Euscorpius

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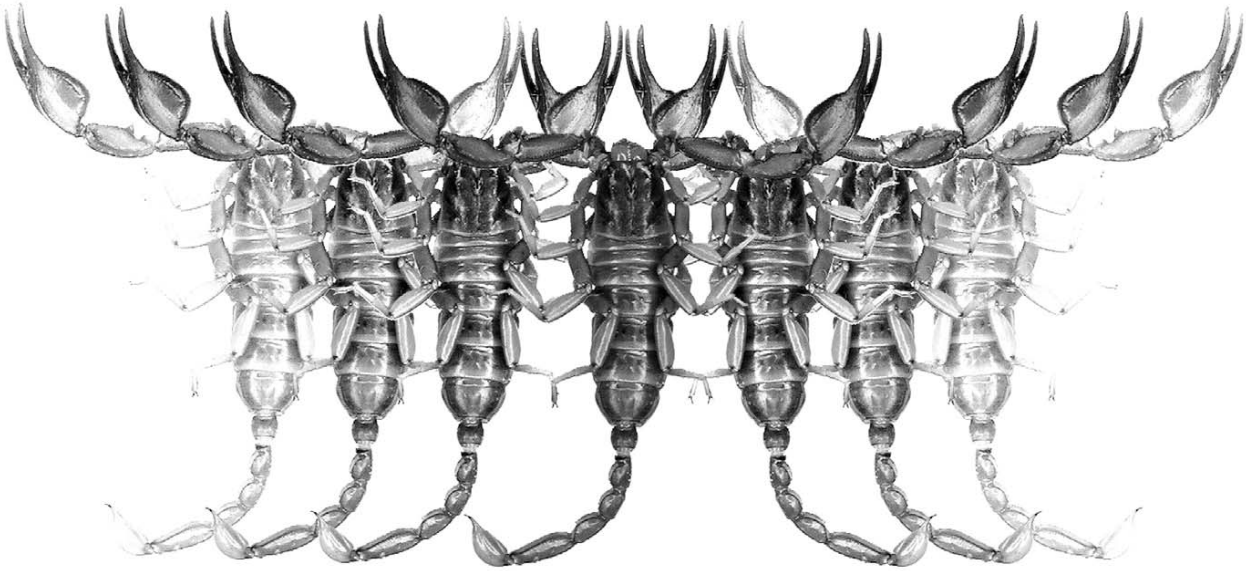

Scorpions of the Horn of Africa (Arachnida: Scorpiones). Part XIX. *Pandiborellius meidensis* (Karsch, 1879) and *Pandinurus fulvipes* sp. n. (Scorpionidae) from Somaliland.

František Kovařík, Graeme Lowe & Tomáš Mazuch

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Euscorpius — Occasional Publications in Scorpiology. 2019, No. 275

Scorpions of the Horn of Africa (Arachnida: Scorpiones). Part XIX. *Pandiborellius meidensis* (Karsch, 1879) and *Pandinurus fulvipes* sp. n. (Scorpionidae) from Somaliland.

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Summary

The male of *Pandiborellius meidensis* (Karsch, 1879) is introduced for the first time and illustrated in detail with color photos, and sexual dimorphism and occurrence of the species are discussed. *Pandinurus fulvipes* **sp**. **n**. from Somaliland is described and fully complemented with color photos of live and preserved specimens, as well as of its habitat.

Introduction

Two of the authors (F. K. and T. M.) had the opportunity to participate in two expeditions to the Erigavo region in Somaliland and traveled on the road from Karim village (2100 m a.s.l.) to Maid village located directly on the coast by the sea (see Fig. 84). These two sites are separated by only 40 km by air, but the intervening altitudinal transect is characterized by dramatic shifts in environment and local ecology, marked by changing floristic and faunistic complexes comprised mostly of local endemics. In this paper, we study two members of the endemic scorpion fauna. We introduce the male of *Pandiborellius meidensis*, a poorly known species that was first described from the area, and discuss its distribution. We also describe a new species, *Pandinurus fulvipes* **sp**. **n**., which apparently inhabits a higher elevation zone above the presumed range of *Pandiborellius meidensis*. However, the exact distribution of both species is still unclear, and awaits elucidation by more extensive fieldwork in the area.

Methods, Material & Abbreviations

Nomenclature and measurements follow Stahnke (1971), Kovařík (2009), and Kovařík & Ojanguren Affilastro (2013), except for trichobothriotaxy (Vachon, 1974) and hemispermatophore (Kovařík et al., 2018).

