Prego, ca. 10 km WNW Tavira, in the dry bed of a small stream, beaten from a bush in the shadow, 1♂ JW leg. 9. XI. 2021; (2) near Sao Bras de Alportel: Begida, in the dry bed of a small stream, beaten from bushes in the shadow, several ♀♂ and a juv. ♂ JW leg. in X-XI 2021, CJW.

Diagnostic characters: Prosoma (cephalic part) (figs. 58-59) strongly raised in both sexes, with the posterior part slightly higher than the anterior part, leg bristles absent, position of the metatarsal trichobothria I, II and IV in 0.65-0.70 but III in 0.5-0.55, colour: Prosoma and opisthosoma uniformly black, legs in the present specimens uniformly yellow or orange, according to the World Spider Catalog black, femur reddish or brighter yellowish; ♂-pedipalpus like published by MILLER (1967); an apical cymbial bristle exists as in certain related species.

Note, ecology: During more than ten years I collected Theridiidae in the Algarve, including four new species which are related to *L. braccata* but I did not collect *braccata* up to this year which I found in beds of small streams in shaddowish biotopes in contrast to previously studied – mainly sunny – places.

Relationships: In *L. convexa* (BLACKWALL 1870) the prosoma is also black, leg bristles are also absent and the cephalic part is also strongly raised – see WUNDERLICH (2020: 17, fig. 15) - but the cephalic part is domed in a different - convex – way and the position of the metatarsal trichobothrium is in 0.3-0.4.

Distribution: Europe, Caucasus; new for Portugal (WSC in XI 2021).

Family LINYPHIIDAE

Agyneta pseudorurestris WUNDERLICH 1980 (fig. 60)

New material: Portugal, SE-Algave, Peninsula Manta Rota, within low plants in dunes, 1♂ (freshly moulted), 1♀, JW leg. 25. XI. 2021, CJW.

Notes: The lamella characteristica (fig. 60) possesses three large and blunt branches and a hidden tooth at the anterior branch. All pedipalpal articles of the present spiders are uniformly black.

Distribution: Mainly Mediterranea.

Gonatium rubens (BLACKWALL 1833)

Material: SE-Portugal, Algarve, ca. 10 km W Tavira, ca. 1 km at the road from Prego to Morenos, in a dry bed of a stream, beaten from bushes ca. 1 ½ m above ground, 1♀ (CJW), 1 subad. pair, JW leg. In X 2021.

Distribution (WSC in X 2021): Europe including Spain and Russia to the Far East, Japan; new to the fauna of Portugal.

***Palliduphantes juliao* n. sp.** (figs. 61-63)

Etymology: The name of the species refers to the village Juliao on the road to Morenos, SE-Portugal, see below.

Material: S-Portugal, SE-Algarve, Juliao, on the road to Morenos ca. 8 km W Tavira, SE-Portugal, under a stone at the margin of a dry stream bed, holotype ♂ JW leg. 5. X. 2021, R214/CJW. - Note: Lost by autotomy beyond the patella are both legs IV and the right leg. III. The left pedipalpus has been separated.

Diagnostic characters (♂; ♀ unknown): Colour of prosoma and legs orange, femoral leg bristles existing only on I; pedipalpus (figs. 61-63): Patella bulging ventrally but not dorsally, paracymbium with a small tooth in the middle of the lateral margin and a large retrobasal tooth, lamella characteristica with a pointed distal branch and a pointed longer and translucent branch in a more basal position.

Description (♂):
Measurements (in mm): Body length 1.6; prosoma: Length 0.77, width 0.65; opisthosoma: Length 0.9, width 0.4; leg I: Femur 1.0, patella 0.2, tibia 1.0, metatarsus 1.0, tarsus 0.7, tibia II 0.85, tibia III 0.76, femur IV 1.0.
Colour: Prosoma and legs orange, with black rings around the eyes, opisthosoma uniformly black brown.
Prosoma (fig. 69) 1.2 times longer than wide, hairs indistinct, fovea short, 8 large eyes, anterior medians smallest, posterior median eyes spaced by 3/5 of their diameter, posterior row slightly recurved, clypeus short, basal cheliceral articles large, bearing distinct retrolateral files, fangs long, anterior margin of the fang furrow with 3 large teeth, labium wide and fused to the sternum which is as long as wide and spacing the coxae IV by less than their diameter. - Legs long, I longest, III distinctly the shortest; bristles long, femora only I 1 prolateral in the distal half and few proventral bristle-shaped hairs in the distal half, patellae a single dorsal apical one, tibiae I-III (IV is lost): Dorsally 1/1, I additionally a pair in the distal half, II a retrodistal bristle, metatarsi I-III a single short bristle in the basal half, metatarsal trichobothria quite short, their position on I in 0.16, paired tarsal claws quite long. - Opisthosoma 2.25 times longer than wide, hairs rather short, spinnerets and colulus well developed,

colulus bearing half a dozen hairs. - Pedipalpus (figs. 61-63) (see also above: Femur bearing probasally a distinct stridulatory tooth, patella and tibia short, both bearing a long dorsal bristle of equal length, tibia with a retrolateral trichobothrium.

Relationships: In the related species – *P. corfuensis* (WUNDERLICH 1995) (Greece), *intirmus* (TANASEVITCH 1987) (Caucasus), *palmensis* (WUNDERLICH 1992) (Canary Islands) and *stygius* (SIMON 1884) (Portugal, Spain, France, Azores) – the shape of the lamella characteristica as well as teeth and shape of the paracymbium are different.

Distribution: Portugal.

FAMILY ZODARIIDAE

Several species of the quite diverse genus *Zodarion* WALCKENAER 1826 are known from the Algarve, see below. On the small Island Fuzeta near Fuzeta I found *Z. styliferum* (SIMON 1870) and *Z. tuber* n. sp., near Aljezur I collected members of *Z. parastyliferum* n. sp.

Zodarion styliferum (SIMON 1870) (figs. 64-65)

Material: Portugal, SE-Algarve, Fuzeta Island near Fuzeta, in low plants in dunes, 1♂ JW leg. In V. 2017, R216/CJW.

Prosoma and femora I-II are dark brown. Measurements of the present male (in mm): Body length 2.7, prosomal length 1.4, length of the cymbium 0.6mm. On the left metatarsus I are two long trichobothria preserved, their position is in 0.33 and 0.9. ♂-pedipalpus: Figs. 64-65. The species is widely spread in Southern Europe and closely related to *Z. parastyliferum* n. sp., see below,

Zodarion parastyliferum n. sp. (figs. 66-68)

Etymology: The name of the species refers to the close relationships to *Zodarion styliferum* (SIMON 1970), from para- (gr.) closely related, similar.

Material: Portugal, W-Algarve, near Aljezur, near a beach, 3♂ 1 subad. ♀ JW. leg. in VIII 2008, holotype ♂ R218/CJW, 2♂ and 1 subad. ♀ paratypes R219/CJW.

Diagnostic characters (♂, subad. ♀): Prosoma and legs uniformly orange, prosomal length 0.9-1.0 mm, ♂-pedipalpus (figs. 67-68): Tibia with a very long ventral apophysis which is apically strongly bent; embolus guided by a small skinny conductor which is difficult to recognize.

Description (♂; subad. ♀: See below):
Measurements (in mm): Body length 1.9; prosoma: Length 0.9-1.0, width 0.65-0.7; opisthosoma: Length 1.1, width 0.65; leg I: Femur 0.9, patella 0.35, tibia 0.67, metatarsus 0.8, tarsus 0.6; tibia II 0.55, tibia III 0.52, tibia IV 1.05, cymbium (prolateral aspect) 0.48; subad. ♀ see below.
Colour: Prosoma and legs uniformly orange, prosomal margin quite narrow black, black rigs around the eyes, opisthosoma ventrally and laterally yellowish, dorsally mainly dark grey brown, in the distal half more or less yellowish rsp. with light transverse bands, yellowish above the spinnerets.
Prosoma (fig. 66) 1.7 times longer than wide, distinctly narrowing anteriorly, hairs and thoracal fissure indistinct, eyes in two rows, posterior row strongly procurved, anterior median eyes quite large, posterior median eyes small and oval, clypeus long, basal cheliceral articles robust, fangs slender, gnathocoxae strongly converging, labium a free sclerite, sternum 1.15 times longer than wide. - Legs only fairly long, order IV/I/II/III, hairs distinct, bristles partly rubbed off, few on the femora; on metatarsus I are two long trichobothria recognizable, their position is in 0.4 and 0.9. - Opisthosoma 1.7 times longer than wide, oval, bearing a large dorsal scutum, hairs short. - Pedipalpus: See the diagnostic characters.
Subad. ♀: Body length 2.1 mm, prosomal length 0.9 mm, femur I 0.85 mm long, colour and eyes as in the male.

Relationships: According to the shape of the long ventral pedipalpal tibial apophysis and the structures of the bulbus *Zodarion styliferum* (SIMON 1870) – see above – is stronly related, but its prosoma and femora I-II are dark brown, the prosoma is distinctly longer, 1.26-2.46 mm long (WSC), the cymbium is longer, 0.6 mm long in the present male (see above), the long ventral pedipalpal tibial apophysis (fig. 64) is distally less bent, the probasal outgrowth of the bulbus and the prolateral outgrowth of the tibia fig. 65) are slightly larger, a skinny conductor is absent. - Further species from Portugal related to *Z. parastyliferum*: In *Z. algarvense* BOSMANS 1994) the ventral pedipalpal tibia apophysis is only slightly bent; in *Z. duriense* CARDOSO 2003 the shape of the long pedipalpal tibia apophysis is distinctly different. *Z. alentejanum* PEKAR & CARVALHO 2006 from Lagoa da Sancha (Alentejo) is only known from the female sex. *Z. styliferum* forma *extraneum* DENIS 1935: See PEKAR et al. (2003); the prosomal length of its male is 1.2-1.5 mm.

Distribution: Portugal.

Zodarion tuber **n. sp.** (figs. 69-71)

Etymology: The name of the species refers to the prolateral pedipalpal tibial hump, from tuber (lat.) = hump.

Material: S-Portugal, SE-Algarve, island Fuzeta near Fuzeta, holotype ♂ JW leg. 24. V. 2016 in dunes within low plants, R216/CJW. - Note: The right leg I of the spider is lost through the distal part of the femur. The stump seems to be healed.

Diagnostic characters (♂; ♀ unknown): Colour: See below, prosoma dark brown, prosomal length 1.5 mm. Pedipalpus (figs. 69-71): Tibia prolaterally with a hump (arrow in fig. 71), bulging retrolaterally and prodistally as well as a ventrally originating large/long and bent apophysis which is bulging retrolaterally and bears a more slender distal branch, and more basally a small tooth which is directed anteriorly; median apophysis compact, embolus guided by a pointed strongly sclerotized and bent conductor as well as a second - skinny (translucent) and blunt - conductor.

Description (♂):
Measurements (in mm): Body length 3.0, prosoma: Length 1.5, width 1.1; opisthosoma: Length 1.7, width 1.1, height 1.3; leg I: Femur 1.6, patella 0.5, tibia 1.4, metatarsus 1.7, tarsus 1.0, tibia II 1.2, tibia III 1.15, tibia IV 1.7.
Colour: Prosoma dorsally and ventrally dark brown, legs mainly light brown, tibiae slightly darkened, femora dark brown, opisthosoma dorsally dark brown, posteriorly bearing transverse yellow patches, darkened around spinnerets and behind lung covers.
Prosoma 1.4 times longer than wide, anteriorly distinctly smaller, dorsally anteriorly bearing long hairs, clypeus quite long, basal cheliceral articles only fairly large. - Legs long and slender, order IV/I/II/III, hairs short, bristles apparently absent; on the left metatarsi I-II is a long trichobothrium well observable, its position is in 0.93. - Opisthosoma oval and high, bearing a large dorsal scutum, see above. - Pedipalpus: See above. The tip of the cymbium bears a strong claw (bristle) as well a few indistinct prodistal bristles.

Relationships: According to the long ventrally originating pedipalpal tibial apophysis and the structures of the bulbus *Zodarion algarvense* BOSMANS 1994, *Z. algiricum* (LUCAS 1846) and especially *Z. maculatum* (SIMON 1870) – type locality Sicilia - are strongly related. In these species a compact median apophysis exist, too, but the shape of the long pedipalpal tibia (humps are absent; quite simlar in *maculatum*!), and the structures of the conductor are different.

Distribution: Portugal.

FAMILY DICTYNIDAE

See also above: Spiders of the Canary Islands.

Ajmonia CAPORIACCO 1934

Eleven years ago I published a short paper on the determination of the Europen species of *Nigma* including *gratiosa*, see WUNDERLICH (2011). Here I will add some notes to this paper.

Ajmonia gratiosa (SIMON 1881) (figs. 72-73)

Material: S-Portugal, Algarve, 10 km WNW Tavira, beaten from bushes, 2♂1♀ JW leg. in V 2020, CJW.

In 2011 I erroneously transferred *gratiosa* (SIMON 1881) from *Ajmonia* CAPORIACCO 1934 to *Nigma* LEHTINEN 1967, see WUNDERLICH (2011: 212-216) not knowing the paper by MARUSIK & ESYUNIN (2010) on *Ajmonia*.

In *Ajmonia* the pedipalpal patella bears an apophysis - frequently the tibia, too, see fig. 72 - an apophysis, tibial ctenidia absent, the cymbium bears 1 - rarely 2 - large(r) dorsal-basal outgrowth(s), the conductor apically is more or less screw-shaped similar to *Dictyna, Nigma* and other related genera. According to MARUSIK & ESYUNIN (2010: 361) an "abdominal pattern" is absent in *Ajmonia* but the colour of *gratiosa* is medium to dark brown with distinct dark brown dorsal opisthosomal patterns similar to certain *Dictyna*. A distinct basal depression of the ♂-chelicerae, leg bristle and tarsal trichobothria are absent in *Ajmonia*, the cribellum is entire, the calamistrum of both sexes is almost as long as metatarsus IV. In *Nigma* LEHTINEN 1967 - see below - the colour of body and legs is quite different, the ♂-chelicerae bear a distinct basal depression, a LARGER cymbial outgrowth is absent and the cribellum is USUALLY divided (bipartite) but in *N. puella* I found it undivided (entire). A rarely entire cribellum in *Nigma* has already reported by LEHTINEN (1967: 360).

According to the characters I regard *gratiosa* to be a member of *Ajmonia* (but not *Nigma*), following LEHTINEN (1967: 210) and MARUSIK & ESYUNIN (210). The special shape of the embolus (figs. 72-73) - distinctly standing out from the tegulum and possessing a "crack" fairly similar to *Archaeodictyna ammophila* (MENGE 1866) - are diagnostic patterns of *gratiosa*.

Nigma LEHTINEN 1967

Diagnostic characters: Colour of the spiders usually light orange to greenish (in some specimens almost white when bleached in alcohol), dark opisthosomal markings absent; red opisthosomal patches may exist and fade in alcohol. Cephalic part strongly raised (convex). Basal article of the ♂-chelicerae anteriorly-basally with a hump, see WUNDERLICH (2011: Figs. 2-3) (sexual-dimorphism), and with a depression below this hump (in contrast, e. g., to *Ajmona, Emblyna* and *Dictyna*). Patella of the ♂-pedipalpus with a retrodistal hump or outgrowth, see WUNDERLICH (2011: Figs. 13-14, 20). Cymbium with a small probasal hump which is distinctly reduced in *puella*.

<u>Further characters</u>: <u>Cribellum</u> divided in most members of the genus but entire in *puella* (see above, the genus *Ajmonia*). Calamistrum almost as long as metatarsus IV. Leg bristles and tarsal trichobothria absent, cephalic part bearing longitudinal stripes of white hairs as, e. g., in the related *Dictyna* and *Emblyna.* ♂-chelicerae retrolaterally not bulging and medially in the middle not inclined (concave) in contrast to *Dictyna and Emblyna.* A dorsal tibial apo-

physis of the ♂-pedipalpus which bears short apical bristles (ctenidia) - like in almost all members of *Dictyna* and *Emblyna* - is absent.

Determination of the European species:

Notes to the key, given by WUNDERLICH (2011: 313-314):

(1) I did not include the weakly known *Nigma laeta* (SPASSKY1952) from Azerbeijan. Its prosomal length is 1.1-1.2 mm. *Gratiosa* is excluded, see above (*Ajmonia*).
(2) The prosomal length is an important and rather constant character: The tiniest species are *laeta* (1.1-1.2 mm), *puella* (0.7-1.3 mm) and *tuberosa* (1.0-1.3 mm), the prosomal length of the remaining species is usually ca. 1.5 mm in both sexes.
(3) Distribution: Most species are known from the Iberian Peninsula, *tuberosa* is restricted to the Canary Islands, *laeta* is westernmost known from Azerbeijan.

Lathys SIMON 1884

See LISSNER (2018)

***Lathys mantarota* n. sp**. (figs. 74-81)

Etymology: The species name refers to its locus typicus, the peninsula of Manta Rota.

Material: S-Portugal, SE-Algarve, (1) peninsula of Manta Rota near the Spanish border, ca 12 km E Tavira, south coast of the peninsula, in low plants in a dune near the beach, holotype ♂ JW leg. 18. X. 2021, R212/CJW; the left pedipalpus is kept separately in a small tube; (2) Island of Tavira near Tavira, south coast, in low plants in a dune near the beach, 1♀ paratype JW leg. 12. XI. 2021, R213/CJW; the epigyne was partly destroyed during preparation (its right half is lost), and is kept separately in a small tube.
Note: The left leg I and the right leg IV of the male are lost beyond the coxa by autotomy.

Diagnostic characters: Prosomal length in both sexes only 0.8 mm, colour and pattern of the opisthosoma quite variable; ♂-pedipalpus (figs. 74-79): Tibia with a blunt retrodistal apophysis and a long, transverse, slender and apically divided/furcate (fig. 79) apophysis which points retrolaterally, conductor with a screw-shaped distal branch which lies dorsally close to the tibia. ♀: epigyne/vulva (figs. 80-81, see above) with a large atrium which bears a pair of copulatory openings which are difficult to recognize and lead to target ball-shaped introductory ducts; the large receptacula seminis - diameter 0.6 mm - are thin-walled and widely spaced.

Description:

Measurements (in mm). ♂: Body length 1.7; prosoma: Length 0.8, width 0.6; opisthosoma: Length 0.9, width 0.6; leg I: Femur 0.8, patella 0.3, tibia 0.8, metatarsus 0.6, tarsus 0.35, tibia II 0.5, tibia III 0.35, tibia IV 0.5; basal cheliceral articles 0.5. ♀ (egg-bearing): Body length 2.2; prosoma: Length 0.8, width0.5; opisthosoma: Length 1.35, width 1.15; leg I: Femur 0.8, patella 0.3, tibia 0.5, metatarsus 0.47, tarsus 0.37, tibia II 0.45, tibia III 0.3, tibia IV 0.5.

Colour. Prosoma ♂ olive green, ♀ olive brown, in both sexes margin small black and a W-shaped black marking in the middle; opisthosoma dorsally (it is intraspecifically very variable, apparently not sexually dimorphic): ♂ mainly olive, with a dark median band in the anterior third as well as irregular dark markings, ♀ olive with irregular dark markings, without a median band, legs in both sexes olive and annulated, with distinct dark markings like in related species. - Prosoma 1.33 times longer than wide, anteriorly distinctly narrowed, fairly convex, thoracic fovea or fissure absent, hairs of medium length, 8 eyes, anterior medians smallest, posterior row slightly procurved, posterior median eyes spaced by their diameter, clypeus short, basal cheliceral articles large, not diverging, more slender in the male, male retroanteriorly bearing 4 larger spurs which bears short bristles, female only with short bristles in this position, fangs long and slender, anterior margin of the fang furrow with 3 basal denticles, posterior margin with 4 larger teeth, labium wider than long, a free sclerite, gnathocoxae long and not converging, the area of the serrula is black (strongly sclerotized), long and apparently nor serrated (in a magnification of 150x), sternum 1.1 times longer than wide, spacing the coxae IV by half of their diameter. - Tarsus of the ♀-pedipalpus with a small claw. - Legs only fairly long, order I/IV/II/III, bristles (number apparently variable, some are rubbed off): Femur I 1 prodorsally in the distal half, the left femur II of the female bears an additional dorsal bristle, patellae dorsally 1/1 (the basal one small), tibiae few dorsally laterally and ventrally, metatarsi: I-II 0 to1/1 ventrally, tarsi: Only the right tarsus IV of the female bears 2 short ventral bristles in the distal half, calamistrum well developed in the basal half in the female, absent or lost (rubbed off) in the male, all metatarsi bear a long trichobothrium near the end, all tarsi bear a long trichobothrium in the middle, tarsal claws were not studied. - Opisthosoma oval, 1.17 times longer than wide, hairs of medium length, cribellum well developed and wide in both sexes. - Copulatory organs: See the diagnostic characters; the tibia of the ♂-pedipalpus bears retrodorsally a longitudinal margin and a long probasal bristle, the sperm duct is wide, see the dorsal aspect of the cymbium.

Relationships: A member of the *stigmatisata*-group. *L. mallorcensis* LISSNER 2018 from the Balearic island Majorca (Mallorca) (Spain) is closely related, see LISSNER (2018). Members of *mallorcensis* live in hypogean environments, they are larger - prosomal length ♂ 0.9-1.1 mm, ♀ 0.7-0.9 mm (a rare case of sexual size dimorphism of spiders in which the female is usually larger than the male!) -, a long fovea exists, the tibia of the ♂ pedipalpus is ventrally-distally more complicated, the transverse pedipalpal tibial apophysis is shorter and apically not divided, the shape of the conductor is slightly different; vulva: The position of the median introductory ducts is more anteriorly.

Distribution: S-Portugal.

Family CHEIRACANTHIDAE

Cheiracanthium algarvense WUNDERLICH 2012 from the Algarve and the Canary Islands: See above. Photo 1.

Family LIOCRANIDAE

Apostenus crespoi LISSNER 2017

Only the female sex of this species is known, collected SE Lisbon. In contrast to *A. fuscus* WESTRING 1851 an epigynal plate is absent in this species.
New material: SE Lisbon, near Sta. Catarina, 1♀ JW leg. in V 2019, CJW.
The characters of the female are as in the holotype, its prosomal length is 1.3 mm. An epigynal plate is absent in contrast to the holotype.

Family GNAPHOSIDAE

Members of this diverse family of the Algarve are still not well studied. Here I describe two new species of *Zelotes* s. l. and and new species which may be a member of *Synaphosus*.

Synaphosus PLATNICK & SHADAB 1980

Although widely distributed in the Northern Hemisphere this unusual gnaphosid genus has not been reported from the Iberian Peninsula up to now. Characteristic for this genus are the absence of a gnathocoxal serrula (fig. 84) - quite unusual within the family Gnaphosidae - and the quite long paired tarsal claws III-IV which are about 1.8 times longer than the claws I-II besides the well developed metatarsal III-IV preening comb, the unnotched tochanters and the absence of praecoxal triangles. The leg spination, the number of the teeth of the fang furrow and the shape, size and position of the 8 eyes are quite variable; the posterior median eyes of *S. parvioculi* n. sp. are circular (figs. 82-83) – another very unusual character within the Gnaphosidae whose posterior median eyes are usually oval.

Note: The present species is keyed out as a member of *Synaphosus* using the key given by WUNDERLICH (2011); the key of the gnaphosid genera of the World Spider Catalog (2021) does not lead the the genus *Synaphosus*.

?***Synaphosus parvioculi* n. sp.** (figs. 82-86)

Etymology: The species name refers to its very small eyes, from parvus (lat.) = small and oculus (lat.) = eye.

<u>Material</u>: Portugal, SE-Algarve, ca. 7 km WNW Tavira, taken from the surface of the swimming pool of the house "Casa Marta"; holotype ♀ JW leg. 5. V. 2018, R210/CJW.
<u>Note</u>: The small eyes of the spider may point to the hypogean lifestyle of this species. Caves near the locus typicus of the new species are unknown to me. In the same swimming pool I found several members of mygalomorph trapdoor spiders like Nemesiidae.

Diagnostic characters (♀; ♂ unknown): All eyes (figs. 82-83) very small, diameter of a posterior median eye 0.055 mm, shape of the posterior median eyes circular (!), anterior and posterior margins of the fang furrow bear about 3 teeth. I did not find feathery hairs of body and legs. Epigyne/vulva: Fig. 86, see below.

Description (♀):
Measurements (in mm): Body length 5.8; prosoma: Length 2.5, width 1.8; opisthosoma: Length 3.3, width 2.2; leg I: Femur 2.0, patella 0.9, tibia 1.6, metatarsus 1.1, tarsus 0.9, tibia II 1.5, tibia III 1.0, tibia IV 1.35; diameter of a posterior median eye 0.055; length of the dorsal prosomal and opisthosomal hairs up to 0.5; length of the tarsal claws I-II 0.1, length of the tarsal claws III-IV 0.18.
Colour: Prosoma and legs medium brown, legs not annulated, opisthosoma dorsally medium grey, ventrally light grey.
Prosoma (figs. 82-84) 1.4 times longer than wide, thoracal part not raised, most of the long hairs (see above) rubbed off, thoracic fissure short, 8 very small eyes (see above), of about the same size in two rows, posterior median eyes circular (!), posterior row slightly procurved, posterior median eyes distinctly wider spaced from each other than from the lateral eyes, basal cheliceral articles rather large, fangs long, anterior margin of the fang furrow with 3 teeth, posterior margin with 3-4 small teeth, labium a free sclerite, distinctly longer than wide, gnathocoxae only weakly converging and weakly inclined, anteriorly medially bearing dense long hairs, serrula absent (!), some longer hairs exist in its usual position, sternum 1.4 times longer than wide, not elongated between coxae IV, praecoxal triangles absent. - Pedipalpus relatively large, tarsal claw well developed and smooth. - Legs rather robust, order I/IV/II/III, tracheal notches absent, hairs of medium length, tarsi and metatarsi only weakly scopulate; bristles few and thin on I-II: Femora dorsally 1/1 and 2 prodistally, patellae dorsally 1/1, tibiae dorsally 1/1, additionally I ventrally 1-2 and II ventrally 1/1, metatarsus I 1 ventrally basally, metatarsus II 1 pair ventrally; femora, tibiae and metatarsi III-IV with numerous bristles, claw tufts absent, paired tarsal claws toothed, III-IV 1.8 times longer than I-II. - Opisthosoma (fig. 85) 1.5 times longer than wide, dorsally with numerous short and not many long hairs, 3 pairs of long spinnerets, anteriors cylindrically, spaced by 1 ¼ diameters, bearing 5 long spigots; in the area of a colulus exists a brush of about 10 longer hairs. - Epigyne/vulva (fig. 86) anteriorly with a sclerotized structure similar to a flying bird, medially light, posteriorly with apparently two pairs of strongly sclerotized receptacula seminis; ducts short.

The **relationships** of the species are unsure until a male will be discovered. Its eye lenses are much smaller than in all other species of *Synaphosus* PLATNICK & SHADAB 1980 and *Cryptodrassus* MILLER 1943 in which the posterior median eyes are oval in contrast to *parviocoli*. In *Cryptodrassus* the ducts of the vulva are short like in *parviocoli* but long and twisted in *Synaphosus*. In both genera in question a gnathocoxal serrula is absent – this absence is confirmed in the type species of *Cryptodrassus* by C. DELTSHEV (in lit. XI 2021) - and the paired tarsal claws III-IV are distinctly longer than I-II. I do not want to exclude the synonymy of *Cryptodrassus* with *Synaphosus*, and regard *parviocoli* provisionally as a member of *Synaphosus*.

Distribution: Portugal, SE Algarve; genus and species are new for the fauna of Portugal.

Zelotes GIESTEL 1848 s. l.

In my opinion *Zelotes* is not a monophyletic genus; see, e. g., *Civizelotes* SENGLET 2011 below. A worldwide revision of the very diverse genus is needed.

***Zelotes barbarella* n. sp.** (figs. 87-93)

Etymology: The name of the species refers to its bearded areas of the opisthosoma from barbatus (lat.) = bearded and the arbitrary ending -ella.

Material: Portugal, SE-Algarve, near Prego, ca. 10 km w Tavira, under a stone in a shadowy dry bed of a small stream, ♂ holotype JW leg. 29. IX. 2021, R209/CJW.

Diagnostic characters (♂; ♀ unknown): Colour of the opisthosoma light brown, tibia and metatarsus I bristle-less, tarsus and metatarsus I with dense scopulae, posterior eye row distinctly procurved (fig. 87), posterior margin of the fang furrow with a single tooth, opisthosoma (figs. 87-88) bearing a short dorsal scutum and anteriorly laterally a “beard” (a brush and a row) of black hairs; pedipalpus (figs. 89-93): Tibia with a straight retrolateral apophysis which apically is three-pointed, bulbus with a large median apophysis, distally with a large divided tegular apophysis; in the ventral aspect the tip of the long embolus is observable.

Description (♂):

Measurements (in mm): Body length 7.0; prosoma: Length 3.3, width 2.5; largest diameter of a posterior median eye 0.14; opisthosoma: Length 4.0, width 2.3; leg I: Femur 2.5, patella 1.7, tibia 2.4, metatarsus 1.9, tarsus 1.15; tibia II 1.9, tibia III 1.5, tibia IV 2.4; femur IV 2.7.

Colour: Prosoma and legs medium brown, legs not annulated, opisthosoma dorsally medium grey, ventrally light grey.

Prosoma (fig. 87) 1.3 times longer than wide, most of the indistinct hairs are rubbed off, thoracic fissure well developed, 8 eyes in two rows, anterior medians largest, posterior row distinctly procurved, posterior median eyes spaced by their diameter, basal cheliceral articles rather large, bearing anteriorly numerous thin hairs, anterior margin of the fang furrow with3 teeth, posterior margin with a single tooth, gnathocoxae robust, not converging, inclined, labium a free sclerite, 1.3 times longer than wide, sternum 1.33 times longer than wide, not spacing the coxae IV, praecoxal sclerites well developed. - Legs robust, hairs short, metatarsi and tarsi bearing distinct scopulae, weak on the tibiae, bristles numerous on III-IV, few on I-II, femora: 3 on I-II, 6 on III-IV, patellae: I-II none, III a lateral pair, IV a prolateral one, tibiae: I none, II 1 distally in the ventral half, III-IV numerous bristles, metatarsi: I none, II 1 proventrally in the basal half, III-IV many, metatarsus III-IV preening comb well developed. - Opisthosoma (figs. 87-88) 1.74 times longer than wide, bearing anteriorly a short scutum, covered with short hairs but anteriorly bearing long hairs and anterior-laterally with a “beard” (a brush and a row) of black hairs, genital area sclerotized, 6 pairs of spinnerets, the long anterior pair spaced from each other by their diameter. - Pedipalpus: See the diagnostic characters.

Relationships: In *Zelotes serratus* WUNDERLICH 2011 from the Iberian Peninsula the position of the median apophysis is more distally than in *barbarella*, its shape is different and the embolus is thin; in *Z. fuscurufus* (SIMON 1879) (Spain, Corsica, Italy and North Africa) the tip of the pedipalpal tibial apophysis is a bit similar, cymbium and bulbus are more slender and the structures of the bulbus are different.

Distribution: S-Portugal.

***Zelotes (Civizelotes) sengleti* n. sp.** (figs. 94-98)

Derivatio nominis: The species is dedicated to the Swiss arachnologist ANTOINE SENGLET who published important studies e. g. on the gnaphosid taxa *Civizelotes* and *Zelotes*.

Material: Spain, Balearic island Ibiza, ca. 4 km NW Santa Eulalia, under a stone in a dry area, ♂ holotype JW leg. 3. VIII. 2017, R211/CJW. The left leg IV of the spider is lost.

Diagnostic characters (♂; ♀ unknown): Prosoma dark brown, posterior eye row very slightly recurved (fig. 94), opisthosoma with a large dorsal scutum (almost as half as the opisthosomal length), all patellae dorsally with 1/1 long and thin (hair-shaped) bristles; pedipalpus (figs. 95-98): Tibia with a long and almost straight retrolateral apophysis, bulbus with several apophyses and a quite long embolus which originates retrolaterally in the distal half of the bulbus, curved directly below the cymbium, is guided by a sclerotized conductor and ends in the impressed distal part of the cymbium. I did not find feathery hairs.

Description (♂):

Measurements (in mm): Body length 6.9; prosoma: Length 3.3, width 2.6; opisthosoma: Length 3.5, width 2.1, length of the scutum 1.5; leg I: Femur 2.25, patella 1.5, tibia 2.0, metatarsus 1.75, tarsus 1.1, tibia II 1.55, tibia III 1.3, tibia IV 2.4.

Colour: Prosoma and opisthosomal scutum dark brown, legs medium brown, opisthosoma dorsally dark grey, ventrally medium grey.

Prosoma (fig. 94) 1.27 times longer than wide, thoracic fissure well developed, 8 small eyes in a narrow field, posterior median eyes largest, shape irregular and oval, posterior row very slightly recurved, clypeus short, basal cheliceral articles robust, fangs long, anterior margin of the fang furrow with 3-5 teeth (the lateral teeth are tiny), posterior margin with 2 small teeth, labium a free sclerite, 1.5 times longer than wide, gnathocoxae slightly converging, ventrally distinctly inclined, serrula well developed, sternum 1.35 times longer than wide, not spacing the coxae IV. - Legs robust, order IV/I/II/III, hairs long but not distinct, tarsi and metatarsi I-II distinctly scopulated; bristles: Femora dorsally 1/1, on I-II thin and additionally 1 prodistally, III-IV 1-2 additionally, all patellae with 1/1 long and thin (hair-shaped) bristles, tibiae I-II bristle-less, III-IV with thicker lateral and ventral bristles, metatarsus I bristle-less, II with 2 ventral-basal bristles, III-IV bear numerous bristles, trochantera not notched, paired tarsal claws bearing long teeth, claw tufts absent. - Opisthosoma 1.7 times longer than wide, dorsally bearing only fairly long hairs and a scutum of almost half of its length, 3 pairs of spinnerets, the anteriors long and spaced by almost 1 ¼ diameter, posterior spinnerets apparently retracted. - Pedipalpus: See the diagnostic character; patella and tibia are short.

Relationships: In *Z. flagellans* (L. KOCH 1882) of Southern Europe the tibia apophysis of the ♂-pedipalpus is quite similar but the origin of the embolus is more ventrally and its loop is different, e. g., retrolaterally close to the margin of the cymbium. In *Z. fuzeta* (Algarve) ...

Distribution: The Balearic island Ibiza (Spain).

(3) SPIDERS FROM GREECE

Almost 40 years ago LYDIA PARASHI from Greece left me some of her spiders which she collected with the help of pit falls in the Eastern Aegean, e. g., of Naxos. Here I describe four new species of that material, members of the families Zodariidae and Liocranidae.

Family ZODARIIDAE

Lachesana STRAND 1932

Members of *Lachesana* are larger spiders which possess a body length of almost 1 cm or even more, numerous strong leg bristles and a uniquely modified/bent fang in the male sex (figs. 100-101) (sexual dimorphism); their cymbium bears strong spines, a median apophysis is absent, the colour of the opisthosoma is frequently intraspecifically quite variable. The spiders have a hidden subterranean life style, they are burrowing spiders. Males searching for fertile females may be found occasionally under stones.

European members of *Lachesana* exist in the Southeastern part of the continent. Here I describe a forth European species of this genus.

Lachesana naxos n. sp. (figs. 99-104)

Etymology: The name of the spider refers to the Greek island Naxos where members of the species live.

Material: Greek island Naxos, 2♂ LYDIA PARASHI leg. 18. IX. 1982 in pit falls; according to Maria Chatzaki (per e-mail) Troulades, 5 km south of Moutsouna, coordinates X:37,037237, Y: 25,570281; holotype R221/ CJW, paratype R222/CJW. - Note: The left pedipalpus of both males as well as the left fang of the paratype are kept in small tubes; the right pedipalpus of the paratype is lost.

Diagnostic characters (♂; ♀ unknown): Fangs as in figs. 100-101), gnathocoxae as in fig. 106; pedipalpus (figs. 102-103): Tibia with a long and almost straight retrolateral tibial apophysis bearing a long depression and lying in a large furrow of the cymbium, cymbium distally with half a dozen spines, scopulate in the distal half, embolus long, thin and hidden by a long conductor.

Description (♂):
Measurements (in mm): Body length .5-10.0; prosoma: Length 5.3-5.4, width 3.8-3.9; opisthosoma: Length 5.6, width 3.8; leg I: Femur 4.2, patella 1.8, tibia 3.5, metatarsus 3.7, tarsus 2.6, tibia II 3.1 tibia III 2.5, tibia III 3.5.
Colour: Prosoma and legs orange brown, opisthosoma dorsally with a dark medium band anteriorly, dorsally-laterally with a broken dark band, in the posterior third with 4 pairs of black touches, ventrally yellow brown, above or around the spinnerets dark brown, lung covers dark.
Prosoma 1.37 times longer than wide, oval, smooth, thoracal fissure long, 8 eyes in position like *L. graeca* THALER & KNOFLACH 2004: Fig. 3, posterior row procurved, posterior median eyes spaced by less than their diameter, anterior median eyes slightly the largest, spaced from each other by 1/2 diameter. Clypeus short, basal cheliceral articles large and bearing fairly short hairs, fangs (figs. 100-101) robust, blunt, bent in a right angle, bearing a laterally depressed structure, anterior margin of the fang furrow with 2-3 teeth, labium a free sclerite, gnathocoxae (fig. 99) converging, bearing proapically a dozen long, strong and flattened hairs, sternum 1.8 times longer than wide, coxae IV close together. - Legs robust, order IV/I/II/III, bristles strong and numerous, their number variable, existing from femora to tarsi, femora with 2 dorsal bristles in the basal 2/3, II 1-2 retrolaterally in the basal half, distally and apically an additional pair, III-IV usually with 7 bristles, patellae I-II smooth, III-IV 2 prolaterally and 1 retrolaterally, tibiae dorsally I-II none, III-IV 2; ventral and lateral bristles: I-II ca. 7, III-IV ca. 10, metatarsi with numerous bristles, tarsi I-II ventrally with 3-5 short bristles, III-IV with 10-15 longer ventral bristles; paired tarsal claws with numerous long teeth, unpaired claw short and strongly bent. - Opisthosoma 1.47 times longer than wide, dorsally bearing short and few longer hairs and a large weak scutum, ventrally with a wide narrow and weakly sclerotized band just behind the epigastric furrow. Genital opening (fig. 104) with a pair of claw-shaped blunt sclerotized structures.

Relationships: In *Lachesana graeca* THALER & KNOFLACH 2004 from Central Greece and Peloponnese the shape of the fang is different, the gnathocoxae are longer, their apical hairs are shorter and a brush of hairs exists near the middle; the pedipalpal tibial apophysis is similar but bent dorsally and with its cavity more distally. In *L. rufiventrias* (SIMON) the gnathocoxae are similar.

Distribution: Greek island Naxos.

Zodarion WALCKENAER 1847

Members of *Zodarion* are one of the most diverse spider genera in South Europe. Its Greek members were revised by BOSMANS (2009).

***Zodarion parashi* n. sp.** (figs. 105-106)

Etymology: The name of the species refers to the collector of the holotype, Lydia Parashi.

Material: Greece, Eastern Aegean island Naxos, "M8"; according to Maria Chatzaki (per e-mail) Troulades, 5 km south of Moutsouna, coordinates X:37,037237, Y:25,570281; holotype ♂ L. Parashi leg. 20. VII. 1982, R220/CJW. - Notes: Both legs I-II are lost beyond their femur, the left tarsus III is lost – probably bite off by an ant - ; the stump apparently is healed. The chelicerae and the left pedipalpus are put in a small tube.

Diagnostic characters (♂; ♀ unknown): Prosoma and legs light orange; pedipalpus (figs. 105-106): Retrolateral tibial apophysis of medium length, bearing a slender dorsal branch, medium apophysis prolaterally complicated toothed, embolus in the distal half bent in a righ angle, widened near its tip; prosomal length only 0.95 mm.

Description (♂):
Measurements (in mm):Body length 1.3; prosoma: Length 0.95, width 0.65; opisthosoma: Length 0.85, width 0.7; femora I-IV 0.87, 0.75, 0.7 and 1.0.

Colour: Prosoma and legs light orange, prosoma dorsally with a light grey touch, margin quite small black, eye field black, opisthosoma dorsally dark, laterally and ventrally yellowish.
Prosoma 1.65 times longer than wide, anteriorly distinctly smaller, thoracic fissure indistinct, basal cheliceral articles robust, fangs slender, furrow medially bearing a toothed outgrowth, sternum 1.1 times longer than wide. - Legs incomplete, order IV/I/IIII, hairs indistinct, bristles absent or rubbed off, position of the long trichobotrium on the right metatarsus IV in 0.95. - Opisthosoma 1.21 times longer than wide, bearing a lage dorsal scutum, hairs only fairly long. - Pedipalpus: See above.

Relationships: According to the structures of the male pedipalpus fairly similar and probably related are *Z. hauseri* BRIGNOLI 1984 an *Z. beroni* KOMNENOV & CHATZAKI 2016, both also from Greece; pedipalpal tibial apophysis, median apophysis an embolus are different, the embolus is not bent in a right angle.

Distribution: Greece.

Family **LIOCRANIDAE**

Apostenus WESTRING 1851

In *Apostenus* the posterior eye row is fairly to distinctly recurved, the lateral eyes are usually larger than the median eyes, the tibiae I-II bear 5 pairs of ventral bristles, the tarsi bear a pair of spatulate apical hairs, the tibia of the male pedipalpus bears up to four apophyses and the cymbium bears (in all species?) a retrobasal border and furrow, in which one of the tibial apophyses may fit during copulation (see the figs.). The epigyne bears not seldom plugs which may be dark brown and thick or shield-shaped and partly translucent (figs. 111, 113). The distribution of *Apostenus* is mainly holarctic, most species have been described from the Mediterranean, and some are apparently island endemics like the two species described below which have been captured with the help of pit falls on the ground. Colleagues informed me about material from at least three other Greek islands which apparently are still undescribed.

***Apostenus naxos* n. sp**. (figs. 107-113)

Etymology: The name of the new species refers to the Greek island Naxos on which the members of the present species have been collected.

Material: Greek island Naxos, L. PARASHI leg. in pit falls about 40 years ago at 3 localites, coded as following: ♂ holotype M28, 11/82, Democritus Univ. of Thrace, Alexandroupoli; 1♂ 3♀ paratypes, 6/XII/82, right ♂-pedipalpus lost, 1 plug shield separated, SMF; 3♀ paratypes: ML 9, 8/IV/84; Cl6, 10/XI/81 and Z21, XII/82, Democritus Univ. of Thrace, Alexandroupoli. According to Maria Chatzaki (per e-mail) the spiders were collected in Troulades, 5 km south of Moutsouna: X:37,037237, Y:25,570281.

Diagnostic characters: Prosoma and legs pale yellowish to light brown; ♂-pedipalpus (figs. 108-110): Tibia with 3 apophyses: A small/indistinct dorsal-distal apophysis, a large pro-dorsal one and a small apical-ventral one, cymbium with a larger retrobasal border and furrow (in which the dorsal tibial apophysis may fit during copulation), embolus fairly large, median apophysis slender and relatively long. ♀: Epigyne (figs. 111-113) with a distinct Y-shaped marking, receptacula seminis fairly large, oval (almost circular), thin-walled and closely together. The epigyne is frequently covered with a wide, thin, partly translucent and partly darkened shield-like plug which easily can be separated. Body length 1.8-2.4 (♀) mm.

Description:

Measurements (in mm): Body length ♂ 1.8-1.9, ♀ 2.1-2.4; prosoma (♂♀): Length 0.9-1.0, width 0.7-0.8; leg I (♂): Femur 0.75, patella 0.37, tibia 0.8, metatarsus 0.5, tarsus 0.43; tibia II 0.7, tibia III 0.55, tibia IV 0.8; ♀-leg I: Femur 0.65, tibia 0.65; tibia IV 0.8.

Colour: See above; black rings exist around the eye lenses; opisthosoma light, occasionally dorsally with grey transverse bands. In the holotype – probably caused by the preservation – all femora, coxae, trochantera and the right tibia IV are strongly brown darkened.

Prosoma ca. 1.3 times longer than wide, distinctly smaller anteriorly, thoracal fissure long, 8 eyes in two rows, posterior row fairly recurved, anterior and posterior lateral eyes larger than the median eyes, posterior median eyes slightly wider spaced than their diameter, fangs long and slender, anterior margin of the fang furrow with 3 teeth, posterior margin with 2 teeth, labium (fig. 107) 1.4 times wider than long, not triangular, a free sclerite, bearing several partly long apical hairs. - ♀-pedipalpus without tarsal claw. - Legs slender and fairly long, order IV/I/II/III, III relatively long, hairs short and indistinct; bristles (most are rubbed off): Femora dorsally 1/1, few additional lateral hairs existing, all patellae bearing at least a long and thin dorsal-apical bristle, tibiae I-II with 5 pairs of ventral bristles, metatarsi I-II with 3 or (occasionally) 2 pairs of ventral bristles. - Opisthosoma oval, hairs short and indistinct, spinnerets short. - Epigyne: See the diagnosis; a plate is absent. - ♂-pedipalpus: See the diagnosis.

Relationships: See *A. epidaurus* n. sp.

Distribution: Greek island Naxos.

Apostenus epidaurus n. sp. (figs. 114 - 117)

Etymology: The name of the new species refers to the Greek island Epidaurus on which the members of the present species have been collected.

Material: Greek island Epidaurus, PARASHI leg. in pit falls at 3 localities about 40 years ago: ♂ holotype leg. in XI/84, Democritus Univ. of Thrace, Alexandroupoli; paratypes 4♂, T46, 10/I/85, Democritus Univ. of Thrace, Alexandroupoli; 1♂ paratype, 5/XII, Alium, SMF. According to Maria Chatzaki (per e-mail) the spiders were collected at the following coordinates: X:37,684157 Y:23,150331.

Diagnostic characters (♂; ♀ unknown): Prosoma and legs pale yellowish to light brown; ♂-pedipalpus (figs. 114-117): Tibia with 4 apophyses: A small/indistinct dorsal-distal apophysis, a larger prodorsal apophysis, a large prodistal, and a small apical-ventral apophysis, cymbium with a small retrobasal border and a small retrobasal border and furrow (in which the dorsal tibial apophysis may fit during copulation), subtegulum with an apical outgrowth, embolus fairly large, median apophysis slender and relatively long. Body length 1.7-1.9 mm.

Description (♂):
Measurements (in mm): Body length 1.7-1.9; prosoma: Length 0.8-0.9, width 0.7-0.75; opisthosoma: Length ca. 0.9, width ca. 0.6; leg I: Femur 0.73, patella 0.31, tibia 0.65, metatarsus 0.5, tarsus 0.45; tibia II 0.58, tibia III 0.52, tibia IV 0.7.
Colour and remaining characters of body and legs as in *A. naxos* n. sp. Pedipalpus: See above.

Relationships: In the also tiny and closely related *A. naxos* n. sp. from Naxos the tibia of the ♂-pedipalpus bears only 3 apophyses, the structures of the cymbium are different, an apical outgrowth of the subtegulum is absent, embolus and median apophysis are quite similar. Both species form a species-group of their own which may include further species of Greek islands; see above.

Distribution: Greek island Epidaurus.

(4) A SPIDER (LINYPHIDAE) FROM TURKEY

***Diplocephalus protuberiscus* n. sp.** (figs. 118-121)

Etymology: The name of the species is an artificial combination of the names of two similar and closely related species, *Diplocephalus protruberans and* and *D. lusiscus*.

Material: E-Turkey, Anatolia, Abant mountains, near Bolu, pit fall, HORST KORGE leg. In V 1976, holotype ♂ R215/CJW. - Note: The opisthosoma of the spider is distinctly deformed. The left pedipalpus is kept separatly.

Diagnostic characters (♂; ♀ unknown): Cephalic part (figs. 118-119) strongly raised, posteriorly slightly overhanging, lateral depressions indistinct, clypeus a large and protruding plate, densily covered with short hairs; pedipalpus (figs. 120-121): Tibia with a transverse apical branch, dorsally bulging, and with a wide retrolateral branch, paracymbium sickle-shaped, embolus thick and strongly bent.

Description (♂):
Measurements (in mm): Body length 1.2; prosoma: Length 0.65, width 0.5; opisthosoma: Length 0.75, width ca. 0.4; leg I: Femur 0.48, patella 0.15, tibia 0.38, metatarsus 0.38, tarsus 0.3, tibia II ca. 0.33, tibia III 0.28, tibia IV 0.4.
Colour: Prosoma and legs orange brown, dark rings around the eyes, clypeus and sternum darkened, opisthosoma dark grey.
Prosoma (figs. 118-119) (see also above): 1.3 times longer than wide, 8 small eyes, posterior row strongly procurved, posterior median eyes spaced by 1 ¼ diameters, basal cheliceral articles only fairly long, lateral files existing, fangs long and slender, anterior margin of the fang furrow with 3 larger teeth, posterior margin with few denticles, sternum 1.2 times longer than wide, spacing the coxae IV by less than their diameter. - Legs of medium length, I and IV almost equal in length, III distinctly the shortest, hairs quite short and indistinct; bristles: A single dorsal-distal one on all patellae, tibial bristles absent but probably rubbed off; a long trichobothrium is well observable in ca. 0.33 on the right metatarsus III. - Opisthosoma deformed, ca. 1.8 times longer than wide, hairs short and indistinct. - Pedipalpus: See above; patella short.

Relationships: *Diplocephalus protuberans* (O. PICKARD-CAMBRIDGE 1875) (Europe including Turkey) and *D. lusiscus* (SIMON 1872) (France, Spain, Germany, Switzerland) are most related but larger; in both species the structures of the bulbus and the shape of the pedipalpal tibia are different, the transverse apical branch of the tibial apophysis is more slender.

Distribution: Turkey.

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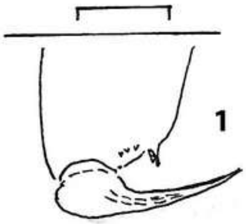
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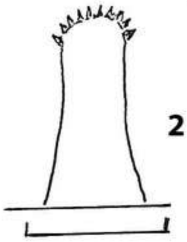
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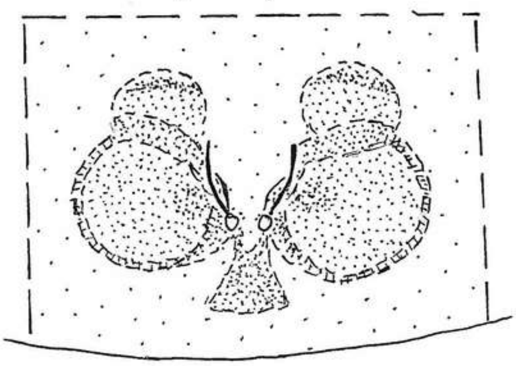

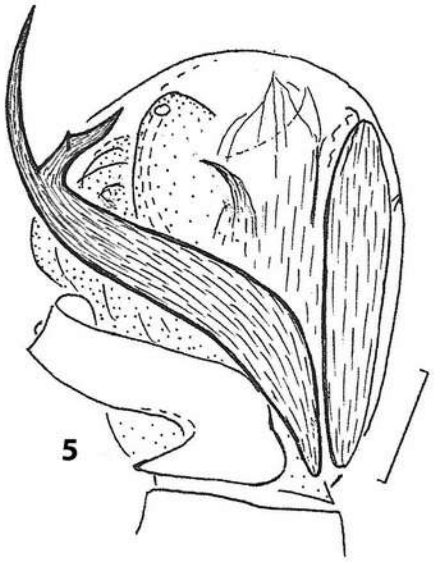
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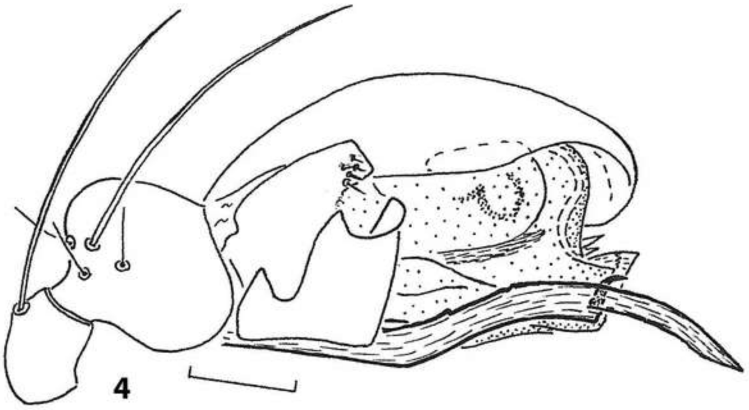
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Figs. 1-3: ***Rugathodes minioculus* n. sp.**, ♀; 1) Anterior aspect of the distal part of the right chelicera; 2) labrum; 3) epigyne. - Scale = 0.05 mm;

figs. 4-5: ***Tenuiphantes palmensis*** WUNDERLICH 1992, ♂, retrolateral and vetral aspects of the right pedipalpus. - Scales = 0.1;

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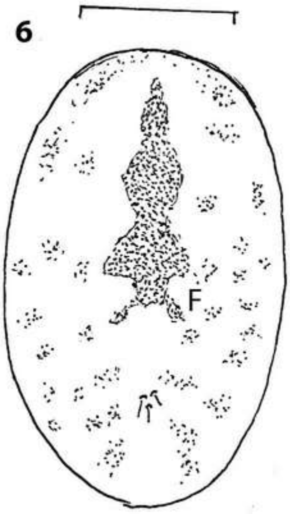

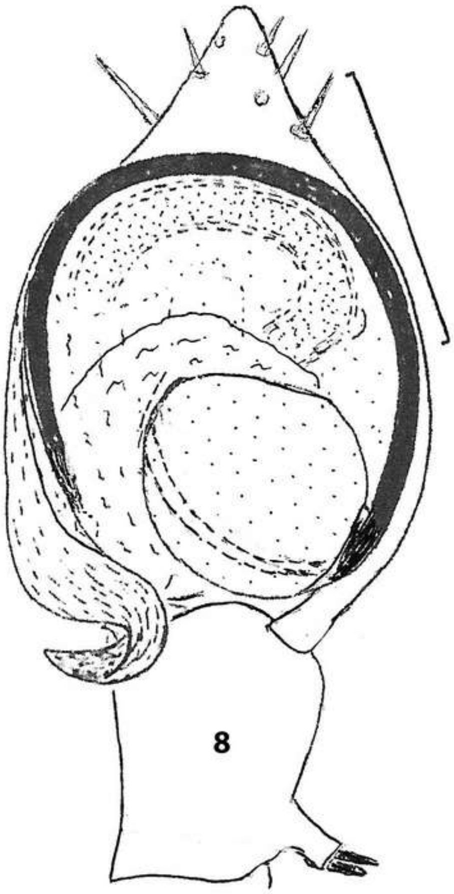

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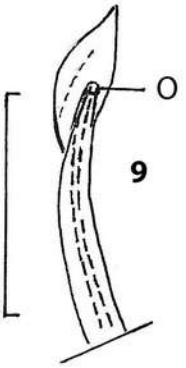

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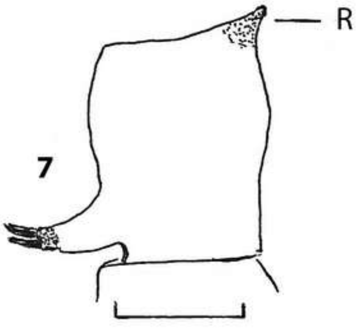

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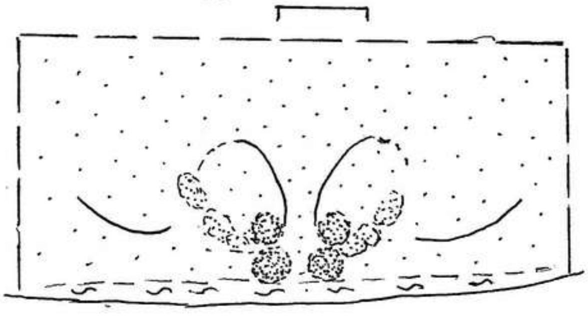
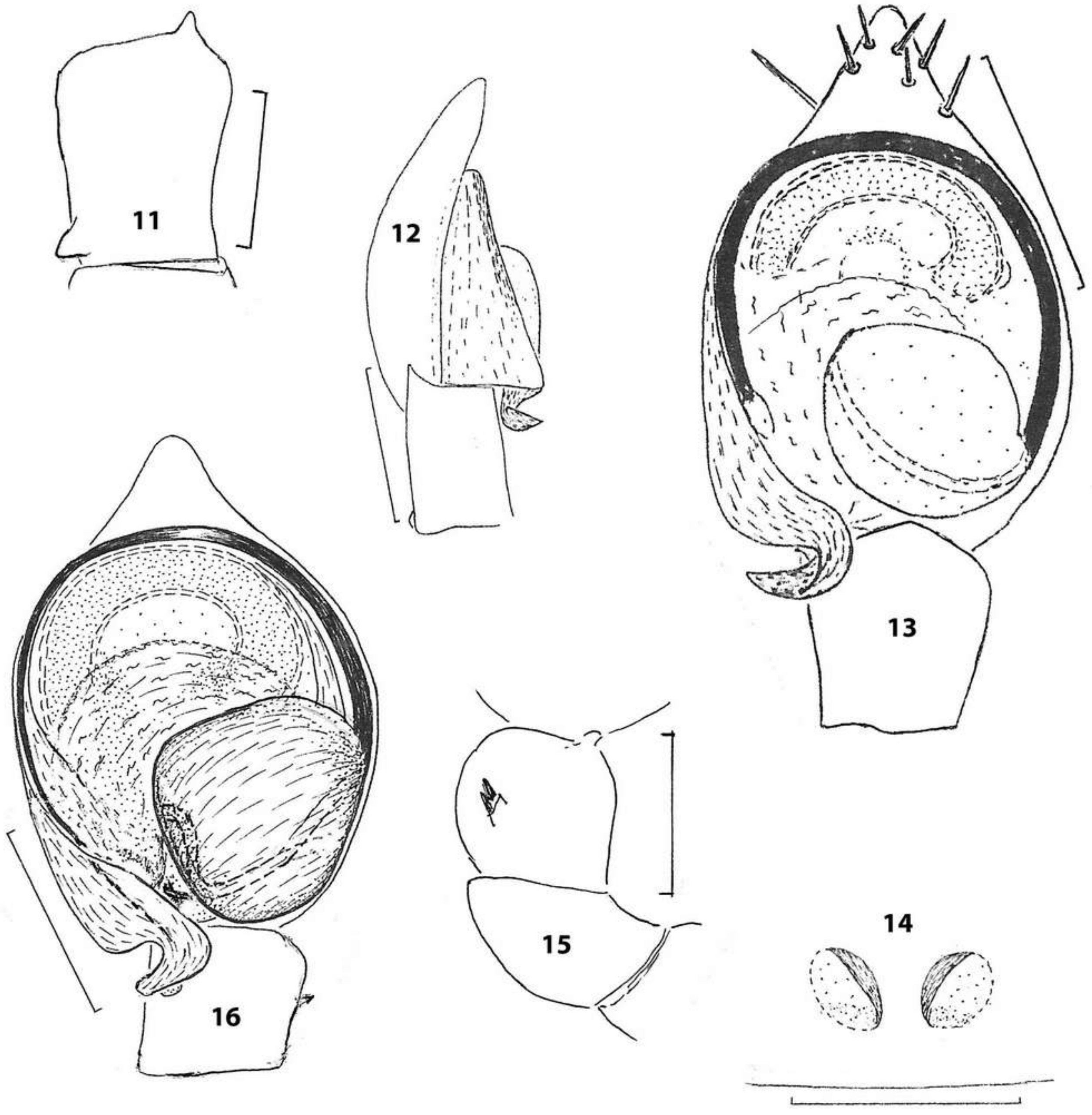


figs. 6-10: ***Emblyna canadas* n. sp.**; 6-9) ♂ holotype: 6) dorsal aspect of the opisthosoma. Only few hairs are drawn; 7) dorsal aspect of the tibia of the right pedipalpus; 8) ventral aspect of the right pedipalpus. Some cymbial bristles are broken off; 9) ventral aspect of the distal part of the left embolus; 10) ♀ paratype No. Z6C/AN (6256), epigyne/vulva. The epigyne is quite variable, the sclerotized rims may be very indistinct in alcohol. - Scales 1.0 in fig. 10, 0.5 in fig. 6, 0.2 in fig. 8, 0.1 in figs. 7 and 9. - O = opening of the sperm duct, R = retrolateral tibial outgrowth;



figs.11-14: ***Emblyna teideensis*** WUNDERLICH 1992; 11-13) ♂, right pedipalpus; 11) dorsal aspect of the tibia; 12-13) retrolateral and ventral aspects; 14) ♀, epigyne. - Scales 0.2;

figs. 15-16: ***Dictyna aguasverdes* n. sp.**; 15) retrolateral aspect of patella and tibia of the right ♂-pedipalpus. - Scyles 0.1 and 0.2;

