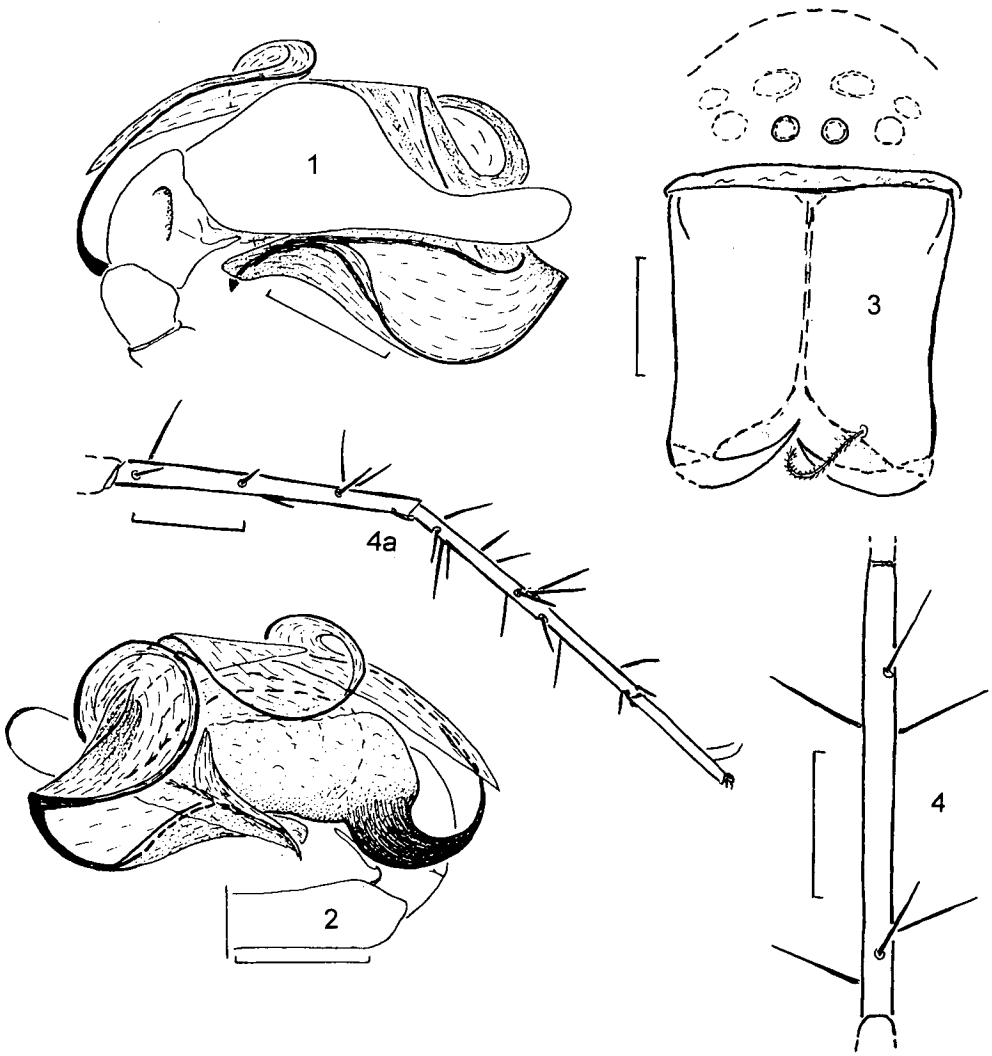


Figs. 1-2: *Tuberta maerens* (O. PICKARD-CAMBRIDGE 1863), ♂, r. pedipalpus dorsally and proventrally; M = 0.2mm; extant;

fig. 3-4e: *Cryphoezaga dubia* **n. gen. n. sp.**, ♂; 3) holotype, prosoma, anterior view (only one of the plumose hairs of the cheliceral promargin is drawn, enlarged); 4) holotype, r. tibia I dorsally (hairs and trichobothria are not drawn); 4a) ♂ F760, l. leg IV prolaterally with bristles and tarsal trichobothria; 4b) ♂ F758, l. pedipalpus dorsally; 4c) ♂ F758, r. pedipalpus prodorsally (C = conductor, E = embolus); 4d) holotype, l. pedipalpus retrolaterally; 4e) ♂ f759, l. pedipalpus proventral-distal view (parts are hidden); M = 1.0mm in fig. 5, 0.5 in fig. 4, 0.2 in the remaining figs.;

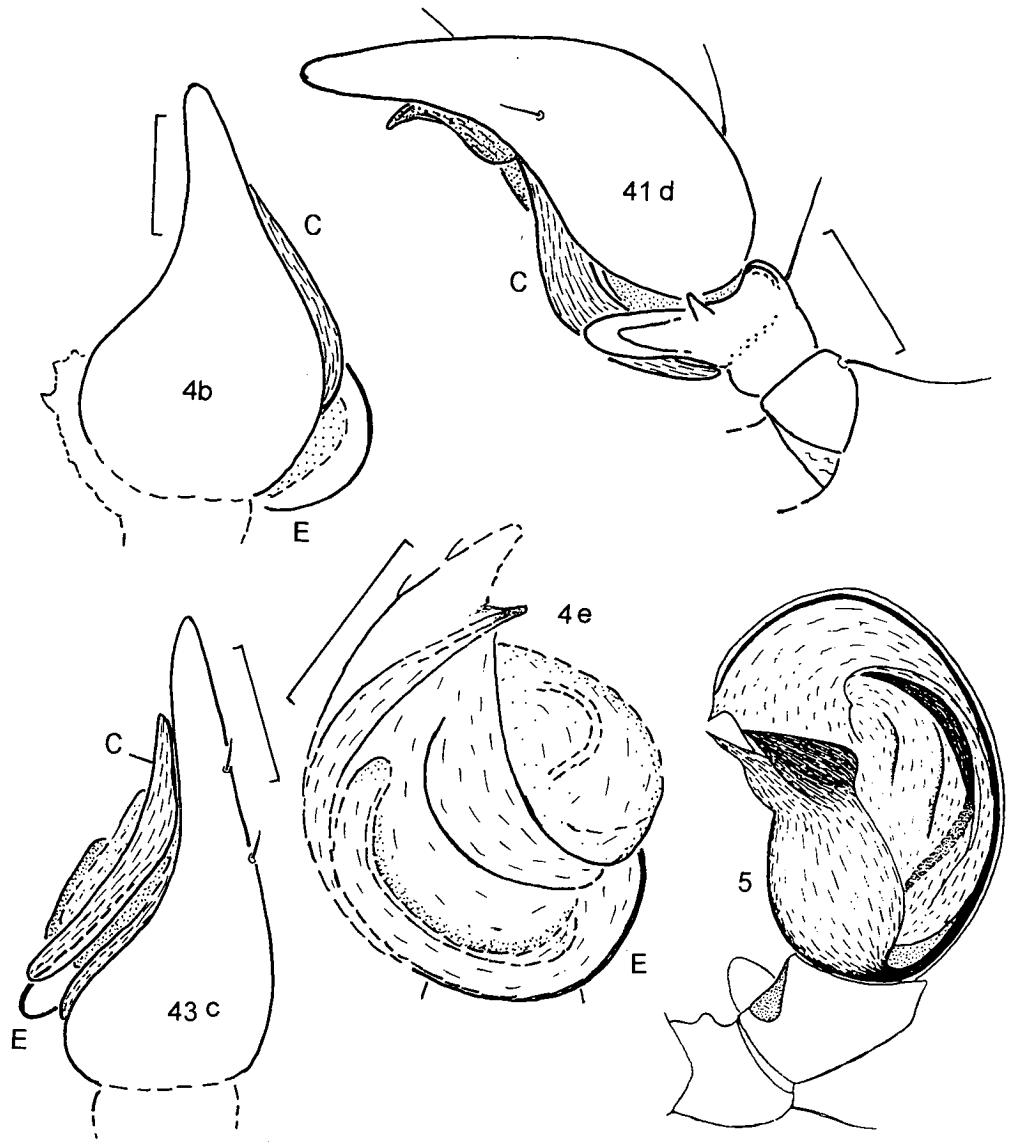


fig. 5) *Cryphoeca silvicola* (C. L. KOCH 1834), ♂, r. pedipalpus ventrally; M = 0.5; extant;

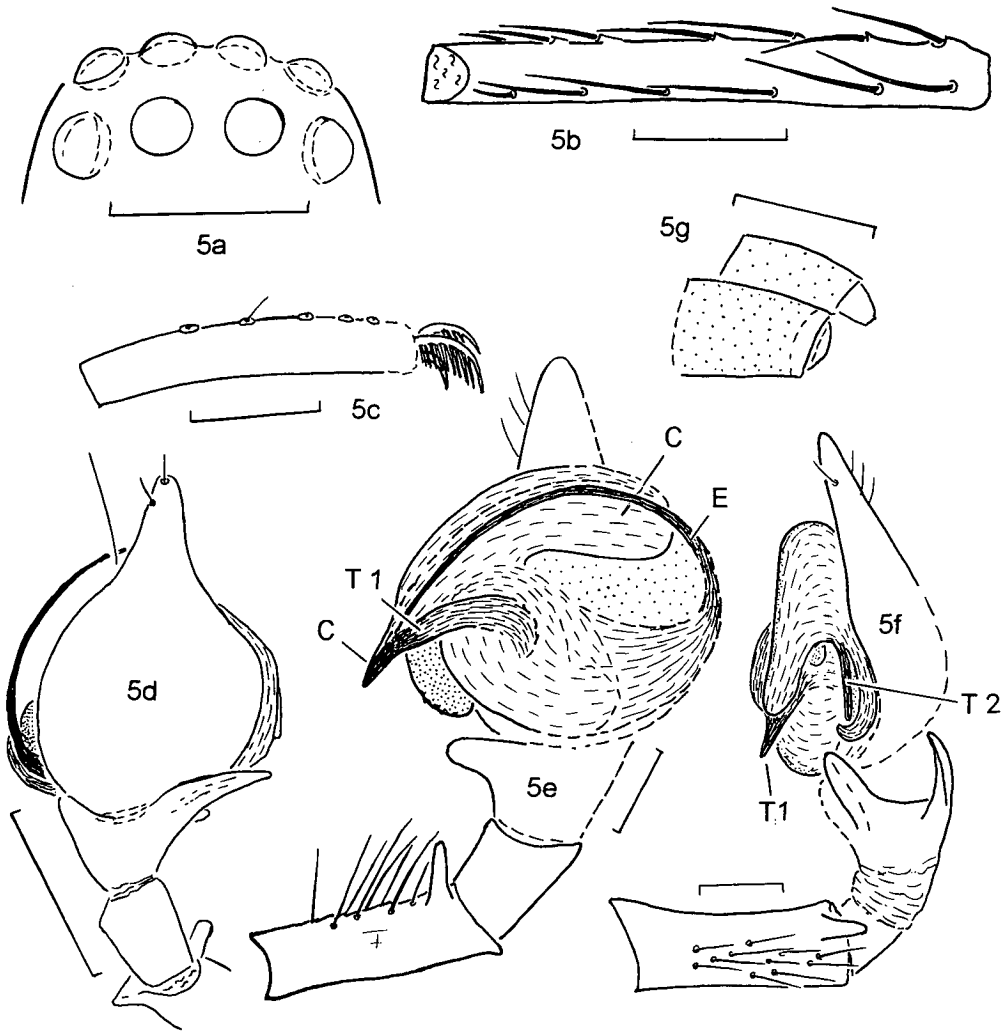


fig. 5a-g: *Balticocryphoeca curvitarsis* **n. gen. n. sp.**, ♂; 5a) holotype, position of the eyes dorsally. Note the large posterior median eyes. The remaining eyes are partly covered with bubbles or emulsions; 5b) holotype, r. tibia II ventrally; 5c) ♂ (ZMHUB), l. tarsus II prolaterally. Normal hairs are not drawn. Note the curved shape of the tarsus and the 5 trichobothria of which in 4 only the bothria are preserved; 5d) holotype, r. pedipalpus dorsally; 5e) holotype, r. pedipalpus ventrally; 5f) holotype, l. pedipalpus retrolaterally; 5g) holotype, outline of the left anterior (below) and posterior spinnerets, ventral-lateral view. (C = conductor, E = embolus, F = femur, T1, T2 = tegular apophyses 1 and 2); M = 0.5 in figs. 5a, b, d, 0.2 in the remaining figs.;

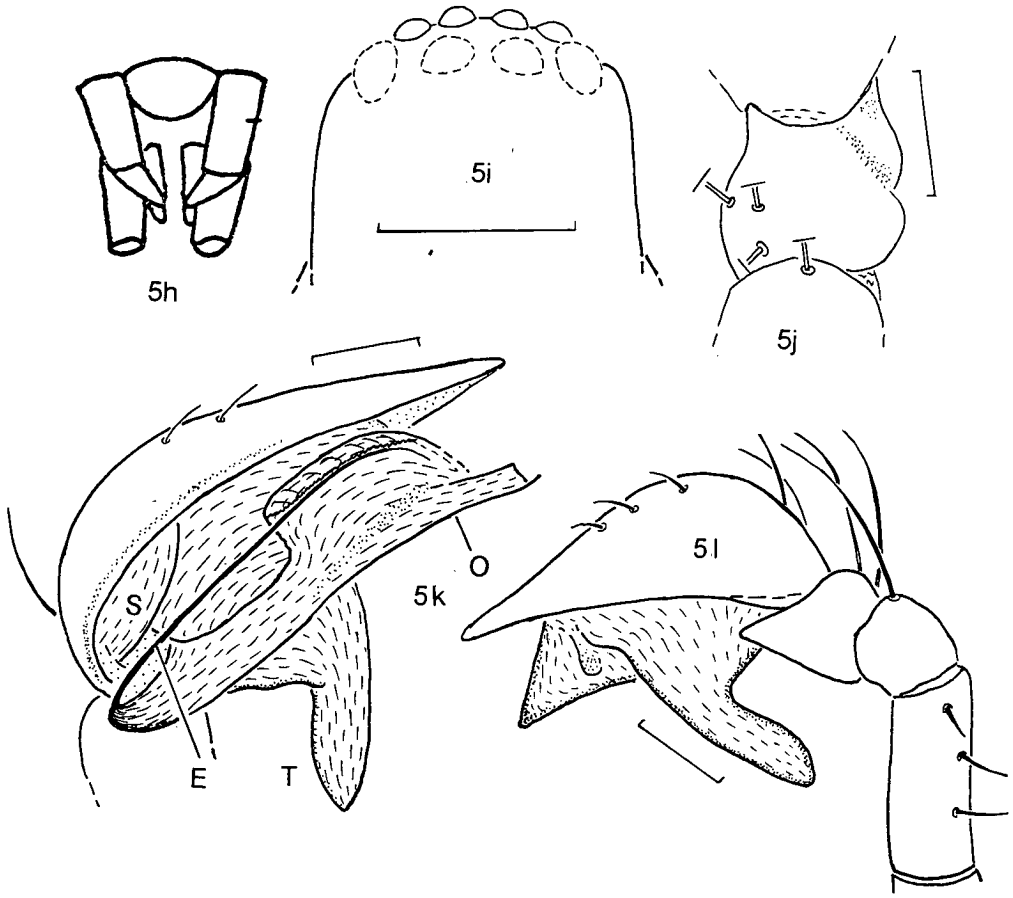
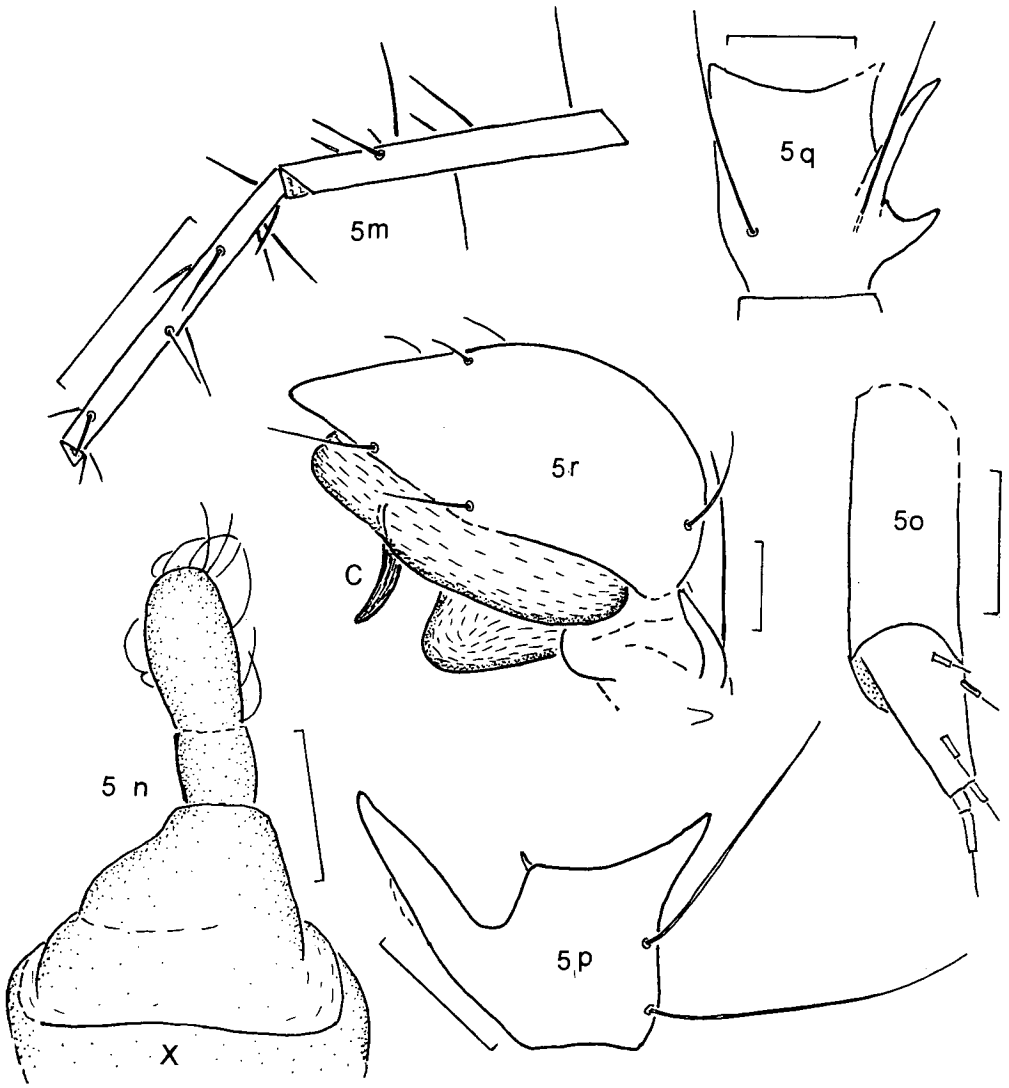


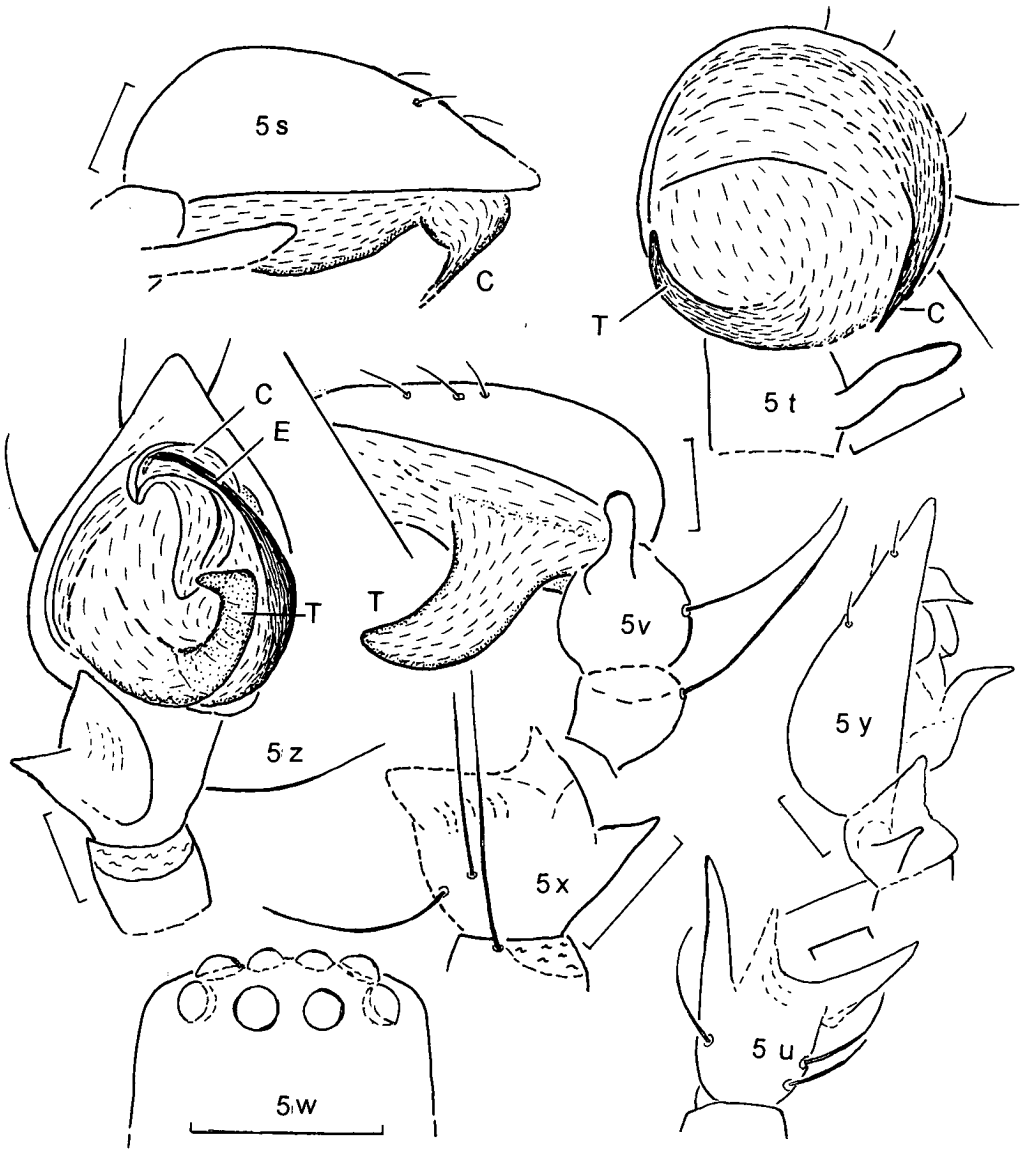
fig. 5h) *Eocryphoeca* sp., ♀, spinnerets (PS = right posterior spinneret) and anal tubercle (A), dorsal view. Taken from PETRUNKEVITCH (1958: Fig. 33);

figs. 5i-l: *Eocryphoecara abicera* **n. gen. n. sp.**, ♂; 5i) anterior part of the prosoma, dorsal view. (Bubbles cover parts of the eyes); 5j) r. pedipalpal tibia dorsally and slightly prolaterally; 5k) r. pedipalpus, prolateral view; 5l) l. pedipalpus retrolaterally. (E = embolus, O = outgrowth of the conductor, S = subtegulum, T = teguiar apophysis); M = 0.5 in fig. 5i, 0.2 in the remaining figs;



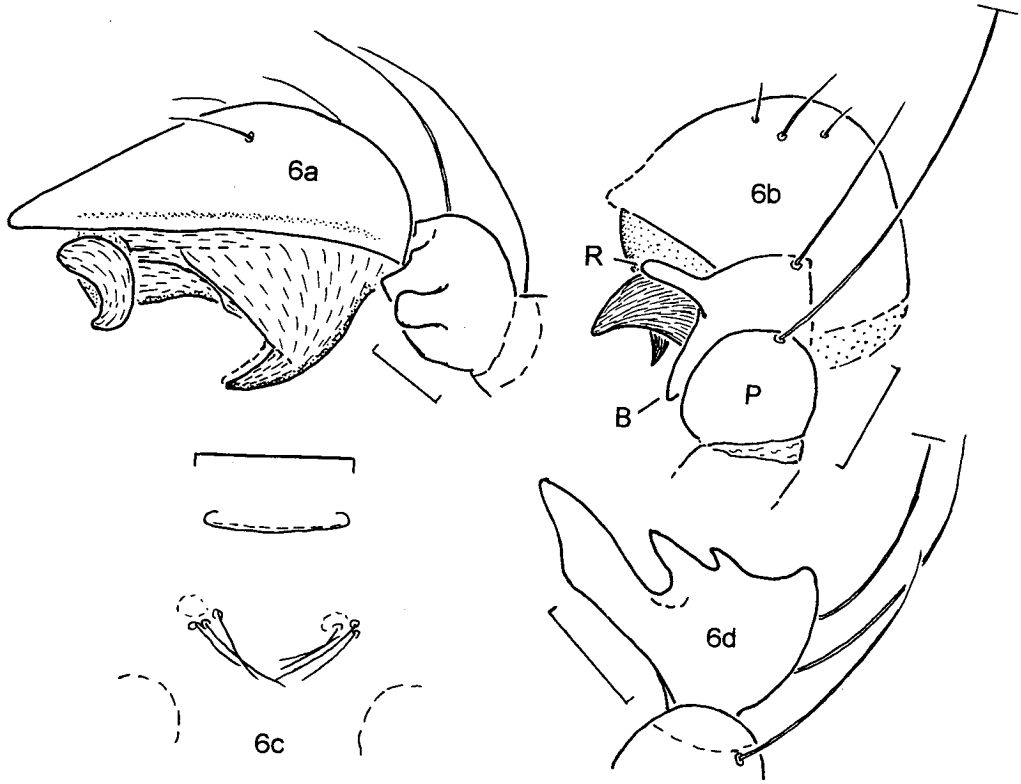
figs. 5m-p: *Eocryphoeca bitterfeldensis* **n. sp.**, ♂; 5m) l. tibia and metatarsus I retrolaterally; 5n) tiny club-shaped two-segmented regenerate of the left leg I ventrally (X = coxa); 5o) r. posterior spinneret ventrally; note the spigots on the apical article; 5p) l. pedipalpal tibia dorsally; M = 1.0 in fig. 5n, 0.1 in fig. 5o, 0.2 in the remaining figs.

figs. 5q-r: *Eocryphoeca electrina* **n. sp.**, ♂; 5q) r. pedipalpal tibia dorsally; 5r) l. pedipalpus retrolaterally and slightly dorsally; M = 0.2;



figs. 5s-t: *Eocryphoeca falcata* **n. sp.**, ♂; 5s) r. pedipalpus retrolaterally. The tegular apophysis is not observable in this position; 5t) l. pedipalpus ventrally and slightly distally. The bulbus may be slightly expanded so that the tip of the conductor nearly reaches the tibial apophysis. (C = conductor, T = tegular apophysis); M = 0.2;

figs. 5u-v: *Eocryphoeca gibbifera* **n. sp.**, ♂; 5u) l. pedipalpal tibia dorsally; 5v) l. pedipalpus retrolaterally (the distal part is hidden). (T= tegular apophysis); M = 0.2;



figs. 5w-z: *Eocryphoeca gracilipes* (KOCH & BERENDT 1854), ♂ from the GPIGöttingen; 5w) anterior part of the prosoma, dorsal view; 5x) r. pedipalpal tibia dorsally; 5y) r. pedipalpus retrolaterally; 5z) r. pedipalpus ventrally (only few hairs are drawn). (C = conductor, E = embolus, T = tegular apophysis); M = 0.5 in fig. 5w, 0.2 in the remaining figs.;

fig. 6a) *Eocryphoeca ligula* **n. sp.**, ♂, paratype, l. pedipalpus retrolaterally. Dotted line: Outline of the larger tegular apophysis of the holotype; M = 0.2;

fig. 6b) *Eocryphoeca mammilla* **n. sp.**, ♂, l. pedipalpus, patella and tibia retrodorsally, cymbium and bulbus seen from the base. (B = retrobasal tibial outgrowth, P = patella, R = retrolateral tibial apophysis); M = 0.2;

figs. 6c-f: *Eocryphoeca splendens* **n. sp.**, ♂, d) paratype a, the remaining figs. holotype; 6c) tracheal spiracle in front of two groups of hairs which replace the colulus in front of the anterior spinnerets (dotted); 6d) l. pedipalpal tibia dorsally; 6e) l. pedipalpus retrolaterally; 6f) r. pedipalpus ventrally. (C = conductor, E = embolus, T = tegular apophysis); M = 0.1 in fig. 6c, 0.2 in the remaining figs.;

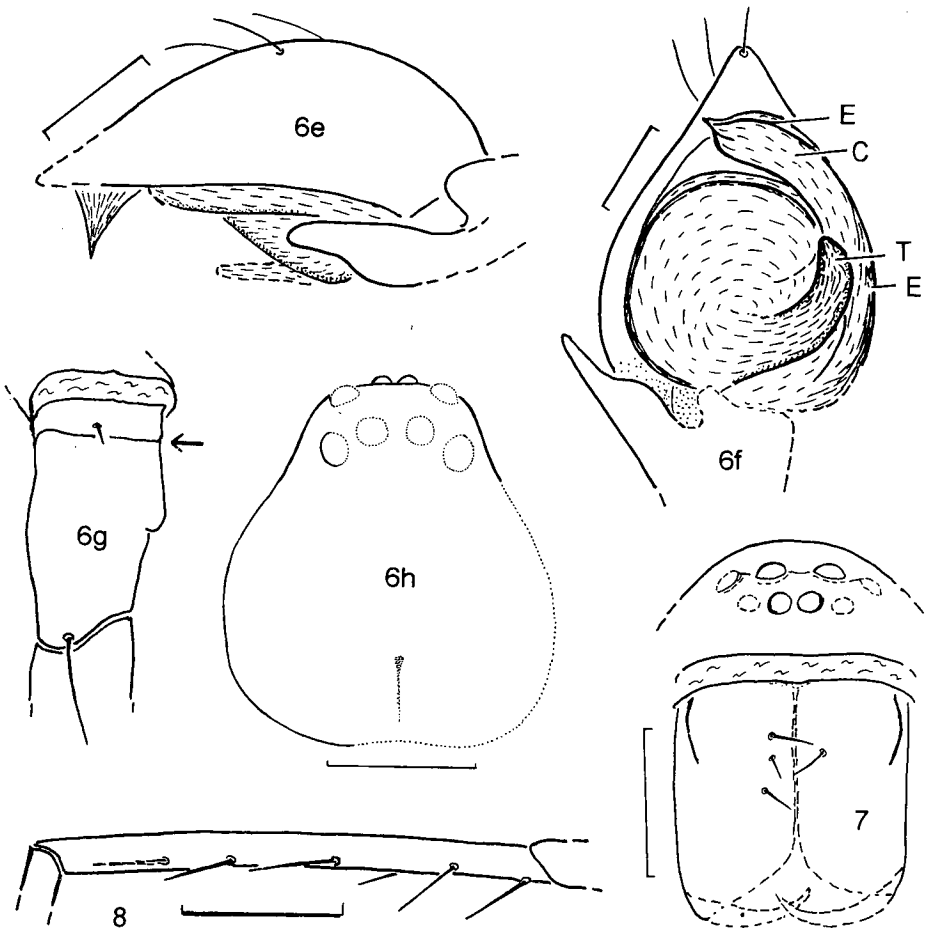


fig. 6g) *Willisus gertschi* ROTH 1981, dorsal view of patella I; the arrow indicates to the basal patellar suture which is in connection with a special type of autotomy. Taken from ROTH (1981: Fig.1), slightly modified;

fig. 6h) *Clythia alma* KOCH & BERENDT 1854, ♀ (holotype), prosoma, dorsal view; M = 0.5;

figs. 7-12: *Gibbermastigusa lateralis* **n. gen. n. sp.**, ♂, paratype in fig. 12, holotype in the remaining figs.; 7) prosoma, anterior view; 8) r. tibia I prolateral view; 9) r. pedipalpus retrolaterally (partly hidden); 10) r. pedipalpus, patella and tibia dorsally, cymbium and bulbus prodorsally; 11) r. pedipalpus, patella and tibia prodorsally, bulbus proventrally; 12) r. pedipalpus retrodorsally. (C = conductor, E = embolus, F = femoral apophyses, P = patellar apophysis); M = 0.5 in fig. 8, 0.2 in the remaining figs.;

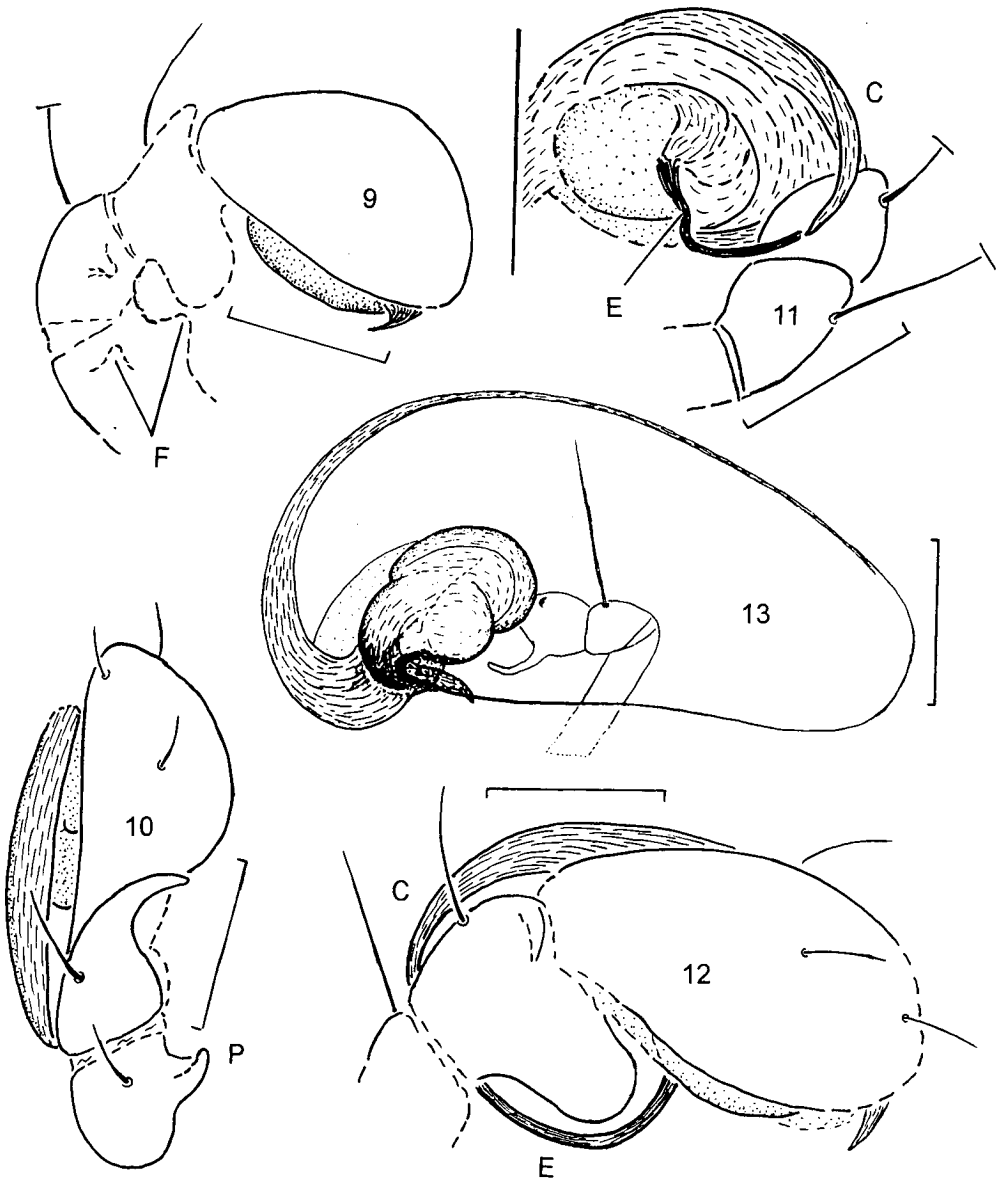
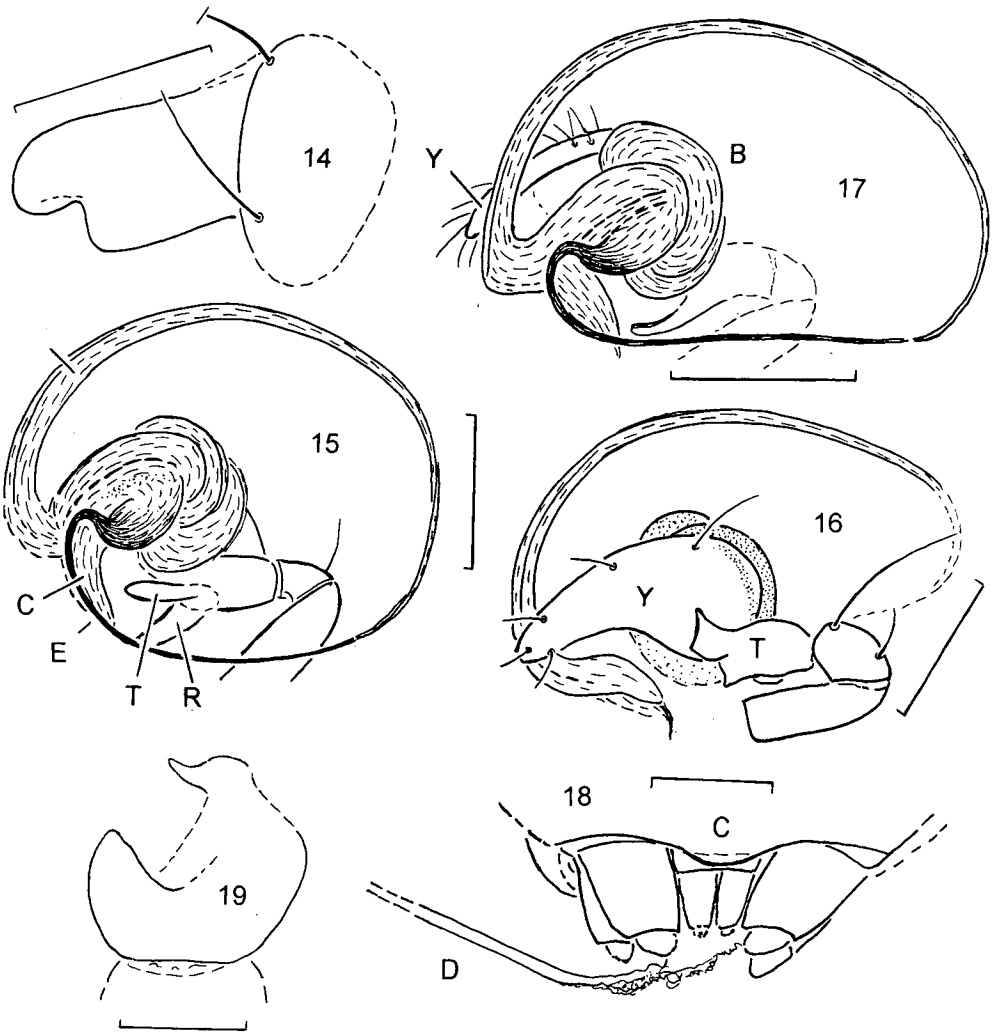


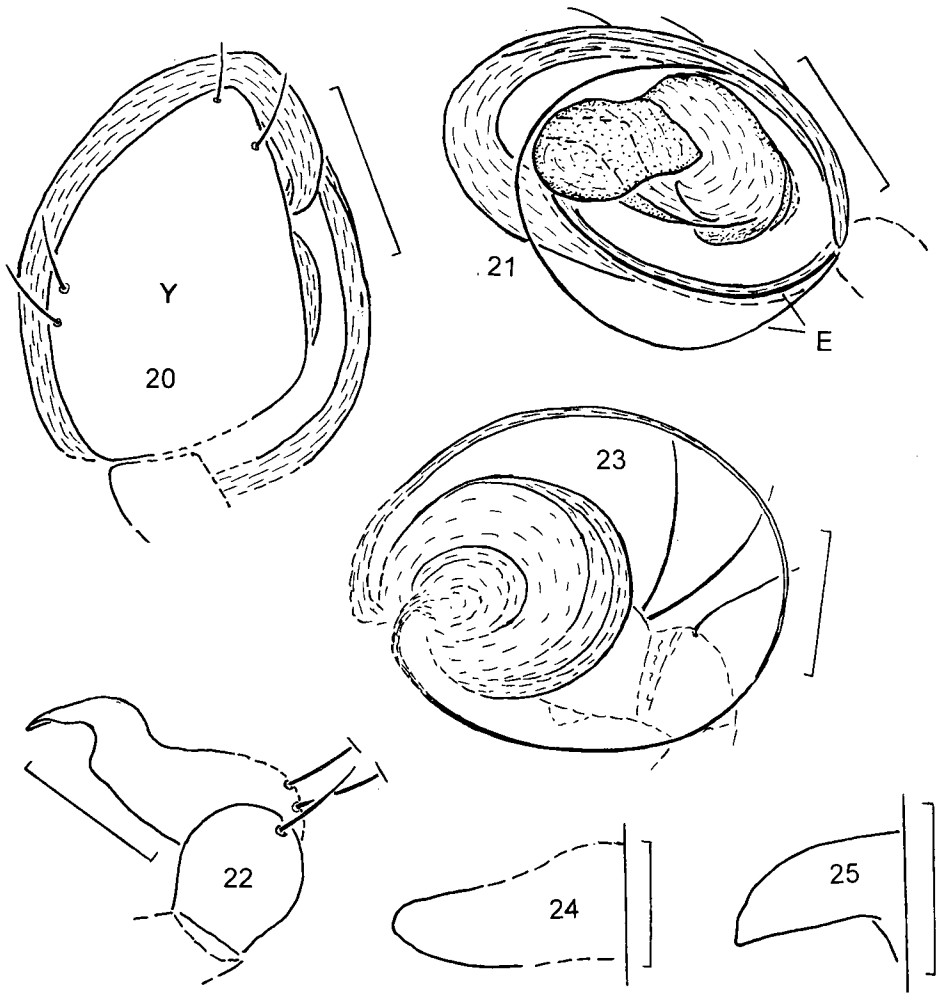
fig. 13) *Mastigusa acuminata* MENGE in KOCH & BERENDT 1854, ♂, neotype, r. pedipalpus prolaterally (ventrally); M = 0.5;



figs. 14-15: *Mastigusa arcuata* **n. sp.**, ♂; 14) l. pedipalpal patella dorsally and tibia retrolaterally; 15) r. pedipalpus prolaterally. (C = cymbium, E = embolus, R = retrolateral tibial apophysis, T = proventral tibial apophysis); M = 0.2 and 0.5;

figs. 16-17: *Mastigusa bitterfeldensis* **n. sp.**, ♂; 16) l. pedipalpus retrolateral (dorsal) view; 17) r. pedipalpus ventrally. (B = bulbus, T = tibia, Y = cymbium); M = 0.5;

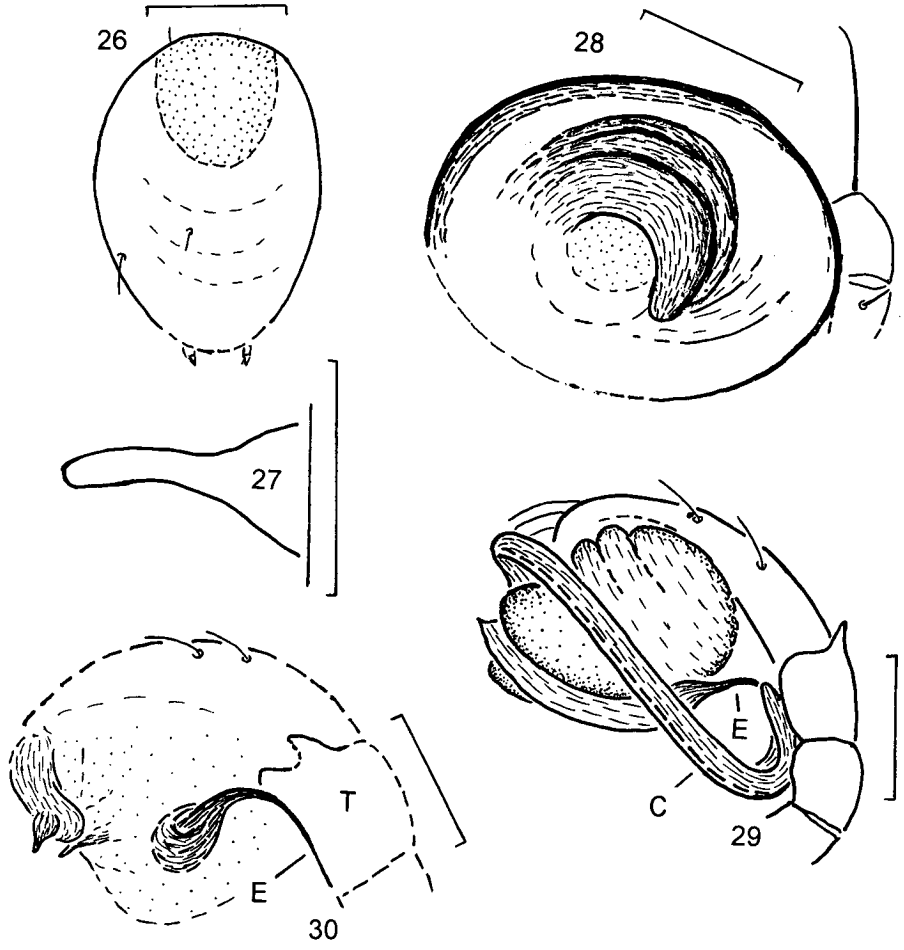
figs. 18-21: *Mastigusa laticymbium* **n. sp.**, ♂, paratype; 18) outline of the spinnerets ventrally. Note the double dragline which originates at the anterior spinnerets; 19) l. pedipalpal tibia dorsally; 20) r. pedipalpus dorsally (only few cymbial hairs are drawn); 21) r. pedipalpus prolaterally. (C = colulus, D = dragline, E = embolus, Y = cymbium); M = 0.2;



figs. 22-23: *Mastigusa magnibulbus* **n. sp.**, ♂; 22) l. pedipalpal patella dorsally and tibia retrolaterally; 23) r. pedipalpus prolaterally (partly hidden); M = 0.2 and 0.5;

fig. 24) *Mastigusa media* WUNDERLICH 1986, ♂ (holotype), retrolateral apophysis of the l. pedipalpal tibia retrolaterally (new drawing from the right pedipalpus); M = 0.1;

fig. 25) *Mastigusa modesta* WUNDERLICH 1986, ♂ (holotype), retrolateral tibial apophysis of the l. pedipalpal retrolaterally; M = 0.1;



figs. 26-28: *Mastigusa scutata* **n. sp.**, ♂; 26) dorsal aspect of the opithosoma, scutum punctuated; 27) retrolateral tibial apophysis of the l. pedipalpus retrobasally; 28) r. pedipalpus prolaterally (partly hidden); M = 0.5 in fig. 26, 0.1 in fig. 27, 0.2 in fig. 28;

figs. 29-30: *Protomastigusa composita* **n. gen. n. sp.**, ♂; 29) r. pedipalpus prolaterally and slightly dorsally; 30) l. pedipalpus retrolaterally and slightly basally-dorsally (parts are hidden). (C = conductor, E = embolus, T = tibia); M = 0.2;

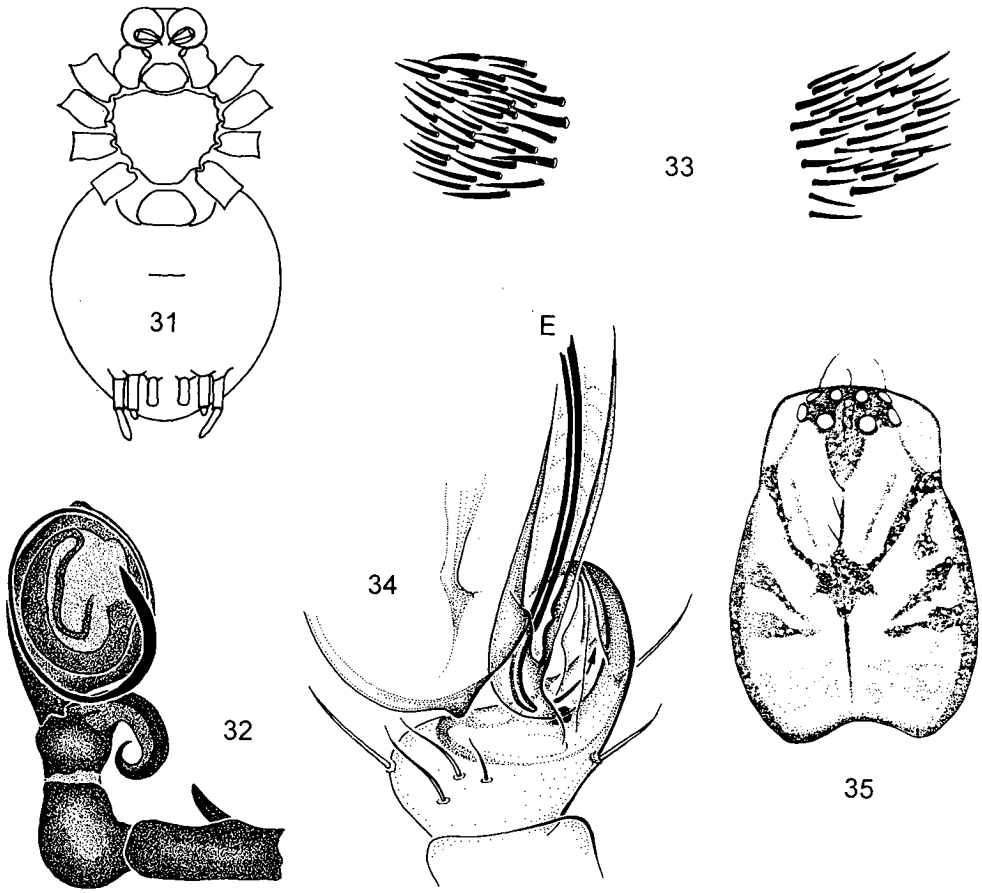


fig. 31) *Neoantistea agilis* (KEYSERLING), ♀, ventral view of the body; taken from OPELL & BEATTY (1976: Fig. 1);

fig. 32) *Antistea brunnea* (EMERTON), ♂, l. pedipalpus ventrally. Taken from OPELL & BEATTY (1976: Fig. 8);

fig. 33) *Neoantistea janetscheki* BRIGNOLI 1976, ♂, stridulatory opisthosomal bristles. Taken from BRIGNOLO (1976: Fig. 28);

figs. 34-35: *Hahnia nava* (BLACKWALL 1841); 34) ♂, l. pedipalpus, ventral view, tibia and basal part of the bulbus. (E = embolus). Taken from WEISS (1996: Fig. 8); 35) ♂♀-prosoma, dorsal view. Taken from HARM (1966: Fig. 51);

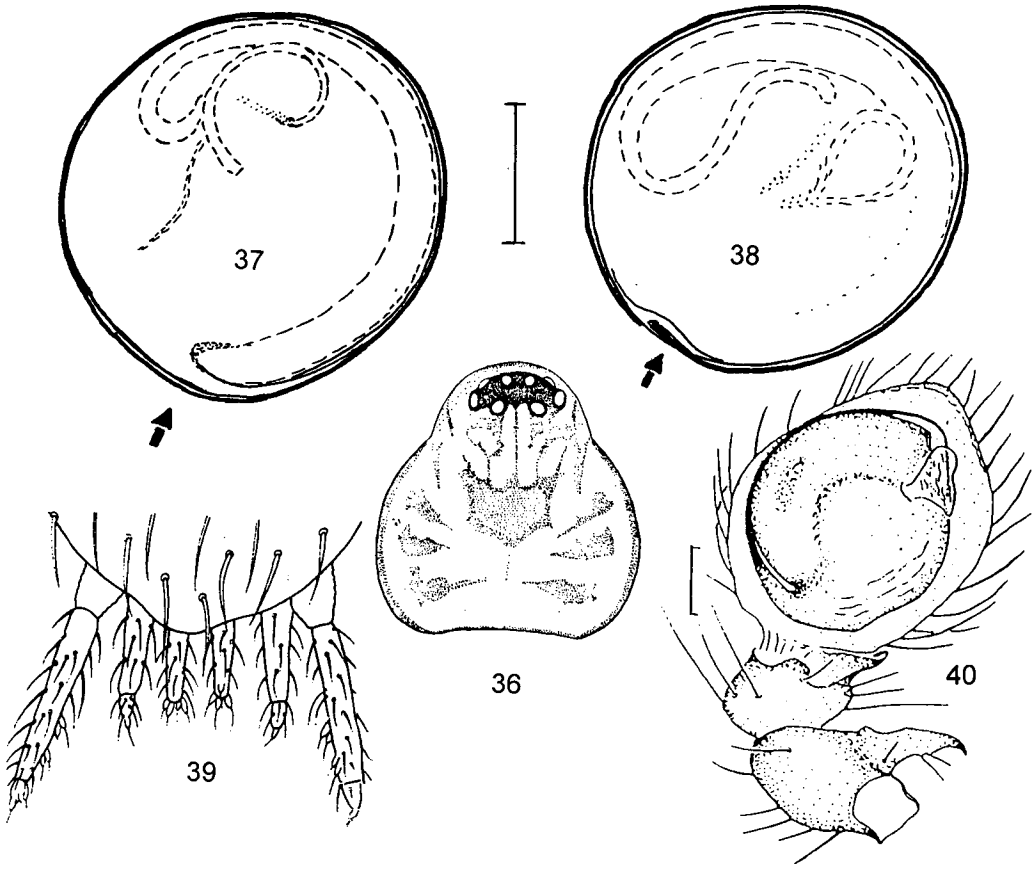


fig. 38) *Hahnia monata* (BLACKWALL 1841), ♂, bulbus of the r. pedipalpus ventrally; M = 0.1; the arrow points to the origin of the embolus;

figs. 36-37: *Hahnia difficilis* HARM 1966; 36) ♂♀-prosoma, dorsal view. Taken from HARM (1966: Fig. 29); 37) ♂, bulbus of the r. pedipalpus ventrally; M = 0.1;

fig. 39) *Iberina caeca* GEORGESCU & SARBU 1992, ♀, spinnerets. Taken from GEORGESCU & SARBU (1992: Fig. 4);

fig. 40) *Asiohahnia alatavica* OVTCHINNIKOV 1992, ♂, l. pedipalpus ventrally. Taken from OVTCHINNIKOV (1992: Fig. 1);

figs. 41-47: *Hahniharmia picta* (KULCZYNSKI 1997), 41) ♀, body, dorsal view; 42) ♀, r. leg III; 43) ♂, patella and tibia of the l. pedipalpus retrodorsally; 44-45) ♀, epigyne and vulva ventrally; 46) ♂, cymbium of the r. pedipalpus retroventrally with the long internal furrow (F); 47) ♂, bulbus and cymbium of the r. pedipalpus ventrally. (C = scinny conductor, E = embolus); M = 0.2 in figs. 46-46, no M in the remaining figs. Figs. 41-45) are taken from HARM (1966);

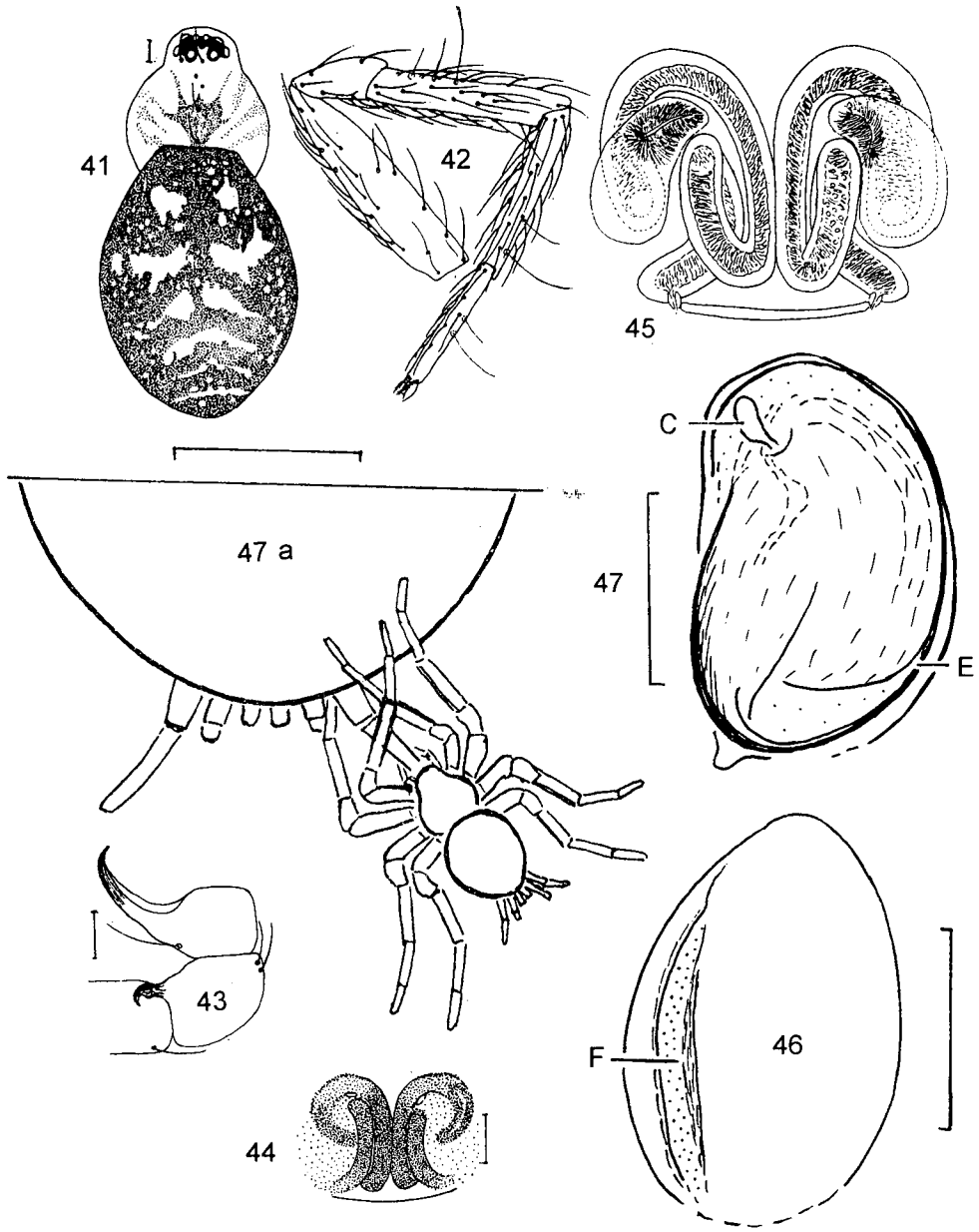
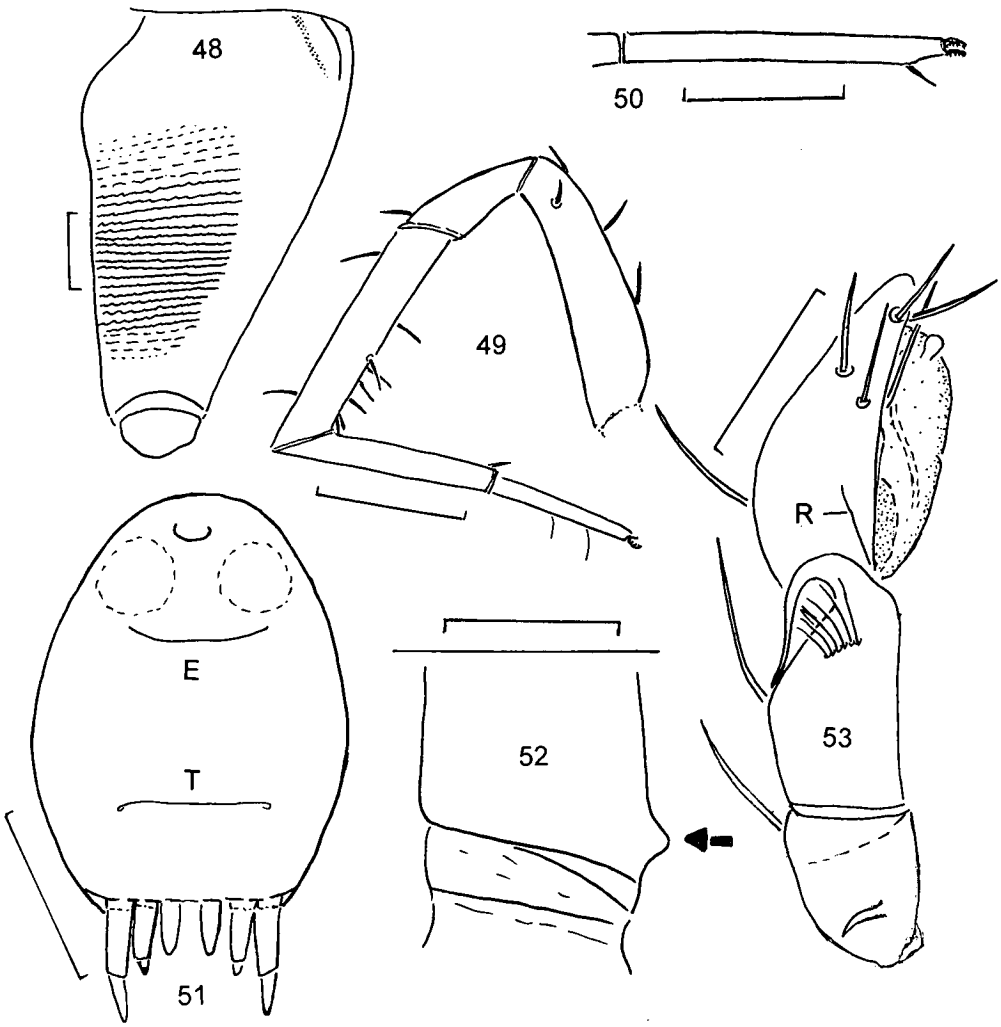
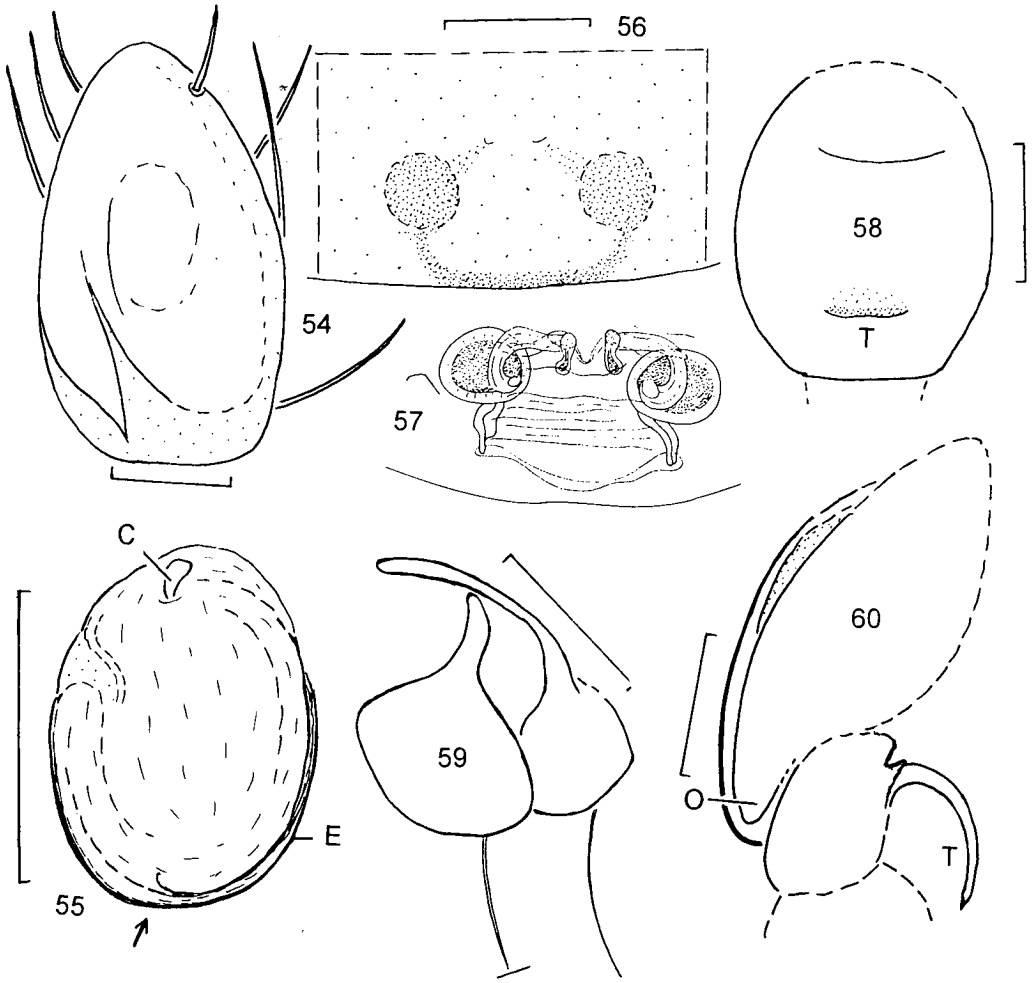


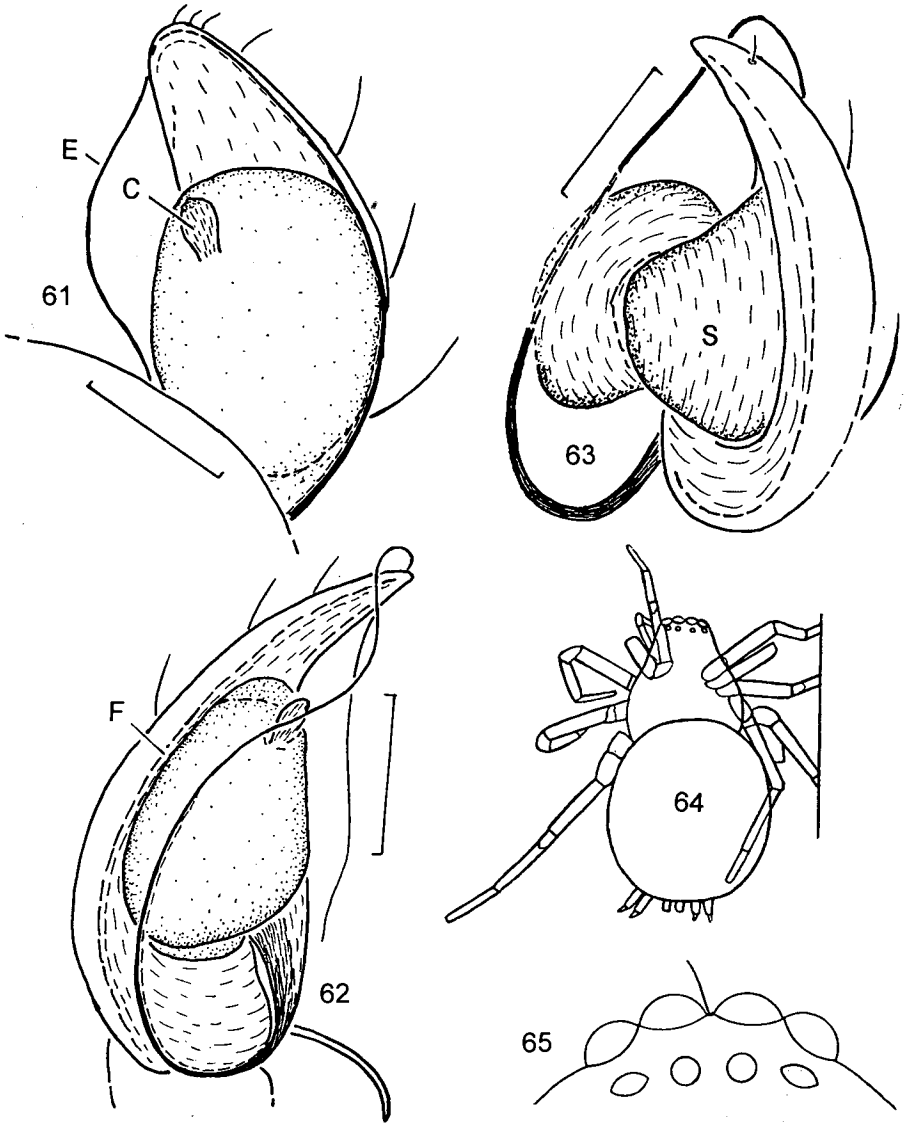
fig. 47a) The unique *Hahnia mammifera* WUNDERLICH 1995, an extant cave spider. ♀-opisthosoma with a sucking spiderling on a lateral spinneret, dorsal view; M = 0.1:



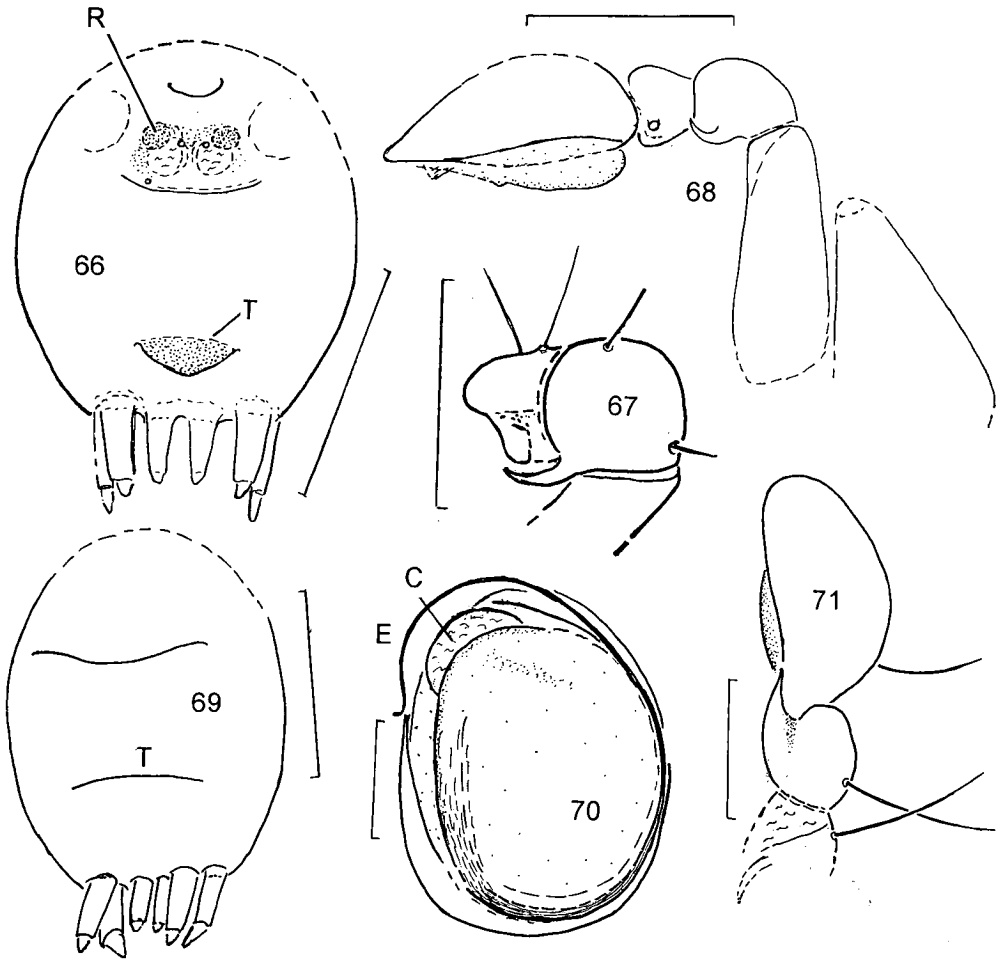
figs. 48-57: *Spinihahnia petrobia* (SIMON 1895); 48) r. ♂-chelicera retrolaterally with stridulatory files; 49) ♂, r. leg I prolaterally (the number of tibial bristles is quite variable; only the tarsal trichobothria are drawn); 50) r. tarsus IV with retrodistal bristle, dorsal aspect; 51) ♂, opisthosoma, ventral aspect; 52) ♂, basal femoral part of the r. pedipalpus ventrally (the arrow indicates to the stridulatory spur); 53) ♂, r. pedipalpus retrolaterally; 54) ♂, cymbium of the r. pedipalpus, ventrally; 55) ♂, bulbus of the r. pedipalpus, ventral aspect (the embolus indicates to the origin of the embolus); 56) ♀, epigyne; 57) ♀, vulva. (C = scinny conductor, E = embolus, EF = epigastral furrow, R = retrolateral cymbial margin, T = tracheal fold); M = 0.5 in figs. 49 and 51, 0.3 in fig. 50, 0.1 in figs. 52, 54 and 56, 0.2 in the remaining figs.; fig. 57 is taken from BRIGNOLI (1978: Fig. 15);



figs. 58-63: *Cymbiohahnia parens* **n. gen. n. sp.**, ♂; holotype figs. 58-59, 62; paratype F740 fig. 62, paratype F741 fig. 66), paratype F742 fig. 63; fig. 58) opisthosoma ventrally, note the epigastral fold and the tracheal fold (T) (the spinnerets are not drawn); 59) patella and tibia of the l. pedipalpus retrolaterally; the tibial apophysis is somewhat deformed; 60) r. pedipalpus, dorsal aspect; 61) r. pedipalpus ventrally and slightly prolaterally (basally hidden; only few hairs are drawn); 62) l. pedipalpus proventrally; embolus in an unnatural position; 63) r. pedipalpus prolaterally, with expanded bulbus. (C = scinny conductor, E = embolus, F = prolateral cymbial furrow which guides the embolus; O = probasal outgrowth of the cymbium, S = subtegulum, T = tibial apophysis); M = 0.2;

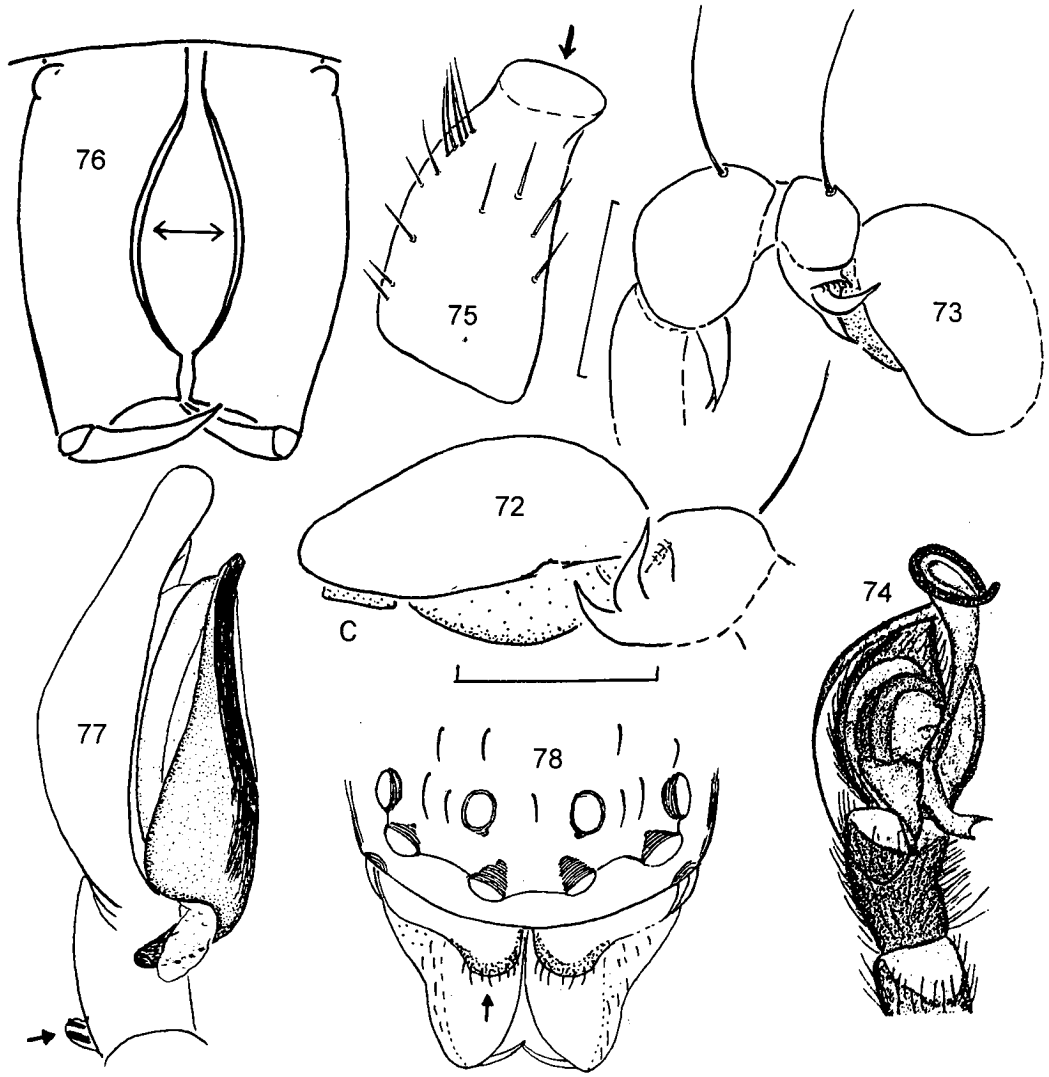


figs. 64-65: *Eohahnia succini* PETRUNKEVITCH 1958, ♀ holotype; 64) body dorsally; 65) position of the eyes which probably are drawn in a posterior view, and therefore the posterior row appears recurved in contrast to ther specimens. Most probably the anterior eyes are covered by bubbles in this specimen. Taken from PETRUNKEVITCH (1958: Figs. 590-591);



figs. 66-68: *Eohahnia* ?*succini* PETRUNKEVITCH 1958; 66) ♀, F729/CJW, opisthosoma ventrally with the tiny genital openings near the middle of the genital area, the r. receptaculum (R) and the sclerotized tracheal area (T); 67) ♂, F730/CJW, patella and tibia with apophyses of the l. pedipalpus retrolaterally and slightly basally; 68) ♂, ZMKopenhagen, l. pedipalpus and l. chelicera retrolaterally; M = 0.5 in fig. 66, 0.2 in the remaining figs.;

figs. 69-71: *Protohania antiqua* **n. gen. n. sp.**, ♂, holotype; 69) opisthosoma, ventral aspect; 70) bulbus and cymbium of the r. pedipalpus, ventral aspect; 71) l. pedipalpus retrolaterally and slightly dorsally. (C = scinny conductor, E = embolus, T = tracheal fold), M = 0.5, 0.1 and 0.2;



figs. 72-73: *Protohahnia tripartita* **n. gen. n. sp.**, ♂; 72) paratype F735/CJW, l. pedipalpus retrolaterally; 73) holotype, r. pedipalpus retrolaterally and slightly dorsally. (C = scinny conductor); M = 0.2;

fig. 74) *Iviella ohioensis* (CHAMBERLIN & IVIE 1935), extant, ♂, l. pedipalpus, ventral view. Taken from CHAMBERLIN & GERTSCH (1958: Fig. 8) (sub *Tricholathys*);

fig. 75) *Altella biuncata* (MILLER 1949), extant, ♂, tibia of the r. pedipalpus retrolaterally. The arrow indicates to the hairless and weakly sclerotized apical area;

fig. 76) *Dictyna* sp., extant, ♂, chelicerae, anterior aspect. The arrows indicate to the medial cheliceral excavations;

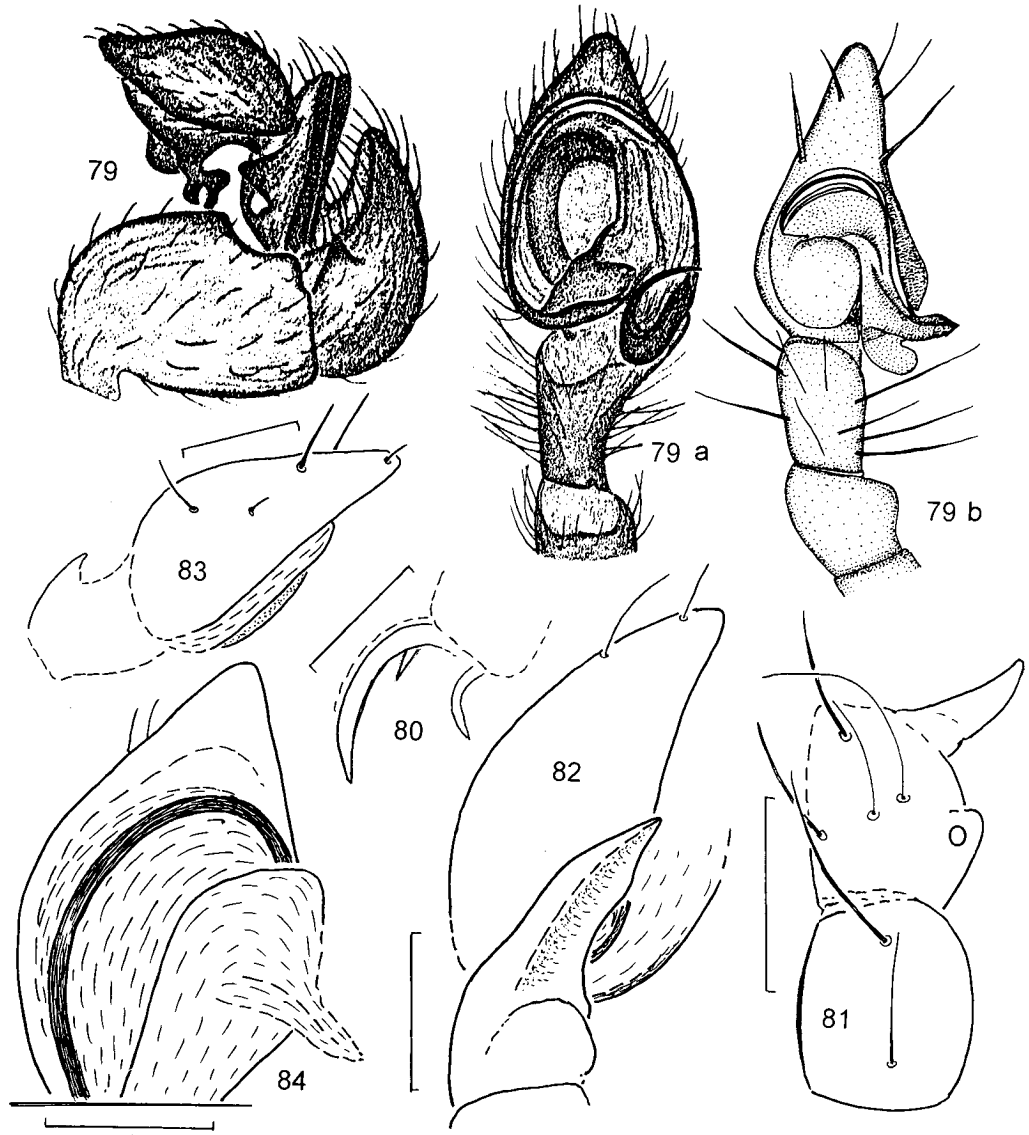


fig. 77) *Dictyna* sp., extant, ♂, r. pedipalpus retrolaterally. The arrow indicates to the tibial ctenidia (tiny "teeth");

fig. 78) *Nigma* sp., extant, ♂, prosoma, anterior-dorsal aspect. The arrow indicates to the hump of the r. chelicera. Taken from WIEHLE (1953: Fig. 175);

fig. 79) *Thallumetus pineus* (CHAMBERLIN & IVIE 1935), extant, ♂, l. pedipalpus retrolaterally. Taken from CHAMBERLIN & GERTSCH (1958: Fig. 13);

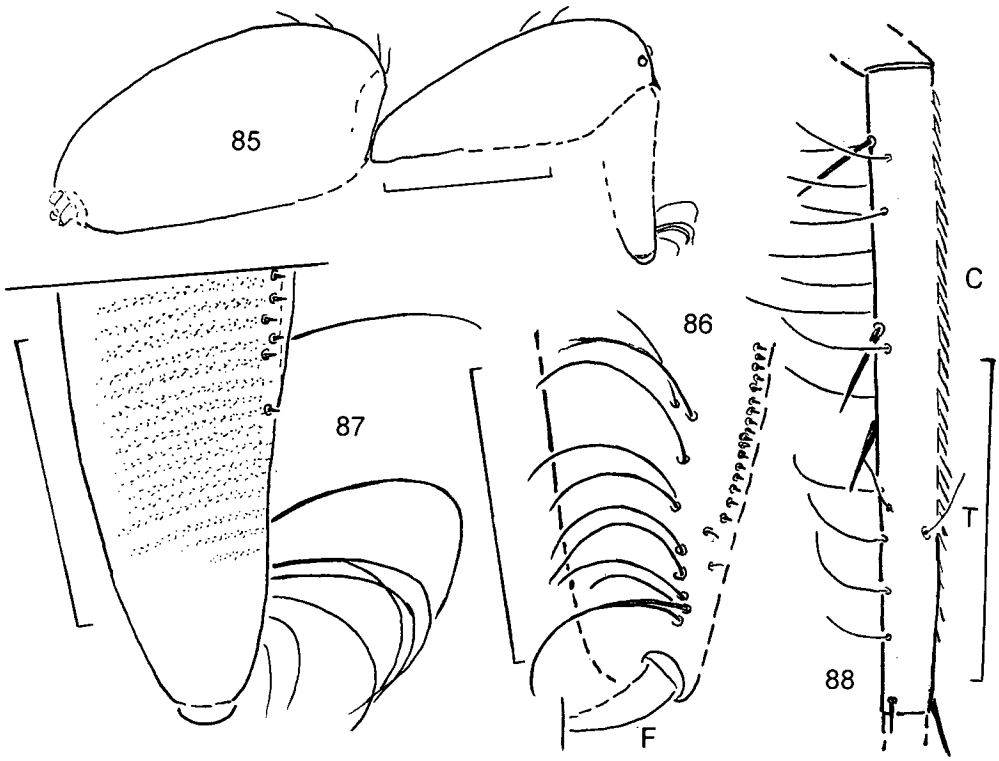
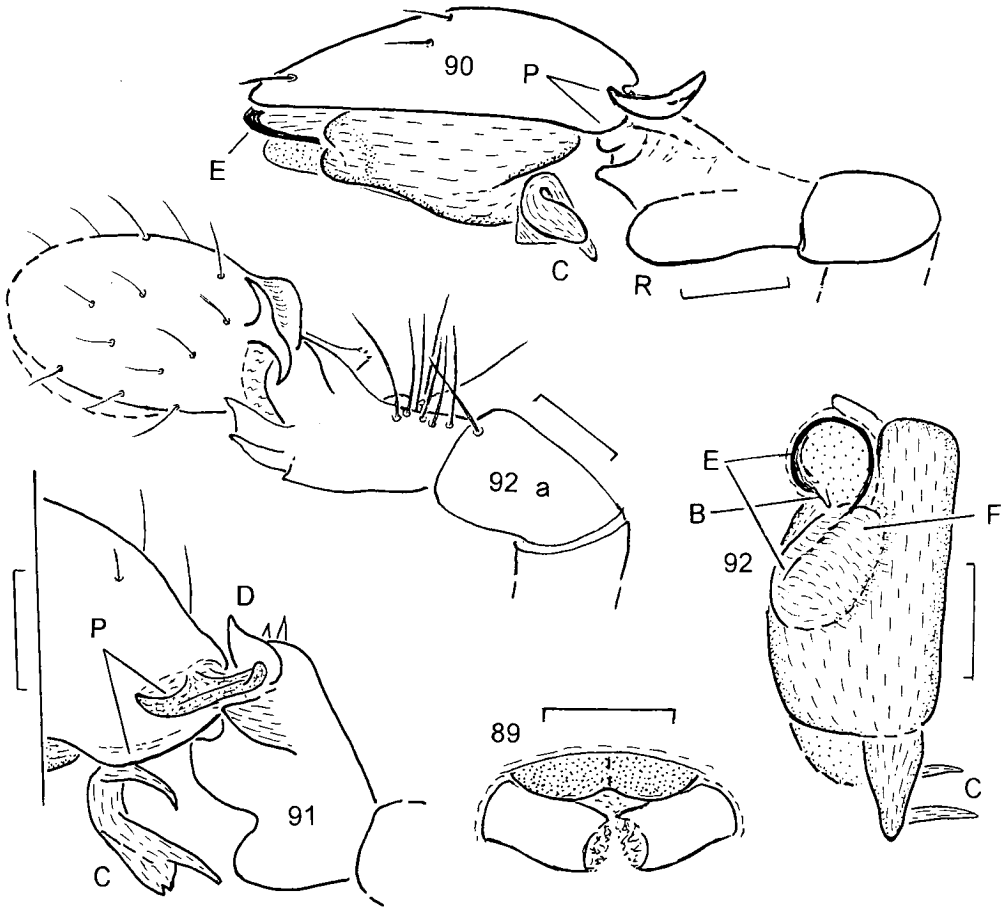


fig. 79a) *Tricholathys* sp. extant, ♂, l. pedipalpus ventrally. Taken from CHAMBERLIN & GERTSCH (1958: p. 4, fig. 1);

fig. 79b) *Devade pusilla* SIMON 1910, extant, ♂, l. pedipalpus ventrally. Taken from LEHTINEN (1967: Fig. 284);

figs. 80-84: *Brommellina longungulae* **n. gen. n. sp.**, ♂; 80) tarsal claws of the r. leg IV oblique prolaterally (probably there are more teeth than one); 81) tibia and patella of the r. pedipalpus dorsally (only two tibial trichobothria are drawn); 82) r. pedipalpus retrolaterally and slightly basally; the bulbus is partly hidden; 83) l. pedipalpus prolaterally; 84) l. pedipalpus ventrally and slightly retrolaterally (the basal parts are hidden).(O = retrolateral outgrowth of the tibia); M = 0.05 in fig. 80, 0.2 in figs. 81-82; 0.1 in figs. 83-84;

figs. 85-92: *Chelicirrum stridulans* **n. gen. n. sp.**, ♂, figs. 86, 90-91) holotype, the remaining figs. paratype ZMKopenhagen, coll. v. HENNINGSEN 16-1 (1961); 85) outline of the body, lateral aspect (most eyes and parts of the r. chelicera are hidden); 86) distal two-third of the l. chelicera, anterior-distal and slightly retrolateral view; 87) distal half of the r. chelicera with long and curved frontal hairs and short retrolateral stridulatory bristles; 88) l. metatarsus IV dorsally and slightly basally, with bristles, trichobothrium (T), long and curved ?sensory hairs and short hairs of the



calamistrum (A); normal hairs are not drawn; 89) cribellum (dotted) and anterior spinnerets ventrally (hairs are not drawn); 90) l. pedipalpus retrolaterally; 91) tibia, conductor and basal part of the cymbium of the l. pedipalpus retrodorsally; 92) bulbus of the r. pedipalpus ventrally. (A = calamistrum, B = basal embolic process, C = conductor, D = three dorsal tibial apophyses, E = embolus, F = fang, FC = part of the functional conductor, P = paracymbium, R = retroventral tibial apophysis, T = trichobothrium); M = 1.0 in fig. 85, 0.5 in figs. 86-88, 0.2 in the remaining figs.;

fig. 92a) *Chelicirrum stridulans* **n. gen. n. sp.**, ♂, paratype, F1136, r. pedipalpus prodorsally to dorsally; M = 0.2;

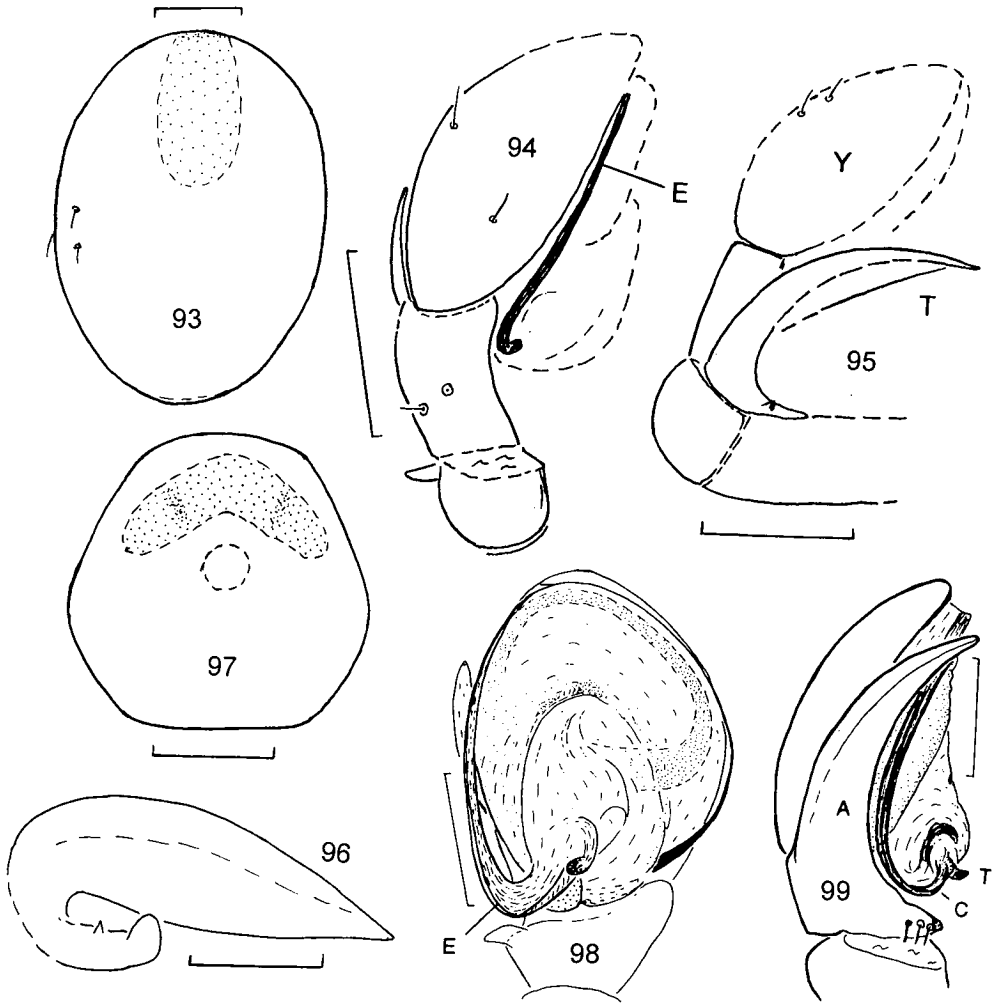


fig. 93-96: *Eobrommella scutata* **n. gen. n. sp.**, ♂; 93) opisthosoma with hardened (scutate) area (dotted) dorsally (only few hairs are drawn); 94) l. pedipalpus prodorsal-basal view (the bulbus is hidden); 95) r. pedipalpus retrolaterally (the bulbus is hidden); 96) tibial apophysis of the r. pedipalpus retrobasally. (E = embolus, T = retrolateral tibial apophysis, Y = cymbium); M = 0.1 in fig.96, 0.2 in the remaining figs.;

fig. 97) *Brommella falcigera* (BALOGH 1935), extant, ♂, outline of the opisthosoma with sclerotized stridulatory area (dotted), anterior-ventral view; M = 0.2;

figs. 98-99: *Brommella hellenensis* WUNDERLICH 1995, extant, ♂, r. pedipalpus ventrally and retrolaterally. (A = tibial apophysis, C = conductor, E = embolus, T = tip of the conductor); M = 0.1;

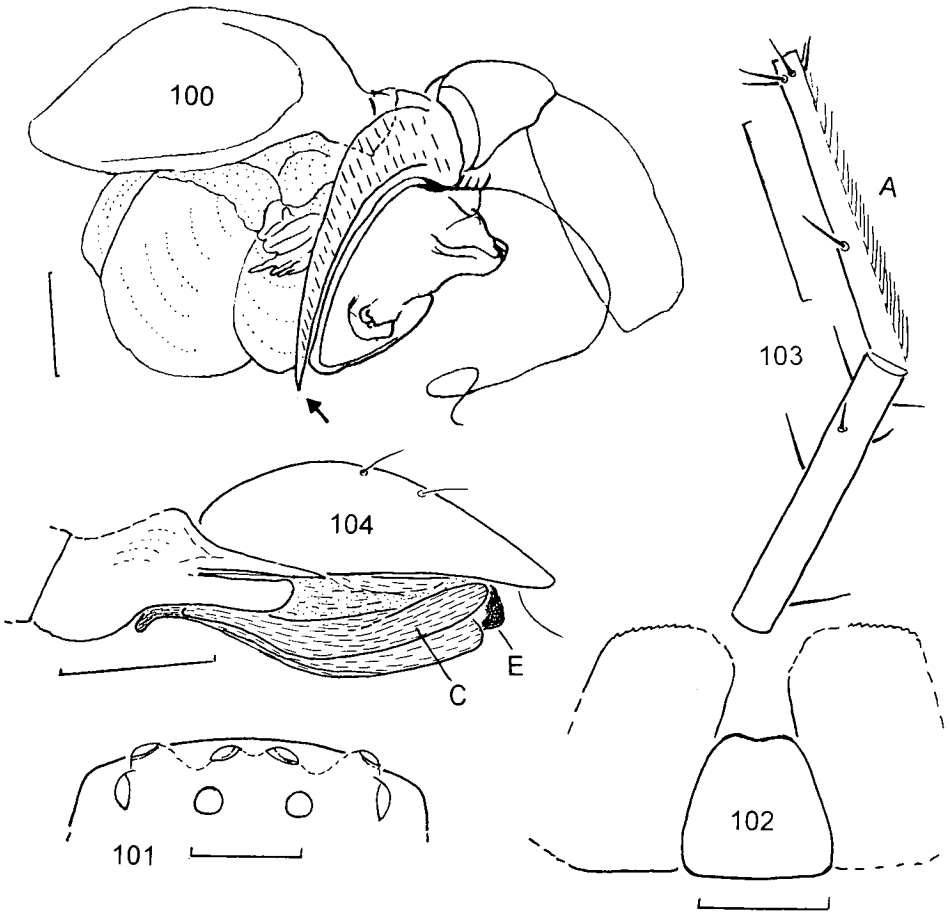
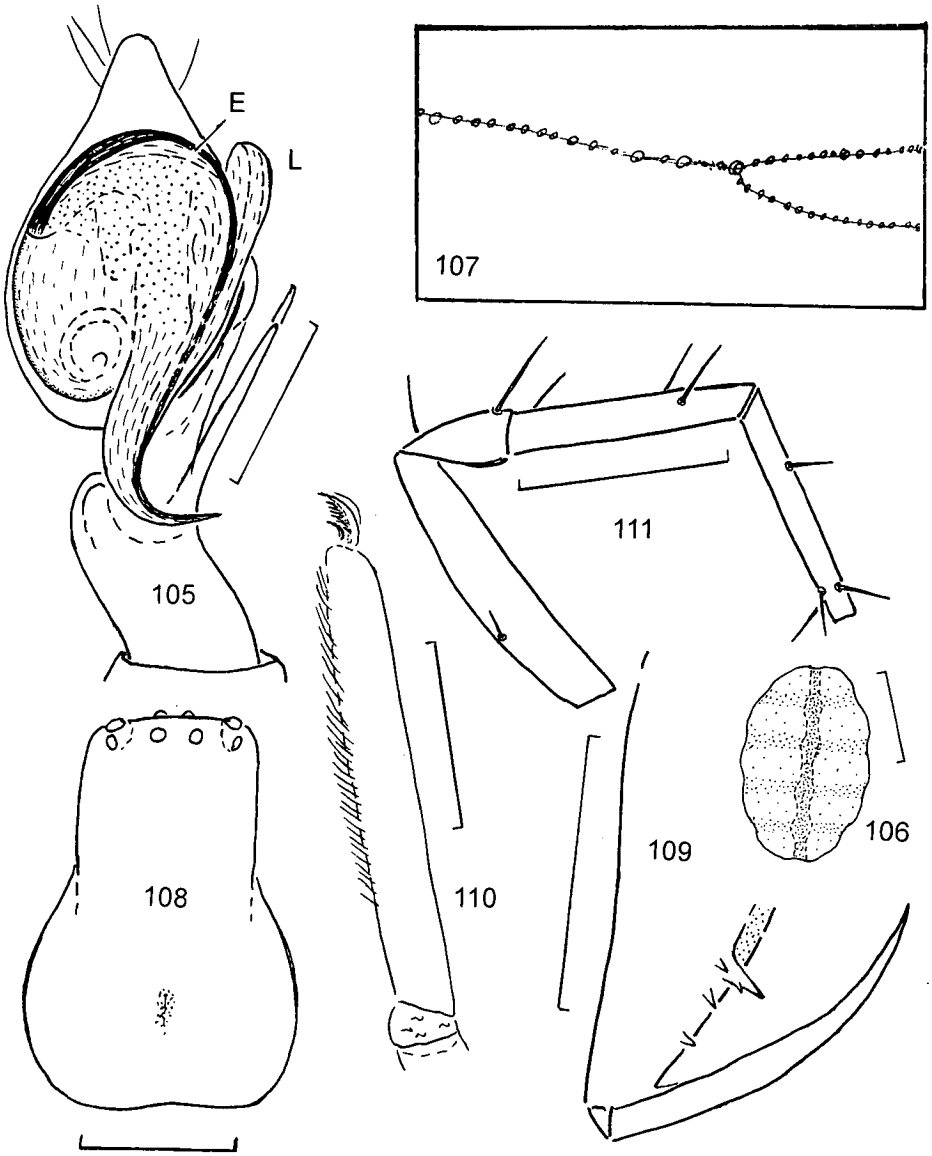


fig. 100) *Brommella falcigera* (BALOGH 1935), extant, ♂, l. pedipalpus with expanded bulbus, showing the large tibial apophysis guiding the basal part of the embolus; the arrow indicates to the tip of the tibial apophysis. Taken from BRAUN (1964: Fig. 1); M = 0.1;

figs. 101-107: *Eodictyna communis* **n. gen. n. sp.**, ♂ and syninclusions (figs. 106-107); 101) paratype F800/CJW, position of the eyes dorsally; 102) holotype, labium and gnathocoxae ventrally; 103) holotype, r. tibia and metatarsus IV oblique retrolaterally, with calamistrum (A) (normal hairs are not drawn); 104) paratype F798/CJW, r. pedipalpus retrolaterally (only few cymbial hairs are drawn); 105) holotype, l. pedipalpus ventrally. The dots show the position of an emulsion. (Only few cymbial hairs are drawn); 106) pollen grain near the paratype F805/CJW; note the longitudinal and the marginal depressions; 107) paratype F807/CJW, part of a cribellate capture web behind the spider in the same layer of amber with a branching and numerous tiny (0.003 mm long) "swellings" which may be puffs. (A = calamistrum, C = conductor, E = embolus, L = distal lobe of the embolus, T = basal tip of the conductor); M = 0.5 in fig. 103, 0.01 in fig. 106, 0.2 in the remaining figs.;



figs. 108-114: *Scopulyna cursor* **n. gen. n. sp.**, ♂, paratype F794/CJW fig. 112, holotype the remaining figs.; 108) prosoma dorsally; 109) r. chelicera ventrally; 110) r. tarsus II prolaterally with the ventral pseudoscopula (normal hairs are not drawn, trichobothria are not observable); 111) l. leg IV (femur to metatarsus) oblique prolaterally, femur more dorsally; 112) cribellum (CR) and anterior spinnerets ventrally and slightly from behind. (Hairs of the spinnerets are not drawn); 113) l. pedipalpus retrolaterally (parts are hidden by bubbles (hatching)); 114) l. pedipalpus retroventrally. (B = bubbles, C = conductor, CR = cribellum, E = embolus, H = hairy area in front of the cribellum); M = 0.5 in figs.108-1o9, 111, 0.1 in figs.112,114, 0.2 in fig.113;

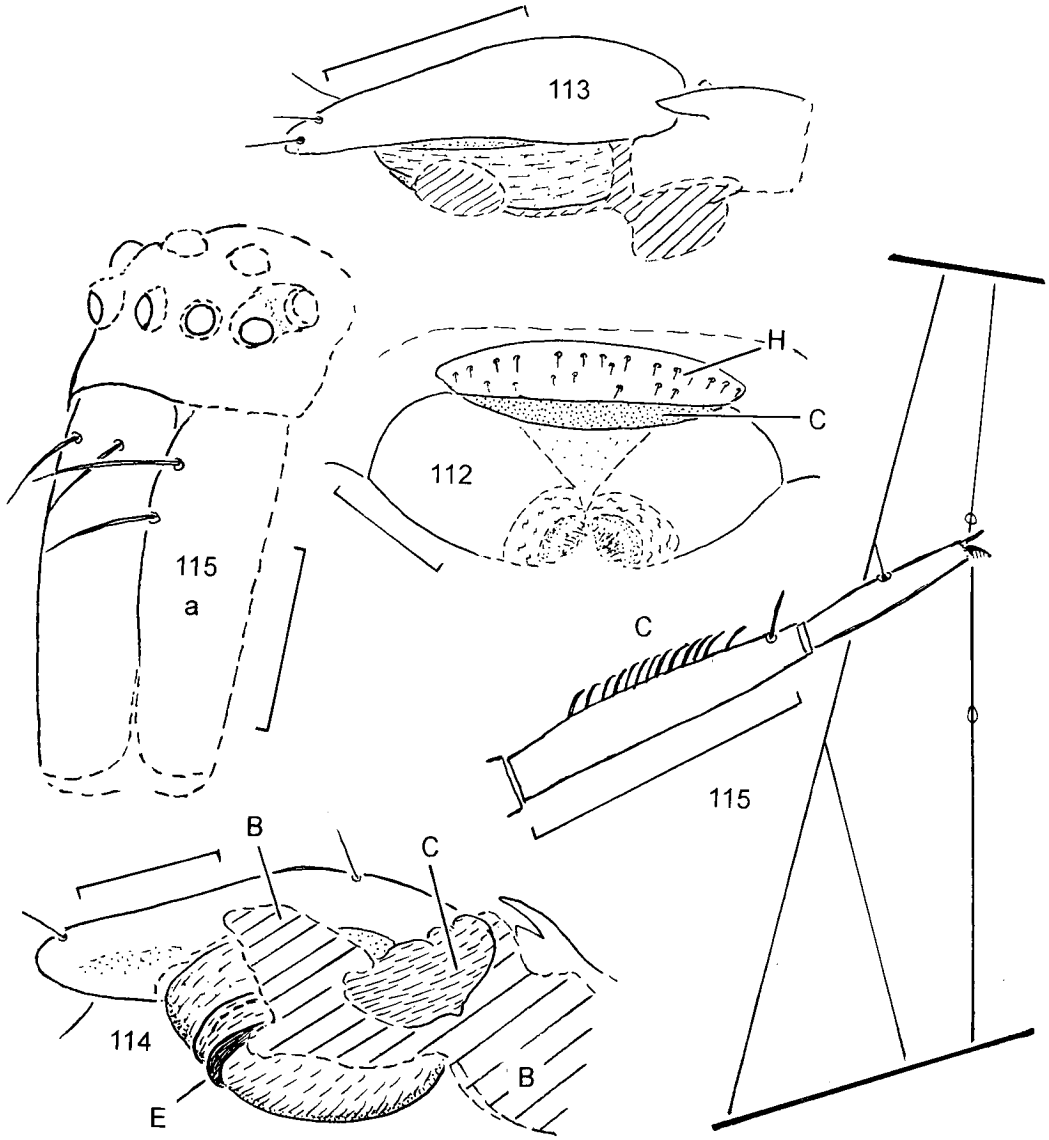
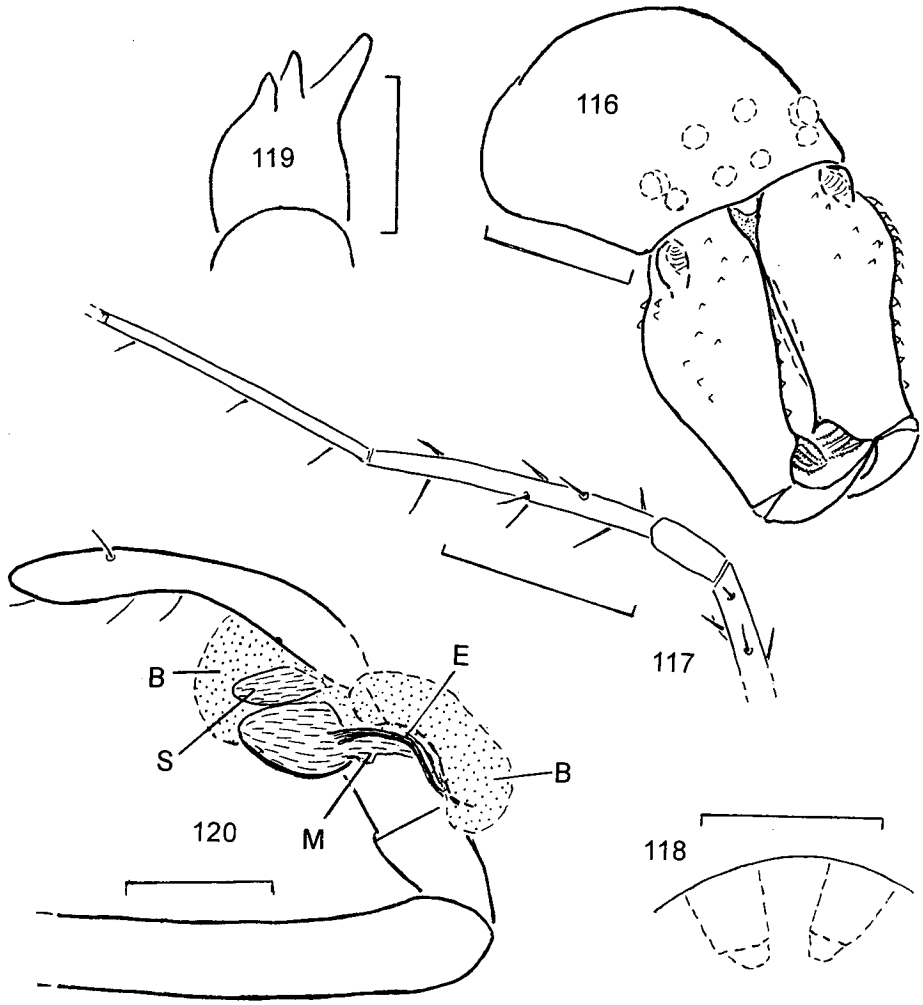
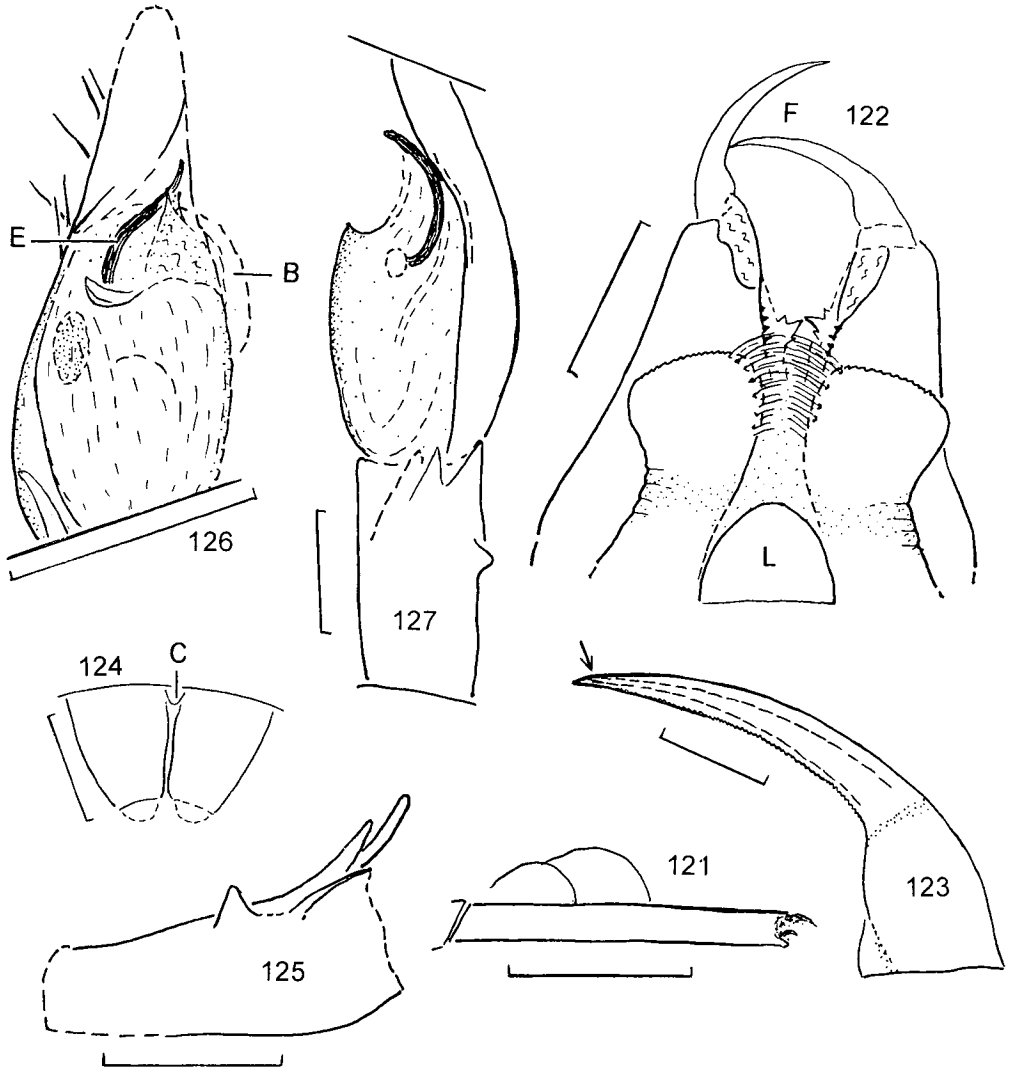


fig. 115) Dictynidae gen. & sp. indet. 1, ?ad. ♀ (F810/CJW), left tarsus and metatarsus IV (C = calamistrum) dorsally and slightly prolaterally, with probably ecribellate threads of the capture web (normal hairs are not drawn; M = 0.5;

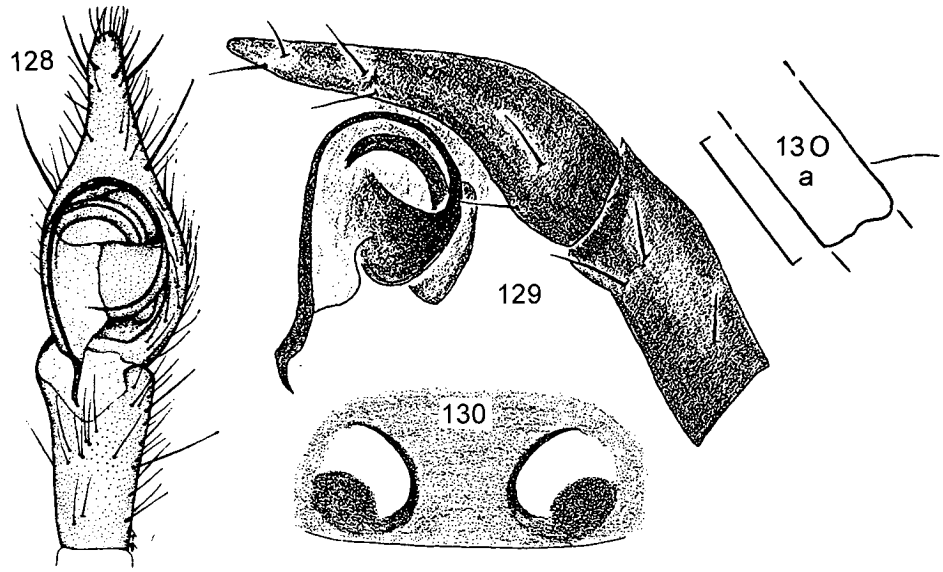
fig. 115a) ?Dictyninae gen. & sp. indet. 2, juv. (F177/CJW), defect prosoma frontally and slightly from the left side; M = 0.5;



figs. 116-120: *Mizagalla tuberculata* **n. gen. n. sp.**, ♂, 116) prosoma, anterior-right aspect (most eyes are covered by bubbles; not all of the tubercles are drawn); r. leg I: Distal part of the femur as well as patella, tibia and metatarsus prodorsally-basally; 118) outline of the anterior spinnerets which are partly covered by a white emulsion, especially the area of the colulus; 119) tibia of the r. pedipalpus, dorsal-basal view; l. pedipalpus retrolaterally, with the expanded bulbus (only few cymbial hairs are drawn). (B = bubbles, E = embolus, M = seam of the embolus, S = subtegulum); M = 1.0 in fig. 117, 0.5 in fig. 116, 0.1 in fig. 119, 0.2 in the remaining figs.;



figs. 121-127: *Mizagalla quattuor* **n. gen. n. sp.**, ♂, 121) r. tarsus IV retrolaterally with two trichobothria (normal hairs are not drawn); 122) mouth parts, ventral view; 123) l. fang ventrally; the arrow indicated to the opening of the poison duct; 124) outline of the anterior spinnerets and colulus (C); 125) tibia of the l. pedipalpus prodorsally; 126) r. pedipalpus ventrally and slightly retrobasally (basally and distally hidden); 127) l. pedipalpus retroventrally. (B = bubble, C = colulus, E = embolus, F = fang, L = labium); M = 0.1 in figs. 123, 125, 0.2 in the remaining figs.;

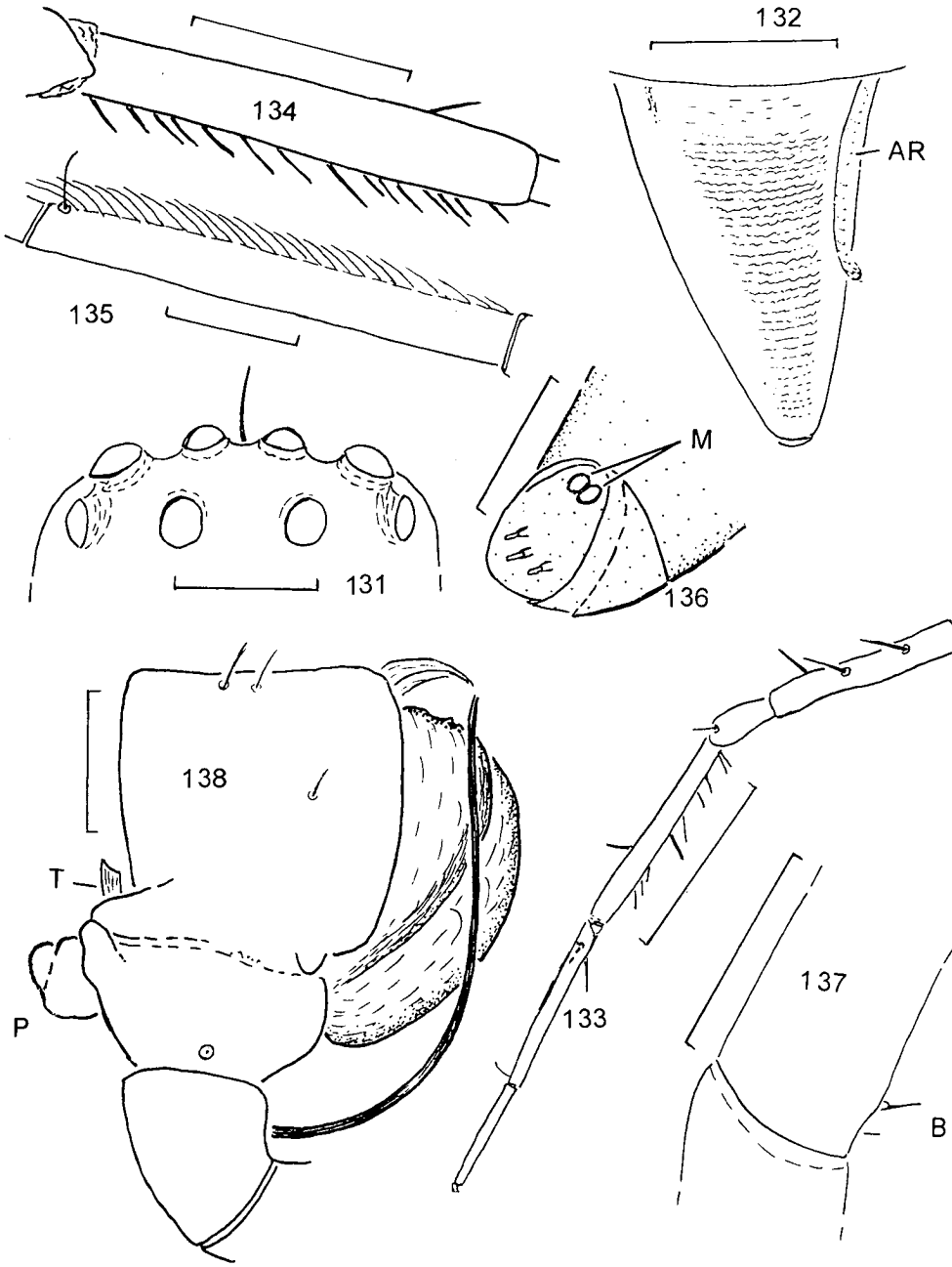


figs. 128-129: *Mizaga racovitzai* (FAGE 1909), extant, ♂; 128) r. pedipalpus ventrally. Taken from LEHTINEN (1967: Fig. 271); 129) r. pedipalpus with the bulbus expanded, prolateral view. Taken from ROTH (1967: Fig. 3);

fig. 130) *Mizaga chevreuxi* SIMON, extant, ♀, epigyne. Taken from ROTH (1967: Fig.

fig. 130a) Dictyna sp., extant, distal part of the r. metatarsus IV retrolaterally, with the trichobothrium which is not curved backward (similar in *Nigma*) (hairs are not drawn); M = 0.2;

Figs. 131-142: *Copaldictyna madagascariensis* **n. gen. n. sp.**, ♂, in copal from Madagascar; 131) position of the eyes dorsally (F815); 132) l. chelicera with stridulating files and a "longitudinal border of teeth" (AR; an artefact, a reflection at an layer in the copal), retrodorsally (F815); 133) l. leg I retrodorsally, with bristles and metatarsal trichobothrium (holotype);134) r. tibia I with bristles dorsally (F814); 135) metatarsus IV with calamistrum and trichobothrium in an apical position prodorsally (normal hairs are not drawn) (F814); 136) distal article of the l. anterior spinneret oblique retrodistally. Only three spigots are drawn besides the two large and flat major ampullate spigots (M) (holotype); 137) base of the r. pedipalpal femur with prolateral stridulatory bristles (B) (F815); 138) l. pedipalpus dorsally and slightly basally (F814); 139) r. pedipalpus dorsally (F815); 140) l. pedipalpus prodorsally (holotype); 141) r. pedipalpus retrolaterally (F815); 142) l. pedipalpus ventrally (bulbus expanded; only few hairs are drawn) (holotype). (A = alveolus, AR = artefact, B = stridulatory bristles, C = functional conductor, D = cymbial depression, DI = distal haematodocha, E = embolus, F = retrolateral furrow of the cymbium, G = embolic gland, H = cymbial horn, M = major ampullate spigots, MA = median apophysis, P = paratibia, S = scinny connection between tibia and paratibia, SS = sperm duct in the subtegulum, ST = sperm duct in the tegulum, T = tooth of the paratibia, TA = dorsal tibial apophysis, Y = cymbium); M = 1.0 in fig. 131), 0.5 in fig. 134), 0.05 in fig. 136), 0.2 in the remaining figs.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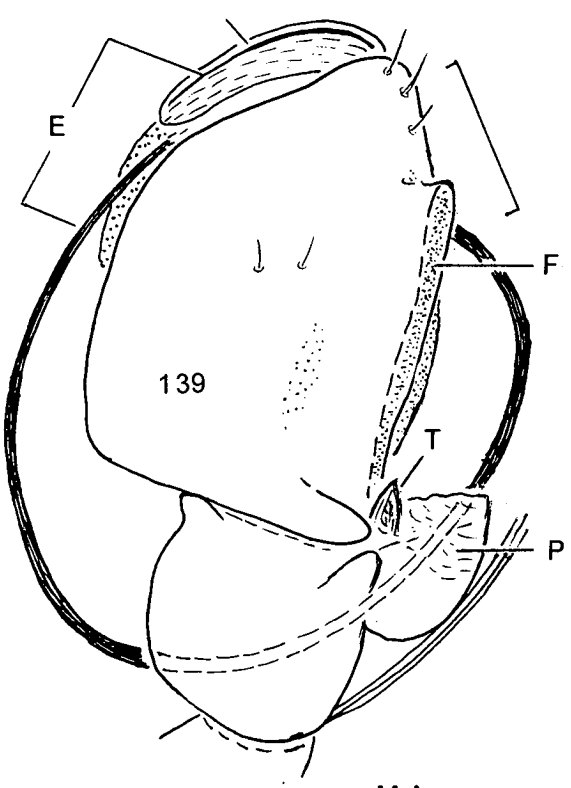
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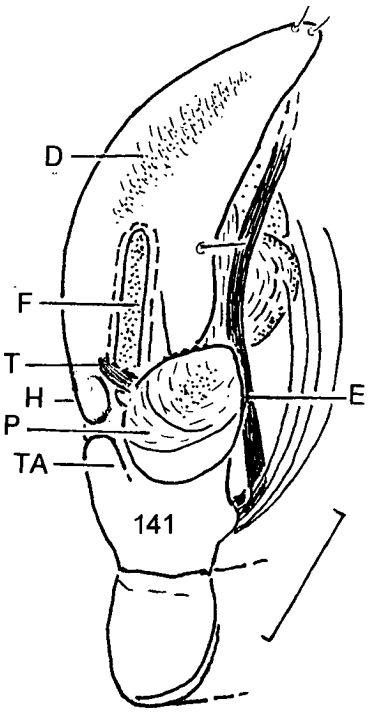
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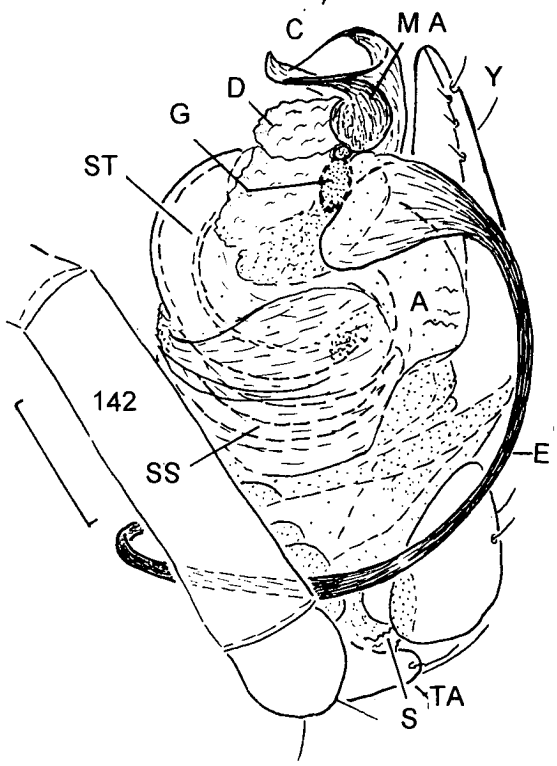
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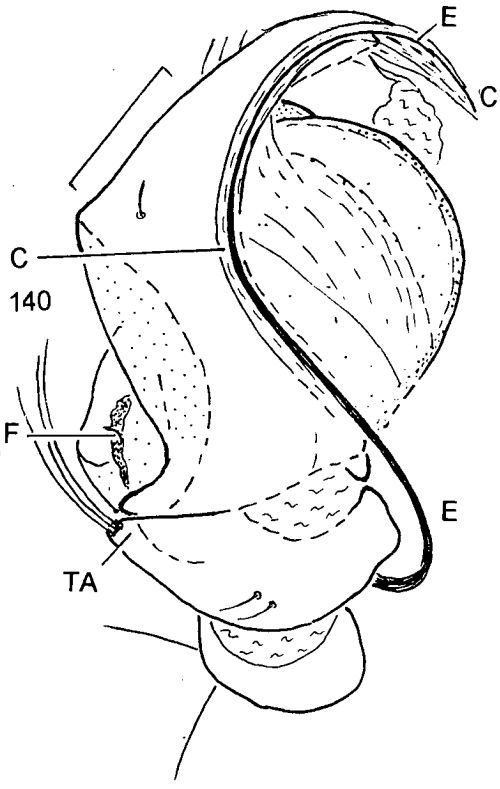
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BEITR. ARANEOL., 3 (2004)

FOSSIL SPIDERS (ARANEAE) OF THE FAMILY AGELENIDAE S. STR. IN BALTIC AMBER

JOERG WUNDERLICH, 75334 Straubenhardt, Germany.

Abstract: The fossil spiders of the family Agelenidae s. str. in Baltic amber are revised, only two questionable genera of the subfamily Ageleninae are recognized: *Agelena* WALCKENAER 1805 and *Tegenaria* LATREILLE 1804. ?*Tegenaria fragmentum* **n. sp**. and ?*Tegenaria obtusa* **n. sp**. are described. *Myro extinctus* PETRUNKEVITCH 1958 is not a member of the family Agelenidae but probably of the Dictynidae s. l.: Cryphoecinae, *Eocryphoeca* is transferred to the Dictynidae s. l.: Cryphoecinae, *Clythia* KOCH & BERENDT 1854 and *Thyelia* KOCH & BERENDT 1854 are dubious genera and most probably not members of the Agelenidae. Cybaeinae and *Textrix* SUNDEVALL 1830 are unknown from Baltic amber.

The **material** is kept in the collection of the author (CJW).

Introduction

Most Funnel Weavers (Agelenidae) - German name "Trichterspinnen" - are large and

hairy spiders, see the photos, their posterior spinnerets are most often long. The large size of most spiders may be the reason for their rareness in Baltic amber. They are unknown from Dominican amber. In most species of the Agelenidae the cymbium is elongated (figs. 3-4) but this character occurs in numerous other spider families, too. - The spiders are cosmopolitical distributed and hides at the narrow end - the funnel - of their capture web, which spread e. g. in gras, under stones and bark or in cellars.

Provisional diagnosis of the family Agelenidae s. str.: Tarsal trichobothria in one row and most often increasing in length, colulus wide, frequently bilobed or reduced, at least trochantera I-II not notched, anterior spinnerets usually widely separated, apical article of the posterior spinnerets long and conically (its length usually at least 1/3 of the basal article). The leg bristles are numerous, the ventral tibial bristles usually outstanding (fig. 2) (as in numerous other families). Feathery hairs may be present, e.g. in *Tegenaria* (fig. 1). Frequently more than one tibial apophyses of the male pedipalpus are present (figs. 5-6) (as in several other families) but see fig. 3, and the cymbium usually is long and slender distally (fig. 3); the median apophysis is large and probably basicly movable (fig. 6), almost ring-shaped anneli of the bulbus are present. Capture web with a tube.

Relationships: The limitation of the family and therefore the exact diagnosis are unsure. Cicurininae and Cryphoecinae may be members of the Agelenidae s. l. or - in my opinion - members of the Dictynidae s. l., see the paper on this family (especially the Cryphoecinae) in this volume - or even families of its own as probably the Cybaeidae and Argyronetidae, see the paper on the dubious family Insecutoridae in this volume. Most - if not all - members of the family Amaurobiidae s. str. are cribellate spiders, see the paper on this family in this volume. Pisauridae and Trechaleidae are related, too, see the paper on this family in this volume.

Distribution: Cosmopolitical; fossil in Baltic amber.

Genera of the Agelenidae in Baltic amber:

PETRUNKEVITCH (1958: 369-370) lists the following genera: *Agelena, Eocryphoeca, Myro, Tegenaria, Textrix* and *Thyelia.*
According to the long posterior spinnerets *Agelena tabida* KOCH & BERENDT 1854 may be a member of the genus *Agelena* or of a related genus; I never saw such a fossil spider in Baltic amber, and I had no opportunity to study type material of *tabida.*- *Tegenaria*: *Tegenaria obscura* KOCH & BERENDT 1854 is most probably a member of the Dictynidae s. l.: Hahniinae, *Tegenaria gracilipes* KOCH & BERENDT 1854 is a member of the *Eocryphoeca* PETRUNKEVITCH 1942, see the paper on the Dictynidae s. l.: Cryphoecinae; no other species of "*Tegenaria*" were described

from Baltic amber. - *Clythia, Eocryphoeca* and *Myro* sensu PETRUNKEVITCH 1942f: See the paper on the Dictynidae s. l.: Cryphoecinae in this volume. - *Textrix* sensu KOCH & BERENDT 1854: According to PETRUNKEVITCH (1958: 370, 376, 381) = Theridiidae (*Clythia funestra* (KOCH & BERENDT 1854)) and Gnaphosidae (*Captrix lineata* (KOCH & BERENDT 1854)). - *Thyelia* KOCH & BERENDT 1854: The type species is *T. tristis* KOCH & BERENDT 1854; type material was not found in the PMHUB. PETRUNKEVITCH (1958: 370) lists 11 species of this genus with a question mark. The genus may be (or may have relationships to) *Eomatachia* PETRUNKEVITCH (Zoropsidae s. l.), see the paper on this family in this volume.

?Agelenidae sp. indet.: See photo 308.

Key to the fossil genera of the family Agelenidae in Baltic amber:

1 Apical article of the posterior spinnerets usually distinctly longer than the basal article, patellar apophysis of the pedipalpus usually present. . . . . ?*Agelena*

- Apical article of the posterior spinnerets shorter than the basal article, patellar apophysis of the pedipalpus usually absent (fig. 5). . . . . ?*Tegenaria*

Description of the new species:

?***Tegenaria obtusa* n. sp.** (figs. 1-4) Photo 309

Material: Holotypus ♂ in Baltic amber and a separated amber piece, F832/BB/AR/AGE/CJW.

Preservation and syninclusions: The spider is well and nearly completely preserved - only the right leg II is absent behind the coxa -, in a 4.2cm long piece of amber which contains numerous particles of detritus; one Diptera is preserved near the spider. Only few parts of the spider are covered by a white emulsion.

Diagnosis (♂; ♀ unknown): Pedipalpus (figs. 3-4; see below) with only a single - the dorsal - tibial apophysis; median apophysis bent in a right angle, embolus blunt, an additional tegular apophysis is present.

Descriptiption (♂):
Measurements (in mm): Body length 6.8, prosoma: Length 3.6, width 2.65, leg I: Femur 3.7, patella 1.25, tibia 3.5, metatarsus 3.8, tarsus 2.3, tibia IV 3.8, length of the apical segment of the posterior spinnerets 0.35.
Colour dark grey brown, legs not annulated.
Prosoma (photo) 1.35 times longer than wide, covered with longer hairs, thoracal fissure long, eyes small, field narrow, anterior median eyes slightly smaller than the anterior lateral eyes, posterior row fairly procurved, posterior median eyes separated by less of their diameter, anterior median eyes smallest, chelicerae, mouth parts and sternum are hidden. - Legs long, covered with numerous long hairs, feathery hairs (fig. 1) are present, numerous long bristles as in fig. 2, femur I bears 6, tibia I at least 6, the dorsal bristles are hair-shaped; trichobothria indistinct. - Opisthosoma 1.7 times longer than wide, dorsally covered with long hairs. Area of the colulus hidden, posterior spinnerets long, partly hidden, the apical segment is at least 1/3 shorter than the basal segment. - Pedipalpus (figs. 3-4): Patella short, without an apophysis, tibia 2 times longer than wide, bearing a dorsal-distal apophysis, cymbium with long bristle-shaped hairs; an additional tegular apophysis is present, the retinaculate median apophysis is bent in a right angle, the embolus is fairly short, conductor of medium size.

Relationships: *Tegenaria* LATREILLE 1804 is a diverse and cosmopolitical distributed genus. The presence of feathery hairs (fig. 1) is known to me from no other genus of the Agelenidae than *Tegenaria* and may be a good character of the genus. The structures of the pedipalpus of *obtusa* - e.g. the retinaculate median apophysis - are similar to *Agelena gomerensis* WUNDERLICH and related extant species of the genus *Agelena* of the Canary Islands but the apical segment of the posterior spinnerets is distinctly shorter than the basal segment similar to *Tegenaria* and a petallar apophysis is absent in contrast to most species of *Agelena* and as in most species of *Tegenaria* (*T. bucculenta* (L. KOCH) is an exception). I do not want to exclude that the two new fossil species are members of a genus besides *Agelena* and *Tegenaria*.- In *T. fragmentum* n. sp. two pedipalpal tibial apophyses are present, the median apophysis is not bent in the middle, the embolus is pointed and an additional tegular apophysisis absent.- The two nominal *Tegenaria*-species sensu KOCH & BERENDT: See above.

Distribution: Tertiary Baltic amber forest.

? ***Tegenaria fragmentum* n. sp**. (figs. 5-6) Photo 310

Material: Holotypus ♂ in Baltic amber, F831/BB/AR/AGE/CJW.

Preservation and syninclusions: Only a fragment of the spider is preserved: Both loose and very well preserved pedipalpi and articles of two anterior legs without the tips of their tarsi and remains of the opisthosoma (?) are present. - Further inclusions

are a larve of a not parasitic mite, a thin thread of silk, a Diptera and several stellate hairs.

Diagnosis (♂; ♀ unknown): Pedipalpus (figs. 5-6; see below) with two tibial apophyses, a straight median apophysis which has a sickle-shaped tip and with a pointed embolus.

Description (♂):
Measurements: Body length and prosomal length unknown; the body length may have been larger than in *T. obtusa*; length of metatarsus I (?) 4.8mm
Colour of the legs yellow brown.
Legs (most articles are lost) long and hairy, tibia I (II?) with 3 pairs of long ventral and at least 2 dorsal bristles, patella with 2 strong dorsal and a retrolateral bristle(s), metatarsus I (II?) bears about 10 long bristles. Tarsal trichobothria indistinct, with small bothria. - Pedipalpus (figs. 5-6): Patella short and without apophysis, tibia 2.7 times longer than wide, bearing long hairs, a wide ventral and a blunt retroapical apophysis, cymbium long and slender distally, conductor large, median apophysis long and retinaculate, embolus fairly short and fairly curved.

Relationship: See *T. obtusa*.

Distribution: Tertiary Baltic amber forest.

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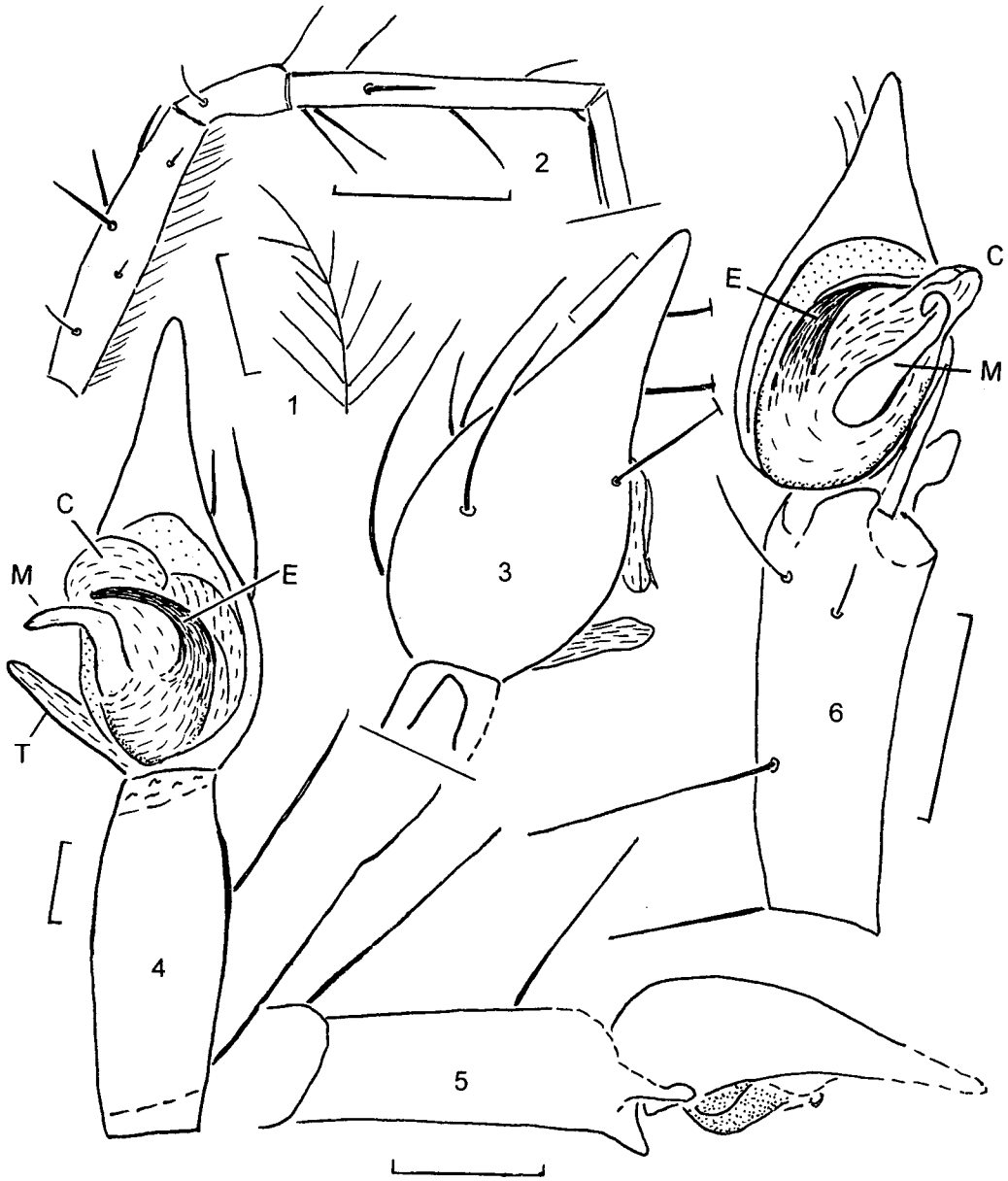

Figs. 1-4: ?*Tegenaria obtusa* **n. sp.**, ♂; 1) feathery hair above the left trochanter IV; 2) part of the r. leg I, femur dorsally, patella retrodorsally, tibia and basal part of the metatarsus retrolaterally (only few hairs are drawn); 3) r. pedipalpus dorsally and slightly retrolaterally; 4) r. pedipalpus proventrally;

figs. 5-6: ?*Tegenaria fragmentum* **n. sp.**, ♂; 5) r. pedipalpus retrolaterally; 6) l. pedipalpus ventrally. C = conductor, E = embolus, M = median apophysis, T = tegular apophysis. - M = 0.1mm in fig. 1, 0.5 in figs. 5-6, 0.2 in the remaining figs.

BEITR. ARANEOL., 3 (2004)

THE FOSSIL ZOROPSIDAE IN BALTIC AMBER WITH REVISED DIAGNOSES OF THE FAMILY ZOROPSIDAE AND ITS FOSSIL AND EXTANT HIGHER TAXA (ARACHNIDA: ARANEAE)

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Abstract: Revised diagnoses are proposed for the family Zoropsidae (s.l.), its subfamilies and tribus. Zorocratidae is regarded as a junior synonym of Zoropsidae (**n. syn.**). A unique kind of autotomy - a special and sexual dimorph suture/break-line of the male tibiae - is regarded as synapomorphy of the Zoropsidae and reported from fossil Baltic amber spiders. The suprageneric taxa Machadoniini LEHTINEN 1967 (extant, hitherto Miturgidae) and Eomatachiini **n. trib**. (fossil, from Psechridae and Amaurobiidae) -, as well as Eoprychiini **n. trib**. (fossil in Baltic amber, hitherto Sparassidae (= Eusparassidae, Heteropodidae)) are described and regarded as members of the family Zoropsidae (**n.comb**.). The extant Acanthoctenini (hitherto Ctenidae) and Udubini (hitherto Miturgidae: Uliodoninae) are regarded as questionable taxa of the Zoropsidae. The fossil genera *Eomatachia* PETRUNKEVITCH 1942 and *Eoprychia* PETRUNKEVITCH 1958 are revised, *Eomatachia barbarus* **n.sp**., *E. bipartita* **n.sp**., *E. divergens* **n.sp**., *E. wegneri* **n.sp**., *E. duplex* **n.sp**., *E. recedens* **n. sp**., *E. xanthippe* **n.sp**., *Succiniropsis* **n.gen**., *S. kutscheri* **n.sp**. and *S. samlandica* **n.sp**. are described from Baltic amber. As nomina dubia of the genus *Eomatachia* are regarded: *Amaurobius faustus* KOCH & BERENDT 1854, *A. rimosus* KOCH & BERENDT 1854, *A. spinimanus* MENGE in KOCH & BERENDT 1854, *A. succini* PETRUNKEVITCH 1942 and *Auximus fossilis* PETRUNKEVITCH 1950. Members of two genera indet. are described. – It is proposed to unite Amaurobioidea and Lycosoidea in a single superfamily. – A case of cannibalism in fossil spiders is reported.