Specimens used for this study were collected and imported with permissions from Erigavo and Hargeisa Universities and the Ministry of the Environment of the Republic of Somaliland. Specimens studied herein were preserved in 80% ethanol, or are maintained in live culture in the first authors (FKCP) collection. *Depositories*: FKCP (František Kovařík, private collection, Prague, Czech Republic); GLPC (Graeme Lowe, private collection, Philadelphia, USA); ZMHB (Museum für Naturkunde der Humboldt-Universität, Berlin, Germany).

Systematics

Family Scorpionidae Latreille, 1802
Subfamily Scorpioninae Latreille, 1802

Pandiborellius meidensis (Karsch, 1879)
(Figs. 1–42, 84, Table 1)

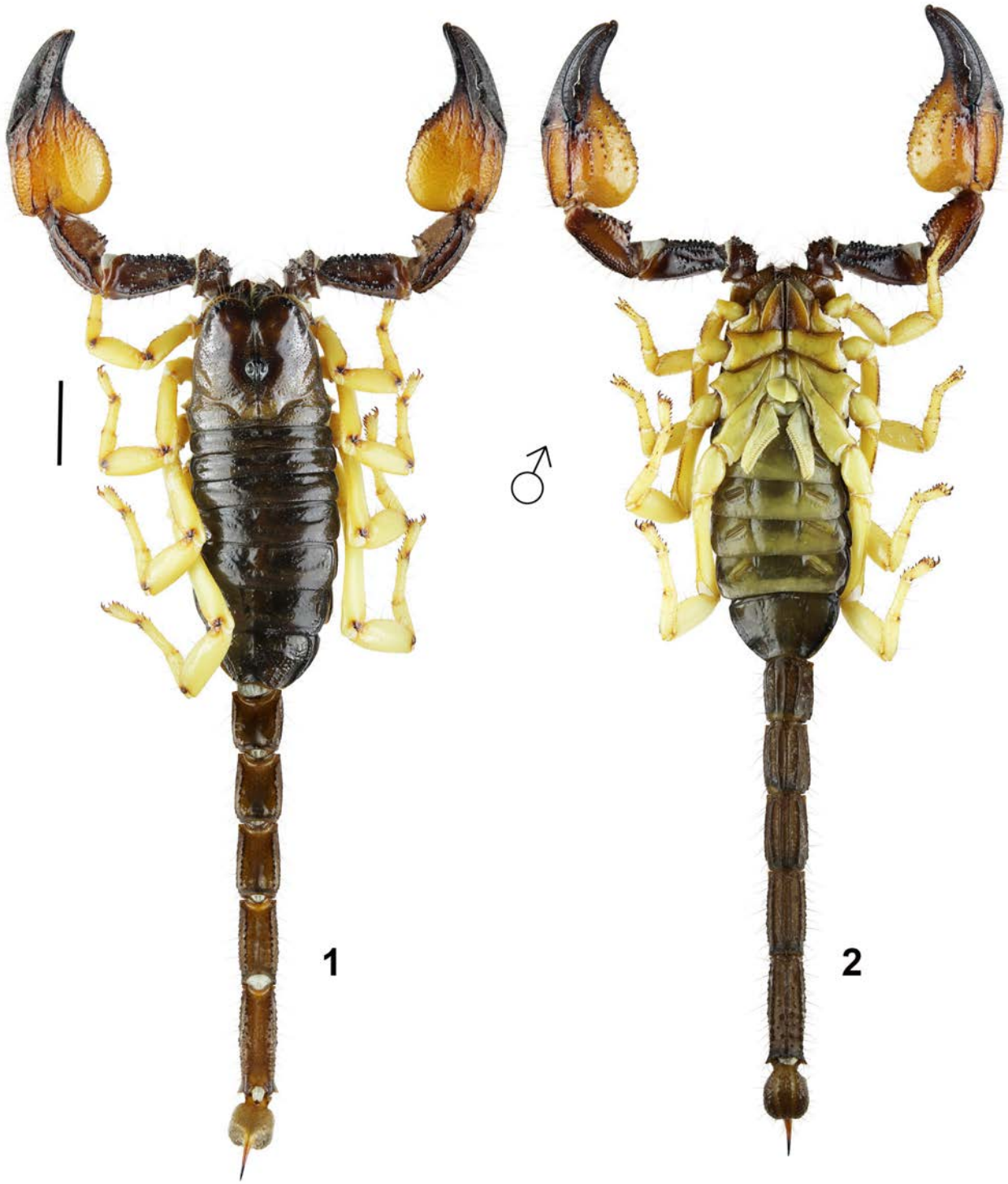
Pandinus meidensis Karsch, 1879: 127.
Pandinus (*Pandinurus*) *meidensis*: Vachon, 1974: 953; Fet, 2000: 472; Kovařík, 2003: 152 (in part); Kovařík, 2009: 55 (in part).
Pandinurus (*Pandipavesius*) *meidensis*: Rossi, 2015d, 42–44.
Pandiborellius meidensis: Kovařík et al., 2017: 34–35, figs. 20, 114–125, 396 (complete reference list until 2017).

