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Description of a new genus of spiders from the eastern Mediterranean and the most armored erigonid species from the western Caucasus (Aranei: Linyphiidae: Erigoninae)

Описание нового рода пауков из восточного Средиземноморья и самого скутинизированного вида эригонид из западного Кавказа (Aranei: Linyphiidae: Erigoninae)

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KEY WORDS: Abkhazia, dorsal scutum, ventral scutum, new species, new combination.
КЛЮЧЕВЫЕ СЛОВА: Абхазия, дорзальный скутум, вентральный скутум, новый вид, новая комбинация.

ABSTRACT. A new genus *Scutpelecopsis* gen.n. is described for two species: *Scutpelecopsis wunderlichi* sp.n. (type species, from Caucasus) and *Scutpelecopsis krausi* (Wunderlich, 1980), comb.n., ex. *Pelecopsis k*. The relationships of the new genus to the related *Pelecopsis* Simon, 1864, *Trichopterna* Kulczyński, 1894 and *Parapelecopsis* Wunderlich, 1992 are discussed. *Scutpelecopsis* gen.n. exhibits several somatic and genitalic characters that are unique within Erigoninae, Linyphiidae and Aranei.

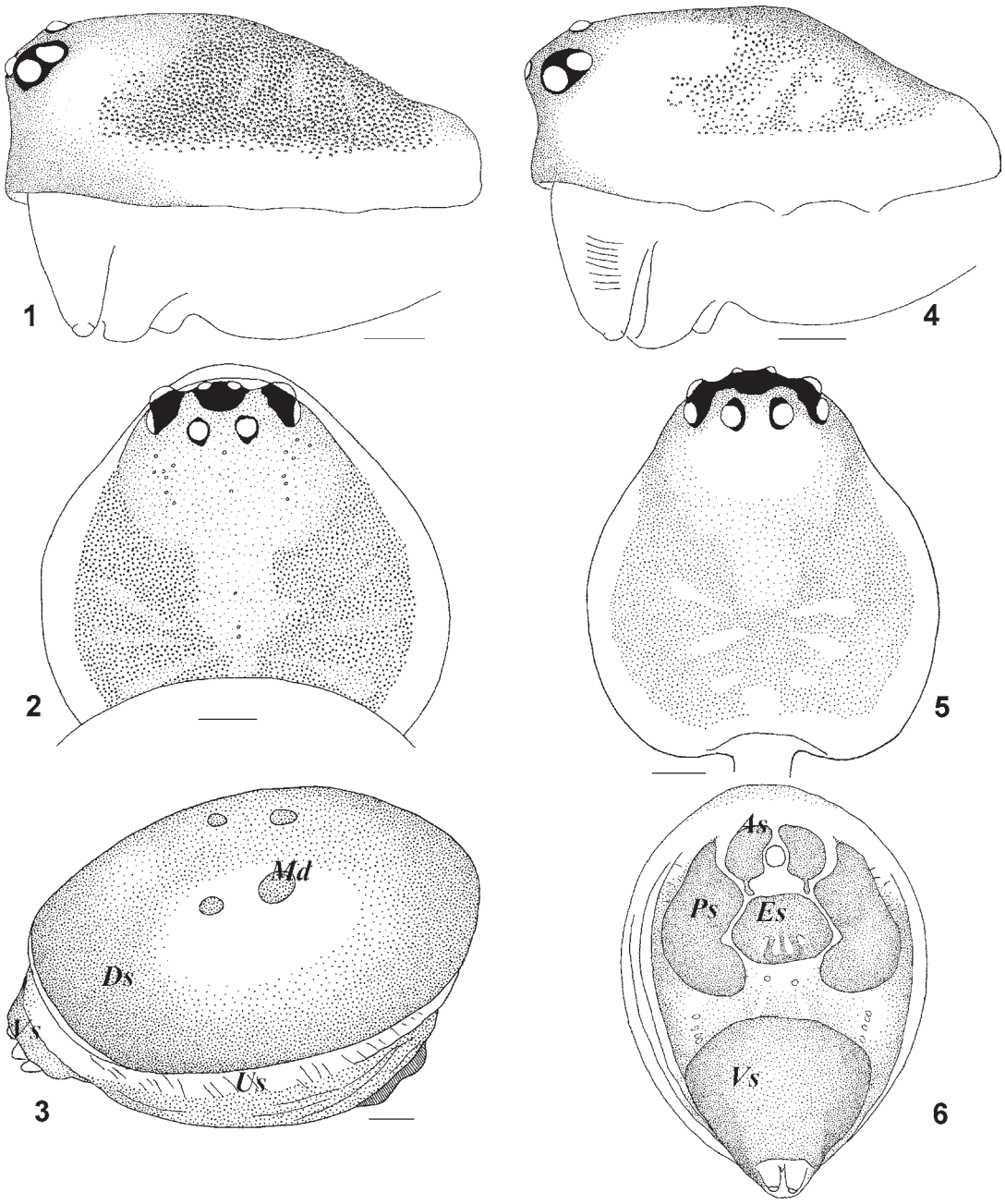
РЕЗЮМЕ. Описан новый род *Scutpelecopsis* gen.n. включающий два вида *S. wunderlichi* sp.n. (типовой вид, Кавказ) и *Scutpelecopsis krausi* (Wunderlich, 1980), comb.n., ex. *Pelecopsis k*. Обсуждаются связи нового рода с близкими родами *Pelecospis* Simon, 1864, *Trichopterna* Kulczyński, 1894 и *Parapelecopsis* Wunderlich, 1992. Для *Scutpelecopsis* gen.n. характерны некоторые соматические признаки и особенности копулятивного аппарата уникальные для Erigoninae, Linyphiidae и даже для всего отряда.

Introduction

Spiders with abdominal scuta are known in many families from different superfamilies and even suborders. In Europe, scutate spiders are known in Anapidae (*Comaroma* Bertkau, 1889), Araneidae (*Cercidia* Thorell, 1869), Gnaphosidae (♂ of Zelotini), Corinnidae (♂ of *Phrurolithus* C.L. Koch, 1839), Linyphiidae (many genera), Oonopidae (several genera), Palpimanidae (all species), Salticidae (♂ of *Chalcoscirtus* Bertkau, 1880), Zodariidae (several genera) and perhaps some others. In most of the aforementioned taxa, only a single, dorsal abdominal scutum is present. Only a few other taxa have additional or other types of scuta situated ventrally on the abdomen. *Palpimanus* Dufour, 1820 has a scutum in the anterio-ventral part of the abdomen which covers the area around the pedicel and the whole pre-epigastral region. This is known as an epigastral scutum. *Comaroma* has a similar scutum, but it also has two additional ring-shaped scuta around the spinnerets (known as inframammillary scuta). Males of *Euophrys frontalis* (Walckenaer, 1802) and a few other salticids have a ventral abdominal scutum located between the spinnerets and the epigastric furrow. *Silhouettella* Benoit, 1979 (Oonopidae) has a ventral scutum, which covers the whole abdominal venter except for the spinneret region and a thin stripe along the lateral part of the abdomen.

It appears that *Comaroma* has largest number of individual scuta among European species: dorsal, anterior-ventral, and two around the spinnerets. However, the world champions in terms of numbers of scuta are Tetrablemmidae. They have a dorsal scutum, up to four ventral unpaired scuta, and up to four pairs of lateral stripe-like scuta.