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INTRODUCTION

Without knowledge of the unusual tibial suture/break in of the fossil male spiders (figs. 1, 27, 43, 46, photos) one easily can regard these spiders as members of the families Ctenidae (*Eoprychia*) or Amaurobiidae (*Eomatachia*) as MENGE in KOCH & BERENDT (1854) (*Amaurobius*), PETRUNKEVITCH (1942, 1950,1958) and also LEHTINEN (1967) (Amaurobiidae) did. - There is a suture near the base of the male tibia (figs., photos); in 40% of the fossil males of the Zoropsidae - in all *Eoprychia*-♂! - a tibia is broken off in this area. This character was described by C. GRISWOLD (1993) and was unknown to SIMON and other previous authors. In my opinion this structure - and with the exception of the Zoropsini – also the brake behaviour (autotomy) are synapomorphies of the Zoropsidae (s.l.) and are a good character to determinate fossil or - ?all - extant males of this family but compare gen. indet. 2 below!
Most extant and fossil members of the family Zoropsidae (in the traditional sense) – after some authors even all taxa - are cribellate spiders (figs. 2, 3). Several extant spiders build capture webs; at least in the Machadoniini cribellum/calamistrum and probably a capture web are wanting, comp. GRISWOLD (1991: 110). After GERTSCH (1949: 146) in the American genus *Acanthoctenus* KEYSERLING 1876 a capture web is present. *Acanthoctenus* is similar and probably related to the Baltic amber genus *Eoprychia*. The web of *Eomatachia*: Compare below.
Zoropsidae usually are of medium size or large up to some cm body length but in the tiny male of *Succiniropsis kutscheri* n. gen. n. sp. the body length is only 1.7mm and this species now is the smallest known member of this family.
I know at least 3 genera and 11 species of fossil Zoropsidae in Baltic amber but none in Dominican amber. Members of the genus *Eomatachia* are quite frequent in Baltic amber - I know at least 7 species, I saw hundreds or even thousands of specimens in many collections -, and I suppose that these spiders were bark-living animals.

EINLEITUNG

Ohne Kenntnis der ungewöhnlichen Naht der Tibia und der „Sollbruchstelle" bei männlichen Fossilien (Abb. 1, 27, 43, 46, Fotos) könnte man diese Spinnen für Vertreter der Familien Kammspinnen (Ctenidae) (*Eoprychia*) oder Finsterspinnen (Amaurobiidae) (*Eomatachia*) halten, wie MENGE in KOCH & BERENDT (1854) (*Amaurobius*), PETRUNKEVITCH (1942, 1950, 1958) und auch LEHTINEN (1967) (Amaurobiidae). – Nahe der Basis der männlichen Tibia aller Beine existiert bei allen

fossilen „Wolfspinnenähnlichen Kammspinnen" (Zoropsidae) eine „Naht (z.B. Abb.1), und in 40% der fossilen Männchen - bei allen *Eoprychia*-♂! - ist die Tibia an dieser Stelle (ab)gebrochen (Autotomie). Diese Struktur (dieses Verhalten) ist von GRISWOLD (1993) beschrieben worden und war früheren Autoren wie SIMON unbekannt. Meiner Ansicht nach sind diese Struktur/dieses Verhalten eine Synapomorphie der Zoropsidae (s.l.) und ein gutes Merkmal, fossile wie heutige Männchen dieser Familie zu erkennen; vgl. aber Gen. indet. 2!
Die meisten heutigen und fossilen Vertreter der Familie Zoropsidae (im traditionellen Sinne) – nach manchen Autoren sogar alle Gattungen – sind cribellate Spinnen (Abb. 2-3). Verschiedene heutige Vertreter legen Fangnetze an; zumindest bei den Machadoniini fehlen Cribellum und Calamistrum, vielleicht wird auch kein Fangnetz angelegt, vgl. GRISWOLD (1991: 110). Nach GERTSCH (1949: 146) wird bei der amerikanischen Gattung *Acanthoctenus* KEYSERLING 1876 ein Fangnetz angelegt. Meiner Ansicht nach ist *Acanthoctenus* vermutlich mit der Gattung *Eoprychia* im Baltischen Bernstein verwandt. Zum Fangnetz bei *Eomatachia*: Siehe unten.
Zoropsidae sind gewöhnlich mittelgroße oder große Spinnen mit einer Körperlänge bis zu mehreren cm, aber das kleine Männchen von *Succiniropsis kutscheri* besitzt nur eine Körper-Länge von 1.7mm. Vertreter dieser Art gehören zu den kleinsten bekannten Spinnen dieser Familie.
Vom Baltischen Bernstein kenne ich mindestens 3 Gattungen und 11 Arten fossiler Zoropsidae, dagegen keine einzige vom Dominikanischen Bernstein. Vertreter der Gattung *Eomatachia* sind im Baltischen Bernstein recht häufig – ich kenne wenigstens 7 Arten und sah Hunderte oder sogar Tausende von Exemplaren in zahlreichen Sammlungen –, und ich vermute, dass diese Spinnen Bewohner der Baumrinde waren.

BIOGEOGRAPHY

The family Zoropsidae has a wide distribution in the tropics and subtropics; in today's Europe only the genus *Zoropsis* SIMON 1878 of the subfamily Zoropsinae is present, compare WUNDERLICH (1995). Some authors regard the North American genus *Zorocrates* SIMON 1888 as a member of another family (e. g. Miturgidae) but comp. GERTSCH (1949); RAVEN (in prep.) regards *Uliodon* L. KOCH 1873 from the Australian Region as a member of the Zoropsidae. From Baltic amber I know members of the tribus Eomatachiini and Eoprychiini. The discovery of these fossil taxa demonstrates (1) relationships of the Baltic amber spider fauna to the southern hemisphere as well as to the Neotropic and to the Ethiopean regions: *Eomatachia* to the Machadoniinae (South Africa and Madagascar), *Eoprychia* probably to the Machadoniiae and perhaps (also) to the Acanthoctenini (America); (2) that in the Early Tertiary this familiy had a much wider distribution than today. Furthermore (3) one species of the genus *Succiniropsis* has mainly been found at the Bitterfeld deposit.

The tibial suture and the limitation of Zoropsidae; remarks on computer cladistic

GRISWOLD (1993) recognized a tibial suture in different spider taxa. This author suggested that this character might be a synapomorphy of the family Zoropsidae (s.str.), and according to this author it occurs also – convergently - in the Machadoniinae and other taxa (e. g. *Campostichomma*, *Raecius, Uduba*, and *Zorodictyna*), see GRISWOLD (1993: 31-32). Later this author regarded the Udubidae as a family of its own (from Miturgidae: Uliodoninae, compare GRISWOLD (1997) and DIPPENAAR-SCHOEMAN & JOCQUE (1998: 211)). GRISWOLD et al. (1999) regarded the genera mentioned above as members of the Zorocratidae.

According to the catalogue of PLATNICK (1997) only the extant cribellate genera *Takeoa* LEHTINEN 1967 and the related *Zoropsis* SIMON 1878 are true members of the family Zoropsidae.

Although SIMON (1892) included *Acanthoctenus* and other taxa - which are now by most authors regarded as members of the family Miturgidae – in the family Zoropsidae, GRISWOLD did not include all spiders in „my" Zoropsidae (s.l.) which possesses a tibial suture. It is important to note that the distribution of this suture and the structure of the tapetum of „indirect" eyes seems not to be congruent. According to GRISWOLD (1993) in the Udobiini the primitive canoe-shaped tapetum retains (?). In my opinion we need more informations about the structure of the tapetum, its variability in spider families & genera and possible convergences. In *Araneus diadematus* e. g. the anterior lateral eyes are of the canoe-shaped type but in the medial half of the posterior median eyes the tapetum is lost. According to GRISWOLD (1993: 3) „the tapetum of *Phanotea* appears to be derived from a grate-shaped type" and (1993: 1) *Machadonia* has a grate-shaped tapetum similar to „Lycosoidea" (e. g. *Zoropsis*) but *Uduba* has the more primitive canoe-shaped tapetum – a reversal?

In my opinion the „tibial suture" – and usually also the „tibial type of autotomy (autospasy)" - is of special interest: (1) it is unique among spiders and all Arachnida, (2) the kinds of autotomy appear to be constant at family level, see ROTH & ROTH (1984: 144) (there are only few exceptions in Agelenidae and Oecobiidae), (3) the tibial autotomy is sexual dimorph, absent in the female; the only known kind of sexual dimorph autotomy in spiders. Perhaps it is in connection with an aggressive mating behaviour of the females. - I think that such a special character should not evolve several times independently, and therefore I believe that the tibial autotomy is most probably a synapomorphy of the family Zoropsidae s.l.. If this is true, the limitation of the Zoropsidae – and some related families - must change radically. If this is not true – compare the convergent evolution of other kinds of autotomy in different families – *Eomatachia* could well be a member of the Amaurobiidae and *Eoprychia* a member of the Acanthocteninae or Ctenidae.

In any case the tibial suture appears to occur in related taxa, of the same superfamily or even the same family, and if this feature evolved several times independently – in related or in not related taxa - there already should have been a predisposition in the muscle anatomy of the ancesters of the present-day spiders because the brake

through a leg article is quite unusual! In spiders a brake through another leg article - the patella - is only reported from few genera of the family Agelenidae, compare ROTH & ROTH (1984: 142). — Tibial suture: See photo 318.
According to GRISWOLD (1993: 23) (tibial) „autospasy at this point apparently does not occur", but the same author writes (p. 1) „the legs of preserved specimens were frequently broken." See also fig. 4 in his paper. In about 40% of „my" fossil Zoropsidae – in both tribus - a male leg is broken at the base of a tibia (e.g. figs. 1, 37), so autotomy doubtless exists in these spiders and is probably an adaptation to the life on the bark of the resin-producing Baltic amber forest trees. - On the other hand in the genus *Zoropsis* SIMON 1878 (Zoropsini) a tibial brake (autotomy) does not occur at the suture but – exceptionally - either between patella and tibia or between coxa and trochanter, pers. obs. in alcohol material of *Z. rufipes* and *spinipes* (I saw only one male each).- Zoropsini: Compare below (Eomatachiini).
I regard the extant genus *Zoropsis* as derived in this character: The tibial suture still exists but the tibial brake has probably been lost in these large spiders which live hidden in tubes. In some other taxa (e. g. *Acanthoctenus*) probably the tibial suture has been lost, see GRISWOLD (1993). In contrast to the opinion of GRISWOLD (1993: 30, fig. 86) - this author believes the tibial suture lost in the Ctenidae – I think that the Ctenidae did never possess a tibial suture and brake and that there has been no reversal. But probably this kind of autotomy has been lost in Lycosidae which are absent in the Early Tertiary Baltic amber and lost also in the gen. indet. 2 as well as in an undescribed species of the genus *Succiniropsis* (CJW).

Remark (1). The crux in cladistic analyses seems to be (a) that the weightening of characters (see below), as well as (b) the selection of characters often appear to be subjective, (c) that the decision of apomorphic or plesiomorphic as well as convergently evolved features is often not well founded. - According to GRISWOLD (1993) a tibial suture occurs in the genus *Zoropsis* (fig. 85), also in the „related taxa" besides *Tengella* and the Lycosoidea (fig. 84) as well as in several taxa of his „Ctenoids" (fig. 86) but should have been lost in genera of this complex as *Ctenus* and *Phoneutria*. In the extant cribellate genera *Acanthoctenus* KEYSERLING 1876 and *Takeoa* LEHTINEN (1967) – both members of the Zoropsidae? - a tibial suture is also absent. – In my opinion the multiple loss is more likely than the multiple convergent evolution of such a special structure, compare GRISWOLD (1993: Comp. no 52 in figs. 84-85)!

Remark (2). In suprageneric taxa I regard the taxonomic value of such unusual characters as the tibial brake higher than a dozen of characters as „posterior eye row straight or recurved", „sternum length/width more or less than 1.2" or „number of paired ventral tibial spines 4 or more than 4"! If we simply ignore such features as the number of tibial spines on supraspecific level - and consider the surely related terminal taxa - we can often handle the few(er) remaining taxa without the help of a computer! - One hundred years ago E. SIMON knew nothing about cladistics with computer programs but a great part of his view is valid nowadays. Living today – would he fail in the correct limitation of the Zoropsidae when using a computer program?

Remark (3). Studying the relationships of higher spider taxa the discovery of synapomorphies is most important, e. g. the finding of sternal glands in the Theridiosomatidae as a synapomorphy of this family or „Archaeid femoral organs" in the Archaeinae, compare the paper on Eresoidea in this volume. On the other hand we

have always to keep in mind the confusion which results from the „cribellate problem" – the cribellum as a plesiomorphic structure which evolved in primitive spiders and the numerous - dozens! - of independent/convergent losses of this structure also on family level, compare GRISWOLD et al. (1999)!

Remark (4) Several spider taxa are regarded by various authors as families and by others as subfamilies of different families or even superfamilies. Students often are searching for related genera. It is often easier to find related genera in a subfamily of the old Catalogues of Araneae of ROEWER than in the modern and important Catalogues of PLATNICK. So a new Catalogue of Araneae should consider subfamilies although most probably we will not know the relationships of all spider subfamilies in the next decennia!

In my opinion the distribution of the tibial suture in spiders confirms...

(1) for most parts the view of E. SIMON from 1892 (!) about the deliminating of the family Zoropsidae,
(2) that Miturgidae is a polyphyletic taxon.

Fossil spiders of the family Zoropsidae in Baltic amber seem to belong to at least two tribus: Eomatachiini (compare gen. indet. 2!) and Eoprychiini. There has been some confusion about the relationships of these fossils: KOCH & BERENDT (1854) described 2 species (at that time sub Drassodidae (= Gnaphosidae)), MENGE in KOCH & BERENDT (1854) mentioned one species sub *Amaurobius*. I now regard these spiders as members of the genus *Eomatachia* PETRUNKEVITCH 1942. *Eomatachia* was regarded as a member of Psechridae by PETRUNKEVITCH (1942) and as a member of Amaurobiidae by LEHTINEN (1967) and – before carrying out this revision – also by me, compare WUNDERLICH (1986: 24, 67). PETRUNKEVITCH (1958) regarded *Eoprychia* as a member of the Sparassidae (= Eusparassidae, Heteropodidae), compare WUNDERLICH (1986: 24). The same author (1942) regarded *Adamator* as a member of the Zoropsidae, LEHTINEN (1967) as a member of the Miturgidae: Uliodoninae and WUNDERLICH (1986: 24) as a member of the Sparassidae (sub Heteropodidae), genus *Sosybius*. Now I regard *Sosybius* as a possible member of the Trochanteriidae, compare the paper on this family in this volume. - Because of the discovery of a tibial suture in the male in three or more fossil genera my present-day view of the limitation of the Zoropsidae and several related taxa is totally different from my view in 1986.

Revised diagnosis of the Zoropsidae (s.l.): A suture at the base of the tibia and most often autotomy (figs. 1, 27, 43) are present in the males, also in subadults and probably juveniles, but absent in the females (sexual dimorphism), as well in Acanthocteini and in the questionable gen. indet. 2; unpaired tarsal claw usually reduced, presence of a retrobasal paracymbium and a modified median apophysis (e.g. figs. 15, 35-36).

Further characters: Cribellum/calamistrum most often present (figs. 2-3) (absent in Machadoniini, probably functionless in Eoprychiini), calamistrum absent (Eoprychiini) or a field of setae or a single row (Eomatachiini, fig. 2), often strongly reduced in males; unpaired tarsal claw mostly reduced or even absent, but present in some Machadoniini and large in Eomatachiini (fig. 29), trochantera notched (e.g. *Succiniropsis*, arrow in fig. 30; *Zoropsis*) or unnotched (e.g. in *Eomatachia*), tarsal trichobothria usually in more than one row (not so e. g. in *Succiniropsis*), grate-shaped tapetum mostly present (canoe-shaped in *Uduba*; not studied/observable in the fossils), epigyne often with an erectile scapus or with a pair of lateral „teeth" (fig. 23) or similar structures, median apophysis cup-shaped or bimarginate in Eomatachiini, Eoprychiini (figs. 15, 36) and Machadoniini or apically divided (typic in Zoropsini). – The tibial suture is a cuticular ring of weakness (in German „Sollbruchstelle") near the base of the tibia, and the break may occur distally of 1-2 ventro-basal tibial bristles/spines, see figs. 1, 27, 37 and GRISWOLD (1993: Fig. 4). At least in the Zoropsini the tibial suture is not connected with a tibial break which is absent, see above. (A loss of the suture may occur in the probably related Lyosidae as a reversal). Posterior eye row usually recurved.

Relationships: In Psechridae and Tengellidae the calamistrum also consists of a field of hairs as in some Zoropsidae but a tibial suture is absent. According to GRISWOLD (1993: 5) in the Stiphidiidae the calamistrum consists of a single row of hairs and a tibial suture is absent. Perhaps these taxa are strongly related. In the usually also cribellate and most probably strongly related Amaurobiidae a tibial suture is absent, too; furthermore the trochantera are unnotched, the tarsi bear usually (!?) only one row of trichobothria and the calamistrum consists often (!) of two rows of setae. The relationships of all these families are not sure. - In Ctenidae, Lycosidae, Miturgidae and Zoridae a tibial suture as well as cribellum and calamistrum are absent; Zoridae seems to be not strongly related to Zoropsidae and in my opinion the cribellate *Acanthoctenus* is not a member of the Ctenidae but probably a member of the „Zoropsid complex" sensu GRISWOLD (1993: 5, 32) or even of the Zoropsidae (s. l.). Lycosidae may be strongly related. E. g. according to the paired sclerotized structures laterally of the epigynal plate in my opinion Amaurobioidea and Lycosoidea should be united in the superfamily Amaurobioidea and include Zoropsidae; see LEHTINEN (1967: 285): Origin of the membraneous secondary conductor.

Subfamilies: At least Machadoniinae LEHTINEN 1967 (Eomatachiini, Matachiini and perhaps Eoprychiini) and Zoropsinae (the remaining tribus, see the tab. below). RAVEN (in prep.) regards *Uliodon* and Uliodoninae as taxa of the Zoropsidae.

Tribus (see the tab. below). - Unsure are the relationships of some extant cribellate taxa, e. g. *Acanthoctenus* (Central and South America) and *Takeoa* (Japan) in which a tibial suture is absent. Perhaps the suture has been lost in these taxa and the limitation of the family Zoropsidae has to extent in the future. In the Udobini – according to GRISWOLD (1997) a family of its own – a canoe-shaped tapetum of the indirect eyes is present, see GRISWOLD (1993: 30). GRISWOLD et al. (1999:59) regard Zorocratidae DAHL 1913 as a family of its own. According to the presence of a tibial suture I regard the genus *Zorocrates* SIMON 1888 (North America) as a member of the Zoropsidae (?Udubini) and Zorocratidae as a junior synonym of Zoropsidae BERTKAU 1882 (**n.syn.**).
Distribution: Cosmopolitical, in tropic and subtropic climates.

Selected features of the tribus of the Zoropsidae (s. l.),

including the questionable Acanthocteini and Udubini, excl. *Uliodon*

Character	Zorop-sini	Udu-bini	Acantho-cteini	Eopry-chiini	Eoma-tachiini	Macha-doniini
Cribellum	+	+	+	?+	+	-
♂-calamistrum	a field	a field	a field	- (♂)	single row	-
Tarsal scopula	+	+	+/-	-	-	-
Claw tufts	+	+	+	+	-	-
Third claws I-II	-	-	-	-	+	+/-
Eye rows	2-3	2	3	3	2	2
Depressed prosoma	-	-	+	+	-	-
Tibial suture (s) or break (b)	s	s/?b	-	s/b	s/b	s/b
Known extant (e) or fossil (f)	e	e	e	f	f	e

Eomatachiini n. trib.

Diagnosis: Calamistrum in a single row (fig. 2), unpaired tarsal claw large, 3-4 mostly long tibial apophysis of the male pedipalpus present which originate in the basal half. Epigyne (fig. 23) with 2 teeth-shaped structures.- Further characters: Compare the table above.

Relationships: According to the presence of a tibial suture in the male as well as a cribellum, the conformation of the bulbus structures and the paired teeth of the epigyne I regard Eomatachiini as a member of the Zoropsidae. According to the presence of an unpaired tarsal claw and the lack of claw tuft and tarsal scopula as well as the presence of a cup-shaped median apophysis Machadoniini should be the nearest relatives; perhaps both are sister groups. In the extant Machadoniini cribellum/calamistrum are absent and there are fewer tibial apophysis of the male pedipalpus. - The long tibial apophyses of the male pedipalpus are similar in the genus *Amaurobius* C. L. KOCH 1837 (Amaurobiinae) but in Amaurobiidae a tibial suture and a trochanteral notch are lacking (in Amaurobiinae a pseudocalamistrum is present and there is only one row of tarsal trichobothria). But I do not want to exclude with certainty that perhaps Eomatachiini is a member of the Amaurobiidae s. l.! – According to plesiomorphic structures – e. g. a well developed cribellum, a large unpaired tarsal claw and the absence of a claw tuft - Eomatachiini may be the most „primitive" tribus of the Zoropsidae. It is far away from the extant Zoropsini in which claw tuft and scopula are present, a tibial brake is absent (lost in my opinion) and the calamistrum is modified.

Capture web: In my private collection there are several cribellate web parts, few are preserved together with exuviae of *Eomatachia* sp. indet., e.g. F1221/B/AR/ZOR/CJW (photo).- In a Baltic amber piece of the private coll. S. ZSCHOKKE in Bale - Bal8 - 2 exuvia of ?*Eomatachia* sp. and fragments of a tubular web are preserved.

Type genus: *Eomatachia* PETRUNKEVITCH 1942. Further genera: *Succiniropsis* n. gen. and perhaps two gen. indet. (see below).

Distribution: Tertiary Baltic amber forest.

Key to the genera of the tribus Eomatachiini

(Adult females are only known from *Eomatachia*)

1 Tiny spiders, body length of the adult male 1.7mm. Patellae with indistinct lateral bristles. (fig. 27). Male pedipalpus: Figs. 31- 34, female unknown . . . . ***Succiniropsis*** Photos 319-320

-Body length of adult males at least 4mm. Patellae with distinct or without (gen. indet. 1) lateral bristles. 2

2(1) Lateral patellar bristles absent, opisthosoma two times longer than wide, legs long and slender as in *Eomatachia* (juv. ♀, photo). . . . . **gen. indet. 1**

- Patellae with lateral bristles (fig. 1). 3

3(2) Chelicerae of normal size, longer legs (tibia I about 9 times longer than high) (photo), male pedipalpus (e.g. figs.14-16): Tibia with longer apophyses; epigyne: (fig. 23) with a pair of teeth-shaped structures. . . . . ***Eomatachia***

- Very large chelicerae, robust legs (tibia I 5 times longer than high) (subad. ♂, photo), genital organs unknown. . . . . **Gen. indet. 2**

Eomatachia PETRUNKEVITCH 1942 Photos 314ff

Diagnosis: Spiders of medium size, body length 4-5.3mm, cribellum divided (fig. 3), calamistrum long, one distinct row in the female (fig. 2), more indistinct in the male. Patellae with lateral bristles (fig. 1), tarsi with more than one row of trichobothria. ♂-pedipalpus (e.g. figs. 14-16): Tibia with 3-4 apophyses, median apophysis modified and in a basal position, embolus of medium length and in a prodistal position. Epigyne (fig. 23) with a pair of teeth-shaped structures.

Further characters: Thorax higher than the caput, condylus present, 8 eyes in two rows (fig. 8), posterior row slightly procurved, order of the legs I/IV/II/III, unpaired tarsal claw large, paired claws with long teeth. Leg bristles numerous and mostly of medium length: Femora usually 1 dorsally in the middle and 3 distally/apically (dorsal none), tibiae with a dorsal one in the distal half, usually a pair ventrally in the middle and some lateral ones distally/apically, metatarsi: Ventrally and laterally about 8-10 long bristles.

Remarks: (1) By far the most frequent species is *latimana*; the remainig 6 species described after males in this paper are represented only ba a single specimen each; (2) Threads of a catching web are figured by PETRUNKEVITCH (1942: Fig. 404), compare figs. and photo; (3) In most fossil spiders the cribellum is hard to observe, often it is hidden by an emulsion.

Relationships: PETRUNKEVITCH (1942: 221-222) compared *Eomatachia* with *Matachia* DALMAS 1917, extant, New Zealand, now family Desidae, in former times regarded as a member of the family Psechridae. In these families a tibial suture is absent. – After the tibial suture and the long tibial apophyses of the male pedipalpus the genus *Succiniropsis* n. gen. should be related to *Eomatachia*. In *Succiniropsis* lateral patellar bristles are indistinct and the spiders are much smaller.

Remark: PETRUNKEVITCH (1942, 1950, 1958) caused some confusion when he described confamiliar and most probably even conspecific spiders – usually after juveniles or even exuvia – under several familiy names, under the names Amaurobiidae (*Amaurobius, Auximus*), Psechridae (*Eomatachia*); the genus *Auximus* is now regarded as a member of the Dictynidae, a synonym of *Lathys*. - It is a criminalistic

work to find out the relationships of such inadult fossil spiders and often takes more time than the description of an unknown species!

Type species: *Eomatachia latifrons* PETRUNKEVITCH 1942.

Nomina dubia: *Amaurobius succini* PETRUNKEVITCH 1942 and *Auximus fossilis* PETRUNKEVITCH 1950. - As noted by PETRUNKEVITCH (1942: 212-213) *Amaurobius faustus* KOCH & BERENDT 1854, *Amaurobius rimosus* KOCH & BERENDT 1854 and *Amaurobius spinimanus* MENGE in KOCH & BERENDT (1954) are doubtful species or even nomina nuda. I did not have the opportunity to study type material. – Also *Eolathys succini* PETRUNKEVITCH 1950 and *E. debilis* PETRUNKEVITCH 1950 may be members of *Eomatachia*. In contrast to the note of PETRUNKEVITCH (1950: 268) there is at least one tarsal trichobothrium in the holotyps of *E. succini* (pers. obs.).

Distribution: Tertiary Baltic amber forest incl. Bitterfeld localities., comp. SCHUMANN & WENDT (1989) (sub Amaurobiidae: *Amaurobius* (sic!)).

Determination of the *Eomatachia* species (males)

Specific are mainly the position of the tibial apophyses and the size and shape of the median apophysis. A large median apophysis occurs at least in *bipartita, divergens* and *duplex* (unknown in *barbarus*). Emulsions and/or bubbles cover mostly parts of the bulbus; so some structures are hidden and some „seemingly" structures are simply bubbles.

1 Retrodorsal tibial apophysis divided (arrow in fig. 4). . . . . ***bipartita***

- Retrodorsal tibial apophysis undivided (e.g. fig. 5). 2

2(1) Tibia of the ♂-pedipalpus short (fig. 9), retrolateral tibia apophysis unusually thick. . . . . ***wegneri***

- Tibia of the ♂-pedipalpus long (e.g. fig. 12), retrolateral tibial apophysis slender. . .3

3(2) Prodorsal and retrodorsal tibial apophyses divergent, patellar bristle longer than in all other species (0.4mm) (figs. 5-6). . . . . ***divergens***

- Distal half of the pro- and retrodorsal tibial apophyses +/- parallel (e.g. figs. 12-13, 23a), patellar bristle 0.2-0.25mm long (fig. 12). 4

4(3) Prodorsal and retrodorsal tibial apophyses basally widely spaced, prodorsal apophysis shorter (fig. 12). . . . . ***duplex***

- Pro- and retrodorsal tibial apophyses basally close together, prodorsal apophysis about as long as the the retrodorsal apophysis or longer (fig. 13, 23a). 5

5(4) Retrodorsal tibial apophysis apically pointed (fig. 23a). . . . . ***barbarus***

- Retrodorsal tibial apophysis blunt (figs. 13-14, 20). 6

6(5) Retrodorsal tibial apophysis apically distinctly widened (figs. 13-14), median apophysis as in fig. 15. . . . . ***latifrons***

- Retrodorsal tibial apophysis apically not or only slightly widened (fig. 20), median apophysis as in fig. 21. . . . . ***recedens***

***Eomatatachia barbarus* n.sp.** (figs. 23a-c)

Material: Holotypus ♂ and 2 juv. in Baltic amber IMGPUG no. B 6.559.

Preservation and syninclusions: The holotype is well and completely preserved on a resin layer. In few parts the ventral side is covered by an emulsion; the median apophysis is hidden, the opisthosoma is ventrally partly covered by a bubble. – In front of the male as well as under the opisthosoma with the right femora III and IV each a juvenile spider is preserved in contact with the holotype. Both tiny spiders are most probably conspecific with barbarus (compare below). The juveniles are dissected – some legs are broken off - and appearantly both have been the prey of the male. – No stellate hairs.

Diagnosis (♂; ♀ unknown): Pedipalpus (figs.23 a-c): Tibia very large and complicated, with at least 4 apophyses: 2 long and thin dorsal apophyses, a long retrolateral and a large ventral one.

Description (♂):
Measurements (in mm): Body lenght 3.4, prosoma: Length 1.7, width about 1.4, tibia I 1.1, length of the patellar bristle of the pedipalpus 0.25.
Colour: Prosoma and legs dark brown (artificial darkened?), opisthosoma grey.
Body and legs as in the genus (see above). Male pedipalpus: Compare the diagnosis.

Colour: Prosoma and legs dark brown, opisthosoma yellow brown.
Prosoma abruptly smaller in front, medially with a band of white hairs. Fovea large. 8 eyes ist position as in fig. 8. Basal articles of the chelicerae large. – Legs fairly slender, bristles as in the genus. Calamistrum hidden. – Opisthosoma longer than wide, dorsally with numerous hairs of medium length, cribellum and spinnerets hidden. – Pedipalpus: See above.

Relationships: In *latifrons* the tibial apophyses are similar but the retrodorsal tibia apophysis is distinctly widened apically and its prolateral hook is mostly indistinct, also the shape of the median apophysis is different.

Distribution: Tertiary Baltic amber forest.

***Eomatachia xanthippe* n.sp.** (fig. 23)

Material: Holotypus ♀ in Baltic amber, F1027/BB/AR/ZOR/CJW.

Preservation and syninclusions: The spider is not well preserved. Nearly the left half of the opisthosoma is feeded off, parts of the left legs are broken off, a leg part (tarsus and metatarsus) is situated behind the spider and behind it 2 parts of an insect puparium, excrements and stellate hairs are present. Most parts of the spinnerets are destroyed but the epigyne is well preserved.

Diagnosis (♀; ♂ unknown): Epigyne (fig. 23) with a wide grove and a pair of teeth-shaped structures.

Description (♀):
Measurements (in mm): Body length 4.8, prosoma: Length 2.7, width about 2.3, metatarsus I 1.5.
Colour dark brown, legs not annulated.
Prosoma distinctly longer than wide, covered with long hairs, fovea large, eyes of medium size, covered by bubbles. Legs robust, with numerous long bristles, e.g. tibia I at least prolaterally 1/2/1 and apical ones, metatarsus I at least 2 ventral pairs and a lateral pair. No tibial suture. Opisthosoma with numerous hairs of medium length. Epigyne: See above.

Relationships: The relationships are unclear because the other species are known from males only.

Distribution: Tertiary Baltic amber forest.

Eomatachia sp.indet.: Two exuviae and the part of a web including cribellate threads, F582/BB/AR/ZOR/CJW. Tibia I of the larger exuvia is 1.15mm long.

Juveniles: Body length about 1 ot 1.2mm, lenth of tibia I 0.29mm. Most parts of the body are hidden/destroyed/covered by an emulsion, compere above and the photo. One loose leg of the juvenile in the anterior position has been broken off through the base of the tibia, so at least this juvenile should be conspecific with the holotype male. – Most probably these juveniles have been the prey of the adult male – the first documented case of **cannibalism** in fossil spiders known to me.

Relationships: The tibia of the pedipalpus has unique apophyses.

Distribution: Tertiary Baltic amber forest.

***Eomatachia bipartita* n.sp**. (fig. 4)

Material: Holotype ♂ in Baltic amber, F1028/BB/AR/ZOR/CJW.

Preservation and syninclusions: The spider is nearly completly preserved, only the tip of the left tibia I is cut off. The ventral side of the body is covered by an emulsion, the opisthosoma is depressed dorsally. The spider lies on a large amber layer; near the right leg I a small Diptera is preserved, also several stellate hairs are present.

Diagnosis (♂; ♀ unknown): Retrodorsal tibial apophysis of the pedipalpus divided (arrow in fig. 4), retrolateral tibial apophysis in a basal position, median apophysis large (its size similar to fig. 7) (bulbus hidden).

Dsecription (♂):
Measurements (in mm): Body length 4.2, prosoma length 2.35, width 2.0, tibia I 2.15.
Colour: Body and legs dark brown, opisthosoma yellow brown.
Body and legs as in the genus; ♂-pedipalpus see above.

Relationships: The divided retrodorsal tibial apophysis is unique in *E. bipartita*.

Distribution: Tertiary Baltic amber forest.

***Eomatachia divergens* n.sp.** (figs. 5-7)

Material: Holotype ♂ in Baltic amber, F69/BB/AR/ZOR/CJW.

Preservation and syninclusions: The spider is well preserved in a larger amber piece and dorsally covered by a thin emulsion. Some left leg parts are missing: I through the femur, II and III at the tibial seam. – In the same amber piece a lot of bubbles (a large one between the opisthosoma and the right leg IV), a Diptera, some stellate hairs and large plant parts are preserved: A piece of an oxydized leaf and a complete slender and 8mm long scale of a flowerbud.

Diagnosis (♂; ♀ unknown): Pedipalpus (figs. 5-7): Length of the unusual long patellar bristle 0.4mm, dorsal tibial apophyses divergent, retrodorsal tibia apophysis with 3 tiny teeth near its prolateral base (arrow in fig. 6), median apophysis large.

Description (♂):
Measurements (in mm): Body length 4.0, prosoma: Length 2.0, width 1.8, femur I 2.2, tibia IV 1.9.
Colour: Body and legs dark brown, opisthosoma yellow brown.
Body and legs as in recedens and other species, chelicerae longer than the high of the prosoma, labium and gnathocoxae wider than long, calamistrum long. Pedipalpus: See above.

Relationships: In latifrons the tibial apophyses are different, the patellar bristle of the pedipalpus is shorter, the median apophysis is smaller and of diferent shape.

Distribution: Tertiary Baltic amber forest.

***Eomatachia wegneri* n. sp.** (figs. 8-11) Photo 316

Derivatio nominis: The species is named after HORST WEGNER, the owner of the holotype.

Material: Holotype ♂ in Baltic amber, coll. H. WEGNER, Hannover.

Preservation and syninclusions: The spider is well preserved but not complete: The left leg I is missing after the base of its femur, parts of the other legs except the left ones II and III are cut off, a small part of the caput is also cut off, most parts of the ventral body side is covered with an emulsion, the pedipalpi are well visible. – A small wingless insect is preserved under the sternum of the spider, some stellate hairs are also present.

Diagnosis (♂; ♀ unknown): Pedipalpus (figs. 8-11): Tibia short, dorsally with 3 apophyses, retrolateral apophysis unusual large, proapically a small apophysis near the cymbium (arrow in fig. 9), position of the median apophysis in a more distal position than in the other known species of this genus.

Description (♂):
Measurements (in mm): Body length about 4.0, prosoma length 2.0, femur II 1.6, metatarsus II 1.55, tarsus II 1.0.
Colour: Prosoma and legs dark brown, opisthosoma yellow brown.

Prosoma (fig. 8) distinctly longer than wide, frontally wide, covered with thin hairs, fovea long and deep, eyes small and in two wide rows, posterior row slightly procurved, posterior median eyes separated by more than one of its diameter. Chelicerae robust, teeth not visible. – Legs fairly robust, bristles as in the genus (see above). – Opisthosoma 1.3 times longer than wide, dorsally covered with numerous hairs of medium length, cribellum not visible. – Pedipalpus: See above; patella with a short bristle, median apophysis of medium size.

Relationships: In the other known species of the genus the tibia of the pedipalpus is longer and ist apophyses are clearly longer.

Distribution: Tertiary Baltic amber forest.

***Eomatachia duplex* n.sp**. (Abb. 12)

Material: Holotype ♂ in Baltic amber, F68/BB/AR/ZOR/CJW.

Preservation and syninclusions: The spider is fairly well preserved, the left legs I-II and the right leg IV are cut off through its femur, the right leg I is lacking after its tibial suture, the right leg II is cut off through ist metatarsus, the mouth parts are covered by an emulsion, spinnerets and cribellum are well visible. – In the amber piece also a small Diptera (with the head cut off), detritus, excrements and some stellate hairs are preserved.

Diagnosis (♂; ♀ unknown): Pedipalpus (fig. 12): Patellar bristle short, prodorsal and retrodorsal tibial apophyses widely spaced, median apophysis large (bulbus hidden).

Description (♂):
Measurements (in mm): Body length 5.3, Prosoma length 2.6, tibia IV 2.2.
Colour: Body and legs dark brown, opisthosoma yellow brown.
Body and legs as in the genus and in *E. recedens*.- Pedipalpus: See above.

Relationships: Compare *E. latifrons* and the key.

Distribution: Tertiary Baltic amber forest.

Eomatachia latifrons PETRUNKEVITCH 1942 (figs. 13-19) Photo 317

Material (in Baltic amber): Numerous ♂ few ♀; 6♂ 2♀ CJW, 1♂ Paleont. Inst. Wien no. 1; 2 questionable ♂ Paleont. Mus. Paris no. 4562 and 7141, 1♂ PMHUB,

MB.A 141 (coll. BERENDT), 2♂ IMGPUG no. 16991 and 17974. Further specimens in collections of different dealers and in private collections. – Remark: Mainly because of its different positions of the pedipalpi I am not quite sure that all studied males are really conspecific.

Diagnosis (♂; ♀ unknown): Pedipalpus (figs. 13-19): patellar spine short, tibia dorsally with 2 long and slender apophyses of equal length, its base close together, the retrodorsal apophysis widened apically, (as in other congeneric species the tibial apophyses appear quite different in slightly different positions, compare the figures!), median apophysis small.

Description (♂):
Body length 4-5mm; body and legs as in the genus. ♂-pedipalpus: See above.

Relationships: Compare *E. recedens* n.sp. and the key.

Distribution: Tertiary Baltic amber forest.

***Eomatachia recedens* n.sp.** (figs. 20-22)

Material: Holotype ♂ in Baltic amber and a separated amber piece, F67/BB/AR/ZOR/CJW.

Preservation and syninclusions: The spider is well and nearly completly preserved, only the dorsal half of the left patella and tibia are cut off in the amber; the ventral side is covered with a weak emulsion, the opisthosoma is ventrally covered by two bubbles, also the bulbi are partly covered by bubbles. The right tibia II is broken off at its suture, the distal leg articles are laying in an unnatural position. – 1cm right of the spider some leg articles and the distal part of the opisthosoma of a probably conspecific spider are preserved, under the right leg I a large detritus particle is preserved and just behind and under the spider in the same amber layer a destroyed Myriapoda (Polyxenidae) is present which perhaps has been the prey of the spider. – In the separated amber piece some leg particles of a seemingly third conspecific specimen are preserved including a basal tibial part which has been broken off at its suture. Furthermore an ant, detritus particles and stellate hairs are present in this amber piece.

Diagnosis (♂; ♀ unknown): Pedipalpus (figs. 20-22): Prodorsal and retrodorsal tibia apophyses close together, retrodorsal apophysis apically not widened, its prolateral hook more distinct than in latifrons, median apophysis with a long basal branch.

Description (♂):
Measurements (in mm): Body length 4.3, prosoma: Length 2.3, width 2.0, leg I: Femur about 2.1, patella 0.7, tibia 2.0, metatarsus 2.0, tarsus 1.0, tibia IV 1.9.

Prosoma similar to *S. kutscheri* n. sp., right chelicera fig. 35b), promargin toothless, retromargin partly hidden. Legs as in *kutscheri*, tarsal claws not studied, calamistrum long. Opisthosoma ovally, covered with shorter hairs. Spinnerets short, the anterior ones thick, the region of the cribellum hidden. Pedipalpus (figs. 35c-d): Patella with a short dorsal-distal bristle, no tibial bristle but at least two dorsal trichobothria; the embolus is not observable.

Relationships: In *S. kutscheri* n.sp. is the shape of the tibial apophyses different, a long retrolateral branch of the dorsal apophysis is absent.

Distribution: Tertiary Baltic amber forest.

Remark: After the manuscript was finished I got males of two undescribed species (CJW).

Gen. indet. 1 (photo)

Material: 1 juv. ♀ in Baltic amber from Bitterfeld locality, F63/BB/AR/?ZOR/CJW.

The spider is well preserved; body length about 4mm, two rows of small eyes in a wide field, opisthosoma twice as long as wide, large chelicerae (nearly half as long as the prosoma), legs long and slender (tibia I about 9 times longer than high), scopula and claw tufts absent, metatarsus IV distinctly compressed laterally and with 3 trichobothria, calamistrum distinct, its length about 0.6 of the metatarsus, tarsal trichobothria indistinct or absent, trochanters not notched, unpaired tarsal claw indistinct.

The **relationships** are unsure – an adult male is needed for further studies. Compare the key above but - the species may be a member of another related tribus or family.

Distribution: Tertiary Baltic amber forest, Bitterfeld locality.

Gen. indet. 2 Photo 324

Material: 1 subad. ♂ in Baltic amber, F43/BB/AR/?ZOR/CJW.

Preservation: The spider is nearly completely preserved but the spinnerets are cut off in the amber. Dorsally body and legs are covered by a white emulsion. A thin thread is running from the spider frontally more than 2cm.

Description (subad. ♂):
Measurements (in mm): Body length 5.3, prosoma length 2.1, tibia I 1.4, metatarsus I 1.3, tibia IV 1.2, metatarsus IV 1.2.
Colour dark grey brown.
Prosoma hairy, wide and convex, fovea indistinct, clypeus short, chelicerae very large/robust, condylus present; cheliceral teeth, labium and gnathocoxae hidden. 8 eyes in two wide rows, posterior row distinctly procurved, posterior median eyes separated by 1 diameter and by nearly 1 ½ diameters from laterals; lateral eyes close together. - Legs hairy, short and robust, no tibial suture, tibia I 5 times longer than high, I and IV about of the same length, III not much shorter. Most leg spines/bristles shorter than the diameter of the articles, femora 1 dorsally in the middle and 3 distally, patellae bristles present dorsally (indistinct) and laterally (distinct), tibiae and metatarsi with lateral and few ventral bristles (no dorsally). Calamistrum distinct, in ?one row, its length nearly 2/3 of the article. Three tarsal claws which are partly hidden by hairs, unpaired claws indistinct, no scopula or claw tufts. Trichobothria short, few on tibiae, ?one on metatarsi, position on metatarsus II in 0.85, probably none on tarsi. – Opisthosoma long ovally, covered with indistinct short hairs. Spinnerets cut off.

The **relationships** are unsure – an adult male is needed for further studies. Compare the key above - but the species may be a member of another family or tribus. After the absence of a tibial suture the species may be a member of the Amaurobiidae, after the indistinct or absent tarsal trichobothria a member of the Titanoecidae.

Distribution: Tertiary Baltic amber forest.

Eoprychiini n.trib.

Diagnosis (♂; ♀ unknown): Tibial suture and brake present (figs. 43, 46), most probably cribellate (fig. 44) but cribellum probably funtionless and male calamistrum absent, prosoma flattened and opisthosoma long (fig. 42), three eye rows of 2/4/2 (figs. 38), ♂-pedipalpus (e.g. figs. 35-36) with a long tibia, a short retro-lateral tibial apophysis and a modified median apophysis.

Further characters: 2 tarsal claws (a third claw may be hidden by the claw tuft) and well developed claw tufts present (fig. 39), tarsal scopula absent, more than one row of tarsal trichobothria present, gnathocoxae (fig. 40) longer than wide, 3 pairs of long spinnerets, anterior and posterior ones conical (fig. 44), apical segments short. – Remark: Because of an emulsion and its ?unnatural position I am not quite sure that a cribellum is present. The ventral structure in front of the spinnerets (fig. 44) appears too wide for a colulus; more likely it seems to be the anterior part of the hidden cribellum spinnig field, compare fig.3 and plate 59, fig. B of *Dardurus spinipes* DAVIES

1976 in the paper of DAVIES (1976). – In every male at least one tibial brake has happened.

Relationships: According to PETRUNKEVITCH (1958) *Eoprychia* is a member of the family Sparassidae (= Eusparassidae, Heteropodidae) but a trilobate metatarsal membrane is absent.- According to the presence of a tibial suture in the male I regard *Eoprychia* as a member of the Zoropsidae s.l. – In *Acanthoctenus* KEYSERLING 1876 (extant, America) the eye position and the modified median apophysis are similar but a scopula at least of the tarsi I-II and a long embolus are present and a tibial suture is absent. Nevertheless *Acanthoctenus* probably is a member of the Zoropsidae s.l., see GRISWOLD (1993: Fig. 85) and perhaps both are even sister groups. – Also in the Machadoniini the median apophysis is modified but in the Machadoniini there are only 2 eye rows, a cribellum, a claw tuft and an unpaired tarsal claw are absent.

Type genus: *Eoprychia* PETRUNKEVITCH 1958 (the only known genus).

Distribution: Tertiary Baltic amber forest.

Eoprychia PETRUNKEVITCH 1958

Diagnosis, relationships and distribution: Compare the tribus diagnosis. Larger spiders, body length (♂) 7-8mm; prosoma flat, opisthosoma 2.4-3 times longer than wide (fig. 42), long legs, no dorsal patellar bristles. Reconstructed ♂-pedipalpus: Figs.35-36, embolus e. g. fig. 41.

Type species: *Eoprychia succini* PETRUNKEVITCH 1958.

Distribution: Tertiary Baltic amber forest.

Eoprychia succini PETRUNKEVITCH 1958 (figs. 37-41)

Material in Baltic amber: Holotype ♂ Paleontological Museum of the Humboldt University Berlin. – The spider is well preserved, some leg articles are missing.

Diagnosis (♂; ♀ unknown): Pedipalpus (figs. 40-41) with a long tibia and a short retroapical tibial apophysis.

Description (♂):

Measurements (in mm): Body length 7.6, prosoma: Length 3.3, width 3.15 (the prosoma width is erroneosly given by PETRUNKEVITCH as 1.43mm), leg I: Femur5.6, patella 1.6, tibia 6.6, metatarsus 6.1, tarsus 2.0, femur III 3.3, femur IV 5.0.
Colour dark brown; partly oxidated.
Prosoma slightly longer than wide, hairy, with a short clypeus and 8 prominent eyes in 3 rows of 2/4/2 (fig. 38). Basal articles of the chelicerae and fangs of medium size, teeth not observable. – Legs (fig. 37) long and hairy, order I/II/IV/III, with numerous bristles on femora (about 10) dorsally,pro- and retrolaterally, on patellae a lateral pair (dorsally none), tibia I 6 ventral pairs and apical ones; trochantera fairly notched. Apical membrane of the metatarsi not modified. Tibial brake present at the right leg III (fig. 37), scopular and claw tufts present, aired tarsal claws with long teeth, (fig. 39). – Opisthosoma (fig.37) 2.4 times longer than wide, with long spinnerets and a large ?functionless cribellum. – Pedipalpus: Patella short, tibia long, with long bristles and a short retroapical apophysis, cymbium retrobasally with a depression between two humps, tegulum outstanding, median apophysis with a longitudinal depression, embolus fairly bent retrolaterally (fig. 41).

Relationships and distribution: In *E. succinopsis* n. sp. the embolus is directed apically and only slightly bent, in *E. vicina* n. sp. the embolus is bent nearly in a right angle and more slender distally.

***Eoprychia succinopsis* n.sp.** (figs. 42-45) Photo 322

Material: Holotype ♂ and a separated amber piece F36/BB/AR/ZOR/CJW.

Preservation and syninclusions: The spider is fairly well preserved, only the spinnerets are ventrally slightly covered by an emulsion. The left leg II is broken off through the tibia, the left leg III is cut off through the base of the femur. —In the same amber piece 2 Diptera, an Aphidina larva and numerous stellate hairs are preserved.

Diagnosis (♂; ♀ unknown): Embolus (fig. 45) slightly bent, directed nearly apically.

Description (♂):
Measurements (in mm): Body length 7.5, prosoma length 3.0, leg I: Femur 5.5, patella 1.0, tibia +/- 5.9, metatarsus 6.1, tarsus 2.0, femur III 3.1, femur IV 4.9.
Colour medium brown.
Body, legs (figs. 42-44) and pedipalpus similar to *E. succini*, compare above but embolus different.

Relationships: See *E. succini* and *vicina*.

Distribution: Tertiary Baltic amber forest.

***Eoprychia vicina* n.sp.** (figs, 46-47) Photo 321

Material: Holotypus ♂, F64/BB/AR/ZOR/CJW.

Preservation and syninclusions: The spider is not well preserved, a dorsal part of the opisthosoma and numerous leg articles are missing, only the left leg IV is complete, few parts of the prosoma are covered by an emulsion, the right legs I and II are broken through the base of the tibia (fig. 46). – A Nematocera and numerous stellate hairs are preserved in the same amber piece.

Diagnosis (♂; ♀ unknown): Embolus (fig.47) bent nearly in an angle, distally slender.

Description (♂):
Measurements (in mm): Body length 7.5, prosoma: Length 3.1, width 2.9, femur I 5.9, leg IV: Femur 5.0, patella 1.0, tibia 4.3, metatarsus +/- 4.8, tarsus 1.6.
Colour medium brown.
Body lags and pedipalpus similar to succini but embolus different.

Relationships: See *E. succini*; in *succini* the embolus is slightly bent and directed foreward.

Distribution: Tertiary Baltic amber forest.

***Eoprychia* sp. indet.** Photo 323

Material: 1 ♂ coll. J. DAMZEN in Vilnius/Lithunia.

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Addendum

In addition to the holotype of *Succiniropsis kutscheri* n.gen.n.sp. there are two male paratypes which are preserved in the same amber piece from the Bitterfeld deposit, coll. H. GRABENHORST no. Ar-20. Dorsal aspect of the tibial apophysis of the male pedipalpus: Fig. 34a). In one of the males a tibial brake is present in the left leg IV, in the other male both legs IV show a tibial brake and loss of the distal leg articles, furthermore the right leg IV is broken through the femur. Quite near the spider in the same amber layer three tiny ants (Formicidae) are preserved. This assemblage is probably not an accident; the hurted right femur IV of the paratype may originate from a bite of one of the ants. Spiders and ants are partly covered by a white emulsion and should therefore been caught alife in the resin. In contrast to the holotypus is in one of spiders the left slender questionable embolus observable in a distal position. Also preserved in the amber piece are a tiny mite, an Aphidina larva and some stellate hairs. - A further paratype - F728/CJW - comes not from the Bitterfeld deposit.

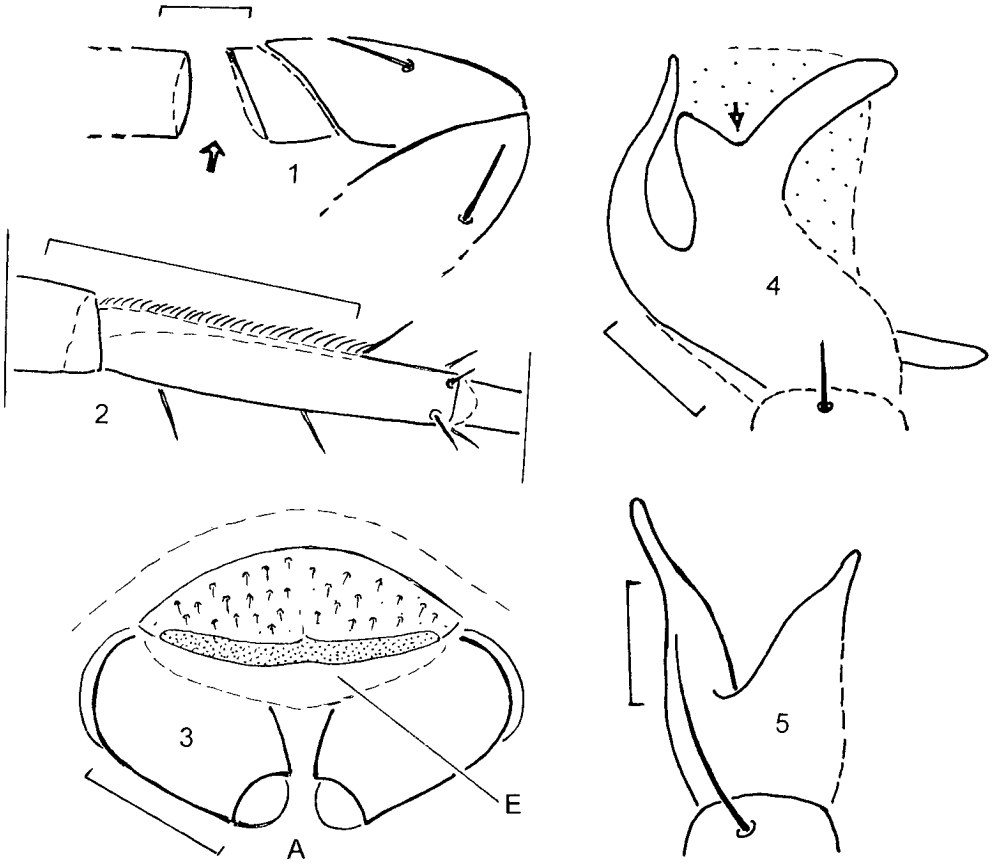


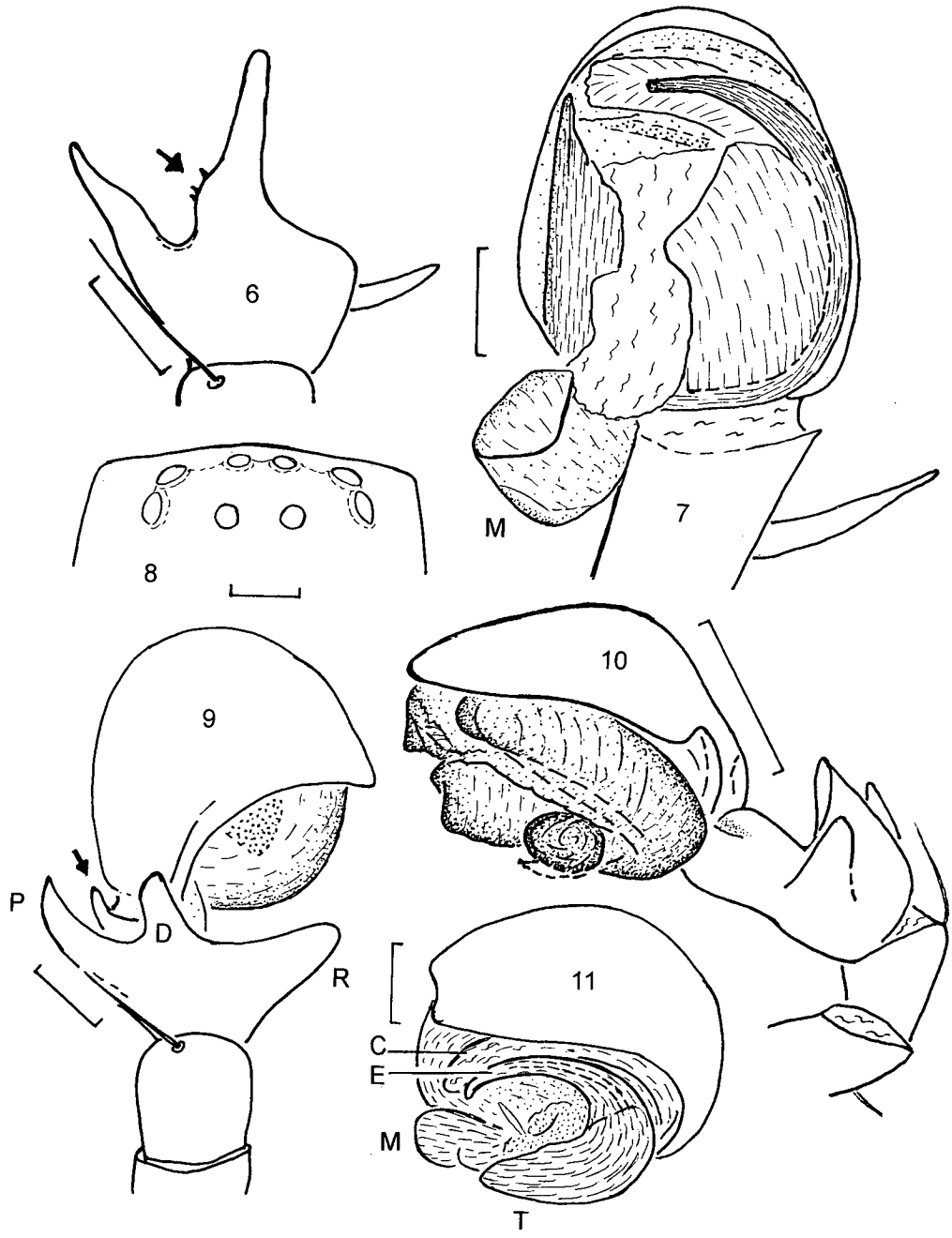
Fig. 1: ***Eomatachia* sp.**, ♂ (CJW), r. leg I prolaterally: Patella, distal part of the femur and basal part of the tibia after autotomy;

fig. 2: ***Eomatachia* sp.**, subad. ♀ (CJW), l. tibia IV with calamistrum retroventrally-distally;

fig. 3: ***Eomatachia* sp.**, ?subad. ♀ (CJW), cribellum (punctuated) in front of an emulsion (E) and the anterior spinnerets (A) ventrally;

fig. 4: ***Eomatachia bipartita* n.sp.**, ♂, tibia of the r. pedipalpus slightly (retro)dorsally;

figs. 5-7: ***Eomatachia divergens* n.sp.**, ♂; 5) tibia of the l. pedipalpus slightly prodorsally; 6) tibia of the r. pedipalpus slightly retrodorsally; 7) r. pedipalpus ventrally; median apophysis (M) in an unnatural position? – M = 0.1mm in fig. 3), 0.5 in fig. 2), 0.2 in the other figs.;



figs. 8-11: ***Eomatachia wegneri* n.sp.**, ♂; 8) position of the eyes dorsally; 9) r. pedipalpus dorsally and a bit aborally; 10) l. pedipalpus retrolaterally; 11) r. pedipalpus seen from the tip; C = conductor, E = embolus, M = median apophysis, T = tegulum. M = 0.5 in fig. 10), 0.2 in the other figs.;

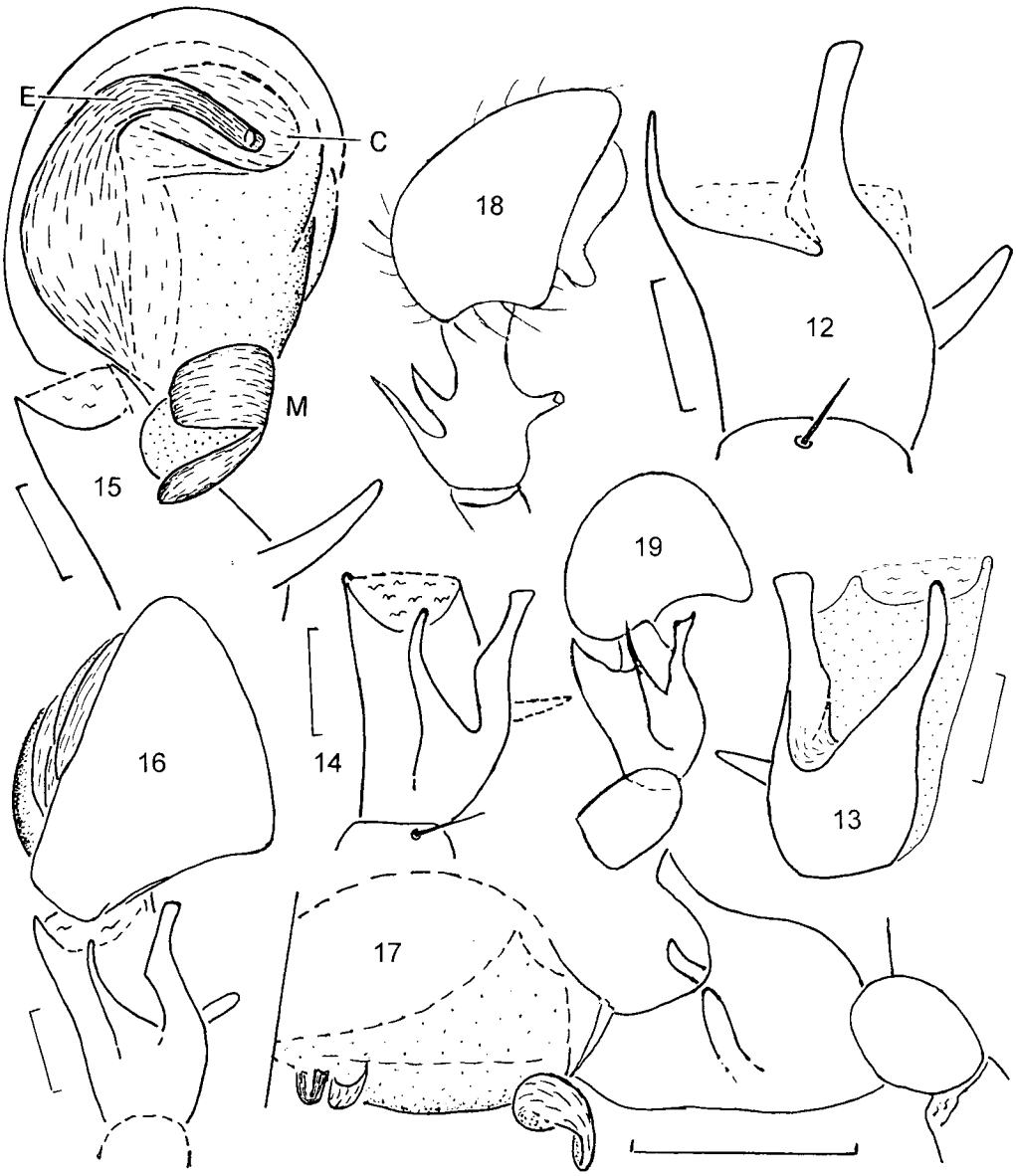
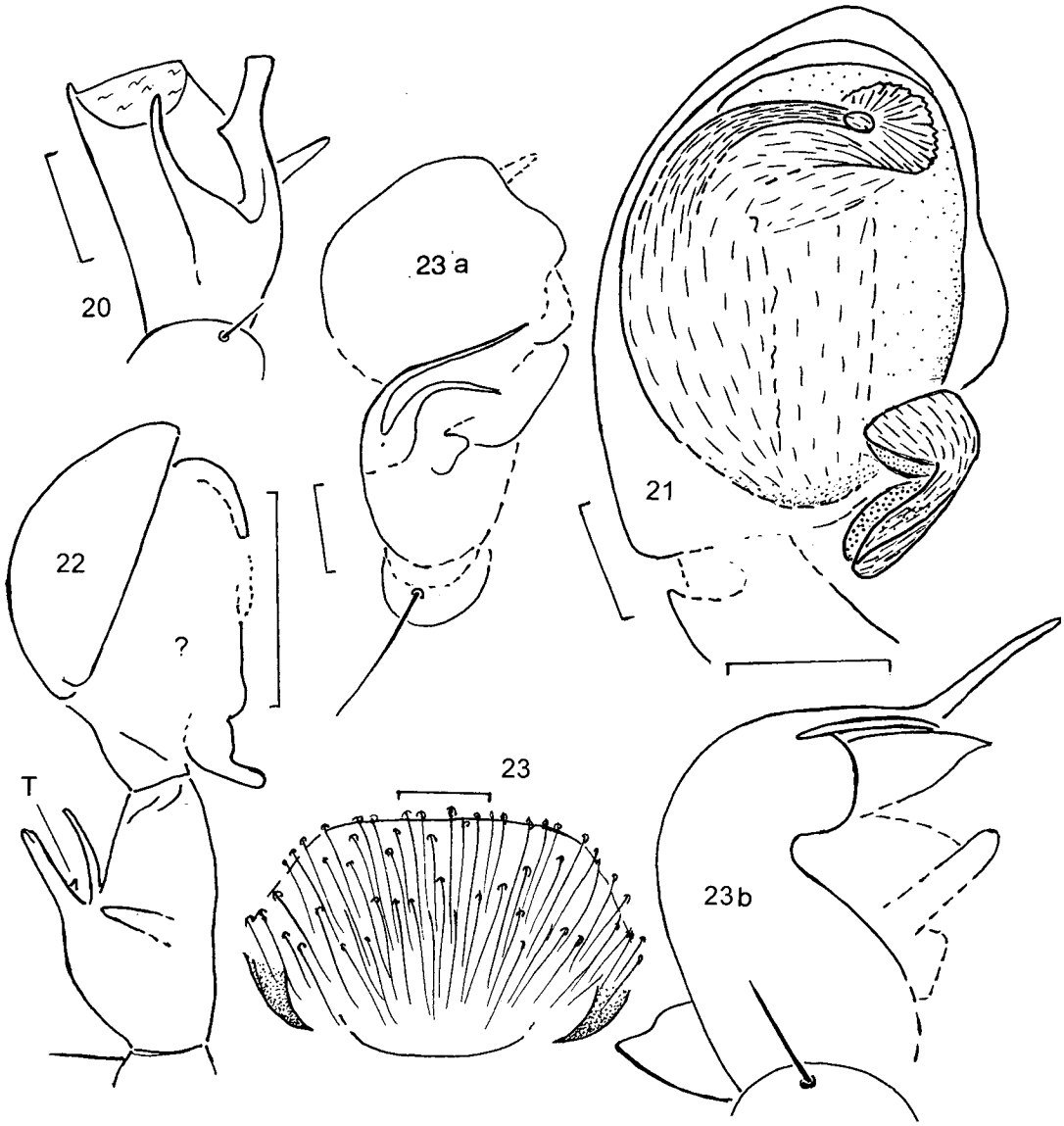


fig.12: ***Eomatachia duplex* n.sp.**, ♂, tibia of the r. pedipalpus dorsally. – M = 0.2;

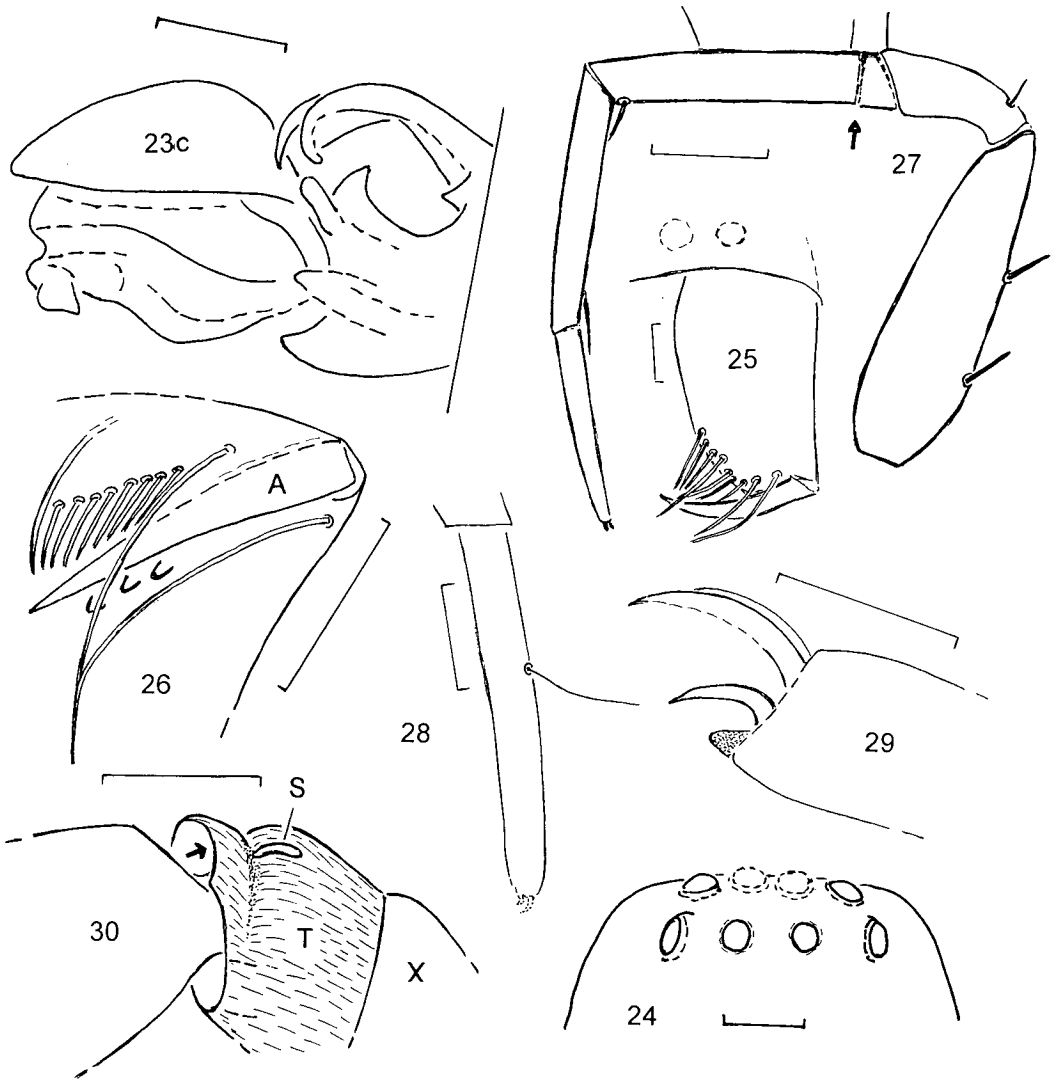
13-19: ***Eomatachia latifrons*** PETRUNKEVITCH 1942, ♂; figs. 13-15, 17) CJW, 16) questionable male, Museum Paris no. 4562, 18-19) holotype; 13) tibia of the l. pedipalpus dorsally; 14) tibia of the r. pedipalpus prodorsally; 15) l. pedipalpus ventrally; 16) r. pedipalpus dorsally; 17) l. pedipalpus retrolaterally; 18-19) r. pedipalpus retrodorsally and prodorsally; after PETRUNKEVITCH (1942: Figs. 65-66), in fig. 66) the retrolateral tibia apophysis is hidden; C = conductor, E = embolus, m = median apophysis. – M = 0.5 in fig. 17), figs. 18-19) without M, 0.2 in the other figs.



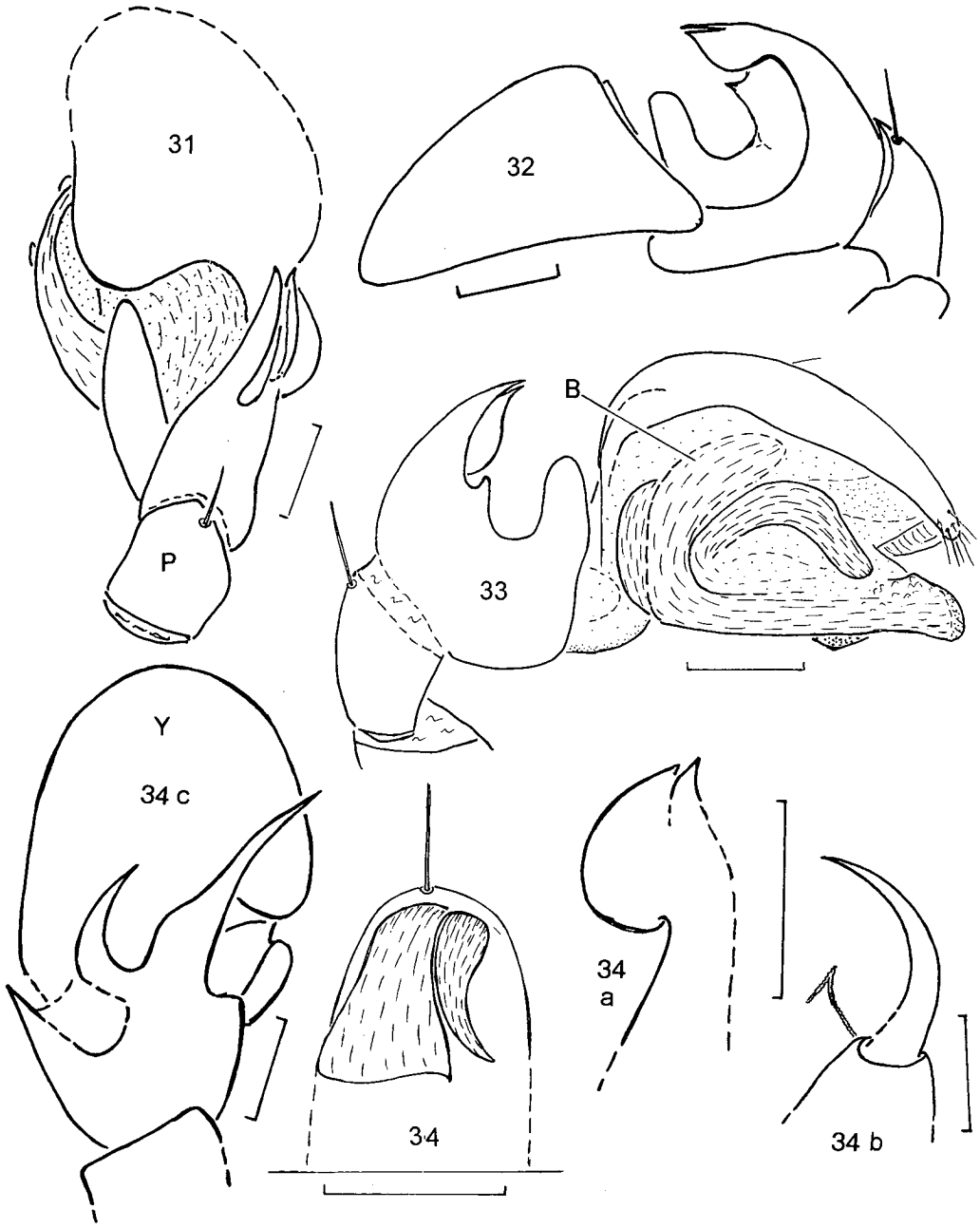
figs. 20-22: ***Eomatachia recedens* n.sp.**, ♂; 20) tibia of the r. pedipalpus prodorsally; 21) l. pedipalpus ventrally; 22) outline of the r. pedipalpus retrolaterally and slightly frontally; T = tiny tooth of the retrodorsal tibia apophysis. – M = 0.2 in fig. 22), 0.2 in the other figs.

fig. 23: ***Eomatachia xanthippe* n.sp.,** ♀, epigyne. – M = 0.2;

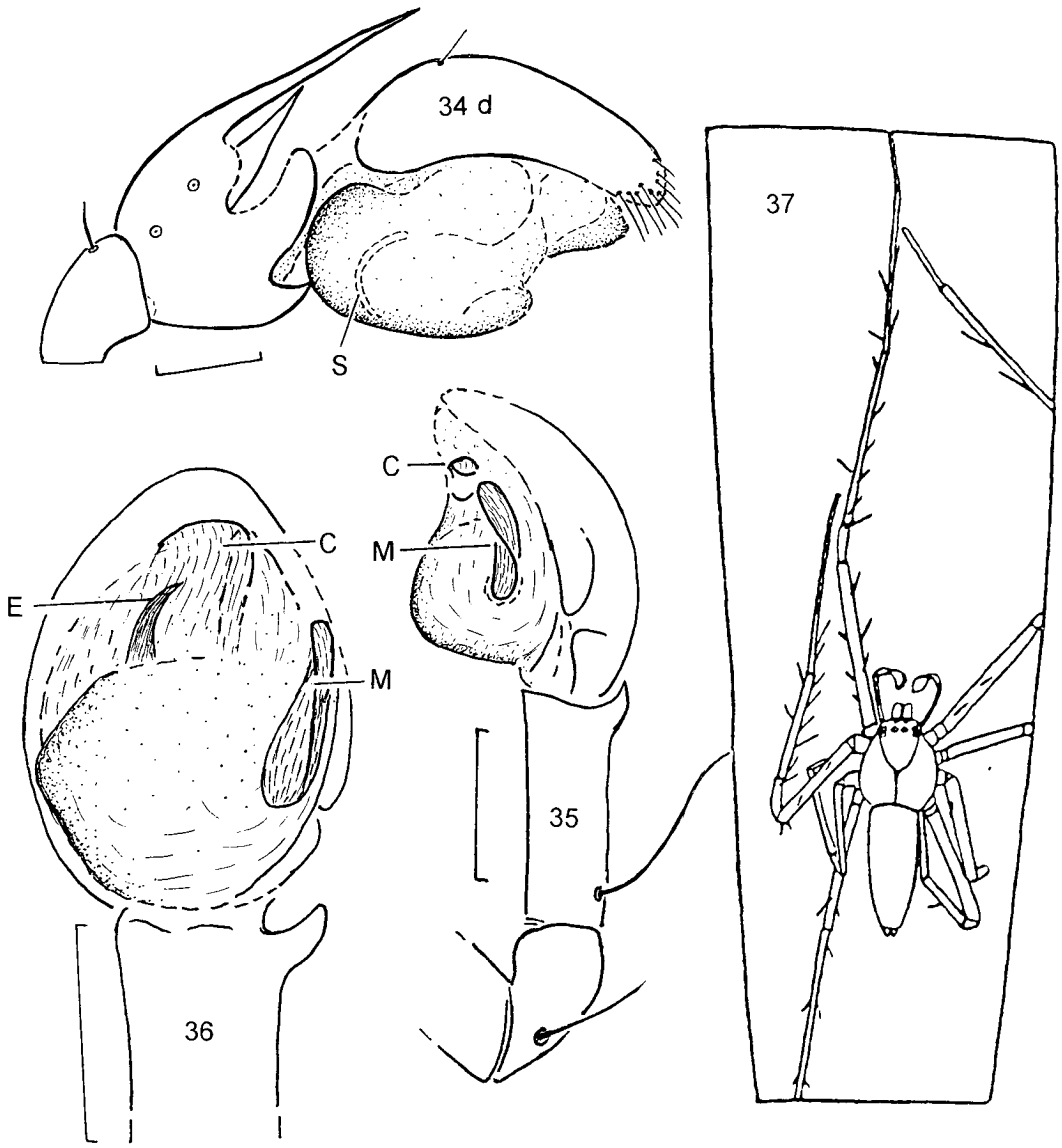
figs. 23a-c: ***Eomatachia barbarus* n.sp.,** ♂; a) r. pedipalpus with its two long tibial apophyses frontally-dorsally; b) tibia of the r. pedipalpus dorsally; c) l. pedipalpus retrolaterally. – M = 0.2.



figs. 24-34a: ***Succiniropsis kutscheri* n.gen.n.sp.**, ♂; 34a) paratypus, remaining figs. holotypus; 24) eye position dorsally; 25) l. part of the prosoma frontally; 26) l. chelicera proventrally. note the partly very long hairs (A = fang); 27) r. leg I prolaterally, hairs and trichobothria not drawn. The arrow shows the suture (detachment line) of the base of the tibia; 28) r. tarsus I retrolaterally (only the long trichobothrium is drawn); 29) tip of the l. tarsis IV retrolaterally. Hairs are not drawn, teeth of the paired claws are not visible but perhaps present; 30) r. trochanter III retroventrally, ventrally-apically with a shallow notch (arrow) and a slit sense organ of the trochanter (S); T = trochanter, X = coxa; 31) l. pedipalpus prodorsally, cymbium slightly aborally (P = patella); 32-33) r. pedipalpus pro- and retrolaterally (B = bubble); 34) tibia of the l. pedipalpus frontally; 34a) distal part of the divided dorsal tibial apophysis of the r. pedipalpus basally-dorsally; M = 0.2 in fig. 27); 0.05 in fig.29), 0.1 in the other figs.;

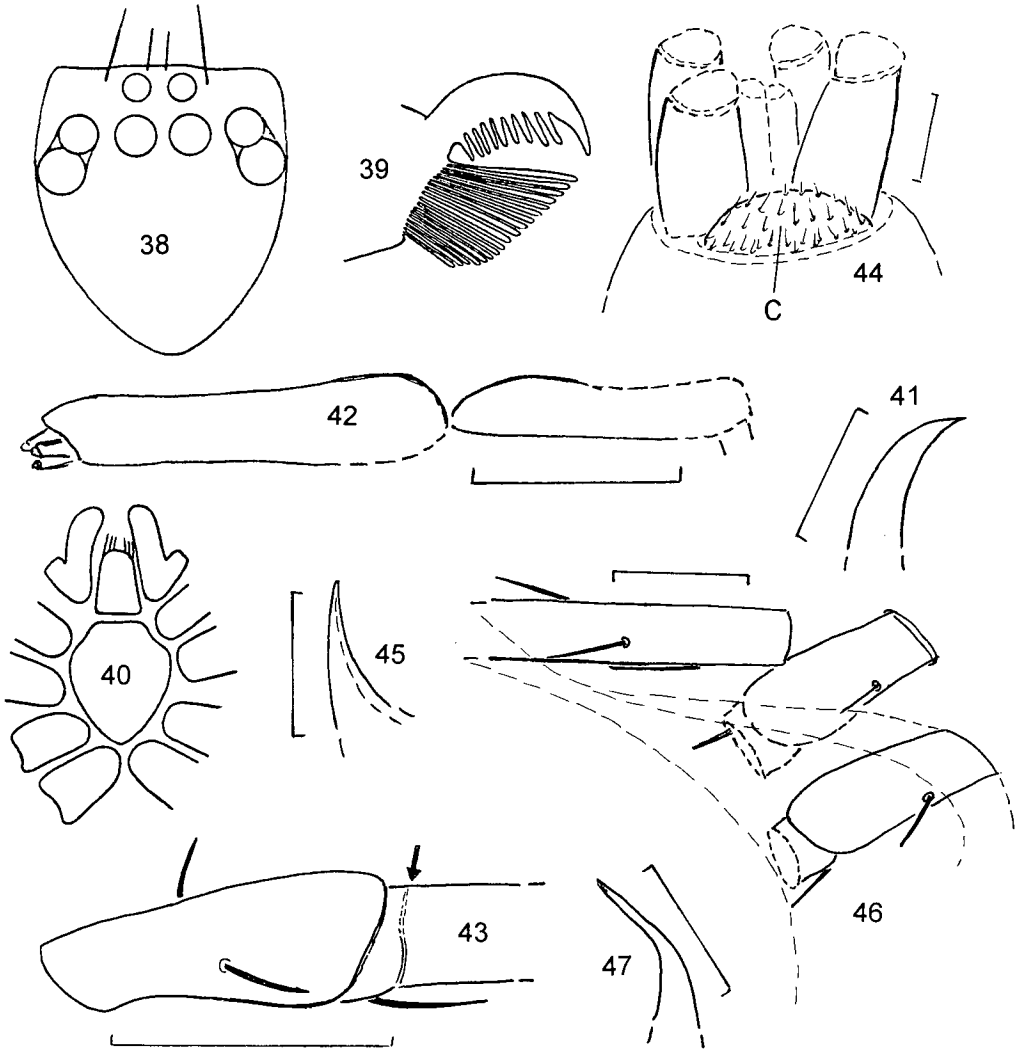


figs. 34b-d: ***Succiniropsis samlandica*** **n.gen.n.sp.**, ♂; b) distal part of the r. chelicera profrontally and slightly basally, with one of the plumose hairs; c-d) r. pedipalpus dorsally and retrolaterally; S = sperm duct, Y = cymbium; M = 0.1;



figs. 35-36: Reconstruction of the left ♂-pedipalpus of the genus ***Eoprychia*** retrolaterally and ventrally; M = 0.5. C = conductor, E = embolus, M = median apophysis.

figs. 37-41: ***Eoprychia succini*** PETRUNKEVITCH 1958, ♂ holotype, figs. 37-40 after PETRUNKEVITCH (1958); 37) dorsal view with a brake through the r. tibia III; 38) eye position; 39) proclaw of the left leg II with claw tuft; 40) prosoma ventrally; 41) embolus of the l. pedipalpus ventrally; M = 0.1;



figs. 42-45: ***Eoprychia succinopsis* n.sp.**, ♂; 42) outline of the body laterally; 43) r. patella and basal part of the tibia II retrodorsally with the tibial suture (arrow); 44) spinnerets ventrally with the large anterior part of the ?functionless cribellum (C); 45) embolus of the left pedipalpus ventrally;

figs. 46-47: ***Eoprychia vicina* n.sp.**; ♂; 46) r. legs I and II with the tibial crack near two resin fluids and the basal part of the loose tibia II. At least the crack of tibia II (left side) did happen in the resin because the tibia lies near its brake; 47) embolus of the r. pedipalpus ventrally; M = 0.1 in the figs. 41, 45, 47, 2.0 in 42, 1.0 in 43 and 46, 0.2 in 44.

BEITR. ARANEOL., 3 (2004)

SPIDERS (ARANEAE) OF THE EXTINCT FAMILY INSECUTORIDAE PETRUNKEVITCH 1942 IN BALTIC AMBER

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Abstract: The relationships of the dubious extinct spider family Insecutoridae PETRUNKEVITCH 1942 (Araneae) from Baltic amber are discussed, ?*Insecutor pecten* **n. sp.** and *Insecutor spinifer* **n. sp.** in Baltic amber are described.

The **material** is kept in the collection of J. Wunderlich (CJW); it probably will be deposited in the SMF in the future.

Introduction

The family Insecutoridae was erected by PETRUNKEVITCH in the year of 1942 and was based on - probably juvenile (!) - females of three species of the single genus *Insecutor*: *Aculeatus*, *mandibulatus* and *rufus*. Unfortunately the holotype of the type species (*aculeatus*) is doubtless a juvenile. A probably congeneric male was added in 1946 (sub *mandibulatus*), some juveniles were added in 1958. According to PETRUNKEVITCH 1942 Insecutoridae possesses characters of the Agelenidae, Pisauridae and Araneidae. The body length of adult males is 5-7mm. In this paper I describe two species for the first time which relationships are not quite sure.

Taxonomy

Insecutoridae PETRUNKEVITCH 1942 (figs. 1-12)

Diagnosis: Posterior eye row slightly recurved and lateral eyes widely spaced in the type species but posterior eye row not recurved and lateral eyes close together in some of my - ?confamiliar - questional material. Legs with numerous long and outstanding bristles (figs. 1, 10). Colulus absent, anterior spinnerets contiguous, apical article of the posterior spinnerets very short, basal article stout (fig. 6). Epigyne unknown. ♂-pedipalpus (figs. 5, 8-9, 12): Patellar apophysis absent, tibia with a dorsal apophysis in the basal half, further tibial apophyses may be present, at least three tegular apophyses are present.

Further characters: Ecribellate, two-clawed, body length of adult males 5-7mm, body shape as in fig. 1, condylus present, the legs may be somewhat laterigrade, trochantera unnotched, feathery hairs absent. - I cannot confirm the differences in the number of teeth of the paired tarsal claws which are reported by PETRUNKEVITCH (1942: 238).

Type genus: *Insecutor* PETRUNKEVITCH 1942.

Relationships: According to WUNDERLICH (1986: 25) Insecutoridae is probably a member of the Agelenidae: Ageleninae, but because of the contiguous anterior spinnerets and the short apical article of the posterior spinnerets I am not sure about the relationships of this taxon which may be a member of the Pisauridae. See the tab. below.

Distribution: Tertiary Baltic amber forest.

Selected characters of the Insecutoridae and some related families:

See the papers on the Agelenidae, Dictynidae s. l. and Pisauridae in this volume. GROTHENDIECK & KRAUS (1994) regard *Argyroneta* as a genus of the Cybaeinae of the Agelenidae.An apomorphic character of the Cybaeinae s.str. is the presence of cuspules on the male pedipalpal patella. - See SELDEN (2002:189-200), J. Arachnol., 30.

Character	Agelenidae	Cybaeinae	Insecutoridae	Argyronetidae
tarsal trichobothria	single row	single row	single row	2 irregular rows, fig.13
ostia of heart	three pairs	three pairs	unknown	two pairs
position of the ant. spinnerets	usually widely separated	contiguous	contiguous	contiguous
apical article of the post. spinn.	long and conical	short, hemispherical	short (fig. 6)	short, hemispherical
colulus	wide/bilobed/reduced	reduced/ absent	absent	reduced/ absent
feathery hairs	absent/present (e.g. in *Tegenaria*)	absent	absent	absent
capture web	with a tube	with a tube	unknown	no tube
distribution	cosmopolitical	holarctic	palaearctic	palaearctic

Insecutor PETRUNKEVITCH 1942 (figs. 1-12) Photos 311-313

Diagnosis, relationships and **distribution**: See above.

Type species: *Insecutor aculeatus* PETRUNKEVITCH 1942 (based on a juv.). The conspecifity of the "androtype" sensu PETRUNKEVITCH (1946) is quite unsure, see below.

Synonymy: *Thyelia* KOCH & BERENDT 1854 may be an older synonym of *Insecutor*. The type species of *Thyelia* is *T. tristis* KOCH & BERENDT 1854; the holotype of *tristis* - a probably adult female - has not been found in the PIHUB.

?***Insecutor* sp. indet**. (figs. 3-5)

Insecutor mandibulatus sensu PETRUNKEVITCH (1946: 7-8, figs. 23-25), ♂ "androtype".

The body length is 5.5mm, the prosoma is 2.5mm long and 2.3mm wide, the lateral eyes are widely spaced (fig. 3). There is a single dorsal tibial apophysis of the ♂-pedipalpus (fig. 5).

Relationships: The holotype of *mandibulatus* is a female which may be juvenile. There is no sure indication that the male in question is conspecific with *mandibulatus*.

Distribution: Tertiary Baltic amber forest.

Further ?*Insecutor* sp. indet. Photo 311

Material (in Baltic amber): 1♂ F645/BB/AR/CJW, 4 juv., F574/BB/AR/CJW, F647/BB/AR/CJW and F648/BB/AR/CJW, 1♂ PMHUB, coll. THOMAS no. 29.

Both males are badly preserved, their opisthosoma is lost, prosoma and legs are partly destroyed, the male of the coll. THOMAS is covered by threads and has been the prey of a spider. The ♂ F645 was apparently also the prey of an arthropod. The body length of the juveniles is 3-3.3mm, their leg position is somewhat laterigrade, 1♂ F646/CJW.

?***Insecutor pecten* n. sp**. (fig. 6-9)

Material: Holotypus in Baltic amber and 3 separated pieces of amber, F644/BB/AR/

CJW.

Preservation and syninclusions: The spider is well preserved, only few parts are covered by a white emulsion, the opisthosoma is somewhat deformed, patella and tibia of the right leg I and the left leg II are cut off. - No stellate hairs.

Diagnosis (♂; ♀ unknown): Lateral eyes close together. Pedipalpus: Figs. 7-9.

Description (♂):
Measurements (in mm): Body length 5.5, prosomal length 3.0, opisthosoma: Length 2.9, width 1.2, leg I: Femur 3.7, patella 0.9, tibia 4.1, metatarsus 4.0, tarsus 2.0, tibia II 3.3, tibia III 3.2, tibia IV about 3.5.
Colour dark grey.
Prosoma - as far as observable - as in *spinifer* n. sp. The posterior cheliceral margin bears 3 large teeth. - Legs long and slender, order I/IV/II/III, III nearly as long as II, numerous leg bristles as in *spinifer*. - The opisthosoma is somewhat deformed, covered with short hairs, 2.4 times longer than wide. Colulus absent, tracheal spiracle probably small and close to the spinnerets. Spinnerets stout, apical article of the posterior spinnerets very short. - Pedipalpus (fig. 7-9) similar to *spinifer* but the dorsal apophysis is shorter and has a slightly different shape.

Relationships: In ?*I. spinifer* n. sp. the shape of the dorsal pedipalpal tibial apophysis is different. In the "androtype" of *mandibulatus* PETRUNKEVITCH an additional apophysis at the anterior base of the pedipalpal tibial apophysis is absent and the lateral eyes are widely spaced.

Distribution: Tertiary Baltic amber forest.

?***Insecutor spinifer* n. sp.** (figs. 10-12) Photos 311-312

Material (in Baltic amber): 2♂, holotypus F642/BB/AR/CJW, patatypus F643/BB/AR/CJW.

Preservation and syninclusions: Holotype: The spider is well preserved, the opisthosoma is covered by a white emulsion, several parts of the legs are cut off, the right leg I and the left legs II-IV are complete. - An excrement ball is preserved in the same piece of amber. - Paratype: The spider is well and nearly completely preserved, only half of the left patella I is cut off. There are only weak white emulsions, the spinnerets are ventrally hidden by a fissure in the amber. The surface of the 4.7cm long amber piece has numerous fine fissures; a part of the (to the spider) dorsal side of the amber piece was just cut off by me. - The anterior half of an Isoptera is preserved just in front of the spider, a beetle (Elateridae) is present behind the spider; no stellate hairs.

Diagnosis (♂; ♀ unknown): Lateral eyes close together; pedipalpus: Figs. 1-12.

Description (♂):
Measurements (in mm): Holotype: Body length about 5.5, prosomal length 3.2, leg I: Femur about 3.8, patella 1.0, tibia about 3.8, metatarsus 3.85, tarsus 1.8, tibia II 3.5, tibia III 3.1, tibia IV 3.2; paratype: Body length 7.0, prosoma: Length 3.35, width 2.9; leg I: Femur 4.0, patella 1.1, tibia 4.5, metatarsus 4.85, tarsus 2.1, tibia II 4.5, tibia III 3.9, tibia IV 3.9; opisthosoma: Length 4.0, height 2.1.
Colour of prosoma and legs medium to dark brown, opisthosoma medium brown.
Prosoma (photo) 1.15 times longer than wide, covered mainly with very short hairs, fovea long and deep, clypeus 3 times longer than the diameter of the anterior median eyes, clypeus in a vertical position, eyes of medium size, posterior row procurved, posterior median eyes separated by 2/3 of their diameter, anterior median eyes smallest, lateral eyes close together. Chelicerae fairly long and slender, distally-medially slightly diverging; the anterior margins bear long plumose hairs, posterior margin hidden, fangs fairly long and slender, sternum, labium and gnathocoxae longer than wide, labium free, gnathocoxal serrula present. - Legs (photo, fig. 10) long and slender, order as in *pecten*, with numerous long and outstanding bristles on femora, patellae, tibiae and metatarsi; the number is variable, femur I usually 5 and apicals, patella I 2 dorsally, tibia I 10-12, metatarsus I about 8 and apicals. Tarsi hairy, one row of trichobothria, tip with long dorsal hairs. Paired tarsal claws with numerous long teeth similar to fig. 4. - Opisthosoma (photo) about twice as long as wide, covered with very short hairs, spinnerets short, similar to *pecten*. - Pedipalpus (figs. 11-12): Patella short, with 2 dorsal bristles, tibia with several trichobothria, a large dorsal apophysis in the basal half, a shorter apophysis at its base, apically a prolateral and a retrolateral apophysis, cymbium elongated, bulbus with an outstanding median apophysis, several tegular apophyses, a shorter conductor and a long embolus which bears a sclerotized knob-shaped structure near its base.

Relationships: See ?*I. pecten* n. sp. which has a similar eye position.

Distribution: Tertiary Baltic amber forest.

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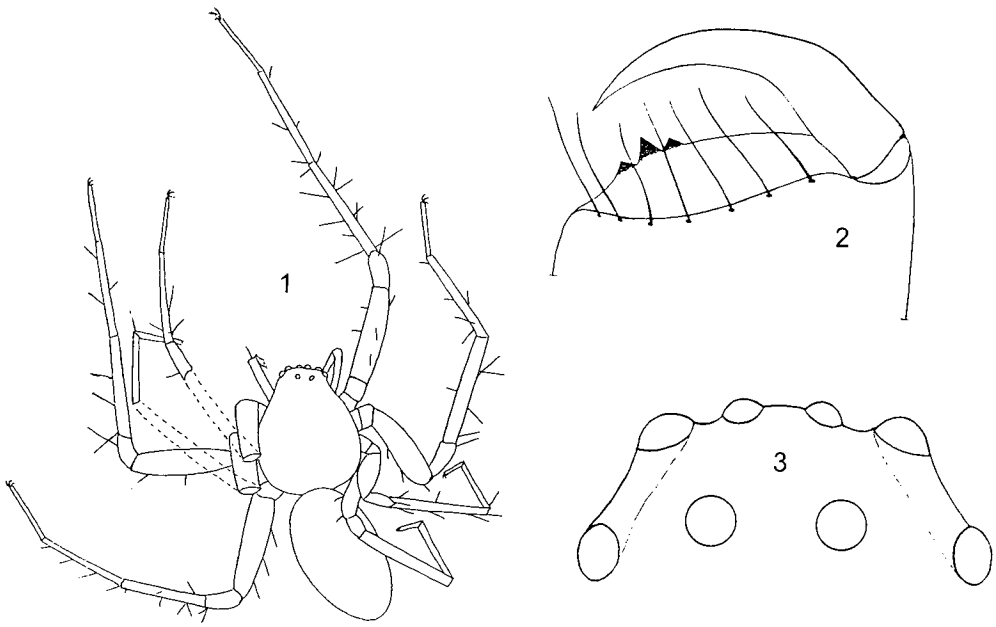
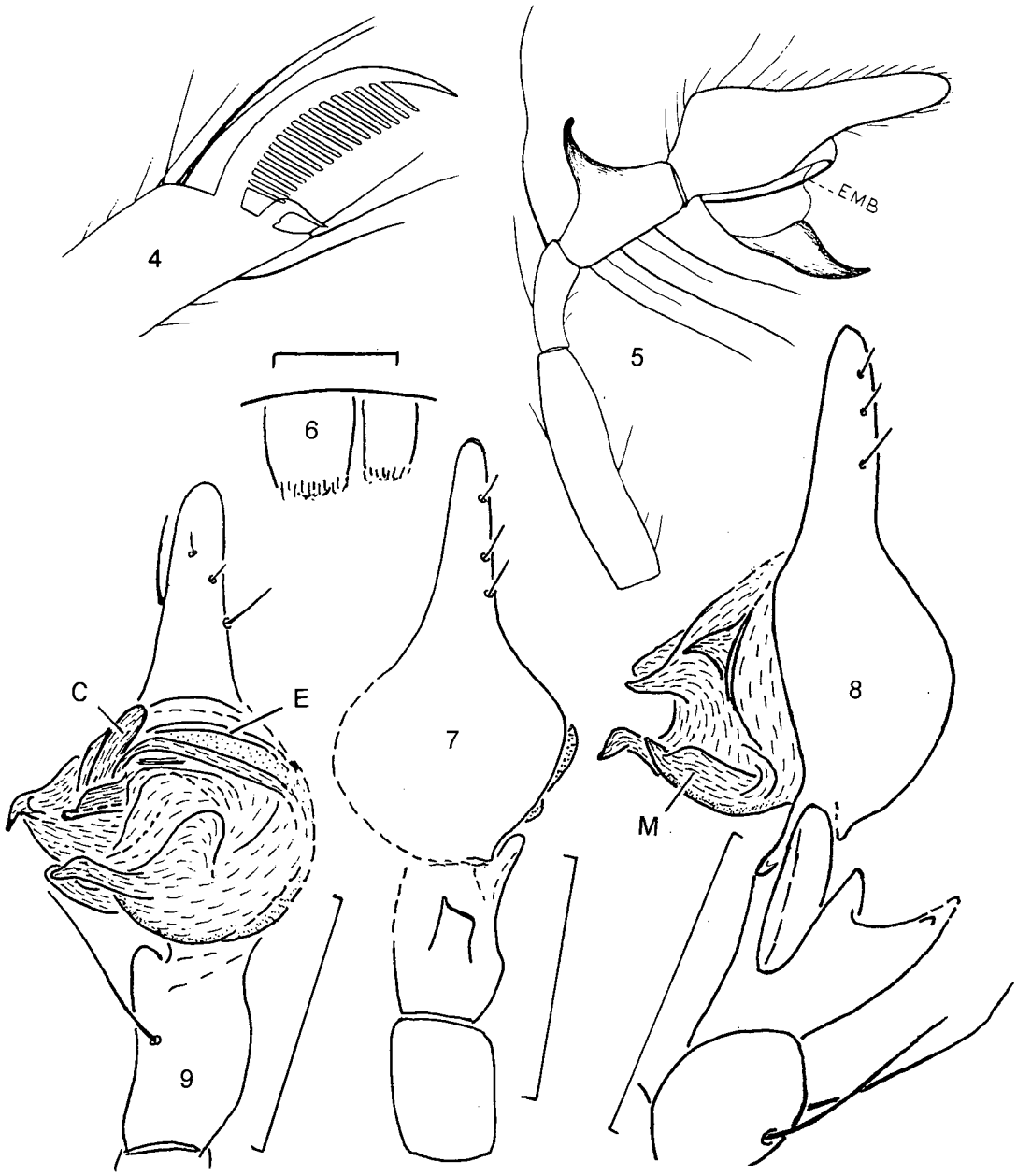


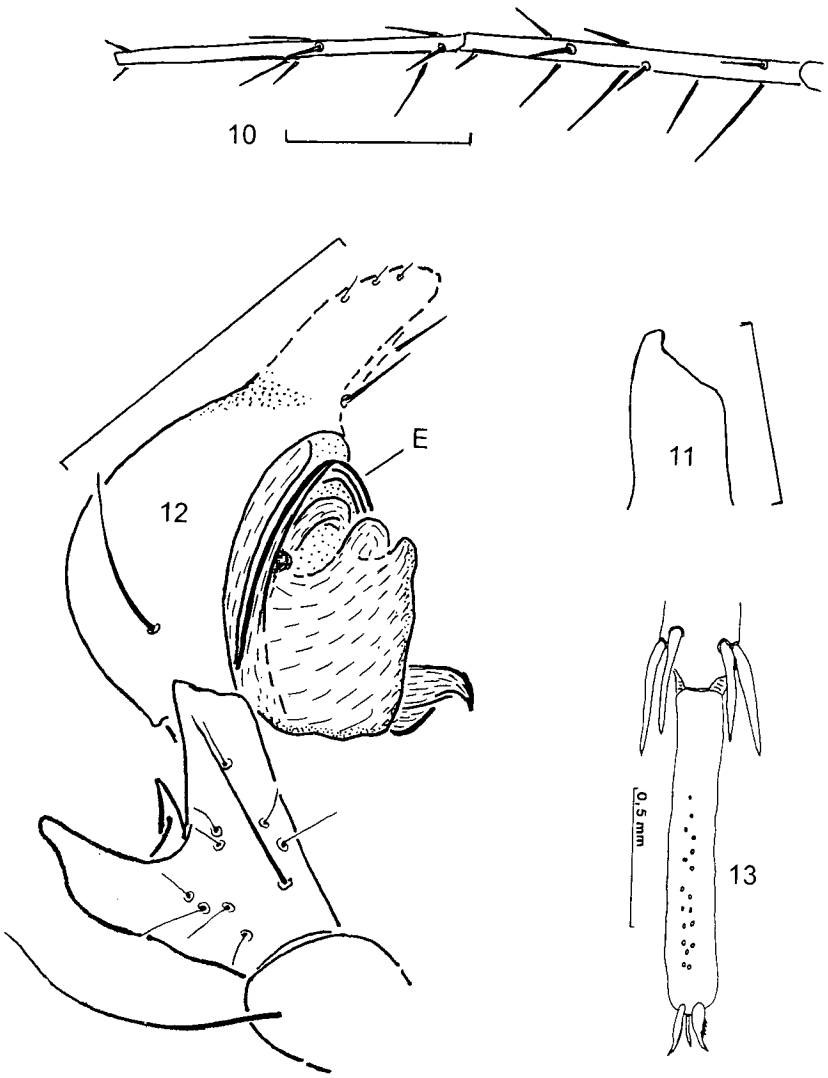
Fig. 1) *Insecutor rufus* sensu PETRUNKEVITCH 1942, juv. ♀, dorsal view, body length 4mm. Taken from PETRUNKEVITCH (1958: Fig. 48);

fig. 2) *Insecutor aculeatus* sensu PETRUNKEVITCH 1946, juv., end of right chelicera, showing three retromarginal teeth. Taken from PETRUNKEVITCH (1946: Fig. 22);

figs. 3-5: *Insecutor mandibulatus* sensu PETRUNKEVITCH 1946, ♂, "androtype"; 3) dorsal view of the eyes; 4) proclaw and unpaired tarsal claw of the left leg II; 5) l. pedipalpus, retrolateral view (EMB = embolus). Taken from PETRUNKEVITCH (1946: Figs. 23-25;



figs. 6-9: ?*Insecutor pecten* **n. sp.**, ♂; 6) outline of the spinnerets, seen from the left. Apparently the short distal articles are retracted in this specimen. Only apical hairs are drawn; 7-9) r. pedipalpus dorsally, prolaterally and ventrally (only few cymbial hairs are drawn) (C = conductor, E = embolus, M = median apophysis); M = 1.0mm;



figs. 10-12: ?*Insecutor spinifer* **n. sp.**, ♂, holotype; 10) r. tibia and metatarsus I dorsally; 11) tibial apophysis of the r. pedipalpus dorsally; 12) l. pedipalpus prolaterally and slightly basally (E = embolus); M = 0.2, 0.5 and 1.0;

fig. 13) *Argyroneta aquatica* (CLERCK 1757); position of the tarsal trichobothria dorsally. Taken from GROTHENDIECK & KRAUS (1994: Fig. 14c).

BEITR. ARANEOL., 3 (2004)

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

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Abstract: Fossil members of the family Pisauridae (Araneae) in Baltic amber - *Eopisaurella* PETRUNKEVITCH 1958, *Esuritor* PETRUNKEVITCH 1942, *Linoptes* MENGE in KOCH & BERENDT 1854, gen. indet. as well as questionable spiders in Dominican amber - gen. sp. indet. - are reported and shortly discussed. *Esuritor* may be a junior synonym of *Linoptes*, *Textrix lineata* KOCH & BERENDT 1854 may be a member of the family Pisauridae; both are preserved in Baltic amber.

Material: CJW = collection of J. WUNDERLICH.

Adult Pisauridae are usually large spiders, their body length is mostly 1-2cm. Because of their large size such spiders must be extremely rare in amber; there is one adult male in Baltic amber and several questionable juveniles of three extinct genera which were described by MENGE in KOCH & BERENDT (1854) and by PETRUNKEVITCH (1942, 1958), several specimens are reported from my private collection.

Diagnosis and limit of the family Pisauridae are quite unsure; I regard the Dolomedinae as a subfamily. As in related families - e.g. probably the Lycosidae - the Pisauridae are large animals - body length mostly 1-2cm -, there is a grate-shaped tapetum of the secondary eyes, the posterior eye row is usually +/- recurved (figs. 1, 11), the anterior tibiae bear pairs of long bristles (figs. 1, 8-9, 12), the trochantera are distinctly notched (fig. 3) - in contrast e. g. to the Agelenidae - (often not observable in fossil spiders), the leg position is usually prograde but may be somewhat laterigrade (fig. 1, photo), there is more than one row of long or short tarsal trichobothria (fig. 10) in contrast to (all taxa of) Agelenidae, the opisthosoma is usually long, tapering posteriorly (photo) and often partly widened in adult spiders (see the remark below), anterior and posterior spinnerets are of about the same length and the colulus is undivided in contrast to the Agelenidae. The cymbium is usually elongated as in most Agelenidae and Oxyopidae and numerous Amaurobiidae. - The best diagnostic - apomorphic - family characters come from the behaviour and are not known from the fossils: The female carries the cocoon (egg sac) with the help of its chelicerae and pedipalpi under the sternum, guards its spiderlings in a special web and at least the juveniles build a web with a tubular retreat (in all taxa?).

The **relationships** are unclear; the family has some characters which are similar to the Agelenidae and Trechaleidae, see the paper on these families in this volume.

Distribution: Extant: Cosmopolitical, fossil: In Baltic amber - incl. the Bitterfeld deposit - and questionable in Dominican amber, see below.

The fossil spiders in amber

1. The fossils in Baltic amber Photos 325-334

Remarks on spiders in Baltic amber: In the smaller fossil spiders the opisthosoma is short (fig. 1), in the larger spiders it may be more than two times longer than wide, e. g. in ?"*Linoptes*" sp. 6. (photos). The reason for these different proportions may be allometric growth. Furthermore the leg position is clearly laterigrade in smaller juvenile fossils (fig. 1, photo) than in larger juveniles (photos) which are described in this paper. Therefore I am unsure that all juvenile spiders in question are really members of the same family or really related which each other. - I saw numerous questionable juvenile Pisauridae in Baltic amber, but only a single adult spider. The adult members of this family probably got free from the sticky resin because of their large size; members of this family lived probably in the vegetation, away from the resin-producing trees, and the juveniles drifted probably as ballooners to the sticky resin.

I do not want to exclude that the holotype of *Textrix lineata* KOCH & BERENDT 1854 (juv., PIHUB, described sub Agelenidae) is a member of the family Pisauridae (**quest. n. rel.**).

Linoptes MENGE in KOCH & BERENDT 1854, ***Eopisaurella*** PETRUNKEVITCH 1958 and ***Esuritor*** PETRUNKEVITCH 1942 - Photos 329-334

In former times - see WUNDERLICH (1986: 28) - I erraneously regarded *Linoptes* as a junior synonym of *Deinopes* MCLEAY 1839.
Apparently MENGE (1856: 8) believed a single monotypic genus in Baltic amber - *Linoptes* MENGE in KOCH & BERENDT 1854, type species *L. oculeus* MENGE 1854 - to be a possible member of the family Pisauridae or strongly related to this family: "*linoptes* aber steht zwischen *lycosa* und *dolomedes*." (the position of *Linoptes* is between *Lycosa* and *Dolomedes*). Because of the very short and insufficient diagnosis in the paper of KOCH & BERENDT (1854: 94): "Long-legged with long slender opisthosoma and eyes similar to *Lycosa*" (transleted from German by JW). I regard *Linoptes* as a nomen nudum and a questionable taxon of the families Pisauridae or Trechaleidae, see the paper on the Trechaleidae in this volume.
According to PETRUNKEVITCH (1942, 1958) members of the genera *Esuritor* PETRUNKEVITCH 1942 (juv.!) and *Eopisaurella* PETRUNKEVITCH 1958 (figs. 1-4) (also described from juv.!) are members of the family Pisauridae. The placing of *Eopisaurella* was only provisionally, its outstanding leg bristles are remarkable. I do not want to exclude that *Esuritor* is a synonym of *Linoptes*. - Questionable *Esuritor*: Photos 325-326.

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

?***Linoptes oculeus*** MENGE 1854 (photos 333-334): See the paper on the family Trechaleidae.

?"***Linoptes***" ***valdespinosa*** (PETRUNKEVITCH 1958) (sub *Eopisaurella*) (figs. 1-4)

Diagnosis and relationships: The species (figs. 1-4) is very similar to most spiders which are described below. The body length of the juveniles is 1.6mm, tibia I bears 4 and metatarsus I bears 3 pairs of long ventral bristles (fig. 1), the eyes of the posterior row are much larger than the eyes of the anterior row, cheliceral teeth are probably absent (fig. 2).

Distribution: Tertiary Baltic amber forest.

?"*Linoptes*" sp. indet. 1 (fig. 5)

Material: 1 juv. in Baltic amber, F124/BB/AR/?PIS/CJW.

Diagnosis (juv.): Leg I: Femur with 3 strong prolateral bristles (fig.5), tibia with 4 pairs of ventral bristles, metatarsus with 3 pairs of ventral bristles, posterior median eyes smaller than in fig. 6 and more separated. Leg I longer than leg II in contrast to the spi-

ders described below.

Selected further characters: Body similar to figs. 2-3, length 2.2 mm, prosoma: Length 1.0mm, width 1.1mm, length of tibia IV 0.85mm. Several tarsal trichobothria present, 2 dorsal bristles on femur I as in sp. indet. 2.

Relationships: Compare *valdespinosa*, sp. indet. 2 and sp. indet. 3.

Distribution: Tertiary Baltic amber forest.

?"*Linoptes*" sp. indet. 2 (fig. 6) Photos 330-331

Material: 1 juv. in Baltic amber and 2 separated amber pieces, F125/BB/AR/?PIS/ CJW.

Diagnosis (juv.): Large posterior median eyes (fig.6) which are separated by only its diameter, bristles of leg I as in sp. indet. 1 but the two distal femoral bristles smaller, probably only 1 tarsal trichobothrium. Leg I slightly shorter than leg II.

Measurements (in mm): Body length 1.8, prosoma: Length 0.85, width 0.8, leg I: Femur 0.75, patella 0.3, tibia 0.7, metatarsus 0.5, tarsus 0.45, tibia IV 0.62.

Relationships: In sp. indet. 1 there are three strong prolateral femoral bristles and several tarsal trichobothria present, the posterior median eyes are smaller and more separated. See *valdespinosa*.

Distribution: Tertiary Baltic amber forest.

?"*Linoptes*" sp. indet. 3

Material: 1 juvenile in Baltic amber F159/BB/AR/?PIS/CJW.

Diagnosis (juv.): Large posterior median eyes similar to fig. 6. 3 strong prolateral bristles of femur I, 4 pairs of long ventral bristles of leg I, leg II slightly shorter than in sp. indet. 2 but with several tarsal trichobothria.

Measurements (in mm): Body length 3.6, prosoma length 1.5, tibia I 1.15, tibia II 1.2.

Distribution: Tertiary Baltic amber forest.

?"*Linoptes*" sp. indet. 4 (figs. 7-8)

Material: 1 juv. in Baltic amber, F165/BB/AR/?PIS/CJW.

Diagnosis (juv.): Large eyes (fig. 7): Anterior row - seen from in front - slightly recurved, lateral eyes distinctly larger than median eyes, posterior row strongly recurved, no pro-lateral bristles of femur I, tibia I with 7 pairs of ventral bristles, metatarsus I bears 5 pairs of ventral bistles (fig. 8). Measurements (in mm): Body length 2.6, prosoma: length 1.1, width 1.0, leg I: Femur 1.05, patella 0.4, tibia 1.0, metatarsus 0.95, tarsus 0.45.

Relationships: In the other questionable fossil spiders of this family there are only 3-4 pairs of ventral bristles on tibia I and there are strong prolateral bristles on femur I.

Distribution: Tertiary Baltic amber forest.

?"*Linoptes*" sp. indet. 5 (figs. 9-10)

Material: 1 juv. in Baltic amber from Bitterfeld, coll. M. KUTSCHER K/AR/1.

Description (juv.):
Measurements (in mm): Body length about 1.5, tibia I 0.85.
Tibia I-II with 4 pairs of long ventral bristles (fig. 9), metatarsus I with 2 pairs of long ventral bristles, femur I with two prodistal bristles on a common elevation. Patellae and tibiae dorsally with two hairs (not bristles). Leg II slightly longer than I. Tarsi with 3 claws and more than one row of long and curved trichobothria (fig. 10), paired claws with long teeth, unpaired claw most probably smooth, situated on a short onychium. Eyes of the posterior row large, posterior lateral eyes the largest, similar to fig. 7.

Relationships: In none of the related species exist a doubled bristle of femur I.

Distribution: Tertiary Baltic amber forest, Bitterfeld deposit.

?"*Linoptes*" sp. indet. 6 (figs. 10-13) Photo 332

Material: Juv. ♀ in Baltic amber: F383/BB/AR/?PIS/CJW.

Preservation: The spider is well and completely preserved, ventrally it is covered by a

white emulsion.

Description (juv.):
Measurements (in mm): Body length 5.0, prosoma: Length 2.3, width 2.1, opisthosoma: Length 3.7, width 1.7, leg I: Femur 2.0, patella 0.8, tibia 1.9, metatarsus 1.35, tarsus 0.55, tibia II 1.85, tibia III 1.7, tibia IV 1.95.
Prosoma nearly as wide as long, with a long thoracal ridge, eyes (fig. 11) in zwo distinctly recurved rows, posterior eyes large, the medians closely together. Cheliceral teeth hidden. Legs slender, prograde, I, II and IV about equal in length; numerous long bristles, tibia I with 4 ventral pairs (fig. 12), metatarsus I with 3 ventral pairs, tarsi with long trichobothria in about three rows, no scopula or claw tuft. Trochantera notched (fig. 13). Opisthosoma nearly 2.2 times longer than wide, covered with hairs of medium length, spinnerets short, anterior and posterior ones with very short apical articles, anterior spinnerets closely together and slightly shorter than the posterior spinnerets.

?"Linoptes" sp. indet. 7

Material: 1 juv. ♀, F386/BB/AR/?PIS/CJW.

The body is ventrally covered by a white emulsion. Body length 5.6mm, prosoma length 2.8mm. Eyes of the posterior row large, posterior row distinctly recurved, the tibia I bears 4 pairs of long ventral bristles, metatarsus I 3 pairs. Opisthosoma 1.8 times longer than wide. Probably there is a pair of dorsal longitudinal lines. - Similar is a juv., F463/BB/AR/?PIS/CJW; the body length of this specimen is 1.9mm.

?"Linoptes" sp. indet. 8

Material: 1juv., F 384/BB/AR/?PIS/CJW.

The spider is well preserved, a white emulsion is absent. Body length 5.5mm. Body similar to the juv. of sp. 6; the leg position is fairly laterigrade. The spinnerets are well observable, the colulus is undivided.

Pisauridae gen. et sp. indet. (fig. 14)

Material: 1♂ in Baltic amber, coll. J. VELTEN in Idstein.

Preservation: The spider is fairly well preserved in an amber piece which was heated. The left leg IV is broken off behind the coxa (autotomy) and missing. The distal articles of the left leg IV and the right legs III and IV, the left patella I and II as well as the right patella and the dorsal half of tibia I are cut off. A white emulsion covers the basal-ventral part of the opisthosoma.

Description:
Measurements (in mm): Body length 6.5, right tibia I about 6.0.
Eyes similar to fig. 7. Legs long and slender, order II/?I/IV/III, leg III long, hairs long, bristles long and numerous, tibia I-II with a dozen (3 ventral pairs), metatarsus I with 8 + apical bristles, femur IV with about 15. No claw tufts or scopulae. Trochartera notched. Tarsi with long trichobothria in more than one row. Opisthosoma long ovally, spinnerets short, a small colulus may be present. Pedipalus (fig. 14): Femur nearly straight, patella short, tibia twice as long as high, apically with a ventral and a retrolateral apophysis, cymbium long and slender, about twice as long as wide, bulbus small, sclerites partly hidden.

The **relationships** are unsure; *Linoptes* may be related.

Distribution: Tertiary Baltic amber forest.

?**Pisauridae sp. indet**. Photos 327-328

A juvenile spider in Baltic amber, F628/BB/CJW, body length 3mm. The legs have numerours bristles which stand out. The two eye rows are widely spaced, the eyes of the posterior row are unusually large.

2. A questionable fossil in Dominican amber

Only one questionable Pisauridae juvenile is reported - see WUNDERLICH (1988: 196, fig. 752). This specimen may be a member of the family Trechaleidae, see the paper on Trechaleidae in this volume.

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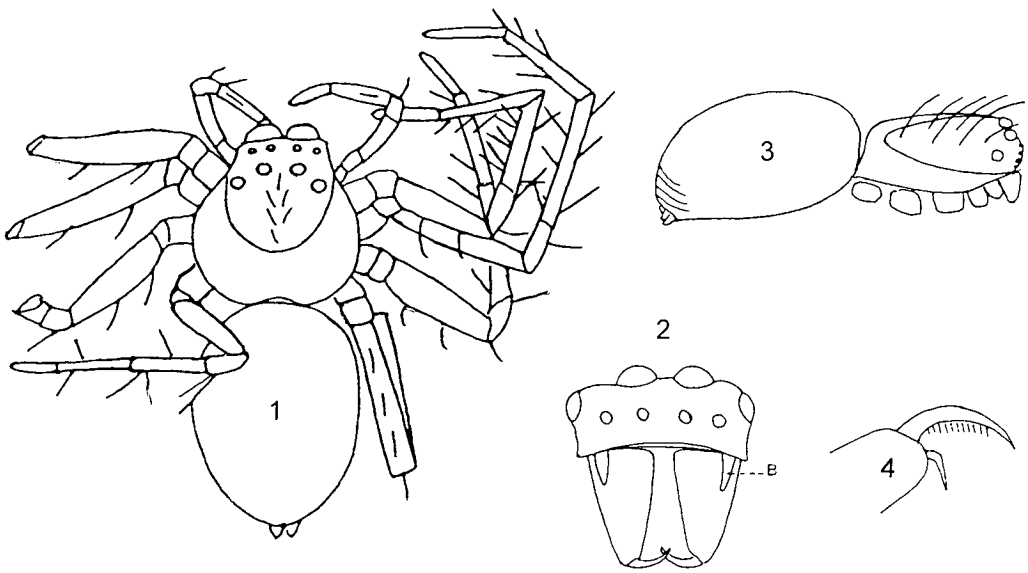


Figs. 1-4: ?"***Linoptes*" *valdespinosa*** (PETRUNKEVITCH 1958) (sub *Eopisaurella s.*), juv. ♀; 1) body dorsally; 2) prosoma frontally; 3) body laterally, 4) claws of the r. leg III retrolaterally; no M;

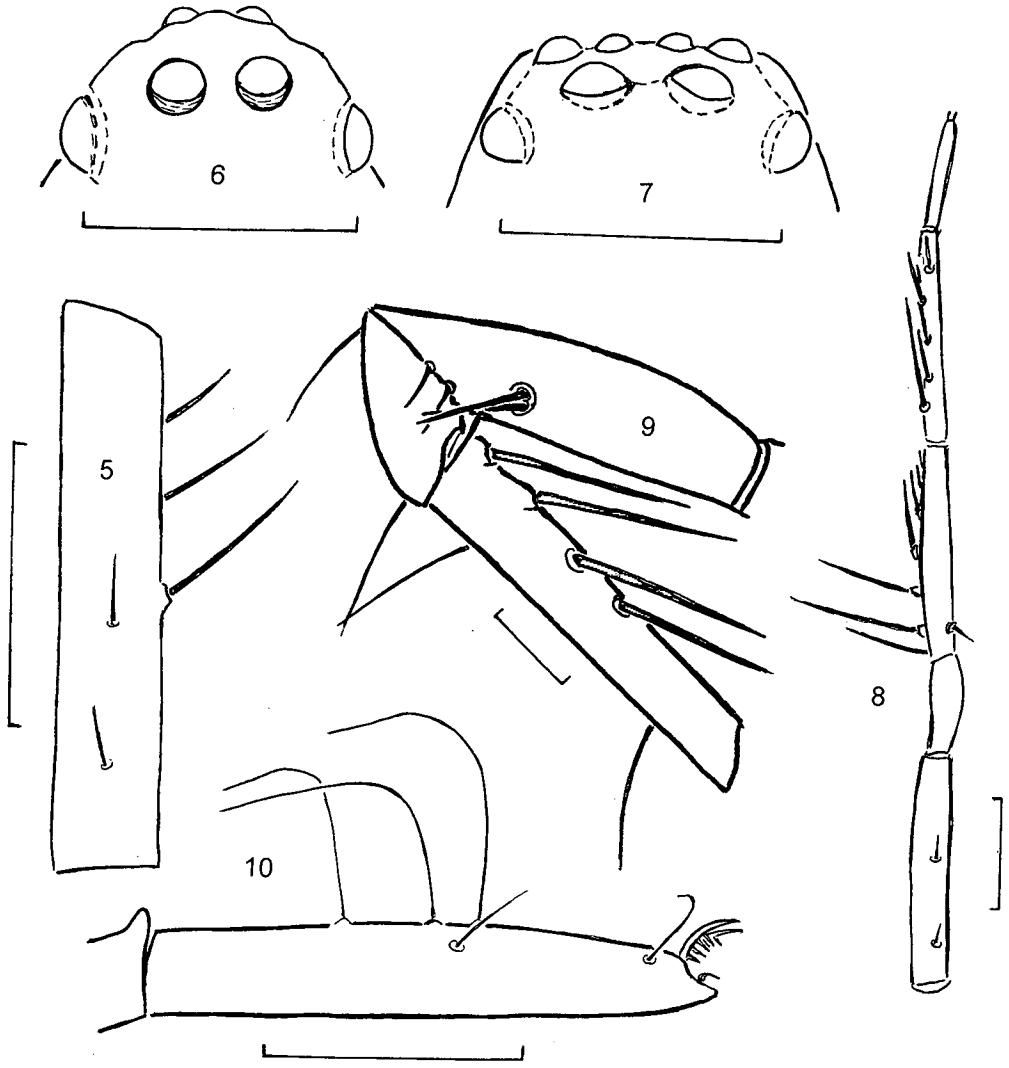
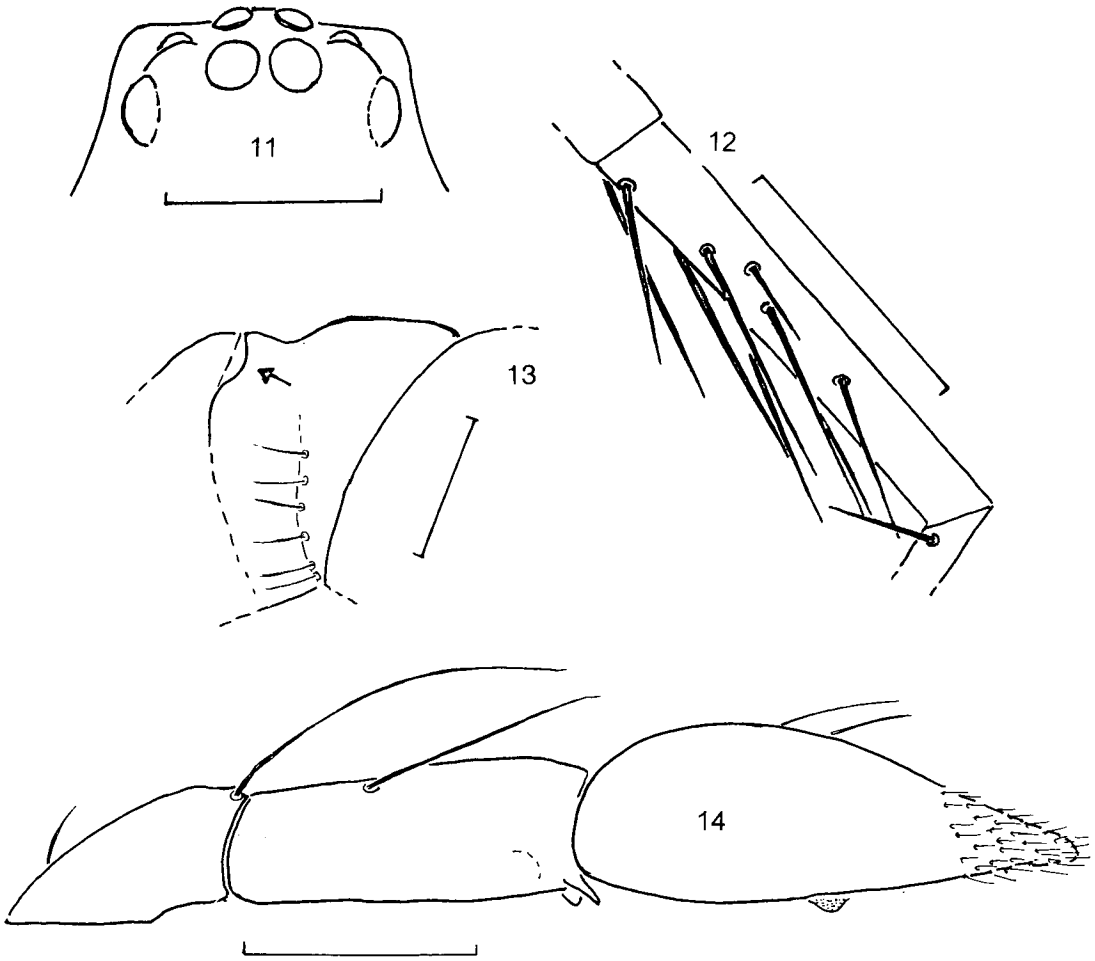


fig. 5: ?**"Linoptes" sp. indet. 1**, juv., l. femur I dorsally; M = 0.5mm;

fig. 6: ?**"Linoptes" sp. indet. 2**, juv., position of the eyes dorsally. The anterior lateral eyes are not observable in this position; M = 0.5mm;

figs. 7-8: ?**"Linoptes" sp. indet. 4**, juv.; 7) position of the eyes dorsally; 8) r. leg I pro-dorsally, tarsus dorsally; M = 0.5;

figs. 9-10: ?***"Linoptes"* sp. indet. 5**, juv. ♀ ; 9) r. femur and tibia I prolaterally (only few hairs are drawn, rertoventral bristles are not drawn); 10) l. tarsus II prolaterally; M = 0.2;



figs. 11-13: ?**"*Linoptes*" sp. indet.** 6, juv. ♀, F383; 11) position of the eyes dorsally; 12) l. tibia I prolaterally; 13) r. trochanter IV ventrally with notch (arrow); M = 1.0mm in figs. 11-12), 0.2mm in fig. 13;

fig. 14) **Pisauridae gen. et sp. indet.**, ♂, r. pedipalpus retrolaterally. Only few hairs are drawn; M = 0.5.

BEITR. ARANEOL., 3 (2004)

MEMBERS OF THE FAMILY TRECHALEIDAE (ARANEAE) IN BALTIC AND DOMINICAN AMBER?

JOERG WUNDERLICH, D-75334 Straubenhardt.

Abstract: The following fossil taxa of the Araneae - questionable members of the family Trechaleidae - in Baltic amber are described: Eotrechaleinae **n.subfam**., *Eotrechalea* **n.gen**. and *E. annulata* **n.sp**. The fossil genus *Esuritor* PETRUNKEVITCH 1958 - preserved in Baltic amber and described after juveniles of the family Pisauridae - and the fossil genus *Linoptes* MENGE in KOCH & BERENDT 1854 - preserved in Baltic amber and published as juveniles sub Thomisidae, Lycosidae and Pisauridae - are regarded as questionable members of the family Trechaleidae. Furthermore a questionable gen. indet. of the family Trechaleidae is described in Baltic amber. Questionable Pisauridae and Lycosidae reported in Dominican amber may be members of the family Trechaleidae but no sure fossil Treachaleidae has been described or reported up to now. - Regenerated legs are reported from ?*Linoptes oculeus* MENGE 1854, phoretic Nematoda from *Eotrechalea annulata*.

The **material** is kept in the collection JOERG WUNDERLICH (CJW), Straubenhardt.

Remark: Juvenile spiders are often difficult to determine, even the family may be unsure. Because of the unclear relationships of such spiders I prefer - in contrast to PETRUNKEVITCH - no designation of such taxa.

Family Trechaleidae

Diagnosis/description: Cocoon carried by the female attached to the spinnerets as in Lycosidae but - in contrast to Lycosidae - tibia of the male pedipalpus with at least one apophysis, one is frequently ventrally. Eyes in 2 rows, position of the large eyes of the posterior row mostly more or less recurved (figs. 1,5), rarely straight, anterior row usually distinctly procurved in the anterior aspect (recurved in *Eotrechalea*). - Further characters: Three tarsal claws, legs prograde or somewhat laterigrade (*Linoptes*); in the fossils besides *Esuritor* leg III is only slightly shorter than the other legs. The trochantera may be notched (fig. 6). The unpaired tarsal claw may be smooth (fig. 3). Opisthosoma ovally to elongated. Ecribellate, bulbus with a complicated median apophysis. - See also below: The subfymily Eotrechaleinae.

Relationships: Like Lycosidae, Pisauridae and some other families in Trechaleidae the secondary eyes possess a grate-shaped tapetum. Like Lycosidae the females of Trechaleidae carry their cocoon (egg sac) attached to the spinnerets. Bothe characters are unknown in the fossils. In contrast to Lycosidae and Pisauridae the trochantera are usually not or only slightly notched. In contrast to the Lycosidae a tibial apophysis of the male pedipalpus is present in the Trechaleidae and there are two eye rows (three in the Lycosidae); in some Trechaleidae the second row is very strongly recurved, similar to the 3 rows in Lycosidae). In the (all?) Pisauridae the females carry their cocoon with the help of chelicerae and pedipalpi under the sternum (the best diagnostic character), the opisthosoma is usually tapering posteriorly, the posterior eye row is usually distinctly recurved or even three eye rows exist.- In former times most genera of the Trechaleidae were regarded as members of the family Pisauridae, and also PETRUNKEVITCH - who only knew juveniles - regarded his fossil genus *Esuritor* as a member of the Pisauridae. - See the papers of CARICO (1993), GRISWOLD (1993) and SIERWALD (1993) and on the families Insecutoridae and Pisauridae in this volumes. - I do not want to exclude that the questionable juv. Pisauridae sensu WUNDERLICH (1988) in Dominican amber and the juv. Lycosidae sensu PENNEY (in prep.) in Dominican amber, too, may be members of the family Trechaleidae.

Distribution: Extant: The Americas and Japan but probably widely distributed in the tropics and subtropics; absent in Europe and Australia; fossil: Probably present in the Tertiary Baltic amber forest and probably in the Tertiary Dominican amber forest: ?Pisauridae gen. sp. sensu WUNDERLICH (1988: 196-197).

Esuritor PETRUNKEVITCH 1958 Photos 325-326

Diagnosis (juveniles; adults unknown): Eye field as wide as the caput, posterior eyes very large, distinctly recurved, anterior eyes small (fig. 1), trochantera not or only slightly notched, legs prograde, leg III distinctly the shortest, trichobothria in two rows on tarsi and metatarsi, sco-pula and claw tuft absend, unpaired tarsal claw smooth (fig. 3), long paired ventral bristles under tibia and metatarsus I-II.

Type species: *Esuritor spinipes* PETRUNKEVITCH 1942.

Relationships: After PETRUNKEVITCH (1942, 1958) *Esuritor* is a member of the family Pisauridae but in Pisauridae the trochantera are deeply notched and the posterior eye row is usually distinctly recurved. - Large posterior eyes occur also in *Heidrunea irmleri* BRESCOVIT & HÖFER 1994 (extant, Brazil) which is a member of the family Trechaleidae. - Also in the extant genus *Toxopsoides* FORSTER & WILTON 1973 (?Desidae, ?Toxopidae) the large eyes of the posterior row are similar to *Esuritor* but the legs are laterigrade, compare DAVIES (1986: Fig. 67a). *Esuritor* may be a member of the family Trechaleidae; an adult male is needed for the study of the structures of the genital organs.

Distribution: Tertiary Baltic amber forest.

***Esuritor ?spinipes* PETRUNKEVITCH 1958** (figs. 1-4)

Material: Holotype (juv. ♀) of *Textrix lineata* KOCH & BERENDT 1854, PMHUB; a questionable juv. ♀ in Baltic amber, F123/BB/AR/?TRE/CJW.

Measurements (F123, in mm): Body length 3.2 (the same as the holotype of *T. lineata*), tibia I 0.9, tibia II 0.8, tibia III 0.75, tibia IV 0.9, diameter of the posterior median eyes 0.15. Body and legs similar to the description by PETRUNKEVITCH (1942: 235-237), e.g. tibia with with 4 pairs of ventral bristles, metatarsus I with 3 pairs of ventral bristles (fig.2). Eyes: Figs. 1, 4; short spinnerets.

Relationships: *Textrix lineata* may be an older synonym of *Esuritor spinipes*. In *Esuritor aculeatus* PETRUNKEVITCH 1958 there are 5 pairs of ventral macrosetae on tibia I and 4 on metatarsus I.

Distribution: Tertiary Baltic amber forest.

***Linoptes* MENGE in KOCH & BERENDT 1854** Photos 329-334

MENGE IN KOCH & BERENDT (1854) created the monotypic genus Linoptes without reporting the relationships, size or sex of the type species or the number of specimens; (most probably MENGEs collection is lost): "*Linoptes* langbeinig, mit langem schmalen Hinterleibe und Augen ähnlich denen von *Lycosa, L. oculeus*" (*Linoptes* long-legged, with long and slender opisthosoma and eyes similar to *Lycosa, L. oculeus*). MENGE (1856: 8) added that leg IV is as long as I or longer and regarded *Linoptes* as a member

of the Lycosidae or Pisauridae: "*Linoptes* aber steht zwischen *Lycosa* und *Dolomedes*" (the position of *Linoptes* is between *Lycosa* and *Dolomedes*). Mainly because of its only two eye rows (fig. 5) *Linoptes* is not a member of the family Lycosidae; mainly because of the only slightly notched trochantera (fig. 6) but also because of the eye position and the possibly smooth unpaired tarsal claw *Linoptes* in my opinion probably is not a member of the family Pisauridae.
The body length of adult *Linoptes* may be one cm or more (the juvenile or subadult female described here is 6.5mm long). After the long leg IV these spiders may have been good runners on the ground, on meadows or on sandy or stony places, probably on the banks of rivers. After the large size and the probably preference of open localities on the ground these spiders only rarely could get contact with the fossil resin and therfore should be rare in amber.

?***Linoptes oculeus*** **MENGE in KOCH & BERENDT 1854** (figs. 5-8), photos 333-334

Material: 1 juv. (?subad.) ♀ in Baltic amber, F11/BB/AR/?TRE/CJW.

Preservation and syninclusions: The spider is well and completely preserved, the ventral side is covered by a white emulsion, the left legs I and II are regegerated. - Near the right side of the spider a small juvenile spider (?Theridiidae) at the left side a caddisfly (Trichoptera) are preserved, and furthermore a small beetle, several plant inclusions including stellate hairs, 2 tiny Hymenoptera nearby the Trichoptera, few Diptera and some excrement balets are present. Probably the amber piece has been cleared in an autoclave.

Description (juv. or subad. ♀):
Measurements (in mm): Body length 6.5, prosoma: Length 2.5, width +/- 2.1, diameter of the posterior median eyes 0.15, diameter of the posterior lateral eyes 0.3; legs: (a) the normal right leg I: Femur 2.3, patella 1.0, tibia 2.35, metatarsus 1.5, tarsus 0.9, (b) the regenerated left leg I: Tibia 1.1, metatarsus +/- 0.9, tarsus 0.5, tibia II 2.35, tibia III 2.0, tibia IV 3.0. Diameters of tibiae I: Right 0.16, left (regenerated) 0.11.
Colour dark brown (probably heated in an autoclave).
Prosoma distinctly longer than wide, caput not elevated. Eyes (fig. 5): Posterior eyes much larger than anterior eyes, strongly recurved, posterior lateral eyes the largest, directed slightly backwards. Chelicerae robust. Most ventral parts of the spider are hidden. Claw of the pedipalpus large and with numerous teeth. - Legs (figs. 6-8, photo) somewhat laterigrade, order IV/I=II/III, leg III nearly as long as I and II. Numerous long macrosetae: Femora few thin dorsal and distal bristles, I additionally with a long prolateral bristle distally of the middle, patellae only with a hair-shaped dorsal-distal bristle, tibiae I-II: 4 ventral pairs and and 2 retrolateral ones, few on tibia III and IV, metatarsus I-II with 3 ventral pairs. Trochantera not elongated, slightly notched; no claw tuft and no true scopula but tarsi I-II ventrally more dense hairy than tarsi III-IV. Unpaired claw present on all legs, probably smooth. Trichobothria long, in 2 rows on tarsi and metatarsi. - The regenerated left legs I and II - compare the figures - regenerated after the coxa

(autotomy) and are distinctly smaller than the right legs I-II. Trichobothria and tarsal claws are shortened in the regenerated articles, the unpaired claw is strongly reduced. Number and size of the macrosetae are also reduced, femoral, retrolateral tibial bristles and patellar bristles are absent, the metatarsi have only 5 ventral bristles, tibia III only 3. - Opisthosoma 1.8 times longer than wide, covered with hairs of medium length, spinnerets short, covered by an emulsion.

The **relationships** are unsure; adults are needed for a closer determination. In *Esuritor* the posterior median eyes are relatively much larger and the opisthosoma of the small spiderling is less slender.

Distribution: Tertiary Baltic amber forest.

?Trechaleidae: Gen. sp. indet.

Material: 1 juv. in Baltic amber, F166/BB/AR/?TRE/CJW.

Diagnosis (juv.) and **relationships**: The spider is quite different from the other fossils: The eye field is wider, the posterior median eyes are separated by its diameter, the leg bristles are thinner. The prosoma is as long as wide and not elevated, the opisthosoma is twice as long as wide, the anterior spinnerets are very thick, the posterior spinnerets are slender, the leg position is prograde, leg III is distinctly shorter than the other legs, femur I bears a long prolateral bristle near the middle, tibia I bears 3 pairs of long and thin ventral bristles in the basal 2/3, 2 long prolateral and 2 dorsal bristles, metatarsus I bears 3 pairs of ventral and 2 dorsal bristles.

Measurements (in mm): Body length 2.5, prosoma length 1.0, opristhosoma: length 1.5, width 0.75, leg I: Femur 1.3, patella 0.35, tibia 1.15, metatarsus 0.5, tarsus 0.68, tibia II 0.88, tibia III 0.5, tibia IV 0.85.

Distribution: Tertiary Baltic amber forest.

Eotrechaleinae n.subfam.

Diagnosis/description (♂; ♀ unknown; compare the genus diagnosis): Anterior eye row procurved in the anterior aspect (fig. 10), opisthosoma (fig. 9) widened in the middle and tapering posteriorly, posterior eye row moderately recurved (fig. 9), trochantera notched (fig. 12), spinnerets short (figs. 14-15), colulus unknown, feathery hairs absent, plumose hairs present, legs long, III slightly the shortest, 3 tarsal claws (figs.13-14), tarsal trichobothria in two rows (fig. 13), claw tuft, leg scopula, tibial suture and calami-

strum absent. Pedipalpus (figs.17-19): Tibia with a large dorsal and a large ventral apophysis, retrolateral tibia apophysis absent, no distal cymbial patch of short hairs, a retrolateral and a basal tegular apophysis present.

Relationships: According to the notched trochantera, the short spinnerets and the only moderately recurved posterior eye row I regard *Eotrechalea* with hesitation but most likely as a member of the family Trechaleidae; it may be a member of an undescribed family. The shape of the opisthosoma is similar to many Pisauridae; see the paper on the questionable Pisauridae in this volume. - In the Trechaleinae a ventrodistal refolded rim of the male pedipalpal tibia is present, a retrolateral tibia apophysis is usually present, a ventral tibia apophysis may occur, and a dorsal tibia apophysis is absent in contrast to the Eotrechaleinae. - In Rhoicinae - whiche were not included in the family Trechaleidae by CARICO (1993: 234) - a dorsal and a ventral tibia apophysis of the male pedipalpus are absent. In *Paradossenus* O. PICKARD-CAMBRIDGE 1903 (extant, S-America) the posterior eye row is also only moderately recurved and a large ventral tibial apophysis of the male pedipalpus is present but a dorsal tibial apophysis is absent and a retrolateral tibial apophysis occurs. In the Zorocratidae sensu GRISWOLD a male tibial suture is present. In the Miturgidae s. str. the apical article of the posterior spinnerets is iong and the tibia apophysis is different. In contrast to the Amaurobiidae claw tuft and leg scopula are absent, tibial apophyses and trochanteral notch are different.

Type genus: *Eotrechalea* n.gen.

Distribution: Tertiary Baltic amber forest.

***Eotrechalea* n.gen.**

Diagnosis, relationships and distribution (♂): See above. Femur of the pedipalpus distinctly bent (fig. 19).

Type species: *Eotrechalea annulata* n.sp.

***Eotrechalea annulata* n.gen.n.sp.** (Figs. 9-22) Photos 335-337

Material: Holotypus ♂ in Baltic amber, F167/BB/AR/?TRE/CJW.