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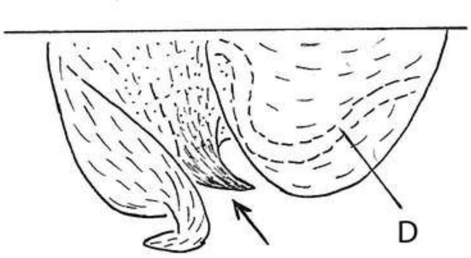

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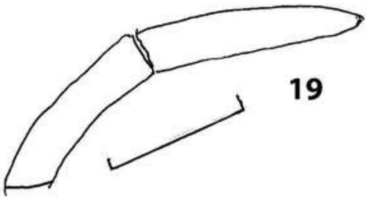

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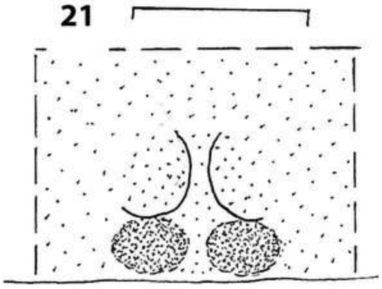

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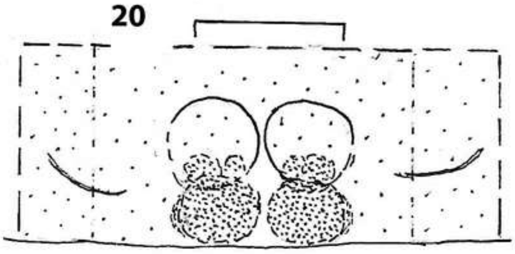
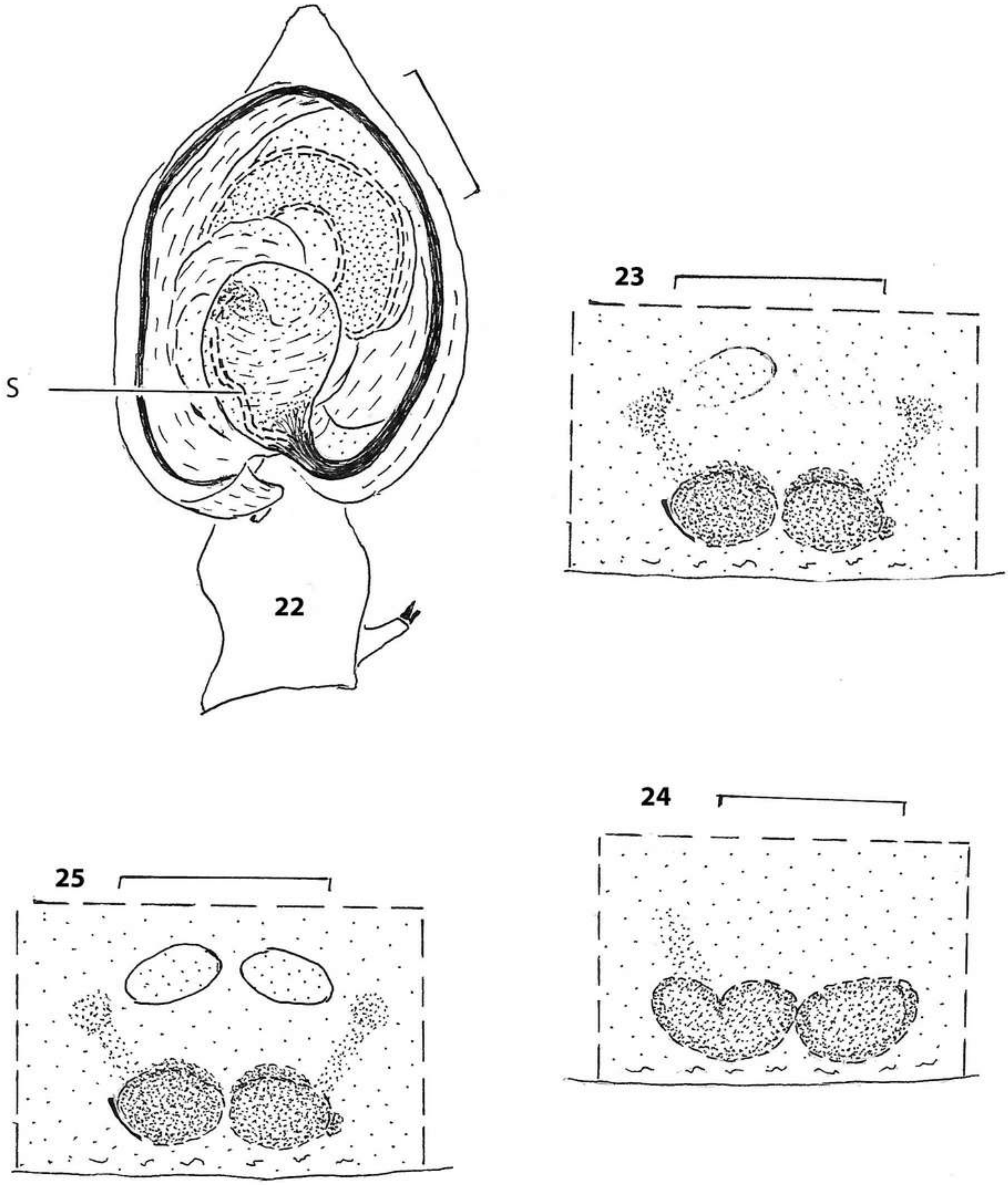


figs. 17-21: ***Dictyna aguasverdes* n. sp**.; 17) ♂, ventral aspect of the basal part of the right bulbus. The arrow points to the pointed and strongly sclerotized basal tegular apophysis which is free observable in this species; 18) ventral aspect of the distal part of the right embolus; 19) retrolateral aspect of tibia and tarsus of the right ♀-pedipalpus; 20-21) epigyne, 20) from Fuerteventura. - Scales 0.1. D = sperm duct;



figs. 22-25: ***Dictyna betancuria* n. sp.**, 22-24) from Betancuria, 25) from Los Molinos; 22) ♂, ventral aspect of the right pedipalpus Hairs are not drawn; 23-25) ♀, epigyne/vulva. - Scales 0.1. S = sperm duct;

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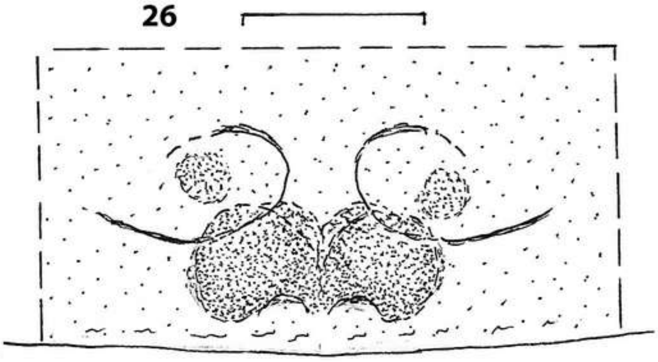

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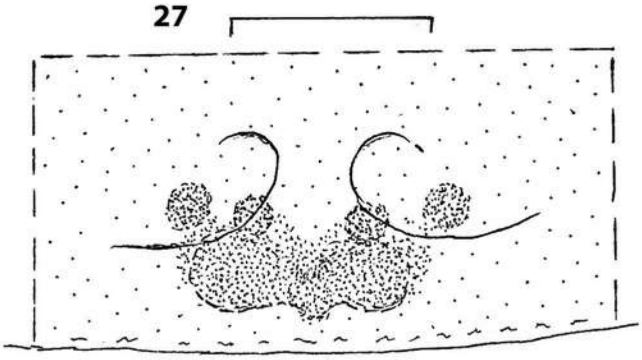

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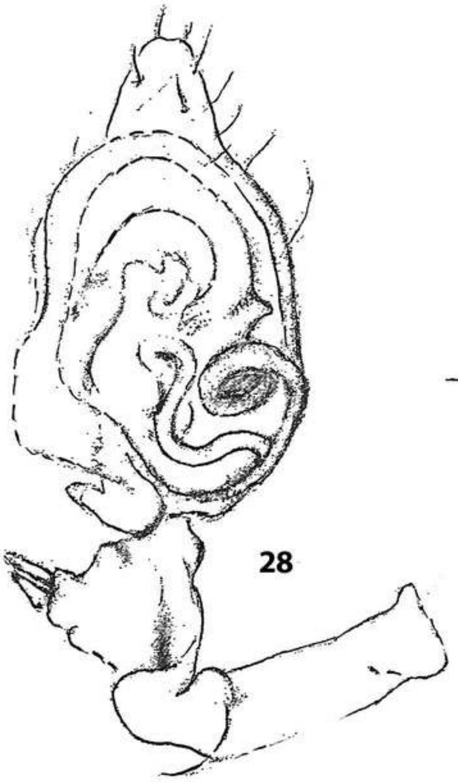

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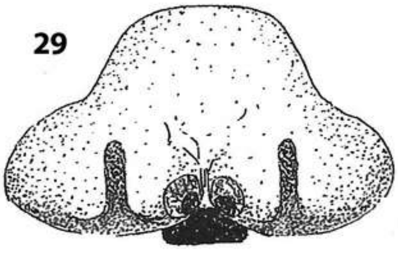
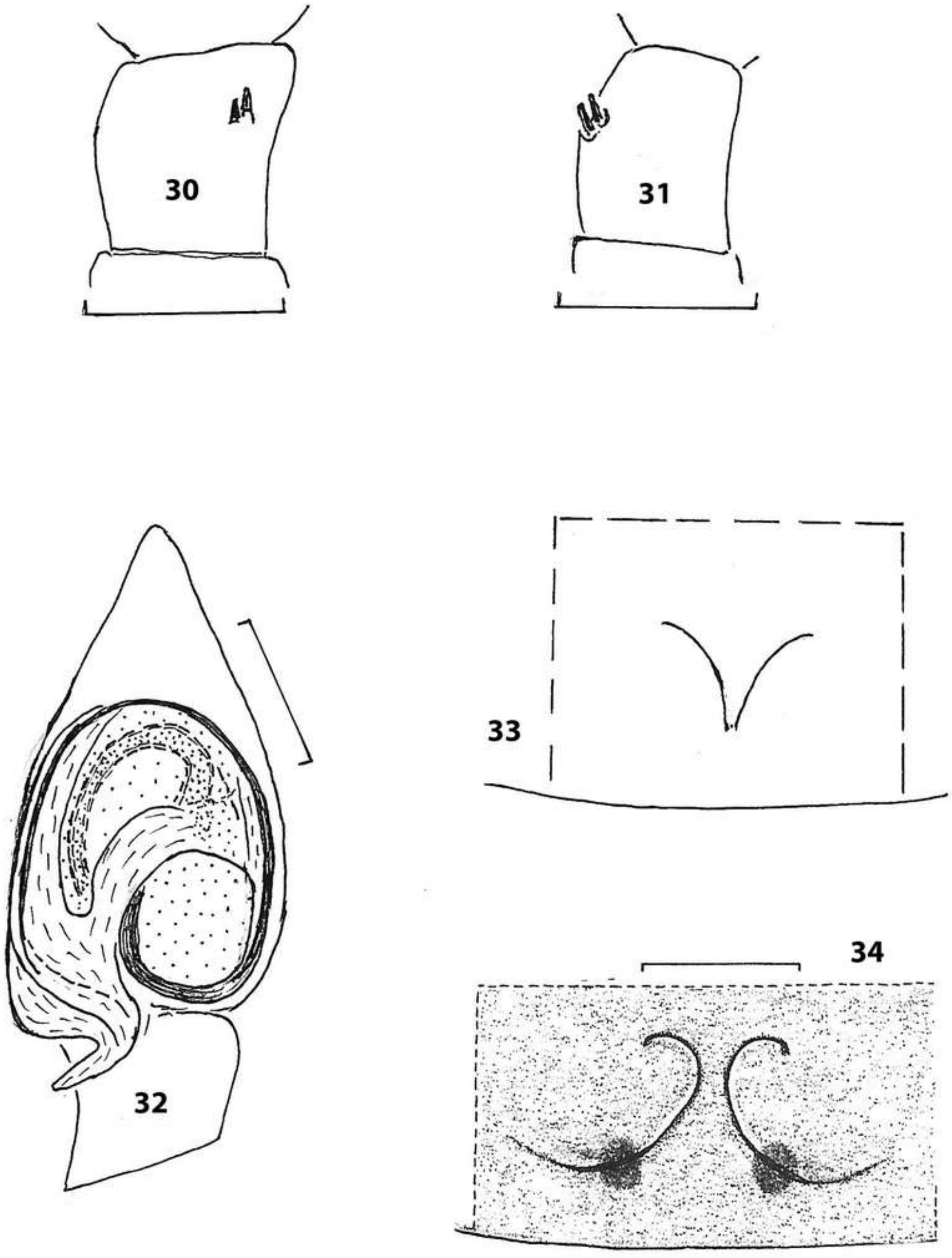


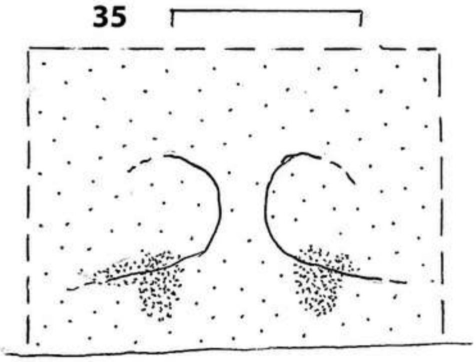
figs. 26) ***Dictyna cofete* n. sp.**, ♀, holotype from Cofete, epigyne/vulva. - Scale 0.1 mm;

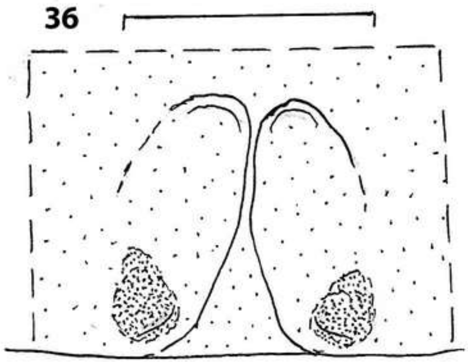
fig. 27) ***Dictyna*** ?***cofete* n. sp.**, ♀, from Alegranza, epigyne/vulva. - Scale 0.1 mm;

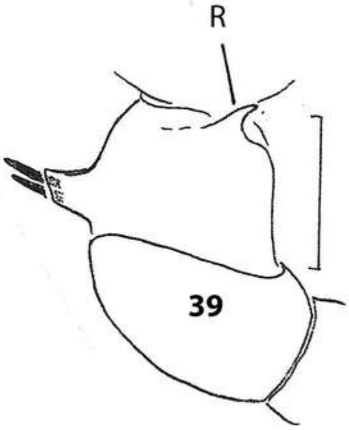
figs. 28-29: ***Dictyna fuerteventurensis*** SCHMIDT 1976; 28) ♂, ventral aspect of the left pedipalpus. Taken from Schmidt (1976), completed from a bad copy; 29) ♀, epigyne. Taken from SCHMIDT (1976). - No scale;

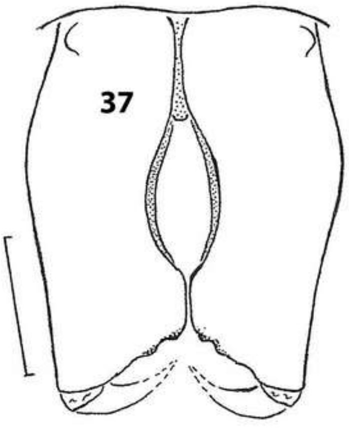


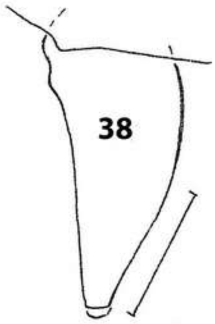
figs. 30-36: ***Dictyna guanchae*** SCHMIDT 1968, 30-32); 30-32) dorsal and retrolateral aspect of the right ♂-pedipalpal tibia; 32) ventral aspect of the left ♂-pedipalpus; 33 (holotype) -36) ♀ from Tenerife, epigyne/ vulva. - Scales 0.1 mm except in fig. 33 (no scale);

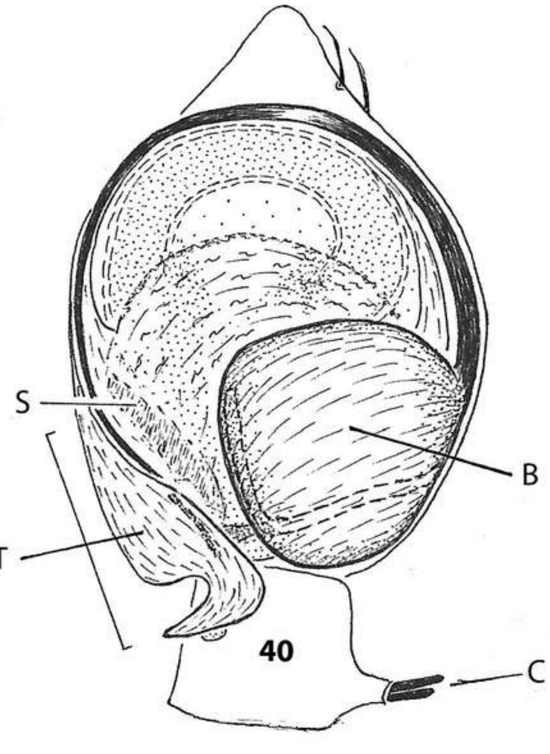






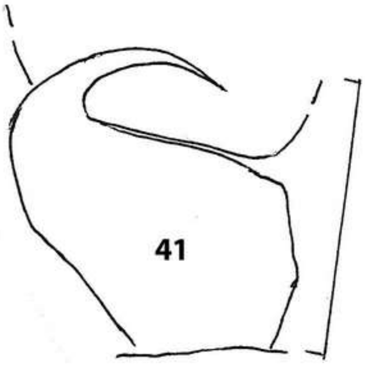






figs. 35-36: ***Dictyna guanchae*** SCHMIDT 1968: see above;

figs. 37-40: ***Dictyna lanzarotensis* n. sp.**, ♂; 37) anterior aspect of the chelicerae; 38) lateral aspect of the left chelicera; 39) retrolateral aspect of tibia and patella of the right pedipalpus; 40) R198/CJW, ventral aspect of the right pedipalpus. Only 3 hairs are drawn. - Scales 0.1. B = basal part of the embolus with sperm duct, C = ctenidia, R = retrolateral tibial apophysis, S = sclerotized structure, T = tegular apophysis (functional conductor);



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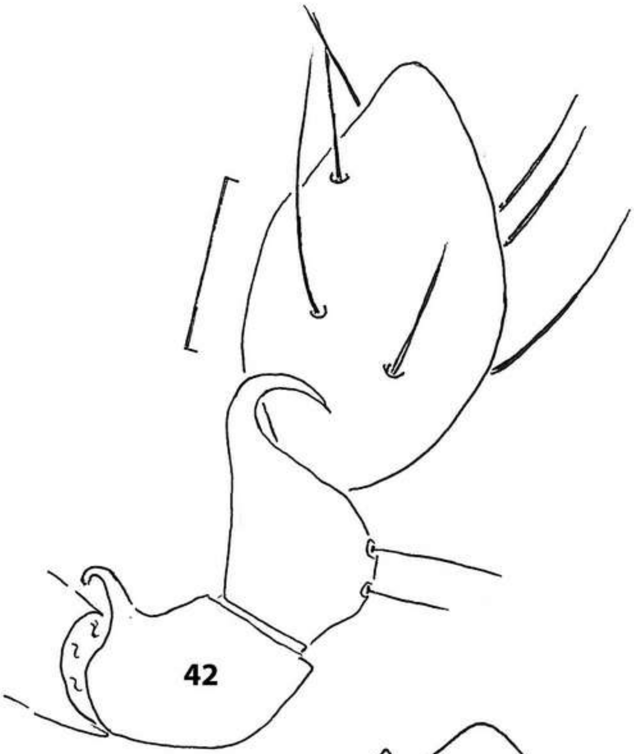

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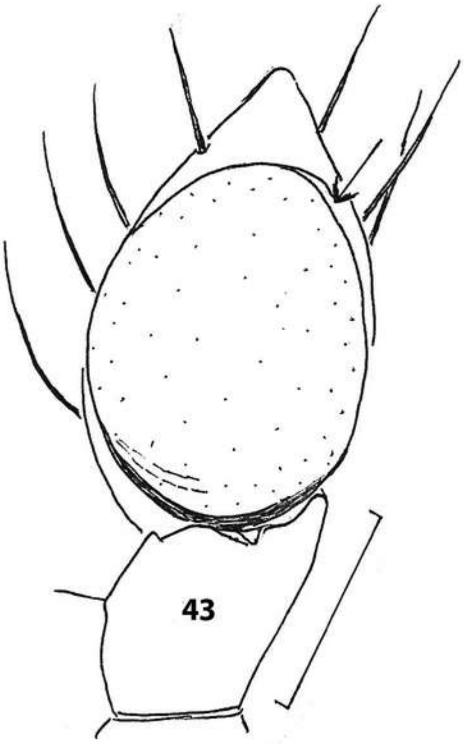

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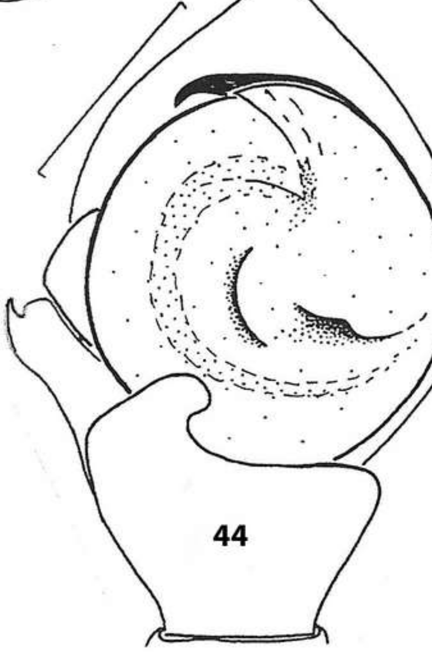

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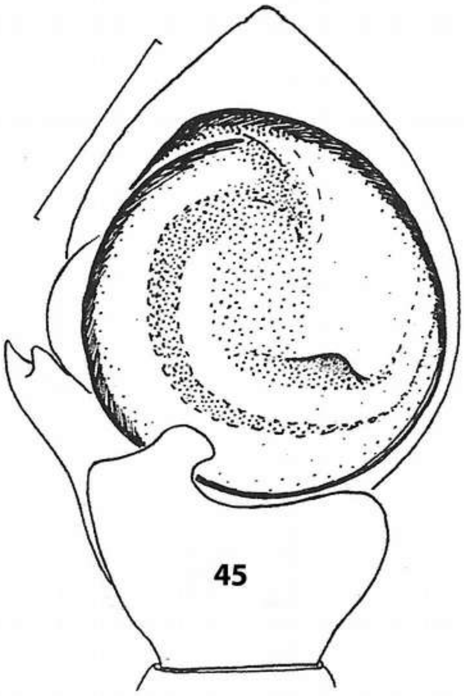
figs. 41-42: ***Hahnia linderi*** WUNDERLICH 1992, ♂; 41) retrolateral aspect of the left pedipalpal tibia; 42-43) retrolateral and ventral aspect of the left pedipalpus. Only few of the long hairs are drawn. The arrow points to the tip of the embolus;

fig. 44) ***Bassanoides canariensis*** (WUNDERLICH 1992), ♂, ventral aspect of the right pedipalpus. - Scales 0.3 in fig. 44, 0.1 in the remaining figs.;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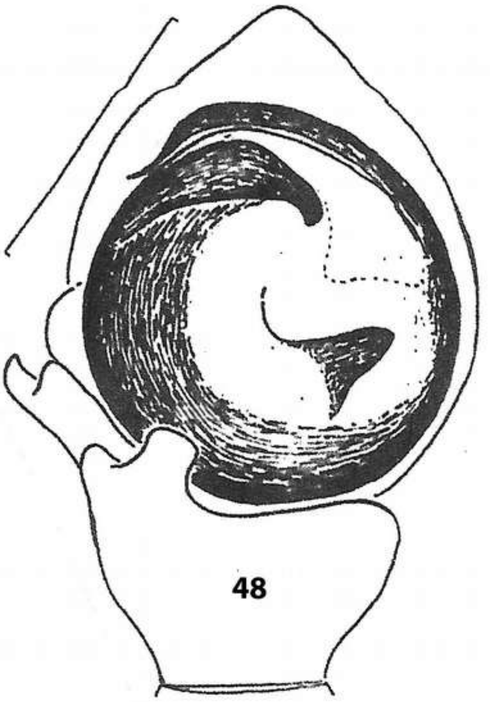
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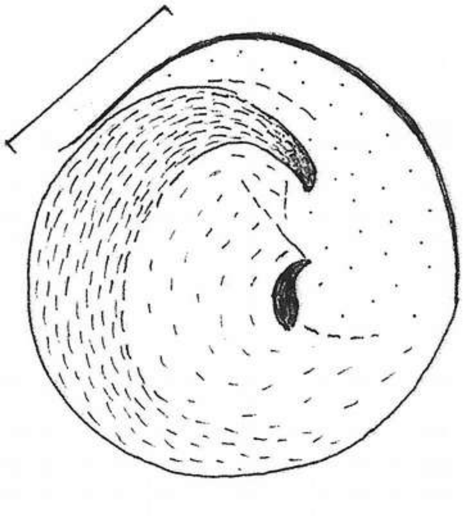

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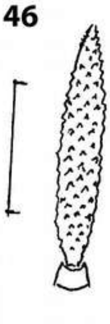
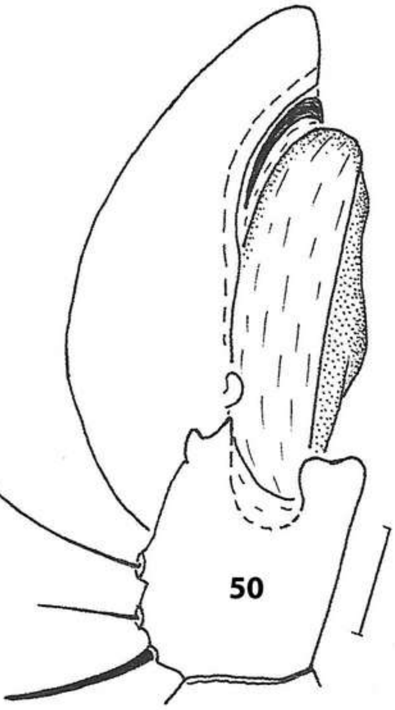


fig. 45) ***Bassanoides clavulus*** (WUNDERLICH 1992), ♂, ventral aspect of the right pedipalpus;

figs. 46-47: ***Bassanoides falx* n. sp.**,; 46) dorsal bristle of the middle of the ♂-opisthosoma; 47) ♂ from central Fuerteventura (bco. Agua de Bueyes), ventral aspect of the tegulum of the right pedipalpus;

fig. 48) ***Bassanoides fuerteventurensis*** (WUNDERLICH 1992), ♂, ventral aspect of the right pedipalpus. - Scales 0.05 in fig. 46), 0.3 in fig. 45), 0.2 in figs. 47-48);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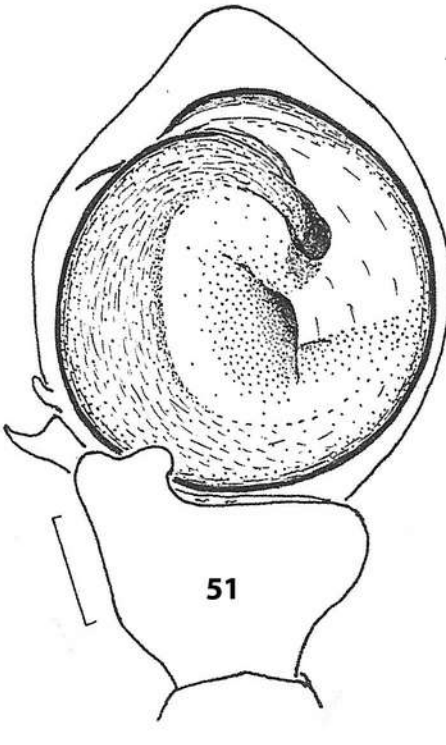
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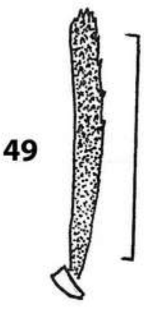
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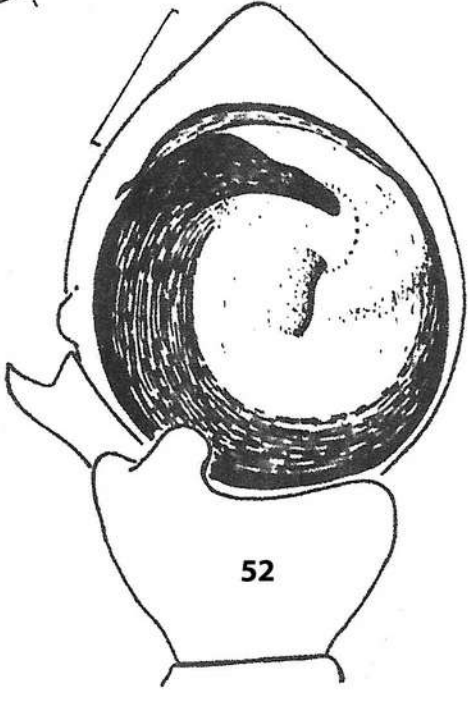
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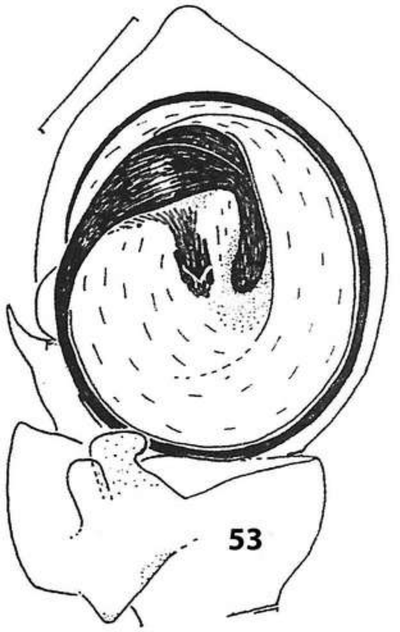
figs. 49-51: ***Bassanoides hariaensis* n. sp.**, ♂; 49) lateral aspect of a dorsal bristle of the middle of the opisthosoma; 50-51) retrolateral and ventral aspect of the right pedipalpus;

fig. 52) ***Bassanoides lanzarotensis*** (WUNDERLICH 1992), ♂, ventral aspect of the right pedipalpus. - Scales: 0.2 in fig. 52), 0.1 in the remaining figs.;



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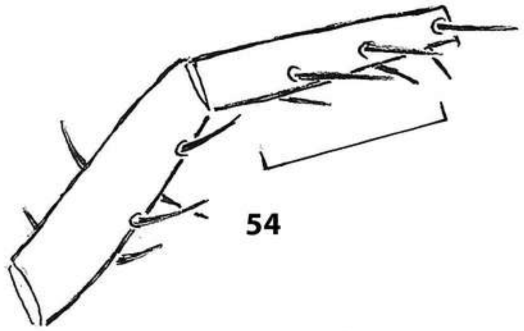

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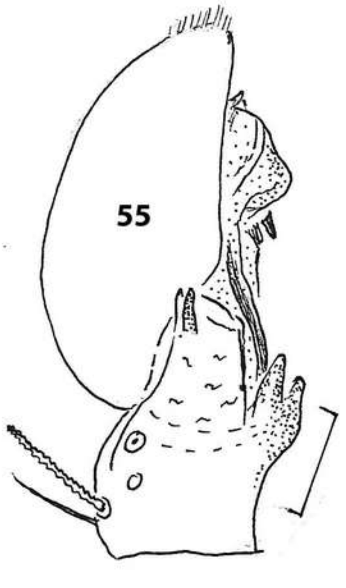

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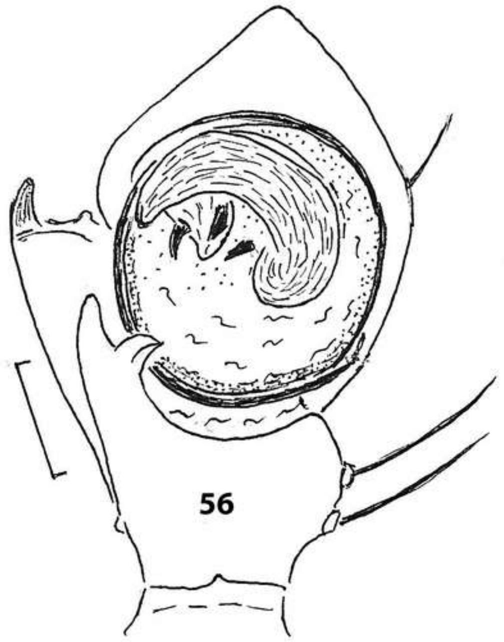

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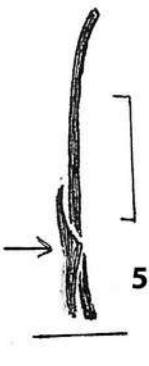

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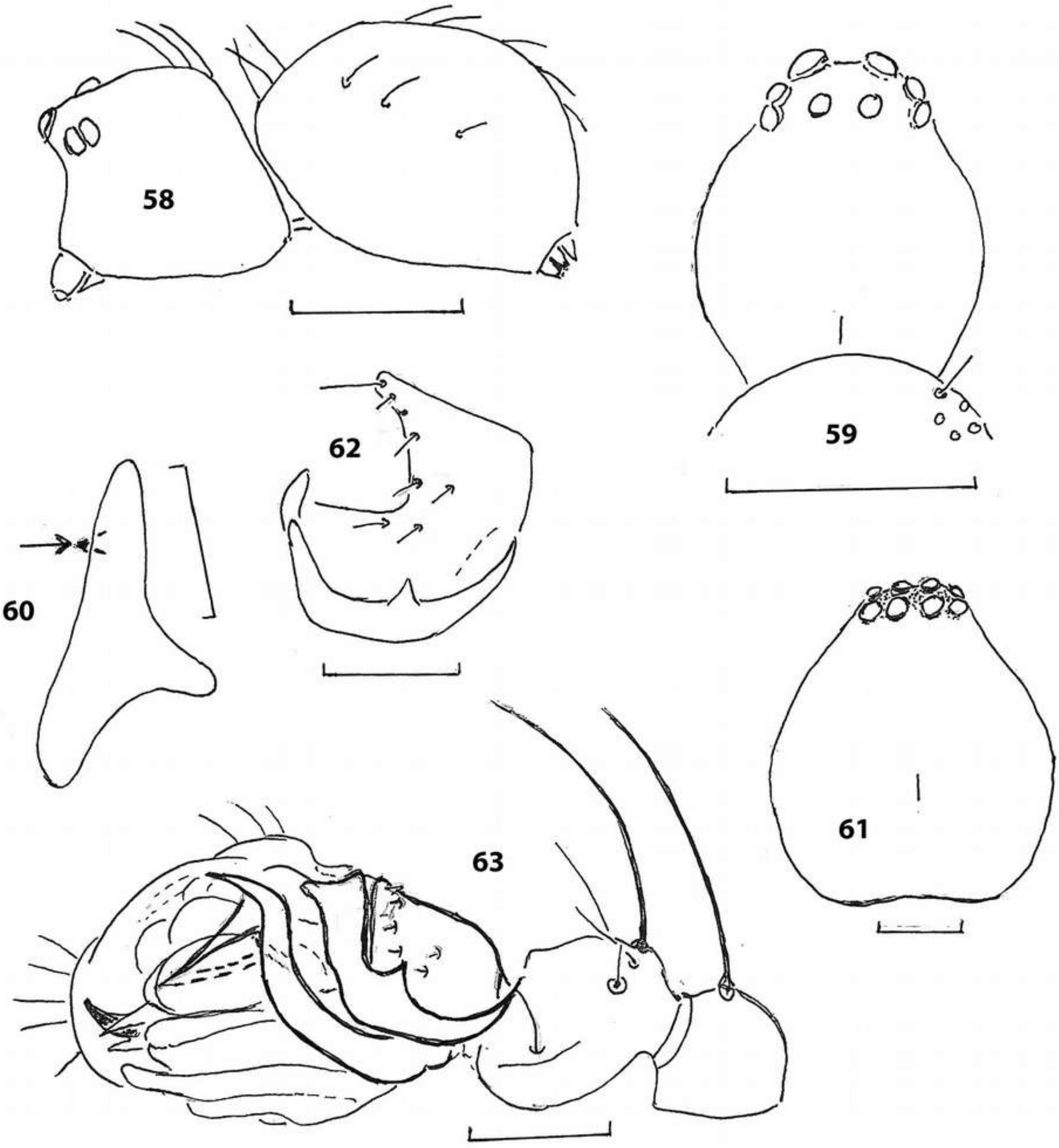
fig. 53) ***Bassanoides squalidus*** (SIMON 1883), ♂, ventral aspect of the right pedipalpus;

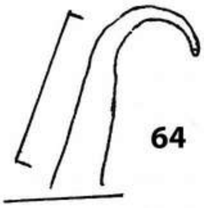
figs. 54-57: ***Ozyptila tenerifensis*** WUNDERLICH 1992, ♂; 54) prolateral aspect of tibia and metatarsus of the left leg I. Hairs are not drawn; 55-56) retrolateral and ventral aspect of the right pedipalpus; 57) prolateral aspect of the right embolus. The arrow points to the apophysis of the embolus. - Scales: 0.5 in fig. 54), 0.1 in the remaining figs.;

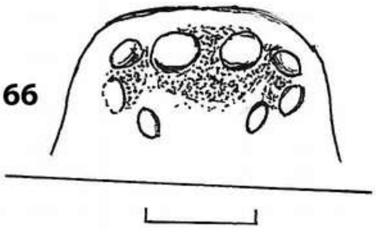


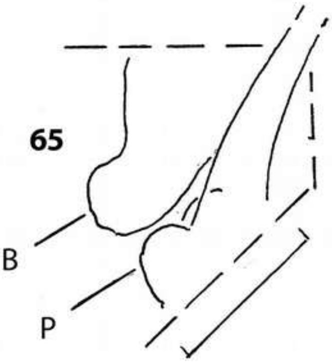
figs. 58-59: ***Lasaeola braccata*** (C. L. KOCH 1841), ♂, lateral aspect of the body and dorsal aspect of the prosoma. Only few hairs are drawn;

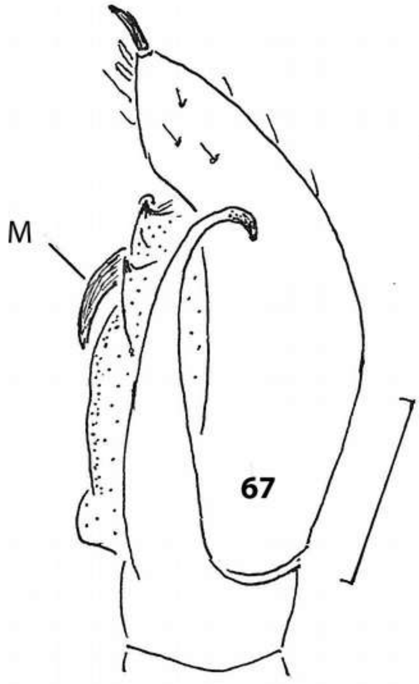
fig. 60) ***Agyneta pseudorurestris*** (WUNDERLICH 1980), ♂, ventral and slightly medial aspect of the lamella characteristica of the partly expanded left pedipalpus to show the tooth (arrow) which is partly hidden because of its dorsal position;

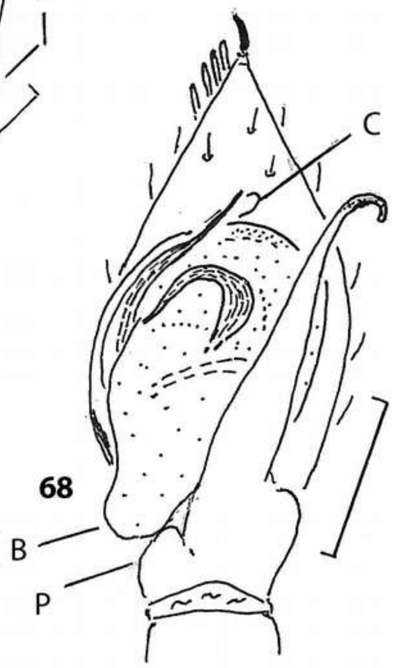
figs. 61-63: ***Palliduphantes juliao* n. sp.**, ♂; 61) dorsal aspect of the prosoma; 62) retrodorsal aspect of the left paracymbium; 63) retrolateral aspect of the left pedipalpus. - Scales: 0.5 in figs. 58-59), 0.2 in fig. 61) 0.1 in the remaining figs.;





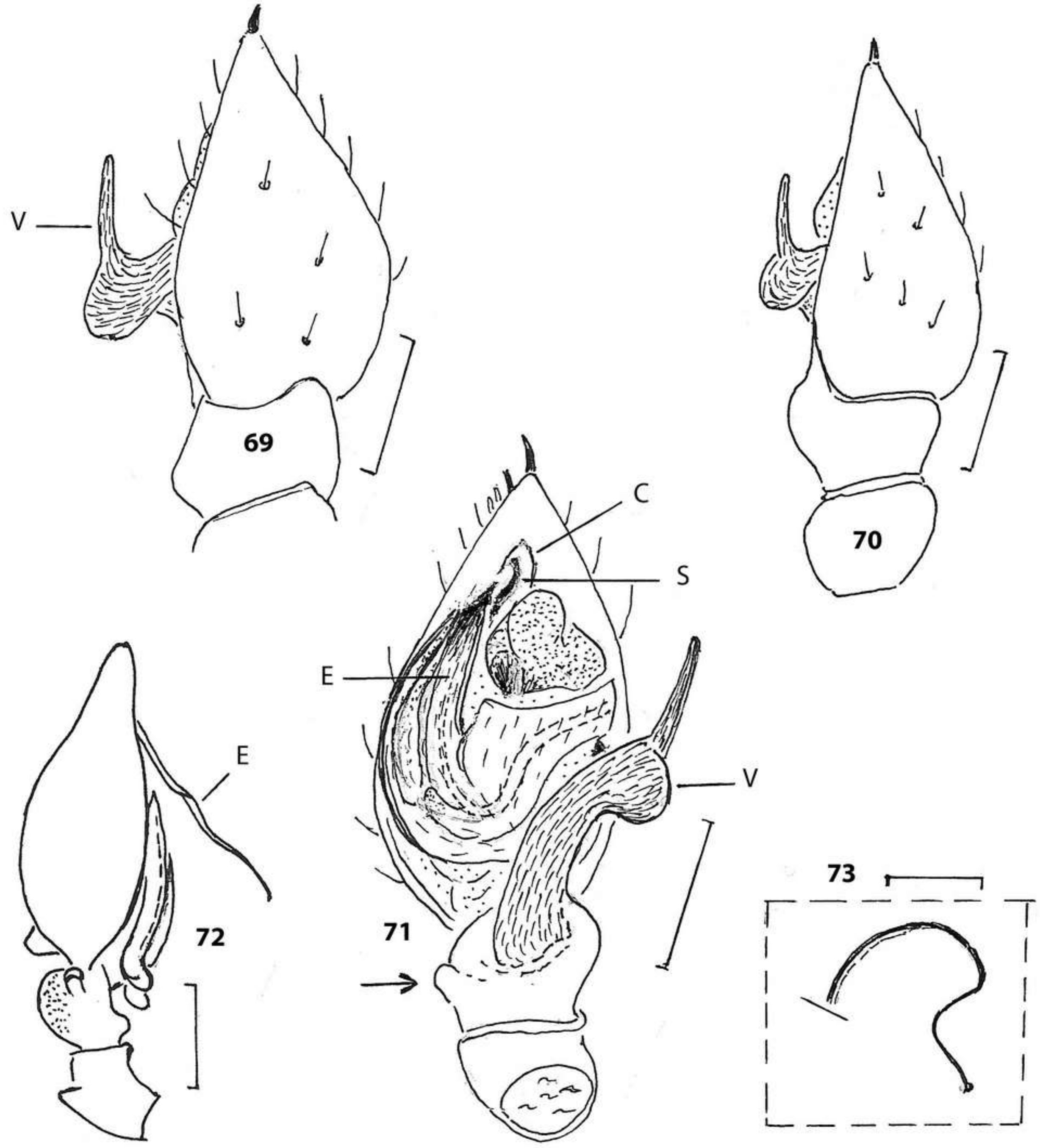






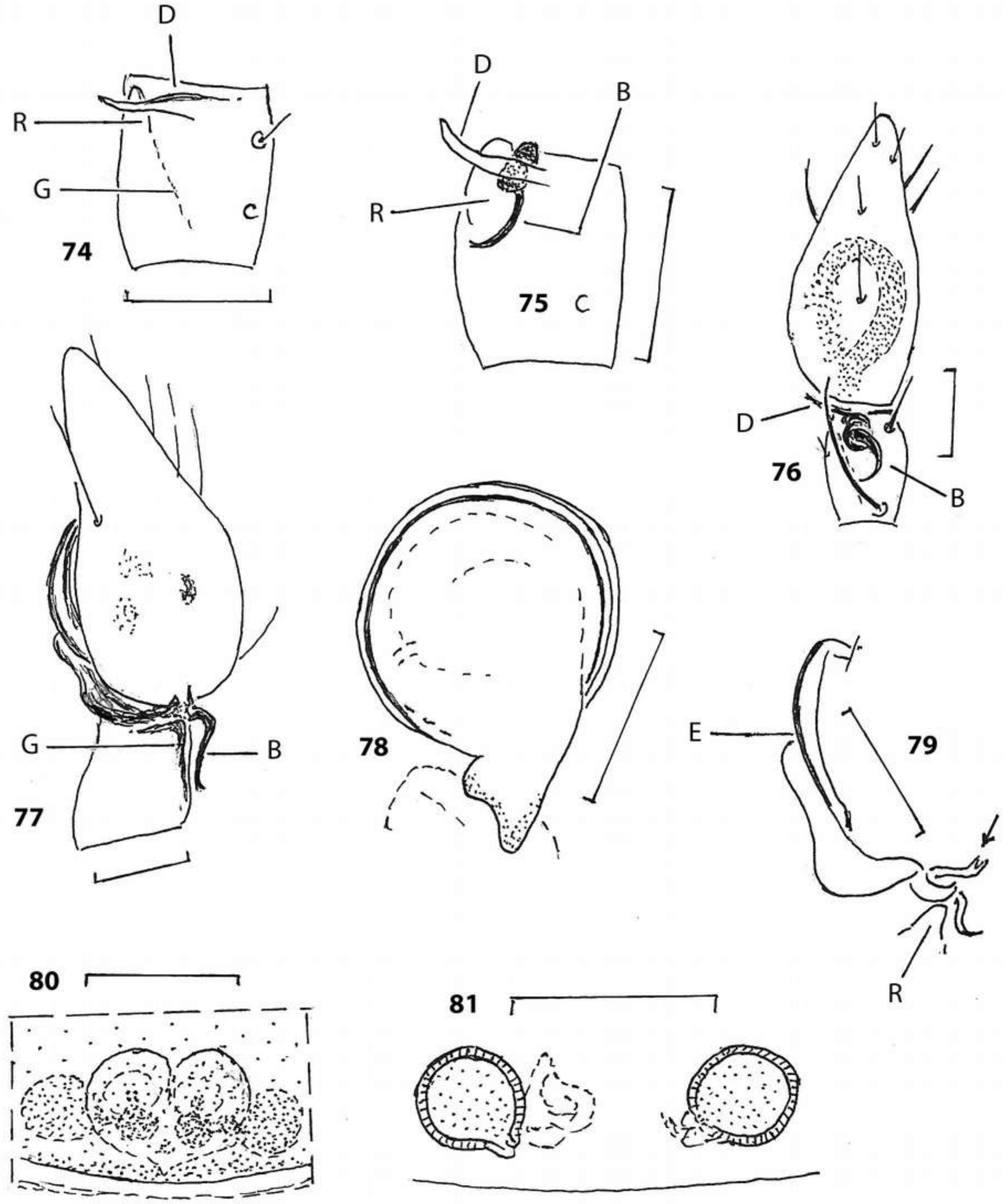
figs. 64-65: ***Zodarion styliferum*** (SIMON 1870), ♂; 64) ventral aspect of the ventral tibial apophysis of the right pedipalpus; 65) ventral aspect of the probasal part of the left pedipalpus;

figs. 66-68: ***Zodarion parastyliferum* n. sp.**, ♂; 66) dorsal aspect of the anterior part of the prosoma; 67-68) retrolateral and ventral aspect of the left pedipalpus. - Scales 0.1 in fig. 64), 0.2 in the remaining figs. - B = probasal outgrowth of the bulbus, C = scinny conductor, M = median apophysis, P = prolateral outgrowth of the tibia;

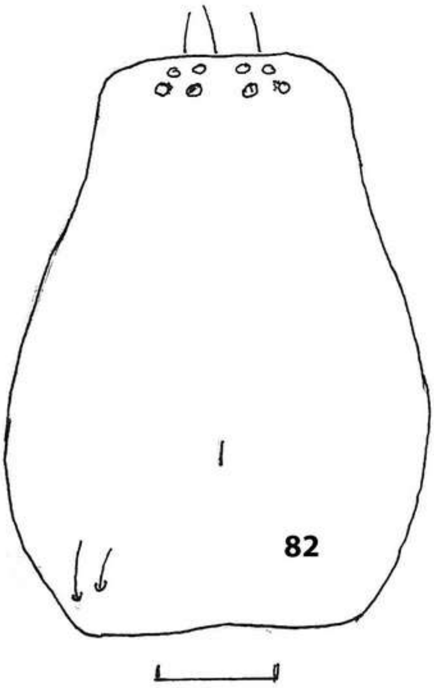


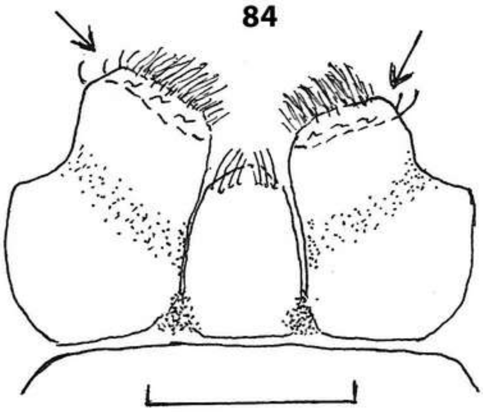
figs. 69-71: ***Zodarion tuber* n. sp.**, ♂; 69-70) retrolateral aspect of the left pedipalpus; 71) ventral aspect of the left pedipalpus. The arrow points to the prolateral tibial hump. Only few hairs are drawn;

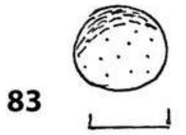
figs. 72-73: ***Ajmonia gratiosa*** (SIMON 1881), ♂; 72) retrolateral aspect of the right pedipalpus; 73) ventral aspect of the embolus of the left pedipalpus. - Scale bars 0.2. C = skinny conductor, E = embolus, S = sclerotized conductor, V = ventral tibial apophysis;

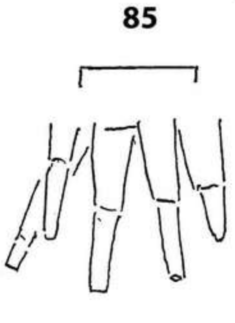


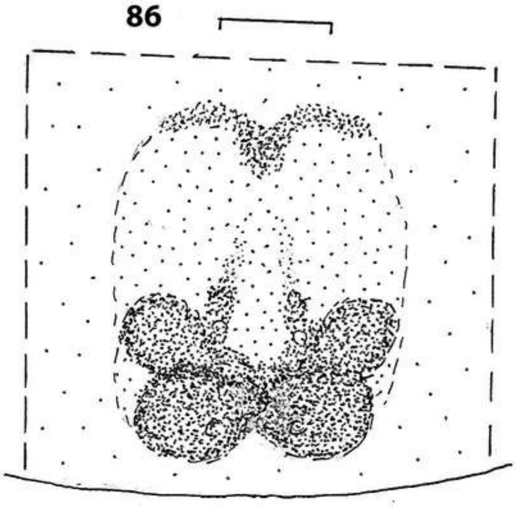
figs. 74-81: ***Lathys mantarota* n. sp.**; 74-79: ♂, left pedipalpus; 74) dorsal aspect of the tibia; the conductor is removed; 75) dorsal aspect of the tibia; 76) dorsal aspect of the pedipalpus. Only few hairs and bristles are drawn; 77) retrolateral and slightly dorsal aspect of the pedipalpus. The tibial apophysis is not drawn; 78) ventral aspect of the bulbus; 79) retrolateral aspect of embolus, conductor and other structures. The arrow points to the divided (forked) dorsal apophysis; 80) epigyne, hairs are not drawn; 81) dorsal aspect of the vulva which was partly destroyed during preparation. - Scales = 0.1. B = distal branch of the conductor, D = dorsal tibial apophysis, E = embolus, G = retrodorsal rim, R = retroapical tibial apophysis;