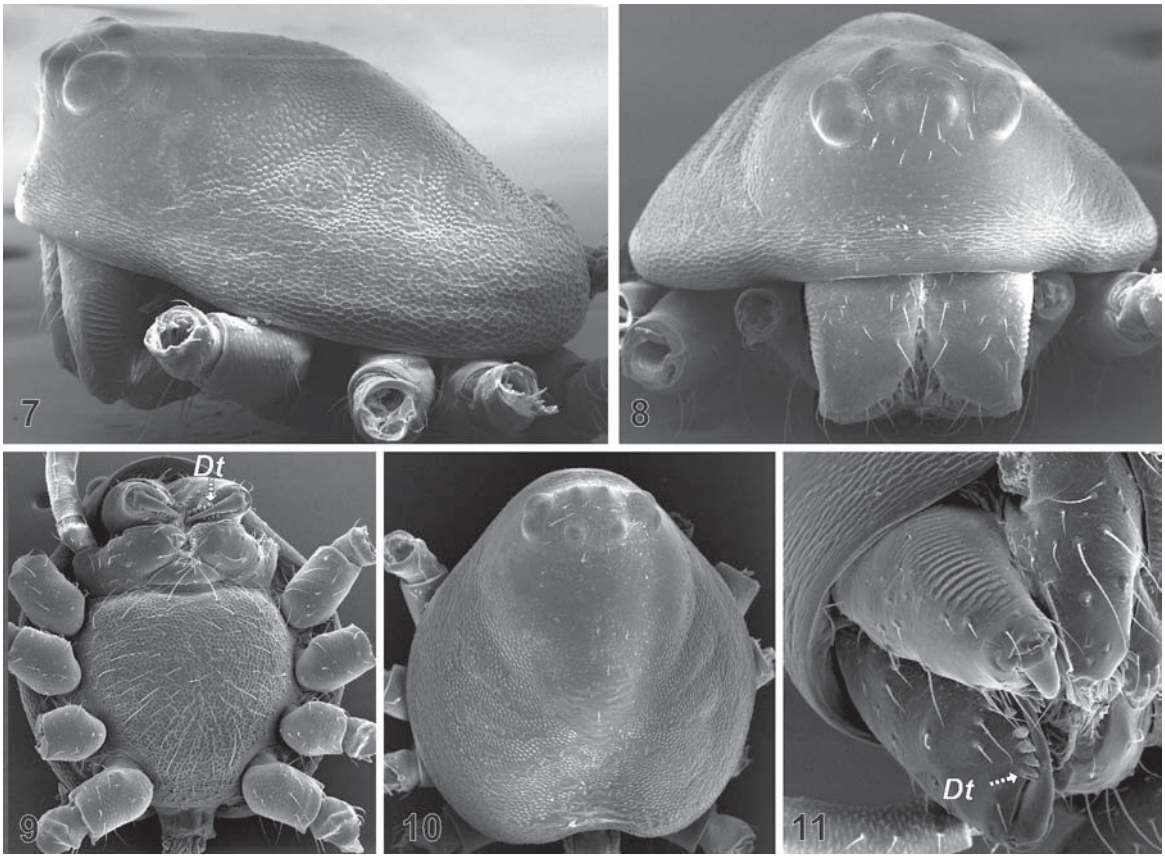
A few years ago the first author had the opportunity to collect spiders in Abkhazia. In coastal pine forest he found numerous specimens of heavily armoured erigo-



Figs 1–6. Carapace and abdomen of *Scutpelecopsis wunderlichi* sp.n.: 1–3 — male; 4–6 — female; 1, 4 — carapace, lateral; 2, 5 — carapace, dorsal; 3 — abdomen dorso–lateral; 6 — abdomen ventral. Scale = 0.1 mm. Abbreviations: *As* — anterior ventral scuta; *Ds* — dorsal scutum; *Es* — epigynal scutum; *Md* — muscle dot; *Ps* — posterior ventral scuta; *Vs* — ventral scutum; *Us* — stripe of weakly sclerotized cuticle.

Рис. 1–6. Карапакс и брюшко *Scutpelecopsis wunderlichi* sp.n.: 1–3 —самец; 4–6 — самка; 1, 4 — карапакс, сбоку; 2, 5 — карапакс, сверху; 3 — брюшко сверху–сбоку; 6 — брюшко снизу. Масштаб 0,1мм. Сокращения: *As* — передние вентральные скутумы; *Ds* — дорзальный скутум; *Es* — эпигинальный скутум; *Md* — мускульная точка; *Ps* — задние вентральные скутумы; *Vs* — вентральный скутум; *Us* — полоска слабо хитинизированной кутикулы.

nid spiders, which were first identified as *Pelecopsis krausi* Wunderlich, 1980. It was a great surprise to discover that the female of this species has six ventral scuta, whereas the male has one solid ventral scutum with two holes (orifices) for the pedicel and spinnerets. As a result of these peculiarities, we decided to check whether *P. krausi* was actually related to the genero-type *P. elongata* (Wider, 1834), to trace its position among erigonids, and to determine whether any other related or unrelated groups have similar scuta and structures allied with them. Whilst comparing Caucasian specimens with types from Yugoslavia, we recognized



Figs 7–11. SEM micrographs of male cephalothorax of *Scutpelecopsis wunderlichi* sp.n.: 7 — lateral; 8 — frontal; 9 — ventral; 10 — dorsal; 11 — mouthparts ventro–lateral. Abbreviation: *Dt* — doubled tooth.

Рис. 7–11. СЭМ микрофотографии головогруди самца *Scutpelecopsis wunderlichi* sp.n.: 7 — сбоку; 8 — спереди; 9 — снизу; 10 — сверху; 11 — ротовой аппарат снизу–сбоку. Сокращения: *Dt* — раздвоенный зубец.

that they were not conspecific. Yugoslavian specimens had smaller scuta and different copulatory organs. Therefore, the purpose of this paper was extended to include the description of a new species from Caucasus and the comparison of two related species with *Pelecopsis elongata* and some other taxa.

Methods

We compared only (or chiefly) the type species of the genera concerned. The material was shared between the Institute for biological problems of the North (IBPN), Zoological Museum of the Moscow State University (ZMMU) and Zoological Museum of the University of Turku (ZMUT). Specimens were photographed using an Olympus Camedia C-5050 camera attached to an Olympus SZX12 stereomicroscope. The images were montaged using "CombineZM" image stacking software. Photographs were taken in dishes of different sizes with paraffin in the bottom. Different sized holes were made in the bottom to keep the specimens in the correct position. Line drawings were made using transmitted light microscopes with drawing «devices». Microphotographs were made with a SEM Jeol JSM-5200 in the Zoological Museum, University of Turku. All measurements are given in mm. Embolic division is abbreviated in some parts of the text as ED.

The following abbreviations were used in text and figures: *As* — anterior ventral scutum; *Co* — column; *Da* — dorsal tibial apophysis; *Ds* — dorsal scutum; *Dt* — doubled tooth; *ED* — emboic division; *Em* — embolus; *Eo* — epigyne opening; *Er* — epigastral furrow raised part; *Es* — epigynal scutum; *Et* — epigastral furrow thickening; *Gh* — genital hump; *Gl* — gland; *Ia* — intermediate apophysis; *Md* — muscle dot; *Mm* — tapering membranous part of embolus; *Mp* — median plate; *Pc* — paracymbium; *Ps* — posterior ventral scutum; *Pt* — process of tegulum; *Ra* — retrolateral apophysis; *Rx* — radix; *Sa* — suprategular apophysis; *Ss* — stridulating setae; *To* — tuberculated outgrowth of the ED; *Tc* — tracheal spiracle's peak; *Te* — tegular extension; *Tp* — tailpiece; *Tr* — tracheal spiracle; *Vs* — ventral scutum (=inframammillary); *Us* — stripe of weakly sclerotized cuticle.

Taxonomic survey

Scutpelecopsis Marusik & Gnelitsa, **gen.n.**

Type species: *Scutpelecopsis wunderlichi* Marusik & Gnelitsa, sp.n.

ETYMOLOGY. The genus name was composed from the word "scutum" and the genus name *Pelecopsis,* with reference to its morphological affinity and relationships. The gender is feminine.

DESCRIPTION. Small dark coloured Erigoninae spiders (ca 2 mm long), with granulated carapace, unmodified cephalic region in males, abdomen with dorsal scutum and one (in ♂) or more ventral scuta (in ♀). Book lung opercula strongly sclerotized. Male palp with three tibial apophyses: dorsal, retrolateral and intermediate, ED with tuberculated outgrowth of the ED; radix screwed; epigyne heavily sclerotized. Intermediate apophysis can also be regarded as an outgrowth of the dorsal apophysis. TmI 0.35–0.4. Metatarsal trichobothrium present. Tibial spines in female 1-1-1-1 and 0-0-1-1 in male.