Preservation and syninclusions: The spider is completely and excelletly preserved, opisthosoma and sternum are partly covered by a white emulsion, the right pedipalpus is partly expanded. The annulation of the legs is preserved, compare fig. 11. - In the

amber piece 1 Acari, about 2 dozens Nematoda: ?Rhabditida (figs. 20-22) and probably Bacteria on the legs are preserved. At least 2 of the tiny juvenile Nematoda were phoretic: The stalk of the larger one in fig. 20 is close to the opisthosoma and another one is attached to a leg (figs.21-22). Some thin threads are running e.g. along the legs. No stellate hairs or detritus particles.

Diagnosis (♂; ♀ unknown): Pedipalpus figs. 17-19, with the cymbium distinctly bent backwards.

Description (♂):
Measurements (in mm): Body length 4.0, prosoma: Length 1.9, width 1.5, opisthosoma: Length 2.5, width 1.6, leg I: Femur 2.1, patella 0.6, tibia 2.1, metatarsus 1.5, tarsus 0.65, tibia II 2.1, tibia III 2.0, tibia IV 2.1.
Colour: Prosoma medium brown, legs dark annulated (photo, fig.11), opisthosoma light brown.
Prosoma (fig. 9-10) 1.25 times longer than wide, with only few hairs and a long thoracal ridge, thorax as high as the caput. Eyes: Anterior row recurved in the anterior aspect, posterior row recurved, posterior lateral eyes largest, separated by less of their diameter, directed sidewards. Clypeus 1.75 times longer than the diameter of the anterior median eyes. Chelicerae about as long as the hight of the prosoma; no condylus or furrow teeth observable; fang and ventral prosoma parts hidden. - Legs (figs. 11-13): All legs of nearly the same length, III a bit shorter, unpaired claw bent in a right angle and probably smooth, no claw tuft, scopula, metatarsal preening comb or tibial suture. Paired tarsal claws with long teeth in a normal (central) position. Numerous bristles on femora to metatarsi, 6 on femur I and metatarsus I each, a dozen on tibia I. Trochantera distinctly notched, tarsal trichobothria in 2 rows. - Opisthosoma (figs. 9, 15-16) covered with thin hairs, soft, tapering posteriorly, widened in the middle. Spinnerets: Anterior ones longer than the posterior ones, two-jointed and fairly close together. - ♂-pedipalpus (figs. 17-19; see above): Femur distinctly bent, patella and tibia without bristles, tibia with a large dorsal and a large ventral apophysis, the dorsal apophysis is distinctly bent backwards, cymbium short.

Relationships: In the male of an undescribed related taxon in Baltic amber (CJW) the legs are distinctly annulated, too; it has a large and very wide colulus which is not devided (fig. 23); its dorsal pedipalpal tibial apophysis is wider and not bent backwards.

Distribution: Teriary Baltic amber forest.

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For older papers see the first volume or the book of WUNDERLICH (1986).

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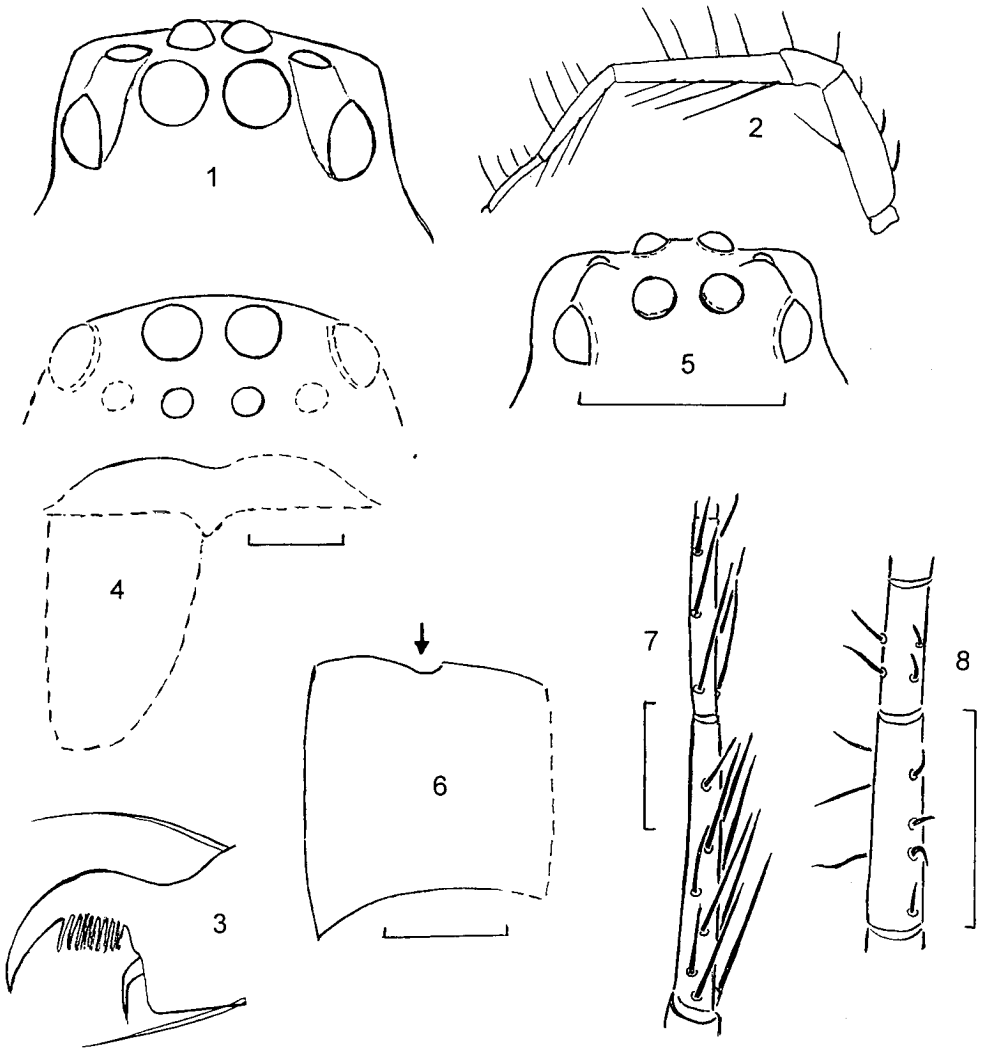
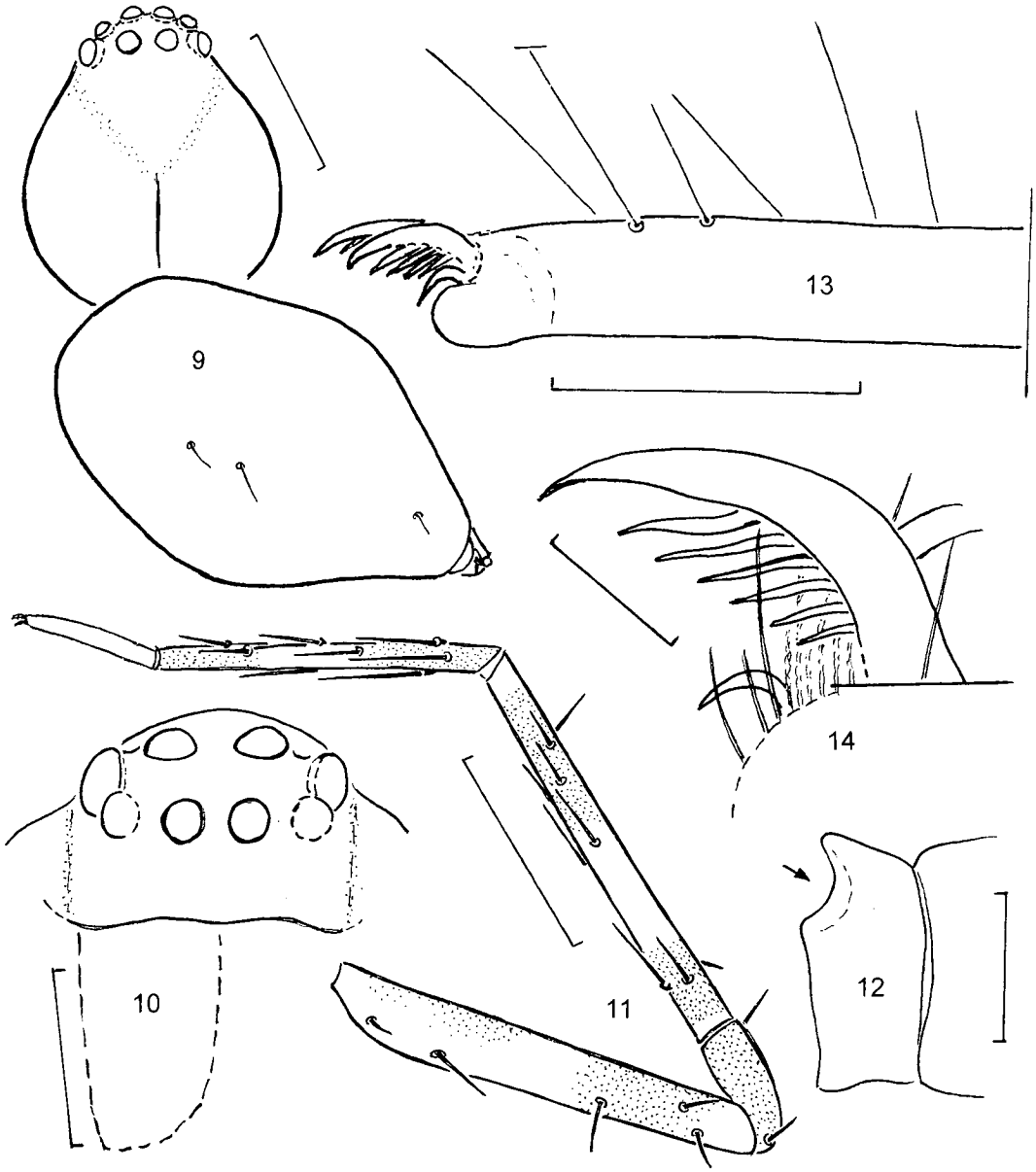


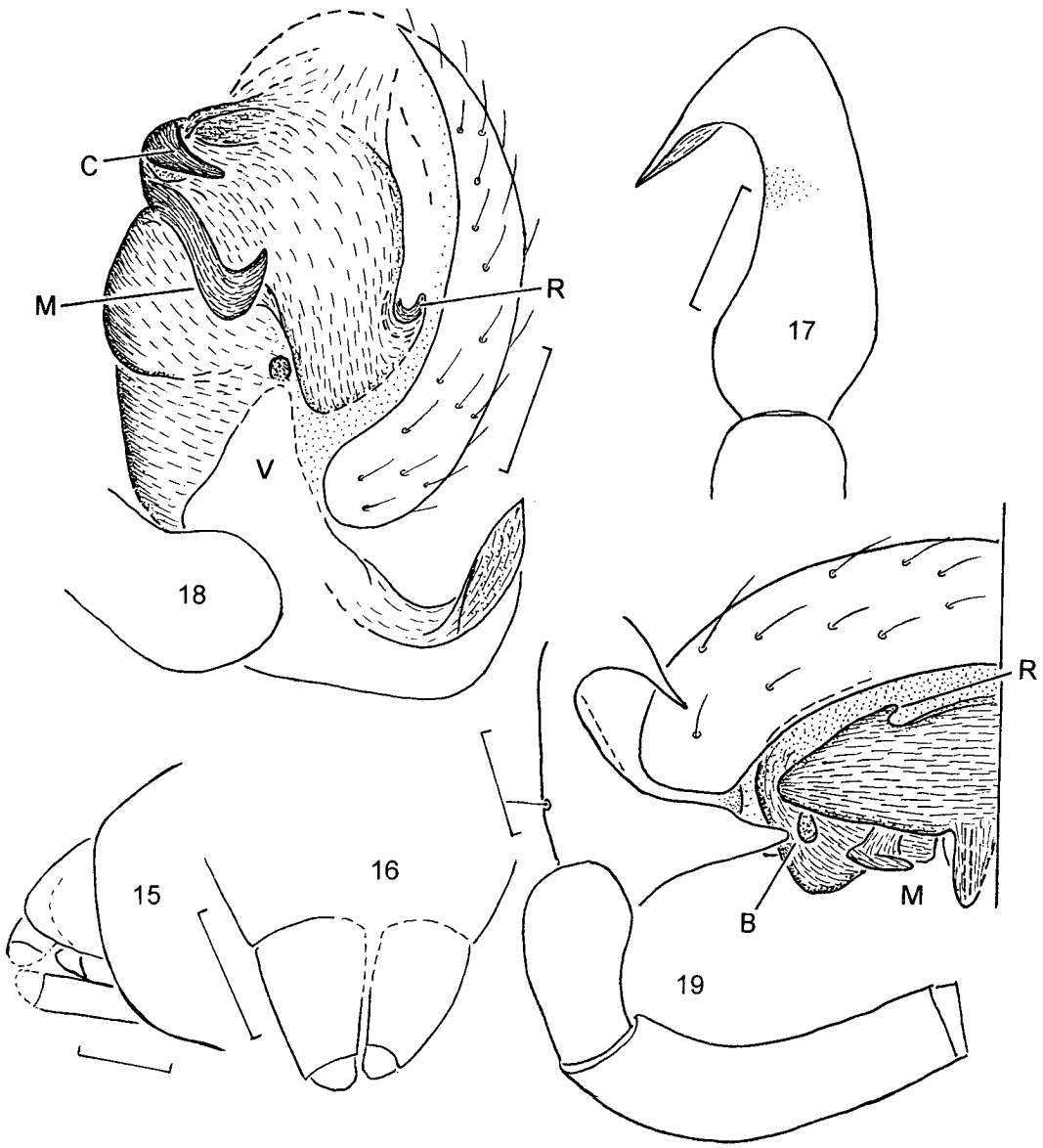
Figs. 1-3: ***Esuritor spinipes*** PETRUNKEVITCH 1942, juv, ♀; 1) eyes dorsally; 2) leg I laterally; 3) r. tarsal claw I. No M. After PETRUNKEVITCH (1942: Figs. 70, 69, 72);

fig. 4: ***Esuritor*** ?***spinipes*** PETRUNKEVITCH 1942; prosoma frontally;

figs. 5-8: ?***Linoptes oculeus*** MENGE in KOCH & BERENDT 1854, juv. (?subad.) ♀; F11/CJW; 5) position of the eyes dorsally; 6) trochanter IV ventrally; the arrow indicates to the apical notch; 7) r. tibia and metatarsus I with macrosetae retroventrally and slightly distally; 8) regenerated l. tibia and metatarsus I with shortened macrosetae ventrally;



figs. 9-14: ***Eotrechalea annulata*** **n.gen.n.sp.**, ♂; 9) body dorsally; 10) prosoma frontally; 11) r. leg I with bristles and annulation prolaterally and slightly ventrally-basally; 12) r. trochanter III retroventrally; the arrow indicates to the notch; 13) distal part of the r. tarsus II with trichobothria (hairs not drawn) prolaterally and slightly apically; 14) r. unpaired and prolateral paired tarsal claws III prolaterally; M = 1.0 in figs. 9 and 11, 0.5 in 10, 0.05 in 14, 0.2 in 12 and 13;



figs. 15-22: ***Eotrechalea annulata*** **n.gen.n.sp.**, ♂, with juvenile phoretic Nematoda: Rhabditida; 15) spinnerets and anal tubercle dorsally and sligthtly laterally (hairs not drawn); 16) spinnerets ventrally, colulus area hidden, hairs not drawn; 17) tibia of the left pedipalpus dorsally; 18) l. pedipalpus retroventrally and slightly basally; 19) r. pedipalpus retrolaterally (distal parts hidden); B = retrobasal tegular apophysis, C = conductor, M = median apophysis, R = retrolateral tegular apophysis, V = ventral tibia apophysis; 20-22) phoretic Nematoda: ?Rhabditida; 20) two specimens, at least the large one phoretic and with a stalk near the opisthosoma of the holotype of *E. annulata*; 21-22) a specimen attatched to the prolateral surface of the right femur I of the holotype of *E. annulata*, prolaterally and ventrally; M = 0.2;

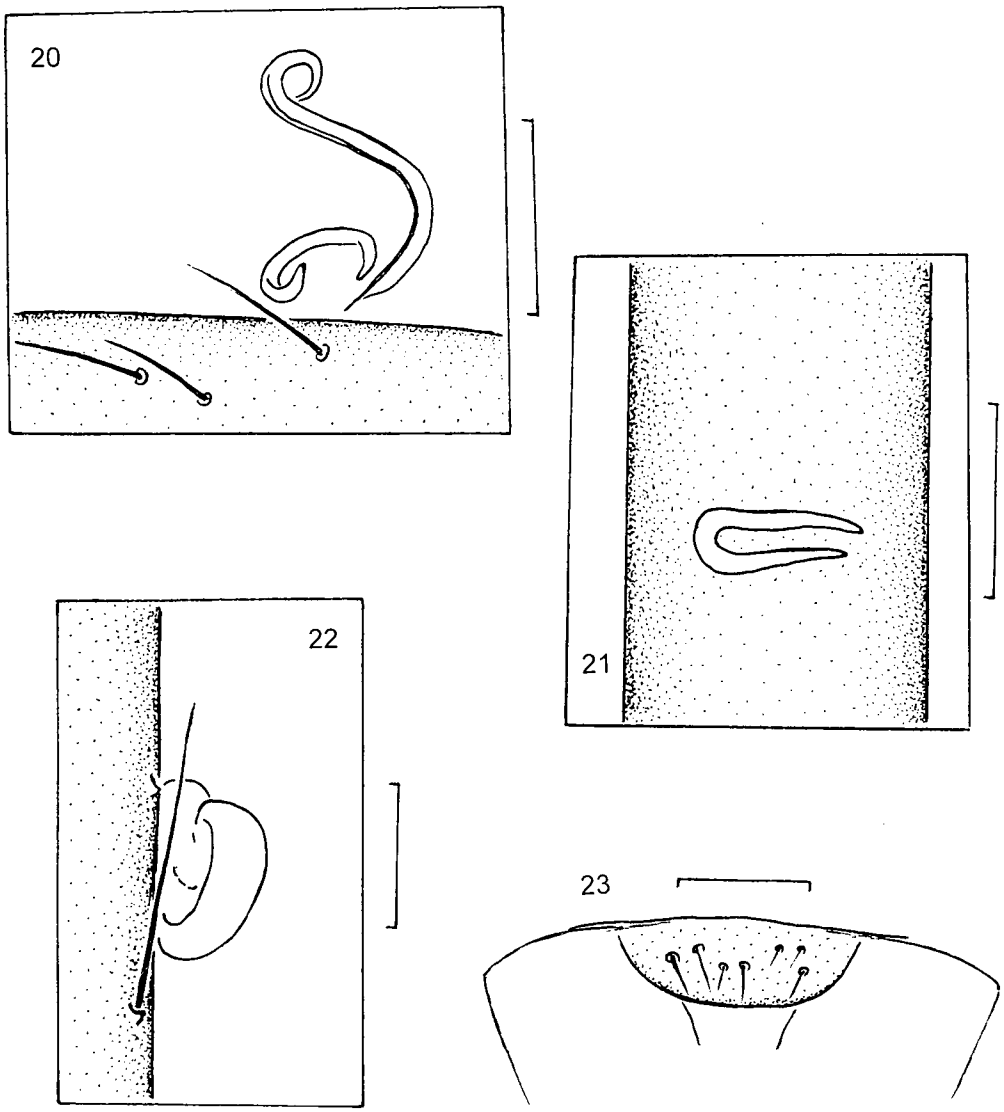


fig. 23) ***Eotrechalea* sp. indescr.** ♂ (1361/CJW), colulus and outline of the basal parts of the anterior spinnerets. M = 0.1.

BEITR. ARANEOL., 3 (2004)

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

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Abstract: The rare fossil spiders (Araneae) of the family Oxyopidae in Baltic and Dominican amber - one species each - are repeated.

Although they are living - today - in higher strata fossil members of the family Oxyopidae (Lynx spiders; German name "Scharfaugenspinnen" oder "Luchsspinnen") in amber are extremely rare; only 6 specimens (two to four species) are reported: *Oxyopes defectus* WUNDERLICH 1988 (figs. 6-7) and *Oxyopes* sp. sensu WUNDERLICH (1988: 197-198) in Dominican amber and *"Oxyopes" succini* PETRUNKEVITCH 1958 in Baltic amber (figs. 1-4). A revision of the taxa is needed.

Material: CJW = private collection of J. Wunderlich.

Diagnosis of the family Oxyopidae: Eye position hexagonal, usually four eye rows with small anterior median eyes and large anterior lateral eyes, and prosoma very high (figs. 1-2, 6), 0-1 cheliceral teeth only, scaly hairs (fig. 7) are frequently present, leg bristles long and numerous (figs. 1, 6), opisthosoma most often long and tapering posteriorly (fig. 1). - Further characters: Ecribellate, unpaired tarsal claw present, web rare.

The **relationships** are unsure.

Distribution: Cosmopolitical.

New material:

Material in Dominican amber: ?*Oxyopes* sp. indet, 1 ♂ and 1juv., Staatl. Mus. Naturk. Stutgart, Do-3300 and Do- 4975. Body length of the spiders about 4 and 2.5mm, scaly hairs are present, in the male a narrow prosomal band and a wide dorsal opisthosomal band of light hairs are present. Photos 338-339. Figs. 5-7 (*Oxyopes defectus* WUNDERLICH).

Material in Baltic amber: Oxyopidae gen. & sp. indet. 1 juv. ♀ from the Bitterfeld deposit, F720/BB/AR/OXY/CJW. Body length of the spider at least 5mm, the posterior part of the prosoma is cut off. Prosoma length 1.8mm, scaly hairs are absent. I do not want to exclude that the spider is congeneric or even conspecific with "*Oxyopes*" *succini* PETRUNKEVITCH 1958; body length ♂ 2.85mm, prosoma length about 1.4mm. According to the absence of scaly hairs and a tibial apophysis of the pedipalpus I doubt than *succini* is a member of the genus *Oxyopes*; it may well be a member of an undescribed and extinct genus. Figs. 1-4 (*Oxyopes succini* PETRUNKEVITCH), photo 340.

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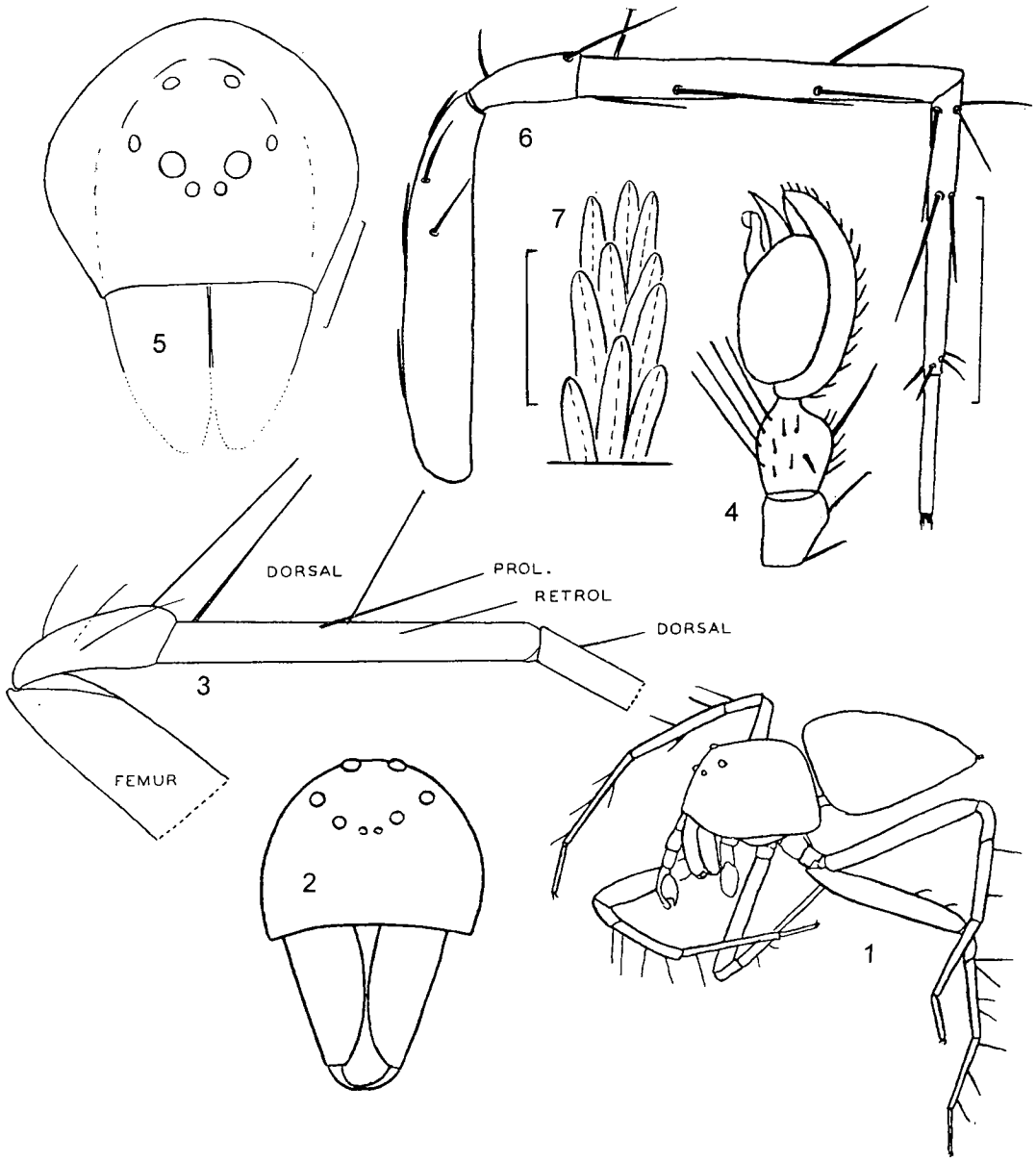

Figs. 1-4: *Oxyopes succini* PETRUNKEVITCH 1958, ♂ in Baltic amber, 1) body with some legs; 2) prosoma, frontal view; 3) r. leg. I, retrolateral view; 4) r. pedipalpus, prolateral view. Taken from PETRUNKEVITCH (1958).

figs. 5-7: *Oxyopes defectus* WUNDERLICH 1988, ♂ in Dominican amber, 5) prosoma, frontal view; 6) l. leg I, prolateral view; 7) some scaly hairs of the prosoma. M: Figs. 5-6 1mm, fig. 7 0.1mm.

BEITR. ARANEOL., 3 (2004)

PROOF OF PRESENCE OF THE FAMILY LYCOSIDAE (ARANEAE) IN BALTIC AND DOMINICAN AMBER?

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Abstract: Hitherto published fossil members of the family Lycosidae (Araneae) in Baltic and Dominican amber as well as in the Cretaceous of Botswana are shortly discussed. A juvenile and highly questionable Lycosidae is known from Dominican amber, no sure member of this family is known from Baltic amber or from the Cretaceous. The present author conciders Lycosidae to be a - geologically - young family.

Diagnosis of the family Lycosidae: Ecribellate and small to very large ground spiders - body length usually 2.5-35mm (♀), most often 4-12mm -, which possess three tarsal claws and 8 eyes in three rows as in fig. 1. The thoracal region is higher than the caput, a tarsal scopula is present, a colulus is absent. A pedipalpal tibial apophysis is absent (except in *Allocosa tuberculipalpus* (CAPORIACCO)), the epigyne has a medium septum, the female carries the egg-sac attached to the spinnerets (as females of the Trechaleidae) and the spiderlings on the opisthosoma, a capture web is usually absent.

RAYNER & DIPPENAAR-SCHOEMAN (1995) regarded a fossil female from the Upper Cretaceous of Botswana (gen. & sp. indet.) as a member of the Lycosoidea, "either...the family Ctenidae or Lycosidae." (p 100). According to the unknown presence of an unpaired tarsal claw, the unknown position of the eyes and the probably unpaired bristles of the anterior tibiae and metatarsi its membership of the Ctenidae, Lycosidae and even the Lycosoidea is highly unsure. So there is no sure proof of Cretaceous Lycosidae.
Fossil spiders in Baltic amber which were published by various authors as Lycosidae are members of other families, e.g. of the Pisauridae or Trochanteriidae - the genus *Sosybius* KOCH & BERENDT 1854, see WUNDERLICH (1986: 28) - or probably of the family Trechaleidae, see the papers on the Pisauridae, Trechaleidae and Trochanteriidae.

From Dominican amber PENNEY (2001) published a 3mm long juvenile spider as "the first indisputable representative of the family Lycosidae identified in the fossil record" (fig. 1). I studied the specimen, body and legs are distinctly deformed, probably by heating. I do not want to exclude that the spider is a member of the family Lycosidae, but it could be a member of another family, e.g. Pisauridae, Trechaleidae, Zoridae or Zoropsidae s. l.. An adult conspecific spider is needed for a sure determination.

The absence of members of the Lycosidae in Baltic amber is remarkable. On the one hand most Lycosidae prefer open biotopes but not forests as the Baltic amber forest, on the other hand the juveniles are good ballooners! This family may be a - geologically - young taxon which evolved - or radiated strongly - only after the disappearance of the Early Tertiary European amber forests.

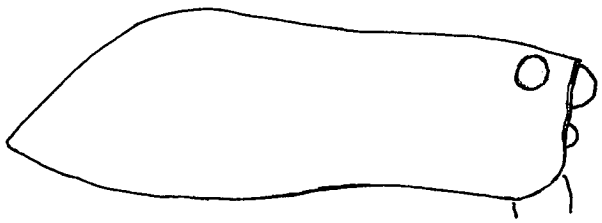

Fig. 1) Outline of the prosoma of a questionable juvenile Lycosidae in Dominican amber, lateral aspect. M = 0.5mm.

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BEITR. ARANEOL., 3 (2004)

FOSSIL SPIDERS (ARANEAE) OF THE EXTINCT FAMILY EPHALMATORIDAE PETRUNKEVITCH 1950 IN BALTIC AMBER

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ABSTRACT: The extinct spider (Araneae) family Ephalmatoridae PETRUNKEVITCH 1950 is revised. The family is only known from Baltic amber and probably related to Corinnidae, Chummidae and Zodariidae. Besides a sp. indet. (female) the following **new species** are described: *Ephalmator bitterfeldensis*, *calidus*, *debilis*, *distinctus*, *ellwangeri*, *kerneggeri*, *petrunkevitchi*, *ruthildae*, *trudis* and *turpiculus*.

Material: CJW = collection of J. WUNDERLICH. There are several more specimens and probably species in the CJW which are not described or listed in this paper and an incomplete male in the coll. F. EICHMANN no. AR 20. See WUNDERLICH (1986: 25).

INTRODUCTION

PETRUNKEVITCH (1950) described one fossil species of his new family Ephalmatoridae, type - and only - genus *Ephalmator,* and (1958) a second - in my opinion probably not confamiliar - species of this genus based on a juvenile female. This author recognized the extraordinariness of these spiders and regarded (1958) a part of a capture web - in which sticky droplets are present - as part of the web of *Ephalmator.* I more tend to regard these threads as originated from a member of the superfamily Araneoidea. I regard the "droplets" which originate from threads of the spinnerets of the paratype as artefacts. The stout legs of *Ephalmator* are similar to the family Chummidae JOCQUE 2001 and are unusual in spiders which build a capture web, see below.
Ephalmatoridae may be related to Chummidae, Zodariidae and probably Nicodamidae. Apparently the family Ephalmatoridae was quite diverse in the Early Tertiary Baltic amber forest, and there is one species known from the Bitterfeld deposit, too.

TAXONOMY

Ephalmatoridae PETRUNKEVITCH 1950 (German name: Glattkieferspinnen)

Revised diagnosis and description: Entelegyne spiders, cribellum and colulus absent (fig. 2), unpaired tarsal claw present (fig. 18), few tarsal and metatarsal trichobothria present (fig. 5), scopula and claw tuft absent, prosomal cuticula structure scale-shaped, nearly smooth (*bitterfeldensis*) or granulate, clypeus as long as two diameters of the anterior median eyes, cheliceral teeth absent (fig.17),8 eyes in two rows (fig.11), dorsal opisthosomal scutum present in the male (fig.1), no ventral scuta, anterior spinnerets stout, conical and close together (fig.2), legs stout (photos), no autotomy has been observed up to now, tibia and metatarsus I-II with long paired ventral bristles which are close to the article (fig.16). ♂-pedipalpus (figs.4,7,9,19-20,22-23): Retrolateral tibial apophysis - erroneously supposed as absent by PETRUNKEVITCH (1950) - present and very variable, a ventral tibial apophysis may be present (fig.28), median apophysis probably absent, a terminal apophysis, a long embolus and a large conductor in a wide circular position are present. ♀: Epigyne (fig. 24) with a pair of large grooves.

Further characters: Body length 2.0-2.7mm, the female of the questionable *E. eximius* 3.4mm, three pairs of not reduced spinnerets present, spigots of the median and posterior female spinnerets unknown, unpaired tarsal claw with a tooth (fig. 18), thorax slightly higher than the caput, plumose cheliceral hairs present, cheliceral condylus present, labium a free sclerite and wider than long (fig.25), gnathocoxal serrula present, coxal window, feathery hairs, scopulae, claw tufts, tarsal comb and metatarsal preening hairs absent, trochantera not notched, eyes of the posterior row large, posterior row straight or +/- procurved, thoracal ridge present (fig. 11). Order of legs I/IV/II/III, tarsi short, tibial suture absent. Chaetotaxy: Femora usually dorsally 2/2/1/0 bristles,I usually with a prodistal bristle which may be long (in *calidus* and *petrunkevitchi*), no distinct patellar bristles, tibia I and usually II at least bear 3 pairs of long ventral bristles, metatarsus I usually also with 3 pairs of long ventral bristles, leg IV with few short apical tibial and metatarsal bristles. Cymbium (fig. 4) nearly as wide as long and not elongated.- According to PETRUNKEVITCH (1950, 1958) a capture web with sticky droplets is present. After the stout legs of the spiders I doubt that *Ephalmator* built capture webs. In my opinion the sticky threads which were observed by PETRUNKEVITCH with *Ephalmator* wer more likely to be produced by members of the superfamily Araneoidea and accidentally preserved with the spider. With the spiders which are described in this paper are only dropless threads preserved.

Type genus: *Ephalmator* PETRUNKEVITCH 1950, the only known genus.

The **Relationships** are not sure, the combination of characters seems to be unique. Ephalmatoridae is a member of the RTA-clade and the Trionychia. The posterior spinnerets are not long, the anterior spinnerets are stout and close together. These characters are as in the Cybaeidae, but in the Cybaeidae - as in the Agelenidae - a colulus is present, the structure of the cuticula is different and an opisthosomal scutum is absent as in the Amaurobiidae; the cymbium is elongated, a special conductor is present. In males of the Zoropsidae s.l. incl. "Miturgidae" part. a tibial suture is present, see the paper on this family in this volume. In the three-clawed Nicodamidae - which possesses a scale-shaped cuticula structure as the Ephamaltoridae - a long clypeus and a dorsal tibial apophysis of the male pedipalpus are present. In the ecribellate Corinnidae and Zodariidae a scale-shaped cuticula exists, an opisthosomal scutum is usually present, long ventral bristles of the anterior tibiae may occur as in the Ephalmatoridae but the unpaired tarsal claw is absent in the Corinnidae which usually are myrmecomorph. In the Zodariidae - in which the anterior spinnerets are similar to the Ephamaltoridae - usually a gnathcoxal serrula is absent, the position of the teeth of the paired tarsal claws is medial, the gnathocoxae are converging, chelicerae and fangs are short. According to the absence of a capture web and the characters listed above Ephamaltoridae may be near the sister group of Corinnidae + Zodariidae ?+ Nicodamidae in which cheliceral teeth occur, the legs are longer and more slender and usually metatarsal preening hairs are present. The short-legged, scutate and web-less Chummidae JOCQUE 2001 may be strongly related; in the Chummidae the structure of the cuticula is ripple-shaped, cheliceral teeth and a median apophysis are present, a wide conductor and embolus are absent.

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

Ephalmator PETRUNKEVITCH 1950

Diagnosis and **relationships**: See above. I do not want ro exlude that *Clythia* KOCH & BERENDT 1854 is a senior synonym - and nomen oblitum - of *Ephalmator*, see *E. bitterfeldensis* n. sp.

Type species: *Ephalmator fossilis* PETRUNKEVITCH 1950.

Distribution: Tertiary Baltic amber forest incl. Bitterfeld deposit.

Key to the species of Ephalmator (males)

Remarks: The questionable *E. eximius* is only known from a juvenile female, the other named species are only known from the male sex. The only known adult female (fig. 24) is annamed and not included in this key. The dorsal opisthosomal scutum (fig. 1) is large (+/- 1.2mm long) in *bitterfeldensis, ruthildae*, sp. indet. F332, sp. indet. coll EICHMANN), in the remaining species is the scutum smaller and only 0.7-0.9mm long. The shape of the tibial apophysis of the male pedipalpus is specific in every species.

1 Tibia I with 5 pairs of ventral bristles similar to fig. 10; the prosomal cuticula appears smooth in a magnification of 100x, a 1.2mm long opisthosomal scutum is present. Pedipalpus figs. 3-4. . . . . *bitterfeldensis*

- Tibia I with 3 pairs of ventral bristles and usually a proventral bristle; the prosomal cuticula appears distinctly granulate in a magnification of 100x, opisthosomal scutum variable, pedipalpus different. 2

2(1) Opisthosomal scutum about 1.2mm long, covering dorsally the whole opisthosoma. Distal branch of the pedipalpal tibial apophysis long, slender, bent dorsally and finally strongly curved downward at the end (fig. 23). . . . . *ruthildae*

- Dorsal opisthosomal scutum 0.7-0.9mm long, covering dorsally only a part of the opisthosoma similar to fig. 1; tibial apophysis different. 3

3(1) Male pedipalpus as in figs. 14-15 . . . . . *fossilis*

- Male pedipalpus otherwise. 4

4(3) Tibial apophysis of the pedipalpus longer, outstanding and with a pointed anterior branch (figs. 8, 9, 19-20). 5

- Tibial apophysis usually shorter, not outstanding. 6

5(4) Tibial apophysis of the pedipalpus long, as in fig3. 19-20. . . . . *kerneggeri*

- Tibial apophysis as in fig. 9. . . . . *distinctus*

- Tibial apophysis as in fig. 8, shorter. . . . . *debilis*

- Tibial apophysis as in fig. 30. . . . . ellwangeri

6(4) Tibial abophysis of the pedipalpus very short, distal branch curved in a right angle (figs. 26-27). . . . . *turpiculus*

- Tibial appophysis of the ♂-pedipalpus longer and less curved. 7

7(6) Pedipalpal tibial apophysis 0.2mm long and with a basal "tooth" (fig. 27-28). . . . . *trudis*

- Tibial apophysis not more than 0.1mm long, no basal "tooth" (figs. 6-7, 21). 8

8(7) Tibial apophysis as in figs. 6-7. . . . . *calidus*

- Tibial apophysis as in fig. 21. . . . . *petrunkevitchi*

In the following descriptions of the species are only few genus characters repeated.

***Ephalmator bitterfeldensis* n.sp.** (figs. 1-4)

Material: Holotypus ♂ in Baltic amber from the Bitterfeld deposit, mine Goitsche, Palaeont. Inst. Humboldt Univ. Berlin no. 569.

Preservation and syninclusions: The spider is fairly well and completely preserved, the ventral side is partly covered by a white emulsion. - Few detritus particles are also preserved but no stellate hairs.

Diagnosis (♂; ♀ unknown): Cuticula of the prosoma smooth in a magnification of 100x, tibia I with 5 pairs of ventral bristles, metatarsus I with 3 pairs of ventral bristles, pedipalpus figs. 3-4.

Description (♂):
Measurements (in mm): Body length 2.7, prosoma length 1.3, tibia I 0.95.
Colour as in *petrunkevitchi* n.sp.
Posterior eye row slightly procurved, opisthosoma (fig. 1) with large scutum and short hairs. Spinnerets and posterior spiracle: Fig. 2.

Relationships: See *E. calidus* n.sp. and ?*E. eximius* PETRUNKEVITCH 1958. - In the type species of *Clythia* KOCH & BERENDT 1854 - *alma* KOCH & BERENDT 1854 and in the holotype (a ?juv. ♀, body length 2.2mm) of *Esuritor aculeatus* PETRUNKEVITCH 1958 (Palaeont. Inst. Humboldt Univ.) - five pairs of ventral tibial bristles are present, too. The relationships of these species are not clear, the males are unknown.

Distribution: Tertiary Baltic amber forest, Bitterfeld deposit.

***Ephalmator calidus* n.sp.** (fig. 5-7)

Material: Holotypus ♂ in Baltic amber, coll. F. KERNEGGER in Hamburg no. 8/83.

Preservation and syninclusions: The amber piece was most probably heated in an autoclave. The spider is well and completely preserved, a white emulsion is absent, the body is ventrally covered by large bubbles. - Few spider's threads without droplets are preserved beneath the spider in the small amber piece but no stellate hairs.

Diagnosis (♂; ♀ unknown): Tibia and metatarsus I bear 3 pairs of ventral bristles, tibial apophysis of the male pedipalpus as in figs. 6-7, bulbus with a thin and curved terminal apophysis.

Description (♂):
Measurements (in mm): Body length 2.5, prosoma length 1.35, tibia IV 0.67.
Colour dark brown, opisthosoma except the scutum light brown.
Posterior eye row fairly procurved, posterior median eyes separated by less than one diameter. Trichobothria and bristles of metatarsus and tarsus III as in fig. 5, opisthosoma with a distinct dorsal scutum and short hairs. Pedipalpus (figs. 6-7) with a large tibial apophysis.

Relationships: The tibial apophysis is similar in *bitterfeldensis* in which the chaetotaxy is different.

Distribution: Tertiary Baltic amber forest.

***Ephalmator debilis* n.sp.** (fig. 8)

Material: Holotypus ♂ in Baltic amber, F337/BB/AR/EPH/CJW.

Preservation and syninclusions: The amber piece has been heated in an autoclave, there are brown markings around the spider which is fairly well - slightly deformed - and completely preserved; ventrally in some distance is a white emulsion present. - No stellate hairs.

Diagnosis (♂;♀ unknown): Tibia and metatarsus I bear 3 pairs of ventral bristles, tibial apopysis of the male pedipalpus (figs. 8) outstanding in a right angle, distally high.

Description (♂):
Measurements (in mm): Body length 2.2, prosoma length 1.1, leg I: Tibia 0.9, metatarsus 0.7, tarsus 0.3.
Colour: Prosoma and legs dark brown, opisthosoma except the scutum light brown.
Body and legs as in the genus, opisthosomal scutum short.

Relationships: In *E. distinctus* and *kerneggeri* is the pedipalpal tibial apophysis longer; in *ellwangeri* (fig. 30) the anterior branch of the tibial apophysis is larger.

Distribution: Tertiary Baltic amber forest.

***Ephalmator distinctus* n.sp.** (fig. 9) Photos 341-343

Material: 2 ♂ in Baltic amber, holotypus F338/BB/AR/EPH/CJW; paratypus F592/BB/AR/EPH/CJW.

Preservation and syninclusions: The spider is well and completely preserved; bubbles and few emulsions are preserved beneath the right gnathocoxa and the opistho-

soma. - Several remains of stellate and other hairs and threads are also preserved in the amber piece.

Diagnosis (♂; ♀ unknown): Tibia and metatarsus I bear 3 pairs of ventral bristles; pedipalpal tibia fig. 9 (holotype) outstanding in a right angle.

Description (♂):
Measurements (in mm): Body length 2.25, prosoma: length 1.15, width 0.95, tibia I 0.85.
Colour as in *E. trudis* n.sp. Body and legs as in the genus, opisthosomal scutum short.

Relationships: In *E. debilis* n.sp. is the pedipalpal tibial apophysis shorter, in *E. kerneggeri* longer.

Distribution: Tertiary Baltic amber forest.

***Ephalmator ellwangeri* n. sp.** (fig. 30) Photo 344

Derivatio nominis: The species is dedicated to R. ELLWANGER; from his collection comes the holotype.

Material: Holotypus ♂ in Baltic amber, F557/BB/AR/EPH/CJW.

Preservation and syninclusions: The spider is well and completely preserved in an amber piece which was heated; there is a weak white emulsion on the ventral side of the opisthosoma. Also preserved are a Diptera, a Collembola, a tiny mite and a larger Acari: Oribatida between the right femora I and II as well as few stellate hairs and excrement particles.

Diagnosis (♂; ♀ unknown): Tibia and metatarsus I bear 3 pairs of ventral bristles as shown in fig. 16; pedipalpal apophysis (fig. 30) outstanding and with a large pointed anterior branch.

Description (♂):
Measurements (in mm): Body length 2.0, prosoma length 1.05, tibia IV 0.65, length of the opisthosomal scutum 0.9. - Colour dark brown. - Body and legs as in the genus; see the photo.

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

Distribution: Tertiary Baltic amber forest.

***?Ephalmator eximius* PETRUNKEVITCH 1958** (fig. 10)

Diagnosis (juv. ♀;♂ unknown): Tibia I bears 5 pairs of ventral bristles and one proventral bristle (fig. 10), metatarsus I bears 4 pairs of ventral bristles. Body length 3.39mm.

Relationships: I am quite unsure that this species is a member of the genus *Ephalmator* or even of the Ephalmatoridae; according to PETRUNKEVITCH (1958) a tooth of the unpaired tarsal claw is absent and there are several taxa of different families in Baltic amber which have a similar chaetotaxy. The body length of the juvenile holotype is distinctly larger than in all surely congeneric species including an adult female, see below.

Remark: In my opinion the producer of the web part which contains droplets on some threads - see PETRUNKEVITCH (1958: Fig. 238) - is more likely a member of the superfamily Araneoidea than of *Ephalmator eximius*, see above.

Distribution: Tertiary Baltic amber forest.

***Ephalmator fossilis* PETRUNKEVITCH 1950** (figs. 11-18)

Material: Holotypus in Baltic amber ♂ British Museum no. 7882.

Diagnosis (♂;♀ unknown): Posterior eye row distinctly procurved, tibia I with 3 pairs of ventral bristles (fig. 16), pedipalpus (figs. 14-15) with an indistinct tibial apophysis and one divided or two single terminal apophyses.

Remarks: In contrast to the statement of PETRUNKEVITCH I found an indistinct tibial apophysis in the holotype of *E. fossilis*; its shape is difficult to observe.

Body length 2.65mm, prosoma 1.3mm long, 1.0mm wide. Body figs. 11-13, left chelicera fig. 17, leg I fig. 16, tarsal claws fig. 18, ♂-pedipalpus figs. 14-15.

The **relationships** are unsure; the bulbus structures of the holotype (figs. 14-15) and of the paratype are partly hidden; the conspecifity of the paratype (♂) appears quite unsure.

Distribution: Tertiary Baltic amber forest.

***Ephalmator kerneggeri* n.sp.** (figs. 19-20)

Derivatio nominis: The species is dedicated with thanks to F. KERNEGGER, the collector and owner of the holotypus.

Material: Holotypus ♂ in Baltic amber, Island of Neuland, coll. F. KERNEGGER no. 196/94.

Preservation and syninclusions: The spider is completely and well preserved, situated on an amber layer. The ventral side of the body is partly covered by a white emulsion. - No stellate hairs. In a separated amber piece is a female of *Balticoroma* sp. (Anapidae) preserved.

Diagnosis (♂; ♀ unknown): Tibia and metatarsus I bear 3 pairs of ventral bristles. Pedipalpus (figs. 19-20): Tibia with a long and outstanding apophysis which is apically divided.

Description (♂):
Measurements (in mm): Body length 2.5, prosoma: length 1.25, width 1.05, tibia I 0.85, tibia IV 0.83.
Colour as in *E. calidus* n.sp. Prosoma distinctly granulate, eyes as in sp. indet (♀), short legs as in the genus. Opisthosoma with a short scutum, similar to fig. 1.

Relationships: In the strongly related *E. distinctus* is the tibial apophysis of the ♂ pedipalpus shorter and more compact.

Distribution: Tertiary Baltic amber forest.

***Eophalmator petrunkevitchi* n.sp.** (figs. 21-22)

Derivatio nominis: The species is dedicated to A. PETRUNKEVITCH who recognized the extraordinariness of the family Ephalmatoridae.

Material: Holotypus ♂ in Baltic amber, F/322/BB/AR/EPH/CJW.

Preservation and syninclusions: The spider is completely and very well preserved

and "sitting" on an amber layer. The ventral side is partly covered by a white emulsion. - No stellate hairs but numerous tiny bubbles are also preserved.

Diagnosis (♂; ♀ unknown): Tibia and metatarsus I bear 3 pairs of ventral bristles. Pedipalpus (figs. 21-22): The tibial apophysis of the pedipalpus bears a slender and curved distal branch.

Description (♂):
Measurements (in mm): Body length 2.4, prosoma length 1.15, tibia I 0.65 long and 0.2 high.
Colour mainly dark brown. Posterior eye row slightly procurved, posterior eyes large, posterior median eyes separated by only its radius. Similar to related species besides the 3 pairs of ventral tibial bristles a further proventral bristle is present, and besides the 3 ventral metatarsal bristles a further prolateral bristle in the basal half. Opisthosomal scutum 0.9mm long, it bears indistinct hairs.

Relationships: The tibial apophysis is different in the other known congeneric species; compare *E. ruthildae* n.sp..

Distribution: Tertiary Baltic amber forest.

***Ephalmator ruthildae* n.sp.** (fig. 23)

Derivatio nominis: The spider is dedicated with many thanks to RUTHILD SCHÖNEICH who helped with the translation of parts of the manuscript into English.

Material: 2 ♂ in Baltic amber, holotypus F321/BB/AR/EPH/CJW; paratypus F336/BB/AR/EPH/CJW.

Preservation and syninclusions: Holotypus: The spider is completely and well preserved, the ventral side of the body is covered by a white emulsion. - A large adult mite (Acari) is preserved behind the spider, a tiny mite left of the spider, bith members of the Prostigmata; no stellate hairs. Two silk threads are running backward from the spinnerets for half a mm; the dorsal thread seems to be very fine "segmented" but bears no droplets. -The paratypus is completely preserved, the amber piece has most probably been heated in an autoclave. - No further organic inclusions.

Diagnosis (♂; ♀ unknown): The dorsal scutum covers the whole opisthosoma, tibia and metatarsus I bear 3 pairs of ventral bristles, distal branch of the tibial apophysis of the pedipalpus (fig. 23) long, slender and distinctly curved downward at the end.

Description (holotypus ♂):
Measurements (in mm): body length 2.3, prosoma: Length 1.05, width 0.85, tibia I 0.7.
Colour dark brown, opisthosoma except the dorsal scutum light brown. Prosoma granulate, posterior eye row straight, chelicerae with distinct plumose hairs, the large - 1.2mm long - dorsal scutum covers the whole opisthosoma and bears short bristles.

Relationships: The bristles of the anterior tibia and metatarsus are as in *E. petrunkevitchi* n.sp., the shape of the tibia apophysis of the male pedipalpus is similar in *petrunkevitchi* but the distal branch of the apophysis is more strongly bent.

Distribution: Tertiary Baltic amber forest.

***Ephalmator* sp. indet**. (fig. 24)

Material: 1 ♀ in Baltic amber and a separated amber piece, F323/BB/AR/EPH/CJW.

Preservation and syninclusions: The spider is only fairly well preserved, parts of the left legs I and II are cut off through the femur, the left leg IV is missing after the femur, the left leg III is broken through the trochanter and missing, an amber layer is hiding the prosoma ventrally, a white emulsion covers parts of the opisthosoma. Left and behind the spider a Diptera: Nematocera is preserved in a different amber layer. - Detritus particles and some stellate hairs are also preserved.

Diagnosis (♀;♂ unknown): Tibia with 3 pairs of ventral bristles, epigyne (fig. 24) with a large pair of grooves.

Description (♀):
Measurements (in mm): Body length 2.2, prosoma length 1.1, tibia I 0.53, tibia IV 0.55.
Colour: Prosoma and legs dark brown, opisthosoma light grey brown. Posterior eye row slightly procurved, anterior median eyes the smallest, posterior median eyes the largest. Pedipalpus large, tarsus spiny. Opisthosoma soft, with hairs of medium length, anterior spinnerets thick.

Relationships: This female may well be conspecific with one of the species which are already named. The body length is similar in the males of *E. petrunkevitchi* and *ruthildae*.

Distribution: Tertiary Baltic amber forest.

***Ephalmator turpiculus* n.sp.** (figs. 25-27)

Material: Holotypus ♂ in Baltic amber, F325/BB/AR/EPH/CJW.

Preservation and syninclusions: The spider is completely preserved and dorsally covered by a white emulsion; the spinnerets are well observable. - No stellate hairs.

Diagnosis (♂; ♀ unknown): Tibia and metatarsus I bear 3 pairs of ventral bristles. Pedipalpus (figs. 26-27): Tibia with a short apophysis which is bent in a right angle, the tip is directed prodorsally.

Description (♂):
Measurements (in mm): Body length 2.0, prosoma length 1.1, leg I: Femur ca 0.85, patella 0.38, tibia ca 0.7, metatarsus 0.62, tarsus 0.27, tibia II 0.6, leg IV: Femur 0.84, patella 0.31, tibia 0.6, metatarsus 0.56, tarsus 0.27.
Colour manly red brown, opisthosoma except the scutum yellow brown.
Prosoma: Eyes hidden, labium and gnathocoxae: Fig. 25, labium a free sclerite, not rebordered, 1.65 times wider than long, gnathocoxal serrula present, sternum 1.13 times longer than wide, small prolongated between the coxae IV. Legs stout, metatarsus I 2.3 times tonger than tarsus I, femur I prodistally with 2 bristles, femur IV ventrally with a proapical bristle. Opisthosoma with indistinct hairs and a short dorsal scutum which is nearly half as long as the opisthosoma. Terminal apophyses of the pedipalpus partly hidden.

Relationships: In the other congeneric species is the tibial appophysis longer and not bent in a right angle.

Distribution: Tertiary Baltic amber forest.

***Ephalmator trudis* n.sp.** (figs. 27-28)

Material: 4 ♂ in Baltic amber, holotypus F339/BB/AR/EPH/CJW; 3 paratypes in a single amber piece, F 340/BB/AR/EPH/CJW.

Preservation and syninclusions: Holotypus: The spider is fairly well and completely preserved, ventrally is a large white emulsion present. - Left of the spider and partly in contact with it is a partly divided spider's thread without droplet preserved; no stellate hairs. - Paratypes: Two complete and an incomplete male are present which are

partly covered by a white emulsion and bubbles. In one of the paratypus are the spinnerets very well preserved and observable. - No stellate hairs.

Diagnosis (♂;♀ unknown): Tibia and metatarsus I bear 3 ventral pairs of bristles. Pedipalpus (figs. 28-29): Tibia apophysis long, bent to the cymbium, probasally with a small "tooth"; a long ventral tibial apophysis is partly covered by an emulsion, most parts of the terminal apophysis are hidden.

Description (♂):
Measurements (in mm): Body length 2.35 (holotypus) to 2.9, prosoma length of the holotype 1.3, tibia I of the holotype 0.9
Colour: Prosoma, legs and opisthosomal scutum dark brown, opisthosoma light brown. Body and legs as in the genus, opisthosomal scutum short. Most spinnerets are hidden but in one of the paratypes are the spinnerets very well preserved and observable.

Relationships: The pedipalpal tibial apophysis is specific in this species.

Distribution: Tertiary Baltic amber forest.

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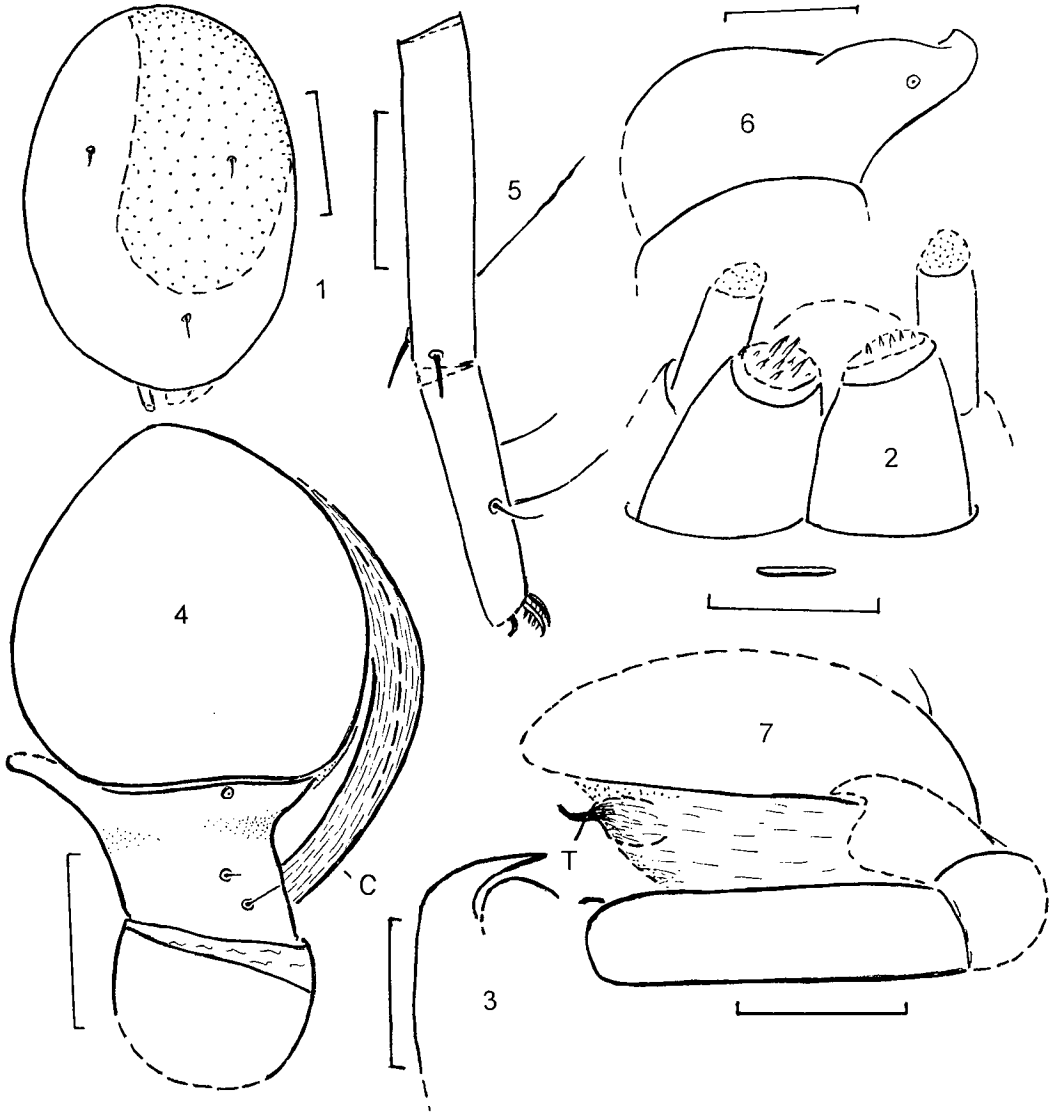
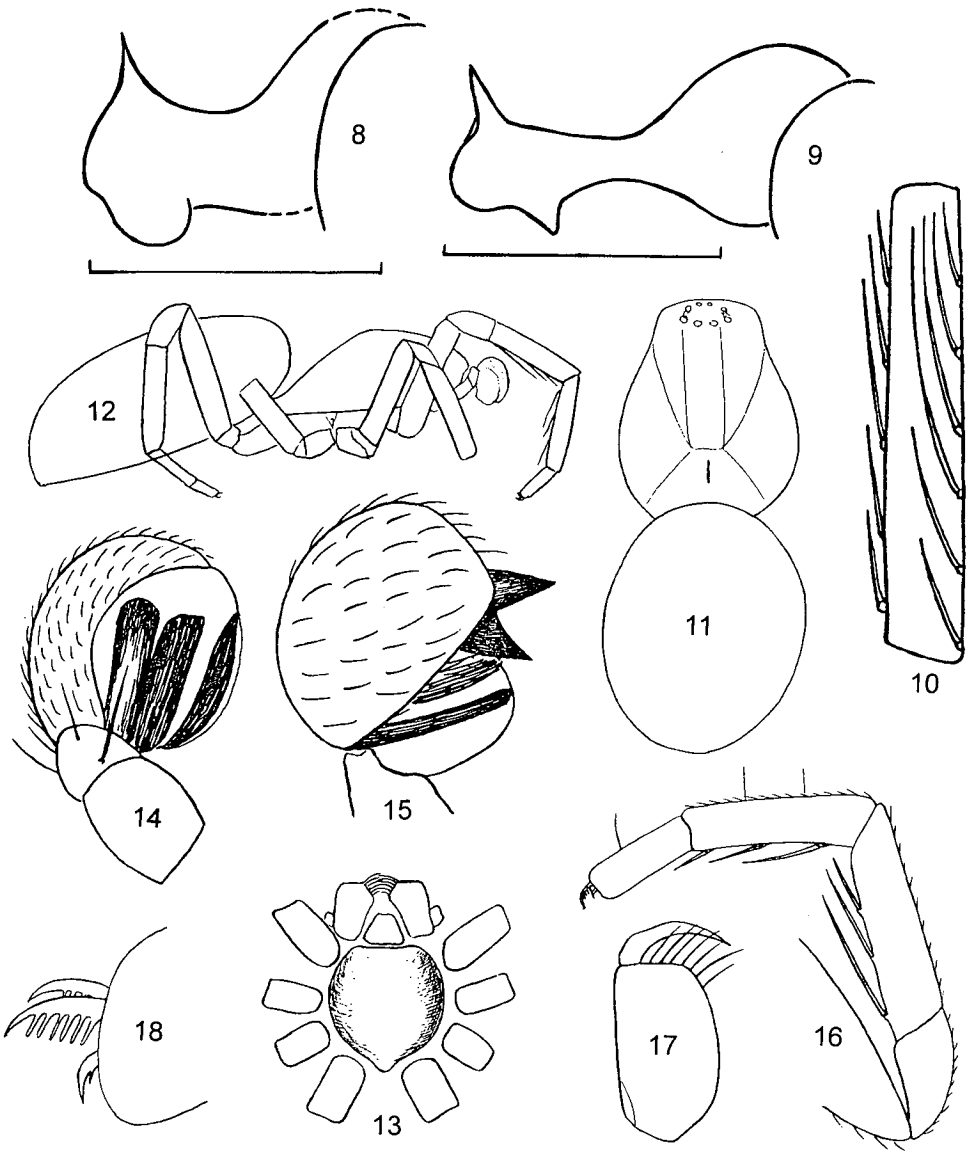


Figs. 1-4: ***Ephalmator bitterfeldensis* n.sp.** , ♂; 1) dorsal view of the opisthosoma with scutum (punctated) and the left posterior spinneret; only few hairs are drawn; 2) posterior tracheal opening, anterior and posterior spinnerets in ventral view; the median spinnerets are hidden; 3) distal part of the tibia apophysis of the r. pedipalpus retrobasally; 4) l. pedipalpus dorsally; C = conductor; M (in mm): 0.1 in fig. 3, 0.2 in 2 and 4, 0.5 in 1;

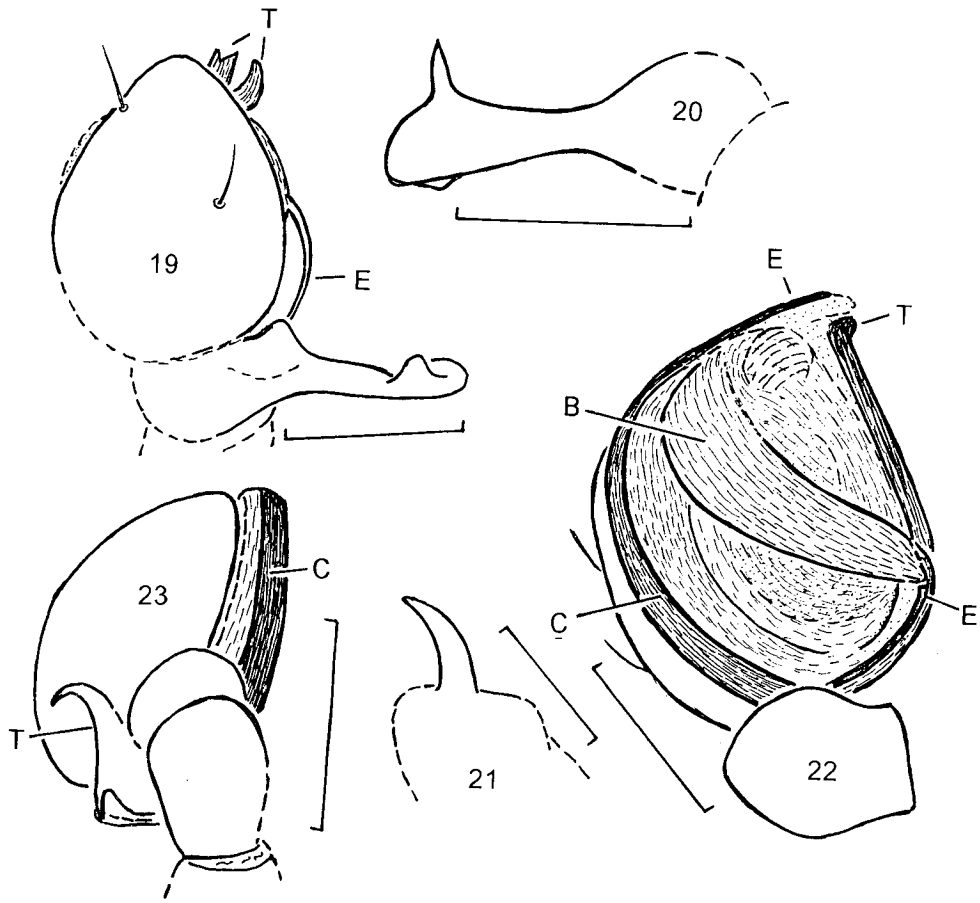
figs. 5-7: ***Ephalmator calidus* n.sp.**, ♂; 5) r. tarsus and metatarsus III retrodorsally with bristles and trichobothria; 6) tibia of the r. pedipalpus dorsally; 7) l. pedipalpus retrobasally; T = terminal apophysis; M = 0.1 in fig. 6), 0.2 in figs. 5 and 7;



figs. 8) ***Ephalmator debilis*** **n.sp.**, ♂, base of the patella and the tibia with its apophysis of the l. pedipalpus dorsally-basally; M = 0.2;

fig. 9) ***Ephalmator distinctus*** **n.sp.**, ♂, base of the patella and the tibia with its apophysis of the l. pedipalpus dosally-basally; M = 0.2;

fig. 10: ?***Ephalmator eximius*** PETRUNKEVITCH 1958 , ♀, ventral view of tibia I; after PETRUNKEVITCH (1958: Fig. 236);

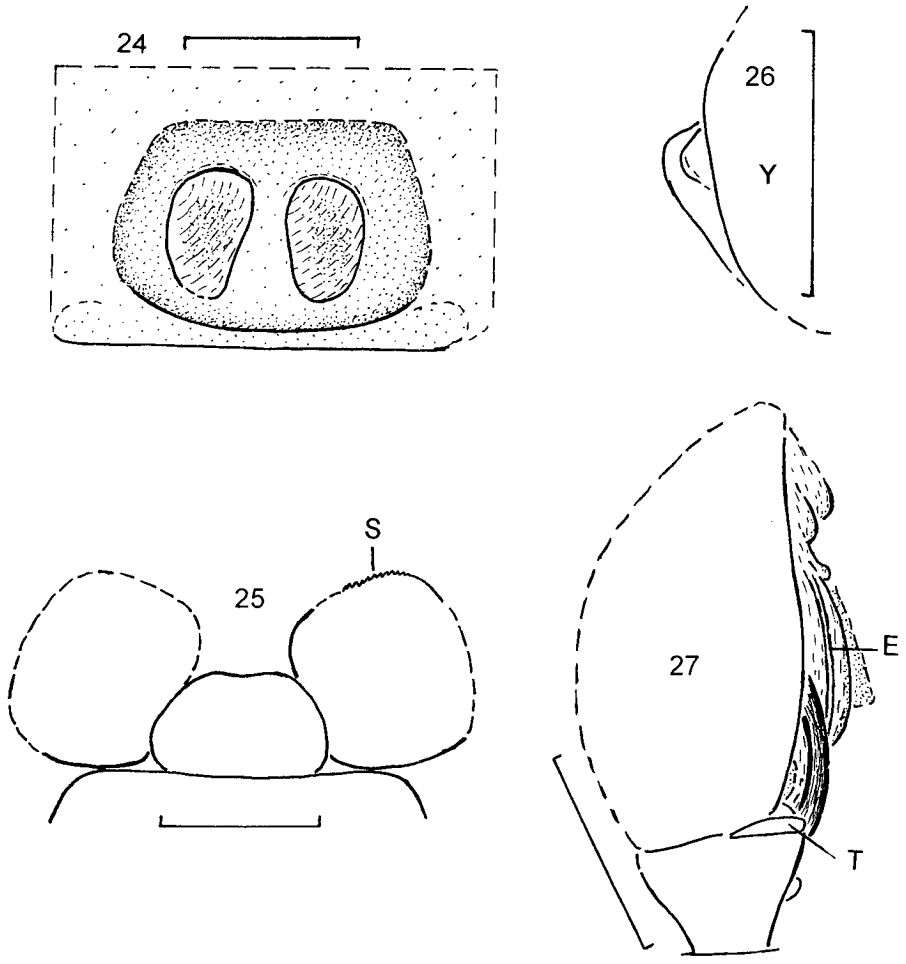


figs. 11-18: ***Ephalmator fossilis*** PETRUNKEVITCH 1950, ♂; fig. 16 paratype, remaining figs. holotype, after PETRUNKEVITCH (1950); 11-12) body dorsally and laterally, the opisthosomal scutum is not shown; 13) prosoma ventrally, compare fig. 25!; 14) left pedipalpus prodorsally; 15) r. pedipalpus retrodorsally; 16) prolateral view of the r. tibia I; 17) frontal view of the right chelicera; 18) r. tarsal I claws prolaterally;

figs. 19-20: ***Ephalmator kerneggeri*** **n.sp.**, ♂; 19) r. pedipalpus retrodorsally-apically; 20) base of the patella and the tibia with its apophysis dorsally-basally; E = embolus, T = terminal apophysis (and artefact?); Y = cymbium; M = 0.2;

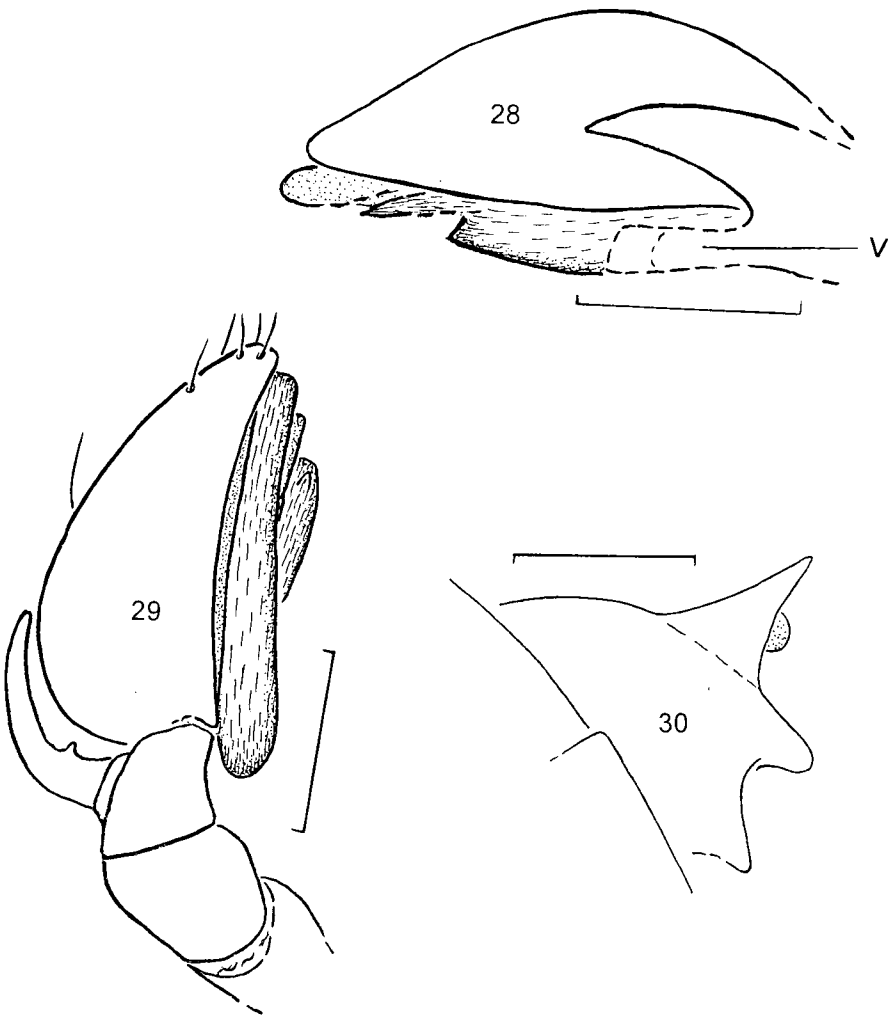
figs. 21-22: ***Ephalmator petrunkevitchi*** **n.sp.**, ♂; 21) distal part of the l. pedipalpal tibial apophysis retrolaterally; 22) r. pedipalpus oblique proventrally-basally; the apical part is hidden; B = basal part of the embolus, C = conductor, E = embolus, T = terminal apophysis; M = 0.1 and 0.2;

fig. 23) ***Ephalmator ruthildae*** **n.sp.**, ♂, holotype, l. pedipalpus dorsally-basally, cymbium and bulbus retrodorsally; C = conductor, T = tibial apophysis; M = 0.2;



24: ***Ephalmator* sp. indet.**, ♀, epigyne; M = 0.2;

figs. 25-27: ***Ephalmator turpiculus* n.sp.**, ♂; 25) labium and gnathocoxae with serrula (S) ventrally; 26) cymbium (Y) and tibial apophysis of the l. pedipalpus dorsally; 27) r. pedipalpus retrolaterally, with the tibial apophysis (T) and a part of the embolus (E); M = 0.2;



figs. 28-29: ***Ephalmator trudis*** **n.sp.**, ♂; holotype; 28) l. pedipalpus retrolaterally (V = ventral tibial apophysis); 29) l. pedipalpus prodorsally; M = 0.2.

fig. 30: ***Ephalmator ellwangeri*** **n. sp.**, ♂, tibial apophysis of the r. pedipalpus retrobasally; M = 0.1.

BEITR. ARANEOL., 3 (2004)

THE FOSSIL SPIDERS (ARANEAE) OF THE FAMILY ZODARIIDAE IN BALTIC AMBER, WITH REMARKS ON THEIR SUBFAMILIES INCLUDING THE CRYPTOTHELINAE AND THE HOMALONYCHINAE

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ABSTRACT: Homalonychinae PETRUNKEVITCH 1923 (**n. stat. and n. comb.**) and Cryptothelinae SIMON 1893 are regarded as subfamilies of the Zodariidae (Araneae), a revised diagnosis of the Zodariidae, a key to and a cladogram of its subfamilies are given. The fossil taxa of the Zodariidae in Baltic amber are revised - *Adorator hispidus* (KOCH & BERENDT 1854) (sub *Therea h.*), *Anniculus* PETRUNKEVITCH 1942 and *Eocydrele* PETRUNKEVITCH 1958 -, and the following new taxa are described: (1) ?Storenomorphinae: *Zodariodamus* **n. gen.**, *Z. recurvatus* **n. sp.**; (2) Zodariinae: *Angusdarion* **n. gen.**, *A. humilis* **n. sp.**, *Spinizodarion* **n. gen.**, *S. ananulum* **n. sp.**; four genera indet. are diagnosed. - Amputated and "healed" legs are reported from fossil Zodariidae in Baltic amber. The relationships of fossil Zodariidae and fossil ants in Baltic amber are discussed. Aggressive ant mimicry is reported from Zodariidae in Baltic amber; two taxa of ants are supposed to be models of the spider taxa. A fossil member of the Zodariidae which feeds on an ant, fights between fossil spiders and ants as well as draglines of a fossil Zodariidae are documented as examples of "frozen behaviour".

Material: CJW = collection of J. Wunderlich.

INTRODUCTION

Zodariidae - German name "Ameisen-Jäger" (Ant-hunters) - is a quite diverse family: E.g. the eye position, the more or less reduced unpaired tarsal claw as well as median and posterior spinnerets are very variable (adult males of the fossil genus *Anniculus* possess probably only one pair of spinnerets). After the family revision of JOCQUE (1991) we know much more of this family than before but the relationships of some higher taxa as the Cryptothelinae - see the paper of BENOIT (1978) - and several fossil taxa - see the papers of PETRUNKEVITCH - as well as the relationships of the whole family remain unclear. In this paper I transfer the Cryptothelidae and the Homalonychidae in a subfamiliar rank to the Zodariidae.

Today about half a dozen of genera occur in the Western Palearctic. From the Baltic amber forest I know 10 genera, 6 are named, all named genera are extinct, *Anniculus balticus* and *Adorator hispidus* appear not rare in Baltic amber, I saw hundreds of specimens of these species.

PETRUNKEVITCH (1942, 1958) described three genera of the family Zodariidae in Baltic amber: *Adorator*, *Anniculus* and *Eocydrele*. Other fossil Zodariidae were erroneously described or mentioned by KOCH & BERENDT (1954) sub Eresidae (*Eresus*), Dysderidae/Segestriidae (*Therea*) or Gnaphosidae (remark of MENGE in KOCH & BERENDT (1854: 77) on *Therea hispida*). The taxon Zodariidae THORELL 1881 was not yet known as a family of its own in the middle of the 19th century. In the dubius extinct genus *Dielacata* MENGE in KOCH & BERENDT 1854 MENGE recognized the presence of only one pair of spinnerets; this number of spinnerets is probably present males of the Baltic amber genus *Anniculus*, too. Photo 349.

Most extant Zodariidae live on the ground, some in the vegetation of higher strata. Probably some members of the more frequent fossil genera *Adorator* and *Anniculus* lived in higher strata of the Baltic amber forest, and groud-living spiders of the rare taxa were captured in the resin only by accident.

Leg autotomy is not rare in spiders, but - according to ROTH & ROTH (1984) - absent in the family Zodariidae. Apparently in fights with fossil ants - see figs. 5-6, photos - legs of the ant-hunters (Zodariidae) were occasionally amputated (e.g. fig. 36) between different articles (see below), and even injured cuticula may be "healed" as documented in fossil Zodariidae (fig. 6, photo). - In 1♂ of *Eocydrele mortua* (F726/CJW) the right leg IV is lost behind the coxa by autotomy, photo 351.

THE DANGEROUS PREY OF THE ZODARIIDAE; AMPUTATED AND "HEALED" LEG ARTICLES

Photos 351, 606-612. Photo 632-634

Occurence of leg amputations in Baltic amber spiders based on personal observations:

Species	sex	leg	behind article	coll. no.
Adorator hispidus	♂	l. leg I	patella	PIGött. B6593
" "	♂	r. leg I	tibia	PIHUB
" "	♂	l. leg I	patella	F184
" "	♂	l. leg II	femur	F184
Eocydrele ?mortua	♂	r. leg III	trochanter	K/AR/9
Eocydrele ?mortua	♂	r. leg I	metatarsus	F611
Eocydrele ?mortua	♂	r. leg I	tibia	F612
Gen. indet. 1	?ad. ♀	l. leg I	tibia	F618
Gen. indet. 2	?ad. ♀	r. leg I	tibia	F187
Spinizodarion ananulum	♂	r. leg I	metatarsus	F616
" "	♂	r. leg I	tibia	F617

I found leg amputations in at least 5 fossil genera, in about 20% of the specimens, most often in *Eocydrele* but not in 30 specimens of *Anniculus*. 9 of 11 cases (= 82%) concern leg I, 7 cases concern the right leg, 4 cases the left leg - this difference may be an accident ("handedness" in spiders is rarely documented!). The frequent amputations of leg I may mainly be the result of fights with ants, see below. - Are this cases of autotomy or of real amputations? Separated legs which are preserved near the spiders in amber give evidence of autotomy. In numerous families - e.g. Linyphiidae, Trochanteriidae and Zoropsidae - I found leg autotomy frequently in fossils which are preserved in Baltic amber. Usually a leg is autotomized at an intersegmental area between two articles and is restricted to one area, see the paper on leg autotomy in this volume. In fossil Zodarii-

dae I never found a separated leg; thus apparently there is no true autotomy in members of this family as already pointed out by ROTH & ROTH (1984).
I found several Zodariidae which possess amputated legs but did not bleed to death; the surface of their amputated stumps is smooth. In a male of *Adorator hispidus* (F184/ CJW) an injured and "healed" patella is preserved (fig. 6, photo), the cuticula is partly split off and no haemolymph can be observed. See also fig. 8. In an extant Zodariid specimen of the genus *Malenella* RAMIREZ 1995 (CJW) I observed 4 legs which are amputated through an article and apparently "healed" - there is a stronger sclerotization near the stumps -, and one femur was split off. - Did members of this family evolve a special "**healing system**" in which the haemolymph clumped rapidly? Is this "healing system" connected with the absence of leg autotomy in this family of spiders? Would leg autotomy at a special area make no sense in these ant-hunting spiders which are attakked by ants at different leg articles and even injured within leg articles (see the figs. 5-6)?
Did Zodariidae really hunt ants already in the Early Tertiary? According to new fossil documents there is no doubt about this behaviour, see fig. 5, the accompanying photo, gen. indet. 2: A spider with an ant in its fangs and the descriptions of two fights below.
Photos 355. 606ff.

MYRMECOMORPHY (ANT MIMICRY)

See the chapter on this matter in this volume.

Some extant Zodariidae are ant-shaped, e.g. members of the genus *Zodarion* in Europe, pers. obs. in living spiders; see CUSHING (1997: 179), WUNDERLICH (1995: 458). The myrmecomorphy is more distinct in mooving spiders but such observations are impossible in the fossils. According to the long prosoma the members of the genus *Adorator* (fig. 17, photos) are the most distinct fossil myrmecomorphic Zodariidae - similar to *Eomazax* (Corinnidae) - but the behavioural ant mimicry in the fossil Zodariidae is unknown and may have been well developed. The typical Zodariid flattened incised/ iridescent hairs - see JOCQUE (1991: Fig. 12) - are frequent and well observable in the fossils in Baltic amber, especially in *Eocydrele* and gen. indet. 4.
Some myrmecomorphic spiders are aggressive and feed on their model; the predator mimics ist prey, the prey species acts as both model and operator. Extant spiders of the family Zodariidae - e.g. members of the genus *Zodarion* WALCKENAER 1847 - are known to be aggressive mimics, see CUSHING (1997). In several pieces of Baltic amber the antagonistical behaviour of ants and spiders of the family Zodariidae is preserved and indicate that already Early Tertiary members of the family Zodariidae were aggressive mimics, see below:

"Frozen behaviour" (1) (figs. 5-8):

Photos 608-610

Material: A male of a fossil spider (Zodariidae) in Baltic amber, *Adorator hispidus* (KOCH & BERENDT 1854) and two ants, workers of *Liometopum goepperti* (MAYR) (Formicidae: Dolichoderinae; det. BARONI URBANI) in the same amber piece, F184/ BB/AR/ZOD/CJW.

This is the fight of a Zodariid spider with two ants of the same size, about 3.5mm. Spider and ants are well preserved, some parts are covered by a white emulsion, they are lying in a close position and partly in contact, see the photo. One of the ants bites into the right tibia I (fig. 5), its left legs I-III are lying on the mouth parts of the spider. A double dragline - which is running from the anterior spinnerets to the right side of the spider - indicates that the spider came into the resin alive. The presence of stellate hairs and air-bag pollen grains in the same amber layers as the animals makes it likely that the trio was blown to the place of their grave by the wind.
Ant-hunters as Zodariidae are usually "single fighters", some are feeding on ants exclusively. During a fast attack they bite an ant, retreat and wait for the poison to work until the ant is paralyzed. Undoubtedly ants are dangerous to spiders, especially because of their mouth parts and their great numbers. In the case mentioned above the socially living ants apparently were too many and thus successful; they captured and injured the spider before the trio was fixed at the resin. The spider was not a "beginner" in ant-hunting but an "old warrior": The left leg I is amputated before the end of the femur, the left leg II is amputated behind the patella, the patella itself is injured (split in the cross direction, fig. 6, photo) and "healed" - no fresh blood (haemolymph is coming out of the injured articles). Furthermore the right leg IV is squeezed at the end of the femur and nearly loose (fig. 7), and surely this leg did not function any more. The ends of this leg show no blood, either, therefore the violations happened some time before, and so the living spider was attacked by the ants but not transported as a dead body.

"Frozen behaviour" (2):

Photo 606

Material: A male of a fossil spider (Zodariidae) in Baltic amber, Zodariidae gen. indet. 4 and two ants (Formicidae), workers of *Lasius* sp. and *Liometopum ?oligocenicum* WHEELER (det. BARONI URBANI) in the same amber piece, F102/BB/AR/ZOD/CJW.

This is again a fight of an ant-hunting Zodariid spider - body length 4mm - with an ant, a worker of *Lasius* sp. - body length 4.6mm -, see the photo. The right legs of the spider are partly in contact with the left legs and the left body side of the ant. The heavy emul-

sion of the bodies of these animals indicates that they were captured in the resin alive. Both arthropods are apparently not injured. The presence of stellate hairs and pollen grains in the same amber layer as the animals indicates that the wind blew them to the resin during their fight. The numerous iridescent hairs of body and legs as well as the long opisthosoma of the spider indicate that this species is myrmecomorphic. The preserved behaviour (the fight) indicates furthermore a kind of aggressive mimicry (Peckhamian mimicry) of this species of spiders. The ant is not much larger than the spider, so this species of the genus *Lasius* may have been the (evolutionary) model of the Zodariid spider species.

TAXONOMY

A sufficient **diagnosis of the family Zodariidae** is wanted and depending e.g. on the subfamilies which are included, see JOCQUE (1991) and the cladogram. Behavioural characters are probably the best apomorphies: The digging behavior, building of an igloo-shaped retreat and probably ant-hunting behaviour. The labium is free, a particular leg autotomy and a capture web are absent (autotomy is probably present in the Homalonychinae between coxa and trochanter), leg IV is usually longer and thicker than I (in the Storenomorphinae this is reversed, in my opinion this is a reversal). - An inwards turned claw of the female pedipalpus is present in several other families, too, e.g. in Thomisidae. The **absence of a gnathocoxal serrula** seems to be the best diagnostic morphological character (such a serrula is also absent in the Gnaphosidae: Prodidominae and in some Desidae (at least in *Desis*)). According to PLATNICK (1986) and JOCQUE (1991) a medial insertian of the teeth of the paired tarsal claws (fig. 1) is absent in the Cyriocteinae but according to fig. 5 given by PLATNICK (1986) the teeth are in a medial position in *Cyrioctena spinifera* (NICOLET). In the Cryptothelinae and Homalonychinae the teeth of the paired tarsal claws are inserted ventrally (not medially), too. - Furthermore there are several "tendencies" which may characterize the Zodariidae in the wide sense: Tendencies to a long clypeus and high cephalic part, short chelicerae and fangs as well as the presence of sensory tarsal hairs and the reductions of median and posterior spinnerets - which may be absent; in adult males of the extinct genus *Anniculus* only the anterior spinnerets are present, in *Eocydrele* the median spinnerets are lost -, the colulus, the cheliceral teeth and the unpaired tarsal claw which may be strongly reduced in adult males (e.g. in the extinct genus *Anniculus* and in the subfamily Storenomorphinae) or completely absent (e.g. in the extant genus *Hermippus*

SIMON. Thus reductions (gnathocoxal serrula, colulus, spinnerets, the unpaired tarsal claw, cheliceral teeth, leg autotomy and a capture web) are the best characteristics of the Zodariidae. - At least some members of the advanced Zodariinae can survive amputations of legs, see above.

Subfamilies: Cydrelinae, Cyriocteinae, Cryptochelinae, Homalonychinae, Lachesinae JOCQUE 1991 (see the remark below), Storenomorphinae, Zodariinae (according to JOCQUE (1992) incl. Storeninae)); see the cladogram. The Zodariinae may not be a monophyletic taxon and a dorsal opisthosomal scutum may have evolved one or several times. See the paper on the Borboropactidae - the subfamily Succiniraptorinae - in this volume.

The **relationships** are unclear; as related to Zodariidae are discussed e.g. Borboropactidae n. fam., Chummidae JOCQUE 2001, the extinct Ephalmatoridae PETRUNKEVITCH 1950, Nicodamidae and Thomisidae/Stephanopinae, see the papers on Borboropactidae and Ephalmatoridae in this volume. - There is a superficial similarity to some taxa of the Corinnidae (body shape, ant mimicry, dorsal opisthosomal scutum); in the Corinnidae a gnathocoxal serrula is present, Corinnidae always have only two tarsal claws whose teeth are implanted ventrally, the clypeus is usually shorter, a leg autotomy is present between coxa and trochanter.

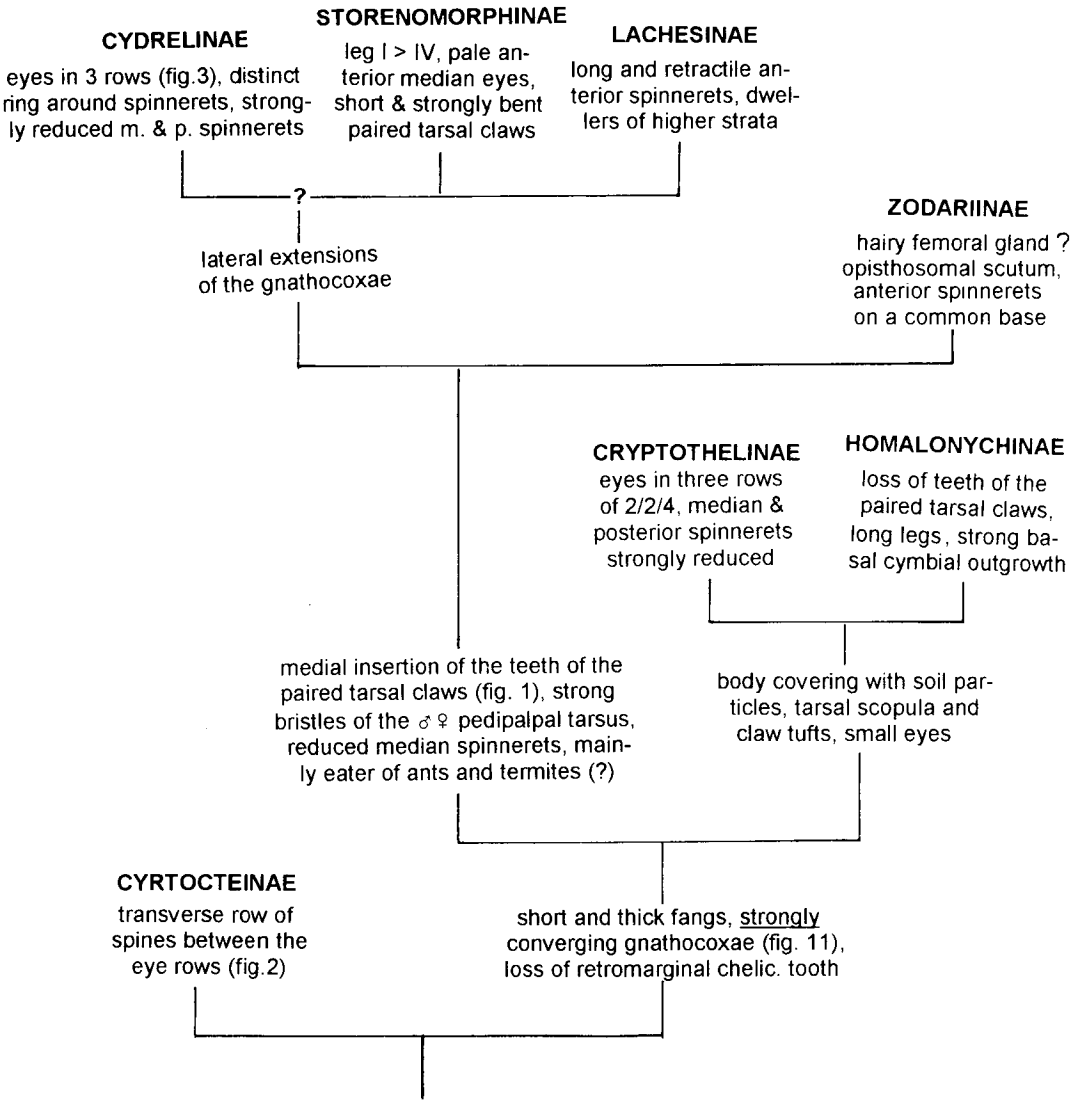
Distribution: Cosmopolitical, mainly in temperate climates.

REMARKS ON SELECTED SUBFAMILIES

Homalonychinae PETRUNKEVITCH 1923 and **Cryptothelinae** SIMON 1893

Diagnosis of the Homalonychinae (see the paper of ROTH (1984)): Paired tarsal claws toothless, tarsi with distinct claw tuft, unpaired tarsal claw distinctly reduced, cymbium with a strong basal outgrowth, body covered with soil particles (except in adult males).

Further characters (pers. obs.): Long-legged spiders. In material of *Homalonychus theologus* (♂) and *H. selenopoides* (♀) from Mexico (MNHN) I found the claw of the ♀-pedipalpus turned prolaterally, a gnathocoxal serrula absent, the spinnerets not redu-



Apomorphies: Loss of the gnathocoxal serrula, at most one retromarginal cheliceral tooth, high pars cephalica ("caput") with a long clypeus, medially turned claw of the female pedipalpus, digging behaviour (basicly at hot and sandy localities?), igloo-shaped retreat. -Tendencies to the presence of special tarsal sensory hairs, ventral tarsal spines and a sclerotized opisthosoma; to the reductions of the unpaired tarsal claw as well as median and posterior spinnerets; feeding on ants or termites.

Plesiomorphies: Ecribellate, several teeth of the cheliceral margins present, long fangs, not converging gnathocoxae, leg IV > I, metatarsal and tarsal trichobothria in several rows, no scopula or claw tuft, soft opisthosoma, no capture web, no leg autotomy.

Possible cladogram of the subfamilies of the Zodariidae

ced; there are numerous short spines dorsally on the opisthosoma and on all leg articles (♀).

Type genus of the Homalonychinae *Homalonychus* SIMON 1893, the only genus.

Type genus of the Cryptothelinae: *Cryptothele* L. KOCH 1872, the only genus.

Relationships of the Homalonychinae: As in the short-leged Cryptothelinae (fig. 3) the body bears short spines and is covered with soil particles, and the spiders are diggers at hot sandy localities; I regard Cryptothelinae and Homalonychinae as possible sister groups. Eyes, claw tuft, spinnerets and male pedipalpus (fig. 4) are different in the Cryptothelinae, see the cladogram. In contrast to the statement of ROTH (1984: 2) the paired tarsal claws bear long teeth in the Cryptothelinae. - In the "Katalog der Araneae" of ROEWER (1954) Homalonychidae is listed together with the Cithaeronidae in a superfamily of its own. LEHTINEN (1967: 294) regards Homalonychidae as a member of the Pisauroidea. In the catalogues of Araneae of PLATNICK Homalonychidae is listed in a position near the Cryptothelidae. - According to the absence of a gnathocoxal serrula, the strongly converging gnathocoxae, the short fang and the absence of retromarginal cheliceral teeth both subfamilies are taxa of th Zodariidae. According to the ventral implantation of the teeth of the paired tarsal claws as in the Cyrtocteinae the Cryptothelinae and the Homalonychinae are basal subfamilies of the Zodariidae, see the cladogram.

Distribution: Southern North America.

Key to the subfamilies of the Zodariidae:

1 Retromarginal cheliceral tooth present, long fangs, transverse row of spines between the eye rows (fig. 2). *Cyrioctea*. - S-America, S-Africa, Australia. . . . . CYRIOCTEINAE

- Retromarginal cheliceral tooth absent, fangs short, no such spines between the eye rows. 2

2(1) Paired tarsal claws toothless, body usually covered with soil particles, diggers in the sand as the Cryptothelinae. Very long-legged spiders, the cymbium bears a strong

basal outgrowth. - N-America. . . . . HOMALONYCHINAE

- Paired tarsal claws toothed. 3

3(2) Three eye rows of 2/2/4 (e.g. fig. 3). 4

- Two eye rows of 4/4 (e.g. fig. 10). 5

4(3) Body covered with short bristles and soil particles (fig. 3), low caput, male pedipalpus as in fig. 4. *Cryptothele*. - SE-Asia, Seychelles, Australian Region. . . . . CRYPTOTHELINAE

- Body not covered with short bristles and soil particles, high caput, male pedipalpus different. - Africa, Thailand. . . . . CYDRELINAE

5(3) Leg I - often distinctly - longer than IV and usually enlarged, at least anterior paired tarsal claws short and strongly bent. - Tropical and Southern Africa, Madagascar; fossil in Baltic amber (?) (*Zodariodamus*). . . . . STORENOMORPHINAE

- Leg I not longer than IV, not enlarged, paired tarsal claws not unusually short and strongly bent. 6

6(5) Anterior spinnerets long and slender, not standing on a common base. Dorsal opisthosomal scutum and femoral organ absent, chelicerae free. Dweller of higher strata. - Three genera in the Northern Hemisphere. . . . . LACHESINAE

- Anterior spinnerets short and thick, standing on a common base (except in *Heradida* and *Trygetus*). Dorsal opisthosomal scutum and femoral organ frequently present, chelicerae not seldom fused at their base. Ground dwellers. - Numerous genera, cosmopolitical, fossil in Baltic amber. . . . . ZODARIINAE

On the evolution of the Zodariidae and its subfamilies

If the first Zodariidae were hunters of ants (Formicidae) the Zodariidae cannot be older than Formicidae. The oldest (known) ant was recently reported from the Early Cretaceous Santana formation of Brazil, which is about 120 million years old, see BECHLY

(2001: Fig. 75) but the determination is unsure; BARONI URBANI (pers. commun.). Apparently ants were very rare or even absent during the Early and Middle Cretaceous. To my knowledge only two Cretaceous ?true ants were reported up to now (the determination is doubted by BARONI URBANI, pers. commun.), and their main radiation took place probably not before the Middle or even in the Late Cretaceous. In the Early Tertiary - the Baltic amber forest - Formicidae already were frequent and diverse, and Zodariidae were diverse, too; in this paper I report 11 genera from a single fossil (the Baltic amber) forest but most probably Early Tertiary Ant-hunters were even much more diverse at that time. The origin of ant-hunting (myrmecophagy) as well as ant mimicry (myrmecomorphy) of the Zodariidae happened probably after the evolution and after the first radiation of true and social living ants; there is no earlier report of frequent fossil ants than those of the Early Tertiary. Thus the main radiation of the Formicidae - as well as the co-evolution and the first main radiation of the Zodariidae - may have taken place probably late in the second half of the Cretaceous. We need a Late Cretaceous deposit to confirm this hypothesis.

THE FOSSIL TAXA IN BALTIC AMBER

Key to the genera in Baltic amber:

Remarks: In *Angusdarion*, *Eocydrele* and gen. indet. 3 the colour of body and legs is usually redbrown, in the other genera dark brown. A large dorsal opisthosomal scutum is present in *Anniculus*, *Eocydrele* and probably in gen. indet.4. I do not want to exclude that *Desultor depressus* PETRUNKEVITCH 1942 (♂, sub "Clubionidae Incertae Sedis") may be a member of the Zodariidae; according to PETRUNKEVITCH the body length is 5.2mm, an unpaired tarsal claw is absent and well developed claw tufts are present.

1 Leg I distinctly longer than IV; embolus long, in a circular position (figs. 14-16). Questionable Storenomorphinae. Photo 354 ..... *Zodariodamus*

- Leg I not longer than IV, usually shorter. Zodariinae. 2

2(1)Anterior median eyes distinctly the largest (fig.29-30),a strong opisthosomal scutum

is present (photos); ♂-pedipalpus (figs. 32-33): Cymbium and bulbus unusually large and flattened. Photos 348-349 ..... *Anniculus*

- Anterior median eyes not distinctly the largest (e.g. figs. 40, 49-51), opisthosomal scutum present (*Eocydrele*) or absent, ♂-pedipalpus different. 3

3(2) Dorsal opisthosomal scutum present (photo), prodistal femoral I-II bristle absent, prosomal colour usually redbrown, body length about 2.5mm. Photo 350 ..... *Eocydrele*

- Dorsal opisthosomal scutum absent (questionable in gen. indet. 4), prodistal femoral bristle present (as in fig. 11) or absent, prosomal colour usually dark brown, redbrown in *Angusdarion* and gen. indet. 3 4

4(3) Prodistal femoral I-II bristle absent, caput raised at least in *Adorator* (fig. 18). 5

- Prodistal femoral bristle I-II present (as in fig. 11), caput low. 6

5(4) Eyes of the posterior row distinctly larger than the eyes of the anterior row, their diameter 0.15mm (fig. 49), equal to the length of the clypeus. ..... Gen. indet. 1

- Eyes of the posterior row not distinctly larger than the anterior eyes, their diameter less than 0.1mm. Male pedipalpus: Figs. 21-23, epigyne fig. 24. Photos 346-347 ..... *Adorator*

6(5) Posterior eye row distinctly procurved (figs. 50-51), ♂ unknown. 7

- posterior eye row straight (fig. 40) or slightly recurved, ♀ unknown. 8

7(6) Eye position fig. 51, colour of prosoma and legs dark brown. ..... Gen. indet. 2

- Eye position fig. 52, colour of prosoma and legs redbrown. ..... Gen. indet. 3

8(6) Colour of prosoma and legs redbrown, tibial apophysis of the ♂-pedipalpus pointed, cymbial furrow absent (fig. 28). ..... *Angusdarion*

- Colour of prosoma and legs dark brown, tibia of the ♂-pedipalpus blunt and lying in a cymbial furrow (figs. 46-47) or male pedipalpus unknown. 9

9(8) Body length 2.9-3.4mm, posterior eye row straight (fig. 40), numerous leg bristles, ♂-pedipalpus (figs. 46-47): Tibial apophysis pointed, cymbial furrow present. Photos 352-353 ..... *Spinizodarion*

- Body length about 4mm, posterior eye row slightly recurved, few leg bristles, ♂-pedipalpus unknown. ..... Gen. indet. 4

The **genera are treated in the following order**: (1) Questionable Storenomorphinae: *Zodariodamus*, (2) Zodariinae: *Adorator, Angusdarion, Anniculus, Eocydrele, Spinizodarion*, gen. indet. 1, gen. indet. 2, gen. indet. 3, gen. indet. 4.

1. Storenomorphinae

Members of this subfamily have a tropical distribution, they are absent in Europe today and occur mainly in Africa and SE-Asia; their - questionable - presence in Baltic amber is a great surprise. In contrast to most taxa of other subfamilies of the Zodariidae - in which leg IV is longer and usually stronger than I - in the Storenomorphinae leg I is the longest and largest, the paired tarsal claws are short and strongly bent, the third claw may be reduced or even absent at least on tarsus III and IV, a tarsal scopula is present, an opisthosomal scutum is absent (in the Zodariinae it frequently is present), legs I and II often bear numerous bristles and the body is elongated, a claw tuft may be present and the trichobothria reduced, the posterior spinnerets are not reduced, the spiders are not ground-dwellers but living in higher strata, e.g. "possibly in holes in trunks", according to JOCQUE (1991: 99), but see the extinct genus *Zodariodamus* below.

Zodariodamus n. gen.

Diagnosis and description (♂; ♀ unknown): Opisthosomal scutum absent, spinnerets hidden, unpaired tarsal claws reduced, legs fairly long and robust, with numerous short bristles (fig. 12), a prodistal femoral bristle is present (fig. 11), prosoma long, caput fairly raised, eyes large and clypeus very long (figs. 9-10), posterior row recurved, anterior row strongly procurved in anterior view, posterior row much wider than the anterior row, anterior and posterior eyes widely spaced, the cymbium bears spines, bulbus (figs. 14-16) with a long conductor and a long embolus in a nearly circular position.

Type species: *Zodariodamus recurvatus* n. sp.

Relationships: According to the long leg I, the claw tufts and scopulae as well as the strongly curved paired tarsal claws I regard *Zodariodamus* with some hesitation as a member of the subfamily Storenomorphinae, but the leg spines III-IV are not reduced as in the extant members of this subfamily, see JOCQUE (1991: 98-99). - The long embo-

lus in a nearly circular position separates *Zodariodamus* from the other fossil genera in Baltic amber.

Distribution: Tertiary Baltic amber forest.

***Zodariodamus recurvatus* n. gen. n. sp.** (figs. 9-16) Photo 354

Material: Holotypus ♂ in Baltic amber, separated from a larger amber piece, coll. F. EICHMANN in Hannover, later on most probably kept in the Geol.-Palaeontol. Inst. of the University Hamburg.

Preservation and syninclusions: The spider is well preserved, the right tarsus II, the tip of the right tarsus IV and the left tibia IV are cut off, most parts of the opisthosoma and the ventral part of the prosoma are covered by a white emulsion. - Several stellate hairs are preserved in the same amber piece.

Diagnosis (♂; ♀ unknown): Pedipalpus as in the figs. 13-16.

Description (♂):
Measurements (in mm): Body length 5.5, prosoma: Length 3.0, width about 1.9, leg I: Femur 2.0, patella 0.7, tibia 1.9, metatarsus 1.65, tarsus 1.2, tibia II 1.5, tibia IV 1.5.
Colour: Prosoma and legs dark brown, opisthosoma light brown.
Prosoma about 1.8 times longer than wide, caput fairly raised, with a distinct thoracal fissure, cuticula distinctly scale-shaped, only few hairs; clypeus long. Eyes (figs. 9-10) large, median eyes close together, see above. Basal cheliceral articles large, mouth parts hidden. - Legs (fgs. 11-12) fairly long and robust, order I/IV/II/III, with numerous mainly short bristles, femur I 2 dorsally and 1 prodistally, patellar bristles I-II absent, patellae III-IV bear 1 dorsal, 1 retrolateral and 2 prolateral short bristles, tibia I with a short dorsal bristle in the middle, a pair of ventral-basal bristles and short apical bristles, tibia and metatarsus II both with 3 long ventral bristles and short apicals, tibia III (fig. 12) besides apicals with a long ventral-basal bristle and laterals. At least tarsus IV bears a short ventral bristle within the scopula. Paired tarsal claws strongly curved, unpaired claw reduced. - Opisthosoma oval, scutum absent, indistinct short dorsal hairs are present, the spinnerets are hidden. - Pedipalpus (figs. 13-16) with a strong and curved femur. A median apophysis is probably hidden.

Ecology: The numerous short leg bristles III-IV indicate that the spiders were ground dwellers and diggers.

Relationships: See above.

Distribution: Tertiary Baltic amber forest.

2. Zodariinae

Members of this subfamily are cosmopolitically distributed, in Europe, too. Zodariinae is the most "modern" subfamily and dominate the Zodariid Baltic amber fauna; see the genus *Zodariodamus* which I regard as a questional member of the subfamily Storenomorphinae. In the Zodariinae at least the male opisthosoma bears frequently a dorsal scutum. In the fossils I did not observe a femoral organ which is frequent in extant taxa.

Remark on taxonomy: The taxa of the Lachesaninae JOCQUE 1991 were regarded as members of the Zodariinae, too, by SIMON, and I do not want to exclude this combination: I found retractile anterior spinnerets - the main apomorphic/diagnostic character of the Lachesaninae - in fossil Zodariinae, in *Anniculus*, see below.

***Adorator* PETRUNKEVITCH 1942** (sub Spatiatoridae; see below)

Diagnosis: Prosoma long and caput raised (figs. 17-18), eyes small, numerous leg bristles, prodistal femoral I bristle absent, dorsal tibial IV bristles thin (fig. 20). ♂-pedipalpus (figs. 21-23): The tibia bears a long retrolateral and a short retroventral apophysis which lies in a furrow of the cymbium; median apophysis divided, conductor complicated, embolus long and in a prolateral position. Epigyne (fig. 24) with a median plate.

Remark: According to PETRUNKEVITCH (1942: 262) leg I is longer than IV but in my material leg IV is longer than I.

Type species: *Adorator brevipes* PETRUNKEVITCH 1942 = *Therea hispida* KOCH & BERENDT 1854 (**n. syn.**): *Adorator hispidus* (KOCH & BERENDT 1854) (**n. comb.**), see below.

Relationships: PETRUNKEVITCH regarded *Adorator* as a genus of the family Spatiatoridae but according to the presence of leg bristles and the absence of spatulate hairs of leg I, the position of the teeth of the paired tarsal claws, spines of the cymbium and a tibial apophysis of the male pedipalpus *Adorator* is not a member of the Spatiatoridae - see the paper on the superfamily Eresoidea in this volume - but a taxon of the RTA-clade and of the family Zodariidae. - See *Spinizodarion* n. gen. - In *Selamia* SIMON (extant, SW-Europe) - see JOCQUE & BOSSELAERS (2001) -, which may be most related, the tibial apophysis of the male pedipalpus lies in a furrow of the cymbium, too,

and the structures of the bulbus are similar, but a retrobasal paracymbium is present.

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

***Adorator hispidus* (KOCH & BERENDT 1854)** (sub *Therea hispida*) (**n. comb.**)

(figs. 5-8, 17-24) Photos 346-347

Therea hispida KOCH & BERENDT 1854: 76, fig. 70
Segestria cylindrica KOCH & BERENDT 1854 : 73, fig. 66 (**questionable n. syn.**)
Adorator brevipes PETRUNKEVITCH 1942: 261, figs. 95-100, 553 (**n. syn.**)
Eresus monachus KOCH & BERENDT 1854: 86, fig. 81 (**quest. n. syn.**)
Eresus curtipes KOCH & BERENDT 1854: 87, fig. 82 (**quest. n. syn.**)
?*Thereola hispida*: PETRUNKEVITCH 1958: 374

Material (in Baltic amber): *Therea hispida* KOCH & BERENDT, holotype ♂, Paläontol. Mus. Berlin (PMH UB); *Segestria cylindrica* KOCH & BERENDT 1854, holotype juv. ♀, PMHUB MB.A.144; *Eresus monachus* KOCH & BERENDT 1854, holotype ?ad. ♀, PMH UB MB.A.180; *Eresus curtipes* KOCH & BERENDT 1854, holotype juv. ♂, PMHUB; 1♂ sub *Clubiona* sp., PMHUB MB.A.142; 1♂ coll. BERENDT, PMHUB; 1♂ coll. HERRLING 1663, 3♂ PI Göttingen nos. 2670, 6593 and 15186; 1♂ PI Moscow no. 363/66; 2♂ coll. GLINK; 1♂ coll. ERNST in Skagen; 1♂ no K/AR/8 and 2♀ in amber from the Bitterfeld deposit, coll. M. KUTSCHER in Saßnitz; 18♂, 1♀, 2juv. F620/BB/AR/ZOD/CJW; 1♂ F619/CJW; 1♂ F621/CJW; 1 ♂ F623/CJW, 1♂ F661/BB/AR/ZOD/CJW; 1♀ F625/CJW; 1♂ in Ukrainean Rovno amber, Inst. Zool Kiew, no. UA1459, F184/BB/AR/ZOD/CJW.

Remarks: (1) The genus *Therea* KOCH & BERENDT 1854 (praeocc., = *Thereola* PETRUNKEVITCH 1955) was described originally as a genus of the family Dysderidae, see the paper on the Dysderidae in this volume; *hispidus* is not congeneric with the generotype. (2) As the first revising author I select *hispida* as the valid name of this species.

Diagnosis (see the diagnosis above): Dorsal bristles on tibia IV absent, only hairs are present (fig. 20) in contrast to tibia III (fig. 19). Leg IV the longest. Male pedipalpus figs. 21-23, 25, tip of the tibial apophysis convex. Female similar to the male, with prolateral bristles on the pedipalpal tarsus, epigyne (fig. 24) with a large median plate and a pair of depressions which may be filled with "plugs" in the specimen F626. Body length 4.5-4.8mm.

Relationships: See the key and above. The male of an undescribed species is kept in the CJW.

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

Angusdarion n. gen.

Diagnosis (♂; ♀ unknown): Prosoma long, eyes small, opisthosomal scutum absent, median spinnerets absent, numerous leg bristles present, male pedipalpus (figs. 26-28): Tibia with a very long retrolaral apophysis, median apophysis present, embolus unknown. Colour of prosoma and legs redbrown.

Type species: *Angusdarion humilis* n. sp., the only known species of the genus.

Relationships: In *Adorator* and *Spinizodarion* a cymbial furrow is present, in *Adorator* a prodistal femoral I bristle is absent and tibia IV bears dorsal hairs and not bristles.

Distribution: Tertiary Baltic amber forest.

***Angusdarion humilis* n. gen. n. sp.** (figs. 26-28)

Material: Holotypus ♂ in Baltic amber, F626/BB/AR/ZOD/CJW.

Preservation and syninclusions: The spider is completely and well preserved in an amber piece which was heated; most parts of the opisthosoma are covered by a white emulsion; no stellate hairs.

Diagnosis (♂; ♀ unknown): Pedipalpus: Figs. 26-28.

Description (♂):
Measurements (in mm): Body length 3.9, prosoma: Length 1.7, width 1.2, leg I: Femur 1.1, patella 0.5, tibia 1.2, metatarsus 1.1, tarsus 0.7, tibia II 1.1, tibia III 0.8, femur IV 1.1.
Colour: Prosoma and legs redbrown, opisthosoma yellow.
Prosoma 1.4 times longer than wide, covered with few hairs, caput low, thoracal fissure distinct. Eyes small, partly hidden, posterior row straight, clypeus short. Chelicerae robust, fangs short, gnathocoxae strongly convex, labium free, slightly longer than wide. - Legs fairly robust, order IV/I/II/III, IV only slightly longer than I, hairs indistinct, bristles numerous, similar to *Spinizodarion ananulum*, thin on I-II, thick on III-IV, prodistal femoral I-II bristle present. - Opisthosoma ovally, covered with very short hairs, dorsal scutum absent, epigastral scutum present, spinnerets hidden. - Pedipalpus: See above.

Relationships: See above.
Distribution: Tertiary Baltic amber forest.

Anniculus PETRUNKEVITCH 1942

Questionable synonymy: *Dielacata* MENGE in KOCH & BERENDT 1854 - type species *D. superba* MENGE - may be an older synonym of *Anniculus*, the type material is most probably lost. MENGE characterized *Dielacata* very short "with two spinnerets only", very similar to *Anniculus*, *Eocydrele* PETRUNKEVITCH and *Ablator* (Corinnidae), too. Therefore I regard *Dielacata* as a nomen dubium.

Diagnosis: The anterior median eyes are distinctly the largest eyes (figs. 29-30), numerous leg bristles and a large dorsal opisthosomal scutum are present, the clypeus is very long (fig. 29). Spinnerets: Adult males have probably only two (the anteriors), females and juveniles probably three pairs, the anterior spinnerets are retractile (observable e.g. in the male F605, photo). Unpaired tarsal claws strongly reduced in adult males. Epigyne a large grove which is three times wider than long. ♂-pedipalpus (figs. 32-34) large, patella with a retrobasal apophysis, tibia very small and without an apophysis, cymbium large and scopulate, long and flat, bulbus flat, embolus long and thin, conductor and median apophysis long, a large tegular apophysis is present, too. PETRUNKEVITCH (1958: Fig. 14, see fig. 34) mistook a bubble as the tip of the cymbium.

Type species (the only known species): *Anniculus balticus* PETRUNKEVITCH 1942.

The **relationships** are unsure. In *Diores* (extant, South Africa) the pedipalpus is a bit similar, patellar pedipalpal apophyses may be present, too, see Jocque (1991: 133).

Distribution: Tertiary Baltic amber forest.

Anniculus balticus PETRUNKEVITCH 1942 (figs. 29-34) Photos 348-349, 632

Material: 6♂ and juveniles CJW, e.g. F602, 604, 605, 1 subad. ♂ F606, 3 juv. ♂ F603, F607, F608; 3♂ Geol.-Paläontol. Inst. Göttingen nos. 6500, 6547 and 14959; 1♂ coll. F. EICHMANN, 1♂, "androtype" of *balticus* and 1♀ Paläont. Inst. Berlin; 1♂ coll. GLINK; 1 ♂ coll. LIEDTKE no. 438, 1♂ coll. W. LUDWIG.

Diagnosis: See above. Leg IV is the longest. Body length ♂ 4.3-6.3mm, ♀ 5.5mm.

Remarks: (1) Just in front of the chelicerae of a juv. male (F608) a juv. Mimetidae indet. is preserved which may have been the prey of the spider. (2) Remains of prosoma and

legs of a male are preserved in an amber piece of the Paläont. Inst. Göttingen, no. 14559. An ant bites in the posterior part of the loose prosoma which is 2.5mm long.

Distribution: Tertiary Baltic amber forest.

Eocydrele PETRUNKEVITCH 1958

Diagnosis (♂; ♀ unknown): A large dorsal opisthosomal scutum is present, eyes (fig. 35) large, posterior row procurved, numerous incised leg hairs, a short dorsal-basal and a prodistal femoral I-II bristle are present, femoral organ probably absent, colour of prosoma and legs usually redbrown as in gen. indet. 3; male pedipalpus (figs. 37-38): Patella short, tibial apophysis present (in contrast to the statement of PETRUNKEVITCH (1958: 121), cymbium with a retrobasal paracymbium and two apical spines, median apophysis large, conductor unknown, embolus long, thin and in a perolateral position (its tip was mistaken by PETRUNKEVITCH (1958: Fig. 22) as the conductor.

Type species: *Eocydrele mortua* PETRUNKEVITCH 1958, the only known species.

Relationships: PETRUNKEVITCH (1958: 120) regarded *Eocydrele* with some doubt as a member of the subfamily Cydrelinae but according to the eye position as well as leg bristles and hairs *Eocydrele* is a member of the Zodariinae. In *Selamia* SIMON (extant, SW-Europe), which may be most related, a paracymbium is present, too, but the eye position is quite different, a dorsal opisthosomal scutum is absent, there are numerous leg bristles and the spiders are much larger, see JOCQUE & BOSSELAERS (2001).

Distribution: Tertiary Baltic amber forest incl. the Bitterfeld deposit

Eocydrele mortua PETRUNKEVITCH 1958 (figs. 36-38) Photos 350-351

Material: 5♂ in Baltic amber, F510 to F514/BB/AR/ZOD/CJW; 1♂ from the Bitterfeld deposit, coll. M. KUTSCHER no. K/AR/9.

Diagnosis: See above.

Remarks: (1) The male from the coll. KUTSCHER is preserved in contact with an ant (Formicidae) which probably was a prey of the spider; this male has an amputated leg III behind the coxa; (2) in the male F611/CJW the right leg IV is amputated and appa-

rently the stump has healed at the end of the tibia (fig. 36).

Measurements (♂ in mm): Body length about 2.4, prosoma: Length 1.2, width 1.05, tibia I 0.7, tibia IV 1.0. - Patella and tibia IV: Fig. 36, pedipalpus figs. 37-38.

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

***Spinizodarion* n. gen.**

Diagnosis (♂; ♀ unknown): Opisthosomal scutum absent, no ring around the spinnerets, legs with few incised hairs only and numerous long bristles (figs. 41-42), prodistal femoral bristle present, prosoma (fig. 39, photo) long, its profile strongly convex, eyes (figs. 39-40) small, anterior median eyes smallest, posterior row straight to slightly procurved, three pairs of large spinnerets, figs. 43-45. Chelicerae free, chilum absent, cymbium (figs. 46-47) with bristles and a retrolateral furrow in which the tibial apophysis is placed.

Relationships: A member of the Zodariinae, see the key.

Type species: *Spinizodarion ananulum* n. sp., the only known species of the genus.

Distribution: Tertiary Baltic amber forest.

***Spinizodarion ananulum* n. gen. n. sp**. (figs. 39-48) Photos 352-353

Material (in Baltic amber): 5♂ in Baltic amber, holotypus and a separated amber piece F616/BB/AR/ZOD/CJW, paratypes: F617, F629, F630, 1♂ Paläont. Inst. Univ. Göttingen no. 6339.

Preservation and syninclusions: Holotype: The spider is well and nearly completely preserved at the margin of a larger yellow amber piece, the tips of the right tarsi III and IV and the left tarsi II and III are cut off, the right tarsus I is amputated and apparently healed, some white emulsion is preserved on the ventral body part, two bubbles are preserved beneath the sternum. - Parts of three insect's legs and numerous stellate hairs are present in the same amber piece. - *Paratype Göttingen*: The spider is well and completely preserved in an amber piece which was heated. - A stellate hair and parts of two insect's antennae are also preserved. - The paratype F617 is well and nearly com-

pletely preserved in an amber piece which was heated. The right leg I is amputated behind the tibia and apparently healed. - Few stellate hairs, a mite and tiny detritus particles are preserved in the same amber piece. - The paratypes F629 and F630 are completely and well preserved, two tiny Diptera, a piece of wood, an excrement ballet, threads (see below) and few stellate hairs are preserved with F630.

Diagnosis (♂; ♀ unknown): Tibia of the pedipalpus (fig. 46-47) with a long and straight apophysis which is excavated apically.

Description (♂):
Measuremets (in mm): Body length 2.9-3.4, prosoma: Length 1.5-1.7, width 1.05-1.2, leg I: Femur 0.85, patella 0.35, tibia 0.77, metatarsus 0.75, tibia II 0.7, tibia III 0.6, tibia IV 0.8.
Colour of prosoma and legs medium to dark brown, opisthosoma light brown.
Prosoma (figs. 39-40): Profile strongly convex, with few long hairs, 1.4-1.5 times longer than wide, with a short thoracal fissure. Eyes (figs. 39-40) small, anterior median eyes smallest, prosterior row straight to slightly procurved. Chelicerae fairly small, fangs short and thick, gnathocoxae strongly converging, labium wider than long, free, sternum longer than wide. - Legs fairly slender, order IV/I/II/III, weak false claw tufts are present, scopulae and metatarsal preening hairs absent; numerous leg bristles (fig. 41-42), long ventral bristles, stout dorsal bristles on patella and tibia III-IV, the femora I-II bear 2 dorsal and a prodistal bristle(s), tibia and metatarsus I bear long and thin bristles, ventral pairs and few dorsally, the patellae I-II are bristle-less. Paired tarsal claws with long teeth, anterior unpaired tarsal claw moderately curved. - Opisthosoma oval, soft, with indistinct hairs; three pairs of large spinnerets (figs. 43-45), the anterior pair on a common podest and longer than the posterior spinnerets, both pairs two-segmented. With the male F630 a pair of drag lines is preserved, fig. 45. - Pedipalpus (figs. 46-48): Tibia longer than the patella, with a long and straight retrolateral apophysis which is placed in a furrow of the cymbium and is excavated apically; cymbium with few long dorsal bristles, median apophysis large, plate-shaped and straight, embolus in a long half-circle.

Rlationships: See above.

Ecology and behaviour: According to the numerous stout dorsal tibial and patellar bristles on the legs III and IV (figs. 41-42) the spiders were diggers in the ground; also their relatively rareness is a hint that the spiders did not live in higher strata.

Distribution: Tertiary Baltic amber forest.

Gen. indet. 1 (fig. 49)

Material: 1 ?adult ♀ in Baltic amber, F618/BB/AR/ZOD/CJW.

Preservation: The spider is only fairly well preserved, parts of body and legs are hidden by a white emulsion, bubbles and fissures. The left leg I is amputated behind the tibia.

Description (♀):
Measurements (in mm): Body length 5.0, prosoma: Length 2.2, width about 1.7, tibia + patella I 1.45. - Unpaired tarsal claw present, anterior spinnerets stout, posterior spinnerets large, legs stout, IV longest, numerous leg bristles, prodistal femoral I-II bristles absent, opisthosomal scutum absent. Eyes as in fig. 49, posterior row strongly procurved, larger than the anterior eyes, prosomal profile distinctly convex, length of the clypeus about two diameters of the anterior median eyes, colour of prosoma and legs dark brown.

The **relationships** are unknown; the posterior eyes are larger than in the other fossil taxa in Baltic amber.

Distribution: Tertiary Baltic amber forest.

Gen. indet. 2 (fig. 50) Photo 633

Material: 1 ?adult ♀ in Baltic amber, F187/BB/AR/ZOD/CJW.

Preservation and syninclusions: The amber piece is 9cm long and was heated. The spider is fairly well preserved, placed on an amber layer and partly covered by a white emulsion. The right leg I is amputated behind the tibia. The spider is holding and biting an ant (Formicidae), a second ant is placed directly beneath the mouth parts and a third 2mm in front of the spider. This ant is dissected and has apparently been a prey of the spider as the other ant, too, which all are about 1.8mm long and preserved in the same amber layer as the spider. The spider's opisthosoma and some parts of the ant in front of the spider's chelicerae are covered by a weak white emulsion. - Also preserved is a juv. and 2.6mm long spider indet. (?Agelenidae, ?Pisauridae), some Diptera and numerous stellate hairs.

Description of the spider:
Measurements (in mm): Body length 3.5, prosoma length about 1.7. Most tarsal claws are hidden, an unpaired claw may be present, large posterior spinnerets are present, leg IV is the longest, the legs are stout and bear numerous bristles incl. a prodistal femoral I bristle. Prosoma dark brown, with long hairs, nearly wide as long, profile fairly convex, clypeus short, not longer than 1 1/2 diameters of the anterior median eyes. Eyes as in fig. 50, small, field wide, the posterior row distinctly procurved, anterior median eyes the smallest. Opisthosoma oval, covered with long hairs.

The **relationships** (see the key) are unknown; the eye field is wider than in most of the other fossils in Baltic amber. In gen. indet. 3 the position of the posterior eye row is similar but the length of the clypeus is 3 times the anterior median eyes and there are fewer leg bristles.

Ecology and behaviour: Most probably the spider has been feeding on all the three ants at the same time and has left one of them only within the resin.

Distribution: Tertiary Baltic amber forest.

Gen. indet. 3 (fig. 51) Photos 355, 634

Material (in Baltic amber): 1 juv. ♂, F615/BB/AR/ZOD/CJW; 1 ?ad. ♀ coll. F. EICHMANN.

Preservation and syninclusions: (a) F615: The spider is well and completely preserved, ventrally it is partly hidden by a white emulsion and a larger bubble; few stellate hairs. - (b) 1 juv. coll. F. EICHMANN: The spider is well and completely preserved, the right ventral side is partly covered by a white emulsion. - In front of the spider and partly in contact with it an ant is preserved which most probably was the prey of the spider. The ant is 2mm long, hold by the spider's left legs I and II and is not injured.

Description (♀):
Measurements (in mm): Body length 2.5-2.6; F615: Prosomal length 1.45, width 1.0, leg I: Tibia 0.65, metatarsus 0.6, tarsus 0.57. - Colour of prosoma and legs red brown. Legs fairly slender, long ventral tibial IV bristles present in the juv.♂ but absent in the ♀. Unpaired tarsal claws strongly reduced or absent, scopulae and claw tufts absent, metatarsal preening hairs present, nunmerous short leg bristles present incl. a prodistal bristle on femur I but no ventral tarsal bristles. Opisthosomal scutum absent but opisthosoma dorsally probally hardened in the juv. male. Posterior spinnerets most probably absent. Prosoma 1.45 times longer than wide, clypeus as long as 3 diameters of the anterior median eyes, basal articles stout. Eyes (fig. 51) small, widely spaced, both rows distinctly procurved.

Relationships: See gen. indet. 2.

Distribution: Tertiary Baltic amber forest.

Gen. indet. 4 Photo 606

Material: 1♂ in Baltic amber, F102/BB/AR/ZOD/CJW.

Preservation and syninclusions: The spider is fairly well and probably completely preserved in a larger amber pieces of 5x3.2x0.9cm. Some thin threads are preserved e.g. between the spider and an ant's worker (Formicidae: *Lasius* sp.). The ventral side and some other parts of the spider are thickly covered by a white emulsion. - Also preserved are two Formicidae (C. BARONI URBANI det.), the worker of a *Lasius* sp., body length 4.6mm, which is ventrally and partly dorsally covered by a white emulsion, and the worker of a *Liometopum ?oligocenicum* WHEELER, body length 2.9mm, some Diptera, Acari and tiny amber splinter, detritus particles, excrement ballets, remains of some arthropods as the chela of a pseudoscorpion and Collembola, stellate hairs and pollen grains, air bags, too.

Description (♂):
Measurements (in mm): Body length 4.0, prosomal length 1.6, width unknown, most probably nearly the same, femur I at least 1.6.
Unpaired tarsal claw probably present, posterior spinnerets present, opisthosomal scutum probably absent, legs with few short bristles, the large leg IV is probably the longest leg, prodistal femoral I bristle present, metatarsal IV preening hairs present, prosoma nearly as long as wide, dark brown, eye field wide, eyes fairly large, posterior row slightly recurved, posterior median eyes probably oval, separated by less of their diameter, anterior and posterior lateral eyes separated by about their diameter, opisthosoma 1.7 times longer than wide, covered with iridescent hairs, pedipalpi hidden.

Relationships: See the key.

Distribution: Tertiary Baltic amber forest.