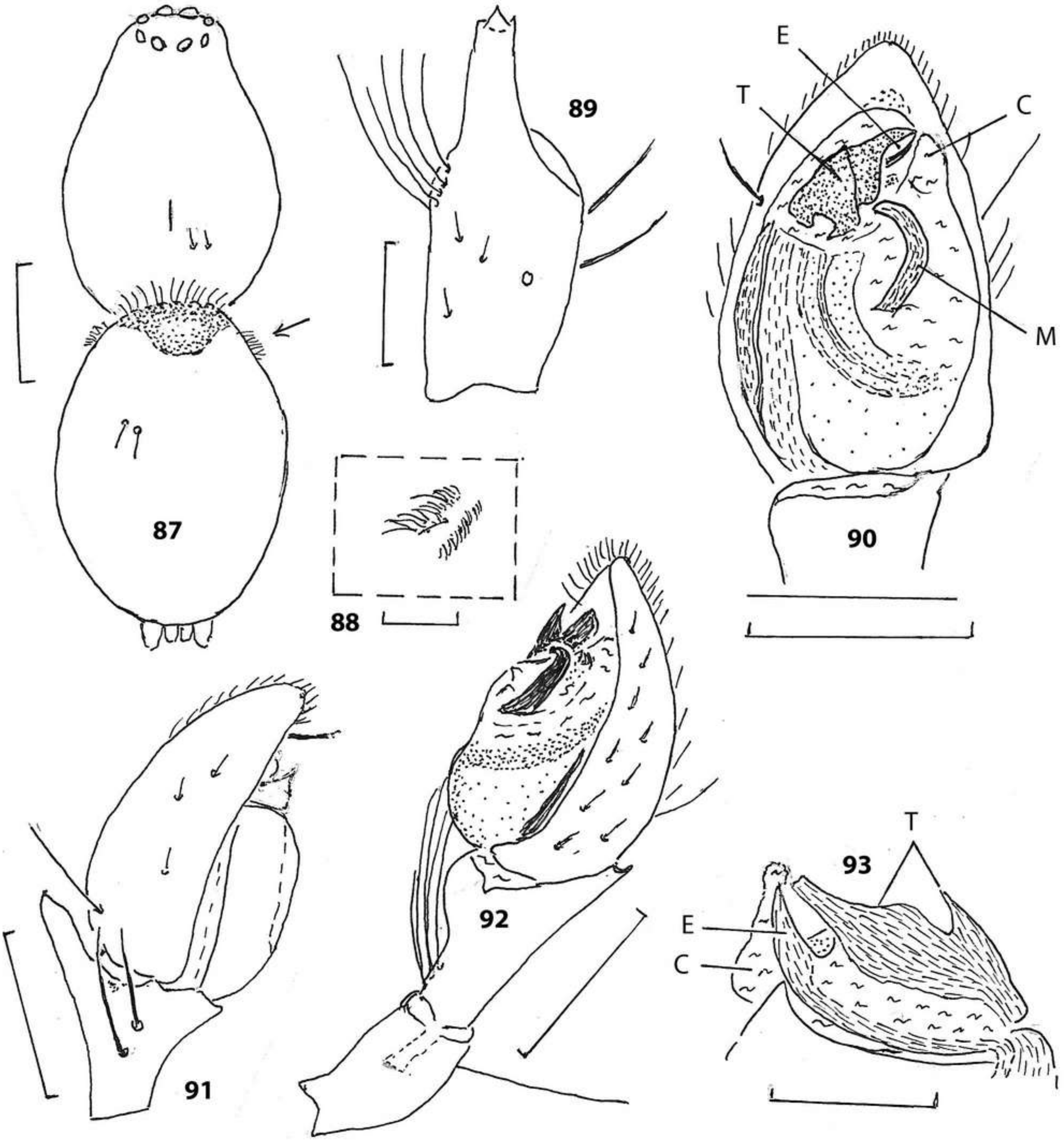




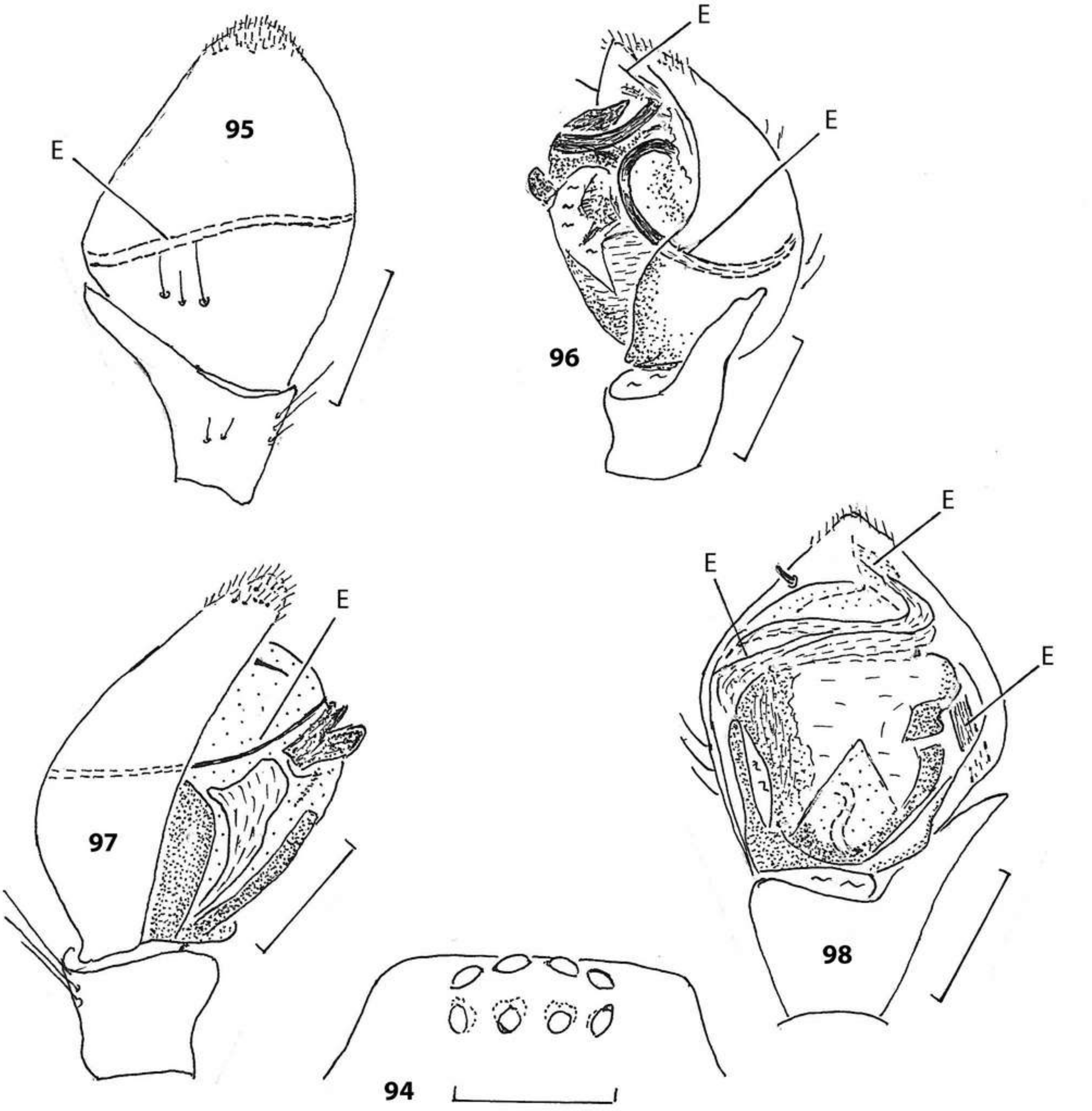




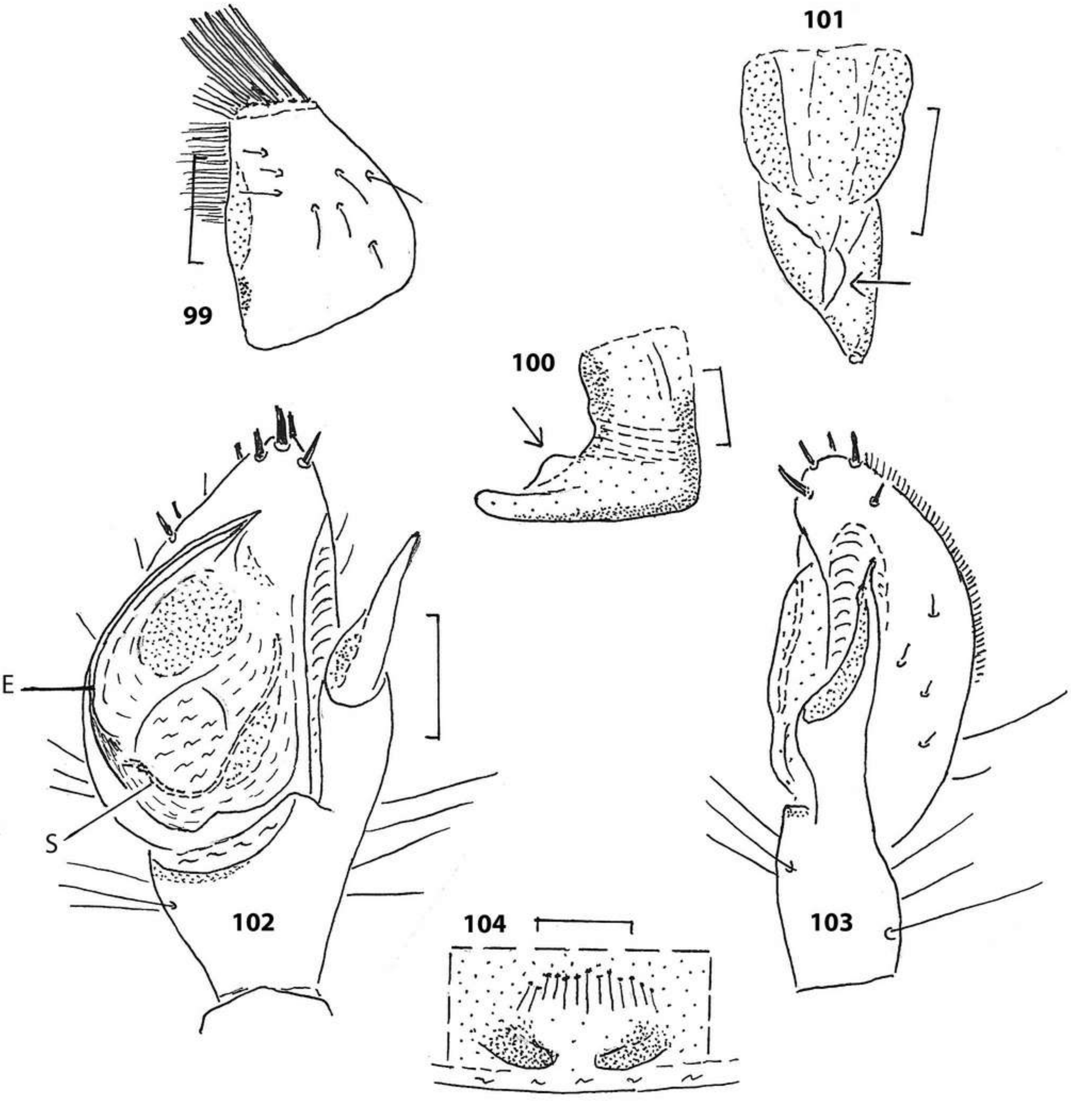
figs. 82-86: ?***Synaphosus parviocoli* n. sp.**, ♀; 82) dorsal aspect of the prosoma. Only few hairs are drawn; 83) left median eye; 84) gnathocoxae and labium. The arrows point to the longer hairs which replace the gnathocoxal serrula; 85) ventral aspect of the spigots of the right anterior lateral spinneret; 86) epigyne/vulva. - Scales: 0.1 in fig. 85), 0.2 in fig. 86), 0.5 in the remaining figs.;



Figs. 87-93: ***Zelotes barbarella*** **n. sp**., ♂; 87) dorsal aspect of the body. The arrow points to the right opisthosomal hair brush. Only few hairs are drawn; 88) lateral aspect of the “rowed” opisthosomal hair brushes; 89-93: left padipalpus; 89) retrodorsal aspect of the left tibia. Only few hairs are drawn; 90) ventral aspect; 91) prolateral aspect; 92) retrolateral aspect. Only few hairs are drawn; 93) dorsal aspect of the sclerites of the bulbus. - Scales 1.0 in fig. 87), 0.5 in figs. 90-92), 0.2 in figs. 88) and 93). C = conductor, E = embolus, T = tegular apophysis;



figs. 94-98: ***Zelotes* (*Civizelotes*) *sengleti* n. sp.**, ♂; 94) dorsal aspect of the anterior part of the prosoma; 95-98) left pedipalpus, dorsal, retrolateral, prolateral und ventral aspects. - Scale bars 0.5. E = embolus:



figs. 99-104: ***Lachesana naxos* n. sp.**, ♂; 99) ventral aspect of the left gnathocoxa. Not all hairs are drawn; 100-101) anterior and ventral aspects of the right fang; 102-103) ventral and prolateral aspects of the left pedipalpus; 104) genital opening just in front of the epigastral furrow. - Scales 0.5 in figs. 102-103), 0.1 in fig. 104), 0.2 in the remaining figs. E = embolus, S = sperm duct;

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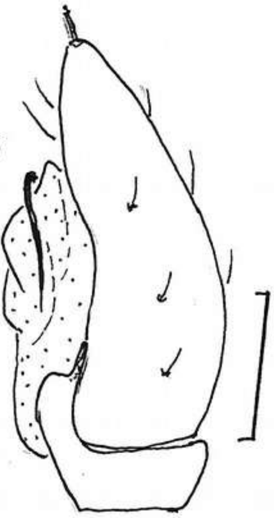

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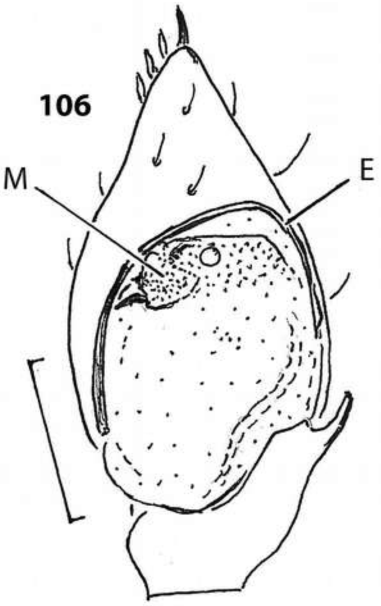

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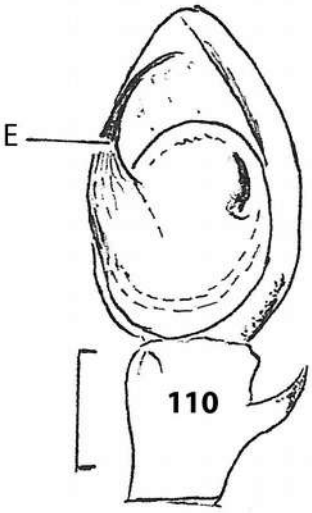

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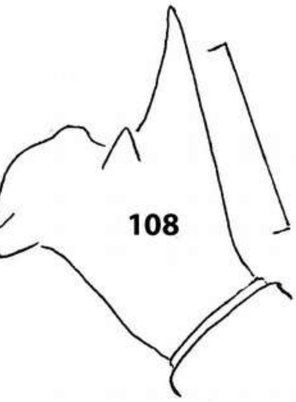

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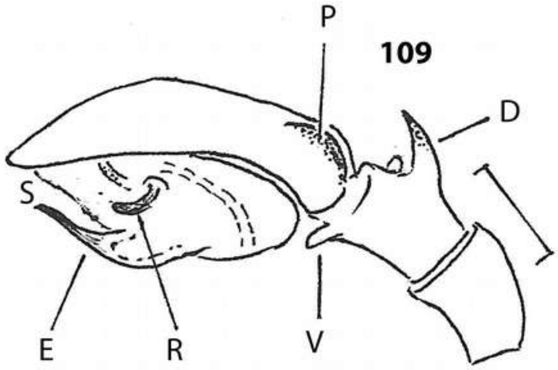

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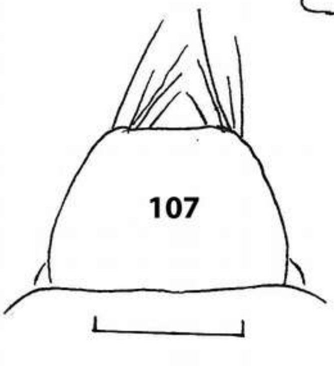
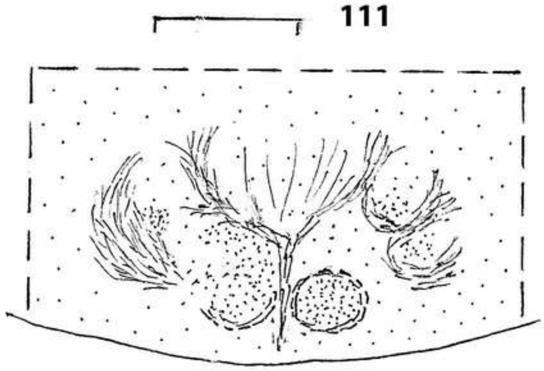


figs. 105-106: ***Zodarion parashi* n. sp.**, ♂, retrolateral and ventral aspect of the left pedipalpus. - Scale bars 0.2. E = embolus, M = median apophysis;

figs. 107-110: ***Apostenus naxos* n. sp.**; 107) ♀, labium; 108-110) ♂: 108) prolateral aspect of the tibia of the right pedipalpus; 109-110) retrolateral and ventral aspect of the left pedipalpus. - Scales 0.2 in figs. 105-106), 0.1 in the remaining figs. D = dorsal tibial apophysis, E = embolus, P = paracymbium, R = median apophysis (retinaculum), V = ventral tibial apophysis;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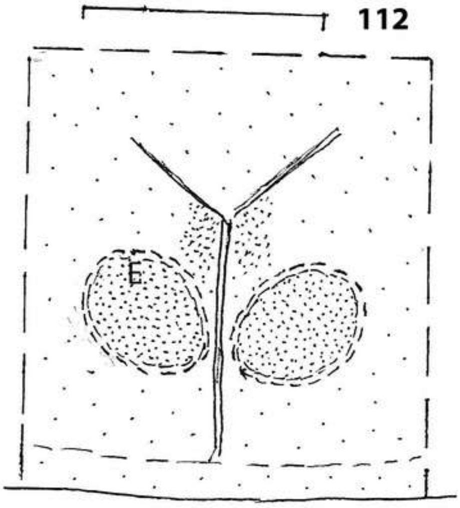
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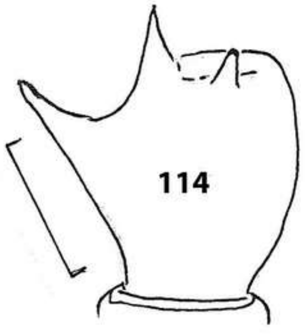
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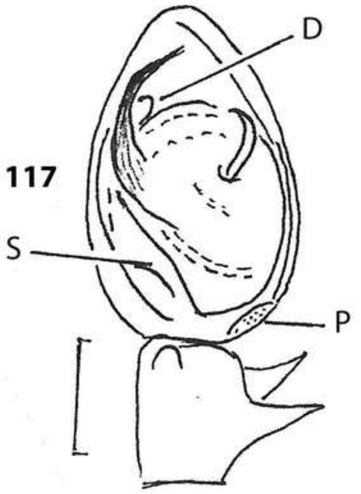
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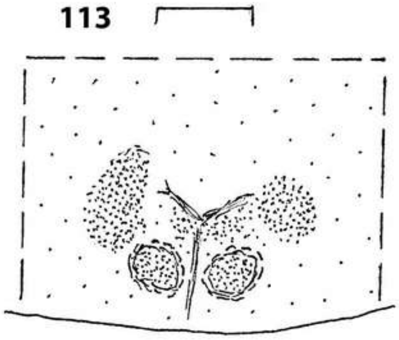
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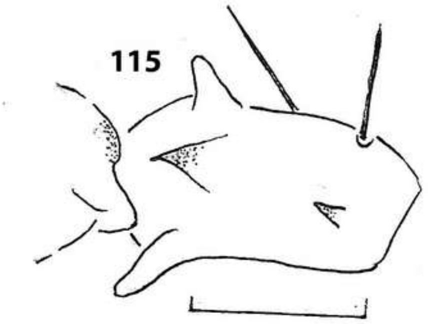
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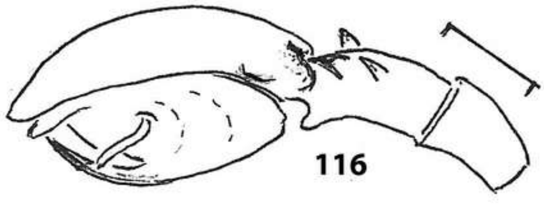
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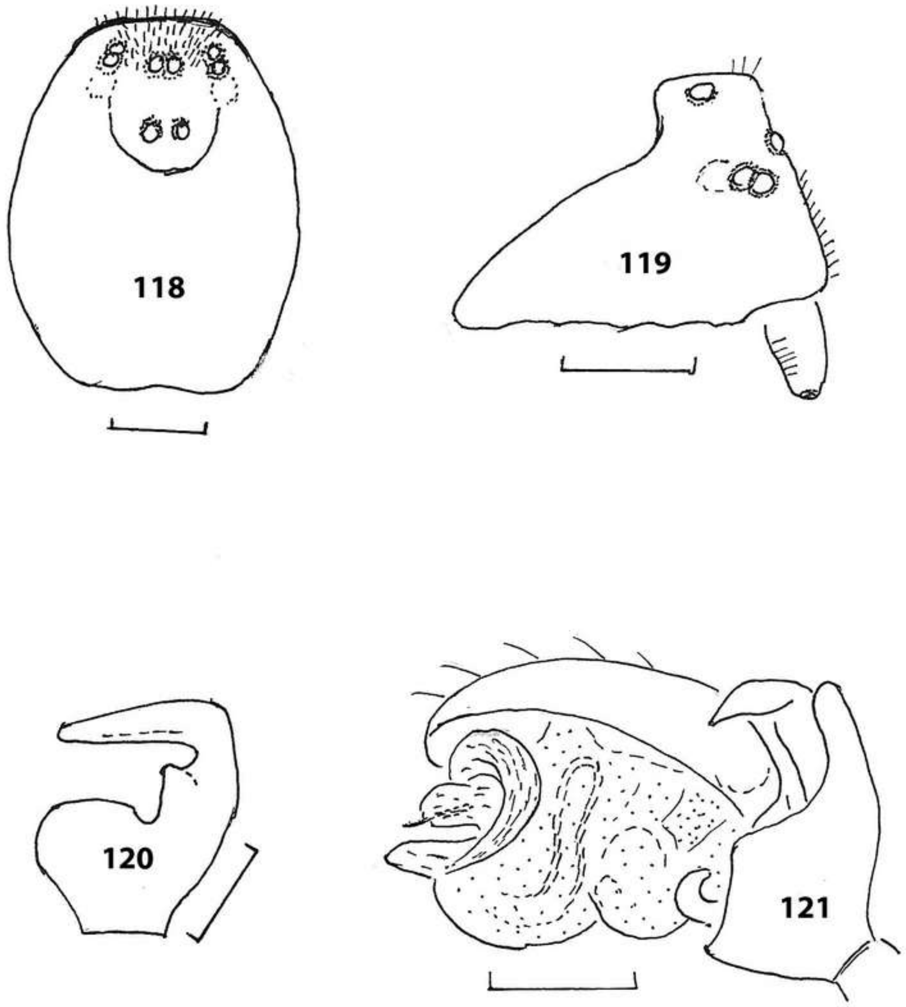
figs. 111-113: ***Apostenus naxos* n. sp.**, ♀, epigyne/vulva which in fig. 111) is covered by a distinct wide “plug shield” and is covered by an indistinct “plug shield” in fig. 113);

figs. 114-117: ***Apostenus epidaurus* n. sp.**, ♂; 114) dorsal aspect of the tibia of the left pedipalpus; 115) retrolateral and slightly dorsal aspect of the tibia of the left pedipalpus; 116-117) retrolateral and ventral aspect of the left pedipalpus. - Scales 0.1. O = outgrowth, P = paracymbium, S = sclerotized structure;



figs. 118-121: ***Diplocephalus protuberiscus*** **n. sp**., ♂; 118-119) dorsal and lateral aspect of the prosoma; 120) dorsal aspect of the left pedipalpal tibia; 121) retrolateral aspect of the left pedipalpus. - Scales 0.2 in figs. 118-119), 0.1 in figs. 120-121).

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NEW AND RARE SPIDERS (ARANEAE) IN EOCENE BALTIC AMBER

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Abstract: Fossil spider taxa in Eocene (Palaeogene) Baltic amber are described or revised. Synotaxidae: *Acrometa gibbosa* **n. sp**., *A. globosa* **n. sp**. and *A. longisetae* **n. sp**., *Balticsynotaxus angulatus* **n. gen. n. sp**., ?*Sulcosynotaxus matrimonium* **n. sp**. The family Hahniidae is treat in a wide sense, including the subfamily Cryphoecinae. *Eocryphoeca duplex* **n. sp**. and *Eocryphoecara longtegap* **n. sp**. The family Trechaleidae has to delete from the list of families in Baltic amber. The genera *Esuritor* PETRUNKEVITCH 1942, *Linoptes* MENGE in KOCH & BERENDT 1854 and *Eotrechalea* WUNDERLICH 2004 - described by WUNDERLICH (2004: 1542-1548) with hesitation under Trechaleidae - are regarded as members of the family Zoropsidae s. l. A sure proof of the subfamily Zoropsinae in Baltic amber is absent but the existence of the Zorocratidae is not unlikely. Zoropsidae s. l. genera found in Baltic amber are *Eomatachia, Eoprychia, Eotrachela* and *Succiniropsis*. Philodromidae: *Balticodromus porrectus* **n. gen. n. sp.**

Synonymy, new comb., n. relat. (see also above) and new stat.: *Cornucymbium* WUNDERLICH 2004 is transferred from the Corinnidae to the Phrurolithinae (**n. relat.**), *Eophrurolithus* PETRUNKEVITCH 1950 and *Laccolithus* PETRUNKEVICH 1950 (Phrurolithidae) are elevatd from subgenus to genus rank (**n. stat**.), *Eothanatus* PETRUNKEVITCH 1950 (under Philodromidae) = *Ablator* PETRUNKEVITCH 1942 (**n syn**.) of the Phrurolithidae (**n. comb**.), *Myrmecorinna gracilis* WUNDERLICH 2004 = *Myrmecorinna* (previously under *Macaria*, Gnaphosidae and Clubionidae) *procera* (KOCH & BERENDT 1854) (Phrurolithidae) (**n. syn**., **n. comb**. and **n. relat**.), *Phrurolithus* sensu PETRUNKEVITCH 1958 (Phrurolithidae) is not regarded as a taxon of *Phrurolithus* C. L. KOCH 1839 which has to delete from the list of Baltic amber spiders.

Key words: Amber, Araneae, Baltic amber, Corinnidae, Eocene, fossils, Hahniidae, Lycosoidea, Palaeogene, Philodromidae, Phrurolithidae, spiders, Synotaxidae, Trechaleidae, Zorocratinae, Zoropsidae.

Descriptions of the taxa p. 81, index p. 109, drawings p. 111.

Introduction

When I – 18 and even 36 years ago, see WUNDERLICH (1986, 2004) – treated fossil spiders in Eocene (Palaeogene) Baltic amber the diagnoses, limits and relationships of several high spider taxa were partly regarded quite different from today. Examples are the families Amaurobiidae, Anapidae, Clubionidae, Corinnidae, Dictynidae, Hahniidae, Lycosoidea and Zoropsidae; see, e. g., UBICK et al. (2017) and WUNDERLICH (2020: 27). In this paper I will discuss some of the - partly unsure - changes in spider taxonomy.
To deal with fossil spiders in amber is an exciting but difficult and somewhat a “lonesome work”; during forty years it occupied a huge part of my life time. I found that conclusions concerning the behaviour, the taxonomy and the phylogeny of extant spiders without consideration of fossil taxa will be incomplete and probably misleading. I tried to get a broad knowledge about the fascinating probably more than 150 extant and extinct spider families but I was unable to inspire/motivate students for close investigations of spider inclusions in amber. My work on fossil spider biogeography, faunistic, behaviour and taxonomy was ONLY INTRODUCTORY, and numerous open questions remain to be solved, many fossil spiders – partly kept in my private collection - have still to describe, to revise and to investigate with the help of modern techniques. A lot of money is spend for molecular genetic studies but these methods are not suited to the use of fossils.

DESCRIPTIONS OF THE TAXA

Family SYNOTAXIDAE

During the Eocene/Palaeogene Synotaxidae was a diverse family in the – mainly subtropical – Baltic amber forest of northern Europe. In 2004: 1189-1239 and 2008: 130-132 I described 10 extinct genera which all are known only from this forest. In this paper I describe the new genus *Balticosynotaxus*, a new species of the genus *Sulcosynotaxus* WUNDERLICH 2004 and 3 new species of *Acrometa* PETRUNKEVITCH 1942.
Today Synotaxidae - similar to the Archaeidae and Cyatholipidae - is extinct in Europe and is almost completely restricted to the Southern Hemisphere. During the Neogene taxa of families like Nesticidae, Theridiidae and Linyphiidae probably replaced the Synotaxidae in the Northern Hemisphere. In Baltic amber Nesticidae are less diverse than the quite similar Synotaxidae. In extant Nesticidae - similar to the Theridiidae - a ventral comb of serrated and bent hairs on tarsus IV exists usually in contrast to the Synotaxidae; in the family Theridiiae it may be indistinct or even absent, e.g. in the fossil taxa in Burmese (Kachin) amber.

Acrometa PETRUNKEVITCH 1942

Specimens and species of the extinct genus *Acrometa* were frequent in the Eocene European – Baltic, Bitterfeld and Ukrainian (Rovno) – amber forests. I have before me 45 males and 5 females of *Acrometa* in Baltic amber (CJW); most probably the generotype *A.*

cristata PETRUNKEVITCH 1942 is the most frequent species, see WUNDERLICH (2004: 1197). In 1986: 132 *Viocurus fossilis* PETRUNKEVITCH 1958 was regarded by me as a junior synonym of *Acrometa cristata*. The uncertain determination of many specimens is caused by the frequently hidden structures of the male pedipalpus, of the paracymbium and the structures of the tegulum.

Notes on the taxonomy:
(1) According to the diverse structures of the prosoma - the tegulum and the direction of the loop of the sclerite which I consider the embolus - *Acrometa* is probably not a monophyletic genus. In *cristata* the direction of the right embolus is clockwise but in most of the remaining species it is apparently counterclockwise.
(2) In this paper I include *Acrometa* in the tribe Acrometini WUNDERLICH 1986, but the level of the Acrometini appears unsure to me: A subfamily of the Synotaxidae or even a family of its own?

Acrometa cristata PETRUNKEVITCH 1942 (figs. 1-3)

In this most frequent species of *Acrometa* the cephalic hair brush (fig. 1) and the structures of the tegulum (fig. 3) are characteristic patterns. Here I describe in short two specimens as the prey of a spider and one specimen with its prey:

F1686BB/CJW and F3705/BB/CJW: Two males as the prey of spiders, spun in in threads and partly (F1686 strongly) dissected.

F2028/BB/CJW: A male of a questionable *cristata* with the part of ?its capture web as remains of the prey of a female of the family Mimetidae.

F3701/BB/CJW: 1♂1♀ in a larger piece of amber which are spaced by 1 cm. Also preserved are few Diptera: Brachycera. The smallest fly is fixed at a thread which is part of the spider's capture web which includes few sticky droplets.

F3705/BB/CJW: 1♂ spun in in spider threads as a the prey of a spider.

Acrometa incidens WUNDERLICH 2004: 1♂ in Baltic amber, F3706/BB/CJW. The body length of the spider is 2mm. Directly on its body the abdomen of a Formicidae is preserved, which has probably been the prey of the spider.

Acrometa gibbosa **n. sp.** (figs. 4-7), photo 2

Etymology: The species name refers to the raised cephalic part, from lat. gibbosus.

Material: Holotype ♂ in Eocene Baltic amber, F3709/BB/CJW.

Preservation and syninclusions: The spider is well – the pedipalpi excellently – preserved in a larger clear yellow-orange piece of amber, the opisthosoma and the left side of the prosoma are covered with a white emulsion.- Syninclusions are threads of the spider's irregular capture web without sticky droplets left and below the spider, and a tiny questionable Acari below the spider; stellate hairs are absent.

Diagnostic characters (♂; ♀ unknown): Cephalic part (fig. 4) raised like a humpback, bearing a short brush of stronger hairs, leg hairs (fig. 5) only fairly long, sequence of the thin dorsal tibial bristles - some are apparently rubbed off - probably 2/2/1/2; pedipalpus (figs. 6-7): Paracymbium widely standing out, median apophysis not distinctly protruding and weakly sclerotized, spirals of both tegular apophyses well developed, embolus slightly oval, in a wide and (the right one) counterclockwise loop.

Description (♂):
Measurements (in mm): Body length 3.3; prosomal length 1.6; opisthosomal length 1.9; leg I: Femur 1.7, patella 0.75, tibia 1.75, metatarsus ca. 1.4, tarsus 0.7; tibia II 1.15, tibia III 0.7, tibia IV 0.9.
Colour: Prosoma and legs medium brown, legs not annulated.
Prosoma (fig. 4, photo): Cephalic part raised like a humpback, bearing a short brush of stronger hairs, fovea large, 8 large eyes, posterior row straight, clypeus not strongly protruding and fairly long, most parts of the chelicerae and mouth parts hidden. - Legs (fig. 4, photo) only fairly long, order I/II/IV/III, III distinctly the shortest, hairs rather short and indistinct, bristles thin, patellae dorsally 1/1, tibiae dorsally 2/2/1/2, position of the metatarsal trichobothria unknown, 3 well developed tarsal claws. - Oposthosoma (photo) egg-shaped, covered with a white emulsion. - Pedipalpus: See above.

Relationships: In *A. eichmanni* WUNDERLICH 2004 the structures of the ♂-pedipalpus are different and the cephalic humpback is smaller.

Distribution: Eocene (Palaeogene) Baltic amber forest.

***Acrometa longisetae* n. sp.** (figs. 8-11), photo 3

Etymology: The species name refers to its long setae on body and legs, from longus (lat.) = long and seta (lat.) = hair.

Material: Holotype ♂ in Eocene Baltic amber, F3707/BB/CJW.

Preservation and syninclusions: The spider is excellently preserved in a clear yellowish piece of amber; parts of the left legs II and III are cut off, the opisthosoma is completely covered with a white emulsion. - Syninclusions like stellate hairs are absent.

Diagnostic characters (♂; ♀ unknown): Prosoma (fig. 8) dorsally with long and almost erect hairs in a long and irregular field; pedipalpus (figs. 9-11): Tegular apophysis 1 with a long and narrow spiral distal loop. Median apophysis large and standing widely out.

Description (♂):
Measurements (in mm): Body length 2.2; prosomal length 1.1; opisthosomal length 1.3; leg I: Femur 1.5, patella 0.4, tibia 1.7, metatarsus 1.5, tarsus 0.8, tibia II 1.2, tibia III ca. 0.7, tibia IV 0.9.
Colour: Prosoma and legs light brown, legs not annulated.
Prosoma (fig. 8, photo) fairly convex, dorsally bearing long and erect hairs in an irregular position of the median cephalic part, fovea deep, 8 large eyes, posterior row distinctly procurved, clypeus fairly long and not distinctly protruding, most parts of the chelicerae and mouth parts hidden, sternum wide, spacing the coxae IV by ca. ¾ of their diameter. - Legs (photo) only fairly long, order I/II/IV/III, hairs long, patellar bristles thin, tibial bristles hair-shaped, position of the metatarsal trichobothria unknown, 3 well developed tarsal claws. - Opisthosoma (fig. 8, photo) covered with a white emulsion, bearing long bristles. - Pedipalpus: See the diagnosis.

Relationships: According to the long hairs of body and legs and the structures of the pedipalpus *A. glomus* n. sp. is strongly related; in *glomus* the loops of the tegular apophyses are different, the distal loop of tegular apophysis 1 is wider.

Distribution: Eocene (Palaeogene) Baltic amber forest.

***Acrometa glomus* n. sp.** (fig. 12)

Etymology: The species name refers to the bag-shaped tegular apophyses, from (lat.) glomus.

<u>Material</u>: Holotypus ♂ in Eocene Baltic amber, F3708/BB/CJW.

<u>Preservation and syninclusions</u>: The spider is completely and only fairly well (the bulbi well) preserved near the surface of a yellowish clear piece of amber, fissures hinder the view of several parts of body and legs. - <u>Syninclusions</u> are several tiny stellate hairs.

Diagnostic characters (♂; ♀ unknown): Body and legs similar to *A. longisetae* n. sp., opisthosomal bristles a bit stronger, structures of the bulbus (fig. 12) different.

Description (♂):
Measurements (in mm): Body length 2.6; prosomal length 1.4; opisthosomal length ca. 1.5; leg I: Tibia 2.0, metatarsus ca. 1.5, tarsus ca. 0.7, tibia II 1.9.
Prosoma and legs not well recognizable, apparently quite similar to *A. longisetae* n. sp., opisthosomal bristles a bit stronger. Position of the questionable metatarsal trichobothria in ca. 0.5. - Pedipalpus (fig. 12): Paracymbium distinctly standing out, tegular apophyses long, questionable embolus describing a wide loop, with a wide questionable seam, its tip in an apical position.

Relationships: See *A. longisetae* n. sp.

Distribution: Eocene (Palaeogene) Baltic amber forest.

<u>Balticosynotaxus</u> n. gen.

<u>Etymology</u>: The name refers to the Baltic area, the origin of the Baltic amber and to the type genus *Synotaxus* of the family Synotaxidae.

<u>The gender</u> of the name is masculine.

<u>Type species</u> (by monotypy): *Balticosynotaxus angulatus* n. sp.

Diagnosis (♂; ♀ unknown): Leg bristles strongly reduced; pedipalpus (fig. 13): Paracymbium blunt, undivided and bearing denticles on its anterior-dorsal part, questionable conductor strongly bent, position of the right embolus counterclockwise.

Relationships: According to the denticulate paracymbium *Balticosynotaxus* is a member of the Acrometini WUNDERLICH 1979. The counterclockwise position of the right embolus is like in *Sulcosynotaxus* WUNDERLICH 2004 in Palaeogene Bitterfeld amber in which the position of the denticulate area of the paracymbium and the shape of the conductor are different and the leg bristles are less strongly reduced: Tibiae I-II bear bristles in contrast to *Balticosynotaxus*. In *Balticosynotaxus* the area of the sternal organ of *Sulcosynotaxus* – vgl. WUNDERLICH (2004: 1238, fig. 92) – is hidden. In *Acrometa* PETRUNKEVITCH 1942 the prosoma bears a brush of long dorsal hairs (fig. 1) and the position of the right embolus is clockwise. See the key provided by WUNDERLICH (2004: 1194).

Distribution: Eocene (Palaeogene) Baltic amber forest.

Balticosynotaxus angulatus **n. gen. n. sp.** (figs. 13), photo 4

Etymology: The name of the new species refers to the wrinkled position of prosoma and opisthosoma.

Material: Holotype ♂ in Eocene/Palaeogene Baltic amber and a separated piece of amber, F3700/BB/CJW.

Preservation and syninclusions: The spider is rather well and almost completely preserved in a clear yellow-orange piece of amber, the right legs III and IV are lost by autotomy, the prosoma is dorsally and the opisthosoma is anteriorly-dorsally deformed; the right side of the body is covered with a white emulsion, the right side of the mouth parts and sternum are hidden by an air bubble, the opisthosoma is bent downwards almost in a right angle. - Syninclusions are a fissure right above the spider, and - in the separate piece of amber - a tiny Collembola, few stellate plant hairs and numerous tiny particles of detritus.

Diagnosis and relationships: See above.

Description (♂):
Measurements (in mm): Body length 2.4; prosoma: Length 1.1, width 1.0; opisthosoma: length 1.5, width 1.0, height 0.7; leg I: Femur 2.5, patella 0.4, tibia 2.5, metatarsus 2.2, tarsus 1.1; tibia III 0.8, tibia IV 1.6.
Colour: Prosoma and legs medium brown, legs not annulated, opisthosoma light grey.
Prosoma (photo) 1.1 times longer than wide, low, bearing few short and indistinct hairs, declined around the large fovea, 8 only fairly large eyes in a wide field, posterior row distinctly recurved, clypeus short, mouth parts, sternum and distal parts of the chelicerae hidden, - Legs long and slender, order I/IV/II/III, hairs indistinct, bristles hair-shaped, patellae dorsally 1/1, tibiae only III-IV with a single dorsal-basal one, position of the right metatarsal I trichobothrium in 0.6, metatarsal IV trichobothrium absent, ventral comb of tarsus IV absent, 3 tiny tarsal claws. - Opisthosoma 1.6 times longer than wide, covered with few rather short hairs, most spinnerets hidden, the observable ones short. - Pedipalpus (fig. 13) (see also above)

with a large subtegulum, a large retrolateral tegular apophysis and a slender apical tegular apophysis.

Distribution: Eocene (Palaeogene) Baltic amber forest.

?***Sulcosynotaxus matrimonium* n. sp**. (figs. 14-16), photo 5

Etymology: The name of the species refers to the existence of both sexes in the same piece of amber, from matrimonium (lat.) = married state.

Material: Holotype ♂ and paratype ♀ in the same piece of Eocene Baltic amber, F3702/ BB/ CJW.

Preservation and syninclusions: The spiders are well and almost completely preserved in a clear yellow-orange piece of amber, retrolateral parts of the right tibia, metatarsus and tarsus I, the tip of the right tarsus II and the retrolateral pedipalpal part of the male are cut off, the ventral side of both specimens is covered with a white emulsion, a fissure exists around the female. - Syninclusion: A large fissure at a layer exists right of the spiders, tiny hyphae have grown, e. g., from the tips of the cymbia.

Diagnosis: Sequence of the long tibial bristles 2/2/1/2, cephalic part with a low humpback in the male which bears few longer hairs (fig. 14), in the female without a humpback and with a medial row of half a dozen stronger hairs which are directed foreward; ♂-pedipalpus (figs. 15-16): Paracymbium standing out, bulbus as wide as long, tegular apophysis large, with a sickle-shaped distal part which may function as a conductor, embolus in a counterclockwise position.

Description:
Measurements (in mm); ♂ : Body length 2.2; prosoma: Length ca. 1.0, width 0.9; leg I: Femur ca. 1.5, patella 0.45, tibia1.3, metatarsus 1.0, tarsus 0.7, tibia IV 0.9; ♀: Body length 2.5, prosoma: Length 1.1, width 1.0; opisthosoma: Length 1.8, width 2.0, height 2.0; tibia I: 0.9.
Colour: Prosoma and legs light to medium brown, legs not annulated, opisthosoma light grey.
Prosoma ♂ (fig. 14, photo) 1.1 times longer than wide, dorsally with a low humpback which bears few longer hairs in an irregular position; in the ♀ low and with a row of longer medial hairs which are directed foreward, 8 rather small eyes, not protruding, posterior row procurved, anterior row recurved, clypeus long, basal cheliceral articles stout, fangs long and slender, teeth of the fang furrow hidden. - Legs (photo) only fairly long, order I/II/IV/III, hairs

of medium length in the ♂, long in the ♀, bristles long and thin, sequence of the tibiae 2/2/1/2, position of the left metatarsal II trichobothrium of the ♀ in 0.33, three small tarsal claws. - Opisthosoma (photo) egg-shaped in the ♂, globular in the ♀, dorsally bearing long hairs, its spinnerets and epigyne hidden by a white emulsion. - ♂-pedipalpus: See the diagnosis. The embolus is probably not preserved in its natural position.

The **relationships**: are quite unsure; I do not exclude the membership of the genus *Sulcosynotaxus* WUNDERLICH 2004. In the only surely known species of this genus, …...

Distribution: Eocene (Palaeogene) Baltic amber forest.

Family HAHNIIDAE: CRYPHOECINAE

The limits and relationships of several similar and related spider families - like Cybaeidae, Dictynidae and Hahniidae - are still controversally discussed. Regarding the Hahniidae I follow here the opinion of LEHTINEN (1967) who included three subfamilies: Cryphoecinae, Cybaeolinae and Hahniinae; see also UBICK et al. (2017: 124) who included Cicurina in the Dictynidae. Previously I regarded Cryphoecinae as a member of the Dictynidae s. l. close to the Hahniinae, see WUNDERLICH (2004: 1387). Dictynidae are cribellate or ecribellate; to my knowledge in the ecribellate Dictynidae the number of the tarsal trichobothria is 3-6.

Note: The relationships of the subfamily Mizagallinae WUNDERLICH 2004 in Baltic amber - probably correctly treated under Dictynidae – are still unsure.

Hahniidae was a diverse family in Baltic amber: 7 genera of the subfamilies Cryphoecinae (4) and Hahniinae (3) sensu WUNDERLICH (2004: 1366-1428) were reported.

Diagnostic characters and relationships of the Hahniidae and the Cryphoecinae:
Ecribellate (apomorphy), feathery hairs absent (an apomorphy?); other characters partly VERY variable: Spinnerets in a wide field with a large median pair: (a) in a transverse row (Hahniinae) or (b) in three rows, see WUNDERLICH (2004: 1454, fig. 5h), UBICK et al. (2017: 126, fig. 32.13), three tarsal claws, number of tarsal and metatarsal trichobothria distinctly reduced (usually up to 3 on the tarsi, fig. 22) (*), tibia of the ♂-pedipalpus frequently

with several - including dorsal - apophyses, the patella may bear an apophysis, too. Cryphoecinae is regarded as a member of the Cybaeidae by WHEELER et al. (2016).

<u>Further (plesiomorphic) characters</u>: Unpaired tarsal claw (fig. 19) as well as tarsal and metatarsal trichobothria existing, cephalic part anteriorly distinctly narrowing (fig. 17).

Mainly according to the position of the spinnerets, the trichobothriotaxy (*) and the chaetotaxy I regard the two extinct genera *Eocryphoeca* PETRUNKEVITCH 1958 and *Eocryphoecara* WUNDERLICH 2004 in Palaeogene Baltic amber - which are treat in this paper – as a branch of the <u>Eocryphoecinae</u>. In these genera the tegulum bears a lage and protruding ventral-basal apophysis (figs. 21, 23).
The genera *Eocryphoeca* PETRUNKEVITCH 1958 and the closely related *Eocryphoecara* WUNDERLICH 2004 are only known from the Paleogene Baltic amber forest; their female sex is unknown. They are well characterized by the large and protruding ventral-basal tegular apophysis (figs. 21, 23). The posterior eyes are large, the posterior row is slightly procurved (fig. 17; see below, *Eocryphoecara abicera*), the anterior eye row is distinctly procurved. The large and strongly protruding tegular apophysis is directed anteriorly in *Eocryphoeca* (fig. 26) but posteriorly in *Eocryphoecara* (fig. 21), the shape of the conductor is also different but the shape of the prosoma - reported by WUNDERLICH (2004: 1389-1390) - is not different.

(*) In *Eocryphoeca gibbifera* I reported 5 trichobothria (real trichobothria?) on the left tarsus IV, see WUNDERLICH (2004: 1398); but see below, *Eocryphoecara longtegap* n. sp.

Below I treat few taxa of both genera.

<u>Eocryphoecara</u> WUNDERLICH 2004

Up to now only the type species - *E. abicera* WUNDERLICH 2004 - has been described, based on a single male. Here I describe a second male of *abicera* as well as a second species of this genus.

Eocryphoecara abicera WUNDERLICH 2004: 1402-1403, figs. 5i-l, photos 269-271

figs. 17-21.

Material: 1♂ and a separated piece of amber in Palaeogene Baltic amber, F3678/BB/CJW.

Preservation and syninclusions: The spider is fairly well preserved in a clear yellowish piece of amber which includes several fissures; mainly the ventral side is covered with a white emulsion, parts of the opisthosoma are dorsally inclined within the amber, the right leg IV is lost beyond the coxa by autotomy, the right legs I-II are cut off through the femora, the lateral eyes are partly deformed. - Syninclusion: Parts of a plant are preserved at the surface of the piece of amber.

Diagnosis (♂; ♀ unknown): Pedipalpus (figs. 20-21): Retroapical tibial apophysis pointed, tegular apophysis of medium length.

Description:
Measurements (in mm): Body length 4.8; prosoma: Length 2.4, width 1.8; opisthosoma: Length 2.3, width 1.8; leg I: Femur 1.9, patella 0.7, tibia 1.75, metatarsus 1.9, tarsus 1.2, tibia II 1.7, tibia III 1.5, tibia IV 2.0.
Colour: Medium to dark brown, legs not annulated.
Prosoma (figs. 17-18) 1.33 times longer than wide, not elevated, anteriorly distinctly narrowed, hairs of medium length, not dense (probably partly rubbed off), fovea well developed, feathery hairs absent, 8 eyes in two rows, posterior eyes distinctly larger than anterior eyes, posterior row slightly procurved (in the holotype reported slightly recurved because of bad preservation), anterior row procurved, clypeus short, basal cheliceral articles (most parts are hidden) robust, mouth parts and sternum hidden. - Legs (fig. 19) fairly long, order IV/I/II/III, tarsal trichobothria unknown, a long trichobothrium is observable on the left metatarsus I in position 0.8, bristles numerous, existing on femora to metatarsi on all legs, tibia I-II bear 2 ventral pairs as in *E. longtegap* (fig. 22), position close to the leg article, metatarsus I-II bear 3 ventral pairs, metatarsus IV straight and spiny (fig. 19), paired tarsal claws with long teeth, unpaired claw of medium size only. - Opisthosoma oval, widest in the middle, soft, hairs of medium length; ventral side and most parts of the spinnerets hidden. - Pedipalpus (figs. 20-21): Femur probasally with half a dozen setae in a row similar to the setae of the family Phyxelidae (such setae exist probably also in other members of *Eocryphoecara* and in *Eocryphoeca*, too, but they may be usually hidden), patella as long as wide, bearing a long dorsal-distal bristle, tibia as long as wide, bearing two long bristles and a fairly slender RTA which is distinctly narrowed distally, cymbium distinctly longer than wide, distally narrowed, tegulum ventrally-basally with a long and strongly protruding apophysis which is directed posteriorly, conductor pointed, embolus (most parts are hidden) fairly long and slender, partly recognizable in the dorsal aspect, in a clockwise position of the left pedipalpus, origin probably basally.

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

Distribution: Eocene (Palaeogene) Baltic amber forest.

***Eocryphoecara longtegap* n. sp.** (figs. 22-24)

Etymology: The artificial and arbitrary species name refers to the quite long tegular apophysis, from longus (lat.) = long, as well as parts of the term “tegular apophysis” of the bulbus.

Material: Holotypus ♂ in Palaeogene Baltic amber, F3679/BB/CJW.

Preservation and syninclusions: The spider is incompletely and partly - e. g., the right pedipalpus and the trichobothria (figs. 22-24) - well preserved in a clear yellowish piece of amber; the left pedipalpus and the ventral side of the opisthosoma are covered with a white emulsion, several leg articles – like most patellae and dorsal parts of the opisthosoma – are cut off. - Syninclusions: Parts of three legs and of a wing of a Diptera are preserved at the margin of the piece of amber.

Diagnosis (♂; ♀ unknown): Pedipalpus (figs. 23-24): Retroapical tibial apophysis large and wide, tegular apophysis very long.

Description (♂):
Measurements (inmm): Body length 5.5; prosoma: length 2.7, width 1.8; opisthosoma: Length 3.0, width 2.1; leg I: Tibia 1.85, metatarsus 1.8, tarus 1.0; length of the cymbium 1.3.
Colour: Prosoma and legs light to medium brown, legs not annulated.
Prosoma 1.5 times longer than wide, hairs of medium length similar to *E. abicera* WUNDERLICH 2004 (see above) but more frequent, eyes also similar to *abicera* but posterior row slightly recurved (probably the position of the posterior row is intraspecific slightly variable). - Legs (fig. 22) also quite similar to *abicera* (see above) but partly better preserved, mainly the trichobothria; tibia I-II bear 2 long ventral bristle, metatarsus I-II bear 3 pairs of ventral bristles (the distal pair is partly hidden), tarsus and metatarsus I bear at least 3 trichobothria increasing in length; I regard some shorter similar hairs in a more basal position as being most probably not trichobothria. - Opisthosoma oval, 1.4 times longer than wide, most parts are hidden or covered with a white emulsion. - Pedipalpus (figs. 23-24): Patella and tibia stout, about as wide as long, RTA wide, cymbium rather long, tegular apophysis very long, directed posteriorly, conductor apically narrowing, embolus (its basal and distal parts are hidden) fairly long and slender, describing at least half a circle.

Relationships: In *E. abicera* WUNDERLICH 2004 the RTA is more slender and the tegular apophysis is shorter.

Distribution: Eocene (Palaeogene) Baltic amber forest.

Eocryphoeca PETRUNKEVITCH 1958

Eight species were described by WUNDERLICH (2004: 1394-1401). Here I descibe a further species.

***Eocryphoeca duplex* n. sp.** (figs. 25-26)

Etymology: The species name refers to the two tibial apophyses of its male pedipalpus, from duplex (lat.) = double.

Material: Holotype ♂ and a separated piece of amber in Eocene Baltic amber, F3680/BB/CJW.

Preservation and syninclusions: The spider is well and completely preserved in a yellowish-orange piece of amber which was slightly heated; the dorsal side of the opisthosoma is partly inclined within the amber, the mouth parts and most parts of the spinnerets are covered with a white emulsion. - Syninclusions are two tiny Coleoptera and a dissected Collembola directly behind the spider which probably was the prey of the spider. In the separated piece of amber are a Diptera: Nematocera and a stellate hair preserved.

Diagnosis (♂; ♀ unknown): Pedipalpus (figs. 25-26): Tibia with a pointed retrodorsal-basal apophysis, RTA wide and blunt.

Description (♂):
Measurements (in mm): Body length 4.4; prosoma: Length 2.0, width 1.6; opisthosoma: length 2.5, width 1.6; leg I: Femur 1.75, patella 0.6, tibia 1.7, metatarsus 1.7, tarsus 1.3; tibia II 1.7, tibia III 1.45, tibia IV 1.9; length of the cymbium 1.0.
Colour dark brown.
Prosoma 1.25 times longer than wide, quite similar to *Eocryphoecara abicera* WUNDERLICH 2004 (figs. 17-18, see above) but hairs more dense; mouth parts hidden, sternum small elongated between coxae IV. - Legs also quite similar to *E. abicera*: bristles: Femora dorsally 1/1 and subapically usually with a lateral pair as well as a short dorsal one. Trichobothria not well preserved and not studied. - Opisthosoma oval, 1.56 times longer than wide, dorsal hairs of medium length, spinnerets hidden. - Pedipalpus (figs. 25-26): Patella and tibia stout, tibia with a pointed retrodorsal-basal apophysis, RTA wide and blunt, tegular apophysis rather long, conductor hidden.

Relationships: The position of the retrodorsal-basal tibial apophysis of the pedipalpus and of the RTA are unique in *E. duplex.*

Distribution: Eocene (Palaeogene) Baltic amber forest.

The family ZOROPSIDAE s. l.

See WUNDERLICH (2004: 1489-1522): “The fossil Zoropsidae in Baltic amber ...”, especially the tab. p. 1496. See also below, the family Trechaleidae.

During the last decades the high taxa of the Zoropsidae and its kin were objects of great changes, see, e. g., GRISWOLD et al. (1993), POLOTOV et al. (2015), WHEELER et al. (2016) and UBICK et al. (eds.) (2017). It was shown that the great-shaped tapetum evolved several times in spiders, claw tuft bearing spiders were discovered which bear an unpaired claw, the taxa “Dionycha” and “Trionycha” need new definitions, Udobidae and Zorocratidae were split off from the Zoropsidae; Zorocratidae and Tengellidae were - finally? - again united with the Zoropsidae. In this paper I prefer the use of the taxon Zoropsidae s. l.

Notes on phylogenetics

Limits and diagnoses of the Zoropsidae s. l. are still debated, see directly above. Most authors regard Zoropsoides s. l. as a member of the Grate-shaped tapetum- of the Oval calamistrum clade and as sister group of the Lycosidoidea in which – in contrast to the Zoropsoidea – a cribellum and a male tibial suture are absent. I suppose that the absence of the cribellum is an apomorphy of the Lycosoidea. The existence (or its disposition) of a male tibial suture may be an apomorphy of the Zoropsoidea. Besides a RTA in several taxa of the Zoropsoidea exist some further tibial apophyses of the male pedipalpus, including dorsal apophyses (figs. 29, 31) like in several further families. Life style: See below.
A well-founded diagnosis of the family Zoropsidae is unknown to me; see UBICK et al. (2017: 290). A cribellum and a suture of the male tibia exist or are absent.
What may be the root and the origin of the Zoropsoidea? I found six genera in Paleogene Baltic amber – *Cymbioropsis* WUNDERLICH 2017, *Eomatachia* PETRUNKEVITCH 1942, *Eoprychia* PETRUNKEVITCH 1958, *Eotrechalea* WUNDERLICH 2004, *Pseudoeoprychia* WUNDERLICH 2017 and *Succiniropsis* WUNDERLICH 2004 – but I did not found a proof in the Mesozoic, e. g., not in the Mid Cretaceous Burmese (Kachin) amber. I was searching for a cribellate taxon which may possess several tarsal trichobothria and tibial apophyses of the

male pedipalpus. Did members of the Zoropsoidea live in the Burmese amber forest hidden on the ground, away from the amber traps (see below, the life style)? Recently - under Agelenomorpha indet. - spiny leg articles were described in Burmese (Kachin) amber which tarsi bear several long trichobothria, fig. 27, see WUNDERLICH & MÜLLER (2021: 184-185, figs. 327-328); compare the tarsal trichobothria of *Eotrechalea annulata* WUNDERLICH 2004 (Zoropsoidea) in Baltic amber (fig. 31), see below. The characters of these legs do not fit in any spider taxon in Burmite known to me. Do these legs belong to a member of the Zoropsoidea? In this case Zoropsoidea would be - in the geological sense - one of the oldest (questionable) proofs of the RTA-clade. See also the family Eotibiaapophysidae WUNDERLICH 2018 sensu WUNDERLICH & MÜLLER (2021: 179-185).

In this respect another family is of interest, the Cretaceous Lagonomegopidae: Tarsal trichobothria and a - small - retrolateral tibia apophysis of the male pedipalpus exist. But in the Lagonomegopidae exists a cheliceral foramen; a cribellum, leg bristles are absent and the position of the eyes is very special.

Notes on the variability of two important taxonomic structures:

The intrafamiliar and partly intrageneric variability of certain structures is enormous; therefore its value for determination is restricted. In *Eomatachia* and in *Eoprychia* a suture of the male tibia exists frequently but on *Eomatachia* sp. indet., F2876/BB/CJW, in *E. xanthippe* WUNDERLICH 2004 and in *Eoprychia* sp. indet., F3677/BB/CJW it is absent (!). According to GRISWOLD et al. (1993: 45) a tibial suture exists in most Zorocratinae but is absent in the type genus *Zorocrates*. - The cribellum: It exists in most Udubidae POLOTOW et al. 2015 but in some *Uduba* - included in the Zorocratidae by GRISWOLD (1993) - it is absent. Cribellate and ecribellate conditions exist even in closely related extant species of *Uduba* and *Zorodictyna*, see UBICK et al. (2017: 26). - A claw tuft PLUS an unpaired tarsal claw exists, e. g., in *Cauquenia,* see PIACENTINI et al. (2013). - The posterior eye row is slightly procurved (e. g. in *Eomatachia*) to strongly recurved (e. g., in *Eoprychia* and *Zoropsis*).

Life style and frequency of Zoropsidae in Baltic amber:

Most extant Zorosidae are wandering hunters, some construct small sheet webs and retreats. *Eoprychia* is rare in amber, probably due to its large body size, *Eotrechalea* and *Succiniropsis* are extremely rare probably because of their ground-living life style but *Eomatachia* is relatively frequent; probably these spiders lived at the bark of the amber trees.

Key to the genera of the Zoropsidae s. l. in Baltic amber:

In the key provided by WUNDERLICH (2017: 32-33) the genus *Eotrechalea* WUNDERLICH 2004 (see below) has to add. In *Eotrechalea* the legs are distinctly annulated (photo) and the tibia of the ♂-pedipalpus (fig. 31) bears a unique large/wide DORSAL apophysis .

The dubius genus *Esuritor* PETRUNKEVITCH 1942 - see below – is not included.

DESCRIPTION OF THE TAXA

Eomatachiini WUNDERLICH 2004

Two genera are united in this tribe: *Eomatachia* PETRUNKEVITCH 1942 and *Succiniropsis* WUNDERLICH 2004.

Differences of these genera: *Succiniropsis* (♀ unknown)/*Eomatachia*: Body length 1.7 mm/ at least 4 mm, posterior eye row straight/slightly procurved and patellar bristles indistinct/ well developed.

Diagnostic characters of the tribe: In both genera the posterior eye row is never recurved but slightly procurved: In *Eomatachia*, see WUNDERLICH (2004: 1516, fig. 8) or straight: In *Succiniropsis*, see WUNDERLICH (2004: 1519, fig. 24); feathery hairs, leg scopulae and claw tufts are absent, the tibia of the ♂-pedipalpus bears several (including dorsal) apophyses and the cymbium is retrobasally widely inclined. A suture of the ♂-tibia exists or is absent (see above), a cribellum exists at least in most species but is probably absent in the male F2876/BB/CJW of *Eomatachia* sp. indet. in which a calamistrum is absent.

The relationships of the tribe are quite unsure. In 2004: 1497 I regarded it as a member of the Zoropsidae s. l. which probably has to split up, see GRISWOLD (1993: 44-46) and the taxa used by UBICK et al (2017: 291). In contrast to the Zoropsinae - but as in the Zorocratinae - claw tufts are absent in the Matachiini and a tibial suture exists; the position of the eyes of the posterior row is as in *Zorocrates* but not as in the Zoropsinae. I tend to regard the Eomatachiini to be more likely to be a member of the Zorocratinae than of the Udubidae.

Members erroneously placed in the family Trechaleidae in Baltic amber:

According to new material, revisions and recent publications Trechaleidae has to delete from the list of Baltic amber spiders. Most probably the spiders treated under Trechaleidae by WUNDERLICH (2004: 1542-1548) will turn out to be members of the family Zoropsidae s. l.: *Esuritor*, *Linoptes* and *Eotrechalea*.

