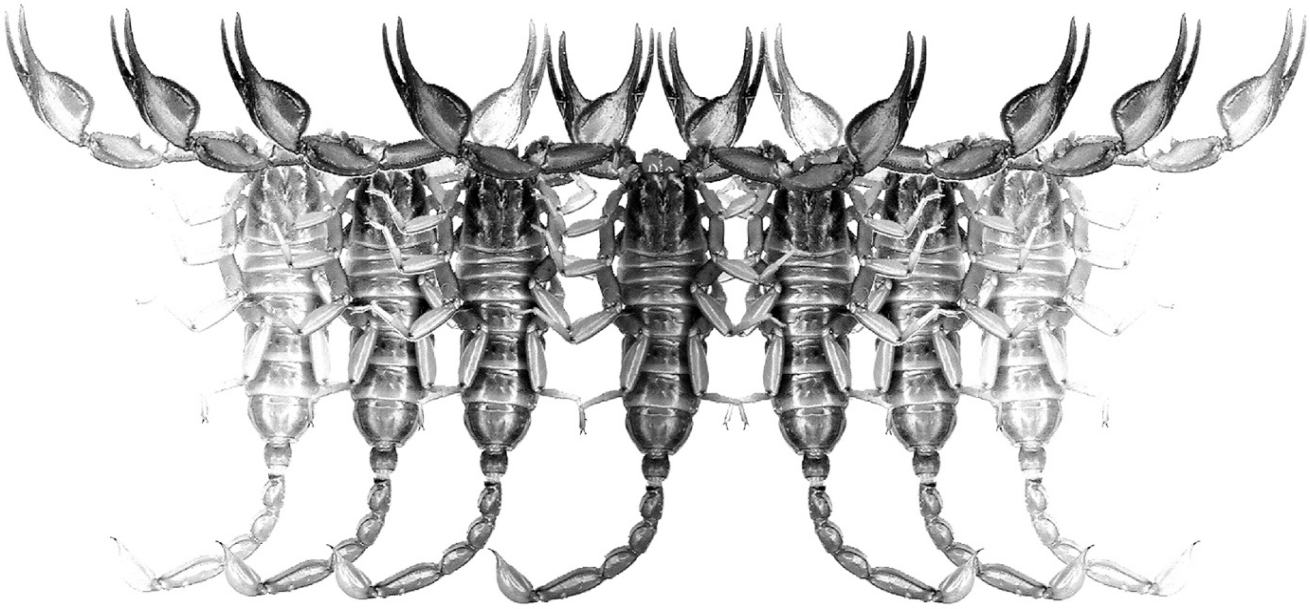
Euscorpius

Occasional Publications in Scorpiology



Five new species of *Euscorpius* Thorell, 1876 (Scorpiones: Euscorpiidae) from Albania, Greece, North Macedonia, and Serbia

František Kovařík & František Šťáhlavský

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Euscorpius

Occasional Publications in Scorpiology

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Derivatio Nominis

The name ***Euscorpius*** Thorell, 1876 refers to the most common genus of scorpions in the Mediterranean region and southern Europe (family Euscorpiidae).

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In September 2012, ICZN Article 8. What constitutes published work**,** has been amended and allowed for electronic publications, disallowing publication on optical discs. From January 2013, ***Euscorpius*** discontinued CD-ROM production; only online electronic version (ISSN 1536-9307) is published. For further details on the new ICZN amendment, see http://www.pensoft.net/journals/zookeys/article/3944/.

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Euscorpius — Occasional Publications in Scorpiology. 2020, No. 315

Five new species of *Euscorpius* Thorell, 1876 (Scorpiones: Euscorpiidae) from Albania, Greece, North Macedonia, and Serbia

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Summary

Five new species are described: *Euscorpius bonacinai* **sp**. **n**. (Albania), *E. janstai* **sp**. **n**. (North Macedonia), *E. kabateki* **sp**. **n**. (Greece), *E. sadileki* **sp**. **n**. (Serbia), and *E. scheraboni* **sp**. **n**. (Greece), fully complemented with color photographs. New species are distinguished from all other species of the genus on the basis of five taxonomic characters. Two other new characters, shape of the pedipalp chela fingers and number of chromosomes, are presented and discussed. In addition to the analyses of external morphology, we also describe karyotypes of two species: *E. janstai* **sp**. **n**. (2n=112) and *E. sadileki* **sp**. **n**. (2n=90).

Introduction

Our understanding of the scorpion genus *Euscorpius* Thorell, 1876, species of which are widespread in southern Europe and Anatolia, underwent a dramatic change in the last two decades. These changes were triggered by the first application of molecular phylogenetic data in scorpions combined with modern reassessements of morphology based on detailed analysis of trichobothrial patterns (Gantenbein et al., 1999, 2000, 2001, 2002; Soleglad & Fet, 2002; Fet et al., 2003). As a result, the discovery of numerous new cryptic species followed, especially in Greece (Parmakelis et al., 2013; Fet et al., 2018). Two subgenera (*Alpiscorpius* Gantenbein et al., 1999 and *Tetratrichobothrius* Birula, 1917) have been recently elevated to genus rank (Kovařík et al., 2019). Still, the current number of valid species in the genus *Euscorpius* is close to 60. Many local forms available in museum collections still remain undescribed, and many areas are poorly explored, especially in the Balkan Peninsula.

In this communication, we describe five new species, adding to the clarification of the position of several populations of *Euscorpius* from the Balkan Peninsula, including poorly studied areas of mainland Greece.

Methods, Material & Abbreviations

Nomenclature and measurements follow Stahnke (1971), Soleglad & Sissom (2001), Kovařík (2009), and Kovařík & Ojanguren Affilastro (2013), except for trichobothriotaxy (Vachon, 1974, 1975).

Chromosome preparations for cytogenetic analysis were made from gonads according to Plíšková et al. (2016). The relative length and morphology of chromosomes were measured and calculated for the diploid set from five postpachytene nuclei using ImageJ v1.47r (http://imagej.nih.gov/ij/) with the Levan plugin (Sakamoto & Zacaro, 2009).

Specimen Depositories: FKCP (František Kovařík, private collection; will in future be merged with the collections of the National Museum of Natural History, Prague, Czech Republic, NMPC); HNHM (Hungarian Natural History Museum, Budapest, Hungary).

Morphometrics: D, depth; L, length; W, width.

Systematics

Family Euscorpiidae Laurie, 1896

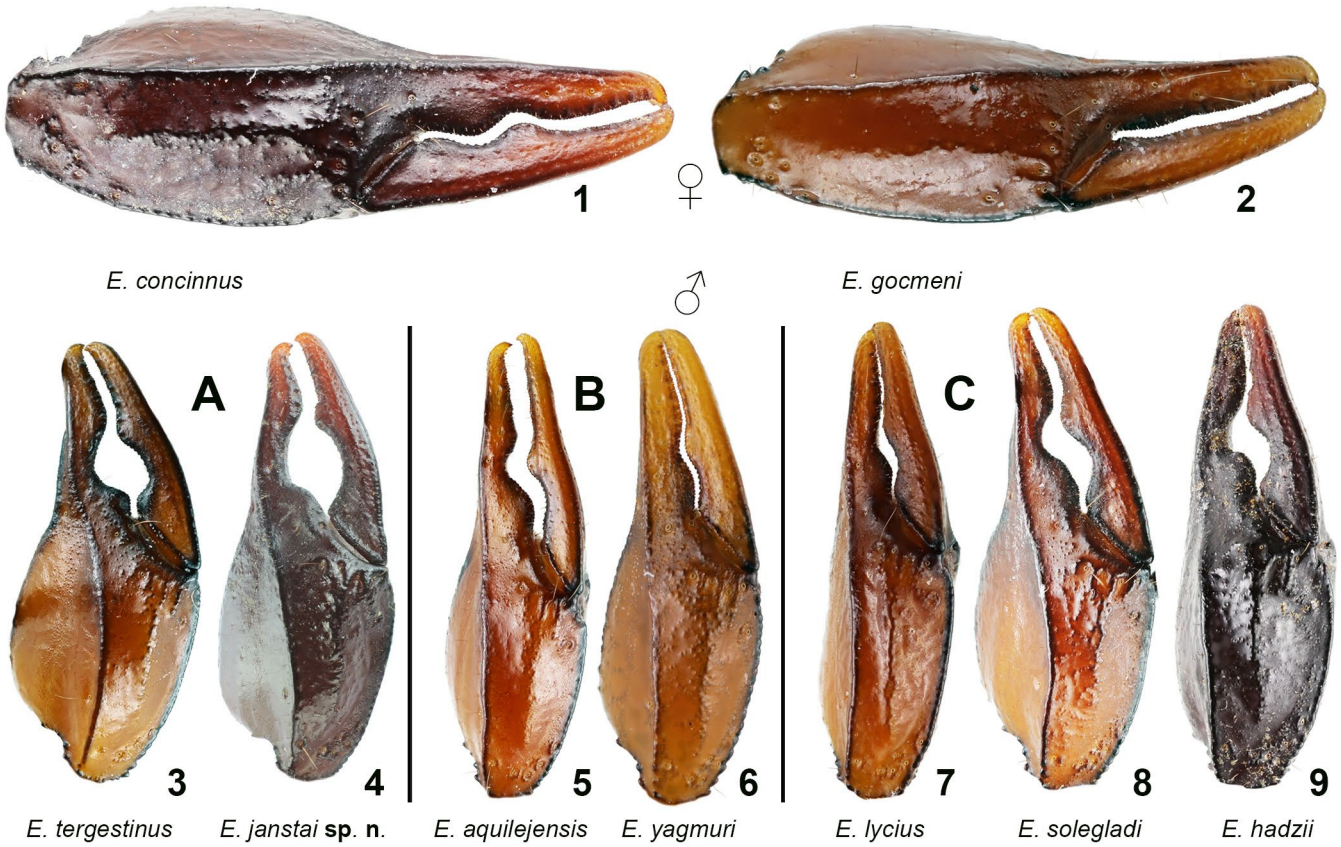
Euscorpius Thorell, 1876

(Figures 1–186, Tables 1–4)

Euscorpius Thorell, 1876: 15; Fet & Sissom, 2000: 357–377 (in part, complete reference list until 1998).

Type species. *Scorpio carpathicus* Linnaeus, 1767

Diagnosis. Total length 20–50 mm. Movable fingers of pedipalp chela with MD aligned in a single straight row in entire length of chelal fingers; ID, IAD (5 in number) and OD present. OD are displaced to outer aspect of fingers. Pedipalp chela flat in appearance. Trichobothrial pattern type C. Two subdistal denticles present on cheliceral movable



Figures 1–9: *Euscorpius* females (1–2) and males (3–9), pedipalp chela external. **Figure 1**. *E. concinnus* (C. L. Koch, 1837), Italy, Tuscany, Camporgiano, 44.1587131°N 10.3357447°E, FKCP. **Figure 2**. *E. gocmeni* Tropea et al., 2014, Turkey, Antalya Province, Akseki District, Elmali Yolu, 36º21'29.9"N 29º28'00.1"E, FKCP. **Figure 3**. *E. tergestinus* (C. L. Koch, 1837), Croatia, Posedarje, 20 km E of Zadar, FKCP. **Figure 4**. *E. janstai* **sp**. **n**., paratype. **Figure 5**. *E. aquilejensis* (C. L. Koch, 1837), Italy, Abruzzo, Silvi Marina, FKCP. **Figure 6**. *E. yagmuri* Kovařík et al., 2014, holotype, Greece, Epirus, Preveza District, Mt. Zalongo, Cassope (Kassope, Kassopi), 39.145278ºN 20.675556ºE, FKCP. **Figure 7**. *E. lycius* Yağmur et al., 2013, Turkey, Antalya Province, 36º24'N 29º41'E, 976 m a. s. l., FKCP. **Figure 8**. *E. solegladi* Fet et al., 2014, paratype, Bulgaria, "Sandanski Pirin" (Blagoevgrad Province, Pirin Mts., Sandanski), NMPC. **Figure 9**. *E. hadzii* Di Caporiacco, 1950, Albania, Prokletije Mts., road Theti–Boge, FKCP.

finger dorsal edge. Ventral edge of cheliceral movable finger smooth; serrula absent. Two pedal spurs present on legs. Tarsal spurs on legs absent. Sternum pentagonal in shape. Hemispermatophore lamelliform in shape with broad trunks. Telson without subaculear tubercle. Metasoma I–IV with single median carina usually absent.

Taxonomic characters.

Characters important for distinguishing species in the genus *Euscorpius* are: (1) trichobothriotaxy of the pedipalp patella, i. e., number of trichobothria in the external series *eb*, eb_a, *esb*, *em*, *est*, and *et*, in combination with the number of ventral trichobothria; (2) shape and dimensions of the carapace, pedipalp and metasomal segments; (3) granulation and carination of metasomal segments; (4) coloration; and (5) pectinal tooth count. Two currently valid subgenera can be separated by the number of ventral trichobothria on the pedipalp chela manus, i. e., 4 in *Euscorpius* sensu stricto, and more than 6 in *Polytrichobothrius* Birula, 1917. These characters alone are not always sufficient for distinguishing a total of ca. 60 species, most of which were described or revalidated in the last two decades. Taxonomy of this genus remains complex and challenging. Recently, DNA analysis was suggested to be the only solution to this problem (see e. g. Parmakelis et al., 2013; Fet et al., 2018). Based on our studies of this genus and the application of diagnostic characters to the related genus *Megacormus* Karsch, 1881 (Euscorpiidae) and to the related family Scorpiopidae Kraepelin, 1905, we here propose application of two additional characters to elucidate taxonomy of *Euscorpius*.

Morphological character:
the shape of the pedipalp chela fingers.
In many scorpions, the dentate margins of the pedipalp chela fingers can deviate markedly from the more common linear or gently curved lateral profiles. Proximal margins of fixed and movable fingers may be modified to varying degrees with undulate profiles. This is usually only fully developed in adults as a secondary sexual characteristic. It is sexually dimorphic,

with undulation stronger in males and weaker or absent in females, and appears to be an adaptive trait allowing courting males to better grasp female chelae during *promenade á deux*. An adaptive advantage for sperm transfer would underlie independent evolution in various unrelated scorpion lineages, and predicts high homoplasy as a phylogenetic character. However, the shape and extent of undulation of the finger margins are useful empirical diagnostic characters at the species level.