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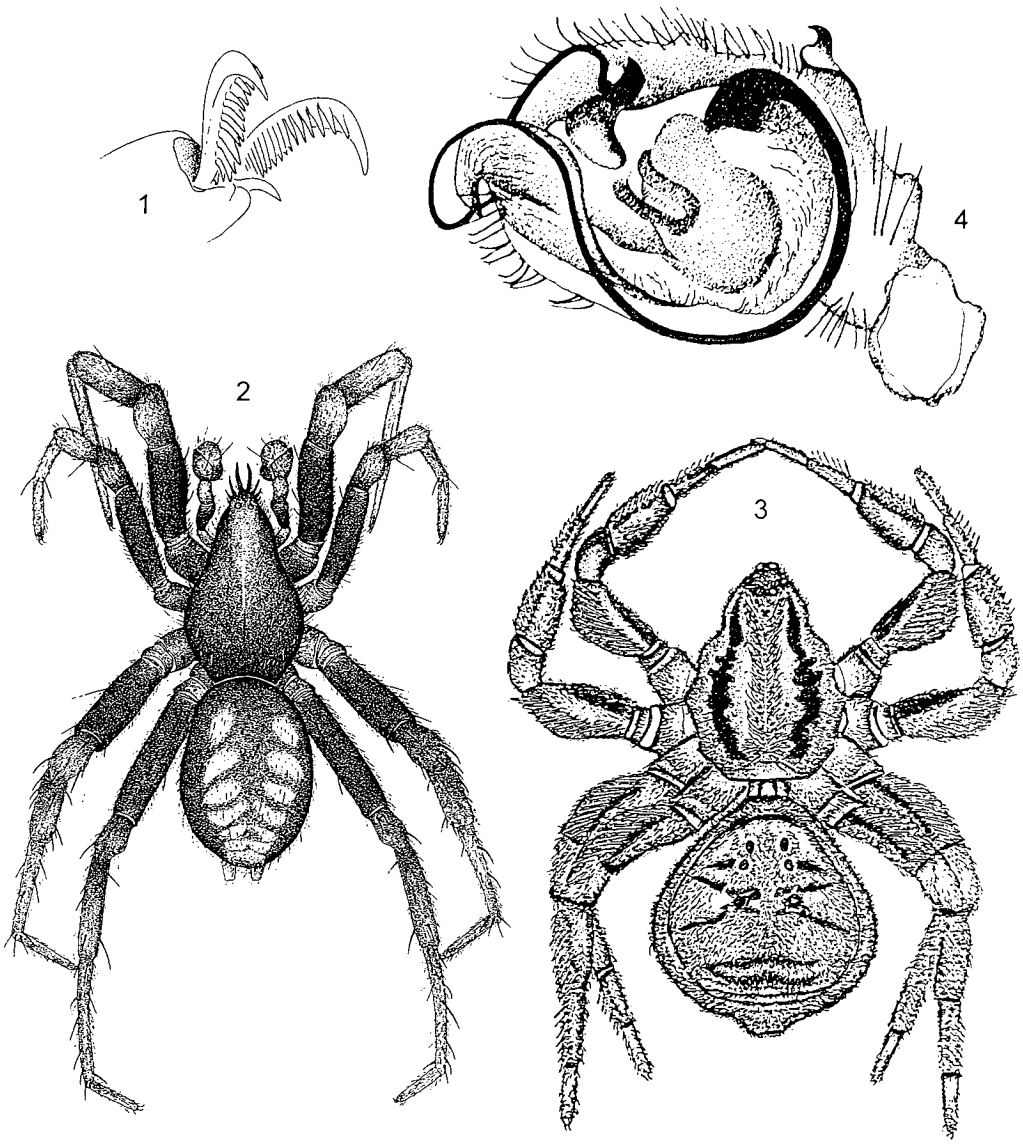
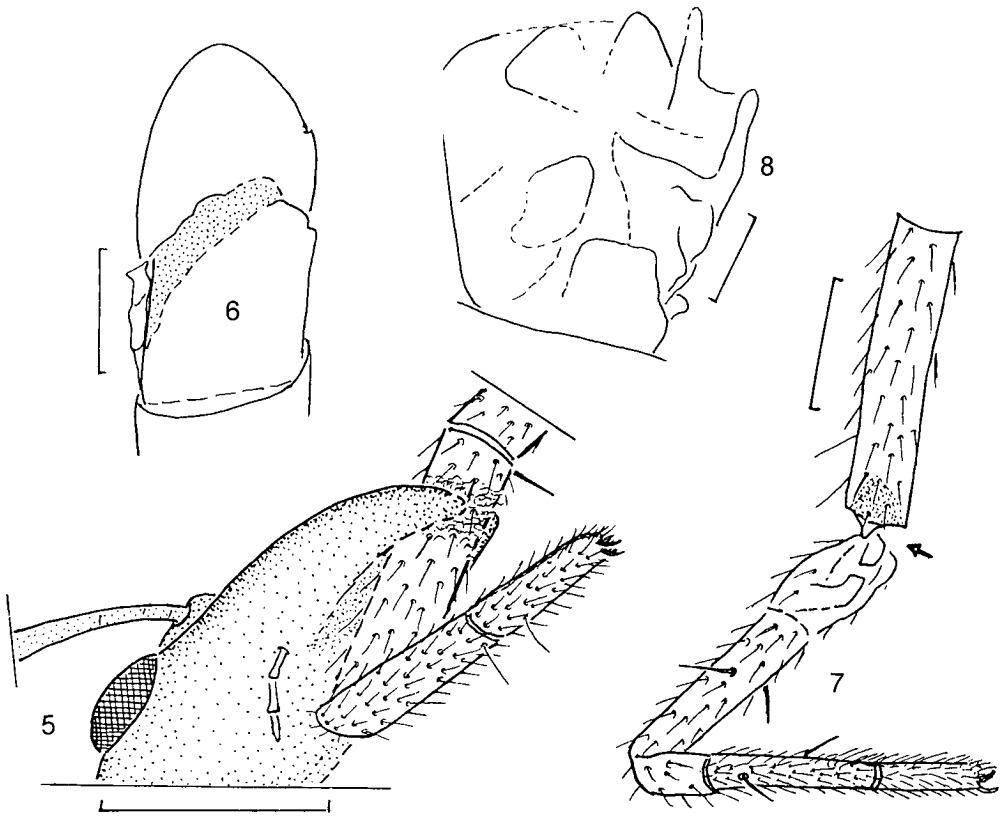


Fig. 1) Zodariidae sp., tarsal claws with the medially inserted teeth of the paired claws. Taken from DIPPENAAR-SCHOEMAN & JOCQUE (1997: Fig. 129c);

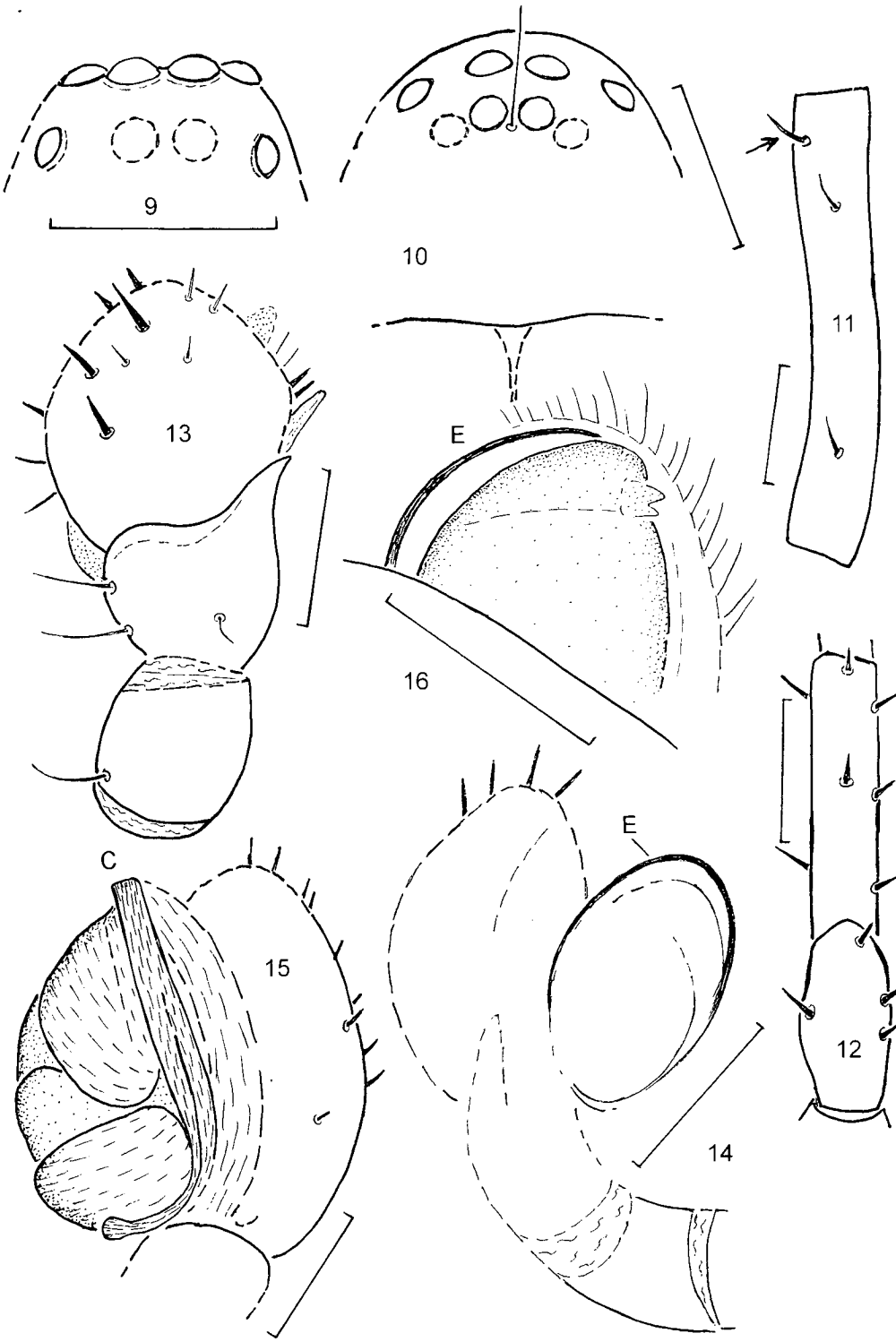
fig. 2) *Cyrioctea* sp., ♂, body, dorsal aspect. Taken from DIPPENAAR-SCHOEMAN & JOCQUE (1997: Fig. 129a);

figs. 3-4: *Cryptothele alluaudi* SIMON 1893; 3) body of the female, dorsal aspect, 4) l. ♂-pedipalpus, ventral aspect. Taken from BENOIT (1978: Figs. 2 and 3c);



figs. 5-8: Frozen behaviour" with the ant-hunter *Adorator hispidus* (KOCH & BERENDT 1854) and ants, ♂ (F184/CJW); 5) the ant - Formicidae: Dolichoderinae: *Liometopum goepperti* (MAYR) - worker's attack: The ant (see the dotted head) bites in the base of the right first tibia of the spider; 6) injured and "healed" left patella II dorsally (compare the photo). Parts of the cuticula are retrolateraly slihgtly standing out. The leg is amputated behind the patella; 7) r. leg IV which has been dissected and nearly amputated between the femur and the patella (arrow), most probably by the left ant in the photo. Because of the absence of haemolymph (blood) this wound should be older; 8) cuticula of the r. coxa II, damaged probably by bites of one of the attacking ants (hairs not drawn); M = 0.5mm in figs. 5 and 7, 0.2 in figs. 6 and 8;

figs. 9-16: *Zodariodamus recurvatus* n. gen. n. sp., ♂; 9) eyes, dorsal aspect; 10) prosoma, frontal aspect; 11) r. femur I, dorsal aspect. The arrow indicates to the prodistal bristle; 12) l. patella and tibia III, dorsal aspect; 13) r. pedipalpus, dorsal aspect (cymbium more basally) (only few hairs are drawn); 14) outline of the right pedipalpus with the bulbus expanded, retrolateral aspect (most structures are hidden); 15) r. pedipalpus, proventral-basal aspect; 16) distal part of the l. pedipalpus, ventral aspect; C = conductor, E = embolus; M = 0.5;


9
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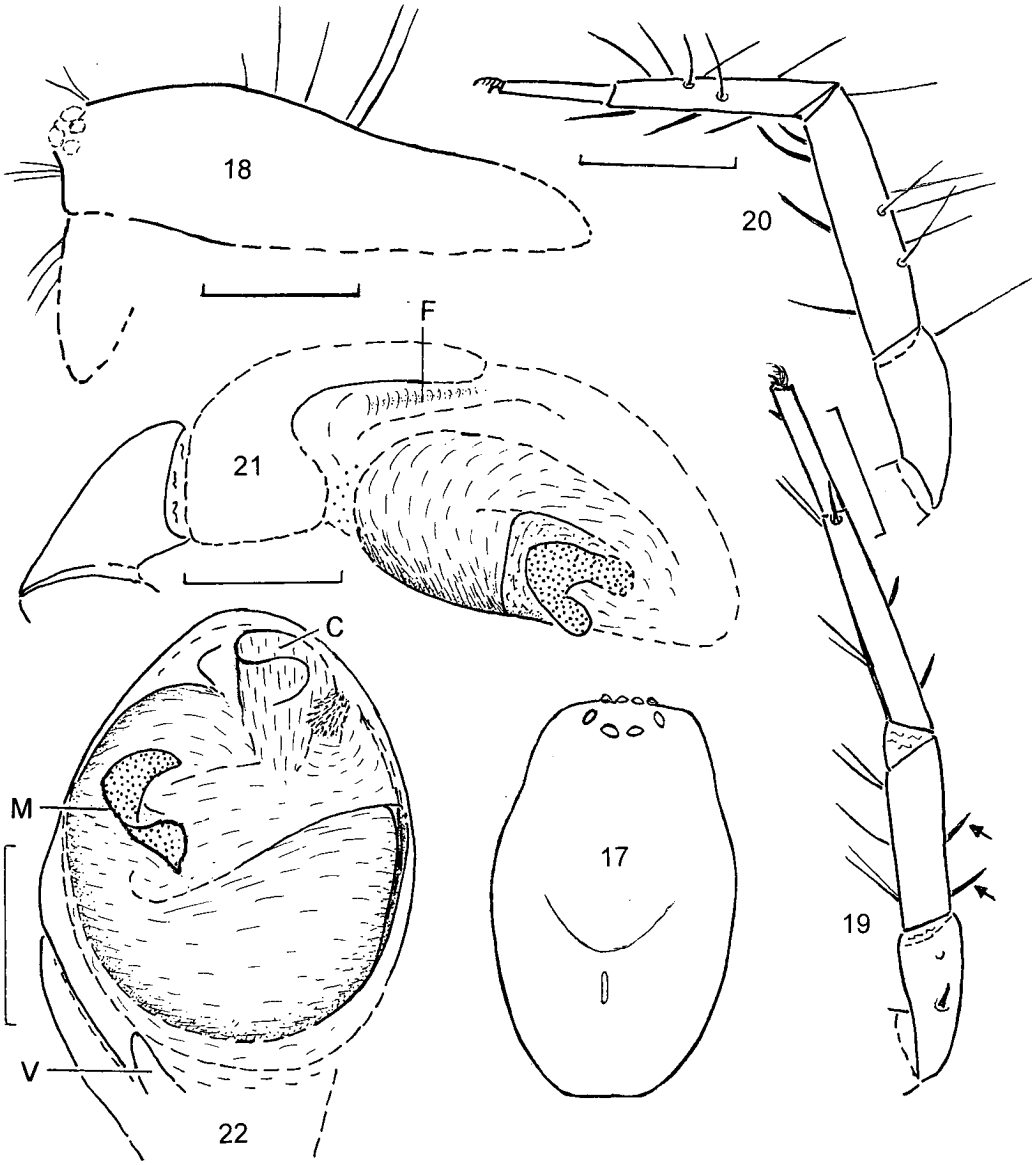


figs. 17-24: Adorator hispidus (KOCH & BERENDT 1854); 17-23) ♂; 17) prosoma, dorsal aspect, taken from PETRUNKEVITCH (1942: Fig. 95, sub *Adorator brevipes*), no M. Remark: In contrast to this figure the shape of the posterior median eyes is really nearly circular and not oval; 18) ♂ F623/CJW, prosoma, lateral aspect (only few hairs are drawn); 19) holotype, r. leg III, retrolateral aspect. Note the strong dorsal tibial bristles (arrows) and the short ventral tarsal bristle; 20) holotypus, r. leg IV, retrolateral aspect; 21) holotypus, r. pedipalpus, retrolateral aspect; 22) ♂ F623/CJW, r. pedipalpus, ventral aspect, 23) ♂ F623/CJW, r. pedipalpus, prolateral aspect; 24) ♀ F625/CJW, epigyne with questionable "plugs" (dotted) on the paired depressions; C = conductor, E = embolus, F = cymbial furrow, H = "hairy" structure, M = median apophysis; M = 0.2 in figs. 21-23, 0.4 in fig. 24, 0.5 in the remaining figs.;

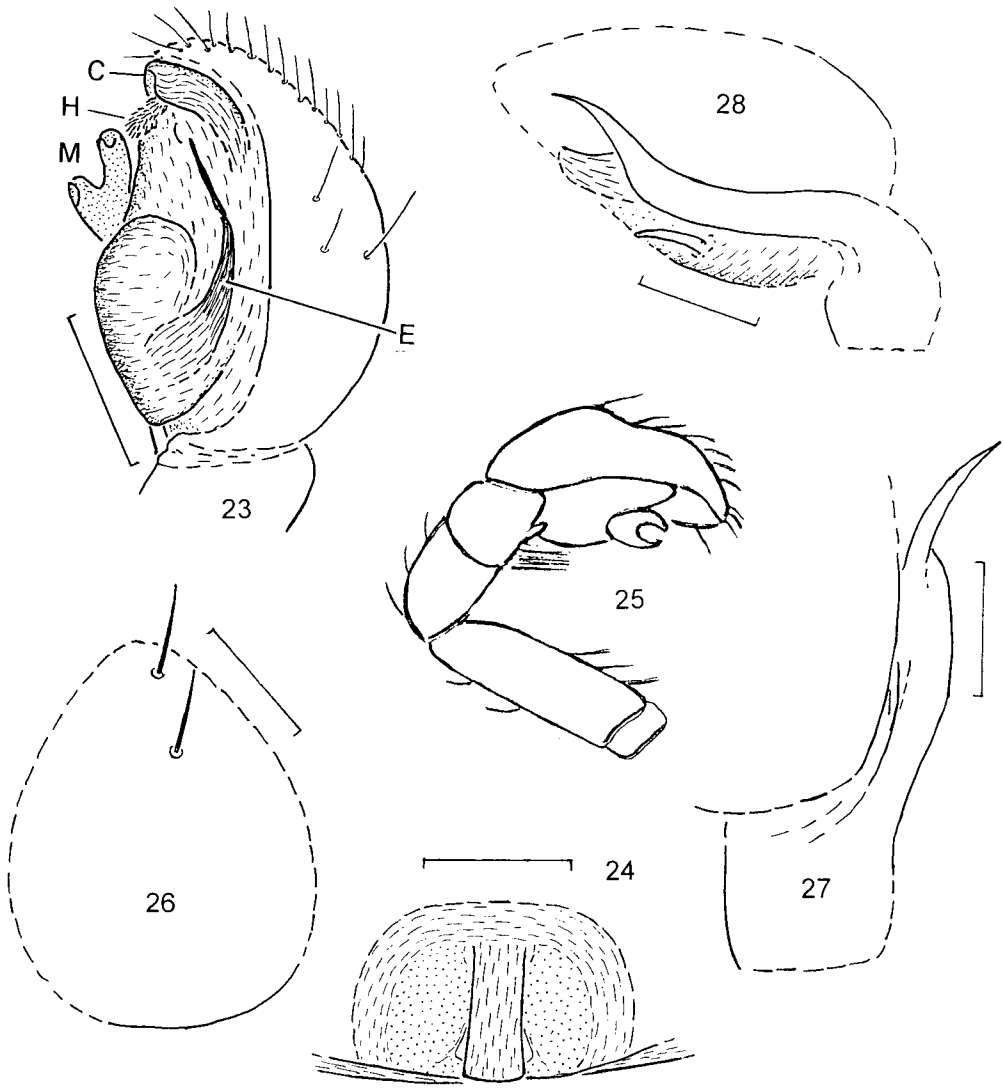
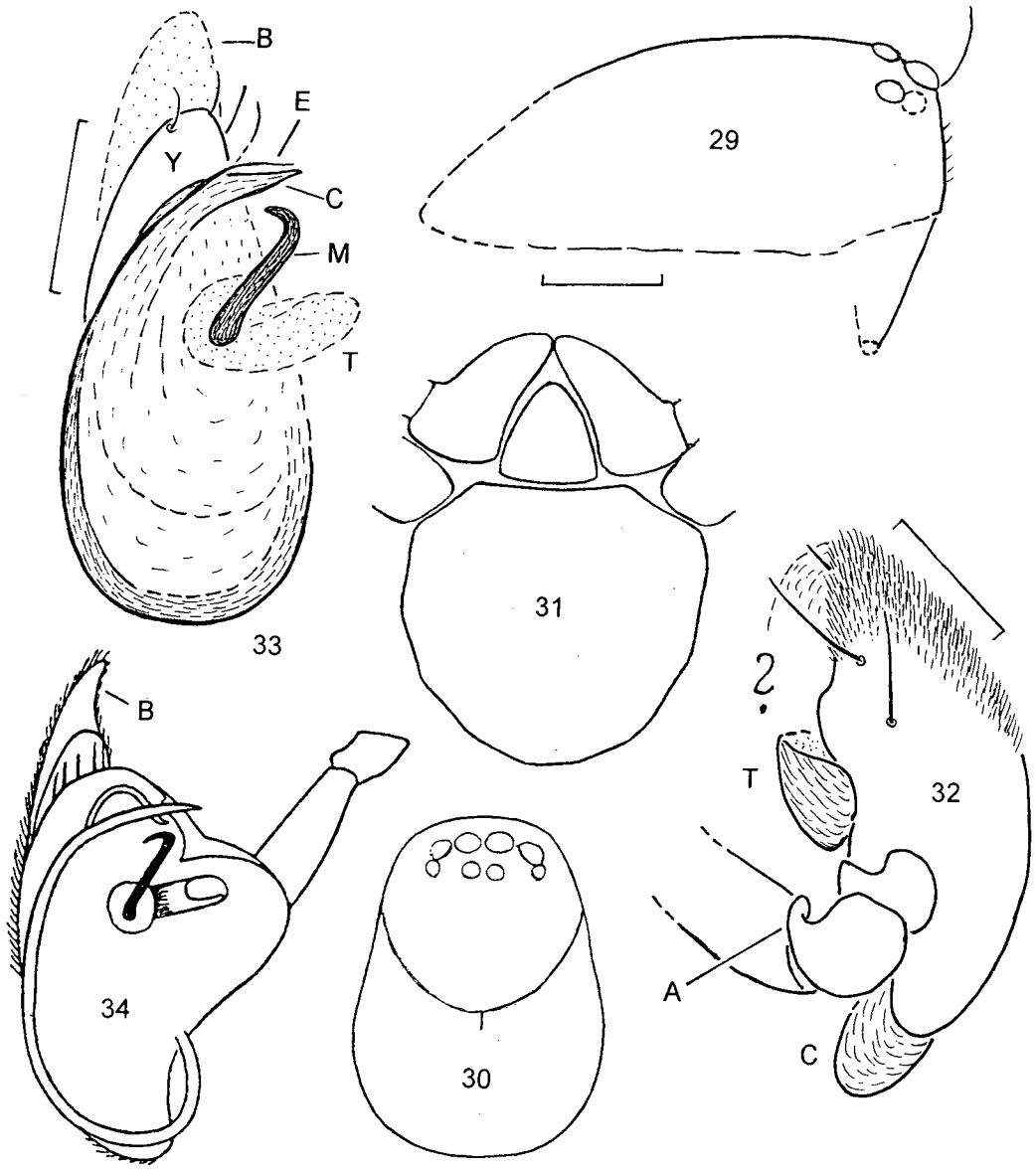
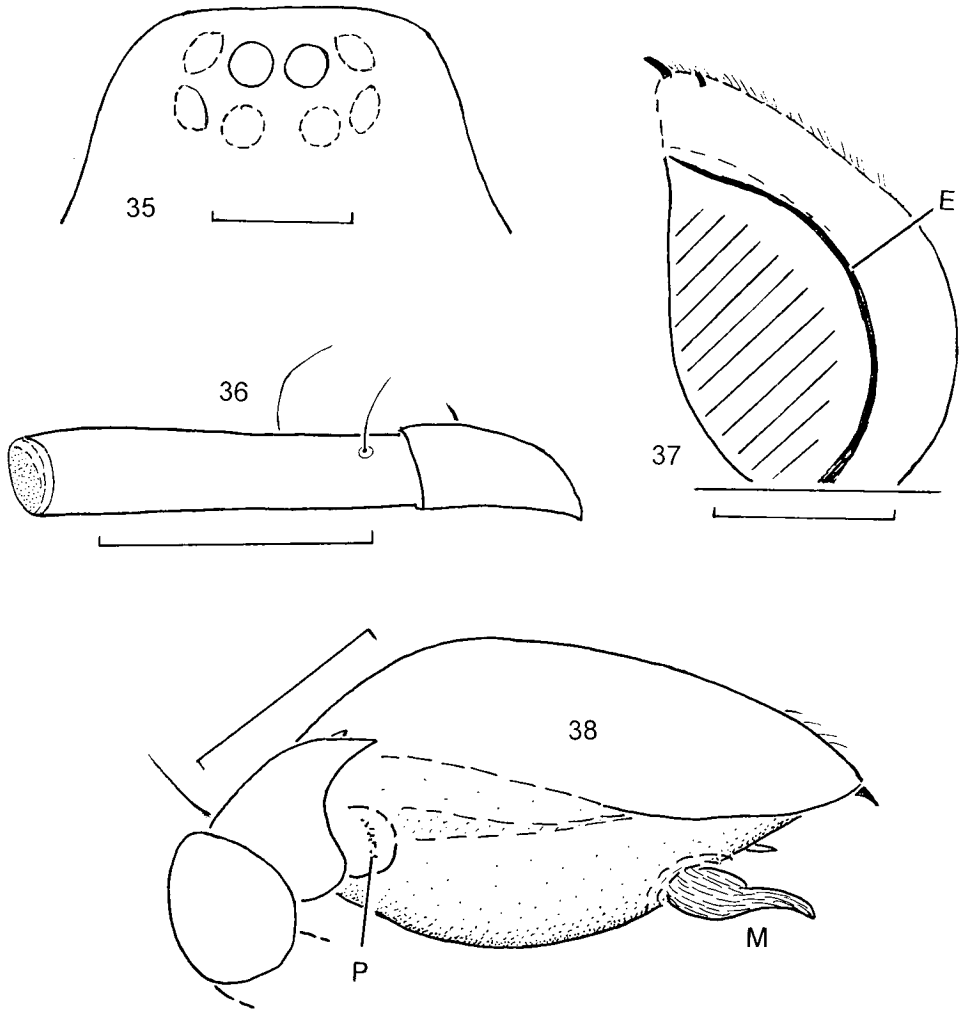


fig. 25) *Adorator samlandica* PETRUNKEVITCH 1942, ♂, r. pedipalpus, retrolateral aspect; taken from PETRUNKEVITCH (1942: fig. 101), no M;

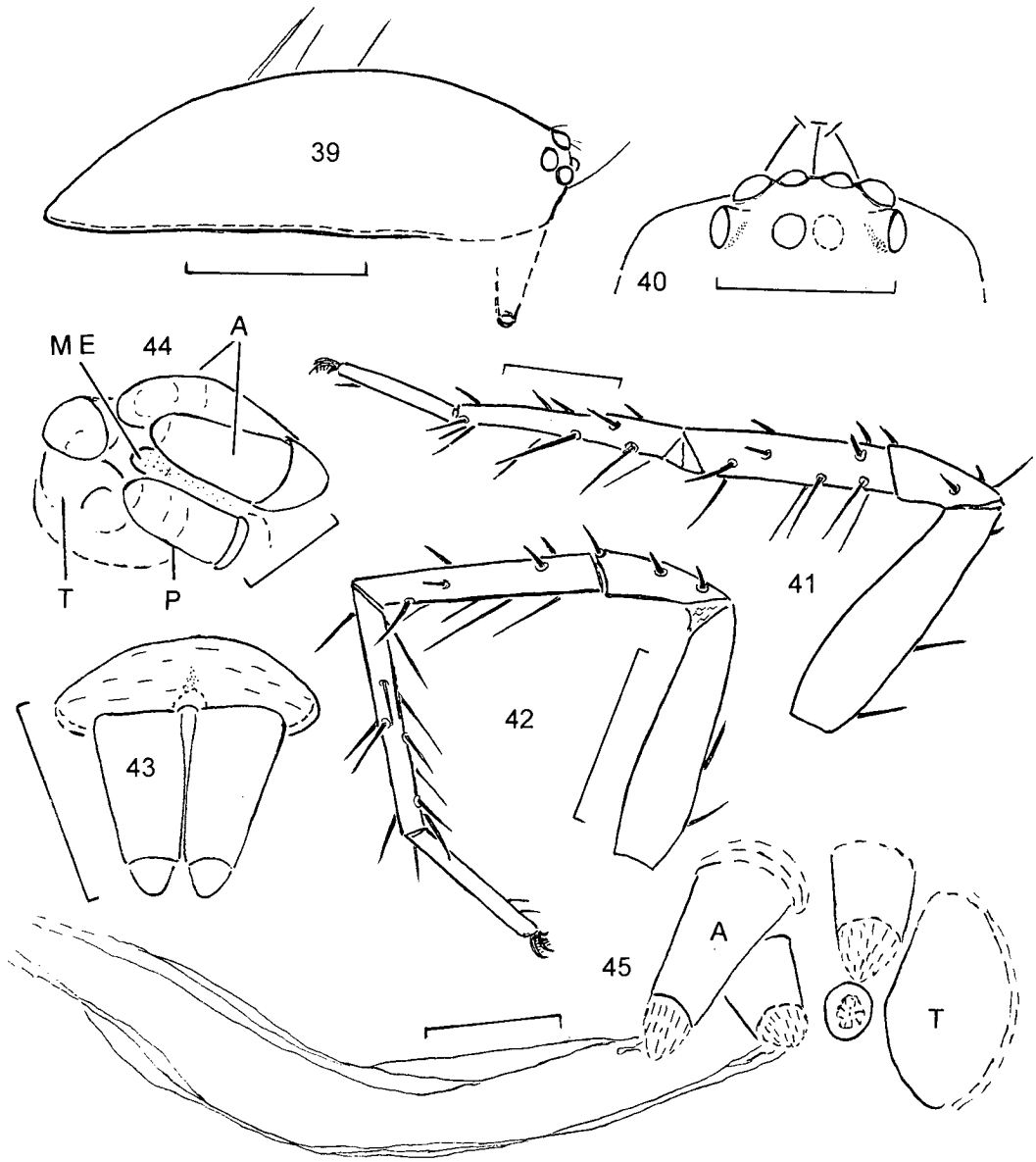
figs. 26-28: *Angusdarion humilis* n. gen. n. sp., ♂; 26) cymbium of the l. pedipalpus with bristles, dorsal aspect; 27) tibia and basal part of the cymbium of the r. pedipalpus. dorsal aspect; 28) l. pedipalpus (partly hidden), retrolateral aspect; M = 0.2;



figs. 29-34: *Anniculus balticus* PETRUNKEVITCH 1942, ♂, except figs. 30-31 (♀); 29) ♂ F604/CJW, prosoma, lateral aspect; 30) prosoma, dorsal aspect; 31) sternum, labium and gnathocoxae, ventral aspect; figs. 30-31 are taken from PETRUNKEVITCH (1942: Figs. 86, 88) (no M); 32) ♂ F602/CJW, l. pedipalpus (partly hidden), retrolateral (slightly basal) aspect; 33-34) ♂ "androtype", l. pedipalpus (partly hidden), ventral aspect; fig. 34 is taken from PETRUNKEVITCH (1958: Fig. 14) (no M); A = patellar apophysis; B = bubble, C = conductor, E = embolus, M = median apophysis, T = tegular apophysis, Y = cymbium; M = 0.5;



figs. 35-38: *Eocydrele ?mortua* PETRUNKEVITCH 1942, ♂; 35) F611/CJW, eyes, dorsal aspect; 36) F611/CJW, r. patella and tibia, retrolateral aspect and slightly apically. Note the short patellar bristle, two tibial trichobothria and the apparently "healed" wound (dotted) at the end of the amputated tibia (hairs are not drawn) (see photo 351); 37) F610/CJW, r. pedipalpus (partly hidden) with the embolus (E), proventral aspect; 38) F612/CJW, r. pedipalpus, retrolateral aspect. Note the retrobasal paracymbium (P) and the median apophysis (M) in an unnatural position; M = 0.5 in fig. 36, 0.2 in the remaining figs.;



figs. 39-48: *Spinizodarion ananulum* n. gen. n. sp., ♂; 39) holotype, prosoma, lateral aspect; 40) F617/CJW, eyes, dorsal aspect; 41) F629/CJW, r. leg IV, prolateral aspect (hairs not drawn); 42) paratype PI Göttingen, r. leg IV, prolateral aspect (hairs are not drawn); 43) paratype PI Göttingen, anterior spinnerets on their pedestral, ventral aspect, slightly posteriorly; 44) F617/CJW, outline of spinnerets and anal tubercle (spigots not drawn); 45) F630/CJW, anal tubercle and spinnerets ventrally-apically, with draglines which originate at the anterior spinnerets; 46) paratype PI Göttingen, l. pedipalpus, retrolateral aspect. Note the large sperm duct; 47) F629/CJW, r. pedipalpus, retrolateral aspect (hairs not drawn); 48) holotype, l. pedipalpus, retrolateral-distal aspect; A = anterior spinnerets, C = conductor, E = embolus, M = median apophysis, ME = median spinnerets, P = posterior spinnerets, T = anal tubercle; M = 0.5 in figs. 39, 41-42, 0.4 in fig. 40, 0.2 in the remaining figs.;

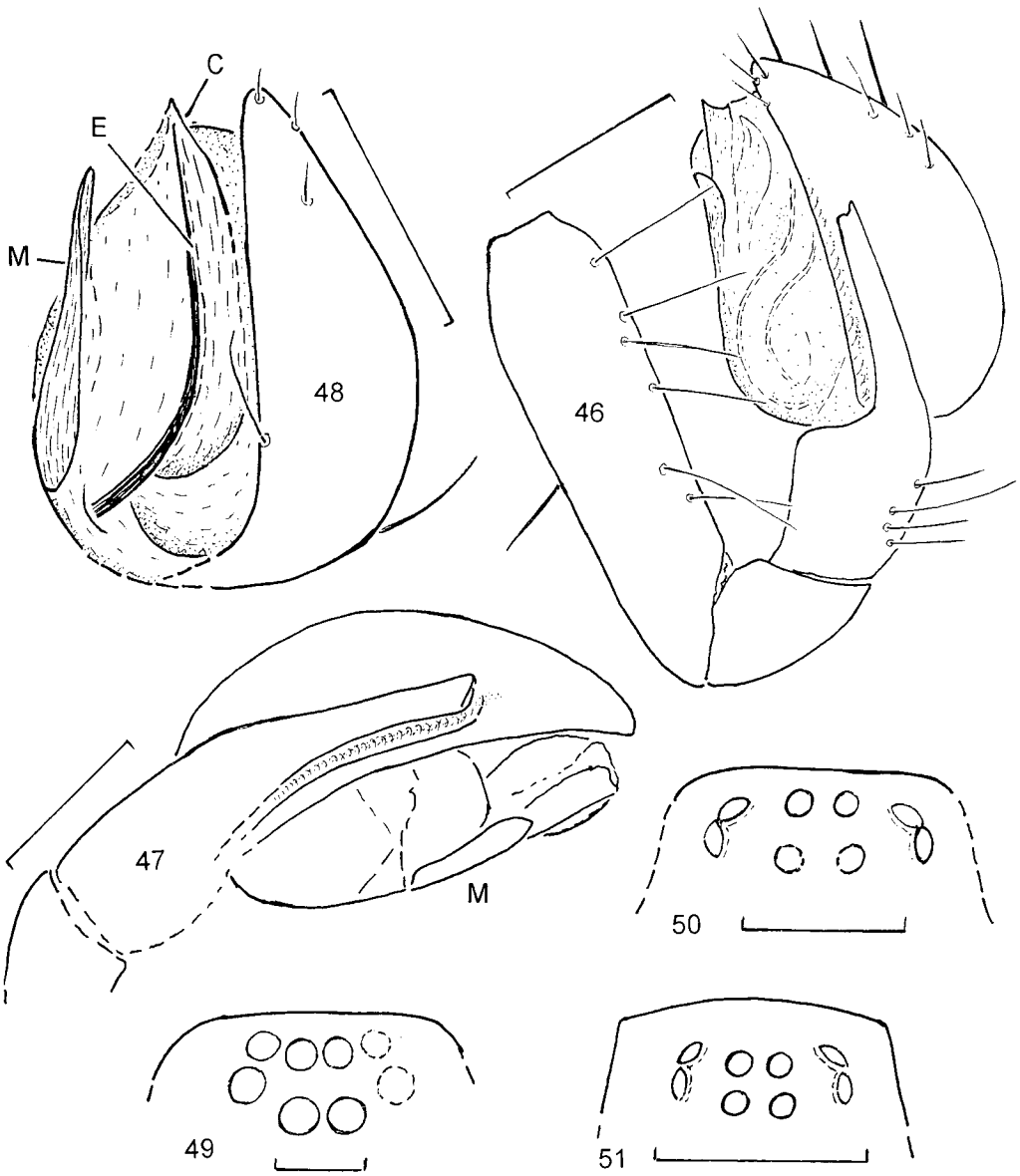


fig. 49) Zodariidae gen. & sp. indet. 1, ♀ F618/CJW, eyes, dorsal aspect; M = 0.3;

fig. 50) Zodariidae gen. & sp. indet. 2, ♀ F187/CJW, eyes, dorsal aspect. M = 0.5;

fig. 51) Zodariidae gen. & sp. indet. 3, juv. ♂ F615/CJW, eyes, dorsal aspect; M = 0.5.

BEITR. ARANEOL., 3 (2004)

FOSSIL SPIDERS (ARANEAE) OF THE FAMILIES CLUBIONIDAE AND MITURGIDAE (QUESTIONABLE) IN BALTIC AND DOMINICAN AMBER

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Abstract: The fossil spiders (Araneae) of the families Clubionidae (Baltic and Dominican amber) and questionable Miturgidae are listed, questional taxa are shortly discussed, some fossil taxa in Baltic amber are revised, *Eodoter eopala* **n. sp.**, *Systariella* **n. gen**. and *S. magnioculi* **n. sp**. (Clubionidae) are described from Baltic amber. Taxonomical remarks are given on the relationships of the family Clubionidae and its subfamilies.

CJW = Private collection of J. WUNDERLICH.

Introduction

Most Clubionidae (Sac spiders; German name "Sackspinnen") are medium sized

spiders (photos, fig. 1) which build "sacs" - name! - as a refuge or a hiding place during the moult as most spiders of related taxa do. They are rare in Baltic and Dominican amber, only few specimens are known from each kind of amber. The presence of fossil Miturgidae in Dominican amber is questionable, see below.

Taxonomy

Until a few decades ago Anyphaenidae, Corinnidae, Liocranidae and Miturgidae were united with the Clubionidae which may look similar and may be difficult to separate. KOCH & BERENDT (1854) listed *Clubiona* sub their Gnaphosidae (sub Drassodidae). LEHTINEN (1967) and PLATNICK (1998) in his Spider's Catalogue regards the genus *Strotarchus* SIMON 1888 as a member of the Miturgidae. BONALDO (pers. commun. in VI 2002) regards *Strotarchus* and the Systariinae - because of the absence of modified spigots in the male anterior lateral spinnerets - as questionable members of the Miturgidae: Miturginae. In contrast e.g. to DEELEMAN-REINHOLD (2001) and me several authors regard also the genus *Cheiracanthium* C. L. KOCH as a genus of the family Miturgidae instead of the Clubionidae: Eutichurinae. - The diverse genus *Clubiona* LATREILLE 1804 has to be split up in my opinion; MIKHAILOV (e.g. 1990) recognizes several subgenera of this genus.

Revised diagnosis of the family Clubionidae: Body pale and weakly sclerotized, opisthosomal scuta absent (the male of *Clubiona pala* DEELEMAN-REINHOLD 2001 is an exception), eye field basicly/usually wide, occupying about 4/5 of the frontal prosomal width (figs. 1, 3, 16), posterior eye row usually distinctly procurved, never distinctly recurved; the cuticular structure of prosoma and legs consists of tiny furrows/ridges, the apical article of the posterior spinnerets is basicly/usually long, myrmecomorphic taxa are absent, the male chelicerae are basicly/usually large and protruding (sexually dimorphic), claw tufts are present.
Further characters: Ecribellate, unpaired tarsal claw absent, tarsal scopula usually present (weakly developed e.g. in the fossil genus *Eodoter*); gnathocoxae usually very long and widened distally (fig. 5); the shape of the anterior spinnerets may be sexually dimorphic in the Clubioninae, conically in the female but cylindrically and longer in the male; a median apophysis of the bulbus may be present, weakly sclerotized and retinaculiform (e.g. in the fossils in Baltic amber, figs. 12 and 15), slender and scinny (e.g. fig. 12, similar in *Cheiracanthium*), reduced or absent (lost e.g. in the members of *Clubiona* s. str.), vulva usually with a pair of bursae.

Subfamilies: DEELEMAN-REINHOLD (2001) distinguishes three subfamilies in SE-Asia: Clubioninae, Eutichurinae (incl. *Cheiracanthium*) and Systariinae DEELEMAN-REINHOLD 2001. The relationships of a fourth subfamily - Cybaeodinae - are unsure. In the Eutichurinae leg I is much the longest and a thoracal fissure is indistinct or absent in contrast to the other subfamilies. In the Systariinae leg III is only 10% shorter than leg II (it is at least 20% shorter in the remaining subfamilies), the anterior

median eyes are distinctly the largest (fig. 16) (except in *Tamin*), and the posterior eye row is narrow (except in *Systaria*), see DEELEMAN-REINHOLD (2001).

Relationships: As in the Corinnidae the vulva has usually a pair of bursae, but in the Corinnidae the cuticula bears scales or even wrinkles, the apical segment of the posterior spinnerets is short, most Corinnidae possess opisthosomal scuta at least in the male sex and/or are myrmecomorphic. - A revision of the polyphyletic Miturgidae is needed. - In the Liocranidae the cuticular structure is similar to the Clubionidae but Liocranidae are coloured spiders (usually with dark brown markings), its eye field is only about 3/4 as wide as the frontal part of the prosoma, a strongly sclerotized median apophysis is present, see the paper on the Liocranidae in this volume. — In contrast to most members of related families are cylindrical gland spigots absent in the Clubionidae; see DEELEMAN-REINHOLD (2001: 15).

Distribution: Cosmopolitical.

The fossil taxa

(a) The taxa in Dominican amber, see WUNDERLICH (1988: 222-226):

Elaver nutua (WUNDERLICH 1988) (= *Clubionoides n.*), n. comb. according to PENNEY & PEREZ-GELABERT (2002: 214), Rev. Iberica Aracnol., 6.
Strotarchus heidti WUNDERLICH 1988 (relationships unsure, see above).

(b) The taxa in Baltic amber; see the list of PETRUNKEVITCH (1958: 372-376) and the papers on the families Corinnidae, Liocranidae, Trochanteriidae and Zoropsidae in this volume:

Questionable taxa and taxa of other families:

Concursator PETRUNKEVITCH 1958: Family unsure (juv.),
Cryptoplanus PETRUNKEVITCH 1958: See the paper on the family Liocranidae,
Machilla PETRUNKEVITCH 1942 (juv., sub Micariinae): Family unsure,
Massula PETRUNKEVITCH 1942 (juv., sub Micariinae): Family unsure,
Mizalia KOCH & BERENDT 1854: See the paper on the Oecobioidea in this volume.

KOCH & BERENDT (1854) described for the first time *Clubiona attenuata*, *C. microphthalma*, *C. sericea*, *C. lanata*, *C. pubescens* and *C. tomentosa*. None of their descriptions were based on the male sex; a revision is needed, most taxa may be members of the families Corinnidae or Liocranidae which were not known in the mid of the 19th century as families of their own.

Revised or newly described taxa:

Eodoter magnificus PETRUNKEVITCH 1958,
Eodoter eopala n. sp.,
Systariella magnioculi n. gen. n. sp.

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

1 Anterior median eyes distinctly the largest (fig. 16). . . . . *Systariella*

- Anterior median eyes not distinctly larger than the anterior lateral eyes (fig. 3). . . . . *Eodoter*

Eodoter PETRUNKEVITCH 1958 Photos 356-358

Diagnosis (♂; ♀ unknown): Tarsal scopula only weak, posterior eye row straight (fig. 3) or slightly procurved, pedipalpus (figs. 8-12, 14-15): The tibia bears two apophyses, median apophysis present, embolus long, originating at the basal part of the bulbus.

Type species: *Eodoter magnificus* PETRUNKEVITCH 1958; a second species: See below.

The **relationships** are unsure. In *Clubiona* LATREILLE 1804 a distinct tarsal scopula is present and the origin of the embolus is usually more distally; in *Clubiona* s. str. a median apophysis is absent. In *Japoniana* MIKHAILOV 1990 (extant, E-Asia) (regarded as a subgenus of *Clubiona* by MIKHAILOV) a median apophysis ("tegular apophysis" sensu MIKHAILOV) is present, too, but it is directed in the opposite direction and the embolus originates more distally.

Distribution: Tertiary Baltic amber forest.

Eodoter magnificus PETRUNKEVITCH 1958 (figs. 2-12) Photos 357a-b

Material (in Baltic amber): 7 ♂ (CJW, e.g. F246, F721, F722, F723) which conspecifity is questionable. Two further males in Baltic amber, Clubionidae indet., may be conspecific: (a) PIHU Berlin MB.A.103 (coll. SIMON) and (b) private coll. of F. EICHMANN in Hannover.

Diagnosis (♂; ♀ unknown): Posterior eye row straight; pedipalpus (figs. 8-12): Tibia long, with a simple proapical and a complicated retroapical apophysis, median apophysis and embolus long and slender. - Remark: The drawings by PETRUNKEVITCH (1958: Figs. 509-510) - see figs. 8-9 - are not correct, this author mistook e.g. the tegulum as the haematodocha, the shape of the tibial apophyses may be different.

Measurements (in mm): Body length 3.7-5.0, prosomal length 1.9-2.4. Prosoma about 1.35 times longer than wide, thoracal fissure distinct. The chelicerae bear numerous long frontal hairs and - according to PETRUNKEVITCH - three teeth on both margins. The male genital area is somewhat sclerotized (male CJW). The order of legs is IV/I/II/III, there are numerous leg bristles (fig. 6).

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

Distribution: Tertiary Baltic amber forest.

***Eodoter eopala* n. sp.** (figs. 13-15) Photo 358

Material: Holotypus ♂ in Baltic amber, F719/BB/AR/CLU/CJW.

Preservation and syninclusions: The spider is fairly well and incompletely preserved, the body as well as the right leg I and the left leg II are complete, the smaller righat leg I is a regenerate, the opisthosoma and the ventral side of the prosoma are covered by a white emulsion, several bubbles are present, one between the right legs II and III; no stellate hairs.

Diagnosis (♂; ♀ unknown): Posterior eye row slightly procurved; pedipalpus (figs. 14-15): Tibia with a small retroapical and a wide proapical apophysis, median apophysis fairly stout, in a prodistal position, embolus long, originating basally.

Description (♂):
Measurements (in mm): Body length 4.3, prosoma length 2.0, femur I 1.8, femur III

1.5, right tibia I (regenerate) 1.0, left tibia II about 1.65, posterior eye row 0.8 wide. Colour pale yellow brown.
Prosoma distinctly longer than wide, thoracal fissure distinct, eye field very wide, posterior slightly procurved, posterior median eyes smallest, separated by 1 1/3 of their diameter. Basal cheliceral articles large, fairly protruding, with numerous long frontal hairs, fangs long and slender, mouth parts hidden. - Legs fairly long and robust, order IV/I/II/III, III relatively long, with numerous long bristles, tibia I-II bear 2 ventral pairs, 1 prolaterally and few apically, metatarsus II bears a ventral-basal bristle, femur II 2 dorsally and 3 apically, femur III (fig. 13) bears 6 bristles, patellae III-IV bear a retroventral bristle. Tarsal scopula weak, metatarsal III-IV preening hairs unknown, dense claw tufts are present. - Opisthosoma long and hairy; most spinnerets are hidden. - Pedipalpus (figs. 15-16): Patella about as long as the tibia, cymbium distally scopulate.

Relationships: In *E. magnificus* the posterior eye row is straight, the tibia apophyses of the pedipalpus are quite different, the median apophysis is much longer and more slender.

Distribution: Tertiary Baltic amber forest.

***Systariella* n. gen.**

Diagnosis (♂; ♀ unknown): Anterior median eyes (fig. 16) very large, posterior row procurved, posterior median eyes separated by less of their diameter, leg scopulae weak; pedipalpus (fig. 18; partly hidden): Median apophysis present, embolus long.

Relationships: According to the large anterior median eyes and the long leg III *Systariell* should be a member of the subfamily Systariinae DEELEMAN-REINHOLD 2001; *Systaria* SIMON 1897 (extant, SE-Asia) may be related. In *Systaria* the posterior median eyes are smaller and separated by more than their diameter, dense leg scopulae are present.

Type species: *Systariella magnioculi* n. sp., the only known species of the genus.

Distribution: Tertiary Baltic amber forest.

***Systariella magnioculi* n. gen.** (figs. 16-18) Photo 359

Material: Holotypus ♂ in Baltic amber, F717/BB/AR/CLU/CJW.

Preservation and syninclusions: The spider is well preserved, the dorsal half of the right patella and tibia IV and the tip of the right tarsus III are cut off, the left leg IV is lost behind the coxa by autotomy, haemolymph is present on the stump, most parts of the spider's ventral side are covered by a white emulsion and a layer of the amber; no stellate hairs.

Diagnosis: See above.

Description (♂):
Measurements (in mm): Body length 3.6, prosoma: length 1.65, width 1.4, leg I: Femur 1.1, femur II 1.2, femur III 1.1, tibia II 1.0.
Colour pale brown.
Prosoma hairy, with a distinct thoracal fissure; eyes (fig. 16) large, anterior median eyes distinctly the largest (although they are covered with an emulsion), posterior row procurved, posterior median eyes separated by less than their diameter. Basal chelicerал articles of medium size, their position vertically, fangs and mouth parts hidden. - Legs robust, prograde, order IV/I/II/III, III not much shorter than II. Bristles thin and numerous; femora: I 2 dorsally and 3 distally, III-IV 3 dorsally and 3 distally, tibiae I-II (fig. 17) bear 1-2 ventral bristles, tibiae and metatarsi III-IV bear numerous lateral and ventral bristles, 7 on tibia III. Tarsal scopulae indistinct, metatarsal III preening hairs and claw tufts present, tarsal claws with long teeth. - Opisthosoma 1.8 times longer than wide, hairy; anterior spinnerets cylindrical, distinctly the largest, separated by their diameter. - Pedipalpus (fig. 18): Patella short, tibia with a long retrolateral apophysis, see above.

Relationships: See above.

Distribution: Tertiary Baltic amber forest.

Material indet.: (1) An exuvia (?subad. ♀) is a questionable member of the family Clubionidae, F1173/BB/AR/CJW. (2) A further questionable specimen (female) of the Clubionidae: See the paper of POINAR on egg parasitism in this volume.

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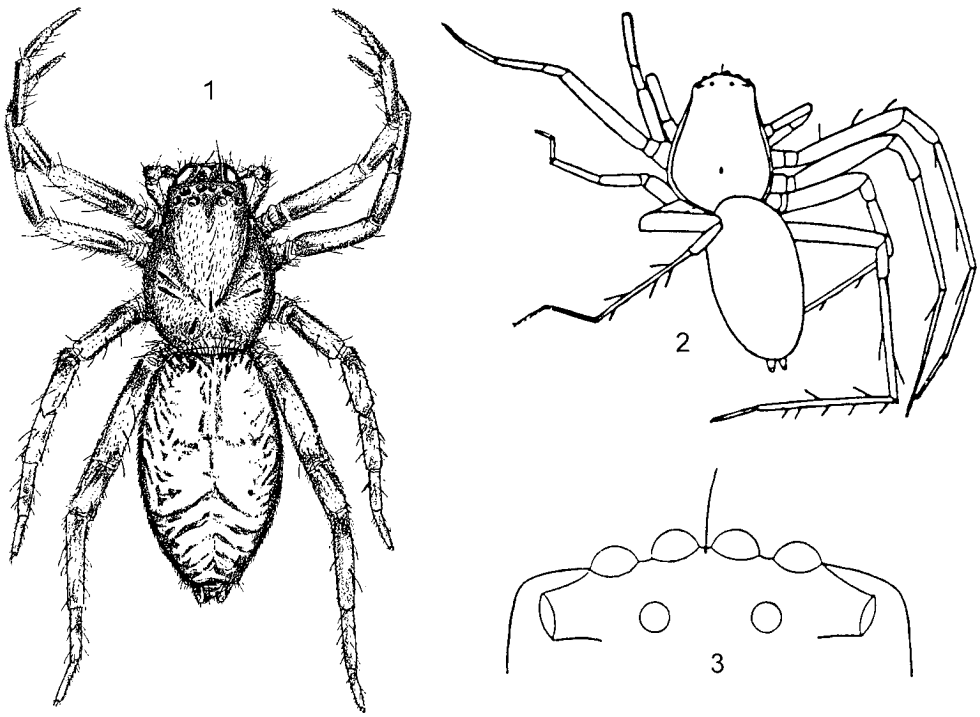
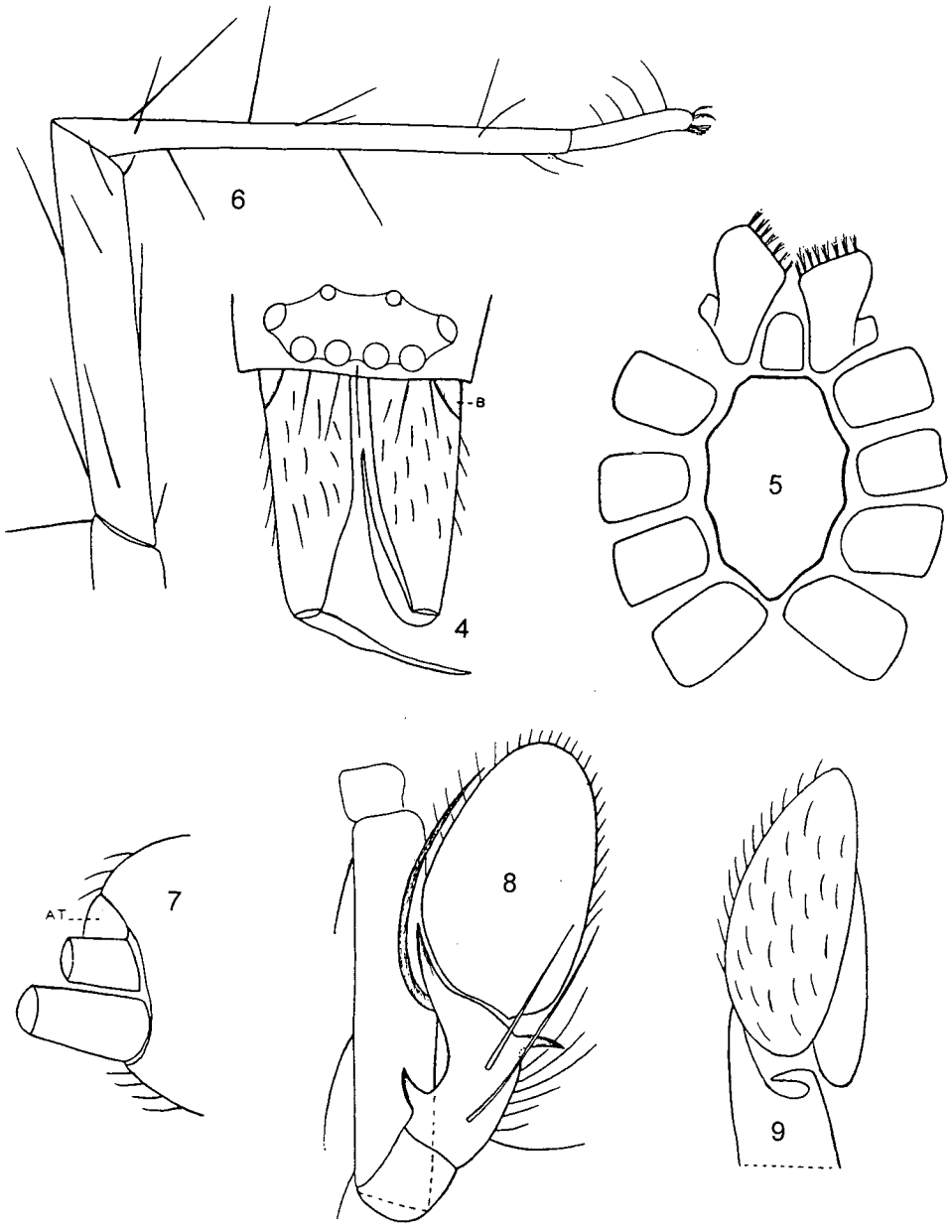
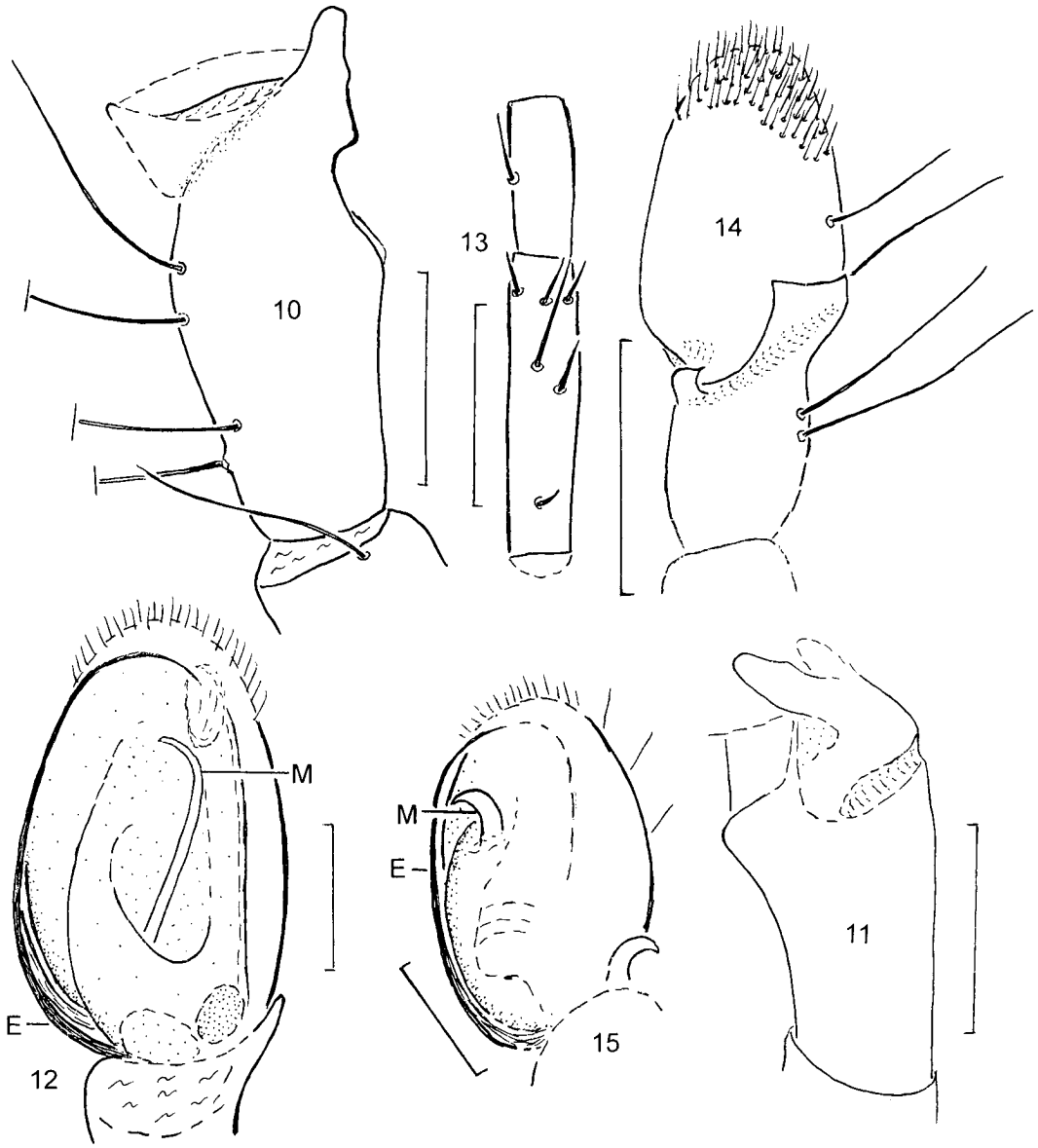


Fig. 1: *Clubiona* sp., ♀ (extant), body, dorsal aspect. Taken from DIPPENAAR-SCHOEMAN & JOCQUE (1997: Fig. 63a);

figs. 2-3: *Eodoter magnificus* PETRUNKEVITCH 1958, ♂, holotype; 2) body, dorsal aspect; 3) position of the eyes, dorsal aspect. Taken from PETRUNKEVITCH (1958: Figs. 502-502);

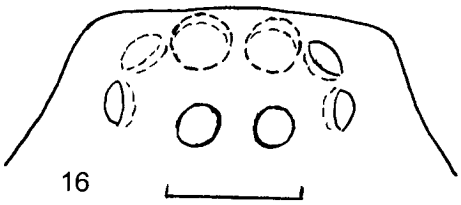


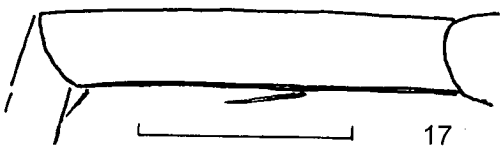
figs. 4-9: *Eodoter magnificus* PETRUNKEVITCH 1958, ♂, holotype; 4) prosoma, frontal aspect (the posterior eyes are drawn too small); 5) coxa-sternal region; 6) retrolateral view of the fourth right leg from patella to end; 7) spinnerets and anal tubercle (AT), lateral aspect; 8) r. pedipalpus, dorsal aspect; 9) r. pedipalpus, retrolateral aspect; taken from PETRUNKEVITCH (1958: Figs. 503-504, 506, 509-511);

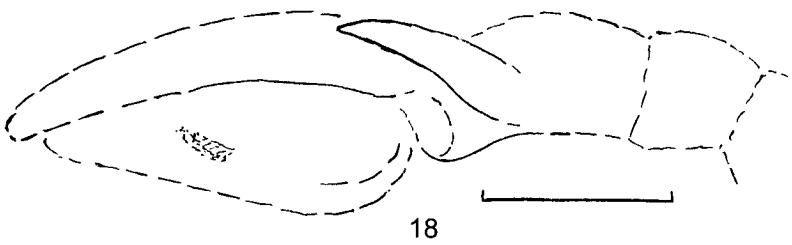


figs. 10-12: *Eodoter ?magnificus* PETRUNKEVITCH 1958, ♂, F721/CJW (fig. 10) and F722/CJW (figs. 11-12); 10) tibia of the r. pedipalpus, dorsal aspect (hairs and trichobothria are not drawn); 11) tibia of the l. pedipalpus retrolaterally; 12) l. pedipalpus ventrally and slightly retrolaterally; E = embolus, M = median apophysis; M = 0.2;

figs. 13-15: *Eodoter eopala* **n. sp.**, ♂; 13) l. femur and patella III, dorsal aspect; 14) l. pedipalpus, dorsal aspect (only few hairs are drawn); 15) l. pedipalpus, basal-retroventral aspect (the structures are partly hidden in this position); E = embolus. M = median apophysis; M = 1.0 in fig. 13, 0.5 in fig. 14, 0.2 in fig. 15;







figs. 16- 18: *Systariella magnioculi* **n. gen. n. sp.**, ♂; 16) position of the eyes, dorsal aspect; 17) r. tibia II, prolateral aspect (hairs not drawn); 18) l. pedipalpus, retrolateral aspect, slightly ventrally (parts are hidden; hairs are not drawn); M = =.3, 0.5, 0.2.

BEITR. ARANEOL., 3 (2004)

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

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Abstract: The fossil spiders (Araneae) of the family Liocranidae in Baltic and Dominican amber are revised. In Dominican amber only a questionable indetermined member of the Liocranidae is reported, from Baltic amber two genera are known of the subfamily Cybaeodinae, *Apostenus* and *Palaeospinisoma*. *Anatone* MENGE 1854 is a dubious genus. *Apostenus spinimanus* (KOCH & BERENDT 1854) (= *Philodromus s.*, **n. comb**.) is revised. The following taxa are described from Baltic amber: *Apostenus arnoldorum* **n. sp**., *A. bigibber* **n. sp**., and *Palaeospinisoma* **n. gen.** whith its type species *P. femoralis* **n. sp**. - Only members of the holarctic genus *Apostenus* WETRING 1851 survived; a stridulating organ is described from this genus. - The limit and the relationships of the Liocranidae are shortly discussed; Cybaeodinae and Zorinae may be subfamilies of the Liocranidae, Trochanteriidae may be most related to this family.

Most of the **material** is kept in the private collection of the author (CJW); it probably will be deposited later in the Senckenberg-Meseum Frankfurt a. M.

Introduction

Liocranidae (German name "Feldspinnen") are small to medium-sized spiders which are not rare in Baltic amber - see *Apostenus spinimanus* -, but only a single questionable indetermined female has been reported from Dominican amber, see WUNDERLICH (1988: 317). Liocranidae spiders can be mistaken as members of other families, see below. The presence of ventral opisthosomal spines in the fossil males (photo, figs. 7, 40) - as in related extant species - indicates a similar courtship behaviour as in various Lycosidae: The spiders rubs the opisthosoma on a dry leaf, e.g., and thus produce vibrations which may stimulate the female. So we can conclude on behavioural patterns and probably on the environment as well as on the habitat from morphological structures of the fossils.

Taxonomy

Provisional diagnosis of the family Liocranidae (no apomorphic character is known): Eye field narrow, posterior eye row procurved or straight (in the Liocraninae) or recurved (in th Cybaeodinae), leg IV longer than I, tibiae and metatarsi I-II with long paired ventral bristles (fig. 13), usually no metatarsal preening hairs (Liocraninae), opisthosoma soft, with the tendency to the presence of ventral spines in the male in the Cybaeodinae (fig. 7, 12, photo), the leg position may be mediograde (see the paper on the family Sparassidae in this volume).

Subfamilies: Liocraninae, Cybaeodinae - a separate family? -, and probably Zorinae.

Close **relationships** of the family Liocranidae are quite unknown; see the tab. below. In former times the family was placed as a taxon of the Clubionidae s. l. Some authors - e.g. DELEMAN-REINHOLD (2001) - unite Liocraninae and Phrurolithinae, see the paper on the family Corinnidae in this volume. According to BOSSELAERS & JOCQUE (2002: E.g. p. 256) Liocranidae is not a monophyletic taxon: Liocraninae (*Hesperocranum, Liocranum, Mesiotelus*) should be related to the Clubionidae - a subfamily of the Clubionidae? - but other genera as *Apostenus* and *Agroeca* should be related to *Cybaeodes* (= *Cerrutia*). *Cybaeodes* was regarded as a member of the Cybaeodinae SIMON 1893 (sub Cybaeodeae) by LEHTINEN (1967:292) within the family Zodariidae (!) but was regarded as a genus of the Liocranidae by PLATNICK & Di FRANCO (1992). BOSSELAERS & JOCQUE (2002: 256) apparently regard Cybaeodinae as the sister group of the Castianeirinae (!). PENNIMAN (1985) placed most North American Liocranidae (except *Scotinella*) in the Clubionidae. If this placement is correct Cybaeodinae has probably to regard as a family of its own. - In this volume I will follow the traditional opinion and do not want to split up the Liocranidae which should be related to Anyphaenidae, Clubionidae, Trochanteriidae and Zoridae. In the Clubionidae the eye field is

usually much wider and the posterior spinnerets are longer; the body colour and the male chelicerae are different, too. In the Anyphaenidae the tracheal spiracle has an advanced position. In the Zoridae the posterior eye row is strongly recurved - similar to fig. 11 -, the colour of body and legs is more grey, but I know no clear difference; so Zoridae may be a subfamily of the Liocranidae. In the Trochanteriidae the leg position is clearly laterigrade, the body is usually flattened, and at least the retroventral tibial I-II bristles may be absent.

Distribution: Cosmopolitical.

Selected characters of four related families:

Remarks: (1) The prosomal structure has not yet been studied in a satisfactory number of genera. (2) Laterally flattened median ♀-spinnerets are present in some Corinnidae: Prurolithinae and in some Liocraninae.

character	Corinnidae	Liocranidae	Clubionidae	Gnaphosidae
prosomal structure	scaly/squamate punctuate/rugose	tiny furrows	tiny furrows	tiny furrows
oval posterior median eyes	-/+	-	-	+
dorsal opisthosomal scutum	+/-	-	- (+ in *Clubiona pala*, *Xantharia* sp.)	-/+
gnathocoxal depression	-/+	- (+ in *Hesperocranum*)	-	+
cylindrical anterior spinnerets	-	- (+ in *Cybaeodes*-♂)	- (+ in Clubioninae-♂)	+ in both sexes
ant-shaped body	+(-)	-	-	-/+
leg & body colour	frequently dark redbrown; often white opist. hairs	usually medium brown	light; frequently greenish	usually dark; occasionally white opisthosomal hairs.
special characters	body heavily sclerotized	occasionally ventral spines of the ♂-opisthosoma and mediograde leg position	wide, proc. post. eye row, long post. spinnerets large ♂-chelicerae	reduced apical article of the anterior spinnerets

The taxa in Baltic amber

Anatone MENGE in KOCH & BERENDT 1854 is a dubious genus, the material is lost. MENGE in KOCH & BERENDT 1854 described *A. spinipes* (the generotype, see PETRUNKEVITCH (1958: 383) (sub Thomisidae) and *A. marginata*; MENGE (1856: 8) added *A. hirsuta* as a nomen nudum. According to the short descriptions *marginata* and *spinipes* may be not congeneric and even the family is unclear; these species may be taxa of the Corinnidae - e.g. of *Ablator* - or Liocranidae. MENGE (1854: 84) compared *Anatone* with *Philodromus* (Philodromidae) and later (1856: 8) with *Zora* (Zoridae). Both genera - and even the family Zoridae - are not known to me from Baltic amber.

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

1 Femur III distinctly thickened, only 2.7 times longer than high (fig. 15), eyes as in fig. 11, opisthosoma with short ventral spines (fig. 12), pedipalpal tibial apophysis short (fig. 16). . . . . *Palaeospinisoma*

- Femur III not thickened, eyes as in fig. 3, opisthosoma with long ventral spines (fig. 7), pedipalpal apophysis long (figs. 4, 8). . . . . *Apostenus*

Revisions and new descriptions

Apostenus WESTRING 1851

Diagnosis: Male opisthosoma with numerous ventral spines (photo, fig. 7), posterior

eye row distinctly recurved (fig. 2) (similar to some Lycosidae), 5-7 long pairs of ventral tibial and 2-3 pairs of metatarsal I-II bristles present (similar to fig. 36), leg scopula absent, claw tufts reduced to one (in the extant *A. fuscus* WESTRING 1851) or two (in *spinimanus*) pairs of spatulate hairs. ♂-pedipalpus (figs. 1-2, 4-6, 10): Cymbium with dorsal bristles and an indistinct retrobasal outgrowth (in the fossil species) or hook (in the extant species); thick embolus with conductor. Epigyne (fig. 2) with a large septum.

Relationships: In some species of the genus *Agroeca* WESTRING 1862 (extant, holarctic) ventral spines of the ♂-opisthosoma exist, too - see WUNDERLICH (1999) -, an epigynal septum is present, and the chaetotaxy is equally, but the posterior eye row is slightly procurved and spatulate hairs of the claw tuft are absent. In *Liocranoeca* WUNDERLICH 1999 (extant, holactic) a septum of the epigyne and ventral spines of the ♂-opisthosoma are absent. In *Agraecina* SIMON 1932 (extant, South Europe, Canary Islands) an epigynal septum is present but spatulate hairs of the claw tufts and ventral spines of the ♂-opisthosoma are absent. In *Palaeospinisoma* n. gen. spatulate hairs of the claw tufts and ventral spines of the ♂-opisthosoma are present, too, but femur III is strongly thickened and the eye position is different.

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

Key to the fossil species of the genus *Apostenus* (♂):

1 Pedipalpus (fig. 6) with two tibial apophyses. . . . . *bigibber*
- Pedipalpus (figs. 4, 10) with only one very long tibial apophysis. 2

2(1) Tibial apophysis slender and apically bent downwards (fig. 10). . . . . *spinimanus*

- Tibial apophysis wide basally and not bent downwards apically (fig. 4). . . . *arnoldorum*

***Apostenus arnoldorum* n. sp.** (figs. 3-4) Photo 360

Derivatio nominis: This species is named after the couple H. and V. ARNOLD in Heide. I thank V. ARNOLD who discovered two interesting fossil spiders, published an important paper on pollen grains in Baltic amber and determined some pollen grains with fossil spiders of my collection.

Material: 2♂ in Baltic amber, holotypus GPIUHamburg (coll. HERRLING), paratypus PMHUB MB.A.194 (coll. BERENDT).

Preservation and syninclusions: The holotype is fairly well preserved, the right leg I and the left leg II are lost behind the coxa by autotomy, the opisthosoma is depressed dorsally, most ventral parts of body and legs are covered by a white emulsion. Few stellate hairs are present with the spider. - The paratype is strongly darkened by aging, the epigaster is covered by a white emulsion, several leg articles are cut off, a loose leg is preserved beneath the spider, the left legs are complete, brushes of fungal hyphae are present on the left femur and patella I, a Diptera: Nematocera and several stellate hairs are preserved in the same piece of amber.

Diagnosis (♂; ♀ unknown): Pedipalpus (fig. 4): Tibia fairly thickened, apophysis long, basally thick, distally curved.

Description (♂):
Measurements (holotype in mm): Body length 2.5, prosoma: Length 1.3, width 1.2, leg I: Femur 1.85, patella 0.55, tibia 1.9, metatarsus 1.8, tarsus 1.25, tibia II 1.6, tibia III 1.35, tibia IV 1.7; body length of the paratype 2.6.
Colour: Holotype light brown, paratype dark brown (darkened by aging).
Prosoma hairy, nearly as long as wide; eyes as in fig. 2, mouth parts hidden. - Legs long, order IV/I/II/III, bristles as in *spinimanus*. The claw tufts consist of three pairs of spatulate hairs. - Opisthosoma long, ventral spines as in *spinimana*, spinnerets hidden. Pedipalpus (fig. 4; see above) with an outstanding bulbus.

Relationships: In *A. spinimanus* the pedipalpal tibial apophysis is very long, too, but it is basally slender and apically bent downwards.

Distribution: Tertiary Baltic amber forest.

***Apostenus bigibber* n. sp**. (figs. 5-6)

Material: 3♂ in Baltic amber; holotypus and two separated pieces of amber F705/BB/AR/LIO/CJW; paratypes F706/BB/AR/LIO/CJW and coll. GRABENHORST AR-40, from the Bitterfeld deposit.

Preservation and syninclusions: The holotype is fairly well preserved, most leg articles are cut off, the left legs I and II are complete, the right leg I is lost behind the coxa by autotomy, the loose tip of the left tarsus I is drifted 1.8mm foreward in the amber, ventral parts of the body are covered by a white emulsion, the opisthosoma is dorsally strongly depressed. - A Collembola is preserved above the left tibia III, remains of a plant as well

as an Acari in contact with a Formicidae are preserved in front/right in front of the spider; few stellate hairs. - F706: The spider is fairly well and nearly completely preserved in a piece of amber which was heated; only the left leg I is lost behind the coxa by autotomy and haemolymph is present; larger bubbles cover the basal articles of the right legs III and IV. - The paratype from the coll. GRABENHORST is not well preserved, the dorsal side is hidden by an amber layer, the ventral side is hidden by a white emulsion. The left legs and the right legs III and IV are completely preserved. - Some Acari and stellate hairs are present in the same piece of amber.

Diagnosis (♂; ♀ unknown): The pedipalpal tibia bears two apophyses, a long dorsal-basal and a short retro-distal one.

Description (♂):
Measurements (in mm): Body length 2.7-3.2; holotype: Prosoma: Length 1.6, width nearly 1.6, leg I: Femur 1.75, patella 0.6, tibia 1.85, metatarsus 1.5, tarsus 1.2, femur IV 1.75.
Colour: Body and legs medium to dark brown, opisthosoma light brown.
Prosoma nearly as wide as long, very hairy in the holotype, nearly smooth in the paratype F706. Eyes as in *arnoldorum*, labium wider than long, gnathocoxae longer than wide, fangs of medium length. Legs long, similar to *spinimanus*, order IV/I/II/III, bristles as in *spinimanus*. - Opisthosoma similar to *spinimanus*, up to 0.1mm long ventral opisthosomal spines are observable in the holotype and in F706. - Pedipalpus (figs. 5-6; see above), the cymbium bears some strong curved distal hairs. The embolus is probably fused to the conductor, the median apophysis is large.

Relationships: In the other congeneric species only one pedipalpal tibial apophysis is present.

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

Apostenus spinimanus (KOCH & BERENDT 1854) (figs. 7-10) (**n. comb.**)

Photos 361-363

1854 *Philodromus spinimanus* KOCH & BERENDT, Die im Bernstein befindlichen...: 83, fig. 78.

Material: 13♂ in Baltic amber; holotypus of *Philodromus spinimanus*, PMHUBerlin MB. A.175; 1♂ coll. F. EICHMANN no. 611; 1♂ from the Bitterfeld deposit F707/BB/AR/LIO/CJW; 10♂ F707/BB/AR/LIO/CJW.

Diagnosis (♂; ♀ unknown): Pedipalpus (figs. 8-10): Tibia thickened, tibial apophysis

long, slender, the tip strongly curved downwards apically; in few males the tibial apophysis is stronger bent downwards than in fig. 10).

Description (♂):
Measurements (in mm): Body length 3.2-4.2, prosoma: Length 1.4-1.6, width 1.4-1.5.
Colour: Prosoma and legs dark brown, opisthosoma light brown.
Prosoma as in the genus, hairy, nearly as wide as long; eyes as in *arnoldorum*. Chelicerae of medium size, labium wider than long, gnathocoxae longer than wide, a depression is absent. Legs usually mediograde; tibiae I-II bear 6-7 pairs of ventral bristles, metatarsi I-II bear 3 pairs of ventral bristles. Opisthosoma (photo): The ventral spines (fig. 7) are up to 0.11mm long, their tip may be pointed or blunt (they probably are partly rubbed off in the basal opisthosomal half). - Pedipalpus (see above): Probably the tibial apophysis is a separate sclerite. Bulbus: Fig. 10.

Relationships: See *A. arnoldorum* n. sp. In the extant *A. fuscus* WESTRING 1851 the embolus is similar curved nearly in a right angle but longer.

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

***Palaeospinisoma* n. gen.**

Diagnosis (♂; ♀ unknown): Anterior median eyes probably absent, posterior eye row strongly recurved (fig. 11), femur III (!) distinctly thickened (fig. 15) - only 2.7 times longer than high - (it is supposed to be a jumping leg), metatarsi I-II bear two pairs of ventral bristles (fig. 13), opisthosoma with short ventral spines (fig. 12).Pedipalpus (figs. 16-17): Cymbium with a retrolateral hump, median apophysis probably in a distal position.

Relationships: In *Apostenus* ventral brisles of the ♂-opisthosoma and spatulate hairs of the claw tufts are present, too, but these spines are longer and femur III is slender. A distinctly thickened femur III is very rare in spiders and not known to me from other members of the family Liocranidae. (In members of the Salticidae leg III or IV may be a jumping leg but the leg is usually leghtened but not thickened). - Also in *Agroeca* WESTRING 1851 ventral spines of the ♂-opisthosoma and a retrobasal cymbial hump are present in some species but spatulate hairs of the claw tufts are absent, the posterior eye row is procurved, and the metatarsi I-II bear three pairs of ventral bristles. According to MENGE the eye position is similar in *Anatone* MENGE, see MENGE (1856: 8); in *Zora* LATREILLE the eye position is similar, too.

Type species: *Palaeospinisoma femoralis* n. sp.; the only known species of the genus.

Distribution: Tertiary Baltic amber forest.

***Palaeospinisoma femoralis* n. gen. n. sp.** (figs. 11-16) Photo 364

Material: Holotypus ♂ in Baltic amber, F704/BB/AR/LIO/CJW.

Preservation and syninclusions: The spider is well but incompletely preserved in an amber piece which was heated; the distal parts of the left legs III and IV and the right leg IV are cut off,the dorsal-distal half of the opisthosoma is strongly compressed, some ventral parts of the opisthosoma are covered by a white emulsion. - 6 1/2 Diptera, large remains of plants, a juvenile spider and stellate hairs are preserved in the same piece of amber.

Diagnosis (♂; ♀ unknown): See above.

Description (♂):
Measurements (in mm): Body length 3.0, prosoma: Length 1.5, width 1.3, leg I: Femur 1.5 (hight 0.4), patella 0.55, tibia 1.7, metatarsus 1.5, tarsus 0.7, tibia II 1.25, tibia III 0.8, tibia IV 1.6, femur III 1.2 (hight 0.45), femur IV 1.6 (hight 0.4).
Colour medium to dark brown.
Prosoma 1.15 times longer than wide, covered with few indistinct hairs, fovea hidden. Eyes (fig. 11): Anterior medians strongly reduced or even absent, anterior laterals large posterior row strongly recurved, eyes large, posterior medians separated by about their diameter. Basal articles of the chelicerae small and in a vertical position, mouth parts hidden. - Legs (figs. 13-15) mediograde, covered with few long hairs, order IV/I/II/III, III distinctly the shortest, femur III distinctly thickened, only 2.7 times longer than high. Most bristles are fairly thin, the femora bear 2 longer dorsal bristles, 2-3 near the end, I additionally 1 prodistally, patellae with a dorsal-distal bristle which is thin on I-II, tibiae I-II 6 proventrally and 5 retroventrally, no apical, ventral or lateral bristles, metatarsi I-II 2 long pairs ventrally, no apicals; legs III-IV bear numerous bristles incl. dorsal and letaral tibial bristles, the metatarsi bear several bristles, too. No scopulae, the claw tufts consists of 3 pairs of spatulate hairs. Tarsal trichobothria in more than one row, claws strongly bent, with longer teeth. - Opisthosoma (it is strongly deformed) ventrally with numerous spines (fig. 12, photo) which are 0.02-0.03mm long, some are pointed, others are blunt; no scutum. Three pairs of short spinnerets. - Pedipalpus (figs. 16-17): Femur straight, with a long and strong prodorsal bristle in the middle, tibia longer than the patella, bearing a short retrodistal apophysis, cymbium with a retrobasal hump and spine-shaped hairs, bulbus protruding basally (or covered by a bubble?), most structures are hidden, probably the median apophysis is observable in a distal position.

Relationships: See above.

Distribution: Tertiary Baltic amber forest.

Remark: A parasitic mite indet. (0.4mm long) is preserved on the opisthosoma of a questionable female Liocranidae in Baltic amber, F940/BB/CJW. Photo 597

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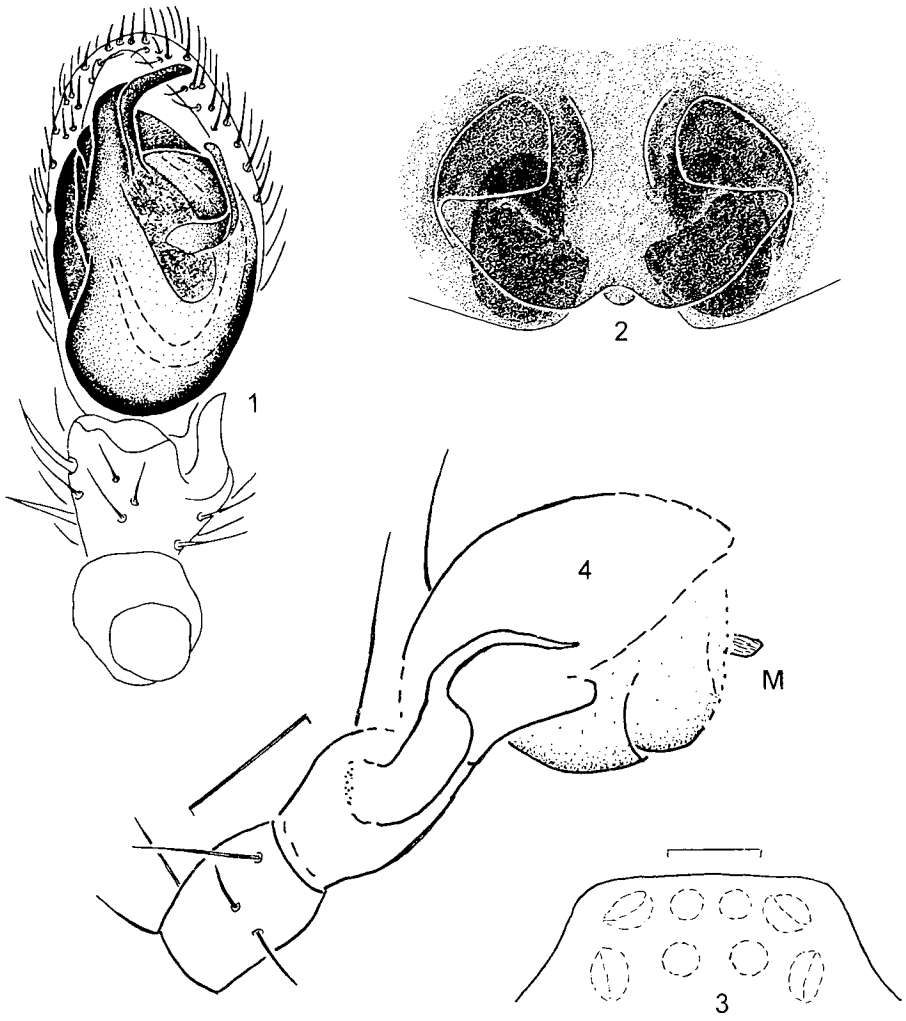
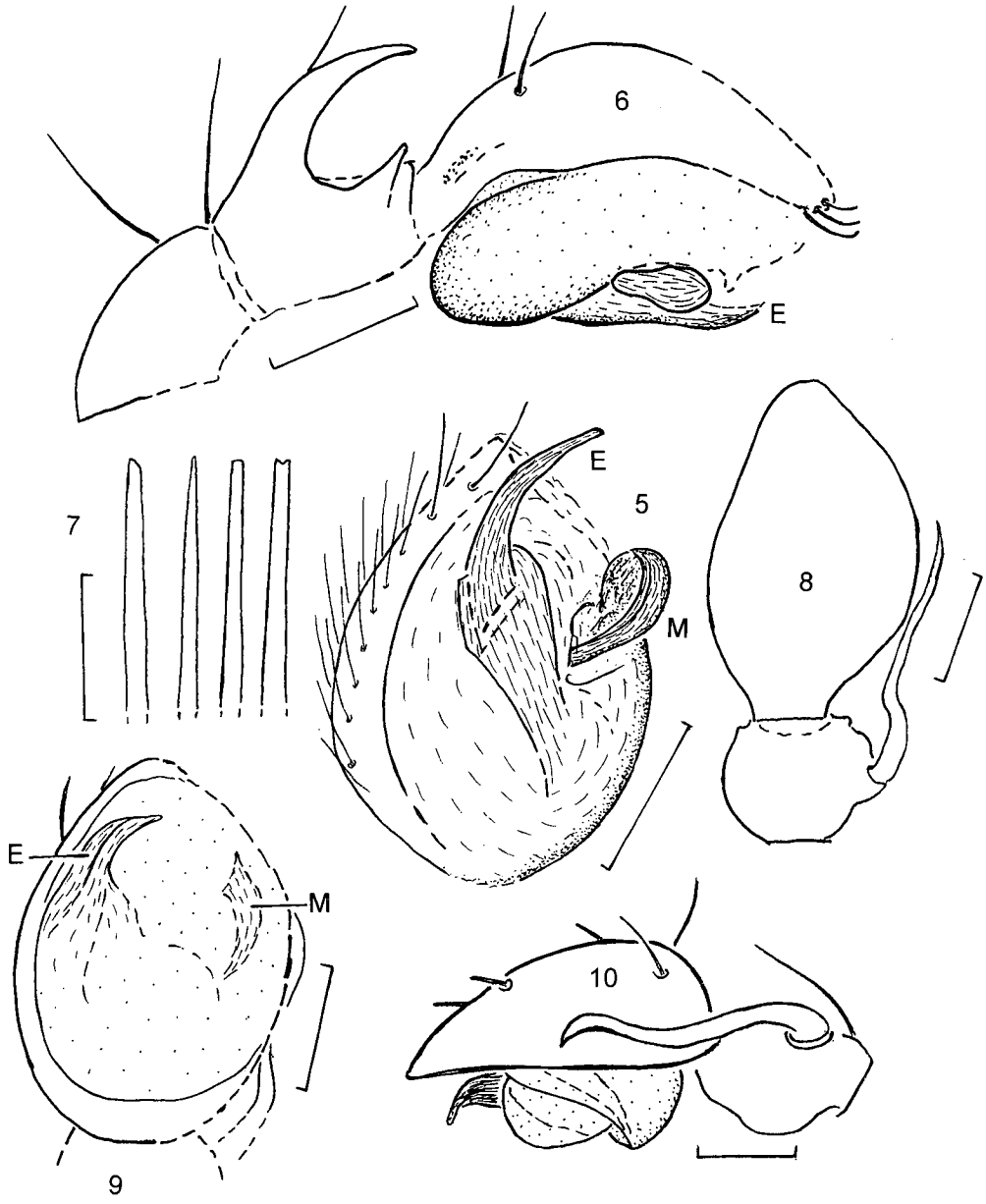


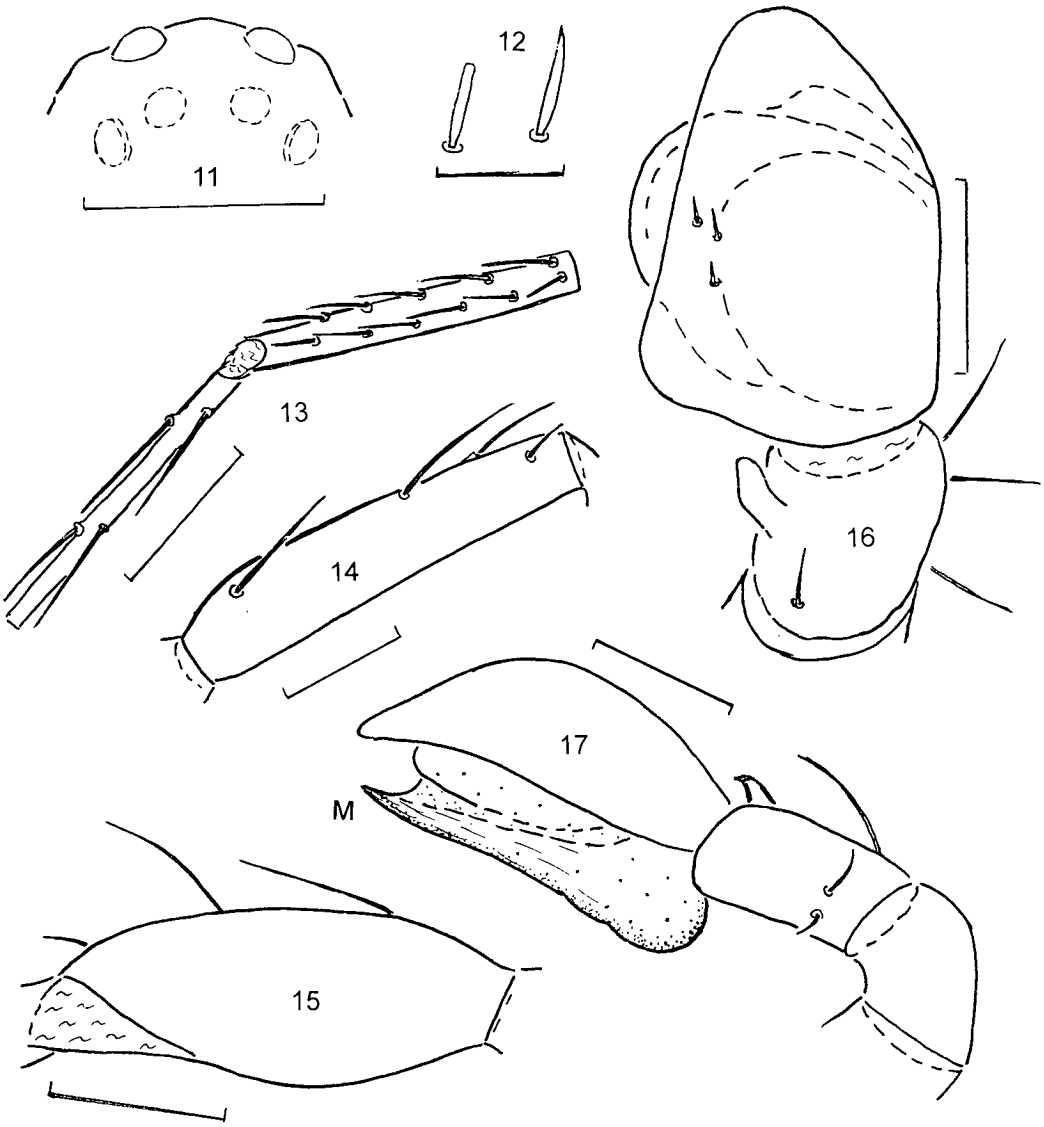
Figs. 1-2: *Apostenus fuscus* WESTRING 1851; 1) l. ♂-pedipalpus, ventral aspect; 2) ♀, epigyne. Taken from GRIMM (1986: Figs. 39b, 40); extant;

figs. 3-4: ***Apostenus arnoldorum* n. sp.**, ♂, holotype; 3) position of the eyes, dorsal aspect; 4) r. pedipalpus retrolaterally (the bulbus structures are partly hidden). M = median apophysis. M = 0.2mm;



figs. 5-6: ***Apostenus bigibber* n. sp.**, ♂; 5) paratype coll. GRABENHORST, l. pedipalpus proventrally; 6) paratype F706, r. pedipalpus retrolaterally (only three of the apical cymbial hairs are drawn). E = embolus, M = median apophysis. M = 0.2;

figs. 7-10: *Apostenus spinimanus* KOCH & BERENDT 1854), ♂; 7) CJW, four different ventral opisthosomal spines; 8) holotype, tibia and cymbium of the r. pedipalpus, dorsal aspect (cymbial bristles not drawn); 9) CJW, l. pedipalpus, ventral aspect; 10) holotype, l. pedipalpus retrolateral aspect. E = embolus, M = median apophysis. M = 0.05 in fig. 7, 0.2 in the remaining figs.;



figs. 11-17: ***Palaeospinisoma femoralis*** **n. gen. n. sp.,** ♂; 11) position of the eyes, dorsal aspect; the anterior median eyes are probably absent; 12) two different ventral opisthosomal spines; 13) l. leg II proventrally; 14) r. femur IV prolaterally; 15) l. femur III retrolaterally; 16) l. pedipalpus, dorsal aspect (only three of the bristle-shaped cymbial hairs are drawn); 17) r. pedipalpus prolaterally. M = median apophysis. M = 0.03 in fig. 12, 0.5 in fig. 11, 13-15, 0.2 in figs. 16-17.

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

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Abstract: The fossil spider (Araneae) taxa of the family Corinnidae in Baltic and Dominican amber are listed; the following taxa of the subfamily Phrurolithinae are described from Baltic amber: *Ablator biguttatus* **n. sp.**, *A. curvatus* **n. sp.**, *A. deminuens* **n. sp.**, *A. depressus* **n. sp.**, *A. duomammillae* **n. sp.**, *A. inevolvens* **n. sp.**, *A. longus* **n. sp.**, *A. nonguttatus* **n. sp.**, *A. parvus* **n. sp.**, *A. robustus* **n. sp.**, *A. scutatus* **n. sp.**, *A. splendens* **n. sp.**, *A. triguttatus* (KOCH & BERENDT 1854) (sub *Ocypete*), *Alterphrurolithus* **n. gen.** with its type species *longipes* **n. sp.**, *Cryptoplanus bulbosus* **n. sp.**, *C. complicatus* **n. sp.**, *C. incidens* **n. sp.**, *C. paradoxus* PETRUNKEVITCH 1958, *C. sericatus* (KOCH & BERENDT 1854) (sub *Pythonissa*, **n. comb.**), *C. sinuosus* **n. sp.**, *Myrmecorinna* **n. gen.** with its type species *gracilis* **n. sp.**, *Protoorthobula* **n. gen.**, *P. bifida* **n. sp.** and *P. deelemanni* **n. sp.**; furthermore *Cornucymbium* **n. gen.** (?Corinninae) with its type species *C. insolens* **n. sp.** are described. - *Eomazax pulcher* PETRUNKEVITCH 1958 is redescribed. - Synonymy, n. comb. and transfers of spiders in Baltic amber: *Abliguritor* PETRUNKEVITCH 1942 = *Ablator* PETRUNKEVITCH 1942 (**n. syn.**), *Abliguritor niger* PETRUNKEVITCH 1942 and *Philodromus microcephalus* KOCH & BERENDT 1854 = *Ablator triguttatus* (KOCH & BERENDT 1854) (**n. syn.**), *Caduceator* PETRUNKEVITCH 1942 = *Ablator* (**quest. n. syn.**), *Philodromus squamiger* KOCH & BERENDT 1854 = *Ablator* sp. indet. (**n. comb.**), *Macaria procera* KOCH & BERENDT 1854 ?= *Eomazax pulcher* PETRUNKEVITCH 1958 (**quest. n. syn.**). - *Eodoter* PETRUNKEVITCH 1958 is transferred from Corinnidae to Clubionidae (**nov. transfer**), *Ablator lanatus* PETRUNKEVITCH 1958 is transferred to *Cryptoplanus* PETRUNKEVITCH 1958 (**n. comb.**). - *Veterator* PETRUNKEVITCH 1963 (fossil in Dominican and Mexican amber) is transferred with hesitation from the Corinnidae to the Trochanteriidae (**quest. nov. transfer**). - Myrmecomorph and probably mutillid fossil spider species are described.

Material: If not otherwise stated the material is kept in the collection of J. Wunderlich (CJW); in the future it will probably be deposited in the Senckenberg-Museum Frankfurt.

INTRODUCTION

Corinnidae - German name "Ameisen-Sackspinnen" = "ant-shaped sack-spiders" - are ecribellate, two-clawed and mainly tropical spiders which may hide in sacs of threads and which are related to the families Clubionidae and Liocranidae. Most members resemble and "imitate" Hymenoptera in their body shape and in their behaviour; they are ant-shaped (myrmecomorph): Especially the fossil genera *Castianeira* and *Eomazax* - see WUNDERLICH (1988, 2002), the photos and figs. 42-44 - or they resemble mutillid wasps (they are mutillimorph): Probably the genus *Ablator*, see the photos and the paper on myrmecomorphy in this volume.- Some Corinnidae resemble the Zodariidae which most often are three-clawed, see the paper on this family in this volume. - Habitats and biotopes of the Corinnidae are diverse: They live the ground in litter and under stones as well as in higher strata of the vegetation, on leaves of bushes, on branches of trees or under bark. - In contrast to the statement of PETRUNKEVITCH (1958: 317) fossil members of the family Corinnidae in Baltic amber are not rare, I know seven genera, which are members of the subfamily Phrurolithinae with the exception of *Cornucymbium* n. gen. which may be a member of the Corinninae. From Dominican amber members of the subfamilies Castianeirinae, Corinninae and Trachelinae are known.

TAXONOMY

In former times Corinnidae (= Myrmeciidae) was regarded as a subfamily of the Clubionidae, and fossil Corinnidae were erroneously described in the families Clubionidae, Gnaphosidae or Philodromidae (*Ablator*). The relationships - e.g. to the Liocranidae - and the limitation of the family Corinnidae are not clear. In this paper I follow PENNIMAN (1985); see DEELEMAN-REINHOLD (2001) and BOSSELAERS & JOCQUE (2002); the latter authors include the genus *Apostenus* WESTRING 1851 and related genera (probably the subfamily Cybaeodinae SIMON 1893) in the "Corinnidae" (s. l.) which they regard as polyphyletic. (The type genus of the Cybaeodinae - *Cybaeodes* SIMON 1878 - was originally described in the Gnaphosidae (sub Drassidae) by SIMON but is now regarded as a member of the Liocranidae by PLATNICK, see the paper on the family Liocranidae in this volume). E. SIMON regarded some myrmecomorph Corinnidae as related to the genus *Micaria* WESTRING 1851 (Gnaphosidae).

Diagnosis of the family Corinnidae: Cuticula scale-shaped (fig. 12) - similar to fig. 200 in the book of WUNDERLICH (1986) -, punctuated to rugose (in all taxa?), the female median spinnerets bear 2-5 large cylindrical gland spigots, the posterior spinnerets bear 2 such spigots (figs. 2-3, 58), tarsi usually with claw tufts (not in Castianeirinae), frequently ant-shaped (myrmecomorph) spiders (fig. 44) which may possess dorsal (and frequently ventral) opisthosomal scuta (fig.44). Photos 384-385.

Further characters and variability (see the tab. of the subfamilies below): Ecribellate, two-clawed, anterior spinnerets short, conical and close together, the female median spinnerets may be depressed laterally (fig. 3), the eye field is usually narrow, autotomy occurs between coxa and trochanter, the opisthosoma may bear white patches (photo). Patellar and ventral tibial bristles may be reduced (figs. 21, 31) or even absent, the posterior median eyes may be oval (fig.10), the gnathocoxae may have ventral depressions (fig. 46), the femur of the ♂-pedipalpus may be modified, bent or with hump (figs. 6, 25, 40).

Relationships: In the related families Clubionidae and Liocranidae the cuticular structure is not scale-shaped (similar to fig. 200 in the book of WUNDERLICH (1986)) but it bears tiny furrows (similar to fig. 203 in the book of WUNDERLICH (1986)), similar e.g. to Gnaphosidae and the spinnerets are different. Furthermore in the Clubionidae the eye field is usually very wide and opisthosomal scuta are absent (*Clubiona pala* DEELEMAN-REINHOLD 2001 is an exception), in the Liocranidae opisthosomal scuta are absent, too, in the Gnaphosidae they are absent or present; see the paper on the family Liocranidae in this volume.

Distribution: Cosmopolitical.

The four subfamilies may be distinguished by the following selected characters:
(Leg scopulae are absent in some taxa of other subfamilies than Castianeirinae, too)

character	Corinninae	Castianeirinae	Trachelinae	Phrurolithinae
usual length of legs I and IV	I>IV (not in *Cornucymbium*)	IV>I	I>IV	IV>I (not in *Teutamus*)
shape of the post. median eyes	circular	circular	circular	oval or circular
special characters	usually powerful and protruding chelicerae	distinctly sclerotized tracheal openings, usually absence of leg scopulae and claw tufts; cymbium long, absence of the median apophysis; distal origin of the embolus	usually no bristles but cusps of leg I-II, wide caput and eye field (fig. 1)	scaly leg hairs (fig. 13), gnathoc. depressions (fig.46), modified/bent femur of the ♂-pedip. & laterally compressed median ♀ spinnerets may be present

(1) Corinnidae in Dominican amber

The following taxa have been described: (a) Castianeirinae: *Castianeira tenebricosa* WUNDERLICH 1988 and probably *Chemmisomma dubia* WUNDERLICH 1988; (b) Corinninae: *Megalostrata grandis* WUNDERLICH 1988 and *Corinna flagelliformis* WUNDERLICH 1988; (c) Trachelinae: *Trachelas poinari* PENNEY 2001 (fig. 1). - In my opinion the genus *Veterator* PETRUNKEVITCH 1963 - see WUNDERLICH (1988: 205-215) - is - e.g. according to the absence of retroventral tibial I-II bristles - not a member of the family Corinnidae but probably of the family Trochanteriidae (**quest. nov. transfer**).

(2) Corinnidae in Baltic amber

PETRUNKEVITCH 1958 regarded *Eodoter magnificus* PETRUNKEVITCH 1958 as a member of the Corinnidae (sub Corinninae), but according to the wide eye field and the absence of an opisthosomal scutum (according to PETRUNKEVITCH) I regard the genus as a member of the Clubionidae (**nov. transfer**); see the paper on the family Clubionidae in this volume. - *Ablator triguttatus* and *Protoorthobula bifida* are the most frequent species of the Corinnidae in Baltic amber.

Key to the fossil genera of the Corinnidae in Baltic amber:

Remarks: (1) *Caduceator* PETRUNKEVITCH 1942 (ad. ♂ unknown, see above) is not included. (2) The female is only known in *Protoorthobula*.

1 Posterior eye row distinctly recurved (fig. 10), posterior lateral eyes directed oblique backwards, no cymbial "horn", body length (♂) less than 6mm. 2

- Posterior eye row straight (fig. 93), cymbium with a pointed dorsal "horn" (fig. 95), body length (♂) 7mm. Photo 387 . . . . . *Cornucymbium*

2(1) Long ventral tibial and metatarsal I-II bristles present (fig. 38), only one dorsal femoral bristle, posterior median eyes oval as in *Ablator* (fig. 10), femur of the ♂-pedipalpus (fig. 40) with a ventral outgrowth. Photo 372 . . . . . *Alterphrurolithus*

- Long ventral tibial and metatarsal I-II bristles present, three dorsal femoral bristles (fig. 91), cymbium with a distinct outgrowth and spines (figs. 75, 78, 86, 90), posterior median eyes circular (fig. 80). Photos 373-375 . . . . . *Cryptoplanus*

- Usually short or tiny ventral tibial and metatarsal I-II bristles (figs. 4, 21) or bristles absent, rarely long ventral tibial I-II bristles present (fig. 57), two dorsal femoral bristles, posterior median eyes oval or circular, ventral pedipalpal femoral outgrowth absent. . . 3

3(2) Two pedipalpal tibial apophyses present (figs. 59, 69-71), epigyne as in fig. 64. . . . Photos 380-385. . . . . *Protoorthobula*

- No or one pedipalpal tibial apophysis present (e.g. figs. 5,23,39,47,54), ♀ unknown. . 4

4(3) Prosoma wide (photos), posterior median eyes oval (figs. 10, 12), gnathocoxae with a basal outgrowth (fig. 40), pedipalpal femur strongly curved (fig. 6). . . . . *Ablator* Photos 366-371

- Prosoma and opisthosoma slender (figs. 42, 44, 50), posterior median eyes circular, gnathocoxal outgrowth absent, pedipalpal femur straight. 5

5(4) Tarsal and metatarsal scopulae present (fig. 44), ventral, opisthosomal scutum present in adult spiders, bristles around spinnerets and thoracal fissure (fig. 42) absent. A retrolateral pedipalpal tibial apophysis is present (fig. 47) Photos 375-377. . *Eomazax*

- Tarsal and metatarsal scopulae and ventral opisthosomal scutum absent, bristles around spinnerets (fig. 52) and a low fovea (fig. 5) present. A prolateral pedipalpal tibial apophysis is present (fig. 54). Photos 378-379 . . . . . *Myrmecorinna*

(a) Phrurolithinae

In my opinion the taxon *Phrurolithus* sensu PETRUNKEVITCH 1958 is not closely related to *Phrurolithus* C. L. KOCH 1839. Three species of three subgenera of *Phrurolithus* (*Eophrurolithus, Laccolithus* and *Phrurolithus*) - all based on juvenile spiders (!) - were described by PETRUNKEVITCH (1958). These taxa may be members of the family Liocranidae; see the paper on this family in this volume. Adult spiders are needed for further investigations. - I regard *Caduceator* PETRUNKEVITCH 1942 (ad. ♂ unknown) as a questionable genus of the Phrurolithinae (?*Ablator*). An adult male is needed for sure conclusions.
Most Phrurolithinae are ground-living spiders but members of the genus *Plynnon* DEELEMAN-REINHOLD 2001 (extant, E- and SE-Asia) live in higher strata of the vegetation. Members of *Ablator, Cryptoplanus* and *Protoorthobula* may have lived in the Baltic amber forest in higher strata as well.

Most genera are treated in alphabetic order but *Cryptoplanus* at the end.

***Ablator* PETRUNKEVITCH 1942**

Type species: *Ocypete triguttata* KOCH & BERENDT 1854.

Synonymy: According to the outgrowth of the gnathocoxae and the male pedipalpal structures *Abliguritor* PETRUNKEVITCH 1942 is synonym with *Ablator* (**n. syn.**). *Anatone* MENGE 1854 - see the paper on the family Liocranidae in this volume - and *Caduceator* PETRUNKEVITCH 1942 may be synonym (**quest. n. syn.**). *Ablator lanatus* PETRUNKEVITCH = *Cryptoplanus lanatus* (**n. comb.**).

Diagnosis (♂; ♀ unknown): Median and posterior spinnerets reduced (figs. 16, 32) (in the female, too?), anterior spinnerets nearly cylindrical, close together and on a common pedestral (figs. 16, 32), the terminal article very short and retractible, posterior median eyes oval (figs. 10, 12), gnathocoxae with a basal outgrowth (fig. 28) and without a depression, ventral tibial I-II bristles short (figs. 4, 21, 31), patellar bristles and metatarsal I-II bristles absent, pedipalpus (e.g. figs. 6-7, 9, 34-36): Femur strongly curved, conductor large and divided, two tegular apophyses present, embolus long.

Description (further characters): Prosoma nearly as wide as long (photo), margin rebordered, cuticular structure of prosoma and legs fine scale-shaped (fig. 12), fovea distinct, posterior eye row recurved or straight (figs. 10, 12), clypeus about as long as 1 1/2 diameters of an anterior median eye, labium free (fig. 28), myrmecomorph or mutillimorph (photos), legs slender, order usually IV/I/II/III, I, II and IV may have the same length, the femora bear 2 dorsal bristles and I a prodistal bristle (further additional bristles are occasionally present), scopulae on tibiae, metatarsi and tarsi, claw tufts, metatarsal III-VI preening hairs and scales on the legs present, tarsal trichobothria long, more than one row, paired tarsal claws toothed and strongly curved, autotomy between coxa and trochanter, a large dorsal opisthosomal and an epigastral scutum are present (no scuta behind the epigaster), colulus absent, cymbium scopulate (fig. 15). Colour (see the photos): The dark opisthosoma bears usually three patches of white hairs, one above the spinnerets and a pair in or just behind the middle of the length (the hairs may be rubbed off), the legs not annulated. The stout body and the three opisthosomal patches may lead to the opinion that these spiders did not mimic ants but mutillid wasps.

Relationships: PETRUNKEVITCH (1942) regarded *Ablator* as a member of "his" - and SIMONS - Micariinae within "his" Clubionidae - *Micaria* is now regarded as a taxon of the Gnaphosidae - but according to the scale-shaped structure of prosoma and legs, the absence of a gnathocoxal depression and the different spinnerets *Ablator* is not a member of the Clubionidae or Gnaphosidae but more likely of the Corinnidae: Phrurolithinae in which the shape of the posterior median eyes may be oval, too, and the male pedipalpal femur may be modified but the median spinnerets are large and laterally compressed in the female and the posterior spinnerets are usually not reduced. Size and shape of the median spinnerets of the ♀ of *Ablator* - which is still unknown - may help to clear the relationships of this taxon.- Relationships to other fossil genera: See the key.

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

Key to the species of the genus Ablator (♂):

Remark: In most species the proventral tibial I bristles are 0.05-0.08mm long, in *depressus/splendens* 0.12/up to 0.15mm, in *biguttatus* about 0.2mm, in *inevolvens* unknown.

1 Pedipalpal tibial apophysis absent (fig. 11), ventral tibial I bristles short. . . .*deminuens*

- Pedipalpal tibial apophysis present (figs. 5, 33), ventral tibial I bristles long or short. . .2

2(1) A distinct depression behind the posterior eye row is present (fig. 12), pedipalpus figs. 14-15. . . . . *depressus*

- No distinct depression behind the posterior eye row, pedipalpus different. 3

3(2) Proventral bristles on tibia I about 0.2mm long (fig. 4), ♂-pedipalpus figs. 5-8. . . . . *biguttatus*

- Proventral bristles on tibia I 0.03-0.12mm long (figs. 21, 31), pedipalpus different. . . . 4

4(3) Pedipalpal tibial apophysis longer than the tibia (fig. 30). . . . . *splendens*

- Pedipalpal tibial apophysis shorter than the tibia (e.g. fig. 23) or as long as the tibia (fig. 9). 5

5(4) Tegulum very large and strongly protruding (figs. 18, 27). 6

- Tegulum different (e.g. figs. 19, 33-36). 7

6(5) Pedipalpus as in fig. 17. . . . . *duomammillae*

- Pedipalpus as in fig. 27, the tegulum bears a hump. . . . . .*robustus*

7(5) Tegular apophysis distinctly sickle-shaped, origin of the embolus more distally (figs. 19, 29). 8

- Tegular apophysis not sickle-shaped (e.g. figs. 9, 26, 35). 9

8(7) Pedipalpus as in fig. 19. . . . . *inevolvens*

- Pedipalpus as in fig. 29, tegular apophysis less bent. . . . . .*scutatus*

9(7) Origin of the embolus in the distal half of the bulbus (fig. 24). . . . . *nonguttatus*

- Origin of the embolus in the basal half of the bulbus (e.g. figs. 9, 22, 26). 10

10(9) Distal branch of the conductor slightly bent (fig. 22). . . . . .*longus*

- Distal branch of the conductor strongly bent (figs. 9, 26, 35). 11

11(10) Bulbus as in fig. 9, with a long central tegular apophysis. . . . . *curvatus*

- Bulus as in figs. 26, 35, with a short central tegular apophysis. 12

12(11) Pedipalpus as in figs. 25-26. . . . . *parvus*
- Pedipalpus as in figs. 33-36. . . . . *triguttatus*

***Ablator biguttatus* n. sp.** (figs. 4-8) Photos 366-367

Material: Holotypus in Baltic amber, F21/BB/AR/COR/CJW.

Preservation and syninclusions: The spider is well preserved and ventrally partly covered by a white emulsion. The left leg II is broken off behind the coxa (autotomy) and lays now at the left side below the spider. The right tarsi I-III are sharply bent to the right side on an amber layer. Left of the spider a small Collembola is preserved; numerous stellate hairs are present, too.

Diagnosis (♂; ♀ unknown): Ventral tibial I bristles relatively long (0.2mm), pedipalpus (figs. 5-8): Tibial apophysis basally wide and slightly bent, tegular apophysis large, the slender distal branch is directed apically.

Description (♂):
Measurements (in mm): Body length 3.5, prosoma: Length 1.8, width 1.6, tibia I 1.5, tibia IV 1.4, ventral tibial I bristles 0.2.
Colour dark brown, opisthosomal patches indistinct. - Prosoma as in *splendens*, labium free. - Legs fairly slender, as in the genus; tibia I with longer bristles (fig. 4). - Opisthosoma completely covered with a scutum. Only the anterior spinnerets are observable. - Pedipalpus (figs. 5-8; see above): Femur distinctly bent, bulbus with at least two apophyses besides the tegular apophysis, embolus hard to observe.

Relationships: See *A. nonguttatus* n. sp. and the key. In *A. triguttatus* the ventral tibial I bristles are shorter, the pedipalpal tibial apophysis is more slender and straight, the embolus is free observable and in a more basal position.

Distribution: Tertiary Baltic amber forest.

***Ablator curvatus* n. sp.** (fig. 9)

Material: Holotypus ♂ in Baltic amber, F668/BB/AR/COR/CJW.

Preservation and syninclusions: The spider is well and nearly completely preserved, the tip of the left tarsus IV, the apical part of the right femur I and the basal half of the tight patella I are cut off. Some dorsal parts of the body are covered by a white emulsion, the ventral side is hidden by a white emulsion and an amber layer. The spider's legs are stretched out, the spider was captured alive in the resin. Both bulbi are partly expanded. - A tiny juvenile spider, a small fly, remains of insects, particles of detritus as well as stellate hairs are preserved in the same piece of amber.

Diagnosis (♂; ♀ unknown): Ventral tibial I bristles short; pedipalpus (fig. 9) with a large and strongly bent conductor, a long and pointed central tegular apophysis which is directed to the tip of the cymbium and a long and strongly curved embolus are present.

Description (♂):
Measurements (in mm): Body length 4.7, prosoma: Length 2.2, width 1.9, tibiae I, II and IV about 1.7, tibia III 1.4, ventral tibial I bristles nearly 0.15.
Colour and body as in the genus, opisthosoma 1.6 times longer than wide. Tibia I bears at least 6 pairs of fairly short bristles similar to *A. longus*. - Pedipalpus: See above; the tibial apophysis is about as long as the tibia.

Relationships: In A. *splendens* tibia I is only 1.45mm long and the conductor is smaller.

Distribution: Tertiary Baltic amber forest.

***Ablator deminuens* n. sp.** (figs. 10-11)

Material: Holotypus ♂ in Baltic amber and a separated piece of amber, F26/BB/AR/COR/CJW.

Preservation and syninclusions: The spider is well and nearly completely preserved, only parts of the right tarsi I and II and the left leg II are cut off. The opisthosoma is completely covered by an emulsion, parts of prosoma and legs are covered, too. Beneath the prosoma larger bubbles are preserved, and below the right leg II a small Diptera, in both amber pieces several tiny Nematoda and stellate hairs are present.

Diagnosis (♂; ♀ unknown): Ventral bristles of tibia I very short and hair-shaped, pedipalpal tibial apophysis absent (fig. 11), tegulum strongly protruding.

Description (♂):
Measurements in mm): Body length 4.1, prosoma: Length 1.7, width 1.6, tibia I 1.55, tibia IV 1.6.
Colour: Prosoma and legs dark brown (opisthosoma hidden).
Prosoma nearly as wide as long, with few hairs and a long foveal fissure. Eyes (fig. 10): Posterior row only slightly recurved, posterior median eyes separated by less than one diameter. Legs fairly stout, as in the genus; ventral bristles of tibia I very short and hair-shaped, short ventral bristles on tibiae II-III, few longer ventral bristles on tibia IV. Opisthosoma 1.5 times longer than wide; the spinnerets are hidden. Pedipalpus: See above. Most parts of the bulbus are hidden.

Relationships: See the key.

Distribution: Tertiary Baltic amber forest.

***Ablator depressus* n. sp.** (figs. 12-15) Photo 368

Material: Holotypus ♂ in Baltic amber, F666/BB/AR/COR/CJW.

Preservation and syninclusions: The spider is well preserved, the colour, too; its legs are stretched out on a layer of the fossil resin; the right patella IV and the tip of the left tarsus IV are cut off; there are some white emulsions on the ventral side of the body. - Some stellate hairs and a small seed scale of a ?Pinaceae are also preserved.

Diagnosis (♂; ♀ unknown): Prosoma with a distinct depression behind the eye field (fig. 12), length of the proventral tibial bristles up to 0.15mm, pedipalpus (figs. 13-15): Tibial apophysis of medium length, tegulum not strongly outstanding; most parts of the embolus are hidden.

Description (♂):
Measurements (in mm): Body length 3.9, prosoma: Length 1.95, width 1.7, tibia I and IV 1.7, length of the ventral tibial I bristles 0.08-0.15.
Colour (photo): White patches distinct, position of the paired patches in the middle of the length. Prosoma (fig. 12, photo) with a distinct depression behind the eye field. Posterior median eyes distinctly oval. Gnathocoxae stout and with a large retrobasal outgrowth as in the related species. Length of the ventral tibial I bristles variable, see above, a scale of a leg: Fig. 13. The right femur III bears a pair of basal-lateral bristles.

Relationships: In the remaining species of Ablator a prosomal depression is absent or very indistinct (in *robustus*); see the key.

Distribution: Tertiary Baltic amber forest.

***Ablator duomammillae* n. sp** (figs. 16-18)

Material: Holotypus ♂ in Baltic amber, F664/BB/AR/COR/CJW.

Preservation and syninclusions: The spider is only fairly well preserved in an amber piece which most probably was heated; the left leg II is lost behind the coxa by autotomy, the middle ventral part of the opisthosoma is covered by a white emulsion, some stellate hairs are present.

Diagnosis (♂; ♀ unknown): ventral tibial I bristles very short; pedipalpus (figs. 17-18; parts are hidden) with a large and protruding tegulum, the questionable embolus is thick.

Description (♂):
Measurements (in mm): Body length 3.0, prosoma: Length 1.5, width 1.35, tibia I and IV

1.3, ventral tibial I bristles about 0.03.
Colour dark brown, no opisthosomal patches are observable (haits rubbed off?).
Prosoma as in the genus, gnathocoxae stout, retrobasal outgrowth observable. Legs fairly stout, ventral tibial I bristles very short and indistinct. Only the anterior pair of spinnerets is observable on its pedestrial (fig. 16); the remaining spinnerets are probably strongly reduced or even absent.

Relationships: The bulbus structures are similar in *robustus* but the shape of conductor and tegular apophysis are different and the tegulum of *robustus* bears a hump; the tibial apophysis is shorter than in *splendens*.

Distribution: Tertiary Baltic amber forest.

***Ablator inevolvens* n. sp**. (fig. 19-20)

Material: Holotypus ♂ in Baltic amber, F181/BB/AR/COR/CJW.

Preservation and syninclusions: The spider is well preserved, both legs I are lost behind the coxa by autotomy, the right leg I is cut off through the femur, the right patella IV is cut off, ventral parts of the opisthosoma are covered by a white emulsion. - Thin threads of silk are present e.g. between the left tibia II and the left femur III. A Diptera: Nematocera, detritus particles and stellate hairs are present, too.

Diagnosis (♂; ♀ unknown): Pedipalpus (figs. 19-20) with a short tibial apophysis, tegulum not protruding, tegular apophysis strongly curved.

Description (♂):
Measurements (in mm): Body length about 3.5, prosoma: Length about 1.75, width 1.55 (tibiae I are lost), tibia IV 1.66.
Colour and body as in the genus; opisthosomal patches distinct, ventral tibial II bristles very short. Pedipalpus (figs. 19-20, see above): The right pedipalpus is incompletely developed, the femur is only 0.4mm long (the left femur is 0.65mm long) and nearly straight, a tibial apophysis is absent, the tarsus has not moult, its lenght is 0.4mm, hairs are present, ventrally, too (fig. 20).

Relationships: See the key.

Distribution: Tertiary Baltic amber forest.

***Ablator longus* n. sp**. (figs. 21-22)

Material: Holotypus in Baltic amber, F667/BB/AR/COR/CJW.

Preservation and syninclusions: The spider is well and completely preserved on an amber layer; its legs are stretched out, the ventral side is heavily and the dorsal side weakly covered by a white emulsion. - A male of *Orchestina* sp. indet. (Araneae: Oonopidae), two Diptera: Nematocera (just in front of the holotype), as well as airbag pollen grains and stellate hairs are preserved in the same piece of amber.

Diagnosis (♂; ♀ unknown): Long-legged spiders (tibia I is 1.5mm long), ventral tibial I bristles indistinct (fig. 21); pedipalpus as in fig. 22, the tegular apophysis bears a tooth, the distal branch of the conductor is only slightly bent.

Description (♂):
Measurements (in mm): Body length 4.1, prosoma: Length 2.05, width 1.9, tibia I 1.5, ventral tibial I bristles up to 0.1mm long.
Colour and body as in the genus, tibial bristles fig. 21, opisthosoma slender, pedipalpal tibial apophysis probably short (hidden), embolus slender.

Relationships: See the key.

Distribution: Tertiary Baltic amber forest.

***Ablator nonguttatus* n. sp.** (figs. 23-24)

Material: Holotypus ♂ in Baltic amber, F3/BB/AR/COR/CJW.

Preservation and syninclusions: The spider is completely preserved, the ventral side of the body and dorsal parts of the opisthosoma are covered by a white emulsion. Most dorsal parts of the prosoma bear a silvery cover, the front is dark brown. The right bulbus shows a torsion so that the ventral side is directed dorsally. - 5 1/2 Diptera and parts of stellate hairs are preserved in the same piece of amber.

Diagnosis (♂; ♀ unknown): Opisthosoma probably without dorsal white patches (haires rubbed off?), ventral tibial I bristles very short (similar to fig. 31). Pedipalpus (figs. 23-24): Tibial apophysis shorter than the length of the tibia, embolus strongly bent, in a distal position, tegular apophysis directed medially.

Description (♂):
Measurements (in mm): Body length 4.0, prosoma: Length 1.8, width 1.7, tibiae: I 1.55, II 1.45, III 1.2, IV 1.55.
Colour: Prosoma silvery and dark brown (see above), legs dark brown, opisthosomal scutum dark brown, white patches absent (hairs rubbed off?).
Prosoma slightly longer than wide, few hairs only, thoracal fissure long. Posterior eye row fairly recurved. Legs fairly stout, ventral tibial bristles very short, similar to fig. 31. The opisthosoma is completely covered with a dorsal scutum. Pedipalpus (figs. 23-24):

Femur distinctly bent, tibia with long and strong hairs, tibial apophysis as in *triguttatus*, embolus strongly bent and in a distal position, bulbus with several apophyses.

Relationships: In *biguttatus* n. sp. the opisthosoma bears a pair of patches and the tegular apophysis is directed apically, the bulbus structures are quite different.

Distribution: Tertiary Baltic amber forest.

***Ablator parvus* n. sp.** (figs. 25-26)

Material: Holotypus ♂ in Baltic amber, F669/BB/AR/COR/CJW.

Preservation and syninclusions: The spider is only fairly well preserved between amber layers and bubbles, the autotomized left leg IV is placed left of the spider, dorsal and ventral parts of body and legs are covered by a white emulsion. - Few stellate hairs.

Diagnosis (♂; ♀ unknown): Ventral tibial I bristles very short and indistinct. Pedipalpus (figs. 25-26) with strongly curved conductor and embolus, central tegular apophysis slender and directed medially.

Description (♂):
Measurements (in mm): Body length 3.8, prosomal length 1.6, tibia II 1.35.
Colour, body and legs as in the genus, the ventral tibial I bristles are very short and indistinct. Pedipalpus: See above, the tibial apophysis is straight and fairly short.

Relationships: See the key. In *A. triguttatus* the origin of the embolus is more basally.

Distribution: Tertiary Baltic amber forest.

***Ablator robustus* n. sp**. (fig. 27)

Material: Holotypus ♂ in Baltic amber, F665/BB/AR/COR/CJW.

Preservation and syninclusions: The spider is fairly well preserved in an amber piece which most probably was heated. The right leg I and the left leg IV are cut off through the femur, the right leg IV is cut off at the end of the tibia; some tarsi are partly cut off. - Some stellate hairs are present in the same piece of amber.

Diagnosis (♂; ♀ unknown): Ventral tibial I bristles short, up to 0.8mm long. Pedipalpus

(fig. 27) with a large tegulum which is strongly protruding and bears a basal hump; the embolus is hidden.

Description (♂):
Measurements (in mm): Body length 4.4, prosoma: Length 2.1, width 1.9, tibia I 1.7.
Colour dark brown, opisthosomal patches indistinct. Body and legs as in the genus, tibial bristles and pedipalpus: See above, pedipalpal tibial apophysis short.

Relationships: See the key.

Distribution: Tertiary Baltic amber forest.

***Ablator scutatus* n. sp.** (figs. 28-29) Photo 369

Material: Holotypus ♂ in Baltic amber and a separated amber piece, F27/BB/AR/COR/CJW.

Preservation and syninclusions: The spider is well preserved, only very few parts are covered by a white emulsion. The left leg II is missing, the right leg I is cut off through the femur, the right leg II is loose and laying besides the spider, dorsal parts of the prosoma are hidden by a layer of amber. - Numerous stellate hairs, some excrement balls and a tiny Diptera are present with the spider, beneath the left femur I a tiny arthropod is preserved.

Diagnosis (♂; ♀ unknown): Posterior eye row distinctly recurved. Pedipalpus (fig. 29): Tibial apophysis as in *triguttatus* (fig. 33), embolus originating near the centre of the bulbus.

Description (♂):
Measurements (in mm): Body length 3.4, prosoma: Length 1.6, width 1.5, leg I: Femur 1.45, patella 0.65, tibia 1.6, metatarsus 1.15, tarsus 0.95, leg IV: Femur 1.7, patella 0.65, tibia 1.55, metatarsus 1.65, tarsus 0.95.
Colour: Dark brown; patches of white opisthosomal hairs are unknown,
Prosoma nearly as wide as long, with tiny wrinkles and few hairs. Posterior eye row distinctly recurved: Position of the posterior lateral eyes completely behind the posterior median eyes. Retrobasal outgrowth of the gnathocoxae distinct (fig. 28). Legs robust, ventral tibial I bristles very short, similar to fig. 31. Opisthosoma 1.7 times longer than wide, dorsally (one scutum) and ventrally covered nearly completely with two scuta, laterally with distinct furrows; spinnerets short. Pedipalpus: See above.

Relationships: See the key.

Distribution: Tertiary Baltic amber forest.

***Ablator splendens* n. sp.** (fig. 30) Photo 370

Material: Holotypus ♂ in Baltic amber and a separated piece of amber, F4/BB/AR/COR/CJW.

Preservation and syninclusions: The spider is well and completely preserved, the opisthosoma is ventrally covered by a white emulsion and some bubbles. Right of the spider a small Diptera is present and beneath the spider half a dozen eggs - from a Diptera (?) -; few stellate hairs.

Diagnosis (♂; ♀ unknown): Pedipalpus (fig. 30): Tibial apophysis longer than the tibia, bulbus with a prominent apophysis, origin of the embolus not basally, conductor of medium size.

Description (♂):
Measurements (in mm): Body length 3.5, prosoma: Length 1.8, width 1.6, tibia I 1.5, tibia IV 1.45.
Colour: Prosoma dark brown around the eyes; most parts have a silvery-metallic cover, legs and opisthosomal scutum dark brown; no white opisthosomal patches are observable. Prosoma with few hairs and a long thoracal fissure, posterior eye row fairly recurved, posterior median eyes oval, separated by one diameter. Legs fairly robust, ventral tibial I bristles up to 0.12mm long. Opisthosoma covered with numerous short hairs, completely covered with a large scutum.

Relationships: See the key and *A. curvatus*.

Distribution: Tertiary Baltic amber forest.

Ablator triguttatus (KOCH & BERENDT 1854) (sub *Ocypete triguttata*) (figs. 31-37)

Photo 371

Synonyms: *Philodromus microcephalus* KOCH & BERENDT 1854 (**n. syn.**); questionable synonyms: *Philodromus squamiger* KOCH & BERENDT 1854 (holotype ?juv. ♀, PMHUB) (**quest. n. syn.**); *Abligurator niger* PETRUNKEVITCH 1942 (**quest. n. syn.**). - The material described by PETRUNKEVITCH (1942, 1958) sub *A. triguttatus* may be conspecific; a revision is needed.
Ablator lanatus PETRUNKEVITCH 1958 is transfered to *Cryptoplanus* PETRUNKEVITCH 1958 (Liocranidae) (**n. comb.** & **n. transfer**) (see the paper on the family Liocranidae in this volume).

Material (in Baltic amber) (see above): Holotypus ♂ coll. BERENDT no. 7236, PIHUBerlin; 1♂ GPIUHamburg; 1♂ PIGöttingen no. 15.678; 1♂ PIMoscow; 1♂ PIParis no.

549; 20♂ incl. 1 ♂ from the Bitterfeld deposit (all conspecific?) CJW, e.g. F5, F6, F22, F23, F185/BB/AR/COR/CJW. - As the first revising author of *Philodromus microcephalus* I select from two male syntypes in the PIHUBerlin no. MB.A.178 as the lectotype and no. MB.A.179 as *Ablator* sp. indet.

Remark: The right leg I of the male F185 is a distinctly shortened regenerate, bristles are absent.

Diagnosis (♂; ♀ unknown): Short ventral tibial I bristles (0.08-0.1mm long), pedipalpus (figs. 32-37): Tibia with a slender, straight and fairly long apophysis, embolus originating in the basal half of the bulbus, strongly curved, conductor large and sickle-shaped.

Description (♂):
Prosomal length 1.7-2.0mm, three white dorsal opisthosomal patches present (indistinct in some males); tibial I bristles and pedipalpus: See above.

Relationships: See the key.

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

***Alterphrurolithus* n. gen.**

Diagnosis (♂; ♀ unknown): Body shape fairly myrmecomorphic, caput narrow, posterior median eyes oval as in *Ablator*, tibia and metatarsus I-II with long paired bristles (fig. 38), only one dorsal - the basal - femoral bristle present, gnathocoxae short, without a depression, pedipalpal femur with a ventral outgrowth (fig. 40).

Relationships: In the other fossil genera in Baltic amber two dorsal femoral bristles are present, long ventral bristles of the legs I-II and a ventral outgrowth of the pedipalpal femur are absent. In the extant genus *Phrurolithus* C. L. KOCH 1839 the leg bristles, the shape of the posterior median eyes and the outgrowth of the pedipalpal femur are similar but a prodistal femoral I-II leg bristle,a large pedipalpal tibial apophysis and a strongly outstanding bulbus are present, a dorsal femoral bristle is absent. In the extant American genus *Phrurotimpus* CHAMBERLIN & IVIE 1938 the pedipalpal tibial apophysis and the tegulum are large as in *Phrurolithus*. In the extant European genus *Phrurolinillus* WUNDERLICH 1995 two pedipalpal femoral humps and two pedipalpal tibial apophyses are present.

Type species: *Alterphrurolithus longipes* n. sp., the only known species of the genus.

Distribution: Tertiary Baltic amber forest.

***Alterphrurolithus longipes* n. gen. n. sp.** (figs. 38-41) Photo 372

Material: Holotypus ♂ in Baltic amber and a separated piece of amber, F686/BB/AR/COR/CJW.

Preservation and syninclusions: The spider is very well and completely preserved, the ventral side is partly covered by a white emulsion. A stellate hair is present beneath the left coxa I.

Diagnosis (♂; ♀ unknown): Legs long, pedipalpus figs. 39-41.

Description (♂):
Measurements (in mm): Body length 3.25, prosoma: Length 1.5, width 1.2, leg I: Femur about 1.0, patella 0.6, tibia 1.55, metatarsus 1.35, tarsus 0.9, tibia II 1.25, tibia III 0.9, tibia IV 1.65.
Colour dark brown, legs not annulated, remains of white hairs are present on the opisthosoma. Prosoma 1.25 times longer than wide, with indistinct hairs, caput narrow similar to *Ablator*, thoracal fissure short but distinct, eyes of medium size, anterior medium eyes largest, separated by their radius, posterior row straight, posterior median eyes oval similar to Ablator (fig. 10), separated by less than one diameter. Chelicerae in a vertical position, of medium size, fangs slender, sternum and labium wide (partly hidden), gnathocoxae wide, without a depression. - Legs fairly long and slender, order IV/I/II/III, hairs short and indistinct, the femora bear only one dorsal bristle in the basal half, a prodistal bristle is absent. Patellae britleless, tibiae I-II with 7 pairs, metatarsi I-II with 4 pairs of long ventral bristles (fig. 38), the tibiae III-IV bear short ventral-apical bristles, the metatarsi III-IV are bristleless. Metatarsal III preening hairs well developed, scopulae absent, claw tufts fairly well developed, claws with several long teeth. - Opisthosoma 1.85 times longer than wide, covered with short hairs and a large scutum (about 3/4 of its length, epigastral scutum present, post-epigastral scutum absent. Anterior and posterior spinnerets large, anterior spinnerets two-jointed, both articles conical, apical article short. - Pedipalpus (figs. 39-41): Femur with a larger and blunt ventral outgrowth in the distal half, retroapical tibial apophysis long and slightly bent, cymbium slender, bulbus fairly outstanding, most structures are hidden.

Relationships: See above.

Distribution: Tertiary Baltic amber forest.

Eomazax PETRUNKEVITCH 1958

Diagnosis: Body distinctly ant-shaped (myrmecomorph) in adult spiders, with a long and cylindrical opisthosoma which possesses a saddle-shaped inclination (arrow in fig. 44) - see WUNDERLICH (2002: 355-356, fig. 1) and the photos -, thoracal fissure ab-

sent, no tibial I-II bristles. Posterior median eyes circular, posterior eye row recurved (fig. 45) in contrast to fig. 42. ♂-pedipalpus (figs. 47-49): Femur without modifications, cymbium scopulate, median apophysis in a distal position, conductor most probably absent, embolus in a prolateral position.

Relationships: PETRUNKEVITCH (1958) regarded *Eomazax* as a member of "his" Clubionidae: Micariinae but according e.g. to the scale-shaped structure of the prosomal cuticula, the width of the eye field, the circular posterior median eyes, the shape of the spinnerets, the male chelicerae and the long legs IV *Eomazax* is a member of the Corinnidae: Phrurolithinae but not of the Clubionidae or Gnaphosidae. I do not know a strongly related extant genus. - *Myrmecorinna* n. gen. is distinctly myrmecomorph, too, but the position of the chelicerae is obliquely protruding, bristles around the spinnerets are present, a leg scopula is absent, the pedipalpal tibial apophysis is longer and a median apophysis is absent.

Type species: *Eomazax pulcher* PETRUNKEVITCH 1958, the only known species besides the questionable ?*E. procera* (KOCH & BERENDT 1854) (= *Macaria p.*).

Distribution: Tertiary Baltic amber forest.

Eomazax pulcher PETRUNKEVITCH 1958 (figs. 42-49) Photo 376

Material (in Baltic amber): Holotypus of *Eomazax pulcher*, subad. ♂, PMHUBerlin (it is darkened by heating); 1♂ F1/BB/AR/COR/CJW, 1♀ F 1/BB/AR/COR/CJW, juv. ?♀ F682/BB/AR/COR/CJW; 1♂ (darkened by heating) Pal. Mus. Paris no. 4447; 2 juv. sub *Macaria procera* KOCH & BERENDT 1854 (no syntypes), PMHUBerlin no. MB.A. 135 and 136.

Synonymy: *Macaria procera* may be a senior synonym of *Eomazax pulcher* (**quest. n. syn.**). The holotype of *Macaria procera*, a male (fig. 42) is probably lost; the larger juvenile of the PMHUB may be congeneric or even conspecific with *procera*, the smaller juvenile is a member of another genus of the Corinnidae (gen. indet.). Remark: KOCH & BERENDT (1854) showed leg bristles in their fig. 55 (see fig. 43) but they wrote (p 63) "legs without bristles".

Remark on the holotype (subad. ♂) of *Eomazax pulcher*: The amber and the spider are darkened, the eyes are difficult to observe, opisthosomal scuta and anterior femoral bristles are not observable.

Diagnosis: See above. Male pedipalpus: Figs. 47-49.

Description (adult spiders of both sexes are described for the first time):
Measurements (in mm): Body length ♂ 5.2 (Mus. Paris) - 5.8 (F1), ♀ 7.2, prosoma: Length ♂ 2.4-2.7, ♀ 3.9, width ♂ (Mus. Paris) 1.6, ♀ about 2.0, legs: ♂ (F1): Femur

1.45, patella 0.6, tibia 1.3, metatarsus 0.95, tarsus 0.85, tibia II 1.2, tibia III 1.0, tibia IV about 1.45; ♀: Tibia I 1.3, metatarsus IV 1.9.
Colour: Grey to grey-brown; patches of white hairs are best preserved in the male F1 (fig. 44): The prosoma bears remains only but on the opisthosoma there are one patch anteriorly, one posteriorly and a pair in the middle of the length.
Body slender, prosoma one third longer than wide, cuticula very fine rugose, covered with very short indistinct hairs, thoracal fissure absent, eyes (fig. 45) small, anterior median eyes largest, posterior row distinctly recurved, posterior median eyes circular, length of the clypeus 1 1/2 diameters of the anterior median eyes, chelicerae in a vertical position, fairly slender, fangs long, both margins bear at least two large teeth, labium free, longer than wide (fig. 46), gnathocoxae longer than wide, with ventral depressions, sternum 1.4 times longer than wide, not prolongated between the coxae IV. - Legs slender and fairly long, order IV/I/II/III, hairs short, few short bristles, patellae, tibiae and metatarsi I-II bristleless; femora: 2 dorsally, I 1 prodistally (probably absent in the female), tibiae and metatarsi III-IV with few bristles, tibia IV 2 retroventrally, metatarsus IV 3 ventrally and 2 apically. Tarsal trichobothria long and in more than one row, tarsal claws with some long teeth, claw tufts, tarsal and metatarsal scopulae distinct, metatarsal preening hairs best developed on III. No scale-shaped hairs on the legs. - Opisthosoma (photos, figs. 42-44) 2.2-2.7 times longer than wide, cylindrical, with a saddle-shaped inclination (arrow in fig. 44) in the middle of the length which is more distinct in the male. Scuta: ♂: A large dorsally and two large ventrally in front and behind the epigastral furrow; ♀: A short dorsal scutum (about one third of the opisthosomal length); the ventral side is hidden. Subad. ♂: Scuta are probably absent. In the juv. ?♀ F682 - body length 3.9mm - dorsal and ventral opisthosomal scuta are absent. - ♂-pedipalpus (figs. 47-49; see above): Femur slender, patella short, tegulum outstanding.

Relationships: See above.

Distribution: Tertiary Baltic amber forest.

***Myrmecorinna* n. gen.**

Diagnosis (♂; ♀ unknown): Body distinctly ant-shaped (myrmecomorph), long and slender (fig. 50), prosoma low, chelicerae obliquely protruding (fig. 50), bristles around spinnerets present (fig. 52), ventral opisthosomal scuta, leg scopulae and claw tufts absent. Pedipalpus (figs. 53-55): Patella with lateral hairs, tibia with a long prodorsal (!) apophysis, bulbus flat, embolus long and thin.

Relationships: See *Eomazax* and the key. In the male of the extant Oriental species *Otacilia parva* DEELEMAN-REINHOLD 2001 a brush of strong ventral opisthosomal hairs is present but the shape of the prosoma and the structures of the ♂-pedipalpus are quite different.

Type species: *Myrmecorinna gracilis* n. sp., the only known species of the genus.

Distribution: Tertiary Baltic amber forest.

***Myrmecorinna gracilis* n. gen. n. sp.** (figs. 50-55) Photos 378-379

Material (in Baltic amber): 4♂, holotypus F683/BB/AR/COR/CJW, paratypes F662/BB/AR/COR/CJW, F684/BB/AR/COR/CJW and F685/BB/AR/COR/CJW.

Preservation and syninclusions: Holotype: The spider is well preserved, the right leg III is lost behind the coxa by autotomy, the right tarsus I is cut off, some white emulsion is present on the left side of the opisthosoma, a bubble on the left metatarsus III. Few stellate hairs. - F662: The spider is well preserved, the right legs I and IV are lost behind the coxa by autotomy, parts of the left femora, patellae and tibiae are cut off. Numerous stellate hairs, tiny excrement balls are preserved, too, and a 0.33mm long, strongly sclerotized and leg-less - ?phoretic - insect (?Coleoptera) larva (fig. 56, photos) which possesses about a dozen articles of the body, and whose head is in contact with/and is apparently attached to the spider's prosoma. - F684 is completely preserved, the legs are stretched out, the tip od the right tarsus I is cut off; 6 Diptera, 1 1/2 beetles, stellate hairs and detritus particles are preserved in the same piece of amber. - F685: The spider is well and nearly completely preserved, only the right leg III is lost behind the coxa by autotomy; the ventral and right sides of the spider are covered by a white emulsion; numerous stellate hairs are preserved near the spider and bubbles on sternum, labium and bulbi.

Diagnosis (♂; ♀ unknown): See above.

Description (♂):
Measurements (in mm): Body length 2.2 (F685) - 3.6 (F662), prosoma: Length 1.2-1.6, width 0.9-1.1. Legs: Holotype: Leg I: Femur 0.95, patella 0.5, tibia 0.8, metatarsus 0.68, tarsus 0.4, tibia II 0.7, tibia IV 0.9; F684: Tibiae: I 1.1, II 0.85, III 0.8, IV 1.2.
Colour light to dark brown (e.g. the opisthosomal scutum); white hairs are present mainly in the basal half of the prosoma and two patches in the middle of the opisthosoma. The legs are not annulated.
Prosoma (fig. 50) 1.33-1.45 times longer than wide, flat, cuticula structure fine scale-shaped, thoracal fissure indistinct, dorsal hairs fairly long, clypeus short, eyes fairly small, posterior row distinctly recurved, posterior median eyes circular, separated by about one diameter. Chelicerae slender and protruding, fangs long and slender, labium and gnathocoxae longer than wide, gnathocoxae inclined laterally, depressions present, sternum small prolongated between the coxae IV. - Legs fairly hairy and slender, order IV/I/II/III. Bristles: Femora 2 dorsally, I - and usually II - additionally a prodorsal bristle, patellar bristles absent, no further bristles on I-IV besides occasionally a ventral-apical bristle on III-IV. Scopulae, claw tufts and metatarsal preening hairs absent. Numerous tarsal trichobothria in more than one row; the tarsal claws bear several long teeth. - Opisthosma (figs. 50, 52) 1.77-2.33 times longer than wide, cylindrical, a weak saddle-

shaped depression may be present (holotype, F684), dorsally covered with hairs of medium length, ventrally and laterally around the spinnerets with bristles, dorsally with a large scutum which covers the whole surface, no ventral scutum. Anterior spinnerets largest, basal article nearly cylindrical, apical article retreated, median spinnerets hidden, posterior spinnerets large, two-jointed. Colulus and scaly hairs absent, tracheal spiracle indistinct. - Pedipalpus (figs. 53-55; see above): Femur slender and not modified, tibia and patella short, the tibia bears a long, curved, slender and erect apophysis which originates prodorsally, the embolus describes one loop.

Relationships: See above.

Distribution: Tertiary Baltic amber forest.

***Protoorthobula* n. gen.**

Diagnosis: ♂-opisthosoma with at least a large dorsal scutum, ♀-opisthosoma soft, posterior median eyes circular, gnathocoxal depression present. ♂-pedipalpus (figs. 59-63, 69-73): Tibia with two apophyses, median apophysis probably absent. ♀ (*bifida*): Tibia I with longer ventral bristles, epigyne/vulva: Fig. 64.

Relationships (see the key): In *Ablator* the posterior median eyes are oval, the opisthosoma bears three patches of white hairs, a gnathocoxal depression is absent, the pedipalpal femur is distinctly bent, and a second tibial apophysis is absent. - In *Sphingius* THORELL 1890 (extant, Asia) an opisthosomal scutum is present, and bristles of tibia I-II are absent, too, but the tarsi are longer
In *Orthobula* SIMON 1897 (extant) femoral bristles are absent and the opisthosoma is short, nearly globular.

Type species: *Protoorthobula bifida* n. sp.

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

***Protoorthobula bifida* n. gen. n. sp**. (figs. 57-64) Photos 380-381

Material (in Baltic amber): 25♂ 1♀ in Baltic amber; holotypus ♂ F935/BB/AR/COR/CJW, ♀ paratypus F29/BB/AR/COR/CJW, ♂ paratypes: F7/BB/AR/COR/CJW, F8/CJW, F692-695/CJW, 13♂ F696/CJW, 1♂ GPIH (ex CJW), 1♂ Mus. Ziemi in Warsaw no. 2126/16. 1♂ PMHUB MB.A.191 (coll. BERENDT), 1♂ coll. F. EICHMANN AR22, 1♂ coll.HOFFEINS.

Preservation and syninclusions: The holotype is well and completely preserved, a member of the order Trichoptera was separated from the piece of amber; two stellate hairs are present in front of the spider, a tiny excrement ball left of the spider. F7 is completely preserved, ventral body parts and left legs are partly hidden, the pedipalpi are well preserved and best observable. F29 is completely but only fairly well preserved in an amber piece which probably was heated and has several fissures, the mouth parts are covered by a white emulsion. The males from the GPIUH and the coll. of EICHMANN and of HOFFEINS are very well preserved. - Stellate hairs are preserved with most spiders, leg autotomy occurs several times between coxa and trochanter.

Diagnosis: Ventral tibial I bristles present (fig. 57), post-epigastral scutum absent. Epigyne/vulva (fig. 64): A large sclerotized plate with translucent ducts and apparently two pairs of receptacula seminis. ♂-pedipalpus (figs. 59-62): Tibia with two large and widely spaced apophyses.

Description:
Measurements (in mm): Body length ♀ 3.6, ♂ 2.8-3.4, prosomal length ♀ 1.35, ♂ 1.15-1.35, prosomal width ♂ 1.0-1.15. Legs: ♀ leg I: Tibia 0.85, metarsus 0.77, tarsus about 0.45, tibia IV 1.1; ♂ (coll. EICHMANN): Right leg I: Femur 1.05, patella 0.45, tibia 0.87, metatarsus 0.8, tarsus 0.52, tibia II 0.9, tibia III 0.78, tibia IV 1.05, left tibia I 0.73.
The colour is well preserved e.g. in the holotype, in F692, and in the males of the coll. EICHMANN and HOFFEINES: Mainly dark brown, legs not annulated; white hairs: A pair of prosomal patches just behind the middle, opisthosoma with a band in the middle which is interrupted in the ventre, an anterior and a posterior patch. In the female and in some males white patches are not observable.
Prosoma (photo): 1.15-1.17 times longer than wide, very fine rugose, covered with very short hairs and two patches of longer white hairs, thoracal fissure short. Eyes small as in *P. deelemani*, posterior row recurved, posterior median eyes circular, fangs long, the anterior margin may bear a bifid tooth, the posterior margin bear at least one large tooth, the gnathocoxae nearly as long as wide, depressions well developed (similar to fig. 72), labium 1.35 times longer than wide. - Legs (fig. 57) fairly slender, covered with short hairs. Bristles: Femora usually 2 dorsally (the distal bristle may be absent) and occasionally a prodistal bristle, patellae none, tibiae I-II with few short ventral bristles (up to three pairs which are shorter in the male), metatarsi I-II usually with a ventral pair in the basal half, posterior legs with some short bristles. Scopulae indistinct (short ventral hairs on tarsi, metatarsi and tibiae), true claw tufts are absent, the tarsal claws bear long teeth. - Opisthosoma oval, in the female 1.6 times longer than wide, partly covered with short brown and longer white hairs (see above); soft in the female but dorsally covered with a large scutum and with a large epigastral scutum. Anterior and posterior spinnerets conical and with a short apical article (fig. 58), posterior spinnerets nearly as long as the anteriors, median spinnerets laterally compressed in the female, hidden in the males; colulus absent, tracheal spiracle small. - ♂-pedipalpus (figs. 59-63): Femur unmodified, patella and tibia short, tibia with two large and widely separated apophyses, cymbium scopulate, embolus long, slender and fairly bent, conductor divided.

Relationships: In *P. deelemani* the prosoma is flattened, ventral tibial and metatarsal I-II bristles are absent and the pedipalpal tibial apophyses are smaller and more close together. - According to the structures of the bulbus "*Orthobula*" (= *Trachelas*) *charitonovi*

(MIKHAILOV 1986) (extant, Eartern Mediterranean to Central Asia) may be congeneric; in *charitonovi* the pedipalpal tibial apophyses are quite different.

Distribution: Tertiary Baltic amber forest.

***Protoorthobula deelemani* n. gen. n. sp.** (figs. 65-73) Photos 382-385

Derivatio nominis: The spider is dedicated to Dr. CHRISTA L. DEELEMAN who revised e.g. Corinnidae of SE-Asia; this revision was very useful to my work.

Material (in Baltic amber): Holotypus ♂ F675/BB/AR/COR/CJW, paratypes (♂): F10/BB/AR/COR/CJW, F671-680/CJW, F725/CJW, private coll. C. DEELEMAN (ex CJW), private coll. SCHIPPLICK no. 2 (Bitterfeld deposit), Zool. Mus. Copenhagen.

Preservation and syninclusions: The holotype is well preserved in an amber piece which was heated, the left leg I and the right legs II and III are lost behind the coxa by autotomy; there is only a weak white emulsion ventrally, e.g. on the spinnerets. A droplet of poison is preserved near the tip of the left fang (fig. 72). Most legs are stretched out sidewards on an amber layer, beneath the left leg III a detritus particle is preserved; no stellate hairs. - Paratypes: Best preserved are F671 (pedipalpi), F672 (spinnerets), F673 (prosoma) and the ♂ from the coll. DEELEMAN (spinnerets). F725 is well and completely preserved in an amber piece which probably was heated. An adult - ?phoretic - Acari (body length 0.3mm) is preserved on the spider's opisthosoma. With F679 9 Diptera are preserved as well as a demarged Nematoda directly beneath the spider's opisthosoma.

Diagnosis (♂; ♀ unknown): Ventral tibial and metatarsal I-II bristles absent (fig. 66), body flattened (fig. 65), no ventral opisthosomal scutum behind the epigastral furrow. Pedipalpus (figs. 69-73): Tibia with a dorsal apophysis which is directed retrolaterally and with a retrolateral apophysis, cymbium with a retrobasal hump, embolus long, slender and nearly straight.- Remark: In the males F679 and from the coll. SCHIPPLICK the dorsal pedipalpal tibial apophysis is somewhat shorter and directed more upwards, in the male F676 the position of the dorsal tibial apophysis is intermediate to the holotype.

Description (♂):
Measurements (in mm): Body length1.8-2.5, prosoma: Length 0.9-1.0, width 0.8-0.85; legs (holotype): I Femur 0.7, patella 0.33, tibia 0.6, metatarsus 0.5, tarsus 0.35, leg IV: Femur 0.75, patella 0.33, tibia 0.68, metatarsus 0.67, tarsus 0.37.
Colour: Dark brown (no patches of white hairs), legs not annulated.
Prosoma (figs. 65-66) flattened, wide, covered with very short hairs, margin rebordered, cuticula with pustules, thoracal fissure short and in a posterior position, eyes of medium size, posterior row distinctly recurved, posterior median eyes circular, separated by nearly 1 1/5 diameters. Clypeus fairly short, chelicerae bulging basally, teeth unknown, fairly long, fangs long and slender, labium free, about as wide as long, gnathocoxae (fig. 72) longer than wide, with a ventral depression, sternum slightly wider than long, nearly

smooth, separating the coxae IV by their diameter. Petiolus covered by a large sclerotized ring. - Legs prograde, order IV/I/II/III, hairs short, few bristles, leg I only 1-2 dorsally on femur I which are short in the holotype but long e.g. in F674; tibiae III-IV bear a proventral-basal and an apical bristle; scaly hairs absent, claw tufts, metatarsal III-IV preening hairs and scopulae weak, trichobothria long, in more than one row on the tarsi (fig. 67), two long teeth on the tarsal claws (fig. 68). - Opisthosoma long oval, flattened (fig. 65), widest behind the middle, covered with short hairs and three scuta (see above). Most probably three pairs of spinnerets (F680), the anteriors largest, the basal article nearly cylindrical, the apical article probably retracted. - Pedipalpus: Fig. 69-73, see above; a conductor is present, a median apophysis is probably absent.

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

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

Cryptoplanus PETRUNKEVITCH 1958

Diagnosis: Posterior median eyes circular (fig. 80), length of the clypeus (fig. 88) up to 2-3 diameters of the anterior median eyes, leg III about as long as I and II, the claw tufts consist of spatulate hairs (fig. 77). A dorsal scutum of the ♂-opisthosoma is present at least in *incidens*. Epigyne as fig. 92; ♂-pedipalpus (e.g. figs. 74-75, 78, 86, 90): Tibia with a large and out-standing apophysis, cymbium with spines, a basal outgrowth and a retrobasal depression, bulbus with a large median apophysis, a large conductor and a thick embolus.

Description (see the diagnosis):
Body fairly ant-shaped (opisthosoma cylindrical), length ♂ 2.8-3.9mm, ♀ 4mm, prosoma very hairy, clypeus fairly short to long (fig. 88), posterior median eyes separated by 1 1/4-1 1/2 diameters (figs. 80, 88), thoracal fissure large, chelicerae (fig. 88) fairly slender, labium (fig. 76) wider than long in contrast to the statement of PETRUNKEVITCH (1958: 325), gnathocoxae stout, serrula distinct (fig. 76), order of legs IV/I/II/III (according to PETRUNKEVITCH (1958) IV/III/II/I), iridescent leg hairs present, metatarsal preening hairs weak, tarsal and metatarsal scopula short, tarsi with two rows of long trichobothria (fig. 77). Chaetotaxy (figs. 84, 91): Femora 3 dorsally, a dorsal-lateral pair and a prolateral bristle in the middle on III-IV, a dorsal or retrolateral patellar bristle may be present on III-IV, tibia I-II usually 2-3 ventral pairs, 1-2 prolaterally may be present; legs III-IV bear numerous bristles.

Relationships: See the key. I do not know close extant relatives. - PETRUNKEVITCH (1958: 323) regarded *Cryptoplanus* as a "Clubionidae incertae sedis" and noted similarities to the Zodariidae; in Zodariidae the shape of the chelicerae and gnathocoxae, e.g.,

is different.

Type species: *Cryptoplanus paradoxus* PETRUNKEVITCH 1958.

Distribution: Tertiary Baltic amber forest.

Key to the species of the genus *Cryptoplanus* (♂; except *lanatus*):

1 Cymbium with a slender (and bristle-bearing) apophysis (fig. 78). . . . . *complicatus*

- Cymbium different. 2

2(1) Cymbial outgrowth very lare and nearly globular (fig. 75, 86). 3

- Cymbial outgrowth smaller, figs. 82, 90. 4

3(2) Pedipalpal tibial apophysis as in fig. 74. . . . . *bulbosus*

- Pedipalpal tibia with a wider retrolateral apophysis (fig. 85). . . . . *paradoxus*

4(2) Pedipalpal tibial apophysis as in fig. 81. .. . . . . *incidens*

- pedipalpal tibial apophysis as in fig. 85. . . . . *sericatus*

- pedipalpal tibial apophysis as in fig. 89. . . . . *sinuosus*

***Cryptoplanus bulbosus* n. sp.** (figs. 74-75)

Material: Holotypus ♂ in Baltic amber, F702/BB/AR/COR/CJW.

Preservation and syninclusions: The spider is incompletely preserved, most legs and the ventral parts of the opisthosoma are cut off, only the left legs II and the right leg III are nearly complete. - A small Collembola, a Formicidae and some stellate hairs are preserved in the same piece of amber.