Esuritor PETRUNKEVITCH 1942

Adult members of both species of this dubious genus are unknown. Its eye field is very wide; see WUNDERLICH (2004: 1543-1544, 1550, figs. 1-4). In my opinion *Esuritor* is probably a member of the family Zoropsidae s. l.

Eoprychiini WUNDERLICH 2004

Eoprychiini was based - under Zoropsidae s.l. - on the single genus *Eoprychia* PETRUNKEVITCH 1958. Cribellum and dense claw tufts exist like in the Zoropsidae: Zoropsinae but in contrast to the Zoropsinae exists basically a suture of the male tibia. This suture is absent in a recently discovered male of *Eoprychia* sp. indet., F3677/BB/CJW, body length

7.5 mm. I regard *Eoprychia* as a member of the Zoropsidae s. l., and I do not want to exclude its membership of the Zorocratinae or Zoropsinae. Probably the badly known genus *Linoptes* MENGE in KOCH & BERENDT 1854 - see WUNDERLICH (2004: 1544-1546) (under Trechaleidae) - is an older synonym of *Eoprychia*.

Eotrechaleinae WUNDERLICH 2004 (with hesitation under Trechaleidae) **= Zoropsidae s. l. (n. relat. & n. comb.).**

Type genus by monotypy: *Eotrechalea* WUNDERLICH 2004

Relationships: According to the characters of the family Trechaleidae - position of the eyes and of spinnerets/colulus, the structures of tarsi and male pedipalpus, see JOCQUE & DIPPENAAR-SCHOEMAN (2006: 262), UBICK et al. (2017: 281) - to my present opinion *Eotrechalea* is not a member of the family Trechaleidae but more likely of the diverse Zoropsidae (**n. relat. & n. comb**.), probably of the subfamily Zorocratinae in which a cribellum, a suture of the male tibia and claw tufts may be absent, and a dorsal tibial apophysis of the male pedipalpus may exist, e. g., in *Titiotus* SIMON (extant, South America) in which claw tufts exist in contrast to *Eotrechalea*. I do not exclude relationships to the family Udubidae (extant).

<u>Eotrechalea</u> WUNDERLICH 2004

Diagnostic characters (♂; ♀ unknown): Legs distinctly annulated (photos), feathery hairs, claw tufts, tibial suture and cribellum absent, colulus large/wide, anterior eye row recurved, posterior eye row slightly procurved, see WUNDERLICH (2004: 1551, figs. 9-10), trochantera notched, anterior spinnerets stout and close together; pedipalpus see WUNDERLICH (2004: 1552, figs. 17-19): Femur distinctly bent, RTA absent but a large/wide DORSAL tibial apophysis exists, cymbium with a retrobasal bristle, tegulum with a pointed distal apophysis and a strongly bent - real? - median apophysis, embolus long, origination in the basal part of the tegulum.

<u>New material of the generotype *E. annulata* WUNDERLICH 2004</u>: 1♂ in Eocene Baltic amber, coll. F. EICHMANN no. Ar 54. Its prosomal length is 2.2 mm, its pedipalpal patella is

0.5 mm long, its tarsi bear several trichobothria in two rows, its legs are distinctly annulated, its bulbus (fig. 31) is partly hidden, the tegulum bears several apophyses.

***Eotrechalea darrellubick* n. sp.** (figs. 28-30), photos 6-7

2004 Taxon indet., male, Beitr. Araneol., 3: 1548, 1553, fig. 23 (*Eotrechalea* indescr.).

Etymology: It is a pleasure for me to name this species after DARRELL UBICK who published numerous papers on extant spiders - including Zoropsidae – which are very helpful for my studies.

Material: Holotype ♂ and a separated piece of amber in Palaeogene Baltic amber, F1361/BB/ CJW.

Preservation and syninclusions: The spider is excellently and completely preserved in a clear yellowish piece of amber, most parts of the opisthosoma are covered with a white emulsion, both bulbi are expanded and partly hidden because they are bent ventrally. – Syninclusions: A fissure exists right below the spider. In the separated piece of amber exist larger plant inclusions, apparently bark.

Diagnosis (♂; ♀ unknown): Pedipalpus (figs. 29-30): Patella 0.65 mm long, dorsal tibial apophysis only fairly bent retrolaterally.

Description (♂):
Measurements (in mm): Body length 4.6; prosoma: length 2.2, width 2.0; opisthosoma: Length 2.6, width 1.7; leg I: Femur 2.5, patella 0.8, tibia 2.3, metatarsus 0.16, tarsus 0.8, tibia II 2.2, tibia III 0.18, tibia IV 2.0, metatarsus IV 0.18; pedipalpal patella 0.65.
Colour (see the photos): Prosoma medium brown, legs distinctly annulated.
Prosoma (photos) 1.1 times longer than wide, as in *E. annulata*, see WUNDERLICH (2004: 1561, figs. 9-10), hairs short, ventral side hidden. - Legs fairly long, prograde, IV about as long as I, III relatively long, tarsal trichobothria as in fig. 28, bristles and tarsal claws as in *E. annulata*. - Opisthosoma: Most parts are hidden by a white emulsion; anterior spinnerets and colulus: See WUNDERLICH (2004: 1553, fig. 23). - Pedipalpus (figs. 29-30; both bulbi are expanded): Patella as long as the tibia, tibia with a long and wide dorsal and a smaller ventral-apical apophysis, cymbium with a retrobasal bristle as in *E. annulata*, tegulum with several apophyses, embolus long, originating the probasal part of the tegulum.

Relationships: In *E. annulata* WUNDERLICH 2004 the legs are also strongly annulated but the pedipalpal patella is shorter - 0.45-0.5 rsp. 0.65 mm -, and the distal part of the dorsal pedipalpal apophysis is stronger bent, fig. 31.

Distribution: Eocene (Palaeogene) Baltic amber forest.

Families CLUBIONIDAE, CORINNIDAE, LIOCRANIDAE and PHRUROLITHIDAE

The intrafamiliar characters of these families are quite diverse and variable; to my knowledge obvious or unique apomorphic characters are absent; certain important characters are not or not surely recognizable in the fossils. In the following some important characters of the families in question are listed and <u>may help to distinguish and identify their taxa</u>:

character	Clubionidae	Corinnidae	Liocranidae	Phrurolithidae
eye field	almost as wide as cephalic area	---------------- usually (!) narrow(er) ------------------------		
posteriorly eye row	----------------------- usually more or less straight (*) ------------------------------			
opisthosoma scutate/leathery	absent	frequently existing	absent	existing
leg bristles III-IV	usually well developed	frequently reduced	usually well developed	occasionally reduced
hairs of the tarsal tufts	usually thin	usually thin	existing	existing
female median spinnerets	normal	normal	laterally flattened	normal
prosomal and leg cuticula	furrowed	scaly	furrowed	scaly
special characters		frequently powerful or protuding chelicerae		modified/bent femur of the ♂-pedipalpus (**)

(*) Recurved, e. g., in *Apostenus* (Liocranidae) and *Eomazax* (Phrurolithidae).
(**) Myrmecomorphy exists frequently (similar to certain taxa in other families like Corinnidae: Castianeirinae), the shape of the posterior median eyes may be rather oval (circular, e. g., in *Eomazax*), gnathocoxal depressions are frequent, strong ventral tibial I-II bristles exist usually but are absent, e. g., in the extinct genus *Eomazax*.

Families PHRUROLITHIDAE and CORINNIDAE

In Eoene Baltic amber I described seven genera of the Corinnidae s. l. under Corinninae and Phrurolithinae, see WUNDERLICH (2004: 1636-1680); in the meantime Phrurolithinae has been elevated to family rank. I regarded the genera *Ablator* PETRUNKEVITCH 1942, *Alterphrurolithus* WUNDERLICH 2004, *Cryptoplanus* PETRUNKEVITCH 1958, *Eomazax* PETRUNKEVITCH 1958, *Myrmecorinna* WUNDERLICH 2004 and *Protoorthobula* WUNDERLICH 2004 as genera of the subfamily Phrurolithinae in Baltic amber but only *Cornucymbium* WUNDERLICH 2004 as - doubtful - genus of the Corinninae, see below. Previously *Ablator* and *Eomazax* were treated under Clubionidae by PETRUNKEVITCH (1958).

I consider now *Cornucymbium* to be more likely a genus of the Phrurolithidae than of the Corinnidae (**n. relat**.): In this genus leg IV is longer than I like in most Phrurolithidae (in most Corinnidae leg I is the longest leg) and the basal cheliceral articles are rather small. Therefore – according to my actual knowledge – Corinnidae (s. str.) has probably to delete from the list of surely reported families in Baltic amber. Contrarily members of the family Phrurolithidae are not rare in Baltic amber.

Synonymy and n. comb.:

I consider now *Macaria procera* KOCH & BERENDT 1854 - described among Gnaphosidae and Clubionidae - to be an older synonym of *Myrmecorinna gracilis* WUNDERLICH 2004 (**n. syn. & n. comb.**) of the Phrurolithidae. The myrmecomorphic *procera* possesses a quite slender prosoma and opisthosoma. Previously I regarded *Eomazax pulcher* PETRUNKEVITCH 1958 to be a QUESTIONABLE junior synonym of *procera*, see WUNDERLICH (2004: 1653) but the body length of the type species of the monotypic genus *Myrmecorinna* - 2.2-3.6mm - is distinctly nearer to the body length of *procera* - 2 mm - than to the body length of *Eomazax pulcher* – 4.3-5.8 mm -, and short bristles/spines (!) around its spinnerets exist in *gracilis* as reported in the holotype of *Macaria procera*. This is a quite rare character in spiders. Therefore the name of the taxon in question has to be *Myrmecorinna procera* (KOCH & BERENDT 1854).

The monotypic genus _Eothanatus_ PETRUNKEVITCH 1950 – based on a badly preserved adult male of the type species *Eothanatus diritatis* PETRUNKEVITCH 1950 – was regarded as a member of the family Philodromidae by PETRUNKEVITCH (1950: 323). The spinnerets of the holotype are cut off and the eyes are "difficult to see". According to the prograde position of the legs and their proportions - II shorter I, III distinctly the shortest -, the few and short leg bristles and the structures of the pedipalpus -, e. g., the strongly bent femur and the protruding bulbus - I regard *Eothanatus* PETRUNKEVITCH 1950 to be a junior synonym of *Ablator* PETRUNKEVITCH 1942 (**n. syn**.) of the family Phrulolithidae (**n. relat**.).

The World Spider Catalog in V. 2021 listed the genus _Phrurolithus_ C. L. KOCH 1839 as the only genus of the Phrurolithidae in Baltic amber. PETRUNKEVITCH (1958: 306-317) described - under Liocranidae - each a single species of three subgenera – *Eophrurillus* PETRUNKEVITCH 1950, *Laccolithus* PETRUNKEVITCH 1950 and *Phrurolitus* – which he placed as members of the genus *Phrurolithus* in Baltic amber, all based on juvenile (!) specimens. In my opinion the relationships of these taxa are quite unsure and none of these is considered by me to be a true *Phrurolithus*. In the taxa treated by PETRUNKEVITCH a dorsal opisthosomal scutum and dorsal opisthosomal markings are absent, an anterior bristle of the basal cheliceral articles exists only in his subgenus *Phrurolithus* in which the paired tarsal claws bear teeth like in *Laccolithus* in contrast to *Eophrurolithus*. Only in *Laccolithus* the prosoma is distinctly punctuate (fig. 37, photo). According to their different characters I elevate the subgenera *Eophrurolithus* and *Laccolithus* (see below) to generic rank (**n. stat**.) of the Phrurolithidae. I regard the subgenus *Phrurolithus* sensu PETRUNKEVITCH 1958 to be a doubtful genus of the Phrurolithidae which may be a junior synonym of an already described genus in Baltic amber.

Eomazax PTRUNKEVITCH 1958

See WUNDERLICH (2004: 1653-1654).

Type species (the only known species, kept in the PIHUB, studied by me) in Baltic amber: *Eomazax pulcher* PETRUNKEVITCH 1958, based on a subad. male.

New material: Two probably conspecific males in Baltic amber:
(1) F3703/BB/CJW: The piece of amber was heated; therefore the white dorsal hairs of the opisthosoma are not recognizable. Measurements: Body length 4.8 mm, prosomal length 2.4 mm. Most parts of the ventral side of the spider and most eyes are hidden. Femoral bristles as in F3704.
(2) F3704/BB/CJW: The piece of amber was heated, therefore the incomplete male is - including the structures of the bulbus - deformed, darkened, and a white emulsion of body and legs is absent. Measurements: Body length 4.3 mm, prosoma: Length 2.2 mm, width 1.2 mm. The slender spider is distinctly ant-shaped. The leg bristles are strongly reduced, the femora bear a single dorsal bristle, their position on I-II in the basal half, on III-IV in the distal half. Precocal triangles and trochanteral notches are absent. The opisthosoma bears dorsally a pair of white hairs anteriorly as well as in the middle, and a single patch posteriorly; it is dorsally completely covered with a strong scutum and ventrally - besides laterally - widely in the whole length also covered with a strong scutum. The spinnerets are completely retracted.

Diagnosis (♂; ♀ unknown; see WUNDERLICH (2004: 1652-1653, 1673-1674, figs. 42-49)): Body distinctly ant-shaped, leg bristles strongly reduced (ventral tibia I-II bristles absent), posterior median eyes circular, posterior eye row distinctly procurved; ♂-pedipalpus: Femur without modifications, retrolateral tibial apophysis simple, median apophysis short, conductor probably absent, embolus in a prolateral position.

Note: As pointed out by me (2004: 1653) the eyes of the darkened holotype are difficult to observe. The position of the posterior eye row is actually distinctly recurved - see WUNDERLICH (2004: 1674, fig. 45) - but not distinctly procurved as erroneously described and figured by PETRUNKEVITCH (1958: 303, figs. 461, 463).

Relationships: See WUNDERLICH (2003: 1653). *Eomazax* was considered as a genus of the Clubionidae: Micariinae (now a subfamily of the Gnaphosidae), and furthermore related to the genus *Mazax* O. PICKARD-CAMBRIDGE 1898 by PETRUNKEVITCH (1958: 302), which is now regarded as a member of the Corinnidae: Castianeirinae. According to the COMBINATION of its characters - see the diagnosis and the tab. above - I include this unusual genus in the family Phurolithidae which - as a former subfamily - has been split off from the Corinnidae.

Distribution: Eocene Baltic amber forest.

Laccolithus PETRUNKEVITCH 1958 (**n. stat.**, from subgeneric level; see directly above) (figs. 32-38), photo 8

Type species (by monotypy): *Phrurolithus* (*Laccolithus*) *extinctus* PETRUNKEVITCH 1958:

311, figs. 477-489, based on a juvenile specimen which body length is less than 2 mm. Further species: *Laccolithus petrunkevitchi* n. sp.

Diagnostic characters (♀; ♂ unknown): Prosoma and legs distinctly punctuate (fig. 37, photo), strongly convex (fig. 36), tarsal claws bearing teeth (at least in the holotype), basal cheliceral articles without anterior bristle.

Further important characters: Posterior eye row slightly recurved (fig. 37), well developed bristles of the anterior legs (fig. 35) exist in strong contrast to the few short bristles of the posterior legs (fig. 34). In *L. petrunkevitchi* n. sp. the opisthosoma bears apparently a large dorsal scutum (see below) which may be absent in the small juvenile holotype of *L. extinctus*.

Relationships: I agree with the opinion of PETRUNKEVITCH (1958: 305f) who regarded *Laccolithus* to be related to *Phrurolithus* C. L. KOCH 1839, but in *Phrurolithus* the basal cheliceral articles bear an anterior bristle, the teeth of the tarsal claws are absent or strongly reduced and a distinctly punctuate prosomal cuticula is absent. Existence of an opisthosomal scutum: See above and below.

Distribution: Eocene (Palaeogene) Baltic amber forest.

***Laccolithus petrunkevitchi* n. sp.** (figs. 32-35), photo 8

Etymology: The species is named after the well-known Alexander Petrunkevitch who described numerous fossil spider taxa including excellently *Laccolithus extinctlus.*

Material: Holotype ♀ in Eocene (Palaeogene) Baltic amber, F3683/BB/CJW. - Remark: According to the voluminous opisthosoma, which may bear large eggs, I consider the female to be adult. Most adult females of extant related taxa possess a similar body length.

Preservation and syninclusions: The spider is completely preserved in a clear yellowish piece of amber, mainly the left and ventral sides of the spider are covered with a white emulsion. - Syninclusions: An air bubble exists below the left femora III and IV. On parts of the surface of the piece of amber - which are not well polished - exist fissures caused by oxidation.

Diagnosis (♀; ♂ unknown): Femur I (fig. 34) bears 6 prolateral and proventral bristles in the basal half.

Description (♀):
Measurements (in mm): Body length 4.3; prosomal length 1.7; opisthosoma: Length 2.5, height 2.0; leg I: Femur 1.4, patella 0.55, tibia 1.3, metatarsus 0.95, tarsus 0.55; leg IV: Tibia ca. 1.0, metatarsus 1.25, tarsus 0.55.
Colour: Prosoma, legs and questionable opisthosomal scutum dark brown, legs not annulated.
Prosoma (photo) not much longer than wide, anteriorly strongly narrowing, distinctly punctuate, 8 eyes - partly covered with enlarging bubbles - in two wide rows, anterior row (in anterior aspect) distinctly procurved, posterior row slightly recurved, clypeus short, basal cheliceral articles fairly large, not protruding, anterior bristles absent, fangs long and slender, teeth of the fang furrow, mouth parts and sternum covered with a white emulsion, praecoxal triangles apparently absent. - Pedipalpus (fig. 32) with long and slender articles, area of the tarsal claw hidden. - Legs (figs. 33-35, photo): I and IV about equal in length, III distinctly the shortest, hairs indistinct, I-II with numerous long bristles in contrast to the few and short bristles of III-IV; femur I with 4 long proventral and 2 shorter prolateral bristles in the distal half, femur III-IV with short bristles, femur I-II also with few long and thin bristles in the basal half, bristles of the patellae apparently absent, tibia I-II ventrally with 8 pairs of long bristles, metatarsi I-II ventrally with 5 pairs of long bristles, tibia and metatarsus III-IV without long ventral bristles, most tips of the short tarsi hidden. - Opisthosoma (photo) oval, hairs quite short, apparently covered with a large dorsal scutum (the area is covered with a thin white emulsion), most parts of the genital area and of the spinnerets hidden, basal articles of the anterior spinnerets relatively long and not widely spaced.

Relationships: In *L. extinctus* (PETRUNKEVITCH 1958) (figs. 36-38) the prosoma is also strongly punctuate but additionally the cephalic part is surrounded by a shallow pitted field and femur I bears only two prolateral bristles; existence of an opisthosomal scutum: See above.

Distribution: Eocene (Palaeogene) Baltic amber forest.

Family PHILODROMIDAE

Fossil taxa of the family Philodromidae are extremely rare, erroneous identifications are frequent, see WUNDERLICH (2004: 1691-1692: “Erroneous identifications and questionable taxa”). The only named taxon in Baltic amber is *Eothanatus diritatis* PTERUNKEVITCH

1950 which actually is a member of the family Phrurolithidae (see above). In Baltic amber I treat three specimens; they belong to the new genus *Balticodromus* (a female, in my opinion adult), to "*Zachria*" *restincta* PETRUNKEVITCH 1958 (juv.) and to the juv. indet. F1285/BB/CJW, see below.

PETRUNKEVITCH (1958: 275-279) treated three species under *Zachria* L. KOCH 1875 under the former family name Eusparassidae (now Sparassidae). In my opinion none of these species are members of the genus *Zachria*. Only *desiderabilis* is based on an adult male and has been shown to be a member of the Sparassidae:

- "*Zachria*" *peculiata* PETRUNKEVITCH 1946 is based on a juv. specimen in which – according to PETRUNKEVITCH - the tarsal claws bear only a single tooth. In my opinion its family relationships are quite unsure.
- "*Zachria*" *desiderabilis* PETRUNKEVITCH 1950 was based on an adult male and placed with hesitation in the genus *Zachria* of the family Sparassidae by PETRUNKEVITCH. A probably conspecific male was published later, see WUNDERLICH (2012: 130-131, 149: Figs. 82-84). Its subfamily relationships – a questionable Heteropodinae according to PETER JÄGER - are unsure. The genus *Zachria* is quite different: Its anterior margin of the fang furrow bears only two teeth and the position of the eyes is different. *Desiderabilis* may well be the member of an unnamed - extinct? - genus.
- "*Zachria" restincta* PETRUNKEVITCH 1958 was described as a member of the Sparassidae. The only known holotype of *restincta* is a juvenile female and has - according to PETRUNKEVITCH (1958: 277) - a body length of 2.31 mm; its prosoma is 1.18 times longer than wide, the chelicerae are not protruding, its legs are long, slender and laterigrade, the leg order is II/I/IV/III, the leg bristles are long and slender, scopulae exist on legs I-III, the two paired tarsal claws bear long teeth and are hidden on all tarsi bear "somewhat flattened" hairs of dense tufts, the tarsi bear two rows of trichobothria, a colulus is absent. In my opinion *restincta* is not a member of the sparassid genus *Zachria* C. L. KOCH 1875 in which the eyes are different but I do not exclude with certainty that *restincta* may be a member of the family Philodromidae, and probably of an unnamed genus. It is surely not congeneric with *Balticodromus porrectus* n. gen., see below.

Previously I did not exclude that the adult male, SMF Be 1937 (old number F1285/BB/CJW) which was described as a questionable philodromid spider in Baltic amber - see WUNDERLICH (2004: 1692) -, body length 4.3 mm, may be another – unnamed – member of the family Philodromidae. Leg II is longer than leg I, the anterior tibiae and metatarsi bear long ventral bristles like in *porrectus* (and *restincta*) and leg scopulae are absent, but claw tufts are absent in SMF Be 1937, the field of the median eyes is only slightly longer than wide, an indistinct thoracal fissure exists, the chelicerae are a bit less protruding, the leg position is apparently prograde, a dorsal opisthosomal sctutum MAY exist, and the bulbus is fairly protruding in contrast to *Balticodromus*. Surely the male SMF Be 1937 is not congeneric with *Balticodromus porrectus* and its family relationships are unsure; I will not exclude that this male may b a member of the Phrurolithidae, Corinnidae or Clubionidae.

In certain aspects <u>Philodromidae and Thomisidae are similar</u>: Both are sit-and-wait predators (Philodromidae are fast runners, too), in both families the leg position is laterigrade, more or less prominent rings exist on certain eye lenses and the tegulum is flat; but unfortunately certain very important family characters - like the teeth of the fang furrow - are not observable in the present fossil spider (and in most other fossil spiders as well). Other characters which may distinguish the families in question are intrafamiliar quite variable. Legs and leg I-II bristles are distinctly longer and more slender in the Philodromidae (photo, fig. 40) (thin leg bristles exists, e. g., in the genus *Heriaeus* SIMON 1875, too), legs III-IV are not or not much shorter than I-II (similar in the thomisid subfamily Bominae in which the legs are stout); rarely leg III is distinctly the shortest within the Philodromidae, e. g., in the genus *Tibellus* in which leg IV is long), leg II may be longer than leg I (in certain philodromid genera even distinctly longer; in certain Thomisidae leg I is distinctly the longest leg), the tarsi bear only a single row of trichobothria in most Philodromidae (as in certain thomisid genera like *Monaeses* and *Tmarus*, too), but in the extinct *Balticodromus* n. gen.

Ecology, phylogeny, frequency and origin of the family: Today members of the Philodromidae are either ground-living spiders or dwellers of higher strata of the, see WUNDERLICH (2008: 25-56). Their rarity in the Baltic amber may indicate that *Balticodromus porrectus* was a ground-living species, probably living in sunny places outside the Baltic amber forest or on clearings, and spiders arrived the forest as ballooner. Aeronautic behaviour in members of the family Thomisidae - its adult members are extremely rare in Baltic amber, too - was reported by WUNDERLICH (2004: 1752). Did these families evolve and even originate on the ground of sunny biotopes – grass lands? - outside of forests? Are the ground-dwelling taxa the most ancient taxa in contrast to the spiders of higher strata of the vegetation (a question of the ecophylogeny)? See also the absence of members of the families Lycosidae and Pisauridae in Baltic amber. The only slightly recurved position of the posterior eye row of *Balticodromus* (and "*Zachria*" *restincta* PETRUNKEVITCH 1958) may well be a plesiomorphic family condition compared with the distinctly recurved eye position of most extant philodromid spiders.

Balticodromus **n. gen.**

Etymology: The name refers partly (a) to the Baltic amber, the origin of the holotype, and (b) to the family Philodromidae.

Type species (by monotypy): *Balticodromus porrectus* n. sp.

Diagnostic characters (♀; ♂ unknown): Basal cheliceral articles distinctly protruding (photo, fig. 39), all eyes of about the same size, leg scopulae absent but dense claw tufts existing (fig. 41), tibia and metatarsus I bear two pairs of long ventral bristles (fig. 40), leg III distinctly the shortest, leg II distinctly the longest, tarsi with more than a single row of trichobothria.

Relationships: All taxa of the Thomisidae in Baltic amber which are known to me are clearly different from *Balticodromus*. According to its characters - mainly the long and slender legs (photo) - which indicate that the spider was a fast runner like extant philodromids -, the long and thin leg bristles (photo, fig. 40), leg IV being about as long as I and leg II being longer than leg I - I regard *Balticodromus* as a member of the Philodromidae, probably of the subfamily Philodrominae. Closer relationships are not sure. In the extant genus *Philodromus* WALCKENAER 1826 - which may be related - the chelicerae are not protruding, the eyes are different and the tarsi bear a single row of trichobothria. - The dubious *Zachria restincta* PETRUNKEVITCH 1958 (see above) may be confamiliar or not, but surely the member of a different genus: Its prosoma is longer than wide, the chelicerae are not protruding, the legs I-III bear scopulae and the lateral eyes are distinctly larger than the median eyes. The dubious male SMF BE 1937 in Baltic amber: See above.

Distribution: Eocene (Palaeogene) Baltic amber forest.

***Balticodromus porrectus* n. gen. n. sp.** (figs. 39-41), photo 9

Etymology: The species name refers to the protruding basal articles of the chelicerae, from porrectus (lat.) = protruding.

Material: Holotype ♀, based on the proportions of body and legs in my opinion most probably adult, and a separated piece of amber in Eocene (Palaeogene) Baltic amber, F3682/BB/CJW.

Preservation and syninclusions: The spider is partly well preserved in a clear yellowish piece of amber which apparently was slightly heated. The amber piece was burst off close to the ventral side of the spider; so two fairly flat amber pieces exist now. The right leg IV is lost beyond the coxa, both legs III are loose, separated by autotomy, and placed left of the spiders' body. The tips of the left tarsi I-II are cut off, parts of the mouth parts are hidden, a white bubble covers right ventral parts of the sternum, air bubbles cover ventral parts of the opisthosoma including the genital area. - Syninclusions are several bubbles and remains of stellate hairs.

Diagnostic charaters and relationships: See above.

Description (♀):
Measurements (in mm): Body length 2.8; prosoma: Length 1.15, width 1.3; opisthosoma: Length 1.8, width 1.15; legs: I: Femur 1.3, patella 0.5, tibia (right/left leg) ca. 1.2/1.5, metatarsus 1.0, tarsus ca. 0.5; II: Femur 1.65, patella 0.55, tibia 2.0, metatarsus 1.6, tarsus ca. 0.6; III: Femur 1.1, patella 0.35, tibia 0.95, metatarsus 1.0, tarsus 0.45; IV: Femur 1.1, pa-

tella ca. 0.5?, tibia ca. 1.25, metatarsus 1.0, tarsus 0.6; pedipalpal femur ca. 0.5.
Colour: Prosoma dark brown, legs medium to dark brown, not annulated, opisthosoma medium grey.
Prosoma (fig. 39, photo) 1.3 times longer than wide, fairly flat, hairs thin, fovea absent, basal cheliceral articles distinctly protruding, 8 small eyes, posterior lateral eyes placed on low humps, posterior row straight, anterior row in dorsal aspect slightly recurved, median eye field distinctly longer than wide, most mouth parts and sternum hidden, gnathocoxae apparently distinctly longer than wide, not inclined. - Pedipalpus (photo) rather short, not spiny, area of the tarsal claw hidden. - Legs (figs. 40-41, photo) rather long and slender, position laterigrade, order II/I/IV/III, II 1.36 times longer than I, IV not much shorter than I, III distinctly the shortest, hairs indistinct, bristles partly very long, thin (some are broken off), femora dorsally 1/1, patellae dorsally 1/1, tibiae dorsally 1/1, tibiae and metatarsi I-II ventrally with two pairs, scopulae absent, all tarsi with dense claw tufts of probably spatulate hairs, tarsi with more than a single row of trichobothria. - Opisthosoma (photo) oval, 1.5 times longer than wide, fairly flattened, hairs short, spinnerets short, anterior pair stout and close together, colulus absent, genital area hidden by bubbles.

Distribution: Eocene (Palaeogene) Baltic amber forest.

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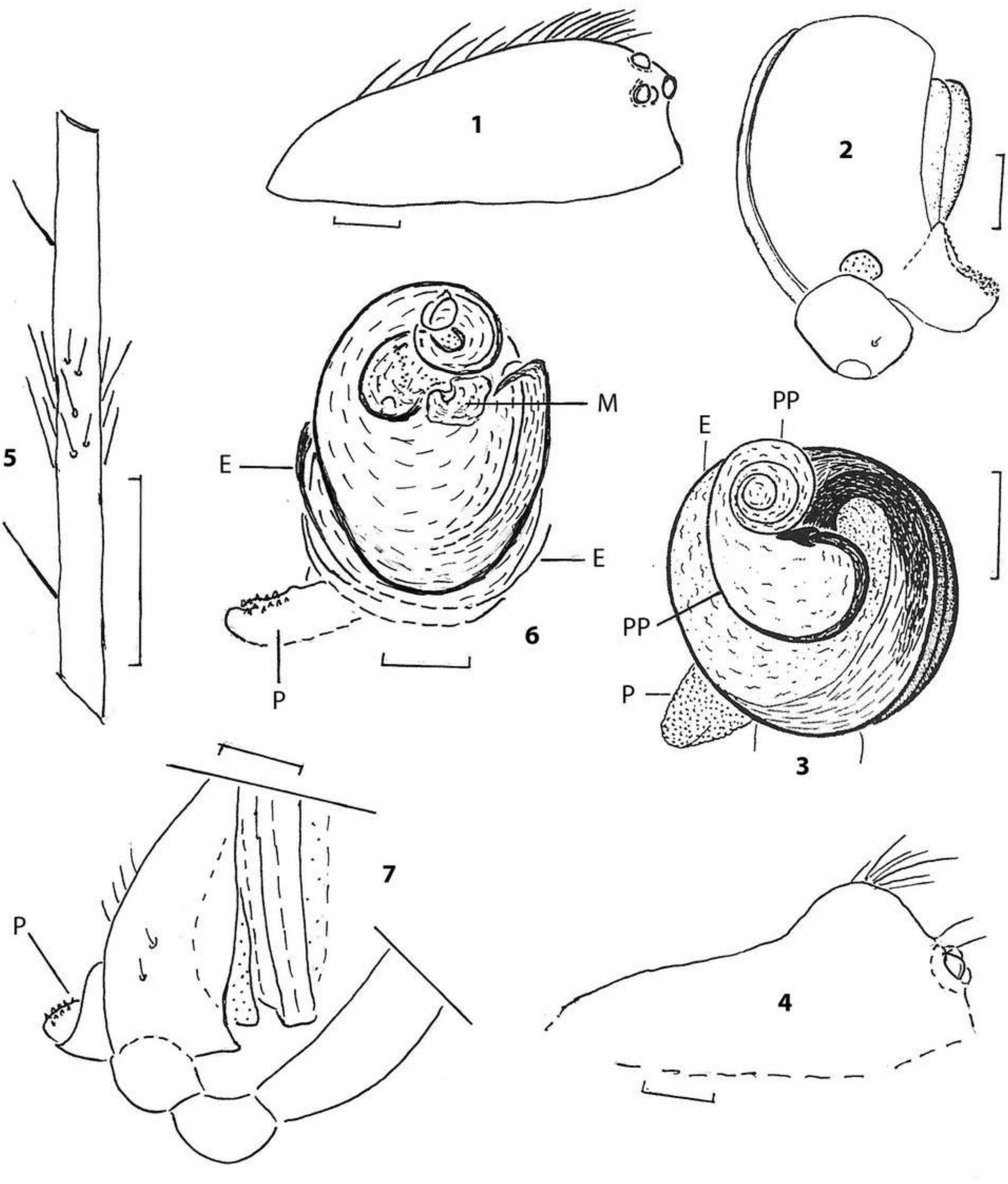
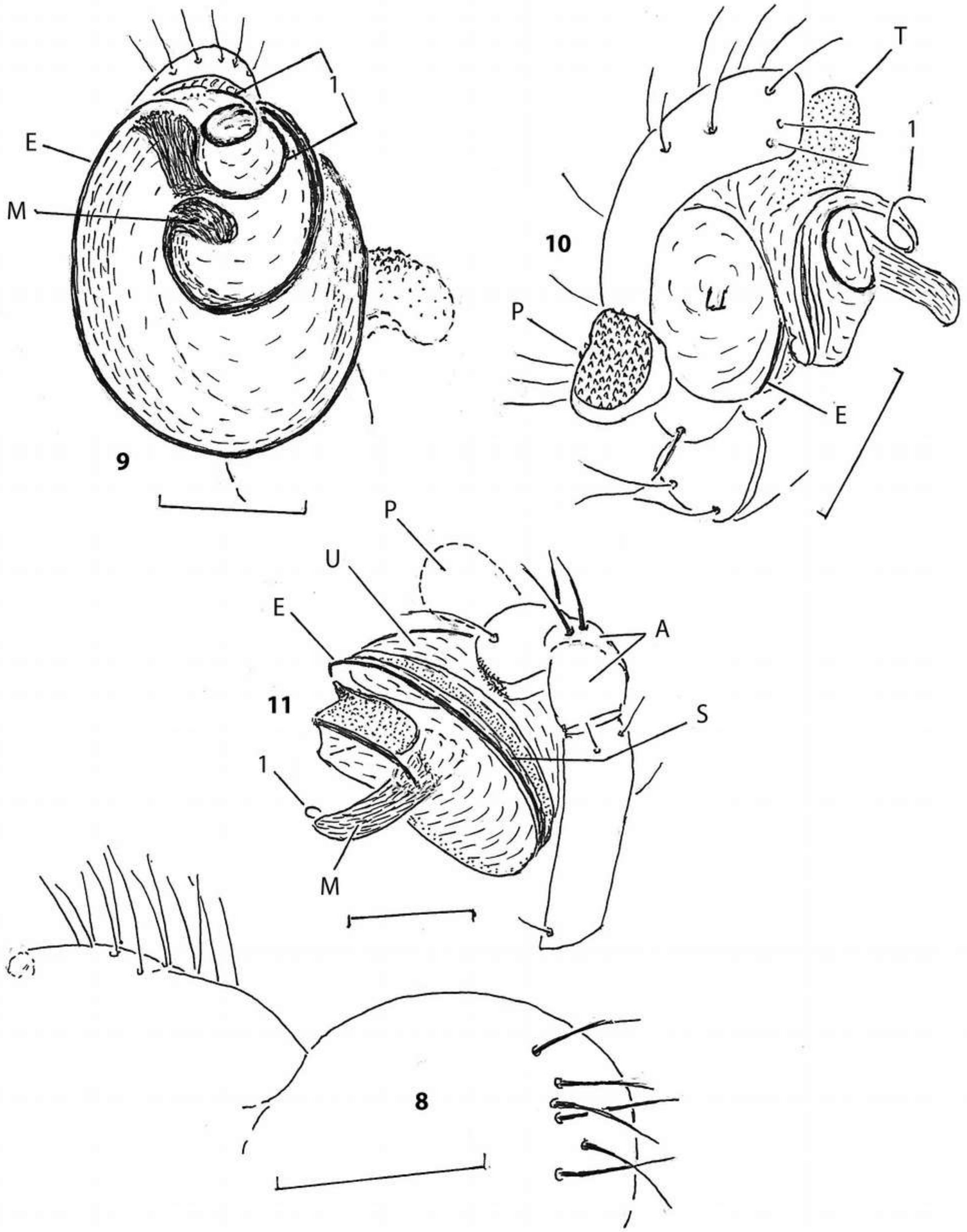
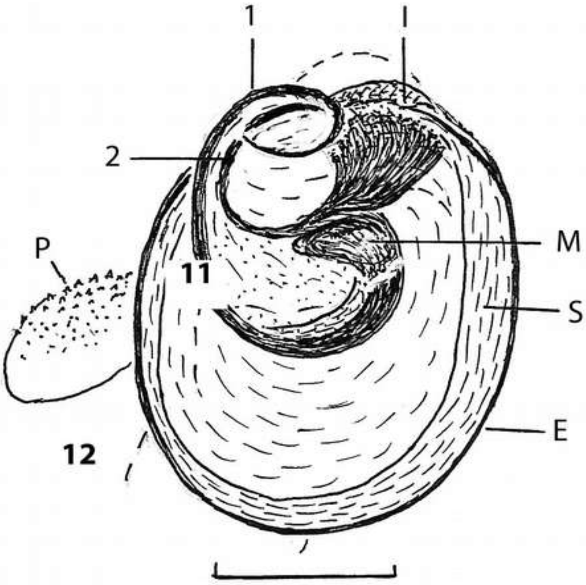


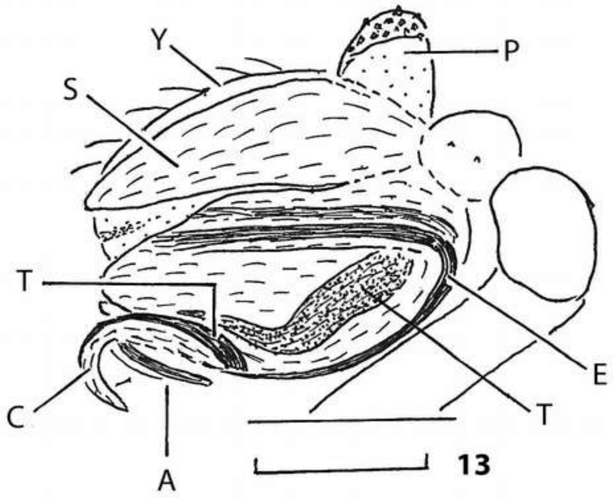
Figs. 1-3: ***Acrometa cristata*** PETRUNKEVITCH 1942, ♂; 1) lateral aspect of the prosoma; 2-3) dorsal and ventral aspect of the right pedipalpus. - Scale: 0.2 mm. E = embolus, P = paracymbium, PP = parembolic process (tegular apophysis);

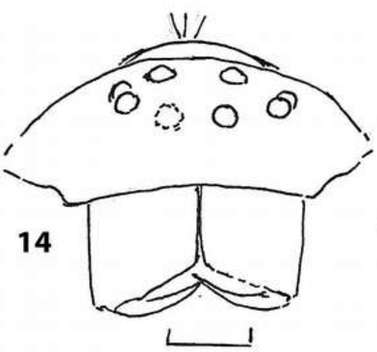
figs. 4-7: ***Acrometa gibbosa*** **n. sp.**, ♂; 4) lateral aspect of the prosoma. Only few hairs are drawn; 5) retrolateral aspect of the right tibia I. Only hairs of the tibial middle are drawn; 6-7) ventral and retrolateral aspect of the right pedipalpus, distally hidden in fig. 7). - Scales 0.5 in fig. 5), 0.2 in the remaining figs. E = embolus, M = median apophysis, P = paracymbium;

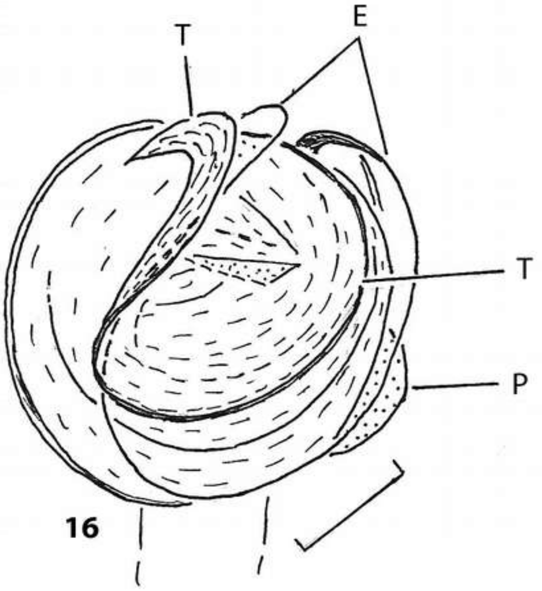


figs. 8-11: ***Acrometa longisetae* n. sp.**, ♂; 8) lateral aspect of the dorsal part of the body. Note the long prosomal hairs and the long bristles of the opisthosoma which is covered with a white emulsion; 9) ventral aspect of the right pedipalpus; 10) retrolateral and slightly apical aspect of the right pedipalpus; 11) retrobasal aspect of the left pedipalpus. - Scales 0.5 in fig. 8), 0.2 in the remaining figs. A = patella, E = embolus, M = median apophysis, P = paracymbium, S = subtegulum, T = tegulum, U = subtegulum, 1 = long tegular apophysis;









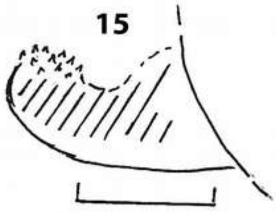
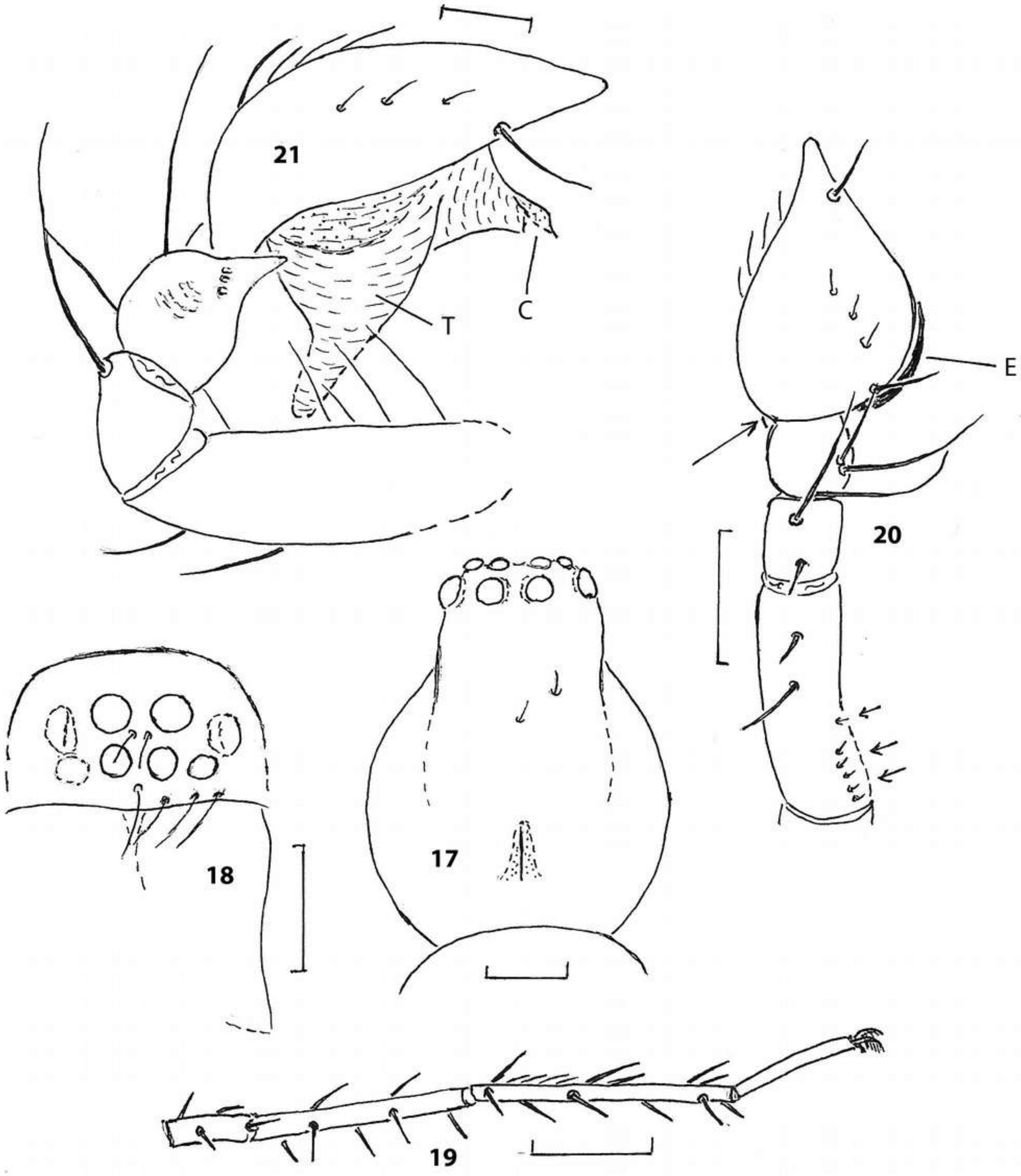


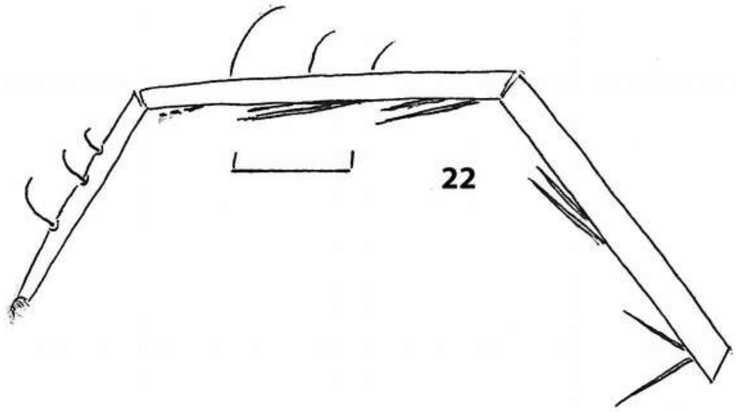
fig. 12) ***Acrometa glomus* n. sp.**, ♂, ventral aspect of the right pedipalpus. - Scale 0.2. E = embolus, I = tip of the embolus, M = median apophysis, P = paracymbium, S = subtegulum, 1, 2 = long and short tegular apophyses;

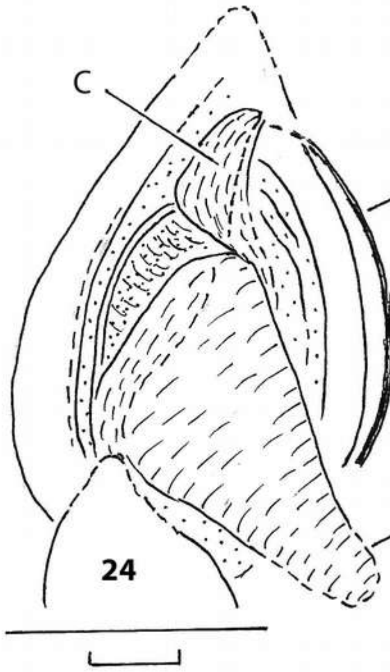
fig. 13) ***Balticosynotaxus angulatus* n. gen. n. sp.,** ♂, retrolateral aspect of the left pedipalpus. - Scale 0.2. A = apical tegular apophysis, C = questionable conductor, E = embolus, P = paracymbium, S = subtegulum, T = tegular apophyses, Y = cymbium;

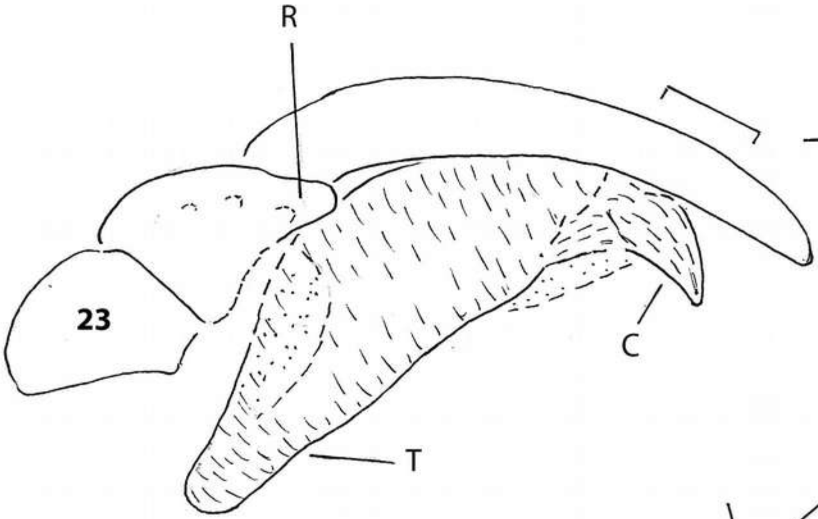
figs. 14-16: ? ***Sulcosynotaxus matrimonium* n. sp.**, ♂; 14) anterior aspect of the prosoma. Note the low cephalic hump which bears few hairs; 15) ventral aspect of the partly cut off paracymbium of the left pedipalpus; 16) ventral aspect of the left pedipalpus, – Scales 0.2. E = embolus, P = paracymbium, T = tegular apophyses;

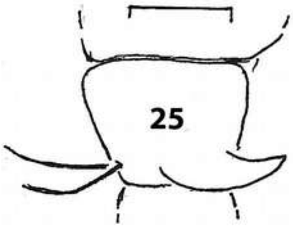


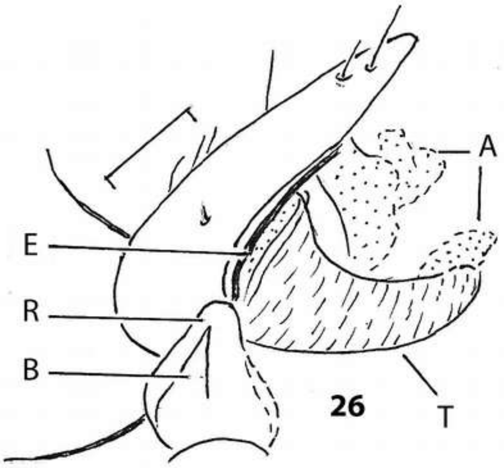
figs. 17-21: ***Eocryphoecara abicera*** WUNDERLICH 2004, ♂; 17-18) dorsal and anterior aspects of the prosoma (partly hidden in fig. 18), some eye lenses are deformed; 19) prodorsal aspect of the distal articles of the left leg IV. Only few hairs are drawn; fig. 20) dorsal aspect of the left pedipalpus. The short arrows point to the probasal femoral setae, the long arrow points to the widely hidden RTA; 21) retrolateral aspect of the right pedipalpus. Only few hairs are drawn. - Scales 1.0 in fig. 19), 0.5 in figs. 17-18), 0.2 in figs. 20-21). C = questionable conductor, E = embolus, T = tegular apophysis;











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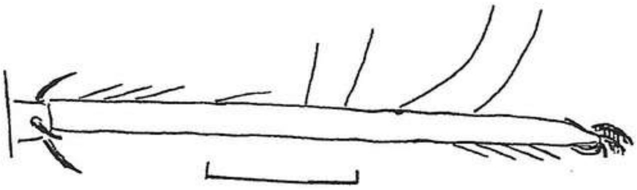
figs. 25-26: ***Eocryphoeca duplex* n. sp.**, ♂; 25) dorsal aspect of the tibia of the right pedipalpus; 26) retrolateral and slightly basal aspect of the right pedipalpus. - Scales 0.1. A = artefacts, B = retrobasal tibial apophysis, E = embolus, R = retrolateral tibial apophysis;



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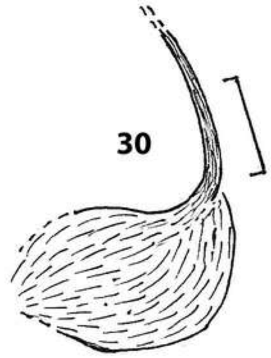

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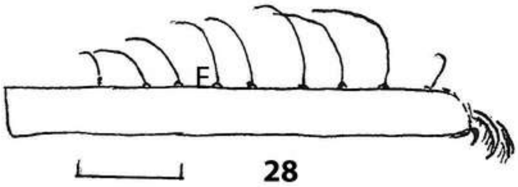

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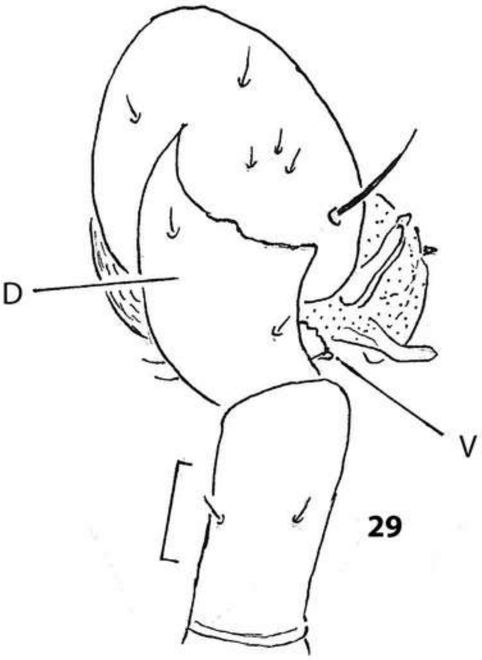

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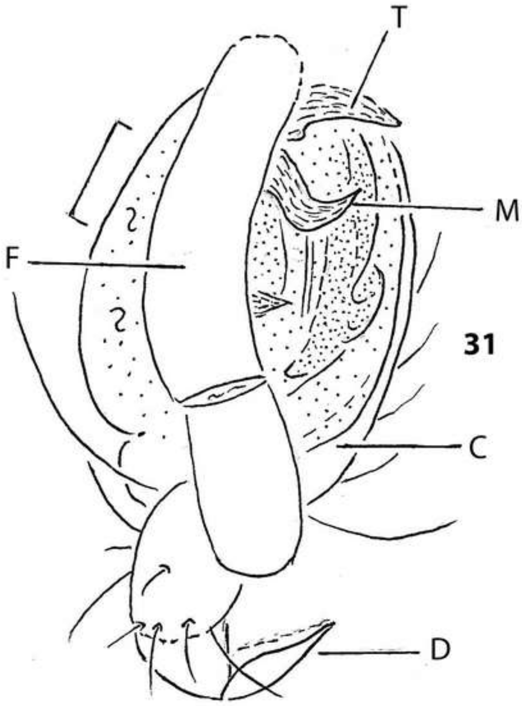

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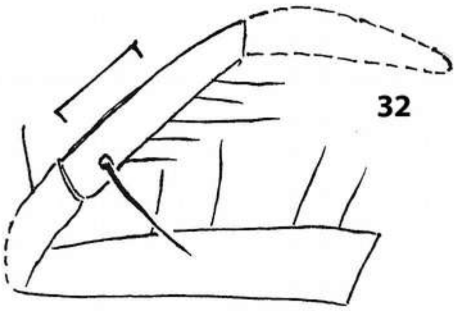
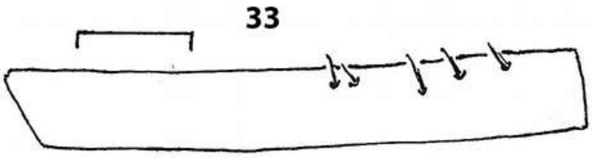
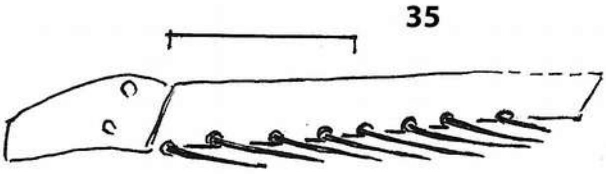
fig. 27) Agelenomorpha indet. of the RTA-clade, lateral aspect of a tarsus. Note the long dorsal trichobothria. - Scale 0.2;

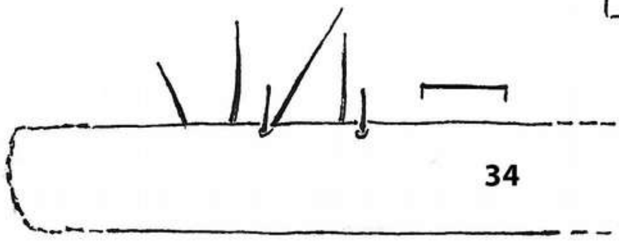
figs. 28-30: ***Eotrechalea darrellubick*** **n. sp**., ♂; 28) retrolateral aspect of the right tarsus IV. Not all trichobothria are drawn; 29) dorsal aspect of the right pedipalpus with expanded bulbus; 30) ventral aspect of the basal part of the embolus of the right pedipalpus. - Scales 0.2. D = dorsal tibial apophysis, V = ventral tibial apophysis;

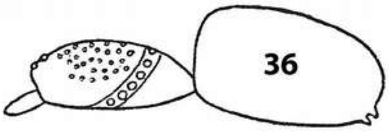
fig. 31) ***Eotrachela annulata*** WUNDERLICH 2004, ♂ (coll. F. EICHMANN), dorsal aspect of the left pedipalpal articles and ventral aspect of the bulbus which is partly hidden. - Scale 0.1. C = cymbium, D = dorsal tibial apophysis, F = femur, M = median apophysis, T = terminal tegular apophysis;

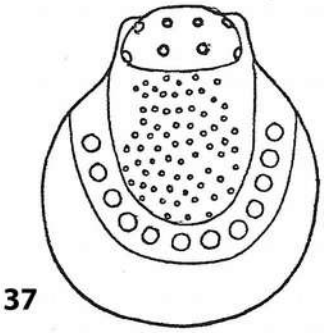


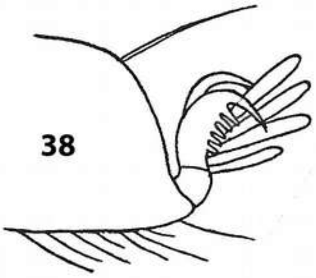






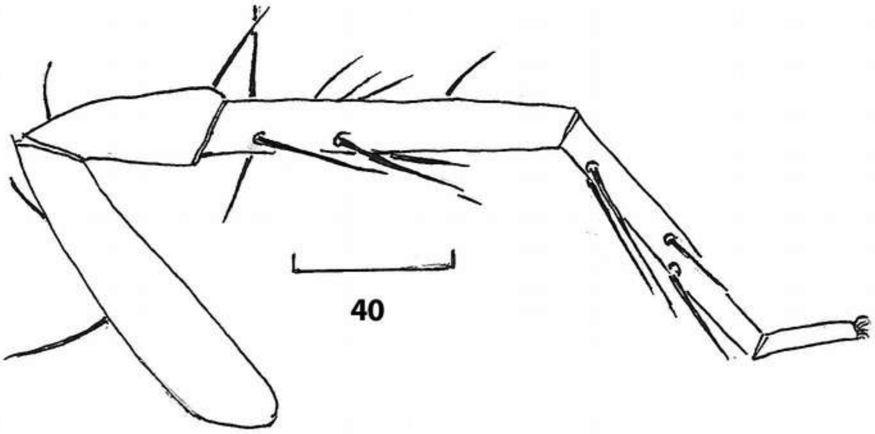


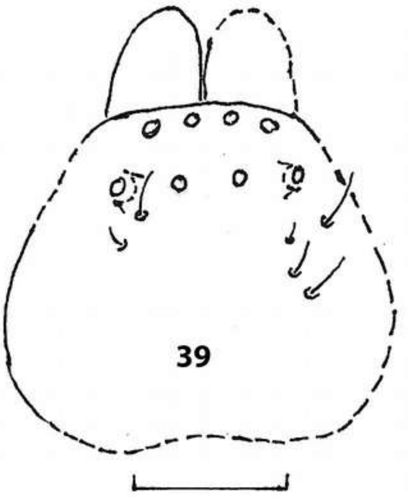


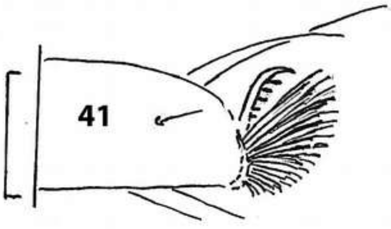


figs. 32-35: ***Laccolithus petrunkevitchi* n. sp.**, ♀; 32) prodorsal aspect of the left pedipalpus; 33) prodorsal aspect of the right femur IV which bears thin bristles; 34) prodorsal aspect of the left femur I which is basally partly hidden by a white emulsion. Hairs and basal bristles are not drawn; 35) prodorsal aspect of the left patella and tibia I. - Scales 0.5 in fig. 35), 0.2 in the remaining figs.;

figs. 36-38: ***Laccolithus extinctlus*** (PETRUNKEVITCH 1958), ♀; 36) lateral aspect of the body; 37) dorsal aspect of the prosoma; 38) retrolateral aspect of the distal parrt of tarsus IV. - Taken from PETRUNKEVITCH (1958). - No scale;







figs. 39-41: ***Balticodromus porrectus* n. gen. n. sp.**, ?ad. ♀; 39) dorsal aspect of the prosoma. Only few hairs are drawn; 40) mainly prolateral aspect of the left leg **I**. Only few hairs are drawn; 41) lateral aspect of the distal part of leg **III**. Only few hairs are drawn. - Scales 0.5, 0.5 and 0.1.