DIAGNOSIS. This genus can be easily distinguished from all other linyphiids by having an abdominal scutum covering the whole dorsal surface, and by the presence of one ventral scutum (in ♂ of *S. wunderlichi* sp.n.) or scuta encircling the spinnerets (ventral or inframammillary, *Vs*), anterior (*As*) and posterior (*Ps*). In addition, this genus has a very wide tracheal spiracle (wider than diameter of the spinneret area) curved anteriorly and located on the posterior scutum. The new genus also differs from related taxa in the structure of the copulatory organs. The embolic division of the new genus has a tuberculated outgrowth of the ED (such an outgrowth is absent in the related *Pelecopsis*, *Parapelecopsis* and *Trichopterna* and otherwise unknown in Erigoninae), the ED is screwed); the tibia has three apophyses instead of two, and in females the epigyne has a pair of distinct, egg-shaped foveae.

DISTRIBUTION. *Scutpelecopsis* gen.n. has a disjunctive range, and known from Macedonia (*S. krausi*) and the western half of Caucasus (*S. wunderlichi* sp.n. (Abkhazia) and species with uncertain belonging from Armenia, Georgia, and Northern Osetia).

Scutpelecopsis wunderlichi Marusik & Gnelitsa, **sp.n.**
Figs 1–11, 15–17, 20–26, 29–30, 35–38, 39–43, 48–54.

MATERIAL EXAMINED. Holotype ♂ and paratypes 60 ♂♂, ♀ (ZMMU), Caucasus, Abkhazia, environs of Pitsunda, Ldzaa Villidge, Myusser highland, *Pinus pityusa* litter on steep slope, 43°10.756'N 40°21.244'E, 15.10.2004 (Yu.M. Marusik).

ETYMOLOGY. Named after our friend and famous arachnologist Jorg Wunderlich.

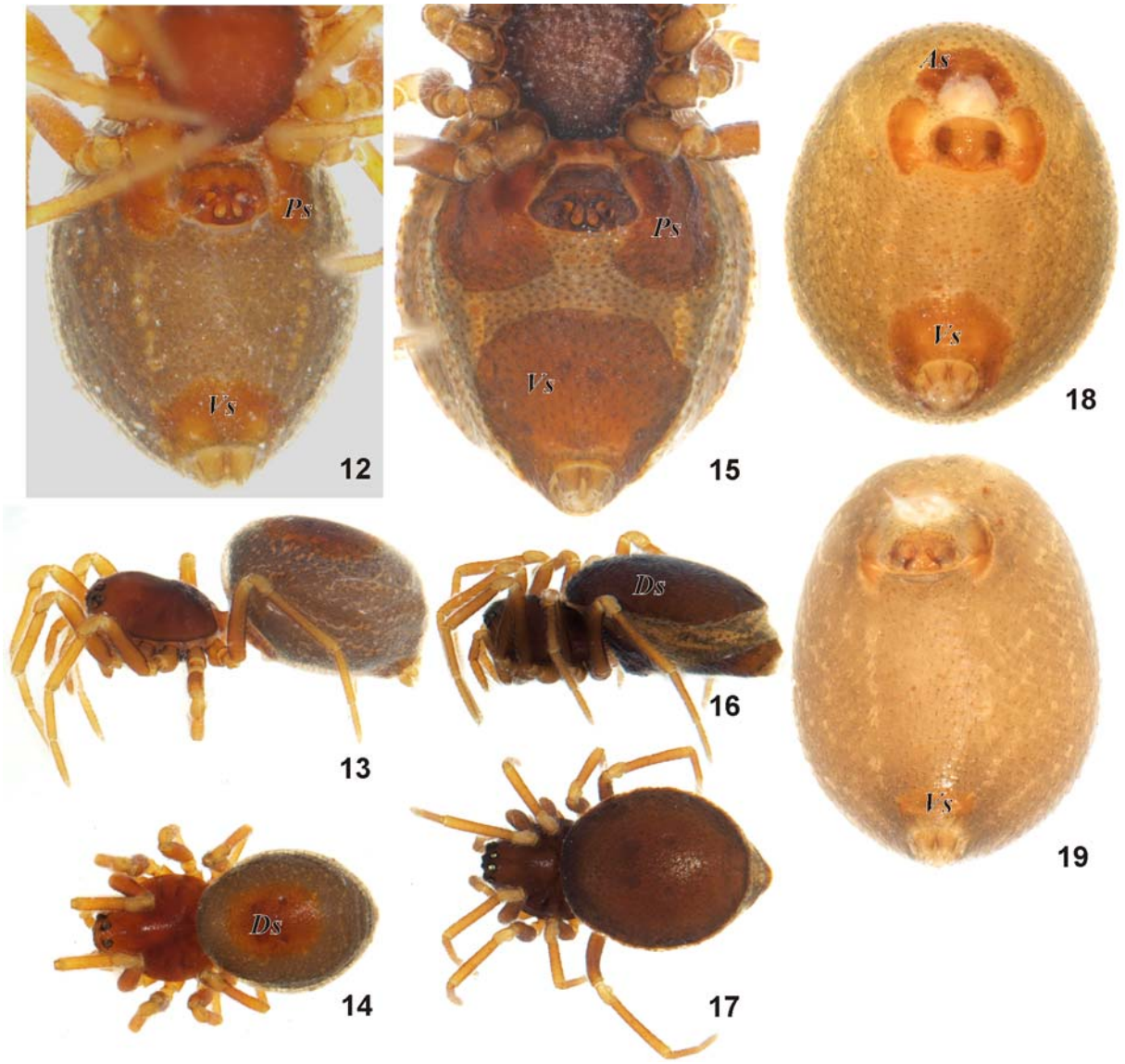
DIAGNOSIS. From the sibling *S. krausi* it can be easily distinguished by the larger dorsal and inframammillary scuta in females, the larger male palp, triangular intermediate tibial apophysis (abrupt (truncate) in *S. krausi*) and the shorter darkened part (tuberculated outgrowth of the ED) in the base of the embolus proper.

DESCRIPTION. Male. Total length 1.82. Carapace: 0.81 long, 0.76 wide, unmodified, dark-brown. Postocular sulci and raised part absent. Cuticle covered with fine granulation and sparse, fine setae arranged in radial stripes on thoracic region (Figs 1, 2, 7–8, 10), margin with scaled cuticle. PME separated by slightly more than one diameter. Sternum 0.46 long and 0.48 wide, dark-brown, with darker marginal regions; entire surface with dense cover of fine punctuations (pits) (Fig. 9). Sternum extended between coxae IV, and coxae separated by 1.5 times their diameter. Chelicera with 5 teeth along inner margin and 6 teeth along outer margin. The distal-most 2 teeth are very close to each other (*Dt*) (Fig. 11). Stridulation file well developed. Maxillae converging, labium wider than long (Fig. 9). Leg spination 1-1-1-1. Macrosetae fine, poorly visible, their length subequal to diameter of tibia. Position of metatarsal trichobothria shown in table. TmI = 0.4. Abdomen heavily sclerotized, the whole dorsum covered with a scutum. Dorsal scutum with 4 sigillae or muscle dots (*Md*) (Fig. 3), surface with fine granulation. Whole ventral part of abdomen with thick scutum, originating at the pedicel and terminating over the posterior spinnerets. Anterior part of scutum (placed over the pedicel) with sparse setae on enlarged bases (*Ss*) (Fig. 20). These setae may function as a stridulating organ. The posterior declivity of the carapace has fine transverse irregular ridges. Genital area raised (humped), and forms a structure very similar to the epigyne (*Gh*) (Figs 20, 21, 23). In lateral view it looks almost like an epigyne (Fig. 21). Posterior margin of epigastric furrow thickened (*Et*) and slightly raised (turned up, *Er*) relative to the rest of the abdomen. Tracheal spiracle (*Ts*) positioned at some distance from the spinnerets, very wide with two distinct openings connected by a slit (Figs 22–24). Spiracle opening wider than width of spinneret area). Slit between openings partly covered by a kind of peak (*Tc*). Spinnerets surrounded by a rim formed from the posterior part of the scutum. Only a small strip of cuticle between the two scuta is not heavily sclerotized (*Us*) (Figs. 3, 21, 23).