Diagnosis (♂; ♀ unknown): Pedipalpus: Tibial apophysis as in fig. 74, cymbial out-

growth large and nearly globular (fig. 75).

Description (♂):
Measurements (in mm): Body length about 3.3, prosoma: Length 1.65, width about 1.5, leg II: femur 1.3, patella 0.65, tibia 1.15, metatarsus 1.1, tarsus 0.75.
Colour light brown. - Body and legs as in the genus, see above.

Relationships. See the key.

Distribution: Tertiary Baltic amber forest.

***Cryptoplanus complicatus* n. sp**. (figs. 76-79) Photo 373

Material: Holotypus in Baltic amber, F699/BB/AR/COR/CJW.

Preservation and syninclusions: The spider is excellently and nearly completely preserved, parts of the right cymbium as well as parts of most tarsi and some metatarsi are cut off, the ventral side of the body is partly covered by a white emulsion.

Diagnosis (♂; ♀ unknown): Pedipalpus: Tibial apophysis as in figs. 78-79, with short retrolateral outgrowths, cymbial outgrowth slender, in a more distal position, bearing short spines.

Description (♂):
Measurements (in mm): Body length 3.35, prosoma: Length 1.7, width 1.5, leg I: Tibia 1.15, metatarsus 1.15, tarsus at least 0.9, tibia II 1.1, tibia III 1.0, tibia IV 1.3.
Colour medium to dark (legs) brown. - Body and legs: See the description of the genus; labium and gnathocoxae fig. 76, tarsus III (fig. 77) with long trichobothria, claw tufts with spatulate hairs. The hairs of body and legs are well preserved in this specimen.

Relationships: See the key and *paradoxus*.

Distribution: Tertiary Baltic amber forest.

***Cryptoplanus incidens* n. sp**. (figs. 80-81)

Material: Holotypus ♂ in Baltic amber, F703/BB/AR/COR/CJW.

Preservation and syninclusions: The spider is fairly well preserved, the right leg III is lost behind the coxa by autotomy, half of the right leg I is cut off, the right leg II is cut off through the tibia, the right leg IV is cut off through the metatarsus, the opisthosoma is somewhat deformed, only weak white emulsions are present. - No stellate hairs are present in the piece of amber.

Diagnosis (♂; ♀ unknown): Tibia v-shaped in dorsal aspect (fig. 81).

Description (♂):
Measurements (in mm): Body length 2.8, prosoma: Length 1.5, width 1.3, tibia I 1.1, tibia IV 1.15.
Colour: Prosoma and legs dark brown, opisthosoma medium brown. Body and legs - as far as preserved - as in the genus, eyes as in fig. 80.

Relationships: See the key.

Distribution: Tertiary Baltic amber forest.

Cryptoplanus lanatus (PETRUNKEVITCH 1958) (**n. comb.**)

1958 *Ablator lanatus* PETRUNKEVITCH, Trans. Connect. Acad. Arts Sci., 41: 293-295, figs. 432-439.

Remark: A revision of this species is needed. The body length is 3.55mm, the prosomal length is 1.6mm, the pedipalpal tibial apophysis is large and outstanding similar to *paradoxus*, see below.

Distribution: Tertiary Baltic amber forest.

Cryptoplanus paradoxus PETRUNKEVITCH 1958 (figs. 82-83)

Material: Holotypus ♂ in Baltic amber, PMHUBerlin.

Preservation: The spider is completely preserved and strongly darkened by aging.

Diagnosis (♂; ♀ unknown): Retrolateral pedipalpal tibial apophysis (figs. 82-83) long, outstanding and in a basal position, simple in the retrolateral aspect.

Description (♂):
Measurements (in mm): Body length 3.0, prosoma: Length 1.55, width 1.3.
Body and legs as in the genus.

Relationships: See the key, *lanatus* and *sericatus*.

Distribution: Tertiary Baltic amber forest.

Cryptoplanus sericatus (KOCH & BERENDT 1854) (**n. comb.**, sub *Pythonissa*) (figs. 84-87)

Photo 374

Material (in Baltic amber): 3♂; holotypus ♂, PMHUBerlin no. 7228 (sub *Pythonissa sericata*, see below; 1♂ F663/BB/AR/COR/CJW; 1♂ coll. F. KERNEGGER no. 52/94.

Remarks: The bulbus structures of the holotype are hidden. *C. paradoxus* may be a junior synonym. - According to the original description the male sub 7228 is the holotype; only one male was mentioned in the original description although MENGE in KOCH & BERENDT (1854: 59) - in a footnote - mentioned two males. Sub no. 7228 I found two males in the collection of BERENDT, and I separated the second - ?congeneric - male as no. 7228a; it is not a syntype.

Diagnosis (♂; ♀ unknown): Pedipalpal tibial apophysis wide (fig. 85), complicated in the lateral aspect (figs. 86-87).

Description (♂):
Body length 3.6-3.9mm, body and legs as in the genus, leg III fig. 84. Pedipalpus (figs. 85-87): The large median apophysis and large conductor as well as the thick embolus are well observable.

Relationships: See the key, *lanatus* and *paradoxus*.

Distribution: Tertiary Baltic amber forest.

***Cryptoplanus sinuosus* n. sp.** (figs. 88-90)

Material: Holotypus ♂ in Baltic amber, F24/BB/AR/COR/CJW.

Preservation and syninclusions: The spider is fairly well preserved in an amber piece which was heated, a white emulsion is absent, the left leg IV is lost behind the coxa by autotomy, the distal articles of the left leg I and the right legs I and II are cut off, two larger bubbles cover the sternum. Few stellate hairs are present in the same piece of amber.

Diagnosis (♂; ♀ unknown): Pedipalpus (figs. 89-90): Tibial apophysis u-shaped, complicated in the retrolateral aspect, cymbium with a short dorsal-basal outgrowth and numerous short and blunt spines.

Description (♂):
Measurements (in mm): Body length 3.0, prosoma: Length 1.4, width 1.25, tibia I 1.15, tibia IV 1.2.
Colour dark brown. - Body and legs as in the genus. Prosoma (fig. 88) with a long clypeus.

Relationships: See the key.

Distribution: Tertiary Baltic amber forest.

Cryptoplanus sp. indet. (figs. 91-92) Photo 375

Material: 1 ♀, F698/BB/AR/COR/CJW.

Preservation and syninclusions: The spider is well and completely preserved, the legs I-III are directed foreward, the legs IV are directed backward. Few parts of the opisthosoma are covered by a white emulsion. - Some excrement balls, a subadult male spider of *Custodela* sp. (Linyphiidae), two Diptera: Nematocera, remains of some insects and few stellate hairs are also preserved in the piece of amber.

Description (♀):
Measurements (in mm): Body length 4.0, prosoma: Length 1.7, width 1.3, tibia I 1.05, tibia II 0.95, tibia III 0.9, tibia IV 1.2.
Colour: Body and legs dark brown, opisthosoma light brown. - The prosoma is relatively longer than in the ?conspecific males. A pedipalpal claw is present. Leg I as in fig. 91; the ventral bristles are longer than in the males. The epigyne (fig. 92) is a sclerotized plate which is wider than long.

The **relationships** are unknown; one of the named species may be conspecific.

Distribution: Tertiary Baltic amber forest.

(b) Corinninae

***Cornucymbium* n. gen.**

Diagnosis (♂; ♀ unknown): Opisthosomal scutum absent, posterior eye row straight, posterior median eyes largest, thoracal fissure long (fig. 93), tarsal scopulae and claw tufts present; pedipalpus (fig. 95): cymbium with a large and pointed dorsal horn, median apophysis present; body not ant-shaped.

Type species: *Cornucymbium insolens* n. sp., the only known species of the genus.

The **relationships** are quite unclear; with hesitation I regard *Cornucymbium* as a member of the family Corinnidae, subfamily Corinninae. The cuticular structure of the prosoma is difficult to observe. No other taxon of the family Corinnidae is known to me which possesses such a dorsal cymbial outgrowth/horn.

Distribution: Tertiary Baltic amber forest.

***Cornucymbium insolens* n. gen. n. sp.** (figs. 93-95) Photo 387

Material: Holotypus ♂ in Baltic amber, F649/BB/AR/COR/CJW.

Preservation and syninclusions: The spider is fairly well and completely preserved, the opisthosoma is slightly deformed and bent ventrally, the structures of the bulbus are not well observable. The 5.7cm long amber piece was most probably heated, only very few remains of white emulsions are present, bubbles hide e.g. sternum and mouth parts. - An ant, 1/2 beetle, a Collembola and remains of plants as stellate hairs are also preserved.

Diagnosis (♂; ♀ unknown): Pedipalpus (fig. 95): Tibia with a short blunt retroventral-distal apophysis, cymbium with a strong and pointed dorsal horn, median apophysis present.

Description (♂):
Measurements (in mm): Body length about 7.0, prosoma: Length 4.0, width 3.3, leg I: Femur 3.2, patella 2.0, tibia 3.1, metatarsus 2.8, tarsus 1.3, tibia II 3.0, femur III 2.9.

femur IV 3.6, right metatarsus IV 3.7, left metatarsus IV 4.2 (!).
Colour dark brown. - Prosoma (photo, fig. 93) 1.2 times longer than wide, hairs short, thoracal fissure large, clypeus short. Eyes fairly large, posterior row straight, posterior median eyes circular, separated by more of their radius. Chelicerae fairly small, in a vertical position, teeth and mouth parts hidden. - Legs (fig. 94) prograde, long and robust, order IV/I/II/III, hairs not distinct. Numerous bristles, leg I: Femur 2 dorsally, a pair dorsolaterally-distally and 3 apically, patellae with a dorsal-distal hair-shaped bristle only, tibia 4 ventral pairs, 2 lateral pairs, 1 hair-shaped dorsal-basal bristle and an apical pair, metatarsus 2 ventral pairs, ?1 lateral pair and apicals. Leg IV: Femur 2 dorsally, 3 prolaterally, 2 retrolaterally and apicals, patella 1 thick retrolateral bristle, tibia similar to I but only 2 ventral pairs, metatarsus 4 ventral pairs, laterals and apicals. Paired tarsal claws fairly short and strongly bent, metatarsal and tarsal scopula and dense claw tufts are present, metatarsal preening hairs absent, trochantera probably not notched, feathery hairs absent, tarsal trichobothria in more than one row. - Opisthosoma oval, covered with short hairs, scuta absent, tracheal spiracle hidden, colulus hidden or absent, spinnerets very short, medians hidden, anteriors two-jointed, apical article very short and probably retreated, basal article stout, posterior spinnerets similar but smaller. Pedipalpus (fig. 95, see above, most parts of the bulbus are hidden): Patella and tibia longer than wide, stronger bristles are absent, the cymbium is not scopulate.

Relationships: See above.

Distribution: Tertiary Baltic amber forest.

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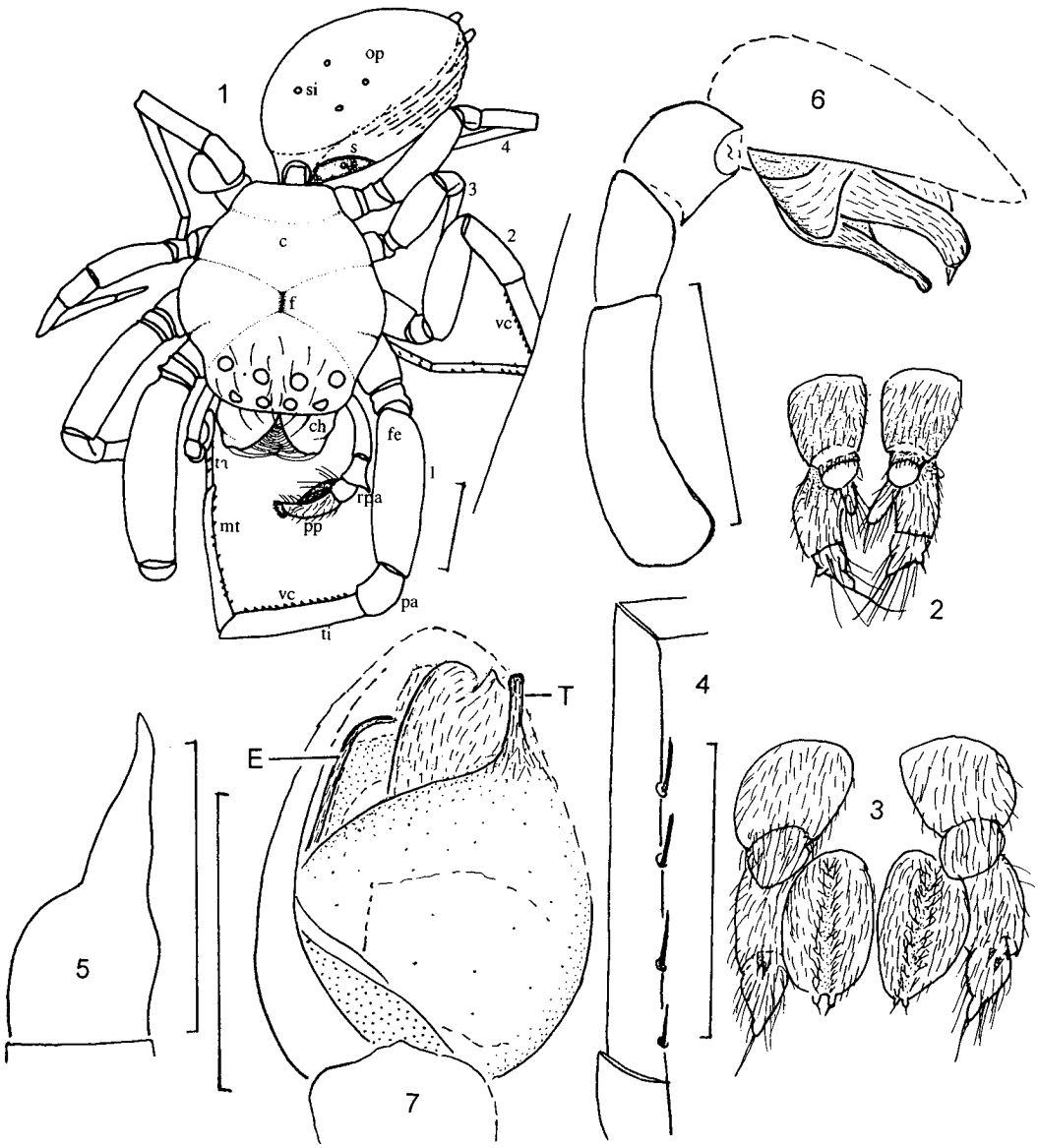


Fig. 1) *Trachelas poinari* PENNEY 2001 (Trachelinae), holotype ♂ in Dominican amber. Taken from PENNEY (2001: Fig. 7). - M = 1.0mm;

figs. 2-3: *Otacilia onoi* DEELEMAN-REINHOLD 2001 (Phrurolithinae), extant, ♂♀-spinnerets, ventral aspect. Taken from DEELEMAN-REINHOLD (2001: Figs. 661-662).;

figs. 4-8: ***Ablator biguttatus* n. sp.**, ♂; 4) l. tibia I prolaterally (hairs and scopula are not drawn); 5) tibia of the r. pedipalpus retrolaterally; 6) l. pedipalpus prolaterally; 7) l. pedipalpus ventrally and slightly probasally; 8) r. pedipalpus ventrally-basally and slightly prolaterally (the embolus is hidden). E = embolus, T = tegular apophysis. - M = 1.0 in fig. 4, 0.5 in the remaining figs.;

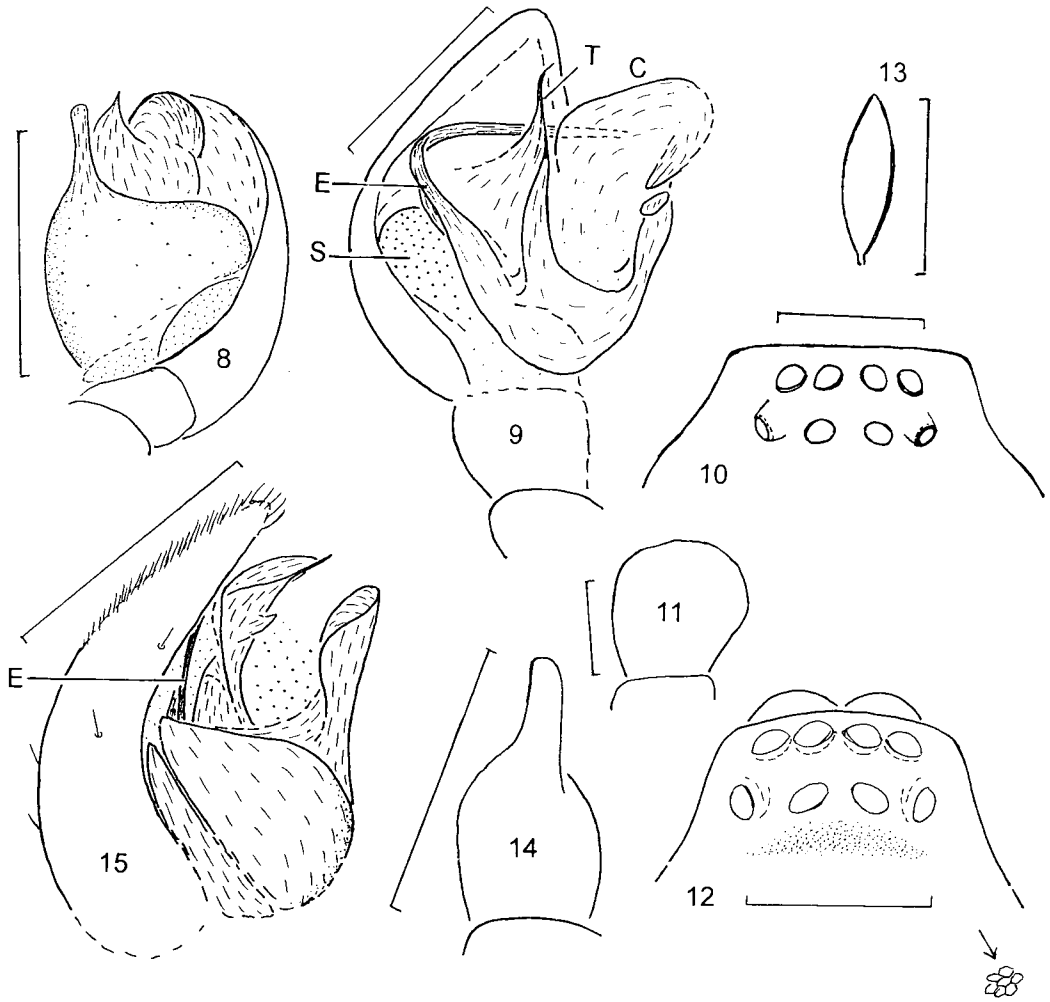
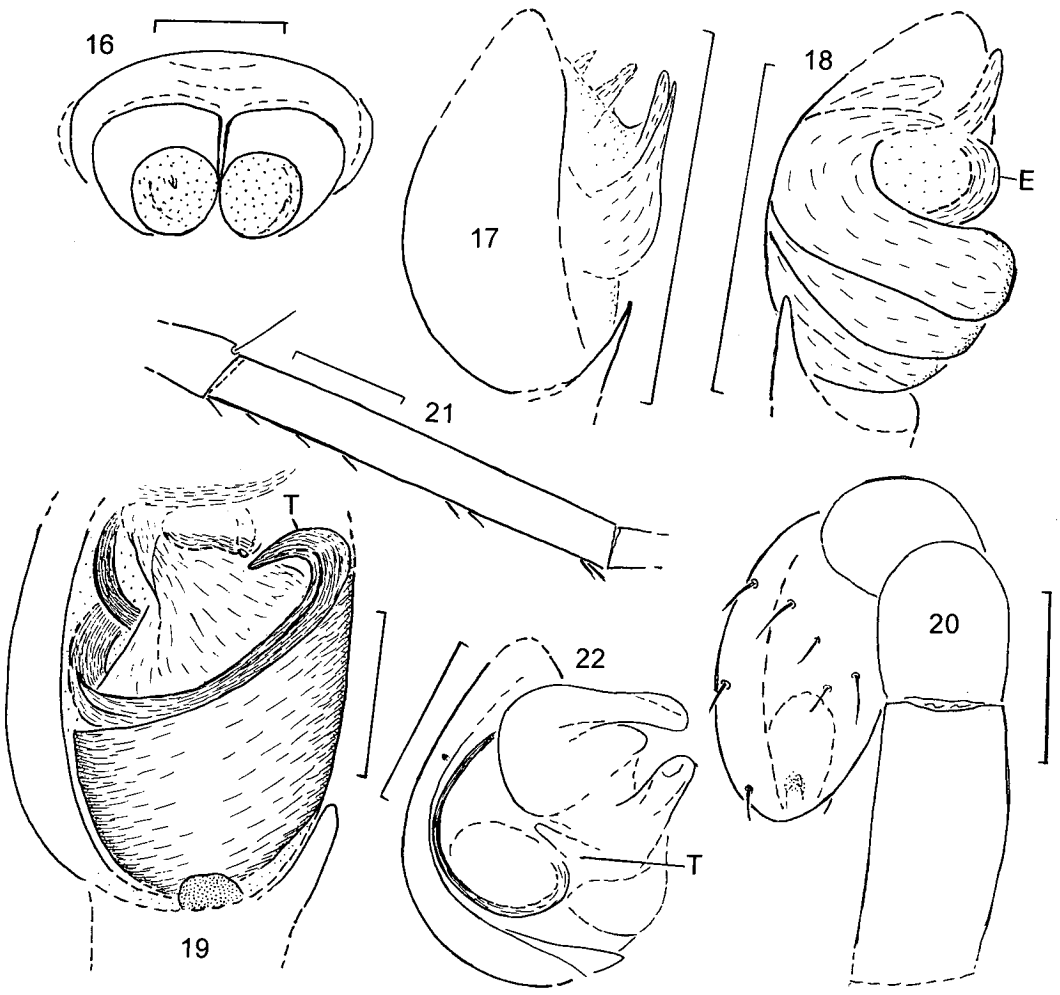


fig. 9) ***Ablator curvatus* n. sp.**, ♂, l. pedipalpus retroventrally, bulbus probably partly expanded. C = conductor, E = embolus, S = subtegulum, T = tegular apophysis. - M = 0.5;

figs. 10-11: ***Ablator demineus* n. sp.**, ♂; 10) anterior part of the prosoma with the eye position, dorsal aspect; 11) tibia of the l. pedipalpus, dorsal aspect. - M = 0.5 and 0.2;

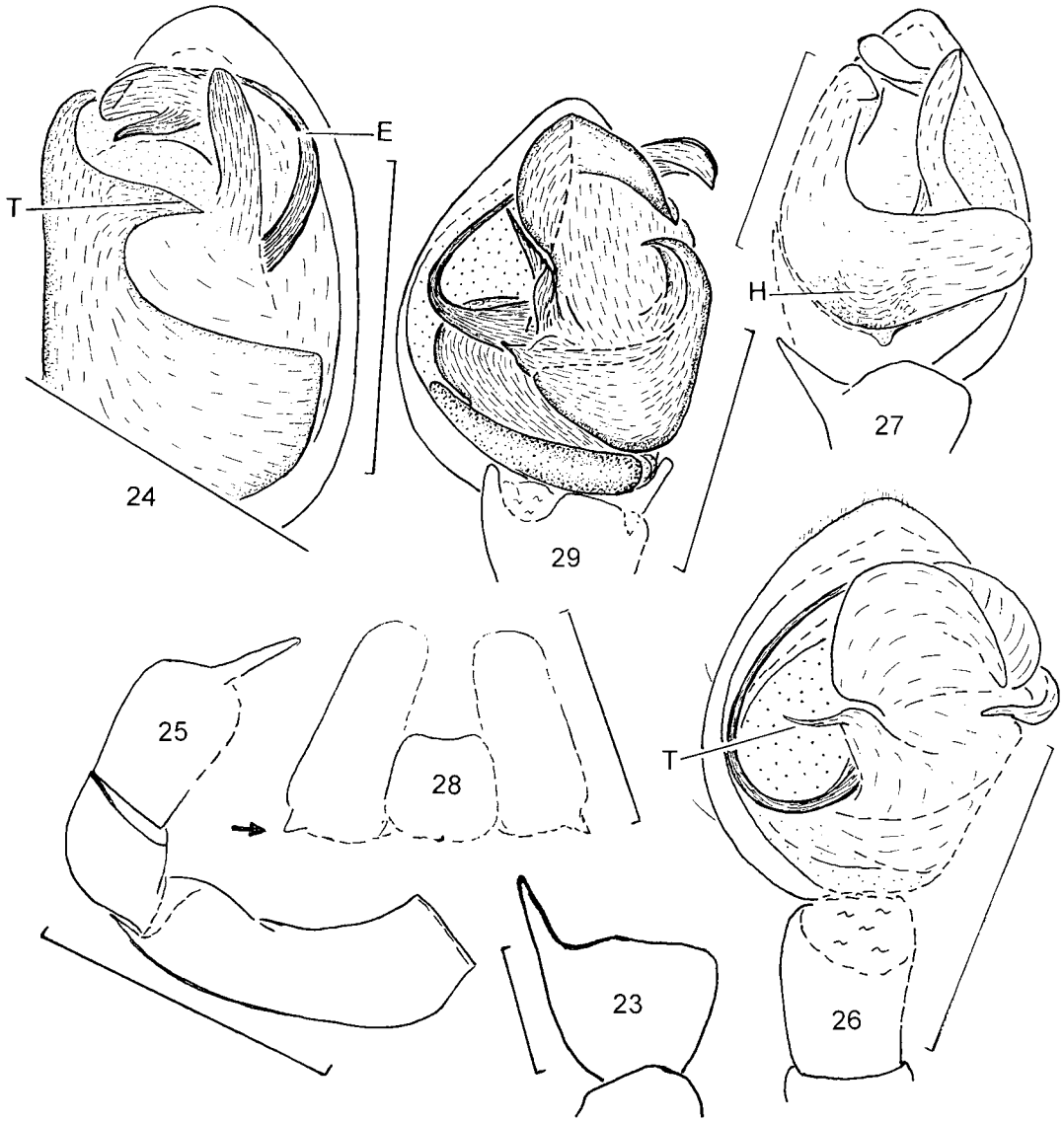
figs. 12-15: ***Ablator depressus* n. sp.**, ♂; 12) anterior part of the prosoma, dorsal aspect. Note the depression behind the posterior eye row and the enlarged scale-shaped structure of the cuticula (arrow); 13) a scale-shaped hair of femur II; 14) tibia of the r. pedipalpus retrolaterally; 15) l. pedipalpus, prolateral aspect. E = embolus. - M = 0.05 in fig. 13, 0.5 in the remaining figs.;



figs. 16-18: ***Ablator duomammillae* n. sp.**, ♂; 16) anterior spinnerets ventrally. Apical article retracted (?); no other spinnerets are observable and are probably absent; 17) r. pedipalpus retrodorsally and slightly from the tip; 18) r. pedipalpus ventrally and slightly retrodistally. Parts of the bulbus sclerites are hidden. E = embolus. - M = 0.1 in fig. 16, 0.5 in 17-18;

figs. 19-20: ***Ablator inevolvens* n. sp.**, ♂; 19) l. pedipalpus ventrally (the distal part is hidden); 20) r. pedipalpus which is not completely developed as in a subadult male, ventral aspect of the tarsus, dorsal aspect of the remaining articles (only few hairs are drawn). T = tegular apophysis. - M = 0.2;

figs. 21-22: ***Ablator longus* n. sp.**, ♂; 21) l. tibia I with short ventral bristes, prolateral aspect (some further bristles may be hidden by hairs which are not drawn); 22) l. pedipalpus prolaterally and slightly basally. T = tegular apophysis. - M = 0.5;



figs. 23-24: ***Ablator nonguttatus* n. sp.**, ♂; 23) tibia of the l. pedipalpus dorsally; 24) r. pedipalpus, ventral aspect. E = embolus, T = tegular apophysis. - M = 0.2 and 0.5;

figs. 25-26: ***Ablator parvus* n. sp.**, ♂; 25) tibia, patella and femur of the r. pedipalpus, retrolaterally; 26) l. pedipalpus, ventrally. T = tegular apophysis. - M = 0.5;

fig. 27) ***Ablator robustus* n. sp.**, r. pedipalpus ventrally and slightly retrobasally. H = hump of the tegulum. - M = 0.5;

figs. 28-29: ***Ablator scutatus* n. sp.**, ♂; 28) gnathocoxae and labium, ventral aspect. The arrow indicates to the retrobasal gnathocoxal outgrowth; 29) l. pedipalpus ventrally and slightly prolaterally. M = 0.5;

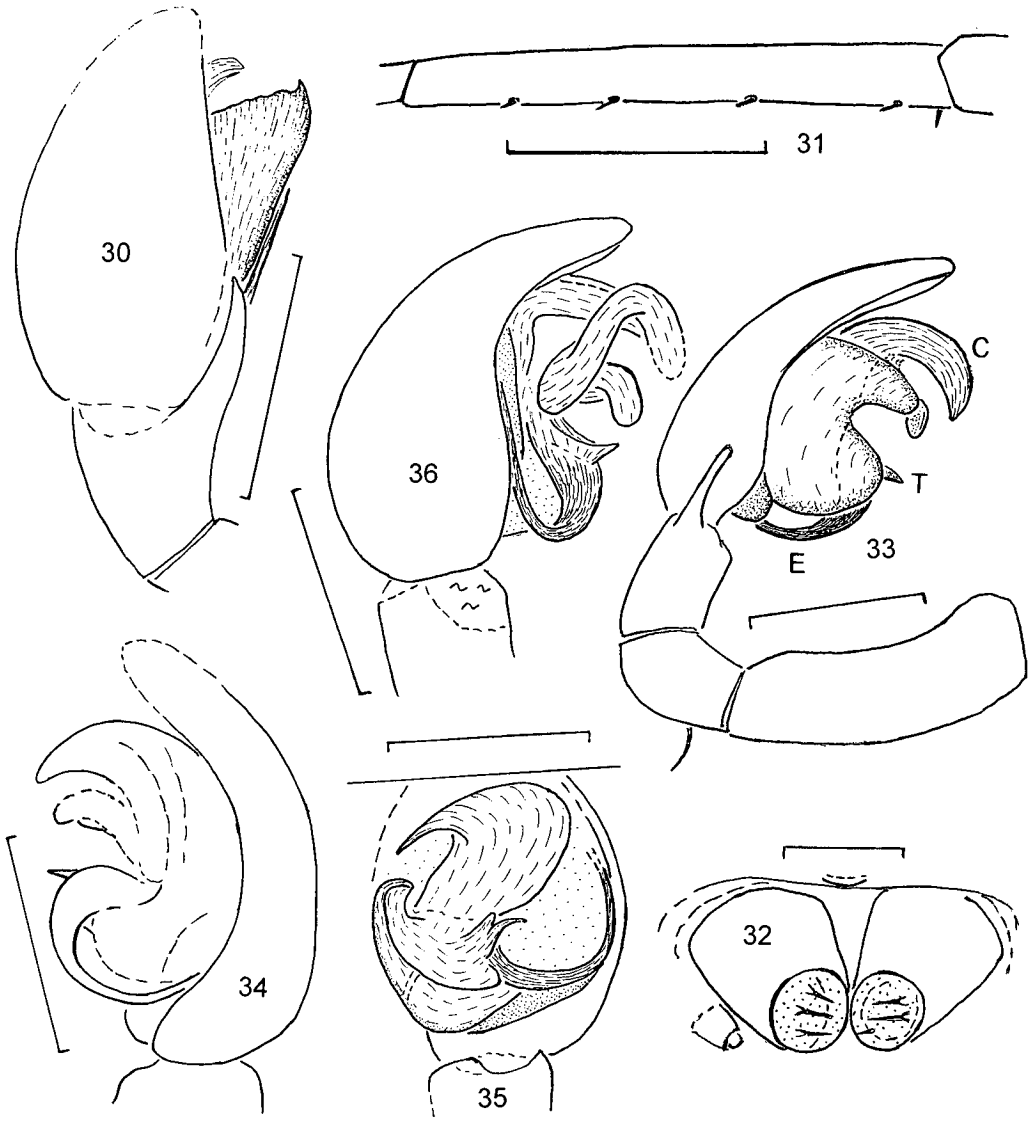
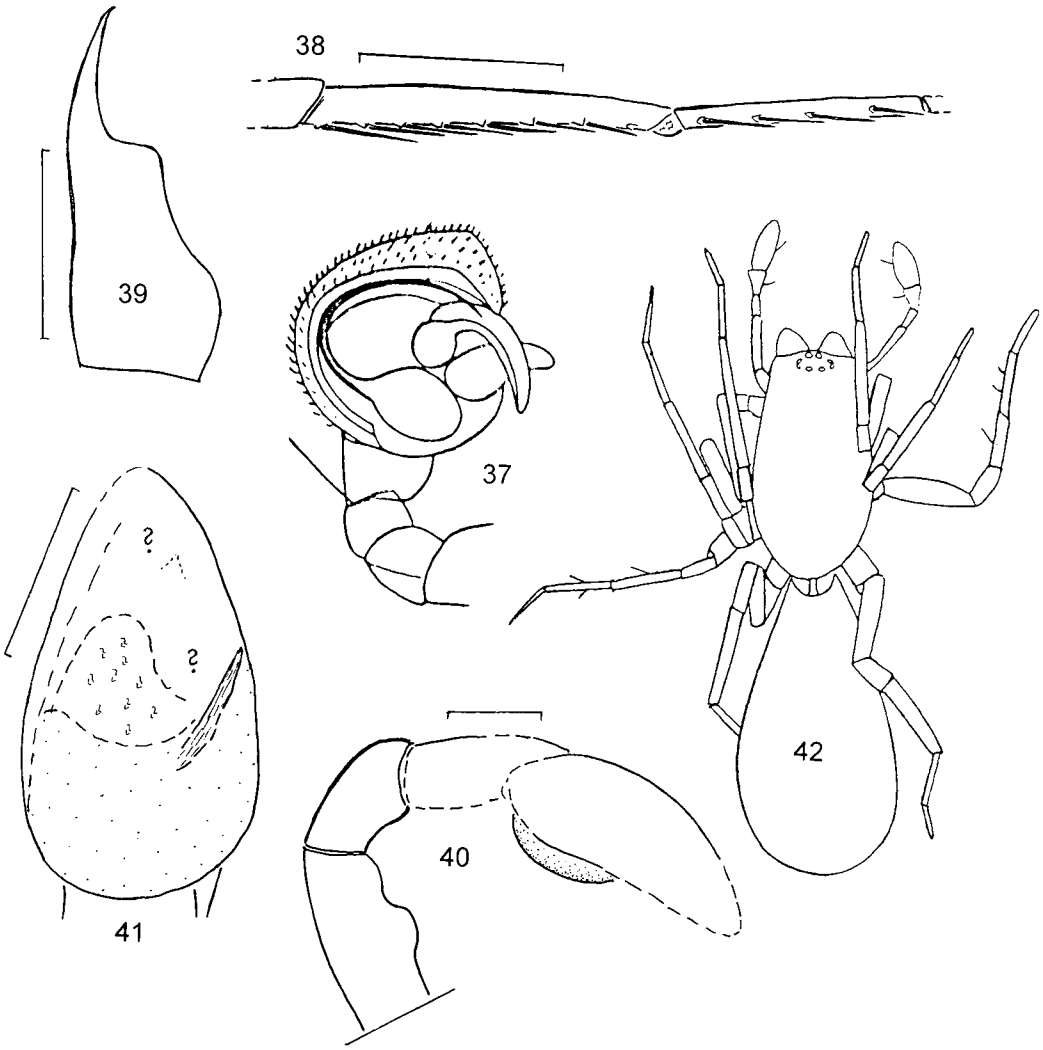


fig. 30) ***Ablator splendens* n. sp.**, ♂, r. pedipalpus retrolaterally. - M = 0.5;

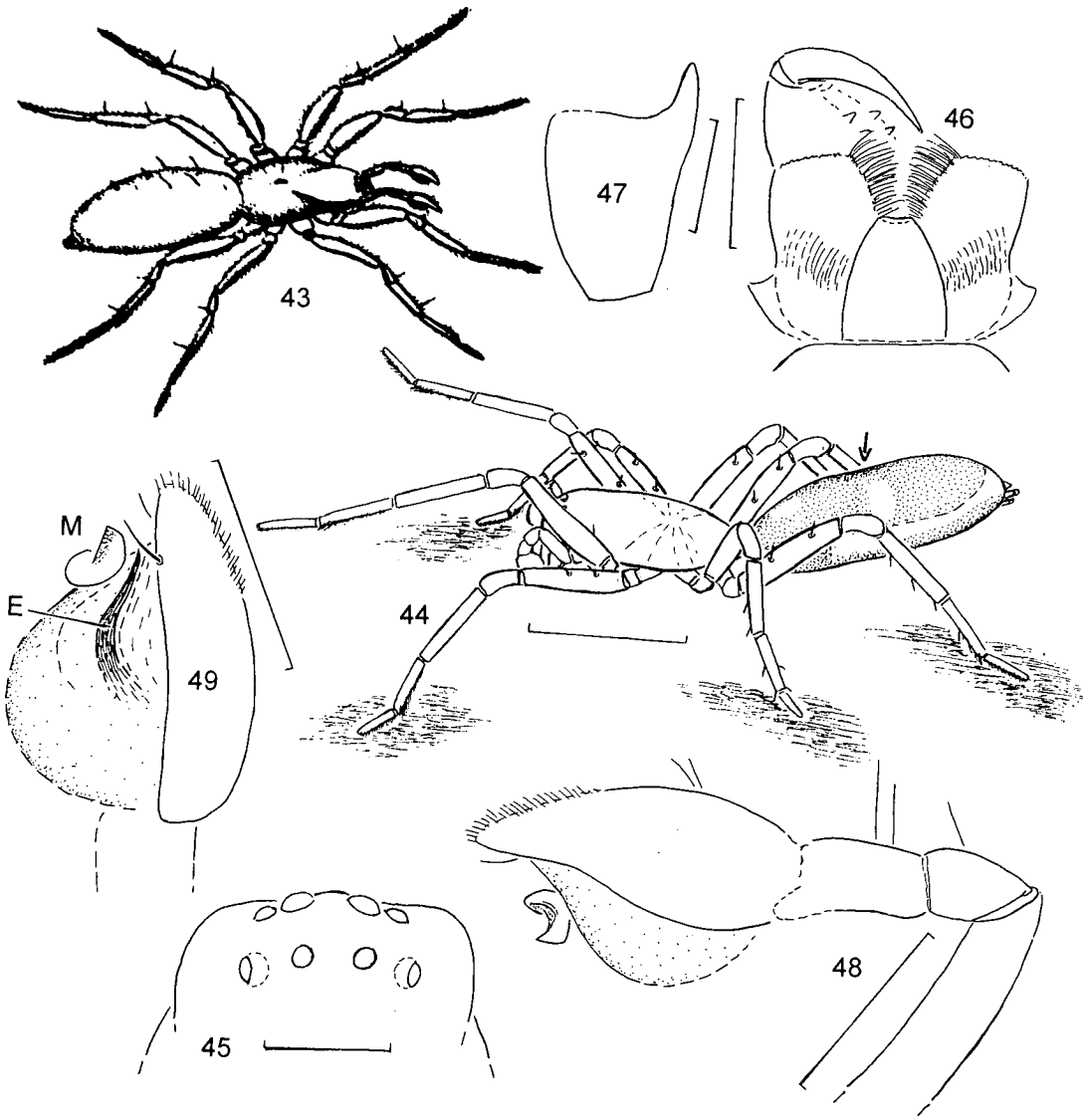
figs. 31-36: *Ablator triguttatus* (KOCH & BERENDT 1854), ♂; 31) holotype, r. tibia I, prodorsal aspect. Note the short ventral bristles or spines which are not cusps (hairs, trichobothria and scopula are not drawn); 32) F5, the stout anterior spinnerets with the apical article retracted (?), the small right posterior spinneret, and the tracheal spiracle, ventral view; 33) holotype, r. pedipalpus retrolaterally; 34) holotype, r. pedipalpus prolaterally; 35) F22/CJW, r. pedipalpus ventrally (the distal part is hidden); 36) F23/CJW, l. pedipalpus prolaterally (the bulbus is partly expanded). C = conductor, E = embolus, T ?= tegular apophysis. M = 0.1 in fig. 32, 0.5 in the remaining figs.;



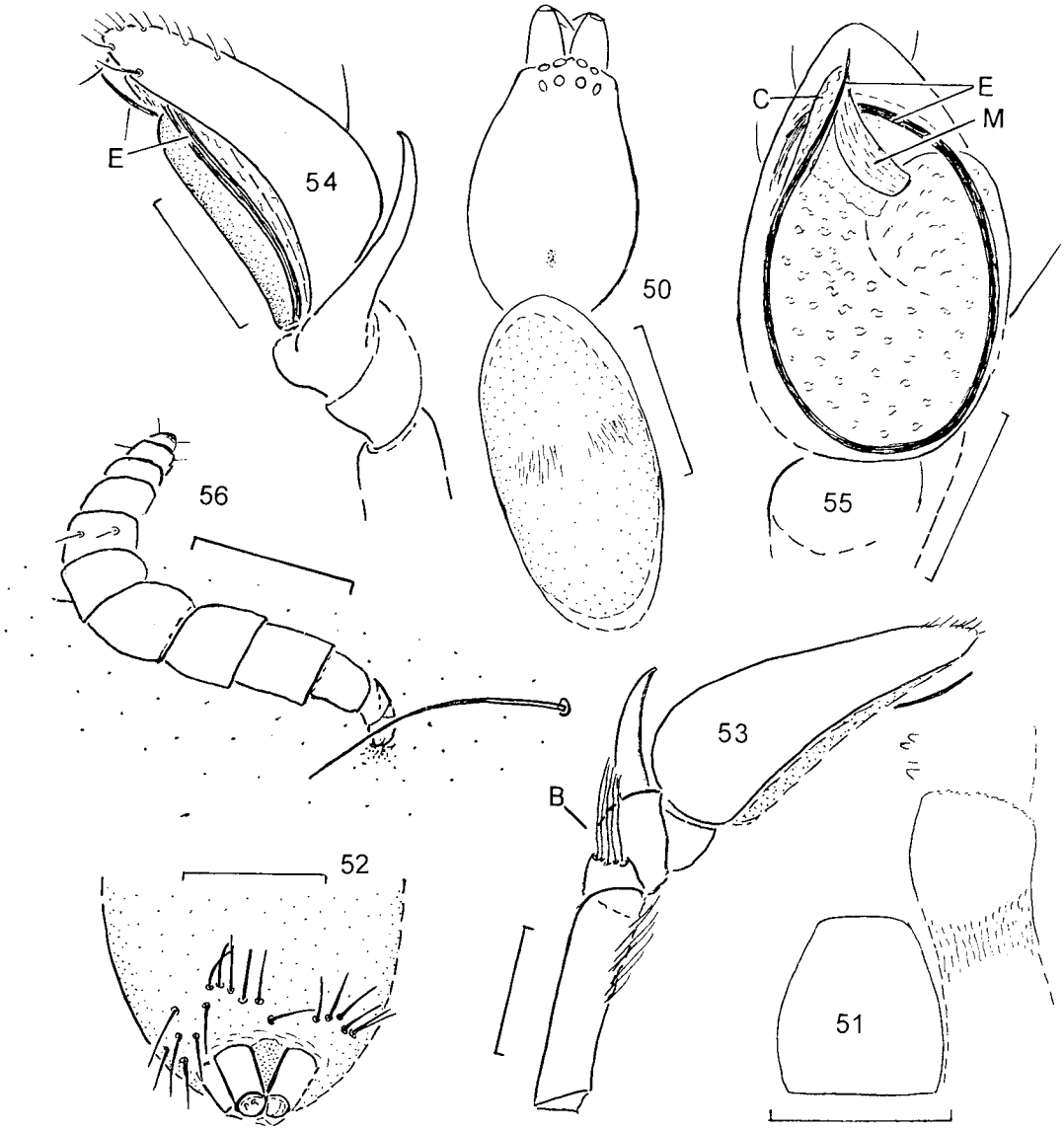
37) *Ablator ?triguttatus* (KOCH & BERENDT 1854), ♂ from the ZMHUBerlin, l. pedipalpus, ventral aspect; taken from PETRUNKEVITCH (1958: Fig. 420);

figs. 38-41: ***Alterphrurolithus longipes* n. gen. n. sp.**, ♂; 38) l. tibia and metatarsus I, prolateral aspect; 39) tibia of the r. pedipalpus retrolaterally; 40) l. pedipalpus prolaterally; 41) l. pedipalpus ventrally (parts are hidden). - M = 1.0 in fig. 38, 0.2 in the remaining figs.;

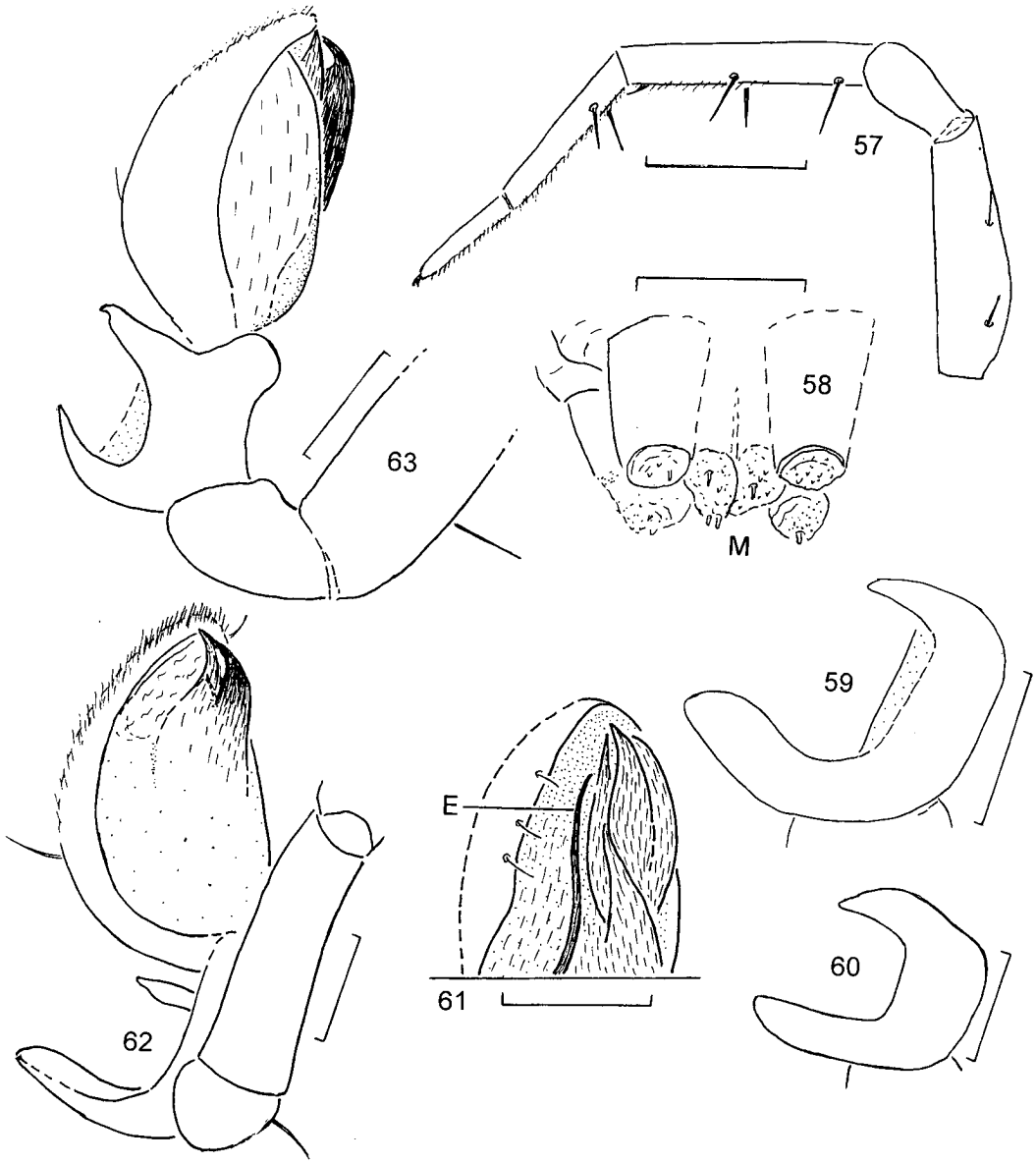
figs. 42-49: *Eomazax pulcher* PETRUNKEVITCH 1958, ♂; 42) holotype, subad. ♂, body length 4.4mm, with the posterior eye row erroneously drawn procurved. Taken from



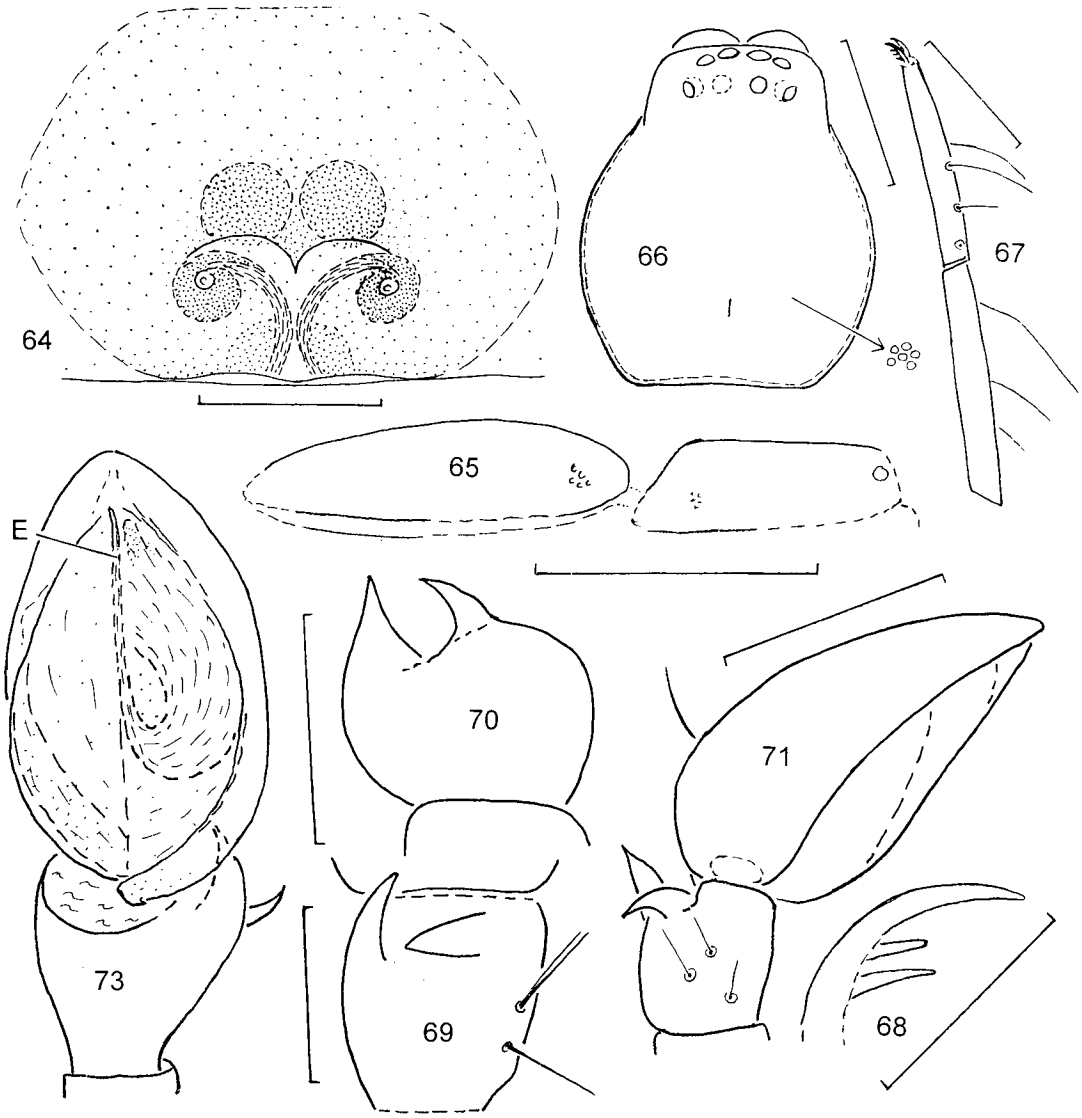
PETRUNKEVITCH (1958: Fig. 461); 43) *Eomazax ?pulcher* (holotype ♂ of *Macaria procera* KOCH & BERENDT 1854, body dorsally. Note the slender body and pedipalpi. Taken from KOCH & BERENDT 1854: Fig. 55); 44) ♂, body in lateral aspect, reconstruktion of F1/CJW, with - hypothetical - raised anterior legs. Note the slender - ant-shaped - body, the patches of white opisthosomal hairs and the saddle-shaped constriction of the opisthosoma (arrow); 45) ♂ from the PMus. Paris, anterior part of the prosoma, dorsal aspect; 46) ♂ F1/CJW, labium, gnathocoxae and r. chelicera, ventral aspect; 47) ♂ F1/CJW, tibia of the r. pedipalpus dorsally; 48) ♂ from the PMus. Paris, l. pedipalpus retrolaterally; 49) ♂ PMus. Paris, r. pedipalpus prolaterally. E = embolus, M = median apophysis. - M = 2.0 in fig. 44, 0.2 in fig. 47, 0.5 in the remaining figs.;



figs. 50-56: ***Myrmecorinna gracilis* n. gen. n. sp.**, ♂; 50) paratype F684/CJW, body, dorsal aspect, opisthosomal scutum puntured, two patches of white hairs in the middle of the opisthosoma; note the slender body and the protruding chelicerae; 51) holotype, labium, l. gnathocoxa and some teeth of the l. chelicera, ventral aspect; 52) holotype, distal part of the opisthosoma, ventral aspect. Note the bristles around the spinnerets (normal hairs are not drawn); 53) holotype, r. pedipalpus retrolaterally; 54) holotype, r. pedipalpus prolaterally; 55) holotype, r. pedipalpus, ventral aspect; 56) ?phoretic legless insect larva whose head - on the right side - is in contact to the prosoma of a male (F662/CJW) of *Myrmecorinna gracilis*. One of the prosomal hairs of the spider is drawn. B = brush of patellar hairs, C = conductor, M = median apophysis. - M = 1.0 in fig. 50, 0.4 in fig. 52, 0.1 in fig. 56, 0.2 in the remaining figs.;



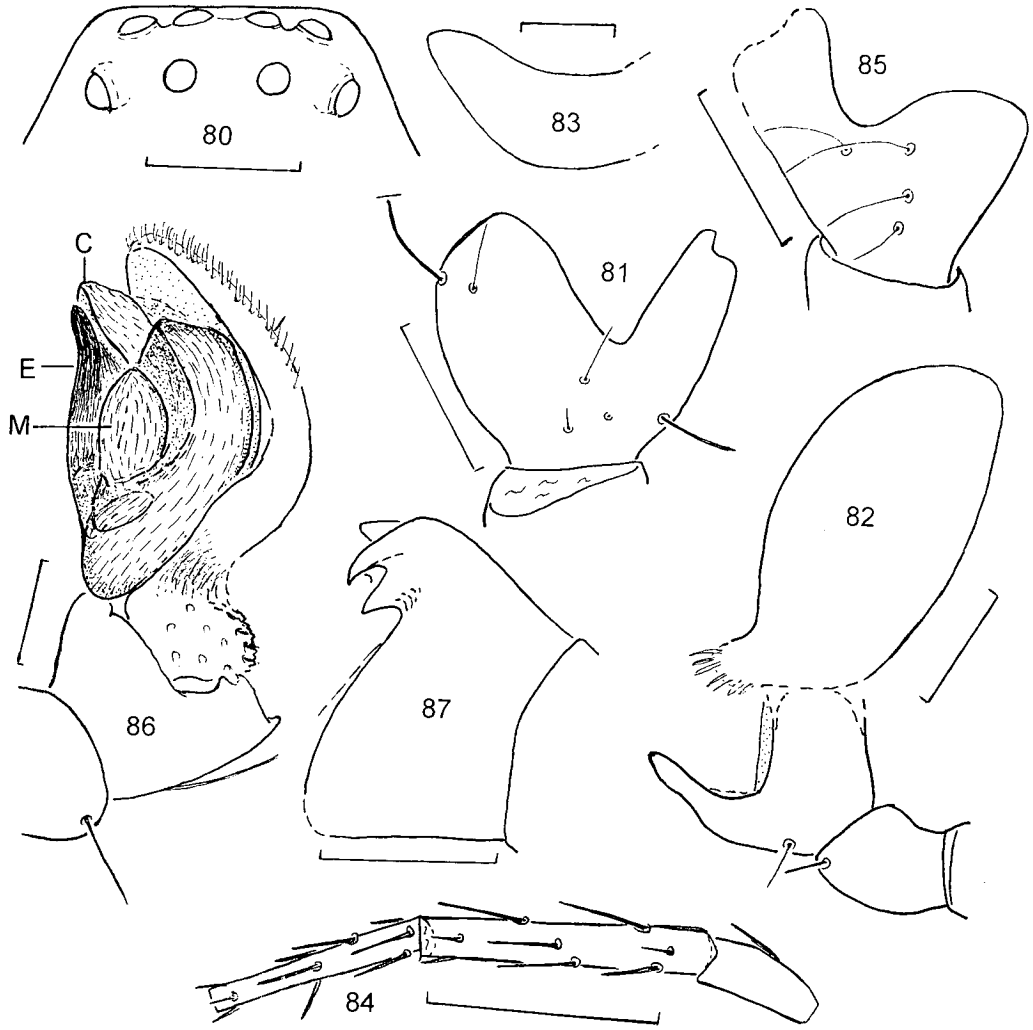
figs. 57-64: ***Protoorthobula bifida* n. gen. n. sp.**; 57) paratype ♀, r. leg I, prolateral aspect; 58) paratype ♀, spinnerets ventrally (parts are hidden). Note the large and laterally compressed median spinnerets (M); 59) paratype ♂, coll. HOFFEINS, tibia of the l. pedipalpus dorsally; 60) holotype, tibia of the l. pedipalpus dorsally; 61) holotype, r. pedipalpus retroventral aspect, slightly seen from the tip (basally hidden); 62) paratype ♂, F7/CJW, r. pedipalpus, retroventral aspect; 63) paratype ♂, F694/CJW, l. pedipalpus prolateral aspect; 64) paratype ♀, epigyne/vulva, ventral aspect. Note the preservation of apparently two pairs of receptacula seminis. E = embolus, M = median spinnerets. - M = 0.5 in fig. 57, 0.2 in the remaining figs.;



figs. 65-73: ***Protoorthobula deelemani* n. gen. n. sp.**, ♂; 65) paratype F679/CJW, outline of the flattened body, lateral aspect. Note the large and rugose dorsal opisthosomal scutum; 66) paratype F673/CJW, prosoma, dorsal aspect. Note the fine rogose structure of the cuticula (arrow) and the basally bulging chelicerae; 67) paratype F677/CJW, r. tarsus and metatarsus prolaterally. Normal hairs are not drawn. Note the basal position of the tarsal organ; 68) holotype, prolateral claw of the l. tarsus I; 69) paratype of the coll. DEELEMAN, tibia of the l. pedipalpus, dorsal aspect; 70) paratype F 676/CJW, tibia of the l. pedipalpus, dorsal-basal aspect; fig. 71) holotype, l. pedipalpus prolaterally;→72) holotype, l. pedipalpus and mouth parts retroventrally; 73) paratype ZMus. Copenhagen no. 8-12 1954, l. pedipalpus ventrally and slightly distally. D = droplet of poison on the left fang, E = embolus, S = sperm duct. - M = 1.0 in fig. 65, 0.5 in fig. 66, 0.2 in figs. 67, 71 and 72, 0.05 in fig. 68, 0.1 in the remaining figs.

figs. 74-75: ***Cryptoplanus bulbosus* n. sp.**, ♂; 74) tibia of the r. prdipalpus, dorsally (only two trichobothria are drawn); 75) tibia and basal part of the cymbium retrolaterally, tibia slightly dorsally (only few cymbial spines are drawn). - M = 0.2;

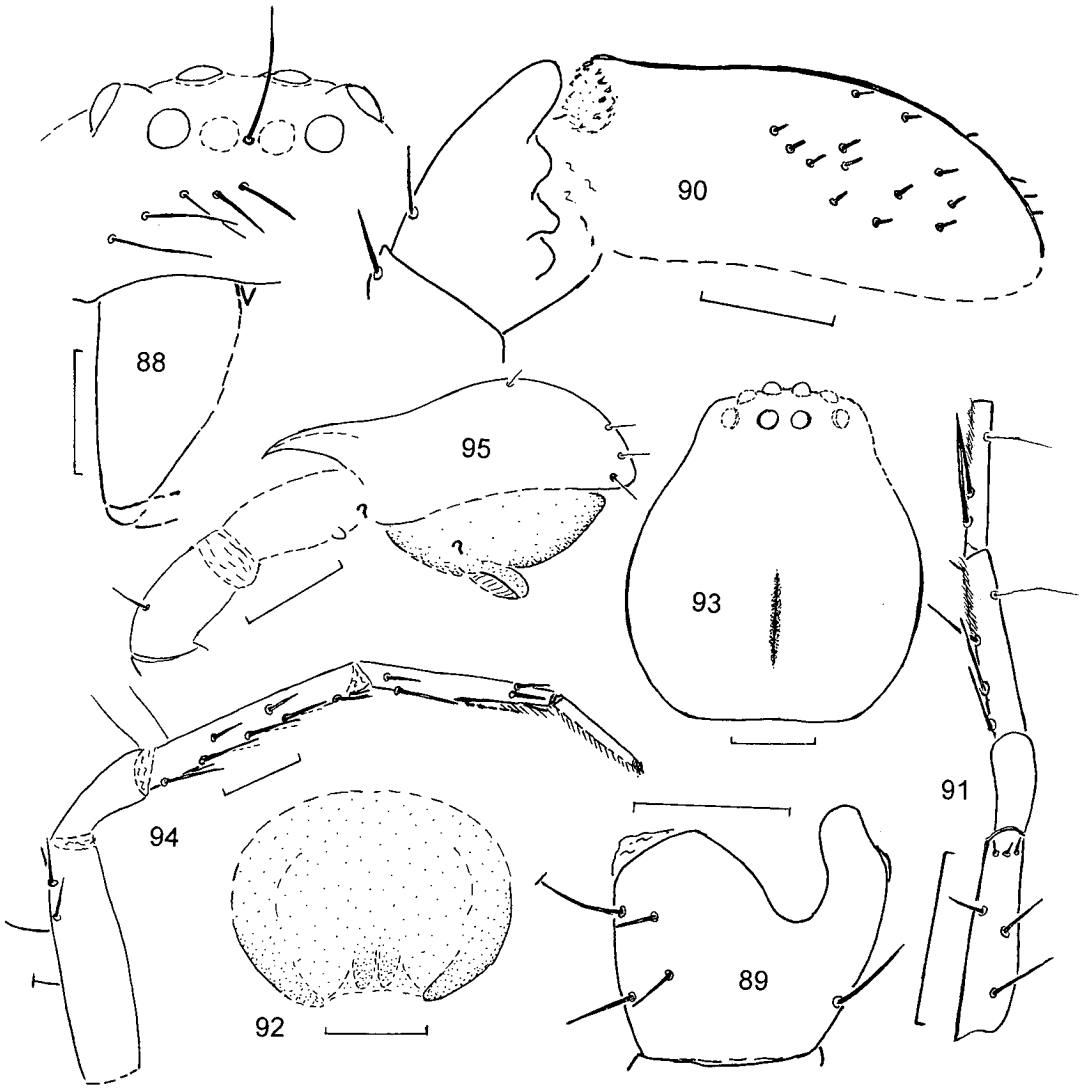
figs. 76-79: ***Cryptoplanus complicatus* n. sp.**, ♂; 76) labium and gnathocoxae ventrally; 77) r. tarsus III retroventrally with trichobothria in at least two rows and spatulate hairs of the claw tuft (scopula not drawn); 78) r. pedipalpus dorsally, cymbium in basal-dorsal aspect; 79) tibial apophysis of the r. pedipalpus retrolaterally. - M = 0.5 in fig. 77, 0.2 in figs. 76 and 78, 0.1 in fig. 79;



figs. 80-81: ***Cryptoplanus incidens* n. sp.**, ♂; 80) position of the eyes dorsally; 81) tibia of the r. pedipalpus dorsally (only four trichobothria are drawn). - M = 0.2;

figs. 82-83: *Cryptoplanus paradoxus* PETRUNKEVITCH 1958, ♂, holotype; 82) outline of the l. pedipalpus prolaterally but cymbium prodorsally (only few basal cymbial bristles are drawn); 83) tibial apophysis of the l. pedipalpus retrolaterally. - M = 0.2 and 0.1;

figs. 84-87: *Cryptoplanus sericatus* (KOCH & BERENDT 1854, ♂; 84) F663/CJW, r. leg III retroventrally; 85) holotype, tibia of the l. pedipalpus dorsally (some trichobothria are drawn but no bristles of hairs); 86) F663/CJW, l. pedipalpus retroventrally; 87) ♂ from the coll. KERNEGGER, tibia of the l. pedipalpus retrolaterally. C = conductor, E = embolus, M = median apophysis. - M = 1.0 in fig. 84, 0.2 in the remaining figs.;



figs. 88-90: ***Cryptoplanus sinuosus* n. sp.**, ♂; 88) prosoma with the r. chelicera frontally; 89) tibia of the r. pedipalpus dorsally (trichobothria not drawn); 90) tibia and cymbium of the r. pedipalpus retrolaterally (not all of the cymbial spines are drawn). - M = 0.1 in fig. 88, 0.2 in figs. 89 and 90;

figs. 91-92: *Cryptoplanus* sp. indet., ♀ (F698/CJW); 91) r. leg I except the tarsus prodorsally (only two trichobothria are drawn); 92) epigyne (most parts are hidden by hairs and an emulsion). - M = 1.0 and 0.2;

figs. 93-95: ***Cornucymbium insolens* n. gen. n. sp.**, ♂; 93) prosoma dorsally; 94) r. leg I retrollaterally. Note the hair-shaped dorsal patellar and tibial bristles; 95) r. pedipalpus retrolaterally which is partly hidden, see the question marks. - M = 1.0 in fig. 93-94, 0.5 in fig. 95.

BEITR. ARANEOL., 3 (2004)

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

JOERG WUNDERLICH, 75334 Straubenhardt, Germany.

Abstract: Some informations are given on the fossil members of the family Gnaphosidae (Araneae) in Baltic and Dominican amber. Gnaphosidae are rare in both kinds of amber; they probably are all members of the subfamily Drassodinae. A provisional key to the subfamilies of the Gnaphosidae s. l. is given.

Introduction

Fossil Ground Spiders (Gnaphosidae) are rare; in my private collection there are only about a dozen specimens in Baltic amber, half a dozen males, e.g. F/715/BB/AR/GNA/CJW, F716/BB/AR/GNA/CJW and F17/BB/AR/GNA/CJW; some determinations are doubtful. None of these males show the bulbus in the ventral aspect and the cheliceral teeth are hidden; therefore the subfamily of the fossils is uncertain (?Drassodinae). A revision of the taxa in Baltic amber is needed. See the chapter on fungi.

Diagnosis of the family Gnaphosidae s.l.: Posterior median eyes ovally (fig. 1), gnathocoxae obliquely depressed (fig. 4), anterior spinnerets cylindrical, usually large and well separated (photo, fig. 2) (not in *Micaria*, fig. 3) and in a parallel position, apical article strongly reduced, piriform spigots of the anterior spinnerets greatly enlarged and with widened base (fig. 2) (PLATNICK (1990), structure of the prosomal cuticula rib-shaped. (A dorsal opisthosomal scutum may be present, some taxa are myrmecomorphic, similar e.g. to Trochanteriidae and Corinnidae: Phrurolithinae).

Subfamilies (the composition is provisional!): Drassodinae (incl. Echemini and Micariini?), Gnaphosinae, Lamponinae, Laroniinae, Prodidominae s.l. (incl. Anagraphini, Molycrini and Zimirini?) and Zelotinae. Several authors - e.g. PLATNICK - regard Lamponinae, Laroniinae and Prodidominae as separate families.

Relationships: Cithaeronidae may be most related, see PLATNICK (2002), Bull. Amer. Mus. Nat. Hist., 271.

Distribution: Cosmopolitical.

Provisional **key** to the subfamilies of the Gnaphosidae s.l.:

1 Anterior spinnerets placed distinctly more anteriorly (fig. 9), the tarsal claws may be smooth and a gnathocoxal serrula may be absent. . . . . Prodidominae s.l.

- Anterior spinnerets in a usual position (photo, fig. 2). 2

2(1) Retromargin of the chelicerae with teeth or smooth. 3

- Chelicerae with a serrated retromarginal keel (fig. 5). . . . . Gnaphosinae

- Chelicerae usually with two retromarginal lobi (fig. 6). . . . . Laroniinae

3(2) Usually with a distinct pair of sclerotized ventral plates just behind the epigastral furrow. A metatarsal preening brush is present (fig. 8). . . . . Lamponinae

- Paired ventral opisthosomal plates absent. Metatarsal brush or comb (fig. 7). 4

4(3) Metatarsus III and/or IV with a preening comb (fig. 7). . . . . Zelotinae

- Metatarsus III and/or IV with or without a preening brush (fig. 8). . . . . Drassodinae

The fossil taxa

A. Taxa in Dominican amber: *Drassyllinus* WUNDERLICH 1988, *D. aliter* WUNDERLICH 1988.

B. Taxa in Baltic amber: Most taxa whiche were published sub Gnaphosidae are members of other families, most often of the Corinnidae: Phruroloithinae, which may possess oval posterior median eyes similar to fig. 1 and a depression of the gnathocoxa similar to fig. 4, but the spinnerets and the cuticular structure of the prosoma are different, see the paper on the family Corinnidae in this volume, e.g. the genus *Eomazax* PETRUNKEVITCH. See the numerous question marks in the list of fossil Gnaphosidae in the book of PETRUNKEVITCH (1958: 376-377). *Captrix* PETRUNKEVITCH 1942 and *Eomactator* PETRUNKEVITCH 1958 may be taxa of the Gnaphosidae. *Pythonissa sericata* KOCH & BERENDT 1854: See the paper on the family Corinnidae in this volume, the genus *Cryptoplanus* PETRUNKEVITCH. See the material which is listed above.
Photo 388.

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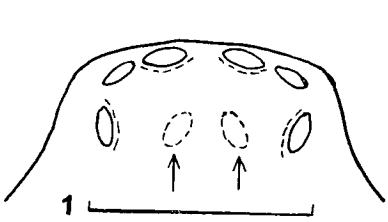

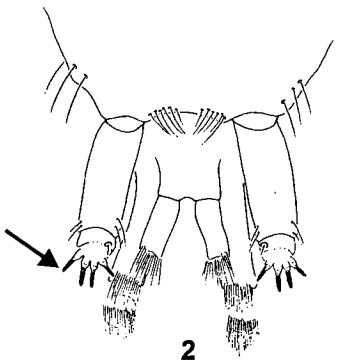

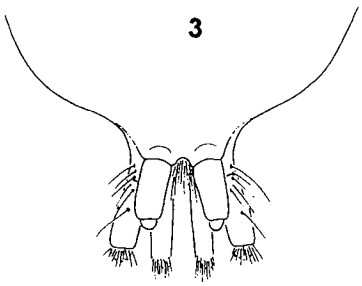

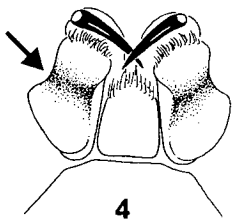

Fig. 1) Oval posterior median eyes of the Gnaphosidae sp. indet., fossil ♂ F715/CJW in Baltic amber

figs. 2-3: Spinnerets of the Gnaphosidae, ventral aspect; 2) *Minosia* sp. (Gnaphosinae); 3) *Micaria* sp. (?Drasodinae: Micariini);

fig. 4) Mouthparts of the Gnaphosidae, ventral aspect. The arrow indicates to the depression of the gnathocoxae;

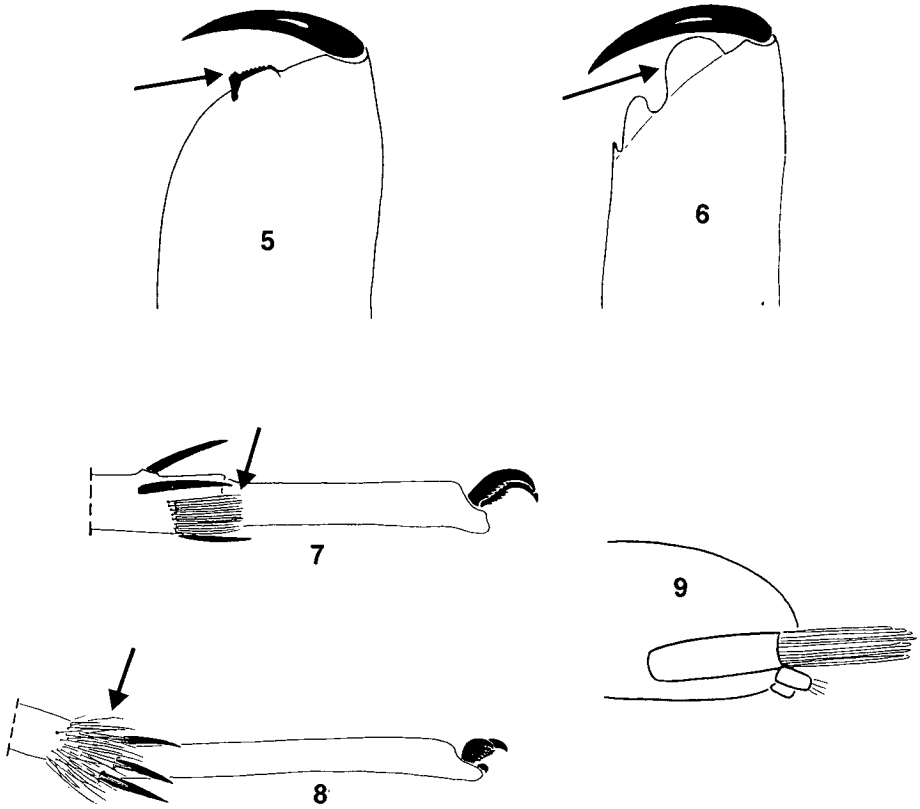

fig. 5) Retromarginal cheliceral keel of the Gnaphosinae;

fig. 6) Retromarginal cheliceral lobes of the Laroniinae;

fig. 7) Preening comb of metatarsus IV and/or IV of the Zelotinae;

fig. 8) Preening brush of metatarsus III and/or IV of most Drassodinae;

fig. 9) Spinnerets of extant Prodidominae, lateral aspect. Note the anterior position of the anterior spinnerets.

Figs. 2-9) are taken from DIPPENAAR-SCHOEMAN & JOCQUE (1997).

BEITR. ARANEOL., 3 (2004)

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

JOERG WUNDERLICH, D-75334 Straubenhardt, Germany.

Abstract: The fossil taxa of the spider (Araneae) family Anyphaenidae in Baltic and Dominican amber are repeated, three species in Dominican amber, one species in Baltic amber.

Fossil Anyphaenidae (German name "Zartspinnen") are extremely rare, although most - extant - members occur in higher strata; only four specimens are known from Dominican amber, one (probably two) specimens from Baltic amber.

Diagnosis of the family Anyphaenidae: Position of the tracheal spiracle one third or more in front of the spinnerets (arrow in fig. 1), anterior spinnerets long and close together (fig. 1), posterior spinnerets usually about as long as the anterior spinnerets (figs. 1-2), cylindrical gland spigots absent, claw tufts with spatulate hairs which are usually more distinct spatulate than in fig. 4. - Further characters: Ecribellate, unpaired tarsal claw absent.

Relationships: Liocranidae (in which cylindrical gland spigots are present) and Zoridae (in which both eye rows are distinctly recurved) may be most related.

Distribution: Cosmopolitical, most diverse in the Neotropics; fossil in the Tertiary Baltic and Dominican amber forests.

The **size of the fossils** is less than 5.5mm.

Taxa in Dominican amber (the taxa were revised by PENNEY (2000: 223-226)):

Anyphaenoides bulla (WUNDERLICH 1988) (= *Aysha bulla*),
Lupettiana ligula (WUNDERLICH 1988) (= *Teudis ligula*),
Wulfila spinipes WUNDERLICH 1988.

Taxa in Baltic amber:

"*Anyphaena*" *fuscata* KOCH & BERENDT 1854. - I saw the holotype, an adult male which is only fairly well preserved. According to the absence of spatulate hairs of the claw tufts the holotype is most probably not a member of the family Anyphaenidae.

"*Anyphaena*" *fuscata* sensu PETRUNKEVITCH 1946 (figs. 1-4). - I had not the opportunity to see the juvenile ♀, which was declared by PETRUNKEVITCH (1946: 17) as the "hypotype" of *Anyphaena fuscata*. According to the differences to the extant species of *Anyphaena accentuata* - see the remark of MENGE in KOCH & BERENDT (1854: 65) - the relationships of this specimen are quite unsure; it may well be a member of an undescribed and extinct genus.

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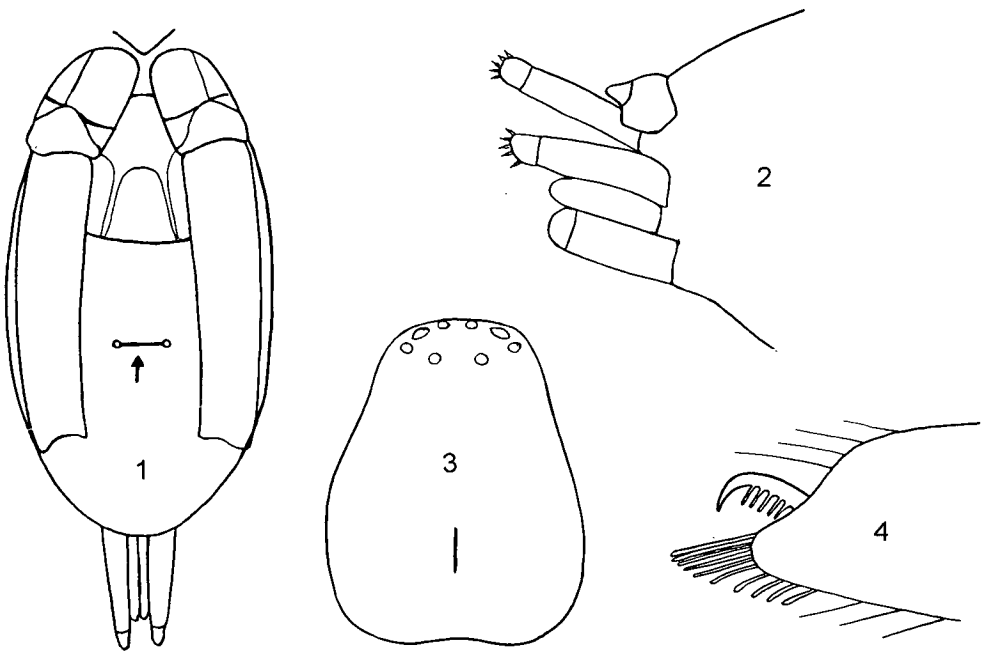

Figs. 1-4: "*Anyphaena*" *fuscata* sensu PETRUNKEVITCH 1946, juv. ♀; 1) opisthosoma and basal articles of the legs IV, ventral aspect; 2) lateral view of the spinnerets; 3) prosoma, dorsal aspect; 4) tip of the l. tarsus IV, lateral aspect.

BEITR. ARANEOL., 3 (2004)

MEMBERS OF THE FAMILY PHILODROMIDAE (ARANEAE) IN BALTIC AMBER?

JOERG WUNDERLICH, D-75334 Straubenhardt, Germany.

Abstract: The questionable fossil taxa of the family Philodromidae (Araneae) in Baltic and Dominican amber are discussed. No sure or adult fossil member of these families in these kinds of amber are known to me. A preliminary diagnosis of the family Philodromidae is given.

If not otherwise noted the **material** is kept in the collection of J. WUNDERLICH, CJW. ZMHUB = Zoological Museum of the Humboldt University Berlin.

INTRODUCTION

Several authors reported members of the family Philodromidae in Baltic and Dominican amber but not a single sure fossil of this family is known to me, some juveniles may belong to the Philodromidae but more likely to the families Liocranidae and Trochanteriidae, see below and the paper on these families in this volume. One juvenile fossil spider in Baltic amber - F164/CJW, see below - is similar to members of the family Ctenidae. Adult fossil spiders and a world wide revision of the families Philodromidae and Trochanteriidae are needed for further studies of fossil spiders.

TAXONOMY and SYNONOMY

Provisional diagnosis/description of the family Philodromidae:
Legs laterigrade, body +/- flattened and with a wide prosoma, eyes usually small, posterior lateral eyes directed laterally to posteriorly, posterior eye row recurved (usually strongly), no fovea/thoracal ridge (in fact in all taxa?), leg II usually longer I or IV, leg III not much shorter than I, paired ventral bristles of tibia I-II present, tarsal trichobothria in one row (in fact in all taxa?), tarsal scopula present, spatulate hairs present under the tarsal claws (in all taxa?), anterior margin of the cheliceral furrow with 0-2 teeth, posterior margin smooth, colulus and tapetum of the secondary eyes absent, two tarsal claws, ecribellate.

Remarks: A world wide revision of the family is needed. I do not know the intrafamiliar variability of the thoracal ridge/fovea as well as the tarsal trichobothria and the spatulate hairs under the tarsal claws. - Philodromidae were regarded as a subfamily of the Thomisidae in former times, e.g. by PETRUNKEVITCH (1958).

Close **relationships** of the family are unsure, Sparassidae may be related. (In the Thomisidae - in contrast to the Philodromidae - leg I is longest).

Distribution: Cosmopolitic.

THE FOSSIL SPIDER TAXA, relationships and synonymy

1. Questionable taxa in Dominican amber

Only two questionable juveniles - Gen. indet., perhaps a member of *Apollophanes* O. PICKARD-CAMBRIIDGE 1898 (= *Gephyrina* sensu BRYANT (1948)) - are known in Dominican amber, see WUNDERLICH (1988: 231-22, figs. 645, 769). Adult spiders are needed for further studies.

2. Questionable taxa in Baltic amber

Fossil members of various families were mistaken as Philodromidae; especially the determination of juveniles is a criminalistic work, and one has to compare flattened Corinnidae, Gnaphosidae, Liocranidae, Sparassidae, Thomisidae and Trochanteriidae.
According to the short diagnosis of *Athera* MENGE in KOCH & BERENDT 1854 - e.g. body long and slender, large eyes of the posterior row -, and of *Anatone* MENGE in KOCH & BERENDT 1854 - size of the eyes of the anterior row about half of the posterior eyes - I am unable to find out the relationships of these genera on family level.
Pythonissa sp. - see PETRUNKEVITCH (1958: 384 sub *Philodromus*) - is according e.g. to the absence of ventral tibial bristles not a member of the Philodromidae. *Pythonissa sericata* KOCH & BERENDT 1854 is a member of the family Liocranidae, see the paper on this family in this volume.
Philodromus dubius KOCH & BERENDT 1854 is according to the note of MENGE below the species description synonym with *Pythonissa affinis* (Gnaphosidae) and also the other species of *Philodromus* sensu KOCH & BERENDT 1854 are regarded as members of *Pythonissa* by this author. Today the species of *Pythonissa* are regarded as mixture of taxa of various families, mainly Gnaphosidae, but in Baltic amber Corinnidae and Liocranidae are much more frequent.
I studied type material of *Philodromus microcephalus* KOCH & BERENDT 1854, P. *spinimanus* KOCH & BERENDT 1854 and *P. squamiger* KOCH & BERENDT 1854 (ZMHUB). MENGE (1854) regarded these species as members of the genus *Pythonissa*. In my opinion *P. microcephalus* is a member of the family Corinnidae and a synonym of *Ablator triguttatus* KOCH & BERENDT 1854 - see the paper on Corinnidae in this volume -, and also *P. squamiger* may be a member of this genus. *P. spinimanus* is a member of the family Liocranidae: *Apostenus* WESTRING 1858, see the paper on the Liocranidae in this volume.
MENGE in KOCH & BERENDT (1854: 84) believed to have "two doubtless species of *Philodromus*" (the material is lost): *P. reptans* MENGE and *P. redrogradus* MENGE. There is no diagnosis or description of these species and therefore they are nomina nuda. In my collection there are *Philodromus*-shaped members of the families Trochanteridae and probably Toxopidae and the spiders in the collection of MENGE may have been members of these families, see the papers on these families in this volume.
I do not want to exclude with certainty that *Coduceator* PETRUNKEVITCH 1942 ad part. could be Philodromidae but in *C. quadrimaculatus* PETRUNKEVITCH 1950 (♀) a leg scopula is absent. *Caduceator* and *Collacteus* PETRUNKEVITCH 1942: Compare the paper on the family Sparassidae in this volume. PETRUNKEVITCH (1950: 317) regarded *Filiolela* PETRUNKEVITCH 1955 (= *Filiola* PETRUNKEVITCH 1942) and *Medela* PETRUNKEVITCH 1942 as "incertae sedis". The descriptions of both were based on juveniles. According to the absence of leg bristles *Medela* should not be a member of the Philodromidae.
PETRUNKEVITCH (1958: 383) regarded "*Syphax" radiatus* KOCH & BERENDT 1854 as a member of the genus *Artamus* C.L. KOCH (Philodromidae) but this species is surely not a member of this family; see the paper on Borboropactidae in this volume.
According to the strongly bent femur of the male pedipalpus *Eothanatus* PETRUNKEVITCH 1950 is similar to *Ablator* PETRUNKEVITCH 1942, but the opisthosoma bears

feathery hairs. I am quite unsure about the relationships of this genus; the convex tegulum is different to members of the family Philodromidae.

Selected questionable fossil Philodromidae of the CJW in Baltic amber

Material: 1 subad. ♂ F152/BB/AR/?PHI/CJW, 3 juv.: F161/BB/AR/?PHI/CJW, F163/BB/AR/?PHI/CJW, F164/BB/AR/?PHI/CJW and 1♂ F1285/BB/AR/?PHI/CJW.

The body length of the spiders varies between 2.3mm (F161) and 6.3mm (F152). The right leg I of the subad. ♂ F152 is a regenerate (photo), the anterior part of the prosoma incl. the eyes are destroyed. This spider is similar to members of *Sosybius* PETRUNKEVITCH (Trochanteriidae) but the chelicerae are not protruding; there may be only one row of tarsal trichobothria. Leg and eye position of the spiders is as in Philodromidae, the body is flattened, an unpaired tarsal claw is absent. The number of the pairs of ventral bristles of tibia I-II - in order to the coll.-no. - is 4, 0(!), 3 (very long bristles) and 3. Body and legs of no. 163 are covered with long hairs.
Compared with extant palearctic Philodromidae taxa the fossil spiders are different, e.g. a fovea is usually present (absent in F1285) and there is more than one row of tarsal trichobothria, F152 and F164 may be exceptions. In one of the juveniles - F164 - the thorax is slightly higher than the caput, similar to members of the Ctenidae but there are only two eye rows which are distinctly recurved. Several structures which are of taxonomic importance - as the cheliceral teeth and the presence of a tapetum of the secondary eyes - are not observable in the fossils. - F1285: The spider is partly covered by a white emulsion and oxidated, the body length is ca. 4.3mm, the eyes are small, the posterior row is slightly recurved, a fovea is absent, leg I is distinctly smaller than II, leg III is clearly shorter than IV, tibiae and metatarsi I-II bear paired ventral bristles, there is more than one row of tarsal trichobothria, leg scopulae and claw tufts are absent, the opisthosoma is long ovally, most parts of the bulbi are hidden, a retrolateral tibial apophysis is present. The piece of amber was heated.
In my opinion most probably none of these fossils spiders are members of the family Philodromidae but more likely they may be members of the families Liocranidae and Trochanteriidae, see the paper on these families in this volume.

Discussion

Nowadays Philodromidae is cosmopolitical distributed and its members are frequent in

higher strata including the bark of trees. In some regions members of the Philodromidae are much more frequent than Anyphaenidae - which also prefer higher strata of the vegetation -, e.g. in the Palearctic Region. Philodromidae probably were absent in the Baltic amber forest or even in the Early Tertiary; Anyphaenidae are known from very few specimens in Baltic amber. The reason for the absence of the Philodromidae in the Baltic amber forest is unclear to me. Is Philodromidae - as Lycosidae - a family which is probably younger than the Baltic amber forest or did spiders of these families not reach the region of the Baltic amber forest at that time?

LITERATURE (See also the paper on the family Corinnidae in this volume)

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BEITR. ARANEOL., 3 (2004)

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

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ABSTRACT: A single species - *Pseudosparianthis pfeifferi* (WUNDERLICH 1988) of the Sparassidae: Sparianthinae is known from Dominican amber. From Baltic amber not a single Sparassidae species is surely known; several taxa which were regarded as members of the Sparassidae by PETRUNKEVITCH are discussed, most are assigned to other families.

INTRODUCTION

Several fossil taxa were erroneously mistaken as members of the family Sparassidae (=

Heteropodidae, Eusparassidae) by PETRUNKEVITCH and other authors. For example a member of the family Salticidae - fig. 43 in the book of BACHOFEN-ECHT (1949) - was mistaken as a member of the Sparassidae. The shape of some members of several families - e.g. Liocranidae and Philodromidae - is similar to the Sparassidae. The most important character of the family Sparassidae - the trilobate metatarsal membrane, figs. 1-4 - is only difficult to observe in fossil spiders and was not studied by PETRUNKEVITCH. The family Sparassidae was erected by BERTKAU in the year 1872 and therefore not yet known by KOCH & BERENDT (1854).

Diagnosis of the family Sparassidae: Metatarsi apically with a soft trilobate membrane (figs. 1-4), legs laterigrade (few exceptions; the leg position is "mediograde" e.g. in *Micrommata* LATREILLE 1804, see below), tarsi and metatarsi usually densily scopulate, usually larger spiders, body length most often > 1cm, about 0.5 up to 4cm (7.2mm in the male of the fossil *Pseudosparianthis pfeifferi* in Dominican amber), dorsal patellar bristles are usually absent.

The **relationships** are unsure.

Distribution: Cosmopolitical; fossil e.g. in Dominican amber.

THE FOSSIL TAXA

a) Taxa in Dominican amber

According to PENNEY (2001: 1003) *Tentabunda pfeifferi* WUNDERLICH 1988 (erroneously sub *Tentabuna*) is a member of the genus *Pseudosparianthis* SIMON 1887; the body length of the small holotype male is 7.2mm. This is the only known Sparassidae in Dominican amber.

b) Taxa in Baltic amber

I never found (and do not konw of) a fossil member of the family Sparassidae in Baltic amber although various taxa were described in this family:

Adulatrix PETRUNKEVITCH 1942, *Collacteus* PETRUNKEVITCH 1942, *Ocypete* (= *Oxypete*) C. L. KOCH and *Sosybius* KOCH & BERENDT 1854 - compare WUNDERLICH (1986: 29) -: See the paper on the family Trochanteriidae in this volume. *Eoprychia* PETRUNKEVITCH 1958: See the paper on the family Zoropsidae in this volume. *Caduceator* PETRUNKEVITCH 1950: See the paper on the family Corinnidae (Phrurolithinae). - Unclear are the relationships of *Eostaianus* PETRUNKEVITCH 1942, *Eostasina* PETRUNKEVITCH 1942 (the description of this genus is based on an exuvia!) and *Zachria* C. L. KOCH 1875; the structures of the male pedipalpus of the small "*Zachria*" *desiderabilis* PETRUNKEVITCH 1950 (figs. 5-6) resemble some members of the Sparassidae but the presence of dorsal patellar bristles are quite unusual in this family.

Remarks on the leg position: The leg position of most Sparassidae - as in several other spider families like Philodromidae, Platoridae, Selenopidae, Sicariidae and Thomisidae - is **laterigrade**: At least and especially the femora I-II are directed sideward, the position of leg III is usually similar to I and II (curved foreward), leg I is shorter than II and the body may be flattened, see the paper on the Trochanteriidae in this volume. - In contrast to this position the usual leg position of most spiders is **prograde**: The legs I-II are directed foreward (in the Segestriidae the leg III, too), the legs III-IV are directed backward, the legs I or IV are the longest and the body is not flattened. - In several spders the leg position is more or less intermediate between the two positions - "**mediograde**" (**new term**) sensu P. JÄGER (pers. commun.) -, usually leg I or IV is longest, the patellae III and IV are directed backward; e.g. in numerous members of the family Liocranidae and in some Sparassidae as *Micrommata*.

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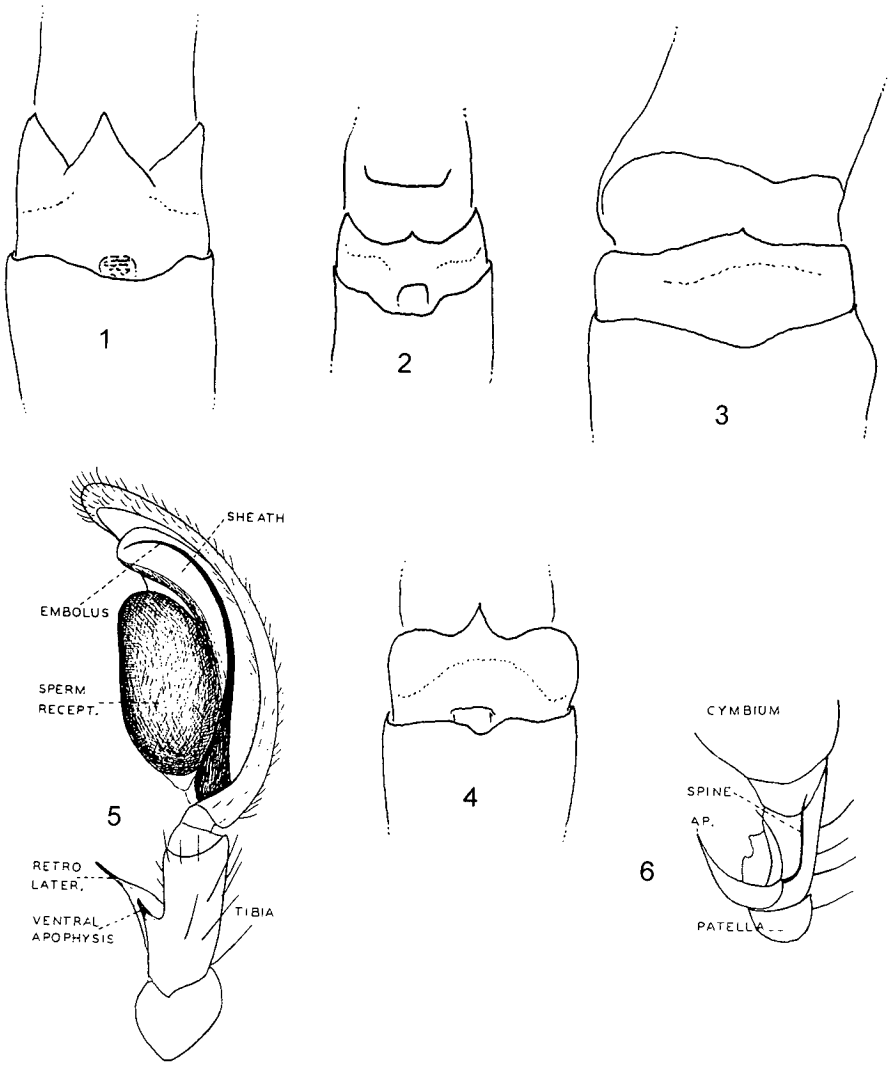

Figs. 1-4: Different trilobate metatarsal membranes of the Sparassidae, dorsal aspect; 1) Heteropodinae: *Heteropoda* sp., 2) Sparianthinae: *Thelcticopis* sp., 3-4) Sparassinae: *Cerbalus* sp. and *Olios* sp. Drawings by P. JÄGER.

Figs. 5-6: *Zachria desiderabilis* PETRUNKEVITCH 1950, ♂; 5) prolateral view of the r. pedipalpus; 6) tibia of the l. pedipalpus, retrolateral view.Taken from PETRUNKEVITCH (1950: Figs. 109-110).

BEITR. ARANEOL., 3 (2004)

FOSSIL SPIDERS OF THE FAMILY TROCHANTERIIDAE (ARANEAE) IN BALTIC, DOMINICAN AND MEXICAN AMBER, WITH A REVISION OF THE GENUS *SOSYBIUS* KOCH & BERENDT 1854

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Abstract: Fossil taxa of the spider (Araneae) family Trochanteriidae (subfamily Trochanteriinae) are reported from Baltic, Dominican and Mexican amber. With some hesitation the extinct genus *Sosybius* KOCH & BERENDT 1854 in Baltic amber is transferred to the Trochanteriidae. *Sosybius* is revised and the **new tribus** Sosybiini is erected; the genera *Eotrochanteria* **n. gen**. with its type species *E. kruegeri* **n. sp**., *Trochanteridromulus* **n. gen**. with its type species *T. glabripes* **n. sp**. and *Trochanteridromus* **n. gen**. with its type species *T. scutatus* **n. sp**. are described. These are the first fossil records of the family Trochanteriidae. Members of the genus *Sosybius* are the largest spiders in Baltic amber. The previously described species of this genus are discussed and **nine new species** are described: *S. berendti, falcatus, kochi, lateralis, longipes, mizgirisi, perniciosus, tibialis* and *unispinosus*. With some hesitation the genus *Veterator* PETRUNKEVITCH 1963 in Dominican and Mexican amber is transferred from the Corinnidae to the Trochanteriidae. Remains of poison in *Sosybius perniciosus*, sperm in *S. lateralis*, a questionable epigynal plug in *S. kochi* as well as regenerated legs in *S.* sp. indet. and *Trochanteridromus scutatus* and probably the tapetum of an eye in *Eotrochanteria kruegeri* are reported.

CJW = Collection J. WUNDERLICH, GPIUH = Geological-Paleontological Institute of the Unversity of Hamburg, PIHUB = Paleontological Institute of the Humboldt University Berlin, SMF = Senckenberg-Museum Frankfurt a. M.

INTRODUCTION

Up to now members of the genera *Sosybius*, *Eotrochanteria*, *Trochanteridromulus* and *Trochanteridromus* are the only ones of the family Trochanteriidae in Baltic amber and are exclusively known as fossils and from this kind of amber. Most extant Trochanteriidae are known from the Tropics of the Southern hemisphere and the Canary Islands. I introduce here the German name „Schenkelring-Spinnen" for this family refering to the long trochantera of the posterior legs (arrow in fig. 23) in several (by far not all!) genera of this family. Photos 389ff.
Some of these are the largest known spiders in Baltic amber. The body length of a female of *Sosybius* from the collection of KRYLOV is 16mm. In contrast to large adult spiders which escape free from the sticky resin – occasionally leaving one or more legs – juvenile members of this genus are not rare in Baltic amber.
Fossil Trochanteriidae can be recognized by a combination of characters: A flattened body with elongated chelicerae (figs 1-2), sidewards directed (laterigrade) legs (see the photos), numerous tarsal trichobothria in an irregular position and – except in *Trochanteridromus* and *Trochanteridromulus* - a dense scopula under the tarsi and metatarsi (figs. 3, 13). These characters and its frequency in amber let conclude that the members of *Sosybius* lived on/under bark of the resin-producing trees. Most extant relatives live under bark and stones. In the fossil Baltic and amber forest members of the Trochanteriidae seemed to be more frequent than members of the family Philodromidae which are frequent today in higher strata in Europe.– How many *Sosybius* species really existed in the Baltic amber forest is unclear; too difficult are the determination and the synonymy of the previous described species. The determination of juveniles is impossible.
Mainly because of the quite unusual intrafamiliar variability - see below - and the limits of this family which is not quite sure to me I regard the fossil genera in question with some hesitation as members of this family.

EINLEITUNG

Vertreter von *Sosybius*, *Eotrochanteria*, *Trochanteridromulus* und *Trochanteridromus* sind die einzigen bisher bekannten Gattungen der Familie Trochanteriidae im Balti-

schen Bernstein; sie sind ausschließlich fossil und nur von dieser Bernstein-Art bekannt. Heutige Trochanteriidae leben überwiegend in den Tropen der südlichen Hemisphaere und auf den Kanarischen Inseln. Ich führe hier den deutschen Namen „Schenkelring-Spinnen" für diese Familie ein. Er bezieht sich auf die bei verschiedenen (längst nicht allen!) Gattungen stark verlängerten Trochantera des vierten Bein-Paares (Pfeil in Abb. 23). Fotos 389ff.
Es handelt sich um die größten bekannten Spinnen in dieser Bernstein-Art. Das größte Exemplar, das ich bisher sah, war ein *Sosybius*-♀ mit einer Körper-Länge von 16mm aus der Sammlung des russischen Händlers A. KRYLOV. Im Gegensatz zu den großen geschlechtsreifen Spinnen, die sich eher aus dem klebrigen Harz befreien konnten - gelegentlich unter Zurücklassung einzelner Beine -, sind juvenile Vertreter dieser Gattung im Bernstein keineswegs selten.
Fossile Schenkelring-Spinnen können nach einer Kombination von Merkmalen identifiziert werden: Ihrem abgeflachten Körper mit den stark verlängerten Cheliceren (Abb.1-2), den zur Seite gerichteten (laterigraden) Beinen (Fotos), den zahlreichen Trichobothrien der Tarsen in unregelmäßiger Position und der – außer bei *Trohanteridromus* und *Trochanteridromulus* - ausgeprägten Scopula unter den Tarsen und Metatarsen (Abb. 3, 13), die allerdings bei Jungspinnen schwach entwickelt sein kann. Diese Merkmale sowie ihre Häufigkeit im Bernstein lassen darauf schließen, daß die Vertreter der Gattungen *Sosybius* (auch) an/unter der Rinde der harz-produzierenden Bäume gelebt haben. Heutige Verwandte leben überwiegend unter Baumrinde (hier sammelte ich sie in Australien) und Steinen. Vertreter der Schenkelring-Spinnen waren im Baltischen Bernstein-Wald offenbar häufiger als Laufspinnen (Philodromidae), die heute in höheren Vegetations-Schichten in Europa dominieren und die im Baltischen Bernsteinwald vermutlich sogar fehlten.- Wie viele Arten der Gattung *Sosybius* im Baltischen Bernsteinwald tatsächlich existiert haben, ist unsicher, offenbar waren es nicht wenige. Kompliziert sind die Synonymie-Verhältnisse der früher beschriebenen Arten, schwierig ist die Bestimmung; nach Jungspinnen ist sie artlich vermutlich sogar unmöglich.
Wegen der offenbar ganz ungewöhnlichen intrafamiliaren Variabilität (siehe unten) sowie der mir unklaren Abgrenzung der Familie Trochanteriidae stelle ich die drei behandelten fossilen Gattungen mit einigem Vorbehalt zu dieser Famile.

Selected synonyms; see the chapter on *Sosybius*

KOCH & BERENDT (1854) regarded the genus *Sosybius* as a member of the family Eriodontidae; today this name is out of use. Species of *Eriodon* are listed today in the genus *Missulena* WALCKENAER 1805 of the family Actinopodidae (Mygalomorpha), in the catalogue of ROEWER (1942) these spiders are listed in the mygalomorpha family Ctenizidae. KOCH & BERENDT (1854) regarded these spiders probably as Mygalomorphs because of its protruding chelicerae but they are members of the Araneomor-

pha as already pointed out by MENGE IN KOCH & BERENDT (1854: 70): „Die Gattung steht in naher Verwandtschaft mit *Clubiona*" (the genus is closely related to *Clubiona*). - PETRUNKEVITCH (1958: 374) regarded *Sosybius* with a question mark as a member of the Clubionidae. The same author (1942) described the family Adjutoridae based on two subfamilies – Adjutorinae and Adjunctorinae – and three fossil genera in Baltic amber. Adjutorinae are members of the Zodariidae, see WUNDERLICH (1986: 23). According to the cylindrical anterior spinnerets the type genus – and only genus – of the Adjunctorinae – *Adjunctor* PETRUNKEVITCH 1942 – is not a synonym of *Sosybius*. Here I revise my earlier opinion, see WUNDERLICH (1986:29). - Following PETRUNKEVITCH (1942: 361 and 1958: 270) – who regarded the genus *Adulatrix* as a member of the family (Eu)sparassidae - I erroneously regarded *Sosybius* as a member of the family Sparassidae (= Eusparassidae, Heteropodidae), see WUNDERLICH (1986: 29). Now I believe that *Sosybius* is a member of the family Trochanteriidae, see below.
In my opinion *Oxypete decumana* KOCH & BERENDT 1854 is most probably also a member of the genus *Sosybius*, see WUNDERLICH (1986: 30) and below.

TROCHANTERIIDAE Photos 389ff

According to the marginal prosomal carina the taxa in Baltic amber are members of the subfamily Trochanteriinae; see PLATNICK (2002), Bull. Amer. Mus. Nat. Hist., 271.

Provisional diagnosis: Legs laterigrade (see the photographs), body usually distinctly flattened and chelicerae +/- strongly protruding (figs. 1-2, 45), eye field usually very wide (fig. 2, but see fig. 45!), opisthosomal scutum usually present (fig. 25).

Further characters: Ecribellate, unpaired tarsal claw absent, structure of the prosomal cuticula scale-shaped or wrinkled (no tiny furrows) (in all taxa?), autotomy between coxa and trochanter, the posterior median eyes may be oval or reduced (figs. 2, 20 but see figs. 25-26), posterior row straight or recurved (e.g. in *Doliomalus*), tarsal trichobothria in an irregular position (not one row); the gnathocoxae may have a depression, usually at least the cheliceral promargin with teeth (retromargin smooth e.g. in *Platyoides*), leg I often shorter than II. A gnathocoxal serrula and a colulus may be absent. Anterior lateral spinnerets conical and distinctly separated (fig. 7), the median spinnerets may be flattened laterally and at least in the female bearing rows of long spigots (fig. 9). Retroventral tibial I-II bristles may be absent (fig. 6), e.g. in all fossil taxa! The trochanter IV may be unusually long (fig. 23)

Remark: According to DIPPENAAR-SCHOEMAN & JOCQUE (1998: 317) a claw tuft and leg spines are absent in African Trochanteriidae but e. g. in the extant genus *Olin* DEELEMAN-REINHOLD 2001 from SE-Asia, *Sosybius* and an extant gen. indet. from Australia (CJW) leg spines are present, in *Olin* and gen. indet. from Australia a true claw tuft is present. See also the list on the „intrafamiliar variability" below.

The **intrafamiliar variablility** is enormous: In *Olin*, posterior median eyes are usually ovally and flat (intrageneric variable in *Sosybius*), trochanter IV is short in *Olin*, *Sosybius* and *Trochanteridromus* (figs.5,30), slightly (e.g. in *Plator*) to distinctly prolongated (longer than the other trochantera) (e. g. in *Eotrochanteria*, fig. 23, *Platyoides* and *Trochanteria*), ventral gnathocoxal depression present (e. g. in *„Platyoides" venturus* and *Trochanteridromus*, fig. 28), absent (e. g. in some *Sosybius*, fig. 5) or indistinct (e. g. gen. indet. from Australia, some *Sosybius*), the labium is about as long as wide or longer than wide (e. g. in *Platyoides*), leg II is longer than I (e. g. in *Plator*) or shorter (e. g. in *Olin* and some *Sosybius* sp.), leg brisles are present (e.g. in *Eotrochanteria* n. gen., *Olin* and *Sosybius*, figs. 6, 16) or absent, teeth of the tarsal claws are present or absent in some claws, claw tuft and tarsal scopula are present or absent (e. g. in *Eotrochanteria*), a dorsal opisthosomal scutum is present (in most fossil taxa) or absent (e.g. in *Plator*), a sclerotized ring around the anterior spinnerets is present or absent (e.g. in *„Platyoides" venturus* - which in my opinion is not congeneric with *Platyoides* - and in *Sosybius*), the prosoma longer than wide (e.g. in *Olin* and in most fossil taxa), as wide as long (e.g. in the fossil genus *Trochanteridromus*) or wider than long (e.g. in *Plator*), a median apophysis present (e.g. in *Platyoides walteri*, *Sosybius*, fig. 15, or absent) (e. g. in *„Platyoides" venturus* and *Trochanteridromus* n. gen.). At least in the Trochanteriinae the prosomal margin is - usually distinctly - rebordered.

Subfamilies: Trochanteriinae KARSCH 1879 (= Platorinae), Morebilinae PLATNICK 2002 and Trachycosminae PLATNICK 2002. According to the diagnostic charcters given by PLATNICK (2002: 63) - e.g. the marginal prosomal carina - all known fossil taxa of this family in amber are members of the Trochanteriinae. - I do not want to exclude that the genus *Veterator* PETRUNKEVITCH 1963 - fossil in Dominican and Mexican amber - may be a member of the family Trochanteriidae (subfamily Trochanteriinae).

Relationships: In several other families there are taxa in which the body is also flattened and the legs are laterigrade: (1) In some Gnaphosidae (e.g. Hemichloeinae); in Gnaphosidae the cuticular structure is different, the anterior lateral spinnerets are cylindrical and their apical article is strongly reduced, and enlarged piriform gland spigots are present. (2) In the Liocranidae – in which the spinning fields may be similar, see fig. 9 – the legs are prograde to mediograde, the tibiae I-II bear long paired ventral bristles, the eye field is not so wide compared with the width of the caput, an opisthosomal scutum is absent, the structure of the cuticula is different (narrow furrows) and the body is usually not flattened. (3) In the Sparassidae (= Heteropodidae) the apical metatarsal membrane is trilobate (in contrast to fig.4). (4) in the Philodromidae there is - in all taxa? - only one row of tarsal trichobothria, retroventral bristles of tibia I-II are present, a dorsal opisthosomal scutum is absent, the bulbus is flat - as in *Trochanteridromus* - and leg II is usually the longest. (5) In the Selenopidae the eye position is quite different. - In

most Corinnidae also an opisthosomal scutum is present, the cuticula structure is similar and the chelicerae may be protuding but the leg position is prograde, a triangular colulus usually is present, see DIPPENAAR-SCHOEMAN & JOCQUE (1998: 127) (it is absent in the strange genus *Cetonia* PLATNICK 1998 *(= Ceto)*), the spiders' body is frequently ant-shaped and usually not flattened. - In the Clubionidae the leg position is prograde (the posterior median eyes are circular, an opisthosomal scutum is absent and the median spinnerets are cylindrical).

Ecology: Most spiders live on and under stones and/or the bark of trees.

Distribution: Extant taxa exist mainly in the Tropics of the Southern Hemisphere, the Australian, Ethiopian and Oriental Regions; *„Platyoides" venturus* occurs on the Canary Islands, *Olin* and *Plator* are known from the Oriental Region. All fossils are known from the Northern Hemisphere in Baltic amber: *Eotrochanteria, Sosybius*, *Trochanteridromulus* and *Trochanteridromus*. - Probably related are furthermore some fossil spiders which have a short trochanter IV as *Trochanteridromus*: Gen. indet. in Baltic amber (CJW).

Key to the fossil genera of the family Trochanteriidae in Baltic amber (adults):

1 Trochanter IV short, coxa IV long (figs.5,30). 2

- Trochanter IV nearly as long as coxa IV (fig.23), bulbus discoid (fig. 24). Photo 349 . . . . . *Eotrochanteria*

2(1) A dense metatarsal and tarsal scopula present (figs. 3, 13), prosoma length at least 3 mm, cymbium with a retrobasal outgrowth (fig. 15), epigyne figs.11-11a. . . . .*Sosybius* Photo 390

- Dense metatarsal and tarsal scopula absent, prosoma length (♂) not more than 2mm, cymbial outgrowth absent (fig. 34), bulbus flat, embolus long and circular, female unknown. 3

3(2) Ventral tibial and metatarsal I-II bristles present (fig. 29), the embolus describes more than one circle, a large conductor is present (figs. 34-36). . . . . *Trochanteridromus* Photo 393

- Ventral tibial and metatarsal I-II bristles absent (fig. 46), the embolus describes less than one circle (fig. 50). Photo 392-3. . . . . *Trochanteridromulus*

Sosybiini n. trib. (German name: "Bernstein-Schenkelringspinnen")

Diagnosis: A dorsal ♂-opisthosomal scutum (similar to fig.20), a dense tarsal and metatarsal scopula (fig.3), a long coxa IV and a short trochanter IV (fig.5) are present. ♂-pedipalpus (figs. 14-15a, 17, 19, 41): Tibia with 2-3 apophyses, cymbium with a retrobasal outgrowth (fig. 15), a large terminal apophysis present; embolus of medium length in a prolateral position. Epigyne (figs. 11-11a) with a large depression and a pit. - See also the family characters, especially the spinnerets and the diagnosis of the type genus.

Relationships: See below, the type genus.

Type genus: *Sosybius* KOCH & BERENDT 1854.

Distribution: Tertiary Baltic amber forest.

Sosybius KOCH & BERENDT 1854 Photos 389-390

Synonyms: *Adulatrix* PETRUNKEVITCH 1942, *Adamator* PETRUNKEVITCH 1942 and *Oxypete* sensu KOCH & BERENDT (part.), see WUNDERLICH (1986: 24, 30).
The relationships of *Adulatrix rufa* PETRUNKEVITCH 1942 and *A. parva* PETRUNKEVITCH 1942 are quite unsure; both descriptions are based on juveniles.
Remarks on the "androtype" of *Adulatrix fusca* PETRUNKEVITCH 1942 sensu PETRUNKEVITCH (1958: 271-273): The body length of the spider excl. chelicerae is 8.6 mm, there are 2 proventral bristles on tibia I, the left pedipalpus is strongly deformed and the tarsus is distinctly smaller than the right tarsus. The right pedipalpus bears a pointed outgrowth which is shorter than in fig. 380 sensu PETRUNKEVITCH 1958 but similar to my figure 37, the "scoop-shaped structure" sensu PETRUNKEVITCH (1958: 373) is an artefact. This male ("androtype") may be a member of an undescribed species - see *S. unispinosus* n. sp. - and is kept in the PIHUB.
(Fossil genera in Baltic amber whose members have also a flat body are *Collacteus* PETRUNKEVITCH 1942 and *Caduceator* PETRUNKEVITCH 1942; males of these taxa are unknown and the relationships are uncertain).

Diagnosis (e. g. regarding the spinnerets see the diagnosis of the family above): Gnathocoxal serrula absent, legs (figs. 3,13, 16, 42): Trochanter IV not elongated (fig. 5), with spines of medium length or short, tarsi and metatarsi I-II scopulate, true claw tuft (paired brush of dense hairs) absent but a false claw tuft present (fig. 13), tibiae with one long and thin dorsal-distal bristle, tibiae I-II with 1-3 proventral macrosetae only (figs. 3, 6); ♂-pedipalpus (figs. 14-15a, 17, 19, 41): Tibia with 2-3 apophyses, cymbium

with a retrobasal outgrowth and a distal hair brush, median apophysis present, a large terminal apophysis present and an embolus of medium length; epigyne (fig. 11-11a) with a large depression.

Further characters: Prosoma fine wrinkled, both cheliceral margins smooth or toothed, thoracal ridge long, labium longer than wide, epigastral scutum present, metatarsal preening hairs present (fig. 13), apical metatarsal membrane: Fig. 4. The long distal metatarsal trichobothrium has a distinct crack (fig. 42) as in most other Trochanteriidae. Dorsal tibial and patellar spines absent, two dorsal hairs present on the patellae, one distal hair on the tibiae (fig. 42). Trochantera not notched (fig. 5), anterior spinnerets clearly separated (fig. 7), the mostly circular posterior median eyes are usually more or less reduced, flat and oval (fig. 2). – In juveniles the leg scopula is less developed and the chelicerae are less prolongated than in adults. - Two **species-groups**, see the key.

Relationships (see above, the family diagnosis): The ♂-pedipalpus of the type species of the genus *Platyoides* O: PICKARD-CAMBRIDGE 1890 – *walteri* (KARSCH 1886) from Africa – is similar, see PLATNICK (1985: Figs. 11-12) but in this taxon trochanter IV is much longer than the other trochantera and the gnathocoxae ("endites") are obliquely depressed. – In the extant genus *Plator* also trochanter IV is not elongated (in *Doliomanus* it is not strongly (?) elongated); in these genera leg spines are absent and the genital organs are different. - In *Trochanteridromus* and *Trochanteridromulus* trochanter IV is short as in *Sosybius* but a dense scopula is absent and the bulbus structures are quite different. - *Eotrochanteria* n.gen: See the key above. - See also the paragraph "synonyms" above.

Type species: *Sosybius minor* KOCH & BERENDT 1854.

Distribution: Tertiary Baltic amber forests - incl. the Bitterfeld deposit - and Ukrainean amber forests.

The earlier described *Sosybius*-species:

See above: The synonyms of *Sosybius: Adulatrix* and *Adamator*.

Sosybius minor KOCH & BERENDT 1854

Type material has not been found in the PIHUB. The holotype is probably a juv. ♀. 4 paratypes mentionad by MENGE (1854) (ad. ♀?) are missing.

As already mentioned by MENGE in KOCH & BERENDT (1854: 70) the eyes and other

characters of the *Sosybius* species were not correctly described by KOCH. Without the examination of type material I am unable to give a diagnosis of this species.

Sosybius major KOCH & BERENDT 1854 (Abb. 2-3)

Material: Holotypus, subad. ♂ (not ♀ as mentioned in the original description!): PIHUB.

Without the knowledge of adult spiders I can not give a useful diagnosis of this species.

Sosybius decumana (KOCH & BERENDT 1854) (sub *Ocypete*)

Material: Type material – the holotype is a female – could not be found in the PIHUB, comp. WUNDERLICH (1986:30). – In my opinion the conspecifity of the „hypotype" described by PETRUNKEVITCH (1942: 361-364) is questionable.

Sosybius succineus (PETRUNKEVITCH 1942) (sub *Adamator*)

This species was erroneuosly described by PETRUNKEVITCH (1942: 344) as a member of the family Zoropsidae, compare WUNDERLICH (1986: 24). The holotype is not an adult female – as reported by PETRUNKEVITCH – but a juvenile (?subadult) female. Without the knowledge of an adult spider I am not able to give a useful diagnosis.

Sosybius species indet.

In private and dealer collections I have seen numerous juveniles and some adults which are most probably members of the genus *Sosybius* (a dozen juveniles in the CJW). An indet. female of the coll. of KRZEMINSKI in Cracow/Poland is probably a member of the

genus *Sosybius* or of a related genus; the epigyne has a distinct grove (fig. 11a). I also studied one juvenile specimen in Ukrainean amber (CJW) (comp. the paper on Ukrainean amber spiders in this volume). A large indet. adult male - body length about 1cm - is kept in the collection of the Geological Institute of the University Paris. - The absence of a gnathocoxal serrula is best observable in a 6.5mm long juvenile spider in the collection H. FLEISSNER (no. BB 1075) in Bad Nauheim/Germany. With this juvenile a small ant is preserved which may have been a prey of the spider; see also below.

***Sosybius* sp. indet.**, juv., in a resting position, photo 390

In this juvenile ♀ of *Sosybius* sp. indet. - F242/BB/AR/TRO/CJW -, body length 3.6mm, appearently the typic resting position of this species is preserved, the articles of the anterior leg pair are streched foreward, compare the photo. A similar resting position is known from many extant spiders of different families.

***Sosybius* sp. indet.**, juv., with a regenerated leg, photo 451

In this juv. ♀ of *Sosybius* sp. indet. - F241/BB/AR/TRO/CJW -, body length 4.2mm, the right leg I is a shortened regenerate, ventral tibial and metatarsal bristles are absent, the tibia is 1.0mm long, the left tibia I is 1.35mm long and bears two strong proventral bristles.

***Sosybius* sp. indet.**, juv. with a prey, fig. 44; see also above

This juv. ♀ of *Sosybius* sp. indet. - coll. LIEDTKE no. 418 -, body length 4mm, has most probably been a disturbed predator of an ant (Formicidae) of the same size. The ant is situated in contact beneath the spider, and probably the spider bites in the base of an antenna or both antennae of the ant, fig. 44.- In the book of WEITSCHAT & WICHARD (fig.36) this spider is erroneously called a member of the family Dysderidae).

DESCRIPTION OF THE NEW TAXA and key to the new described species of *Sosybius*

Key to the new described species of the genus *Sosybius* (males)

Remark: The measurements of body and legs can not be taken as characters for determination because the intraspecific variability is not known.

1 Median apophysis short, only about as long as wide (figs. 17,19). Species-group A. . 2

- Median apophysis distinctly longer than wide (fig. 15). Species-group B. 3

2(1) Median apophysis in a more basal position (fig. 17). . . . . ***berendti***

- Median apophysis in a more distal position (fig. 19). . . . . ***lateralis***

3(1) Tibia I-II with one proventral bristle/spine (fig.42). Median apophysis shorter than in the related species (fig.43). . . . . ***unispinosus***

- Tibia I-II with two to three proventral bristles/spines. 4

4(3) Retrolateral tibia apophysis of the pedipalpus with a strong dorsal outgrowth (figs. 15c, 37). 5

- No such strong outgrowth (figs. 14, 40). 6

5(4) Tibia of the pedipalpus long, in the middle with a distinct depression (arrow in fig. 15c) and more distally with an erect apophysis (arrow in fig. 15d). . . . . ***tibialis***

- Tibia of the pedipalpus shorter, no distinct dorsal depression. Bulbus fig. 39, embolus directed to the tip of the cymbium. . . . . ***falcatus***

6(4) Median apophysis slender (figs. 15, 41). 7

- Median apophysis wider, also embolus and conductor different (fig.15a). . ***perniciosus***

7(6) Tibia of the pedipalpus with a large proapical apophysis (fig. 41). . . . . ***longipes***

Tibia of the pedipalpus without a large proapical apophysis (fig. 15). . . . . ***mizgirisi***

***Sosybius kochi* n.sp.**, (Abb.5-9)

Material: Holotype (♀) and 2 separated amber pieces in Baltic amber, F235/BB/AR/TRO/CJW.

Preservation and syninclusions: The spider is preserved in an amber piece with numerous layers and small bubbles. Ventrally it is excellently preserved, especially spinnerets and epigyne. The labium is covered with an emulsion, the left anterior spinneret is broken off and twisted about 180°. The opisthosoma is particularly aborally damaged - by feeding? The depression of the epigyne is partly covered with a secretion. The left legs II-IV are nearly completely preserved, only the tarsi III-IV are partly cut off. The left leg I and the right legs III-IV were partly cut off **in** a layer of the resin, the left tarsi and metatarsi I are complete. The left legs I and II are broken off with a piece of amber at the end of the femur. Dorsally the spider is – including the eye field - partly covered with an emulsion. – Behind the left patella IV 2 small Insect legs are preserved, on the right side. Behind the spider several more Insect legs can be seen and near the left side a stellate hair. In one of the separated amber pieces a Diptera and a movable gas-bubble in a liquid are preserved.

Diagnosis (♀; ♂ unknown): Lenses of the posterior median eyes flat and oval. Epigyne (fig. 11) with a large depression which is small posteriorly and bears lateral elevations.

Description (♀):
Measurements (in mm): Body length 6.7, prosoma: Length 3.0, width 2.6, femur I at least 2.1, femur II 2.7, tibia II 2.05, tibia III 1.8, tibia IV 2.3.
Colour: Prosoma and legs dark brown, opisthosoma yellow-brown.
Prosoma distinctly longer than wide and strongly flattened, not very hairy, front has longer hairs. Eye field wide, similar to fig. 2 but posterior row more clearly recurved, lenses of the posterior median eyes ovally. Chelicerae large and strongly protuding, teeth not visible, fangs large. Sternum (fig. 5) 1.42 times longer than wide, frontally wide (and with an emulsion), labium slightly longer than wide, gnathocoxae about twice as long as wide, a ventral depression is absent, medially concave; because of an emulsion the occurence of a serrula is unsure. Pedipalpus long, with a claw which is probably toothed. – Legs laterigrade, long and robust. Order of its length most probably IV/I/II/III, coxae long, trochantera short. Spines (fig. 6) short and partly bristle-shaped, femora with several spines, tibia II at least 2 proventrally, tibia III ventrally 3 pairs, and at least 1 each-proventral-basal and retrodorsal. Posterior metatarsi with several macrosetae, at least 5 on III. Tarsi I-II – not III-IV – with a dense scopula but no true (divided) claw tufts. Tarsal claws large, in I 3 large teeth are visible. Tarsus IV with long trichobothria; no long trichobothria are visible on tarsus I. – Opisthosoma long ovally, 1.75 times longer than wide, ventrally short and sparse, dorsal short hairs, ventrally 4 rows of small sigillae, ist number medially about 10, laterally about 20. Lung covers clearly sclerotized. Spinne-

rets (figs. 7-10) deformed: Anterior spinnerets thick and the largest, its spigots with a almost spherical base; median spinnerets laterally flattened bearing 6 (or 8?) pairs of spigots; posterior spinnerets not clearly observable. Position of the posterior tracheal stigma (fig. 7) near the spinnerets. No colulus. – Epigyne (fig. 11) large, with a large anterior depression which is partly filled with a secretion, probably a plug („Begattungs-Zeichen"?). In the depression are two low elevations, laterally behind the depression are two more elevations.

Relationships: *S. mizgirisi* is larger and the posterior median eyes are circular; in *S. berendti* tibia II bears a larger number of bristles.

Distribution: Tertiary Baltic amber forest.

***Sosybius mizgirisi* n.sp**. (Abb.12-15)

Derivatio nominis: Named after Mr. KAZIMIERAS MIZGIRIS from Nidda in Lithunia, who discovered the holotype.

Material: Holotype (♂) in Baltic amber, F237/BB/AR/TRO/CJW.

Preservation and syninclusions: The spider is complete and well preserved. It lays with prosoma and legs on a partly pyritized layer. On all sides the opisthosoma is partly covered with an emulsion, with the prosoma at the right side. - Under the left bulbus two bubbles are situated. Also in the amber are small particles of detritus preserved, 2 Nematocera and some bubbles; stellate hairs are absent.

Diagnosis (♂; ♀ unknown): ♂-pedipalpus (fig. 14-15): Tibia with a larger retrolateral apophysis and a small apophysis nearby (arrow in fig. 14) and with a further apophysis prolaterally. Outgrowth of the cymbium fairly large, median apophysis long and slender, strongly bent apically.

Description (♂):
Measurements (in mm): Body length 8.5, prosoma: length 3.6, width 2.8; leg I: Femur 3.0, patella 1.45, tibia 2.35, tibia II 2.5, tibia III 2.0, tibia IV 2.9.
Colour: Prosoma dark brown, legs light brown (the opisthosoma is covered by an emulsion).
Prosoma (fig. 12) distinctly longer than wide, with a clear thoracal ridge similar to fig. 2, slightly wrinkled, with fairly short hairs and strongly protuding chelicerae. 8 large eyes, its field wide, posterior median eyes separated by its diameter, closer together than the lateral eyes; lenses flat, large and circular, posterior row recurved. – Legs laterigrade,

long and robust, its order IV/I/II/III. Macrosetae short and mostly thin, numerous, insufficient to observe. Leg I similar to fig. 3. Femur about 3 bristles in the basal half, tibia I 2 proventrally, length of the basal one 0.23mm. Metatarsus I-II with one ventral spine or a pair, metatarsus and tarsus I-II with a scopula, no distinct claw tuft. Tarsal claws with numerous long teeth. Trichobothria long and numerous, tarsus III about 10 in an irregular position (fig. 13). – Opisthosoma nearly 1.8 times longer than wide, strongly covered with short hairs; dorsal scutum small and indistinct. – ♂-pedipalpus (figs. 14-15) (compare the diagnosis): Cymbium distally and dorsally with a dense field of short and hairs, median apophysis and conductor large, embolus fairly short.

Relationships: Compare *S. longipes* n.sp. and *perniciosus* n.sp.

Distribution: Tertiary Baltic amber forest.

***Sosybius perniciosus* n.sp.** (figs. 15a-b) Photo 389

Material: Holotype ♂ in Baltic amber, F238/BB/AR/TRO/CJW.

Preservation and syninclusions: The spider is well preserved, only the ventral side of the opisthosoma is partly covered with an emulsion. Parts of most legs are cut off, only the left leg I is complete; also parts of the spinnerets are cut off. A larger bubble is preserved on the right side dorsally-distally on the opisthosoma. A larger „drop"(bubble) with remains of poison is hanging at the tip of the left fang (fig. 15b, photo). The bubble seem to be nearly empty. – No more larger syninclusions.

Diagnosis (♂; ♀ unknown): Femur I with numerous bristles; pedipalpus (fig. 15a): Tibia with a small distal-retrodorsal apophysis as in *S. mizgirisi* n.sp. (fig. 14), median apophysis robust, conductor large and divided, embolus basally with a tooth.

Description (♂):
Measurements (in mm): Body length 9.5, prosoma: Length 3.5, width 2.7, hight above coxae 0.8; leg I: Tibia 2.65, metatarsus 2.3, tarsus 1.35, femur II 4.0, femur IV 3.4.
Colour yellow-silvery, legs partly darkened by benzoeacidbenzylester.
Prosoma (photo) 1.3 times longer than wide, flat, fine granutale; few hairs, a long thoracal ridge. 8 eyes in a wide field (as in the genus), posterior row recurved, posterior median eyes separated by 1.15 of its diameter, large and circular. Chelicerae strongly protuding, anterior margin with long hairs but no teeth visible. Gnathocoxae and labium distinctly longer than wide, no depression on the gnathocoxae. – Legs (photo) laterigrade, fairly long (most articles are cut off), its order II/IV/III/I (!), leg I is the shortest; numerous short bristles: Femur I dorsally 7 in the basal half, tibia I 2 short spines proventrally, length of the basal one only 1.1mm. Metatarsi I-II with a short spine ventrally-

basally. Tarsi with numerous trichobothria in an irregular position. A dense scopula under tarsi and metatarsi and a false claw tuft are present. Legs III-IV with numerous short spines. – Opisthosoma (photo) slender, two times longer than wide, with a dorsal scutum which length is less than 1/3 of the opisthosoma and which is covered with numerous short hairs. – Pedipalpus (fig.15a): Tibia as in *S. mizgirisi* n.sp. (fig. 14), cymbium with a retrobasal outgrowth, median apophysis robust, conductor large and divided, embolus with a basal tooth.

Relationships: In *S. mizgirisi* n.sp. the median apophysis is more slender and the tip is longer bent; embolus and conductor are also different, a tooth of the embolus is absent; there are also fewer bristles on femur I and the spines of tibia I are twice as long as in *perniciosus*. In *S. unispinosus* n.sp. tibia I-II bear only one prolventral bristle and the median apophysis is shorter.

Distribution: Tertiary Baltic amber forest.

***Sosybius tibialis* n.sp.** (figs. 15c-d)

Material: Holotype ♂ in Baltic amber, F239/BB/AR/TRO/CJW.

Preservation and syninclusions: The spider is well preserved and nearly complete, only the tips of the left tibia II and the left tarsus IV are cut off. There is no emulsion but a bubble ventrally in the centre of the opisthosoma. – Also few stellate hairs, small excrement balls and the tiny rest of a Collembola are preserved in the amber piece.

Diagnosis (♂; ♀ unknown): Tibia of the pedipalpus with a dorsal depression (arrow in fig. 15c) and dorsally with an erect apophysis (arrow in fig. 15d).

Description (♂):
Measurements (in mm): Body length 7.5, prosoma. Length 3.3, width 2.9; tibia I 2.65, metatarsus I 2.35, tibia IV 2.9.
Colour (photo): Prosoma dark brown (darkened by bezoeacidbenzylester), legs medium brown, opisthosoma light brown.
Prosoma (photo) 1.14 times longer than wide; chelicerae and eyes similar to *perniciosus* but posterior eye row only slightly recurved. – Legs fairly long, laterigrade, its order IV/I=II/III. Bristles and scopulae as in *perniciosus*. – Opisthosoma 1.8 times longer than wide, with indistinct short hairs and a short dorsal scutum. Anterior and posterior spinnerets fairly long. – Pedipalpus (figs. 15c-d): Tibia more than twice as long as wide, in the middle dorsally with a depression, distallly with an erect dorsal apophysis and also with a retroapical apophysis. Cymbium with a retrobasal outgrowth, median apophysis long, embolus without a basal tooth.

Relationships: In *S. mizgirisi* and *perniciosus* the tibia of the ♂-pedipalpus is shorter, a dorsal depression of the tibia of the pedipalpus and a dorsal apophysis are absent.

Distribution: Tertiary Baltic amber forest.

***Sosybius berendti* n.sp**. (Abb.16-17)

Material: Holotype ♂ in Baltic amber, F247/BB/AR/TRO/CJW.

Preservation and syninclusions: The spider – except its right pedipalpus - is not well preserved; it is laying at a pyritized layer and is partly oxydized. Ventrally some large bubbles are preserved, dorsally some „Blitzer". Half of the left tibia is dorsally cut off, the right leg IV is cut off through the tibia. – No syninclusions.

Diagnosis (♂; ♀ unknown): Median apophysis very short, in a basal position (fig. 17).

Description (♂):

Measurements (in mm): Body lngth 6.2, prosoma-length 3.0, tibia I 2.55, tibia II 2.5, tibia III 2.2, tibia IV 3.0.
Colour: Body and legs dark brown.
Prosoma flat, with short hairs and a distinct thoracal ridge. Most parts of the eye field are hidden. Chelicerae and fangs large, teeth not visible. Sternum hidden, labium and gnathocoxae each longer than wide, gnathocoxae proapically with numerous long hairs. – Legs robust, long, in a laterigrade position, with short hairs. Spines/bristles short (fig. 16): At least 3 on femur IV, no dorsal ones on tibia I and IV, tibia I proventrally 3, tibia II additionally a small one proventrally in the middle, metatarsi I-II 1 long bristle ventraly-basally, several bristles on metatarsus IV. Scopula as in *kochi*. – Opisthosoma oval, with numerous short hairs; dorsal scutum absent, spinnerets hidden. – ♂-pedipalpus (fig. 17): Tibia twice as long as wide, with long bristles; because of its position the apophyses are not observable. Cymbium retrobasally with a large outgrowth, distally and dorsally a dense field of short hairs.

Relationships: Compare *S. lateralis* n.sp.

Distribution: Tertiary Baltic amber forest.

***Sosybius lateralis* n.sp**. (figs.18-19)

Material: Holotype ♂ in Baltic amber coll. M. GLINK in Buxtehude. Probably the fossil will deposited later on in the GPIUH.

Acknowledgement: I thank M. GLINK for the loan of the holotype.

Preservation and syninclusions: The spider is fairly well preserved, the body is partly covered with an emulsion, especially ventrally, the right pedipalpus is bent beneath the body, the left legs II and III are cut through the metatarsus and femur. Above/behind the fossil a large gas bubble is preserved, in front of the spider a Collembola, ventrally pyrite particles are preserved, left of the spider a stellate hair.

Diagnosis (♂; ♀ unknown): Median apophysis short, its position near the middle of the bulbus (fig.19).

Description (♂):
Measurements (in mm): Body length about 7.0, prosoma: Length nearly 3.5, width 2.9; leg I: tibia 2.65, metatarsus 2.4, tarsus 1.35, tibia III 2.3, tibia IV 3.0.
Colour: Body and legs dark brown (opisthosoma covered with an emulsion).
Prosoma with a distinct fovea, eye field wide, posterior row slightly recurved, lenses of the posterior median eyes circular and flat, separated by ist diameter. Clypeus short, chelicerae strongly prolongated, teeth not visible. – Legs laterigrade and robust, sequence of ist length IV/II/I/III. Spines short, femur I bears 2 (?), III-IV 3, tibia I probably none, tibia III-IV at least 3 proventrally and 1 retrodistally, metatarsus III at least 3 proventrally. – Opisthosoma covered with an emulsion. - ♂-pedipalpus (figs. 18-19): Articles similar to *S. mizgirisi* (fig. 14), tibia with a large retrolateral and a large prolateral (and slightly ventral) apophysis, cymbium retrobasally with an outgrowth and distally with numerous hairs, bulbus with a short median apophysis, a large conductor and a partly hidden embolus which appearently has a tiny secretion of sperm at its tip.

Relationships: In contrast to *S. lateralis* the position of the short median apophysis is near the middle of the bulbus.

Distribution: Tertiary Baltic amber forest.

***Sosybius falcatus* n.sp** (figs. 37-39)

Material: Holotypus ♂ in Baltic amber, F245/BB/AR/TRO/CJW.

Preservation and syninclusions: The spider is incompletely preserved: The dorsal halfs of the prosoma with the eyes and the opisthosoma as well as most leg articles are cut off or broken off and lost, the dorsal part of the body and thedorsal part of the left pedipalpus are now open. The right leg I and the right pedipalpus are completely preserved. The ventral side of the opisthosoma, sternum, parts of body and legs including remains of the cuticula are observable from above. The ventral side of body and legs are partly covered with a white emulsion. - No stellate hairs.

Diagnosis (♂; ♀ unknown): Tibia I with 3 proventral spines. ♂-pedipalpus (figs. 37-39): Retrolateral tibia apophysis with a strong outgrowth and with a distinct proapical outgrowth. Because of the position of the bulbus the bulbus structures are hard to observe; the embolus is thick and directed to the tip of the cymbium.

Description (♂):
Measurements (in mm): Body length 7.0, prosoma length about 3.3, leg I: Femur 3.0, patella 1.3, tibia 2.4, metatarsus 2.3, tarsus 1.4.
Colour: Prosoma and legs dark brown, opisthosoma grey brown.
Prosoma and opisthosoma incompletely preserved, cheliceral margins probably toothless. - Legs incompletely preserved, tibia I with 3 short proventral spines, femur I with 2 short prolateral bristles/spines. - Pedipalpus: Compare the diagnosis.

Relationships: Probably the "androtype" of *Adulatrix fusca* PETRUNKEVITCH 1958 is conspecific, compare above. A strong dorsal outgrowth of the retrolateral tibia apophysis is also present in *S. tibialis* n.sp.; but in *tibialis* a distinct dorsal tibial depression is present and the bulbus structures are different.

Distribution: Tertiary Baltic amber forest.

***Sosybius longipes* n.sp.** (figs. 40-41)

Material: Holotypus ♂ in Baltic amber, F244/BB/AR/TRO/CJW.

Preservation and syninclusions: The spider is nearly completely preserved, only the right leg IV is cut off through the tibia. Ventrally the spider is covered with a white emulsion, dorsally an amber layer is present which is only fairly well transparent. Most eyes are hidden. - Several Acari and stellate hairs are present in the amber piece near the spider.

Diagnosis (♂; ♀ unknown): Long-legged spider, tibia I-II with 2 proventral spines; pedipalpus (figs. 40-41): Tibia proapically with a strong outgrowth, retrolateral tibia apophysis with an erect outgrowth of medium length, cymbial outgrowth small, median apophy-

sis long.

Description (♂):
Measurements (in mm): Body length 7.1, prosoma length about 3.4, leg I: Femur 3.3, patella 1.4, tibia 2.8, metatarsus 2.3, tarsus 1.4, tibia II 2.8, tibia III 2.4, fangs 0.7.
Colour: Prosoma and legs dark brown, opisthosoma grey brown, dorsally with two large pairs of light hair spots and a further large light spot above the spinnerets.
Prosoma: Most parts are hidden. - Legs long, especially tibiae and metatarsi, compare above; tibia I with 2 short proventral spines. - Opisthosoma fairly flattened, 1.7 times longer than wide, densely covered with short hairs. Scutum indistinctly preserved. - Pedipalpus: Compare above.

Relationships: In *S. mizgirisi* n.sp. a distinct proapical tibia apophysis of the ♂ pedipalpus is absent and the cymbial outgrowth is larger.

Distribution: Tertiary Baltic amber forest.

***Sosybius unispinosus* n.sp.** (figs. 42-43)

Material: Holotypus ♂ in Baltic amber and three separated amber pieces, F243/BB/AR/TRO/CJW.

Preservation and syninclusions: Most probably the amber piece has been heated in an autoclave. The spider is incompletely preserved: The ventral and distal parts of the opisthosoma are broken off with a part of the amber piece, the opisthosoma is open, the left legs I and II are broken off by autotomy and are lost, the right metatarsus III is broken off and missing after its middle. There is no white emulsion besides parts of the pedipalpi, the eyes are partly hidden, both pedipalpi are well preserved. - Near the spider remains of a spider's leg and a Collembola as well as stellate hairs are preserved. In the separated amber pieces a tiny insect larva (?) (0.2mm long) and few stellate hairs are preserved.

Diagnosis (♂; ♀ unknown): Tibia I-II with one proventral bristle only (fig. 42). Pedipalpus (fig. 43): retrolateral tibia apophysis without a dorsal outgrowth, cymbial outgrowth of medium size, medium apophysis relatively short, sickle-shaped, embolus thick (the distal bulbus structures are hidden by a white emulsion).

Description (♂):
Measurements (in mm): Body length about 6.5, prosoma: Length 3.1, width 2.55, leg I: Femur 2.65, patella 1.45, tibia 2.25, metatarsus 1.85, tarsus 0.95, tibia II 2.3, tibia III 1.9.

Colour: Prosoma and legs dark brown, opisthosoma grey brown.
Prosoma flat, about 1.23 times longer than wide, covered with very few indistinct hairs, most parts of the eyes are hidden, thoracal ridge is long, chelicerae large, margins probably toothless. - Legs (fig. 42) fairly robust, II slightly longer than I, tarsi short, tibia I-II with only one short proventral spine, femur I with 5 prolateral short bristles. - Pedipalpus: Compare above.

Relationships: In the other described species of the genus *Sosybius* tibia I-II bear two or three proventral spines. Perhaps *S. perniciosus* n.sp. is most related, compare the key.

Distribution: Tertiary Baltic amber forest.

***Eotrochanteria* n. gen.**

Diagnosis (♂; ♀ unknown): Trochanter IV strongly prolongated, distinctly longer than trochanter III (arrow in fig. 23), legs with bristles only (fig. 22), spines, scopulae and claw tufts absent, bulbus strongly outstanding (fig. 24), most structures hidden.

Relationships: In *Sosybius* PETRUNKEVITCH 1942 leg spines and scopulae are present, trochanter IV is not prolongated, adults are larger, the cymbium has a retrolateral outgrowth and the bulbus is only fairly outstanding. In *Trochanteridromus* trochanter IV is distinctly shorter than coxa IV and the bulbus is flat/discoid.

Type species: *Eotrochanteria kruegeri* n.gen.n.sp.

Distribution: Tertiary Baltic amber forest.

***Eotrochanteria kruegeri* n.sp.** (figs. 20-24) Photo 394

Derivatio nominis: This species is named with thanks after F. J. KRUEGER in Braunschweig who supported my work on fossil spiders.

Material: Holotype ♂ in Baltic amber and 4 separated amber pieces, GPIUH.

Preservation and syninclusions: The spider is fairly well preserved, no part is cut off. Mainly its ventral side is covered with an emulsion, bubbles are present on the bulbi (larger ones), on the right tibiae III and IV and ventrally in front of the spider. The right legs III and IV are lost after the coxa by autotomy. – Between the left femora III and IV a small Nematocera is preserved; nearby the spider small detritus particles and some stellate hairs are preserved. In the separated pieces some more stellate hairs as well as some pollen grains e. g. of oak relatives (Fagaceae) (det. V. ARNOLD) are present.