In the genus *Megacormus*, males of three out of six species in total have undulate margins, whereas males of the other three species, and all females, have linear margins (see Kovařík, 2019: figs. 38–48 on page 11 and key on page 12). In the family Scorpiopidae, either undulate or linear finger margins can occur in males or females. If a species has linear margins in the male, then they are also linear in the female. If a male has undulate margins, females of the species may be either undulate or linear (Kovařík, 2000).

In the genus *Euscorpius*, we found that finger margins were invariably undulate in males (Figs. 3–9), and either linear (Fig. 2) or weakly to moderately undulate (Fig. 1) in females. Undulation patterns of males were stable intraspecifically, and hence of value as diagnostic characters. We classified them according to three types:

Type A (Figs. 3–4). Margins strongly undulate, with deep proximal excavations in approximately the same area on both fingers, leaving a very pronounced rounded gap when fingers are distally closed.

Type B (Figs. 5–6). Margins moderately undulate, with reciprocal profiles on fixed and movable fingers (i. e., lobes on one finger fitting into excavations of opposing finger), leaving a narrow uniform gap, or no gap, when fingers are distally closed.

Type C (Figs. 7–9). Margins moderately to strongly undulate, with non-reciprocal profiles on fixed and movable fingers, leaving a sigmoid gap of varying width, when fingers are distally closed.

Cytogenetic character: **number of chromosomes**.

Under the auspices of Charles University of Prague (research group of F. Šťáhlavský), we are systematically investigating the chromosomal sets of all scorpion families and numerous species. Scorpions are an ancient group of arachnids exhibiting distinctive cytogenetic features. They are distinguished by the occurrence of both types of chromosomes (i. e. monocentric and holokinetic), achiasmatic male meiosis, lack of recognizable sex chromosomes, and an extensive karyotype variability (2n = 5–186). For example, taxa of the family Buthidae generally show a narrow range of chromosome counts (2n = 5–48) and a distinct pattern of karyotype diversity across the genera. Most buthid genera studied exhibit either a stable or a slightly variable number of chromosomes among their species; e. g. *Androctonus* spp. (2n = 24), *Compsobuthus* spp. (2n = 22), *Microbuthus* spp. (2n = 26), *Reddyanus* spp. (2n = 15–17) (Sadílek et al. 2015; Kovařík et al., 2016, 2020, 2020b; Kovařík & Šťáhlavský, 2019; Lowe et al., 2018). However, our studies show that, on the contrary, the genus *Euscorpius* has a wide range of chromosome counts (2n = 36–112, Šťáhlavský et al., unpublished and present results) that could be very important as a taxonomic character. This imporance was recently demonstrated for a closely related genus *Alpiscorpius* (Kovařík et al., 2019) where variability of the karyotypes (2n=46–90) enabled to deliminate several cryptic species in the Alps (Kovařík et al., 2019; Štundlová et al., 2019). Our cytogenetic analysis of *Euscorpius janstai* **sp. n.** (2n=112) (Fig. 185) and *Euscorpius sadileki* **sp. n.** (2n=90) (Fig. 186) also confirmed distinct interspecific variability of the karyotypes of euscorpiids. The karyotypes differs not only by diploid number of the chromosomes but also by morphology (Table 4). Interestingly, both species possess one extra large biarmed chromosomes in the karyotypes probably as an effect of Robertsonian translocation. This rearrangement is typical for scorpions with monocentric chromosomes and cause fast and distict differentiation of the karyotypes (Shanahan, 1989; Štundlová et al., 2019).

Euscorpius bonacinai **sp. n.**

(Figures 10–45, 184, Table 1)

http://zoobank.org/urn:lsid:zoobank.org:act:24837678-7078-4297-B4D9-4026A0C535EC

Type locality and type repository. Albania, Vlorë County, Mali i Cikës, Maja e Gurrës, 2010 m a. s. l.; HNHM.

Type material. **Albania**, Vlorë County, Mali i Cikës, Maja e Gurrës, 2010 m a. s. l., 12.VIII.2004, HNHM No. 2004/101, 1♂ (holotype), leg. Z. Fehér; Vlorë County, Cikë Mts, pine forest N of the Llogara Pass, 40°12'43.0"N 19°34'45.0"E, 860 m a. s. l., 11.V.2006, 1♀ (paratype), leg. Dányi, Kontschán and Murányi, HNHM.

Etymology. The species epithet is a patronym honoring our colleague Alberto Bonacina, the author of important early studies on the genus *Alpiscorpius* (Euscorpiidae).

Diagnosis (♂♀). Total length 35 mm. Color reddish black, pedipalp reddish brown, legs and telson yellow. Pedipalp patellar external trichobothria numbers: 5*eb*, 4eb_a, 2*esb*, 4*em*, 4*est*, 6*et*, ventral aspect of patella with 8–9 trichobothria. Pectinal teeth number 9 in male, 7 in female. Chelicerae yellow, very slightly reticulated. Male with pedipalp fingers type C, female with fingers undulate. Dorsal metasomal carinae on III– IV segments irregularly granulated. Dorsolateral metasomal carinae on II–IV segments absent. Ventrolateral metasomal carinae on II–IV segments present and smooth. Metasoma V ventrally with median carina developed. Chela length/width ratio, 2.5 in male and 2.75 in female. Metasoma IV length/width ratio, 1.99 in male and 1.89 in female. Telson length/depth ratio, 2.50 in male and 3.13 in female.

Dimensions (mm)		*E. bonacinai* **sp. n.** ♂ **holotype**	*E. bonacinai* **sp. n.** ♀ **paratype**
Carapace	L / W	4.88 / 5.00	4.90 / 5.14
Mesosoma	L	12.05	14.23
Tergite VII	L / W	2.18 / 3.94	2.52 / 4.31
Metasoma + telson	L	18.30	15.66
Segment I	L / W / D	1.80 / 1.77 / 1.57	1.67 / 1.56 / 1.58
Segment II	L / W / D	2.07 / 1.59 / 1.53	1.88 / 1.42 / 1.31
Segment III	L / W / D	2.29 / 1.55 / 1.47	2.04 / 1.37 / 1.23
Segment IV	L / W / D	2.82 / 1.42 / 1.40	2.44 / 1.29 / 1.19
Segment V	L / W / D	4.56 / 1.40 / 1.39	3.84 / 1.25 / 1.31
Telson	L / W / D	4.76 / 1.73 / 1.90	3.79 / 1.22 / 1.21
Pedipalp	L	17.57	16.38
Femur	L / W	4.27 / 1.62	4.00 / 1.50
Patella	L / W	4.21 / 1.88	4.05 / 1.71
Chela	L	9.09	8.33
Manus	W / D	3.69 / 2.60	3.00 / 2.32
Movable finger	L	5.54	4.80
Total	**L**	**35.23**	**34.79**

Table 1. Comparative measurements of adults of *Euscorpius bonacinai* **sp. n.** Abbreviations: length (L), width (W, in carapace it corresponds to posterior width), depth (D).

Description (♀♂). Total length about 35 mm in both sexes. The habitus is shown in Figs. 10–13. For position and distribution of trichobothria of pedipalps, see Figs. 38–44. Sexual dimorphism, see below in the description.

Coloration (Figs. 1–2). Base color uniformly reddish black, sternites lighter, yellowish brown, legs and telson yellow, pedipalps reddish brown. Chelicerae yellow and very slightly reticulate.

Carapace and mesosoma (Figs. 10–13, 14–17). Carapace finely granulated with several smooth areas; carinae are absent. The anterior margin of the carapace is straight. Carapace with two lateral eyes. Tergites finely granulated, without developed carina. Tergite VII lacking lateral and median carinal pairs. Sternites III–VII smooth and lustrous; VII lacking lateral and median carinae. Stigmata small, narrow ellipical. Pectinal teeth number 9 in male and 7 in female, fulcra are present. Pectines have three marginal lamellae and five middle lamellae.

Metasoma and telson (Figs. 22–29). Metasoma very sparsely hirsute and finely granulated. Dorsal metasomal carinae on II–V segments distinctively irregularly granulated; dorsolateral carinae absent; ventrolateral carinae present, smooth on segments II–IV and granulated on segment V. Metasoma V ventrally granulated with median carina developed, metasoma I–IV with ventral median carina indicated to absent. Anal arch with small pigmented granules. Telson finely granulated, elongate in female and swollen in male, with annular ring absent in female and developed in male. Aculeus short, more curved in male.

Pedipalps (Figs. 30–45). Pedipalps very sparsely hirsute. Patella with 25 (5*eb*, 4eb_a, 2*esb*, 4*em*, 4*est*, 6*et*) external and 8–9 (2 x 8, 2 x 9) ventral trichobothria. Chela with 4 ventral trichobothria, of which V_4 is located on external surface near Eb_1. Femur and patella granulated, femur roughly and patella with fine, reticulated granules. Femur has granulated developed carinae; ventroexternal carina is incomplete. Patella with 5 complete carinae including irregular wide externomedian. DPS well developed. Manus dorsally with fine, rounded granules, which do not form median carina; only five chelal carinae are developed, of which dorsoexternal is almost absent in female. Male with pedipalp fingers type C, female with fingers undulate.

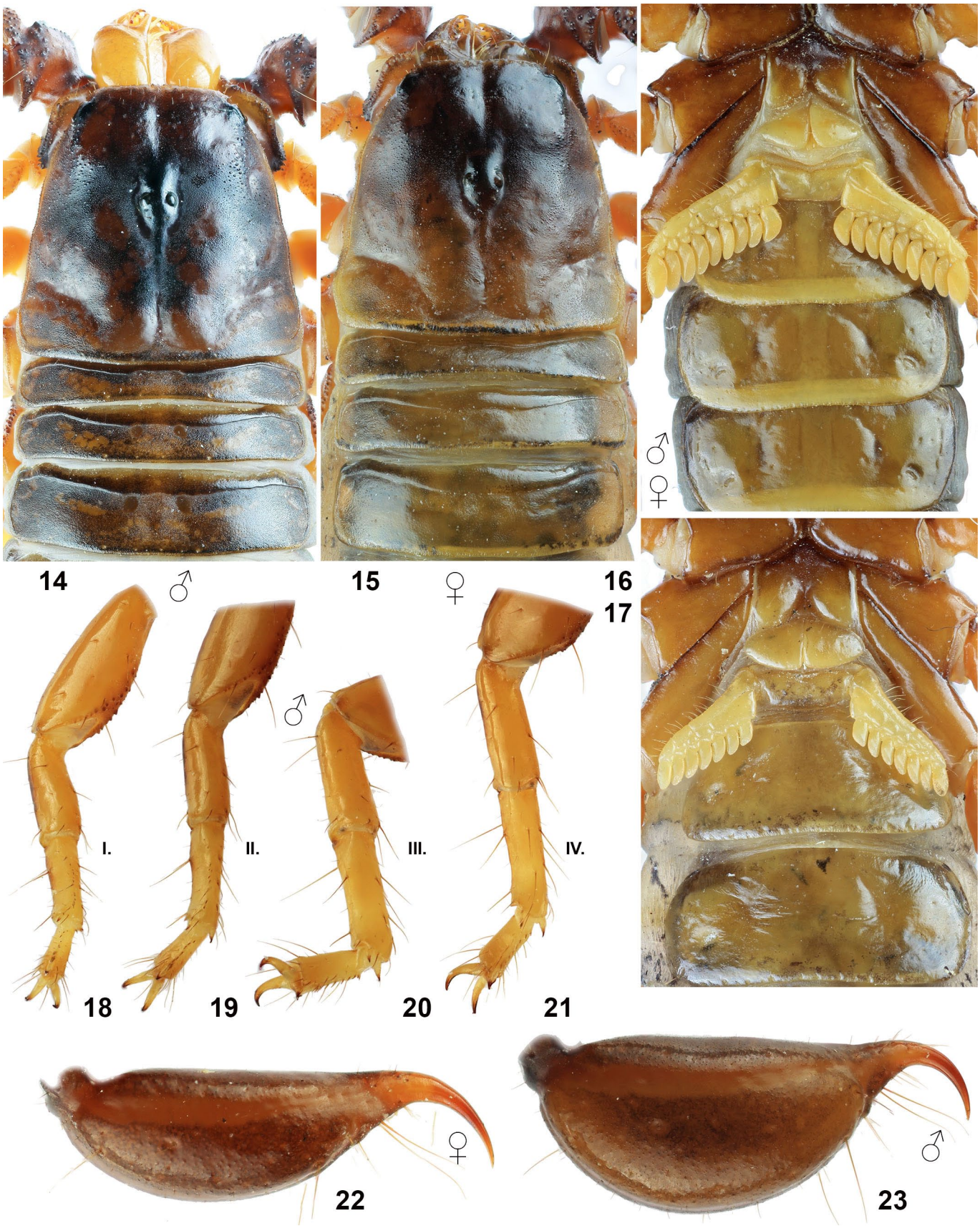
Legs (Figs. 18–21). Both pedal spurs present on all legs, lacking spinelets; tibial spurs absent. Tarsus with single row of spinules on ventral surface, terminating distally with two essentially adjacent spinules.

Measurements. See Table 1.

Affinities. *E. bonacinai* **sp. n.** is morphologically most similar to *E. solegladi* Fet et al., 2014 from Bulgaria and Greece. These two species are differentiated according to trichobothrial pattern: *E. bonacinai* **sp. n.** has pedipalp patella with 4 eb_a and 8–9 ventral trichobothria and *E. solegladi* has 5–6 eb_a and 9–10 ventral trichobothria.