Length of leg joint and position of metatarsal trichobothria in ♂:

	Femur	Patella	Tibia	Metatarsus	Tarsus	MtT
I	0.56	0.15	0.50	0.42	0.35	0.4
II	0.53	0.15	0.45	0.38	0.31	0.36
III	0.45	0.16	0.35	0.34	0.29	0.36
IV	0.63	0.15	0.57	0.45	0.32	absent

Palp as in Figs 29–30, 35–41, 48–53. Male palpal tibia 0.3 long. Palpal tibia with tree apophyses: retrolateral (*Ra*), intermediate (*Ia*) and dorsal (*Da*) (Figs 48, 51). Retrolateral apophysis flattened, slightly widened terminally, tip abrupt. Dorsal apophysis hook-like, longer than the cymbium. Intermediate apophysis can treated as a separate one, or as a retrolateral arm of the dorsal tibial apophysis. It is shorter than the other apophyses, with a triangular shape (dorsal view) and the cuticle of the dorsal surface is scaly. Tibia with

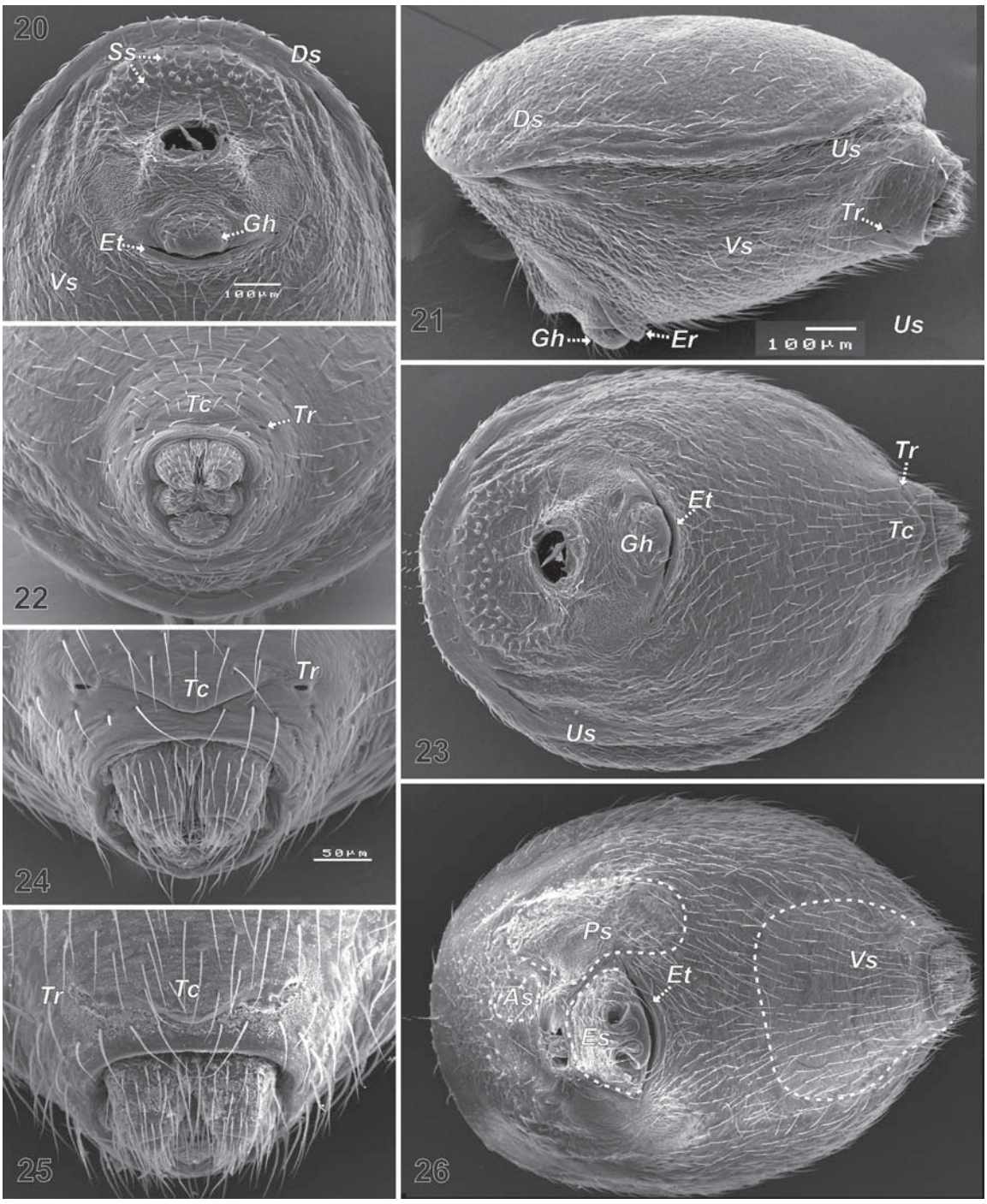


Figs 12–19. Habitus and abdomen of females of *Scutpelecopsis krausi* (12–14), *S. wunderlichi* sp.n. (15–17), *Trichopterna cito* (18) and *Pelecopsis elongata* (19): 12, 15, 18–19 — abdomen, ventral; 13, 16 — habitus, lateral; 14, 17 — habitus dorsal. Abbreviations: *As* — anterior ventral scutum; *Ds* — dorsal scutum; *Ps* — posterior ventral scuta; *Vs* — ventral scutum.

Рис. 12–19. Габитус и брюшко самки *Scutpelecopsis krausi* (12–14), *S. wunderlichi* sp.n. (15–17), *Trichopterna cito* (18) и *Pelecopsis elongata* (19): 12, 15, 18–19 — брюшко, снизу; 13, 16 — габитус, сбоку; 14, 17 — габитус, сверху. Сокращения: *As* — передние вентральные скутумы; *Ds* — дорзальный скутум; *Ps* — задние вентральные скутумы; *Vs* — вентральный скутум.