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

Description (♂):
Measurements (in mm): Body length 4.5, prosoma: Length 2.0, width 1.65; leg I: Femur 2.15, patella 1.12, tibia 1.95, metatarsus 1.5, tarsus 0.68, tibia II about 2.1, tibia III about 1.65, tibia IV about 1.7.
Colour: Prosoma and legs dark brown (darkened by heating or with the help of benzoe-acid-bencylester?), opisthosoma yellowish, scutum slightly darker.
Prosoma (figs. 20-21) strongly flattened, distinctly longer than wide, nearly smooth, with few frontal hairs and a long fovea. 8 eyes in a wide field, posterior row slightly recurved, posterior median eyes large and oval, separated by a nearly one diameter, lateral eyes on small elevations. With the left posterior medium eye (fig. 21) probably remains of the canoe-shaped tapetum are preserved. This kind of tapetum is probably typic in this family. Chelicerae protuding, teeth not visible, fangs long; labium, gnathocoxae and most parts of the sternum are covered with a white emulsion. – Legs laterigrade, with few short hairs, sequence of its length II/I/IV/III; spines, scopulae, claw tufts and metatarsal preening hairs are absent. Trochanter IV (fig. 23) elongated, its length more than 2/3 of coxa IV and distinctly shorter than trochanter III, length of trochanter III about 2/3 of trochanter IV. Short and indistinct bristles are present dorsally-basally on the femora, a single or a couple dorsally near the base and 1, 2 or more distally. Long bristle occur distally on all patellae and tibiae (fig. 22), some patellae have also a dorsal-basal bristle, some tibiae a distal-ventral bristle. Tarsi with more than one row of trichobothria, paired claws with several long teeth. – Opisthosoma (fig. 20) flattened, covered with short hairs, 1.83 tmes longer than wide, with a dorsal scutum. Spinnerets short, hidden by an emulsion. – Pedipalpus (fig. 24): Femur nearly straight, patella and tibia short, tibia apophysis apically pointed and straight, cymbium short, bulbus large and outstanding, its structures hidden because of the position of the bulbus.

Relationships and **distribution**: Compare above.

***Trochanteridromus* n.gen.**

Diagnosis (♂; ♀ unknown): Body extremely flattened (figs. 25-27), prosoma only ante-

orly hairy, gnathocoxae parallel and with ventral depressions (fig. 28); ♂-pedipalpus (figs. 33-36): Bulbus discoid - similar to Philodromidae -, median apophysis absent, conductor large, embolus in a wide circle, describing more than one circle.

Relationships: See *Trochanteridromulus* n. gen.

Type species: *Trochanteridromus scutatus* n.sp., the only known species of this genus.

Distribution: Tertiary Baltic amber forest.

***Trochanteridromus scutatus* n.gen.n.sp.** (figs. 25-36) Photo 393

1986 Philodromidae sp., –WUNDERLICH; Spinnenfauna gestern und heute: 269, Figs. 357-358.

Material: 2 ♂ in Baltic amber; holotype F240/BB/AR/TRO/CJW, paratype PIHUB no. MB. A. 610., coll. KUEHL; M. MORITZ det „Platoridae".

Preservation and syninclusions: (1) Holotype: The spider is completely and well preserved. Frontal parts of the spider and the pedipalpi are partly pyritized. The right pedipalpus is twisted around 180°, so the bulbus is well observable. - Below the epigaster 2 bubbles are preserved, in front of the spider a tiny mite. Also numerous stellate hairs are preserved. – (2) Paratype: The spider is well preserved and ventrally fairly covered with an emulsion. Most parts of the gnathocoxae and spinnerets are hidden, the right leg I is missing after the coxa by autotomy, the right leg II is cut off through the tibia, the pedipalpi are +/- bent to the body. The left leg I is distinctly shorter than leg II (0.7) and I suppose that this leg is a regeneration. - Below the pedipalpi and the mouth parts some bubbles are preserved. The amber piece is darkened from its age. Behind the spider some stellate hairs and a Formicidae are preseved.

Diagnosis (♂; ♀ unknown): Pedipalpus (figs. 33-36) with a long tibial apophysis and a long embolus which describes more than one circle.

Description (♂):
Measurements (in mm): Body length 3.25-3.5, prosoma: Length 1.25-1.3, width 1.25-1.3, hight with the sternum about 0.4; leg I (holotype): Femur 1.6, patella 0.55, tibia 1.1, metatarsus 0.8, tarsus 0.57; (paratype; this leg seems to be a regeneration): Coxa 0.3, trochanter 0.14, femur 1.2, patella 0.46, tibia 0.85, metatarsus 0.7, tarsus 0.55; leg II (paratype): Coxa 0.54, trochanter about 0.2, femur 1.95, patella 0.64, tibia 1.2, metatar-

sus 1.0, tarsus 0.55; leg III (paratype): Coxa 0.55, trochanter 0.2, femur 1.9, patella 0.55, tibia 1.3, metatarsus 1.0, tarsus 0.55; leg IV (paratype): Coxa 0.55, trochanter 0.2, femur 1.9, patella 0.55, tibia 1.3, metatarsus 1.0, tarsus 0.55. Length of the opisthosomal hairs from the middle 0.05.
Prosoma (figs. 25-28) strongly depressed, as long as wide, in front abruptly smaller, hairy only anteriorly, with a weak thoracal grove. Eyes in a wide field and fairly small, posterior row slightly recurved, posterior median eyes nearly circular, separated by more than its diameter, posterior lateral eyes the largest. Clypeus as long as the diameter of an anterior median eye. Chelicerae large and protuding, fangs hidden. Labium free, about as long as wide, gnathocoxae (fig. 28) distinctly longer than wide and with clear depressions. Sternum 1.2 times longer than wide. – Legs (figs. 29-31) laterigrade, slender, I the shortest, the other legs about equal in length. Spines, distinct scopulae and claw tufts absent. Coxae (fig. 30) very long, I slightly shorter than the other ones. trochantera short. Bristles thin, tibiae with bristles in one prolateral row, femur I 2 dorsal bristles, patella I only 1 dorsally-basally. Legs III-IV with numerous bristles. Metatarsi basally 1 pair of ventral bristles; no trilobate membrane. Tarsi with few scopula-shaped hairs, trichobothria long, appearently in 2 rows (fig. 31). Paired tarsal claws with long teeth. – Opisthosoma (fig. 25) long, depressed and sparcely covered with short hairs, with a dorsal scutum about 1/3 of the opisthosoma length. Spinnerets (fig. 32) short, the anterior ones conic. - ♂-pedipalpus (fig. 33-36) with short articles, femur bent, patella shorter than the tibia, retrolateral tibia apophysis long, slender and bent, cymbium asymmetric, bulbus flat, embolus describing a long circle, distally in contact with a conductor.

Relationships: See the genus.

Distribution: Tertiary Baltic amber forest.

***Trochanteridromulus* n. gen.**

Diagnosis (♂; ♀ unknown): Ventral tibial and metatarsal I-II bristles absent, tibial and metatarsal I-II bristles hair-shaped (fig. 46). Pedipalpus (figs. 48-509: Median apophysis absent, conductor unknown (absent or small), embolus long and thin, describing less than one circle. In *Desognaphosa* PLATNICK 2002 - extant, Australian Region - in which a median apophysis is absent, too, and which may be related according to the structures of the bulbus, the chelicerae are about half the lenth of the prosoma.

Relationships: In *Trochanteridromus* n. sp. the body is more flattened, ventral tibial and metatarsal I-II bristles are present, a large conductor is present and the embolus describes more than one circle.

Type species: *Trochanteridromulus glabripes* n. sp., the only known species of the genus.

Distribution: Tertiary Baltic amber forest.

***Trochanteridromulus glabripes* n. gen. n. sp.** (figs. 45-50) Photo 392

Material: Holotypus ♂ in Baltic amber, F718/BB/AR/TRO/CJW.

Preservation and syninclusions: The spider is well preserved in an amber piece which was heated, the right leg I is lost behind the coxa by autotomy, a bubble is preserved beneath the sternum, another bubble near the right bulbus, remains of a white emulsion are preserved in front of the spinnerets.- Some stellate hairs, a small piece of moss and a small insect larva in a part of a plant as cocoon are present in the same piece of amber.

Diagnosis: See above.

Description (♂):
Measurements (in mm): Body length 3.1, prosoma: Length 1.2, width 1.1, leg I: Femur 1.1, patella 0.6, tibia 1.1, metatarsus 0.9, tarsus 0.55, tibia II 0.95, tibia III 0.9, tibia IV 1.05.
Colour brown with dark parts from heating.
Prosoma nearly as long as wide, flat, covered with few hairs, thoracal fissure short, eyes (fig. 45) fairly small, posterior row slightly recurved, posterior median eyes probably circular, separated by about their diameter. Chelicerae of medium size, bulging basally (fig. 45), their position vertical, fangs long and slender, teeth, labium and sternum hidden, gnathocoxae longer than wide, bearing weak depressions. - Legs laterigrade, slender, I slightly the longest, the others nearly the same length, covered with some longer hairs, bristles few, long and most often hair-shaped (fig. 46), ventral tibial and metatarsal I-II bristles absent, dorsal metatarsal I-II bristles thin, , two bristles dorsally on the femora (no apicals), leg III-IV bristles stronger, two thin ventral bristles on tibia III-IV. Scopulae, metatarsal preening hairs and claw tufts absent, two large toothed tarsal claws. Trochanter IV shorter than wide. - Opisthosoma oval, covered with few short hairs; a short and weak dorsal scutum is probably present; spinnerets (fig. 47) large, basal article of the anterior spinnerets conical. - Pedipalpus: See above, patella and tibia short and with thinbristles, tibial apophysis strong and pointed.

Relationships: See above.

Distribution: Tertiary Baltic amber forest.

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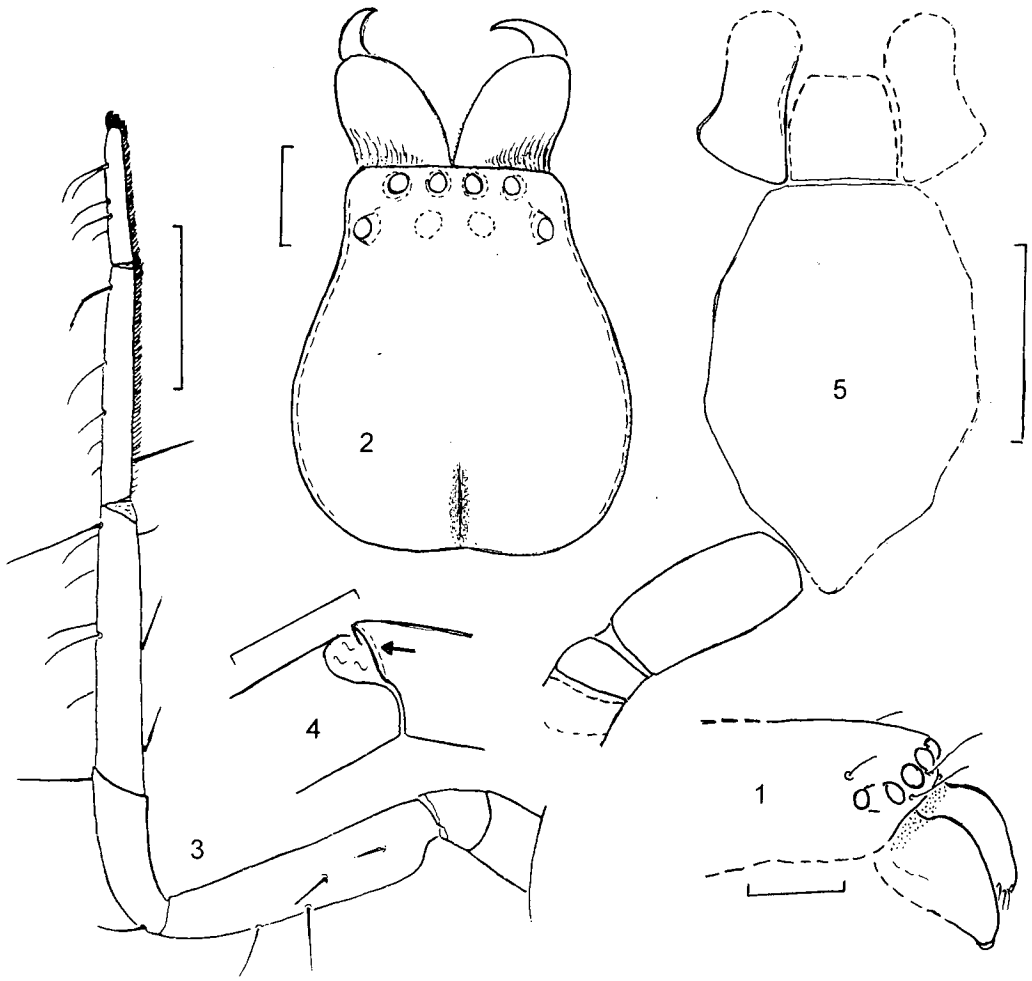


Fig.1: *Sosybius* sp., juv., frontal part of the prosoma laterally; M = 1.0;

figs.2-3: *Sosybius maior* KOCH & BERENDT 1854, holotype, subad. ♂; 2) prosoma dorsally; 3) l. leg I prolaterally (hairs and short trichobothria are not drawn); M = 1.0;

fig.4: *Sosybius* sp., juv., rounded membrane between tarsus and metatarsus I retrodorsally; M = 0.1;

figs.5-11: ***Sosybius kochi* n. sp.**, ♀; 5) prosoma and basal part of r. leg I ventally; 6) l. leg. II retroventrally; 7) r. anterior spinneret and spiracle (S) ventrally with the reconstructed left anterior spinneret (part) (dotted); 8) spigot of the r. anterior spinneret frontally; 9) spinning field of the r. medium spinneret; median spigot of at least 3 ones of the r. posterior spinneret frontally; 10) median spigot of the r. posterior spinneret ventrally; 11) epigyne with a large secretion (P) (a plug?) in the depression; M = 1.0 in figs. 5-6, 0.5 in fig.11, 0.2 in fig.7), 0.1 in figs.9-10), 0.05 in fig.8).

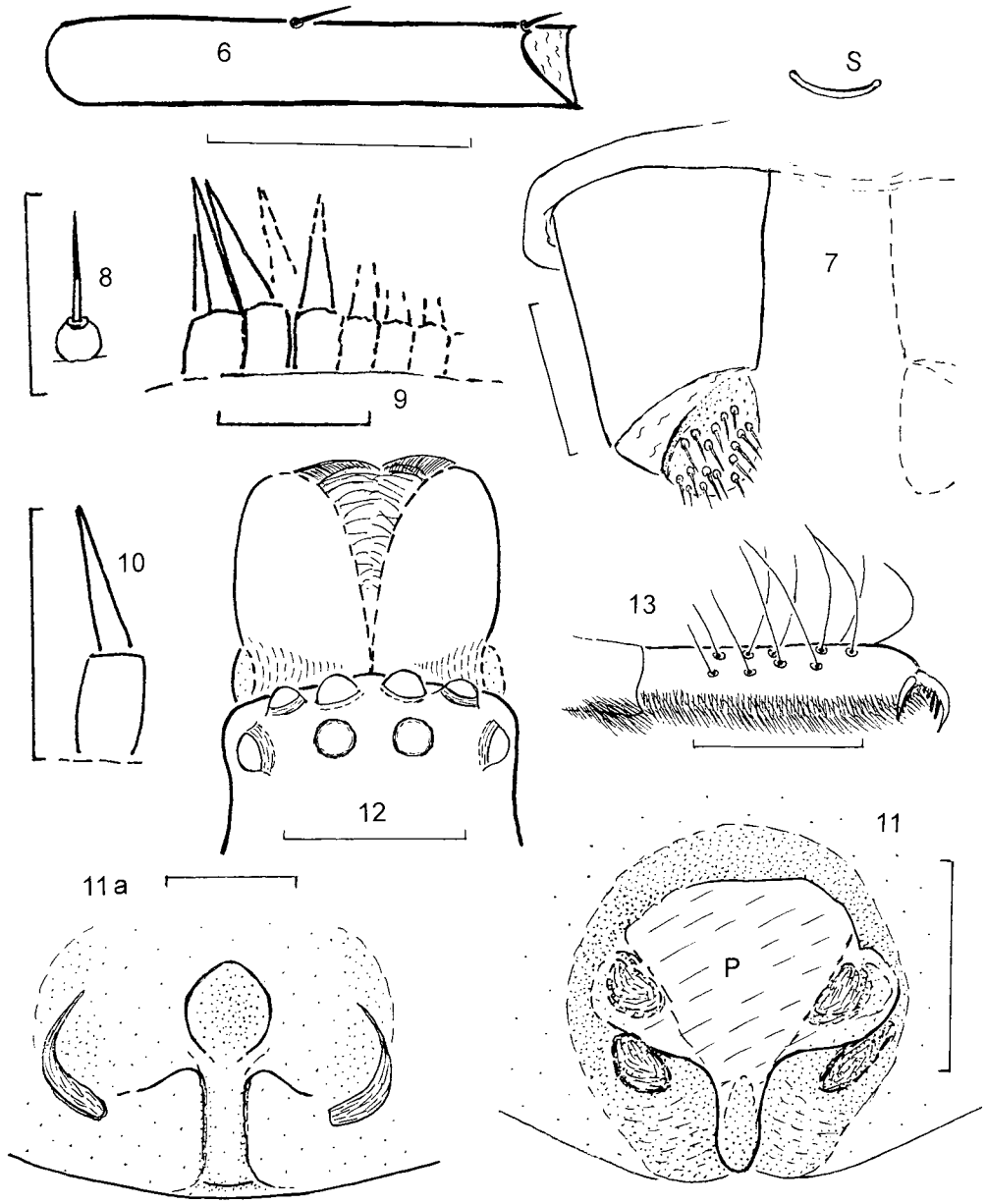
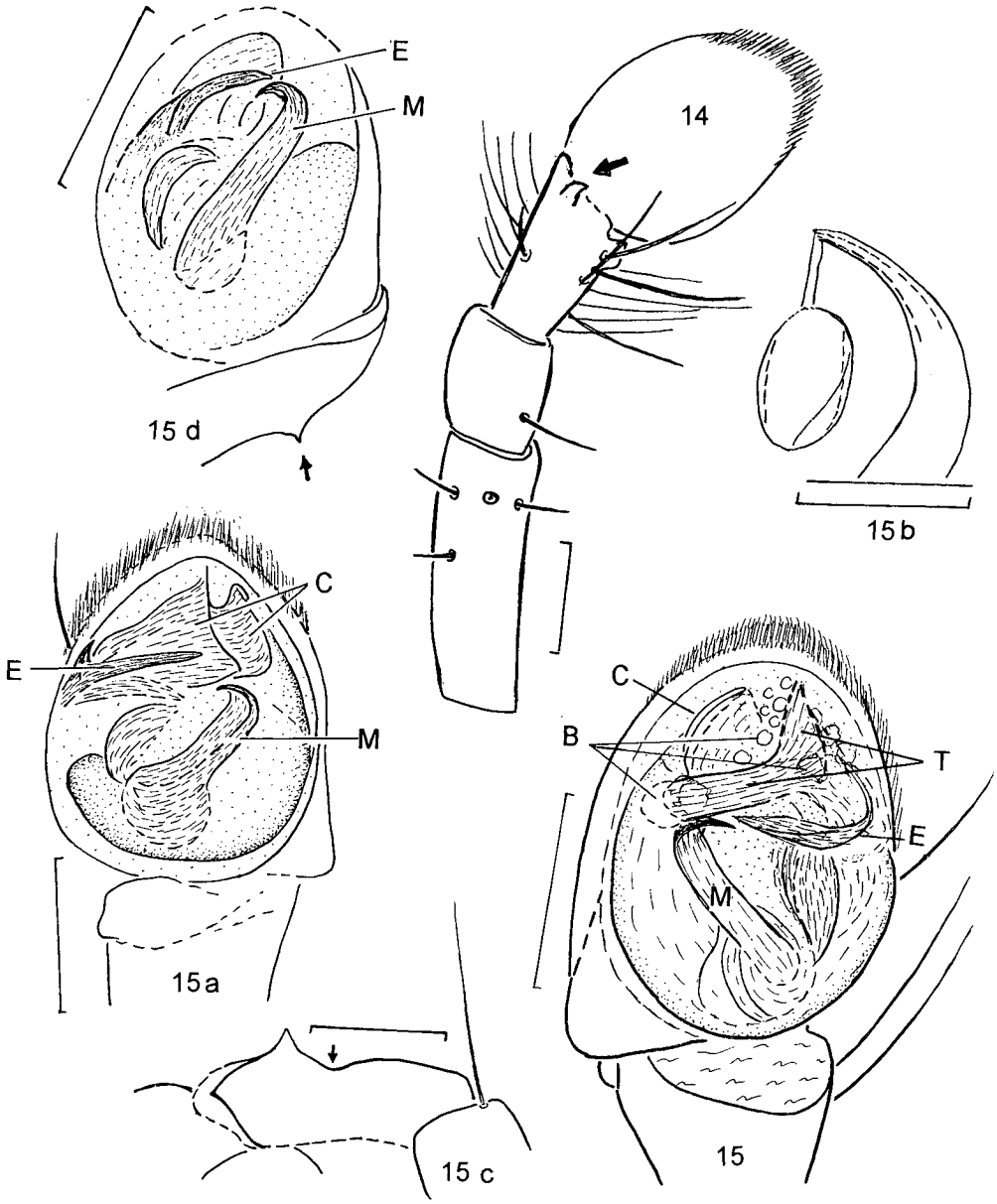


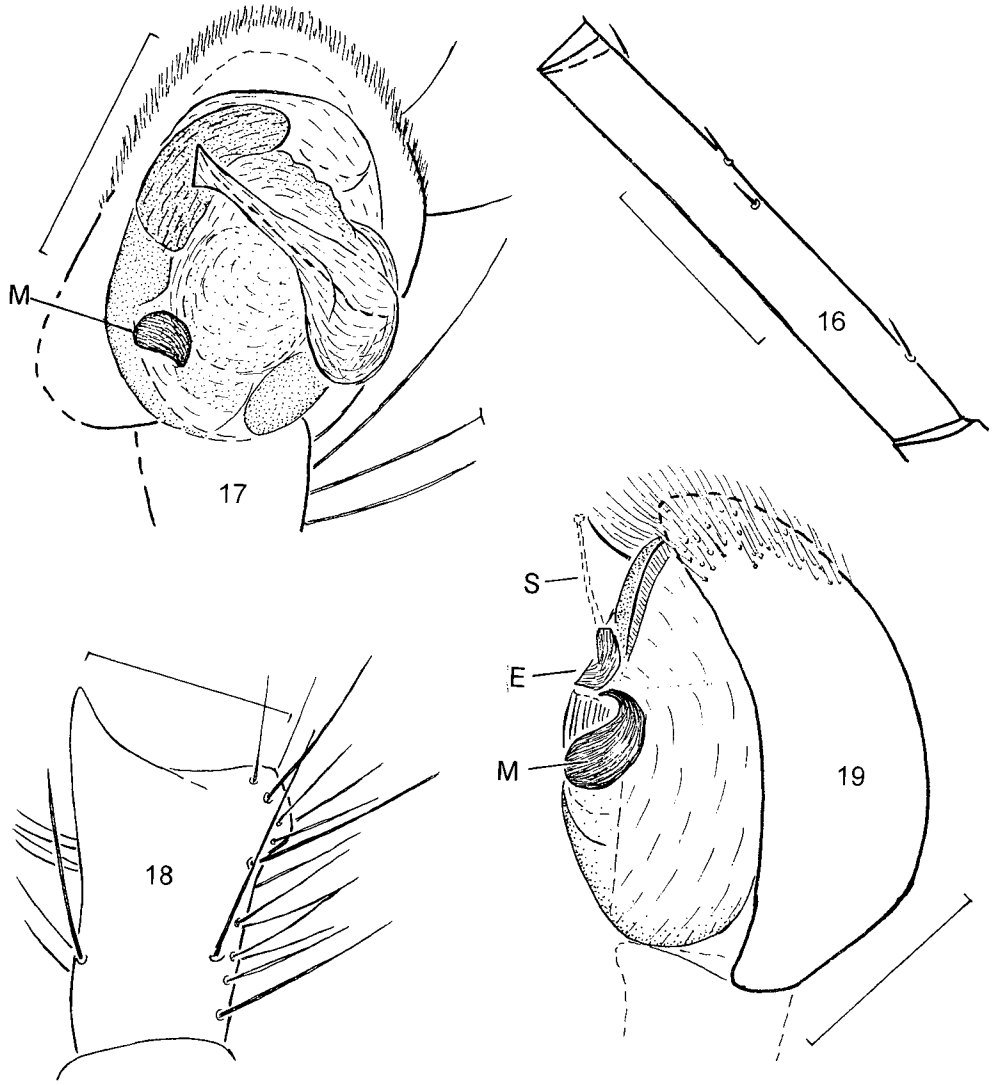
fig.11a) ?*Sosybius* sp., ♀ , epigyne; M = 0.5;

figs.12-15: ***Sosybius mizgirisi* n. sp.**,♂; 12) frontal part of the prosoma dorsally; 13) r. tarsus III retroventrally-apically with tarsal scopula and trichobothria and ventral-apical metatarsal cleening hairs; 14) l. pedipalpus dorsally; 15)→r. pedipalpus ventrally. (B = bubbles, not all bubbles are drawn, C = conductor, E = embolus, M = median apophysis, T = terminal apophysis); M = 0.5;



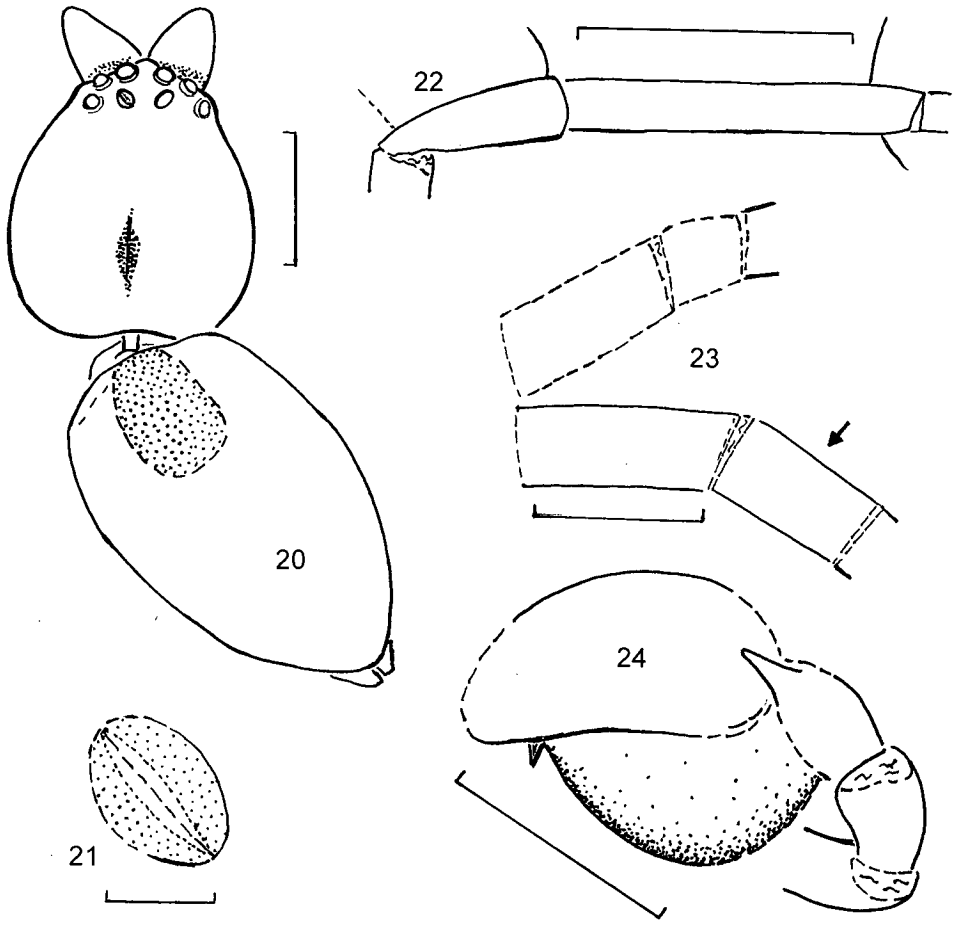
figs. 15a-b: ***Sosybius perniciosus* n. sp.**, ♂; 15a) l. pedipalpus ventrally (C = conductor, E = embolus, M = median apophysis); 15b) l. chelicera with remains of a poison „droplet"/bubble near the fang ventrally; M = 0.5;

figs. 15c-d: ***Sosybius tibialis* n. sp.**, ♂; 15c) tibia of the l. pedipalpus retrolaterally; 15d) l. pedipalpus retroventrally-basally (E = embolus, M = median apophysis); M = 0.5;



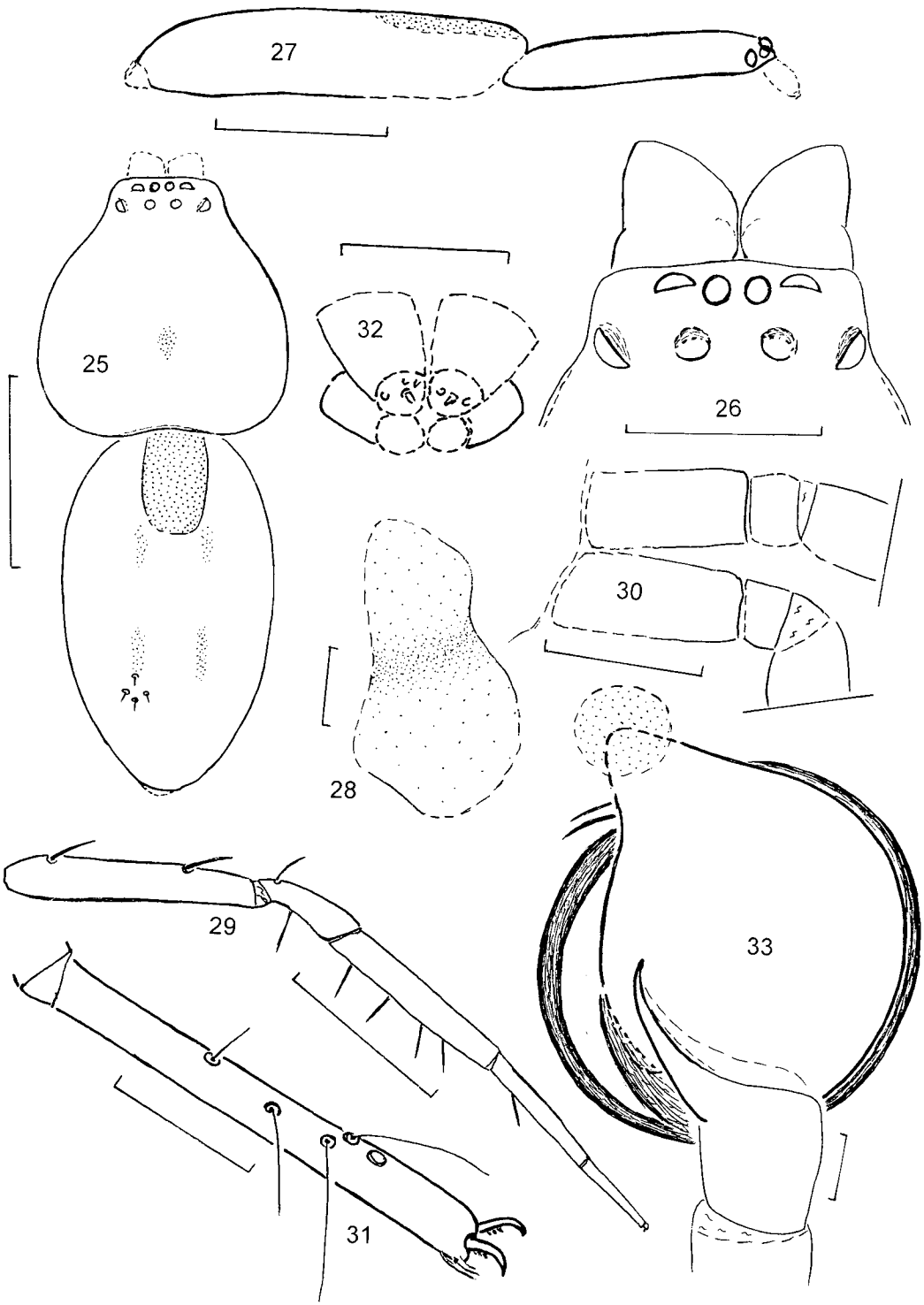
figs.16-17: ***Sosybius berendti* n. sp.**, ♂; 16) r. tibia II retroventrally, hairs & trichobothria not drawn; 17) r. pedipalpus ventrally and slightly apically; M = 1.0 in fig.16), 0.5 in fig.17);

figs.18-19: ***Sosybius lateralis* n. sp.**, ♂; 18) tibia of the l. pedipalpus dorsally (not all hair are drawn); 19) l. pedipalpus retrolaterally and slightly venteroapically; only the distal cymbial hairs are drawn (E = embolus, M = median apophysis, S ?= questionable remains of sperma); M = 0.5;



figs.20-24: ***Eotrochanteria kruegeri* n. gen. n. sp.**, ♂; 20) body dorsally; 21) l. posterior median eye with preserved questionable remains of the canoe-shaped tapetum; 22) patella and tibia of the l. leg III with bristles prolaterally; 23) l. coxae and trochantera III-IV ventrally with the prolongated trochanter IV (arrow); 24) l. pedipalpus retrolaterally (E = embolus, M = median apophysis, S = questionable remains of sperma); M = 1.0 in figs. 20, 22, 0.1 in fig. 21, 0.5 in figs. 23-24;

figs.25-36: ***Trochanteridromus scutatus* n. gen. n. sp.**, ♂; holotype figs. 25, 28, 29, 32,33; paratype: The remaining figs. 25) body dorsally; 26) frontal part of the prosoma dosally; 27) outline of the body laterally; 28) left gnathocoxa ventrally; 29) l. leg I with bristles prolaterally; 30) left legs III and IV: Coxa, trochanter and basal part of the femur ventrally; 31) l. tarsus IV prodorsally with trichobothria; 32) spinnerets ventrally; 33-34) l. pedipalpus dorsally and ventrally; distal part of the r. pedipalpus dorsally-distally (C = conductor, E = embolus); 35-36) distal part of the r. pedipalpus dorsally and ventrally; M = 1.0 in figs. 25, 27, 29, 0.5 in figs, 26, 30, 0.2 in figs. 31-32, 0.1 in the remaining figs. ;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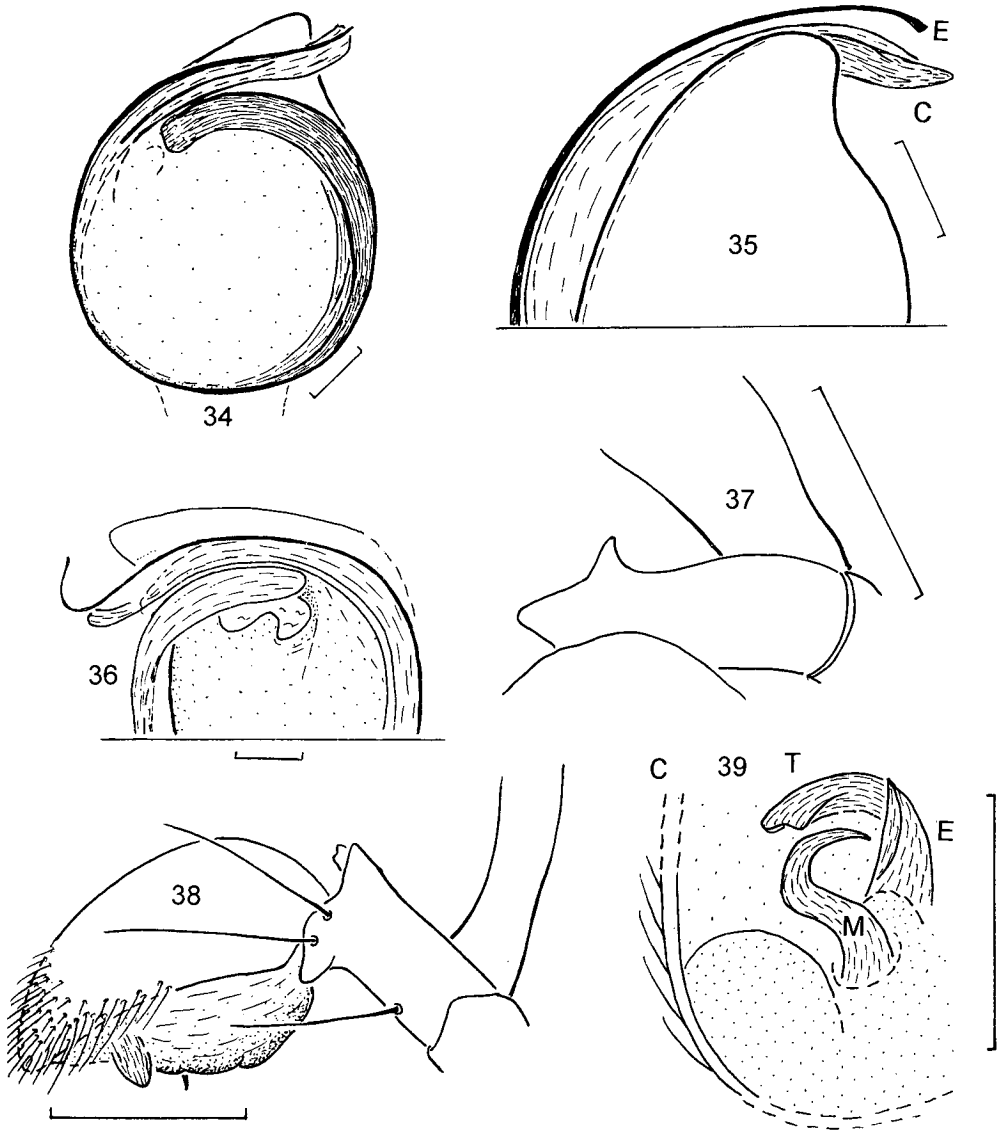


figs.37-39: ***Sosybius falcatus* n. sp.**, ♂; 37) Tibia and basal part of the r. cymbium pro-apically; 38) l. ♂-pedipalpus retrolaterally (only few of the hairs are drawn); 39) r. ♂-pedipalpus ventrally-basally (C = cymbium, E = embolus, T = terminal apophysis); M = 0.5;

figs.40-41: ***Sosybius longipes* n. sp.**, l. ♂-pedipalpus; 40) r. patella and tibia retrolaterally; 41) pedipalpus retroventrally; M = 0.5;

figs.42-43: ***Sosybius unispinosus* n. sp.**, ♂; 42) r. leg I prolaterally; hairs and trichobothria not drawn except two long distal metatarsal trichobothria; M = 1.0; 43) l. pedipalpus ventrally and slightly retrodistally; M = 0.5;

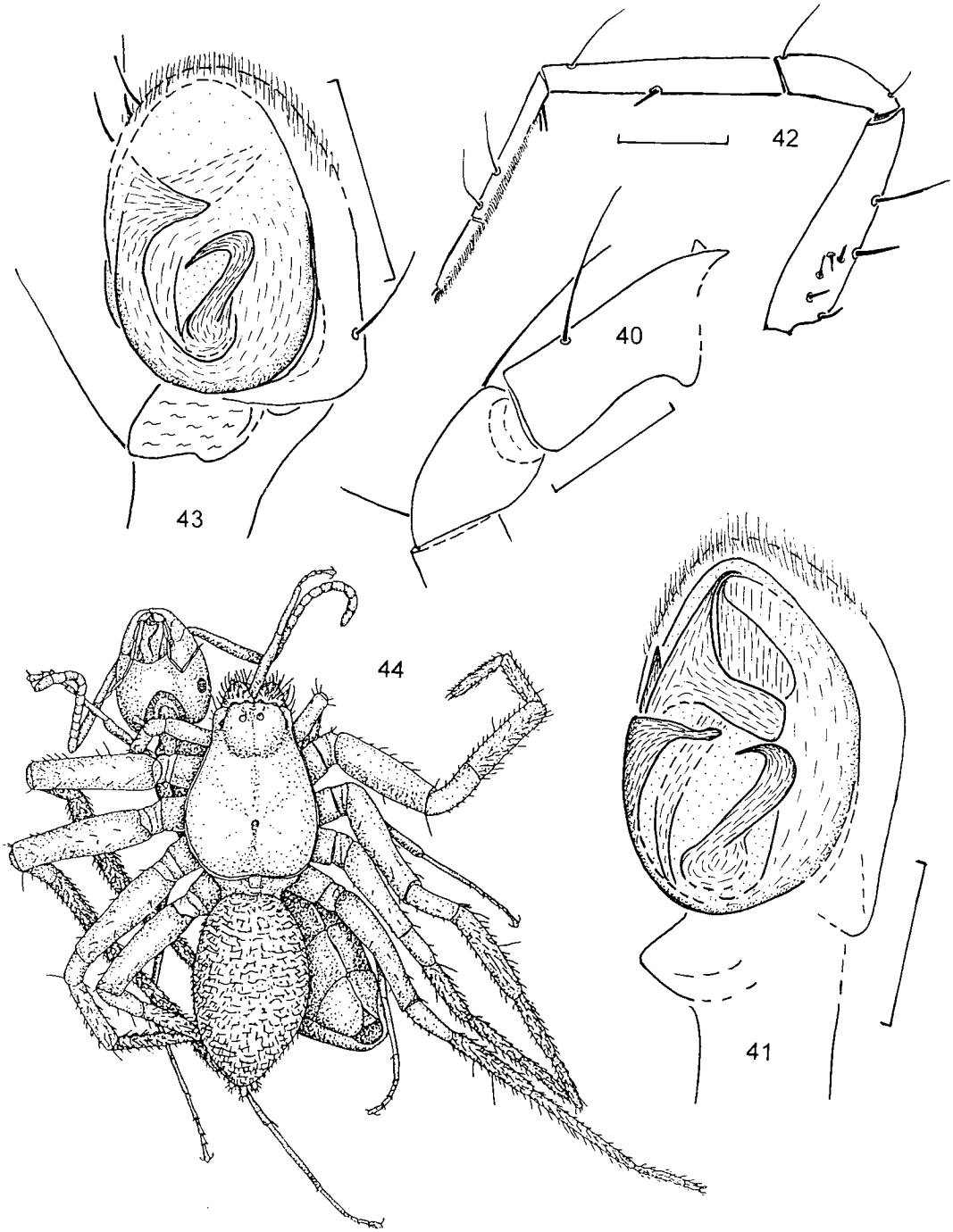
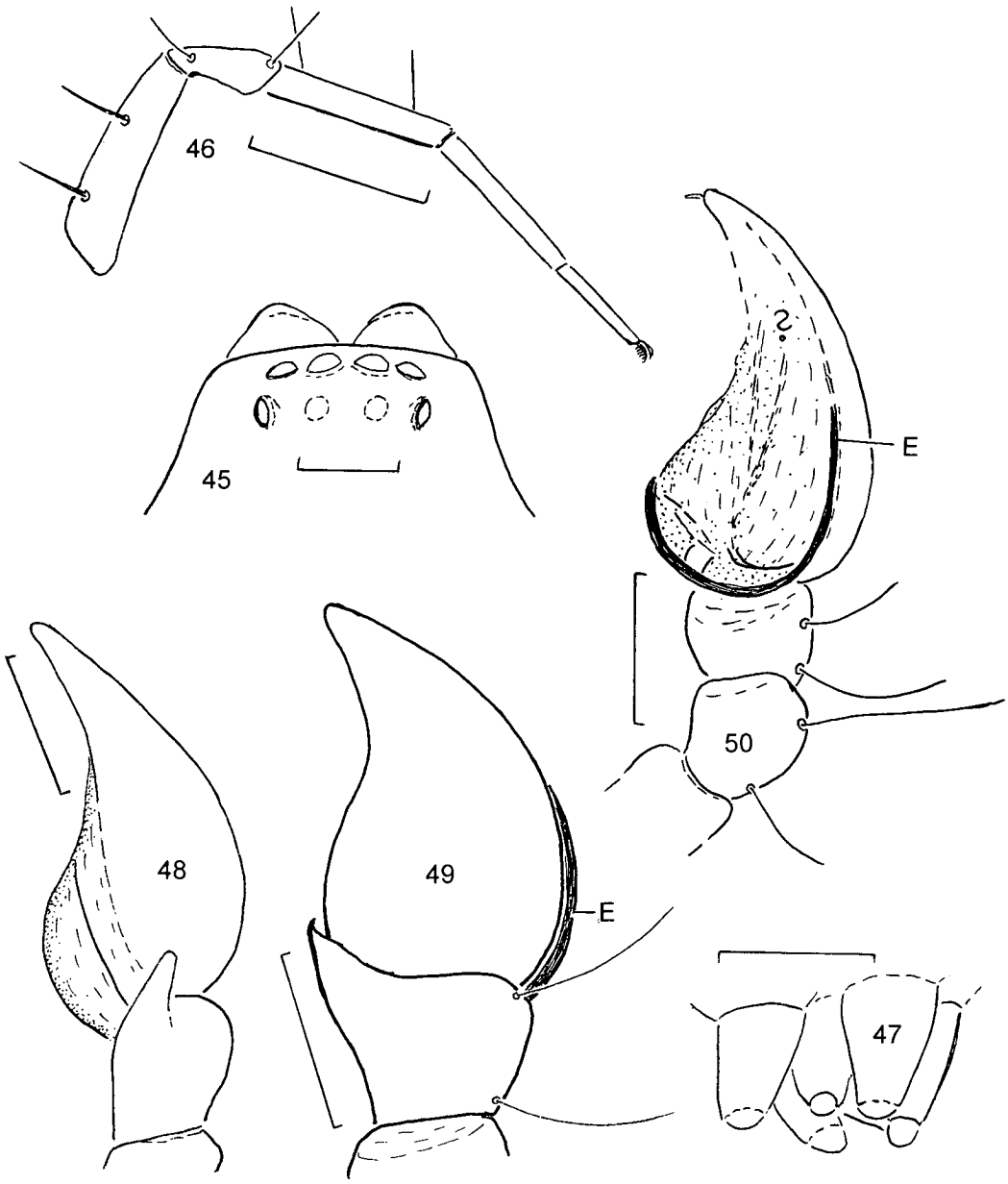


fig.44: *Sosybius* sp., (coll. LIEDTKE), juv. spider with an ant (Formicidae) as a prey. Taken from G. LIEDTKE (in litt.), modified. Body length of the spider: 4mm;



figs. 45-50: ***Trochanteridromulus glabripes* n. gen. n. sp.**, ♂; 45) anterior part of the prosoma, dorsal aspect; 46) l. leg I, prolateral aspect. Hairs are not drawn. Note the hair-shaped patellar and tibial bristles; 47) spinnerets, ventral aspect; 48) l. pedipalpus, retrolateral aspect; 49) l. pedipalpus, dorsal aspect; 50) r. pedipalpus, dorsoventral aspect. E = embolus; M = 1.0 in fig. 46, 0.3 in fig. 45, 0.2 in the remaining figs.

BEITR. ARANEOL., 3 (2004)

FOSSIL SPIDERS (ARANEAE) OF THE FAMILY SELENOPIDAE IN DOMINICAN AMBER

Joerg Wunderlich, 75334 Straubenhardt, Germany.

Abstract: The second species of fossil spiders (Araneae) of the family Selenopidae is described from Dominican amber: *Selenops dominicanus* **n. sp**.

The **material** is kept in the private collection of the author (CJW) and will probably be deposited in the future in the Senckenberg Museum Frankfurt s. M.

Introductory remarks

Selenopidae are usually large - most often 5-20mm long - ecribellate and two-clawed

spiders of the tropics which possess a distinctly flattened body and a laterigrade leg position. The prosoma (fig. 1) is about as wide as long, the eye field is very wide (the lateral eyes are near the prosomal margin), the position of the posterior median eyes is most often frontally in about the same transverse row as the anterior eyes (e.g. in the genus *Selenops* (fig. 1), six eyes are situated in a single tranverse frontal row) (in the African genus *Apyphops* BENOIT 1968 the posterior median eyes are in a more posterior position). Leg I, II, III (!) or IV may be the longest, the paired tarsal claws may be toothed or smooth. - Sparassidae may be most related. -The spiders mainly live under bark and rocks or in houses. - Four Selenopidae genera are known; in Central America only the genus *Selenops* LATREILLE 1819 occurs.
Only a single fossil species has been described up to now: *Selenops beynai* SCHAWALLER 1984 from Tertiary Dominican amber. WUNDERLICH (1988: 235) mentioned (sub *Selenops* sp. 1 and 2) two exuviae. In this paper I describe a second fossil species from the same Caribbean Island, Hispaniola. - See the paper on spiders in copal from Madagascar in this volume. Photo 395.

***Selenops dominicanus* n. sp.** (figs. 1-4) Photo 396

Material: Holotypus in amber from the Dominican Republic (Island of Hispaniola), F932/ DB/AR/SEL/CJW.

Preservation and syninclusions: The spider is well but incompletely preserved, the prosoma and the right legs I-II are nearly complete, the right leg I is broken off within the amber behind the coxa by autotomy and positioned right in front of the right pedipalpus, the right leg II is broken longitudinally through patella, tibia, metatarsus and tarsus, the dorsal parts are preserved in the separate amber piece, the tip of the tarsus is cut off. Only the anterior part of the opisthosoma is present, the remaining part and most leg articles are cut off. Haemolymph is present on the stump of the right coxa I (photo). - A tiny Hymenoptera and half of a tiny Diptera are preserved near the spider.

Diagnosis (♂; ♀ unknown): Pedipalpus (figs. 2-4): Tibia with a long divided and curved retrolateral apophysis, bulbus wide.

Description (♂):
Measurements (in mm): Body length about 7.5, prosoma: length 4.4, width 4.5, leg I: Femur 5.4, patella 2.0, tibia 4.6, metatarsus 4.1, tarsus 1.8, leg II: Femur 6.1, patella about 2.5, tibia 5.7, metatarsus 4.1.
Colour light brown but the loose right leg I medium to dark brown.
Prosoma as long as wide, covered with short hairs, fovea long, 8 eyes as in fig. 1, chelicerae fairly small, teeth of the margins hidden, fangs long and distinctly curved, labium free, longer than wide. - Legs in a laterigrade position, hairy, II longer than I. Femora I-II bear 6 bristles, tibia I-II with 3 pair of ventral bristles, laterals and apicals, metatarsi I-II bear 2 pairs of long ventral bristles, tarsi and metatarsi with short pseu-

doscopulae of thin hairs, tarsi with dense claw tufts. - Opisthosoma: Only a small hairy anterior part is present. - Pedipalpus (figs. 2-4; see above): Patella as long as wide, tibia wider than long, bulbus as wide as long, median apophysis divided, conductor large, origin of the embolus near the median apophysis, its position in a wide loop.

Relationships: In *S. beynai* SCHAWALLER 1984 from Dominican amber the pedipalpal tibial apophysis is different (fig. 5); in *S. insularis* KEYSERLING (extant, Dominican Republic) the pedipalpal tibial apophysis is larger, the position of embolus and conductor are different; in *S. phaseolus* MUMA 1953 (extant, Dominican Republic) the pedipalpal tibia is longer, its apophysis as well as the position of embolus and conductor are different, see MUMA (1953).

Distribution: Tertiary Dominican amber forest.

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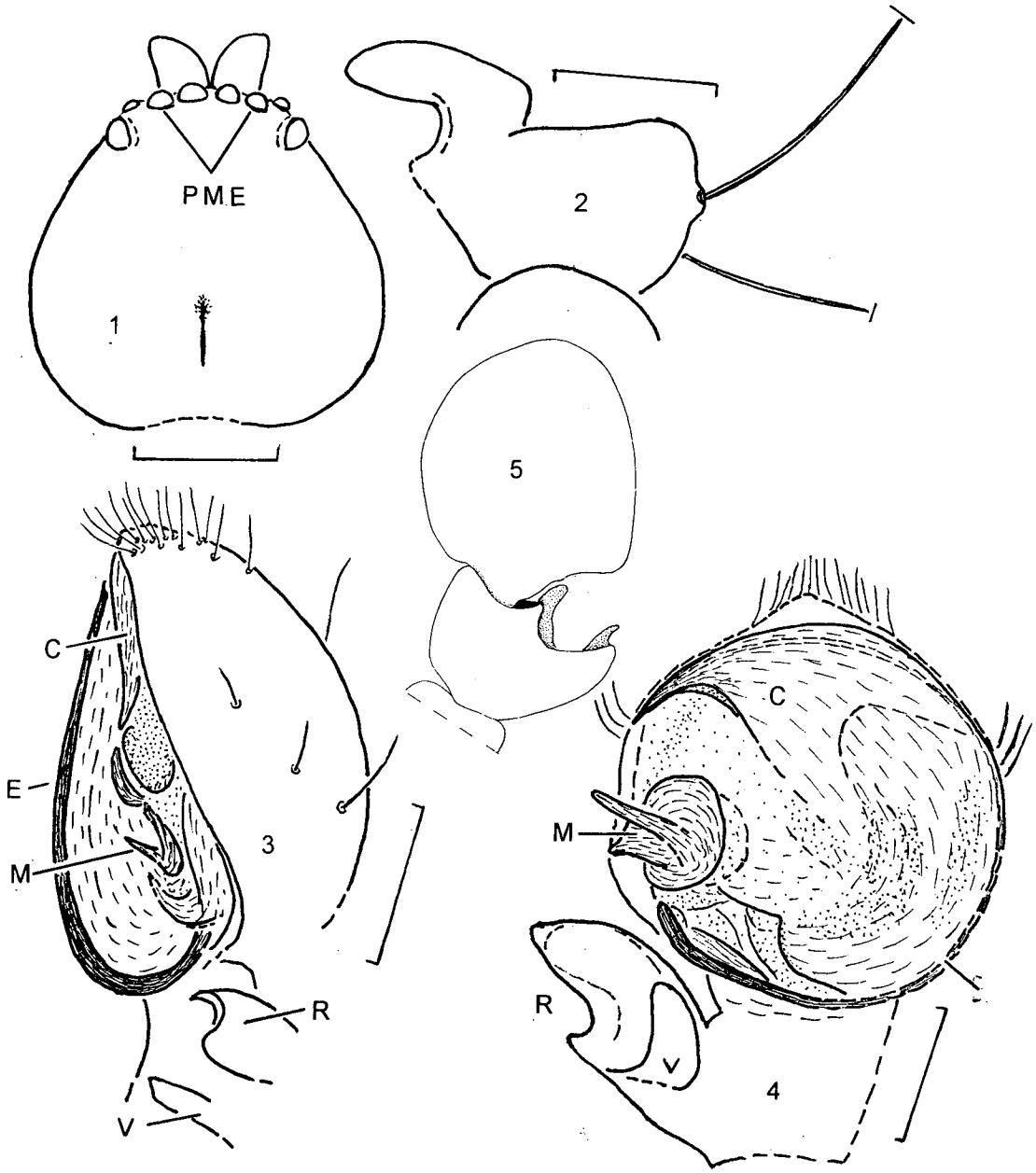

Figs. 1-4: *Selenops dominicana* **n. sp.**, ♂; 1) prosoma, dorsal view; 2) tibia of the l. pedipalpus, dorsal view; 3) l. pedipalpus retrolaterally-apically (basal parts are hidden; only few cymbial hairs are drawn); 4) r. pedipalpus, ventral view. C = conductor, E = embolus, M = median apophysis, PME = posterior median eyes, R = retrolateral tibial apophysis, V = ventral branch of the retrolateral tibial apophysis. M = 2.0mm in fig. 1, 0.5mm in the other figs.;

fig. 5) *Selenops beynai* SCHAWALLER 1984, ♂, r. pedipalpus, dorsal view. Taken from SCHAWALLER (1984: Fig. 5).

BEITR. ARANEOL., 3 (2004)

THE NEW SPIDER (ARANEAE) FAMILY BORBOROPACTIDAE FROM THE TROPICS AND FOSSIL IN BALTIC AMBER

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ABSTRACT: The description of the spider (Araneae) family Borboropactidae **n. fam**. is based on extant and fossil spiders. The family is regarded as a relict taxon and most related to the Zodariidae and/or the Thomisidae. It is known (1) extant (tropical Africa, SE-Asia) from the type genus *Borboropactus* SIMON 1884 (hitherto Thomisidae: Stephanopinae, transferred here to the Borboropactinae), (2) from the fossil ?*Borboropactus radiatus* (KOCH & BERENDT 1854) (sub *Syphax*, **n. comb**.), which is preserved in Baltic amber, and is transferred to *Borboropactus* with some hesitation, and (3) from the fossil *Succiniraptor paradoxus* **n. gen. n. sp**. - Succiniraptorinae **n. subfam**. -, which is preserved in Baltic amber, too.

Acknowledgement: I thank Dr. K. SCHÜTT (HUB) for producing the REM-photos, Dr. C. ROLLARD (MNHP) for the loan of material of the genera *Borboropactus* and *Stephanopis* and Dr. C. DEELEMAN-REINHOLD for the loan of members of the Stephanopinae.

INTRODUCTION

In spiders (Araneae) there are numerous taxonomical problems on family level, world wide revisions of the higher taxa are wanted, Thomisidae and Zodariidae are examples for such families whose relationships are unclear, see the papers on these families in this volume.

Borboropactidae is one of the numerous relict spider families among the families which are treated in this volume: Borboropactidae, Drymusidae, Huttoniidae, Loxoscelidae, Microstigmatidae, Periegopidae, Pimoidae and Stenochilidae (Borboropactidae, Microstigmatidae and Pimoidae are known from fossils, too). These families are only known from one or two genera.

SIMON regarded *Borboropactus* as a genus of the family Thomisidae, subfamily Stephanopinae, but he gave the genus diagnosis without knowing the male. SIMON knew the special behaviour of the spiders of his Stephanopinae which cover their body with soil particles. In my opinion this behaviour - and digging behaviour - evolved several times convergently and caused a similar body shape (1) in the Thomisidae: Stephanopinae, e.g. in *Stephanopis* O. PICKARD-CAMBRIDGE 1869, (2) in the Borboropactidae and (3) in the Zodariidae: In the Cyptothelinae and - separately? - in the Homalonychinae.

Digging/burrowing is an "old" behaviour in spiders - numerous Mygalomorphae as Ctenizidae (Trapdoor spiders) use their powerful chelicerae for digging (also more advanced spiders as some Dysderidae, Lycosidae and Zodariidae are "diggers"). Such a behaviour evolved several times convergently in the suborder Araneomorpha besides the examples which are mentioned above, e.g. in the Eresidae and Sicariidae as a family character and in *Cerbalus* SIMON (Sparassidae).

Borboropactidae n. fam. Figs. 1-13, photos 397-398

Diagnosis: Presence of a special large leg sense organ, the "tarsal pit organ" (figs.4-9),

which bears club-shaped hairs and - at least in extant spiders - feathery trichobothria besides thin "normal" hairs in a large depression; tarsi, metatarsi and tibiae depressed dorsally or laterally, leg I powerful and distinctly the longest with the femur thickened prolaterally and bearing tubercles/spines and with a depression (figs. 1, 11), chelicerae toothed on both margins and with teeth within its furrow (fig. 2) at least in the Borboropactinae, male pedipalpus (figs. 3, 12-13): Bulbus simple and prominent, median apophysis present, conductor present or absent (in the Succiniraptorinae).

Further characters: Ecribellate, unpaired tarsal claw absent, depressed body shape, see WUNDERLICH (1986: Fig. 16), opisthosoma hardened, prosoma narrowed anteriorly (fig. 1), eyes small, both rows recurved, lateral eyes on tubercles, the anterior lateral eyes are the largest - see WUNDERLICH (1986: Fig. 17) -, legs prograde (fig. 1), III and IV not distinctly shorter than II, I-II with paired ventral tibial and metatarsal spines, with a scopula at least under tarsi and metatarsi III and IV, teeth of the paired tarsal claws inserted ventrally (not medially as in most Zodariidae), leg autotomy between coxa and trochanter (not known in the Succiniraptorinae), tibia of the male pedipalpus with a retrodistal apophysis. Body covered with numerous club-shaped hairs in the Borboropactinae, body length 3-7mm.

Relationships: According e.g. to the presence of cheliceral teeth *Borboropactus* was placed within the Thomisidae: Stephanopinae by SIMON; SIMON did not know the male of the genus. In contrast to the Stephanopinae as well as other Thomisidae the legs are prograde in the Borboropactidae (in *Stephanopis* the first three leg pairs may be directed foreward as in the Segestriidae, pers. obs.), the legs III and IV are not distinctly shorter than the small leg II, the cheliceral furrow bear teeth, the eye field is narrow, the posterior lateral eyes are small, a "tarsal pit organ" is present, a retroventral and/or a divided retrolateral tibial apophysis of the male pedipalpus is absent, the bulbus is prominent but not flattened. The body covering behaviour of *Borboropactus* is similar to some members of the Thomisidae as well as to some Zodariidae (see above), sensory tarsal hairs and a depressed and scopulate cymbium of *Borboropactus* are similar to some Zodariidae, e.g. the cymbium is similar to *Storosa* JOCQUE 1991, but sure synapomorphic morphological characters with the Zodariidae (or the Thomisidae) are unknown. As in plesiomorphic taxa of the Zodariidae the spinnerets are not reduced in the Borboropactidae (unknown in the Succiniraptorinae), the fang is not shortened, the gnathocoxae are not convergent and an opisthosomal scutum is absent at least in the Borboropactinae. In contrast to the Zodariidae a gnathocoxal serrula, a "tarsal pit organ" and leg autotomy are present in the Borboropactidae (the leg autotomy is unknown in the Succiniraptorinae). - The burrowing/digging behaviour is present in the Borboropactidae - at least in the Borboropactinae - as well as in most plesiomorphic taxa of the Thomisidae (Stephanopinae) and in most plesiomorphic taxa of the Zodariidae (Cyriocteinae, Cryptochelinae and Homalonychinae; see the paper on the Zodariidae in this volume). This behaviour may well be a - the only known! - synapomorphic character of the families Borboropactidae, Thomisidae + Zodariidae. These families - as well as the probably related Chummidae and the extinct Ephalmatoridae (see the paper on the Ephalmatoridae in this volume) - may well be a group of related families - a superfamily of its own? - whose members possess no capture web but are "waiting predators".

Subfamilies: The nominate Borporopactinae and the Succiniraptorinae n. subfam.

Distribution: Extant: Tropical regions of Africa and SE-Asia; fossil: The Early Tertiary Baltic amber forest.

Borboropactinae n. subfam.

Diagnosis: Body and legs covered with numerous club-shaped hairs (photos), clypeus short, fangs long, labium free; male pedipalpus (figs. 1, 3): Cymbium scopulate, bulbus with a median apophysis, a long conductor and a long embolus which is coiled apically.

Relationships: See the Succiniraptorinae which I regard as related with some hesitation, mainly because of the rather different mouth parts and bulbus structures.

Type genus: *Borboropactus* SIMON, the only known genus of the subfamily.

Distribution: Tropical Africa and SE-Asia.

Borboropactus SIMON 1884

Synonyms: *Regillus* O. PICKARD-CAMBRIDGE 1884, *Regillulus* STRAND 1942.

Type species: *Regillus asper* O. PICKARD-CAMBRIDGE 1884.

This may be the only extant genus of the family, see BARRION & LITSINGER (1995: 203-208, figs. 116-118), SONG DAXIANG & ZHU MINGSHENG (1997: 21-23, figs. 8-9), WUNDERLICH (1986: 28, figs. 16-17). The relationships of the fossil ?*Borboropactus radiatus* are unsure see below.

Diagnosis and distribution: See above.

Relationships: See the fossil ?*Borboropactus radiatus* below.

?***Borboropactus radiatus*** (KOCH & BERENDT 1854) (sub *Syphax r.*) (**n. comb.**)

Material: Holotypus of *Syphax radiatus* KOCH & BERENDT 1854, ?ad. ♀, (the only known fossil specimen of this taxon), Palaeont. Museum. Humboldt University Berlin.

Description (?ad. ♀), see WUNDERLICH (1986: 28, figs. 16-17):

Measurements (in mm): Body length 4.2, prosoma: Length 1.8, width 1.6, femur II 1.2, tibia IV 0.8, femur IV about 1.2.

Colour dark grey brown. Body dorsoventrally depressed, prosomal cuticula corniculate, fovea absent. Eyes - see WUNDERLICH (1986: Fig. 16-17) small, field narrow, posterior row strongly recurved, anterior lateral eyes largest and on strong humps. The chelicerae are small, the claws and the gnathocoxae are hidden, the labium is free. The tarsus of the thickened pedipalpus bears prolateral spines. Legs - the first pair is missing by autotomy behind the coxa - stout, prograde, articles depressed dorsally or laterally, an unpaired tarsal claw as well as bristles or spines may be absent, claw tufts and tarsal scopulae are present, according to the large coxa the first leg is distinctly the largest, leg IV nearly as long as II, the relation is about 11.5 : 13.5. The tarsi bear a large dorsal-distal pit similar to *Borboropactus*, its fine structure is not observable with the help of a light microscope. Opisthosoma hardened, its surface bears tiny and large folds and wrinkles, tiny soil ?particles, three pairs of rugose sigillae and numerous tiny ?sockets of spines or club-shaped hairs (?) which may be broken off. Stout anterior and posterior spinnerets are present in a position in front of the opisthosoma's end. The genital area may bear an epigyne but the presence of this structure is quite unsure.

Relationships: KOCH & BERENDT (1854) regarded their *Syphax radiatus* (fossil, in Baltic amber) as a member of the Thomisidae (as SIMON regarded the genus *Borboropactus*) and they also did not know the male but only an ?adult female. MENGE in KOCH & BERENDT (1854: 77) thought *radiatus* to be a member of the family Philodromidae near the genus *Artamus*. - Habitus of the body and the shape of the prograde legs, eyes and tarsal pits of *radiatus* are similar to *Borboropactus* but a male of *radiatus* is needed to confirm phylogenetic relationships. In contrast to *Borboropactus* leg bristles and club-shaped hairs are probably absent in *radiatus*, the anterior lateral eyes are situated on distinct humps, and thus *radiatus* should be the member of an undescribed and extinct genus.

Distribution: Tertiary Baltic amber forest.

Succiniraptorinae n. subfam.

Diagnosis (♂; ♀ unknown): Fangs short, labium fused to the sternum, strongly pointed and bent upwards (fig. 10); pedipalpus (figs. 12-13): Median apophysis in a retrobasal position, conductor absent, embolus straight, originating in a central position of the bulbus.

Type genus: *Succiniraptor* n. gen., the only known genus of the subfamily.

Relationships: In the Borboropactinae the legs (position, order, shape, "raptorial" leg I, presence of a "tarsal pit organ") are similar but body and legs are covered with numerous club-shaped hairs at least in the extant taxa, the clypeus is short, the fangs are long, the labium is free and not pointed and bent upwards, the cymbium is scopulate, a long conductor is present and the embolus is coiled apically.

Distribution: Tertiary Baltic amber forest.

***Succiniraptor* n. gen.**

Diagnosis, relationships and **distribution**: See above.

Type species: *Succiniraptor paradoxus* n. sp.

***Succiniraptor paradoxus* n. gen. n. sp.** (figs. 10-13) Photos 397-398

Material: Holotypus ♂ in Baltic amber, F609/BB/AR/BOR/CJW.

Preservation and syninclusions: The spider is incompletely preserved at the corner of a 4cm long amber piece; it is dorsally covered by a white emulsion, the legs are not preserved in its natural position, the right leg I is completely preserved, the right legs II and III and the left legs I and II are nearly completely preserved only some basal parts of the right leg IV, parts of the prosoma and remains of the dorsal surface of the opisthosoma are preserved, most eyes are hidden, both pedipalpi are excellently pre-

served and well observable. - Syninclusions: A member of the Hymenoptera: Ichneumonoidea (9.5mm long), a Coleoptera: Cleridae (10mm long), a small Coleoptera indet., a large scopulate leg of a spider (?Trochanteriidae: ?*Sosybius* sp., nearly 28mm long), several Diptera: Hybotidae, a large antenna of an insect (?Diptera) and stellate hairs are present.

Diagnosis (♂; ♀ unknown): Pedipalpus as in the figs. 12-13.

Description:
Measurements (in mm): Body length probably nearly 3.0, prosoma length probably 1.3, leg I: Femur 1.7, patella 0.75, tibia 1.9, metatarsus 1.0, tarsus 0.4, tibia II 0.73, tibia III 0.65, tibia IV unknown. - Colour dark brown.
Prosoma (fig. 10) with long basal articles of the chelicerae, short and thick fangs, a longer clypeus (probably longer than the hight of the prosoma), a pointed labium which is fused to the sternum and strongly bent upwards, teeth of the cheliceral furrows are unknown, most parts of the gnathocoxae are hidden. Most eyes are hidden, too, the posterior row is distictly recurved, its lateral eyes are larger than the median eyes and directed upwards. The sternum bears numerous large hairs. - Legs (they are incompletely preserved in an unnatural position) stout, their position most probably prograde. Leg I (fig. 11, photo) powerful, distinctly longer and stronger than the other legs, leg III nearly of the same size as the small leg II, the remains of leg IV indicate that it is smaller than leg I; hairs short. Femur I bears a probasal depression and spines on a concavation; tarsi and metatarsi as well as tibia I distally have longitudinal dorsal depressions which bear thin sensory hairs, two trichobothria and a club-shaped hair near the end of the metatarsus. There are numerous ventral and lateral spines/spinules on femora, tibiae and metatarsus I-II (fig. 11), patellar spines are absent; leg I: At least 2 prolaterally on the femur, tibia I bears 5 pairs ventrally and few laterally, metatarsus 4 ventral pairs, few laterals and apicals, there are slightly fewer on tibia and metatarsus II, probably none on III (IV is unknown). No metatarsal preening hairs. Paired tarsal claws strongly bent, tufts distinct, scopulae most distinct on tarsus and metatarsus III. Most trichobothria are short and indistinct, apparently there is only one row of tarsal and metatarsal trichobothria. Tarsal organ large, its position on III in 0.83. - The opisthosoma is nearly completely cut off, the anterior remains bear no long bristles or spines. - Pedipalpus (figs. 12-13, see above) with stout articles and a relatively small and short cymbium; the tibia bears a long retrodistal apophysis, the median apophysis (retinaculum) is long and sickle-shaped; near the tip of the embolus an additional tiny tegular sclerite is present (fig. 12).

Relationships: See above.

Distribution: Tertiary Baltic amber forest.

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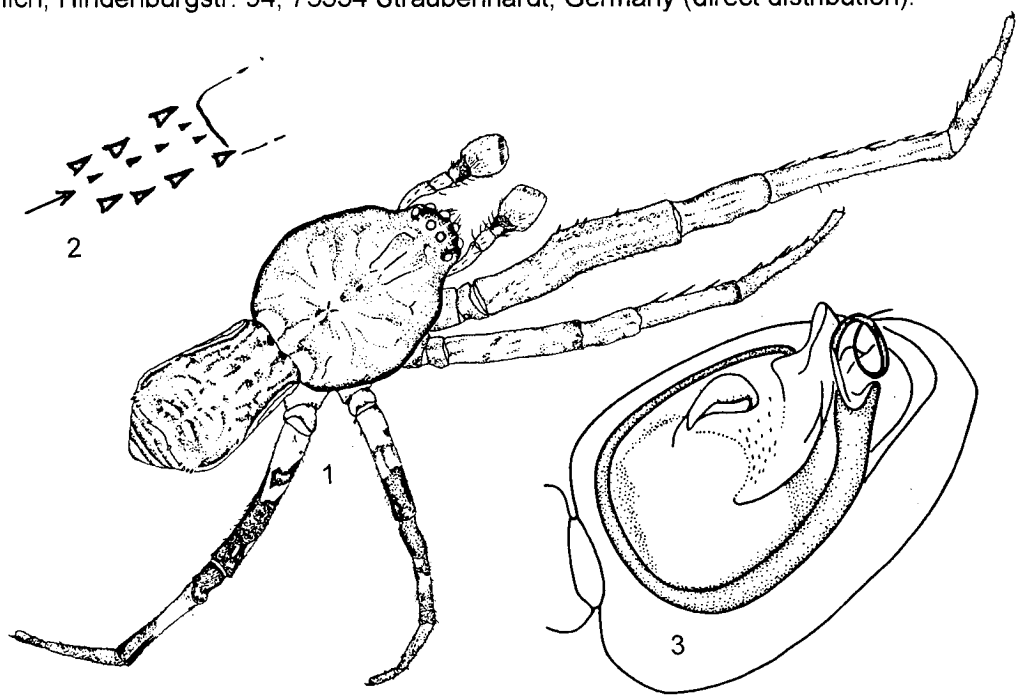
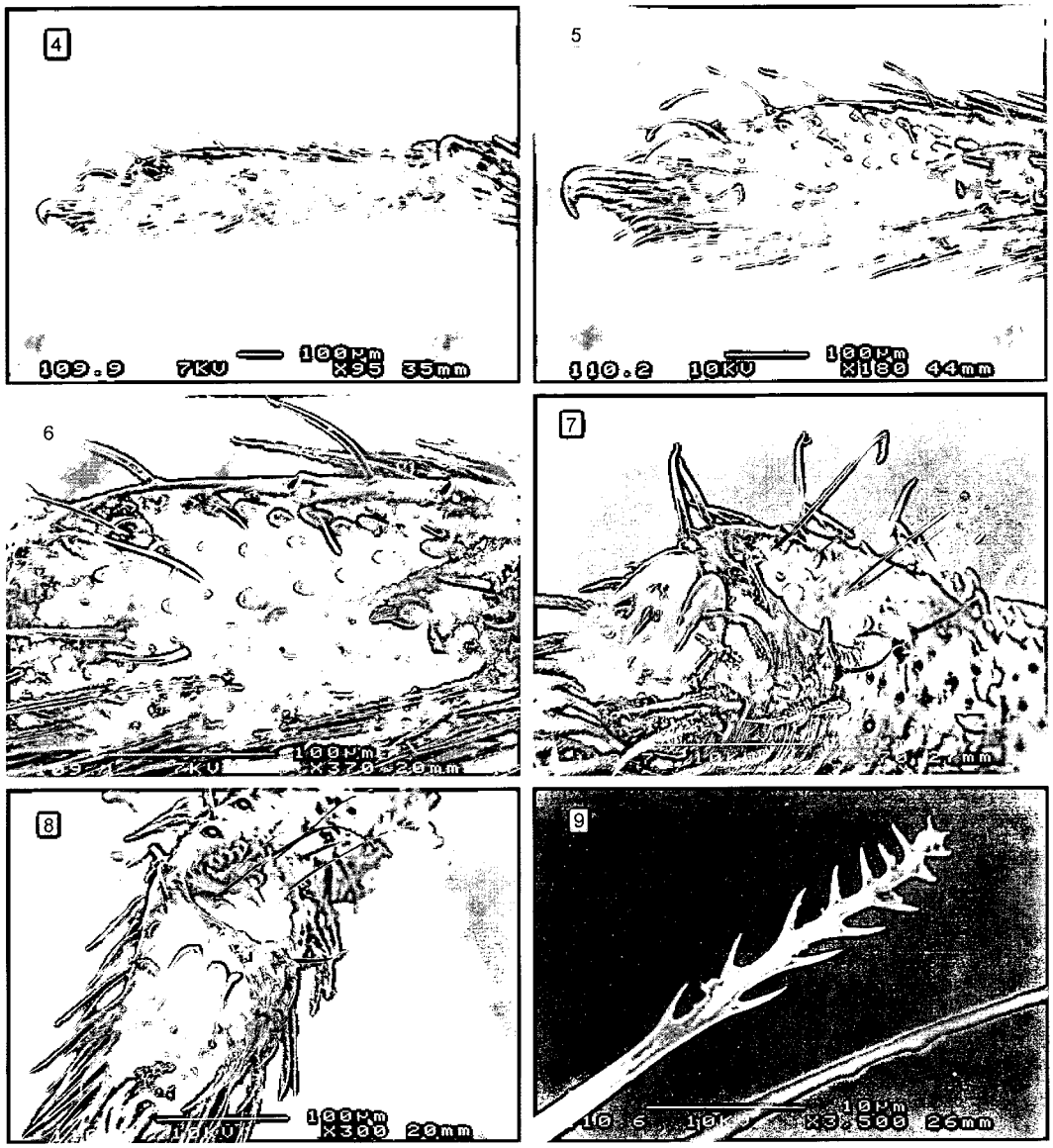
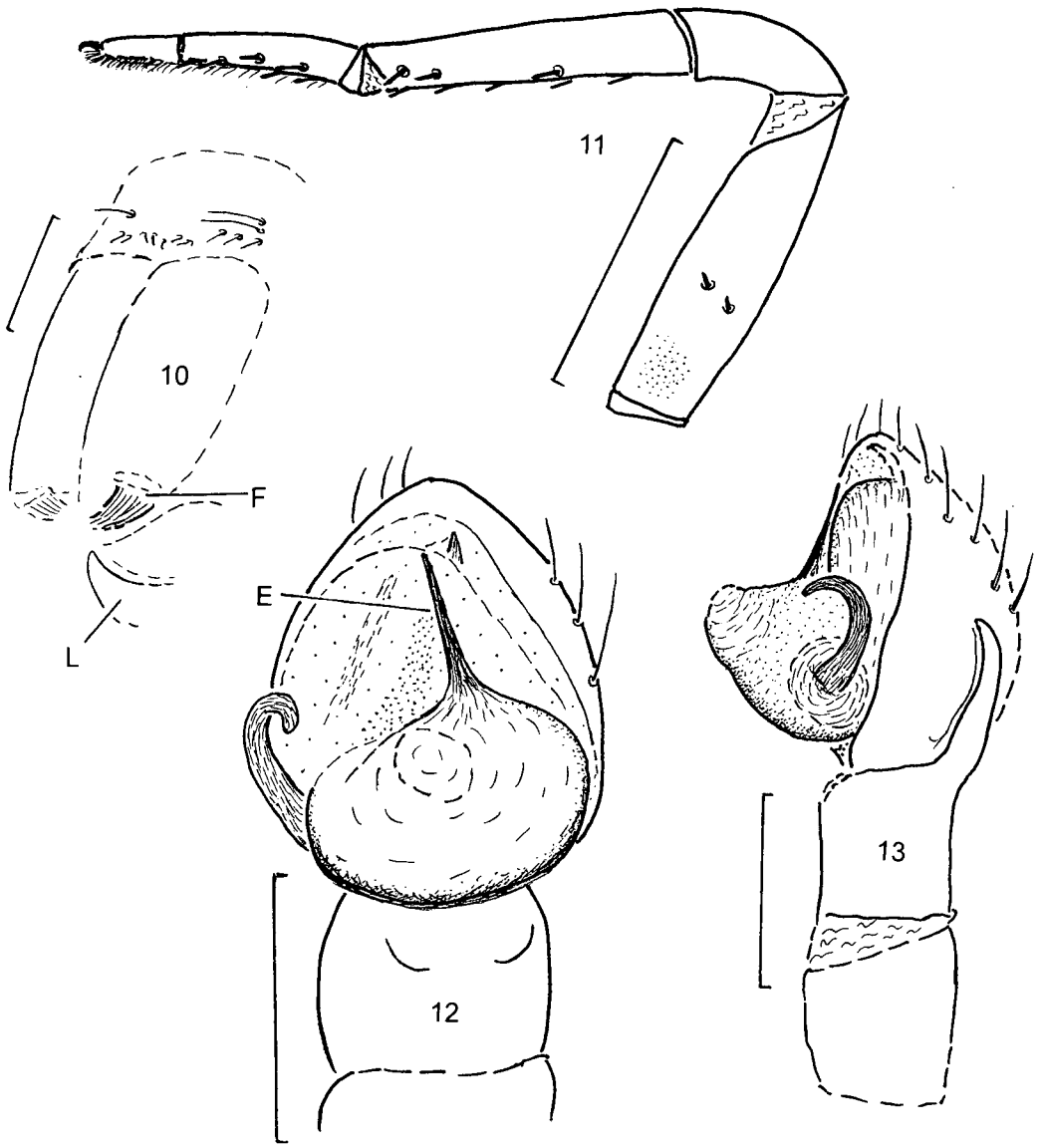


Figs. 1-9: Extant Borboropactidae. 1) *Borboropactus umaasaeus* BARRION & LITSINGER 1995, ♂ body in dorsal view, taken from BARRION & LITSINGER (1995: Fig. 117 a);
2) *Borboropactus* sp., ♂, left chelicera with marginal teeth and denticles in the cheliceral furrow;
3) *Borboropactus hainanus* SONG 1993, ♂, r. pedipalpus proventrally, taken from SONG DAXIANG & ZHU MINGSHENG (1997: Fig. 9c). - No M.



Figs.4-9: REM-photos of the r. tarsus I of *Borboropactus* sp., ♂, with a group of special sensory hairs in the "tarsal pit organ", 4-8) different positions of the organ, 8) the organ seen from the tip. Note the feathery trichobothria and the club-shaped hairs among few thin "normal" hairs; 9) distal part of a feathery trichobothrium of the "tarsal pit organ".



Figs. 10-13: *Succiniraptor paradoxus* n. gen. n. sp., ♂; 10) anterior part of the prosoma, retrofrontal view (eyes and several other parts are hidden). Note the long basal chelicerae articles, the short fang (F) and the pointed and strongly bent labium (L); 11) r. leg I prolaterally (not all spinules are drawn); 12) r. pedipalpus ventrally (E = embolus); 13) l. pedipalpus retrolaterally (only few hairs are drawn). - M = 0.5 in fig. 11), 0.2 in the other figs.

BEITR. ARANEOL., 3 (2004)

FOSSIL CRAB SPIDERS (ARANEAE: THOMISIDAE) IN BALTIC AND DOMINICAN AMBER

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ABSTRACT: The fossil Crab Spiders (Araneae: Thomisidae) in Baltic and Dominican amber are listed and partly revised, namely the genus *Syphax* KOCH & BERENDT 1854 ?= *Facundia* PETRUNKEVITCH 1942 (**n. quest. syn.**). In the Middle Tertiary Dominican amber members of the subfamily Thomisinae are preserved (the genera *Komisumena* ONO 1988 and *Heterotmarus* WUNDERLICH 1988), in the Early Tertiary Baltic amber most probably only members of the most "plesiomorphic" subfamily Stephanopinae are preserved, members of the derived Thomisinae are absent. The following taxa are described from Baltic amber: *Succinaenigma* **n. gen.**, *S. raptor* **n. sp.**, *Thomisiraptor* **n. gen.**, *T. liedtkei* **n. sp.** and two gen. & sp. indet. - The relationships of the subfamilies of the Thomisidae are shortly discussed.

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

INTRODUCTION

Some Crab Spiders have a crab-shaped body; the legs of these spiders are usually distinctly directed sideward, the anterior two pairs are usually longer and stronger than the posterior pairs (photos, fig. 4), these "raptorial legs" are specialized for catching insects, and the spiders build no capture web. Many spiders are able to move sidewards. The lateral eyes are most often situated on distinct tubercles (photos, fig. 1). The "advanced" Holarctic - most Eurasian and most North American - Thomisidae are quite distinct from certain tropical spiders e.g. spiders of the subfamily Stephanopinae which possess several plesiomorphic characters e.g. large teeth on the cheliceral margins (fig. 3) as well as usually distinct tarsal scopulae, metatarsal III-IV preening hairs, distinct claw tufts, low tubercles of the lateral eyes and a long cymbium; a tutentaculum may be absent.
Some Thomisidae live on the ground, few are diggers in the ground and cover their body with soil particles, others can be observed in a characteristic "sit-and wait-position" e.g. on flowers, at least the members of the Aphantochilinae are ant-hunters (spiders of the genus *Aphantochilus* are myrmecomorph) and few species are adapted to the life under the bark of trees, few of these possess an extremely flattened body.
Fossil Thomisidae in amber are very rare, adult spiders are even extremely rare: I know of only two adults in Dominican amber and three or four adults in Baltic amber. This rareness can be explained (a) with the hypothesis that the - short-legged - fossil spiders of the Baltic amber forest were ground-living animals (see the remark below with *Syphax*); fast running spiders as members of the genus *Heriaeus* are long-legged and live in higher strata (and their legs are less laterigrade). Contrarily to these taxa the spiders of the genus *Komisumena* of the Dominican amber are long-legged. (b) Thomisidae of the Baltic amber forest were members of the mainly tropical subfamily Stephanopinae, and the Baltic amber forest was chiefly subtropically.

In former times Thomisidae was united with the Philodromidae (Philodrominae was regarded as a subfamily of the Thomisidae); e.g. PETRUNKEVITCH (1950: 317-318) mixed genera of both families in his "Key to Baltic amber Thomisidae" as well as (1958: 383-384) in his list of Baltic amber Thomisidae, and he did not discriminate between true Thomisidae and taxa of other families, see in this volume the papers on Borboropactidae, Philodromidae, Pisauridae, Trochanteriidae and Zoropsidae.

To my knowledge there are at least five genera of the Thomisidae in Baltic amber (three are named) and two in Dominican amber; all are extinct. The spiders in Dominican amber are members of the subfamily Thomisinae (= Misumeninae). The spiders in Baltic amber most probably are all members of the subfamily Stephanopinae; sure members of the "modern" Thomisidae - which dominate in the moderate climates - are not known to me. Taxa of the tropical Stephanopinae are completely absent in Europe today. See this volume, the family Salticidae in Baltic amber, in which also only the most "plesiomorphic" subfamily is present.

1. TAXONOMY

Diagnosis of the family Thomisidae: Legs laterigrade, I and II usually distinctly longer than III and IV, eye field usually wide (except in some Stephanopinae), lateral eyes most often distinctly larger than the small or tiny median eyes and on tubercles, cuticula scale-shaped, frequently rugose, club-shaped hairs of body and legs are not rare; ♂-pedipalpus: Tibia with a retrolateral and a ventral apophysis, cymbium frequently with a retrolateral outgrowth (tutaculum) which may guide the tip of the embolus, tegulum (except in *Epidius*) disc-shaped and with a ridge, embolus usually long and thin, most often in a marginal and circular position, epigyne usually with a hood or guide pocket.

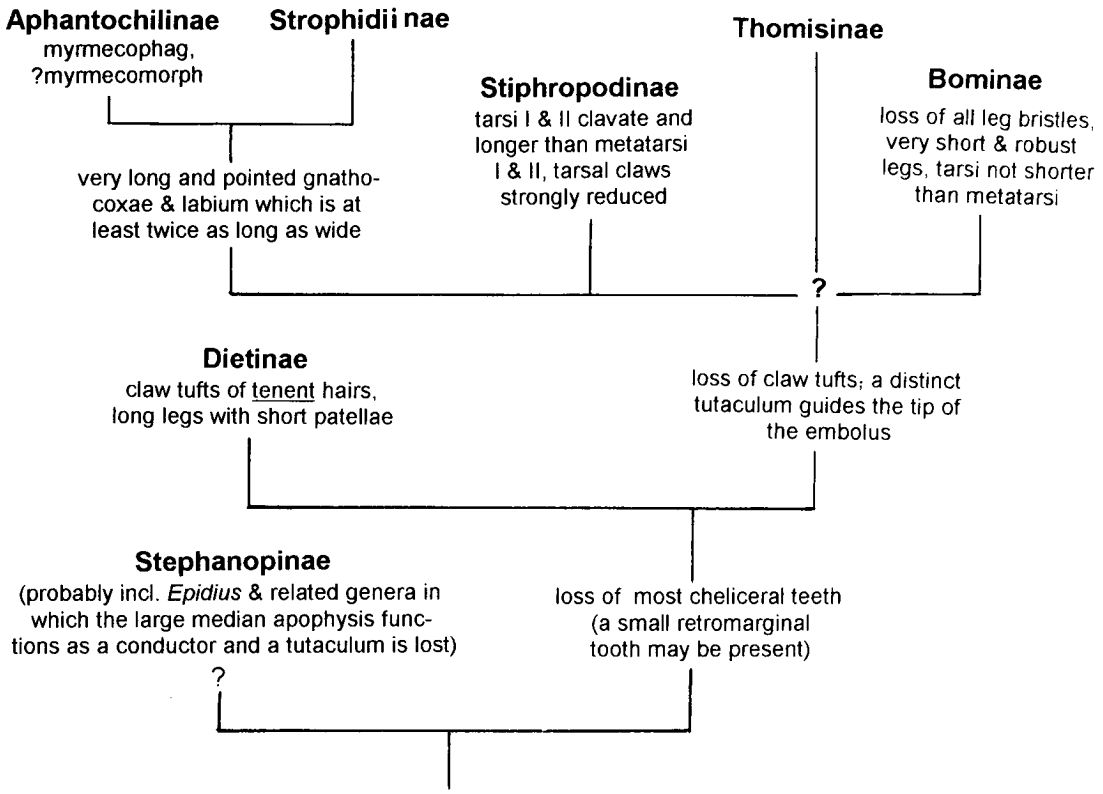
Remarks: In the Bominae the length of the short legs I-IV is only slightly different and all eyes have about the same size; in some Stephanopinae legs III and IV are not distinctly shorter than I and II. In *Aphantochilus* leg IV is the longest. In several Thomisinae claw tufts are present which are formed by simple hairs. The tutaculum has apparently been independently reduced several times in the taxa of the Thomisidae; in the fossil males in Baltic amber a tutaculum is absent.

Further characters: Ecribellate, unpaired tarsal claw absent, there may be more than one row of tarsal trichobothria (e.g. in *Stephanopis*), autotomy between coxa and trochanter, colulus reduced. Except in the Stephanopinae (fig. 3) teeth of the cheliceral margins are absent or only a tiny retromarginal tooth is present. Some Stephanopinae cover their body with soil particles. At least in most Thomisinae (= Misumeninae) a distinct sexual size dimorphism is present. At least the Aphantochilinae are myrmecophag, see ANDRADE & BARONI URBANI (1999: 823).

Subfamilies: There may be seven subfamilies - see below: Possible relationships - but a revision is needed.

The relationships are unknown, see ONO (1981: 17) and the papers on the families Borboropactidae, Salticidae and Zodariidae in this volume. In the Toxopidae (extant) the position of eyes and legs may be similar but Toxopidae are three-clawed.

Distribution: Cosmopolitical; in moderate climates mainly Thomisinae occur.



Apomorphic characters: Laterigrade leg position, ?wide eye field, small median eyes, large lateral eyes on tubercles, legs I & II distinctly longer than III & IV, tendency to the presence of club-shaped hairs; ventral pedipalpal tibial apophysis, ?tutentaculum, disc-shaped tegulum with a ridge.

Plesiomorphic characters: Teeth on both cheliceral margins, ?tarsal scopulae and claw tufts.

Possible relationships of the subfamilies of the Thomisidae

2. THE FOSSILS IN AMBER

A) **Spiders in Dominican amber** (Thomisinae)

Described are - besides an indet. juvenile sensu WUNDERLICH (1988) - *Komisumena rosae* ONO 1988 (n. gen. n. sp.) and *Heterotmarus altus* WUNDERLICH 1988 (n. gen. n. sp.), see WUNDERLICH (1988: 228-231).

B) Spiders in Baltic amber

The descriptions of most fossil species were based on juveniles and several types are lost; therefore I was unable to revise all fossil taxa, see the list which was given by PETRUNKEVITCH (1958: 383-384) and the remark above. Among numerous described fossil taxa I found only members of one genus, *Syphax* KOCH & BERENDT 1854. - *Misumena samladica* PETRUNKEVITCH 1942 (juv.): According to the relative large median eyes and - according to PETRUNKEVITCH - the absence of leg spines/bristles in my opinion the taxon is not a member of the family Thomisidae.
By far most Thomisidae in Baltic amber are juveniles of the genus *Syphax* (photos); among about 80 000 spiders in Baltic amber I found only a single probably adult specimen of *Syphax* (♀) but more than 30 or 40 juveniles, see below.
It is remarkable that there exist juvenile spiders in Baltic amber which resemble strongly members of the genus *Syphax* in their eye position and +/- laterigrade leg position, but these spiders possess an unpaired tarsal claw as the Toxopidae, have long leg bristles and may have long legs III and IV; see the paper on Pisauridae in this volume, e.g. the genus *Linoptes*.

Key to the genera of the Thomisidae in Baltic amber:

1 Body covered with very long and strong spines (fig. 4). 2

- Long body spines absent. 3

2(1) Fewer leg bristles (fig. 7), numerous opisthosomal bristles (fig. 4). . . .*Thomisiraptor*
Photos 405-408

- Numerous leg bristles (figs.11-12), few opisthosomal bristles (photo)..Gen.& sp.indet.1
Photo 409

3(1) Tibia and metatarsus I-II bristleless, ♂-pedipalpus fig. 14. . . . . *Succinaenigma*
Photos 399-400

- Tibia and metatarsus I-II bear bristles (figs. 1-2, 16). 4

4(2) Prosoma with an inclination (photo), lateral eyes on distinct tubercles. . . . . .*Syphax*
Photos 401-404

- Prosomal inclination absent (photo), lateral eyes not on distinct tubercles. Photo 410 . .

. . . . . Gen. & sp. indet. 2

Syphax KOCH & BERENDT 1854

Questionable synonym: *Facundia* PETRUNKEVITCH 1942 (**n. quest. syn.**).

Diagnosis (juv., ?ad. ♀): Prosoma with a lateral inclination (photos), cuticula fine rugose (in the juveniles nearly smooth), legs I, II and IV distinctly larger than III, eye field wide, both rows recurved, lateral eyes large and on distinct tubercles (fig. 1, photos), short leg bristles (fig. 2), 2-3 ventral pairs on tibia I, claw tufts and tarsal scopulae distinct in the largest specimen (the holotype of *Syphax fuliginosis*), posterior cheliceral margin with two large teeth in the exuvia F 631 (fig. 3).

Type species: *Syphax megacephalus* KOCH & BERENDT 1854 (the holotype is a juvenile). Further nominal species: *Asper* PETRUNKEVITCH 1950, *crassipes* PETRUNKEVITCH 1942, *fuliginosus* KOCH & BERENDT 1854, *hirtus* MENGE in KOCH & BERENDT 1854, *thoracicus* KOCH & BERENDT 1854; *radiatus* KOCH & BERENDT 1854: See the paper on the family Borboropactidae in this volume.

The generic **relationships** are unknown, an adult male is needed for study. According to the large cheliceral teeth of the posterior margin (fig. 3), the presence of a tarsal scopula and the claw tuft *Syphax* is a member of the subfamily Stephanopinae.

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

Remark: The relation of nearly 30 juvenile specimens of *Syphax* to at most one adult specimen only is quite unusual. Probably spiders of this genus were groud-dwellers and juveniles arrived by ballooning the resin. I know of three spiders which are preserved together with its exuviae; these spiders - as well as the exuvia F631 - may have been blown by the wind into the resin from lower places. Among the spiders of my private collection there are three spiders which are preserved together with leafs of ?*Thuites* sp., e.g. F631, F635.

Syphax megacephalus KOCH & BERENDT 1854 (figs. 1-3) Photos 401-404

Questionable synonyms: Some of the nominal species of *Syphax* - e.g. *fuliginosus* - may be synonym but adult material is needed to confirm this suggestion.

Material: 6 juv. and an exuvia F635/BB/AR/THO/CJW; exuvia F631; 3juv. CJW: F633, F634 and F1344; 1juv. in amber from the Bitterfeld deposit coll. SCHIPPLICK no. 12; 1juv. Mus. Ziemi in Warsawa no. 21100; 1juv. coll FLEISSNER no. 1132; 1juv. coll. GRÖHN no. 2124; holotypus, ?ad. ♀ with its exuvia during moulting, embedded in artificial resin, Palaeontol. Inst. Humboldt Univ. Berlin MB.A.174.

Measurements (in mm): Holotypus of *megacephalus*: Prosoma length 3.0, juv. F632: Prosoma length 1.0, exuvia F631: Prosoma length 2.5, body length of the remaining juveniles 1.3-4.0.
The holotype of *S. fuliginosus* may well be an adult female, the body length may have been 6mm, the genital area is hidden. In contrast to most juveniles the tarsal scopula and the claw tuft are well developed.

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

Thomisiraptor n. gen.

Diagnosis (♂, juv.): Prosoma and opisthosoma with long and strong spines (photos, figs. 4-5, 10), opisthosoma with a dorsal-distal hump (figs. 4, 10), prosomal cuticula distinctly rugose, cheliceral teeth unknown, tarsal scopula and claw tuft indistinct, no fovea, eye field (fig. 5, photos) wide, posterior row recurved, legs I and II distinctly longer than III and IV, I the longest, legs with strong bristles (fig. 7). ♂-pedipalpus (figs. 8-9) small, with a retrolateral tibial apophysis (a ventral apophysis may be present but is not observable), bulbus longer than wide, embolus probably in a prolateral position, median apophysis hidden or absent.

Type species: *Thomisiraptor liedtkei* n.sp.

The **relationships** are unsure, the cheliceral teeth are hidden, a tarsal scopula and a claw tuft are absent. According to the unusual small cymbium and bulbus the genus may be a member of the Stephanopinae but I do not want to exclude relationships to the Thomisinae. I do not know a related genera of the Holarctic Region. Large spines of the body occur in various genera of the Thomisidae, e.g. in *Onocolus* SIMON 1895 (extant, South and Central America) in which additional lateral opisthosomal humps occur; the male pedipalpus is probably similar.

Distribution: Tertiary Baltic amber forest.

***Thomisiraptor liedtkei* n. gen. n. sp.** (figs. 4-10) Photos 405-408

1998 Thomisidae indet., WEITSCHAT & WICHARD, Atlas der Pflanzen und Tiere im Baltischen Bernstein: 74, Fig. 34.

Derivatio nominis: The species id dedicated to GERHARD LIEDTKE in Itzehohe, who collected the holotype.

Material in Baltic amber: Holotypus ♂ coll. G. LIEDTKE in Itzehoe no. 423; 1 juv. (?subad. ♀) paratypus, F636/BB/AR/THO/CJW; 1 juv. (?subad. ♀) paratyus, embedded in artificial resin, coll. F. KERNEGGER in Hamburg.

Remark: The conspecifity of the juveniles is not quite sure.

Preservation and syninclusion: Holotypus: The spider is completely and fairly well preserved on an amber layer, ventrally it is parly covered by a white emulsion; the paratype F636 is also completely preserved on an amber layer, the opisthosoma is covered by a white emulsion; no stellate hairs; the paratype of the coll. KERNEGGER is completely and fairly well preserved between two amber layers and partly covered by a white emulsion; fissures hide parts of body and legs; few stellate hairs are also preserved, and threads of silk, one thread originates at the - ?anterior? - spinnerets.

Diagnosis (♂, juv.): See above.

Description:
Measurements (in mm): Holotype (♂): Body length 2.4, Prosoma: Length 1.2, width 1.15, leg I: Femur 1.45, patella 0.55, tibia 1.2, metatarsus 0.8, tarsus 0.5, tibia II 0.9, tibia III 0.5, tibia IV 0.6, length of the cymbium 0.35; F636: Body length 2.3, prosoma length 0.9, tibia I 0.8; juv. coll. KERNEGGER: Body length 2.75, tibia I 1.05, tibia IV 0.5.
Colour of the holotype: Prosoma and most legs dark brown, opisthosoma and hind legs leght brown.
Prosoma (figs. 4-5) nearly as wide as long, cuticula distinctly rugose similar to the legs (fig. 7), dorsally covered with long spines (medially three rows), fovea absent, clypeus fairly long, chelicerae robust, anterior margin with long hairs, posterior margin and mouth parts hidden. Eye field fairly wide, lateral eyes on low tubercles and larger than the median eyes, posterior row recurved. - Legs (fig. 7) robust, I and II distinctly longer than III and IV, order I/II/IV/III, cuticula distinctly rugose, scopulae and claw tufts absent, paired tarsal claws with long teeth; numerous spines on femora, patellae, tibiae and metatarsi; leg I (holotype): Femur 1 prolaterally (a second spine is probably broken off) and 3 dorsally, patella 2 dorsally, tibia 2 pairs (short) ventrally and 2 dorsally, metatarsus 2 pairs ventrally; patella and tibia furthermore with strongly curved dorsal hairs; no ventral spines on leg IV. - Opisthosoma (figs. 4, 6, 10) ovally, covered with long spines,

with a dorsal-distal hump which is indistinct in the juvenile F636. Spinnerets stout, colulus apparently absent. - ♂-pedipalpus (figs. 8-9) small, with a short patella and tibia, see above.

Relationships: In the fossil gen. & sp. indet. a hump of the opisthosoma is absent, the opisthosoma bears less but the legs bear more spines, the tibiae are more slender and the pedipalpi are larger.

Distribution: Tertiary Baltic amber forest.

***Succinaenigma* n. gen.**

Diagnosis (♂; ♀ unknown): Leg IV longer than I, tarsi long (fig. 13), tibia and metatarsus I-II bristleless, legs with few short bristles (fig. 13) (except femora), lateral eyes (photo) not on distinct tubercles, pedipalpus (fig. 14): A long retrolateral tibial apophysis is present, a ventral tibial apophysis is most probably absent, bulbus fairly prominent, median apophysis and embolus are hidden (or absent?).

Type species: *Succinaenigma raptor* n. sp.

Relationships: According to the tarsal scopulae and claw tufts *Succinaenigma* is a taxon of the Stephanopinae. In the other fossil Stephanopinae the eye position and the leg spination are different, see the key. The bristleless tibia and metatarsus I-II are quite unusual in the Thomisidae.

Distribution: Tertiary Baltic amber forest.

***Succinaenigma raptor* n. gen. n. sp.** (figs. 13-14) Photos 399-400

Material: Holotypus ♂ in Baltic amber, F640/BB/AR/THO/CJW.

Preservation and syninclusions: The spider is well but incompletely preserved, the opisthosoma is cut off except the dorsal-anterior part, most parts of the left tibia and metatarsus IV are cut off, the distal part of the left tarsus II is lost (amputated?), dorsal parts of prosoma and legs are covered by a white emulsion. - Parts of a second spider are preserved in front of the holotype.

Diagnosis: See above.

Description (♂):
Measurements (in mm): Body length about 3.2, prosoma: Length 1.7, width 1.6, leg I: Femur 1.5, patella 0.7, tibia 1.5, metatarsus 1.1, tarsus 0.85, tibia II 1.3, tibia III 1.1, leg IV: Tibia 1.4, metatarsus 2.0 (!), tarsus 1.05.
Colour median to dark brown.
Prosoma nearly as wide as long, low, cuticula structure scale-shaped. Thoracal fissure indistinct, mouth parts hidden. The eyes (photo) are partly covered by a white emulsion, field wide, anterior eyes of equal - medium - size, posterior row recurved, the laterals on low tubercles only, distinctly larger than the posterior median eyes, posterior median eyes separated by their diameter. Clypeus as long as 1 1/2 diameters of the anterior median eyes. - Legs fairly robust, laterigrade, hairs indistinct, IV longer than I, order IV/I/II/III, femora I-II distinctly stronger than III-IV, few short bristles (femoral bristles are longer); the femora bear 2 dorsal bristles, tibia and metatarsus I-II are bristleless, tibia III-IV bear 2 pairs of short ventral and apical bristles, metatarsus III bears a pair of ventral bristles in the basal half, tarsal trichobothria in more than one row, metatarsal trichobothria long; metatarsal preening hairs, short but dense, tarsal and metatarsal scopulae and strong claw tufts are present. - Opisthosoma - most parts are lost - dorsally with short hairs, no dorsal scutum. - Pedipalpus (see above) with a short patella and a distal cymbial scopula.

Relationships: See above.

Distribution: Tertiary Baltic amber forest.

Thomisidae: Gen. & sp. indet. 1 (figs. 11-12) Photo 409

Material: 1♂ in Baltic amber and a separated amber piece, F637/BB/AR/THO/CJW.

Preservation and syninclusions: Body and legs are partly oxidated, strongly darkened and fissured, with a weak emulsion and large bubbles on prosoma and pedipalpi which hide the eyes, mouth parts and pedipalpi; parts (tibia, patella, distal part of the femur of the left leg I are cut off. The amber piece was probably heated in an autoclave and includes a small part of a liverwort (Bryophyta). In the separated amber piece few stellate hairs and moss are preserved.

Description (♂):
Measurements (in mm): Body length 2.6, prosoma length about 1.2, leg I: Femur about

1.75, tibia about 1.8, metatarsus + tarsus 2.3, tibia II about 1.4, tibia III 0.9, tibia IV 1.2. Colour darb brown (see above). - Prosoma: Most parts are hidden, dorsal spines may be present. - Legs (figs. 11-12) robust, I and II distinctly longer than III and IV, order I/II/IV/III, with numerous strong spines on femora, patellae, tibiae and metatarsi of all legs, tibia I bears at least 35 spines, femora I-II bear dorsal, prolateral and most probably ventral spines; tarsal scopulae and claw tufts most probably present. Opisthosoma as wide as long, with long dorsal spines, humps absent, spinnerets stout. Pedipalpus (most parts are hidden or destroyed by oxidation): Cymbium large and with dorsal spines.

Relationships: See *Thomisiraptor liedtkei* n. sp. and the key.

Distribution: Tertiary Baltic amber forest.

Thomisidae: Gen. & sp. indet. 2 Photo 410

Material: 1 juv. ♀ in Baltic amber, F641/BB/AR/THO/CJW:

Preservation and syninclusions: The spider is fairly well and completely preserved, epigaster, spinnerets, the dorsal part of the opisthosoma and the dorsal hairs of the prosoma are covered by a white emulsion; bubbles cover parts of the legs, detritus particles are preserved on the sternum, two Diptera (Limoniidae and Sciaridae) are preserved near the spider.

Description (juv.):
Measurements (in mm): Body length4.2, prosoma: Length 2.0, width 1.85, leg I: Patella 0.75, tibia 1.3, metatarsus 0.95, tarsus 0.7, tibia II 1.25, tibia III 0.8, tibia IV 0.9.
Prosoma (photo) nearly wide as long, covered with numerous short hairs, cuticula structure scale-shaped, caput low, clypeus as long as two diameters of the anterior median eyes, eye field (photo) wide, posterior row recurved, lateral eyes larger than the median eyes, posterior lateral eyes on very low tubercles, posterior median eyes separated by 1 1/4 diameters, chelicerae robust, fangs fairly long, labium 1.2 times longer than wide, blunt, gnathocoxae long, serrula present. - Legs short and robust, laterigrade, order I/II/IV/III, I and II distinctly larger than III and IV, tarsal scopulae, claw tufts and metatarsal III-IV preening hairs present, paired tarsal claws with numerous long teeth, numerous bristles of medium length on femora, patellae, tibiae and metatarsi of all legs, the femora bear 2 dorsal, 2 prodistal and 1 apical bristle(s), tibia I with 4 ventral and 2 lateral pairs, metatarsus I with 2 ventral pairs, 1 prolaterally and some apically. - Opisthosoma 1.17 times longer than wide, covered with short hairs, spinnerets hidden.

Relationships: According to the tarsal scopulae and claw tufts I regards this taxon as a

member of the Stephanopinae but a male is needed for a sure determination.

Distribution: Tertiary Baltic amber forest.

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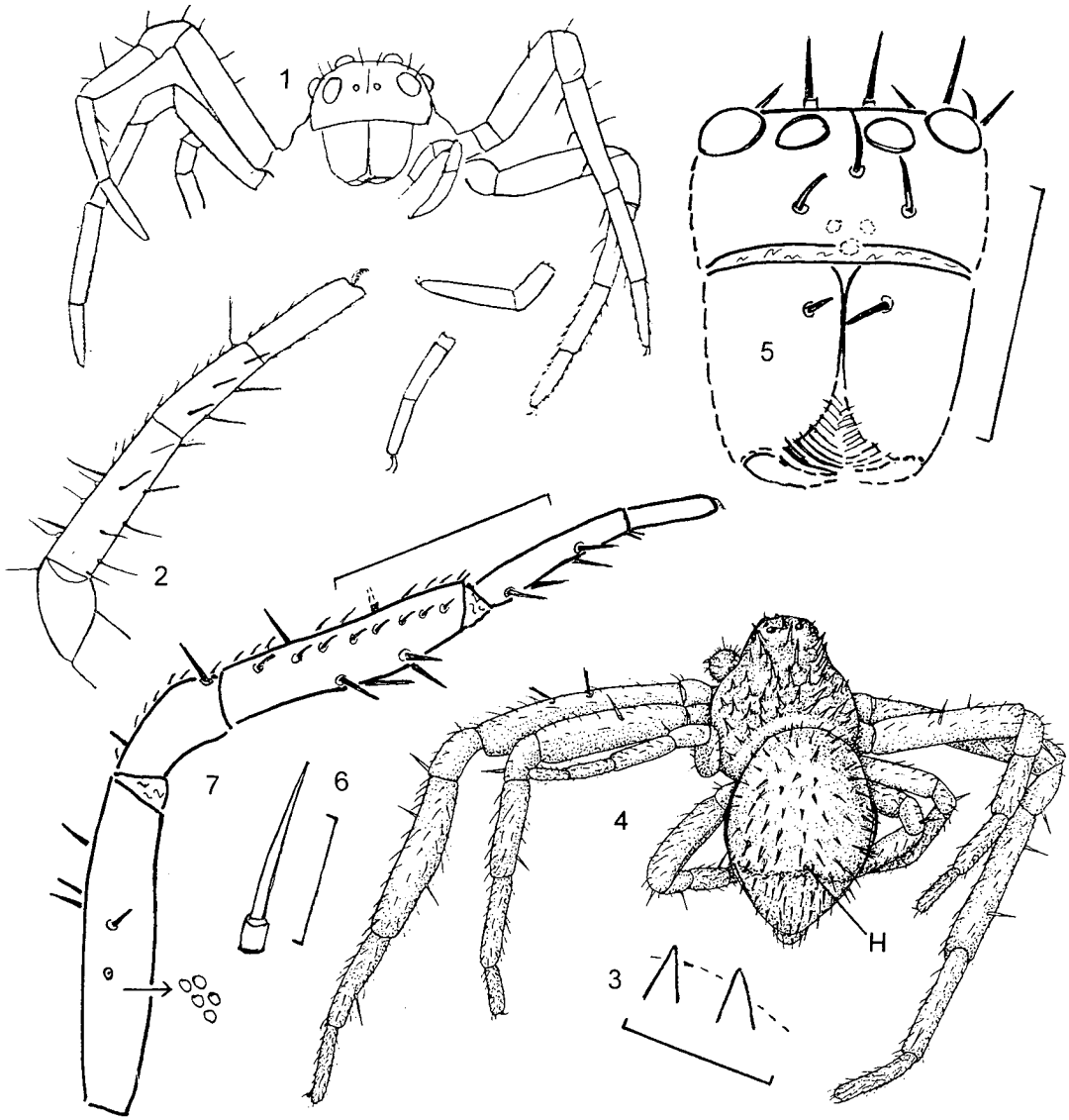
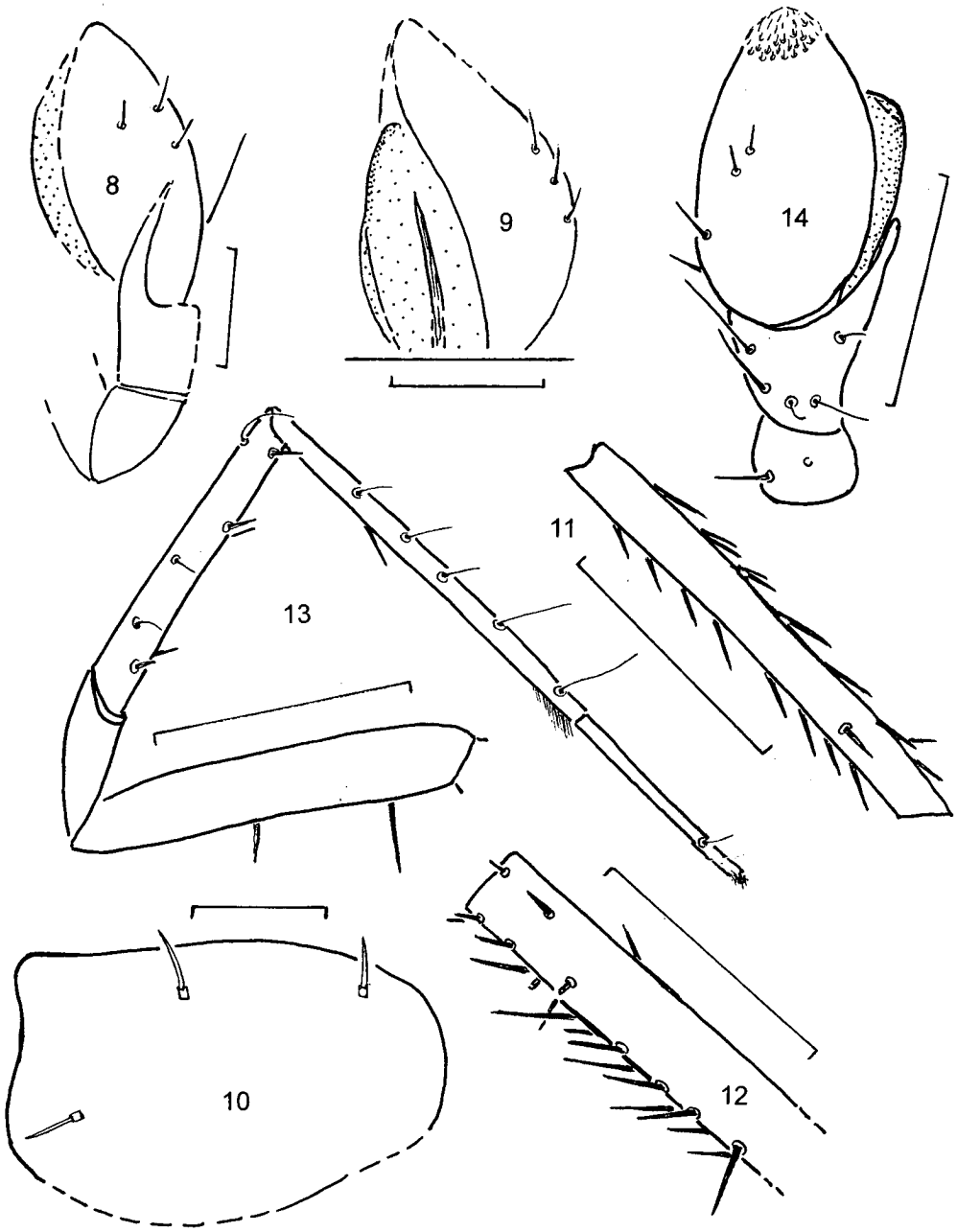


Figs. 1-3: Syphax ?megacephalus KOCH & BERENDT 1854, 1-2) holotypus (juv.) of *Facundia clara* PETRUNKEVITCH 1942, drawings taken from PETRUNKEVITCH (1942: Figs. 415-416); 1) frontal view of the spider; 2) r. leg I retrolaterally (no M); 3) exuvia F631, large teeth of the posterior cheliceral margin proventrally; M = 0.1;

figs. 4-10: Thomisiraptor liedtkei **n. gen. n. sp.**; 1-9: Holotype ♂, 4) body dorsally-posteriorly, body length 2.4mm, drawing by G. LIEDTKE, slightly modified by the author; 5) prosoma frontally; 6) spine of the opisthosoma; 7) l. leg I prolaterally. Note the enlarged rugose cuticula structure (arrow); 8) l. pedipalpus retrodorsally (only few bristles are drawn); 9) r. pedipalpus proventrally; 10) juv. coll. KERNEGGER, outline of the opisthosoma laterally and slightly dorsally (only few spines are drawn); note the distinct hump, compare the photo; M = 1.0 in fig. 7), 0.5 in figs. 5) & 10), 0.2 in figs. 8-9), 0.1 in fig. 6);



figs. 11-12: Thomisidae gen. & sp. indet. 1, ♂; 11) r. tibia I retrolaterally (only one of the retrolateral spines is drawn); 12) l. tibia II prodorsally (some additional spines may be destroyed by oxidation); M = 1.0;

figs. 13-14: *Succinaenigma raptor* **n. gen. n. sp.**, ♂; 13) r. leg IV retrolaterally. Scopula not drawn, only few long trichobothria are drawn; 14) r. pedipalpus dorsally; M = 1.0 and 0.5.

BEITR. ARANEOL., 3 (2004)

FOSSIL JUMPING SPIDERS (ARANEAE: SALTICIDAE) IN BALTIC AND DOMINICAN AMBER, WITH REMARKS ON SALTICIDAE SUBFAMILIES

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ABSTRACT: Selected fossil taxa of Jumping spiders (Araneae: Salticidae) in Baltic and Dominican amber are revised. Among the spiders in amber I distinguish provisionally (a) two "primitive" subfamilies which have a larger amount of plesiomorphic characters: The Cocalodinae and the Lyssomaninae, (b) "derived" families: Euophrydinae with its relatives and Synemosyninae (= Myrmarachninae). Cocalodini (= Gorgopsininae PETRUNKEVITCH 1955 **n. syn**.) and Spartaeini WANLESS 1984 **n. stat**. (= Spartaeinae; ?incl. Hisponini) are regarded as taxa of the upgraded Cocalodinae SIMON 1901 **n. stat**. (= Cocalodeae). In the +/- 50 million years old Eocene Baltic amber are only members of the "primitive" subfamily Cocalodinae preserved - no Lyssomaninae, no "higher" or myrmecomorph taxa - but in the +/- 20 million years old Miocene Dominican amber are members of all the four subfamilies present, questionable Cocalodinae are very rare. Salticidae seems to be a relative young family. A chronocladogram of selected Salticidae subfamilies is given. The following taxa are described: (a) in Baltic amber: *Almolinus bitterfeldensis* **n.sp**., *A. ligula* **n.sp**., *Calilinus* **n.gen**., *C. fleissneri* **n.sp**., *Distanilinus* **n.gen.,** *D. filium* **n.sp**., *D. nutus* **n.sp**., *D. paranutus* **n.sp**., *D. pernutus* **n.sp**., *Eolinus bitterfeldensis* **n.sp.,** *E. fungus* **n.sp**., *E. insuriens* **n.sp**., *E. prominens* **n.sp**., *E. samlandica* **n.sp**., *E. tystschenkoides* **n. sp**., *E. vates* **n.sp**., *Gorgopsidis* **n.gen**., *G. bechlyi* **n.sp**., *Gorgopsina amabilis* **n.sp**., *G. constricta* **n.sp**., *G. expandens* **n.sp**., *G. inclusa* **n.sp**., *G. speciosa* **n.sp**., *Microlinus* **n.gen**., *M. calidus* **n. sp**., *M. folium* **n.sp**.; (b) in Dominican amber: ?*Pensacolatus tibialis* **n.sp**. and the myrmecomorph ?*Sarinda* sp. indet. The genera *Almolinus* PETRUNKEVITCH 1958, *Cenattus* PETRUNKEVITCH 1942, *Eolinus* PETRUNKEVITCH 1942, *Gorgopsina* PETRUNKEVITCH 1955 and *Prolinus* PETRUNKEVITCH 1958 in Baltic amber are partly revised. Parasitic and phoretic fossil Acari, parasitoitic Hymenoptera as well as Bacteria, decompositing fungi (in *Eolinus fungus* and *E. prominens*), a droplet of questionable excrement (in the holotype of *Gorgopsidis bechlyi*), remains of sperm (in *Microlinus folium*) and draglines (in *Distanilinus filum* and *Eolinus* sp. indet.) are reported from Salticidae specimens in Baltic amber.

CJW = coll. of J. WUNDERLICH, PIHUB = Paleont. Inst. Humboldt University Berlin.

INTRODUCTION

A complete revision of the fossil Jumping spiders (Salticidae) - German name Springspinnen - in amber is needed but not carried out in this paper; I had the opportunity to study a large part of the fossil type material in Baltic amber.

Characteristics of the Salticidae (See the chronocladogram): Members of this family are easily to recognize by its special eye position (see the photos and figs. 42, 52-53): The eye field is very wide and long, there is a pair of giant anterior median eyes which are directed forwards (best seen in frontal view) and three or even four (Lyssomaninae) rows of eyes with the posterior row far behind the other eyes, in a position usually near the middle of the prosoma, best seen in dorsal view. The prosoma is high and has steep sides. Usually all legs have about the same length, III not much shortar than I; in most spider families leg III is distinctly the shortest. Most Salticidae are hunting spiders which do not build capture webs, exceptions are e. g. some Cocalodinae. Most Jumping spiders jump - exceptions are again e. g. some Cocalodinae, the only subfamily in Baltic amber. "During periods of inactivity they (Salticidae, JW) conceal themselves in small retreats made of densely woven silk, most often attached to vegetation." DIPPENAAR-SCHOEMAN & JOCQUE (1997: 258). Such a retreat is not yet known from a fossil spider.

Prey: Most Salticidae feed on insects, some are specialized on ants, several spiders - e. g. members of *Cyrba, Portia* and other Cocalodinae - feed on spiders.

Draglines are occasionally preserved with Jumping Spiders, e.g. with the male of *Eolinus* sp. indet. F266/BB/AR/SAL/CJW and with the male of *Gorgopsina frenata*, F266 /BB/AR/SAL/CJW; the doubled thread originates from the anterior spinnerets, photos Photos 566-567.

Fossils which are associated with spiders: In contrast e. g. to members of the superfamily Araneoidea - which are most frequent in amber and which are usually sessil spiders hanging in capture webs - Salticidae are vagile hunting spiders which may get more likely in contact with Bacteria - e. g. from detritus - and with Acari. Several taxa of Acari are known as parasites or as phoretic animals. Therefore it was not unlikely to discover such organisms at specimens of the Salticidae which have never been reported before from fossil spiders:

Preservation of the body's colour and camouflage: See Photos 427-428. e.g. 417, 419-420.

(a) ?Bacteria: Material: (1) *Gorgopsina frenata* (KOCH & BERENDT 1854): 1 ♂, F268/BB/AR/SAL/CJW; (2) Salticidae sp. indet, 1 ♀, F222/BB/AR/SAL/CJW.
Photos 427-428.

(1) On the hairs of both tarsi IV of the male F268 numerous tiny "particles" - its size is few thousandth mm - are preserved which I regard as questionable Bacteria (or

spors?), see the photo. - (2) In the partly destroyed opisthosoma of the female F222 some questionable coccal Bacteria (H. DOERFELT det.) are preserved, its size is about 0.002mm. - Further investigations of both inclusions are needed.

b) Parasitic Acari: (1) A parasitic larva of the Parasitengona: Erythraeidae (F308/ BB/AR/SAL/CJW, A. WOHLTMANN det.) is preserved near the paratype d) of the Jumping spider *Almolinus ligula* n. sp. (♂), see below. The mite is about 0.5mm long and situated about 1mm left in front of the spider with the mouth parts directed to the spider. Probably the mite has already parasited the spider and has detached only in the resin. (2) A parasitic Acari larva of the family Trombidiidae (F311/BB/AR/SAL/ CJW, A.WOHLTMANN det.), body length 0.22mm, is preserved just behind the spinnerets of the holotype of Distanilinus pernutus n. sp. (♂), its mouth parts are directed to the spider's spinnerets. Most probably the mite first was sucking near the spinnerets. - Acari of four families (Erythraeidae, Eutrombiidae, Laelapidae and Trombidiidae) as parasites of spiders are listed in the paper of WELBOURN & YOUNG (1988: 382-383). Only one member of the family Salticidae - *Saitis* sp. from South Africa - is reported in this paper as parasited by a member of the Acari family Erythraeidae. Photo 598.

(c) Parasitoitic Hymenoptera: In a distance of less than 0.1mm left of the holotypus ♂ of *Distanilinus paranutus* n.gen.n.sp. a 1.5mm long member of the family Diapriidae (Hymenoptera) is preserved. Diapriidae are parasitoitic, see the chapter on parasitoitics in part 1 of this volume. Spider and wasp are situated near to a large drop of amber in the amber piece. - With the holotypus of *Eolinus insuriens* n.sp. the member of an Ichneumonidae (indet.) is preserved which may have been a potentiell or actuell parasitoitic animal of the spider. Photo 604.

(d) Phoretic Acari: Material: F314/BB/AR/SAL/CJW, a nymph of the Acari: Astigmata: Histiostomatidae (= Anoetidae) gen. et sp. indet. (A. WOHLTMANN det.) with the Jumping Spider (Araneae: Salticidae) *Eolinus* sp. indet., ♂, fig. 85. - The mite is 0.2mm long and fixed with its posterior body part prolaterally on the left cymbium of the spider. The body of the spider is 3.5mm long. Another - questionable - phoretic mite is preserved with the questionable male of *Eolinus tystschenkoi*, see below. According to A. WOHLTMANN (pers. commun.) such phoretic Acari are known from extant taxa. This is the first report of phoretic mites with fossil spiders. Photo 584.

Diversity: Salticidae is one of the most diverse spider families; there may be about 600 extant genera and more than 5000 species. In Baltic amber members of about 10 genera - only of the subfamily Cocalodinae (= Gorgopsininae, incl. Spartaeini) - are known. In Dominican amber also nearly 10 genera of at least 3 subfamilies are known: Likely Cocalodinae, Euophrydinae and Synemosyninae (= Myrmarachninae). On subfamily level the fauna of the Dominican amber forest is more diverse, on generic and species level the fauna of the Baltic amber forest is more diverse. Most rich in species are (a) in Baltic amber: The genera *Eolinus* and *Gorgopsina*, (b) in Dominican amber: By far the genus *Corythalia* with several undescribed species e.g. in the CJW.

Fauna: There are enormeous differences in the Salticidae between the Early Tertiary Baltic amber fauna and the young Tertiary fauna in Dominican amber: (1) There is no

common genus of both kinds of amber; (2) all spiders in Baltic amber are members of only one and "primitive" subfamily (Cocalodinae); among the fossils in Dominican amber probably are members of this subfamily - *Phlegrata* WUNDERLICH 1988, extremely rare - but members of the Lyssomaninae and the "modern" subfamilies Euophrydinae (frequent) and the myrmecomorph Synemosyninae (= Myrmarachninae) are present. The absence of the Lyssomaninae and the advanced subfamilies Euophrydinae and Synemosyninae in Baltic amber is quite remarkable and discussed below; (3) all genera in Baltic amber are extinct, in Dominican amber only two genera - *Descangeles* and *Phlegrata* - of +/- 9 genera are extinct/not known from extant spiders.

Subfamily	Baltic amber	Dominican amber
Cocalodinae	all the +/- 10 genera	*Phlegrata*
Lyssomaninae	-	*Lyssomanes*
Synemosyninae	-	*Descangeles*, ?*Sarinda*
Euophrydinae	-	about 5 genera

Presence of subfamilies and genera of the Salticidae in Baltic and Dominican amber

Biogeography: Salticidae has a cosmopolitical distribution, most taxa occur in the tropics. Members of the "old" subfamilies Cocalodinae and Lyssomaninae occur nearly exclusively in the tropics, as do by far most of the Synemosyninae. - The Bitterfeld deposit: In the genus *Almolinus* PETRUNKEVITCH there is a remarkable difference between species which are preserved in Bitterfeld and in not-Bitterfeld deposits: The only two specimens of A. *bitterfeldensis* n.sp. are known from the Bitterfeld deposit, all the remaining nine specimens (two species) which are published in this paper were collected at other Baltic amber deposits. This finding may be an accident but - in my opinion - it is more likely a hint for the existence of an independent part of the fossil Bitterfeld amber forest; see the chapter on the amber from Bitterfeld in the first of these volumes.

Relatives of the Salticidae and the chronocladogram: the sister group of the Saltici-

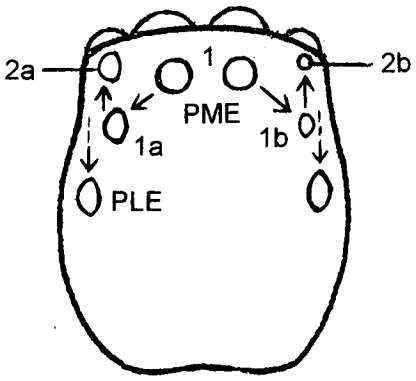
dae is unknown - see METZNER (1997). - Thomisidae and Oxyopidae are discussed as related families. According to the pronounced sac-building and hunting behaviour as well as probably the structure of the prosomal cuticula the two-clawed Corinnidae may be related to the Salticidae; in the basicly three-clawd Zodariidae frequently large anterior median eyes are present. Probable relationships of some subfamilies: See the chronocladogram. Such a "**chronocladogram**" - **new term** - is a chronogram which is combined with a cladogram.
Up to now no member of the Salticidae is known from the Cretaceous Period (D. PENNEY, pers. commun. in III 2002). From the Early Tertiary (Eocene) of the Baltic amber forest only the subfamily Cocalodinae is known which has a larger amount of plesiomorphic characters. (The only member of a "modern" subfamily - *Parevophrys succini* PETRUNKEVITCH 1942 from Baltic amber - has been shown to be preserved in young copal from Africa, see GRIMALDI et al. (1994: 262)). Spiders of the advanced subfamilies - e. g. Euophrydinae, Synemosyninae - are absent in Baltic amber but members of the Synemonyninae are present and Euophrydinae are even frequent in the Young Tertiary (Miocene) Dominican amber in which - questionable - members of the Cocalodinae are extremely rare.
A camouflage/ornamentation of the body was already evolved in some of the Early Tertiary Salticidae, see the photos.

Evolution, radiation and chronocladogram

Jumping spiders have a world wide distribution and are good ballooners; numerous species live in higher strata. For probably 10 million years the Baltic amber forest covered large parts of Europe including moderate, subtropical and tropical areas, see part I of this volume. The findings above are quite surprising: If the "modern" subfamilies of the Salticidae existed or radiated already before, they ought to be present in the Baltic amber forest - but they are not! Therefore I suppose...

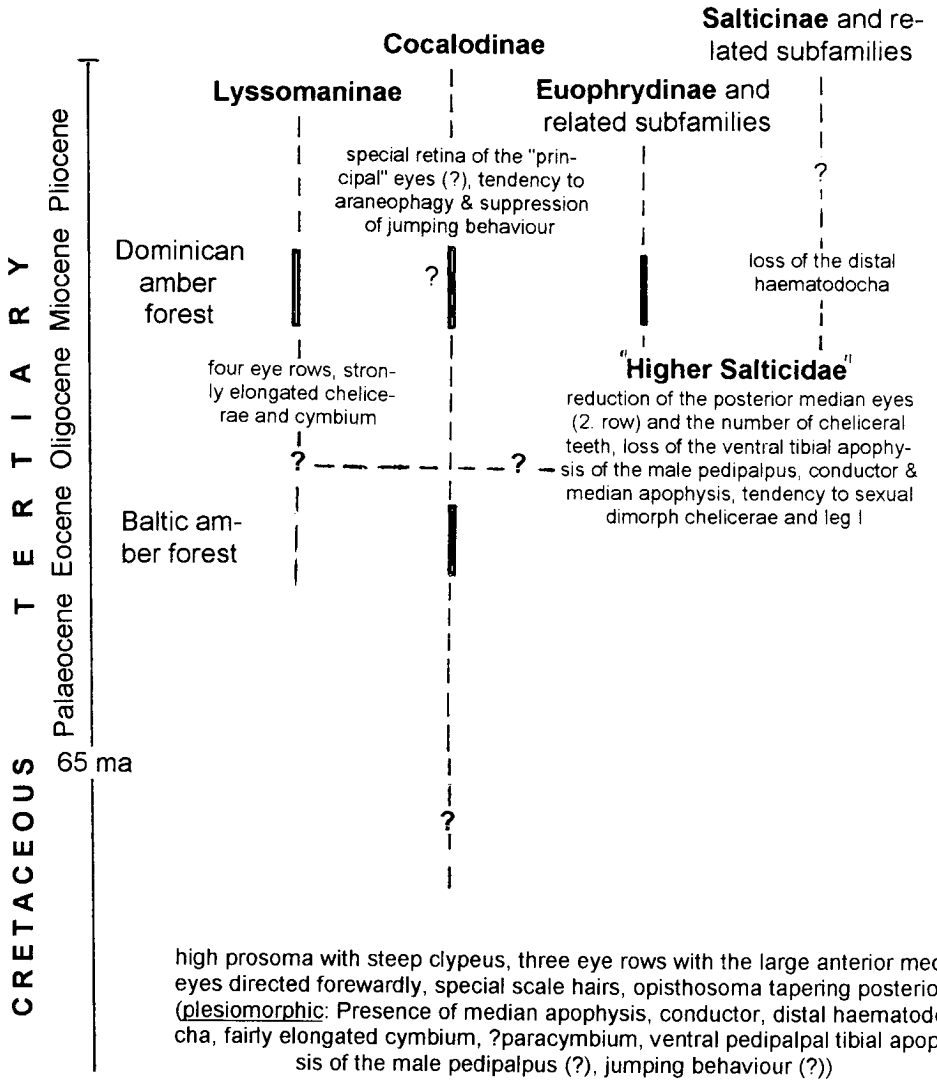
(1) that the family Salticidae is a relatively young family which was poorly diversified in the Early Tertiary (only members of one subfamily in the Baltic amber forest) and which may have originated in the Middle Cretaceous. (Most probably Apoidea and Formicidae originated at about the same time).According to ZABKA (1989:416)"..Salticidae seem to be rather a young group and certainly most (if not all) modern genera originated after the braekup of Gondwana..., no modern genera appeared until the Oligocene (Dominican amber, ...).". There are similar findings in some orders of insects, e. g. according to MICHELSEN (2000: 12) "One obvious explanation for the paucity of "higher" Diptera in Baltic amber could be that they are relatively young and thus happened to be poorly diversified by the beginning of the Cenezoic era.",
(2) that in the Early Tertiary, the Eocene, members of the subfamily Cocalodinae were present in the Northern hemisphere which may have radiated in the Late Cretaceous and the Early Tertiary, see (1),
(3) that in the Early Tertiary the - tropical and "plesiomorphic" - Lyssomaninae were still absent in Europe and probably even in the whole Northern hemisphere and
(4) that the radiation - and probably the origin - of the Euophrydinae, Heliophaninae, Synemosyninae and other "higher" subfamilies happened many millions of years later as in the basal branches, in the Oligocene, when the Baltic amber forest was go-

ne, the time between the existence of the Baltic amber forest and the Dominican amber forest, see the chronocladogram. In the Miocene Dominican amber forest apparently by far most of the Cocalodinae were already displaced by the "Higher Salticidae" subfamilies. The distinct declining of the temperature about 40 million years ago - compare WEITSCHAT & WICHARD (1998: 28-29) - may have caused global changes in the spider fauna, the restriction of the Cocalodinae and Lyssomaninae to tropical regions as well as radiation and spreading of members of the "higher" subfamilies.



Probable development of size and position of the posterior median eyes (PME) (lenses) in the family Salticidae - except Lyssomaninae - besides the backward movement of the posterior lateral eyes (PLE). - 1 = hypothetical position in the ancestor, 1a, 1b "movement" including size reduction (b), 2 = "movement" foreward and origin of a common tubercle with the anterior lateral eyes in several taxa (2b). Position 2 of the posterior median eyes in numerous Salticidae genera is the usual position of the posterior lateral eyes (!) in spiders. The way to the special final position in the Lyssomaninae (four eye rows) might have been different.

The basic position in the Cocalodinae may have been as in 1a of the figure, in some species as in 2a, in few reduced as in 2b and probably in few as in 1b. Reductions of the posterior median eyes happened according to my hypothesis in some Cocalodi-



Possible chronocladogram of selected subfamilies of the family Salticidae

nae and is probably a synapomorphy of the "Higher Salticidae".
According to the presence of a median apophysis, probably a ventral tibial apophysis of the male pedipalpus and several cheliceral teeth - see WANLESS (1984), WIJESINGHE (1992), RODRIGO & JACKSON (1992) (sub Spartaeinae) - are Lyssomaninae and Cocalodinae the most basal branches of the Salticidae. (The genus *Gorgopsina* is not mentioned in the list of extinct Salticidae genera by RODRIGO & JACKSON (1992: 66)). Lyssomaninae may be the sister group of the remaining Salticidae taxa, Cocalodinae may be the sister group of the "Higher Salticidae", see the chronocladogram. In the number of cheliceral teeth there occur reductions in the Cocalodinae as well as probably reversals of the reduction in the "Higher Salticidae". A prosomal constriction evolved several times in the Salticidae, e. g. in some Cocalodinae - e. g. the fossil genera *Almolinus*, *Gorgopsidis, Gorgopsina* - and in some *Massagris*-species.

List of fossil Salticidae in Baltic and Dominican amber:

(a) Spiders in Baltic amber:

Compare the chapter on synonymy below and the list of PETRUNKEVITCH (1958: 379-380)

Almolinus PETRUNKEVITCH 1958
Almolinus bitterfeldensis n. sp.
Almolinus clarus PETRUNKEVITCH 1958
Almolinus ligula n. sp.

Cenattus PETRUNKEVITCH 1942
Cenattus exophthalmicus PETRUNKEVITCH 1942

Distanilinus n. gen.
Distanilinus filum n. sp.
Distanilinus nutus n. sp.
Distanilinus paranutus n. sp.
Distanilinus pernutus n. sp.

Eolinus PETRUNKEVITCH 1942
Eolinus bitterfeldensis n. sp.
?Eolinus fasciatus (KOCH & BERENDT 1854) (sub *Phidippus*)
Eolinus fungus n. sp.
Eolinus insuriens n. sp.
Eolinus prominens n. sp.
Eolinus samlandica n. sp.

Eolinus succineus PETRUNKEVITCH 1942
Eolinus theryi PETRUNKEVITCH 1942
Eolinus tystschenkoi PROSZYNSKI & ZABKA 1980
Eolinus tystschenkoides n. sp.
Eolinus vates n. sp.

Gorgopsidis n. gen.
Gorgopsidis bechlyi n. sp.

Gorgopsina PETRUNKEVITCH 1955
Gorgopsina amabilis n. sp.
Gorgopsina constricta n. sp.
Gorgopsina expandens n. sp.
(*Gorgopsina fasciata* (KOCH & BERENDT 1854) (sub *Phidippus*) (? = *Eolinus f.*)
Gorgopsina frenata (KOCH & BERENDT 1854)
Gorgopsina formosa (KOCH & BERENDT 1854)
Gorgopsina inclusa n. sp.
Gorgopsina jucunda (PETRUNKEVITCH 1942)
Gorgopsina melanocephala (KOCH & BERENDT 1854)
?*Gorgopsina naumanni* (GIEBEL 1856)
Gorgopsina speciosa n. sp.

Microlinus n. gen.
Microlinus calidus n. sp.
Microlinus folium n. sp.

Paralinus PETRUNKEVITCH 1942
Paralinus crosbyi PETRUNKEVITCH 1942

(*Parevophrys succini* PETRUNKEVITCH 1942: East African copal, see above!)

Prolinus PETRUNKEVITCH 1958
Prolinus fossilis PETRUNKEVITCH 1948

(*Steneattus* BRONN 1856, a dubious genus)
(*Steneattus promissa* (KOCH & BERENDT 1854) (= *Leda promissa*))

Gen. indet.

(b) Spiders in Dominican amber

Corythalia C. L. KOCH 1850
Corythalia ocululiter WUNDERLICH 1988
Corythalia pilosa WUNDERLICH 1982
Corythalia scissa WUNDERLICH 1988

Descangeles WUNDERLICH 1988
Descangeles pygmaeus WUNDERLICH 1988

(*Descangeles* sp. indet. 1 sensu WUNDERLICH 1988)
(*Descangeles* sp. indet. 2 sensu WUNDERLICH 1988)

(*Descanso* PECKHAM 1892 : Siehe *Sarinda*).

Lyssomanes HENTZ 1844
Lyssomanes pristinus WUNDERLICH 1986
Lyssomanes pulcher WUNDERLICH 1988 (Photo 411)

(*Nebridia* SIMON 1902: See WUNDERLICH (1988: 242))

Pensacolatus WUNDERLICH 1988
Pensacolatus coxalis WUNDERLICH 1988
Pensacolatus spinipes WUNDERLICH 1988
Pensacolatus tibialis **n. sp.**
(?*Pensacolatus* sp. indet.)

Phlegrata WUNDERLICH 1988
Phlegrata pala WUNDERLICH 1988

(Salticidae gen. et sp. indet. sensu WUNDERLICH (1988: 245))

(?*Sarinda* PECKHAM & PECKHAM 1892)
(?*Descaso* sp. sensu WUNDERLICH (1988: 247-248))
(?*Sarinda* sp. indet.)

Thiodina SIMON 1900
T. beugelorum WOLFF 1990

Synonymy in the Baltic amber spiders:

"*Euophrys*" *gibberula* (KOCH & BERENDT 1854) (sub *Phidippus gibberulus*), see MENGE in KOCH & BERENDT (1854: 93): In my opinion a dubious species, compare *Cenattus* PETRUNKEVITCH and *Prolinus* PETRUNKEVITCH.

Steneattus BRONN 1856 with the type species *Leda promissa* KOCH & BERENDT 1854: The description of the type (and only) specimen - kept in the Palaeontol. Mus. Berlin MB.A.182 - was based on a badly preserved juvenile. The relationships of this taxon are quite unsure. According to the eye position (pers. obs.) the holotype is not a member of the Salticidae.

Nomen nudum in the Baltic amber spiders:

Propetes MENGE in KOCH & BERENDT 1854: MENGE characterized the genus simply according to the large posterior median eys which occur in several genera of the Salticidae.

TAXONOMY

(1) Suprageneric taxa

Diagnosis of the family Salticidae: The family is diagnosed mainly by its pronounced jumping behaviuor and its special eye position with three or four rows (Lyssomaninae) and the anterior median eyes powerful and directed forewards (see the introduction, figs. 42, 52-53).

There are numerous nominal **subfamilies** of the Salticidae, some may be "true" subfamilies but in my opinion most have to regard as tribus only, compare METZNER (1999).

Cocalodinae SIMON 1901 (**n. stat.**) (= Cocalodeae SIMON 1901)

I choose the name Cocalodinae because of its priority - it is an older name than Gorgopsininae PETRUNKEVITCH 1955 and Spartaeinae WANLESS 1984 - and because of the presence of a median apophysis and a conductor of the male pedipalpus in the type genus *Cocalodes* POCOCK as in the extinct genera in Baltic amber. WANLESS (1984) excluded the Cocalodini from his Spartaeinae because of the presence of a median apophysis but included 5 extinct genera from Baltic amber although they possess a median apophysis (!). According to my hypothesis the presence of a median apophysis is a plesiomorphic character of the Cocalodinae and lost in several genera more than once as well as lost as a synapomorphy of the "Higher Salticidae".

Diagnosis: Basicly - see the fossil genera in Baltic amber - presence of numerous retromarginal cheliceral teeth (fig. 64a) (in extant spiders 2-10, see RODRIGO & JACKSON (1992: 66)), large posterior median eyes (figs. 14, 48, 69), a ventral tibial apophysis (figs. 18, 20, 43, 73), conductor and median apophysis (figs. 10, 26, 34, 63), probably a special type of the retina of the principal eyes, see RODRIGO & JACKSON (1992: 65), tendency to araneophagy - e. g. *Cyrba* and *Portia* - and probably suppression of jumping behaviour, see MURPHY & MURPHY (2000: 324) (in 7 or 8 genera in SE-Asia); according to the lengthened femur IV some fossil spiders like the members of *Gorgopsidis* were good jumpers. A capture web may be present - e. g. in *Portia* KARSCH - in contrast to members of other subfamilies.

Tribus: (1) Cocalodini SIMON 1901 (= Gorgopidinae PETRUNKEVITCH 1942; Gorgopsininae PETRUNKEVITCH 1955) (**n. syn.**), (2) Spartaeini WANLESS 1984 (**n. stat.**) (= Boetheae SIMON 1901, see WANLESS 1984). See below, "Genera".

Genera: *Wanlessia* WIJESINGHE 1992 and the genera which are listed by RODRIGO & JACKSON (1992: 66), see below. The "tree" of these authors (fig. 2) shows five groups within the "Spartaeinae"; *Spartaeus* and *Cocalodes* are within the same group (!). In contrast to RODRIGO & JACKSON are in my opinion - according to the structures of the male pedipalpus, see the diagnoses of the tribus - both genera not closely related.

The **relationships** are not sure, Lyssomaninae or the "Higher Salticidae" branch may be the sister group, see the chronocladogram. I do not want to exclude that Hisponini SIMON 1901 is strongly related and that several basal Salticidae groups may be paraphyletic taxa; a revision of all Salticidae subfamiles is needed.

Type genus: *Cocalodes* POCOCK 1897.

Distribution: Nearly exclusively tropical; Tertiary Baltic amber forest.

Diagnosis of the Cocalodini: Median apophysis and conductor present, tegular furrow absent (figs. 10, 18, 64). (A distinct sexual dimorphism - modified male chelicerae or modified male legs I which are frequent in "Higher Salticidae" - are absent at least in the fossil taxa).