Type locality and type repository. Somaliland, Meid; ZMHB.

Type material examined. **Somaliland**, Meid (see comments below), 1♀, II.1875, leg. J. M. Hildebrandt (holotype, Figs. 3–9, 24–27), ZMHB No. 3018.

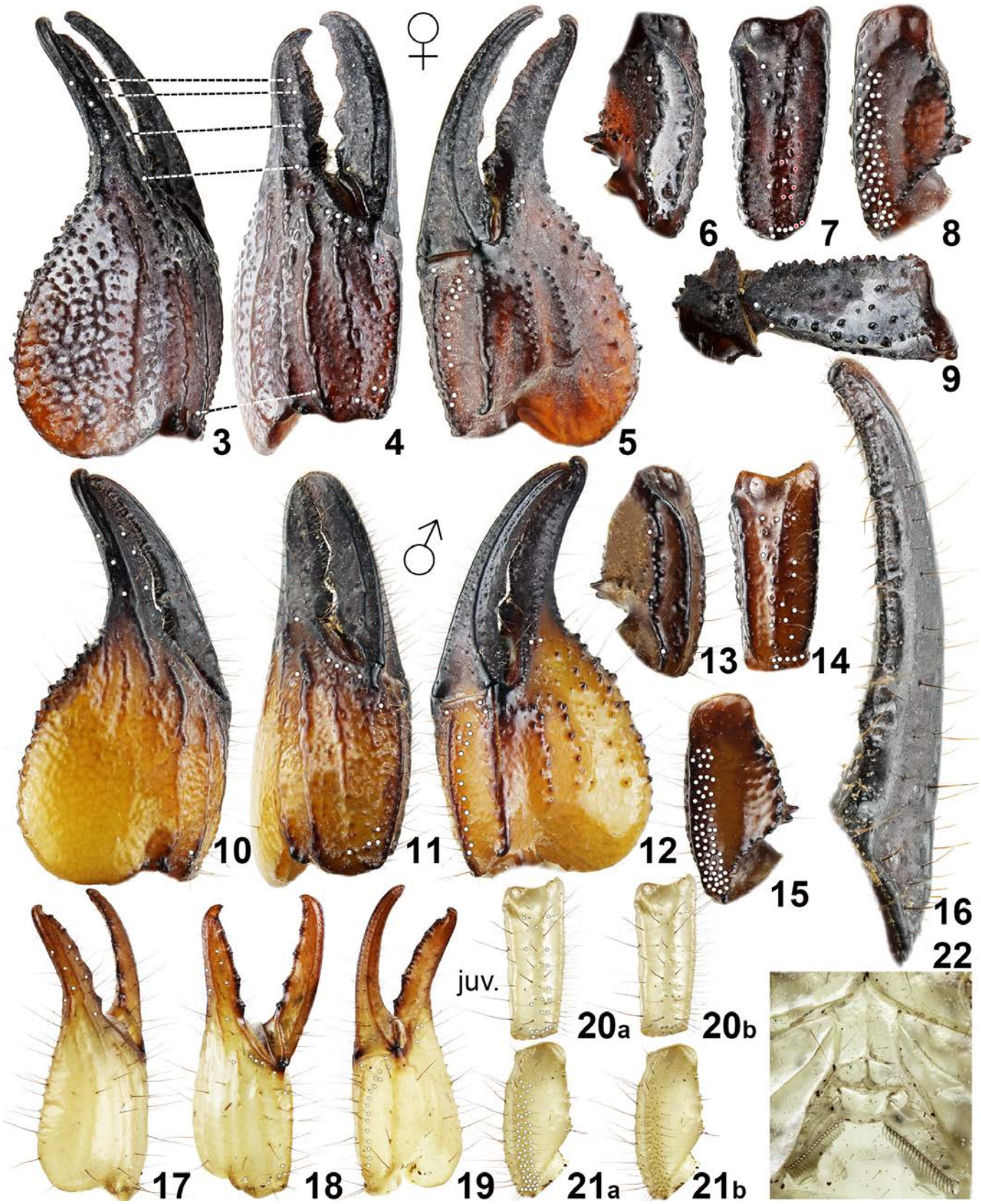
Additional material examined. **Somaliland**, vicinity of Rugay village, ca 30 km SE from Maid, 10°52'08"N 47°17'47"E, 422 m a. s. l. (Locality No. **17SM**, Fig. 41), 3.IX.2017, 1juv. (ecdysis 14.XII.2017, Figs. 17–22, 31–32), leg. F. Kovařík and T. Mazuch, FKCP; Rugay village, 10°50'46"N 47°18'23"E, 428 m a. s. l. (Locality No. **18SE**, Fig. 42), 24.VIII.2018, 1♂ (Figs. 1–2, 10–16, 23, 28–30, 33–40), leg. F. Kovařík, P. Frýdlová and D. Frynta, FKCP.