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SOME SPIDERS IN CRETACEOUS AMBER FROM MYANMAR (ARANEIDA: CHIMERARACHNIDA AND ARANEAE)

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&

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Abstract: The extinct suborder Chimerarachnida WUNDERLICH 2018 of the order Araneida (spiders in a wide sense) has turned out to be a mixture of (1) basic/plesiomorphic characters: existence of a flagellum and a pedipalpal metatarsus as well as basically a more anterior position of the spinnerets, and (2) of derived/apomorphic characters: Reduced median spinnerets, a bipartite cymbium and dwarfism. These unique spiders are only represented by the taxa *Chimerarachne* WANG et al. 2018 and *Parachimerarachne longiflagellum* **n. gen. n. sp**. of the family Chimerarachnidae WUNDERLICH 2018. - The following further new taxa in Mid Cretaceous Burmese (Kachin) amber are described: Leptonetidae: *Palaeoleptoneta acus* **n. sp.**, *P. baculum* **n. sp.** and *P. laticymbium* **n. sp.**; Protoaraneoididae: *Praeteraraneoides multidentatum* **n. sp.**; Telemidae: *Kachintelema calcarfemur* **n. gen. n.**

sp.; Tetrablemmidae: *Claspingblemma duospinae* **n. gen. n. sp**., *Electroblemma acuminataformis* **n. sp**., *Eogamasomorpha magnaseta* **n. sp**., *Procerclypeus corniculatus* **n. sp.**; Uloboridae: *Microuloborus ater* **n. sp**., *Propterkachin pygmaeus* **n**. **sp**., and *P. unispinatus* **n. sp**.; Vetiatoridae: *Praetervetiator parvicirculus* **n. sp**.; Zarqaraneidae: *Palptibiaap cochlear* **n. gen. n. sp**., *Spinicymbium curviparacymbium* **n. sp**. - The family Parvithelidae WUNDERLICH 2017 is resurrected and not regarded to be synonymous with the family Arthromygalidae PETRUNKEVITCH 1923 (**n. resurr.**). The name *Longissipalpus aliter* WUNDERLICH **nom. nov.** is introduced to replace the name *Longissipalpus cochlea* WUNDERLICH 2021 which is preoccupied. - "Regain" of leg bristles: See *Claspingblemma quadrispinae* **n. gen. n. sp.** (Tetrablemmidae). - First report of a Cretaceous member of the family Mysmenidae in Burmite: See the paragraph on orb webs.

Key words: Araneae, Araneoidea, Burmese amber, Burmorsolidae, Chimerarachnidae, Cretaceous, Deinopoidea, Kachin amber, Leptonetidae, Mesothelae, Mygalomorpha, Mysmenidae, orb web, Parvithelidae, Protoaraneoididae, spiders, Telemidae, Tetrablemmidae, RTA-clade, Uloboridae, Vetiatoridae, Zarqaraneidae, Zoropsidae.

Acknowledgements: For selecting fossil spiders of high scientific importance and taking excellent photos with stacking technique I thank very much my friend and co-author Patrick Müller. For a quite helpful discussion I thank very much my dear colleague Ivan Magalhaes.

Most **material** – Mid Cretaceous Burmese (Kachin) amber - is kept in the collection of Joerg Wunderlich (CJW) – most probably it will be given later to the Senckenberg Museum Frankfurt a. M. (SMF) –, few fossil spiders are stored in the collection of Patrick Müller (PM). Origin of the Mid Cretaceous material is the Kachin Province of N-Myanmar (Burma): See WUNDERLICH & MÜLLER (2020: 27).

Note on the authorship: The author of the new described taxa is Joerg Wunderlich.

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INTRODUCTORY REMARKS

See WUNDERLICH & MÜLLER (2021: 29).
The most spectacular spider fossils in Burmite are members of the extinct suborder Chimerarachnida of the order Araneida. Photos 10-11 show the member of a new genus. These fossils provide insight into the quite enigmatic evolution of spiders. It modifies distinctly the systematics/classification of spiders, see WUNDERLICH (2019: 9).

Note on the preservation: The excellent preservation of several male copulatory structures (pedipalpi) in Burmese (Kachin) amber - see e. g. the figs. 32, 34, 56 - allows frequently important conclusions on the phylogenetic relationships of these taxa although a three-dimensional reconstruction of the bulbus may be difficult.

A new name for the praeoccupied *Longissipalpus cochlea* WUNDERLICH 2021 and some corrections regarding vol. 14 (2021) of the Beitr. Araneol.

I thank Jason Dunlop and Andrew Ross for some corrections regarding vol. 14 (2021) of the Beitr. Araneol. (2021).

Recently I described *Longissipalpus cochlea* WUNDERLICH 2021: 75 of the family Pholcochyroceridae in Burmese (Kachin) amber which turned out to be a homonym of *Longissipalpus cochlea* WUNDERLICH 2017 (Jason Dunlop, person. commun.). I introduce here the name *aliter* WUNDERLICH **nom. nov**. to replace the name *cochlea*. The new name is based on aliter (lat.) = different.

P. 93: *Planarchaea kopp, longissipes* and *oblonga* are correctly listed under this genus name but they are also erroneously listed under *Filiauchenius* WUNDERLICH 2015. - The dubious *P. pilosa* WUNDERLICH 2015 has not been included in the list of *Planarchaea* species on the same page.

P. 98: the genus *Praetervetianus* WUNDERLICH 2021 was erected; the name *Praetervetiator* on the same page is a lapsus.

P. 141: *Palaeomiagrammopes* WUNDERLICH 2008 was synonymized with *Paramiagrammopes* WUNDERLICH 2008. The type species of *Paramiagrammopes* is *cretaceus* WUNDERLICH 2008, so for *vesica* the genus *Paramiagrammopes* is a nov. comb.

Notes on the origin of the orb web

Probably fossils in amber may help to solve an old question of spider evolution: Did the orb web evolve only once or did it evolve two times, separately in (the ancestor of) the ecribellate superfamily Araneoidea and in (the ancestor of) the basically cribellate superfamily Deinopoidea or did it originate only once, in the common ancestor of both? (*).
What do the CAPTURE WEBS preserved in Kachin amber tell? Recently the first orb web was reported by WUNDERLICH & MÜLLER (2018). It is a cribellate capture web. In my opinion this web may well have been used by a member of the Uloboridae, the most frequent deinopoid spider family in this kind of amber.
What do the TAXA in Kachin amber tell? Extant cribellate orb weavers are, e. g., members of the family Uloboridae. Species of this family are frequent in Kachin amber as well as taxa of other related deinopoid families, see WUNDERLICH & MÜLLER (2021). No reason exists that the fossil spiders did not construct wheele-shaped orb capture webs. - Contrarily not a single (!) sure report of a taxon of the ecribellate orb weaving Araneoidea - like Araneidae, Tetragnathidae or Theridiosomatidae – has been reported from Kachin amber except a single recently discovered undescribed male of the family Mysmenidae (F3730/BU/ CJW), body length 1.1 mm, which possesses quite large pedipalpi with complicated stuctures of the bulbi. Extant mysmenids construct modified orb webs as probably already did the fossil member. - Members of BOTH superfamilies of orb weavers were frequent in the Eocene

Baltic amber forest which is 60 million years younger than the Burmese amber forest. Probably the cribellate orb web is really distinctly older than the ecribellate orb web and the ecribellate orb web may well have evolved later than the cribellate type, but more fossil reports and probably fossils of other deposits – preserved in stone - are needed for a more certain conclusion in this respect.

(*) New considerations of several independent origins of the orb web appear quite dubious to me – indications from fossils are unknown to me -, and are not discussed here.

DESCRIPTIONS OF THE TAXA

CHIMERARACHNIDA WUNDERLICH 2018

Single known family: Chimerarachnidae WUNDERLICH 2018. Figs. A, 1-5, photos 10-11.

Only a single genus and species – *Chimerarachne yingi* WANG et al. – of the extinct, relic, extremely rare and quite remarkable group of spiders has been described. *Chimerarachne* is the member of a suborder of its own of the arachnid order Araneida (spiders in the wide sense), see WUNDERLICH (2019: 19) and (2020: 27): The Chimerarachnida (Tailed

Spiders), photos 10 - 11. These tiny spiders – body length 2-3 mm - were only found in the 100 million-year-old Upper (Mid) Cretaceous Burmese (Kachin) amber of Myanmar (Burma). They were rarely found but several species of at least two genera existed.

The unexpected existence of an opisthosomal tail of a spider - the ancient genus *Chimerarachne* WANG et al. (2018) - demonstrates that not only a modified male pedipalpus proper for sperm transfer (figs. 3-5) but also a long and segmented tail and the posterior position of the spinnerets at the end of the opisthosoma (not well preserved in the present male, photos 10-11) was a basic/ancient pattern of the order Araneida. In this paper I describe the second genus - *Parachimerarachne* - of this suborder, preserved in Upper (Mid) Cretaceous Burmese Kachin amber like the already known taxon, and also based on the male sex. When I studied the structures of the unique pedipalpus of the new taxon more closely I got a great surprise: A pedipalpal metatarsus exists in contrast to all other extinct and extant spiders besides *Chimerarachne.*

The members of the Chimerarachnida are easily recognizable and **diagnosed** by the combination of the following characters (see fig. A):

(1) The existence of a long, thin and multi-segmented flagellum at the end of the opisthosoma (photos 10-11) (as well as a shorter pygidium), a plesiomorphic character of the suborder Chimerarachnida and the order Araneida. I suppose that the flagellum was held straight backwards in the Chimerarachnida similar to the Palpigradi. (A posterior "tail" of the opisthosoma is an old – plesiomorphic - character of the class Arachnida);

(2) a male pedipalpus (figs. 3-5) which is modified in a unique way and proper for sperm transfer (see below). I regard this sexual dimorphism as an apomorphic character of the order Araneida and a plesiomorphy of the Chimerarachnida + Araneae (see fig. A), and the existence of a pedipalpal metatarsus as another plesiomorphy of the order Araneida and the suborder Chimerarachnida. The newly discovered existence of a pedipalpal metatarsus in the Chimerarachnida has to be added basally to the cladogram in the paper by WUNDERLICH (2019: 17, fig. B), see also fig. A below, and *Parachimerarachne* n. gen., the note. I regard the existence of a particular tarsus (= cymbium) - which bears a bulbus and an embolus - as an apomorphic character of the Araneida, and a particular divided (BIPARTITE) cymbium (figs. 4-5) may be an apomorphic character of the Chimerarachnida. - *Note*: I am not quite sure about the segmentation of the pedipalpus of the Chimerarachnidae as shown in fig. 3: I do not want to exclude with certainty that a metatarsus is absent and a basally elongated tarsus exists (see fig. 5), but such a basal elongation of the cymbium is quite different from the cymbium of all Araneae, and the existence of a separate metatarsus in the Chimerarachnidae – and in the suborder Chimerarachnida as well - appears very likely to me (fig. 3);

(3) strong reduction/loss of the median spinnerets (apomorphy);

(4) dwarfism, body length besides the tail 2 – ca. 3 mm; a further apomorphic character.

Further basic spider characters are plesiomorphies like the existence of 8 eyes partly placed on tubercles, of a distinctly segmented opisthosoma (photo), of two pairs of lungs, of a petiolus, of two well developed pairs of segmented lateral spinnerets in an anterior position of the opisthosoma similar to extant Mesothelae or in a posterior position (*), of an orthognath position of the fangs (not of the basal cheliceral articles) (**), of tarsal trichobothria, probably of a tarsal pulvillus, as well as the absence of a cribellum and of feathery hairs. A pedipalpal metatarsus of both sexes in higher spider taxa (Araneae) is absent, see fig. A.
Still unknown are: The female sex, the existence of prosomal venom glands, of a tarsal organ, of the kind or absence of leg autotomy (leg autotomy is completely absent in the 6 specimens of the Chimerarachnidae known to me), of perenniality (most primitive arachnids are long living species), moulting of adults as well as of a hiding tube, of a capture web, a sperm web, epiandrous glands/spigots and the existence of an aeronautic behaviour. The existence of distinctly pointed cheliceral fangs may point to the existence of prosomal venom glands. The existence of a long flagellum may contradict the existence of a capture web and probably of an aeronautic behaviour. Threads were probably used for covering egg sacs and/or covering the inside of hiding tubes; see below (*)!

Relationships and Phylogenetics (see also above and fig. A). Because of the existence of spinnerets at the end of the opisthosoma and a modified (sexual-dimorph) male pedipalpus I regarded the members of *Chimerarachne* as “true” spiders in 2019 - in accordance with WANG et al. (2018) but in contrast to HUANG et al. who included Chimerarachnidae in the order Uraraneida SELDEN et al. -, and the suborder Chimerarachnida as sister group of the suborder Araneae in the sense of these authors. - *Chimerarachne* and *Parachimerarachne* demonstrate clearly that the reduction of the pygidium to an anal tubercle and the loss of the flagellum were not the oldest spider apomorphies. Also the anterior position of the spinnerets (fig. 1, photos 10-11) (*) and the male pedipalpus proper for sperm transfer (figs. 3-5) are ancient characters of the Araneida which includes Chimerarachnida as well as Araneae (Mesothelae and Opisthothelae). The uniquely modified and specialized male pedipalpus may indicate that Chimerarachnida was apparently not very near to the ancestor of the remaining extinct and extant spiders (Araneae). - Although Chimerarachnida is surely a very old - far more than 300 or even more than 360 million years old, Carboniferous or even Devonian? - branch of spiders (Araneida) (***), the members of the family Chimerarachnidae cannot answer the following questions which have been discussed for a long time - see, e. g., WUNDERLICH (2019: 17) -: Which was the sequence of the origin of characters during the evolution and what was the first apomorphic character of spiders (Araneida): The existence of opisthosomal spinnerets, or the existence of prosomal/cheliceral venom glands or the existence of a modified male pedipalpus proper for sperm transfer? We have to search for further special well preserved and surely very rare fossil taxa which may be preserved in old stone but most probably not in younger kinds of amber which may be too young - but see the surprising discoveryof the Chimerarachnida and its characters! Will we ever find the nearest (extinct) member of the Chimerarachnida whose male pedipalpal tarsus was modified in a different way like in *Chimerarachne* and *Parachimerarachne*?

REMARK: The hypothetical extinct and most primitive suborder Praechimerarachnida (nom. nudum) of the order Araneida could have possessed a flagellum (plesiomorphy), a male pedipalpus possessing a metatarsus and NOT proper for sperm transfer (plesiomorphies) as well as (four?) pairs of ventral opisthosomal spinnerets (apomorphy).

(*) The position of the spinnerets of the two genera of the Chimerarachnidae is quite variable: It is near the end of the opisthosoma in *Chimerarachne* in contrast to *Parachimerarachne* in which the anterior lateral spinnerets originate in the middle of the opisthosoma (fig. 1). - Within the Mesothelae a similar situation exists, see WUNDERLICH (2019): In the extant taxa as well as in the Cretaceous species *Burmathele biseriata* WUNDERLICH 2017 – see WUNDERLICH (2019: 28, fig. 1) - the spinnerets are placed near the middle of the opisthosoma but, e. g., in the Createaceous species *Intermesothele pulcher* WUNDERLICH 2019 (p. 31, photo 3) the position of the spinnerets is quite near the opisthosomal end (an intermediate position exists in certain other Cretaceous taxa). As apparently demonstrated by the old - Upper (Mid) Cretaceous - family Eomesothelidae WUNDERLICH (2019: 31, figs.1-4) the ancient position of the spinnerets of the infraorder Mesothelae was in my former opinion basically not near the middle of the opisthosoma but at its end. After knowing the circumstances of the variable spinneret position in the Chimerarachnidae – which are comparable in the Mesothelae and the Chimerarachnidae as well – I now question my previous conclusion regarding the Eomesothelidae, asking: Which may have been the ancient/plesiomorphic position of the spinnerets? What was the reason for their shifting within the Chimerarachnidae and Mesothelae? A different function of the spinnerets may be the key to the answer. In the Mesothelae - the most ancient/”primitive” living spiders – the position of the spinnerets is in or near the middle of the opisthosoma. Mesothelae use no capture web in contrast to numerous capture web dwellers of the Opisthothelae in which the spinnerets are placed at the end of the opisthosoma (with very few exceptions). Undoubtedly the posterior position of the spinnerets is best - more effective - for building capture webs in contrast to their ventral opisthosomal position. Contrarily the ventral position of the spinnerets is well suitable for covering (subterranean) hiding tubes of the Mesothelae – and of the Chimerarachnidae, too? Therefore I regard the ventral (more anterior) position of the spinnerets to be the plesiomorphic position but not their posterior position, and the reverse direction of the evolution appears unlikely to me. If so: The original function of spider threads is not building capture webs but covering hiding tubes and/or covering/hiding eggs, and the shifting of the spinnerets position happened within the Chimerarachnidae, within the Mesothelae, and at the origin of the Opisthothelae.
Note: The ventral opisthosomal sclerites 4 and 5 are associated with the spinnerets in the Araneida: Araneae and apparently in the Chimerarachnida, too. According the erroneous opinion of WANG et al. (2018) the “Loss of the ventral sclerites associated with spinnerets on opisthosomal sclerites 3 and 4 clearly differenciates all modern spiders from the new fossils, and the retention of these sclerites in *Chimerarachne* may support the hypothesis that it reflects a plesiomorphic ventral anatomy.”

(**) Size and position of the cheliceral articles of the Chimerarachnidae are of special interest, see WANG et al. (2018, figs. 1b, d): The vertical position of the basal articles (not protruding and not enlarged) is not orthognath but labidognath in contrast to the position of the almost parallelly orientated fangs with their tips pointing posteriorly, which is an orthognath character. This mixture of characters of the Chimerarachnidae points to the fact that the position of the basal cheliceral articles and the position of the fangs changed in two different evolutionary steps; see, e. g., WANG et al. (2018), WUNDERLICH (2015) and (2019: 17).

(***) Between the only known spiders of the Chimerarachnida in the 100 million-years-old Burmese (Kachin) amber and the supposed origin of this suborder - of far more than 300 million years - exists a gap of far more then 200 million years without any known fossils (!).

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

CHIMERARACHNIDAE WUNDERLICH 2018

Type genus (by monotypy): *Chimerarachne* WANG et al.: 2018. Further genus: *Parachimerarachne* n. gen.

Diagnosis, **relationships** and **distribution** are almost identical with the order Chimerarachnida, see above. The pedipalpus: See above and below: *Parachimerarachne* (notes).

Chimerarachne WANG et al. 2018 (fig. 5)

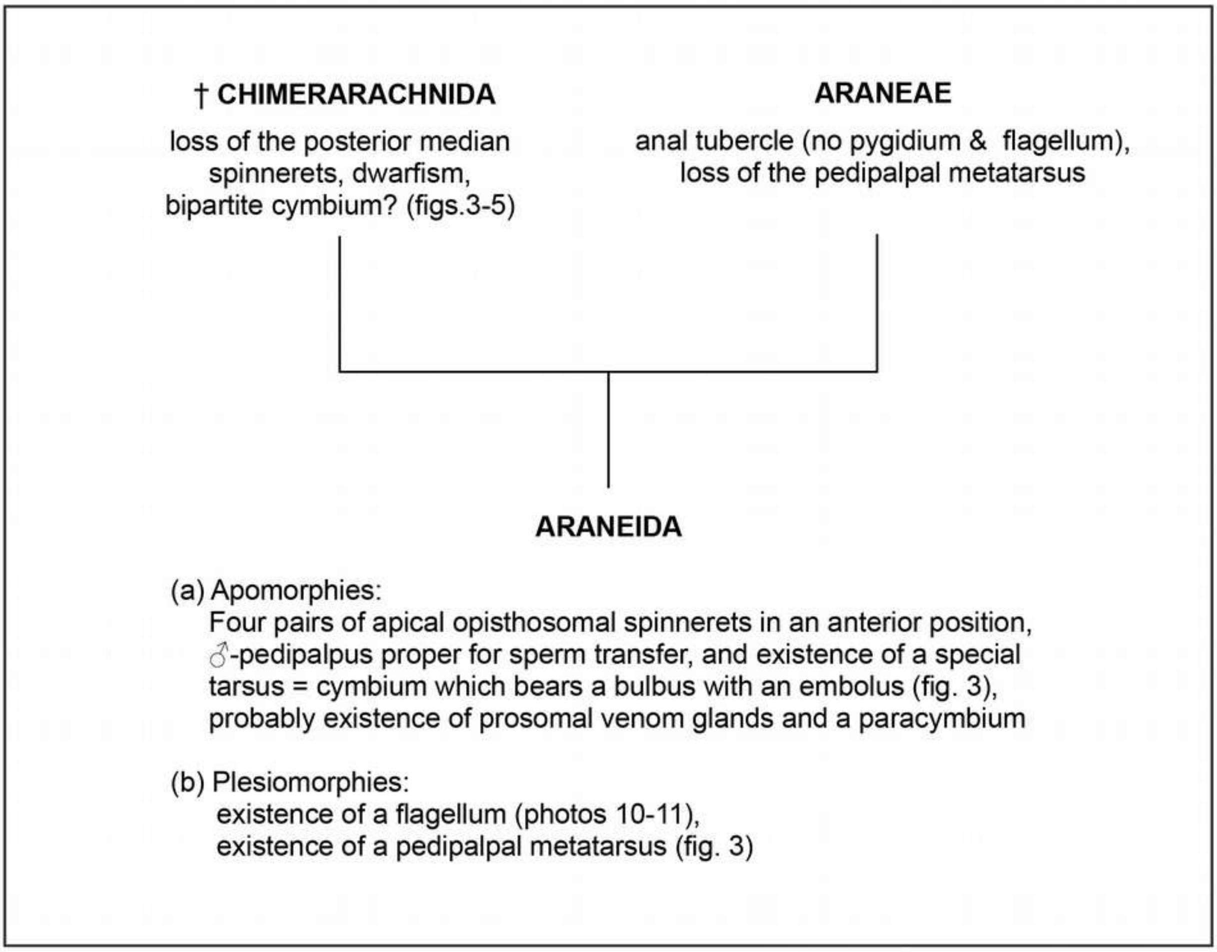
A gender of the name was not published by WANG et al.; here I propose the female gender.

Type specis (by monotypy): *Chimerarachne yingi* WANG et al. 2018 in Upper (Mid) Cretaceous Kachin amber of Myanmar.

Diagnostic characters (♂; ♀ unknown): Flagellum about as long as the body and consisting of ca. 30 segments which are – except near the base and distally – alternating long and short, position of the spinnerets near the end of the opisthosoma; pedipalpus (fig. 5): See below and above: The diagnosis of the Chimerarachnida and notes.

Relationships: See *Parachimerarachne* n. gen.

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



loss of the posterior median spinnerets, dwarfism, bipartite cymbium? (figs.3-5)

anal tubercle (no pygidium & flagellum), loss of the pedipalpal metatarsus

(a) Apomorphies:
Four pairs of apical opisthosomal spinnerets in an anterior position, ♂-pedipalpus proper for sperm transfer, and existence of a special tarsus = cymbium which bears a bulbus with an embolus (fig. 3), probably existence of prosomal venom glands and a paracymbium

(b) Plesiomorphies:
existence of a flagellum (photos 10-11),
existence of a pedipalpal metatarsus (fig. 3)

Fig. A. Possible relationships of the suborders Araneae and Chimerarachnida of the order Araneida

Parachimerarachne **n. gen.** (figs. 1-4), photos 10-11

Etymology: The name refers to the relationships to the genus *Chimerarachne* WANG et al. 2018, from para- (gr.) = similar, related.

The gender of the name is feminine.

Type species (by monotypy): *Parachimerarachne longiflagellum* n. sp.

Diagnostic characters (♂; ♀ unknown): Flagellum almost three times the length of the prosoma, consisting of ca. 70 segments which are almost equal in length (figs. 2a-b, photos 10-11); origin of the anterior lateral spinnerets in a quite anterior position (fig. 1); pedipalpus (figs. 3-4): Metatarsus (!) and tarsus (cymbium) well developed, cymbium covering the bulbus (which is only fairly protruding), divided longitudinally in two branches, I think that the prolateral branch is not an artefact, the retrolateral branch bears a questionable retrobasal paracymbium, the questionable long and thin embolus originates retrobasally on the bulbus which possesses no sclerotized apophyses but a ventral-distal outgrowth.

Notes on the pedipalpal articles: Fig. 1d of the paper by WANG et al. (2018) of *Chimerarachne yingi* - see fig. 5 - shows a long tibia, no metatarsus, a long basal part of the tarsus and a long bipartite distal part; one of the distal parts was supposed to be the cymbium, the second to be the bulbus in the holotype and even the existence an embolus in the paratype; but these designations appear unsure to me. The basal – quite long (!) - part of the "cymbium" in *Chimerarachne* is very different from the basally short (not elongated) cymbium of all known spiders. Basal and distal parts of the "cymbium" (x in fig. 5) are not shown (sub)segmented but their separation may well have been overlooked due to the position and insufficient preservation of these pedipalpal articles. Furthermore the bulbus in its ventral position was probably hidden in *yingi* due to the more dorsal position of the tarsus. Therefore I think that the pattern of the tarsus is basically identical in both genera, and a metatarsus exists. - Note: A divided pedipalpal tarsus is rare in the Arachnida; it exists in the Palpigradi and possesses 5 (!) subsegments in this order.

Relationships: In *Chimerarachne* WANG et al. 2018 - preserved in Kachin amber, too -, the flagellum is only about as long as the body and consists of only ca. 30 segments which are – except near the base and distally – alternating long and short; the position of the spinnerets is near the end of the opisthosoma. The distal articles of the pedipalpus are different (fig. 5): According to WANG et al. (2018: Fig. 1d) a metatarsus is absent, the tarsus consists of a long basal part and ends in two long and blunt branches in a parallel position, the cymbium and the bulbus, but see the notes above!

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

***Parachimerarachne longiflagellum* n. sp.** (figs. 1-4), photos 10-11

Etymology: The name of the species refers to its long flagellum, from longus (lat.) = long.

Material: Holotypus ♂ in Mid Cretaceous Burmite (Kachin amber), F3726/BU/CJW. This quite expensive specimen will probably later deposited in the SMF.

Preservation and syninclusions: The spider is completely preserved and partly decomposed, body and legs are partly shrunk and deformed, some distal leg articles (most often tips of the tarsi) are lost, the distal part of the flagellum and the right pedipalpus are well preserved. - Syninclusions are a questionable spider thread lacking sticky droplets, ca. 5 mm right of the spider, 1 Diptera: Nematocera, decomposed parts of a Blattaria, small plant hairs, hyphae, detritus and a deep boring of a shell.

Diagnostic characters: See the new genus.

Description (♂):
Measurements (in mm): Body length without pygidium 2.0; prosoma: Length 1.0, width ca. 0.7; opisthosoma: Length without pygidium 1.0, width 0.55; leg I: Femur 0.8, patella ca. 0.3, tibia 0.55, metatarsus 0.4, tarsus 0.35; femur II-IV 0.7/ca. 0.6/ca. 0.8; pygidium ca. 0.8, flagellum ca. 6.0; pedipalpal femur 0.45.
Colour light to medium brown, with dark touches.
Body and legs (photos 10-11) deformed and partly hidden, as much as is recognizable quite similar to *Chimerarachne yingi*, see WANG et al. (2018), prosoma ca. 1.4 times longer than wide, eyes and mouth parts badly preserved, basal cheliceral articles not protruding. - Legs fairly long and slender, hairs not distinct, bristles few (some may be rubbed off), long and thin, partly hair-shaped, existing from femora to metatarsi, on femora dorsally 2-3, patellae dorsally 2, tibiae I-II dorsally none, ventrally few, tibia IV dorsally and ventrally 1 near the base, 4 near the middle and 4 near the end, on the left tibia I a row of 4 long and thin ventral hairs (or bristles?) is preserved. Tarsi and metatarsi bear few trichobothria. - Opisthosoma 1.82 times longer than wide, strongly deformed, spinnerets (fig. 1) in an anterior position, the anterior laterals originating in the middle of the opisthosoma, flagellum very long, ca. three times longer than the body, consisting of ca. 70 segments not alternating long and short (figs. 2a-b), bearing longer hairs. - Right pedipalpus (figs. 3-4) (the left pedipalpus is badly preserved and recognizable) of medium size (some articles of one of the pedipalpi are deformed by the preservation, a spoon-shaped structure on the right tibia is most probably an artefact), articles not thickened, patella short, tibia long, metatarsus fairly long, tarsus (cymbium) relatively small, longitudinally divided, see above: The diagnostic characters of the genus. Sclerotized apophyses of the bulbus are absent or not recognizable due to the position of the pedipalpus.

Relationships: See the new genus.

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

ARANEAE: MESOTHELAE

Family PARVITHELIDAE

SELDEN (2021) synonymized the family Parvithelidae WUNDERLICH 2017 with the Arthromygalidae PETRUNKEVITCH 1923 based, e. g., on their similar apical tarsal lobe which was called "pseudopulvillus" by WUNDERLICH in the Parvithelidae. This term has - following SELDEN (2021: 336) – better to be replaced by the German term "Mittellappen".

Such a lobe exists in several extinct spider taxa like the Chimerarachnida (called "pulvillus"), see SELDEN (2021: 336). How to interprete/regard the existence of this lobe in the different taxa? I will in short discuss three possibilities:

(a) The lobe is an ancient (plesiomorphic) structure, existing already in the Chimerarachnida which remains, e. g., in the Arthromygalidae (Carboniferous) as well as in the Mid Cretaceous Parvithelidae.

(b) The lobe evolved separately as a synapomorphy of Arthromygalidae + Parvithelidae rsp. of the Arthromygalidae including Parvithelidae.

(c) The lobe evolved separately in the Arthromygalidae and another time in the Parvithelidae.

Such tarsal structures - like numerous other plesiomorphic structures - may outlast long periods. This is not an unusual fact but I will not decide the correctness of one of the three possibilities in question. (Similar structures - like spatulate apical tarsal hairs - evolved numerous times in spiders, e. g. in the genus *Apostenus* WESTRING 1851, in which the hairs are reduced to a single pair). - Besides the huge time space of 200 million years between the known existence of the two families in question the existence of apically notched paracymbial spines is a diagnostic character of the family Parvithelidae; such spines are unknown in the Arthromygalidae. I (JW) regard the synonymy of the two families as not well founded and not justified; therefore I “revive” (resurrect) the mesothelid family Parvithelidae WUNDERLICH 2017 as a family of its own (**n. resurr.**).

MYGALOMORPHA

The remarkable number of high mygalomorph taxa preserved in Burmese (Kachin) amber – see WUNDERLICH & MÜLLER (2020, 2021) – indicates their high diversity in the tropical Cretaceous forest of Myanmar although most members of these infraorder are ground-living animals and therefore relatively rarely captured by the fossil resin. The number of extant and fossil spider families may be a dozen or even more. In this paper I describe a remarkable exuvia which family relationships are unsure.

Mygalomorpha indet. (figs. 6-10), photos 12-13

Material: Exuvia in Mid Cretaceous Burmite (Kachin amber), F3710/BU/CJW.

Preservation ans syninclusions (see the photos): The exuvia is incompletely and partly well preserved in an orange piece of amber, some leg articles are deformed (mainly strongly thinned), both pedipalpi and the left legs I-II are completely preserved, the chelicerae are well preserved, the slightly deformed peltidium is placed above the right femur II, the remains of the opisthosoma are placed above the posterior part of the sternum.

Diagnostic characters (exuvia): Most probably 8 yes (fig. 6), unpaired tarsal claw existing (fig. 8), paired claws I-II with a single row of 4-5 teeth, metatarsi and tarsi I-II bear dense scopulae (fig. 8, photo), claw tufts and thickened trichobothia absent, chelicerae (fig. 7, photo) large, rastellum absent, anterior margin of the fang furrow with 5 large and 2 small teeth, furrow with about 8 small teeth, posterior margin with a long row of hairs, gnathocoxae with ca. 10 cusps, labium wide, fused to the sternum, bearing 4 cusps, sternal sigillae, fovea and spinnerets unknown, opisthosomal hairs (fig. 10) quite long, urticate hairs absent.

Description (exuvia):
Measurements (in mm): Body length probably more than 10 mm; prosoma: Length 4.6, width ca. 4.8; length of a fang 1.8, pedipalpus ca. 10.0; right leg II: Tibia 3.0, metatarsus II 2.4, tarsus 1.5, femora III and IV ca. 4.5, remains of the opisthosoma ca. 4.5.
Colour of prosoma and legs light brown, legs not annulated.
Prosoma (figs. 6-7 photo): Eye region not raised, peltidium about as wide as long, not hairy, fovea not well recognizable, petiolus well preserved, sternum ca. as wide as long, pedipalpus long, tibia spiny, tarsus strongly scopulate, claw long and slender, bearing teeth, mouth parts see above. - Legs (figs. 8-9, photo, see also above) only fairly long, bearing not many thin bristles on patellae, tibiae and metatarsi, tarsi not pseudoscopulated. - Remains of the opisthosoma (fig. 10, see also above), remains of the spinnerets may exist.

The **relationships** are unsure. Certain characters - like of the legs - are similar to the extinct family Fossilcalcaridae WUNDERLICH 2020 in Kachin amber but ventral tarsal bristles exist in the type species of the Fossilcalcaridae, *Fossilcalcarus praeteritus,* and the opisthosomal hairs are indistinct (the eyes are unknown). Long opisthosomal hairs like in F3710 exist in the family Theraphosidae, too.

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

ARANEOMORPHA

Family BURMORSOLIDAE WUNDERLICH 2015

See WUNDERLICH (2021:45-48).

Relationships - see, e. g., Orsolobidae, Ochyroceratidae and Psilodercidae -, limits and diagnosis of the dubious ecribellate and six-eyed Burmorsolidae are still unsure. In this family the cymbium is long and the embolus - in its natural position - is directed backwards to the pedipalpal femur, the bulbus is simple, see the figs., the leg bristles are numerous, long and slender. In the genus *Burmorsolus* WUNDERLICH 2015 exists dense claw tufts in contrast to *Loxoderces* WUNDERLICH 2017.

Here males in Burmese (Kachin) amber of two taxa are described in short in which the habitus, the eye position, the long and slender legs and leg bristles and the simple bulbus (figs.) are similar to the Burmorsolidae, the tarsal claws are similar to *Loxosceles*; their clypeus is quite short. In contrast to the Burmorsolidae their cymbium is short, the bulbus is not basally attached to the cymbium and the position of the embolus is different: It stands out from the cymbium in a right angle. I regard the two males in question as quite unsure members of the family Burmorsolidae which may be well related; they will be objects for more closer studies in the future.

In the dubious monotypic genus *Aculeatosoma* WUNDERLICH 2017: 148 in Burmese (Kachin) amber - regarded by me as a member of the family Psilodercidae - the cymbium is short like in the two males described below and different from the taxa of the Burmesorsolidae, the legs are very long, and the opisthosoma bears bristles; on the other hand its embolus is directed in a special way, backwards to the pedipalpal femur like in the Burmorsolidae.

In contrast to the Psilodercidae the clypeus of the two males in question is quite short and not protruding, in contrast to the Eopsiloderidae their basal cheliceral articles are not fused basally and a medial lamella is absent.

Male F3717/BU/CJW:

The spider is completely and deformed preserved.

Measurements (in mm): Body length 2.5; prosomal length 1.1; opisthosoma: Length 1.4, height 0.7; leg I: Femur 1.15, patella 0.5, tibia 1.2, metatarsus 1.0, tarsus 0.5, tibia II 1.15, tibia III 0.8, tibia IV 1.0. Colour light brown, legs not annulated. Six eyes in a segestriid position, clypeus quite short, chelicerae long, slender and distinctly DIVERGING in the distal half, legs rather long and slender, bristles numerous, long and slender, existing from femora to metatarsi, femora dorsally 1/1, patellae none, tibiae and metatarsi several ventrally and laterally, unpaired tarsal claws rather small, paired claws rather long, bearing long teeth, opisthosoma twice as long as wide, densely covered with hairs of medium length. Pedipalpus (fig. 11) with a thickened tibia and a short cymbium which bears the large bulbus apparently ca. in the middle; embolus apically strongly bent.

Relationships: Pedipalpus and bristle-less leg patellae are similar in F3718/BU/CJW but the basal cheliceral articles are not diverging in F3718 and the paired tarsal claws are a bit shorter.

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

Male F3718/BU/CJW:

The spider is only fairly well preserved, partly deformed, only four legs are complete. - Measurements (in mm): Body length 2.3, prosomal length 1.0; opisthosoma: Length 1.3, width 0.65, height 0.6; leg I: Femur 1.15, tibia 1.1. Colour light brown, legs not annulated. Six eyes in a segestriid position, clypeus quite short, basal cheliceral articles long, slender and not diverging. Legs rather long and slender, bristles numerous, long and slender, existing from femora to metatarsi, femora dorsally 1-2, at least 1 with a prolateral one in the distal half, patellae none, tibiae and metatarsi several ventrally and laterally, tibia I with two ventral pairs, unpaired tarsal claws rather small, paired claws rather long, bearing ca. 10 long teeth, opisthosoma twice as long as wide, bearing hairs of medium length. Pedipalpus (fig. 12) quite similar to F3717 (see above); the right bulbus is strongly deformed. A droplet of secretion (sperm?) is preserved at the tip of the left embolus.

Relationships: See F3717 above.

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

Family **VETIATORIDAE** WUNDERLICH 2015

The extinct family is only known from Cretaceous Burmese (Kachin) amber and is related to the extant family Huttoniidae, see WUNDERLICH (2017: 203-209), WUNDERLICH & MÜLLER (2021: 82, 97-101). Four genera have been described, each based on a single species, see the key below. In this paper we describe the second species of the genus *Praetervetiator* WUNDERLICH 2021 (= *Praetervetianus*, see WUNDERLICH (2021: 98), lapsus).

Key to the genera and species of the family Vetiatoridae:

1 Prosoma and labium unusually long. - *P. fruticosus* WUNDERLICH 2021 (♂ unknown) …... Procervetiator

- Prosoma and labium not unusually long ….. 2

2(1) Prosoma anteriorly and posteriorly strongly narrowed. - *V. gracilipes* WUNDERLICH 2015 (♀ unknown) …... Vetiator

- Prosoma anteriorly and posteriorly not strongly narrowed. Anterior eyes large (fig. 13) to very large ….. 3

3(2) Embolus in a circular position (fig. 14). - *P. circulus* WUNDERLICH 2021 and *P. parvicirculus* n. sp. (♀ unknown) ….. Praetervetiator

- Embolus not in a circular position. - *P. vesica* WUNDERLICH 2017 (♀ unknown) …............... …... Pekkachilus

Praetervetiator parvicirculus WUNDERLICH **n. sp**. (figs. 13-14), photo 14

Etymology: The name of the new species refers to the smaller circle of its embolus compared with *P. circulus* WUNDERLICH 2021, from parvus (lat.) = small.

Material: Holotype ♂ in Upper (Mid) Cretaceous Burmese (Kachin) amber, F3689/BU/CJW.

Preservation and syninclusions: During polishing the piece of amber split off near its surface longitudinally through the body of the spider. Patrick Müller glued together the amber pieces and enclosed it in artificial resin in VII 2021. The spider is fairly well preserved in a larger clear yellow-orange piece of amber, some leg articles and most parts of the right pedipalpus are lost (cut off). - Syninclusions are few tiny plant hairs, few particles of detritus and two larger darkenings in the piece of amber.

Diagnostic characters (♂; ♀ unknown): Prosoma egg-shaped; pedipalpus (fig. 14): Embolus in a circular and distal position, its diameter 0.07 mm.

Description (♂):
Measurements (in mm): Body length 1.7; prosomal length 0.9; opisthosoma: Length 1.15, width 0.9, height 0.9; leg I: patella 0.4, tibia 1.4, metatarsus ca. 0.9, tarsus 0.5.
Colour medium brown, legs not annulated.
Prosoma (fig. 13, photo) high and convex, finely rugose, bearing few thin hairs, 8 eyes in a wide field, anterior median eyes distinctly the largest, lateral eyes close together, basal cheliceral articles large and only slightly diverging, inclined basally, lateral files unknown, peg teeth absent, mouth parts hidden. - Legs (photo) long and slender, bristle-less, hairs short, position of the metatarsal trichobothrium unknown. - Opisthosoma (photo) egg-shaped, not much longer than wide or high (see above), order IV/I/II/III, hairs short, probably leathery or hardened but scuta absent, anterior and posterior spinnerets large, median spinnerets tiny. - Pedipalpus (fig. 14; see above) with fairly slender articles, tibia retrolaterally with an apical bristle, bulbus long, deformed, probably less long in the living specimen.

Relationships: In the closely related *P. circulus* WUNDERLICH 2021 the opisthosoma is more slender, the bulbus is shorter and the diameter of the circle of the embolus is distinctly larger.

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

Family **TETRABLEMMIDAE**

See, e. g., WUNDERLICH & MÜLLER (2021: 50-62)

Up to now 14 tetrablemmid genera in Burmese (Kachin) amber have been described, see WUNDERLICH & MÜLLER (2021: 51). Here we describe a further genus and new species as well.

Claspingblemma WUNDERLICH **n. gen.**

Etymology: The name of the genus refers (a) to the existence of questionable clasping (mating) bristle-shaped hairs on femur I and (b) to the name of the con-familiar genus Tetrablemma.

The gender of the name is feminine.

Type species (by monotypy): *Claspingblemma quadrispina* n. sp.

Diagnostic characters (♂; ♀ unknown): Femur I anteriorly with a pair of bristle-shaped hairs (or hair-shaped bristles?) (fig. 15), clypeal and cheliceral “horns” absent; pedipalpus (fig. 16): Cymbium long, bulbus/embolus long, embolus apically complicated.

Relationships: Mainly according to the small size and the basal position of the metatarsal trichobothrium a member of the Tetrablemminae. According to characters like the position of the eyes, the long cymbium, the long bulbus/embolus and the absence of clypeal and cheliceral “horns” *Palpalpaculla* WUNDERLICH 2017 is most related; in *Palpalpaculla* questionable clasping bristles are absent, and the embolus is tube-shaped. - Notes: (1) See the indet. tetrablemmid male F3720/BU/CJW below. (2) Clasping SPURS on the male tibia I exist in the fossil *Electroblemma* SELDEN et al. 2016. - (3) The new genus can be added in the key no. 7 to the fossil tetrablemmid genera given by WUNDERLICH (2021: 52) after *Palpalpaculla*. - (4) The present male may well demonstrate the origin and development of leg bristles in a spider family, here the family Tetrablemmidae – and even within the whole superfamily Palpimanoidea – in which the complete loss of leg bristles is an apomorphic character. It furthermore apparently is an example of the “REGAIN” - a secondary development - of leg bristles whithin a higher spider taxon. See also *Eogamasomorpha magnaspina* below, *Spiniarchaea* WUNDERLICH 2021 (Archaeidae) and the fmily Micropalpimanidae.

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

Claspingblemma duospinae WUNDERLICH **n. gen. n. sp**. (figs. 15-16), photo 15

Etymology: The name of the species refers to the existence of two (a pair) of bristle-shaped hairs on femur I, from duo (lat.) = two and spina (lat.) = hair.

Material: Holotype ♂ in Mid Cretaceous Burmese (Kachin) amber, F3719/BU/CJW.

<u>Preservation and syninclusions</u>: The spider is completely and rather well preserved in a clear yellow-orange piece of amber; body legs and pedipalpi are deformed, the prosoma is laterally strongly compressed, a bubble is preserved under the spinnerets. - <u>Syninclusions</u> are an apparently conspecific juvenile spider, body length 0.7 mm, several Collembola, several Acari of different families, including the larva of an Erythraeidae, the clump of a questionable egg sac, diameter 0.13 mm, plant hairs and particles of detritus.

Diagnostic characters, relationships and distribution: See above.

Description (♂; ♀ unknown):
Measurements (in mm): Body length 1.5; prosoma: Length 0.7, width 0.52; opisthosoma: Length 0.8, width 0.55; leg I: Femur 0.7, metatarsus 0.34, tarsus 0.35, femur III ca. 0.45.
Colour light brown, legs not annulated.
Prosoma (photo) 1.35 times longer than wide, deformed, distinctly wrinkled, cephalic part distinctly narrowed, 6 eyes in a wide “segestriid” position, clypeus long, basal cheliceral articles large, distinctly diverging, fangs and most mouth parts hidden, clypeal and cheliceral “horns” absent, sternum spacing coxae IV by about their diameter. - Legs (fig. 15, photo) only fairly long, order I/II/IV/III, tarsus I about as long metatarsus I, bristles absent, hairs long, femur I prolaterally in the distal half with a pair of bristle-shaped hairs (or hair-shaped bristles?) which may be clasping (mating) hairs (absent in the juvenile spider in the same piece of amber). These hairs or bristles may be too weak to be used as mating structures. Position of the metatarsal I-III trichobothrium in ca. 0.22. - Opisthosoma (photo) 1.45 times longer than wide, dorsally completely covered with a distinctly wrinkled scutum, ventrally hidden, laterally with rows of numerous scuta, spinnerets hidden. - Pedipalpus (fig. 16) distinctly deformed, tibia thickened, cymbium long, bulbus long, ventrally bearing a sclerotized spine-shaped structure, “embolus” apically complicated, probably deformed.

<u>Electroblemma</u> SELDEN et al. 2016

The males of this genus possess a huge erect dorsal stalk of the prosoma (figs. 17-16, photo 16) which bears six eyes and small outgrowths on its top. The eyes are difficult to recognize. Dorsal prosomal outgrowths exist in small members of several spider families, mainly of the superfamily Araneoidea, most frequent in the subfamily Erigoninae of the Linyphiidae, and in some taxa of the Theridiidae convergently evolved, see, e. g., WUNDERLICH (2008). Frequently such outgrowths bear a pair of lateral groves and glands inside which produce secretions and pheromons to attract conspecific females which may bite in such groves and fix themselves during copulation.

A huge dorsal prosomal stalk, a bit similar to *Electroblemma*, exists in the erigonine species *Walckenaeria acuminata* (WALCKENAER 1833). Groves and glands of the prosomal outgrowths are absent in these two taxa. To my knowledge the function of these stalks and the mating position of these spiders are still unknown. In *Eriauchenius* O. PICKARD-CAMBRIDGE 1881 exists also a dorsal prosomal stalk.

Electroblemma acuminataformis WUNDERLICH **n. sp**. (figs. 17-23), photo 16

Etymology: The name refers to its long dorsal prosomal stalk (fig. 17) which is a bit similar to the stalk of the erigonine species *Walckenaria acuminata*, see above.

Material: Holotype ♂ in Mid Cretaceous Burmite (Kachin amber) and and a small separated piece of amber, F3721/BU/CJW.

Preservation and syninclusions: The spider is well but incompletely preserved in a small clear yellow-orange piece of amber; five legs or leg articles are are loose and preserved near the body of the spider. - Syninclusions are some particles of detritus.

Diagnostic characters (♂; ♀ unknown): Prosomal stalk (figs. 17-19, photo) large and directed fairly posteriorly, apical “horns” small, tibia I distally with a proventral mating (clasping) spur (fig. 20), clypeal “horns” (fig. 19) large, bent and not divided; pedipalpus (fig. 23) with a large and slender embolus whose thin distal part is relatively short.

Description (♂):
Measurements (in mm): Body length) 1.25; prosoma: Length ca. 0.6, width ca. 0.33, height ca. 0.45; opisthosoma: Length 0.9, width 0.55, height 0.3; tibia I ca. 0.45, femur II ca. 0.5, metatarsus IV 0.26, tarsus IV 0.28.
Colour: Prosoma and legs dark brown, legs not annulated, opisthosoma medium brown.
Prosoma (figs. 17-19, photo) (see also above) distinctly wrinkled, the long stalk bears dorsally 6 eyes (they are difficult to recognize) as well as a pair of apical short “horns”, chelicerae only fairly long, bearing anteriorly a pair of long, bent and converging “horns”, mouth parts deformed, sternum tuberculate, 1.3 times longer than wide, spacing the coxae IV by about their diameter. - Legs (fig. 20, photo) incomplete, bristles absent, hairs indistinct, tarsi longer than metatarsi, tibia I distally with a single proventral mating spur, position of the metatarsal trichobothria unknown. - Opisthosoma (figs. 21-22, photo) dorsally completely covered with a scutum which is strongly wrinkled, ventrally bearing three scuta in front of a larger sclerotized ring around the spinnerets. - Pedipalpus (fig. 23) (see also above) partly deformed, apparently a deformed cymbial outgrowth exists.

Relationships: In *E. caula* WUNDERLICH 2020 the ♂-tibia I bears a pair of mating spurs and the thin distal part of the embolus is longer, in *E. pinnae* WUNDERLICH 2020 the "horns" of the prosomal stark are larger, in *E. spinaferens* WUNDERLICH 2021 the cymbium possesses a distinct dorsal outgrowth and the embolus is thicker in the basal half.

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

Eogamasomopha magnaseta WUNDERLICH **n. sp**. (figs. 24-25)

Etymology: The species name refers to its large hair on femur I, from magnum (lat) = large and seta (lat.) = hair.

Material: Holotype ♂ in Mid Cretaceous Burmese (Kachin) amber of Myanmar (Burma), F3720/BU/CJW.

Preservation and syninclusions: The spider is completely and well preserved in a clear yellow-orange piece of amber, the prosoma is fairly deformed, bubbles are preserved on the left femur I and below the right femur IV. - Further syninclusions are a member of the Polxenida, of a tiny Thysanoptera, insects excrement, plant hairs and particles of detritus.

Diagnostic characters (♂; ♀ unknown): Femur I bears a larger prodistal bristle-shaped hair (or hair-shaped bristle?) (fig. 24); pedipalpus (fig. 25) with a long, protruding, pointed, partly thickened and almost u-shaped embolus.

Description (♂):
Measurements (in mm): Body length 1.0; prosoma: Length 0.5, width 0.35; opisthosoma: Length 0.55, width 0.4; leg I: Femur ca. 0.45, metatarsus 0.21, tarsus 0.25.
Colour medium to dark (opisthosoma) brown, legs not annulated.
Prosoma deformed, ca. 1.4 times longer than wide, fairly pitted, 6 eyes in a "segestriid" position, "horns" apparently absent, basal cheliceral articles fairly large, most mouth parts deformed or hidden. - Legs (fig. 24) only fairly long, order I/II/IV/III, tarsi longer than metatarsi, hairs short and not distinct, bristles absent, but femur I prodistal with a long and strong bristle-shaped hair (or hairs-shaped bristle?) (it is absent - broken off? - on the left femur I), position of the metatarsal trichobotria in ca. 0.35. - Opisthosoma almost 1.4 times longer than wide, bearing short hairs on the pits of its large scutum, laterally with numerous scuta in rows, ventrally with a large scutum in the anterior two thirds, a wide scutum behind this and a large ring around the retracted spinnerets like in ?*Eogamasomorpha clara* WUNDERLICH 2015, see WUNDERLICH (2021: 201, fig. 37). - Pedipalpus (fig. 25) see the diagnosis, tibia thickened, bulbus globular.

Relationships: The u-shaped and partly thickened embolus separates *magnaseta* from all other congeneric species.

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

Procerclypeus WUNDERLICH 2021

The tetrablemmine genus was based on a single badly preserved male of its type species *P. deformans* WUNDERLICH 2021. Recently I got two further congeneric males which I here describe, an excellently preserved specimen of *P. corniculatus* n. sp. and a rather badly preserved specimen of *P.* indet.
The males of this genus are easily to **recognize** by their anterior-lateral “horns” of the male prosoma (fig. 26-27) (sexual dimorphism) and their large embolus (fig. 29). The well preserved eyes of *P. corniculatus* (figs.) show (a) that the median eyes of *Procerclypeus* are more close together than supposed to be by me in *P. deformans* – see WUNDERLICH (2021: 205, fig. 62) – and (b) that the position of the anterior lateral eyes is actually different of fig. 62: They are situated ANTERIORLY at the base of the horns; thus the horns are situated BETWEEN the lateral eyes. Therefore only four of the six eyes are observable from above, and the position of the horns is anteriorly on the prosoma, just ABOVE the clypeus.
The function of these prosomal outgrowth is unknown; most probably they are used during mating like in numerous members of the Erigoninae.

Relationships and similarities: In *Tenuicephalus penicillus* WUNDERLICH 2021: fig. 66 – also a member of the Tetrablemminae – exists a pair of anterior prosomal horns, too, but their position is really ON the clypeus. - Similar clypeal horns evolved convergently in males of the extant European species *Saloca diceros* (O. PICKARD-CAMBRIDGE 1871) (Linyphiidae: Erigoninae) in which the horns are placed in front of all eyes.

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

Procerclypeus corniculatus WUNDERLICH **n. sp.** (figs. 26-30), photos 17-18

Etymology: The name of the species refers to its anterior prosomal horns, from corniculatus (lat.) = bearing horns.

Material: Holotype ♂ in Mid Cretaceous Burmite (Kachin amber), F3722/BU/CJW.

Preservation and syninclusions: The spider is completely and excellently preserved in a clear yellow-orange piece of amber, only the pedipalpi are fairly deformed. - Syninclusions are a small Acari, tiny plant hairs and particles of detritus.

Diagnostic characters (♂; ♀ unknown): Prosoma anteriorly with a pair of widely spaced horns which are fairly stout (figs. 26-27), pedipalpus as in figs. 29-30, see below.

Description (♂):
Measurements (in mm): Body length) 2.0; prosoma: Length 0.8, width 0.68, length of the clypeus 0.13, length of the basal cheliceral articles 0.3; opisthosoma: Length 1.2, width 0.8; leg I: Femur ca. 0.75, patella 0.22, tibia 0.62, metatarsus 0.38, tarsus 0.33; metatarsus IV 0.42, tarsus IV 0.34.
Colour mainly medium to dark brown, legs not annulated, opisthosoma grey brown.
Prosoma (figs. 26-27, photo), 2.5 times longer than wide, distinctly wrinkled, anteriorly bearing a pair of widely spaced horns, each horn bears the lateral eyes – anteriorly and posteriorly – at their base, clypeus long, chelicerae fairly long and slightly diverging, fangs of medium length, teeth of the fang furrow hidden, gnathocoxae strongly converging and medially almost touching, labium distinctly wider than long, sternum distinctly wrinkled, 1.1 times longer than wide, spacing the coxae IV by less than their diameter. - Legs (photo) of medium length, tarsi shorter than metatarsi, bristles absent, hairs of medium length, position of the metatarsal trichobothrium I in 0.34. - Opisthosoma (fig. 28, photo) 1.5 times longer than wide, flat, distinctly wrinkled, bearing not many longer hairs on a dorsal scutum which covers the whole opisthosoma, ventral aspect as in fig. 28, the anterior scutum covers more than half of the opisthosomal length, lung covers well preserved. - Pedipalpus (figs. 29-30) (note the quite different deformation of the bulbi) with slender articles, a long cymbium which is narrowed distally and a large deformed embolus.

Relationships: In P. *deformans* WUNDERLICH 2021 the – deformed - prosomal horns are apparently more slender in their basal half and the shape of the – deformed - embolus is different; the position of the eyes may be not different.

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

Procerclypeus sp. indet.

Material: 1♂ in Mid Cretaceous Burmite (Kachin amber), F3723/BU/CJW.

The spider is completely and only fairly well preserved in a clear yellow-orange piece of amber full of insects excrement. It is darkened by heating and pressure of the fossil resin and partly hidden by fissures; the prosoma and the pedipalpi are deformed. Measurements (in mm): Body length 1.8, prosomal length 0.9, femur I ca. 0.65. The prosomal horns and eyes are apparently as in *P. corniculatus* n. sp.

Family LEPTONETIDAE

Specimens of the family Leptonetidae are rare in Burmese (Kachin) amber but regarding the species it is diverse: In this paper I add 3 new species to the 5 already described species.

The genus *Palaeoleptoneta* WUNDERLICH 2012 is the only genus of the extinct tribe Palaeoleptonetini WUNDERLICH 2012 (under Leptonetinae), and is the sister tribe of the Leptonetini which is known in Eocene Baltic and Bitterfeld ambers as well as extant but not in Cretaceous amber, see WUNDERLICH & MÜLLER (2018: 45-47, 59-62) and (2021: 65-66).

Members of the genus *Palaeoleptoneta* possesses long and slender legs and leg bristles as well as a voluminous bulbus (fig. 33); some species possess strong cymbial bristles (figs. 34-35). The shape of the cymbium and - in certain species - its bristles/spurs are important characters to recognize the species.

I distinguish two <u>species-groups</u> of *Palaeoleptoneta* in Burmese amber:

(1) The *calcar* species-group in which the cymbium bears spurs (fig. 31):
Calcar WUNDERLICH 2012, probably *crus* WUNDERLICH 2017, *laticymbium* n. sp., *nils* WUNDERLICH 2018 and *thilo* WUNDERLICH 2018;

(2) the *fissura* species-group in which spurs of the cymbium are absent:
Baculum n. sp., *fissura* WUNDERLICH 2021 and *trochanter* n. sp.