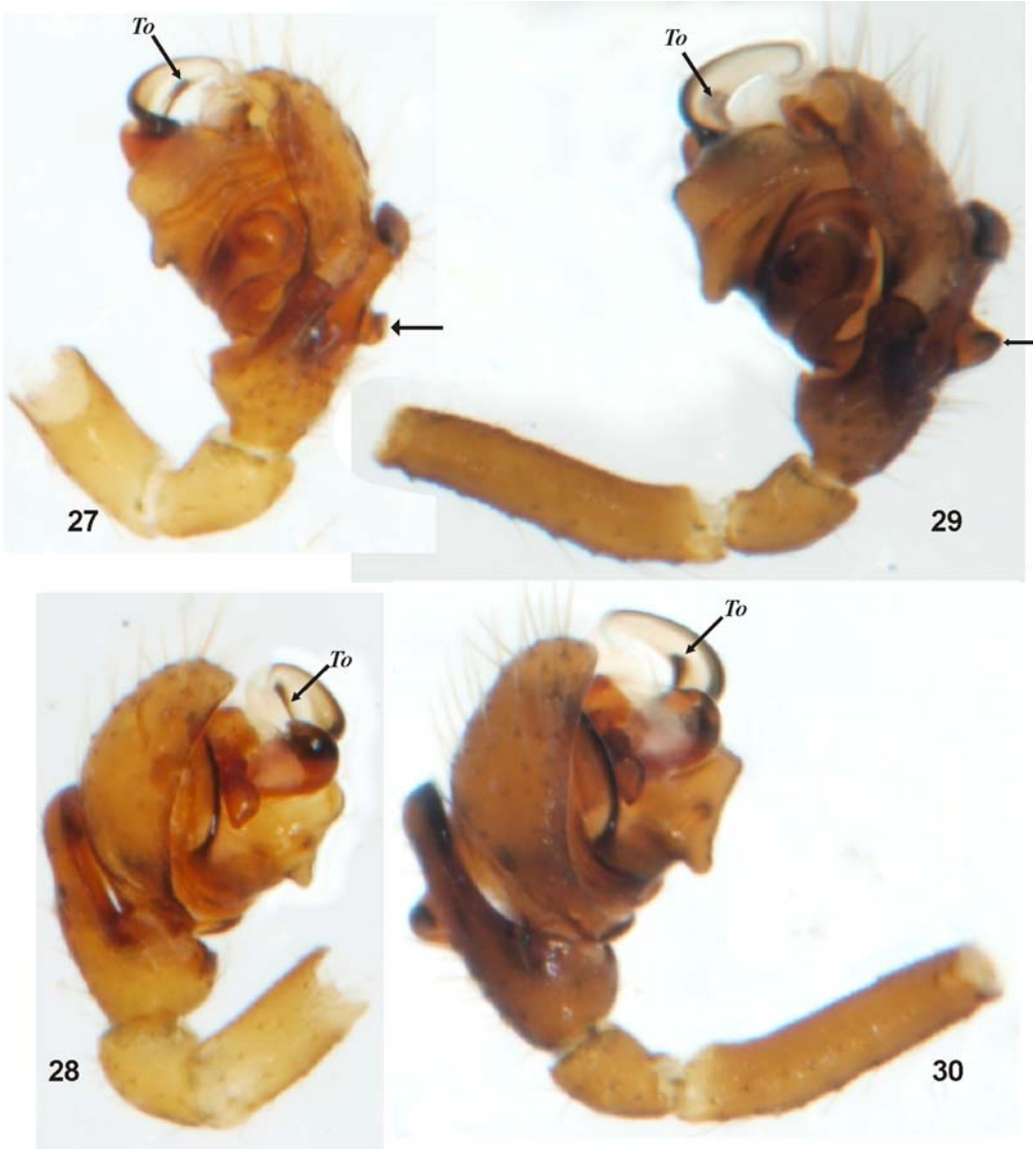
fewer than 10 slit-organs on dorsal side and with 2 trichobothria. Cymbium unmodified. Paracymbium (*Pc*) simple, small, hook-shaped. Tegulum high (in retrolateral view), with conical extension (*Te*) on ventral side. Seminal duct thin. Process of tegulum (*Pt*) long, undivided. Embolic division relatively compact, with short, broad and flattened tailpiece (*Tp*) (Figs 40, 49–50). Radix screwed (*Rx*), relatively short (its height < tailpiece length), with ribbon-like, coiled-screwed embolus (*Em*) and short tuberculated outgrowth of the ED (*To*), partly hidden in fold of the radix. In some coils tuberculated outgrowth of ED is invisible. Embolus proper consists of seminal duct and tapering membranous part (*Mm*) (Figs 49, 50).

Female. Total length 2.0. Carapace: 0.79 long, 0.67 wide, unmodified, covered with fine granulation as in male. Eyes and chelicerae as in male. Sternum 0.45 long, 0.46 wide, coloration and surface as in male. Spination as in male. Position of metatarsal trichobothria shown in table. TmI = 0.36. Abdomen with dorsal scutum as in male, and with several ventral scuta: pair of anterior scuta around pedicel (*As*), pair of scuta lateral from the epigyne which encompass book lung opercula and adjoining area (*Ps*), and two unpaired scuta: scutum with epigyne and surrounding area (*Es*), and posterior scutum (*Vs*) covering posterior 1/3 of the venter and spinnerets (Figs 6, 15, 26). Anterior part of the venter above the pedicel with modified setae, which



Figs 20–26. SEM micrographs of abdomen in *Scutpelecopsis wunderlichi* sp.n.: 20–24 — male; 25–26 — female. 20, 22–26 — ventral; 21— lateral. Broken line shows separate scuta. Abbreviations: *As* — anterior ventral scutum; *Ds* — dorsal scutum; *Es* — epigynal scutum; *Et* — epigastral furrow thickening; *Gh* — genital hump (epiandrous part); *Ps* — posterior ventral scuta; *Ss* — stridulating setae; *Tc* — tracheal spiracle's peak; *Tr* — tracheal spiracle; *Vs* — ventral scutum; *Us* — stripe of weakly sclerotized cuticle.

Рис. 20–26. СЭМ микрофотографии брюшка *Scutpelecopsis wunderlichi* sp.n.: 20–24 — самец; 25–26 — самка. 20, 22–26 — снизу; 21 — сбоку. Пунктиром показаны отдельные скутумы. Сокращения: *As* — передние вентральные скутумы; *Ds* — дорзальный скутум; *Es* — эпигинальный скутум; *Et* — утолщение эпигастральной щели; *Gh* — генитальное возвышение (эпиандрус); *Ps* — задние вентральные скутумы; *Ss* — стридуляционные волоски; *Tc* — козырёк трахейной щели; *Tr* — трахейное дыхальце; *Vs* — вентральный скутум; *Us* — полоска слабо хитинизированной кутикулы.



Figs 27–30. Male palp of *Scutpelecopsis krausi* (27–28) and *S. wunderlichi* sp.n. (29–30): 27, 29 — retrolateral; 28, 30 — prolateral. Arrows show differences between two species.

Рис. 27–30. Пальпа самца *Scutpelecopsis krausi* (27–28) и *S. wunderlichi* sp.n. (29–30): 7, 29 — ретролатерально; 28, 30 — пролатерально. Стрелками показы основные отличия двух видов.

possibly function as a stridulation organ. Males have fewer of these setae. Dorsal scutum with two pairs of sigillae or muscle dots. Tracheal spiracle as in male. Posterior part of epigastric furrow thickened (*Et*) (Figs 26, 54). Below the epigastric furrow are two gland openings (*Gl*) (Fig. 54), which are absent on the ventral scutum of males.

Length of leg joint and position of metatarsal trichobothria in ♀:

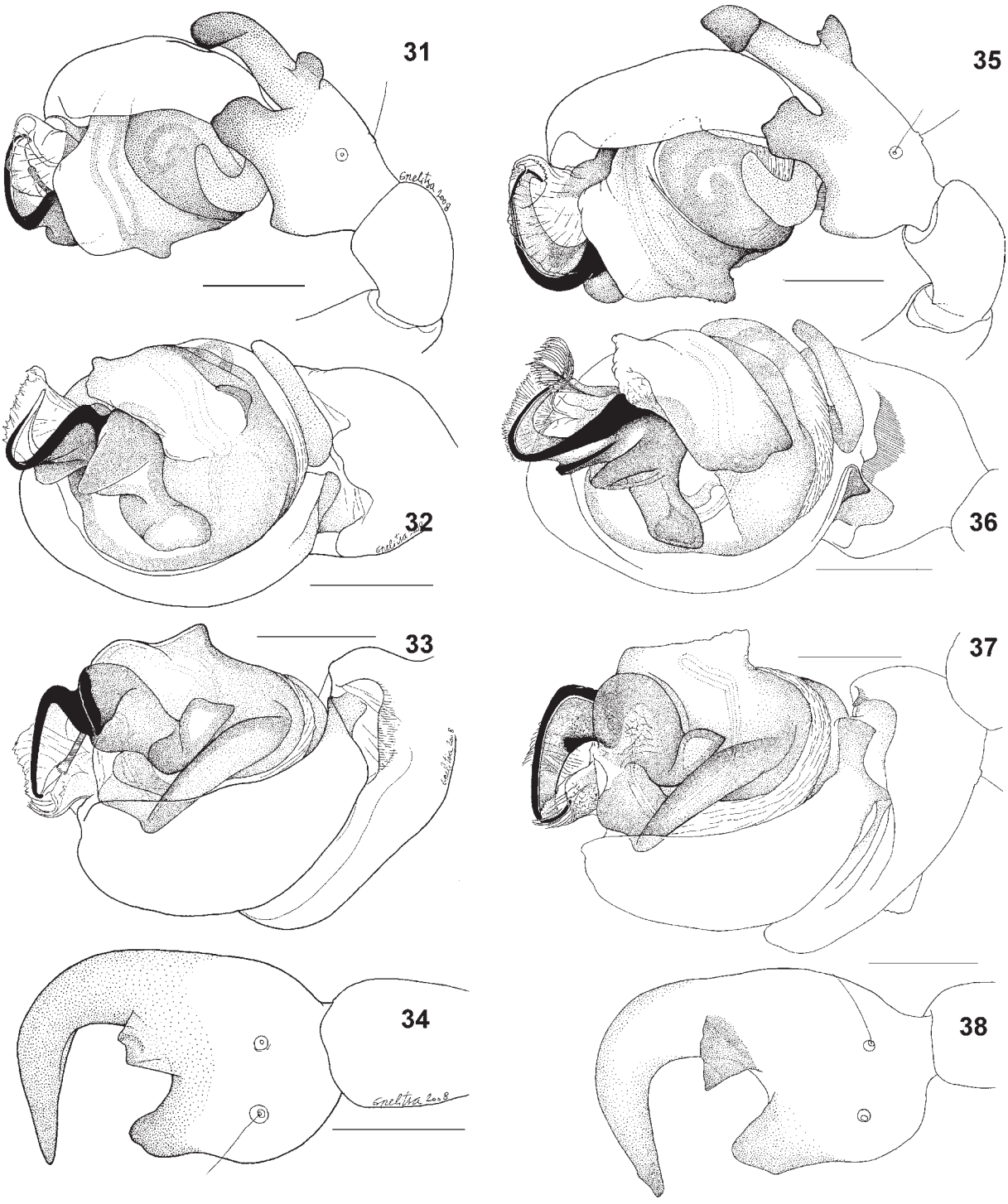
	Femur	Patella	Tibia	Metatarsus	Tarsus	MtT
I	0.56	0.18	0.48	0.38	0.32	0.36
II	0.53	0.17	0.41	0.35	0.31	0.40
III	0.46	0.17	0.35	0.32	0.27	0.35
IV	0.64	0.18	0.55	0.41	0.29	absent

Epigyne as in Figs 15, 26, 42–43, 54, with "Ω"-shaped median plate (*Mp*), with weakly sclerotized droplet-shaped parts beside the septum. Lateral part of median plate with spoon-like depressions clearly visible using SEM. These concavities, together with lateral and anterior margins of the foveae, form two oval converging foveae (*Eo*) (Fig. 54).

Scutpelecopsis krausi (Wunderlich, 1980), **comb.n.**
Figs 12–14, 27–28, 31–34.

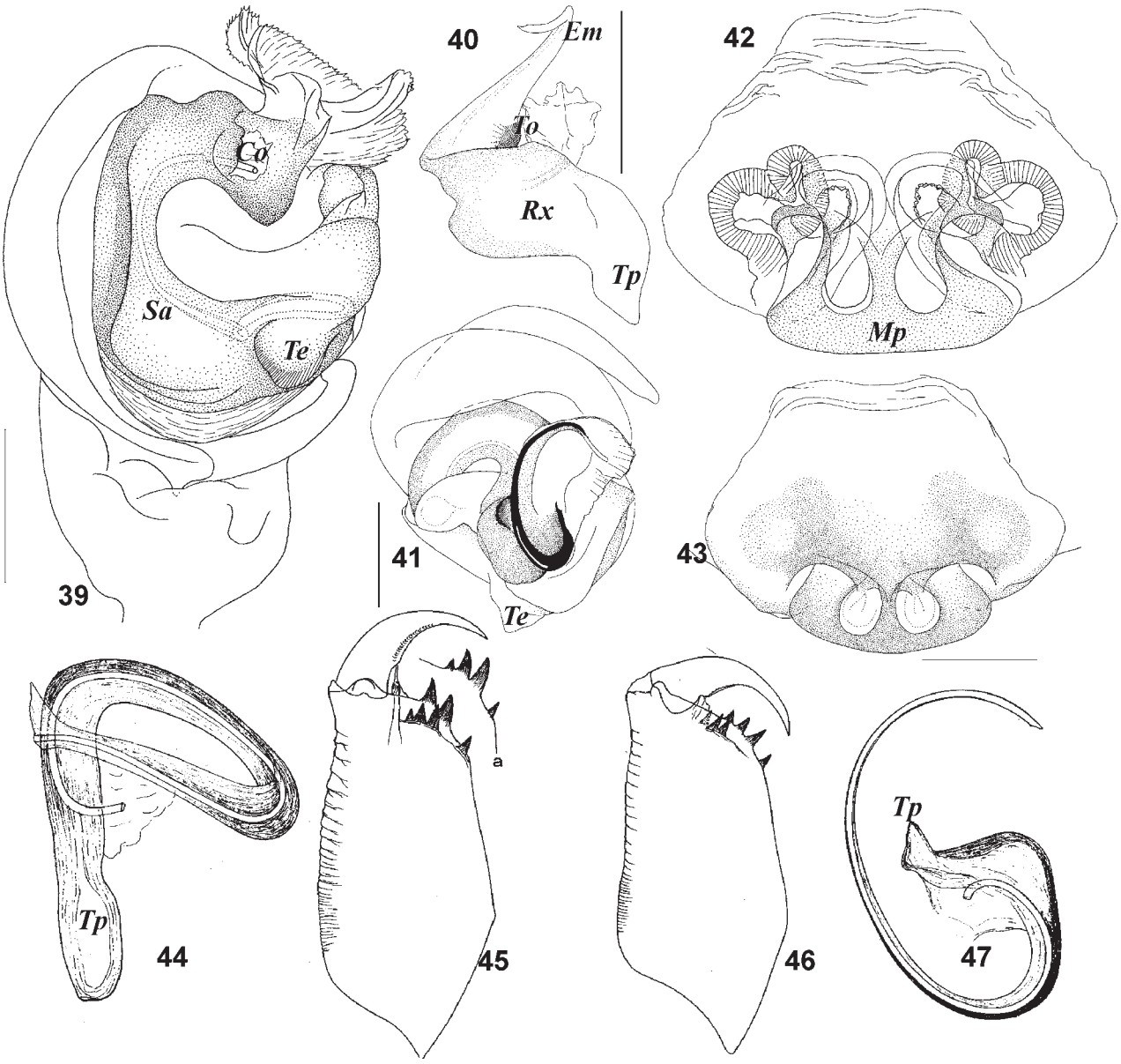
Pelecopsis k. Wunderlich, 1980: 331, f. 38–44 (D♂♀).

MATERIAL EXAMINED. Holotype ♂, " 28982/1, Jugoslawien: Ohrid, unter Steinen 700 m Wunderlich leg. III.1973" Paratypes: " 3 ♀♀ (1 detached palp and 1 female with epigyne), "SMF 28981/4



Figs 31–38. Male palp of *Scutpelecopsis krausi* (31–34) and *S. wunderlichi* sp.n. (35–38): 31, 38 — retrolateral; 32, 36 — ventral; 33, 37 — prolateral; 34, 38 — tibia, dorsal. Scale = 0.1 mm.

Рис. 31–38. Пальпа самца *Scutpelecopsis krausi* (31–34) и *S. wunderlichi* sp.n. (35–38): 31, 38 — ретролатерально; 32, 36 — снизу; 33, 37 — пролатерально; 34, 38 — голень, сверху. Масштаб = 0,1 мм.



Figs 39–47. Copulatory organs and chelicera of *Scutpelecopsis wunderlichi* sp.n. (39–43), *Pelecopsis elongata* (44–45) and *Trichopterna cito* (46–47): 39 — male palp without ED, prolateral; 40, 44, 47 — embolic division; 41 — male palp, from above; 42–43 — vulva and epigyne respectively; 45–46 — right chelicera, posterior. 45 — shows right and left chelicera dentition. Figs 44–47 after Holm [1979]. Abbreviations: *Co* — column; *Em* — embolus; *Mp* — median plate; *Rx* — radix; *Sa* — suprategular apophysis; *Te* — tegular extension; *To* — tuberculated outgrowth of the ED; *Tp* — tailpiece.