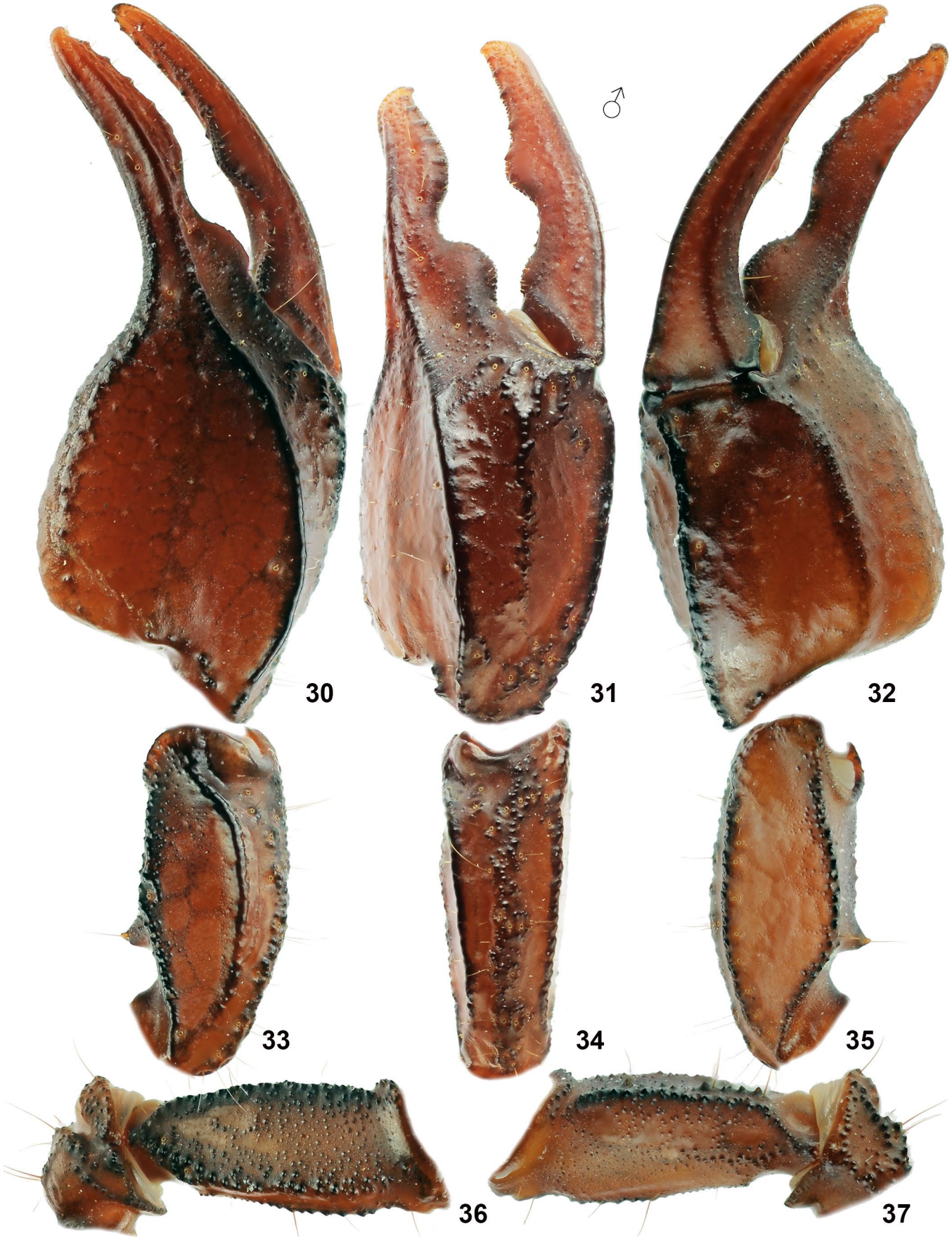
Distribution. Albania (Fig. 184).

Figures 10–13: *E. bonacinai* **sp. n. Figures 10–11**. Male holotype in dorsal (10) and ventral (11) views. **Figures 13–14**. Female paratype in dorsal (12) and ventral (13) views. Scale bar: 10 mm.



Figures 14–23: *E. bonacinai* **sp. n. Figures 14**, **16**, **18–21**, **23**. Male holotype, carapace and tergites I–III (14), coxosternal area and sternites III–V (16), left legs I–IV, retrolateral aspect (18–21 respectively), and telson lateral (23). **Figures 15**, **17**, **22**. Female paratype, carapace and tergites I–III (15), coxosternal area and sternites III–IV (17), and telson lateral (22).

Figures 24–29: *E. bonacinai* **sp. n. Figures 24–26**. Female paratype, metasoma and telson lateral (24), dorsal (25), and ventral (26) views. **Figures 27–29**. Male holotype, metasoma and telson lateral (27), dorsal (28), and ventral (29) views. Scale bars: 5 mm (24–26, 27–29).



Figures 30–37. *E. bonacinai* **sp. n.**, male holotype, pedipalp segments. Chela dorsal (30), external (31) and ventral (32) views. Patella dorsal (33), external (34) and ventral (35) views. Trochanter and femur dorsal (36) and ventral (37) views.

Figures 38–**45**. *E. bonacinai* **sp**. **n**., female paratype, pedipalp segments. Chela dorsal (38), external (39) and ventral (40) views. Patella dorsal (41), external (42) and ventral (43) views. Trochanter and femur dorsal (44) and ventral (45) views. Trichobothrial pattern is indicated by white circles.

Dimensions (mm)		*E. janstai* **sp. n.** ♂ **holotype**	*E. janstai* **sp. n.** ♀ **paratype**	*E. kabateki* **sp. n.** ♂ **holotype**	*E. kabateki* **sp. n.** ♀ **paratype**
Carapace	L / W	5.52 / 5.45	5.63 / 5.37	4.94 / 4.98	4.63 / 4.64
Mesosoma	L	8.48	14.70	10.20	14.44
Tergite VII	L / W	2.05 / 4.32	3.01 / 4.34	2.64 / 3.75	2.48 / 3.39
Metasoma + telson	L	19.03	17.01	17.07	13.62
Segment I	L / W / D	1.49 / 1.85 / 1.79	1.85 / 1.82 / 1.49	1.70 / 1.62 / 1.46	1.66 / 1.43 / 1.32
Segment II	L / W / D	2.18 / 1.71 / 1.71	2.03 / 1.51 / 1.36	1.91 / 1.45 / 1.34	1.71 / 1.21 / 1.24
Segment III	L / W / D	2.49 / 1.73 / 1.57	2.20 / 1.38 / 1.30	2.17 / 1.38 / 1.24	1.77 / 1.14 / 1.20
Segment IV	L / W / D	3.03 / 1.55 / 1.54	2.75 / 1.38 / 1.32	2.67 / 1.25 / 1.16	1.91 / 1.08 / 1.12
Segment V	L / W / D	4.73 / 1.58 / 1.65	4.27 / 1.30 / 1.32	4.08 / 1.27 / 1.26	3.18 / 1.13 / 1.14
Telson	L / W / D	5.11 / 1.96 / 2.20	3.91 / 1.38 / 1.30	4.54 / 1.49 / 2.00	3.39 / 1.15 / 1.05
Pedipalp	L	19.80	18.71	16.11	15.45
Femur	L / W	4.81 / 1.83	4.73 / 1.72	3.93 / 1.51	3.81 / 1.54
Patella	L / W	4.82 / 1.99	4.47 / 1.93	4.03 / 1.79	3.84 / 1.77
Chela	L	10.17	9.51	8.15	7.80
Manus	W / D	4.36 / 3.83	3.48 / 2.57	3.53 / 2.62	3.18 / 1.96
Movable finger	L	5.80	5.35	4.63	4.51
Total	**L**	**33.03**	**37.34**	**32.21**	**32.69**

Table 2. Comparative measurements of adults of *Euscorpius janstai* **sp. n.** and *E. kabateki* **sp. n.** Abbreviations: length (L), width (W, in carapace it corresponds to posterior width), depth (D).

Euscorpius janstai **sp. n.**

(Figures 46–79, 184–185, Tables 2, 4)

http://zoobank.org/urn:lsid:zoobank.org:act:B71FEF8F-77A6-4CFF-B1FE-1CCDB1F3503D

Type locality and type repository. North Macedonia, Mavrovo, 41.65°N 20.72°E; FKCP.

Type material. **North Macedonia**, Mavrovo, 41.65°N 20.72°E, VI.2014, 3♂1♀ (holotype and paratypes, 540, 541, 542), leg. M. Minařík, FKCP; Tetovo Province, Shar Planina, road 1209 (Tetovo to Popova Shapka) between Popova Shapka and junction to Shipkovica, 42.020617ºN 20.903512ºE, 8.VI.2014, 1♀ (paratype), leg. Petr Janšta et al., FKCP.

Etymology. The species epithet is a patronym honoring Petr Janšta, the collector of paratype of the new species.

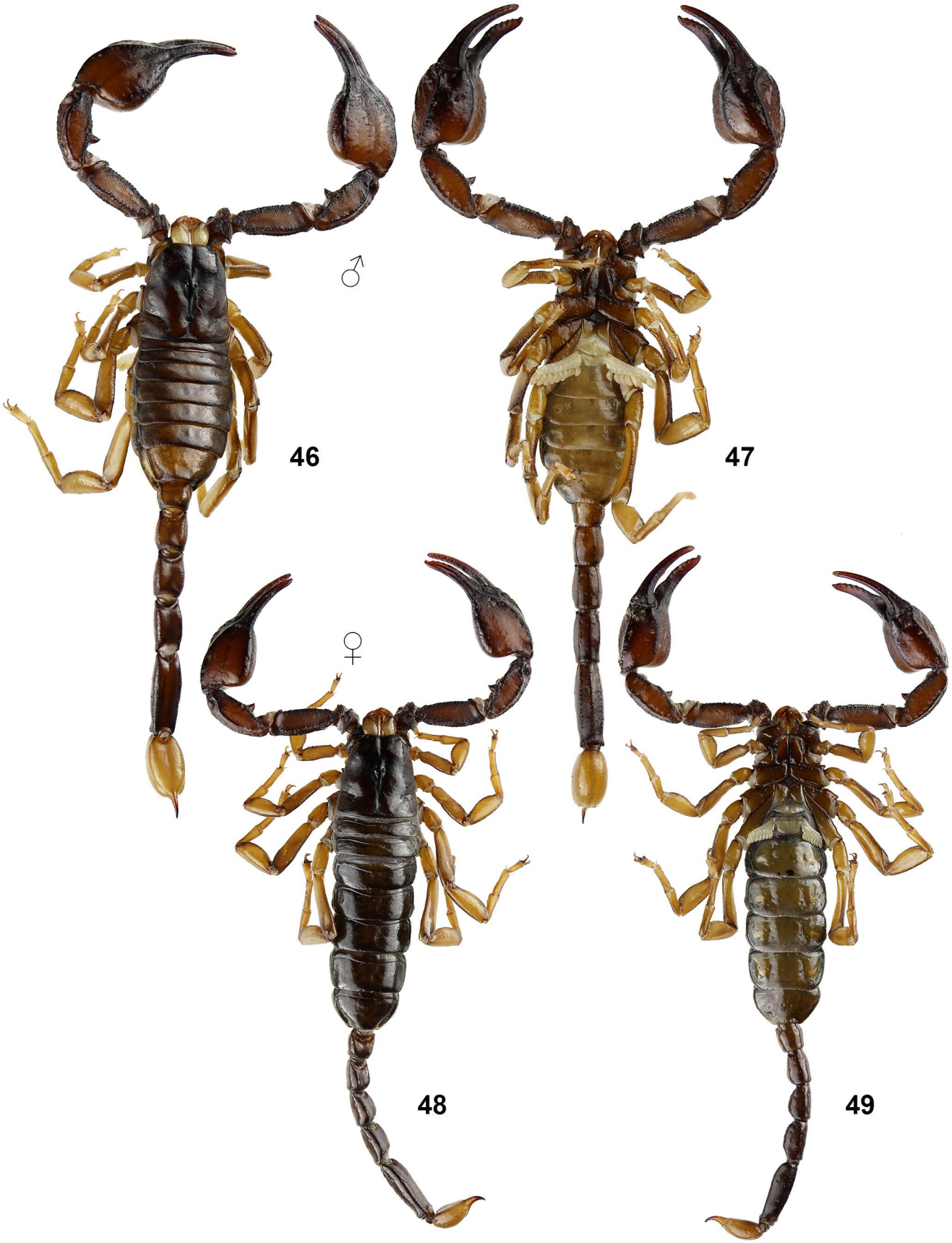
Diagnosis (♂♀). Total length 33–40 mm. Color reddish black, legs and telson yellow. Pedipalp patellar external trichobothria numbers: 4*eb*, 4eb_a, 2*esb*, 4*em*, 4*est*, 6*et*, ventral aspect of patella with 7–8 trichobothria. Pectinal teeth number 8–9 in males, 7 in females. Chelicerae yellow, slightly reticulated. Male with pedipalp fingers type A, female with fingers undulate. Dorsal metasomal carinae on III–IV segments granulated. Dorsolateral metasomal carinae on II–IV segments absent. Ventrolateral metasomal carinae on II–IV segments present and smooth. Metasoma V ventrally with median carina developed. Chela length/width ratio, 2.3 in males and 2.6 in females. Metasoma IV length/width ratio, 1.95 in males and 2 in females. Telson length/depth ratio, 2.3 in males and 3 in females.

Description (♀♂). Total length about 33–40 mm in both sexes. The habitus is shown in Figs. 46–49. For position and distribution of trichobothria of pedipalps, see Figs. 72–78. Sexual dimorphism, see below in the description.