Palaeoleptoneta laticymbium WUNDERLICH **n. sp.** (fig. 31)

Etymology: The species name refers to its wide cymbium, from latus (lat.) = wide, broad.

Material: Holotype ♂ in Mid Cretaceous Burmese (Kachin) amber, F3684/BU/CJW.

Preservation and syninclusions: The spider is incompletely preserved in a clear small/flat piece of amber, which is split off, and has lost mainly with the posterior part of the opisthosoma, a fissure runs almost longitudinally through the dorsal part of the spider's body. - Syninclusions are a plant hair, a bubble in the anterior part of the prosoma and numerous tiny particles of questionable silicious pebbles.

Diagnostic characters (♂; ♀ unknown): Leg IV distinctly shorter than leg I (see the length of the femora below), pedipalpus (fig. 31) with a wide cymbium which bears a strong retrodistal bristle (spur).

Description (♂):
Measurements (in mm): Body length 1.3; prosomal length 0.5, opisthosoma: Length 0.8, width 0.5; leg I: Femur 0.95, patella 0.2, tibia 1.1, metatarsus 0.78, tarsus 0.5; femur III 0.63, femur IV 0.7.
Colour medium brown, legs not annulated.
Prosoma: Most parts including most eyes are hidden. - Legs: Order I/II/IV/III, I and II distinctly longer than III and IV, hairs short and indistinct, bristles long and thin (some bristles are probably rubbed off): All femora dorsally 1/1 and 1 prolaterally in the distal half (additional bristles exist mainly subapically), patellae dorsally 1/1 (the basal one quite small), tibiae dorsally 1/1, additionally at least I prolaterally 1/1, metatarsi I-II ventrally with 1/1 bristles, III-IV bear few more and longer bristles. Position of the metatarsal trichobothrium in ca. 0.95. - Opisthosoma 1.6 times longer than wide. - Pedipalpus badly preserved, see above, embolus hidden.

Relationships: According to the cymbial spur *laticymbium* is a member of the *Palaeoleptoneta calca*r species-group. In the related species the proportions of the legs are different and the cymbium is more slender; in *P. nils* WUNDERLICH 2018 and *P. thilo* WUNDERLICH 2018 two cymbial bristles/spurs exist.

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

Palaeoleptoneta baculum WUNDERLICH **n. sp**. (figs. 32-33)

Etymology: The species name refers to the long and staff-shaped tegular apophysis, from baculum (lat.) = staff.

Material: Holotype ♂ in Mid Cretaceous Burmese (Kachin) amber, F3685/BU/CJW.

Preservation and syninclusions: The spider (photo) is complete and partly distinctly deformed preserved in a yellow-orange and partly clear piece of amber; its brownish darkened parts are most probably caused by natural heating (fire in the forest?). An air bubble each in the prosoma and in the opisthosoma indicate that the spider was dead and partly dried out before trapped in the amber. - Syninclusions are two small particles of earth and a small silicious pebble.

Diagnostic characters (♂; ♀ unknown): Pedipalpus (figs. 32-33; both are distinctly deformed) with a long, staff-shaped tegular apophysis.

Description (♂):
Measurements (in mm): Body length 1.3; prosomal length 0.7; opisthosomal length 0.7; leg I: Femur 0.9, patella 0.18, tibia 1.0, metatarsus 0.8, tarsus 0.4; femur II 0.9, femur III ca. 0.75, femur IV ca. 0.9.
Colour mainly medium brown, partly darkened by natural heating, legs not annulated.
Prosoma strongly deformed. - Legs long and slender, hairs indistinct, bristles - most bistles are apparently rubbed off - probably quite similar to *P. fissura*. - Opisthosoma strongly deformed, bearing longer hairs. - Pedipalpus (figs. 32-33) with slender articles, patella with a slender dorsal-apical bristle, tibia with a small retrolateral bristle in the basal half, bulbus voluminous, questionable embolus long and in a ventral position, tegulum with several apophyses.

Relationships: According to the absence of cymbial bristles a member of the *fissura* species-group, see *fissura* WUNDERLICH 2021 (fig. 34) in which the tegular apophyses are different. See *P. baculum* n. sp.

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

Palaeoleptoneta acus WUNDERLICH **n. sp.** (fig. 35), photo 19

Etymology: The name of the species refers to its needle-shaped ventral tegular apophysis, from acus (lat.) = needle.

Material: Holotype ♂ in Mid Cretaceous Burmese (Kachin) amber, F3688/BU/CJW.

Preservation and syninclusions: The spider is complete and partly – the eyes and the pedipalpi strongly – deformed, preserved in a clear yellow-orange piece of amber. - Syninclusions are tiny air bubbles, tiny plant hairs, detritus, and a tiny, flat and partly translucent unknown animal (a larva?), body length 0.5 mm, right in front of the spider.

Diagnostic characters (♂; ♀ unknown): Pedipalpus (fig. 35): Trochanter apparently quite long (fairly deformed?), position of the questionable embolus dorsally of the long dorsal tegular apophysis; tegulum with several further apophyses including a needle-shaped ventral apophysis.

Description (♂):
Measurements (in mm): Body length 1.6; prosoma: Length 0.75, width 0.55; opisthosomal length 0.8; leg I: Femur right/left 0.9/1.0, patella 0.2, tibia 1.0, metatarsus 0.75, tarsus 0.5; femur II 0.8, femur III 0.7, femur IV 0.9.
Colour medium brown, legs not annulated.
Prosoma (photo) ca. 1.36 times longer than wide, finely rugose, hairs short, fovea absent, eyes strongly deformed, clypeus and basal cheliceral articles long, mouth parts and sternum strongly deformed. - Legs (photo) long and slender, order I/IV/II/III, hairs not distinct, bristles long and slender, nos. on I: Femur 1 dorsally in the basal half, 1 proventrally in the middle, a lateral pair in the distal half and 3 subapically, patella 1/1 (the basal one quite thin), tibia dorsally 1/1, a lateral pair in the distal half and few subapically, metatarsus and tarsus none; remaining femora similar, metatarsus IV with 2 bristles in the basal half, position of the metatarsal trichobothrium near the end of the article. - Opisthosoma (photo) distinctly longer than wide, hairs long and numerous, anterior spinnerets long, slender and basally widely spaced. - Pedipalpus (fig. 35) (see also the diagnosis): Trochanter apparently quite long (see above), femur strongly bent, bearing a prolateral bristle in the distal half, tibia long, with a prolateral bristle.

Relationships: A member of the *fissura* species-group. According to the long dorsal tegular apophysis and the needle-shaped ventral apophysis *P. baculum* n. sp. is strongly related; in *baculum* the position of the embolus is ventral of the dorsal tegular apohysis.

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

Family TELEMIDAE

Members o the family Telemidae are tiny six-eyed spiders, see WUNDERLICH (2021: 64). The Cretaceous telemid spiders – as well as the extant members of the genus *Telema* SIMON 1882 – possess only a single long bristle each on all patellae and tibiae (fig. 136); femoral and metatarsal bristles are absent in contrast to several related families. I regard this to be probably a family character. Unfortunately chaetotaxy and trichobothriotaxy are only weakly study by researchers of extant spiders, e. g., by HUI FENG et al. (2020). Femoral leg bristles are known from the extant *Jocquerella leopoldi* BAERT 1980 from New Guinea; in my opinion the existence of these bristles in this taxon may well be a regain.
Only two Cretaceous species of ?*Telemophila* WUNDERLICH 2017 have been described up to date. Here a single male of a new genus in Burmite is described.

Kachintelema WUNDERLICH **n. gen.**

Etymology: The name refers (1) to the Kachin Province of Myanmar, the type locality of the genus and (2) to the genus name *Telema* of the family Telemidae.

The gender of the name is feminine.

Type species (by monotypy): *Kachintelema calcarfemur* n. sp.

Diagnostic characters (♂; ♀ unknown): Femur I (fig. 36) thickened and bearing a row of ventral hair-bearing spurs, quite few leg bristles (fig. 36): See below; pedipalpus (figs. 38-39): Bulbus rather slender, embolus guided by a conductor; the existence of a paracymbium is unknown, a furrow of the embolus is apparently absent.

Relationships: According to the characters of the male pedipalpus, - e. g., the relatively slender embolus - the diverse extant S(E) Asian genus *Pinelema* FENG et al. 2012 is most related; in *Pinelema* spurs of femur I and a separate conductor are absent, and a furrow of the embolus exists.

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

Kachintelema calcarfemur WUNDERLICH **n. sp.** (figs. 36-39), photo 20

Etymology: The name of the species refers to the spurs of femur I, from calcar (lat.) = spur.

Material: Holotype ♂ in Upper (Mid) Cretaceous Kachin amber from Myanmar, F3725/BU/CJW.

Preservation and syninclusions: The spider is fairly well preserved in a partly muddy yellow-orange piece of amber, the left leg I is cut off at the base of the tibia, some leg articles and the body including the petiolus are deformed. - Syninclusions are a ca. 0.7 mm long spider (or mite?) which is badly preserved, 2 Machilidae, few Collembola, some ballets of insect excrement and particles of detritus.

Diagnostic characters and relationships: See above.

Description (♂; ♀ unknown):
Measurements (in mm): Body length 1.1; prosoma: Length 0.47, width 0.37; opisthosoma: Length 0.6, width ca. 0.43; leg I: Femur ca. 0.8 (width 0.12), patella 0.15, tibia ca. 0.85, metatarsus ca. 0.5, tarsus 0.25, femora II-IV 0.7/0.55/0.62
Colour medium brown, legs not annulated.
Prosoma (photo) not well preserved and partly hidden, 1.2 times longer than wide, 6 eyes in a “segestriid” position, sternum wide. - Legs long and slender, order I/II/IV/III, hairs very short; bristles: Only a single long bristle each on all patellae and tibiae (fig. 36), position of the metatarsal trichobothria unknown. - Opisthosoma ca. 1.4 times longer than wide, hairs indistinct, colulus and spinnerets strongly deformed. - Pedipalpus fairly deformed, with slender articles, see above.

Family **PROTOARANEOIDIDAE** WUNDERLICH 2018

The relationships of this cribellate family are quite unsure; primitive structures of the male pedipalpus exist as well as a large paracymbium. Four genera are known, see WUNDER-

LICH (2018: 48) and (2021: 62f).

Praeteraraneoides WUNDERLICH 2018: 47f.

Praeteraraneoides multidentatum WUNDERLICH **n. sp**. (figs. 40-44), photo 21

Etymology: The name of the species refers to the several teeth on the tip of its paracymbium, from multi- (lat.) = many and dens (lat.) = tooth.

Material: Holotype ♂ in Mid Cretaceous Burmese (Kachin) amber, F3716/BU/CJW.

Preservation and syninclusions: The spider is completely but only fairly well preserved in a clear yellow-orange piece of amber, dorsal parts of the prosoma (including most eyes) and of the opisthosoma are cut off, the body is modified and deformed by decomposition gas. - Syninclusions: Remains of 6 Collembola, 1 Psocoptera, some tiny Acari, tiny plant hairs and particles of detritus.

Diagnostic characters (♂; ♀ unknown): Pedipalpus (figs. 42-44): Paracymbium relatively short, two-partite, both tips bearing several teeth.

Description (♂):
Measurements (in mm): Body length 1.8; prosomal length 0.85, opisthosomal length ca. 1.15; leg I: Femur 0.9, patella 0.27, tibia 1.0, metatarsus 0.8, tarsus 0.4, femur II 0.95, femur III ca. 0.9, femur IV 0.9.
Colour light brown, legs not annulated.
Prosoma (photo; most parts are dissected, deformed or cut off) with large and distinctly diverging basal cheliceral articles which bear anteriorly some longer plumose hairs, anterior margin of the fang furrow distally with ca. 5 small teeth (fig. 40), sternum spaced by coxae IV by less of their diameter. - Legs fairly long and slender, similar to *P. furcatum* WUNDERLICH 2018: 142, fig. 64, order IV/I/II/III, III relatively long, tarsi III-IV with few indistinct ventral bristles of the pectunculus, calamistrum indistinct or absent, position of the metatarsal trichobothrium in ca. 0.9, unpaired tarsal claw small, paired claws with long teeth. - Opisthosoma incomplete and decomposed, covered with short hairs, spinnerets (fig. 41), deformed and large, cribellum strongly deformed. - Pedipalpus (figs. 42-44; see also above) with slender and spiny articles, a long tibia which bears ventrally a bristle on a hump, a larger cymbium

and a large bulbus; embolus thin, slightly bent and bearing a short and blunt basal apophysis.

Relationships: In the related species - see WUNDERLICH (2018: 53) – the paracymbium is divided in two large branches whose tips are not multidentate.

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

Superfamily DEINOPOIDEA

See WUNDERLICH & MÜLLER (2021: 101-166)

Family ULOBORIDAE

See WUNDERLICH & MÜLLER (2021: 134-166)

Microuloborus WUNDERLICH 2015

Generotype: *Microuloborus birmanicus* WUNDERLICH 2015 – see WUNDERKICH & MÜLLER (2021: 138-139, figs. 213-15), further species: *M. oblongus* WUNDERLICH 2021. An indet. male – which has deformed pedipalpi (fig. 220) -, was also described. Here a third

species of this genus is described which is distinctly larger than the already known species and which possesses leg bristles.
The quite different characters of *Microuloborus* may indicate that it is not monophyletic. Its characteristics are the rather small pedipalpus whose articles do not bear apophyses nor spines or strong bristles, a strongly bent sclerite of the bulbus which I call tegular apophysis (fig. 47) as well as probably the quite basal position of the metatarsal trichobothria in ca. 0.1 (!) at least in *M. ater* n. sp. (fig. 46). A cribellum is probably existing, femoral trichobothria and leg bristles may exist or not, feathery hairs are absent, the posterior eye row is strongly recurved, the lateral eyes are distinctly spaced from each other (fig. 45).

Microuloborus ater WUNDERLICH **n. sp.** (figs. 45-47), photo 22

Etymology: The species name refers to its dark (darkened) colour, from ater (lat.) = dark.

Material: Holotype ♂ in Mid Cretaceous Burmite (Kachin amber), F3711/BU/CJW.

Preservation and syninclusions: The spider is well and completely preserved in a clear light yellow piece of amber; it is darkened probably by natural heating or pressure.. - The amber includes some fissures, tiny plant hairs and detritus; few bubbles are enclosed near the anterior legs of the spider.

Diagnostic characters (♂; ♀ unknown): Pediplpus (fig. 47): Patella with thin hairs but no bristles or spines, tegular apophysis strongly bent in its basal half, distal – observable - part of the embolus short. I did not recognize femoral trichobothria.

Description (♂):
Measurements (in mm): Body length 1.75; prosomal length 0.8; opisthosoma: Length 1.1, width 0.55; leg I: Femur 0.8, patella ca. 0.3, tibia 0.8, metatarsus 0.85, tarsus 0.45, tibia II 0.4, tibia IV 0.4.
Colour mainly dark brown; probably the spider is darkened by heating or pressure of the piece of amber.
Prosoma (fig. 45, photo; it is partly hidden) dorsally fairly convex, bearing short hairs, fovea apparently indistinct, “shoulders” absent, 8 large eyes, the anterior medians largest and apparently protruding, lateral eyes distinctly spaced from each other, posterior row distinctly recurved, basal cheliceral articles of medium size, mouth parts hidden in the present position but probably recognizable after cutting the piece of amber. - Legs (fig. 46, photo) of medium length, order I/IV/II/III, I distinctly the longest, III distinctly the shortest, hairs short, bristle only fairly large, most tarsi with a single ventral bristle (reduced pectunculus), femora 1 dorsally-

distally (but in the middle on III), patellae dorsally 1/1 (the basal one tiny), tibiae dorsally 1/1 and a retrodistal one at least on I-II, metatarsi I-II 1 dorsally near the middle and few apically, femoral trichobothria apparently absent, position of the metatarsal trichobothria I-III In 0.98, 0.12 and 0.14 (!), calamistrum short and indistinct, unpaired tarsal claw existing. - Opisthosoma (fig. 45, photo) twice as ong as wide, soft, bearing short hairs; most spinnerets and cribellum hidden. - Pedipalpus (fig. 47) small, patella with few dorsal hairs, tibia fairly thickened, bearing a long dorsal hair on a hump, cymbium large, bulbus with a small ventral-basal sclerite (arrow), tegular apophysis strongly bent in its basal half, its tip pointing to the tip of the questionable embolus which is basally apparently hidden by a small questionable bubble.

Relationships: In *M. birmanicus* WUNDERLICH 2015 and *M. oblongus* WUNDERLICH 2021 the body length is only ca. 1.0 mm and leg bristles are absent, in *birmanicus* the pedipalpal tibia is distinctly shorter than in *ater*, shape of the tegular apophysis is different and a long trichobothrium on femur I exists which may also exist in *ater* but in *ater* the prodistal position of femur I is hidden. In *oblongus* long and strong dorsal femoral hairs exist and the sclerites of the bulbus are different.

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

Propterkachin WUNDERLICH 2017

The extinct genus Propterkachin is restricted to Burmite (Kachin amber). Typical characters of this genus are the large and divided distal tegular apophysis and the long, strongly bent, pointed and thin sclerite (tegular apophysis) originating on the basal part of the tegulum and which I previously called embolic apophysis (2), (figs.), see *P. pygmaeus* n. sp. A pair of pedipalpal patellar bristles/spines (fig. 48) or a single spine (figs. 50-51) exist. Femoral trichobothria exist at least in *bispinatus*. Feathery hairs and ventral pointed outgrowths of the pedipalpal femur are absent in contrast to *Paramiagrammopes*.

Here I describe two further species of this genus besides the generotype *P. magnoculus* WUNDERLICH 2017 and *P. bispinatus* WUNDERLICH 2021 as well as in short a male which may be conspecific with *bispinatus*.

Propterkachin* ?*bispinatus WUNDERLICH 2021

Material: 1♂ in Burmese (Kachin) amber, F3714/BU/CJW.

Preservation and short description: The spider is very well and almost completely preserved in a yellowish piece of amber, only the left leg IV has been lost beyond the coxa by autotomy. Body and legs are irregularly darkened probably by heating and/or pressure of the amber. The legs are strongly bent under the body; this position indicates that the spider was captured by the resin as a dead animal. One of the Diptera in this piece of amber is the member of the Brachycera which is preserved not far below the mouth parts of the spider. Only remains of the fly's abdomen are existing. - Femur I of the spider bears 5 longer and few short apical bristles, the wide cribellum is well observable. Measurements (in mm): Body length 3.0, prosomal length 0.9, length of femur I 1.7.

Relationships: As far as observable the structures of the pedipalpus are quite similar to *P. bispinatus* WUNDERLICH 2021 but – because of their position – they cannot be studied and compared in all details.

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

Propterkachin pygmaeus WUNDERLICH **n. sp.** (figs. 48-50), photos 23-24

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

Material: Holotype ♂ in Mid Cretaceous Burmese (Kachin) amber, F3715/BU/CJW.

Preservation and syninclusions: The spider is excellently preserved in a clear yellowish piece of amber, tarsus and metatarsus of the left leg I as well as the distal articles of the right legs II-IV are cut off, chelicerae and mouth parts are dissected and deformed. - Syninclusion: Only a thin plant hair left of the spider.

Diagnostic characters (♂; ♀ unknown): Body length 1.6 mm; pedipalpus (figs. 48-50): Prolateral patellar spine larger than the retrolateral spine.

Description (♂):
Measurements (in mm): Body length 1.6; prosoma: Length 0.6, width 0.6; opisthosoma: Length 1.15, width 0.7; leg I: Femur 0.8, patella 0.25, tibia 0.65, metatarsus 0.7, tarsus 0.4, tibia IV 0.45.
Colour mainly yellow brown; I regard darkenings of the legs as caused by heating and/or pressure of the piece of amber.
Prosoma (photo) as wide as long, covered with short hairs, fovea deep, 8 eyes in two rows, anterior medians largest, posterior row strongly recurved, lateral eyes widely spaced from each other, clypeus not protruding, chelicerae and mouth parts dissected, coxae IV spaced by the sternum by about their diameter. - Legs (photo) of medium length, hairs rather short, bristles short, existing on femora to metatarsi, femora 1 dorsally in the basal half; I: Femur furthermore 4 distally, patella 1 dorsally-apically (no further bristle like in the remaining patellae), tibia dorsally 1/1 and few distally, metatarsus 4 in the basal half and in the middle as well as few distally; bristles of the pectunculus absent, calamistrum existing in the basal half, position of the metatarsal trichobothria unknown, unpaired tarsal claw existing. - Opisthosoma (photo) almost 1.6 times longer than wide, covered with short hairs, three pairs of short spinnerets, cribellum well developed. - Pedipalpus (figs. 48-50) with slender articles, distally-ventrally on the right femur are two small humps recognizable, patella short, bearing a pair of dorsal-apical spines, the prolateral one being longer than the retrolateral one, tibia longer than wide and longer than the patella, cymbium large, distal tegular apophysis with two long and bent branches. The long sclerite which originates ventrally-basally on the tegulum was previously regarded by me as “tegular apophysis 2”. Both these sclerites bear a secretion (sperm?) on their tip, and therefore I regard them here as the emboli.

Relationships: Smallest known member of the genus, body length 1.6 mm, structures of the male pedipalpus different from the related species.

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

Propterkachin unispinatus WUNDERLICH **n. sp**. (figs. 51-52)

Etymology: The name of the species refers to the existence of a single spine on the pedipalpal patella, from unus (lat.) = a single and spina (lat.) = spine.

Material: Holotype ♂ in Mid Cretaceous Burmese (Kachin) amber, F3713/BU/CJW.

Preservation and syninclusions: The spider is rather badly preserved at the surface of a yellowish piece of amber, parts of body, legs and pedipalpi are cut off, both legs IV are almost completely preserved, the opisthosoma is crumbled. - Syninclusions are few plant hairs and small particles of detritus.

Diagnostic characters (♂; ♀ unknown): Pedipalpus (figs. 51-52): Patella with a single blunt dorsal spine, bulbus distally with a large, divided and bent tegular apophysis.

Description (♂):
Measurements (in mm): Body length 3.0, prosomal length 1.1, opisthosomal length ca. 1.9; leg IV: Femur ca. 1.5, patella ca. 0.3, tibia 1.1, metatarsus 1.25, tarsus 0.7
Colour of prosoma and legs light to medium brown, opisthosoma light brown.
Prosoma distinctly deformed, bearing short hairs and 8 eyes. - Legs (most articles are cut off) long, bearing longer and thin bristles on femora to metatarsi, tarsus IV bears half a dozen quite short ventral bristles of the pectunculus; further bristles: Femora at least 2 dorsally, patellae 1/1 dorsally, tibia IV 1/1 dorsally and few laterally, metatarsus IV few dorsally, laterally and apically, metatarsus III few dorsally, laterally and apically as well as 3 ventrally, position of the metatarsal trichobothria unknown. - Opisthosoma strongly deformed, bearing short hairs. - Pedipalpus: See above, embolus long and thin.

Relationships: In the remaining congeneric species the pedipalpal patella bears a pair of apical bristles.

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

Family ZARQARANEIDAE

Members of this extinct diverse Cretaceous family were revised by WUNDERLICH & MÜLLER (2018: 69-98); two species were added by us in 2020. Here we describe a further new genus and two new species.

Palptibiaap WUNDERLICH **n. gen.**

Etymology: The name is an artificial combination of syllables, referring to the existence of an unusually long (pedi)palpal patellar apophysis (outgrowth).

The gender of the name is masculine.

Type species (by monotypy): *Palpaltibiaap cochlear* n. sp.

Diagnostic characters (♂; ♀ unknown): Pedipalpus (figs. 54-55): Patella with a long and pointed distal outgrowth which bears two long dorsal bristle, tibia quite short, paracymbium long and bearing a flat retroventral apophysis (A), bulbus with a long and spoon-shaped ventral tegular apophysis.
Further characters: Clypeus long, sequence of the long (photo) dorsal tibial bristles 2/2/2/2, prosomal length 0.6 mm.

Relationships: In *Curvitibia* WUNDERLICH 2015 exists a similar pedipalpal patellar outgrowth and a quite short pedipalpal tibia, too, but the apical bristles of tibia I are short, tibia I is ventrally-basally thickened and a long spoon-shaped apophysis of the bulbus is absent.

Note on the figs. in the original description of *Curvitibi curima* WUNDERLICH 2015, p. 378: The fig. in the middle left of the page is fig. no. 153; “P” in fig. 151 has to change to “PA” (patellar apophysis).

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

Palptibiaap cochlear WUNDERLICH **n. gen. n. sp**. (figs. 53-55), photo 25

Etymology: The name of the species refers to its long and spoon-shaped apophysis of the bulbus, from cochlear (lat.)= spoon.

Material: Holotype ♂ in Upper (Mid) Cretaceous Burmese (Kachin) amber from Myanmar (Burma), F3727/BU/CJW.

Preservation and syninclusions: The spider is completely and well preserved in a rather clear yellow-orange piece of amber, its prosoma is fairly, its eye lenses and its opisthosoma are distinctly deformed, fissures exist above the spider, parts of the amber piece in front of the spider are broken off. - Syninclusions are absent.

Diagnostic characters: See the new genus.

Description (♂):
Measurements (in mm): Body length 1.25; prosoma: Length 0.6, width ca. 0.55; opisthosomal length ca 0.85; leg I: Femur 0.8. patella 0.25, tibia ca. 0.52, metatarsus ca. 0.5, tarsus ca. 0.3, tibia II 0.4, tibia III 0.23, tibia IV ca. 0.4.
Colour: Prosoma light to medium brown, legs light to medium brown and annulated, patellae and tibiae distally (fig. 53) darkened, opisthosoma grey brown.
Prosoma (photo) deformed, almost 1.1 times longer than wide, bearing partly longer hairs and 8 deformed eyes in two rows, clypeus long. - Legs (fig. 53, photo) fairly long and slender, order I/II/IV/III, hairs of medium length, bristles partly very long, existing on femora to tibiae; leg I: Femur 2 dorsally, 2 prolaterally and 1 retrodorsally, patellae 2 dorsally, the distal one very long, tibia 2 dorsally, 1 probasally and a pair apically. Position of the right metatarsal III trichobothrium in 0.3. Opisthosoma (photo) almost globular. - Pedipalpus: See above, articles slender, cymbium quite large, embolus unknown.

Relationships: See the new genus.

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

Spinicymbium WUNDERLICH 2017

Members of this genus are tiny spiders, see WUNDERLICH & MÜLLER (2021: 175). Here I describe the fifth species of this genus.

Spinicymbium curviparacymbium WUNDERLICH **n. sp**. (figs. 56-57)

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

Material: Holotype ♂ in Mid Cretaceous Burmite (Kachin) amber, F3712/BU/CJW.

<u>Preservation:</u> The spider is quite well and almost completely preserved in a fairly clear piece of amber, only the left leg I is cut off through the tibia; the legs are strongly bent under the body. - <u>Syninclusions</u> are a Diptera: Brachycera, two Coleoptera, tiny plant hairs and detritus.

Diagnosis (♂; ♀ unknown): Metatarsus I straight; pedipalpus (figs. 56-57): Paracymbium strongly bent in the distal half, cymbium with two bristles, the distal one larger.

Description (♂):
Measurements (in mm): Body length 1.0; prosomal length ca. 0.5, height of the clypeus 0.12, length of a basal cheliceral article 0.17; opisthosoma: Length 0.7, height 0.5; leg I: Femur 0.7, patella left/right 0.2/0.25, tibia 0.6, femur IV 0.65, tibia IV 0.35; length of the basal tibial I bristle 0.23.
Colour: Body and legs light brown, legs not annulated, opisthosoma yellow brown.
Prosoma - partly hidden by a fissure in the amber – covered with short hairs, 8 large eyes, clypeus fairly long and protruding, basal cheliceral articles of medium size, distally distinctly diverging, anterior margin of the fang furrow bearing few small teeth, fang well developed, most parts of the sternum hidden. - Legs fairly long, order I/II/IV/III, hairs quite short, metatarsus I straight, tibia I slightly thickened in the basal half, bristles long and thin, femora 1 dorsally near the middle, patellae dorsally 1/1, tibiae dorsally 1/1 and at least I with at least 1 prolaterally in the basal half and 3 near the end; position of the metatarsal trichobothria unknown. - Opisthosoma egg-shaped, bearing short hairs and short spinnerets. - Pedipalpus: See the diagnosis.

Relationships: In *S. curvimetatarsus* WUNDERLICH 2018 metatarsus I is bent, the shapes of paracymbium and embolus are different. In *Parvispina tibialis* WUNDERLICH 2011 the shape of the paracymbium is similar but the tibial bristles are shorter and the structures of the bulbus are different.

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

Questionable ZOROPSOIDEA s. l. (RTA-clade)

I found four zoropsoid genera in Eocene Baltic amber but I did not found a proof in the Mesozoic, e. g., not in the Mid Cretaceous Burmese (Kachin) amber. I was searching for a cribellate taxon which may possess several tarsal trichobothria and tibial apophyses of the male pedipalpus. Did members of the Zoropsoidea live in the Burmese amber forest hidden on the ground, away from the amber traps? Recently - under Agelenomorpha indet., F3665/BU/CJW - spiny leg articles were described in Burmese (Kachin) amber which tarsi bear several long trichobothria, see WUNDERLICH & MÜLLER (2021: 184-185, figs. 327-328); compare the tarsal trichobothria of *Eotrechalea annulata* WUNDERLICH 2004 (Zoropsoidea) in Baltic amber. The characters of these legs do not fit in any spider taxon in Burmite known to me. Do these legs belong to a member of the Zoropsoidea? In this case Zoropsoidea would be - in the geological sense - one of the oldest (questionable) proofs of the RTA-clade. See also the family Eotibiaapophysidae WUNDERLICH 2018 sensu WUNDERLICH & MÜLLER (2021: 179-185).

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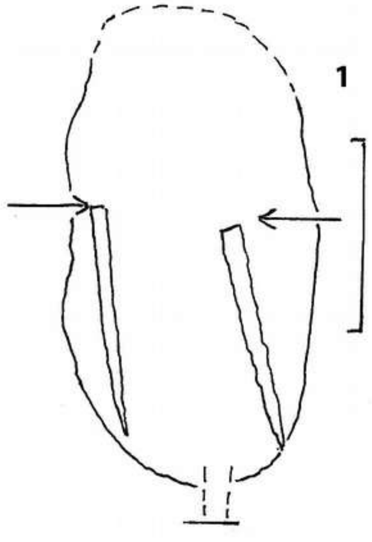
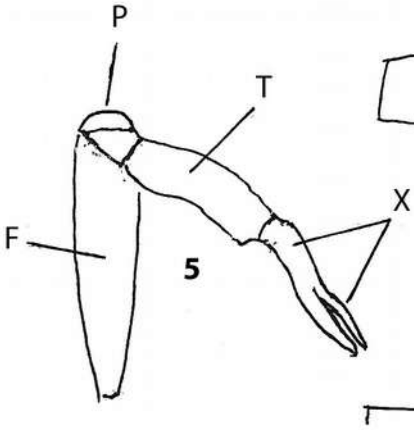
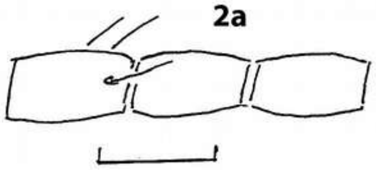
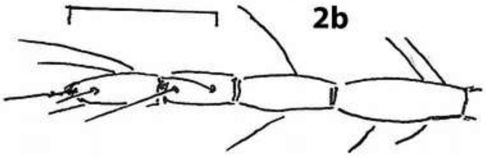
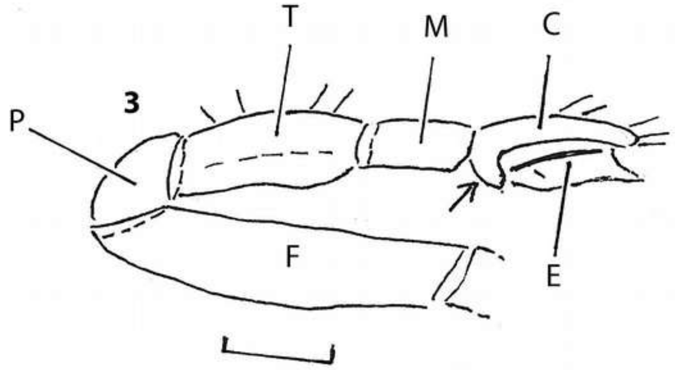
- (2021): Description of new fossil spiders (Araneae) in Late (Mid) Cretaceous Burmese (Kachin) amber with focus on the superfamilies Palpimanoidea and Deinopoidea and members of the RTA-clade, as well as remarks on the palaeobehaviour, palaeofauna, taxonomy and phylogenetics. – Beitr. Araneol., 14: 25-262.

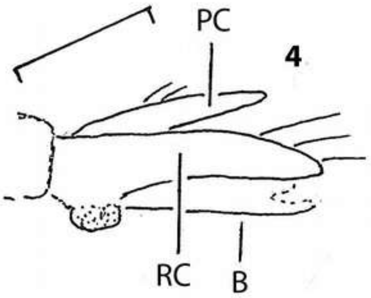






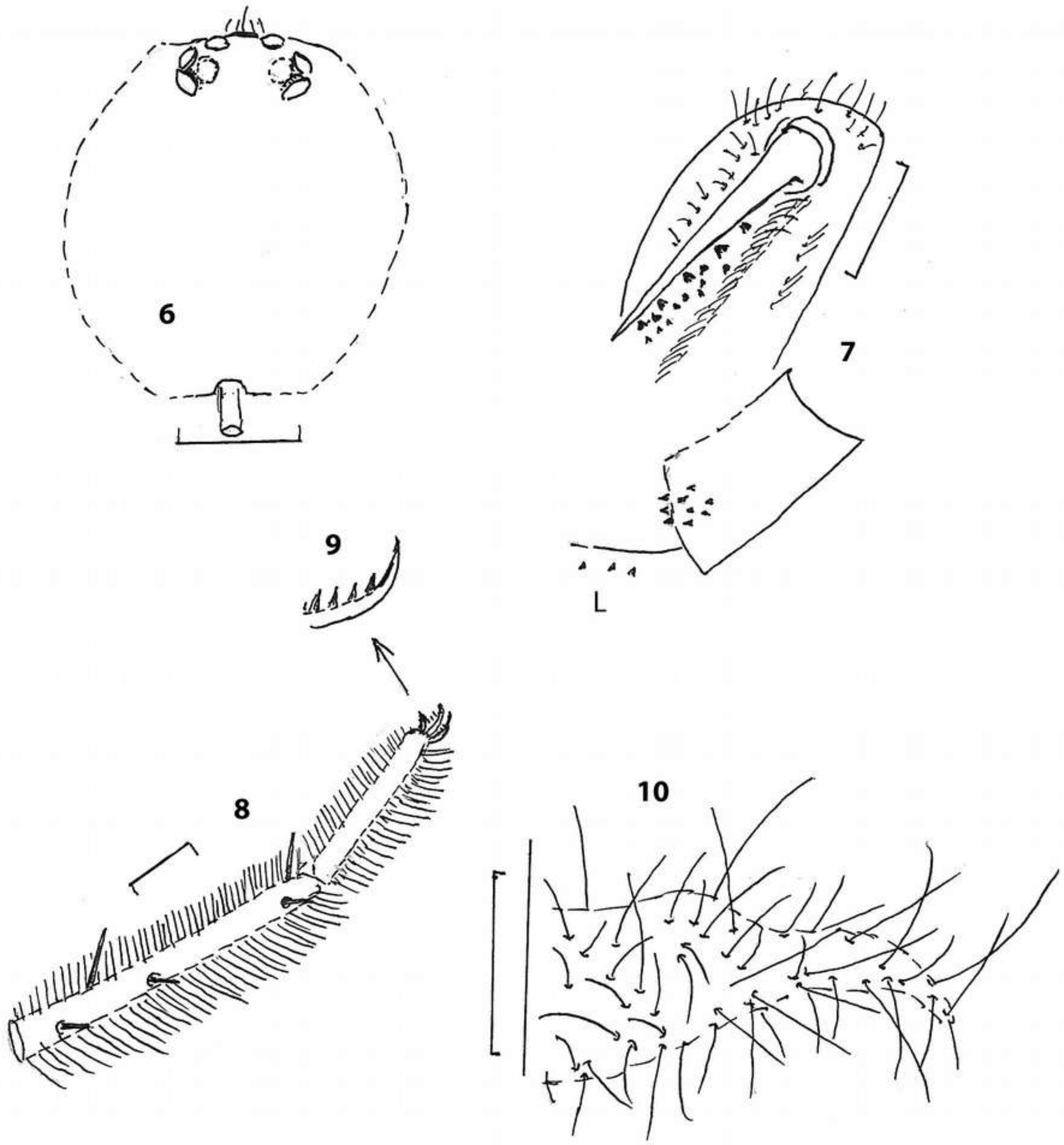




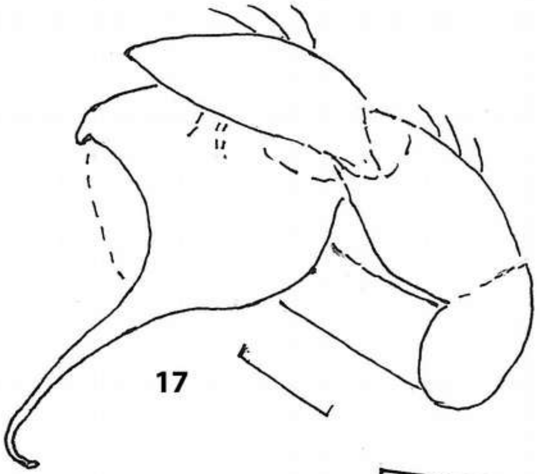


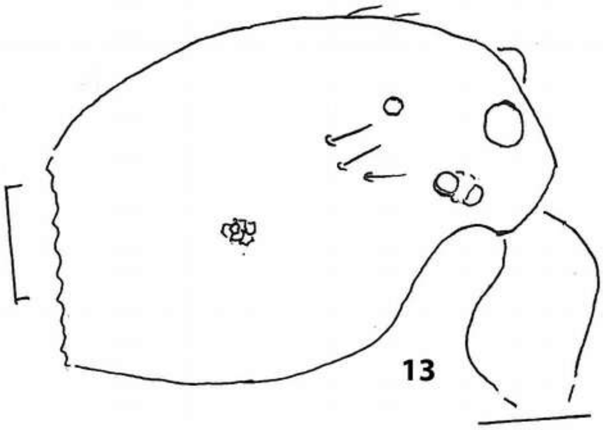
Figs. 1-4: ***Parachimerarachne longiflagellum* n. gen. n. sp**. (Chimerarachnida: Chimerarachnidae), ♂; 1) ventral aspect of the deformed opisthosoma, outline. The arrows point to the base of the deformed long anterior lateral spinnerets; 2a) ventral aspect of three segments of the flagellum just behind the middle. Only three hairs are drawn; 2b) ventral aspect of the four distal segments of the flagellum. Only few hairs are drawn; 3) retrodorsal aspect of the partly deformed right pedipalpus. The arrow points to the questionable paracymbium; 4) retrodorsal aspect of the bipartite cymbium of the right pedipalpus. The questionable embolus is hidden in this position. Only few hairs are drawn. - Scales 0.2 mm in fig. 1, 0.1 mm in figs. 2-4.

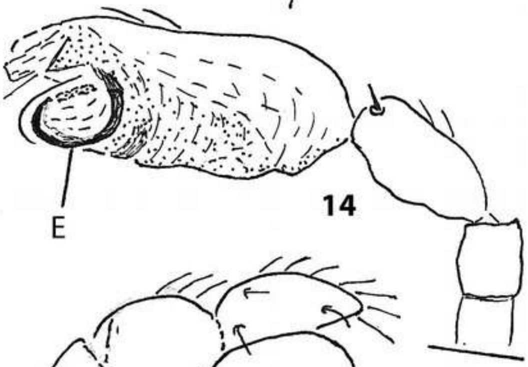
figs. 5) ***Chimerarachne yingi*** WANG et al. 2018 (Chimerarachnida: Chimerarachnidae), ♂, prolateral aspect of the left pedipalpus. Taken from WANG et al. (2018, fig. d), enlarged. Note that the existence of a metatarsus is excluded by these authors. - No scale.
B = bulbus, C = cymbium, E = questionable embolus, F = femur, M = metatarsus, P = patella, PC, RC = prolateral and retrolateral branches of the cymbium, T = tibia, X = entire tarsus in the sense of WANG et al (2018);

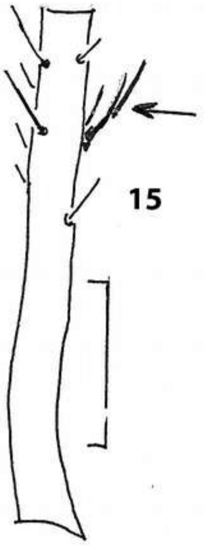


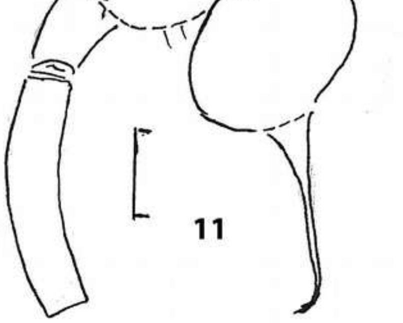
figs. 6-10: Mygalomorpha indet., F3710/BU/CJW, exuvia; 6) dorsal aspect of the slightly deformed peltidium with petiolus. The eye lenses and the fovea are difficult to recognize; 7) ventral aspect of the left chelicera, gnathocoxa and part of the labium (L); 8-9) retroventral aspect of the left metatarsus and tarsus I. The paired proclaw is enlarged. Not all hairs are drawn; 10) part of the deformed remains of the opisthosoma. Note the long hairs which not all are drawn. - Scales 2.0 in fig. 6) 1.0 in fig. 9), 0.5 in figs. 7-8);











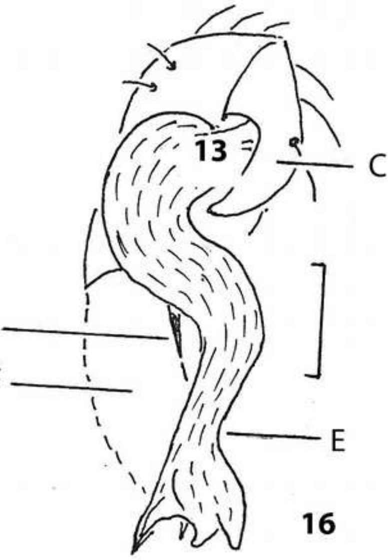
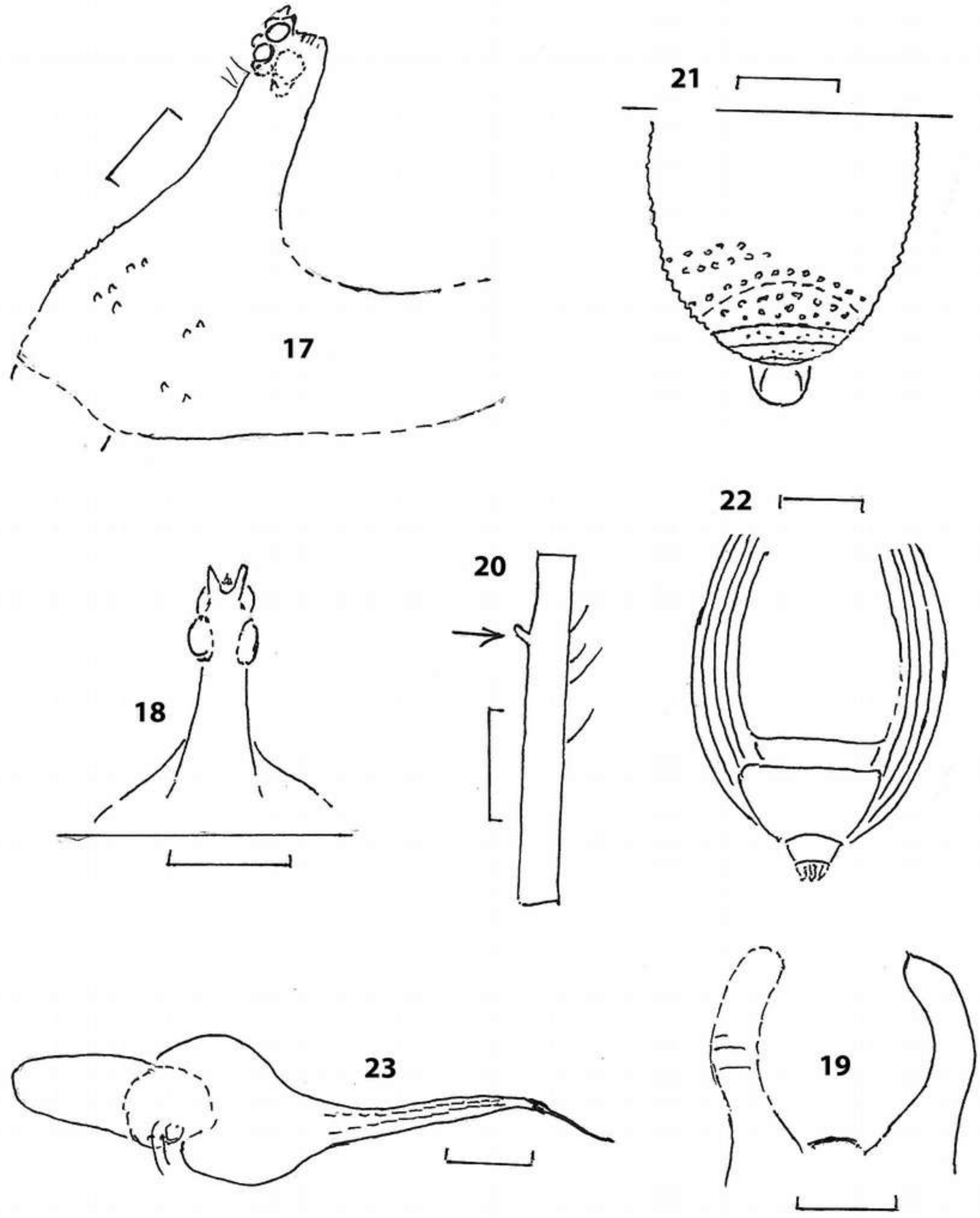


fig. 11) Questionable member of the family Burmorsolobidae, indet., ♂ F3717/BU/CJW, retrolateral aspect of the right pedipalpus. Only few hairs are drawn. - Scale 0.1;

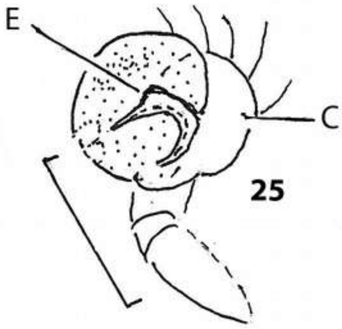
fig. 12) Questionable member of the family Burmorsolobidae, indet., ♂ F3718/BU/CJW, prolateral aspect of the partly deformed right pedipalpus.- Scale 0.1;

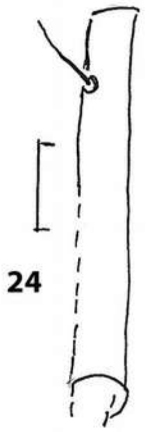
figs. 13-14: ***Praetervetiator parvicirculus* n. sp.** (Vetiatoridae), ♂; 13) lateral (slightly retrolateral) aspect of the prosoma; 14) retrolateral aspect of the deformed left pedipalpus. - Scales 0.2 and 0.1.

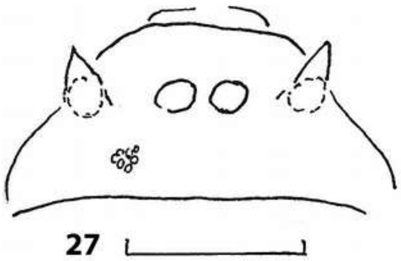
figs. 15-16: ***Claspingblemma duospinae* n. gen. n. sp.** (Tetrablemmidae), ♂; 15) dorsal and slightly apical aspect of the left femur I. The arrow points to the questionable clasping bristle-shaped hairs. Only few normal hairs are drawn; 16) ventral aspect of the deformed right pedipalpus, of the femur (F), and dorsal aspect of the cymbium (C) and the embolus (E). - Scales 0.2 and 0.1;

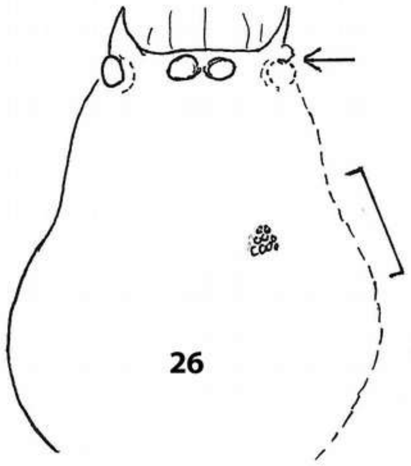


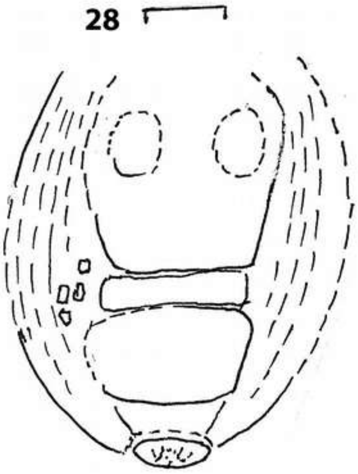
figs. 17-23: ***Electroblemma acutinataformis* n. sp.** (Tetrablemmidae), ♂; 17) lateral aspect of the prosoma which is partly deformed; 18) anterior aspect of the prosomal stalk; 19) ventral aspect of the cymbial “horns”; the right “horn” is deformed; 20) dorsal aspect of the right tibia I. The arrow points to the mating spur. Only few hairs are drawn; 21) dorsal-posterior aspect of the posterior half of the opisthosoma. Only few tubercles are drawn; 22) ventral aspect of the opisthosoma. Tubercles are not drawn; 23) dorsal aspect of the distal articles of the partly deformed left pedipalpus. - Scales 0.2 in figs. 21-22), 0.1 in the remaining figs.;











figs. 24-25: ***Eogamasomorpha magnaseta*** **n. sp.** (Tetrablemmidae), ♂; 24) dorsal aspect of the right femur I which is basally incomplete and partly hidden. Note the strong prodistal bristle-shaped hair (or hair-shaped bristle?). Normal hairs are not drawn; 25) ventral aspect of the right pedipalpus. The embolus is ventrally strongly protruding and partly strongly sclerotized, the sperm duct is probably recognizable.- Scale 0.1. C = cymbium, E = embolus;

figs. 26-30: ***Procerclypeus corniculatus*** **n. sp**. (Tetrablemmidae), ♂; 26) dorsal aspect of the prosoma which partly is hidden. The posterior lateral eye (arrow) is strongly deformed; 27) anterior aspect of the prosoma; 28) ventral aspect of the opisthosoma which is partly hidden. The scuta are slightly deformed. Only few of the small scutate plates - which are placed in deformed rows - are drawn; 29) bent right pedipalpus in ventral position of the spider; 30) dorsal aspect of the left pedipalpus. - Scales 0.1 in figs. 29-30), 0.2 in the remaining figs.; B = bulbus, C = cymbium, E = embolus, F = femur;

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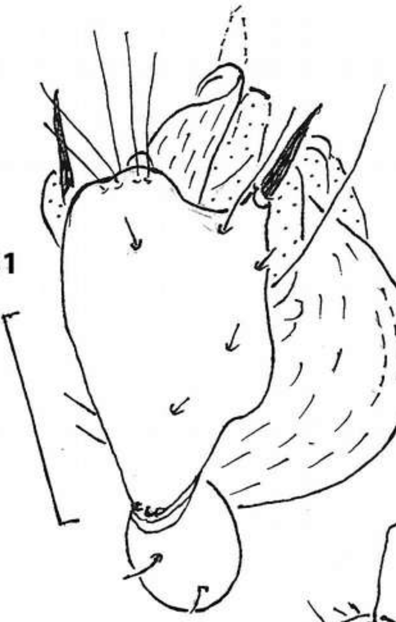

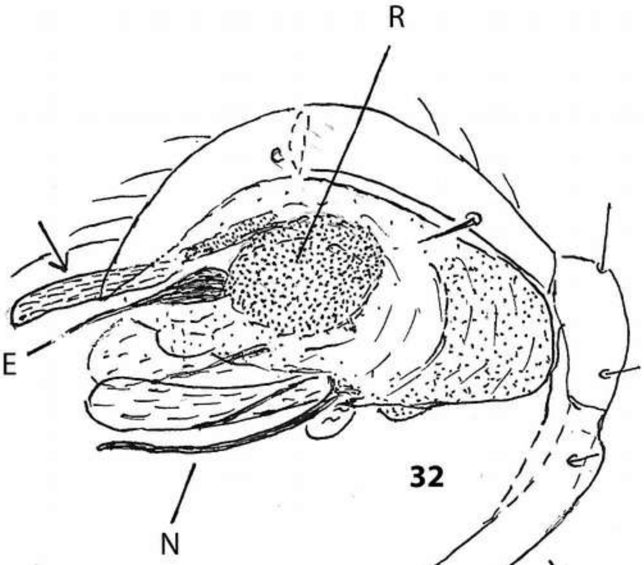

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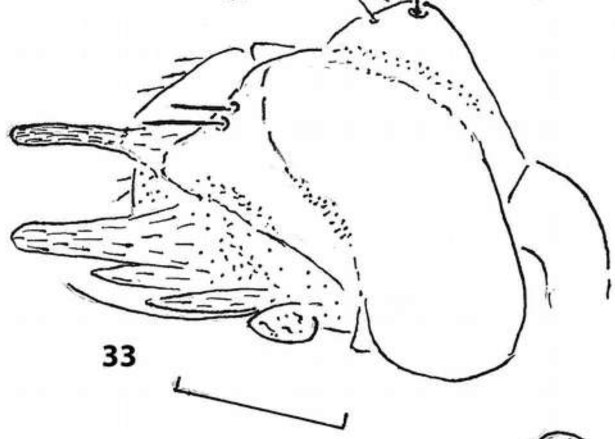

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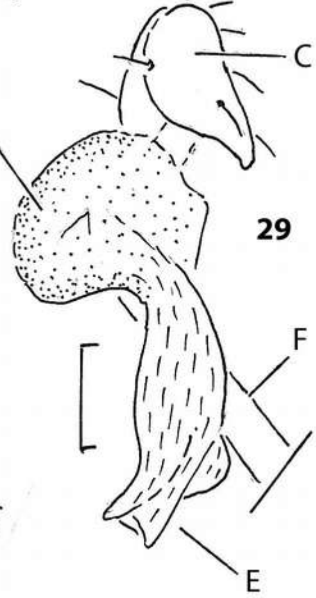

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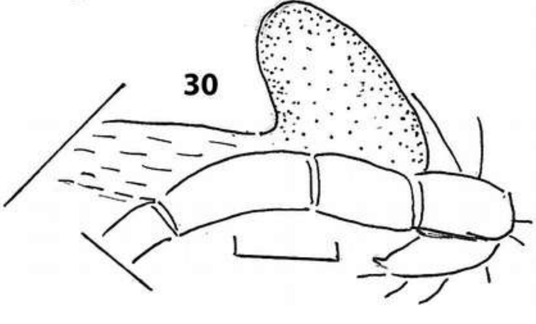


figs. 31) ***Palaeoleptoneta laticymbium*** **n. sp**. (Leptonetidae), ♂, dorsal and slightly retrolateral aspect of the right pedipalpus. Note the large retrodistal cymbial spoon/bristle. Only few hairs are drawn. - Scale 0.2;

figs. 32-33: ***Palaeoleptoneta baculum*** **n. sp**. (Leptonetidae), ♂; 32) prolateral aspect of the partly deformed right pedipalpus. The arrow points to the long dorsal tegular apophysis; 33) retrolateral aspect of the deformed left pedipalpus. - Scales 0.2. E = embolus, N = needle-shaped ventral tegular apophysis, R = sperm reservoir;