Рис. 39–47. Копулятивные органы и хелицеры *Scutpelecopsis wunderlichi* sp.n. (39–43), *Pelecopsis elongata* (44–45) и *Trichopterna cito* (46–47): 39 — пальпа самца без ED, пролатерально; 40, 44, 47 — эмболюсный отдел; 41 —пальпа самца, сверху; 42–43 — вульва и эпигина, соответственно; 45–46 — правая хелицера, сзади. 45 — показаны зубцы левой и правой хелицеры. Рис. 44–47 по Holm [1979]. Сокращения: *Co* — колонка; *Em* — эмболюс; *Mp* — медиальная пластинка; *Rx* — радикс; *Sa* — супратегулярный отросток; *Te* — выступ тегулюма; *To* — терминальный вырост ED; *Tp* — хвост радикса.

Paratypoide!, Jugoslawien: Ohrid Wunderlich leg. III.1973". Text label: Sud-Jugoslawien am Ohrid-See, unter Steinen"

DESCRIPTION. We present only a brief description, because the species was described well by Wunderlich [1980]. Male 1.7 long, female 1.8 long. Carapace in male 0.77 long, in female 0.79 long, in both sexes 0.45 wide. TmI 0.4–0.5. Male palpal tibia 0.25 long.

DIAGNOSIS. From the sibling *S. wunderlichi* sp.n. it can be easily distinguished by the smaller dorsal and inframammillary scuta in females, and in males by the smaller palp, truncate-shaped intermediate tibial apophysis (triangular in *S. wunderlichi* sp.n.) and longer darkened part (tuberculated outgrowth of the ED) in the base of the embolus proper.

NOTE. While describing this species Wunderlich [1980] mentioned a large ventral scutum in males, but did not indicate inframammillary or other scuta, although they are clearly visible.

DISTRIBUTION AND HABITAT. This species is known from the environs of Ohrid Lake in Macedonia. All records of this species from Caucasus refer to *S. wunderlichi* sp.n. or to undescribed species. The type series of this species was collected from under stones.

DISTRIBUTION AND COMMENTS. Tanasevitch [1987, 1990] reported *Pelecopsis krausi* from northern Osetia (Russia), Armenia and Central Georgia All records came from elevations from 750 to 3000 m. These specimens may belong either to *S. wunderlichi* sp.n. or to one or more undescribed species. We had no opportunity to examine Tanasevitch's specimens. All type specimens of the new species were collected at approximately sea level in pine litter from a single locality in Abkhazia.

RELATIONSHIPS AND MORPHOLOGICAL COMPARISON WITH RELATED AND UNRELATED TAXA. There is no doubt that *Scutpelecopsis* gen.n. belongs to the *Pelecopsis* group of genera *sensu* Millidge [1977] and is related to *Pelecopsis* Simon, 1864, *Trichopterna* Kulczyński, 1894 and *Parapelecopsis* Wunderlich, 1992 (or *Pelecopsis* sensu lato). *Scutpelecopsis* gen.n. shares several characters with related genera, such as the presence of a dorsal tibial apophysis, the same type of paracymbium (small and hooked) and a screwed embolic division. However, it has many somatic and genitalic features that make this genus very different from other erigonids and even unique among all other spiders. Below we compare several affinities of *Scutpelecopsis* gen.n. with other linyphiids, and with unrelated taxa that have similar structures.

Similarity with other linyphiids

SOMATIC CHARACTERS. Almost all species in *Pelecopsis sensu lato* have a modified carapace in the male: raised cephalic part. Only a few species have small cephalic lobes e.g., *P. punctilineata* Holm, 1964 (no cephalic elevation). The great majority of *Pelecopsis s.l.* have postocular sulci and cephalic pits. In addition, several species have a punctuated carapace (small pits). *Scutpelecopsis* has none of the following: elevation of the cephalic part, sulci or cephalic pits, small pits. Instead of small pits, *Scutpelecopsis* has a fine granulation.

Chelicera. *Pelecopsis* sensu lato has 3 inner teeth and 3–4 outer teeth on the chelicera. The new genus has 6 outer teeth and 5 teeth on the inner side of the chelicera.

Abdomen. Several species in *Pelecopsis s.l.*, and some more distant taxa (*Ceratinella* Emerton, 1882, *Ceraticelus* Simon, 1884, *Idionella* Banks, 1893, *Styloctetor* Simon, 1884, etc.) have a dorsal abdominal scutum. In many cases the scutum is present only in the male. The dorsal scutum usually covers part of dorsum, not all of it (exceptions include some species of *Ceraticelus s.l.*, *Pelecopsis bishopi* Kaston, 1945, and some others). *Scutpelecopsis* gen.n. has a dorsal scutum in both sexes. This scutum covers the entire dorsum of the abdomen in males of both species and in females of *S. wunderlichi* sp.n. In contrast to other taxa with a dorsal scutum *Scutpelecopsis* gen.n. has two distinct pairs of sigillae or muscle dots on the dorsum. In *Pelecopsis mengei* these dots are present but they are indistinct.

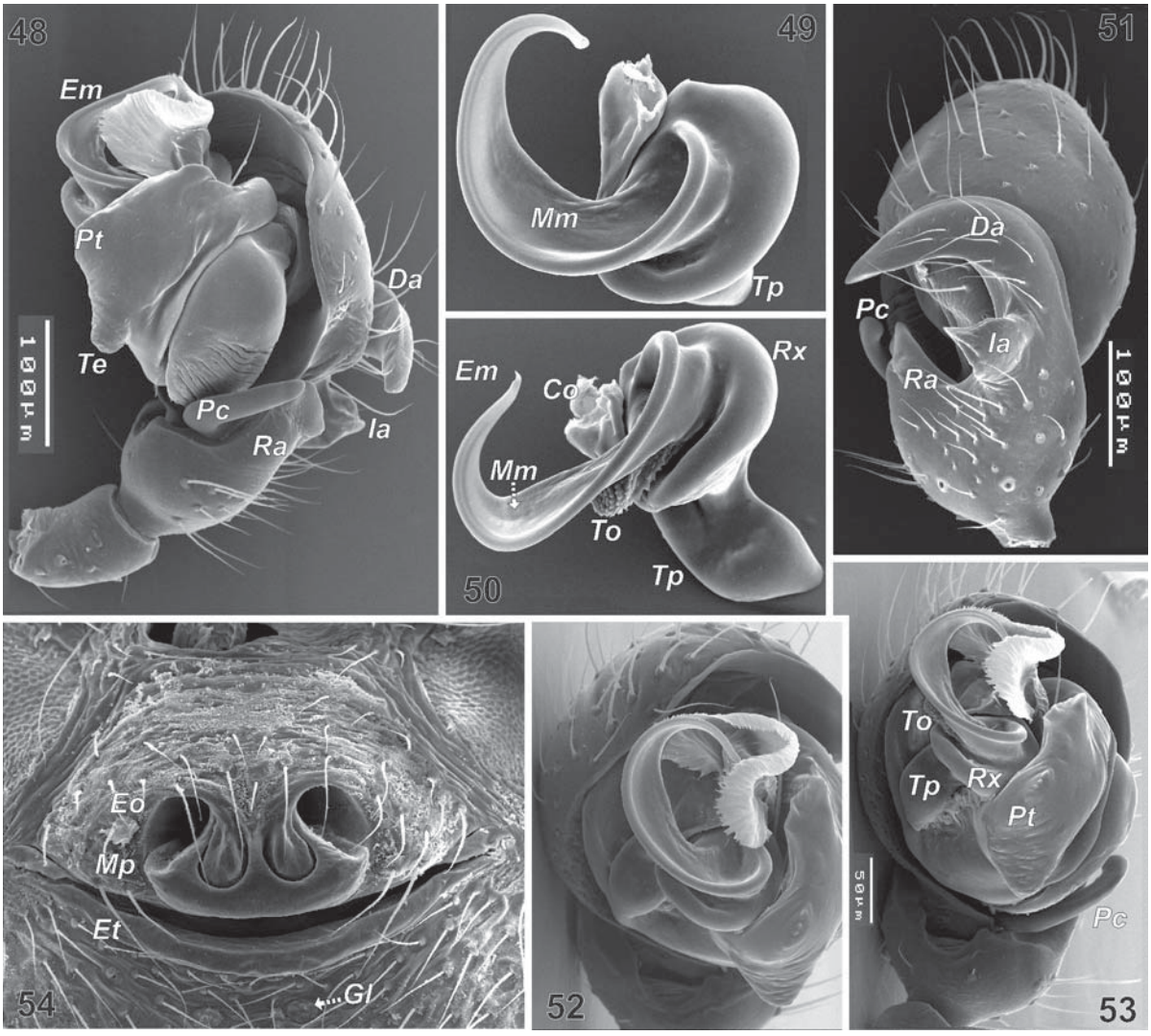
In addition to a dorsal scutum, *Scutpelecopsis* gen.n. has a ventral scutum in males and also in females. Ventral scuta are rather uncommon in linyphiids. Among European linyphiids only *Ceratinella* was known to have scuta: heavily sclerotized book-lungs and the area around them. A large scutum or scuta are present in some Nearctic species of *Ceraticelus* and *Idonella*. In most cases they have an anterior scutum covering the area around pedicel to the epigastric furrow. It is often called the epigastric sclerite. Several species have a rather wide scutum around the spinnerets, called the inframammillary plate or sclerite by American authors [cf. Figs 76–77, in Crosby & Bishop, 1925]. *Idionella titivillitium* (Crosby & Bishop, 1925) has very large ventral scuta covering almost the entire venter, except for a small belt between the anterior and spinneret scuta [Fig. 107, in Crosby & Bishop, 1925].