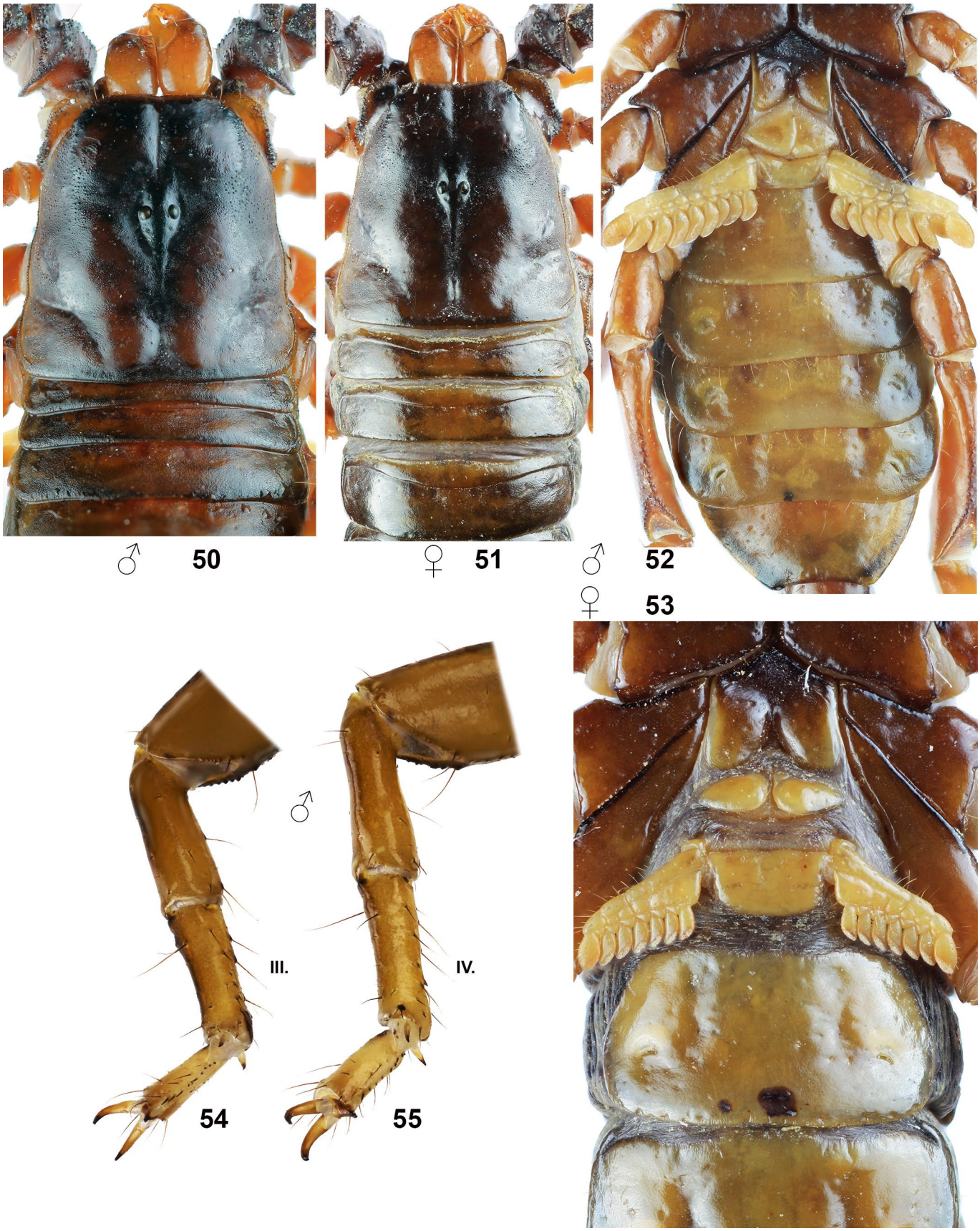
Coloration (Figs. 46–49). Base color uniformly reddish black, sternites lighter, brown, legs and telson yellow. Chelicerae yellow, slightly reticulate.

Carapace and mesosoma (Figs. 46–53). Carapace finely granulated with several large granules in anterior part and several smooth areas; carinae are absent. The anterior margin of the carapace is almost straight. Carapace with two lateral eyes. Tergites finely granulated, without developed carina. Tergite VII lacking lateral and median carinal pairs. Sternites III–VII finely granulated, lacking lateral and median carinae. Stigmata small, narrow ellipical. Pectinal teeth number 8–9 (2x8, 4x9) in males and 7 in females, fulcra are present. Pectines have three marginal lamellae and 4–6 middle lamellae.

Metasoma and telson (Figs. 56–63). Metasoma very sparsely hirsute. Metasoma, mainly in dorsal aspect and whole metasoma V finely granulated more in males. Dorsal metasomal carinae on II–V segments distinctively irregularly granulated; dorsolateral carinae absent; ventrolateral carinae present, smooth on segments II–IV and granulated on segment V. Metasoma V ventrally granulated with median carina developed, on metasoma I–IV ventral median carina is absent. Anal arch with small pigmented granules. Telson finely granulated, elongate in females and



Figures 46–49: *E. janstai* **sp. n. Figures 46–47**. Male holotype in dorsal (46) and ventral (47) views. **Figures 48–49**. Female paratype in dorsal (48) and ventral (49) views.



Figures 50–55: *E. janstai* **sp. n. Figures 50**, **52**, **54–55**. Male holotype, carapace and tergites I–III (50), coxosternal area and sternites (52), left legs III–IV, retrolateral aspect (54–55 respectively). **Figures 51**, **52**. Female paratype, carapace and tergites I–III (51), coxosternal area and sternites III–IV (52).

Figures 56–63: *E. janstai* **sp. n. Figures 57–60**. Female paratype, telson lateral (57), and metasoma and telson lateral (58), dorsal (59), and ventral (60) views. **Figures 56**, **61–63**. Male holotype, telson lateral (56), and metasoma and telson lateral (61), dorsal (62), and ventral (63) views. Scale bar: 5 mm (58–63).

Figures 64–**71**. *E. janstai* **sp**. **n**., male holotype, pedipalp segments. Chela dorsal (64), external (65) and ventral (66) views. Patella dorsal (67), external (68) and ventral (69) views. Femur dorsal (70). Movable finger dentition (71).

Figures 72–79. *E. janstai* **sp. n.**, female paratype, pedipalp segments. Chela dorsal (72), external (73) and ventral (74) views. Patella dorsal (75), external (76) and ventral (77) views. Trochanter and femur dorsal (78) and ventral (79) views. Trichobothrial pattern is indicated by white circles.

swollen in males, with annular ring indicated in females and developed in male. Aculeus short, more curved in male.

Pedipalps (Figs. 64–79). Pedipalps very sparsely hirsute. Patella with 24 (4*eb*, 4eb_a, 2*esb*, 4*em*, 4*est*, 6*et*) external and 7–8 (3 x 7, 7 x 8) ventral trichobothria. Chela with 4 ventral trichobothria, of which V_4 is located on external surface near Eb_1. Femur and patella are granulated, femur roughly and patella with fine, reticulated granules. Femur has granulated developed carinae; ventroexternal carina incomplete. Patella with 5 complete carinae including irregular wide externomedian. DPS moderately developed. Manus dorsally with fine, rounded granules, which do not form median carina; only five chelal carinae are developed. Male with pedipalp fingers type A, female with fingers undulate.

Legs (Figs. 54–55). Both pedal spurs present on all legs, lacking spinelets; tibial spurs absent. Tarsus with single row of spinules on ventral surface, terminating distally with two essentially adjacent spinules.

Measurements. See Table 2.

Affinities. *E. janstai* **sp**. **n**. is morphologically most similar to *E. concinnus* (C. L. Koch, 1837) from Italy, which differs by darker colored telson and legs, and *E. deltshevi* Fet et al., 2014 from Bulgaria and eastern Serbia, which differs by having usually a higher number of pedipalp patellar trichobothria in *et* series. Both of these species differ in having pedipalp fingers type C in males while *E. janstai* **sp**. **n**. has type A (see Figs. 3–9 versus Fig. 65).

Distribution. North Macedonia (Fig. 184).

Euscorpius kabateki **sp**. **n**.

(Figures 80–114, 184, Table 2)

http://zoobank.org/urn:lsid:zoobank.org:act:A813698C-63F9-40B2-B2EA-45DE501FF7D4

Euscorpius sicanus (in part): Parmakelis et al. 2013: fig. 1 (Locality 60), fig. 2–3 (FESP5).

Euscorpius sicanus complex (in part): Fet et al., 2018: 129, fig. 3.

Type locality and type repository. Greece, Mt. Parnassos, Ski Center Parnassos, 38°32.4‘N 22°34.8‘E, 1800 m a. s. l.; FKCP.

Type material. **Greece**, Mt. Parnassós, Ski Center Parnassou, 38°32.4'N 22°34.8'E, 1800 m a. s. l., 2♂4♀1♀juv. (holotype and paratypes), 5– 6.VI.2007, leg. P. Kabátek, 6.VI.2007, 2♀1♀juv. (paratypes), leg. V. Ryjáček, FKCP.

Etymology. The species epithet is a patronym honoring Petr Kabátek, the collector of holotype of the new species.

Diagnosis (♂♀). Total length 28–37 mm. Color reddish yellow. Pedipalp patellar external trichobothria numbers: 5–6*eb*, 4eb_a, 2*esb*, 4*em*, 4*est*, 7*et*, ventral aspect of patella with 9–11 trichobothria. Pectinal teeth number 9–10 in males, 7–9 in females. Chelicerae yellow, without reticulation. Males with pedipalp fingers type C, females with fingers undulate. Dorsal metasomal carinae on III–IV segments granulated. Dorsolateral metasomal carinae on II–IV segments absent. Ventrolateral metasomal carinae on II–IV segments present and smooth. Metasoma V ventrally with median carina indicated. Chela length/width ratio, 2.3 in males and 2.4–2.5 in females. Metasoma IV length/width ratio, 2.1–2.2 in males and 1.7–1.8 in females. Telson length/depth ratio, 2.2–2.3 in males and 3.2–3.3 in females.

Description (♀♂). Total length about 28–37 mm in both sexes. The habitus is shown in Figs. 80–83. For position and distribution of trichobothria of pedipalps, see Figs. 107–113. Sexual dimorphism, see below in the description.

Coloration (Figs. 80–83). Base color uniformly reddish yellow to orange. Chelicerae yellow, without reticulation.

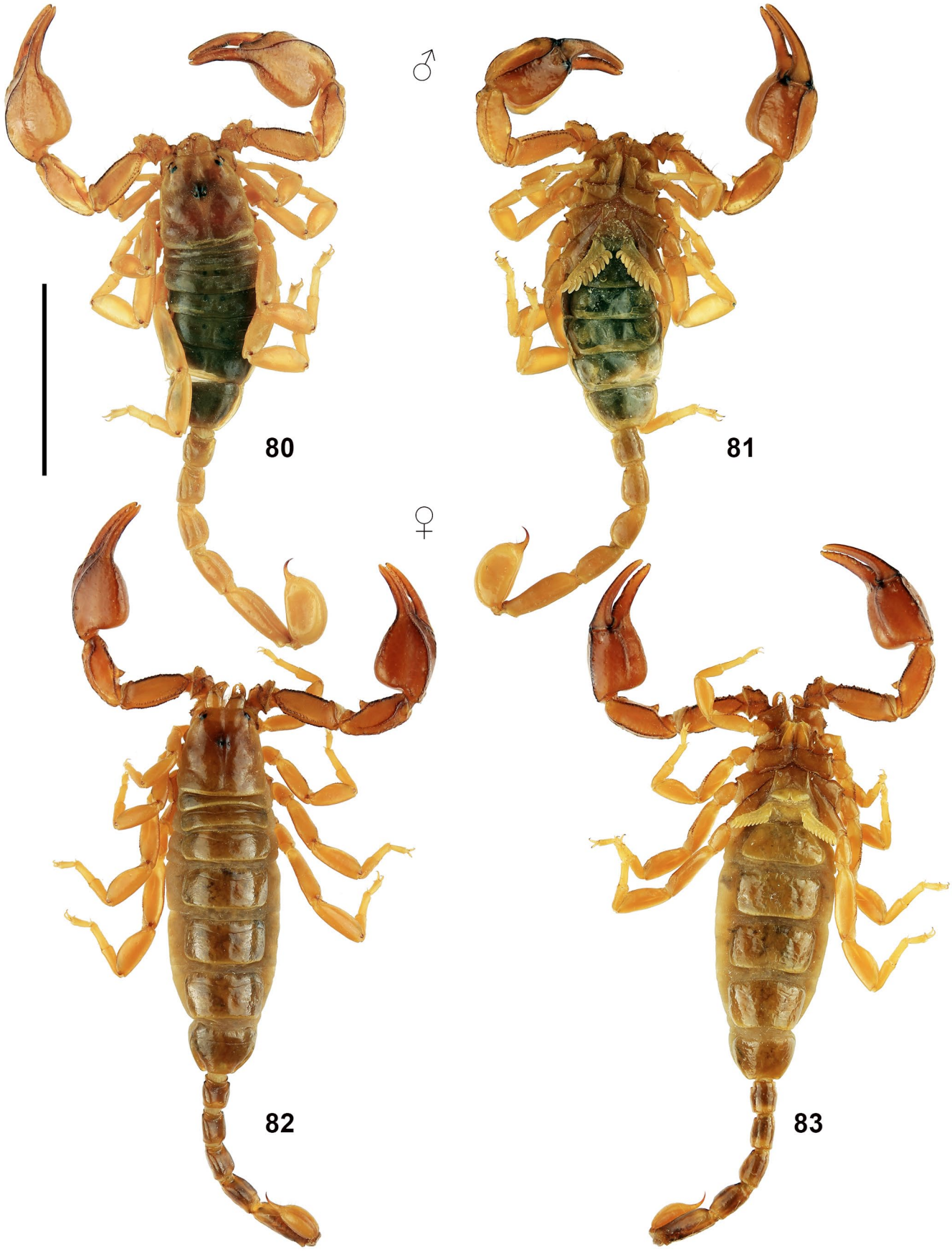
Carapace and mesosoma (Figs. 80–88). Carapace finely granulated with several smooth areas; carinae are absent. The anterior margin of the carapace is almost straight. Carapace with two lateral eyes. Tergites finely granulated, without developed carina. Tergite VII lacking lateral and median carinal pairs. Sternites III–VII smooth and lustrous, lacking lateral and median carinae. Stigmata small, narrow ellipical. Pectinal teeth number 9–10 (1 x 9, 3 x 10) in males and 7–9 (2 x 7, 3 x 8, 7 x 9) in females, fulcra are present. Pectines have three marginal lamellae and 4–5 middle lamellae.

Metasoma and telson (Figs. 91–98). Metasoma very sparsely hirsute. Metasoma, mainly in dorsal aspect and whole metasoma V very finely granulated. Dorsal metasomal carinae on II–V segments distinctively irregularly granulated; dorsolateral carinae absent; ventrolateral carinae present, smooth on segments II–IV and granulated on segment V. Metasoma V ventrally granulated with median carina developed, on metasoma I–IV ventral median carina is absent. Anal arch with small pigmented granules. Telson smooth, elongate in females and swollen in males, with annular ring indicated in females and developed in male. Aculeus short more curved in male.