Emended Diagnosis. Total length 90–115 mm. Base color reddish black, legs yellow, telson and chela manus orange to yellowish brown, lighter-colored than body. Chelicerae

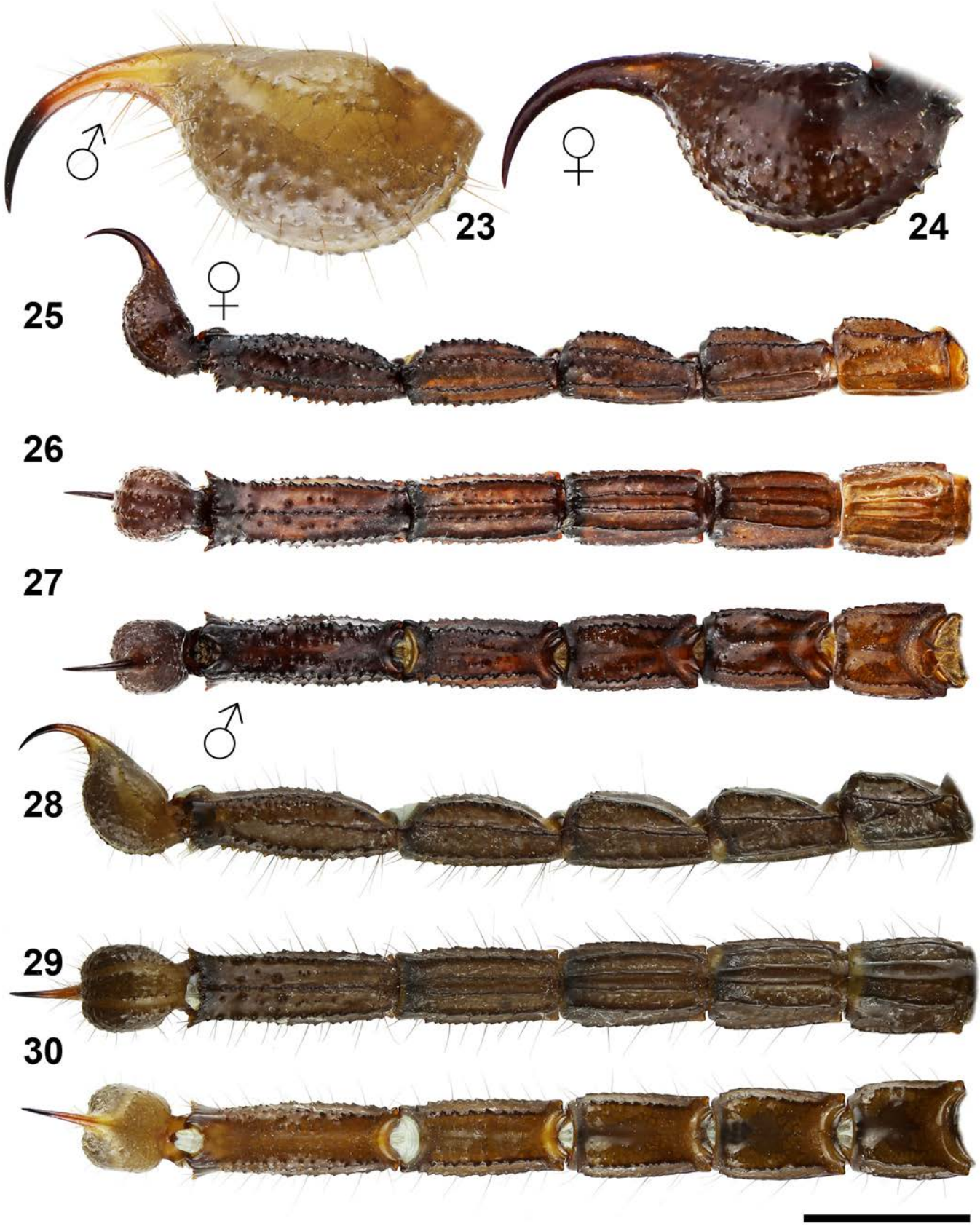


Figures 1–2: *Pandiborellius meidensis*, male in dorsal (1) and ventral (2) views. Scale bar: 10 mm.

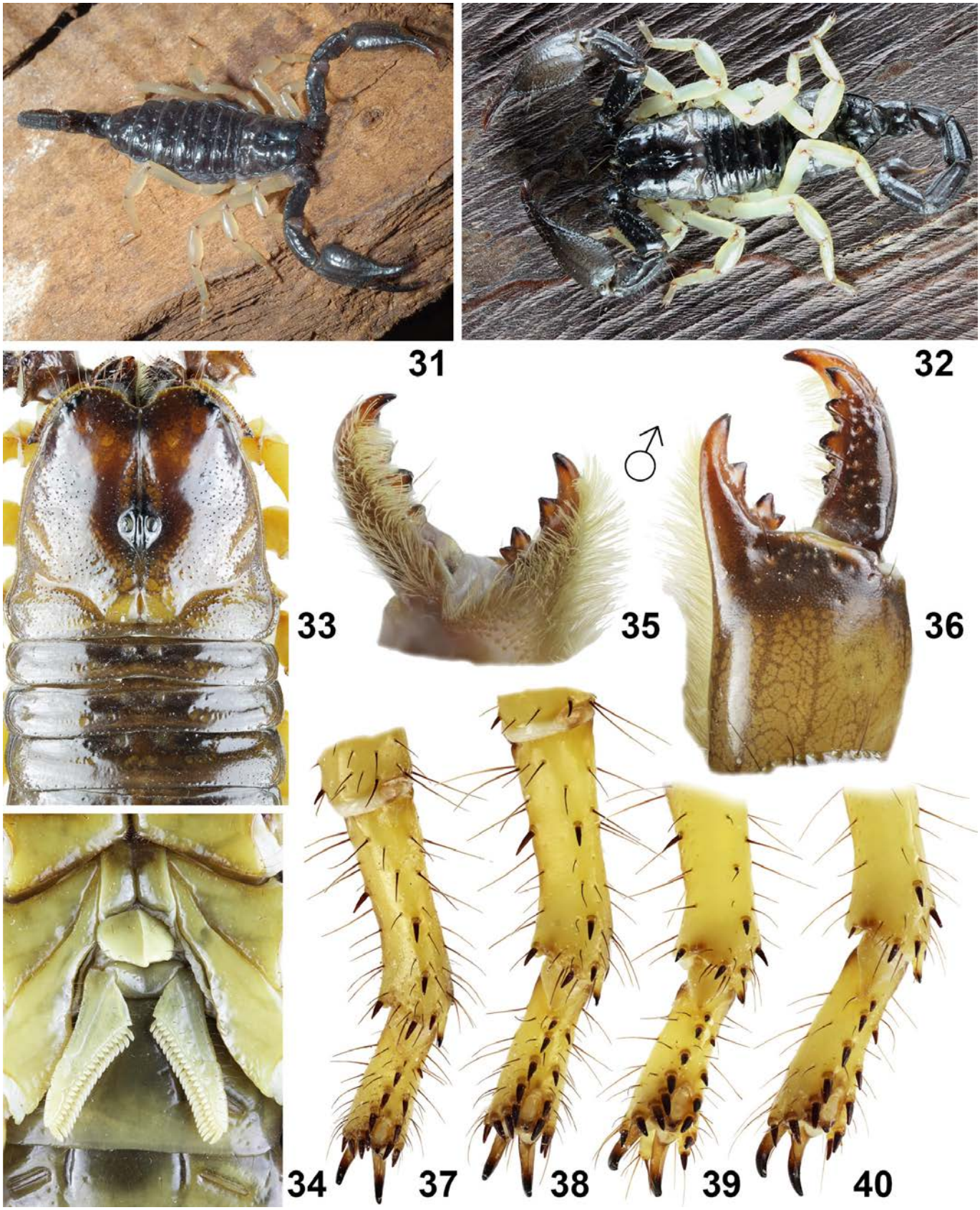
brown, reticulate, with black fingers and anterior margins. Carapace lacking carinae and finely granulated. External trichobothria on patella number 17–20 (6–7 *eb*, 5–7 *esb*, 2 *em*, 1 *est*, 3 *et*); ventral trichobothria on patella number 48–57; internal trichobothria on chela number 2 or 3, ventral trichobothria on chela number 13–16. Pedipalp chela dorsally tuberculate. Dorsoexternal surface of chela with five smooth carinae present. Chela internally with two longitudinal carinae covered by granules. Pectinal teeth number 20–24 in both sexes. Male has larger telson than female. Dorsal carinae on first through fourth metasomal segments granulate and terminate in a larger denticle most conspicuous on fourth segment. Spiniform formula of tarsomere II = 8/5-6: 8-9/6: 8-9/6-7: 7-9/5-7. Tarsomere II usually with 3 spines on inclined anteroventral surface.