Genera: Extant at least the genera of the *Cocalodes*-group sensu RODRIGO & JACKSON (1992) (*Allococalodes, Cocalodes, Holcolaetis* and *Sonoita*), fossil the genera in Baltic amber (*Almolinus, Cenattus, Distanilinus, Eolinus, Gorgopsidis, Gorgopsina, Microlinus, Paralinus, Prolinus* and *Steneattus*) and probably *Phlegrata* in Dominican amber.

Relationships: See the Spartaeini.

Diagnosis of the Spartaeini: Tegular furrow present, see WANLESS (1984) (in *Cyrba*, too?), median apophysis absent, conductor usually absent (present in *Wanlessia* WIJESINGHE 1992), probably special type of the retina of the "principal" eyes, see RODRIGO & JACKSON (1992: 65).

Genera: See RODRIGO & JACKSON (1992), genera of the "Spartaeinae" except the *Cocalodes*-group (see above), *Wanlessia*. Unsure are the relationships to *Hispo* SIMON 1901 and related genera.

Relationships: In the Cocalodini a median apophysis is present and a tegular furrow is absent.

(2a) Genera and species in Baltic amber

Key to the genera :

Remarks: Not included are the genera *Cenattus* and *Prolinus* in which the adult male is unknown and the dubious genus *Steneattus*. - The female of most species and most genera is unknown. - Frequently the ventral view of the bulbus is needed for a sure determination. - The posterior median eyes are the eyes of the second row, the posterior lateral eyes are the eyes of the third row, see the fig. above. - A ventral tibial apophysis or outgrowth of the male pedipalpus occurs in the genera *Almolinus, Calilinus, Distanilinus, Eolinus* and retroventrally in *Microlinus*.

1 A distinct constriction is present between the second and third eye row (photos, figs. 5-6, 52-53). 2

- Prosomal constriction absent (figs. 14, 42). 4

2(1) Large posterior median eyes present (fig. 48), cymbium very long and bulbus flat (figs. 50-51). Photos 421-422 . . . . . ***Gorgopsidis***

- Posterior median eyes distinctly smaller than posterior lateral eyes (posterior row) (figs. 5, 52), cymbium and bulbus e. g. as in figs. 10-11, 55). 3

3(2) ♂-pedipalpus (figs. 9-13): Femoral apophysis present, retrolateral tibial apophysis absent, prosoma not very high, not steep posteriorly (fig. 6). . . . . ***Almolinus***
Photos 412-414.

- Pedipalpal femoral apophysis absent, prosoma high, posteriorly steep. . ***Gorgopsina***
Photos 422-427

4(1) Body length only 1.8mm, prosoma nearly as wide as long, position of the posterior median eyes near to the posterior lateral eyes (fig. 69). Only one long tarsal trichobothrium (fig. 71). ♂-pedipalpus: Figs. 72-78. Photo 429 . . . . . ***Microlinus***

- Body length > 2.5mm, prosoma distinctly wider than long, position of the posterior median eyes nearer to the anterior lateral eyes than to the posterior lateral eyes (figs. 14, 42). More than one tarsal trichobothrium (in all taxa?). ♂-pedipalpus otherwise. .5

5(4) Tibial apophysis of the ♂-pedipalpus nearly as long as the cymbium (figs. 79-80). . . . . ***Paralinus***

- Tibial apophysis of the ♂-pedipalpus distinctly shorter than the cymbium (e. g. figs. 25, 34). 6

6(5) Embolus long (fig. 27, 29, 36). 7

- Embolus short (fig. 18). . . . . ***Calilinus***

7(6) Cymbium wide, median apophysis short, with a hook-shaped long and bent distal branch, position of the distal part of the embolus near the margin of the cymbium (figs. 40-41, 46). Photos 417-420 ..... ***Eolinus***

- Cymbium more slender, median apophysis long, slender and not divided, position of the distal part of the embolus in some distance from the margin of the cymbium (figs. 21, 25-30). Photos 415-416 ..... ***Distanilinus***

posterior median eyes (second row)	prosomal constriction: absent (fig. 14)	prosomal constriction: present (figs. 5-6, 52-53)
small (figs.5,52)	Gen. indet.	*Gorgopsina*, *Almolinus*
large (figs. 42,48,69)	remaining genera	*Gorgopsidis*

The genera of the family Salticidae in Baltic amber, an overwiev in addition to the key

Almolinus PETRUNKEVITCH 1958

Revised diagnosis (♂; ♀ unknown; compare *Prolinus* and ?*Almolinus* sp.): Prosoma (figs.5- 6) nearly as wide as long, with a distinct constriction between the second and third eye row, posterior median eyes small and near to the anterior lateral eyes, opisthosomal scutum absent, bristles on leg I - similar to *Microlinus*, figs. 70 -: Patella without strong bristles, tibia (fig. 1) with 3 pairs of strong ventral bristles, sequence of the tarsal trichobothria 2/2/3/3, leg IV is the longest leg. ♂-pedipalpus (figs. 2-4, 9-

13): Femur with a large retrolateral apophysis, a long ventral and - in all species? - a retrolateral furrow in the distal half, ventral tibial apophysis present, cymbium without apical hair brush, with a large retrobasal paracymbium, bulbus prominent, median apophysis in a distal position, conductor short, embolus short and thick (?) (the distal bulbus structures are difficult to observe).

Remarks: (1) According to PETRUNKEVITCH (1958: 338, fig, 544) are posterior median eyes in the type species *A. clarus* are large and directed backwards - "a very unusual direction in Salticidae.". According to my investigations are the posterior median eyes small in *Almolinus* (fig. 6) and directed sidewards. In the male paratypus f) of *Almolinus ligula* n. sp. the prosoma is deformed most probably by heating in an autoclave . Most probably also the prosoma with the eyes and the pedipalpal femur of the holotypus of *A. clarus* PETRUNKEVITCH are deformed, see the arrow in fig. 4. Therefore I suppose that size and position of the eyes of the holotype of *Almolinus clarus* are deformed by heating. - (2) According to PETRUNKEVITCH (1958) leg II is longer than I in *A. clarus* but in my material I found leg I longer than II.

The **relationships** are unclear. In the other fossil genera a femoral apophysis and a femoral furrow are absent and a retrolateral tibial apophysis is present. In the extant genus *Heliophanus* C. L. KOCH 1833 occur convergently evolved femoral structures of the ♂-pedipalpus; *Heliophanus* is not a member of the Cocalodinae. I do not want to exclude that *Cenattus* PETRUNKEVITCH 1942 and *Prolinus* PETRUNKEVITCH 1958 (ad. ♂ unknown) are synonym with *Almolinus*.

Type species: *Almolinus clarus* PETRUNKEVITCH 1958.

Distribution: Tertiary Baltic amber forest.

Remark: Not all characters of the genus are repeated in the follwoing descriptions of the species. The colour of legs and prosoma is usually medium brown, the opisthosoma is yellow brown, the legs are not annulated.

Almolinus clarus PETRUNKEVITCH 1958 (fig. 4)

I had not the opportunity to study the holotypus of this species. According to PETRUNKEVITCH the prosoma length is 1.7mm. Eyes and pedipalpus: See above. In *A. bitterfeldensis* n. sp. the shape of the femoral apophysis is similar but metatarsus I bears ventrally long sensory hairs.

Distribution: Tertiary Baltic amber forest.

***Almolinus bitterfeldensis* n. sp.** (figs. 1-3) Photo 412

Material: 2 ♂ in Baltic amber from the Bitterfeld deposit, holotypus F307/BB/AR/SAL/JCW, paratypus coll. M. KUTSCHER K/AR/16.

Preservation and syninclusions: (1) Holotypus): The spider is fairly well preserved and dorsally partly hidden by an amber layer. The left legs I and II are cut off through the femur. - Remains of 2 Collembola and some stellate hairs are also preserved in the amber piece; (2) paratypus: The spider has been darkened by heating in an autoclave, on its right side appeared a brown ring. The preservation is well, the left leg I is missing after the coxa by autotomy and also the left pedipalpus is absent except the coxa. - Numerous stellate hairs are also preserved in the amber piece.

Diagnosis (♂; ♀ unknown): Metatarsus II bears ventrally unusually long sensory hairs (fig. 1), the outgrowth of the pedipalpal femur is apically wide (fig. 2).

Description (♂):
Measurements (holotypus/paratyus in mm): Body length 3.0/3.0, prosoma: Length -/1.6, width -/1.2, tibia I, II and IV of the paratypus about 0.7, III 0.55.
Body and leg bristles similar to *A. ligula* but metatarsus II ventrally with numerous long and bent sensory hairs (fig. 1) which are longer and strongar than the trichobothria. Pedipalpus (figs. 2-3, see above) with a large retrolateral paracymbium; the bulbus structures are hidden.

Relationships: See *A. clarus*. The long sensory hairs on metatarsus II are unique in this species, compare figs. 1 and 7.

Distribution: Tertiary Baltic amber forest, Bitterfeld deposit; not known from other deposits (!).

***Almolinus ligula* n. sp.** (figs. 5-13) Photos 413-414

Material: 9 ♂ in Baltic amber; holotypus F305/BB/AR/SAL/CJW, paratypus a) F306/BB/AR/SAL/CJW, paratypus b) coll. H. FLEISSNER BB 1089 ARA, paratypus c) Geol.-Palaeontol. Inst. University Hamburg, paratypus d) F308/BB/AR/SAL/CJW, paratypus e) F304/BB/AR/SAL/CJW, paratypus f) Naturhist. Mus. Wien, paratypus g) F309/BB/AR/SAL/CJW; paratypus h) F1110/BB/AR/SAL/CJW.

Preservation and syninclusions:Holotypus: The spider is very well preserved, yellow brown, the amber piece is not heated, there are few parts of emulsion, the right leg III is missing after the coxa by autotomy.- No stellate hairs are present in the

small amber piece but remains of an insect beneath the spider and a tiny Diptera larva near the rigth side of the spider. - The following paratypes were most probably been heated in an autoclave: b and h (weakly), c, e and f. - Syninclusions with the paratypes: a: A Diptera: Nematocera and remains of a Diptera; b: A Diptera: Nematocera; c: 3 Acari and numerous stellate hairs; d: 1/2 Nematocera, 2 Acari larvae - one (det. A. WOHLTMANN) is a parasitic member of the Parasitengona: Erythraeoidea: Likely Erythraeinae, see above - and numerous stellate hairs; e: A large amber drop, 1 Coleoptera: Elateridae, 3 Diptera, 3 Acari, 1 Formicidae, some excrement particles and stellate hairs; g: 1 Acari, 2 tiny amber pieces and some stellate hairs; h: 5 Diptera and 3 Acari. - In the paratypus c parts of pro- and opisthosoma are cut off at an amber layer, paratypus d is strongly covered by a white emulsion, with paratypus e large and spiny leg parts of an insect are preserved.

Diagnosis (♂; ♀ unknown): Femoral outgrowth of the pedipalpus oval spoon-shaped, apically not widened (figs. 9, 12-13), cymbium with long dorsal white haits (photo).

Description (♂):
Measurements (in mm): Body length usually 3.4-3.8 (holotypus 3.6) but in paratypus d only 2.8 and in paratypus e 4.1; holotypus: Prosoma: Length 1.6, width 1.5, opisthosoma: Length 1.8, width 1.1, Tibia I nearly 0.8, tibia IV 0.95; leg I of paratypus f: Tibia 0.8, metatarsus 0.6, tarsus 0.38, tibia II ca 0.72, tibia III ca 0.7, diameter of a posterior median eye 0.1-0.11. - Prosoma (figs. 5-6) as in the genus, Length to width 1.07-1.13. Chelicerae slender, teeth not observable. Labium a free sclerite, slightly wider than long, sternum slightly elongated posteriorly between the coxae IV. - Legs as in the genus (fig. 7). - Opisthosoma: Length to width = 1.6, dorsally covered with few hairs, dorsal scutum absent, basal article of the anterior spinnerets thick. - Pedipalpus: See above.

Relationships: In *A. bitterfeldensis* and *A. clarus* the pedipalpal femoral apophysis is apically widened, in *A. bitterfeldensis* bears metatarsus II ventrally very long hairs and long dorsal hairs of the cymbium are absent.

Distribution: Tertiary Baltic amber forest.

?***Almolinus*** sp. indet.

1988 *Prolinus fossilis*,--ZABKA, Ann. Zool. Warszawa, 30 (13): 419, figs. 11-13.

In my opinion - according to the small posterior median eyes - the two specimens (♀, juv.) which are described by ZABKA sub *Prolinus* are not members of the genus *Prolinus* but probably of *Almolinus*.

***Calilinus* n. gen.**

Diagnosis (♂; ♀ unknown): Prosomal constriction absent, posterior median eyes (2. row) (fig. 14) large, its position nearer to first row than to the third row, opisthosomal scutum present, bristles on leg I: Patella without strong bristles, tibia (fig. 15) with 3 ventral pairs, sequence of the tarsal trichobothria (fig. 16) probably 2/2/1/1. Pedipalpus (figs. 17-18): Tibia largely elongated prolaterally and retrolaterally with an apophysis which is strongly bent, cymbium long, retrobasal paracymbium present, bulbus long, median apophysis large, tegulum medially longitudinally with a sharp margin, conductor probably fused with the embolus.

Relationships: See *Eolinus*.- Embolus and conductor are similar to *Wanlessia* WIJESINGHE 1992 (extant, Borneo) but in *Wanlessia* are the posterior median eyes tiny, a tegular furrow is present and a median apophysis is absent.

Type species: *Calilinus fleissneri* n. sp.

Distribution: Tertiary Baltic amber forest.

***Calilinus fleissneri* n. gen. n. sp.** (figs. 14-18)

Material: Holotypus ♂ in Baltic amber, coll. H. FLEISSNER BB 987 ARA.

Preservation and syninclusions: The amber piece was heated in an autoclave, body and legs of the spider are darkened. The spider is well preserved, remains of a white emulsion covers the opisthosoma ventrally, leg pair IV is lost after the coxa by autotomy, the apical part of the left tarsus I is broken off. - 1/2 Diptera, several stellate hairs and excrement particles are preserved with the spider.

Diagnosis (♂; ♀ unknown): Pedipalpus: Figs. 17-18, see the diagnosis of the genus.

Description (♂):
Measurements (in mm): Body length 2.5, prosoma: Length 1.3, width 1.0, leg I: Tibia 0.55, metatarsus 0.48, tarsus 0.31.
Colour: Body and legs dark brown, opisthosoma medium brown.
Prosoma (fig. 14) 1.3 times longer than wide, posterior median eyes large and nearer to the anterior lateral eyes than to the posterior lateral eyes, thoracal slit indistinct. Chelicerae small, mouth parts hidden, sternum posteriorly not elongated. - Legs (figs. 15-16) fairly robust, patellae I without strong bristles, femora with 2 long dorsal and few short apical bristles, tibia I with 3 ventral pairs, metatarsus I with several long

bristles, metatarsi III-IV with some apical bristles, sequence of the tarsal trichobothria probably 2/2/1/1, the trichobothrium of the rigth tarsus III is doubled (malformation) (fig. 16). - Opisthosoma slender, posteriorly narrowish, frontally-dorsally covered with long hairs, dorsally covered with a large scutum. - Pedipalpus (see above): Retroventral tibial apophysis with a distal-ventral branch which is directed prolaterally.

Relationships: See above.

Distribution: Tertiary Baltic amber forest.

Cenattus PETRUNKEVITCH 1942 (fig. 19)

Diagnosis according to PETRUNKEVITCH (1942: 435) (♀; ad.♂ unknown): Prosoma 1.14 times longer than wide, eyes on elevations (see the remark below), eyes of the second row 2/3 as large as the anterior lateral eyes and very near to these eyes (fig. 19), order of legs IV/III/I/II (!), tibia I only with ventral bristles, tarsal claws slender, with a long row of short teeth.

Remarks: The body length of the ad. female is 3mm. According to the strong elevations of the eyes I suppose that the spider was heated in an autoclave - like many fossil Salticidae in Baltic amber - and the size as well as the position of some eyes are unnatural.

Relationships: Unknown, probably synonym with *Eolinus* (the adult male is unknown).

Type species: *Cenattus exophthalmicus* PETRUNKEVITCH 1942, the only known species of the genus.

Distribution: Tertiary Baltic amber forest.

Distanilinus **n. gen**.

Diagnosis (♂;♀ unknown): Posterior median eyes nearly as large as the posterior lateral eyes and nearer to the anterior lateral than to the posterior lateral eyes (fig. 42), opisthosoma with a small scutum (fig. 24), patellae without strong bristles (fig. 22), tibia I with 3 pairs of strong ventral bristles as in *Eolinus*, all tarsi with 2 trichobothria; pedipalpus: Cymbium long and nearly symmetrical (figs.26-27,29), tip somewhat in the center, probasal and retrobasal paracymbium present, median apophysis

long, slender and outstanding (figs. 21, 25-26), embolus long, its distal part in some distance from the cymbial margin (figs. 26, 29), conductor present (fig. 29).

Further characters: Labium wider than long, gnathocoxae longer than wide, (chelicer al teeth hidden).

Relationships: In *Eolinus* PETRUNKEVITCH 1942 the chaetotaxy is identical and a probasal as well as a retrobasal paracymbia are present but the cymbium is wider and asymmetrical, the median apophysis is short, wide and has a distal hook-shaped branch, the position of the distal part of the embolus is near the cymbial margin.

Type species: *Distanilinus nutus* n. sp.

Distribution: Tertiary Baltic amber forest.

Remark: Only few of the generic characters are repeated in the following species descriptions.

Key to the species of the genus *Distanilinus*

1 Retrolateral tibial apophysis slightly bent (figs. 20-21). . . . . *filum*

- Retrolateral tibial apophysis strongly bent (figs. 25, 28, 30). 2

2(1) Retrolateral tibial apophysis basally wider (fig. 28). . . . . *paranutus*

- Retrolateral tibial apophysis more slender (figs. 25,30). 3

3(2) Pedipalpus figs. 25-26. . . . . *nutus*

- Pedipalpus fig. 30. . . . . .*pernutus*

***Distanilinus filum* n. gen. n. sp.** (figs. 20-21) Photo 415

Material: Holotypus ♂ in Baltic amber, F267/BB/AR/SAL/CJW.

Preservation and syninclusions: The amber piece was heated in an autoclave and the spider with parts of the amber piece are darkened. The spider is completely and fairly well preserved, an emulsion is absent. - A - partly doubled - drag line is running backward from the spinnerets. - Few stellate hairs and remains of legs of a Diptera are also preserved.

Diagnosis (♂; ♀ unknown): Retrolateral tibial apophysis of the pedipalpus wide and only slightly bent, retrolateral tibial apophysis with two distinctly separated branches (figs. 20-21).

Description (♂):
Measurements (in mm): Body length 3.5, prosoma length 1.7, tibia I 0.62, tibia IV 0.75.
Prosoma, legs and opisthosoma as in *D. nutus* n.sp. Pedipalpus: Figs. 20-21.

Relationships: See the key.

Distribution: Tertiary Baltic amber forest.

***Distanilinus nutus* n. gen. n. sp**. (figs. 22-26)

Material: 2♂ in Baltic amber, holotypus F303/BB/AR/SAL/CJW; paratypus and two separated amber pieces F310/BB/AR/SAL/CJW.

Preservation and syninclusions: The holotypus is well and nearly completely preserved, the right leg II is lost after the coxa by autotomy, the dorsal parts of body and legs are partly covered by a white emulsion. - Some stellate hairs are preserved in the same amber piece. - The paratypus is fairly well preserved, the left leg III is lost after the coxa, both pedipalpi are bent beneath the body and the bulbus structures are hidden. The amber piece was heated in an autoclave. - A tiny Acari larva is present near the spinnerets.

Diagnosis (♂; ♀ unknown): Pedipalpus (figs. 25-26): Retrolateral tibial apophysis slender and bent downwards near the tip, retroventral tibial apophysis short and far away from the retrolateral apophysis, median apophysis very long, outstanding and with an apical branch which is directed medially.

Description (♂):
Measurements (in mm): Body length 3.0, prosoma length 2.0, leg I: Tibia 0.8, metatarsus 0.6, tarsus 0.33.
Colour of the holotypus: Body and legs dark brown, opisthosoma medium brown.
Prosoma dorsally partly hidden by a white emulsion, labium longer than wide, ster-

num not prolongated posteriorly. - Legs (figs. 22-23): Order IV/I/II/III, hairs short, bristles: Femora 2 dorsally and few distally, patellae without strong bristles, tibia I with 3 ventral pairs, metatarsus I: Fig. 23, metatarsi III-IV with some apical bristles, too. Tarsal claws with numerous long teeth. - Opisthosoma (fig. 24) slender, posteriorly narrowish, dorsally covered with indistinct short hairs and a small scutum. - Pedipalpus (figs. 25-25; see above): Patella and tibia short.

Relationships: See the key.

Distribution: Tertiary Baltic amber forest.

***Distanilinus paranutus* n. gen. n. sp**. (figs. 27-28) Photo 416

Material: Holotypus ♂ in Baltic amber and a separated amber piece, F313/BB/AR/SAL/CJW.

Preservation and syninclusions: Anterior parts of the prosoma with some eyes are cut off, both legs IV are missing after the coxa by autotomy, the opisthosoma is partly covered by a white emulsion. - Near the spider is a parasitoitic wasp preserved, see above ("Parasitoitic wasps"); also preserved are numerous detritus particles, stellate hairs and 3 Collembola.

Diagnosis (♂; ♀ unknown): Pedipalpus (figs. 27-29): Retrolateral tibial apophysis of the pedipalpus strongly bent downwards, retroventral apophysis long and directed retroventrally.

Description (♂):
Measurements (in mm): Body length about 3.5, tibia I about 0.7.
Colour: Prosoma and legs medium brown, opisthosoma yellow brown.
Prosoma, legs and opisthosoma as in *nutus* n. sp. - Pedipalpus: Figs. 27-29.

Relationships: See the key.

Distribution: Tertiary Baltic amber forest.

***Distanilinus pernutus* n.gen.n.sp**. (fig. 30)

Material: Holotypus ♂ in Baltic amber, F311/BB/AR/SAL/CJW.

Preservation and syninclusions: The amber piece was most probably heated in an autoclave. The spider is well preserved, the left leg III is missing after the coxa by autotomy, remains of a white emulsion are preserved on the ventral side of the body, the pedipalpi are bent to the chelicerae. - No stellate hairs. A parasitic Acari larva Parasitengona: Trombidiidae (A. WOHLTMANN det.), 0.22mm long, is preserved directly behind the spider's spinnerets, its mouth parts are directed to the spider.

Diagnosis (♂; ♀ unknown): Retrolateral tibial apophysis of the pedipalpus long, slender and strongly bent (fig. 30).

Description (♂):
Measurements (in mm): Body length 3.0, prosoma: Length 1.65, width 1.4, tibia I 0.68, tibia IV 0.78.
Colour: Brown, parts of the prosoma are darkened.
Prosoma, legs and opisthosoma as in *nutus* n. sp. but an opisthosomal scutum is not clearly observable. - Pedipalpus: Fig. 30.

Relationships: See the key.

Distribution: Tertiary Baltic amber forest.

Eolinus PETRUNKEVITCH 1942

Remark 1: Unfortunately PETRUNKEVITCH (1942) made a female the holotypus of the generotypus of *Eolinus succineus* PETRUNKEVITCH. I do not want to exclude that this female is actually a member of the *Distanilus* n. gen.; I can distinguish both genera only after the male genital structures. Provisionally I regards the "androtype" of the type species sensu PETRUNKEVITCH (1942) as a member of *Eolinus* although it may be not congeneric with the generotype female, and probably being a member of *Distanilinus*.

Remark 2: Most probably the fig. 43 in the book of BACHOFEN-ECHT (1949) sub "Sparassidae" shows a member of the genus *Eolinus* (♀?).

Diagnosis (♂; ♀ unknown): Scutum of the ♂-opisthosoma present (photo, similar to *Distanilinus*, fig. 24), posterior median eyes nearly as large as the posterior lateral eyes and nearer to the anterior lateral eyes than to the posterior lateral eyes (fig. 42). Patella I-II without strong dorsal bristles, occasionally with lateral bristles, tibia I-II usually with 3 pairs of strong ventral bristles, occasionally with lateral bristles, all tarsi with 2 trichobothria. ♂-pedipalpus (figs. 31-36): Tibia with a retrolateral, a retroventral and a proventral apophysis, cymbium with a probasal and a retrolateral paracymbium, median apophysis in a retrobasal position, embolus long and in a cross position,

conductor present. - Questionable ♀: Epigyne with a deep groove (figs. 37, 38).

Further characters: Labium wider than long, gnathocoxae longer than wide (cheliceral teeth hidden). Opisthosoma at least in some species with paired longitudinal white bands, photos.

Type species: *Eolinus succineus* PETRUNKEVITCH 1942. - Remark: The conspecifity of the type material besides the holotype ♀ - e. g. the "androtype" (fig. 38) - is quite unsure.

Relationships: See the strongly related genus *Distanilinus* n. gen.

Distribution: Tertiary Baltic amber forest incl. Bitterfeld deposit.

Determination: See the diagnoses of the species, especially the shape of the tibial apophyses. Attention: A slightly different view of the pedipalpus may cause a quite different shape of the tibial apophyses!

***Eolinus fungus* n. sp.** (figs. 31-32)

Material: Holotypus ♂ in Baltic amber, F317/BB/AR/SAL/CJW:

Preservation and syninclusions: The preservation is bad, the spider was hurted, legs and opisthosoma are strongly deformed, fungus hyphae were growing on body and legs. Most parts of the spider are hidden by tiny white bubbles and numerous hyphae, which decomposited parts of the spider; parts of the left legs II-IV are cut off.- Several Acari are preserved near the spider.

Diagnosis (♂; ♀ unknown): Tibial apophyses of the pedipalpus as in fig. 31, median apophysis as in fig. 32.

Description (♂):
Measurements (in mm): Body length about 3.2, tibia I about 0.6.
Colour dark brown. - Most parts of the body are deformed or hidden, see above.

Relationships: *E. samlandica* n. sp. has a similar retrolateral tibial apophysis of the male pedipalpus, compare the figs.

Distribution: Tertiary Baltic amber forest.

***Eolinus insuriens* n. sp.** (fig. 33)

Material: Holotypus ♂ in Baltic amber, F315/BB/AR/SAL/CJW.

Preservation and syninclusions: The spider is fairly well preserved, the left leg IV is missing after the coxa by autotomy, the ventral part of the prosoma and the whole opisthosoma are covered by a white emulsion. - 5 Diptera: Nematocera and a Hymenoptera: Ichneumonidae are also preserved in the amber piece. The Ichneumonidae - body length 4.1mm - may have been a potential or actual parasitoitic animal of the spider.

Diagnosis (♂; ♀ unknown): Tibial apophysis as in fig. 33.

Description (♂):
Measurements (in mm): Body length 3.6, prosoma length 1.7, tibia I 0.65, tibia IV 0.85.
Colour: Prosoma and legs dark brown, opisthosoma hidden. - Prosoma and legs as in the genus.

Relationships: In *E. theryoides* n. sp. the retroventral tibial apophysis of the pedipalpus is longer and slightly directed ventrally.

Distribution: Tertiary Baltic amber forest.

***Eolinus prominens* n. sp.** (fig. 34)

Material: Holotypus ♂ in Baltic amber, F147/BB/AR/SAL/CJW.

Preservation and syninclusions: Parts of the spider are well preserved but the opisthosoma is strongly deformed and partly cut off, also most parts of the left pedipalpus and the left legs are cut off; no emulsion. - On the anterior-dorsal part of the opisthosoma fugus hyphae have grown; 0.5mm dorsally of the prosoma is a 1.7mm long bud of a Fagaceae (Dr. WILDE det.) preserved. Furthermore few excrement particles, numerous stellate hairs and the leg of an insect are preserved in the amber piece.

Diagnosis (♂; ♀ unknown): Bulbus prominent and probably partly expanded, retroventral pedipalpal tibial apophysis wide and u-shaped divided (fig. 34).

Description (♂):
Measurements (in mm): Body length about 3.2, prosoma length 1.6, tibia I 0.6.

Colour: Body and legs dark brown, opisthosoma light brown.
Prosoma, legs and opisthosoma s in the genus.

Relationships: The shape of the pedipalpal tibial apophysis is unique in this species.

Distribution: Tertiary Baltic amber forest.

***Eolinus samlandica* n. sp.** (figs. 35-36)

Material: Holotypus in Baltic amber, Palaeontological Museum Moscow.

Preservation and syninclusions: The spider is fairly well preserved, the opisthosoma is deformed and partly cut off, the legs are complete, the prosoma is partly covered by a white emulsion. - No stellate hairs.

Diagnosis (♂; ♀ unknown): Pedipalpus (figs. 35-36): Retrolateral and retroventral tibial apophyses widely separated, conductor large, embolus in a special position.

Description (♂):
Measurements (in mm): Body length about 3.3, prosoma length 1.7, tibia I about 0.6.
Colour dark brown. - Prosoma, legs and opisthosoma - as fas as observable - as in the genus.

Relationships: See *E. tystshenkoi.*

Distribution: Tertiary Baltic amber forest.

Eolinus succineus PETRUNKEVITCH 1942 (fig. 37-37a)

I had not the opportunuty to study the type material which is figured insufficiently. Unfortunately the holotype is a female; the other types - males - are probably not conspecific. The body length of the holotype is - according to the original description - 3.64mm, the length of the "androtype" is 2.96mm, its pedipalpus: Fig. 37a; the epigyne of the holotype (fig. 37) has a medial depression.

The **relationships** are unsure.

Distribution: Tertiary Baltic amber forest.

Eolinus theryi PETRUNKEVITCH 1942 (fig. 39)

I had not the opportunity to study the type material which is figured insufficiently. The body length of the holotype (♂; ♀ unknown) is 4.1mm.

The **relationships** are unsure.

Distribution: Tertiary Baltic amber forest.

***Eolinus theryoides* n. sp.** (figs. 40-41) Photo 417

Material: 2♂ in Baltic amber. holotypus F318/BB/AR/SAL/CJW, paratypus F714/BB/AR/SAL/CJW..

Preservation and syninclusions: Holotype: The spider is very well preserved, only the left leg IV is missing after the coxa by autotomy. Bubbles covers parts of the body. - No stellate hairs but 4 wings of a termite are present in the amber piece; paratype: Several articles of the right legs and of the right pedipalpus are cut off.

Diagnosis (♂;♀ unknown): Pedipalpus of the olotype: Figs. 40-41, median apophysis u-shaped in retrolateral view.

Description (♂ holotype):
Measurements (in mm): Body length 3.7, prosoma: Length 1.7, width 1.4, opisthosoma: Length 2.0, width 1.15, tibia I 0.7, tibia IV 0.87.
Colour of the holotype: Prosoma and legs dark brown, opisthosoma light brown; paratype: Prosoma with a median band of light brown hairs, opisthosoma with a pair of light dorsal stripes.
Prosoma, legs and opsithosoma as in the genus, opisthosomal scutum indistinct.

Relationships: See *E. insuriens* n. sp. and *thery* PETRUNKEVITCH.

Distribution: Tertiary Baltic amber forest.

Eolinus tystschenkoi PROSZYNSKI & ZABKA 1980 (figs. 42-45)

Material: A questionable ♂, F316/BB/AR/SAL/CJW.

Preservation and syninclusions: The male is fairly well preserved, the left patella I and the right tarsus I are cut off. - One stellate hair, 2 tiny mite larvae - one near the

spider and a probably phoretic mite (body length 0.15mm) prolaterally on the base of the right femur II - are also preserved in the amber piece.

Diagnosis (♂; ♀ unknown): Pedipalpus (figs. 43-45): Cymbium apically asymmetrical, retroventral tibial apophysis apically divided at least in the questionable male (fig. 45).

Characters and remarks: The conspecifity of the immature female with the holotype - fig. 21 in the paper of PROSZYNAKI (1980) - is quite unsure. Measurements: Holotypus: In the original description the body length is not noted and the legs are "invisible" (hidden). Prosoma: Fig. 42. The body length of the questionable male F316 is 1.8mm, the length of tibia I/IV is 0.75/0.8mm.

Relationships: In *E. samlandica* n. sp. the shape of the retroventral tibial apophysis of the ♂-pedipapus, the median apophysis and the embolus are different, see the figures.

Distribution: Tertiary Baltic amber forest.

***Eolinus vates* n. sp.** (figs. 46-47) Photo 418

Material: Holotypus ♂ and a separated amber piece, F312/BB/AR/SAL/CJW.

Preservation and syninclusions: The spider is fairly well preserved. There are some weak emulsions, bubbles cover the base of the left femora, the mouth parts and the right bulbus. The opisthosoma is well observable. - In the separated amber piece a tiny mite larva and few stellate hairs are preserved.

Diagnosis (♂; ♀ unknown): The retrolateral pedipalpal tibial apophysis bears a posterior outgrowth (fig. 46), embolus in a more distal position (fig. 47). Body and legs are less hairy than in most other species.

Description (♂):
Measurements (in mm): Body length 3.2, prosoma: Length 1.3, width 1.15, opisthosoma: Length 1.85, width 1.2, leg I: Femur 0.8, patella 0.4, tibia 0.6, metatarsus 0.5, tarsus 0.35, tibia II 0.55, tibia III 0.5, tibia IV 0.7.
Colour: Prosoma, legs and opisthosomal scutum dark brown, opisthosoma light brown.
Prosoma, legs and opisthosoma as in the genus but less hairy and prosoma wider than in most other species.

Relationships: The shape of the tibial apophysis of the pedipalpus as well as the

position of embolus and conductor are unique in this species.

Distribution: Tertiary Baltic amber forest.

Indet. material of *Eolinus* (see the remark on *Gorgopsina fasciata* below):

Material: 1 female and several males: ♂ F266/BB/AR/SAL/CJW, F314/BB/AR/SAL/CJW, ♂ F319/BB/AR/SAL/CJW, ♀ F320/BB/AR/SAL/CJW (amber from the Bitterfeld deposit), F1243 (photo 419), coll. GRÖHN (photo 420).

F266: Body length 3.6mm. The rigth bulbus is observable in its ventral aspect, the embolus is longer than in most of the related species, most parts of the tibial apophyses are hidden. A partly doubled dragline is running backwards from the spinnerets.

F314: Body length 3.5mm. There is a tiny phoretic mite larva of the family Histiostomatidae (det. A. WOHLTMANN), fig. 85, body length nearly 0.2mm which is fixed posteriorly on the promargin of the left cymbium of the spider.

F319: Body length 3.5mm. Body, legs and cymbia are strongly covered with hairs, the prosoma bears a white longitudinal stripe. The origin of the very long embolus is probasally, the tibial apophyses are hidden. The spider may well be the member of an undescribed species.

F320: Body length 3.5mm. The amber piece was heated in an autoclave. The epigyne (fig. 38) is posteriorly fairly outstanding, a groove is present similar to the holotype of *E. succineus* PETRUNKEVITCH 1942, probably the large and dark receptacula seminis are preserved.

***Gorgopsidis* n. gen.**

Diagnosis (♂;♀ unknown): Prosoma with a constriction between the second and third eye row (fig. 48), posterior median eyes nearly as large as the posterior lateral eyes and distinctly separated from the anterior lateral eyes. Strong bristles of the patella I-II and dorsal tibial I-II bristles are present (fig. 49). Opisthosoma : Leathery but scutum absent. Pedipalpus (figs. 50-51): Tibia with a nearly straight retrolateral apophysis, cymbium distinctly longer than the bulbus, a small paracymbium present (not figured), conductor long,embolus long, originating at the basal part of the bulbus.

Type species: *Gorgopsidis bechlyi* n. sp. Apparently there are more - undescribed - species in Baltic amber, see below.

Relationships: A constriction of the prosoma is also present in *Gorgopsina* PETRUNKEVITCH but dorsal tibial I-II bristles (and usually strong patellar bristles) are absent, the posterior median eyes are small, their position is near the anterior lateral eyes, the retrolateral tibial apophysis is bent, the cymbium is shorter, the bulbus is wider, its structures are quite different, a retrobasal median apophysis is present.

Distribution: Tertiary Baltic amber forest incl. Bitterfeld deposit.

***Gorgopsidis bechlyi* n. gen. n. sp.** (figs. 48-51a) Photos 421-422

Derivatio nominis and acknowledgement: The species is dedicated to G. BECHLY, curator of the Staatl. Mus. Naturk. in Stuttgart, with thanks for the loan of the holotypus of the new species.

Material: 2♂ in Baltic amber; holotypus and a 5cm long separated amber piece, Staatl. Mus. Naturk. Stuttgart, no. BB-480-K, paratypus F895/BB/AR/SAL/CJW.

Preservation and syninclusions of the holotype: The male is well and nearly completely preserved, only distal parts of the left leg III and of both legs IV are cut off; dorsal body parts are slightly covered by a white emulsion. - A questionable droplet of excrement - the spiders excrements are liquid - is preserved above the spinnerets just behind and in contact left of the anal tubercle (fig. 51a; quite indistinct visible in the photo); it is 0.47mm long and partly covered by a white emulsion. In the separated amber piece an ant, several larva of Aphidina, a small Diptera: Nematocera, a leaf, a stamen, leaver moss and small excrement balls are preserved; no stellate hairs. - The paratype is well preserved, both legs II are lost beyond the coxa by autotomy, some leg articles and parts of the opisthosoma are cut off.

Diagnosis (♂; ♀ unknown): Pedipalpus as in figs. 50-51.

Description (♂):
Measurements (in mm): Body length 4.2, prosoma: Length 2.0, width 1.5, leg I: Femur 1.3, patella 0.6, tibia 1.2, metatarsus 1.2, tarsus 0.55, tibia II 1.1, tibia III 1.0, tibia IV 1.3, diameter of an anterior median eye 0.42.
Colour: Body and legs dark brown, opisthosoma light brown.
Prosoma (fig. 48) 1.33 times longer than wide, covered with numerous hairs, fovea long; a constriction is present between the second and third eye row, posterior median eyes distinctly separated from the anterior lateral eyes and nearly as large as the posterior lateral eyes. Chelicerae slender, directed downwards, teeth hidden. Sternum not prolongated between the cocae IV. - Legs fairly robust, order IV/I/II/III, with numerous bristles: Femur I 5, patella I (fig. 49) a lateral pair and 2 thin dorsal brist-

les, tibia I 2 dorsally, 2 lateral and 2 ventral pairs besides apical bristles, metatarsus I a ventral pair, metatarsus III with 3 to 4 short apical bristles, tarsi with 2-3 trichobothria, paired tarsal claws with long teeth. - Opisthosoma slender, nearly 2 times longer than wide, covered with numerous hairs and thin bristles, posterior spinnerets long, colulus absent as in other Salticidae. - Pedipalpus (figs. 50-51): Patella and tibia about as long as wide, tibia with some strong bristles and a slightly bent retrolateral apophysis, a short questionable median apophysis is present (the bulbus structures are partly hidden), a large conductor

Relationships: See above.

Distribution: Tertiary Baltic amber forest.

Indet. material of *Gorgopsidis* in Baltic amber: 2 ♂ Mus. nat. d'Hist. nat. Paris, no. 557 and 4626; 1 ♂ F299/BB/AR/SAL/CJW, 1 ♂ F300/BB/AR/SAL/CJW.

Gorgopsina PETRUNKEVITCH 1955

Gorgopsina PETRUNKEVITCH 1955 n. nom. pro *Gorgopis* MENGE 1854 (not 1954 as noted by PETRUNKEVITCH (1958: 335)), praeocc. by HUEBNER 1820 (not 1920 as noted by PETRUNKEVITCH (1958: 335)).

Revised diagnosis: Prosoma with a distinct constriction between the second and third eye row (figs. 52-53), posterior median eyes small, very near to the anterior lateral eyes and on a common elevation. Opisthosoma in both sexes dorsally hardened and probably at least in some males with a scutum, e. g. in the questionable male of *G. expandens* n. sp. (fig. 58). ♂-pedipalpus (figs. 55, 59, 60a, 62a-64): Retrolateral tibial apophysis distinctly bent, no ventral tibial apophysis, bulbus large and prominent, median apophysis in a retrobasal position, embolus originating prodistally, its tip is situated in a cavity of the cymbium, tegulum with a retrobasal outgrowth. Usually strong bristles on patella I-II bristles absent, no dorsal tibial I-II bristles. ♀: Epigyne of *Gorgopsina* sp. indet. (fig. 67) with a longitudinal groove.

Further characters: According to PETRUNKEVITCH (1955: 150) are both cheliceral margins smooth but actually there are at least 5 teeth on both margins at least in one species (fig. 64a). Body hairy, opisthosoma slender and narrow posteriorly, legs fairly robust, order variable, leg I or IV the longest, leg bristles of medium length, tarsal claws with long teeth, occasionally strong lateral patellar I-II bristles are present (fig. 61a), tarsi with several trichobothria, femora and metatarsi with several strong bristles, usually 6 on femur I, 8 on femur III, 1 ventral pair on metatarsus I, 7 long and

apically 6 short bristles on metatarsus IV. Chelicerae long, with a condylus (fig. 56), fangs long and slender.

Relationships: See *Gorgopsidis* n. gen. and *Almolinus* PETRUNKEVITCH. According to PROSZYNSKI & ZABKA (1983) *Gorgopsina* is very close or even congeneric with the extant genus *Tomocyrba* SIMON 1900 (Madagascar and east Africa) but in *Tomocyrba* the bulbus structures are quite different, e. g. a median apophysis is absent. I regard the constriction of the prosoma in both genera as most probably convergently evolved.

Type species: *Phidippus frenatus* KOCH & BERENDT 1854. I am not sure about the identity of the type species, see below.

Distribution: Tertiary Baltic amber incl. Bitterfeld deposit, Ukrainean amber.

Syninclusion of plants: Together with an indet. male of *Gorgopsina* sp. indet. (F148/BB/AR/SAL/ CJW) a 2.5cm long part of a ?Fagaceae branch is preserved.

Remark: Most characters of the genus are not repeated in the descriptions below.

Key to the males of the species of the genus *Gorgopsina* which are described in this paper:

1 Embolus very long, nearly circular (fig. 64). . . . . *frenata*

- Embolus shorter, less bent (e. g. figs. 55, 66). 2

2(1) Tibial apophysis of the male pedipalpus large and outstanding (fig. 58). 3

- Tibial apophysis of medium size (fig. 66). 4

3(2) Embolus short (fig. 58). . . . . *expandens*

Embolus long (fig. 55). . . . . *amabilis*

4(2) Position of the embolus about longitudinally (figs. 57, 60). 5

- Position of the embolus more horizontally and spirally (figs. 64b, 66). 6

5(4) Embolus thicker (fig. 57). . . . . *constricta*

- Embolus thinner (figs. 60-60a). . . . . *flexuosa*

6(4) Embolus as in fig. 64b. . . . . *inclusa*

- Embolus as in fig. 66-67. . . . . *speciosa*

Indet. material of the genus *Gorgopsina*:

F148/BB/AR/SAL/CJW: ♂, with the 22.5mm long part of a branch of a ?Fagaceae, *Acrometa* sp. indet. (Araneae: Synotaxidae), and a Coleoptera: Elateridae sp. indet.;

F297/BB/AR/SAL/CJW: ♀;

F298/BB/AR/SAL/CJW: 1♂ and 1♀. Epigyne: Fig. 67;

a juv. spider with its exuvia: Mus. Ziemi no. 21705.

***Gorgopsina amabilis* n. sp.** (figs. 54-55) Photo 423

Material: Holotypus ♂ in Baltic amber and a separated amber piece, F295/BB/AR/SAL/CJW.

Preservation and syninclusions: The spider is lying on a layer of amber; it is well and completely preserved, mouth parts and the opisthosoma ventrally are covered by a white emulsion. - Few stellate hairs.

Diagnosis (♂;♀ unknown): Pedipalpus (fig. 55): Tibial apophysis of medium size, embolus long, strong and nearly straight. Leg I distinctly longer than leg IV.

Description (♂):
Measurements (in mm): Body length 4.8, prosoma lenth 2.3, leg I: Femur 1.1, left tibia 1.55, right tibia 1.1 (see below), metatarsus 1.0, tarsus 0.55, tibia IV 1.2.
Colour: Prosoma and legs dark brown, opisthosoma light brown.
Body and legs as in the genus, left patella and tibia fig. 54. The shortened right leg I may be a regenerate; it is slightly bent - dorsally concave - and shortened,see above.

Relationships: In the related *G. expandens* n. sp. the embolus is short.

Distribution: Tertiary Baltic amber forest.

***Gorgopsina constricta* n. sp.** (figs. 56-57)

Material: Holotypus ♂ in Baltic amber, F292/BB/AR/SAL/CJW.

Preservation and syninclusions: The spider is well and nearly completely preserved, only the left leg I is cut off through the tibia. A weak white emulsion covers parts of the mouth articles. - A darkened Diptera: Nematocera, few stellate hairs and a longer drop of amber are preserved in the same amber piece; a large bubble is preserved on the bulbus.

Diagnosis (♂; ♀ unknown): Pedipalpus (fig. 57): Tibial apophysis of medium size, embolus bent and basally thick. Leg IV slightly longer than I.

Description (♂):
Measurements (in mm): Body length 3.5, prosoma length 1.6, leg I: Tibia 1.1, metatarsus 0.95, leg IV: Tibia 1.05, metatarsus 1.15.
Colour: Prosoma and legs dark brown, opisthosoma light brown.
Body and legs as in the genus. The condylus of the right chelicera is clearly observable (fig. 56). The opisthosoma bears probably a dorsal scutum.

Relationships: See *G. speciosa* n. sp.

Distribution: Tertiary Baltic amber forest.

***Gorgopsina expandens* n. sp.** (figs. 58)

Material: Holotypus ♂ in Baltic amber, F293/BB/AR/SAL/CJW.

Preservation and syninclusions: The spider is fairly well preserved, the left leg I is missing after the coxa by autotomy, body and legs are partly covered by a white emulsion. - A tiny worm-shaped structure is preserved on the left embolus. - Several stellate hairs.

Diagnosis (♂; ♀ unknown): Pedipalpus (fig. 58; the bulbus is partly expanded): Tibial apophysis large, embolus base large, conductor distinct, embolus short. Leg I

about as long as leg IV.

Description (♂):
Measurements (in mm): Body length 4.8, prosoma: Length 2.1, width 1.8, leg I: Tibia 1.1, metatarsus 1.1, leg IV: Tibia 1.2, metatarsus 1.1.
Colour: Prosoma and legs dark brown, the opisthosoma is covered by a white emulsion. - Body and legs as in the genus.

Relationships: See *G. amabilis* n. sp.

Distribution: Tertiary Baltic amber forest.

"Gorgopsina" fasciata (KOCH & BERENDT 1854) (sub *Phidippus fasciatus*)

Material: 3♀ syntypes in Baltic amber, PIHUB MB.A.1057.

According to the original description there should be 3♂ and 3♀. The three females in the PIHUB are most probably members of the genus *Eolinus* PETRUNKEVITCH.

***Gorgopsina flexuosa* n. sp.** (figs. 59-60a)

Material: Holotypus ♂ in Baltic amber, PIHUB no. MB.A.1052: I separated this spider as holotypus of *flexuosus* from 15 spiders sub "*Phidippus frenatus*" from the old collection of BERENDT in the PIHUB; a questionable ♂ in Baltic amber and a separated amber piece, F294/BB/AR/SAL/CJW.

Preservation and syninclusions: Holotypus: The spider is well preserved and nearly complete, only the right leg I is missing after the coxa by autotomy. The ventral side of the body is covered by a white emulsion. - Several stellate hairs. - Questionable ♂: The spider is fairly well preserved, few ventral parts are covered by a white emulsion, the left leg I is cut off through the femur, the right leg I is missing after the coxa, the right legs III and IV are separated after the coxa by autotomy and situated near the spider. - Near the spider a part of a beetle is preserved, in the separated amber piece a Diptera: Nematocera and some stellate hairs.

Diagnosis (♂; ♀ unknown): Pedipalpus (figs. 60-60a): Tibial apophysis fairly large and bent, embolus long, slender and bent. Leg I slightly longer than leg IV.

Description (♂):

Measurements (holotypus, in mm): Body length 4.2, prosoma length about 1.9, tibia I 1.4, tibia IV 1.3.
Colour of the holotypus: Body and legs medium brown, opisthosoma light brown.
Body and legs as in the genus; no scutum on the slender opisthosoma of the holotypus in contrast to the questionable male (fig. 59).

Relationships: In *G. inclusa* n. sp. the distal part of the embolus is thinner and complicated, in *constricta* n. sp. the embolus is thicker, in *speciosa* n. sp. the embolus is spiraly.

Distribution: Tertiary Baltic amber forest.

Gorgopsina formosa (KOCH & BERENDT 1854) (sub *Phidippus formosus*)

Material: ?Holotypus juv. ♀ in Baltic amber, PIHUB MB.A.1055.

According to the original description the holotypus should be a subad. ♂. The body length of the spider is 3.2mm, the relationships are unsure.

Gorgopsina frenata (KOCH & BERENDT 1854) (figs. 61a-64)

Photos 424, 427-428

Material in Baltic amber: 2 ♂ 3 ?juv. ♀, syntypes, PIHUB. From these specimens I selected a male as the Lectotypus, MB.A. 1049, 1 ♂ as paralectotypus, MB.A. 1050 and 3 ?juv. ♀ as paralectotypes, MB.A.1051; "hypotype" ♂ sensu PETRUNKEVITCH (1942), British Museum London In. 18739; 1 ♂ in amber from the Bitterfeld deposit coll. H. GRABENHORST AR44; several specimens in the coll. JW, e. g. F268/BB/AR/SAL/CJW, F287 - 291; no. 287 comes from the Bitterfeld deposit.

Remarks: Most parts of the bulbi of the syntypes are hidden; therefore the identity of this species is not sure. Provisionally I use the name *frenata* in the sense of PETRUNKEVITCH (1942), part.: Figs. 20-25, 27-28. Apparently *frenata* is the most frequent species of the genus.

Diagnosis: ♂: Pedipalpus (figs. 62a-64): Tibial apophysis fairly outstanding, embolus very long, in a wide and nearly circular/spiral position. ♀: I am not sure about the identity of the female and do not want to exclude that the female F298 (epigyne fig. 67) is conspecific with *frenata*.

Body length: Usually 4.5-5.5mm. The prosoma is very hairy in F289 but nearly hairless in F290 which was heated in an autoclave. Leg I as in figs. 61a-b.

Relationships: In the other congeneric species the embolus is distinctly shorter and less bent.

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

***Gorgopsina inclusa* n. sp.** (figs. 64a-b)

Material: Holotypus ♂ in Baltic amber, F335/BB/AR/SAL/CJW.

Preservation and syninclusions: The spider is fairly well preserved, dorsal parts of all left legs are cut off, ventrally the opisthosoma is partly covered by a white emulsion. - Two Diptera and several stellate hairs are also preserved in the amber piece.

Diagnosis (♂; ♀ unknown): Pedipalpus (fig. 64b): Distal part of the embolus long, thin and straight.

Description (♂):
Measurements (in mm): Body length 4.7, prosoma length 2.1, opisthosoma: Length 2.7, width 1.4, tibia I 1.35.
Colour: Prosoma and legs dark brown, opisthosoma medium brown.
Body and legs as in the genus. About 5 long teeth are observable on the anterior and posterior cheliceral margins each. Opisthosoma nearly twice as long as wide, covered with short hairs, dorsally probably hardened. The tibial apophysis of the pedipalpus is robust and strongly bent to the cymbium.

Releationships: *G. speciosa* may be most closely related; in *speciosa* the embolus is distinctly shorter.

Distribution: Tertiary Baltic amber forest.

Gorgopsina jucunda (PETRUNKEVITCH 1942) (sub *Gorgopis jucunda*)

The body length of the female is 5.8mm. Only the adult female and questionable juveniles in both sexes are known; the relationships are unclear.

Distribution: Tertiary Baltic amber forest.

Gorgopsina marginata (KOCH & BERENDT 1854) (sub *Phidippus marginatus*)

Material: Holotypus ♂ in Baltic amber, PIHUB MB.A.1054.

The prosoma length of the spider is 2.5mm. Both bulbi are covered by a white emulsion, the emboli are hidden, the relationships are unsure.

Gorgopsina melanocephala (KOCH & BERENDT 1854) (sub *Phidippus m.*)

Material: Holotypus ♂ in Baltic amber, PIHUB MB.A.1056.

The body length of the spider is about 5mm, most parts of the pedipalpi are hidden, the relationships are unsure.

Gorgopsina paulula (KOCH & BERENDT 1854) (sub *Phidippus paululus*)

Material: Holotypus juv. ♀ in Baltic amber, PIHUB MB.A.1053.

The body length of the spider is 2.5mm. The relationships of the juvenile spider are unsure.

Gorgopsina speciosa **n. sp.** (figs. 65-66a)

Material: 2♂ in Baltic amber, holotypus F296/BB/AR/SAL/CJW; paratypus Mus. Cracow.

Preservation and syninclusions: Holotypus: The spider is well and nearly completely preserved, only the right leg I is cut off after the tibia. There are light white emulsions laterally and ventrally of the body. - No stellate hairs. - Paratypus: It is completely preserved, the dorsal side is hidden, the sternum is covered by a white emulsion. - A large Hymenoptera, 2 Diptera and numerous stellate hairs are also preserved in the 5.1cm long amber piece.

Diagnosis (♂; ♀ unknown): Pedipalpus (figs. 65-66a): Tibial apophysis large, the embolus builds a small spiral, leg I longer than leg IV.

Description (♂):
Measurements (holotypus in mm): Body length 4.7, prosoma length 2.5, leg I: Tibia 1.45, metatarsus 1.4, tibia IV 1.3. Body length of the paratypus 4.0.
Colour: Prosoma, opisthosomal scutum and legs medium brown, remaining parts of the opisthosoma light brown.
Body and legs as in the genus. The right patella II bears a strong prolateral bristle. A weak dorsal opisthosomal scutum seems to be present.

Relationships: In *G. constricta* n. sp. the position of the embolus is cross.

Distribution: Tertiary Baltic amber forest.

Microlinus n. gen.

Diagnosis (♂; ♀ unknown): Smallest known Salticidae in Baltic amber, body length 1.8mm, opisthosomal scutum (fig. 68) large, prosoma (figs. 68-69) nearly as wide as long, posterior median eyes large, nearer to the posterior lateral eyes than to the anterior lateral eyes, patella I with 2 hair-shaped dorsal bristles only, tibia I with only 2 pairs of ventral bristles and a retroventral bristle (fig. 70), tarsi with only one long trichobothrium (fig. 71). Pedipalpus (figs. 72-78): Tibia with a sickle-shaped retrolateral apophysis and a leaf-shaped retroventral apophysis which may be movable, bulbus prolaterally outstanding, conductor large and leaf-shaped, median apophysis sickle-shaped.

Relationships: See the key of the genera. In *Eolinus* and *Distanilinus* n. gen. the shape of prosoma and eyes, the number of tarsal trichobothria, the median apophysis, the conductor and the embolus are different.

Type species: *Microlinus folium* n. sp.

Distribution: Tertiary Baltic amber forest.

***Microlinus folium* n.gen.n.sp.** (figs. 68-75) Photo 429

Material: Holotypus ♂ in Baltic amber and 2 separated amber pieces F301/BB/AR/SAL/CJW.

Preservation and syninclusions: The spider is completely and excellently preserved, the legs are strongly bent under the body, the mouth parts are covered by a white emulsion, a large bubble covers the right part of the opisthosoma, a secretion is preserved at the tip of both emboli. - No stellate hairs but the part of a leg of an insect is also preserved.

Diagnosis (♂; ♀ unknown): Pedipalpus (figs. 73-75): Retrolateral tibial apophysis straight in dorsal aspect, embolus with an apophysis, conductor longer than the tip of the cymbium.

Description (♂):
Measurements (in mm): Body length 1.8, prosoma: length 0.9, width 0.83, hight above coxae 0.5, opisthosoma: Length 1.0, width 0.77, leg I: Femur: Length 0.43, hight 0.16, patella 0.23, tibia: Length 0.27, hight 0.1, metatarsus 0.24, tarsus 0.2, leg IV: Femur 0.55, tibia 0.5, diameter of a posterior median eye 0.11, diameter of an anterior median eye 0.24.
Colour dark brown but opisthosoma besides the scutum light brown.
Prosoma (figs. 68-69) nearly as wide as long, covered with white hairs, anterior lateral eyes in a frontal position, posterior median eyes large, their position nearer to the posterior lateral eyes than to the anterior lateral eyes. Chelicerae small, sternum not prolongated between the coxae IV. - Legs (figs. 71-72) robust, order IV/I/II=III, I not modified, no scopula, few bristles: Hair-shaped on the femora, 1 dorsally and 1 prodistally, patellae 2 dorsal hair-shaped bristles, tibiae 2 ventral pairs and a retroventral bristle near the tip of the article, no true dorsal or lateral bristles, metatarsus I: 2 pairs of long ventral bristles, metatarsi III-IV with several apical bristles, metatarsus IV with a long retrodistal bristle, tarsal claws with tiny teeth. All tarsi with only one long dorsal trichobothrium in the basal half. - Opisthosoma with a large dorsal scutum, fairly hairy, spinnerets long. - Pedipalpus (figs. 72-75): See above. Between embolus and conductor there exists a lamellar structure.

Relationships: In *M. calidus* n. sp. is the retrolateral tibial apophysis of the pedipalpus shorter and slightly bent to the cymbium, the conductor is shorter and an apophysis of the embolus is absent.

Distribution: Tertiary Baltic amber forest.

***Microlinus calidus* n. gen. n. sp.** (figs. 76-77)

Material: Holotypus ♂ in Baltic amber and a separated amber piece, F302/BB/AR/SAL/CJW.

Preservation and syninclusions: The smaller amber piece which contains the holotype was heated in an autoclave. The spider is completely and well preserved but

darkened; the white hairs of the prosoma - compare *M. folium* n. sp. - are not observable. - Two Diptera and several detritus particles are preserved in the piece with the holotype. In the larger separated amber piece 2 1/2 Diptera: Nematocera, 1/2 Coleoptera, numerous detritus particles and some stellate hairs are preserved; one of the Diptera is parasited on its abdomen by a tiny Acari.

Diagnosis (♂; ♀ unknown): Pedipalpus (figs. 76-78): Retrolateral tibial apophysis in dorsal aspect bent to the cymbium, conductor shorter than the tip of the cymbium.

Description (♂):
Measurements (in mm): Body length 1.8, prosoma length 0.95, tibia I 0.3, tibia II 0.25, tibia III 0.25. Colour dark brown (heated). Body and legs as in *M. folium* n. sp.

Relationships: See *M. folium* n. sp.

Distribution: Tertiary Baltic amber forest.

Paralinus PETRUNKEVITCH 1942 (figs. 79-80)

Remark: I never found a member of this genus among Baltic amber inclusions.

Diagnosis (♂; ♀ unknown): Posterior median eyes nearly as large as posterior lateral eyes, according to the original description bear tibia I-II a row of 3 strong dorsal "bristles". Pedipalpus (figs. 79-80): Tibia with a retrolateral apophysis which is nearly as long as the cymbium, no ventral tibial apophysis, cymbium long, median apophysis unknown, according to the original description a conductor is present, embolus long and thin. - Body length about 4.2mm.

The **relationships** are unsure.

Type species: *Paralinus crosbyi* PETRUNKEVITCH 1942, the only known species.

Distribution: Tertiary Baltic amber forest.— I do not want to exclude a fake.

Prolinus PETRUNKEVITCH 1958 (fig. 81)

Diagnosis (♀; ♂ unknown): Eyes of the second row nearly as large as the eyes of the third row and nearer to the anterior lateral eyes than to the posterior lateral eyes

(fig. 81), prosoma 1.4 times longer than wide, femoral bristles absent according to the original description, tibia I with 3 pairs of ventral bristles, body length 4.14mm.

Type species: *Prolinus fossilis* PETRUNKEVITCH 1958, the only known species of this genus.

Remark: I do not want to exclude that - according to its small posterior median eyes - *Prolinus fossilis* sensu ZABKA (1988) (Female) may be a member of the genus *Almolinus*.

The **relationships** are unknown, only the female is known.

Distribution: Tertiary Baltic amber forest.

Gen. & sp. indet: Material: 1 exuvia, subad. ♂ in Baltic amber, F591/BB/AR/SAL/CJW. Prosomal length 1.8mm. The exuvia is densily covered by hyphae of a fungus and dorsally some spider's threads, the posterior median eyes are small, a prosomal constriction is absent. - Thre relationsphips are unknown.

Distribution: Tertiary Baltic amber forest.

(2b) Genera and species in Dominican amber (See p. 1769-1770)

Lyssomanes *galianoae* REISKIND 1989 = *L. pristinus* WUNDERLICH 1986, see PENNEY (2000), Palaeontology, 44 (5): 1005. *L. pulcher* WUNDERLICH (1988), photo 411.

Pensacolatus WUNDERLICH 1988

?***Pensacolatus tibialis*** **n. sp**. (figs. 82-84)

Material: Holotypus ♂ in Dominican amber, F324/BB/AR/SAL/CJW.

Preservation and syninclusions: The amber piece with the holotype is full of tiny

and large bubbles. The spider is well and nearly completely preserved, only the legs III are missing after the coxa by autotomy. Both bulbi are observable in the ventral aspect. - A Collembola is situated in a ventral excavation of the spider's opisthosoma, a small Diptera: Nematocera just above the opisthosoma, a long and thin part of a leg of an insect left of the spider.

Diagnosis (♂; ♀ unknown): Tibia I distinctly thickened, tibia and metatarsus I-II hairy (fig. 82), pedipalpus (figs. 83-84): Retrolateral tibial apophysis and ventral tibial outgrowth of medium length, position of the embolus in a short spiral.

Description (♂):
Measurements (in mm): Body length 2.8, prosoma: Length 1.6, width 1.2, leg I: Femur 0.95, (hight 0.37), patella 0.55, tibia 0.65 (hight about 0.25), metatarsus about 0.5, tarsus 0.34, tibia II 0.6, tibia IV 0.75.
Colour: Prosoma and legs dark brown, opisthosoma light brown.
Prosoma and legs similar to ?*Pensacolatus* sp. indet. sensu WUNDERLICH (1988: Figs. 685-686). Cheliceral fangs long, teeth hidden. - Legs (fig. 82): Order IV/I/II/III, femora and tibiae I-II high. Chaetotaxy as in the genus, three pairs of ventral bristles on tibia I, no dorsal-basal bristle on tibia IV. - Opisthosoma 1.45 times longer than wide, covered with thin hairs, a dorsal scutum may be present; spinnerets long, probably somewhat deformed. At least one tarsal and two metatarsal trichobothria. - Pedipalpus (figs. 83-84) with long and slender cymbium and bulbus, see above.

Relationships: In *Pensacolatus* WUNDERLICH 1988 the tibiae I-II bear 3 pairs of ventral bristles, a ventral tibial outgrowth is present and the bulbus structures are similar. In contrast to the two known fossil species tibia I is distinctly thickened and hairy in the new species; probably the shape of the male tibia I is not a generic character.

Distribution: Tertiary Dominican amber forest.

?**Sarinda sp. indet**.

Material: 1 ♂ in Dominican amber, Staatl. Mus. Naturkunde Stuttgart, Do-3476-M.

Body length 2.6mm. This distinctly myrmecomorph spider may well be a member of the American genus *Sarinda* PECKHAM & PECKHAM 1882 and congeneric or even conspecific with the subad. male of ?*Descangeles* sp. indet. sensu WUNDERLICH (1988: 247, fig. 693) and Salticidae sp. indet. sensu WUNDERLICH 1986 (48, fig. 33).

Distribution: Tertiary Dominican amber forest.

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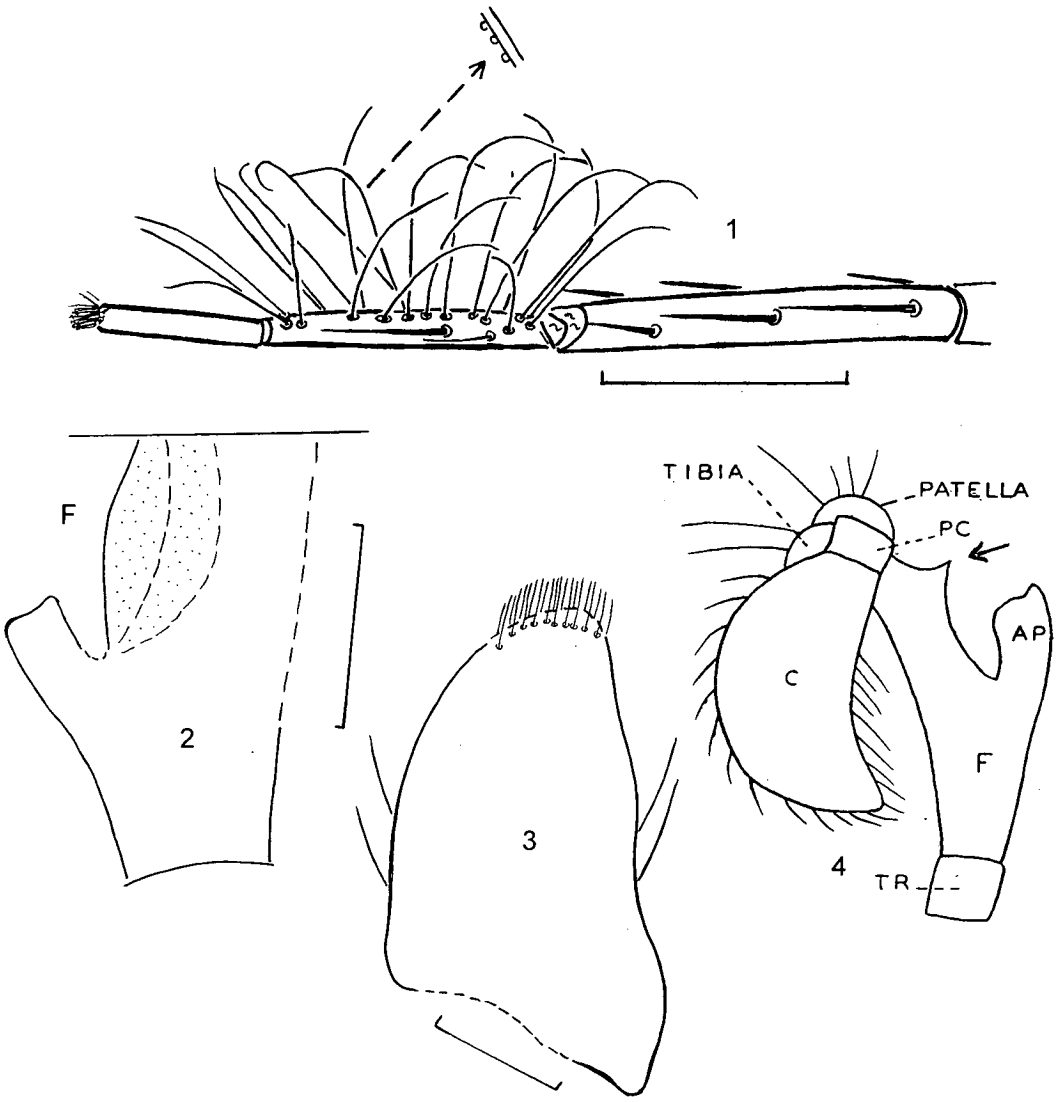
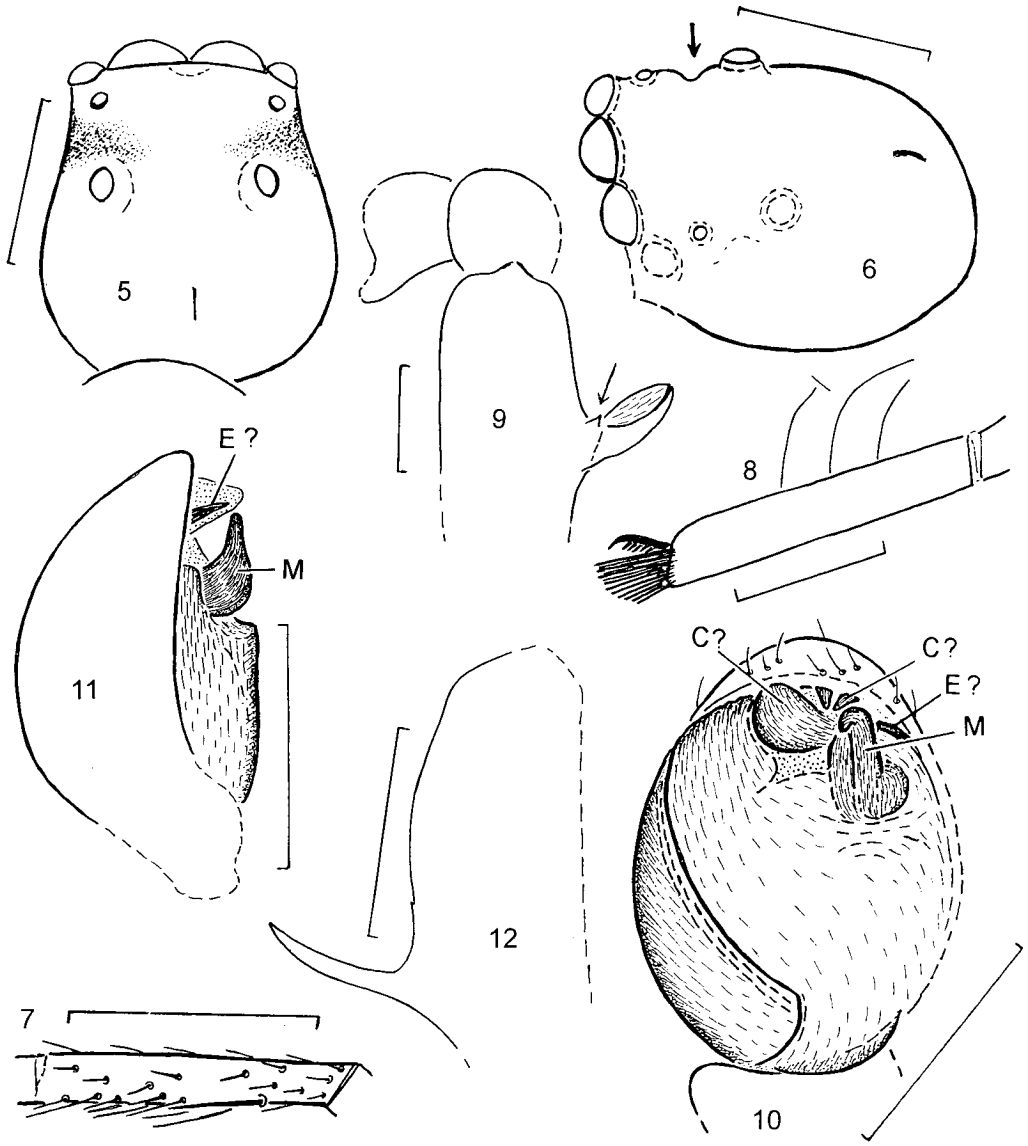
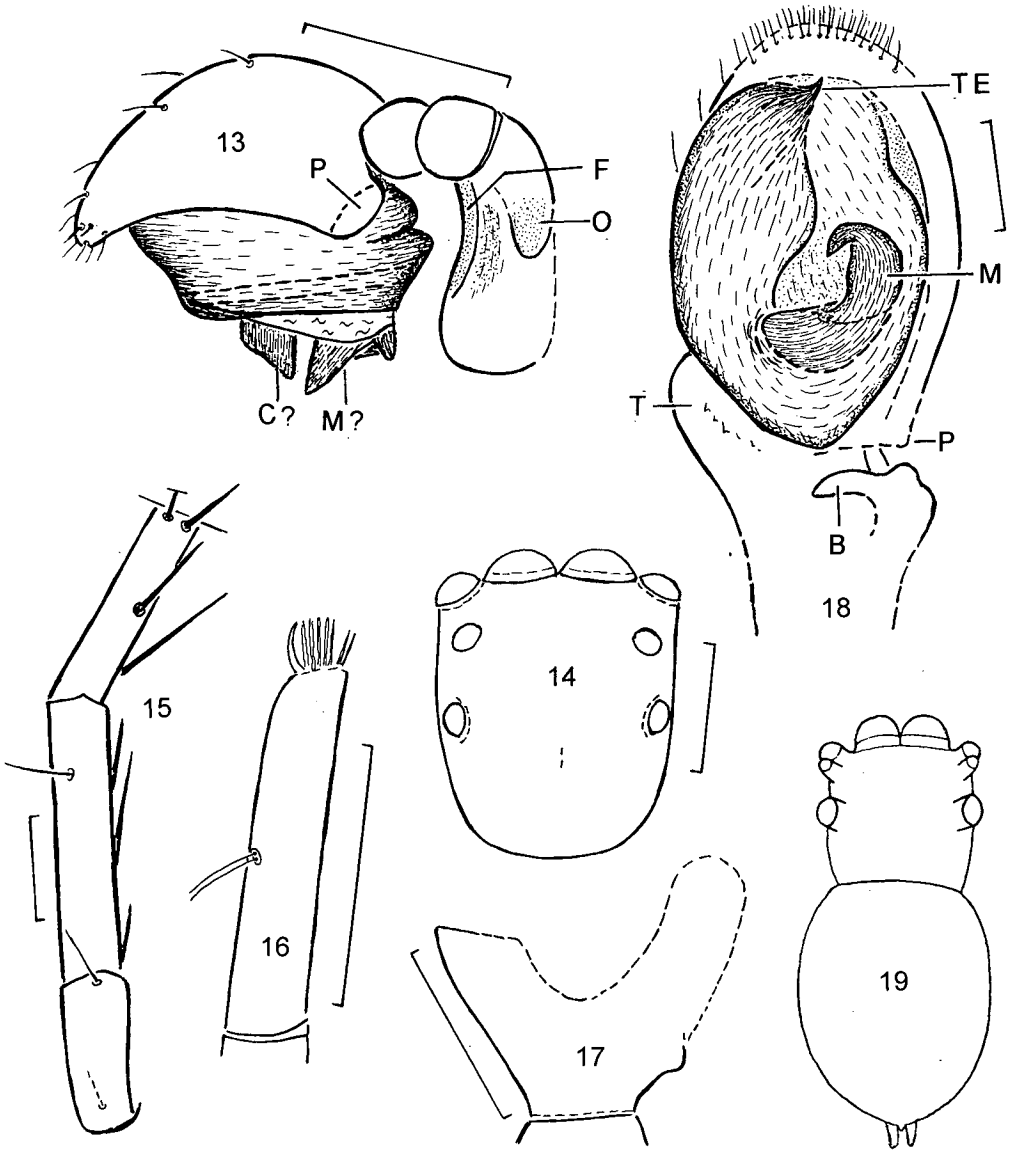


Figs. 1-3: ***Almolinus bitterfeldensis* n. sp.**, ♂; 1) holotypus, distal articles of the left leg II retroventrally. Trichobothria and normal hairs are not drawn. Note the long ventral metatarsal sensory hairs (not all hairs are drawn); at least the sides of the hairs which are directed to the tarsal claws are covered with tiny granules (arrow); 2) holotypus, femur (partly hidden) of the r. pedipalpus ventrally and slightly basally (F = furrow); 3) paratypus, r. cymbium dorsally. - M = 0.5mm in fig. 1, 0.2 in figs. 2-3;

fig. 4: ***Almolinus clarus*** PETRUNKEVITCH 1958, ♂ holotypus, l. pedipalpus "retrolaterally" (the cymbium apparently more dorsally, the femur more ventrally). The arrow indicates to the most probably - by heating - deformed part of the femur. (AP = femoral apophysis, F = femur, PC = paracymbium, TR = trochanter. - Taken from PETRUNKEVITCH (1958: Fig. 545). - No M;

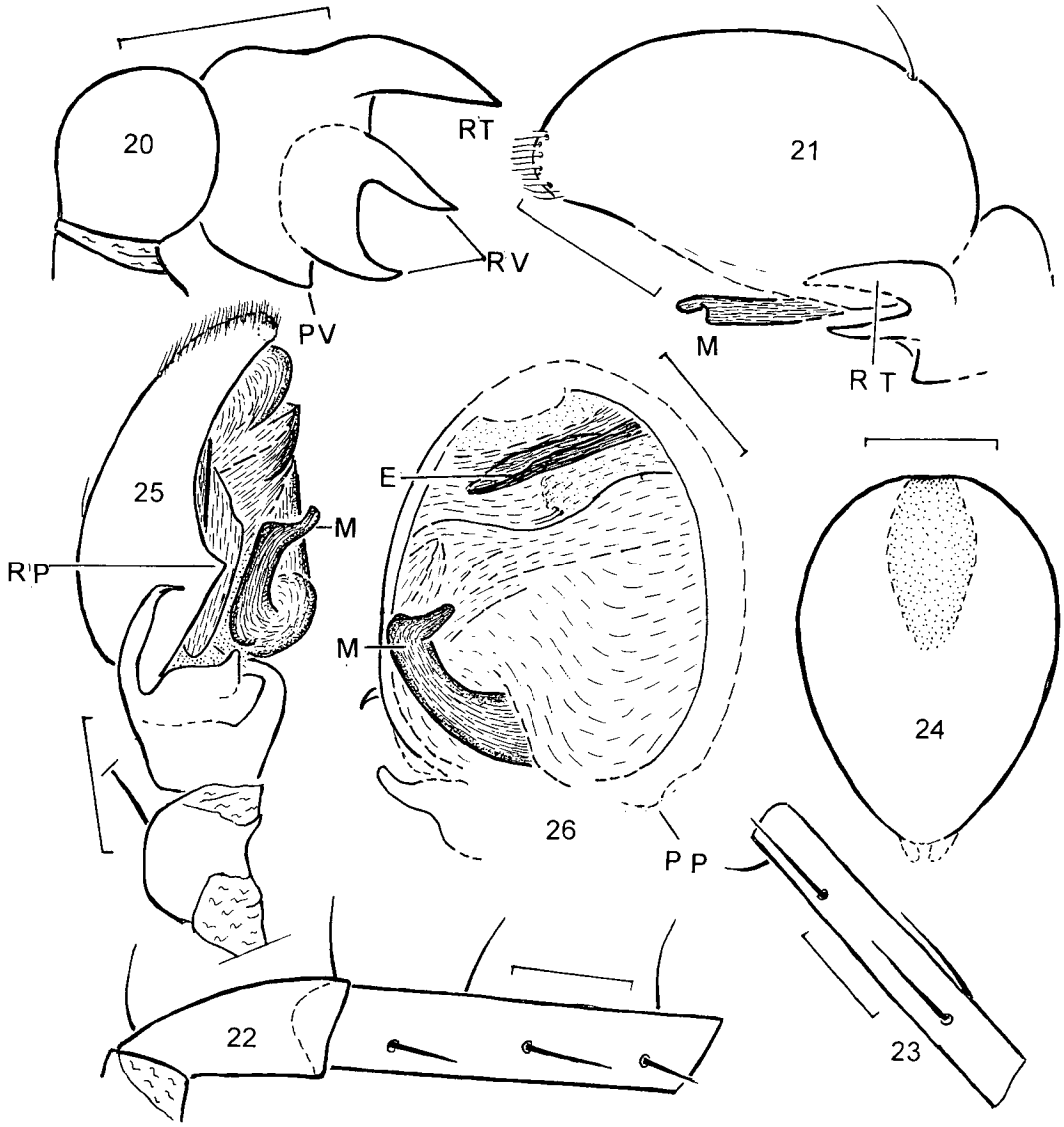


figs. 5-13: ***Almolinus ligula* n. sp.**, ♂; 5) paratypus a), prosoma dorsally; 6) paratypus e), prosoma in dorsal-left aspect. The arrow indicates to the inclination between the posterior median and posterior lateral eyes; 7) holotypus, l. metatarsus II retrolaterally. Note the short ventral hairs; 8) male from the GPIH, l. tarsus III with trichobothria retrolaterally and slightly ventrally; 9) paratypus a), r. pedipalpus, patella prolaterally, tibia prodorsally and femur dorsally; 10-11) holotypus, l. pedipalpus ventrally and r. pedipalpus retrolaterally; 12) paratypus d), femur of the l. pedipalpus (partly hidden) dorsally;→13) paratypus e), l. pedipalpus (expanded) retrodorsally (C = conductor,E= embolus, M = median apophysis, O = femoral outgrowth, P = paracymbium). - M = 0.2 in figs. 10-12, 0.5 in the remaining figs.;



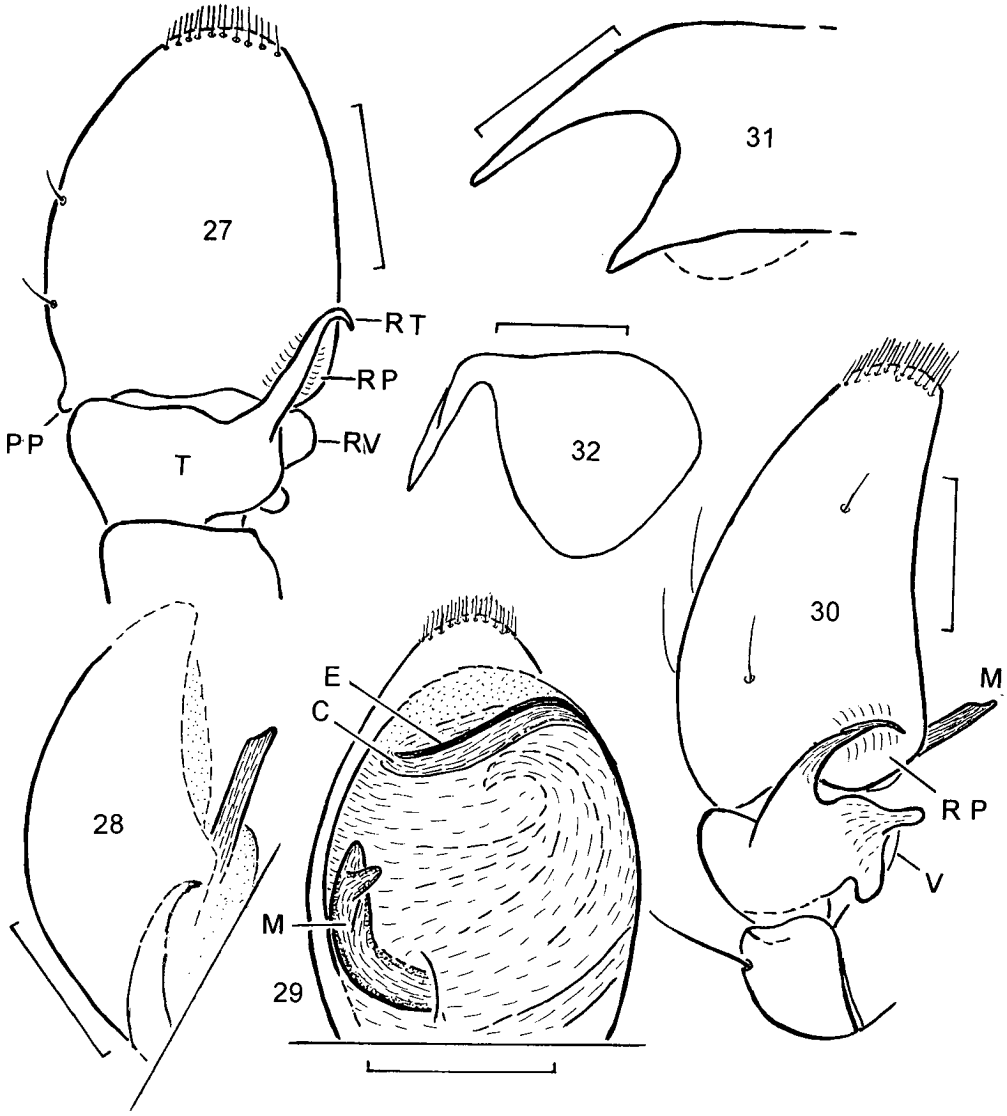
figs. 14-18: ***Calilinus fleissneri* n. gen. n. sp.**, ♂ holotypus; 14) prosoma dorsally; 15) l. patella and tibia prodorsally and basal part of the l. metatarsus prolaterally; 16) r. tarsus III retrodorsally and slightly from the tip. Note the abnormally doubled trichobothrium! 17) tibia of the l. pedipalpus (partly hidden) dorsally; 18) l. pedipalpus ventrally and slightly distally (B = branch of the retroventral tibial apophysis, M = median apophysis, P = retrolateral paracymbium, PT = prolateral prolongation of the tibia, TE = tip of the embolus). - M = 0.5 in fig. 14), 0.2 in the remaining figs.;

fig. 19: ***Cenattus exophthalmus*** PETRUNKEVITCH 1942, ♀, body in the dorsal apect. Taken from PETRUNKEVITCH (1942: Fig. 33);



figs. 20-21: ***Distanilinus filum*** **n. gen. n. sp.**, ♂; 20) patella and tibia of the r. pedipalpus retrolaterally; 21) l. pedipalpus retrodorsally (M = median apophysis, PV = proventral tibial apophysis, RT = retrodorsal tibial apophysis, RV = divided retroventral tibial apophysis). - M = 0.2;

figs. 22-26: ***Distanilinus nutus*** **n. gen. n. sp.**, ♂, holotypus; 22) r. patella and tibia I retroventrally; 23) r. metatarsus I retrolaterally; 24) outline of the opisthosoma dorsally with the scutum (punctated) (hairs not drawn); 25) r. pedipalpus retrolaterally; 26) r. pedipalpus (partly hidden) ventrally and slightly prodistally (E = embolus. M = median apophysis, PP = probasal paracymbium, RP = retrolateral paracymbium). - M = 0.5 in fig. 22), 0.2 in the remaining figs.;



figs. 27-29: ***Distanilinus paranutus*** **n. gen. n. sp.**, ♂; 27) r. pedipalpus dorsally; 28) r. pedipalpus (partly hidden) retrolaterally); 29) r. pedipalpus (basally hidden) ventrally (C = conductor, E = embolus, M = median apophysis, PP = probasal paracymbium, RP = retrolateral paracymbium, RT = retrolateral tibial apophysis, RV = retroventral tibial apophysis, T = tibia). - M = 0.2;

fig. 30: ***Distanilinus pernutus*** **n. gen. n. sp.**, ♂, r. pedipalpus retrolaterally and slightly dorsally (M = median apophysis, RP = retrolateral paracymbium, V = ventral tibial apophysis). - M = 0.2;

figs. 31-32: ***Distanilinus fungus*** **n. gen. n. sp.**, ♂; 31) l. pedipalpus, retrolateral and retroventral tibia apophysis retrolaterally; 32) l. median apophysis retrolaterally. - M = 0.2 in fig. 31, 0.2 in fig. 32;

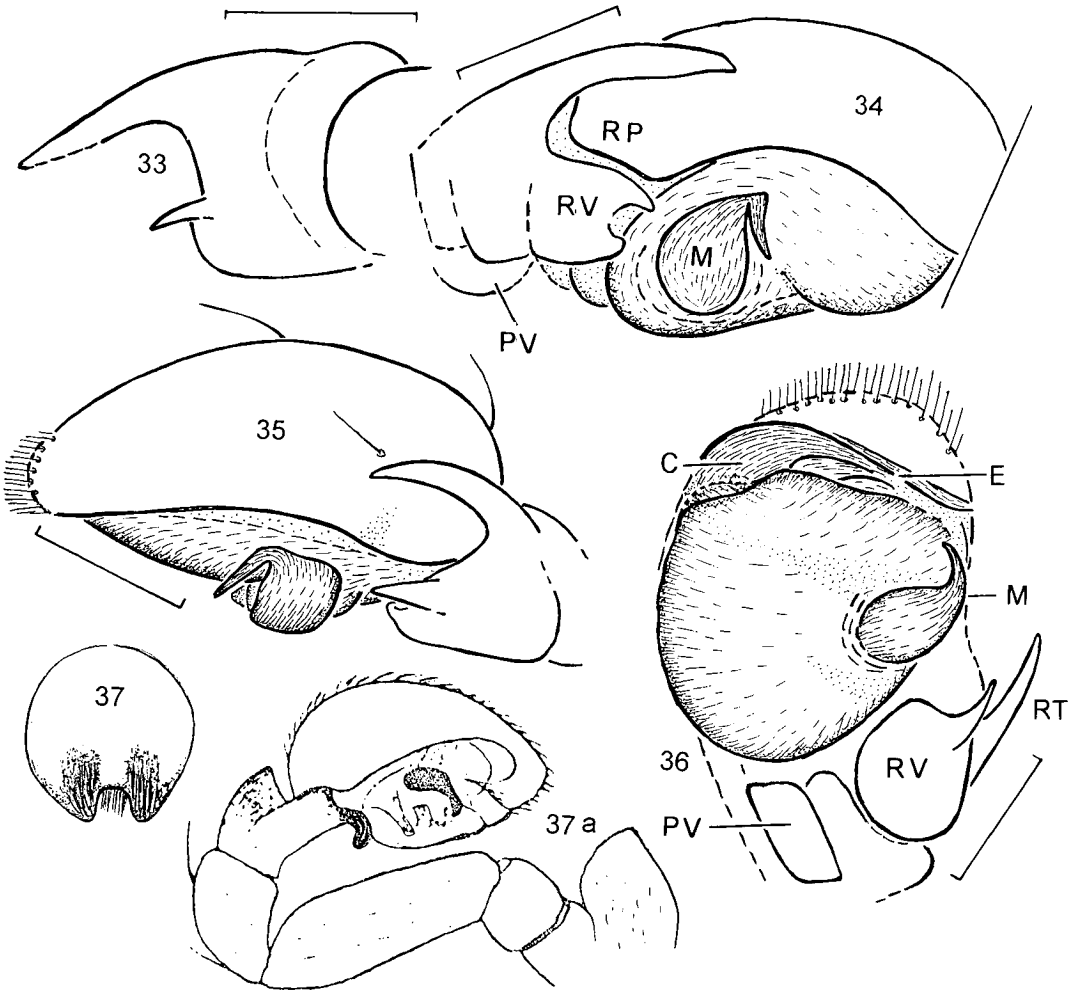


fig. 33: ***Eolinus insuriens*** **n. sp.**, ♂, tibia of the l. pedipalpus retrolaterally. - M = 0.2;

fig. 34: ***Eolinus prominens*** **n. sp.**, ♂, r. pedipalpus retrolaterally, bulbus probably partly expanded (M = median apophysis, PV = proventral tibial apophysis, RP = retrolaterales paracymbium, RV = retroventral tibial apophysis). - M = 0.2;

figs. 35-36: ***Eolinus samlandica*** **n. sp.**, ♂, l. pedipalpus retrolaterally and ventrally (C = cymbium, E = embolus, M = median apophysis, see fig. 34). - M = 0.2;

fig. 37: ***Eolinus succineus*** PETRUNKEVITCH 1942, ♀, holotypus, epigyne, taken from PETRUNKEVITCH (1942: Fig. 41). - No M;

fig. 37a: ***Eolinus succineus*** PETRUNKEVITCH 1942, ♂, "androtype", taken from PETRUNKEVITCH (1942: Fig. 42). - No M;

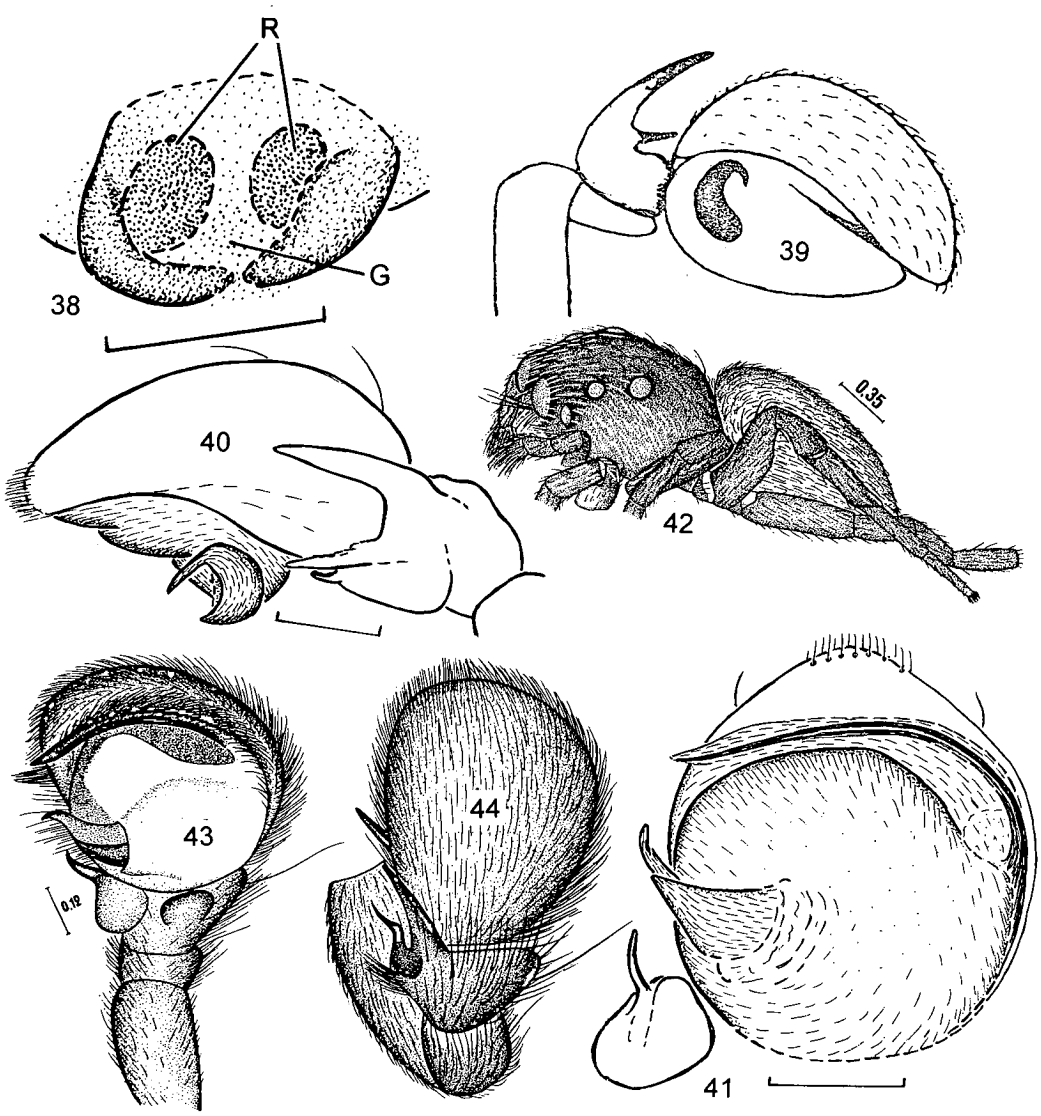


fig. 38: ?***Eolinus* sp. indet.**, Bitterfeld deposit, F320, ♀, epigyne in ventral-left aspect with the groove (G) and the questionable receptacula seminis (R). - M = 0.2;

fig. 39: ***Eolinus theryi*** PETRUNKEVITCH 1942, ♂, r. pedipalpus retrolaterally, taken from PETRUNKEVITCH (1942: Fig. 46). - No M;

figs. 40-41: ***Eolinus theryoides* n. sp.**, ♂; 40) l. pedipalpus retrolaterally; 41) r. pedipalpus ventrally. - M = 0.2;

figs. 42-44: ***Eolinus tystschenkoi*** PROSZYNSKI & ZABKA 1980, ♂, holotypus; 42) body laterally; 43-44) r. and l. pedipalpus ventrally and dorsally;

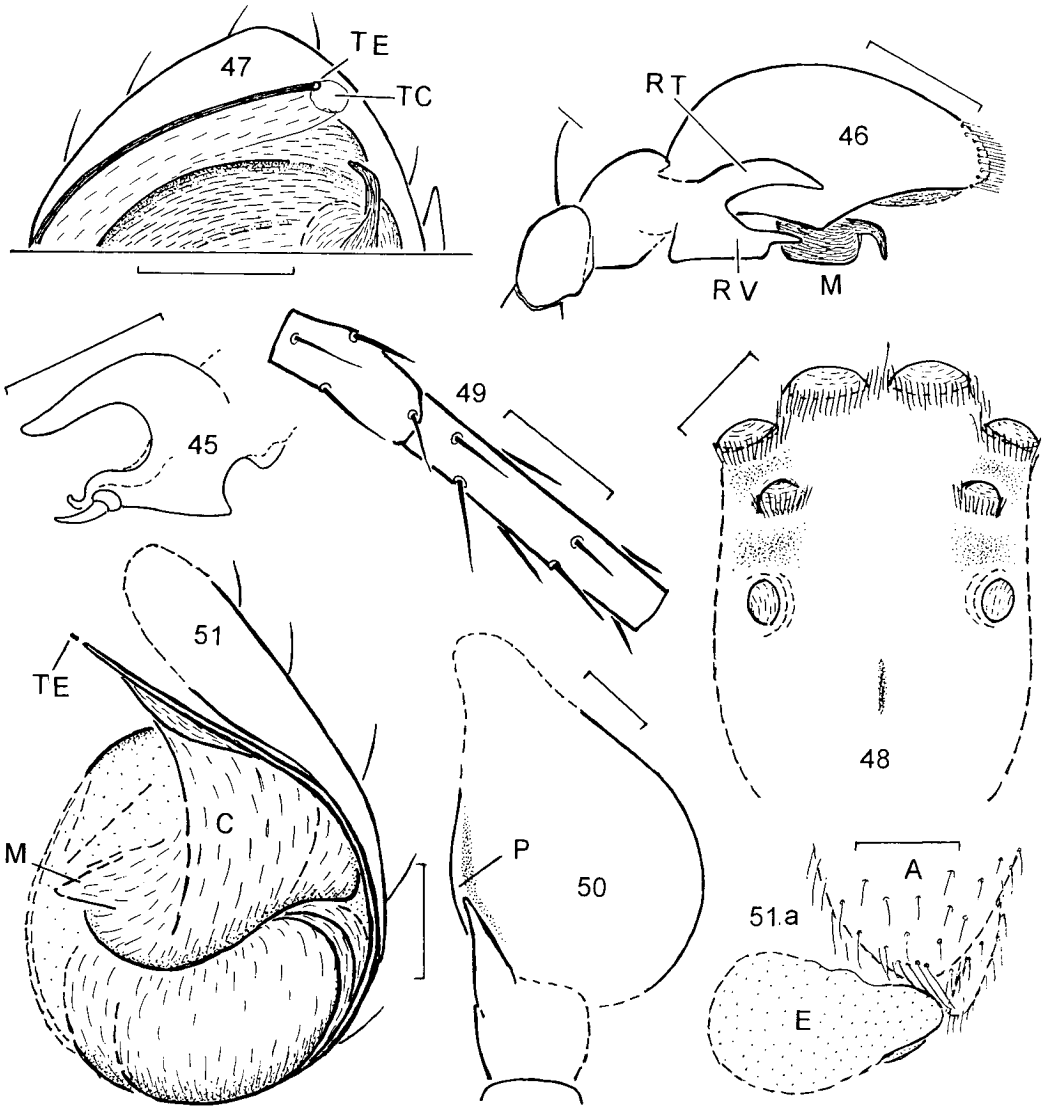
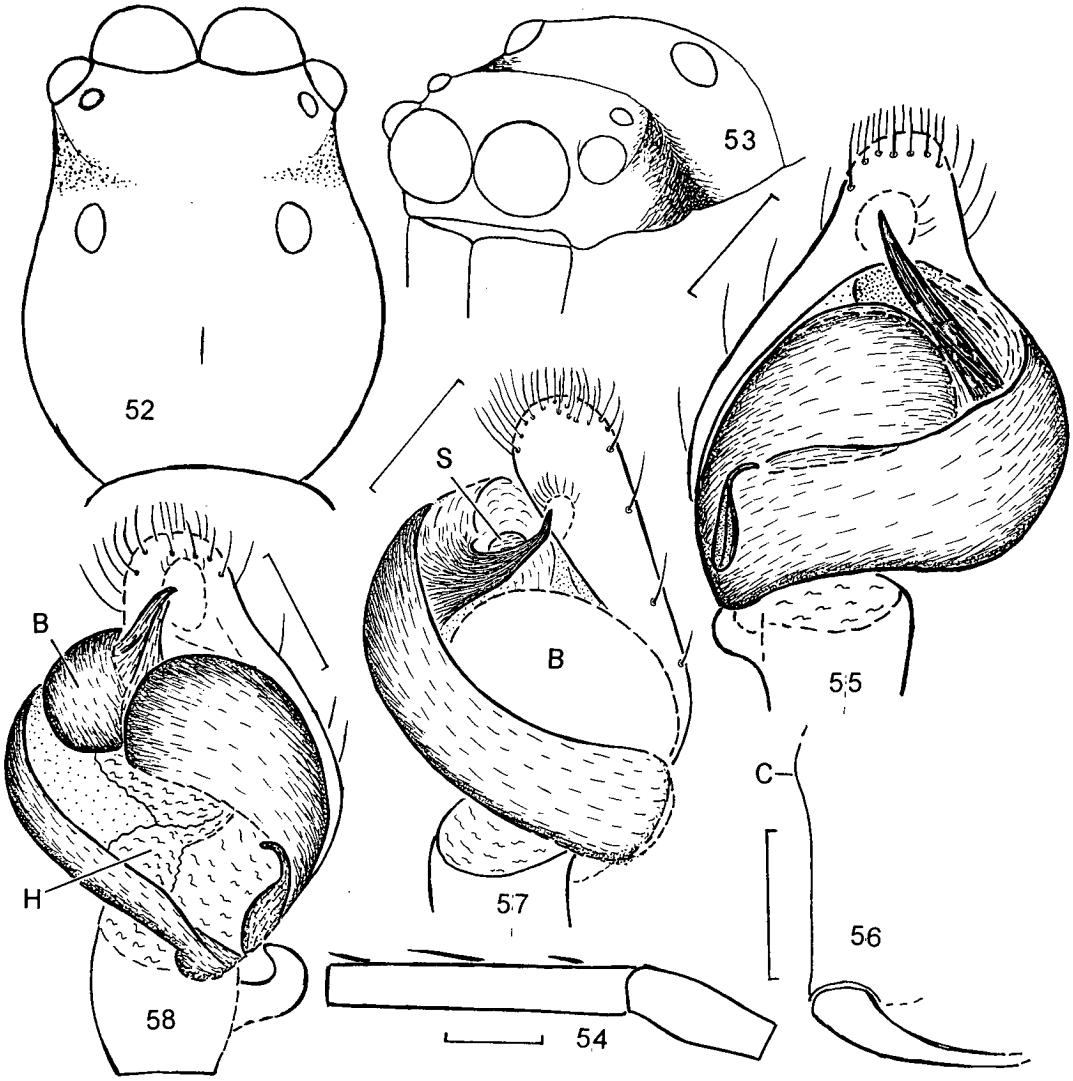


fig. 45: ***Eolinus* ?*tystschenkoi*** PROSZYSKI & ZABKA 1980, ♂ (F316), tibial apophysis of the r. pedipalpus retrolaterally and slightly dorsally-distally. - M = 0.2;

figs. 46-47: ***Eolinus vates* n. sp.**, ♂; 46) r. pedipalpus retrolaterally; 47) distal part of the l. pedipalpus ventrally (M = median apophysis, RT = retrolateral tibial apophysis, RV = retroventral tibial apophysis, TC = tip of the conductor, TE = tip of the embolus. - M = 0.2;

figs. 48-51a: ***Gorgopsidis bechlyi* n. gen. n. sp.**, ♂, holotype ; 48) prosoma dorsally (only few hairs are drawn); 49) l. patella and tibia I prodorsally; 50) tibia and cymbium of the l. pedipalpus dorsally and slightly probasally (hairs and tibial bristles are not drawn) (P = retrolateral paracymbium); 51) r. pedipalpus ventrally and slightly prodistally (the retrolateral parts are hidden); 51a) questionable remains of an excrement droplet (E) behind the anal tubercle (A) (M ?= median apophysis, TE = hidden tip of the embolus). - M = 0.5 in figs. 48-49, 0.2 in the remaining figs.;

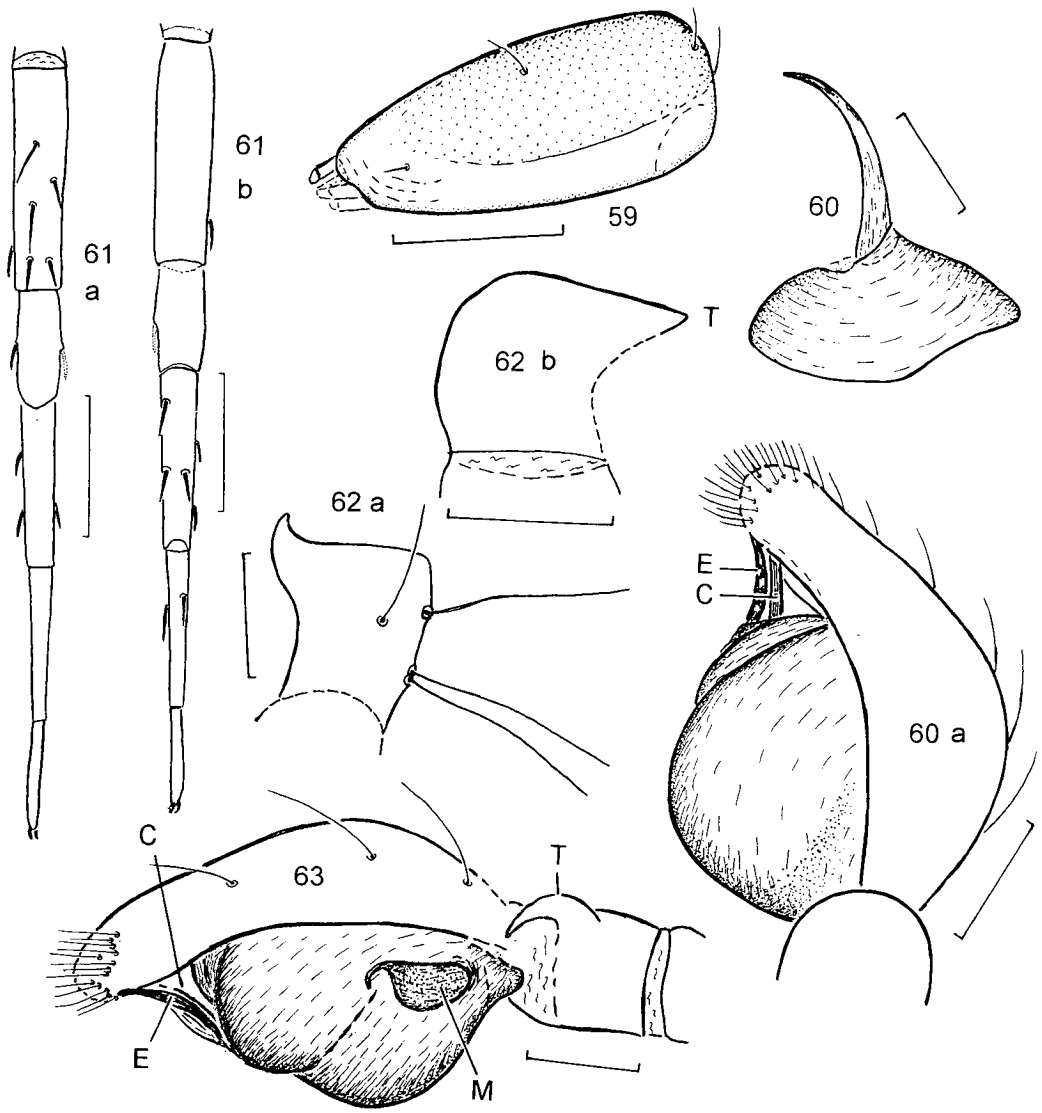


figs. 52-53: ***Gorgopsina jucunda*** (PETRUNKEVITCH 1942), ♀, prosoma in dorsal and frontal-lateral aspect, taken from PETRUNKEVITCH (1942: Figs. 48-49), slightly modified. - No M;

figs. 54-55: ***Gorgopsina amabilis*** **n. sp.**, ♂; 54) l. patella and tibia I prodorsally; 55) r. pedipalpus ventrally. - M = 0.5 and 0.2;

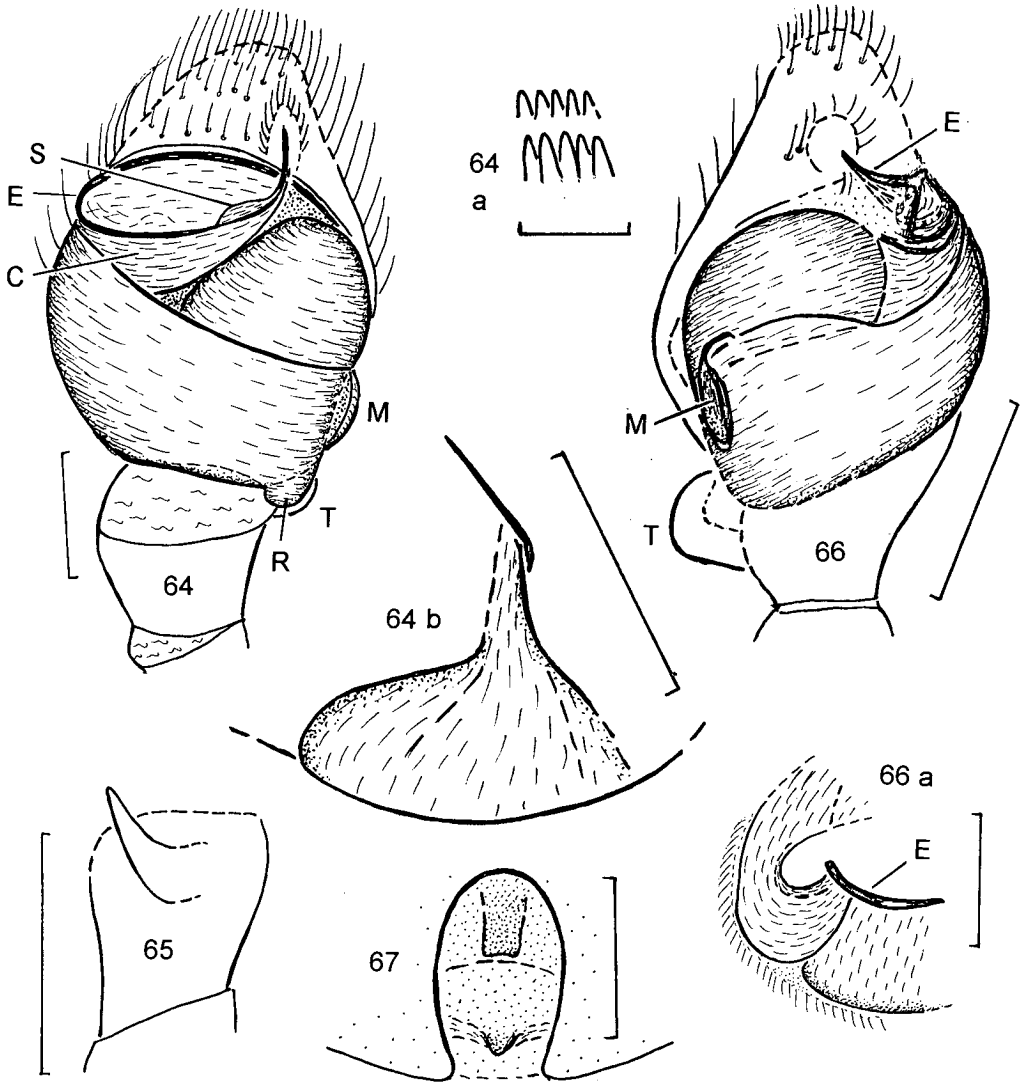
figs. 56-57: ***Gorgopsina constricta*** **n. sp.**, ♂; 56) outline of parts of the r. chelicera, frontal-distal aspect (C = condylus); 57) l. pedipalpus ventrally (B = bubble, S = secretion). - M = 0.2;

fig. 58: ***Gorgopsina expandens*** **n. sp.**, ♂, l. pedipalpus ventrally, subtegulum partly expanded (B = base of the embolus, H = median haematodocha). - M = 0.2;



figs. 59-60a: ***Gorgopsina flexuosa* n. sp.**, ♂, holotype (60) and questionable ♂ (59, 60a); 59) opisthosoma in retrodorsal view, scutum punctated, only few hairs are drawn; 60) embolus of the r. pedipalpus ventrally; 60a) r. pedipalpus prolaterally (C = conductor, E = embolus). - M = 1.0 in fig. 59, 0.1 in fig. 60 and 0.2 in fig. 60a;

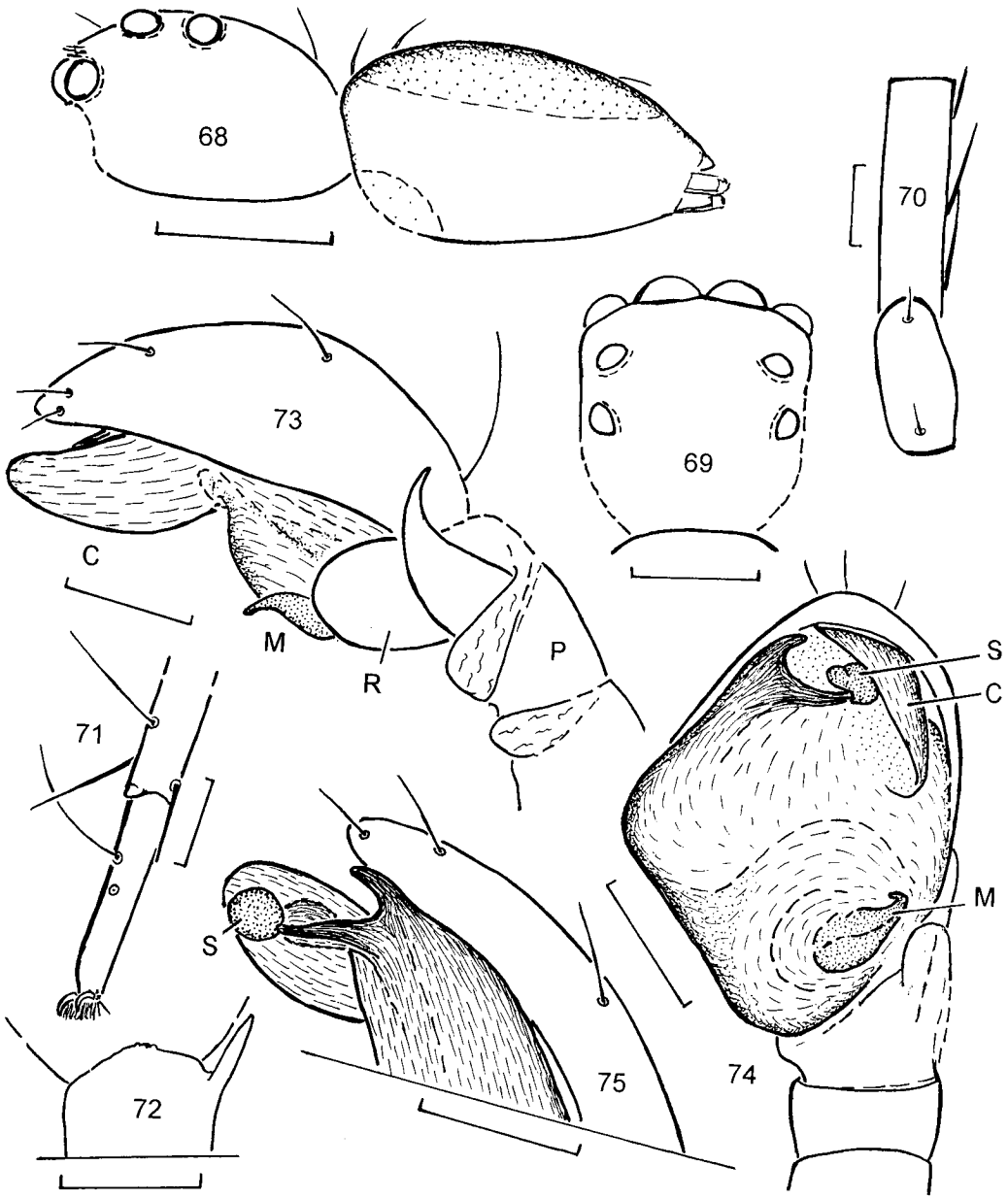
figs. 61a-64: ***Gorgopsina frenata*** (KOCH & BERENDT 1854), questionable males; 61a-b) "hypotype" of the British Museum, In. 18739, l. leg Idorsally and ventrally (few of the short apical bristles are not drawn); 62a) F288, tibia of the l. pedipalpus dorsally; 62b) F290, outline of the tibia of the r. pedipalpus dorsally; 63-64) F287, l. pedipalpus retrolaterally, slightly ventrally and ventrally (not all hairs are drawn) (C = conductor, E = embolus, M = median apophysis, R = retrobasal bulbus-outgrowth, S = seam of th embolus, T = retrolateral tibial apophysis). - M = 0.2 in figs. 62-64, 1.0 in figs. 61a-b;



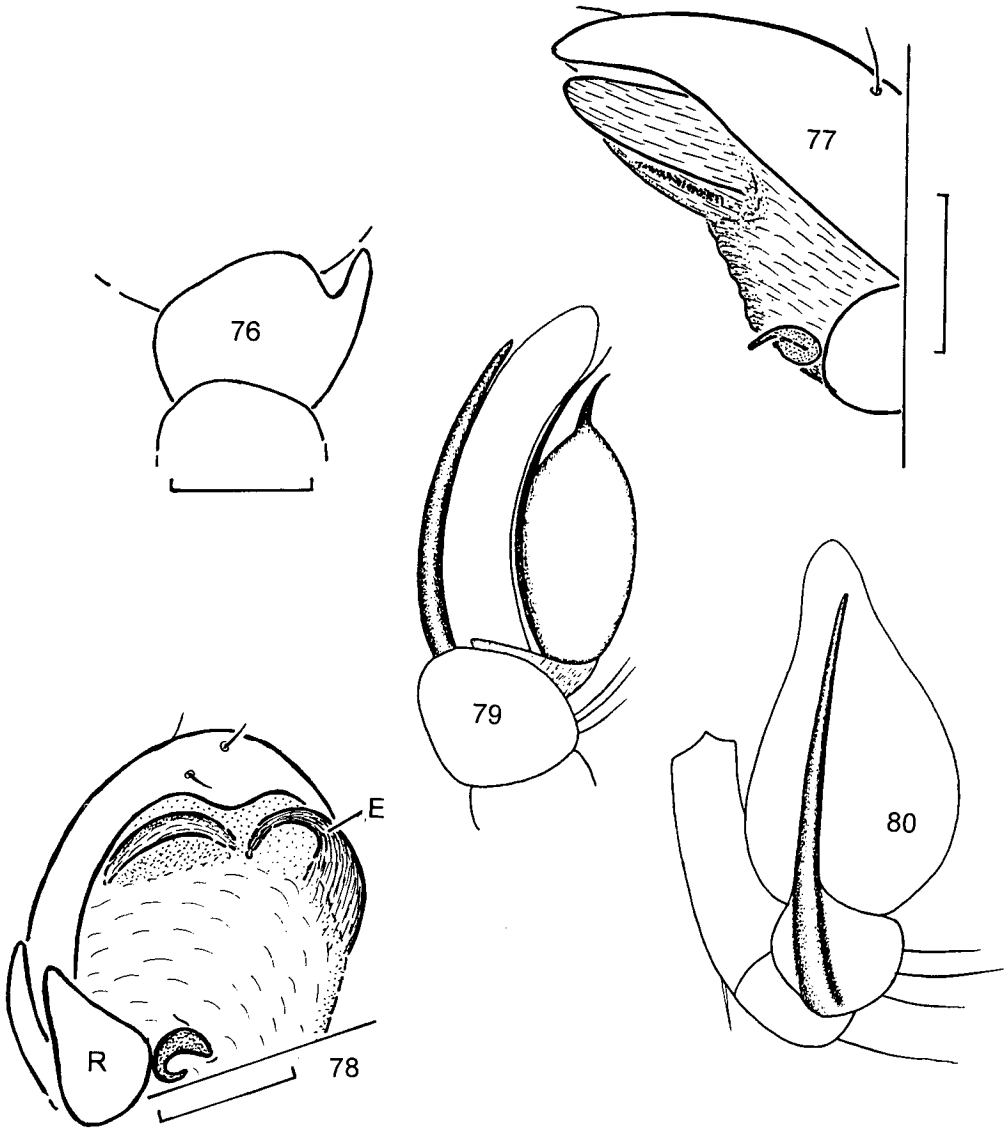
figs. 64a-b: ***Gorgopsina inclusa* n. sp.**, ♂; 64a) teeth of the l. cheliceral margins ventrally-distally; 64b) embolus and conductor of the l. pedipalpus prodistally. - M = 0.1 and 0.2;

figs. 65-66a: ***Gorgopsina speciosa* n. sp.**, ♂; 65) tibia of the l. pedipalpus retrolaterally; 66) r. pedipalpus ventrally; 66a) r. embolus apically (E = embolus, M = median apophysis, T = retrolateral tibial apophysis). - M = 0.2;

fig. 67: ***Gorgopsina* sp.**, ♀, F298, epigyne. Note the tongue-shaped structure frontally in the groove. - M = 0.2;



figs. 68-75: ***Microlinus folium*** **n. gen. n. sp.**, ♂; 68) body laterally; 69) prosoma dorsally; 70) r. patella and tibia I retrodorsally; 71) r. tarsus I and the basal part of the metatarsus prodorsally. Note the long single tarsal trichobothrium and the tarsal organ; 72) distal part of the tibia of the r. pedipalpus dorsally; 73-74) l. pedipalpus retrolaterally and ventrally; 75) distal part of the r. pedipalpus prolaterally (C = conductor, M = median apophysis, S = secretion - questionable sperm at the tip of the embolus -, P = patella, R = retroventral tibial apophysis). - M = 0.5 in figs. 68-69, 0.1 in the remaining figs.;



figs. 76-78: ***Microlinus calidus* n. gen. n. sp.**, ♂; 76) tibia of the r. pedipalpus dorsally; 77) l. pedipalpus (basally hidden) retrolaterally; 78) r. pedipalpus (basally hidden) retroventrally-distally (E = embolus, R = retroventral tibial apophysis). - M = 0.1;

figs. 79-80: ***Paralinus crosbyi*** PETRUNKEVITCH 1942, ♂, l. pedipalpus prolaterally and retrolaterally. - No M. Taken from PROSZYNSKI & ZABKA (1980: Figs. 16-17);

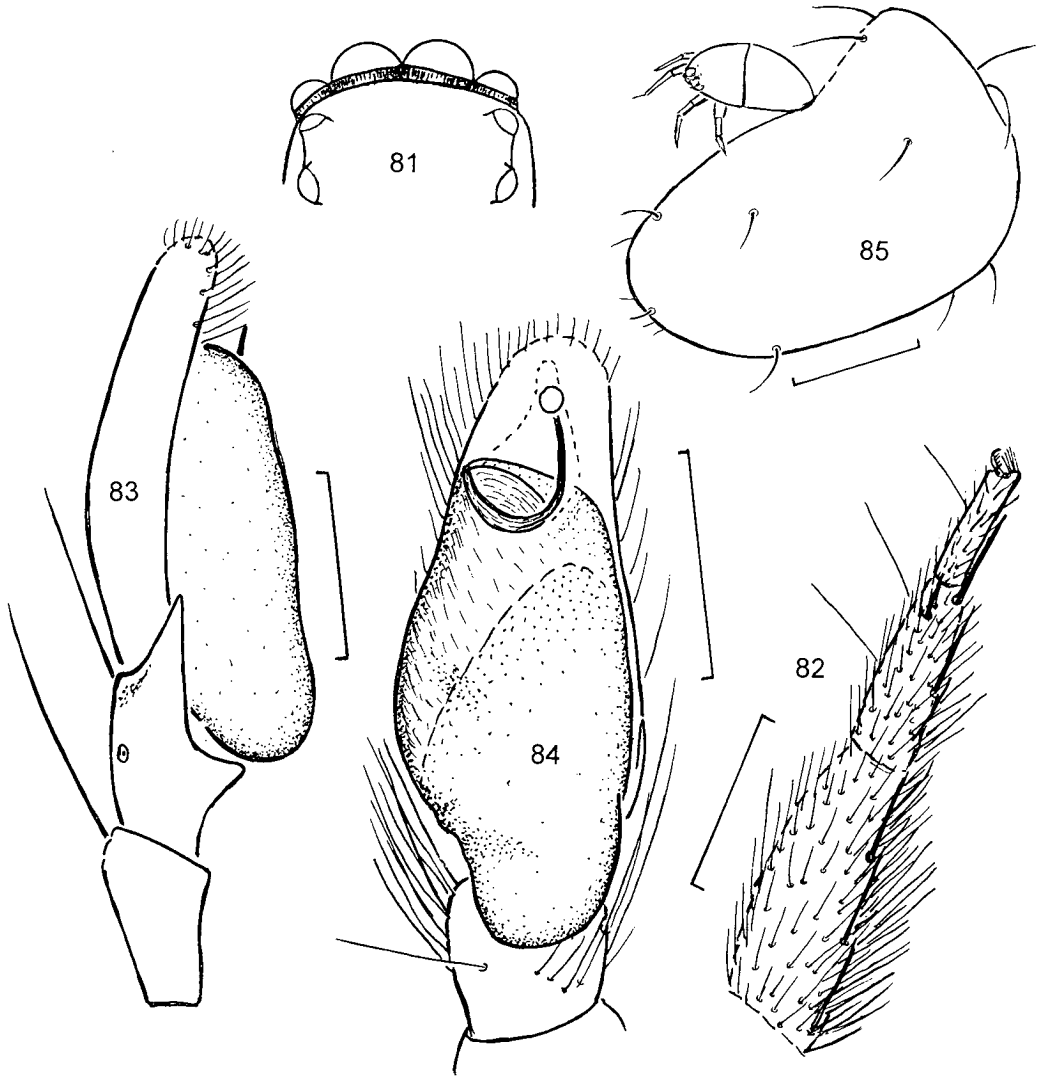


fig. 81: ***Prolinus fossilis*** PETRUNKEVITCH 1958, ♀, anterior part of the prosoma dorsally. - No M. Taken from PETRUNKEVITCH (1958: Fig. 551);

figs. 82-84: ?***Pensacolatus tibialis*** **n. sp.**, ♂; 82) tibia, metatarsus and tarsus of the r. leg I retrolaterally; only few trichobothria are drawn, the bristles are partly hidden; 83-84) r. pedipalpus retrolaterally and ventrally; note the droplet - remains of sperm? - at the tip of the embolus in fig. 84. - M = 0.5 in fig. 82, 0.2 in the other figs.;

fig. 85: A **phoretic mite** (Acari: Astigmata: Histiostomatidae) larva (at the left) fixed with its posterior body part on the promargin of the left cymbium of the Jumping spider (Salticidae) *Eolinus* sp. indet. Only few hairs are drawn. F314. - M = 0.2.

BEITR. ARANEOL., 3 (2004)

FOSSIL SPIDERS (ARANEAE) IN EARLY TERTIARY AMBER FROM THE UKRAINE

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Abstract: 13 families of fossil spiders (Araneae) are reported from the Early Tertiary Ukrainean amber from Rovno. The fossil spider fauna of the Rovno amber is not identical with the Baltic amber fauna from the Kaliningrad deposit: Although some specimens are conspecific with species in Samlandic amber, other species have never been found in Baltic amber. Apparently most spider genera of the Rovno amber are identical with genera from the Kaliningrad deposit. The following taxa are described for the first time: *Balticonopsis perkovskyi* **n. sp**. (Anapidae: Anapinae), *Succinero rovnoensis* **n. sp**. (Mimetidae) and *Gorgopsina fractura* **n. sp**. (Salticidae).

Material: Most fossils are deposited in the Institute of Zoology of the National Academy of Sciences of the Ukraine, Kiew (IZNASU) (Dr. E. PERKOVSKY), nos. "UA" and "D" (from Dubrovitsy). Two spiders are kept in the private collection of the author (CJW).

Introductory remarks

There are several deposits of Tertiary amber in the Northern Ukraine, see TUTSKIJ & STEPANJUK (1999). These authors mentioned two spiders from Klessow: *Clya* sp.

(Theridiidae) (fig. 13) and *Mizalia* cf. *pilosa* (Oecobiidae) (no fig.). According to fig. 13 in this paper "*Clya* sp." is not a member of the family Theridiidae. - Most spiders which are treated in this paper - probably except Anapidae indet. (fig. 1), and *Sosybius* sp. indet. (fig. 7) - are preserved in amber from Rovno which is called "Rovno amber" by E. PERKOVSKY et al. (2003).

Remarks on the fossil spider fauna of the Rovno amber

Material: 41 fossil specimens. More than one third are adult males, 1/10 adult females, the remaining ones are juveniles.

Families: I found 13 families: Anapidae, Archaeidae, ?Cyatholipidae (a questionable juvenile), Linyphiidae, Mimetidae, Oecobiidae, Oonopidae, Salticidae, Synotaxidae, Theridiidae, Theridiosomatidae, Trochanteriidae and Zodariidae. All these families are known from the Samlandic deposits which are four times richer in spider families.

Genera: I identified 9 genera; the identification is based on adult males:
Acrometa PETRUNKEVITCH 1942 (Synotaxidae), 2♂1♀; this genus is frequent in Samlandic amber,
Adorator PETRUNKEVITCH 1942 (Zodariidae) (see below),
Balticonopsis WUNDERLICH 2003 (Anapidae) (see below),
Fossilanapis WUNDERLICH 2003 (Anapidae),
Succinero WUNDERLICH 2003 (Mimetidae) (see below),
Mizalia KOCH & BERENDT 1854 (Oecobiidae), not so rare in Samlandic amber,
Orchestina SIMON 1882 (Oonopidae), 4♂1♀ 2juv., very frequent in Samlandic amber,
Sosybius KOCH & BERENDT 1854 (Trochanteriidae) (see below),
Gorgopsina PETRUNKEVITCH 1955 (Salticidae) (see below).

Species: I identified two species which were already described: *Acrometa cristata* PETRUNKEVITCH 1942 (Synotaxidae) and *Adorator ?hispidus* (KOCH & BERENDT 1854) (Zodariidae). *Acrometa cristata* is one of the most frequent species in Baltic amber, and the questionable *Adorator hispidus* is not rare in this kind of amber. - I never found the following species in Samlandic amber: *Balticonopsis perkovskyi*, *Fossilanapis* sp. indet., Anapidae indet., *Succinero rovnoensis* n. sp. and *Gorgopsina fractura* n. sp. These species I never found in Samlandic amber, although the families Anapidae, Mimetidae and Salticidae in Samlandic amber are well studied, see the paper on these families in these volumes. When he compared the ant's (Formicidae) fauna of Rovno and "Kaliningrad amber" PERKOVSKI (pers. commun., publ. in prep.) found also distinct differences between both kinds of amber. More comparative studies are needed to confirm and specify the differences between both fossil faunas. SCHLEE (1978: Fig. 2) regarded the Ukrainen deposits as parts of the large "Baltic amber forests"; I call these large areas the "Eocene European amber forests".

Description of selected taxa

Anapidae: Mysmeninae:

Gen. & sp. indet. (fig. 1) Photo 177

Material: 1 fossil subad. ♂ in amber from the Ukraine (locality?), P. BERANKIS leg., CJW. A small piece of amber was separated by me. F793/CJW.

Description (subad. ♂): The spider is completely preserved; most parts - except dorsal parts - are covered by a white emulsion or by bubbles. In the separated piece of amber 1 Acari and 1 defect Collembola are preserved. - Measurements (in mm): Body length 1.65, prosoma: Length about 0.7, width 0.6, opisthosoma: Length about 0.93, width 0.83, hight about 1.2. - Prosoma (fig. 1) high (partly hidden), 8 eyes, field protruding, posterior row straight, anterior row strongly procurved, anterior median eyes smallest, with some redbrown ?pigment, some long hairs behind the eye field. - Legs stout, tarsus and metatarsus II of the same length. Bristles long and strong, patellae dorsally 2, sequence on the tibiae probably 2/2/1/1. Caused by the leg position the probable presence of a femoral organ and of a metatarsal I bristle are not sure. - Opitshosoma higher than long, with a distinct dorsal hump (fig. 1) and long dorsal hairs. - Pedipalpal tarsus (fig. 1) thick.

The **relationships** are not sure. Similar to most members of the family Theridiidae the tarsi are not distinctly longer than the metatarsi. A dorsal opisthosomal hump is known from some species of the genus *Mysmena* SIMON 1894 (Mysmeninae); in *Mysmena* the tarsi are distinctly longer than the metatarsi.

Distribution: Early Tertiary Unkrainean amber forest (locality?).

Anapidae: Anapinae:

Balticonopsis WUNDERLICH 2003 (n. gen.). See the paper on the family Anapidae in these volumes.

***Balticonopsis perkovskyi* n. gen. n. sp.** (figs. 2-5)

Derivatio nominis: The new species is dedicated to EVGENY PERKOVSKY who is investigating the fossil fauna of Arthropoda in Rovno amber, especially the Formicidae.

Many **thanks** to H. W. HOFFEINS in Hamburg who preserved the amber piece with the holotype in artificial resin in a professional way!

Material: Holotypus ♂ in Rovno amber (Ukraine), IZNASU, no. UA-293.

Preservation and syninclusions: The spider is not well preserved; the piece of amber has been embedded in artificial resin. Only the anterior quarter of the opisthosoma is present, the right tibia IV is cut off, the prosoma and parts of the legs are covered by a white emulsion.

Diagnosis (♂; ♀ unknown): Leg I (figs. 2-3): Metatarsus hairy and stout (shorter than the patella, half as long as the tarsus), tarsus long and curved, with three strong and strongly bent retrolateral hairs (arrow in fig. 3). Pedipalpus (figs. 4-5): Femur with a proapical outgrowth (the other articles except cymbium with bulbus are hidden), embolus fairly long and bent.

Description (♂):
Measurements (in mm): Body length 0.8, prosomal length about 0.38; leg I: Femur about 0.5, patella 0.18, tibia 0.35, metatarsus 0.15, tarsus 0.31, tibia II 0.31, tibia III 0.21, tibia IV 0.27, tarsus II 0.29, tarsus III 0.23, tarsus IV 0.26.
Colour light brown.
Prosoma (most parts are covered by bubbles and white emulsions) high, wrinkled, 8 eyes in a wide field, anterior medians smallest, wider separated from the lateral eyes, posterior medians largest. The mouth parts are partly hidden. - Legs (figs. 2-3) stout, I longest and strongest, II and IV about the same length. Femoral bristles absent, patellae with a long dorsal-distal bistle, tibiae with two long dorsal bristles, I bears an additional long prolateral bristle in the middle.The hairy tarsus I is more than twice as long as the stout and hairy metatarsus I, tarsus I bears e.g. three stronger and strongly bent retrolateral hairs in the middle (arrow in fig. 3). - Opisthosoma (most parts are lost, see above) with few dorsal hairs. - Pedipalpus (fig. 5): See above. The shape of the embolus is variable, depending of the view.

Relationships: The species is a member of the genus *Balticonopsis* WUNDERLICH n. gen., see the paper on the family Anapidae in this volume. In *B. bispinosus* n. sp. strong metatarsal I hairs are present, too, but two additional proventral spines are present on tibia I.

Distribution: Early Tertiary Rovno amber forest, N-Ukraine.

Succinero WUNDERLICH 2003 (n. gen.): See the paper on the family Mimetidae in these volumes.

***Succinero rovnoensis* n. sp.** (fig. 6)

Material: Holotypus ♂ in Rovno amber from the Ukraine, IZNASU, no. UA 1705b.

Preservation and syninclusions: The spider is completely and fairly well preserved in a piece of amber which most probably was heated; white emulsions are absent and the surrounding of the inclusions is darkened, the inclusions are slightly deformed. Three Diptera: Nematocera are preserved close to the spider; they are more or less deformed. Numerous stellate hairs are present in the same piece of amber.

Diagnosis (♂; ♀ unknown): Paracymbium long, anteriorly with a pointed structure (arrow in fig. 6).

Description (♂):
Measurements (in mm): Body length 2.0, prosomal length 1.0, leg I: Femur 1.25, patella 0.45, tibia 1.15, metatarsus 1.0, tarsus 0.9, tibia IV 0.85, basal article of the chelicerae 0.4. - Colour: Prosoma and legs dark brown, opisthosoma medium brown.
Prosoma high, with few dorsal-medial bristles; the eyes are partly hidden, their position is as in the related species. Clypeus as long as the chelicerae which are long and slender. - Legs slender, bearing numerous long bristles; femora with a dorsal bristle in the middle and apicals, patellae 2 dorsally, tibiae with 2 dorsal bristles which are up to 0.43mm long. Tibia and metatarsus II bear the typical mimetid long and short bristles. - Opisthosoma ovoid, dorsally covered with long hairs. - Pedipalpus (fig. 6): Patella with a long dorsal bristle, which is broken off on the right patella, tibia long, paracymbium with a pointed anterior structure (arrow in fig. 6); the structures of the bulbus are partly hidden.

Relationships: Probably *S. aberrans* (PETRUNKEVITCH 1958) and *S. permunda* (PETRUNKEVITCH 1958) are most related; in these species a pointed structure of the paracymbium is absent, see the papar on the family Mimetidae in these volumes.

Distribution: N-Ukraine, Rovno deposit.

Zodariidae

Adorator ?hispidus (KOCH & BERENDT 1854)

Material: 1 fossil ♂ in Rovno amber from the Ukraine, IZNASU no. UA-1459.

See the revision of the genus *Adorator* in the paper on the family Zodariidae in this volume.

The body length of the male is 3.2mm, the left leg II is amputated behind the patella and the stump apparently is healed. The structures of the bulbus are not well observable, therefore the conspecifity with *hispidus* is not quite sure.

Distribution: Early Tertiary Baltic and Unkrainean (Rovno) amber forests.

Trochanteriidae

***Sosybius* sp.** (fig. 7)

Material: 1 fossil juv. ♀ in amber from the Ukraine (locality?), P. BERANKIS leg., F1358/UB/AR/TRO/CJW.

Preservation and syninclusions: The spider is only fairly well preserved and placed on a layer in the amber; the ventral side is covered by a white emulsion, both legs IV are missing behind the coxa by autotomy. - Numerous bubbles, a tiny excrement ball and some stellate hairs are preserved in the same piece of amber.

Description (juv. ♀):
Measurements (in mm): Body length (without chelicerae) 5.0, prosoma: Length 2.1, width 1.75, tibia II 1.6.
Colour: Prosoma and legs dark brown, opisthosoma yellow brown.
Body flat, prosoma (fig. 7) longer than wide, chelicerae protruding, posterior eye lenses indistinct, legs laterigrade, metatarsal and tarsal I-II scopula well developed. The tibiae bear one ventral bristle in the distal half only, the metatarsi bear at least a ventral pair of bristles in the distal half. The long opisthosoma (fig. 7) is densily covered by short hairs.

Relationships: According to the flat body, the protruding chelicerae, the flat and indistinct posterior median eyes, the laterigrade leg position and the well developed leg

scopula this juvenile spider is most probably a member of the the genus *Sosybius* KOCH & BERENDT 1854, see the paper on the family Trochanteriidae in this volume. Without knowledge od a conspecific adult spider the relationships remain unsure.

Distribution: Early Tertiary Ukrainean amber forest (locality?).

Salticidae

Gorgopsina PETRUNKEVITCH 1955; see the paper on the family Salticidae in these volumes.

Gorgopsina fractura n.sp. (figs. 8-9)

Material: Holotypus ♂ in Rovno amber, IZNASU no. D-1918.

Preservation and syninclusions: The spider is only fairly well preserved, mainly the right side of the opisthosoma is covered by a white emulsion, the right leg I is lost behind the coxa by autotomy, several parts of the legs are cut off, only the leg pair IV is complete. Several stellate hairs and a Diptera: Nematocera are preserved in the same piece of amber.

Diagnosis (♂; ♀ unknown): Pedipalpal tibial apophysis large and with two anterior outgrowths, embolus fairly short and bent.

Description (♂): Body length 5.1, prosomal length 2.0, leg IV: Femur 1.75, patella 0.5, tibia 1.25, metatarsus 1.45, tarsus 0.5.
Colour: Prosoma and legs medium brown, opisthosoma light brown.
Prosoma high, with long and short dorsal hairs and a distinct constriction in front of the middle eyes; eyes as in the genus. - Legs (most articles are lost) fairly long, hairy and with numerous bristles. - Opisthosoma slender, 2.2 times longer than high, dorsally covered with dense hairs; a scutum is not observable. - Pedipalpus (figs. 8-9): Tibia thick, with a large retrolateral apophysis which bears two anterior outgrowths; embolus fairly short and bent.

Relationships: *G. inclusa* WUNDERLICH 2003 is probably most related; in *inclusa* the tibia of the ♂-pedipalpus and the embolus are different.

Distribution: N-Ukraine, Rovno deposit.