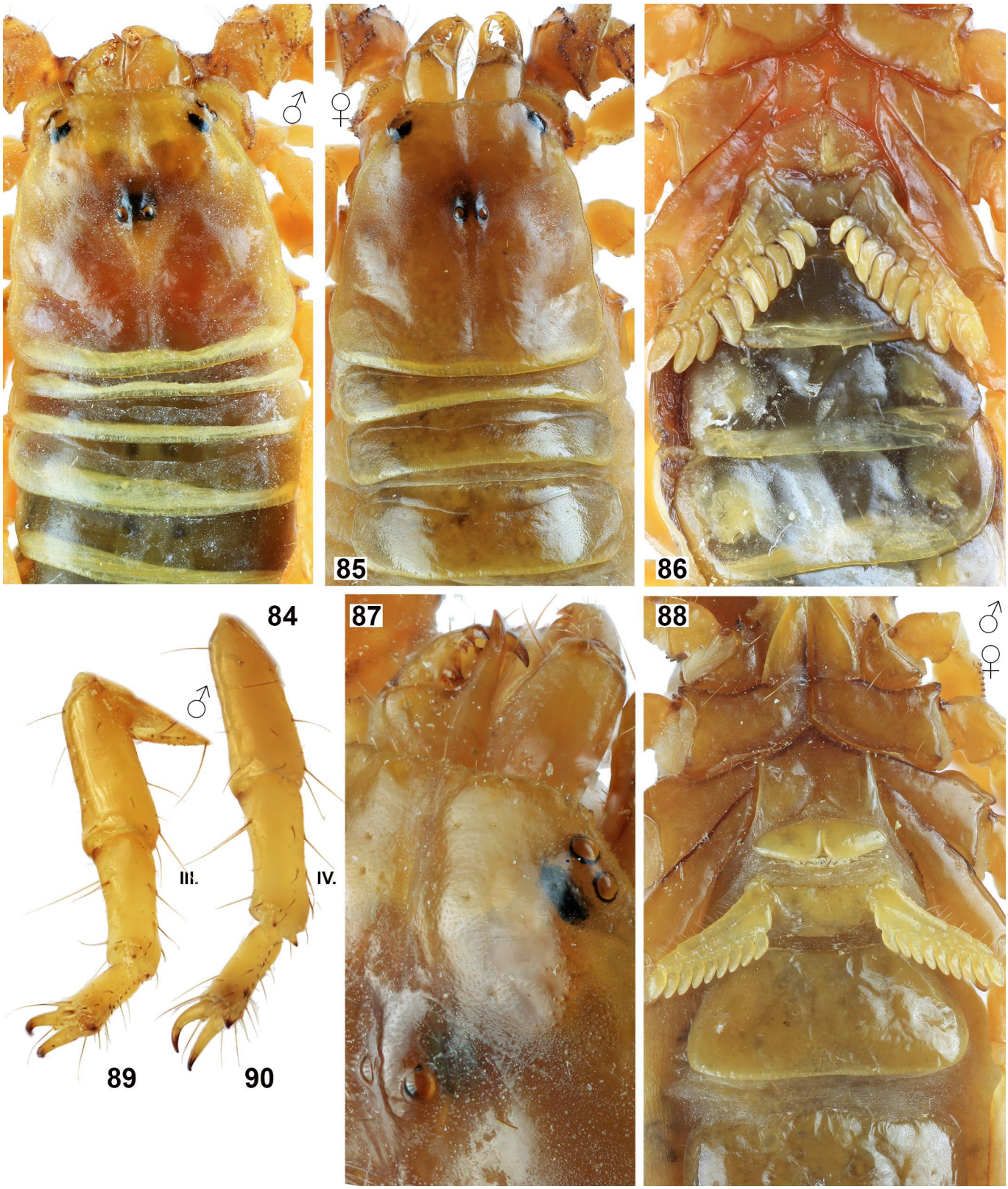
Pedipalps (Figs. 99–114). Pedipalps very sparsely hirsute. Patella with 26–27 (5–6*eb*[8 x 5, 12 x 6], 4eb_a, 2*esb*, 4*em*, 4*est*, 7*et*) external and 9–10 (2 x 9, 15 x 10, 3 x 11) ventral trichobothria. Chela with 4 ventral trichobothria, of which V_4 is located on external surface near Eb_1. Femur granulated; patella rather smooth. Femur has granulated developed carinae; ventroexternal carina is incomplete. Patella with 5 complete carinae including irregular wide externomedian. DPS well developed. Manus dorsally with fine solitary granules, almost absent in females; median carina missing, other carinae are smooth. Male with pedipalp fingers type C, female with fingers undulate.

Legs (Figs. 89–90). Both pedal spurs present on all legs, lacking spinelets; tibial spurs absent. Tarsus with single row of spinules on ventral surface, terminating distally with two essentially adjacent spinules.

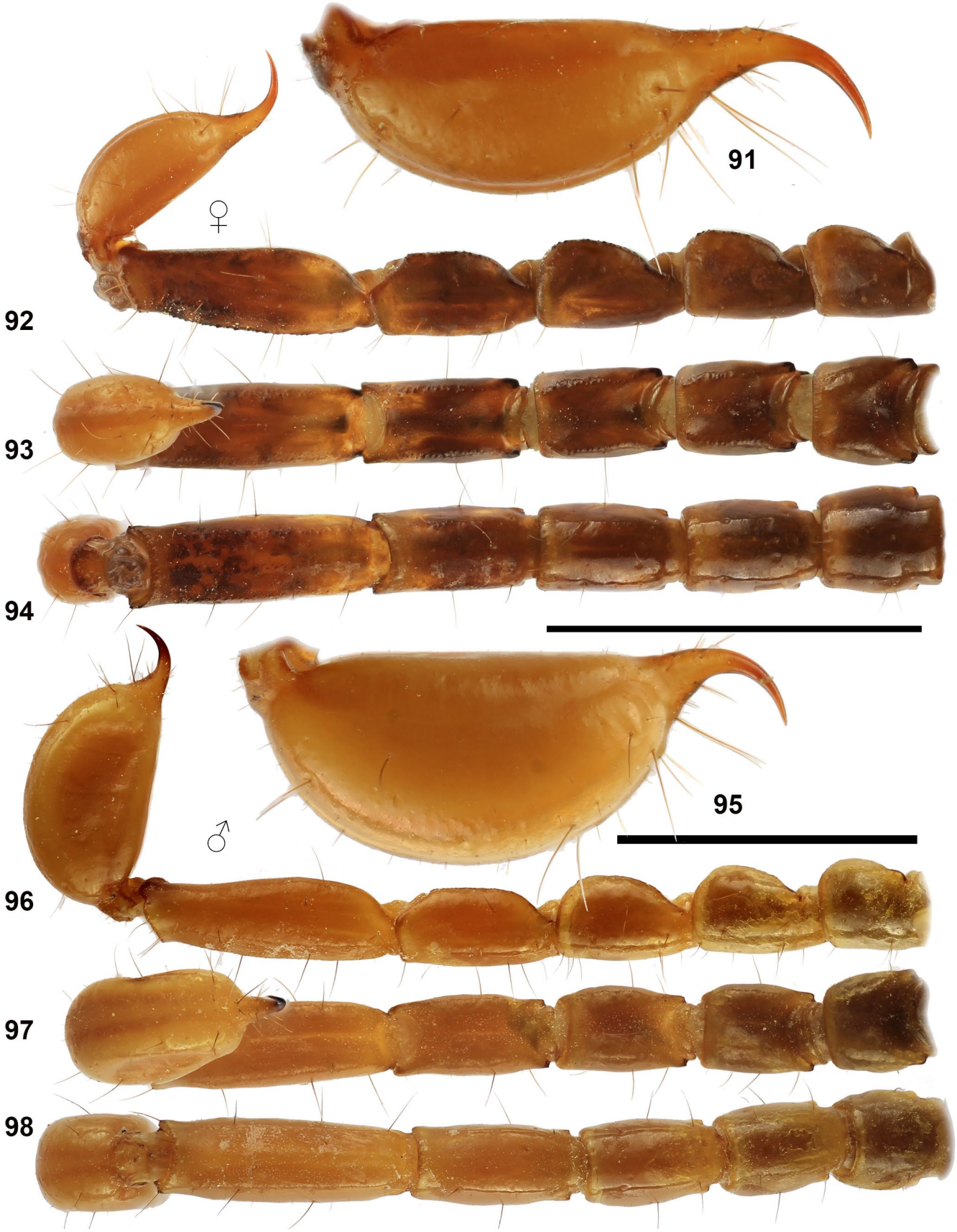
Measurements. See Table 2.



Figures 80–83: *E. kabateki* **sp. n. Figures 80–81**. Male holotype in dorsal (80) and ventral (81) views. **Figures 82–83**. Female paratopotype in dorsal (82) and ventral (83) views. Scale bar: 10 mm.



Figures 84–90: *E. kabateki* **sp. n**. **Figures 84**, **86–87**, **89–90**. Male holotype, carapace and tergites I–IV (84), coxosternal area and sternites III–V (86), left legs III–IV, retrolateral aspect (89–90 respectively), and chelicerae and eyes with part of carapace (87). **Figures 85**, **88**. Female paratopotype, carapace and tergites I–III (85), coxosternal area and sternites III–IV (88).



Figures 91–98: *E. kabateki* **sp. n**. **Figures 91–94**. Female paratopotype, telson lateral (91), and metasoma and telson lateral (92), dorsal (93), and ventral (94) views. **Figures 95**. Male paratype, telson lateral. **Figures 96–98**. Male holotype, metasoma and telson lateral (96), dorsal (97), and ventral (98) views. Scale bars: 5 mm (92–94, 96–98).

Figures 99–106. *E. kabateki* **sp. n.**, male holotype, pedipalp segments. Chela dorsal (99), external (100) and ventral (101) views. Patella dorsal (102), external (103) and ventral (104) views. Trochanter and femur dorsal (105) and ventral (106) views.

Figures 107–114. *E. kabateki* **sp. n.**, female paratopotype, pedipalp segments. Chela dorsal (107), external (108) and ventral (109) views. Patella dorsal (110), external (111) and ventral (112) views. Trochanter and femur dorsal (113) and ventral (114) views. Trichobothrial pattern is indicated by white circles.

Dimensions (mm)		*E. sadileki* **sp. n.** ♂ **holotype**	*E. sadileki* **sp. n.** ♀ **paratype**	*E. scheraboni* **sp. n.** ♂ **holotype**	*E. scheraboni* **sp. n.** ♀ **paratype**
Carapace	L / W	4.19 / 4.29	4.63 / 4.75	4.06 / 3.94	4.67 / 4.59
Mesosoma	L	5.85	14.28	9.84	11.58
Tergite VII	L / W	1.52 / 3.42	2.42 / 4.00	2.19 / 3.13	2.06 / 3.77
Metasoma + telson	L	15.56	15.87	14.08	13.95
Segment I	L / W / D	1.54 / 1.74 / 1.62	1.62 / 1.70 / 1.54	1.48 / 1.29 / 1.13	1.46 / 1.47 / 1.37
Segment II	L / W / D	1.84 / 1.61 / 1.54	1.80 / 1.53 / 1.42	1.68 / 1.18 / 1.09	1.73 / 1.28 / 1.26
Segment III	L / W / D	1.97 / 1.50 / 1.49	2.08 / 1.41 / 1.42	1.80 / 1.09 / 1.05	1.89 / 1.23 / 1.22
Segment IV	L / W / D	2.22 / 1.32 / 1.36	2.39 / 1.32 / 1.33	2.15 / 1.00 / 1.02	2.18 / 1.14 / 1.12
Segment V	L / W / D	3.75 / 1.23 / 1.41	4.09 / 1.37 / 1.29	3.29 / 1.05 / 1.09	3.28 / 1.15 / 1.17
Telson	L / W / D	4.24 / 1.67 / 1.61	3.89 / 1.34 / 1.27	3.68 / 1.23 / 1.40	3.41 / 1.14 / 1.11
Pedipalp	L	14.06	14.85	13.56	15.52
Femur	L / W	3.43 / 1.47	3.64 / 1.49	3.42 / 1.35	3.80 / 1.50
Patella	L / W	3.64 / 1.57	3.82 / 1.58	3.37 / 1.34	3.87 / 1.63
Chela	L	6.99	7.39	6.77	7.85
Manus	W / D	3.17 / 2.14	3.06 / 2.34	2.92 / 1.89	3.09 / 2.20
Movable finger	L	3.75	3.84	3.58	3.70
Total	**L**	**25.60**	**34.78**	**27.98**	**30.20**

Table 3. Comparative measurements of adults of *Euscorpius sadileki* **sp. n.** and *E. scheraboni* **sp. n.** Abbreviations: length (L), width (W, in carapace it corresponds to posterior width), depth (D).

Affinities. This species belongs to the subgenus *Euscorpius* Thorell, 1876, s. str.; it is morphologically similar to *E. sicanus* (C. L. Koch, 1837) from Italy (Sicily), which differs by having darker coloration. The presence of more than 4 (usually 5) trichobothria in eb series is a signature trait of a monophyletic '*Euscorpius sicanus* complex' (see Fet et al., 2003; Parmakelis et al., 2013).

Comments. Fet et al. (2018: 129) mentioned that "'*Euscorpius sicanus* complex' representatives are found across Central Greece, including Mt. Parnassos". After *E. sicanus* was recently restricted to its type locality of Sicily (Tropea, 2017), the Greek populations of this diverse complex remained unnamed. DNA data are available for this species in Parmakelis et al. (2013) under FESP5 (Locality 60; a specimen was collected by J. O. Rein in Lilaia, Mt. Parnassos).

Distribution. Greece, Mt. Parnassos (Fig. 184).

Euscorpius sadileki **sp. n.**

(Figures 115–149, 184, 186, Tables 3–4)

http://zoobank.org/urn:lsid:zoobank.org:act:382FE1BA-8307-406D-A493-6EC930BAA309

Type locality and type repository. **Serbia**, Sokobanja, 43.63°N 21.80°E; FKCP.