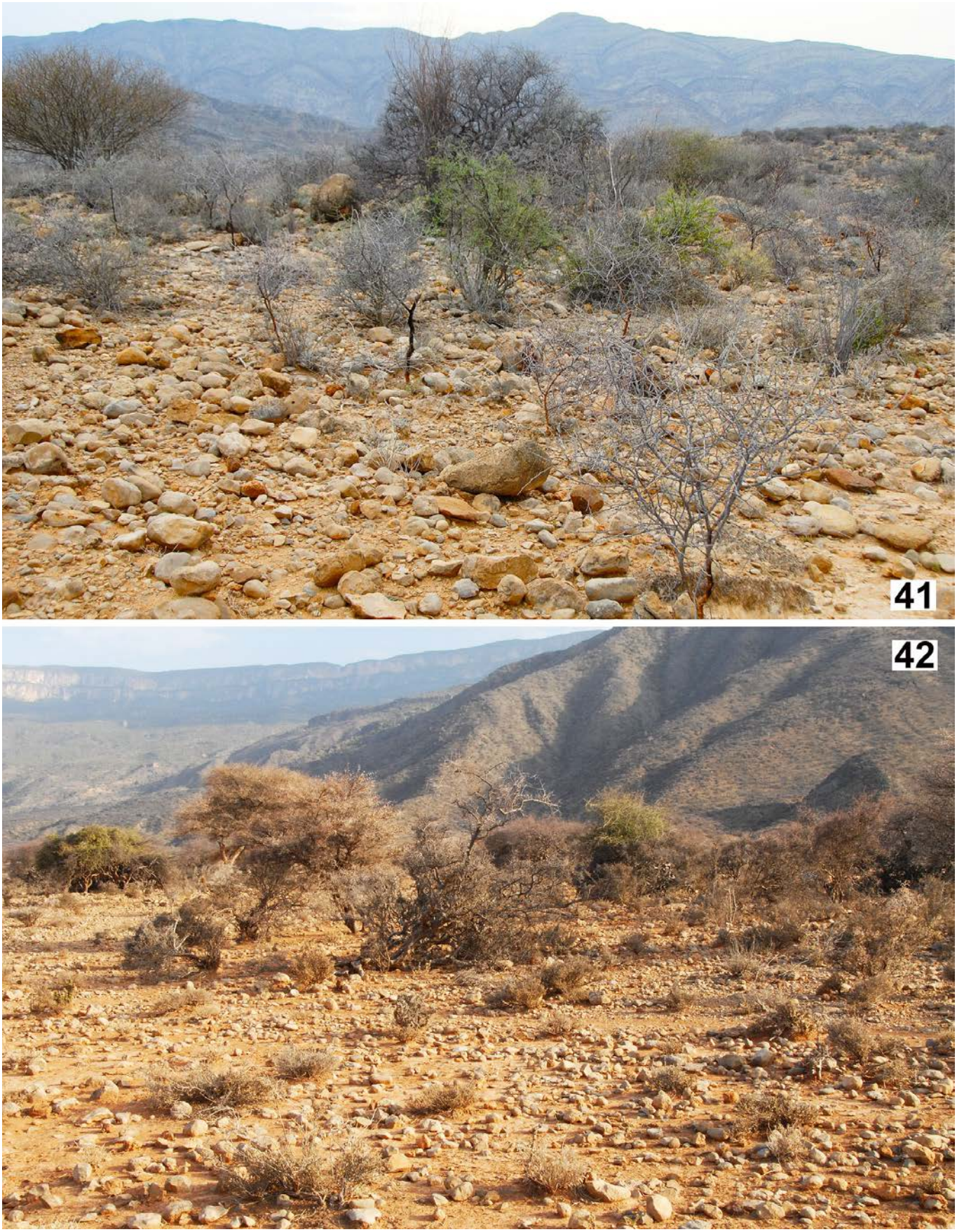
Figures 3–**22**: *Pandiborellius meidensis*. **Figures 3**–**21.** Pedipalp segments of female holotype (3–9), male (10–16), and exuvia of juvenile (17–21). Chela dorsal (3, 10, 17), external (4, 11, 18) and ventrointernal (5, 12, 19). Femur dorsal (9). Patella dorsal (6, 13), external (7, 14, 20) and ventral (8, 15, 21). Movable finger dentate margin (16). The trichobothrial pattern is indicated except Figures 20b and 21b (white circles; external additional trichobothria are indicated in Figures 4 and 7 by red circles). **Figure 22.** Exuvia of juvenile, coxosternal area.