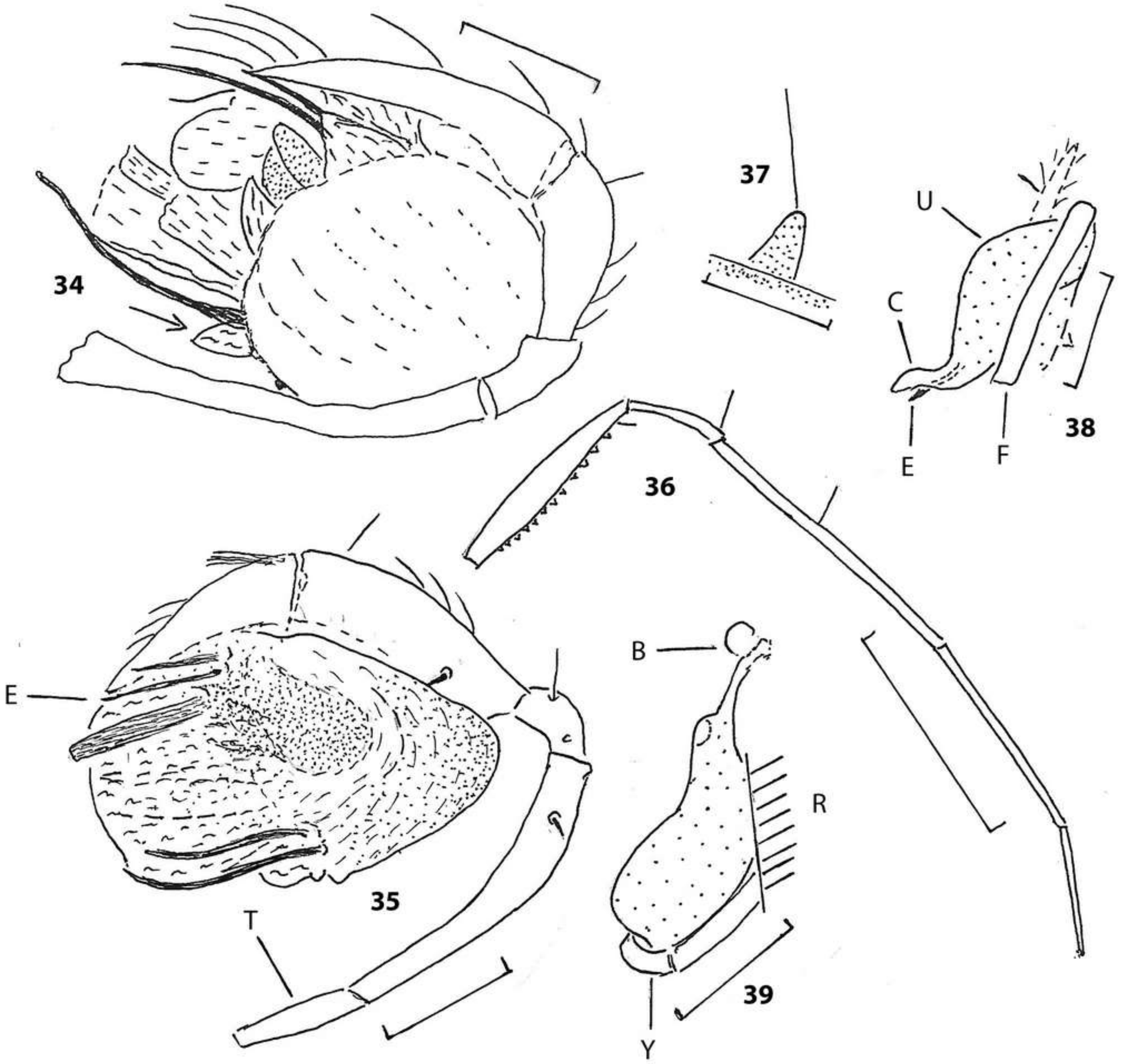
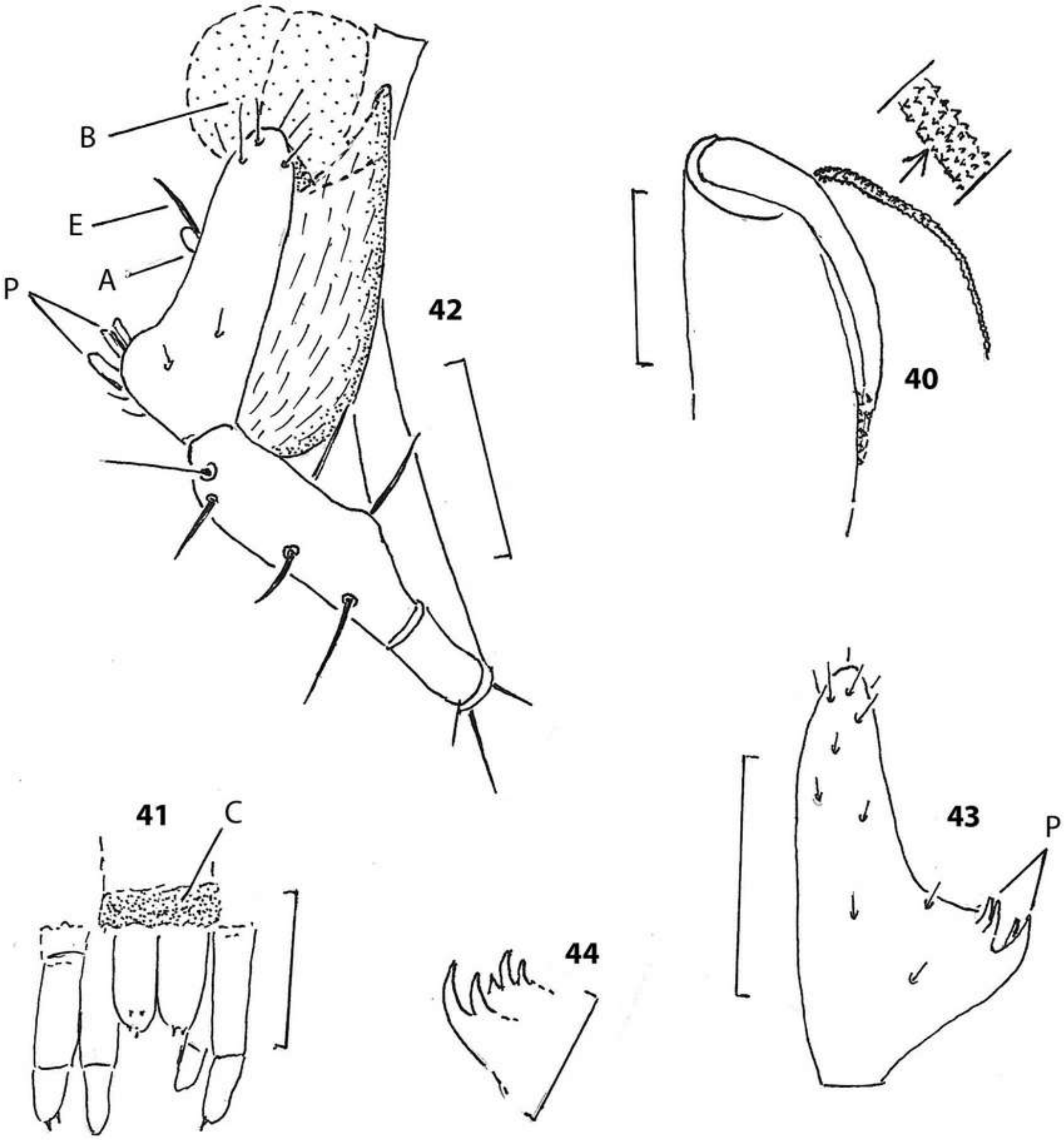


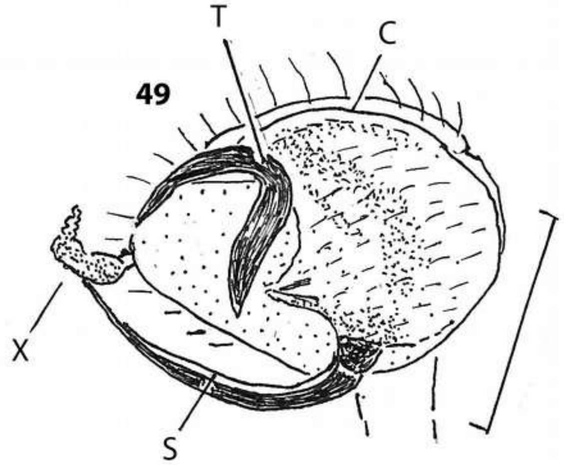
fig. 34) ***Palaeoleptoneta fissura*** WUNDERLICH 2021 (Leptonetidae), ♂, prolateral aspect of the partly deformed right pedipalpus. - Scale 0.2. The arrow points to a translucent tegular structure;

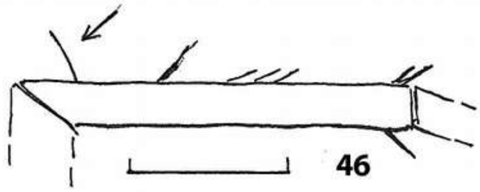
fig. 35) ***Palaeoleptoneta acus* n. sp**. (Leptonetidae), ♂, prolateral aspect of the fairly deformed left pedipalpus. - Scale 0.2. E = questionable embolus;

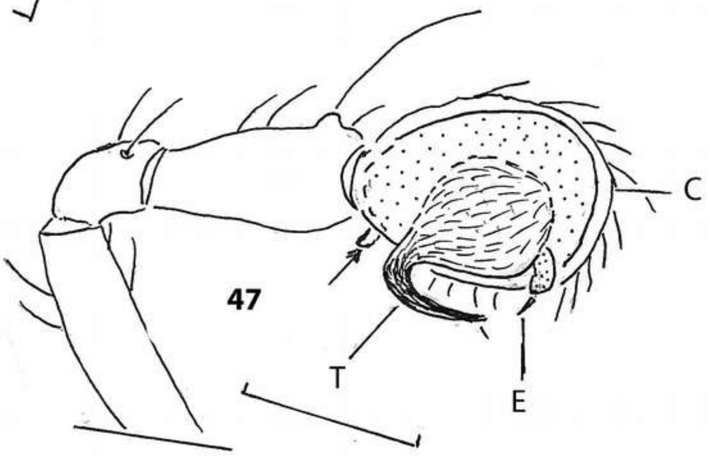
figs. 36-39: ***Kachintelema calcarfemur* n. sp**. (Telemidae), ♂, 36) mainly retrolateral aspect (the femur is actually longer) of the right leg **I**; 37) hair-bearing spur of the left femur **I**; 38) left pedipalpus, dorsal aspect of the femur and ventral aspect of bulbus, embolus and conductor. The paracymbium is hidden in this position but it is observable in the dorsal position; 39) retrodorsal aspect of the right pedipalpus. The tips of embolus and conductor as well as parts of bulbus and femur are hidden. - Scales 0.5 in fig. 36), 0.05 in fig. 37), 0.1 in figs. 38-39). B = bubble, C = conductor, E = embolus, F = femur, R = right leg femur **I**, Y = cymbium;

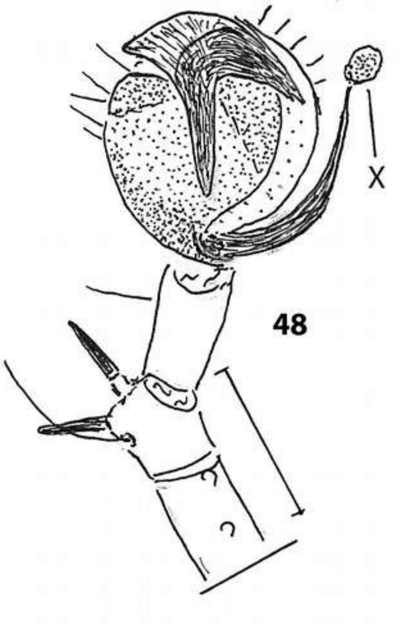


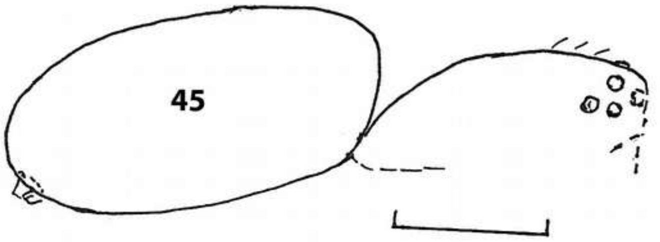
figs. 40-44: ***Praeteraraneoides mutidentatum* n. sp.** (Protoaraneoididae), ♂; 40) ventral aspect of the right chelicera. Only the longest plumose hair is drawn and partly enlarged (arrow). Some of the tiny teeth of the fang furrow are probably hidden; 41) ventral aspect of the deformed spinnerets; 42) left pedipalpus with prodorsal aspect of cymbium and bulbus; 43) dorsal aspect of cymbium and paracymbium of the right pedipalpus; 44) ventral aspect of the paracymbium of the right pedipalpus. - Scales 0.1 in figs. 40) and 44), 0.2 in the remaining figs. A = apophysis of the embolus, B = bubble, C = cribellum, E = embolus, P = paracymbium;





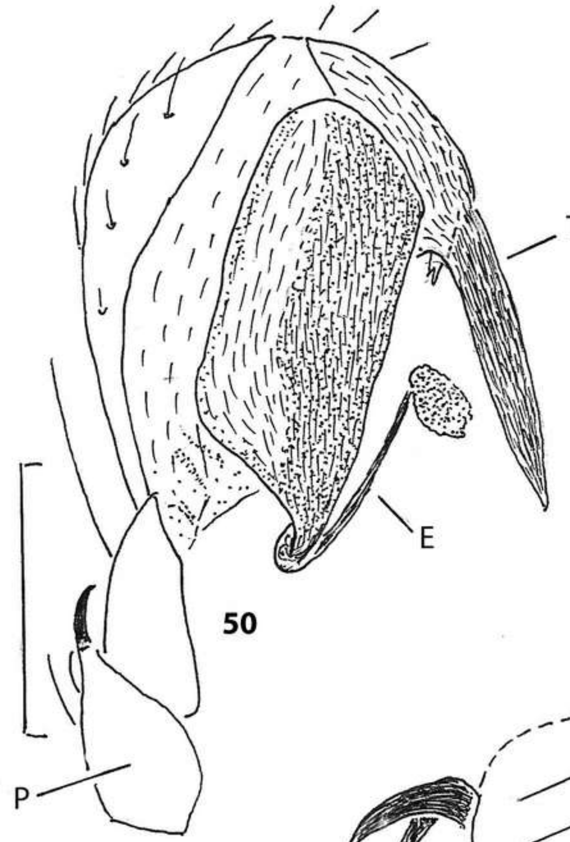






figs. 45-47: ***Microuloborus ater* n. sp**. (Uloboridae), ♂; 45) outline of the body which is partly hidden, lateral aspect; 46) retrolateral aspect of the right metatarsus II. The arrow points to the trichobothrium. Only few hairs are drawn; 47) retrolateral (partly ventral) aspect of the right pedipalpus. The arrow points to the small basal tegular outgrowth. Because of darkenings the structures of the bulbus are hard to recognize. - Scales 0.5, 0.2 and 0.1. C = cymbium, E = embolus, T = tegular apophysis;

figs. 48-49: Explanation see next page.



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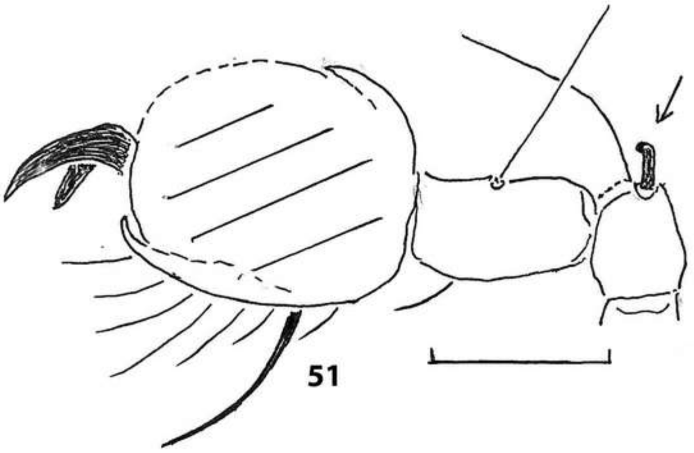

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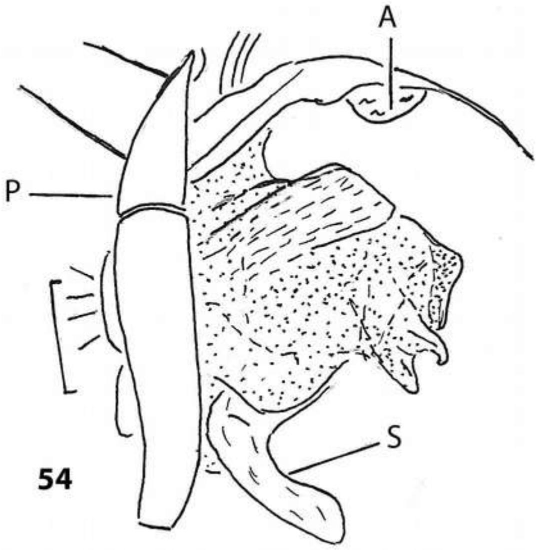
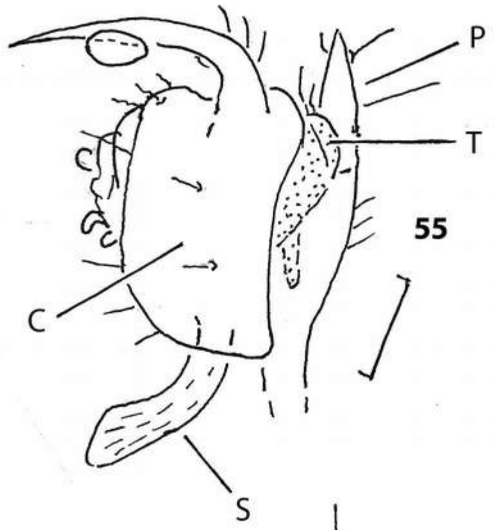
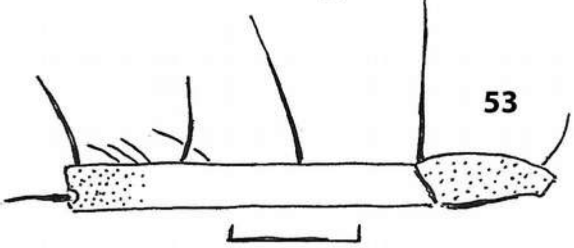
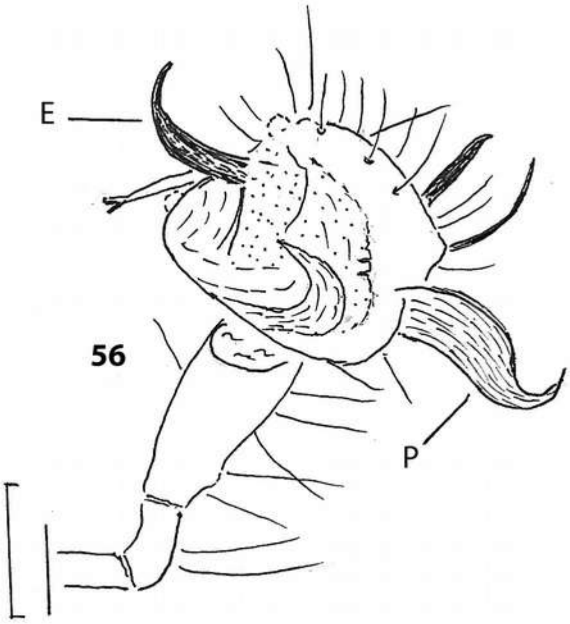
figs. 48-50: ***Propterkachin pygmaeus* n. sp**. (Uloboridae), ♂; 48-50: See the previous page; 48) ventral aspect of the right pedipalpus. Details are difficult to recognize; 49) ventral aspect of the left pedipalpus; 50) retrolaterl aspect of the right pedipalpus. - Scales 0.2. C = cymbium, E = embolus, P = patella, S = seam of the embolus, T = divided tegular apophysis, X = secretion (sperm?) at the tip of the embolus;

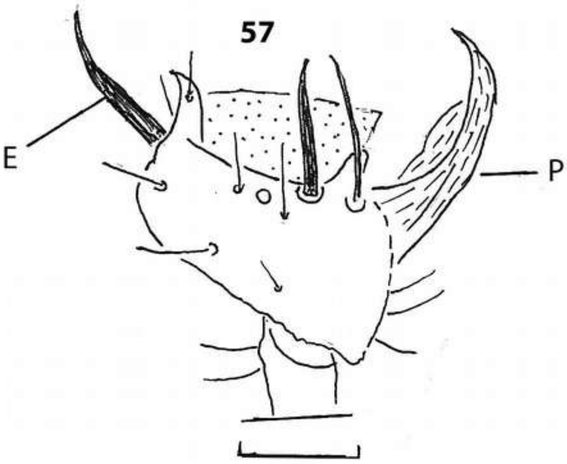
figs. 51-52: ***Propterkachin unispinatus* n. sp.** (Uloboridae), ♂; 51) prodorsal aspect of the right pedipalpus which has a twisted bulbus and cymbium and is partly cut off. The arrow points to the blunt patellar spine; 52) ventral aspect of the distal tegular apophysis of the right pedipalpus. - Scale 0.2 and 0.1;











figs. 53-55: ***Palptibiaap cochlear*** **n. gen. n. sp.** (Zarqaraneidae), ♂; 53) retrodorsal aspect of the left tibia I. Only few hairs are drawn; 54) Dorsal aspect of the right pdipalpus. The tibia is hidden in the present position; 55) ventral aspect of the right pedipalpus. - Scales 0.2, 0.1, 0.1. A = apophysis of the paracymbium, C = cymbium, P = patella; S = spoon-shaped apophysis, T = the mainly hidden tibia;

figs. 56-57: ***Spinicymbium curviparacymbium*** **n. sp**. (Zarqaraneidae), ♂; 56) retroapical aspect of the left pedipalpus; 57) retrodorsal aspect of the right pedipalpus. - Scales 0.1. E = embolus, P = paracymbium.

BEITR. ARANEOL., 15: 174-184 (2022)

DESCRIPTIONS OF FEW EARLY MIOCENE FOSSIL SPIDERS (ARANEAE) IN AMBER OF CHIAPAS, MEXICO

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Abstract: The following fossil spider (Araneae) taxa in Early Miocene Mexican amber from Chiapas are described: Oonopidae indet., *Araneometa procera* WUNDERLICH **n. sp**. (Tetragnathidae) and *Chrosiothes chiapas* WUNDERLICH **n. sp**. (Theridiidae). *Araneometa* WUNDERLICH 1988 is transferred from the Araneidae to the Tetragnathidae (**n. relat**.). *Pronepos* PETRUNKEVITCH 1963 may be a juniour synonym of *Chrosiothes* SIMON 1894 (**n. quest. syn**.). The two first described species document the close relationships of the Miocene Mexican and the Dominican spider amber faunas which are both of about the same age. The family Tetragnathidae is reported in Mexican amber for the first time.

Material: The fossil spiders in Mexican amber from Chiapas: Simojovel were bought by Patrick Müller from a Mexican dealer and will be kept in the the Palaeontological Institute in Munich.

INTRODUCTION

In two papers PETRUNKEVITCH (1963, 1971) described members of a dozen spider families (26 specimens only) from Early Miocene Mexican amber of Chiapas. Like in other Tertiary amber deposits Theridiidae is the most diverse family on generic level. The family Oonopidae exists also in all larger Cenozoic amber deposits (as well as in Mesozoic deposits) but almost all taxa are members of a single subfamily, Orchestininae; scutate Oonopidae in amber are extremely rare, see below.

NOTES: (1) In 1971 PERUNKEVITCH described members of the Oonopidae, Dysderidae (questionable), Hersiliidae, Theridiidae, Linyphiidae and Salticidae; taxa of the Mysmenidae sensu PETRUNKEVITCH – *Mysmena* and *Eomysmena* – are in my opinion most probaby members of the family Theridiidae. (2) Members of *Eoscaphiella* WUNDERLICH 2008 of the Gamasomorphinae sensu WUNDERLICH (2008) are actually members of the family Tetrablemmidae.

In this paper we describe a scutate specimen indet. of the family Oonopidae and a single new species of the families Tetragnathidae and Theridiidae each in Mexican amber. Both new species are closely related to members in Early Miocene Dominican amber of Hispaniola. Curiously, both new species possess an anterior outgrowth of the prosoma as well as a pair of opisthosomal humps - although they are members of different families.

During the last years M. A. GARCIA-VILLAFUERTE described spiders of the families Anyphaenidae, Mimetiae, Pholcide, Salticidae, Theraphosidae, Theridiidae and Tomisidae in Mexican amber, see, e. g., GARCIA-VILLAFUERTE (2020) and the World Spider Catalog.

DESCRIPTIONS OF THE TAXA

Family OONOPIDAE

(a) Subfamily ORCHESTININAE (see the introduction)

The single described species in amber from Chiapas is *Orchestina mortua* PETRUNKEVITCH 1971. According to PETRUNKEVITCH the position of the trichobothrium on metatarsus II of the female holotype is at the end of the basal half of the article but not at its end like in other species of *Orchestina* SIMON 1882 known to me. The subadult male "androtype" of this species (seen by me) is not an Oonopidae but probably a member of the family Theridiidae.

(b) Subfamily "GAMASOMORPHINAE"

Oonopidae indet.

Material: 1♀ which I regard as most probably adult, preserved in Early Miocene Mexican amber, coll. Patrick Müller, Mex. B 5.

Preservation and syninclusions: The spider is completely and well preserved near the margin of a clear piece of amber, the prosoma is fairly deformed, the opisthosoma is ventrally distinctly flattened; probably the spider hungered for a longer time or was quite aged. - Syninclusions are a tiny insect and tiny particles of detritus.

Description (♀):
Measurements (in mm): Body length 1.4; Prosoma: Length ca. 0.6, width ca. 0.52: Opisthosoma: Length 1.05, width 0.75, height 0.22; femora: I 0.45, II 0.5, III 0.42, IV ca. 0.47; leg IV: patella 0.25, tibia 0.47, metatarsus 0.35, tarsus 0.18.
Colour grey brown, legs not annulated.
Prosoma deformed, cephalic part apparently raised, cuticula fine but distinctly wrinkled, 6 eyes which are difficult to observe in the present position, clypeus short, basal cheliceral articles long and slender, most mouth parts and sternum hidden. - Legs slender, bristle-less, hairs of medium length, order IV/II/I/III (!), position of the metatarsal trichobothrium unknown.

- Opisthosoma dorsally and ventrally strongly armoured, flattened (see above).

Relationships: In Central and South America numerous genera of armoured Oonopidae exist. A male of the present species is needed for a determination. In Miocene Dominican amber a male has been described as a questionable member of the genus *Gamanomorpha* KARSCH 1881 – *incerta* WUNDERLICH 1988 -, in which a dorsal opisthosomal scutum is probably absent.

Distribution: Early Miocene amber forest on Chiapas (Mexico).

Family TETRAGNATHIDAE

The family Tetragnathidae has not been reported by PETRUNKEVITCH (1963, 1971). This author included *Mirometa valdespinosa* PETRUNKEVITCH 1963 – based on a deformed male - in the subfamily Metinae which is now regarded as a member of the Tetragnathidae, but in my opinion the relationships of *Mirometa* are quite unsure; the strong bristles on tibia II are like in certain taxa of the family Araneidae.
In 1963: 23 PETRUNKEVITCH described *Aranea exusta* under Araneidae incertae sedis, based on a quite deformed and incomplete specimen (the dorsal part of the body, the chelicerae and the spinnerets are missing) which may be juvenile or adult. Its prosomal length is 2 mm, the leg bristles are long and slender. I do not want to exclude that *valdespinosa* may be a member of the family Tetragnathidae. In contrast to *Anameta* femoral bristles are absent.

Araneometa WUNDERLICH 1988

Diagnosis: (see WUNDERLICH (1988: 108) and below: Relationships): Prosoma: Eye field very wide, in the male sex bearing a dorsal-anterior hump or outgrowth between the posterior median eyes (fig. 1), opisthosoma (fig. 6) with a pair of lateral humps near the middle; ♂-pedipalpus (fig. 7) with a long embolus in a spiral position which is widely guided by a conductor which in *procera* n. sp. may be wrapping the embolus.

Relationships: *Araneometa* possesses a mixture of araneid and tetragnathid characters. Mainly based on the more "araneid" eye position and the small paracymbium I regarded the genus in 1988: 108 with some hesitation s a member of the family Araneidae. According to the long gnathocoxae, the thin leg bristles, the position of the bulbus which is not twisted retrolaterally, the absence of a colulus and a median apophysis as well as an embolus which is widely guided – and probably wrapped by a conductor in *A. procera* – I transfer *Araneometa* from the Araneometa to the Tetragnathidae (**n. relat**.). It is considered to be a member of the subfamily Metinae like *Chrysometa* SIMON1894. A more "areneid eye position" and a small "araneid-shaped" paracymbium exist in certain Tetragnathidae, too. In contrast to the Araneidae the dimorphism of the body size of *Araneometa* is probably low as in other Tetragnathidae: In 1988: 112 I regarded a female indet. of this genus as juvenile but it well may be adult; its body length of 2.1 mm is like the body length of adult congeneric males. The basal cheliceral articles of *Araneometa* are quite variable: Long (fig. 1) - probably the plesiomorphic character - or short or of medium length, see WUNDERLICH (1988: Figs. 232, 242). In 1988: 108-109 I compared *Araneometa* with *Chrysometa* SIMON 1894 (Central and South America) and regarded the spiral embolus of both genera - contrarily to my present opinion - as convergently evolved. In contrast to *Araneometa* in *Chrysometa* the prosoma bears no dorsal hump or outgrowth, the legs bear long and conspicuous hairs and the paracymbium is much larger and complex. - In *Homalometa* SIMON 1897 the cymbium is strongly modified and a paracymbium is absent.

Distribution: Early Miocene amber forest of Chiapas, Mexico.

Araneometa procera WUNDERLICH **n. sp**. (figs. 1 - 7), photo 26

Etymology: The name of the species refers to its slender basal cheliceral articles, from procerus (lat.) = slender.

Material: Holotype ♂ in Early Miocene Mexican amber of Chiapas, coll. Patrick Müller Mex. B 1.

Preservation: The spider is completely and well preserved in a clear yellow-orange piece of amber, mainly the spinnerets and prosoma including the eyes are deformed, fissures exist laterally around body and legs.

Diagnosis (♂; ♀ unknown): Prosoma (figs. 1-3) between the posterior median eyes with a distinct dorsal outgrowth, clypeus with a pair of blunt and flat (or flattened?) outgrowths, tibia I-II with a pair of dorsal-apical spurs, opisthosoma with a pair of low lateral humps in the middle; pedipalpus (fig. 7): Cymbium apically elongated, embolus long and thin, in a spiral position, describing about two loops, conductor long, distally apparently wrapping the embolus.

Description (♂):
Measurements (in mm): Body length 2.6; prosoma: Length 1.15, width 1.1; opisthosoma: Length 1.6, width 1.2; leg I: Patella 0.65, tibia 1.3, metatarsus 1.25, tarsus 0.63, tibia II 1.2, tibia III 0.55, tibia IV 1.2.
Colour: Prosoma and legs medium brown, legs not annulated, opisthosoma light grey, sigillae dark brown.
Prosoma (figs. 1-3, photo) almost as wide as long, posteriorly fairly raised, hairs short, fovea well developed, most eyes hidden, a hump exists between the posterior median eyes, clypeus long, bearing a pair of blunt and flat (or flattened?) outgrowths, basal cheliceral articles long, condylus absent, labium a free sclerite, sternum as long as wide, coxae IV only weakly spacing. - Legs (figs. 4-5, photo) only fairly long, slender, order I/?II/IV/III, III distinctly the shortest, patellae relatively long (about as long as the tarsi), tibia I-II with a pair of dorsal-apical spurs, bristles slender, partly long, numerous, existing from femora to metatarsi; leg I: Femur 2 dorsally and 2 prolaterally, patella 1 prolaterally and 2 dorsally (most retrolateral parts are hidden), tibia about a dozen, metatarsus half a dozen, position of the metatarsal trichobothrium unknown, 3 tarsal claws, paired claws quite large, bearing long teeth. - Opisthosoma (fig. 6, photo) 1.23 times longer than wide, dorsally apparently leathery, bearing 4 pairs of sigillae, short hairs and a pair of low lateral humps in the middle, spinnerets and colulus strongly deformed. - Pedipalpus (see the diagnosis, too): Position of the cymbium dorsally (not prolaterally), paracymbium hidden, bulbus not twisted retrolaterally, median apophysis absent.

Relationships: The characters of the prosoma, the opisthosoma and the shape of the embolus are as in the genus *Araneometa* but the congeneric species in Dominican amber – see WUNDERLICH (1988: 108-112) – are different in several characters: Outgrowths of the clypeus and tibial I-II spurs are absent, the gnathocoxae are stouter, the number of metatarsal bristles is lower, the cymbium and the conductor are not elongated.

Distribution: Early Miocene amber forest of Chiapas, Mexico.

Family THERIDIIDAE

PETRUNKEVITCH (1963, 1971) described four theridiid genera in Mexican amber. Most of the described specimens are different from the present genus *Chrosiothes* SIMON 1894 (Episinae) but the female holotype of *Pronepos exilis* PETRUNKEVITCH 1963, the generotype of the genus *Pronepos* PETRUNKEVITCH 1963 may be a member of *Chrosiotes*, and therefore I do not want to exclude that *Pronepos* may be a junior synonym of *Chrosiotes* (**n. quest**. **syn**.) (*). Today *Chrosiothes* is widely distributed, mainly in the Americas; it existed fossil in Mexican and Dominican amber. In Dominican amber, - Early Miocene, too - I described seven species of *Chrosiothes*, see WUNDERLICH (1988: 137-144). The extinct species belongs to a species-group of its own in which usually a dorsal-anterior prosomal outgrowth exists (fig. 8); their legs are annulated or not. Extant species are unknown.

(*) In my opinion *Pronepos fossilis* PETRUNKEVITCH is not a member of *Chrosiothes*.

Chrosiothes chiapas WUNDERLICH **n. sp**. (figs. 8-11), photo 27

Etymology: The name of the species refers to the Mexican province Chiapas, the area of the amber deposit.

Material: Holotype ♂ in Early Miocene Mexican amber of Chiapas, coll. Patrick Müller, Mex B 2.

Preservation and syninclusions: The species is well and completely preserved in a clear yellow-orange piece of amber, particles of detritus cover sternum and mouth parts, the ventral-right side of the opisthosoma is distinctly inclined/depressed in its whole length, the prosoma is slightly deformed. - Syninclusions are remains of two arthropods right of the spider and particles of detritus.

Diagnosis (♂; ♀ unknown): Prosoma (fig. 8) with a small anterior-dorsal outgrowth, opisthosoma (fig. 9) bearing a pair of low dorsal-lateral humps in the middle, pedipalpus (figs. 10-11) with an apically distinctly divided cymbium, a long embolus which describes a wide loop and a strongly bent radix apophysis.

Description (♂):
Measurements (in mm): Body length 1.35; prosoma: Length 0.47, width 0.45; opisthosoma: Length 1.0, width ca. 0.7; tibia I 0.6, tibia III 0.23, tibia IV 0.52.
Colour: Prosoma and legs medium brown, legs not annulated, opisthosoma medium grey.
Prosoma (fig. 8, photo) almost as wide as long, bearing a dorsal-anterior outgrowth, hairs indistinct, 8 deformed eyes in a wide field, posterior row fairly procurved, anterior median eyes largest, spaced by less than their diameter, clypeus long, basal cheliceral articles small, fangs not long, mouth parts and sternum hidden. - Legs (photo) slender, fairly long, order I/IV/II/III, hairs not long, bristles thin and fairly long, sequence 2/2/1/2, patellar bristles thin, metatarsus IV almost twice as long as tarsus IV, position of the right metatarsal II trichobothrium in ca. 0.5, hairs of the ventral comb of tarsus IV long, almost straight and only weakly serrated, three tarsal claws. - Opisthosoma (fig. 9, photo) 1.43 times longer than wide, soft, bearing a pair of low dorsal-lateral humps in the middle, hairs not long, colulus absent, three pairs of short deformed spinnerets. - Pedipalpus (figs. 10-11) (see also the diagnosis) with slender articles, paracymbium hidden, the divided apical part of the cymbium guides radix apophysis and embolus

Relationships (see also above): In *C. chiapas* - like in most congeneric male species of *Chrosiothes* in Miocene Dominican amber - the prosoma bears a dorsal-anterior outgrowth (fig. 8). According to the similar shape and size of the prosomal outgrowth, the shape of the opisthosomal humps and of the radix apophysis *C. biconigerus* WUNDERLICH 1988 and *C. monoceros* WUNDERLICH 1988 are most related, see WUNDERLICH (1988: Figs. 320-325). In contrast to *C. chiapas* the apical part of the cymbium is not distinctly divided in the dominican amber species. In the female of *Pronepos exilis* PETRUNKEVITCH (see above) the opisthosoma bears a single strong dorsal outgrowth and some long dorsal hairs.

Distribution: Early Miocene amber forest of Chiapas (Mexico).

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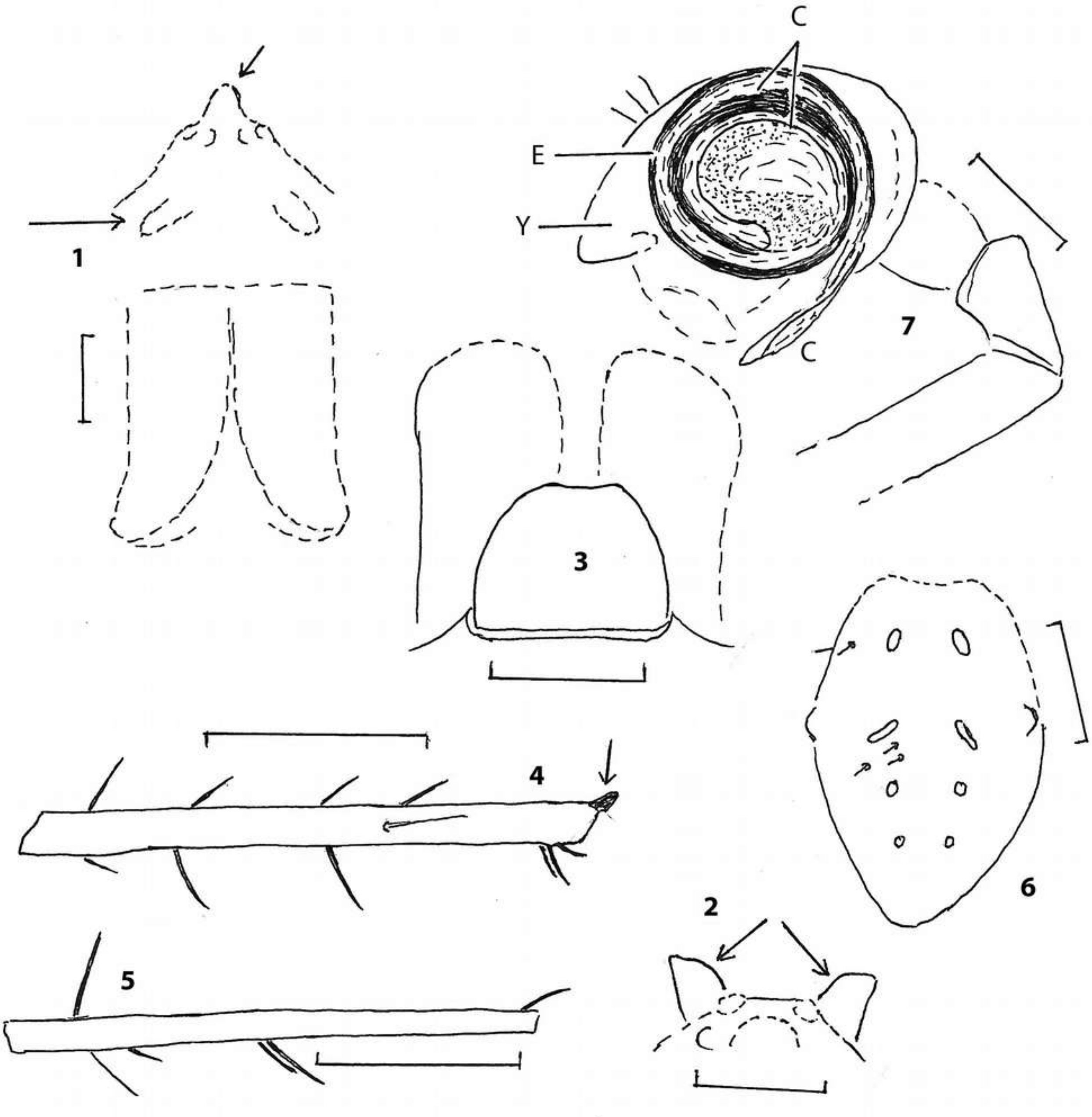
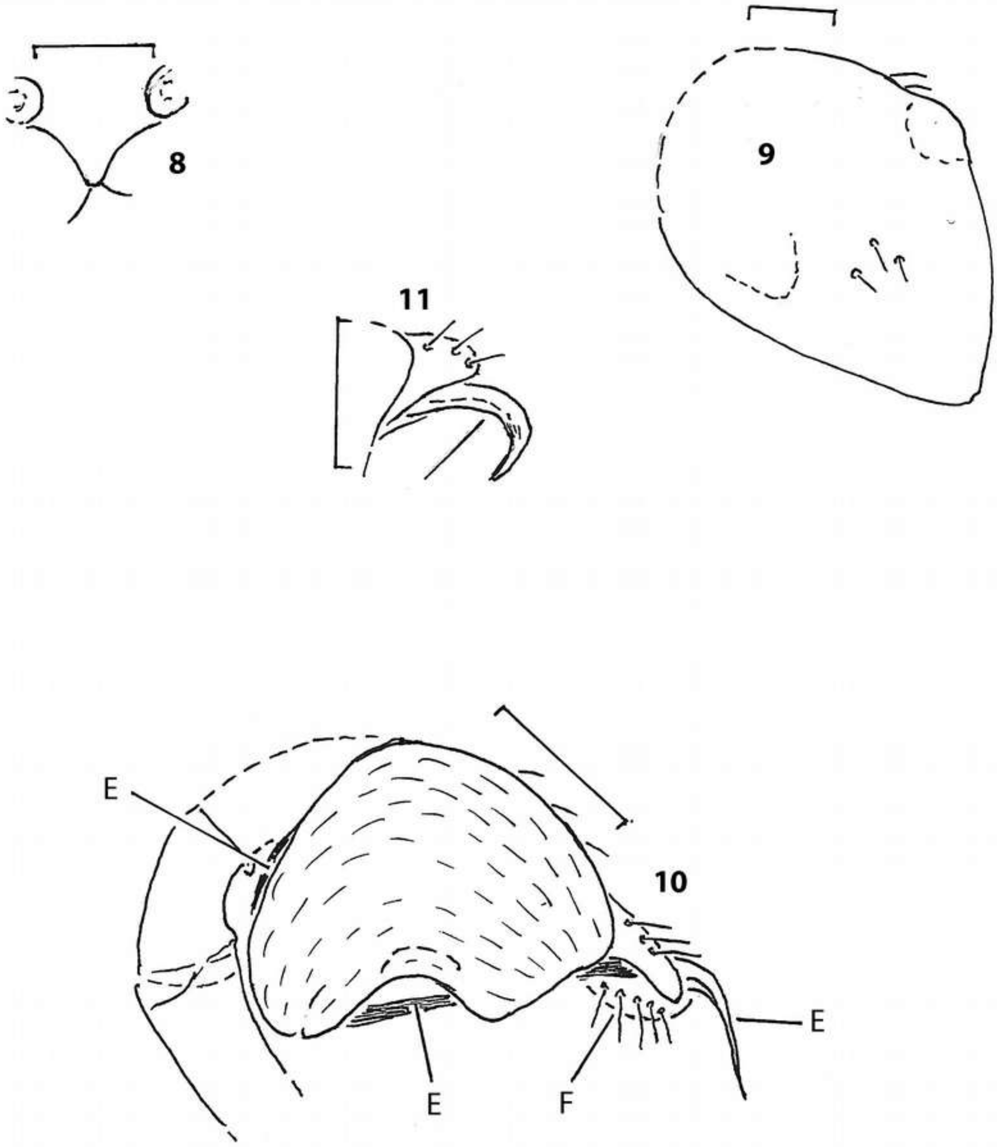


Figs. 1-7: ***Araneometa procera*** WUNDERLICH **n. sp**. (Tetragnathidae), ♂; 1) anterior aspect of the prosoma which is partly hidden. The short arrow points to the hump (outgrowth) between the posterior median eyes, the long arrow points to the right outgrowth of the clypeus; 2) dorsal aspect of the anterior part of the prosoma. Note the pair of clypeal outgrowths (arrows). Most eyes are hidden and deformed; 3) labium and gnathocoxae which are partly hidden; 4) prolateral aspect of the left tibia II. Probably some bristles are rubbed off. The arrow points to the pair of strongly sclerotized apical-dorsal spurs; 5) prolateral aspect of the left metatarsus II; 6) dorsal aspect of the opisthosoma. Only few of the short hairs are drawn; 7) retroventral aspect of the left pedipalpus which is partly hidden or deformed. - C = conductor, E = embolus, Y = cymbium. Scale bars 0.5 mm in figs. 4-6, 0.2 mm in the remaining figs.;



figs. 8-11: ***Chrosiothes chiapas*** WUNDERLICH **n. sp**. (Theridiidae), ♂; 8) anterior aspect of the medium-dorsal part of the prosoma; 9) dorsal-left and slightly anterior aspect of the opisthosoma. Only few hairs are drawn; 10) retrolateral aspect of the right pedipalpus; 11) prodorsal aspect of the distal part of radix apophysis and embolus which tip is probably hidden or broken off. - E = embolus, F = flattened apical part of the cymbium. Scale bars 0.2 mm in fig. 9, 0.1 mm in the remaining figs.

BEITR. ARANEOL., 15 : 185-204 (2022)

A NEW EXTINCT FAMILY OF THE ARACHNID ORDER RICINULEI IN CRETACEOUS BURMESE (KACHIN) AMBER, WITH NOTES ON THE ORDER TRIGONOTARBIDA AND ON SPERM TRANSFER IN ARACHNIDA

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Abstract: The new extinct arachnid family Sigillaricinuleidae of the order Ricinulei, based on *Sigillaricinuleus tripares* **n. gen. n. sp.**, is described from Mid Cretaceous Burmese (Kachin) amber from Myanmar. The main characters of the four actually known extinct ricinuleid families in the Mid Cretaceous Burmese amber are compared. The intrafamiliar variability of extinct and extant Ricinulei and its diagnostic characters as well as of its suborders - Primoricinulei and Posteriorricinulei are treated. Ricinulei is regarded as probably not strongly related to the extinct order Trigonotarbida. Notes are provided for the kinds of sperm transfer in Arachnida.

The material is kept in the coll. of Jörg Wunderlich (CJW) and the coll. Patrick Müller (PM).

Acknowledgement: I thank very much Patrick Müller who discovered in his large collection of Burmese (Kachin) amber the holotype of the new species, recognized the particularity of it and took the photos.

Members of the order Ricinulei in Burmese (Kachin) amber are rare, juveniles are not too rare, but adult males are extremely rare. These flattened and usually ground-living tropical arachnids were diverse in the Palaeozoic (Carboniferous of Europe and the USA, see DUNLOP & PENNEY (2012)). The first Ricinulei from the Mesozoic were described by WUNDERLICH 2012 in amber of the Mid Cretaceous tropical Burmese amber forest which existed 100 million years ago. Today the relic Ricinulei exists in Africa and South America in the single family Ricinoididae, in Eurasia they are extinct. In the Cretaceous in parts of Asia they were apparently diverse in structures and on family level: Taxa of four extinct families are known from a single (!) deposit, the Burmese amber - see WUNDERLICH (2012, 2015, 2017) and tab. 1 -: Hirsutisomidae WUNDERLICH 2017, Primoricinuleidae WUNDERLICH 2015, the new family Sigillaricinuleidae and questionable Poliocheridae SCUDDER 1884. (The family Monooculricinuleidae WUNDERLICH 2017 turned out to be a junior synonym of the Sandocanidae (Opiliones)).

Notes on the suborders of the orders Ricinulei and of the order Araneida which have something in common in certain respects: Sexual behaviour, prey capturing and modification of the pedipalpal structures DURING THEIR LONG-TERM EVOLUTION

The diagnostic characters of both orders are quite different if extant taxa are included and also extinct taxa of the Mid Cretaceous, the Burmese (Kachin) amber of Myanmar as well as of Carboniferous taxa. The distal structures of their pedipalpi are of special interest and importance because their function is quite different, and both differ distinctly in their suborders, too. Furthermore their phylogenetic position and branching are very different.

The sexual behaviour of the Arachnida is quite variable and frequently - like the sperm transfer – peculiar. An indirect transport of spermatophores is an ancient sexual behaviour of arachnids in which a penis is most often absent or not used for direct sperm transport (*).

In the Ricinulei the transport of such sperm balls is performed by modified articles of leg III. In members of this order the pedipalpus is used for prey capturing in both sexes. To my knowledge no (distinct) morphological sexual dimorphism of the pedipalpus exists in these animals in contrast to spiders (see below). Concerning the distal/apical structures of the pedipalpus exist two kinds; shape and structure are quite different in the fossil (Cretaceous) taxa of the suborder Primoricinulei and in fossil and extant members of the second suborder, the Posteriorricinulei, see below and WUNDERLICH (2015: 420), (2017: 52).

In the order Araneida the distal part of the male pedipalpus is modified for for the use of sperm transfer in a special way (a kind of sexual dimorphism): The end of the pedipalpus possesses two main parts, a cymbium and a bulbus, the latter takes over the sperm which is sucked from a sperm web. A special pointed/thin part of the bulbus, the embolus, transfers the sperm to the female genital opening, the epigyne. (Within the Araneae a transport by free spermatophores regained exceptionally in the family Telemidae).

(*) A PENIS which transfers sperm directly to the female genital opening exists in Opiliones, penis-like structures exist in several groups of Acari. Ricinulei possesses a small penis ventrally on petiolus - see TALARICO et al. (2008) – which does NOT transfer sperm directly to the female genital opening but may be used as a “spermapositor”, see below. In the Trigonotarbida a penis is - according to J. DUNLOP (person. commun.) - absent. In certain arachnids the SPERMATOPHORE is deposited on the ground (e. g., Scorpiones, Pseudoscorpiones) but frequently an extremity is used for a direct SPERM TRANSFER to the female genital opening: A leg, rarely the pedipalpus (see below) or the chelicerae (most Solifugae, certain Acari) - see TALARICO et al. 2008 -; in *Eremobates durangomus* of the Solifugae sperm is directly transferred from the male to the female genital opening, see WESTHEIDE & RIEGER (1996: 485) - a quite rare pattern in the Arachnida which is known only from certain Acari, too.

According to its mixture od apomorphic and plesiomorphic characters the Cretaceous suborder Primoricinulei is surely not a “connecting taxon” and not a very basal branch of the order. The basically large eyes, the large/stout articles of the pedipalpus (figs.1, 9-10) and probably the large/wide sternum (figs. 1, 9) are plesiomorphies, but the existence of an ENTIRE dorsal opisthosomal scutum, the absence of an unpaired tarsal claw and probably of teeth of the paired tarsal claws, apparently the not retractable tarsal claws - see SELDEN (1992) -, the single large pedipalpal claw (the fixed “finger” is absent) and their dwarfism are apomorphies.

Characters of the Ricinulei; see DUNLOP & PENNEY (2012: 96-97), WUNDERLICH (2017: 50-52) and - additionally based on fossil taxa in Burmit - the paragraph “variability ...” below.

The main characters of the Ricinulei - which may be fairly easily recognizable in fossils are ..

- a flattened (dorso-ventrally depressed) body (in some respects similar to certain mites),
- tarsi consisting of several segments (tarsus II is 5-jointed),
- leg II being distinctly the longest leg,
- a small pygidium (figs. 5, 10) (no spinnerets, no telson, no anal tubercle).

More difficult to recognize in fossils are:

- the absence of trichobothria and leg bristles (but see the regain in the family Sigillaricinulei, fig. 3!),
- an anterior prosomal hood-like movable cucullus which covers the mouth parts (figs. 8, 10) and may help to transport the egg case,

- a dorsally and ventrally strongly scutate (armoured) opisthosoma which edge may be fairly well recognizable at the margin (figs. 4, 10),
- tiny and hidden chelicerae (basal article and fang as well) (fig. 1),
- legs III and IV with double trochanters (fig. 2),
- metatarsus and tarsus III in adult males modified for sperm transfer as copulatory organ.

Note: The first stage (nymphs) of the Ricinulei possesses - like the Acari - three pairs of legs (the following stages of the Ricinulei are similar to adults), but to my knowledge juvenile Trigonotarbida have four pairs of legs like adult specimens (the first stage, too?). (not-adult spiders (Araneae), possess always 4 pairs of legs).

Variability of certain structures within fossil and extant Ricinulei (see also the suborders Primoricinulei and Posteriorricinulei, WUNDERLICH (2017: 52) and tab. 1):

(1) Extant Ricinulei possess only remains of eye lenses or none; most fossils possess paired eye lenses (fig. 5). (The existence of eye lenses of the Sigillaricinulei is unsure).
(2) The dorsal opisthosomal scuta in most extant and fossil Ricinulei are divided (fig. 5). usually longitudinally, too, but in the Cretaceous families - Hirsutisomidae, Primoricinuleidae and Sigillaricinuleidae - a single undivided dorsal scutum exists (fig. 8, photo 28).
(3) In these families the sternum is wide (fig. 11) in contrast to all other extinct and extant taxa.
(4) In the same families an unpaired tarsal claw is absent (fig. 2); see fig. 7.
(5) In the same families the pedipalpal articles are distinctly thickened and a fixed (ventral) “finger” is absent (fig. 9) but in the remaining extant and most (!) extinct taxa the pedialpal articles are slender and end in a chela (fig. 6).
(6) The body length of adult extant Ricinulei is almost 4 to 10 mm, the body length of Carboniferous specimens is up to 18 mm, the body length of Hirsutisomidae is 2.8 to 3.5 mm (♀) mm, the body length of the holotype of *Sigillaricinuleus tripares* n. sp. (Sigillaricinuleidae) is only 1.5 mm.

SIGILLARICINULEIDAE n. fam.

Etymology: The name refers to the dorsal opisthosomal openings (“sigilla”), from sigillum (lat.) = seal, sign, and the family name Ricinuleidae.

Character	Primoricinuleidae	Sigillaricinuleidae	Hirsutisomidae	?Poliocheridae
Sternum	wide (fig. 10)	wide	wide	narrow
fixed pedipalpal "finger"	absent (fig. 9)	absent (fig. 2)	absent	present (fig. 6)
unpaired tarsal claw	absent	absent (fig. 2)	absent	existing, blunt (fig. 7)
pedipalpal articles	strongly thickened (figs. 9-10)	strongly thickened (fig. 3)	strongly thickened	slender (fig. 8)
dorsal opisthosomal scutum	undivided	undivided (*) (photo 29)	undivided	divided (fig. 5)
dense dorsal opisthos. hairs	absent	absent	existing (fig. 8)	absent (fig. 5)
ventral pedipalpal outgrowth	absent	existing (fig. 3)	absent	absent

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(*) bearing three pairs of openings.

Tab. 1. Selected characters of the ricinuleid families in Burmese (Kachin) amber.

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

Diagnostic characters (♂; ♀ unknown): Opisthosoma (photo, fig. 4) completely covered with an entire scutum which dorsally bears quite short (bristle-shaped) hairs and three pairs of openings (apomorphy), eyes in two large triads (plesiomorphy), metatarsus I with a bristle (fig. 3) (apomorphy), sternum wide (fig. 1), probably about as long as wide (synapomorphy of the Primoricinulei), unpaired tarsal claw absent (synapomorphy of the Primoricinulei), paired claws relatively short and thick, placed at the end of the tarsus and not retractable (fig. 2), pedipalpal femur (fig. 1) with a bipartite ventral outgrowth (apomorphy), quite thick articles and most probably lacking immobile "finger" (apothele) (synapomorphy of the Primoricinulei).

Relationships: According to the undivided dorsal opisthosomal scutum, the wide sternum, the absence of an unpaired tarsal claw, the not retractable tarsal claws, the quite thick pedipalpal articles and – most probably – the absence of an immobile pedipalpal "finger" Sigillaricinuleidae is a member of the suborder Primoricinulei WUNDERLICH 2015. In contrast to the remaining families of the Primoricinuei - Hirsutisomidae and Primoricinuleidae - the opisthosoma bears dorsal (openings), the shorter, thicker and not retractable tarsal claws are placed at the end of the articles and the pedipalpal femur bears a ventral outgrowth. Further differences: See tab. 1 and the description below.

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

Sigillaricinuleus n. gen.

Etymology: See above.

Types species (by monotypy): *Sigillaricinuleus tripares* n. sp.

The gender of the name is masculine.

Diagnosis, **relationships** and **distribution**: See above.

Sigillaricinuleus tripares n. gen. n. sp. (figs. 1-4), photos 28-29

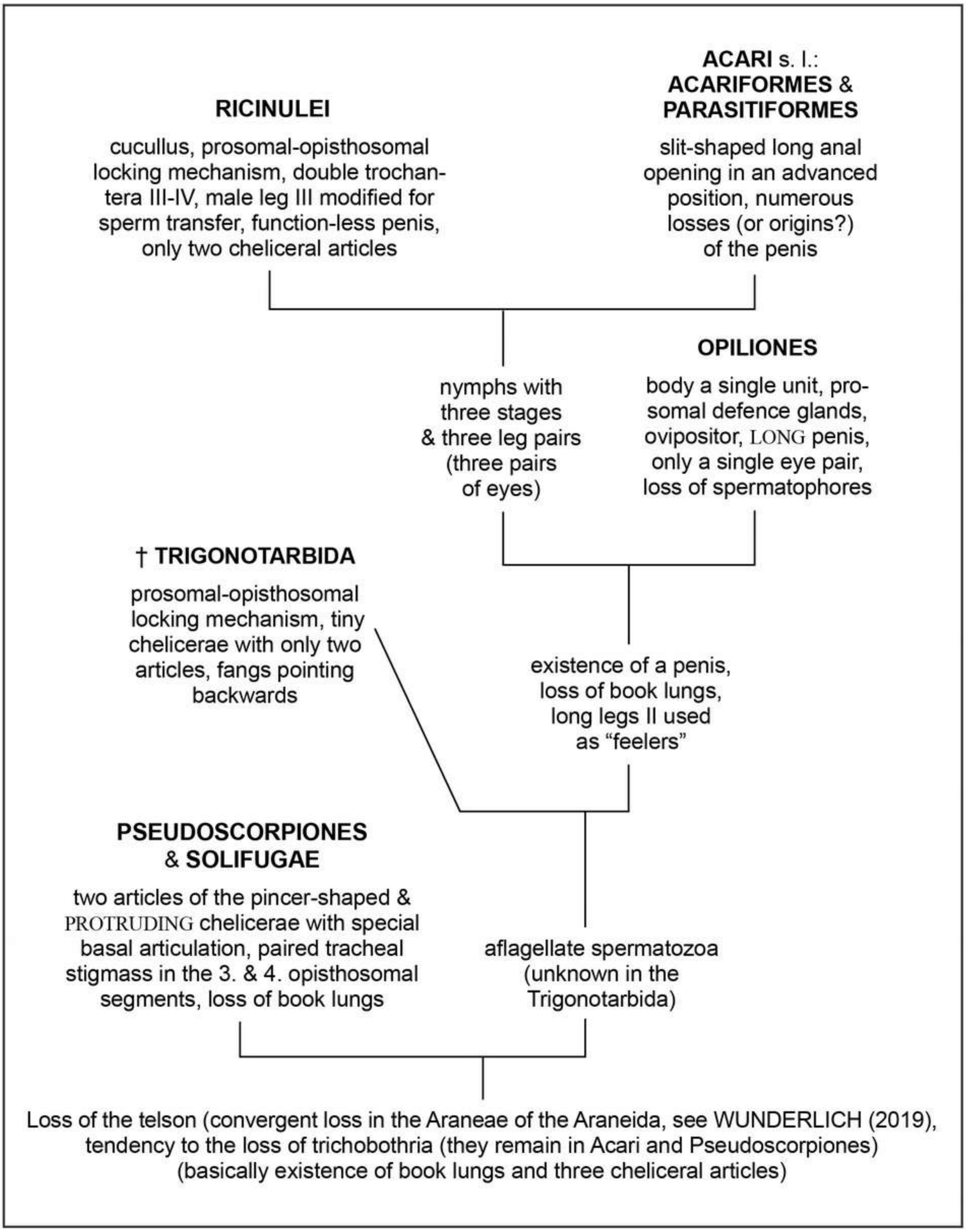
Etymology: The species name refers to the three pairs of dorsal opithosomal “sigillae”, from tri (lat.) three and par (lat.) = pair.

Material: Apparently inad. juvenile in Upper (Mid) Cretaceous Burmese (Kachin) amber from Myanmar (Burma), holotype, F3690/BU/CJW.

Preservation and syninclusions: the specimen is almost completely and partly well preserved in a clear yellow-orange piece of amber, most eyes are hidden, right parts of the prosoma – including parts of the cucullus -, the distal articles of the left leg I and lateral parts of the left femur IV are lost, three air bubbles exist ventrally, a large air bubble is preserved between some left legs. - Syninclusions are numerous ring-shaped sporangia (ferns), several small plant hairs, a tiny piece of amber, two Acari larvae (the slender one is quite tiny), two small and slender eggs of insects below the spider's opisthosoma, tiny crumbled remains of an arthropod, numerous small pebbles and tiny air bubbles as well as particles of detritus. - Note: The large number of sporangia may indicate that the specimen lived near the ground.