Type material. **Serbia**, Sokobanja, 43.63°N 21.80°E, 14.VI.2014, leg. D. Sadílek, 1♂1♀ (holotype and paratype, 543), FKCP; Nišava Province, Gadžin Han env., road between Donji Dušnik and Supotnica, Suva Planina foothills, 43.155ºN 22.118ºE, 5.VI.2014, 1♀ (paratype), leg. P. Šípek et al., FKCP.

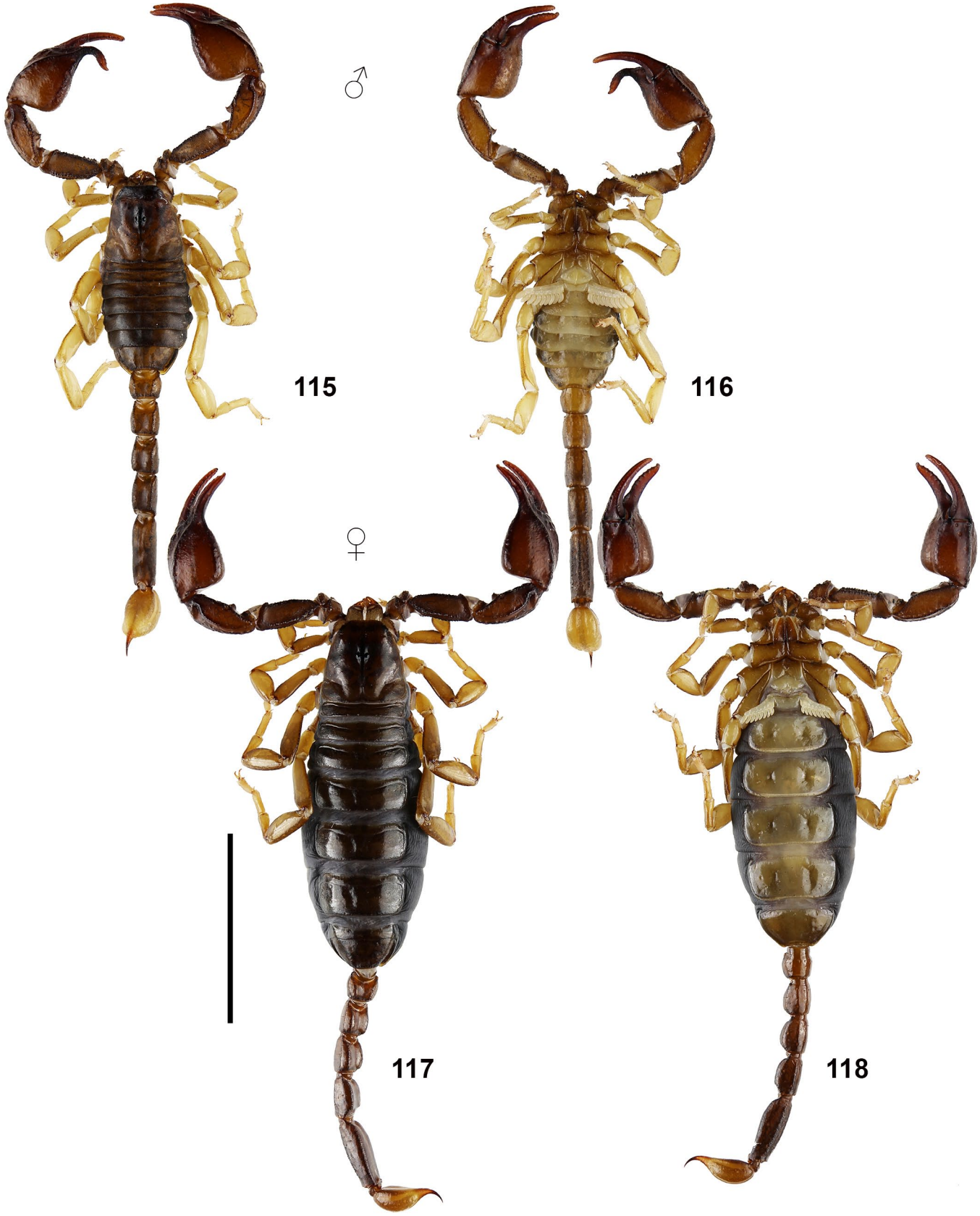
Etymology. The species epithet is a patronym honoring David Sadílek, the collector of holotype of the new species.

Diagnosis (♂♀). Total length 26–36 mm. Color reddish black, legs and telson yellow. Pedipalp patellar external trichobothria numbers: 4*eb*, 4eb_a, 2*esb*, 4*em*, 4*est*, 6*et*, ventral aspect of patella with 8–9 trichobothria. Pectinal teeth number 9 in male, 6–8 in females. Chelicerae yellow, with reticulation. Male with pedipalp fingers type C, female with fingers undulate. Dorsal metasomal carinae on III–IV segments granulated. Dorsolateral metasomal carinae on II–IV segments absent. Ventrolateral metasomal carinae on II–IV segments present and smooth or granulate (mainly in male). Metasoma II–IV densely (roughly) granulated including lateral surface. Metasoma V ventrally granulated with median carina present. Chela length/width ratio, 2.2 in male and 2.4–2.5 in females. Metasoma IV length/width ratio, 1.68 in male and 1.8 in females. Telson length/depth ratio, 2.6 in male and 3–3.1 in females.

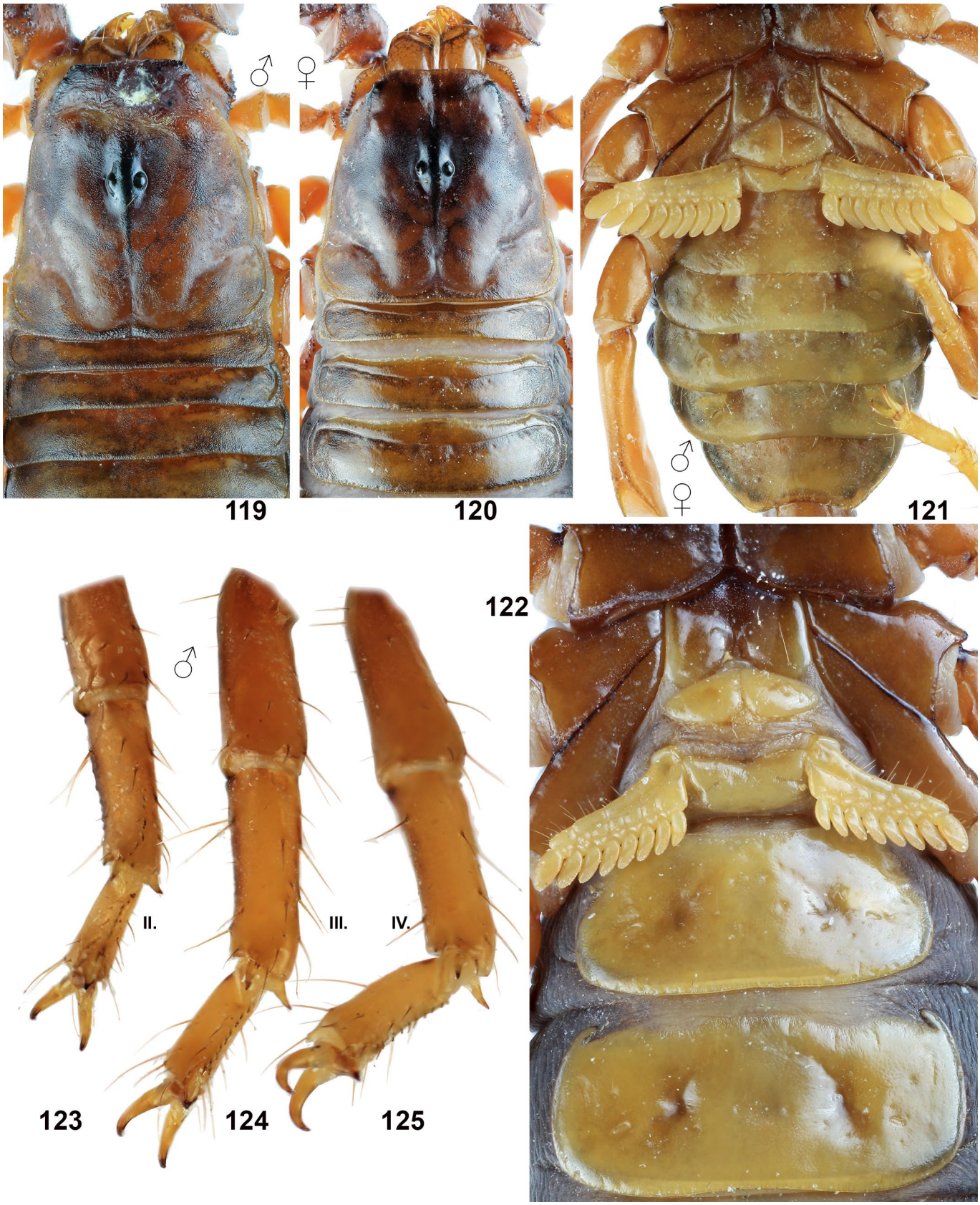
Description (♀♂). Total length about 26–36 mm in both sexes. The habitus is shown in Figs. 115–118. For position and distribution of trichobothria of pedipalps, see Figs. 141–147. Sexual dimorphism, see below in the description.

Coloration (Figs. 115–118, 149). Base color uniformly reddish black, sternites lighter, yellowish brown, legs and telson yellow. Chelicerae yellow, reticulate.

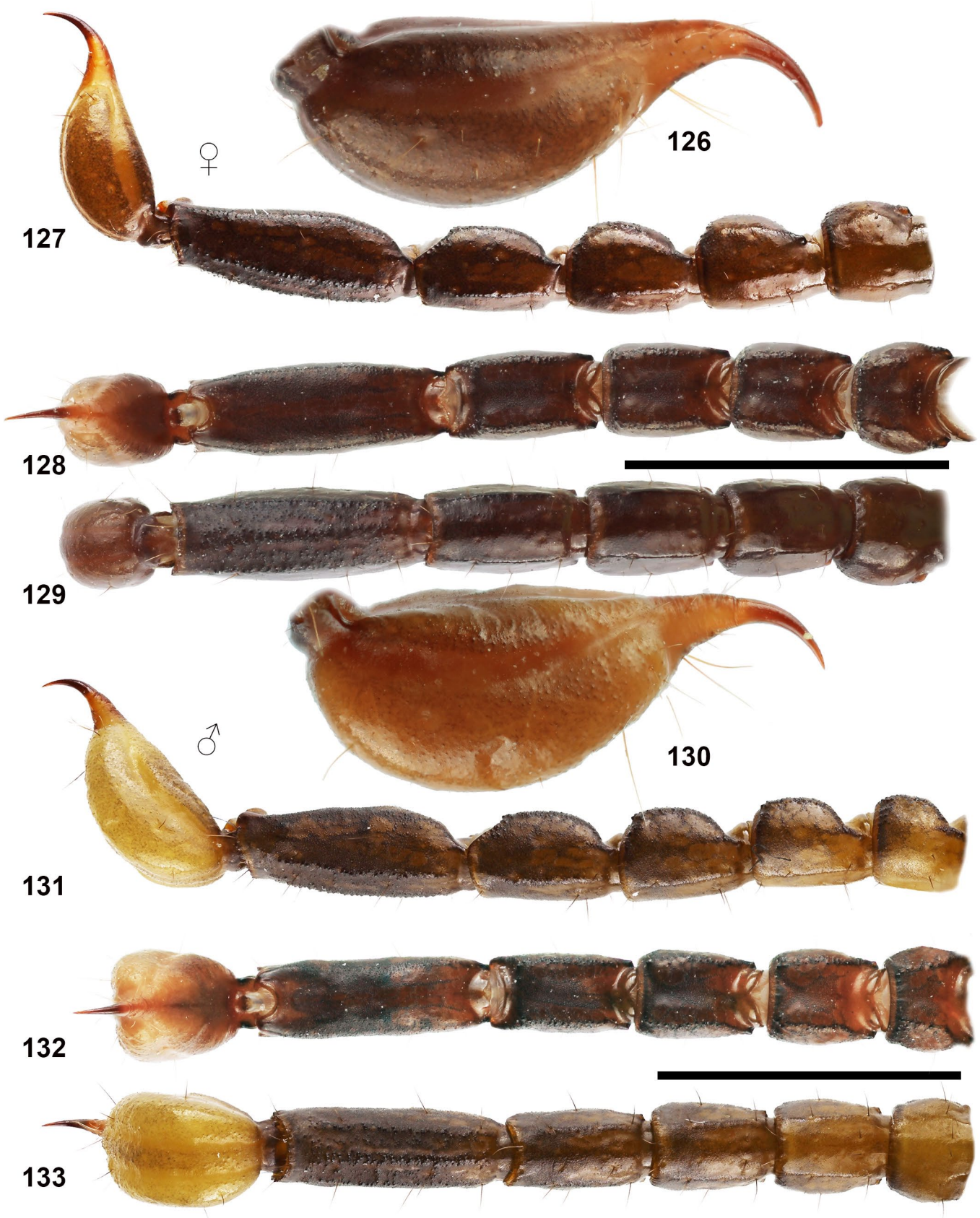
Carapace and mesosoma (Figs. 115–122). Carapace finely granulated with several smooth areas; carinae are absent. The anterior margin of the carapace is straight. Carapace



Figures 115–118: *E. sadileki* **sp. n. Figures 115–116**. Male holotype in dorsal (115) and ventral (116) views. **Figures 117–118**. Female paratopotype in dorsal (117) and ventral (118) views. Scale bar: 10 mm.



Figures 119–125: *E. sadileki* **sp. n. Figures 119**, **121**, **123–125**. Male holotype, carapace and tergites I–IV (119), coxosternal area and sternites (121), left legs II–IV, retrolateral aspect (123–125 respectively). **Figures 120**, **122**. Female paratopotype, carapace and tergites I–III (120), coxosternal area and sternites III–IV (122).



Figures 126–133: *E. sadileki* **sp. n. Figures 126–129**. Female paratopotype, telson lateral (126), and metasoma and telson lateral (127), dorsal (128), and ventral (129) views. **Figures 130–133**. Male holotype, telson lateral (130), and metasoma and telson lateral (131), dorsal (132), and ventral (133) views. Scale bars: 5 mm (127–129, 131–133).