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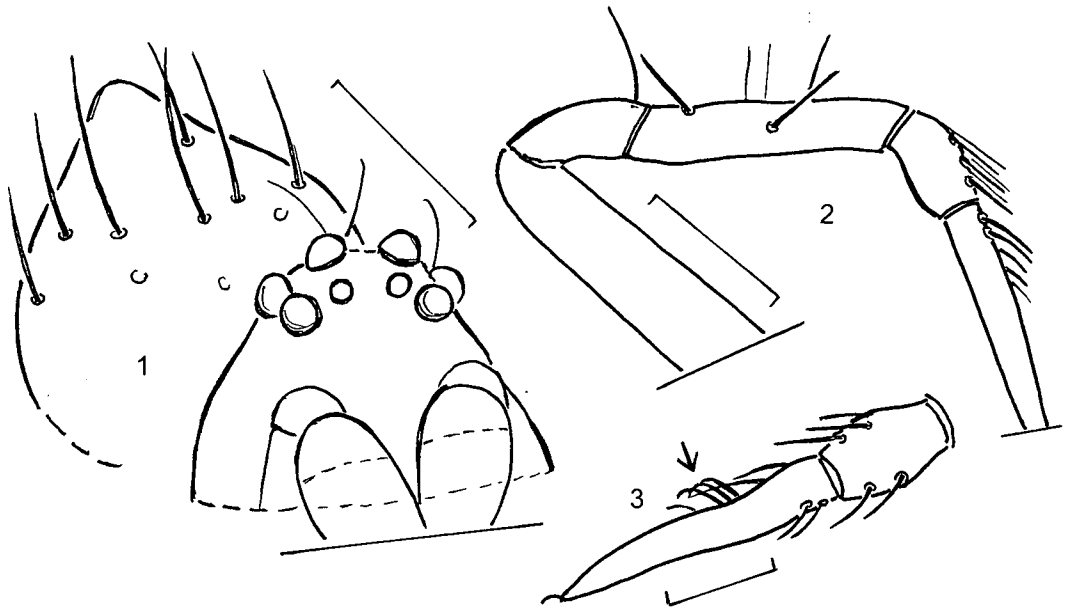

Fig. 1) Anapidae: Mysmeninae indet., subad. ♂, body, oblique frontal view. M = 0.3 mm;

figs.2-5: *Balticonopsis perkovskyi* **n. sp.**, ♂; 2) l. leg I prolaterally (the basal femoral part is hidden, normal hairs are not drawn, two long dorsal tibial trichobothria are observable); 3) r. metatarsus and tarsus I dorsally (only some of the stronger hairs are drawn);

4) outline of the l. pedipalpal femur dorsally (it is covered by an emulsion); 5) l. pedipalpus prolaterally and slightly apically, with the embolus (E) (the basal part of the femur is hidden). M = 0.2 in fig. 2, 0.1 in the remaining figs.;

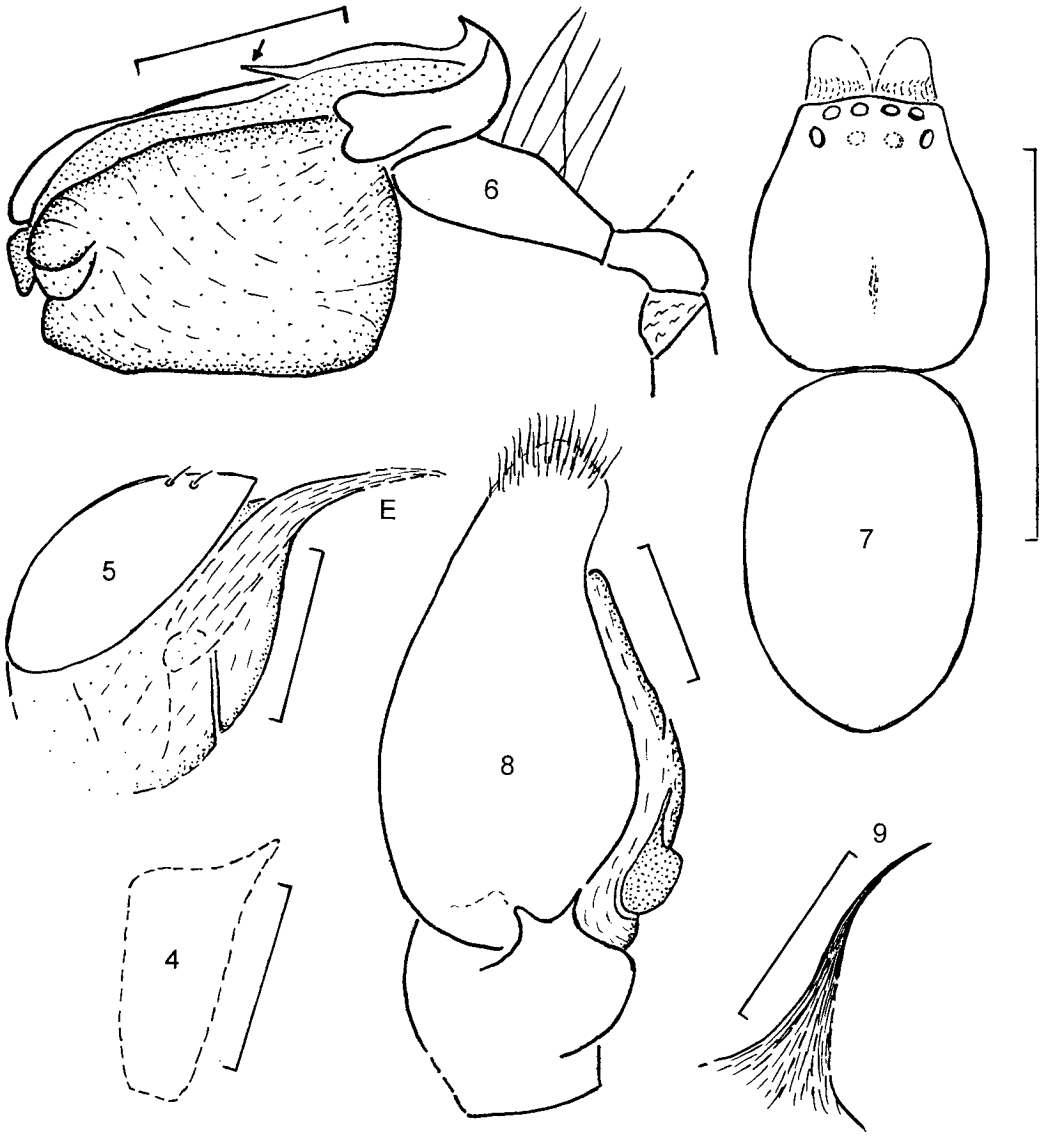

fig. 6) *Succinero rovnoensis* **n. sp.**, ♂, l. pedipalpus, retrolateral view. The arrow indicates to the pointed structure of the paracymbium; M = 0.1;

fig. 7) *Sosybius* sp. indet., juv. ♀, body, dorsal view. M = 3.0;

figs. 8-9: *Gorgopsina fractura* **n. sp.**, ♂; 8) r. pedipalpus, dorsal aspect (only the dense apical cymbial hairs are drawn); 9) embolus of the l. pedipalpus, ventral aspect. M = 0.2 and 0.1.

BEITR. ARANEOL., 3 (2004)

SUBRECENT SPIDERS (ARANEAE) IN COPAL FROM MADAGASCAR, WITH DESCRIPTION OF NEW SPECIES

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Abstract: 21 families of subrecent spiders (Araneae) are reported in copal from Madagascar; the following families and subfamilies are new to the fauna of Madagascar: Oonopidae (Oonopinae), Anapidae s. l. (Mysmeninae), Dictynidae s.l.: Copaldictyninae (endemic), Dictyninae and Hahniinae. The following taxa are described: Segestriidae (Ariadninae): *Ariadna hintzei* **n. sp.**, Oonopidae (Oonopinae): *Orchestina madagascariensis* **n. sp.**, Linyphiidae (Erigoninae): ?*Toschia fossilis* **n. sp.**, Theridiidae (Pholcomminae): *Phoroncidia ?aculeata* WESTWOOD 1835 and Argyrodinae. *Argyrodes* (*Rhomphaea*) *gibbifera* **n. sp.**, and Selenopidae: ?*Anyphops cortex* **n. sp.** and *Selenops benoiti* **n. sp.**. Remarks are given on the subrecent spider fauna of Madagascar, on the age of the copal and on fakes; previously from Dominican amber reported spiders (Archaeidae, Erigoninae and Mysmeninae) are really preserved in heated copal from Madagascar (fakes). *Grammonota deformans* WUNDERLICH 1998 (Linyphiidae: Erigoninae) is transferred to *Ceratinopsis* EMERTON 1882 (**n. comb.**).

The **material** is kept in the private collection of the author (F/.../CJW) and will probably be deposited in the future in the Senckenberg-Museum Frankfurt a. M.

Introductory remarks

Madagascar is the fourth largest island in the world, situated in the Indian Ocean; its copal belongs to the East Africa copal area (fig. 1). Some 150 million years of isolation resulted in the evolution of a unique fauna - e.g. Lemures, Chamaeleons, bizarre Archaeid spiders as well as members of the endemic spider family Halidae JOCQUE 1994 and the new endemic subfamily Copaldictyninae (Dictynidae s. l.) (see the photos) - and flora, including numerous endemic species.
During the last 10 years huge material of copal including millions of arthropods was imported from Madagascar to Germany - mainly to Hamburg -, and I had the opportunity to have a look at about one thousand spiders, to sort out, to buy and to study some hundred spider inclusions. Concerning the inclusions there is an unknown number of undescribed species - few are described in this paper - and even three families of spiders which were not reported from this island before, see the abstract and below.

The importance of the inclusions

According to the findings of the spider fauna and the syninclusions - plants and animals in the same piece of copal - the spiders were caught in resin (copal) which originated in a forest. Members of the family Archaeidae - which are preserved in several species and numerous specimens, see the photos - occur in primary (rain) forests, see LEDOUX (1994: Fig. 9), MILLOT (1948). Nowadays the copal is collected in places where no trees grow. The primary forests of Madagascar have been destroyed up to small remains by humans, and an unknown part of the fauna has gone forever. Numerous animals and plants are preserved in resin (copal) which can be found in the earth of north and northwest Madagascar. Such inclusions are of great scientific importance as one of the last evidences of a lost world! Young pieces of copal may contain subrecent extinct species! Probably a whole subfamily of spiders - the Copaldictyninae, see below - has been exterminated but is preserved in the copal of Madagascar, see the photos and the paper on the family Dictynidae s. l. in this volume.

The East African copal

The (Only?) resin producing plant was - and still is in several regions - *Hymenaea verru-*

cosa OLIVER (= *Trachylobium v.*) (fig. 2), a member of the family Leguminosae, a timber tree up to 35m high, see SCHLÜTER & GNIELINSKI (1987: 6-7). Some pieces of copal are full of animal and plant inclusions, there may be hundreds; certain spiders and other arthropods are covered by hyphae of an unknown decompositing fungus (photo).

Terms: Such young resins - and its fossils in which extant species may be included - are called "subrecent", "subfossil" or "semifossil" by different authors, e.g. POINAR, RICE, SCHLEE, SCHLÜTER & GNIELINSKI. I prefer the term "subrecent".

Distribution: East African copal is found mainly along the coast of East Africa as well as on Zanzibar, Madagascar and other islands (fig. 1), see RICE (1993). Origin on Madagascar: Most of the copal comes from the northernmost part of the island, the Cap d'ambre (Antsiranana, Antsirane).

Age of the copal and its inclusions: According to my personal experiences the material which comes from Madagascar may be mixed: In the same lot I found pieces of different colour and hardness; some pieces were even sticky and colourless, that means that they are only few years (or month?) old. The highest age of the copal is unknown (pieces from deep in the earth may be the oldest), it may be some thousand years or even more than ten thousand years as copal from other regions, see e.g. SCHLEE (1984: 35), WUNDERLICH (1986: 15).
Due to the kindness of Prof. M. A. GEYH, Niedersächsisches Landesamt für Bodenforschung in Hannover, four pieces of copal from N-Madagascar with arthropods were determined in 1996 by using the carbon-14-dating method, e.g. a piece containing *Eriauchenius*. Result: The pieces contained radioactive carbon from the time after the use of atomic bombs. The age lies between 1958 and 1989 and there are two groups of age: (a) 1958 or 1989 and (b) 1961 or 1979.

Fakes: According to SCHLEE (1984: 33) some dealers manipulate(d) copal: They heat(ed) it under pressure in an autoclave to harden it and give/gave it a yellow (amber-like) colour, and they sold/sell it as amber. Such material (see descriptions below) - named "Dominican amber" by the firm MÖCK near Stuttgart - was sold e.g. to the author. As a result the animal inclusions may be more or less deformed; see the photos, below, and the paper on fakes in this volume. Such fakes of the families Archaeidae, Anapidae s. l. and Linyphiidae were published by the author (1998, 1999) (see below). Apparently it is impossible (!) to distinguish between heated copal and amber by the pyrolysis gas-chromatography, see HECK (1996), WUNDERLICH (1998, 1999). However findings from biogeography may be more successful: (a) Some members of the family Thomisidae which are preserved in heated resin/copal ("amber" sensu the firm MÖCK) are found to be congeneric with Thomisidae in copal which were imported from Madagascar via Hamburg and were determined by ONO as *Apyretina* sp. indet.; members of this genus occur on Madagascar but not in the Neotropics; (b) Members of ?*Mysmena dominicana* WUNDERLICH 1998 (Anapidae: Mysmeninae) were discovered in copal from Madagascar, see below; (c) No members of the family Archaeidae - which are not so rare in copal from Madagascar - are known from the Neotropics as well. The presence of the extant species *Archaea gracilicollis* (e.g.) within the Madagascaran material indicates surely that this is copal but not amber. Finally the age of the "amber" pieces which were sold to me by the firm MÖCK is less than half of a century - confirmed by the car-

bon-14-dating method, see above -; this is much to little for amber.
Fakes have been produced for centuries. An interesting case was reported by SCHLÜTER & GNIELINSKI (1987: 19): A piece containing a specimen of a probably extant beetle - the Cicindelinae genus *Odontochile* - was originally assigned to be Baltic amber about one hundred years ago, but was later suggested to be embedded in copal from Madagascar, but according to WEITSCHAT & WICHARD (2002: 154) - based on a paper of RÖSCHMAN (1999) - the fossil beetle is not identical with the extant *Tetracha carolina* L.

Remarks on the extant and subrecent spider fauna of Madagascar

Photos 29-31, 34, 86-87, 248, 431-440, 445-447

Most frequent spiders (species and specimens) in copal from Madagascar - as well as extant spiders in higher strata of the vegetation - are members of the Combfooted Spiders (Theridiidae, especially members o the genus *Dipoena*) which may be tiny or bizarre (fig. 19). Crab Spiders (Thomisidae) are not rare, the legs of these spiders are directed sidewards (see the photos); Jumping Spiders (Salticidae) are conspicuous and have enormous anterior median eyes; Archaeidae (fig. 10, photos) are bizarre and possess a "neck"; Hersiliidae (photos) are larger spiders and are easy to identify by their strongly elongated spinnerets; Copaldictyninae (photos) are strange, their embolus is thin and very long, the/a female is unknown and wanted (!); tiny Oonopidae (genus *Orchestina*, see below) are frequently overlooked and are present in most kinds of amber and copal as well, not as frequent in copal from Madagascar as in Baltic amber.
Up to now 45 families of extant spiders have been reported from Madagascar - see GRISWOLD (2001) (Cyatholipidae), LEGENDRE (1972), PLATNICK (in prep., person. commun., list from 1995), plus Phyxelidae -; in the present paper I will add three families to the previously known Madagascaran fauna: Oonopidae (Oonopinae), Anapidae s. l. (Mysmeninae), Dictyninae s. l. (Dictyninae, Hahniinae and the new subfamily Copaldictyninae from subrecent material which is preserved in copal. The new subfamily Copaldictyninae may be a palaeoendemic taxon, see the paper on the family Dictynidae s. l. in this volume. Halidae JOCQUE 1994 is a spider family which is endemic to Madagascar and has not been reported from copal.
On the other hand there are remarkable gaps in the spider fauna of Madagascar: To my knowledge - besides of some families of the Mygalomorpha - members of several Araneomorpha families as Agelenidae, Anyphaenidae, Mimetidae, Nesticidae, Oecobiidae, Synotaxidae and Theridiosomatidae are not reported from the extant fauna of Madagascar (or from copal); all these families are known from South/East Africa and can be expected to exist in Madagascaran copal similar to the new finds of Dictynidae and Oonopidae.
Extant species: Slightly more than 400 species have been described, but these may be only 10 or 20% of the fauna. - Nominal subrecent species which were already described in copal from Madagascar are *"Grammonota" deformans* WUNDERLICH (1998) (Linyphiidae: Erigoninae), *?Mysmena dominicana* WUNDERLICH 1998 (Anapidae: Mysme-

ninae) and *Archaea copalensis* LOURENCO 2000 (Archaeidae), a synonym, see below. Members of 21 families of spiders in Madagascaran copal are deposited in my private collection. This is nearly half of the number of extant families (45). Some comments are given in the family list below:

(a) Mygalomorpha:

?Migidae (questionable, juv., det. N. PLATNICK, 1juv. F936/CJW, 3juv. F937/CJW); photo 34

(b) Araneomorpha:

Anapidae (Mysmeninae): Family and subfamily are new to the fauna of Madagascar, ?*Mysmena dominicana* WUNDERLICH 1998 (figs. 17-18)
Araneidae (Araneinae, Nephilinae) are not so rare
Archaeidae (Archaeinae): Members of the genus *Eriauchenius* O. P.-C. (= *Archaea* auct.) are not so rare, see below and the paper on the superfamily Eresoidea in this volume
Clubionidae: Clubioninae
Corinnidae incl. Castianeirinae
Deinopidae: Only juv.
Dictynidae: Family and three subfamilies are new to the fauna of Madagascar: Copaldictyninae n. subfam. (see the paper on the family Dictynidae s. l. in this volume), Dictyninae (gen. indet.) and Hahniinae (gen. indet., only a single female, F117/CJW)
Hersiliidae: See the paper on the superfamily Oecobioidea in this volume (new taxa)
Linyphiidae: Linyphiinae gen. indet. and Erigoninae (two species, see below)
?Miturgidae: 1♂, F931/CM/AR/?MIT/CJW, a badly preserved specimen, bulbus similar to *Strotarchus* SIMON 1888; the relationships of this taxon are unsure
Oonopidae (Oonopinae): Subfamily and family are new to the fauna of Madagascar; *Orchestina madagascariensis n. sp.* See the paper on the superfamily Dysderoidea in this volume
Philodromidae: Only a single juvenile spider; the determination is not quite sure, F1118
Pholcidae (Rholcinae): Members are not so rare
Salticidae (Salticinae s. l.): Members are not rare
Scytodidae: *Scytodes marginalis* n. sp.
Segestriidae (Ariadninae and Segestriinae), see below
Selenopidae: The genera ?*Anyphops* and *Selenops*
Tetragnathidae: Diphyinae, Tetragnathinae
Theridiidae (Argyrodinae, Hadrotarsinae (incl. Dipoenini: *Dipoena/Lasaeola*), Pholcomminae (fig. 19-21), Spintharinae and Theridiinae); very frequent and diverse, some specimens with red eyes, e.g. F828/CM/AR/THE/CJW, see the photos, figs. 19-22, and the paper on red eyes of fossil spiders in this volume
Thomisidae, frequent are e.g. members of the genus *Apyretina,* see the photo
Uloboridae (Uloborinae): The genus *Uloborus*

DESCRIPTION OF NEW SPECIES and REMARKS on the families Anapidae, Archaeidae and Linyphiidae

SEGESTRIIDAE: ARIADNINAE

Only one species of this family has been reported from Madagascar, *Segestria madagascariensis* KEYSERLING 1877 (Segestriinae); the genus *Ariadna* AUDOUIN (Ariadninae - see the paper on the superfamily Dysderoidea in this volume) is new to this island.

Ariadna hintzei n. sp. (fig. 3)

Derivatio nominis: The species is named after J. HINTZE who presented the holotype to the GPIHamburg.

Material: holotype ♂ in copal from N-Madagascar, GPIUH.

Preservation and syninclusions: The spider is preserved in an obligue position in the piece of copal (therefore exact measurements are difficult), it is only fairly preserved and partly covered with hyphae of an unknown fungus and probably with bacteria, too. The left legs I and II are cut off longitudinally through the femora, the left leg III is broken off near the base of the femur and lost, the left three eyes and parts of the left pedipalpal patella and of the left patella I are cut off. - Numerous arthropods are pre-served in the same piece of copal: Acari, Collembola, Hymenoptera, Coleoptera, Diptera and remains of a partly decomposited Blattaria.

Diagnosis (♂; ♀ unknown): Prosomal length about 2.5mm, tibia I not modified; pedipalpus fig. 3, with the embolus fairly bent.

Description (♂):
Measurements (in mm): Body length about 5.2, prosomal length about 2.5, tibia I 2.0.
Colour: Prosoma dark brown, legs medium brown, opisthosoma light gray.
Prosoma (fig. 3) long, hairs indistinct, eyes partly hidden, anterior laterals largest, basal articles of the chelicerae protruding and fairly slender. - Legs fairly stout, hairs distinct. Only some of the bristles are observable, tibia II bears 3 ventral pairs, 1 basally, 3 prodorsally and probably few retrolaterally, metatarsus I at least 3 ventral pairs, tibia IV bears at least 4 bristles. - Opisthosoma roller-shaped, dorsally with short dense hairs, spinnerets short. - Pedipalpus: Fig. 3.

Relationships: According to the short and blunt cymbium and the position of the alveolus in the middle of the cymbium *hintzei* is a member of the genus *Ariadna* AUDOUIN. *A. corticola* LAWRENCE 1952 (extant, South Africa) may be closely related; *corticola* is distinctly larger, its prosomal length is 4.3mm.

Distribution: Subrecent, preserved in copal from N-Madagascar.

OONOPIDAE: OONOPINAE

No member of this family has been reported from Madagascar. Members of the genus *Orchestina* SIMON (Oonopinae) are known from most of the diverse faunas of fossil resins, see the paper on Dysderoidea: Oonopidae in this volume.

***Orchestina madagascariensis* n. sp.** (figs. 4-6) Photos 92-31, 431

Material: 5♂2♀ in copal from N-Madagascar; holotypus ♂ and 5 separated pieces of copal, F1119/CM/AR/OON/CJW, 3♂ paratypes a, b and c; F1120-1122, 2♀ paratypes d and e in the same piece of copal, F1123, 1♂ paratype coll. J. HINTZE in Extertal.

Preservation: All spiders except paratype d are well preserved in light yellow pieces of copal and are completely preserved except paratype c. - The holotype is excellently preserved, prosoma, opisthosoma and some of the right femora are filled with gas bubbles. - Paratype a: The right leg IV is stretched foreward, within the right bulbus some red ?pigments are observable. - Paratype b: The left femur IV is stretched foreward. - Paratype c: The opisthosoma is slightly deformed. - Paratype d: The opisthosoma is deformed, the left leg IV is stretched foreward beneath the body. - Paratype e is only fairly well preserved, pro- and opisthosoma are deformed, parts of the left tarsus I are cut off.

Syninclusions: Holotype: A mite, some bubbles and particles of detritus are present near the spider; in the separated pieces of copal some bubbles (few are movable in water), a mite, numerous Diptera and Hymenoptera, some ants, a large termite, a cicada larva, a small butterfly, a beetle and several plant inclusions. - Paratype a: Some Diptera (some are covered with hyphae), wasps and a juvenile spider (Thomisidae). - Paratype b: A male spider (Theridiidae) and an incomplete juvenile spider, some spider's threads, numerous Diptera and Hymenoptera, an incomplete Auchenorrhyncha, some Collembola, a Psocoptera, some Acari, remains of a Blattaria and numerous

bubbles. - Paratype c is situated directly beneath a male spider of the family Thomisidae, near two beetles (Platypodidae, Elateridae) and a bug; also preserved are a small butterfly and some Psocoptera. - Paratypes d and e: Three juvenile spiders (Archaeidae: *Eriauchenius* sp., ?Clubionidae, fam. indet.), some Acari and Psocoptera, 2 Coleoptera, numerous Diptera and the small branch of a plant.

Diagnosis: Body length 0.9-1.0mm. Male pedipalpus (figs. 4-6): Patella small, tibia fairly thick, embolus long, slender and distinctly curved, originating in the middle part of the bulbus.

Description (♂):
Measurements (♂♀ in mm): Body length 0.9-1.0, prosoma: length 0.43, width 0.35, leg I (♂): Femur 0.45 (hight 0.08), patella 0.15, tibia 0.37, metatarsus 0.33, tarsus 0.18, femur IV 0.45 (hight 0.14); ♀: Tibia I 0.35, femur IV 0.46, (hight 0.15); length of the basal cheliceral article (♀): 0.22.
Colour: Light brown to yellow brown.
Prosoma distinctly longer than wide, thorax higher than the caput, dorsally-medially with 3 long hairs (up to 0.22m long) (they are lost in some specimens). Six large eyes, anterior median eyes separated by nearly 1/3 diameter, coxae IV separated by more than their diameter. - Legs fairly long and slender, femur IV strongly thickened (photo) as in the other congeneric species, very few bristles, e.g. few distally on metatarsus IV (up to 0.7mm long). - Opisthosoma oval, dorsally with long hairs.

The **relationships** are unsure. No member of this genus or of the family Oonopidae has ever been reported from Madagascar. According to its pedipalpal structures *O. seychellorum* BENOIT 1979 is not closely related.

Distribution: Subrecent, preserved in copal from N-Madagascar.

SCYTODIDAE

Only one extant species - *Scytodes oswaldi* LENZ 1891 has been reported from Madagascar. Subfossil spiders are rare.

***Scytodes marginalis* n. sp.** (figs. 7-9)

Material: 2♂ in copal from N-Madagascar, holotypus F921/CM/AR/SCY/CJW, paratypus F922/CM/AR/SCY/CJW.

Preservation and syninclusions: The holotype was probably a prey, the prosoma is deformed, remains of the opisthosoma are present beneath the prosoma, both legs I are lost behind the coxa by autotomy, the right legs II-IV are complete, most articles of the remaining legs are lost/cut off, the pedipalpi are well preserved. - Just in front of the spider a beetle is preserved; a wasp, a fly and parts of spider's legs are present in the same piece of copal. - The paratype is preserved at the margin of a piece of copal which is 5.3cm long. The spider is well preserved but incomplete: The right legs II-IV are broken off through their femora with a piece of copal and are lost, the remaining legs are complete.

Diagnosis (♂; ♀ unknown): Small spiders, prosoma 1.2mm long and only fairly convex (fig. 7). Pedipalpus (figs. 8-9): Cymbium curved, embolus basally straight, laterally flattened, distally thin.

Description (♂):
Measurements (in mm): Body length 2.2, prosoma: Length 1.2, width 1.2, femur I paratype 2.3, leg II (holotype): Femur 1.8, patella 0.35, tibia 1.95, metatarsus 2.05, tarsus 0.5, tibia III 1.4, tibia IV 1.6.
Prosoma fairly convex, as long as wide, scarcely covered with thin hairs, bristleless; a short metatarsal trichobothrium is present near the middle of the article. - Opisthosoma ovally, scarcely covered with hairs. - Pedipalpus (see above) with a thickened tibia and a small and nearly globular bulbus. The cymbium (well observable in the holotype) is slender and bent.

Relationships: The remaining congeneric species from Madagascar and SE-Africa are distinctly larger; *S. oswaldi* HENTZ from Madagascar has a body length of about 5mm and a strongly convex prosoma. According to the shape of the embolus *Scytodes* sp. F sensu BRIGNOLI 1976 from Somalia may be related; this may be a dwarf form of *S. lugubris*, see BRIGNOLI (1976: 166, fig. 81); in this "sp. F" the distal part of the embolus is wider than in *S. marginalis*.

Distribution: Subrecent, preserved in copal from N-Madagascar.

ARCHAEIDAE: ARCHAEINAE

Photos 79-83

Several extant species of the genus *Eriauchenius* O. PICKARD-CAMBRIDGE (sub *Archaea* auct. per error) are reported from Madagascar, see LEGENDRE (1970), MILLOT (1948), and at least four species in copal from N-Madagascar, e.g. *E. gracilicollis* (MILLOT 1948) (sub *Archaea g.*, fig. 10) (= *Archaea copalensis* LOURENCO 2000, *Archaea gracilloides* and *A. gracillodes* sensu POINAR (2001: 73, fig. p. 72) (misspelling)); see the paper on the superfamily Eresoidea in this volume. 1♂ and 2♀ fe-

males of *gracilicollis* in copal from N-Madagscar are deposited in my private collection, F600, F601 and F951. In F951 (♀) the position of the cheliceral bristle is in 0.29 and about 40 small eggs which partly are cut off - of an insect or a spider? - lie near the spider. Besides of several juv. indet. of *Eriauchenius* (e.g. F820/CJW) a juv. of *E. ?jeanneli* (MILLOT 1948)(F950) and a juv. of *E. ?vadoni* (MILLOT) 1948 (F816) are deposited in my private collection. The fake of Archaeidae sp. indet. (juv., CJW) sensu WUNDERLICH 1999 - which was reported from Dominican amber - may be a member of *Eriauchenius gracilicollis* or *E. workmanni* O. PICKARD-CAMBRIDGE 1881.

ANAPIDAE: MYSMENINAE

Mysmena dominicana WUNDERLICH 1998 (figs. 11-12a) Photo 179

Material in copal from N-Madagascar: F1127/CM//AR/ANA/CJW: Half a dozen specimens (♂♀o) in a 12cm long piece of copal, together with a part of the web of a spider and hundreds of Arthropod syninclusions; further males in the CJW: F1129-1131; F1129 is excellently preserved, with F1130 two separated pieces of copal and remains from sawing are present.

The subrecent species *Mysmena dominicana* WUNDERLICH 1998 (figs. 11-12) was described from Dominican amber but the piece is a fake and is really preserved in heated copal from Madagascar; see above and WUNDERLICH (1999). The body length of the spiders is 0.5-0.8mm, the ♂-leg I is shown in fig. 11, the pedipalpus in the figs. 12-12a, an opisthosomal hump is absent. Relationships: In the related *Mysmena elsae* ROBERTS 1978 (Seychelle Islands) an opisthosomal hump is present and the embolus is longer. - The occurrence of several specimens in the same piece of amber (F1127) may be a hint that this is a kleptoparasitic species. Probably a part of a web of the host spider (incl. droplets) is preserved in the same piece of copal. - The subfamily Mysmeninae and the family Anapidae s. l. are new to the fauna of Madagascar.

LINYPHIIDAE: ERIGONINAE

The subrecent species *Grammonota deformans* WUNDERLICH 1998 (figs. 13-14) was

described from Dominican amber but is a fake and is really preserved in heated copal from Madagascar, see WUNDERLICH (1999), too. Here I transfer this species to the genus *Ceratinopsis* EMERTON 1882 (**n. comb**.) which has a cosmopolitical distribution.

?***Toschia fossilis* n. sp**. (figs. 15-18)

Material: Holotypus ♂ and a separated piece in copal from N-Madagascar, CJW.

Preservation and syninclusions: The spider is distinctly deformed; the deformation may be caused by heating, the prosoma is compressed dorsally, the pedipalpi are preserved fairly well. The left half of the opisthosoma, a small part of the prosoma and parts of the left legs II-IV are partly decomposited, small parts of legs are preserved closely behind the right leg IV. - Also preserved in the piece of copal are numerous tiny bubbles.

Diagnosis (♂; ♀ unknown): Most probably without a prosomal lobe; pedipalpus (figs. 17-18): Tibia retrobasally with three long and bristle-shaped hairs and a long, outstanding retrodistal apophysis, cymbium probably deformed but it may have a dorsal outgrowth, paracymbium with outgrowths and widened distally, embolus fairly stout.

Description (♂):
Measurements (in mm): Body length 1.6, prosomal length 0.6, leg I: Femur 0.75, patella 0.2, tibia 0.65, metatarsus 0.6, tarsus 0.4, tibia II 0.55, tibia III 0.45, tibia IV 0.67.
Colour mainly dark brown, remains of the opisthosoma yellow brown, legs not annulated. - Prosoma (it is strongly deformed): Lobe most probably absent, dorsally covered with very long and outstanding hairs; eye position obscure. Basal chelieral articles large, the promargin bears at least three large teeth, lateral stridulating files not observable but most probably present because of the presence of a probasal pedipalpal stridulatory tooth (fig. 16). - Legs slender, order IV/I/II/III, I slightly shorter than IV, covered with distinct hairs, posterior tibiae with long dorsal bristles (fig. 15), their sequence 2/2/1/1. Metatarsal trichobothria unknown. - Opisthosoma oval, large - probably enlarged by decomposition gas, bearing hairs of medium length. Spinnerets large. - Pedipalpus (figs. 17-18; see above): Patella as long as high; because of the bad preservation and darkenings the exact shape of cymbium, paracymbium and the bulbus structures remain fairly obscure.

The **relationships** are not sure; prosoma, leg bristles and structures of the male pedipalpus - e.g. the distally widened paracymbium - lead me to the genus *Toschia* DI CAPORIACCO 1949 which is known from the African mainland. I do not know another species which has such strong tibial hairs of the ♂-pedipalpus and such a tibial apophysis.

Distribution: Subrecent, preserved in copal from N-Madagascar.

THERIDIIDAE

Members of the Theridiidae - five subfamilies, see above - are frequent in Madagascaran copal, spiders of *Dipoena/Lasaeola* (Hadrotarsinae) are frequent; occasionally members of the Pholcommatinae are preserved, e.g the species of the genus *Phoroncidia* WESTWOOD 1835 which is described below. Spiders of the genus *Argyrodes* SIMON 1864 (Argyrodinae) are frequently kleptoparasites; they build no capture web, leg spines or bristles are usually absent (but see fig. 20!), and their body - prosoma and/or opisthosoma - is most often modified. Members of the subgenus *Argyrodes* are not very rare in Madagascaran copal (7 extant species are known from this island) but the species of *Rhomphaea* L. KOCH 1872 which is described below is the first record of this subgenus from Madagascar.

Phoroncidia* ?*aculeata WESTWOOD 1835 (figs. 19-21) Photo 434

Material: 3♂ in copal from N-Madagascar, CJW, F821, F1125 and F1126.

Description: The body length of F821 is 1.85mm, the prosomal length is 1mm, the colour is orange, the region of the eyes is strongly protruding. Leg I (figs. 19-20) is distinctly the largest, dorsal tibial bristles are absent (as in the other congeneric species), tibia I bears two strong ventral bristles in the distal half and four probasal bistles, metatarsus I is curved and bears 3 curved proventral spines in a row in the distal half, tarsus I is slightly shorter than metatarsus I, tarsus IV is slightly longer than metatarsus IV. The opisthosoma is strongly armoured, dorsally strongly depressed and with three pairs of spiny hooks; a strongly sclerotized ring surrounds the spinnerets. The pedipalpus (fig. 21) possess a short tibia and a long embolus.

Relationships: According to LEVI & LEVI (1962: Figs. 235-237) this spider may be a member of *Phoroncidia aculeata* WESTWOOD. - The spination of the male leg I is quite unusual in the family Theridiidae. In contrast to the report of LEVI & LEVI (1962: 57) in *Phoroncidia* leg I may be longer than leg IV, so in the questionable *aculeata* from Madagascar.

Distribution: Oriental Region (Malabar), N-Madagascar (subrecent, in copal), new to the fauna of Madagascar.

***Argyrodes* (*Rhomphaea*) *gibbifera* n. sp.** (fig. 22) Photo 433

Material: Holotypus ♂ in copal from N- Madagascar, F1116/CM/AR/THE/CJW.

Preservation and syninclusions: The spider is well and completely preserved but parts of the body are deformed. Below and in front of the spider a second 6.5mm long spider (Araneae: ?Clubionoidea) is preserved; furthermore remains of a larger insect, a Diptera, a Coleoptera, the larva of an Auchenorrhyncha and the larva of an Acari near the left metatarsus II are present.

Diagnosis (♂; ♀ unknown): Caput higher than the thorax (fig. 22), part of the opisthosoma behind the spinnerets 3.3 times longer than the part in front of the spinnerets, outline of the pedipalpus: Fig. 22.

Description (♂):
Measurements (in mm): Body length 3.65, prosomal length 1.0, opisthosoma: Hight 0.4, length in front of the spinnerets 0.6, length behind the spinnerets 2.0; pedipalpus: Femur 1.25, patella 0.55, tibia 0.7; leg I: Femur ca. 4.4, metatarsus 2.1, tarsus 1.3; leg II: Femur 2.4, patella 0.3, tibia 1.75, metatarsus 1.45, tarsus 0.9, tibia III 0.62, tibia IV 1.65, femur IV 3.0. - Colour light brown, anterior median eyes dark redbrown.
Prosoma (fig. 22) long, with the eye region elevated and with a distinct thoracal depression (most eyes are hidden), chelicerae fairly long. Legs long and slender, order I/IV/II/III, without bristles. Opisthosoma slender, elongated beyond the spinnerets, with a small apical "tail". Pedipalpus (fig. 22) with very long and slender articles, bulbus fairly small, its structures are difficult to observe.

Relationships: In *Argyrodes* (*Rhomphaea*) *rostratus* SIMON 1873 - extant, Mediterranean - and *A. recurvatus* SAARISTO 1978 (extant, Seychelle Islands, ♂ unknown) the posterior part of the prosoma is distinctly higher than the anterior part.

Distribution: Subrecent, preserved in copal from N-Madagascar.

SELENOPIDAE

The members of the family Selenopidae are flattened larger to large tropical spiders

which have laterigrade legs and a wide eye field (e.g. figs. 23-24) with the position of the posterior median eyes more or less between the anterior median and lateral eyes. Two fossil species are described in Dominican amber, see the paper on fossil Selenopidae in this volume. - Members of this family build no capture web; some members live on/under the bark of trees. In the same piece of copal with ?*Anyphops cortex* a spider of the family Hersiliidae (indet.) is preserved. Most Hersiliidae occur on tree trunks, and ?*A. cortex* lived most probably at bark, too.

A generic revision of the world fauna of the Selenopidae is wanted. From Africa the genera *Anyphops* BENOIT 1968, *Hovops* BENOIT 1968, *Orops* BENOIT 1968 and *Selenops* LATREILLE 1819 are known; according to BENOIT (1968) *Hovops* is endemic to Madagascar, the genera *Anyphops* (questionable) and *Selenops* are new to the fauna of Madagascar.

Selected **characters** of the African genera of the family Selenopidae:

character	*Anyphops*	*Hovops*	*Orops*	*Selenops*
Iridescent hairs of the body	---	+	---	---
prosoma	about as wide as long	longer than wide	wider than long	wider than long
ventral tibial I-II bristles	4-7 pairs	proventrally 2, retroventrally 3-6	3 pairs	3 pairs
ventral metatarsal I-II bristles	usually (?) 3 pairs	2 pairs, short	2 pairs	2 pairs
median eyes	post. median eyes > ant. median eyes (figs. 23-24)	posterior median eyes < anterior median eyes		post. median eyes not > ant. med. eyes
occurrence on Madagascar	+ (?)	+	---	+

?***Anyphops cortex* n. sp.** (figs. 24-25)

Material: Holotypus ♂ in copal from N-Madagascar, F1114/CM/AR/SEL/CJW.

Preservation and syninclusions: The spider is fairly well preserved, the left leg I and the right legs III and IV are lost beyond the coxa by autotomy (one of these legs is preserved loose right of the spider), the apical part of the left tarsus IV is cut off. A female of the Araneae: Hersiliidae is present beneath and behind the holotype, a subadult member of the Araneae: Theridiidae is preserved right in front of the holotype. Furthermore an Acari and insects are preserved in the same piece of copal, e.g. numerous Diptera and two Formicidae.

Diagnosis (♂; ♀ unknown): Small spiders, body length 5.2mm, position of the eyes as in fig. 24, with the posterior median eyes between the anterior median and anterior lateral eyes; pedipalpus: Fig. 25.

Description (♂):
Measurements (in mm): Body length 5.2, prosoma: Length 2.8, width 2.9, tibia I 3.2, tibia II about 3.6, tibia III 3.3, tibia IV 3.1.
Colour medium brown; the legs are not annulated.
Prosoma strongly flattened, about as long as wide, hairy, with a long thoracal fissure. Eyes (fig. 24): Posterior medians larger than the anterior medians, chelicerae protruding. Legs long, laterigrade, I the shortest, II the longest. Femur I bears about 5 long bristles, tibia I-II bear 4 pairs of long bristles, metatarsus I-II bear 3 pairs of long bristles, the claw tufts are well developed, the tarsi bear weak pseudoscopulae (thin hairs), true scopulae are absent. The opisthosoma is 1.3 times longer than wide, flat, covered with short hairs. The pedipalpus (fig. 25) has stout articles and a long and slender retrolateral tibial apophysis which is slightly bent; the structures of the bulbus are hidden.

The **relationships** are unsure, the ventral aspect of the bulbus is unknown. According to BENOIT (1968: Figs. 3-4; see fig. 23 in this paper) in most species of *Anyphops* the posterior median eyes are in a more posterior position than in ?*A. cortex*.

Distribution: Subrecent, preserved in copal from Madagascar.

***Selenops benoiti* n. sp.** (figs. 26-28) Photo 436

Derivatio nominis: The species is dedicated to P. L. G. BENOIT, who revised a part of the African Selenopidae.

Material: Holotypus ♂ in copal from N-Madagascar, F1115/CM/AR/SEL/CJW.

Preservation and syninclusions: The spider is well preserved, the opisthosoma is distinctly deformed (depressed), the prosoma bears a bubble inside, the left legs III and IV and the right leg IV are cut off through their femur, the left femur II is hurt in the distal half. - Syninclusions: A juvenile Salticidae and a male Theridiidae (Araneae), remains (an exuvia?) of a Mygalomorpha indet., some Hymenoptera, a Coleoptera: Platypodidae, 2 Psocoptera, hyphae, and numerous Acari, particles of excrement and detritus.

Diagnosis (♂; ♀ unknown): Small spiders, body length 4.9mm, eyes as in fig. 26, with the anterior median eyes larger than the posterior median eyes. Pedipalpus (figs. 27-28): Tibia with three apophyses, a retinaculate median apophysis is probably absent.

Description (♂):
Measurements (in mm): Body length 4.9, prosoma: Length 2.3, width 2.55; leg I: Femur 3.5, patella 1.05, tibia 3.0, metatarsus 2.55, tarsus 1.3, tibia II 3.55, tibia III 3.8 (tibia IV is lost).
Colour litght to medium brown; the legs are not annulated.
Prosoma (fig. 26, photo) wider than long, covered dorsally with short and marginally with long hairs, thoracal fissure long. Eyes as in fig. 26, the anterior median eyes are larger than the posterior median eyes. Chelicerae protruding, the teeth are hidden, fangs slender, gnathocoxae distinctly longer than wide, labium 1.17 times wider than long. - Legs (photo) laterigrade and long, hairy, order (most parts of IV are cut off; according to the long coxa it may be the longest): ?IV/III/II/I, without a true scopula, but most articles are ventrally very hairy; with dense claw tufts. Bristles: Femora I-II with 3 long dorsal bristles, without apicals, tibia I-II bear 3 long ventral bristles (no laterals), metatarsus I-II bear 2 long ventral bristles, the dorsal patellar and tibial bristles are very thin. - Opisthosoma (photo) flat, covered with short hairs, 1.5 times longer than wide. - Pedipalpus (figs. 27-28, see above) with stout articles.

Relationships: In *Selenops secretus* HIRST 1911 (extant, Seychelle Islands) the tibial apophyses of the ♂-pedipalpus are different and a distinct retinaculate median apophysis is present.

Distribution: Subrecent, preserved in copal from N-Madagascar.

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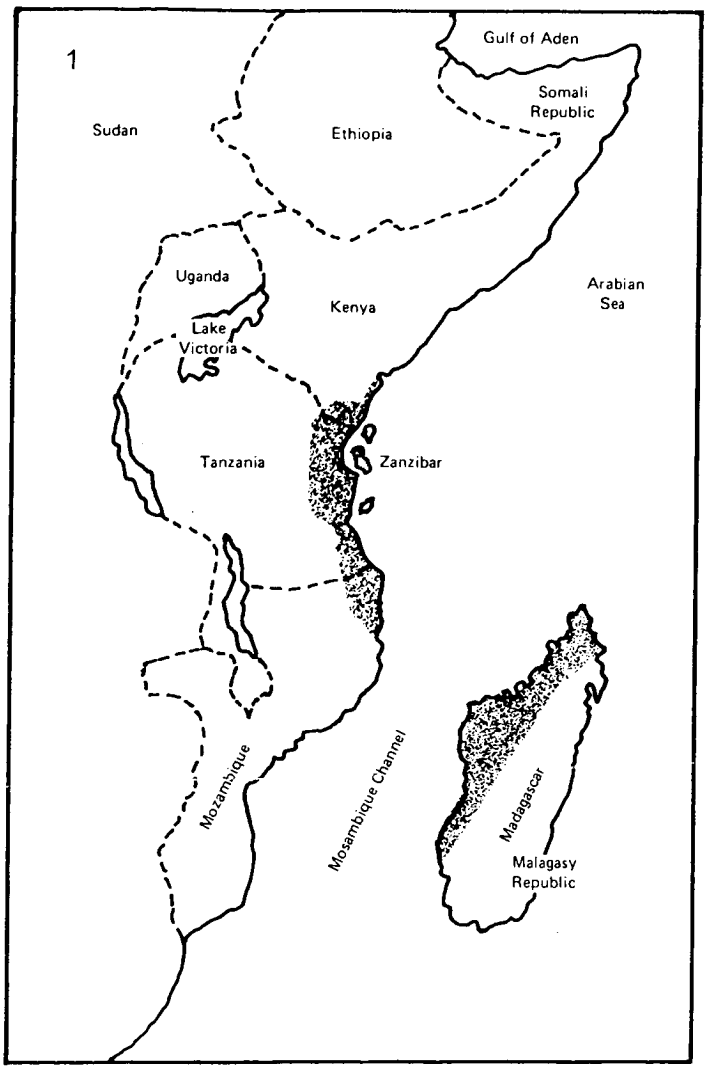
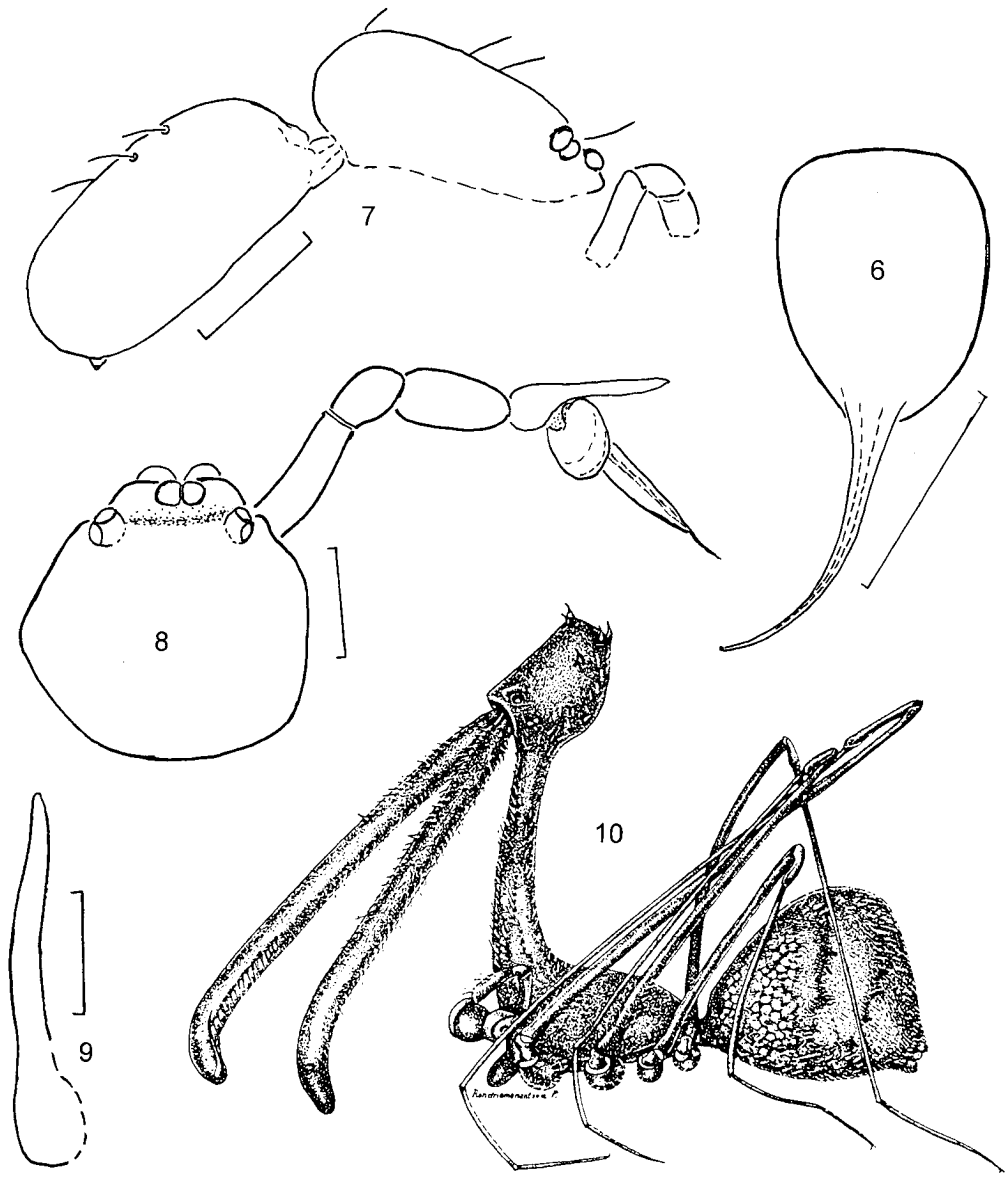


Fig. 1: Map of East African's copal areas.
Taken from RICE (1993: Fig. 8-4);

Fig. 2: Branches, leafs and fruits of the copal-producing plant *Hymenaea verrucosa* of Madagascar. Taken from SCHLÜTER & V. GNIELINSKI (1987: Fig. 2);

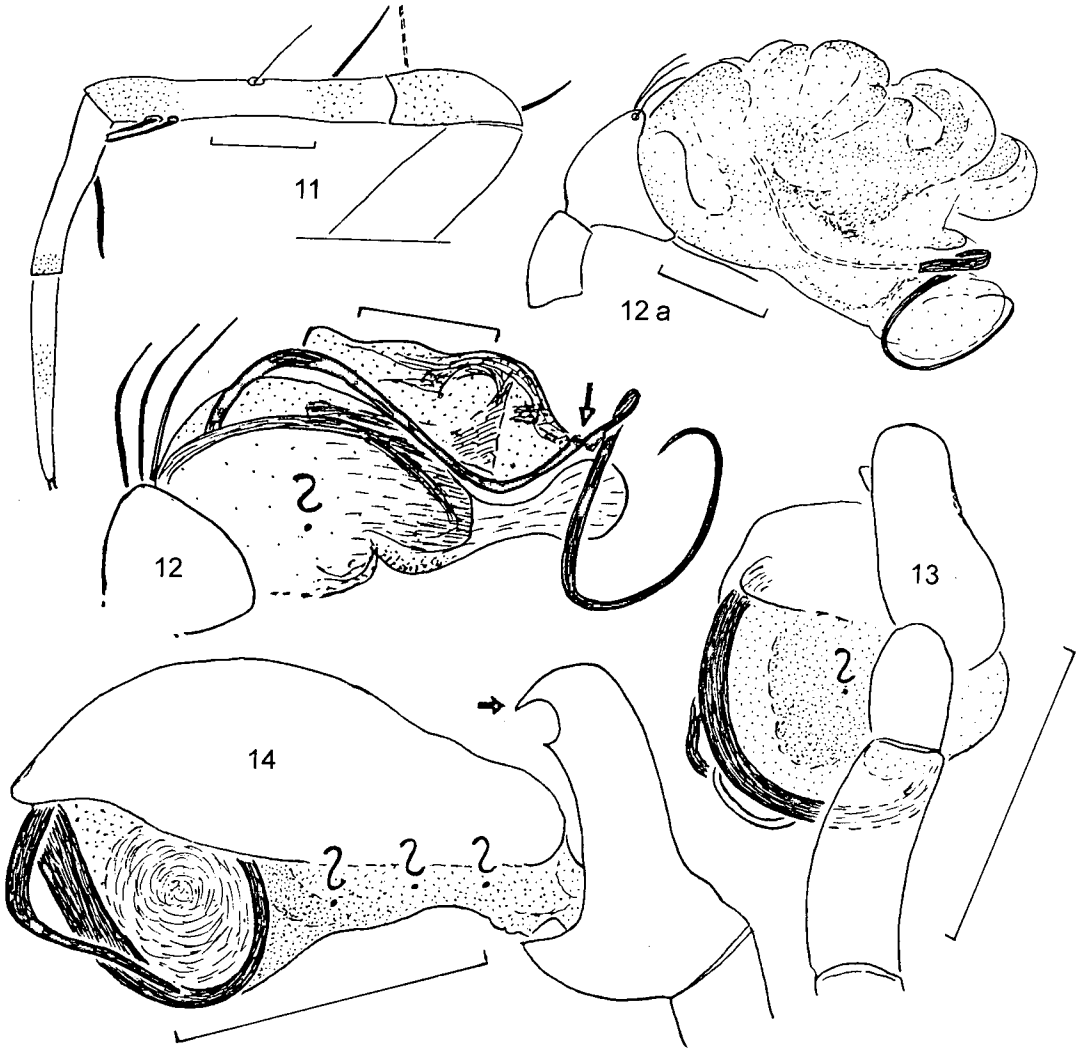
fig. 3: ***Ariadna hintzei* n. sp.**, ♂, anterior part of the prosoma (the left eyes are cut off) and pedipalpi, dorsal aspect, slightly frontally and from the left side. M = 0.5mm;

figs. 4-6: ***Orchestina madagascariensis* n. sp.**, ♂; 4) paratype a), r. pedipalpus retrolaterally, the bulbus is slightly twisted outwards, the embolus probably has been broken; 5) paratype b), l. pedipalpus oblique prolaterally; 6) paratype b), r. bulbus with the embolus, aborally and slightly retrolaterally. M = 0.1;



figs. 7-9: ***Scytodes marginalis* n. sp.**, ♂; 7) paratype, body and three articles of the right pedipalpus, retrolateral view (only few hairs are drawn); 8) holotype, deformed prosoma dorsally, and right pedipalpus (tibia, cymbium and bulbus retrolaterally) (hairs not drawn); 9) holotype, r. cymbium dorsally and slightly retrolaterally. M = 0.2 in fig. 9, 0.5 in the remaining figs;

fig. 10) ***Eriauchenius gracilicollis*** (MILLOT 1948), ♂, subfossil and extant, body laterally, body length 2.4mm. Taken from LEGENDRE (1970: Fig. 2);

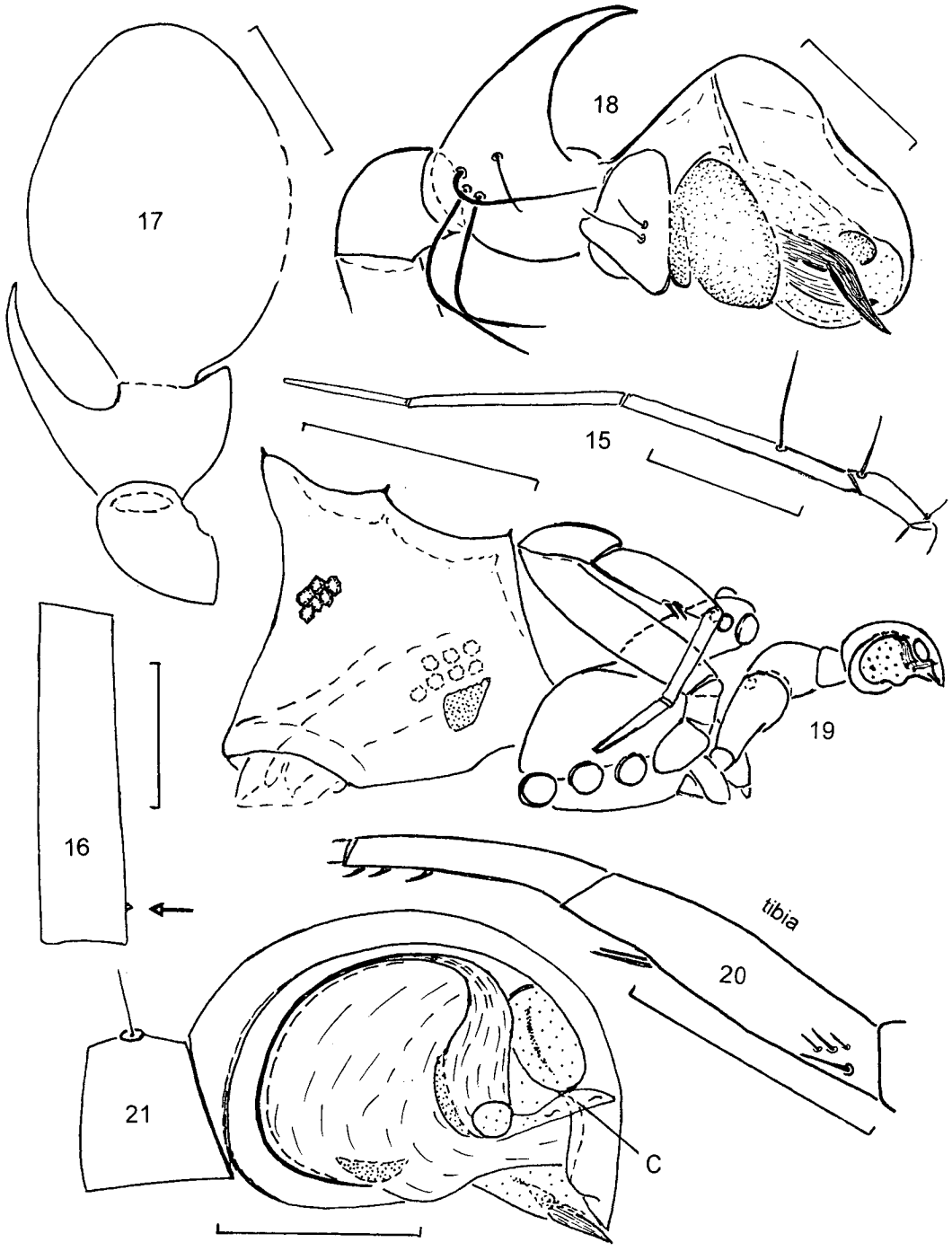


figs. 11-12: ***Mysmena dominicana*** WUNDERLICH 1998, ♂; 11) r. leg I oblique prolaterally, tibia slightly deformed (depressed laterally), with preserved remains of pigments; 12) deformed r. pedipalpus retrolaterally. The embolus was broken (arrow). M = 0.1;

fig. 12a) The same species, ♂, F1128/CJW, r. pedipalpus retrolaterally;

figs. 13-14: ***Ceratinopsis deformans*** (WUNDERLICH 1998), ♂; 13) l. pedipalpus dorsal-aboral view. M = 0.2;

figs. 15-18: ?***Toschia fossilis* n. sp.**, ♂, 15) r. leg IV, articles behind the femur retrolaterally (deformations not drawn); 16) femur of the r. pedipalpus ventrally with stridulatory tooth (arrow); 17) l. pedipalpus, patella and tibia prolaterally, cymbium dorsally; 18) slightly deformed r. pedipalpus retrolaterally. M = 0.5 in fig. 15, 0.2 in the remaining figs.;



figs. 19-21: ***Phoroncidia*** ***?aculeata*** WESTWOOD 1835, ♂; 19) body, r. leg I and r. pedipalpus, lateral view. Dotted: The r. lung cover. At two areas the small honeycomb-shaped sclerotized plates are drawn; 20) r. leg I prolaterally; 21) r. pedipalpus retrolaterally. M = 1.0, 0.5 and 0.2.

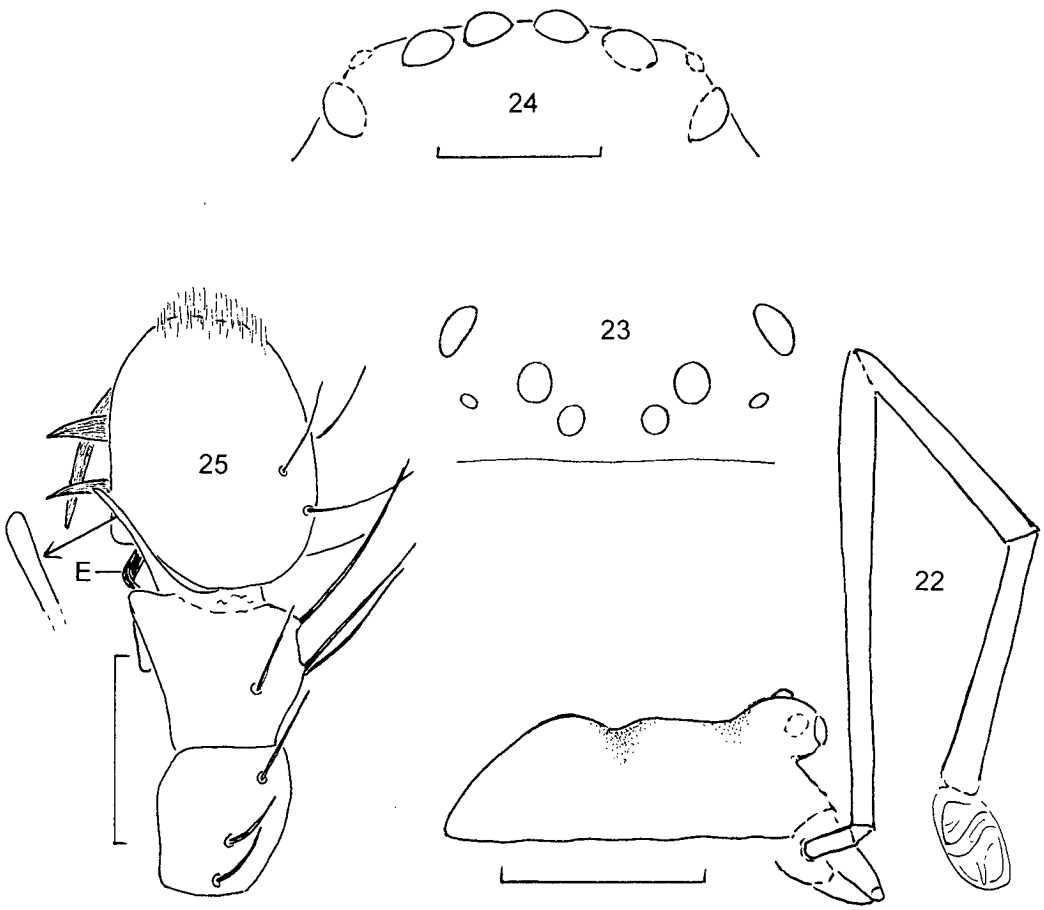
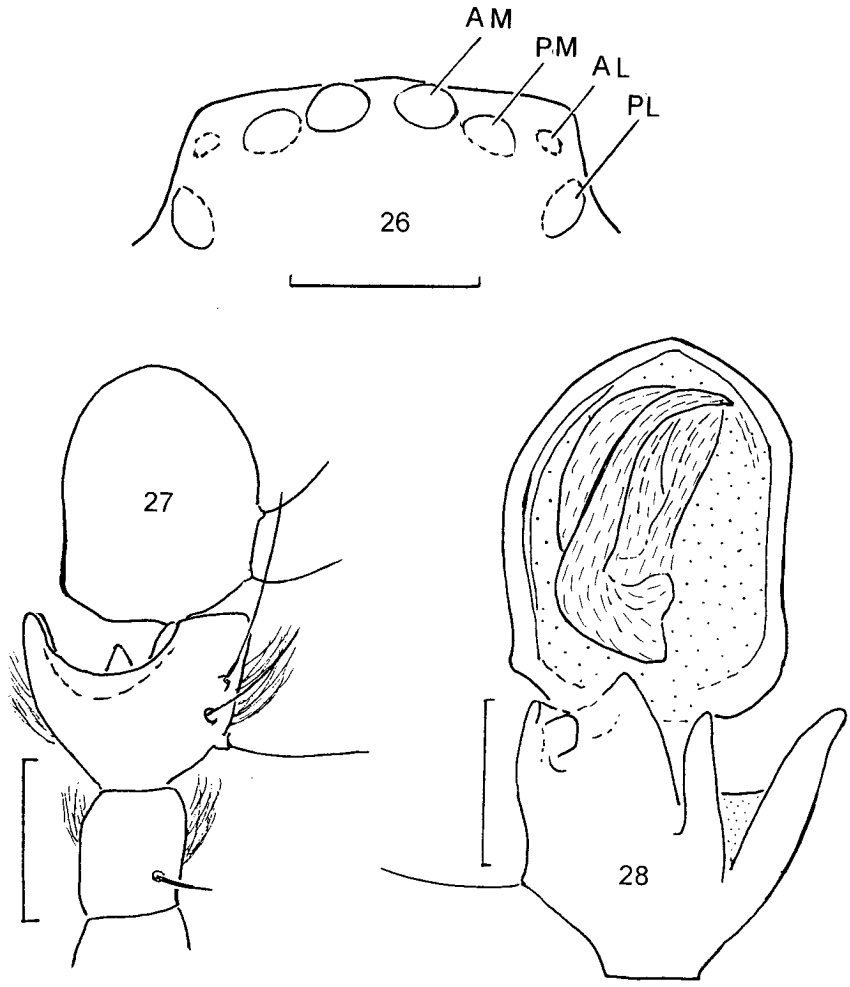


fig. 22) ***Argyrodes*** (***Rhomphaea***) ***gibbifera*** **n. sp.**, ♂, prosoma and r. pedipalpus laterally (most eyes are hidden). M = 0.5;

fig. 23) *Anyphops* sp. (extant, Africa), position of the eyes. Taken from BENOIT (1968: Fig. 4);

figs. 24-25: ?***Anyphops cortex*** **n. sp.**, ♂; 24) position of the eyes; 25) l. pedipalpus dorsally. The arrow indicates to the tibial apophysis in a slightly different position. E = embolus. M = 0.5;



figs. 26-28: ***Selenops benoiti* n. sp.**, ♂; 26) position of the eyes (AM = r. anterior median eye, AL = r. anterior lateral eye, PL = r. posterior lateral eye, PM = r. posterior lateral eye); 27) l. pedipalpus dorsally, 28) l. pedipalpus ventrally (hairs are not drawn). M = 0.5.

BEITR. ARANEOL., 3 (2004)

TWO NEW FOSSIL SPIDER SPECIES IN COPAL FROM COLOMBIA (ARANEAE: OONOPIDAE AND DICTYNIDAE)

JOERG WUNDERLICH; 75334 Straubenhardt, Germany.

Abstract: Three subrecent species of spiders (Araneae) in copal from Colombia are described: *Orchestina colombiensis* **n. sp**. and *O. truncata* **n. sp**. (Oonopidae) and *Thallumetus copalis* **n. sp**. (Dictynidae).

The **material** is kept in the private collection of the author (CJW) and will probably be deposited later in the Senckenberg-Museum Frankfurt a. M.

Introductory remarks

Colombian copal was and is produced by tropical trees of the genus *Hymenaea*. It is reported to come from Pena Blanca, Santander Province, see RICE (1993: 227). A

Colombian dealer sold me some spiders in copal as coming from from "Simatara".
Copal may be young or even recent, that means younger than 250 years, see RICE (1999: 227) but may be several thousand years old. Two pieces of copal in which the two spiders are enclosed which are treated in this paper are light yellow and hard: In more than ten years the surface did not change, no fissures appeared; so these pieces and fossils probably are not very "young". But the holotype of *Orchestina truncata* is preserved in a piece of copal which surface got very strong fissures during 15 years.
Oonopidae of the nearly cosmopolitical genus *Orchestina* SIMON have been reported from several fossil resins, see the chapter on this family in the paper on the superfamily Dysderoidea in this volume.
Fossil Dictynidae are not rare in Baltic and Dominican amber. Subrecent members of the American genus *Thallumetus* SIMON are reported here for the first time, see the paper on the family Dictynidae in this volume.
There are some more spiders in copal from Colombia in my private collection which are waiting for a study, e.g. members of the families Theridiidae and Corinnidae.

Oonopidae

Members of these usually six-eyed haplogyne spiders are easily recognizable by the thickened femur IV (fig. 1); leg IV is a jumping leg. See the chapter on the Oonopidae in the paper on the superfamily Dysderoidea in this volume.

Orchestina colombiensis n. sp. (figs. 1-4)

Material: Holotypus ♂ in copal from Colombia (Simatara), F953/CC/AR/OON/CJW. Separated are a large piece of copal and three pieces which were grinded off.

Preservation and syninclusions: The spider is fairly well preserved in a light yellow piece of copal, the sternum is somewhat and the opisthosoma is distinctly deformed, the left leg IV is directed foreward in an unnatural, position, the right leg IV is stretched out backwards. - A tiny wasp, 3 Diptera and excrement balls are preserved in the same piece of copal. About a dozen Diptera, excrement balls and detritus are present in the separated piece of copal; no stellate hairs.

Diagnosis (♂; ♀ unknown): Pedipalpus (figs. 2-4): Femur slender, patella small, tibia fairly thickened, bulbus large, embolus simple, fairly stout, apically slightly divided.

Description:
Measurements (in mm): Body length 1.0, prosomal length 0.45, leg I: Femur 0.45, patella 0.13, tibia 0.4, metatarsus 0.42, tarsus 0.25, femur IV 0.5, hight of femur I 0.085, of femur IV 0.13.
Colour orange, with redbrown parts. - Prosoma smooth (the hairs are most probably rubbed off), six eyes, medians largest and contiguous, clypeus strongly protruding, chelicerae slender, diverging distally, labium hidden. - Legs long and slender but femur IV distinctly thickened, order IV/I/II/III, few indistinct hairs, bristles absent (rubbed off?). - Opisthosoma ovally, dorsally with longer hairs, anterior spinnerets long. - Pedipalpus: See above.

Relationships: See *O. truncata* n. sp. In the extant South American *O. saltabunda* SIMON 1892 the male chelicerae bear pointed anterior humps, see DALMAS (1916: Fig. 33).

Distribution: Colombia, subrecent in copal from Pena Blanca.

***Orchestina truncata* n. sp.** (fig. 5-6)

Material: Holotypus ♂ in copal from Colombia and two separated pieces of copal, F1113/CC/AR/ONO/CJW.

Preservation and syninclusions: The surface of the piece of copal has strong fissures and is partly distroyed by aging. The spider is well preserved, the left leg II is lost beyond the coxa by autotomy, the opisthosoma is dorsally slightly depressed. I thin insects antenna (?) is preserved below the left pedipalpus and the mouth parts. Left of the spider a Diptera is preserved, around the spider several excrement particles are present. In the separated piece of copal numerours particles of excrement are preserved.

Diagnosis (♂; ♀ unknown): Pedipalpus (figs. 5-6): Femur slender, patella very large. tibia very small, embolus short.

Description (♂):
Measurements (in mm): Body length 1.0, prosoma: Length 0.55, width about 0.4, leg I: Femur 0.45, patella 0.12, tibia 0.43, metatarsus 0.4, tarsus 0.23, femur IV 0.5 (hight 0.12). - Colour mainly yellow brown, parts of the sternum and the left pedipalpus are darkened redbrown.
Prosoma and legs - as observable - as in *O. colombieneis* n. sp. Opisthosoma oval, covered with indistinct short hairs. Pedipalpus: Figs. 5-6, see above; parts of the long and twisted sperm ducts are observable.

Relationships: In *O. colombiensis* n. sp. the patella is smaller, the tibia is larger, and a long embolus is present.

Distribution: Subrecent in copal from Pena Blanca, Colombia.

Dictynidae

Males of the American genus *Thallumetus* SIMON are easily recognizable by the strongly thickened femur, patella and tibia of the pedipalpus (figs. 7-8).

***Thallumetus copalis* n. sp.** (figs. 7-8) Photo 295

Material: Holotypus in copal from Columbia (Simatara), F952/CC/AR/DIC/CJW.

Preservation and syninclusions: The spider is very well and completely preserved in a light yellow piece of copal, a drop of ?digestive fluid is preserved directly in front of the fangs, several particles of excrement are present e.g. directly behind the opisthosoma; the leg of an insect, a member of the Diptera, large remains of plants and detritus are preserved in the same piece of copal; no stellate hairs.

Diagnosis (♂; ♀unknown): Pedipalpus (figs. 7-8): Anterior margin of the patella concave, tibia sickle-shaped, conductor bipartite, both parts straight.

Description (♂):
Measurements (in mm): Body length 1.7, prosoma: Length 0.8, width 0.7, leg I: Femur about 0.7, patella 0.25, tibia 0.68, metatarsus 0.45, tarsus 0.32.
Colour light to medium brown. - Prosoma 1.14 times longer than wide, caput fairly raised, few hairs, fovea indistinct, 8 small eyes in a wide field, posterior row straight, posterior median eyes separated by 1 1/2 of their diameter, clypeus longer than the eye field, chelicerae fairly stout, posterior margin with two teeth, fangs slender, labium wider than long, gnathocoxae longer than wide, coxae IV separated by nearly one of their diameters. - Legs slender, covered with short hairs, bristles and tarsal trichobothria absent (bristles rubbed off?), order I/II/IV/III, calamistrum well developed. - Opisthosoma ovally, covered with short hairs, anterior spinnerets largest, cribellum well developed. - Pedipalpus (figs. 7-8): Order of size of the articles: Femur/patella/tibia; patella with a convex dorsal-apical margin, tibia sickle-shaped, conductor bipartite and straight, embolus originating prolaterally, about as long as half of a circle, its tip is hidden.

Relationships: In the related species the shape of the pedipalpal patella and tibia is different.

Distribution: Colombia, subrecent in copal from Pena Blanca; first known member of this genus in Colombia.

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Figs. 1-4: ***Orchestina colombiensis* n. sp.**, ♂; 1) l. leg I retrolaterally. Note the thickened femur; 2-3) l. pedipalpus dorsally and retrolaterally; 4) bulbus with embolus of the l. pedipalpus apically. A = artefact. M = 0.5mm in fig. 1, 0.1 in the remaining figs.;

figs. 5-6: ***Orchestina truncata* n. sp.**, ♂; 5) l. pedipalpus, prolateral view; 6) r. pedipalpus, retrolateral view. M = 0.1;

figs. 7-8: ***Thallumetus copalis* n. sp**. ♂; 7) l. pedipalpus, dorsal view; 8) l. pedipalpus, oblique ventral view. C = bipartite conductor, E = embolus, F = femur, P = patella. M = 0.2.


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BEITR. ARANEOL., 3 (2004)

DESCRIPTION OF TWO FOSSIL TAXA OF SPIDERS (ARANEAE: OONOPIDAE, PHOLCIDAE) IN CHINESE AMBER

JOERG WUNDERLICH, 75334 Straubenhardt, Germany.

Abstract: The following fossil spider (Araneae) taxa in Early Tertiary Chinese amber from Fu Shun, Liaoning province are described: *Orchestina fushunensis* **n. sp**. (Oonopidae) and Pholcidae gen. & sp. indet.

The **material** is kept in the private collection of the author (CJW) and will probably be deposited in the Senckenberg-Museum Frankfurt a. M. in the future.

Acknowledgement

I thank dipl. ing. G. HECK from the Rathgen-Forschungslabor der Staatlichen Museen zu Berlin, Preussischer Kulturbesitz, who kindly verified the origin of the Chinese amber pieces.

Introduction

Twelve years ago I had the opportunity to buy some spider inclusions in Chinese (Fushun) amber from the firm Ambar Del Caribe in Duesseldorf (now in Munic). Two of these spiders are preserved in a way that descriptions are ingenious.
Early Tertiary amber is known from the Guchenzgi formation near the city Fu Shun in Liaoning province, 600km N Beijing. It was concluded that the area had a subtropical climate during the Eocene, see POINAR (1992: 46).
Arthropod inclusions in Chinese amber are deformed by the pressure of layers below (thermic influence), see below and the photos; parts may be well preserved, see the paratype male of *Orchestina fushunensis* n. sp..
According to POINAR (2000: 9) "Amber containing insects and spiders is being bought in Europe, reworked in China, and sold as Chinese amber.". ("Reworked" most probably means that the pieces were heated in an autoclave, JW). In the few amber pieces of my private collection I did not find stellate hairs which are typical for Baltic amber. For a closer study - with the help of the pyrolysis gas-chromatography - in the year 1998 I send two samples to G. HECK, which were separated from amber pieces of my private collection - one from the holotype of *Orchestina fushunensis* n. sp.. He concluded that these pieces are true Chinese amber (person. commun.).
The first spider from Chinese (Fushun) amber was described by the geologist HONG YOUCHONG (1982): *Sinodictyna fushunensis* (n. gen. n. sp.). This author based the new genus on a probably juvenile spider which "probably belongs to the superfamily Dictynoidea", but neither a cribellum nor a calamistrum was documented or even mentioned. Therefore the family relationships of this taxon remain doubtful, most probably it is not a member of the superfamily Dictynoidea; I do not want to exclude that it is a member of the family Theridiidae.
Below I describe a new species of the genus *Orchestina* SIMON (family Oonopidae, dwarf six-exed spiders) which is present or even most frequent in most fossil resins (rare in Dominican amber).

Oonopidae

Members of these tiny six-eyed haplogyne spiders are easily to recognizable by their thickened femur IV (fig. 1); leg IV is a jumping leg. See the chapter on the family Oonopidae in the paper on the superfamily Dysderoidea in this volume.

***Orchestina fushunensis* n. sp.** (figs. 1-2)

Material: 2♂1♀ in Chinese amber from Fu Shun, Liaoning province; holotypus ♂ F956/CB/AR/OON/CJW, 1♂ paratype F957/CB/AR/OON/CJW, 1♀ paratype F958/CB/AR/OON/CJW.

Preservation and syninclusions: Body and legs of the three spiders are darkened and strongly deformed by pressure/heating; stellate hairs are absent. - The holotype is incompletely preserved, most parts of the left legs are cut off. - F957: Dorsal parts of the opisthosoma and parts of the right tibia and patella I and other legs are cut off, the legs are surrounded by veils, the left leg II behind the patella is surprisingly well preserved and not deformed. - F958 is completely preserved at a plant's branch behind numerous small bubbles.

Diagnosis: Pedipalpus (fig. 2): Femur and patella small/slender, tibia only fairly thickened, bulbus ovally, embolus fairly long (distal part hidden).

Description:
Measurements (in mm): Body length ♂♀ 1.2-1.3, prosomal length about 0.55, tibia I (holotype) 0.45, femur IV (♀): Length 0.48, hight 0.14.
Colour: Medium to dark brown (darkened by pressure and heat).
The prosoma is strongly deformed. Legs (deformed) fairly slender, hairs and bristles are indistinct, femur (fig. 1) distinctly thickened as in all spider of the genus *Orchestina*. The opisthosoma is strongly deformed; it bears long dorsal hairs. Pedipalpus: See above.

Relationships: The female of the fossil *Orchestina* sp. sensu NISHIKAWA (1974) (♂ unknown) from Japan is only 0.85 mm long, see NISHIKAWA (1974). In the extant Chinese species *O. sinensis* XU 1987 and *O. thoracica* XU 1987 the embolus is stout.

Distribution: Early Tertiary Chinese amber, Laoning province.

Pholcidae

Gen. & sp. indet.

Material: 1 ?ad. ♀ in Chinese amber from Fu Shun, F955/CB/AR/PHO/CJW.

The spider is completely preserved in a light orange piece of amber; legs and prosoma - especially the eye region - are deformed by thermic influence which was caused by pressure, the opisthosoma is laterally compressed. A tiny member of Diptera is preserved in the same piece of amber; no stellate hairs. - Measurements (in mm): Body length

1.1, prosomal length 0.45, tibial length I 1.0. - Most eyes are destroyed or strongly deformed, the legs are long and slender, the opisthosoma is as high as long, the genital area is protruding. - The relationships are unsure, the shape of the body is similar to *Spermophora* HENTZ 1841 and related genera.

Distribution: Early Tertiary Chinese amber, Liaoning province.

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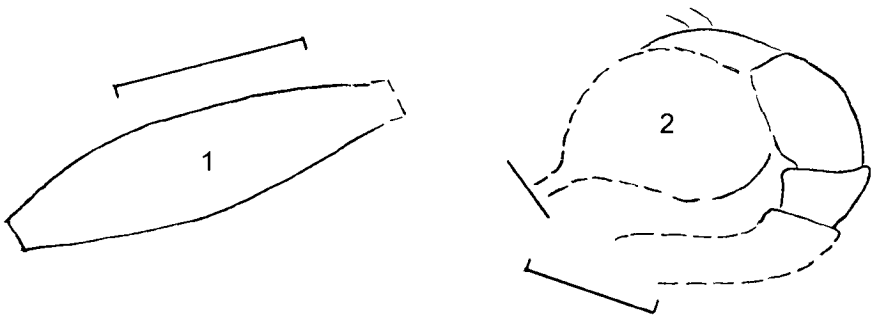

Figs. 1-2: ***Orchestina fushunensis* n. sp.**; 1) ♀ (paratype), thickened r. femur IV retro-ventrally; 2) ♂ (holotype), r. deformed pedipalpus prolaterally (the distal part of the embolus is hidden). M = 0.2 and 0.2.

BEITR. ARANEOL., 3 (2004)

REPORT ON SPIDERS (ARANEAE) OF THE FAMILIES ARANEIDAE AND ZYGIELLIDAE IN LEBANESE AMBER

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Abstract: A juvenile fossil member of the Orb weavers (Araneae: Araneidae) in Lebanese amber is described but not named. A female which was described by PENNEY & SELDEN (2002) as a member of the Linyphiidae in Lebanese amber, is here transferred to the family Zygiellidae.

Recently PENNEY & SELDEN (2002), J. Arachnol., 30: 487-493, described a fossil spider which is preserved in Lebanese amber (fig. 1). PENNEY & SELDEN considered it a member of the family Linyphiidae but I regard it as a member of the Zygiellidae, see the paper on the families Linyphiidae in these volumes. - A Cretaceous juvenile member of the family Araneidae was reported by ESKOV & WUNDERLICH (1995: 99) from Siberian amber (Taimyr). A male member of the family Oecobiidae is described in these volumes, see the paper on the superfamily Oecobioidea. - In this paper I shortly describe a juvenile Araneidae in Cretaceous Lebanese amber which is 125-135 million years old, see PENNEY & SELDEN (2002).

Araneidae indet. (fig. 2)

Material: A juv. ♀ in Lebanese amber, near Jezine, D. SCHLEE leg. in 1969; Mus. Nat. Hist. Stuttgart, no. C32/39.

Preservation: The spider is only fairly well and completely preserved; the small piece of amber is embedded in artificial resin.

Description: Measurements (in mm): Body length 1.5, leg I: Femur 1.15, patella 0.3, tibia 1.0, metatarsus 1.0, tarsus 0.6.
Prosoma (fig. 1) only slightly longer than wide, clypeus short and vertical, anterior eyes fairly small, their field very wide, lateral eyes on humps and clearly separated from each other. Chelicerae fairly large, anterior margin with two larger teeth, condylus low. Legs fairly long, I longest, III shortest, with numerous bristles of medium length on femorae, patellae, tibiae, metatarsi and on the left tarsus III (a single ventral bristle). Three tarsal claws. Trichobothria: Femora and tarsi none, metatarsi one. Opisthosoma soft, somewhat flattened and deformed, 1.17 times longer than wide, covered with short hairs.

Relationships: According to the short clypeus and the position of the eyes the female is a member of the family Araneidae; the subfamily is unsure.

Distribution: Lebanese amber, deposit near Jezine.

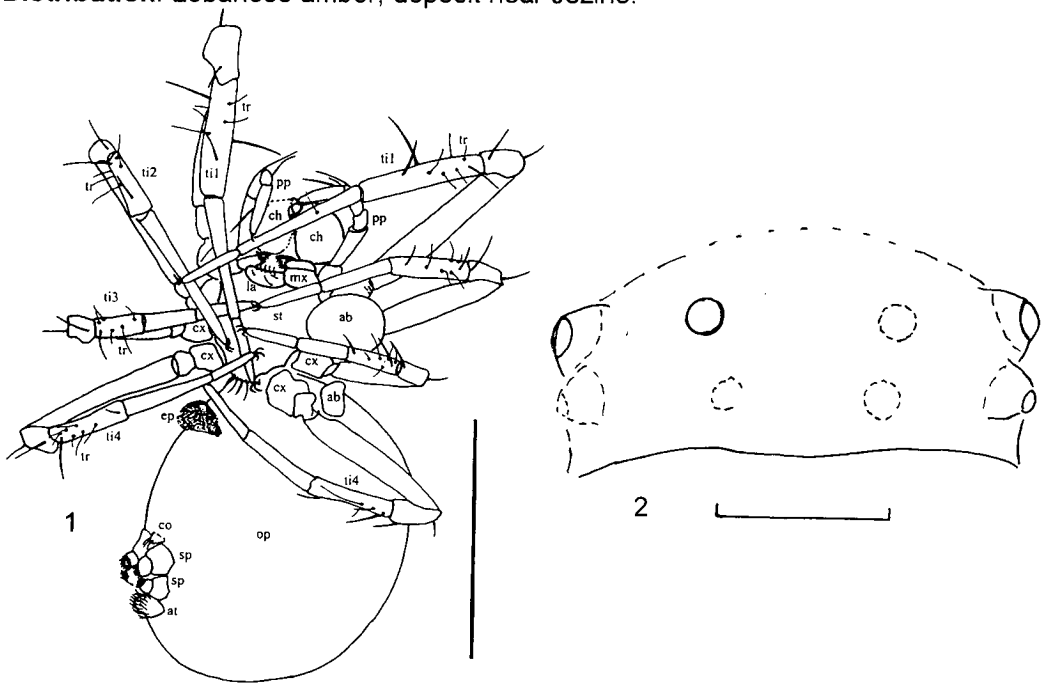

Fig. 1) Female spider in Lebanese amber, Araneae: Araneoidea indet., ventral view and from the left side. According to PENNEY (2002) this is a member of the family Linyphiidae but I consider it a member of the Araneidae or Zygiellidae. M = 1mm. Taken from PENNEY (2002: Fig. 3).

Fig. 2) Juvenile Araneidae indet. in Lebanese amber, anterior aspect of the prosoma. M = 0.2mm.

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PART IV / TEIL IV:

PAPERS OF VARIOUS AUTHORS ON FOSSIL ARACHNIDS / ARBEITEN VERSCHIEDENER AUTOREN ÜBER FOSSILE SPINNENTIERE

BEITR. ARANEOL., 3 (2004)

DESCRIPTION OF THE EXTINCT NEW SUBFAMILY MICROSEGESTRIINAE (ARANEAE: SEGESTRIIDAE) IN CRETACEOUS LEBANESE AMBER

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ABSTRACT: The following fossil and extinct spider taxa of the Araneae: Segestriidae are described from Cretaceous Lebanese amber: Microsegestriinae WUNDERLICH **n. subfam.**, *Microsegestria* WUNDERLICH & MILKI **n. gen**. and *Microsegestria poinari* WUNDERLICH & MILKI **n. sp**.

Acknowledgements: Thanks to the kindness of Dr. G. O. POINAR we had the opportunity to study this interesting Cretaceous amber spider.

INTRODUCTION

Because of its high age – almost three times older than Baltic amber – Lebanese amber fossils are of special interest concerning biogeographic and even evolutionary aspects, see SCHLEE & GLOECKNER (1978: 13-18), POINAR (1992: 56-58), POINAR & MILKI (2001).

Up to now only two spider species have been described from Lebanese amber: A member of the family Deinopidae, see PENNEY (2003), and a member of the Zygiellidae (or Araneidae?), erroneously sub Linyphiidae, see PENNEY & SELDEN (2002) and the paper on the family Linyphiidae in these volumes.
Fossil species of the family Segestriidae - three extant genera - are known from Tertiary Baltic and Dominican ambers, see WUNDERLICH (1986, 1988 and these volumes). In this paper we describe the (geologically) oldest known member of this family. A further fossil taxon will be described by D. PENNEY (in press) sub *Palaeosegestria* from North American amber from New Jersey.
Present-day Segestriids have relationships to ants: Certain spiders have a cylindrical opisthosoma and are more or less ant-shaped, some may feed on ants, but ants are unknown from Lebanese amber, and the Lebanese Segestriid is clearly not ant-shaped.

CRETACEOUS LEBANESE AND OTHER MEDITERRANEAN AMBERS

The Lebanese amber was formed in a wet, tropical pine forest, and was produced by trees of *Agathis levantensis*, see POINAR & MILKI (Araukariaceae). The age of the Lebanese amber is 125 to 135 million years, the "high life" of Dinosaurs. At that time Africa was still connected to South America as a part of the Gondwanaland.–The preservation of some inclusions is excellent, see e. g. SCHLEE (1970), GLOECKNER & SCHLEE (1978), PENNEY (2003).
The Early Cretaceous amber forests probably covered wide parts of the Mediterranean area, from Jordania and Lebanon to the Iberian Peninsula (e. g. Alava in N-Spain). Perhaps the name „Lower Cretaceous Mediterranean ambers" is justified for this kind of fossil resins, including the „Middle East Amber" – POINAR (1992: 56) - and the Cretaceous Iberian amber. Several arthropod taxa have been reported from these kinds of ambers, and hundreds – probably even thousands – of fossil species have to be described in the future!

THE CRETACEOUS SPIDER FAUNAS PRESERVED IN AMBER

The Cretaceous spider faunas in fossil resins are poorly known, see ESKOV & WUNDERLICH (1995), OENNEY (2003). But a few facts are already known, e.g.:

(1) The Cretaceous spider faunas – e.g. the family Lagonomegopidae ESKOV & WUNDERLICH 1995 - are partly quite different from the Tertiary Baltic or Dominican amber faunas, see WUNDERLICH (1986, 1988).

(2) Also „modern" higher taxa - as members of the superfamily Araneoidea, e.g. questionable Araneidae - are known from Cretaceous ambers, see ESKOV & WUNDERLICH (1995: 99).
(3) In most – perhaps in all – Cretaceous and Tertiary resins members of the genus *Orchestina* SIMON (Oonopidae) occur. In the private collection of RUBEN VIGIL in N-Spain (Vitoria) I have seen a specimen (female?) of the genus *Orchestina* with its prey, a tiny Diptera. These fossils have been collected in Moraza, south of Vitoria. The old genus *Orchestina* seems to be a „living fossil".
(4) Up to now certain remarkable gaps in the Cretacous spider fauna are known: E.g. not a single member of the Jumping spiders (Salticidae) has been found. Salticidae are frequent in Tertiary ambers and today. This largest and most diverse extant spider family did probably not evolve before the middle or late Cretaceous Period, and diversified even much later, see the paper on this family in these volumes and the chapter on phylogenetics.

THE SPIDER FAMILY SEGESTRIIDAE

Segestriidae is a member of the superfamily Dysdeoidea; in the first half of the 20th century thy were usually placed as a subfamily of the Dysderidae. The spiders are haplogyne, ecribellate, possess three tarsal claws and only two cardiac ostia. Even most fossils and the exuviae can be determined as Segestriidae by the unusual position of the third pair of legs which is directed forwards in contrast to members of other families. Only six eyes; in all extant taxa a typical "Segestroid eye position" exists with the posterior median eyes set forwards between the anterior lateral eyes in a wide field (the anterior median eyes are lost); but in an undescribed taxon in Baltic amber - the description of a new subfamily is in preparation by the first author - the position of the posterior median eyes is between the posterior lateral eyes, in the plesiomorphic position.

DESCRIPTION OF THE NEW FOSSIL TAXA

Microsegestriinae WUNDERLICH **n. subfam.**

Diagnosis (♂; ♀ unknown): Clypeus widely projecting in an oblique direction (fig. 1), opisthosoma egg-shaped (photo), dwarf spiders (body length of the male 1.35mm), male pedipalpus (fig. 4): Tibia long and thickened, bulbus globular, attached in the distal half to the short cymbium, with a free conductor. – Further characters: Ecribellate, haplogyne, most probably six-eyed, legs in a "segestriid position", clasping spines of the first male leg absent.

Relationships: According to the "segestriid leg position" and the structures of the male pedipalpus we regard the Microsegestriinae as a taxon of the Segestriidae of the superfamily Dysderoidea. Unfortunately details of the chelicerae, spinnerets, the respiratory system and some tarsal structures are hidden or lost and most parts of the eyes are hidden; therefore the relationships are not quite sure. The presence of a conductor may be a plesiomorphic character. - The egg-shaped opisthosoma of *Microsegestria* is shared by an undescribed fossil genus in Baltic amber, but it is cylindrical in the extant genera of this family. In the gen. indescr. in Baltic amber - which may be most related - the prosoma is distinctly rugose, the posterior median eyes are oval, and the position of the posterior median eyes is not between the anterior lateral eyes but between the posterior lateral eyes. - Ariadninae: See the paper on the superfamily Dyseroidea (Segestriidae) in these volumes.

Type genus: *Microsegestria* WUNDERLICH n.gen. (the only known genus).

Distribution: Cretaceous Lebanese amber forest.

Microsegestria WUNDERLICH & MILKI **n. gen.**

Diagnosis (♂; ♀ unknown), **relationships** and **distribution**: See the subfamily. Additional remark: The long tibia of the male pedipalpus is similar to this article in numerous Mygalomorpha and Filistatidae.

Type species: *Microsegestria poinari* n.sp.

Microsegestria poinari WUNDERLICH & MILKI **n. gen. n. sp**. (figs. 1-4) photo 22

Derivatio nominis: This species is dedicated to Dr. G. O. POINAR who selected the holotype for study.

Remark: POINAR & MILKI (2001: 33, pl. 23) listed and figured the holotype of this species as a member of the family Oonopidae; this was a erroneous determination of the present author.

Material: Holotype male in Cretaceous amber from Jessine, Lebanon. The specimen is mounted on a glass microscope slide. MILKI collection PSB 7, American University in Beirut.

Preservation: The spider is partly well preserved (e.g. the right pedipalpus), most leg articles are well observable. In all legs except the left leg III the tarsus or parts of it are lost, the ventral part of the opisthosoma is broken off and lost with most parts of the spinnerets, parts of the ventral body side are covered with an emulsion (e.g. the mouth parts and the openings of the respiratory system), the prosoma is dorsally darkened, only the outlines of few eyes are fairly well observable.

Diagnosis (♂; ♀ unknown): Body length only 1.35mm, embolus long and bent, surrounded by a conductor in a half circle.

Description (♂):
Measurements (in mm): Body length 1.35, prosomal length 0.65; leg I: Femur 0.68, patella 0.18, tibia 0.59, metatarsus 0.6; dorsal opisthosomal hairs ca. 0.16, tibia of the male pedipalpus: Length 0.31, hight 1.0.
Colour: Prosoma dark brown, legs brown, opisthosoma grey.
Prosoma (fig. 1) not wrinkled, not elevated, covered with few long hairs. Clypeus widely projecting in an oblique direction, chelicerae fairly protruding, thoracal ridge, labium and gnathocoxae not observable. Most probably 6 large eyes (most parts of the lenses are hidden). – Legs (figs. 2-3): I-III prograde (the right femur III is slightly retrograde), IV retrograde, order I/II/IV/III, fairly long with robust femora, metatarsus III 1.2 times longer than tarsus III, hairs not dense, of medium length. At least 2 long trichobothria on tibia I. Bristles: Tarsi and patellae none, femora 1 dorsally-basally and 3 distally, tibial bristles ventrally and laterally (most are more or less hidden), tibia I bears a dorsal bristle in the basal half and ca. 4 ventral pairs; at least metatarsus III bears a prolateral bristle in the basal half and an apical bristle. Scopulae absent. Most tarsi missing but the third right tarsus fairly well preserved and dorsally observable: The thin paired claws are badly visible (the teeth are hidden). Because of an emulsion I cannot decide if an unpaired claw or a claw tuft is present. – Opisthosoma only 1.2 times longer than wide or high, dorsally scarcely covered with long hairs. (Respiratory systeme hidden, most parts of the spinnerets are hidden or lost). Anterior and posterior spinnerets long. – Pedipalpus (fig. 4): Femur slender, patella short, tibia long and thickened, cymbium short and simple, bulbus globular, inserted in the distal half of the cymbium and with a wide sperm duct. Embolus outstanding and bent, surrounded in the basal half in a half-circle by a thin conductor.

Relationships and **distribution**: See above.

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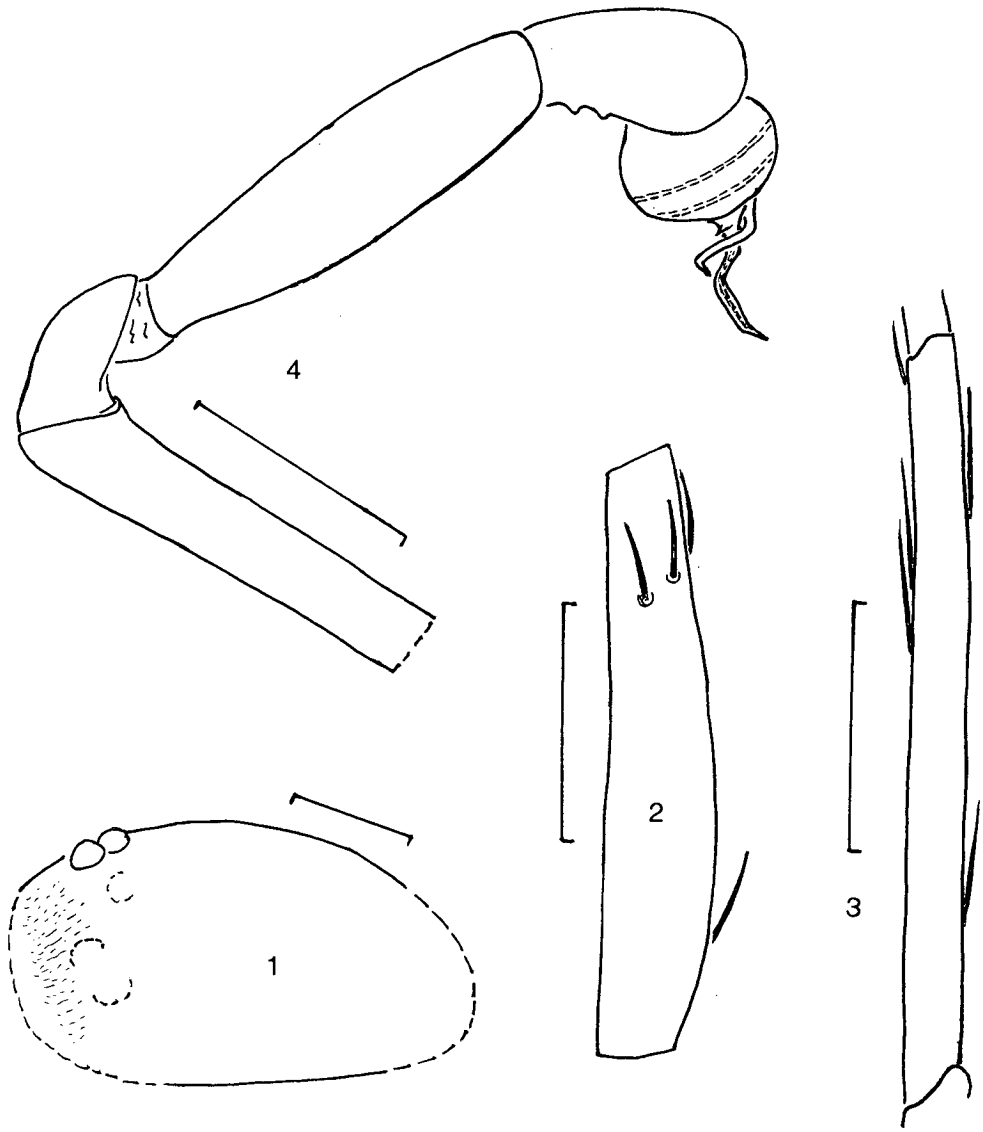

Figs. 1-4: *Microsegestria poinari* **n. gen. n. sp.**, ♂; fig. 1) outline of the prosoma retrodorsally. Only the outlines of few eyes are shown, most eye lenses are hidden; 2) right second femur prolaterally and slightly dorsally-apically; 3) first left leg retrolaterally; 4) right pedipalpus retrolaterally. M = 0.2mm.

BEITR. ARANEOL., 3 (2004)

FOSSIL EVIDENCE OF SPIDER EGG PARASITISM BY ICHNEUMONID WASPS

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Abstract: The first case of spider (Araneae: Clubionidae) egg parasitism by an ichneumonid wasp (Hymenoptera) is described from Baltic amber.

Introduction

While spiders are victims of a number of parasites, there is little fossil evidence to indicate how long these associations have existed. Previous fossil evidence of spider parasitism includes a polysphinctine wasp larva on a spider in Dominican amber, see PONAR (1987) and a mermithid nematode parasite of a spider in Baltic amber, see POINAR (2000). The present study describes what is interpreted to be a case of spider egg parasitism by an ichneumonid wasp in Baltic amber.

Material and methods

The piece of amber containing the spider and wasp cocoon originated from the Baltic amber, making it about 50 million years old. The amber piece was repolished in order to examine details of the wasp cocoon. - With some hesitation the spider was determined as a member of the family Clubionidae by J. WUNDERLICH. - The specimen is deposited in the amber collection of ANDREW CHOLEWINSKI, 2219 Artesia Blvd., Redondo Beach, CA 90278, USA.

Results

The spider, which is 6.7mm long, is a most probably adult female of the family Clubionidae. It is well preserved and in a resting position (fig. 1). Its white opisthosoma is probably due to the minute air bubbles resulting from moisture making contact with the resin. At the rear of the spider is a cocoon, 3.13mm in length and 1.3mm in greatest width. The light gray, elliptical cocoon is complete, without openings at either end, and finely woven (figs. 1, 2). Inside the cocoon can be seen the dried remains of a last instar larva or perhaps pupal stage adhering to the wall. The cocoon is resting among a cluster of oak trichomes (stellate hairs). Some of these trichomes are attached by silk threads to the outer wall of the cocoon. Beneath the spider and cocoon is a layer of silk webbing. There are no spider eggs present.

Discussion

The size and structure of the cocoon is characteristic of members of the Ichneumonoidea, see CLAUSEN (1962). Since there are no braconid parasites of spiders, it is highly likely that a member of the Ichneumonidae constructed the cocoon. The spider is in a position that is typical of a female guarding her eggs. Since the spider is in a perfect condition, it is obvious that she was not parasited. The presence of silk webbing under the spider and cocoon suggest that the spider was in her nest guarding eggs. Since no eggs are present and where eggs would be expected is now occupied by the wasp cocoon, it appears that the wasp larva fed on the spider eggs before making the cocoon.

Members of the tribe Polysphinctini are eliminated as possible candidates since they attack and destroy the spider and construct cocoons with an opening at the posterior end, from which the meconium is extruded (fig. 3), see TOWNES & TOWNES (1960). However extant members of the tribe Ephialtini of the subfamilies Pimplinae and Phygadeuontinae are known to feed on spider eggs, see FITTON et al. (1987). The wasp may have had habits similar to those of *Zaglyptus* spp., of the former group, which select eggs of a spider in which the female is guarding the nest, kill the spider by stinging and then oviposit on the spider eggs; TOWNES & TOWNES

(1960). Clubionid eggs in *Rubus* and Rumex leaves are attacked by *Zaglyptus varipes* (GRAVENHORST) in Europe, see FITTON et al. (1987). Or the wasp could be related to the extant *Trychosis*, a fairly large genus with 10 extant European species, all of which attack spiders; FITTON et al. (1987).
Curled leaves are a common habitat for Clubionids, see COMSTOCK (1948), and curved amber flows around the spider suggest that her nest was in a curled leaf, possibly an oak leaf since there are so many oak trichomes present. It is not clear if the spider gathered the oak trichomes, some of which were then incorporated on the outside of the wasp cocoon or if the wasp larva gathered and attached them to the outside of its cocoon.

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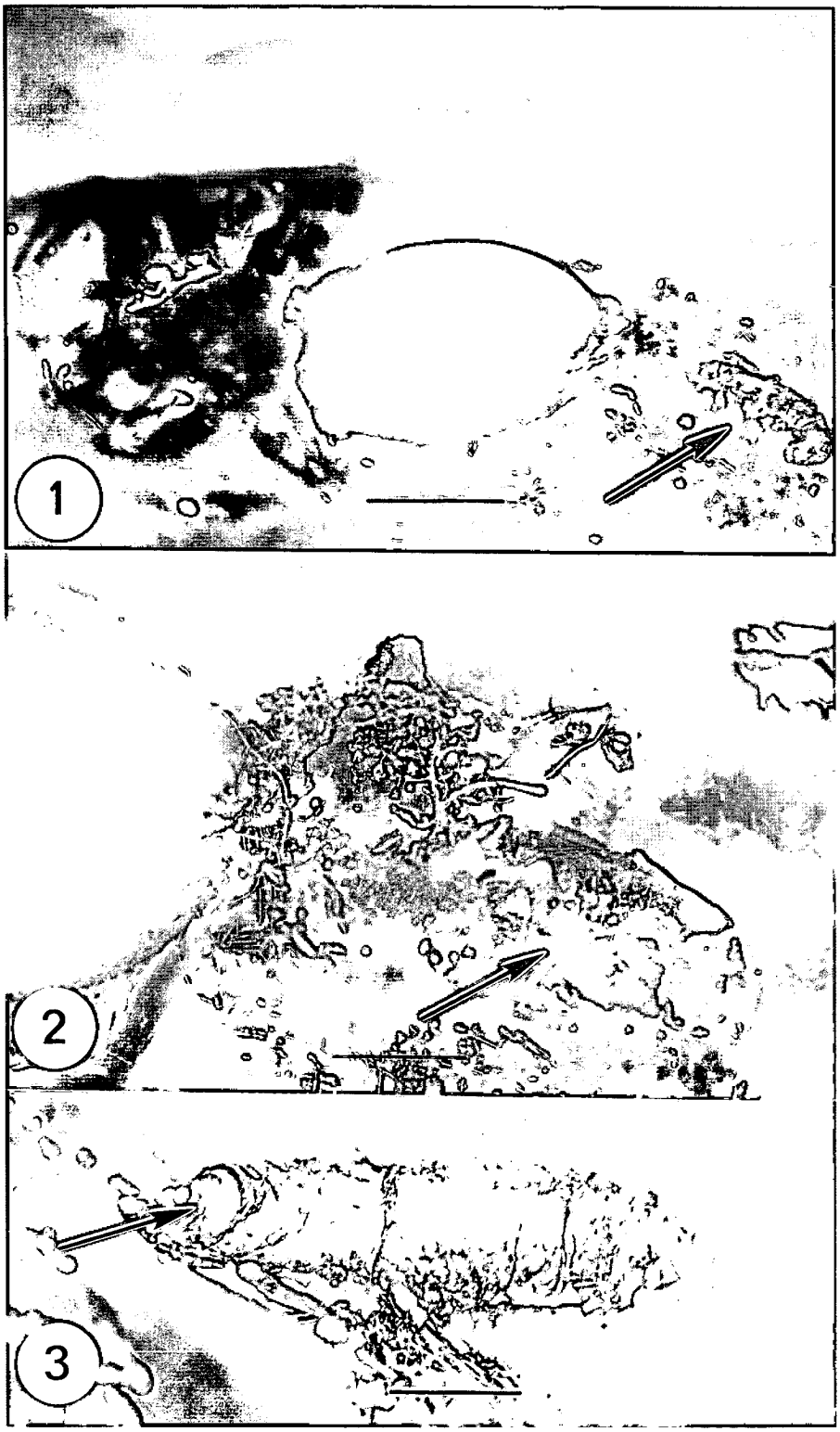
Fig. 1) Female clubionid spider adjacent to an ichneumonid wasp cocoon (arrow) in Baltic amber. Bar = 1.74mm.

Fig. 2) Detail of ichneumonid wasp cocoon (arrow) shown in fig. 1. Bar = 0.78mm.

Fig. 3) Extant cocoon of a polysphinctine wasp containing a developing *Zatypota* inside (reared by the author from a parasitized spider of the family Dictynidae collected in California). Arrow shows natural opening in the end of cocoon. Bar = 0.69mm.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BEITR. ARANEOL., 3 (2004)

FOSSIL EVIDENCE OF SCALE PHORESY ON SPIDERS

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Abstract: The first fossil phoretic scale insect (Hemiptera: Coccinea) on a spider (Araneae: Salticidae) is reported from Baltic amber.

Introduction: Scale insects (Hemiptera: Coccinea) in amber have been well studied, see KOTEJA (2000), however fossil records of scale phoresy on spiders or insects is unknown. During the life cycle of most scale insects, the first instar emerging from the eggs is called a crawler. The crawlers are dispersal stages and can mount on any mobile objects for transportation; KOTEJA, person. commun., 2. IV. 1999. The present study discusses a case of a coccid crawler attached to the ventral surface of a Jumping Spider in Baltic amber.

Material and method: The piece of amber containing the spider and coccid originates from the Baltic amber region, making it about 50 million years old. The amber

piece was re-polished in order to examine details of the coccid crawler; it is deposited in the POINAR amber collection (accession # Sy-1-117) maintained at Oregon State University.

Results: The coccid is attached to the ventral surface of the spider's opisthosoma (fig. 1). The spider, which is here the transporter, is 1.8mm in length and a juvenile of the family Salticidae. The coccid crawler (fig. 2) is 0.508mm in length and 0.18mm in greatest width. The head of the crawler contains a short beak, a few ommatidia and 5-segmented antennae. The three thoracic and 11 abdominal segments are quite distinct. Setae occur on the sides of the 4 terminal abdominal segments and are longest on the terminal segment.

Discussion: It is not possible to identify the family of the coccid with certainty, however the well developed legs and 5-segmented antennae are similar to members of the family Conchaspididae. These insects, which not produce honeydew, infest aboveground parts of plants and occur in both, the Old and the New World tropics, including South Africa, see SCHOLTZ & HOLM (1985).

Remark of the editor (JW): I am not sure about the real attachment of the scale insect to the spider's opisthosoma and therefore of a true phoresy, too.

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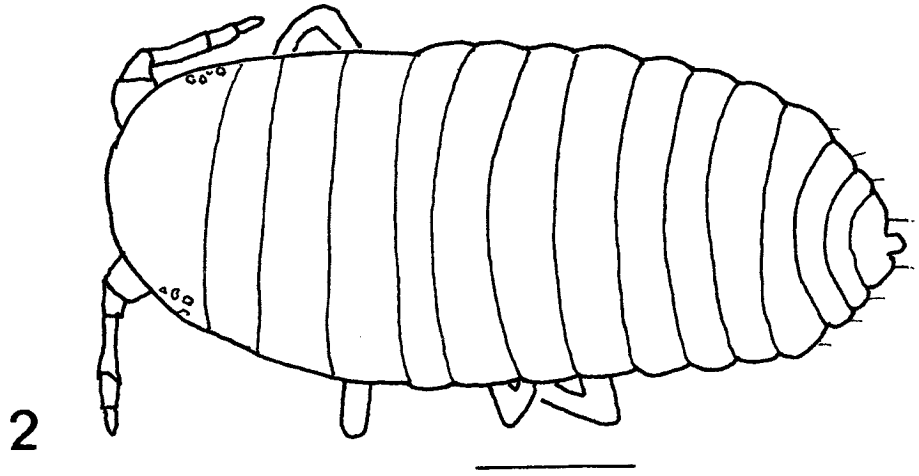

Fig. 1) Photo of the ventral surface of the salticid spider (indet.) with the attached coccid crawler (arrow) in Baltic amber. Bar = 0.4mm.

Fig. 2) Drawing of the coccid crawler on the ventral opisthosomal surface of the salticid spider. Bar = 0.96mm.

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A NEW WHIP SPIDER (ARACHNIDA: AMBLYPYGI), *PHRYNUS MEXICANA*, IS DESCRIBED FROM MEXICAN AMBER

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Abstract: A new species of whip spider (Amblypygi), *Phrynus mexicana*, represented by a well-preserved nymphal instar, is described from Mexican amber dated at 22-26 million years. The fossil exibits some interesting characters and suggests that perhaps the size of the coxal apotheses (gnathobases) could be used as a taxonomic character in this group.

Introduction: Whip spiders (Arachnida: Amblypygi) (earlier known as tailless whip scorpions) are an interesting, little studied group, which has basically a Gondwanian distribution, with extant forms found in Southern North America, Central and South America, Southernmost Europe, Africa, Southern Asia and North Australia. The fossil record of whip spiders is sparse, with only one partial specimen of *Electrophrynus mirus* PETRUNKEVITCH previously described from Mexican amber, see PETRUNKEVITCH (1971). The present study describes a second specimen, in the genus *Phrynus* WOOD, from these deposits. While Amblypygi is known from Oligocene Dominican amber this order is unknown from Eocene Baltic amber.

Material and methods: The amber piece was obtained from a mine in the Simojovel area of Chiapas, Mexico. The locations of various amber mines in this region and a synopsis of Mexican amber are presented in POINAR (1992). Amber of this region, which was produced by *Hymenaea mexicana* (Leguminosae) - see POINAR & BROWN (2002) - occurs in lignitic beds among sequences of primarily marine calcareous sandstones and silt. The amber occurs in association with the Balumtun Sandstone of the Early Miocene and the La Quinta formation of the late Oligocene. These formations have been assigned radiometric ages from 22.5 to 26 million years, see BERGGREN & VAN COUVERING (1974). Since the amber is secondarily deposited in these marine formations, it is somewhat older than the above dates. Terminology follows that of QUINTERO (1981, 1983) and WEYGOLDT (2000). Numbering of the pedipalp and leg articles begins at the proximal end of the article and proceeds to the distal end.

***Phrynus mexicana* n. sp.** (figs. 1-9, photo 696)

Etymology: the name, mexicana" refers to the country of origin of the fossil.

Holotype, immature, in Mexican amber, amber mines in Simojovel (Chiapas); POINAR amber collection (Accession # A-10-264) maintained at Oregon State University.

Preservation: The specimen is well preserved, although only the left leg IV is complete with all other legs missing the terminal segments. The left antenniform leg has only the proximal 8 segments preserved.

Description: Body 3.8mm long, covered with some sharp setae and spines; prosoma slightly broader (1.94mm) than long (1.75mm), medial portion (with sulcus at base) raised from remainder of prosoma, with some small teeth lining the medial edge, frontal process inconspicuous; posterior border slightly convex; lateral eye groups projecting from surface; medial eyes on a raised tubercle with lateral projections,

positioned near anterior medial margin of the prosoma; basal segment of chelicera with 3 teeth, upper one bifid, second tooth small, located immediately behind bifid tooth, third tooth minute, located somewhat below second tooth, single long seta located at outer margin of basal segment near claw suture; proximal cursp of bifid tooth shorter than distal cusp of same tooth; claw short, stout, strongly curved; pedipalp femur (length 0.67mm) with 4 spines on ventral surface; tibia 1.1mm long, with 4 primary spines on ventral surface and 5 primary spines on dorsal surface; Td 1 approximately equal to Td 5; Td 2, 3, 4 subequal, with Td 3 slightly shorter than other two; tarsus 1.2mm long, basitarsus separated from tarsus; no dorsoventral suture line between pedipalp tarsus and post tarsus (distitarsus and claw); no small spine on proximal end of pedipalp tarsus; basitarsus with 3 spines on ventral and 4 on dorsal surface; large subcylindrical sclerotized apophyses (gnathosoma) projecting anteriorly from inner, ventral, surface of pedipal coxae; tibia of leg IV (length 3.6mm) composed of three segments; basitibia divided into 2 articles by adelmal joint; tarsus of leg IV (length 0.9mm) with four segments, basitarsus nearly as long as remaining 3 segments; claw well developed, pulvillus absent; opisthosoma (length 2.0mm) with 10 visible segments; trichobothria difficult to see, many apparently missing.

Relationships: The absence of a pulvillus in leg IV, the three segmented tibia of leg IV and the proximal cusp of the inner double pointed tooth on the medial edge of the basal cheliceral segment shorter than the distal cusp on the same tooth place the specimen in the family Phrynidae WOOD 1863, see QUINTERO (1981). The absence of posteriorly directed subcylindrical apophyses on the pedipal trochanter, the anterior edge of the prosoma with short, dentiform tubercles and the dorsal margin of the pedipalp tibia with only one spine between the two longest spines place the specimen in the genus *Phrynus* LAMARCK 1801. The long coxal apotheses, the raised medial area on the prosoma, the short and wide chelicerae, the number and size of teeth on the basal cheliceral segment, the spinal arrangement of the pedipalpal tibia and basitarsus, the single adesmal joint on the basitibia of leg IV and the long basitarsus on leg IV, are characters which separate the species from other members of the genus, see QUINTERO (1981, 1983). The new species can be separated from the only other described Mexican amber whip spider - *Electrophrynus mirus* PETRUNKEVITCH 1971 - by the longer pedipalp coxal apophyses (which PETRUNKEVITCH termed maxillary lobes) and the absence of a spur on each of the inner faces of the basal cheliceral segments. Also, *E. mirus* has a retrolateral distal extension of the tibia, very slender elongate chelicerae, a median anterior extension on the prosoma and lacks teeth on the basal segment of the chelicerae, characters that are lacking in the present species.

Discussion: Opiliones have also gnathobases similar to the pedipalp coxal apotheses described in the fossil. The coxal apotheses have not been used previously as taxonomic character in whip spiders. If their proportions remain constant throughout the various instars they might provide a useful character.

Distribution: Mexico, fossil, in amber from Chiapas.

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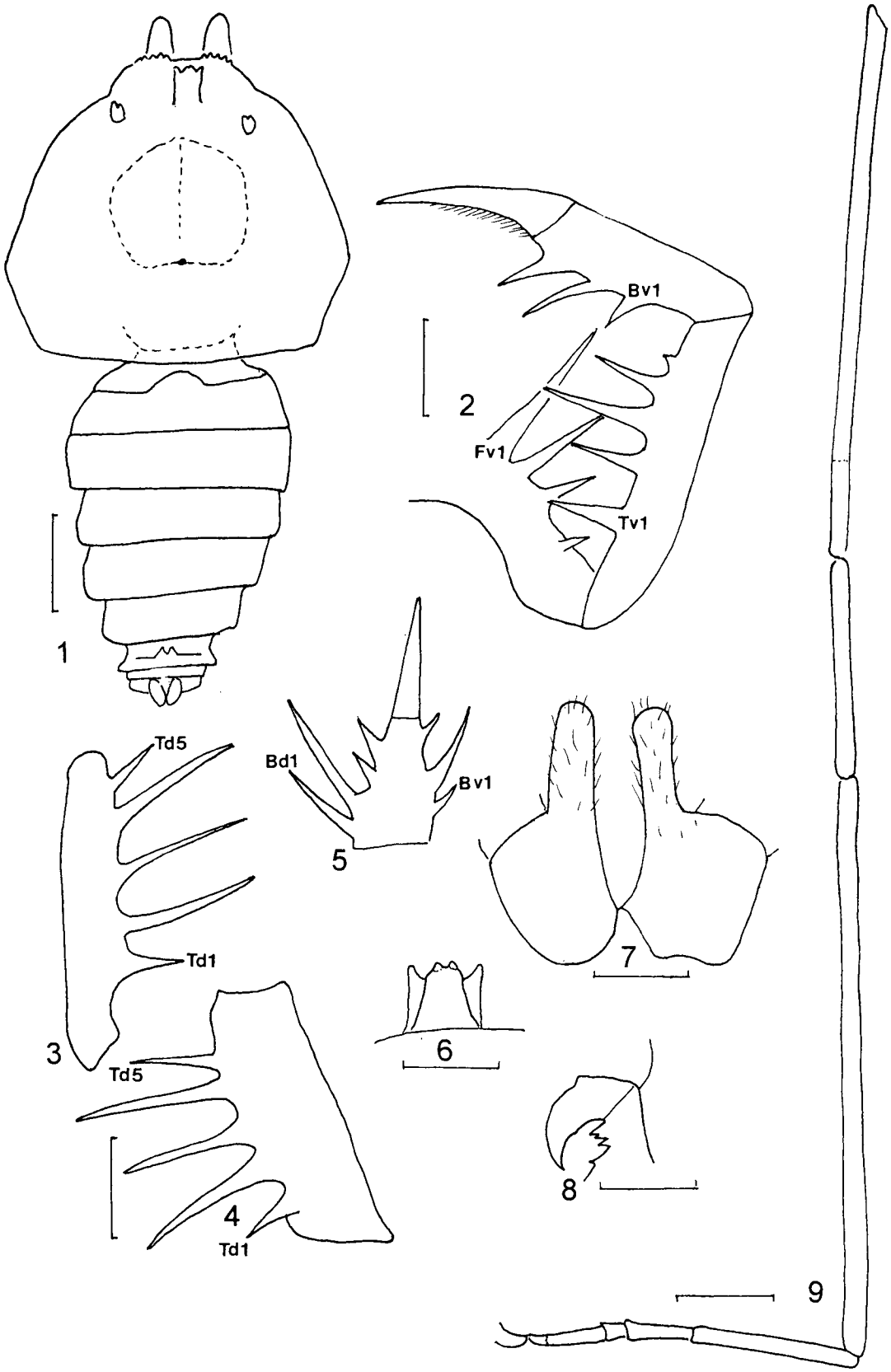
Figs. 1-9: ***Phrynus mexicana* n. sp.**, holotype, immature specimen in Mexican amber.
1) Dorsal aspect of prosoma and opisthosoma;
2) Ventral surface of left pedipalp;
3) Dorsal surface of left pedipalp tibia;
4) Dorsal surface of right pedipalp tibia;
5) Inner lateral aspect of basitarsus and tarsus;
6) Median eye tubercle with lateral projections;
7) Anteriorly projecting sclerotized apophyses (gnathobases) on ventral surface of pedipalp coxae;
8) Left chelicera showing teeth on basal segment.
9) Tibia and tarsus og left leg IV.

Bar = 0.2mm in fig. 6, 0.6mm in fig. 1, 0.3 in the remaining figs.
Td1 - spine one on dorsal surface of tibia; Td5 - spine 5 on dorsal surface of tibia; Tv1 - spine one on ventral surface of tibia; Bd1 - spine one on dorsal surface of basitarsus; Bv1 - spine one on ventral surface of basitarsus; Fv1 - spine one on ventral surface of femur.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Bv1
Fv1
Tv1
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Td5
Td1
Td5
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Td1
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Bd1
Bv1
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BEITR. ARANEOL., 3 (2004)

DESCRIPTION OF A FURTHER SPECIES OF FOSSIL SCORPION IN BALTIC AMBER

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Abstract: A new species of fossil scorpion, *Palaeoananteris wunderlichi* sp. n. (Scorpiones, Buthidae), is described from Baltic amber. This is the eighth specimen to have been found and described from Baltic amber and its discovery provides further evidence of the diversity in the Tertiary Baltic amber forest.

Introduction

In recent papers describing new genera and species of scorpions found in Baltic amber (Lourenço & Weitschat, 1996, 2000, 2001), the rarity of such specimens has been discussed. Even though fossil scorpions in amber have also been discovered in other regions of the world, such as the Dominican Republic, Mexico, Lebanon and Burma, they can still be considered rare.

The history of scorpions found in pieces of Baltic amber is complex. In recent years, five fossil scorpions have been studied and described as new genera and species of Buthidae (Lourenço & Weitschat, 1996, 2000, 2001). It was suggested, however, that all these distinct genera might possibly represent a single phylogenetic lineage.

In this note, one new species is described representing the second species assigned to the genus *Palaeoananteris* Lourenço & Weitschat, 2001. Although the various genera and species of Baltic amber seem to be more or less closely allied, they attest to an interesting degree of diversity in the Baltic amber-producing forests. For the ecology of the amber-producing forests and the methods used, see Lourenço and Weitschat (1996, 2000, 2001).

***Palaeoananteris wunderlichi* sp. n.** (Fig. 1, photo 586)

Derivatio nominis: The new species is named after J. Wunderlich (Germany) who made possible the study of the specimen.

Holotype: Age and sex unknown. (Several micro-scorpions have an average total length ranging from 10 to 15 mm). - Deposit: Collection J. Wunderlich, N° F326/CJW, Straubenhardt, Germany. - Baltic amber (Eocene): see LOURENCO & WEITSCHAT (1996) for details.

Preservation: The specimen is rather incomplete, including only the metasoma and telson. The quality of the amber is particularly good, allowing a very detailed examination.

Diagnosis: Total length about 13 mm, including total length of metasoma + telson which is about 7 mm long. General morphology of metasoma similar to that of *Palaeoananteris* Lourenço & Weitschat, particularly in the spinoid shape of the subacular tooth. The new species can, however, be distinguished from the other known species in the genus, *P. ribnitiodamgartensis*, by: (i) the number of carinae on metasomal segment II (8, instead of 10 in *P. ribnitiodamgartensis*); (ii) the shape of metasomal segment V, which is flattened laterally, whereas in *P. ribnitiodamgartensis* it is rounded; (iii) the presence of lateral carinae on the telson; and (iv) the size of the subacular tooth, which is very strong.

Description:
Coloration: The general colour is a light-brown to reddish brown in all visible parts of the metasoma and telson.

Measurements (in mm): Total length of metasoma + telson: 7.1. Metasoma segments: I: length, 0.84; depth, 0.75; II: length, 0.94; depth, 0.75; III: length, 0.97; depth, 0.75; IV: length, 1.25; depth, 0.69; V: length, 1.66; depth, 0.69. Telson length, 1.40; vesicle depth, 0.53.

Morphology. Carapace, carinae and furrows unknown. Median ocular tubercle, lateral eyes and sternum unknown. Mesosoma: Tergites I to VII unknown. Venter: genital operculum, pectines, sternites and spiracles unknown. Metasoma: segment I with 10

carinae; segments II to IV with 8 carinae. Segment V flattened laterally, with 5 carinae. All carinae strongly crenulate. Lateral inframedian carinae on segment I complete, crenulate; absent on segment II. Ventrolateral and submedian carinae strongly crenulate. Segment V with dorsolateral carinae strongly crenulate. Dorsal and lateral inframedian carinae with spinoid posterior granules on segments I to IV; better marked on segments III and IV. Intercarinal spaces without granulation, chagrined. Telson with some weak granulation, and with one strong ventral and two latero-ventral carinae. Aculeus moderately to strongly curved and of same length as vesicle. Subaculear tooth very strong and spinoid; no dorsal granules can be observed. Leg, cheliceral and pedipalpi unknown.

Distribution: Tertiary Baltic amber forest; most probably Kaliningrad deposit.

Acknowledgements: I am very grateful to MARK JUDSON (MNHN, Paris) for linguistic corrections to the manuscript.

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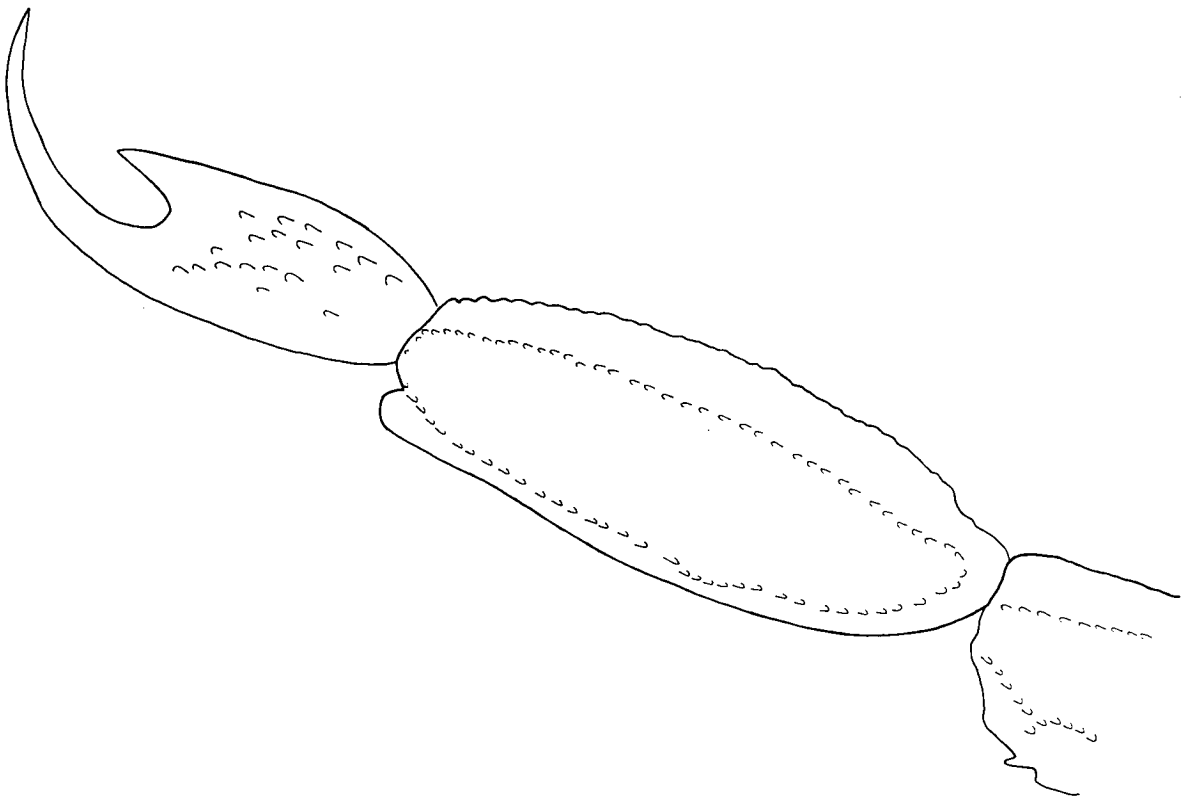


Fig. 1. *Palaeoananteris wunderlichi* n. sp., schematic drawing of metasomal segment V and telson, lateral aspect.

BEITR. ARANEOL., 3 (2004)

BETRACHTUNGEN UND GEDANKEN ÜBER BERNSTEIN UND INKLUSEN / REFLECTIONS ON AMBER AND INCLUSIONS

Abstract: Some new findings mainly on the biotopes and the origin of spider inclusions as well as their syninclusions in Baltic amber are presented and discussed.

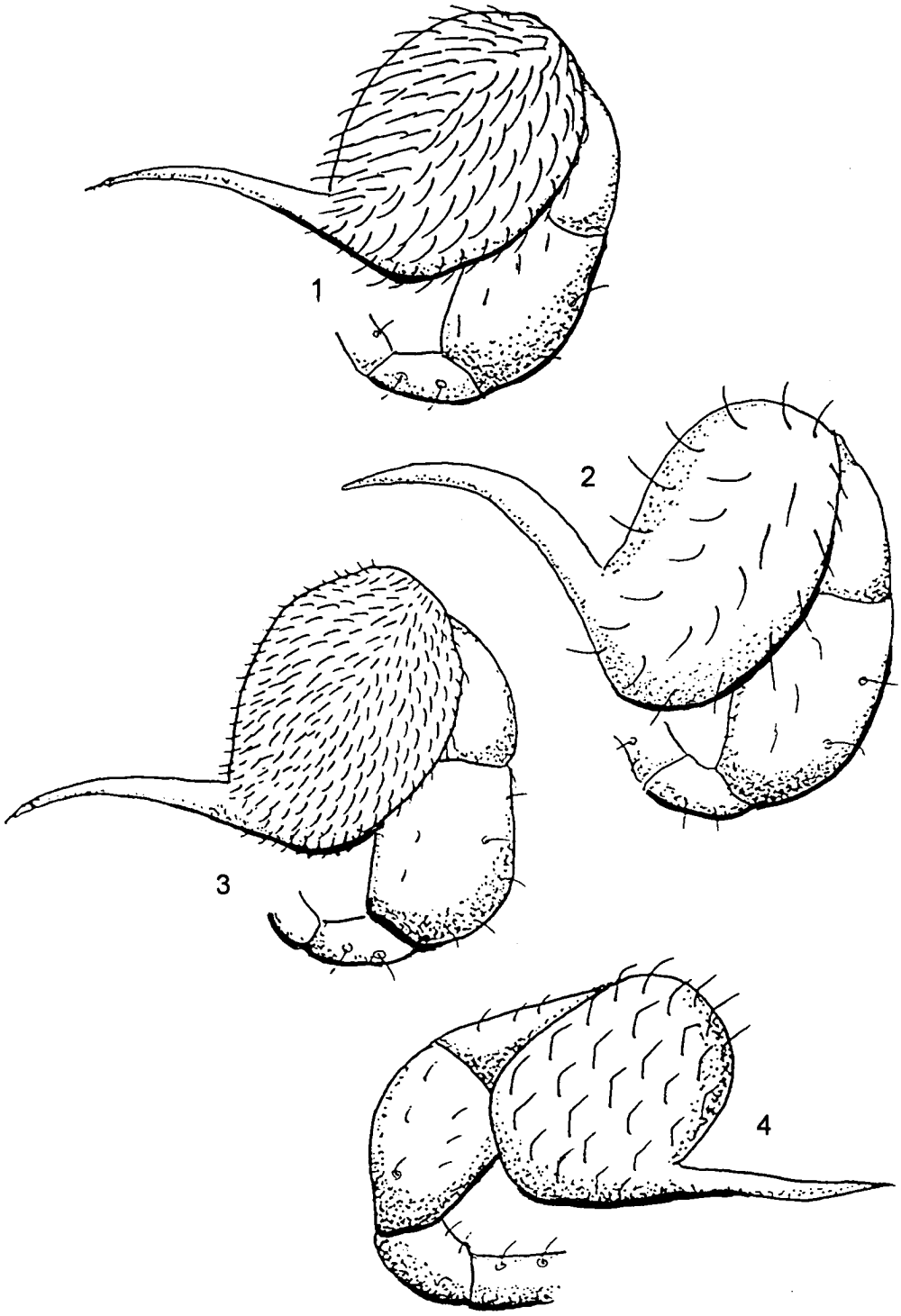
Wenn ich mit einigen Bernsteinen von der Strandlese nach Hause komme, meine Ausbeute wasche und sortiere, ist es immer wieder faszinierend, das Farbenspiel der einzelnen Steine zu bewundern. Da taucht dann unwillkürlich die Frage auf, wie die einzelnen Stücke hinsichtlich Herkunft und Alter miteinander in Zusammenhang stehen. Stammen hier eventuell zwei der Steine von ein- und demselben Baum oder stammen sie - was natürlich wahrscheinlicher ist - von verschiedenen Bäumen? Und wie weit standen diese Harzspender mit ihren blutenden Wunden voneinander entfernt - einen Steinwurf, einen Tagesmarsch oder gar Hunderte von Kilometern? Wie groß war Fennoskandia? Und noch interessanter: haben diese Steine denselben Frühling erlebt? Sind sie zeitlich zwei oder zweihundert Jahre auseinander? Oder gar fünfhunderttausend Jahre, ja vielleicht mehrere Millionen Jahre? Wie lange standen die Wälder des Alttertiärs?
Bei Altersbestimmungen von Bernsteinen versagen jedenfalls die C14-Methode wie auch Versuche mit der Fission-track-Methode. Ebenso geben Kurven von Infraspektren keine verläßliche Antwort auf unterschiedliches Harzalter.
Aber da haben wir noch unsere geliebten Einschlüsse! Wie schrieb doch Immanuel Kant: "Oh, wenn du reden könntest, kleine Fliege, wie ganz anders würde es um unsere Kenntnis der Vergangenheit stehen!" Haben wir hier vielleicht einen Ansatzpunkt für die Ermittlung von Alter und Herkunft der Bernsteine? Nun wissen wir, daß in phylogenetischer Hinsicht kaum Veränderungen aufgetreten sind, jedenfalls nicht in der relativ kurzen geologischen Zeitspanne der einstigen Bernsteinwälder. Es ist also nicht weiter verwunderlich, daß mich das mikroskopische Befragen von Fliegen - ich habe in vielen Stunden alle Feinstrukturen und abweichenden Merkmale an

meinem Diptera-Material studiert - nicht weiterbrachte. Wir müssen demnach die genaue Altersbestimmung vorläufig ad acta legen; hier sheint es kein Weiterkommen zu geben.
Bleibt der zweite Punkt: die Herkunft der einzelnen Bernsteine innerhalb Fennoskandiens! Vielleicht gibt uns eine ältere Gruppe des Stammes der Arthropoda, die Klasse der Spinnentiere (Arachnida) - und hier Vertreter der häufiger im Bernstein anzutreffenden Ordnung der Spinnen (Araneae) - eine Antwort?!
Seit dem ersten Mitgliedertreffen des Fördervereins des GPI-Museums in Hamburg in der letzten Woche des Jahres 1993 nämlich, angeregt durch unseren Spinnenspezialisten Jörg Wunderlich, habe ich mich etwas näher mit den in meiner Sammlung befindlichen Spinnen beschäftigt. Hier fand ich bei den nicht seltenen Zwerg-Sechsaugenspinnen (Oonopidae) der Gattung *Orchestina* mit ihren typisch verdickten Hinterschenkeln etwas sehr Bemerkenswertes.
Zunächst mußte ich mich vergewissern, Vertreter derselben Art vor mir zu haben. Dies ist bei den merkmalsarmen Männchen nicht immer ganz einfach und erfordern genaue Messungen der Glieder des Pedipalpus. Nach zusätzlichen Vergleichen der Bulbusformen und speziell der Dicke des Embolus fand ich 7 vollständig erhaltene und zwei beschädigten Männchen der Art *Orchestina* baltica PETRUNKEVITCH - siehe Foto 32 in Band A -, teilweise gemeinsam mit unterschiedlichen Insekten eingeschlossen.
Bei der Kleinheit der Zwerg-Sechsaugenspinnen - sie messen weniger als 2mm - mußte ich schon sehr dicht heranschleifen, um insbesondere die äußere Seite des jeweiligen Bulbus in Planlage zu bringen. Nach dieser anstrengenden und zeitaufwendigen Präparation entdeckte ich allerdings etwas sensationelles: Nach Dichte, Länge und Form der feinen Härchen auf dem Bulbus - 160-fache Vergrößerung - waren markante Unterschiede zu erkennen:

a) (Abb 1) In einem größeren Bernsteinstück liegt außer der Spinne noch eine Köcherfliege (Trichoptera) der Familie Beraeidae. Deren Larven leben ausschließlich in sauerstoffreichen und kühlen Gebirgsbächen mit überrieselten Felsen. Die mit eingeschlossene Spinne läßt auf dem gut einsehbaren Bulbus des Pedipalpus - dem Endglied des männlichen Geschlechtsorgans - viele lange, dicht stehende, fast pelzartig wirkende Härchen erkennen. Dies könnte für einen gewissen Isolierschutz der hochempfindlichen Geschlechtsorgane agehalten werden. Die Vergesellschaftung mit der Baraeidae könnte auf eine Herkunft aus dem nordwetlichen, etwas kühleren, gebirgigen Fennoskandien hinweisen. Bei einem zweiten Tier ist der Bulbus ähnlich dicht behaart.

b) (Abb. 2) Bei einer dritten *Orchestina* sowie bei zwei weiteren Einschlüssen zeigt der Bulbus nur wenige, einzeln stehende, lange Haare - ein deutlicher Unterschied! In zwei dieser Inklusensteine befinden sich außer den Spinnen noch eine bzw. drei Trauermücken (Sciaridae). Diese Mücken bevorzugen ausschließlich feuchtwarme Biotope, wie sie in zentralen und östlichen Bereichen der Eozänwälder vorherrschten!

c) (Abb. 3) Zwei andere Spinnen zeigen wiederum unterschiedlichen Haarbewuchs auf den Pedipalpen: hier stehen sie dicht, sind auffällig kurz und haben einen hellen, weißlichen Glanz im distalen Bereich. Wahrscheinlich dienten sie der Reflexion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übermäßigen Sonnenlichts. Das läßt eindeutig auf einen südlichen, trockenwarmen Lebensraum schließen! - (Anmerkung des Herausgebers J. W.: Vgl. die auffälligen Haare auf dem Cymbium einiger fossilen Springspinnen, Foto 414! Bei diesen Spinnen besitzen die dichten Cymbium-Haare allerdings eine ganz andersartige Funktion als bei den Zwerg-Sechaugenspinnen).

d) (Abb. 4) Als größte Überraschung fand ich bei den restlichen beiden Spinnen unterschiedlich lange, in der Mitte abrupt zur Seite abknickende Bulbushärchen - ein typisches Zeichen für starken Seitenwind, vergleichbar den "Windflüchtern" in Küstennähe an der Nordsee! Diese beiden Spinnen waren ohne Zweifel im sturmgepeitschten Westen Fennoskandiens beheimatet!

Damit ist für mich die Herkunft zumindest der hier behandelten Bernsteinstücke geklärt. Abschließend kann ich nur hoffen, daß Bernsteinfreunde, insbesondere Spiderman J. W., meine Entdeckungen früher oder später bestätigen werden. - (Anmerkung des Herausgebers J. W.: die in dieser Arbeit beschriebenen Bulbushärchen existieren offenbar nur bei frisch gehäuteten Spinnen; die "gewöhnlichen" Bulbi älterer Exemplare - wie sie mir vorliegen - sind dagegen völlig kahl!).

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1. IV. 1994

(1) Liseistieg 10, D-22149 Hamburg.

INDEX of the scientific spider names - mainly of the taxonomical part - of these volumes, Beitr. Araneol., 3 - and the number of the photos (in brackets)
Those higher taxa treated in more detail are printed in bold letters

APPENDIX (ANHANG)

(1) New higher (suprageneric) spider taxa which are described in these volumes

In alphabetic order; extinct taxa are underlined. See also pp 210-223.

Antisteini (Dictynidae: Hahniinnae),
Ariadninae (Segestriidae),
Balticorominae (Anapidae s. l.),
Baltsuccinidae (Araneoidea), Baltic amber,
Borboropactidae (from Thomisidae),
  Borboropactinae,
  Succiniraptorinae,
Chrysometinae (Zygiellidae?),
Copaldictyninae Dictynidae), subfossil, in copal from Madagascar,
Eomatachiini (Zoropsidae s. l.; from Amaurobiidae and Psechridae), Baltic amber,
Eoprychiini (Zoropsidae s. l.), Baltic amber,
Eotrechaleinae (Trechaleinae), Baltic amber
Lebanoecobiinae (Oecobiidae), Lebanese amber,
Microsegestriinae (Segestriidae), Lebanese amber,
Miraraneinae (Araneidae), Baltic amber,
Mizagallinae (Dictynidae), Baltic amber,
Parvomygalinae (Microstigmatidae), Dominican amber,
Protheridiidae (Araneoidea), Baltic amber,
  Praetheridiini,
  Protheridiini,
Sosybiini (Trochanteriidae; from Clubionidae and Sparassidae), Baltic amber,
Succiniraptorinae (Borboropactidae, see above), Baltic amber.

(2) New ranks (status) of higher spider taxa and transfers:

See also above (transfers of Eomatachiini and Sosybiini) as well as Eresoidea, Araneidae: Nephilinae, Anapidae s. l., Mimetidae s. l., Dictynidae s. l., Zoropsidae s. l., Corinnidae: Phrurolithinae (not Liocranidae) and Salticidae. Only Mizaliinae is extinct.

Cocalodinae (Salticidae; from Cocalodini; see Spartaeinae),
Cryptothelinae (Zodariidae; from Cryptothelidae),
Cyriocteinae: See Zodariidae,
Diguetinae (Plectreuridae; from Diguetidae),
Hahniinae (Dictynidae; from Hahniidae),
Holarchaeini (Mimetidae: Pararchaeinae; from Holarchaeidae),
Homalonychinae (Zodariidae; from Homalonychidae),
Insecutoridae: Probably a taxon of the family Pisauridae,
Micromygalidae (from Micromygalinae),
Mimetini (Mimetidae; from Mimetinae; Araneoidea, not Archaeoidea/Palpimanoidea/Eresoidea),
Mizaliinae (Oecobiidae; from Mizaliini and Mizaliidae), Baltic amber
Nanometinae FORSTER & FORSTER 2000 (Tetragnathidae; from Nanometidae),
Nephilinae: A subfamily of the Araneidae but not Tetragnathidae,
Oarcini (Mimetidae; from Oarcinae),
Oecobiini (Oecobiidae; from Oecobiinae),
Pararchaeinae (Mimetidae; from Pararchaeidae),
Prodidominae (Gnaphosidae; from Prodidomidae),
Spartaeinae = Spartaeini of the Cocalodinae (Salticidae),
Sternodini (Mimetidae; from Sternodidae),
Urocteini (Oecobiidae; from Urocteinae),
Zorocratidae: A taxon of the Zoropsidae s. l.,
Zygiellidae, Zygiellinae (from Zygiellini, Araneidae).

(3) New synonyms of higher spider taxa:

See also above, e.g. Spartaeinae and Zorocratinae.

Guizygiellinae ZHU et al. 2003 = Zygiellinae (Zygiellidae), extant,
Jurarchaeinae ESKOV 1987 (fossil, not inamber) ?= Archaeinae (Archaeidae) (questionable synonymy),
Mimetarchaeinae ESKOV 1992 (sub Archaeidae, Baltic amber) = Mimetini (Mimetidae).

These two books introduce to the diversity of fossil spiders which are mainly preserved in Baltic amber; they open a "window to a vanished world". Fossil spiders in old amber and young copal are compared with now-living relatives. These volumes are addressed to scientists as well amateurs which are interested in the fascinating inclusions of fossil resins which go back up to 130 million years, the era of dinosaurs.

Diese beiden Bände stellen die Vielfalt der fossilen Spinnen vor, die vor allem im Baltischen Bernstein konserviert sind - sie öffnen ein "Fenster zu einer längst vergangenen Welt". Fossile Spinnen in altem Bernstein und jungem Kopal werden mit ihren heute lebenden Verwandten verglichen. Diese Bände wenden sich an Amateure wie Wissenschaftler, die sich für die faszinierenden Einschlüsse in fossilen Harzen interessieren, deren Alter bis zu 130 Millionen Jahren zurückreicht, das Zeitalter der Dinosaurier.

Besides a large general popular part a scientific part is presented: descriptions of more than 400 new species, genera and families, revisions as well as identification keys of fossil and extant taxa (from species to superfamiliar level). New findings are given e.g. on systematics, phylogenetics, palaeofaunistic, palaeobiogeography, the palaeoclimate and the palaeobiology (e.g. on fossil capture webs, spiders' prey, pararasites, egg sacs, courtship and moulting behaviour, camouflage, decomposition and autotomy of fossil and extant spiders) as well as on fakes.

Neben einem umfangreichen populären, zweisprachigen, farbig bebilderten Teil wird ein wissenschaftlicher Teil präsentiert: Beschreibungen von mehr als 400 neuen Arten, Gattungen und Familien, Revisionen, Bestimmungs-Tabellen fossiler und heutiger Gruppen. Neue Befunde z. B. zu Systematik und Stammesgeschichte, zur früheren Fauna und Verbreitung, zum frühe-Klima und zur Biologie (fossilen Fangnetzen, Beute und Parasiten der Spinnen, Kokonbau u.a. Fortpflanzungs- sowie Häutungs-Verhalten, Tarnung, Zersetzung und Autotomie fossiler und heutiger Spinnen) wie auch zu Fälschungen.

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