The presence of only a ventral scutum, as in males of *Scutpelecopsis* gen.n. appears to be previously undocumented for Linyphiidae. Similarly, we do not know other linyphiids with two pairs of lateral scuta. There are no linyphiid species with even one pair of normal scuta. Scuta in *Ceratinella* are rather small and connected with the book-lung opercular region. It is possible that the posterior lateral scuta are homologous to the book-lung scuta in *Ceratinella*, although they are much larger.

The size of the ventral (or inframammillary) scutum in the female of *S. wunderlichi* sp.n., is also unique. It occupies two thirds (2/3) of the space between the spinnerets and the epigastric furrow and is larger in size than all other scuta. In *Ceraticelus* the situation is opposite. The epigastric sclerite extends well beyond the epigastric furrow, and the posterior (inframammillary) scutum is much smaller. While comparing members of the new genus with related taxa, we found that females of *Trichopterna cito* and *Pelecopsis elongata* also have ventral abdominal scuta. The former species (Fig. 18) has sclerotized book-lung opercula (=posterior scuta), fused anterior scuta and an inframammillary scutum (Vs). The later species (Fig. 19) has only one distinct, small scutum (Vs) just before the spinnerets. Its book-lung opercula are weakly sclerotized, although more heavily so than other parts of the abdomen.

Judging from the study of several species of *Pelecopsis* and *Ceratinella*, the size, shape and level of fusion of the anterior and posterior scuta can be used as species diagnostic characters.

The anterior part of the scutum (in ♂) or anterior pair of scuta (in ♀) in *S. wunderlichi* sp.n. appear to have stridulatory organs (setae with enlarged bases).



Figs 48–54. SEM micrographs of *Scutpelecopsis wunderlichi* sp.n.: 48–53 — male; 54 — female. 48, 51, 52–53 — male palp, retrolateral, dorsal, from above and ventral respectively;49–50 — embolic division, prolateral and ventral; 54 — epigyne, ventral. Abbreviations: *Co* — column; *Da* — dorsal tibial apophysis; *Ds* — dorsal scutum; *Em* — embolus; *Eo* — epigyne opening; *Et* — epigastral furrow thickening; *Gl* — gland; *Ia* — intermediate apophysis; *Mm* — tapering membranous part of embolus; *Mp* — median plate; *Pc* — paracymbium; *Pt* — process of tegulum; *Rx* — radix; *Te* — tegular extension; *To* — tuberculated outgrowth of the ED; *Tp* — tailpiece.

Рис. 48–54. СЭМ микрофотографии *Scutpelecopsis wunderlichi* sp.n.: 48–53 — самец; 54 — самка. 48, 51, 52–53 —пальпа самца, ретролатерально, сверху, спереди и снизу соответственно; 49–50 — эмболюсный отдел, пролатерально и снизу; 54 — эпигина, снизу. Сокращения: *Co* – колонка; *Da* — дорзальный отросток голени; *Ds* — дорзальный скутум; *Em* — эмболюс; *Eo* — отверстие эпигины; *Et* — утолщение эпигастральной щели; *Gl* — железа; *Ia* — средний отросток голени пальпы; *Mm* — сужающаяся отдел мембранизированной части эмболюса; *Mp* – медиальная пластинка; *Pc* — парацимбиум; *Pt* — вырост тегулюма; *Rx* — радикс; *Te* — выступ тегулюма; *To* — терминальный вырост ED; *Tp* — хвост радикса.

Perhaps, similar structures are present in other armoured linyphiids (*Ceraticelus* and/or *Idionella*).

The most striking character in *Scutpelecopsis* gen.n. is the position and size of the tracheal spiracle. It is situated away from the spinnerets, is very wide, has two openings united by a slit and there is a peak-shaped outgrowth of cuticle (*Tc*) (Figs 22–25), which partially covers the slit. Among linyphiids we know only *Tenneeseellum* Petrunkevitch, 1925 (Linyphiinae: Micronetini) and *Bathyphantes brevis* (Emerton, 1917) (Linyphiinae: Porrhommini) which have a displaced spiracle. In *Tenneeseellum* the spiracle is also very wide, and its openings are separated by more than the diameter of the spinneret area. In *B. brevis* the spiracle is displaced anteriorly, but is of normal width [cf. fig. 26 in Kaston, 1945]. A more important peculiarity is that the spiracle is placed on the scutum.

Unfortunately, no one has described the position and size of the spiracle in the heavily armored *Ceraticelus* and *Idionella*, but it is likely that these taxa may have their spiracle on a scutum.

So, for the time being, *Scutpelecopsis* gen.n. appears to be the only genus with a tracheal spiracle located on a scutum, the third species of Linyphiidae

with a displaced spiracle, and the second species of Linyphiidae with a widened spiracle.

Male palp. The male palp of the new genus is similar to those of *Pelecospis* s.l., however it has three tibial apophyses (one or two in related genera, with the exception of *P. nigriceps* Holm, 1962). In comparison to *Pelecopsis* s.s., *Scutpelecopsis* gen.n. has a large and flat tailpiece (long and cylindrical in *Pelecopsis*). In *Trichopterna cito* the tailpiece is highly reduced (cf. Fig. 47). More prominent differences can be found in the radix. *Pelecopsis* s.l. and perhaps other related genera have no tuberculated outgrowth of the ED, whereas the new genus has a small tuberculate outgrowth originating from the same area as the embolus. It is not clear if this outgrowth is homologous to the terminal apophysis in other groups of erigonids (i.e. the *Tapinocyba* group of genera). We do not know any other erigonids with tuberculate (indenticulate) ougrowths in the ED. Unlike in *Pelecopsis* and *Trichopterna*, which have a coiled embolic division (cf. Figs 44–45), the new genus has a screwed embolic division (Figs 40, 49–50).

Epiandrous area. The epiandrous area is strongly extended ventrally and looks like an epigyne (Figs 20–21, 23). We do not know any other linyphiids with such a modification of this region.

Epigyne. The epigyne in the new genus has no great differences with those of *Pelecopsis* s.l. except for its strong sclerotization and deep oval depressions (fovea) aside the median plate.

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