Figures 134–140. *E. sadileki* **sp. n.**, male holotype, pedipalp segments. Chela dorsal (134), external (135) and ventral (136) views. Patella dorsal (137), external (138) and ventral (139) views. Trochanter and femur dorsal (140) view.

Figures 141–**148**: *E. sadileki* **sp. n.**, female paratopotype, pedipalp segments. Chela dorsal (141), external (142) and ventral (143) views. Patella dorsal (144), external (145) and ventral (146) views. Trochanter and femur dorsal (147) and ventral (148) views. Trichobothrial pattern is indicated by white circles.

Figure 149. *E. sadileki* **sp**. **n**., female paratype in vivo habitus.

with two lateral eyes. Tergites finely granulated, without developed carina. Tergite VII lacking lateral and median carinal pairs. Sternites III–VII rather smooth in females and sparsely finely granulated in male, both lacking lateral and median carinae. Stigmata small, narrow ellipical. Pectinal teeth number 9 in male and 6–8 (1 x 6, 1 x 7, 2 x 8) in females, fulcra are present. Pectines have three marginal lamellae and 4–6 middle lamellae.

Metasoma and telson (Figs. 126–133). Metasoma very sparsely hirsute. Metasoma I–V granulated finely in females and roughly in male. Dorsal metasomal carinae on I–V segments distinctively irregularly granulated; dorsolateral carinae absent; ventrolateral carinae present, smooth in females and granulated in male. Metasoma V completely granulated in both sexes with median carina developed, on metasoma I–IV ventral median carina is absent. Anal arch with small pigmented granules. Telson finely granulated, elongate in females and swollen in males, with annular ring present in both sexes. Aculeus short more curved in male.

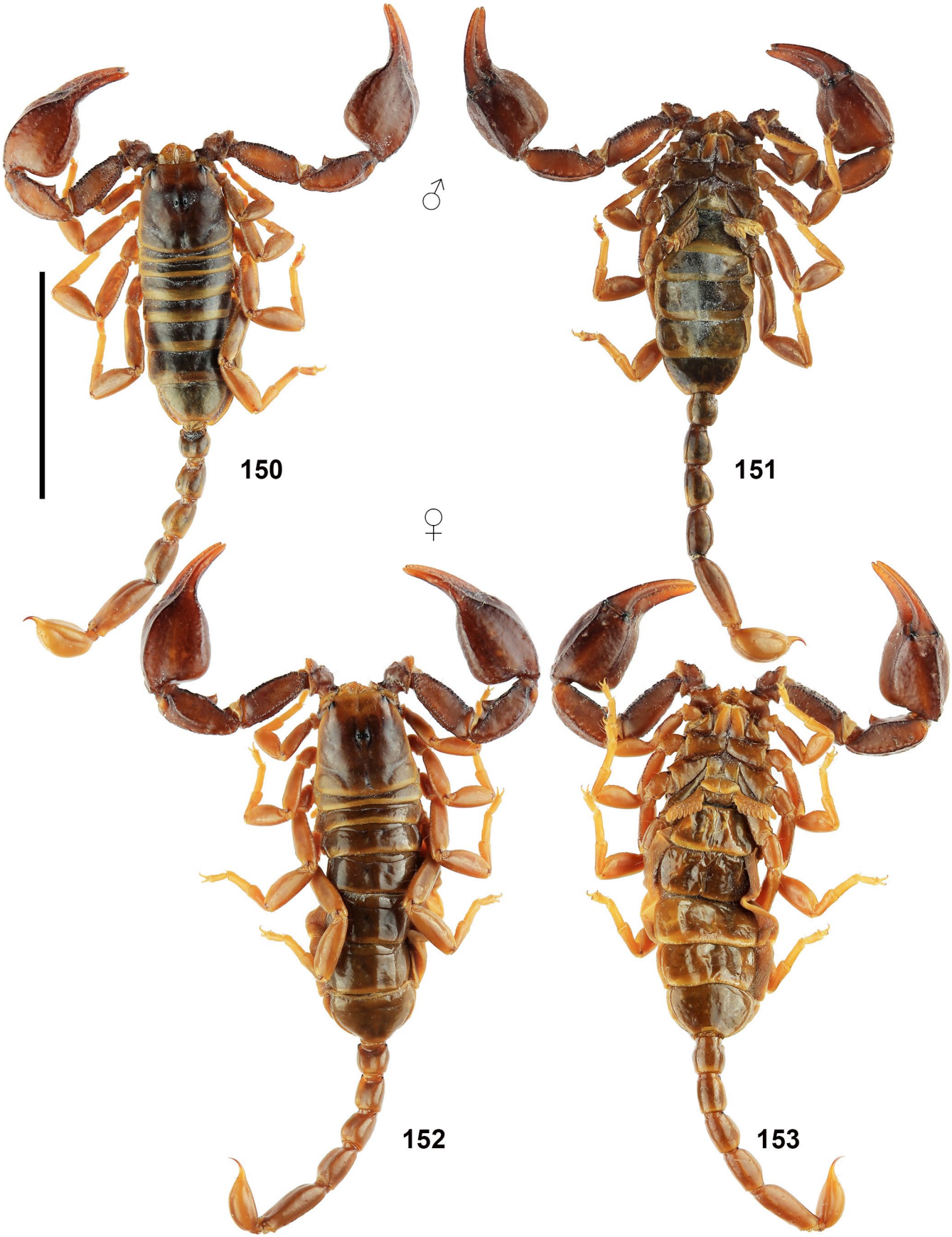
Pedipalps (Figs. 134–148). Pedipalps very sparsely hirsute. Patella with 24 (4*eb*, 4eb_a, 2*esb*, 4*em*, 4*est*, 6*et*) external and 8–9 (3 x 8, 1 x 9) ventral trichobothria. Chela with 4 ventral trichobothria, of which V_4 is located on external surface near Eb_1. Female paratype has additional trichobothrium eb_a on chela external surface (Fig. 142), which is absent in male holotype. Femur and patella are granulated, femur roughly and patella finely. Femur has granulated developed carinae; ventroexternal carina is incomplete to missing. Patella with 5 complete carinae including irregular wide externomedian. DPS weak to moderate. Manus dorsally with fine, rounded granules, which do not form median carina; only five chelal carinae are developed. Male with pedipalp fingers type C, weakly undulate, similar ar females.

Legs (Figs. 123–125). Both pedal spurs present on all legs, lacking spinelets; tibial spurs absent. Tarsus with single row of spinules on ventral surface, terminating distally with two essentially adjacent spinules.

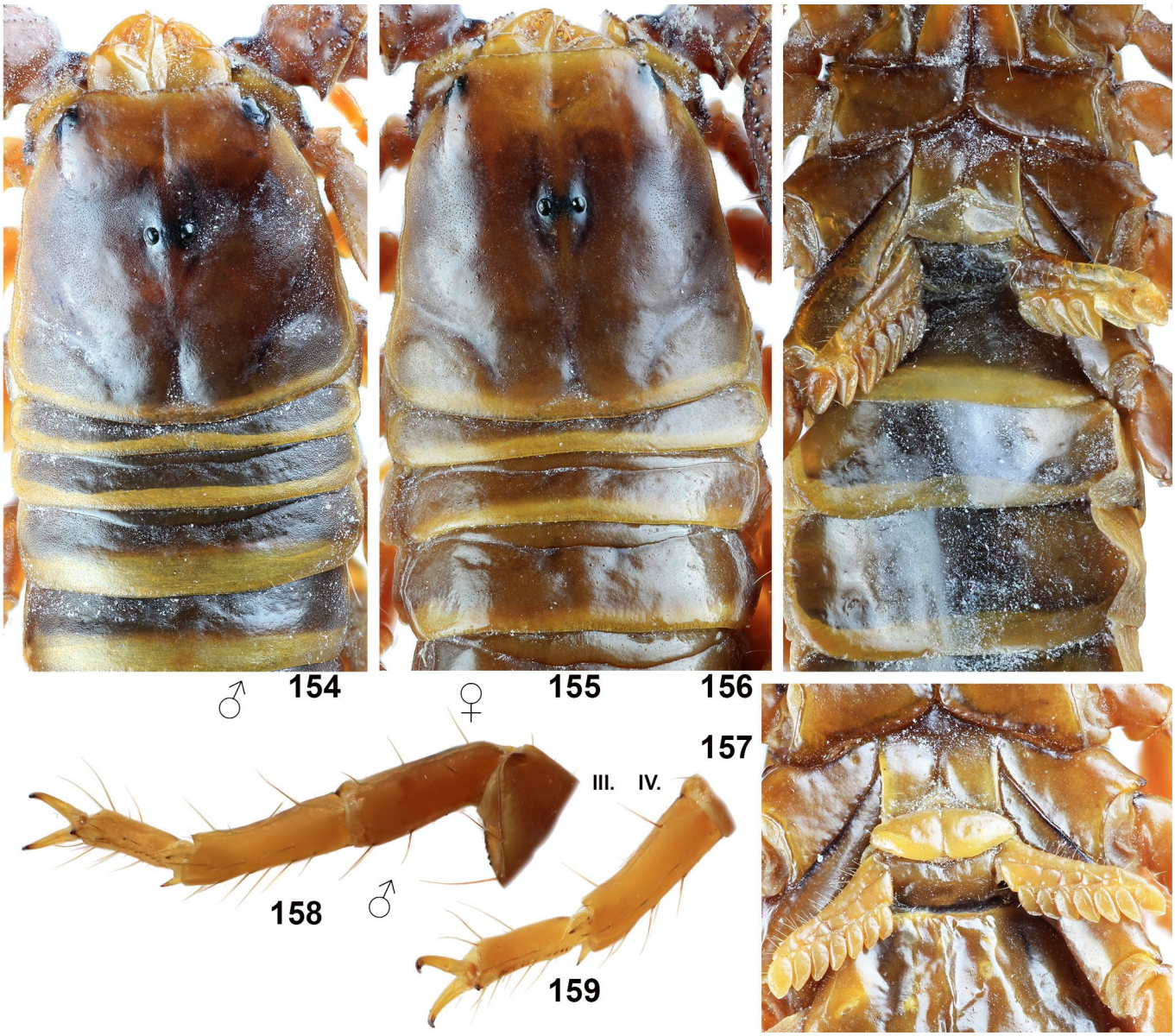
Measurements. See Table 3.

Affinities. The combination of four characters (pedipalp patellar external trichobothria numbers: 4*eb*, 4eb_a; metasoma IV length/width ratio 1.6–1.8; male with pedipalp fingers type C and female with fingers undulate; and metasoma II–IV densely (roughly) granulated including lateral surface) is unique in the entire genus *Euscorpius*.

Distribution. Serbia (Fig. 184).



Figures 150–153: *E. scheraboni* **sp. n. Figures 150–151**. Male holotype in dorsal (150) and ventral (151) views. **Figures 152–153**. Female paratype in dorsal (152) and ventral (153) views. Scale bar: 10 mm.



Figures 154–159: *E. scheraboni* **sp. n. Figures 154**, **156**, **158–159**. Male holotype, carapace and tergites I–IV (154), coxosternal area and sternites III–V (156), left legs III–IV, retrolateral aspect (158–159 respectively). **Figures 155**, **157**. Female paratype, carapace and tergites I–III (155), coxosternal area (157).

Euscorpius scheraboni sp. n.

(Figures 150–184, Table 3)

http://zoobank.org/urn:lsid:zoobank.org:act:487753D8-3E57-45C6-B783-4B33969A4006

Euscorpius carpathicus (in part: Mt. Imittos (=Hymettos), Mt. Pentelikon): Kinzelbach, 1975: 33.

Euscorpius sp. "pale form": Fet et al., 2018: 129, fig. 6.

Type locality and type repository. **Greece**, Attiki, Mt. Imittos, near Athens, ca 37.95°N 23.74°E; FKCP.

Type material. **Greece**, Attiki, Mt. Imittos, near Athens, ca. 37.95°N 23.74°E, 2013, 4♂10♀ (holotype and paratypes), leg. Michael Misch; FKCP.

Etymology. The species epithet is a patronym honoring our colleague Bernhard Scherabon, the author of important early studies on the genus *Alpiscorpius* (Euscorpiidae) in Austria.

Diagnosis (♂♀). Total length 24–31 mm. Color reddish brown, legs and telson yellow to orange. Pedipalp patellar external trichobothria numbers: 4*eb*, 3–4eb_a, 2*esb*, 4*em*, 4*est*, 6*et*, ventral aspect of patella with 8 trichobothria. Pectinal teeth number 7–8 in males, 6–7 in females. Chelicerae yellow, without reticulation. Male with pedipalp fingers type C, female with fingers slightly undulate. Dorsal metasomal carinae on III–IV segments smooth. Dorsolateral metasomal carinae on II–IV segments absent. Ventrolateral metasomal carinae on II–IV segments present and smooth. Metasoma V ventrally with median carina absent. Chela length/width ratio, 2.3 in males

Figures 160–167: *E. scheraboni* **sp. n. Figures 160–163**. Female paratype, telson lateral (160), and metasoma and telson lateral (161), dorsal (162), and ventral (163) views. **Figures 164, 165–167**. Male holotype, telson lateral (164), and metasoma and telson lateral (165), dorsal (166), and ventral (167) views. Scale bars: 5 mm (161–163, 165–167).

Figures 168–**175**. *E. scheraboni* **sp**. **n**., male holotype, pedipalp segments. Chela dorsal (168), external (169) and ventral (170) views. Patella dorsal (171), external (172) and ventral (173) views. Trochanter and femur dorsal (174) and ventral (175) views.

Figures 176–183. *E. scheraboni* **sp. n.**, female paratype, pedipalp segments. Chela dorsal (176), external (177) and ventral (178) views. Patella dorsal (179), external (180) and ventral (181) views. Trochanter and femur dorsal (182) and ventral (183) views. Trichobothrial pattern is indicated by white circles.