Diagnosis, relationships and distribution: See above.

Description (?juv.):
Measurements (in mm): Body length 1.5; prosoma: Length 0.55, width 0.47; opisthosoma: Length 1.0, width0.75; legs deformed and partly difficult to observe, IV: Femur 0.25, patella 0.22, tibia 0.27, metatarsus 0.18, tarsus 0.2.
Colour (photo) medium brown, legs not annulated.
Prosoma (fig. 1, photos) 1.17 times longer than wide, almost smooth and flat, bearing few quite short hairs, fovea absent, eye lenses most probably absent, cucullus wide, chelicerae quite small, two-jointed, bearing tiny fangs, pedipalpi with thick articles, bearing basally a bipartite ventral outgrowth, movable “finger” (apotele) long and strongly bent, fixed “finger” apparently absent, gnathocoxae long and contiguous, sternum large, spacing widely the coxae I-III. - Legs (figs. 2-3, photos; several articles are deformed or absent, most articles are bent under the body): Four pairs, slender and fairly long, order II/I/IV/III, tarsi I and IV with 5 segments, III with 4 segments, trichobothria absent, bristles almost absent, I recognized only a single prodorsal bristle in the distal half of the right metatarsus I (probably a regain), unpaired tarsal claws absent, paired claws long and broad, placed at the end of the articles, not retractable into a tarsal inclination, tiny teeth existing, distal tarsal segments ventrally with slightly flattened hairs – Opisthosoma (fig. 4, photos) 1.33 times longer than wide, flattened, bearing quite short (spine-shaped) dorsal and ventral hairs, dorsally and ventrally completely covered with an undivided scutum, dorsally with three pairs of openings (holes) within low depressions, which are similar to sigillae but may be outlets of glands: One opening is surrounded by a questionable secretion; pygidium small (retracted), bearing longer hairs but no bristles. - Pedipalpus: See above.



Tab. 2. Possible relationships of the order Ricinulei
See WESTHEIDE & RIEGER (1996: 450-451).

Notes on tab. 2:

(1) The most basal characters are listed. - Acari s. l. (probably two separate orders exist) possesses the most diverse characters of the Arachnida orders, some are even worm-shaped, the anal opening may be situated posteriorly, the chelicerae are quite variable, in advanced taxa leg I may be the longest but not leg II, the reproduction is very variable, spermatophores or a penis may be present.

(2) The relationships of the extinct Trigonotarbida are enigmatic, see DUNLOP & PENNEY (2012: 100). This Carboniferous order is unknown from the Burmese amber forest. According to the similar armoured and flattened opisthosoma, the prosomal-opisthosomal locking mechanism and the absence of trochobothria – both are shared with the Ricinulei – this order has occasionally been regarded as the sister taxon of the Ricinulei, but numerous important differences exist: Book lungs are present in the Trigonotarbida, their trochanters are not doubled, leg II is not lengthened, a cucullus and a penis are absent and the inadults are apparently different; the existence of spermatophores is unknown. The position of the fangs is parallel in the Trigonotarbida similar to mygalomorph spiders, therefore their tips are directed backwards; in Ricinulei the fangs are directed against each other. Interestingly in the Trigonotarbida as well as in the Ricinulei two kinds of pedipalpal claws exist, see DUNLOP (2009). - The LOCKING-MECHANISM: I suppose that this mechanism evolved convergently in both orders. - The PENIS: To my knowledge the present branch is the only arachnid branch in which a penis exists. It is remarkable that the kind and the function of the penis are quite different: It is large in the Opiliones, function-less? - or used as a “spermapositor”? - in the Ricinulei and quite variable in the (certain) Acari s. l. (penis-SHAPED structures only?). Was the penis lost in the Trigonotarbida in which spermatophores are unknown? Did these animals copulate opisthosoma to opisthosoma, transferring sperm through their ventral genital openings directly like few Solifugae (see above) and certain Acari s. l.? - The LUNGS (see also above): The existence of these organs is an ancient (apomorphic) character of the Arachnida, already existing in the scorpions. They are absent in almost all members of the present arachnid branch, remaining only in the Trigonotarbida. In my opinion lungs were lost two times separately (see tab. 2), If lungs had been lost basically (as an apomorphy) in the present branch their existence in the Trigonotarbida would be a reversal. A reversal of these organs appears quite unlikely to me.

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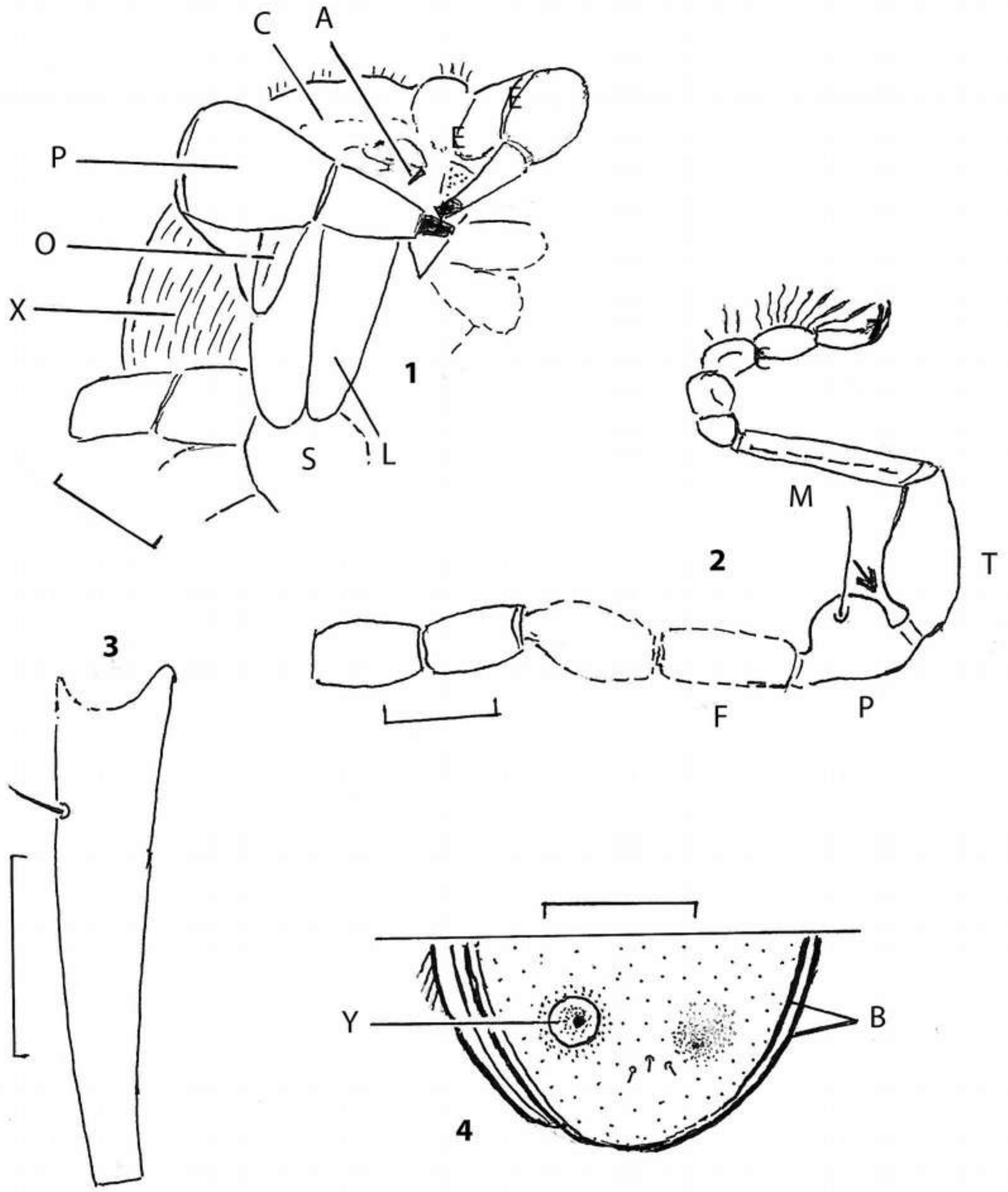
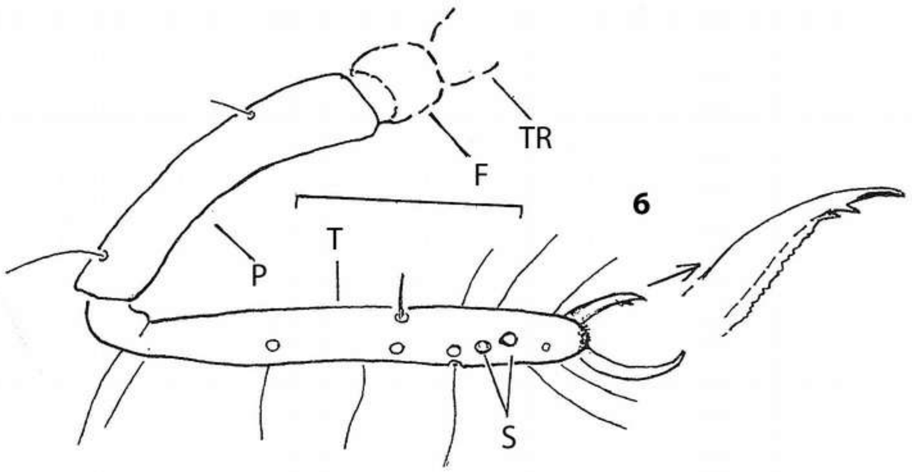
– (2019): What is a spider? – Beitr. Araneol., 12: 1-32.

WUNDERLICH, J. & MÜLLER, P. (2018): Fossil spiders (Araneae) in Cretaceous Burmese amber. – Beitr. Araneol., 11: III-IV, 1-177.

– (2020): New and already described fossil spiders (Araneae) of 20 families in Mid Cretaceous Burmese amber with notes on spider phylogeny, evolution and classification. – Beitr. Araneol., 13: 22-64, 132.



figs. 1-4: *Sigillaricinuleus tripares* **n. gen. n. sp**. (Ricinulei: Sigillaricinuleidae **n. fam**.), holotype; 1) ventral aspect of the anterior part of the prosoma; parts – mainly of the chelicerae – are hidden; in black: The movable “fingers”; 2) retrolateral aspect of the partly hidden right leg III; the arrow points to distinct deformations; 3) dorsal aspect of the right metatarsus I which bears a single bristle; 4) dorsal and slightly right aspect of the posterior part of the opisthosoma. - A = left fang, B = ventral and dorsal borders (margins) of the opisthosomal scuta, C = remains of the cucullus, F = femur, L = left gnathocoxa, M = metatarsus, O = ventral femoral outgrowth of the right pedipalpus, P = patella, S = sternum, T = tibia, X = peltidium and lost part, Y = cover (questionable secretion) around the right posterior opisthosomal opening. - Scale bars 0.2 mm in fig. 4, 0.1 in the remaining figs.;



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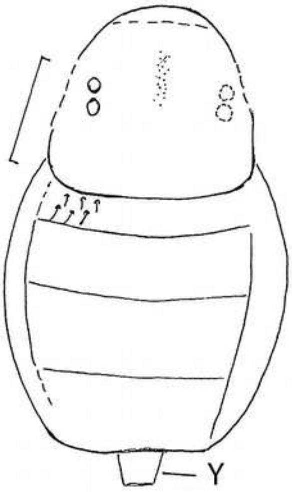

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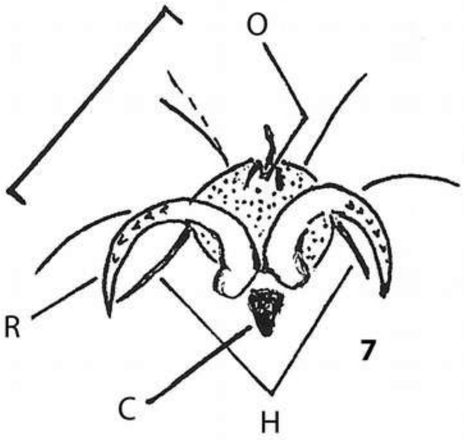

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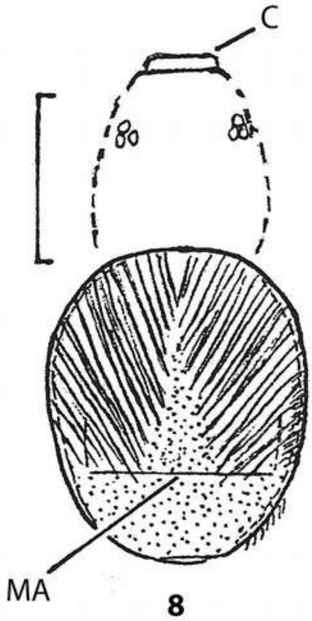

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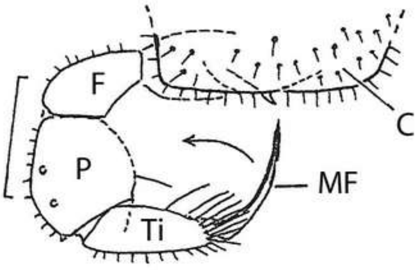
figs. 5-7: ?*Poliochera cretacea* WUNDERLICH 2012 (Poliocheridae), nymph; 5) dorsal aspect of the body; 6) prolateral and slightly dorsal aspect of the right pedipalpus which is folded in its natural position. The fixed “finger” of the pincer (arrow) is enlarged to show the teeth; 7) apical aspect of the right tarsus IV with its claws. Only few long hairs are drawn. - C = strongly sclerotized cone-shaped modified unpaired claw, F = femur, H = stiff setae, O = dorsal-apical outgrowth, R = right paired tarsal claw, P = patella, S = sensory pits, TR = trochanter. Scale bars: 0.1 in fig. 5, 0.2 in figs. 6-7;

fig. 8) *Hirsutisoma bruckschi* WUNDERLICH 2017 (Hirsutisomidae), ♂, dorsal aspect of the body. - C = cucullus, MA = VENTRAL opisthosomal margin. Scale bar 1.0;



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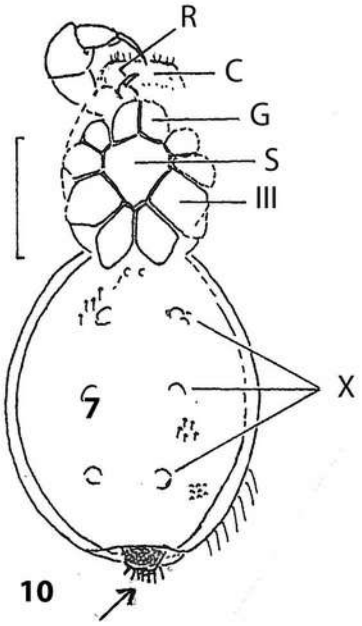

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figs. 9-10: <u>*Primoricinuleus pugio*</u> WUNDERLICH 2015 (Primoricinuleidae), nymph; 11) ventral aspect of the body; 12) dorsal and slightly anterior aspect of the right pedipalpus and the anterior part of the cucullus. The arrow points to the small bristles of the pygidium. - C = cucullus, F = femur, G = gnathocoxa, MF = movable "finger", O = coxa, P = patella, R = right fang, S = sternum, Ti = tibiotarsus, X = three paired ventral opisthosomal strunctures of unknown function. Scale bars 0.5 and 0.2.

THE PHOTOS

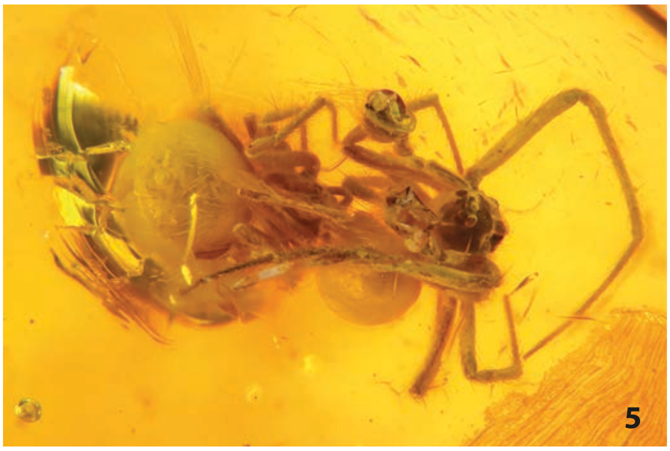
Most photos are taken by Patrick Müller; only photos no.1 of the extant *Cheiracanthium* and the two photos of *Eotrechalea* were taken by Jörg Wunderlich.

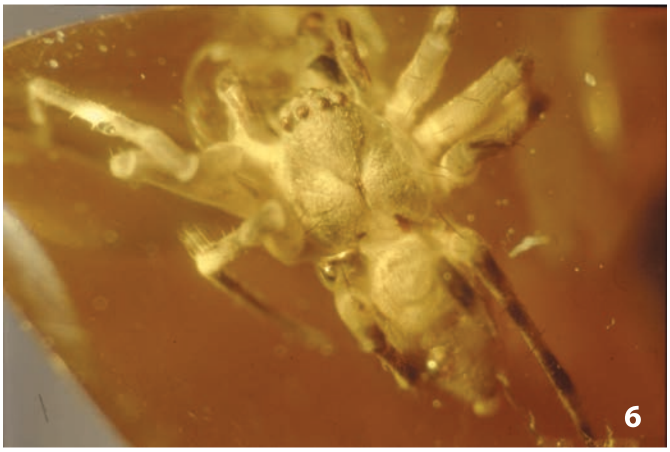
Material: CJW = coll. of Jörg Wunderlich: CPM = coll. of Patrick Müller.

If not otherwise noted the photos refer to holotypes.

The photos of the spiders (Araneida) – as well as a Ricinulei at the end – are grouped in the following order:

1: An extant spider from Portugal.
2-9: Preserved in Eocene Baltic amber, p.199.
10-25: Preserved in Mid Cretaceous Burmese (Kachin) amber, p. 200.
26-27 Preserved in Early Miocene Mexican amber, p. 203.
28-29: Preserved in Mid Cretaceous Burmese (Kachin) amber (Ricinulei), p. 203.





1) ***Cheiracanthium algarvense*** WUNDERLICH 2012 (Cheiracanthidae), CJW, ♂ (not the holotype), dorsal aspect of the body which is 4.8 mm long, extant, Portugal (Algarve);

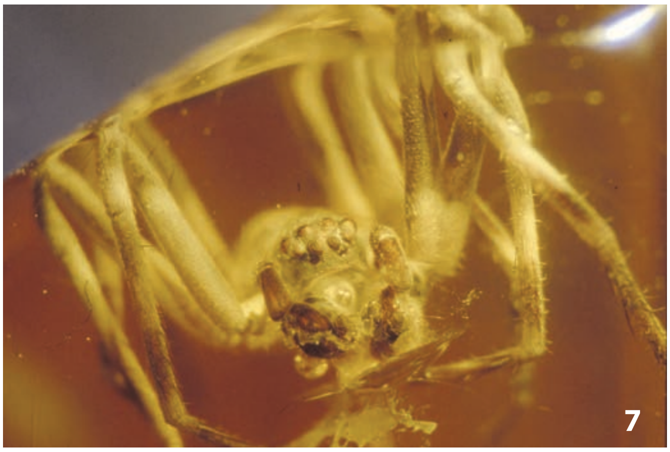
2) ***Acrometa gibbosa*** **n. sp**. (Synotaxidae), F3709/BB/CJW, ♂ in Baltic amber, body length 3.3 mm, lateral aspect;

3) ***Acrometa longisetae*** **n. sp.** (Synotaxidae), F3707/BB/CJW, ♂ in Baltic amber, body length 2.2 mm, dorsal aspect;

4) ***Balticosynotaxus angulatus*** **n. sp**. (Synotaxidae), F3700/BB/CJW, ♂ in Baltic amber, body length 2.4 mm, lateral aspect;

5) ?***Sulcosynotaxus matrimonium*** **n. sp.** (Synotaxidae), F3702/BB/CJW, Baltic amber, ♂

6-7) ***Eotrechalea darrellubick*** **n. sp**. (Zoropsidae s. l.), F1361/BB/CJW, ♂ in Baltic amber, body length 4.6 mm, dorsal and anterior aspects.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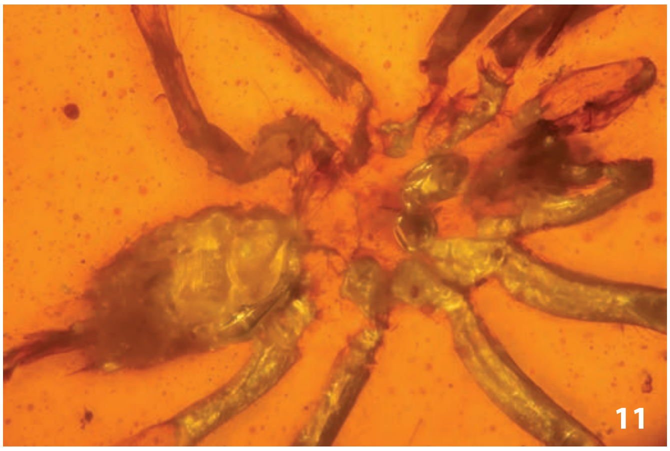
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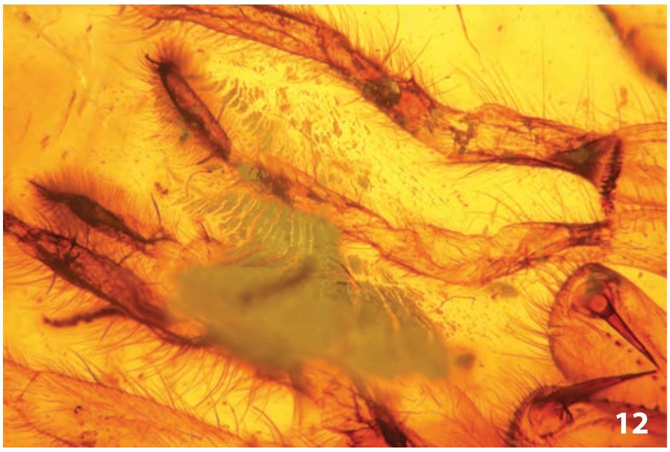
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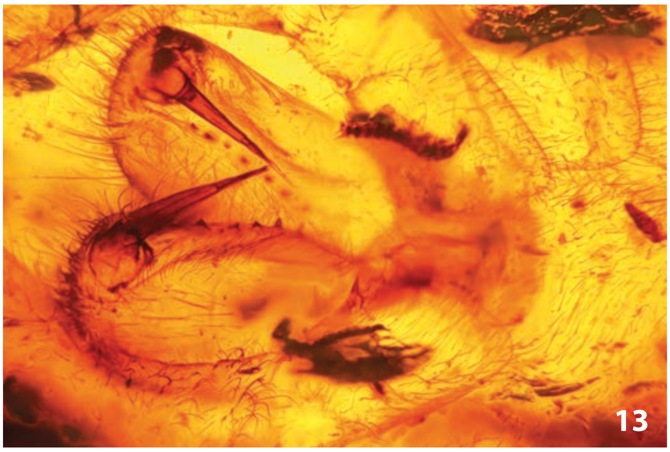
8) ***Laccolithus petrunkevitchi*** **n. sp**. (Phrurolithidae), F3683/BB/CJW, ?ad. ♀ in Baltic amber, body length 4.3 mm, lateral aspect;

9) ***Balticodromus porrectus*** **n. gen. n. sp.** (Philodromidae), F3682/BB/CJW, ♀ in Baltic amber, body length 2.8 mm, lateral aspect;

10-11) ***Parachimerarachne longiflagellum*** **n. gen. n. sp**. (Araneida: Chimerarachnida: Chimerarachnidae), F3726/BU/CJW, ♂ in Burmese (Kachin) amber, body length 2.0 mm, dorsal and ventral aspects. Note the slender and extremely long tail which is three times the body length. A needle-shaped artefact is preserved near the tip (arrow in fig. 10) of the tail. The spinnerets at the base of the tail are only badly preserved and recognizable;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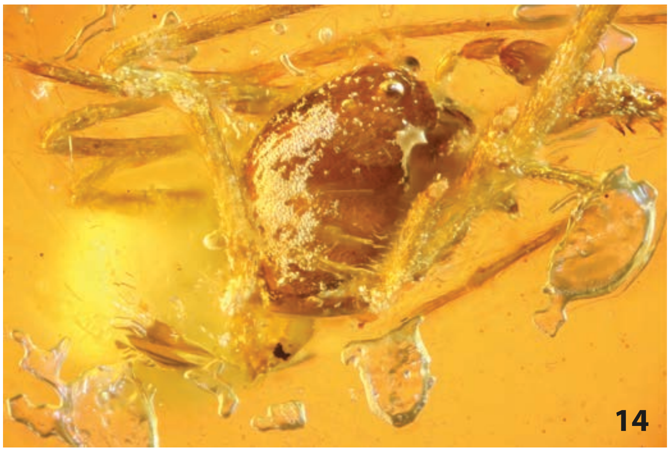
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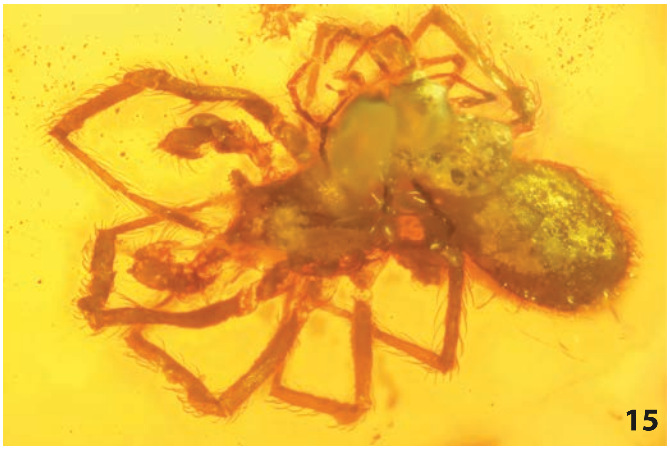
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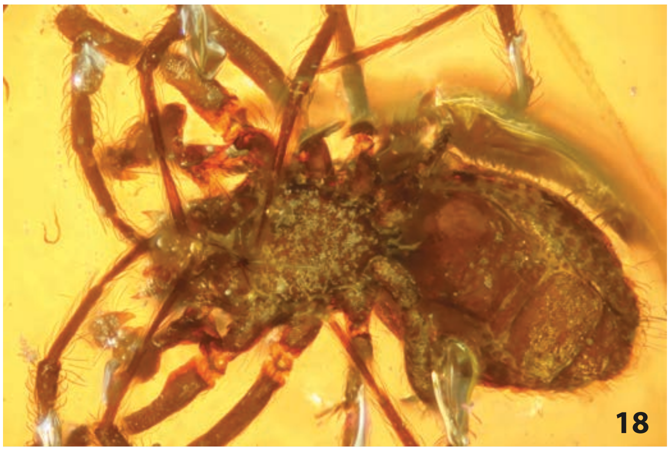
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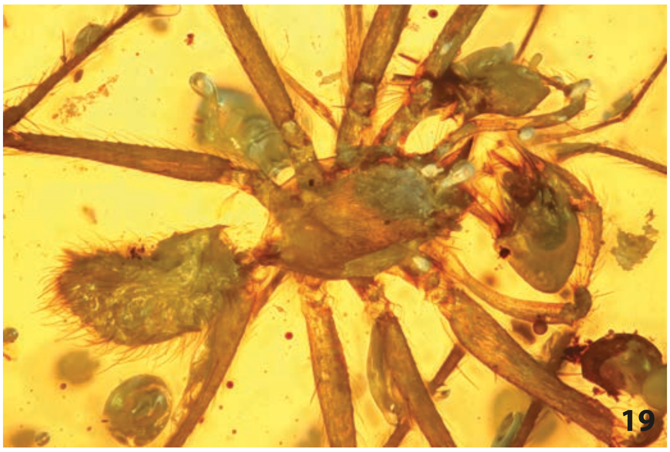
12-13) **Mygalomorpha indet.**, F3710/BU/CJW, exuvia in Burmese (Kachin) amber, length > 10 mm, ventral aspects of the anterior part of the spider and chelicerae;

14) ***Praetervetiator parvicirculus* n. sp.** (Vetiatoridae), F3689/BU/CJW, ♂ in Burmese (Kachin) amber, body length 1.75 mm, dorsal-right aspect of the body; the opisthosoma (left) is out of focus;

15) ***Claspingblemma duospinae* n. gen. n. sp.** (Tetrablemmidae), F3719/BU/CJW, ♂ in Burmese (Kachin) amber, body length 1.5 mm, dorsal aspect of the body;

16) ***Electroblemma acuminataformis* n. sp.** (Tetrablemmidae), F3721/BU/CJW, ♂ in Burmese (Kachin) amber, body length 1.25 mm, lateral aspect of the body;

17-18) ***Procerclypeus corniculatus* n. sp**. (Tetrablemmidae), F3722/BU/CJW, ♂ in Burmese (Kachin) amber, body length 2.2 mm, dorsal and ventral aspects of the body;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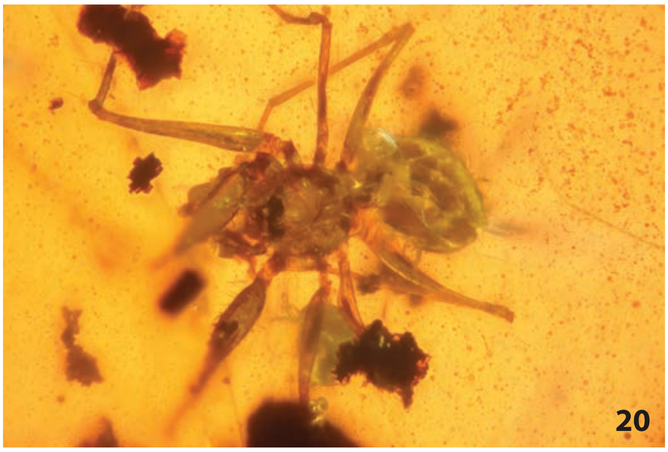
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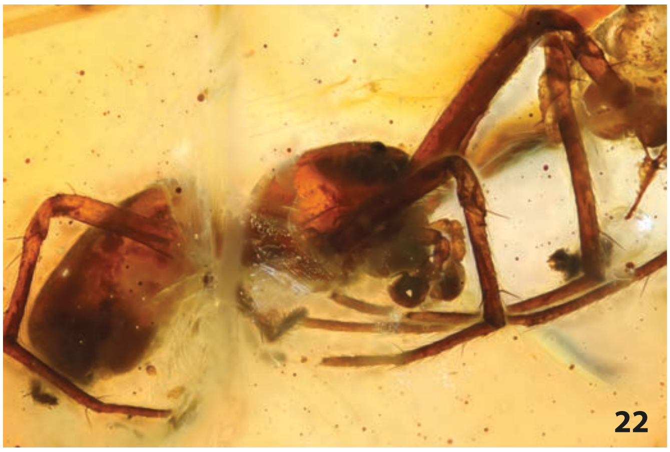
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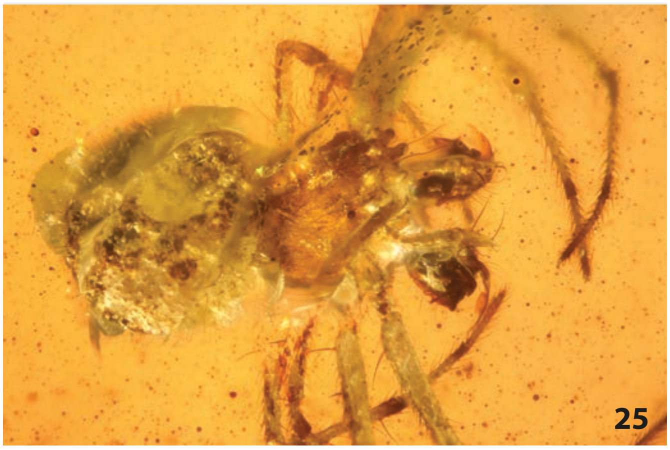
19) ***Palaeoleptoneta acus* n. sp**. (Leptonetidae), F3688/BU/CJW, ♂ in Burmese (Kachin) amber, body length 1.6 mm, dorsal aspect of the body;

20) ***Kachintelema calcarfemur* n. gen. n. sp**. (Telemidae), F3725/BU/CJW, ♂ in Burmese (Kachin) amber, body length 1.1 mm, dorsal aspect of the body;

21) ***Praeteraraneoides multidentatum* n. sp**. (Protoaraneoididae), F3716/BU/CJW, ♂ in Burmese (Kachin) amber, body length 1.8 mm, dorsal aspect of the body;

22) ***Microuloborus ater* n. sp**. (Uloboridae), F3711/BU/CJW, ♂ in Burmese (Kachin) amber, body length 1.75 mm, lateral aspect of the body;

23-24) ***Propterkachin pygmaeus* n. sp**. (Uloboridae), F3715/BU/CJW, ♂ in Burmese (Kachin) amber, body length 1.6 mm, dorsal left aspect; enlarged;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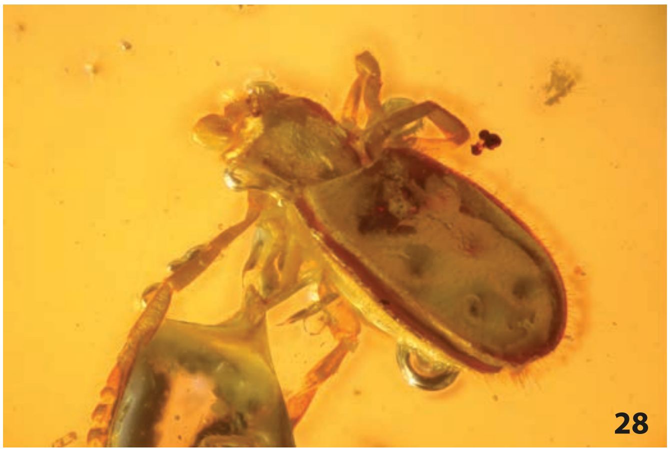
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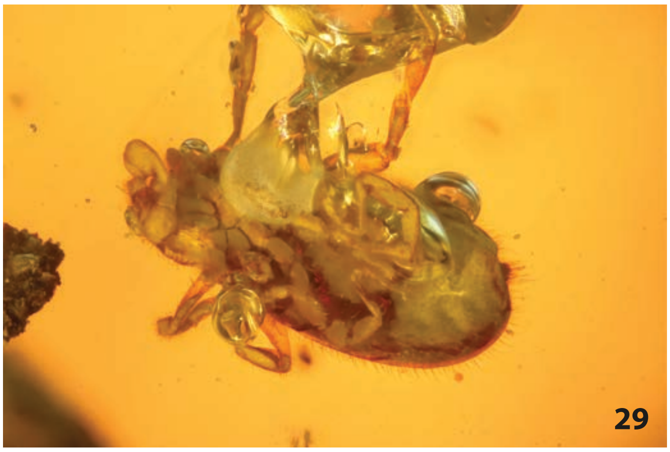
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25) ***Palptibiaap cochlear* n. gen. n. sp**. (Zarqaraneidae), F3727/BU/CJW, ♂ in Burmese (Kachin) amber, body length 1.25 mm, dorsal aspect of the body;

26) ***Araneometa procera* n. sp.** (Tetragnathidae), CPM Mex. B 1, ♂ in Mexican amber, body length 2.6 mm, dorsal aspect of the body;

27) ***Chrosiotes chiapas* n. sp**. (Theridiidae), CPM Mex. B 2, ♂ in Mexican amber, body length 1.35 mm, dorsal aspect of the body;

28-29) ***Sigillaricinuleus tripares* n. gen. n. sp.** (Ricinulei: Sigillaricinuleidae), F3690/BU/CJW, in Burmese (Kachin) amber, inadult, F3690/BU/CJW, body length 1.5 mm; dorsal and ventral aspects of the body.

BEITR. ARANEOL., 15: 205-210 (2022)

EPILOG: Gendereien und Rassenhass

JÖRG WUNDERLICH, joergwunderlich@t-online.de

(1) Unwissenschaftliche GENDEREIEN betr. Spinnen, Menschen, andere Tiere und Pflanzen

Auf die „Diskriminierung“ des weiblichen Geschlechts durch „Angst einflößende“ Tiere wie DIE Spinne habe ich bereits früher hingewiesen, siehe “Pfui Spinne - Linguistische Gendereien”, Beitr. Araneol., 15: 456 (2015), „Pfui Spinne“. Als DIE “blöde Kuh” wird nie ein Mann bezeichnet, und zum “stolzen Adler” existiert meines Wissens kein weiblicher Gegenpart. Ein Blick in die Vergangenheit: Vor mehr als eineinhalb Jahrhunderten hat der renommierte Arachnologe A. MENGE (1854) die beschriebenen männlichen Spinnen als „Mann“ bezeichnet, die weiblichen Spinnen dagegen geschlechtsneutral als „(DAS) Weib“. - (Wie) lässt sich für Spinnen eine geschlechtsneutrale Bezeichnung finden? Ist sie wünschenswert? Existieren unwichtigere Fragestellungen? Führen geschlechtsneutrale Bezeichnungen tatsächlich wesentlich zu einer Emanzipation der Frau? Siehe auch den unten stehenden Beitrag.

Bemerkenswert sind die geschlechtlichen Zuordnungen bei Spinnen und Pflanzen:
Für Spinnennamen gilt grundsätzlich das weibliche Geschlecht: Die Kreuzspinne, die Wolfspinne, die Springspinne,…. Die überwiegende Anzahl der Namen der Blütenpflanzen – etwa der Bäume - ist ebenfalls weiblichen Geschlechts: Die Aster, Eiche, die Nelke, die Tulpe, die Rose, die Strelitzie; die geschlechtliche Zuordnung anderer Namen von Blütenpflanzen - wie der Raps der Enzian oder das Vergissmeinnicht - sind vergleichsweise selten. Sprachwissenschaftler werden die Ursache dieser unterschiedlichen Verteilung kennen. Wieso sind fast alle Namen der Gräser männlich: Hafer, Mais, Reis, Roggen, Weizen; DIE Gerste ist die Ausnahme. Somit ist das Geschlecht der SCHÖNEN Blütenpflanzennamen ganz überwiegend weiblich, dasjenige der allermeisten Getreidearten, die für die menschliche Ernährung von enormer Bedeutung sind, ist bemerkenswerterweise dagegen männlich.

(2) DER RASSENHASS UND DAS RASSEWEIB – GEDANKENSPLITTER

Bin ich ein Rassist? Das mögen sich Menschen fragen, sofern sie negativ besetzte Wörter wie Schwarzfahrer oder Schwarzseher benutzen, die manchem diffamierend erscheinen. Andere fragen: Kann es überhaupt Rassisten geben, wenn doch gar keine menschlichen Rassen existieren??

“Nur drei Jahre ist es her, dass man deutschen Rassismus am Beispiel von Özil studieren konnte.” (M. FELDENKIRCHEN in DER SPIEGEL Nr. 29, 2021). War tatsächlich *DIE RASSE* Mesut Özils' als “deutsche Rassismus-Variante” (M. F.) gemeint? Der türkisch-stämmige deutschsprachige Fußballspieler Özil ließ sich mit mit dem religiös-ideologischen türkischen Ministerpräsidenten ablichten. Ich bin verwirrt! Für Antworten sehe ich schwarz – äh, nicht sehr hell. Welcher “Rasse” gehört Özil an? Die begriffliche Verwirrung zum Begriff *RASSE* in gewissen Organen der Medien – nicht nur hinsichtlich der Zitate von M. F. - könnte kaum größer sein! Unbedacht und inkorrekt werden alle möglichen Arten von Diffamierung/Herabsetzungen, forsch als “Rassismus” bezeichnet, obwohl es sich um nichts anderes als Hass gegenüber Andersdenkenden bzw. Fremden handelt. In den USA – man denke an den Ku-Klux-Klan – bezieht sich der Begriff „Rassenhass“ eher auf dunkelhäutige Menschen wie ursprünglich auch bei uns. Inzwischen hat in Deutschland ein bemerkenswerter Bedeutungswandel des Begriffes stattgefunden: Hier ist heute eher eine allgemeine Diskriminierung und Herabsetzung gemeint, die nicht nur Dunkelhäutige betrifft.

“*MENSCHLICHE RASSE*”: Im Gegensatz zu früher wird der Begriff heute - außer von Anhängern der AFD – kaum noch verwendet, wohl aber diskutiert. Allerdings benutzen zahlreiche Autoren unbedacht den Begriff “Rasse”, z. B. HARRARI (S. 271): “So haben wir inzwischen gelernt, dass keine RASSE einer anderen überlegen ist, ...” (*). Abgesehen von der inkorrekten Verwendung – etwa der nicht existierenden “Arischen Rasse”, der “Semitischen Rasse” (Sprachgemeinschaften) oder der “Slawischen Rasse” in der Nazi-Ideologie (“Rassentheorie”) – existieren umgangssprachlich vieldeutige und unklare Bezeichnungen wie Haustier”*RASSEN”* (siehe unten) oder menschliche Schwarze “*RASSE”.*

Im Folgenden versuche ich eine begriffliche Klärung von “Rasse” und notwendigerweise auch von ”Art”. (1) Beide sind lediglich in ihrer Beziehung zueinander hinreichend verständlich. Der biologische Rassebegriff ist den meisten Nicht-Biologen ganz offenbar nicht leicht zu vermitteln; seine Klärung ist für ein Verständnis allerdings unerlässlich (Pflichtlektüre für AFD-Anhänger!) (2). Die Ursachen für Verständnis-Schwierigkeiten sind vor allem die folgenden: Die enorme zeitliche Dimension der Entwicklung (Evolution) – Jahrtausende, Jahrmillionen - ist nur schwer vorstellbar und begreifbar. Biologische Arten (Spezies) sind definiert als eigenständige Fortpflanzungsgemeinschaften, wobei auch relativ nahe stehende Arten wie Katze und Hund, die einen gemeinsamen ausgestorbenen Vorfahren besitzen, sich nicht miteinander paaren bzw. sich nicht kreuzen. Sehr nahe verwandte Arten wie der heutige Mensch (Homo sapiens) und der Neandertaler haben allerdings - nur gelegentlich und ausnahmsweise! - Erbanlagen ausgetauscht, siehe weiter unten.

Biologische Arten bestehen IMMER aus Gruppen (Populationen) und sind nicht statisch zu verstehen: Während einer langen Folge der Entwicklung – Generation für Generation – können sich durch Erbänderungen (Mutationen) innerhalb von Arten verschiedene Rassen entwickeln. Diese können noch gemeinsame Nachkommen haben und sich später sogar zu eigenständigen - nicht kreuzbaren - Arten entwickeln: Dann sind aus einer ursprünglichen Art zwei Folgearten entstanden.

Da dieser Vorgang der Artaufspaltung (Gabelung, Verdopplung) allmählich („fließend") abläuft, KANN eine Abgrenzung der daraus hervor gehenden "Formen" zu weiter entwickelten Rassen und schließlich zu Arten nicht immer klar abgrenzbar sein. Biologische Evolution ist in dieser Hinsicht nicht vergleichbar mit technischen Entwicklungen wie z. B. diejenigen zu gewöhnlich klar abgrenzbaren Automarken!

Eine derartige Differenzierung (Aufspaltung von Arten) lässt sich analog am Beispiel der Entwicklung (Evolution) von Sprachen in verblüffender Weise näherungsweise veranschaulichen. Beginnen wir im Kleinsten, mit dem Gebrauch unterschiedlicher Wörter, *"sprachlichen Neuschöpfungen",* die selbst in direkt benachbarten Dörfern (eigenständigen Populationen) benutzt werden. Diese mögen biologischen Mutationen entsprechen. In verschiedenen Regionen - Bundesländern oder ihren Teilen - werden vielfach eigene *Dialekte* gesprochen, etwa in Sachsen oder Bayern bzw. Franken. Ursachen hierfür sind "sprachliche Neuschöpfungen" entstanden in räumlich getrennten Gebieten. Aus Dialekten (vergleichbar mit biologischen Lokalformen oder sogar *Rassen*, siehe unten) können sich schließlich eigenständige Sprachen wie das Friesische entwickeln, entsprechend biologischen *Arten*. Sprachgemeinschaften wie die Indogermanische können grob mit höheren biologischen Kategorien - wie Gattungen oder sogar Familien - verglichen werden.

Religiöse Ideologen und gewisse Philosophen haben die heute lebende Menschenart (den Homo sapiens) früher als einzigartig dem "Tierreich" gegenüber gestellt, obwohl der Mensch eindeutig nichts anderes ist als eine dem Tierreich zugehörige Art aus der Gruppe der Menschenaffen (zu der auch die nächst-verwandte Art gehört, der ausgestorbene Neandertaler). In diesem Zusammenhang ein Gedankenexperiment: Wären Ameisen Angehörige einer intelligenten Zivilisation, würden sie sich wohl als einzigartig dem gesamten "Tierreich" gegenüber stellen? (Somit Ameisen - und andererseits Tiere).

Biologische Rassen sind bei Tieren und Pflanzen keineswegs die Ausnahme, sondern eher die Regel; dazu existiert eine umfangreiche Literatur. So gibt es etwa bei der Kohlmeise neben der weithin bekannten europäischen Rasse noch drei weitere Rassen in Asien, die sich nach Färbung, Erbanlagen und Verbreitung unterscheiden, und die sich teilweise miteinander vermischen (kreuzen) (*).

Haustier"rassen" sind dagegen KEINE Rassen, obwohl der allgemeine Sprachgebrauch in verwirrender Weise darauf hinweist: Es handelt sich um künstlich – teilweise als Missbildungen – gezüchtete "Formen", die meist in nur wenigen Jahrhunderten oder sogar Jahrzehnten aus dem Wolf hervorgegangen sind. - "Rasseweib" wird zwar sexistisch benutzt, ist allerdings durchaus positiv gemeint und hat mit Rassismus gewiss nichts zu tun. Siehe auch den oben stehenden Beitrag.

Zurück nach diesen Umwegen zum Rassebegriff beim Menschen. Inwiefern lassen sich Menschen als Angehörige verschiedener Rassen klassifizieren - oder eben nicht? In diesem

Zusammenhang lohnen sich historische wie auch evolutive Rückblicke. Nach archäologischen Funden haben Menschen Jahrhunderttausende lang in KLEINgruppen von einigen Dutzend oder weniger gelebt. In der Folge der “landwirtschaftlichen Revolution” vor nicht mehr als 10 000 Jahren - siehe HARARI (*) - haben sich ERSTMALS in umfangreicheren menschlichen Großgesellschaften Hierarchien herausgebildet und Menschen wurden in künstliche Gruppen und „Schichten“ eingeteilt; Macht und Privilegien konnten damit verteilt werden, etwa im Kastensystem Indiens bis heute. Bereits im Jahre 1776 vor Beginn der Zeitrechnung teilten die Gesetze des Hammurabi - König in Babylon - Menschen ein in Freigeborene, Gemeine und Sklaven. 3 ½ Jahrtausende später (1776 nach Beginn unserer Zeitrechnung) teilten die Siedler in Nordamerika in der Unabhängigkeitserklärung die – im wesentlichen männliche (!) – Bevölkerung ein in bevorrechtigte “WEISSE” und andererseits in diskriminierte und unterdrückte “SCHWARZE” (häufig Sklaven) und “INDIANER”. Spätestens in dieser künstlichen Aufteilung scheint mir eine der Ursachen zu liegen, die bis zur heutigen Rassendiskriminierung reicht. Für Hammurabi war das “Sklaventum” ein Teil der „göttlichen Ordnung“. Aber auch viel später noch haben nach Aristoteles Sklaven eine “Sklavennatur” und Freie eine “freie Natur”; ihre gesellschaftliche Stellung war ein Ausdruck ihrer “wahren Natur”. Rassisten behaupten, dass Angehörige der “weißen Rasse” denjenigen der “schwarzen Rassen” überlegen seien, sie seien VON NATUR AUS intelligenter, moralischer und fleißiger, siehe HARARI, S. 169f (**). Zwar wurden (und werden) immer wieder Intelligenzunterschiede sogar bis gegen Ende des vergangenen Jahrhunderts diskutiert und sogar gestützt auf “wissenschaftliche Studien”, siehe z. B. Berichte in DIE ZEIT (!) aus den 70-er Jahren (D. E. Zimmer). Derartige Unterschiede wurden aber nicht bestätigt und haben nichts zu tun mit fraglos existierenden Unterschieden beider, etwa nach Hautfarbe, Haarform und sogar nach bemerkenswerten Abschnitten des Erbgutes: Im Gegensatz zu allen (!) indigenen Afrikanern besitzt das Erbgut aller übrigen heute lebenden Menschen ca. 3% des Erbgutes des Neandertalers. Offenbar fand gelegentlich – wohl vor mehr als 30 000 Jahren - außerhalb Afrikas, vermutlich in Europa, eine Vermischung beider nahe verwandter Arten statt, des Sapiens und des nahe verwandten Neandertalers, der Afrika nicht besiedelte. Wir „weiße“ Europäer - wie etwa auch Inder und Chinesen - sind somit die überlebende Mischform zweier unterschiedlicher Arten, also eigentlich Mischlinge, wobei das Erbgut des sapiens bei weitem überwiegt.

Der Tradition folgend wurde z. T. noch im 20. Jahrhundert eine – bereits damals – umstrittene, grobe und unzureichende Einteilung nach menschlichen “Großrassen” oder “Rassenkreisen” diskutiert (wobei sehr starke Pigmentierung der menschlichen Haut auch außerhalb Afrikas in bestimmten tropischen Regionen existiert; so etwa in Südamerika, Sri Lanka und Australien: Bei den Aborigines):
(a) die besonders heterogene “Negride Rasse”: Sie ist charakterisiert durch eine krause bis spiralige Haarform, besonders ausgeprägte Pigmentierung der Haut, das Fehlen von “Neandertaler-Genen” sowie gewöhnlich einer breiten Nase und dickeren Lippen;
(b) die “Mongolide Rasse”: Ihre Vertreter besitzen eine besondere Lidfalte der Augen (“Mongolenfalte”) (sie existiert nicht nur bei diesen Menschen), vorgeschobene Wangenbeine (nicht nur bei diesen Menschen) sowie eine glatte Haarform;
(c) die “Europide Rasse” mit relativ längerer und schmaler Nase, Tendenz zu welligem Haar und zu geringerer Pigmentierung von Haut, Haaren und Iris.

Diese (und weitere) Unterschiede haben sich offenbar erst in (geologisch) jüngerer oder sogar jüngster Zeit in geographisch abgegrenzten Gruppen entwickelt.

IM VERGLEICH zu den Rassen vieler anderer Tiere sind die globalen Unterschiede der "Formen" des heutigen Menschen (Homo sapiens) viel zu gering und uneinheitlich ausgeprägt, um für sie den Begriff "Rasse" zu rechtfertigen. Meiner Meinung nach fehlt in diesem Zusammenhang ein adäquater Begriff für derartige Gruppen im allgemeinen Sprachgebrauch. Dieser existiert allerdings und wurde in früherer Zeit durchaus verwendet: Die "LOKALFORM". Dieser Begriff bezieht sich auf indigene Gruppen von Menschen und anderen Lebewesen, die geographisch getrennt waren oder noch sind und sich wenigstens in der Summe ihrer Merkmale voneinander unterscheiden. Natürlich wird dieser Begriff den Fremdenhass nicht tilgen; ich halte ihn in diesem Zusammenhang allerdings für zutreffend und passend; außerdem ist er nicht traditionell negativ besetzt wie "Rasse". Vielleicht wäre es sinnvoll - wie von manchen vorgeschlagen - den Begriff (menschliche) "Rasse" auch im Grundgesetz durch "Lokalform" zu ersetzen.

Eine BIOLOGISCHE WURZEL bei nicht wenigen Menschen für Fremdenhass - bzw. die Herabsetzung andersartiger Lokalformen - dürfte in der "Ausstoßreaktion" liegen, die bei zahlreichen Säugetieren und Vögeln gut bekannt ist, siehe EIBL-EIBESFELDT S. 331 (***), einer Form der Aggressivität, die gegen Gruppenfremde gerichtet ist. "Menschen neigen ebenfalls dazu, von der Norm abweichende Gruppenmitglieder zu verstoßen." In Schulklassen werden nicht selten Dicke oder Schielende ausgelacht, gehänselt oder sogar gemobbt, ohne dass Kinder zu derartigem Verhalten angeleitet worden wären. „Die Evolution hat den Homo sapiens wie alle anderen Herdentiere zu einem fremdenfeindlichen Wesen gemacht,... Ethnische Gruppen haben die Tendenz, andere auszuschließen und sich nach außen abzuschotten. Sie wollen andere aus ihrem Fleckchen Heimat fernhalten. … Die anderen werden oft nicht einmal als Menschen anerkannt.“ (HARRARI, S. 230). Dieses wohl "animalische Erbe" ist offenbar auch bei manchen Erwachsenen - man denke an eine bestimmte Partei - in ausgeprägter Weise zu beobachten, wobei es nicht nur um die Hautfarbe der Diffamierten geht, sondern ganz wesentlich um andersartige Kultur, Sprache, Religion und Tradition (sowie angeblich um den Verlust von Arbeitsplätzen). Diesem biologischen Erbe kann nur dann begegnet werden, wenn wir uns das oben Geschriebene bewusst machen. Dann könnte der Mensch seinem wissenschaftlichen Namen - sapiens - tatsächlich gerecht werden. Allerdings: Wieweit sind Respekt und Toleranz erlernbar, ist ein bloßer Zuwachs an Wissen hilfreich, ist eine Emanzipation vom „animalischen Erbe“ denkbar? Fremdartigkeit ruft bekanntlich sowohl Neugier als auch Ängste bei vielen Menschen in ganz unterschiedlicher Weise hervor. Auf welche Art ist Unwissenheit, Vorurteilen, Ängsten und Aggressivität zu begegnen? In diesem Zusammenhang kommt fraglos den Medien und den Schulen eine besondere und langfristige Aufgabe der Aufklärung zu, die enorm viel Feingefühl und Geduld erfordert, ehe die Kenntnis vielfältiger Lokalformen des Homo sapiens als eine dauerhafte Bereicherung des gesellschaftlichen Lebens empfunden wird, auch nach dem Motto "black is beautiful"!

Beim Auftreten der angesprochenen Formen von Diskriminierung – etwa gegenüber Indigenen bzw. Angehörigen gewissen als Rassen deklarierten Lokalformen, Andersgläubigen sowie in vielen Ländern Frauen – sind wir alle gefordert, Vertretern eines lange tradierten religiös-ideologisch begründeten Machtanspruchs sowie Diskriminierungen nachdrücklich entgegen zu treten. Angehörige einer “schweigende Mehrheit” sind nicht tolerant, nicht bequem, sondern schlicht feige.

(*) Großgruppen innerhalb der Artebene (Unterarten) lassen sich bei manchen Lebewesen wie Spinnen nur schwer nachweisen, sie können sogar sehr selten sein.

(**) HARARI, Y. N. (2013): Eine kurze Geschichte der Menschheit.

(***) EIBL-EIBESFELDT, I. (1967): Grundriss der vergleichenden Verhaltensforschung.

(1) Internettext auf dem Bildschirm meines Laptops vom 31.7.2021 (dumm wie ein …): „Neuseeland beheimatet von einem bestimmten Tier MEHR ARTEN als jedes andere Land“. Welches TIER ist hier wohl gemeint?.
(2) Es fragt sich (ich frage mich): Wen interessiert das alles überhaupt? Und: Welcher Nicht-Biologe versteht das bzw. kann und sollte es verstehen?

Anmerkung: Der Autor dieses Artikels hat Diskriminierungen im Verlaufe mehrmaliger Vertreibungen aus politischen Gründen erfahren. Seine familiären Wurzeln sind Vertriebene aus Frankreich (Hugenotten) und aus Polen.

FIVE PAPERS ON EXTANT SPIDERS (ARANEIDA) AS WELL AS ON FOSSIL SPIDERS AND RICINULEI

BEITR. ARANEOL., 15 (2022)

JOERG WUNDERLICH (ed.)

ALS SPINNEN NOCH SCHWÄNZE TRUGEN – EIN SENSATIONELLER FUND DER PALÄONTOLOGIE!

Konserviert in 100 Millionen Jahre altem Bernstein aus Myanmar (Burma), mitten aus der Zeit der Dinosaurier, wird eine einzigartige Spinne beschrieben, siehe das Foto unten auf dem vorderen Umschlagdeckel dieses Buches. Ist das tatsächlich eine Spinne?

Es handelt sich um ein Mischwesen (eine Chimaere) mit Merkmalen, die einem Skorpion ähneln: Einem Schwanzanhang (dem allerdings ein Giftstachel am Ende fehlt), sowie andererseits dem Merkmal einer heutigen Spinne: Spinnwarzen am Hinterkörper! Spinnwarzen am Ende des Hinterkörpers dieser Winzlinge (Körperlänge ohne Schwanzanhang lediglich 2–3 mm!) finden sich AUSSCHLIESSLICH bei Spinnen. Die ebenfalls für Spinnen einzigartigen männlichen Paarungsorgane (Pedipalpen) belegen zusätzlich klar: Dieser ausgestorbene Achtbeiner war zweifellos eine Spinne, obwohl er einen „Schwanz" von dreifacher Körperlänge trug!

Dieser spektakuläre und überraschende Fund aus der Kreidezeit beleuchtet in einzigartiger Weise die rätselhafte Evolution der Spinnen aus ihrer Frühzeit vor weit mehr als 300 Millionen Jahren, der Steinkohlezeit, lange vor der Existenz der Dinosaurier! Der Schwanzanhang dieser Tierchen war ein „Überbleibsel" (Relikt) und erinnert an Merkmale skorpionähnlicher und lange ausgestorbener Verwandter heutiger Spinnen. Diese fossilen Chimaeren sind die ursprünglichsten bekannten Spinnen!

WHEN SPIDERS STILL HAD TAILS – A SENSATIONAL FIND OF PALEONTOLOGY!

A unique spider preserved in 100 million-year-old amber from Myanmar (Burma), directly from the time of the dinosaurs, is described, see the photo down on the front cover of this book. Is that really a spider?

It is a chimera with characteristics similar to a scorpion: A tail (but without a poison sting) on the one side as well as characteristics of today's spiders: spinnerets of the opisthosoma. Spinnerets at the end of the opisthosoma of these tiny animals - body length only 2-3 mm – ONLY exist in spiders. Its male mating organs (pedipalpi) unique for spiders, too, show clearly: this extinct eight-legged animal was undoubtedly a spider although bearing a tail of three times the body length!

This spectacular and surprising find from the Cretaceous lightens up in a unique way the enigmatic early evolution of spiders in primeval times more than 300 million years ago, the time of the Carboniferous, long before the existence of dinosaurs. The tail of these animals was a relic and reminds one of characteristics of relatives to scorpions that have been extinct for a long time. These fossil chimeras are the most ancient known spiders!

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