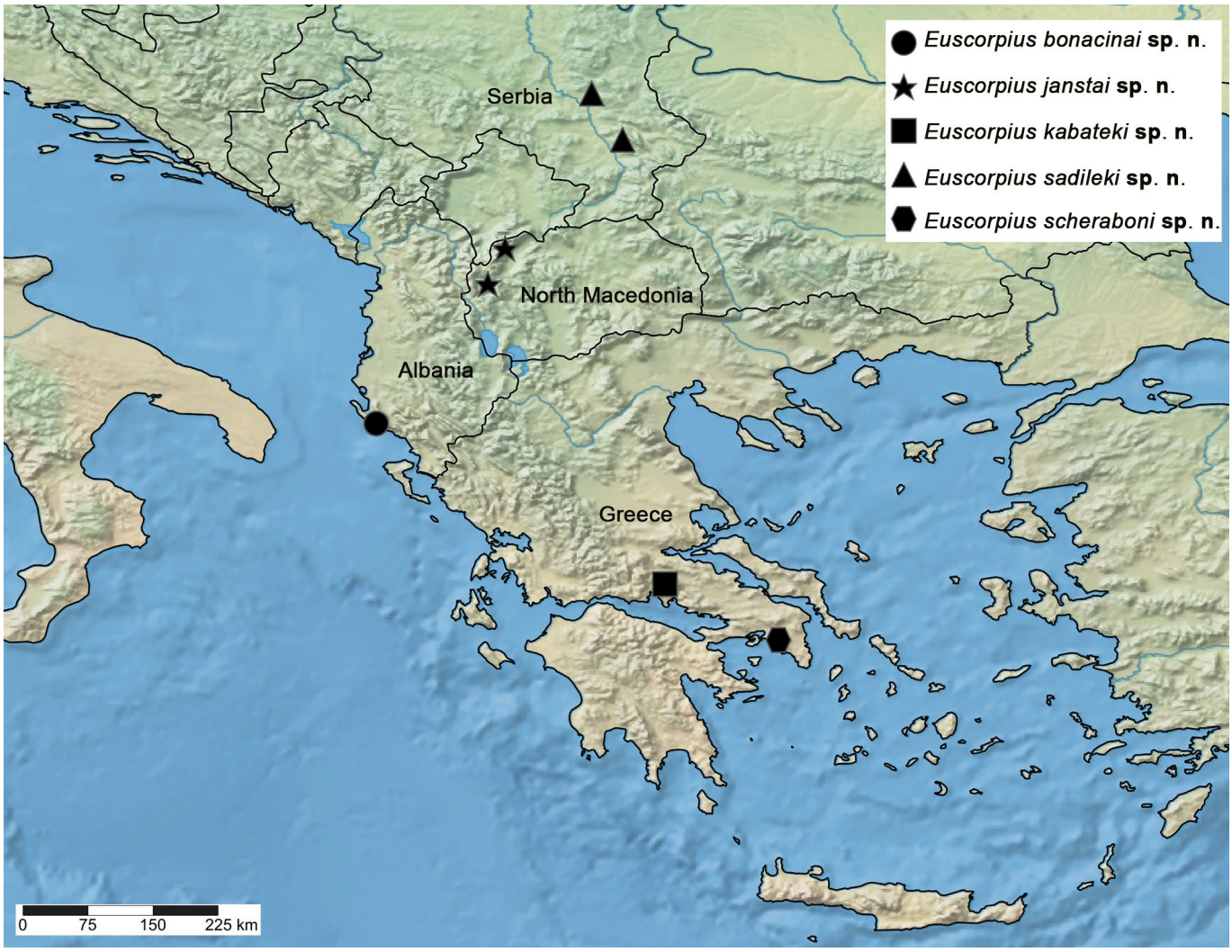


Figure 184. Map of distribution of five species described here.

and 2.5 in females. Metasoma IV length/width ratio, 2–2.15 in males and 1.9–2 in females. Telson length/depth ratio, 2.6–2.7 in males and 3–3.2 in females.

Description (♀♂). Total length about 24–31 mm in both sexes. The habitus is shown in Figs. 150–153. For position and distribution of trichobothria of pedipalps, see Figs. 176–182. Sexual dimorphism, see below in the description.

Coloration (Figs. 150–153). Base color uniformly reddish brown, legs and telson yellow to orange. Chelicerae yellow, without reticulation.

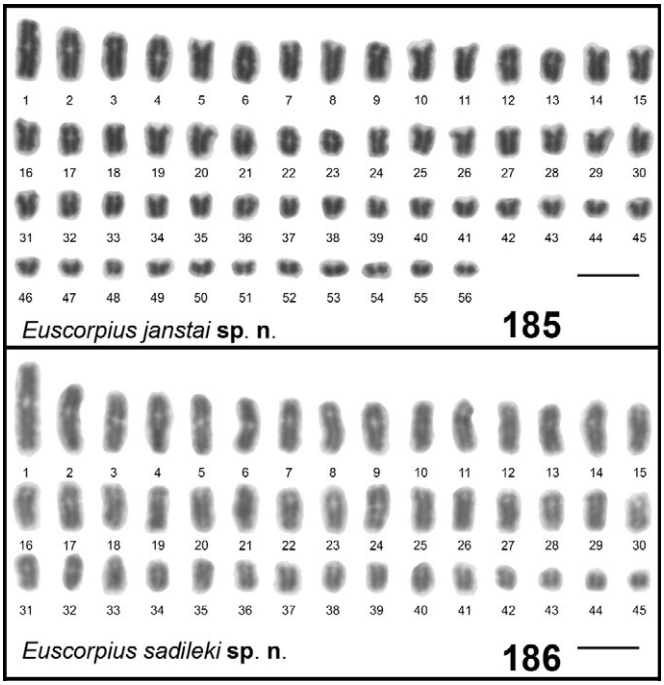
Carapace and mesosoma (Figs. 150–157). Carapace finely granulated with several smooth areas; carinae are absent. The anterior margin of the carapace is straight. Carapace with two lateral eyes. Tergites finely granulated (more in males), without developed carina. Tergite VII lacking lateral and median carinal pairs. Sternites III–VII smooth, lacking lateral and median carinae. Stigmata small, narrow ellipical. Pectinal teeth number 7–8 (4x7, 4x8) in males and 6–7 (3x6, 17x7) in females, fulcra are reduced. Pectines have three marginal lamellae and 4–5 middle lamellae.

Metasoma and telson (Figs. 160–167). Metasoma very sparsely hirsute. Metasoma I–IV smooth except several fine granules in dorsal surfaces, metasoma V very sparsely finely granulated, mainly in male. Dorsal metasomal carinae on I–V segments smooth; dorsolateral carinae absent; ventrolateral carinae smooth on segments I–IV and irregularly granulated on segment V. The entire metasoma without ventral median carina. Anal arch with small pigmented granules. Telson smooth, elongate in females and swollen in males, with annular ring indicated in females and developed in male. Aculeus short, more curved in male.

Pedipalps (Figs. 168–183). Pedipalps very sparsely hirsute. Patella with 23–24 (4*eb*, 3–4eb_a [4 x 3, 24 x 4] 2*esb*, 4*em*, 4*est*, 6*et*) external and 8 ventral trichobothria. Chela with 4 ventral trichobothria, of which V_4 is located on external surface near Eb_1. Femur is granulated in both sexes and patella in granulated in males and rather smooth in females. Femur has granulated developed carinae; ventroexternal carina is incomplete or missing. Patella with 5 complete carinae including irregular wide externomedian. DPS moderately developer. Manus smooth in females and finely granulated in males; dorsal median carina missing, other carinae smooth. Male with pedipalp fingers type C, female with fingers undulate.

Pair No.	*E. janstai* **sp. n.**, **2n=112** (20M+8SM+6ST+78T)		*E. sadileki* ***sp*. n.**, **2n=90** (16M+20SM+12ST+42T)	
	%DSL (±SD)	AR (±SD)	%DSL (±SD)	AR (±SD)
1	2.26 (±0.15)	1.41 (±0.25)	2.42 (±0.21)	1.12 (±0.09)
2	1.77 (±0.08)	1.69 (±0.56)	2.00 (±0.14)	1.94 (±0.29)
3	1.60 (±0.09)	≥7.00	1.74 (±0.09)	1.29 (±0.21)
4	1.57 (±0.11)	1.41 (±0.44)	1.70 (±0.21)	2.57 (±1.21)
5	1.50 (±0.09)	≥7.00	1.68 (±0.15)	1.42 (±0.20)
6	1.45 (±0.15)	1.25 (±0.22)	1.64 (±0.17)	1.24 (±0.22)
7	1.41 (±0.08)	≥7.00	1.52 (±0.10)	1.49 (±0.33)
8	1.37 (±0.05)	≥7.00	1.44 (±0.06)	3.27 (±1.11)
9	1.29 (±0.10)	5.44 (±0.86)	1.43 (±0.08)	1.94 (±0.44)
10	1.27 (±0.08)	≥7.00	1.40 (±0.08)	1.25 (±0.24)
11	1.23 (±0.09)	≥7.00	1.40 (±0.09)	≥7.00
12	1.21 (±0.03)	1.96 (±0.37)	1.32 (±0.08)	6.02 (±0.04)
13	1.20 (±0.13)	1.58 (±0.38)	1.30 (±0.07)	1.41 (±0.29)
14	1.18 (±0.07)	≥7.00	1.29 (±0.08)	2.20 (±0.22)
15	1.13 (±0.07)	≥7.00	1.27 (±0.07)	≥7.00
16	1.08 (±0.08)	1.86 (±0.64)	1.24 (±0.08)	≥7.00
17	1.07 (±0.05)	1.21 (±0.26)	1.20 (±0.06)	2.02 (±0.42)
18	1.06 (±0.06)	≥7.00	1.20 (±0.05)	≥7.00
19	1.04 (±0.05)	≥7.00	1.20 (±0.06)	≥7.00
20	1.02 (±0.06)	≥7.00	1.15 (±0.05)	≥7.00
21	1.01 (±0.06)	≥7.00	1.14 (±0.04)	≥7.00
22	0.99 (±0.04)	1.31 (±0.13)	1.13 (±0.05)	6.31 (±2.23)
23	0.95 (±0.04)	1.47 (±0.16)	1.12 (±0.07)	≥7.00
24	0.94 (±0.01)	≥7.00	1.12 (±0.14)	1.38 (±0.27)
25	0.94 (±0.03)	≥7.00	1.11 (±0.05)	≥7.00
26	0.92 (±0.06)	≥7.00	1.11 (±0.04)	≥7.00
27	0.91 (±0.04)	≥7.00	1.06 (±0.06)	≥7.00
28	0.90 (±0.22)	1.53 (±0.37)	1.01 (±0.06)	3.10 (±1.15)
29	0.89 (±0.05)	≥7.00	0.97 (±0.08)	≥7.00
30	0.88 (±0.08)	≥7.00	0.96 (±0.08)	6.49 (±2.56)
31	0.82 (±0.01)	≥7.00	0.93 (±0.06)	3.99 (±1.86)
32	0.78 (±0.09)	≥7.00	0.92 (±0.07)	1.81 (±0.27)
33	0.76 (±0.04)	3.11 (±0.47)	0.86 (±0.08)	≥7.00
34	0.72 (±0.05)	≥7.00	0.78 (±0.07)	1.90 (±0.73)
35	0.70 (±0.04)	6.24 (±0.59)	0.77 (±0.07)	≥7.00
36	0.70 (±0.04)	2.62 (±1.14)	0.72 (±0.07)	≥7.00
37	0.66 (±0.04)	≥7.00	0.70 (±0.07)	5.03 (±4.80)
38	0.61 (±0.03)	≥7.00	0.65 (±0.04)	≥7.00
39	0.59 (±0.05)	≥7.00	0.65 (±0.04)	≥7.00
40	0.57 (±0.05)	≥7.00	0.62 (±0.05)	≥7.00
41	0.55 (±0.04)	≥7.00	0.58 (±0.07)	≥7.00
42	0.55 (±0.03)	≥7.00	0.45 (±0.06)	1.91 (±0.47)
43	0.54 (±0.01)	≥7.00	0.43 (±0.06)	1.88 (±0.48)
44	0.53 (±0.05)	≥7.00	0.40 (±0.06)	≥7.00
45	0.50 (±0.02)	2.31 (±0.34)	0.31 (±0.10)	≥7.00
46	0.49 (±0.03)	≥7.00		
47	0.47 (±0.04)	≥7.00		
48	0.44 (±0.03)	≥7.00		
49	0.43 (±0.05)	≥7.00		
50	0.42 (±0.04)	1.32 (±0.21)		
51	0.41 (±0.02)	≥7.00		
52	0.40 (±0.03)	≥7.00		
53	0.38 (±0.05)	≥7.00		
54	0.36 (±0.06)	≥7.00		
55	0.34 (±0.05)	≥7.00		
56	0.32 (±0.06)	≥7.00		

Table 4. Measurements of the relative diploid set length (%DSL) and arm ratio (AR) of chromosomes (including standard deviation ±SD) of *Euscorpius janstai* **sp. n.** and *E. sadileki* **sp. n.** Abbreviations: M – metacentric, SM – submetacentric, ST – subtelocentric, T – telocentric.



Figures 185–186. Male karyotypes of *E. janstai* **sp. n.** (185), and *E. sadileki* **sp. n.** (186) based on postpachytene. Scale bar: 10 μm.

Legs (Figs. 158–159). Both pedal spurs present on all legs, lacking spinelets; tibial spurs absent. Tarsus with single row of spinules on ventral surface, terminating distally with two essentially adjacent spinules.
Measurements. See Table 3.

Affinities. The combination of five characters (pedipalp patellar external trichobothria numbers: 4*eb*, 3–4eb_a; metasoma IV length/width ratio 1.9–2.15; male with pedipalp fingers type C; metasoma II–IV smooth; and metasoma V ventrally without median carina) is unique in the entire genus *Euscorpius*.

Comments. This species, found within the city limits of Athens, quite surprisingly, was never systematically collected. Fet et al. (2018: 129) recognized it as an undescribed species that "inhabits the urban zone of Athens, including mountain ranges of Imittos, Pentelikon, and Parnitha". No DNA data are available for this species. An interesting reduction of trichobothrial number from 4 to 3 in eb_a series is present in some specimens (14.3% of pedipalps scored, n=28), a trend that is independently observed in the closely related genus *Alpiscorpius* (see Kovařík et al., 2019).

Distribution. Greece (Fig. 184).

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