Figures 23–30: *Pandiborellius meidensis*, metasoma and telson. **Figures**. **23, 28–30**. Male, telson lateral (23), metasoma and telson lateral (28), ventral (29), and dorsal (30) views. **Figures 24–27**. Female holotype, telson lateral (24), metasoma and telson lateral (25), ventral (26), and dorsal (27) views. Scale bar: 10 mm (25–30).



Figures 31–40: *Pandiborellius meidensis*. **Figures 31–32**. Juvenile before (31) and after ecdysis (32)**. Figures 33–40.** Male, carapace and tergites I–III (33), coxosternal area and sternites III–IV (34), chelicerae ventral (35) and dorsal (36) views. tarsomeres I and II of legs I–IV, retrolateral views (37–40).



Figures 41–42: *Pandiborellius meidensis*, locality 17SM (41) and 18SE (42).

Dimensions (MM)		*Pandiborellius meidensis* ♂	*Pandinurus fulvipes* **sp. n.** ♂ **holotype**	*Pandinurus fulvipes* **sp. n.** ♀ **paratype**
Carapace	L / W	17.4 / 18.9	16.2 / 17.5	15.0 / 16.4
Mesosoma	L	34.40	25.00	33.40
Tergite VII	L / W	7.24 / 14.4	7.62 / 14.0	6.05 / 12.9
Metasoma + telson	L	61.38	63.45	53.92
Segment I	L / W / D	7.76 / 6.53 / 5.17	7.98 / 7.14 / 5.27	6.84 / 6.19 / 4.99
Segment II	L / W / D	8.60 / 5.61 / 4.94	8.84 / 6.06 / 5.90	7.34 / 5.47 / 5.09
Segment III	L / W / D	9.22 / 5.40 / 4.89	9.83 / 5.96 / 5.49	8.11 / 5.07 / 4.62
Segment IV	L / W / D	10.5 / 5.00 / 4.59	11.0 / 5.35 / 5.25	9.13 / 4.64 / 4.56
Segment V	L / W / D	13.3 / 4.80 / 4.52	13.5 / 4.86 / 5.12	11.3 / 4.30 / 4.51
Telson	L / W / D	12.0 / 5.64 / 5.10	12.3 / 5.93 / 5.35	11.2 / 4.31 / 5.33
Pedipalp	L	52.90	53.60	47.80
Femur	L / W	13.1 / 6.08	12.6 / 5.71	11.2 / 5.16
Patella	L / W	13.3 / 6.76	13.2 / 6.91	11.9 / 5.21
Chela	L	25.50	27.80	24.70
Manus	W / D	12.5 / 9.11	14.8 / 8.30	13.5 / 8.35
Movable finger	L	15.70	18.20	16.13
Total	**L**	**113**	**104.65**	**102.32**

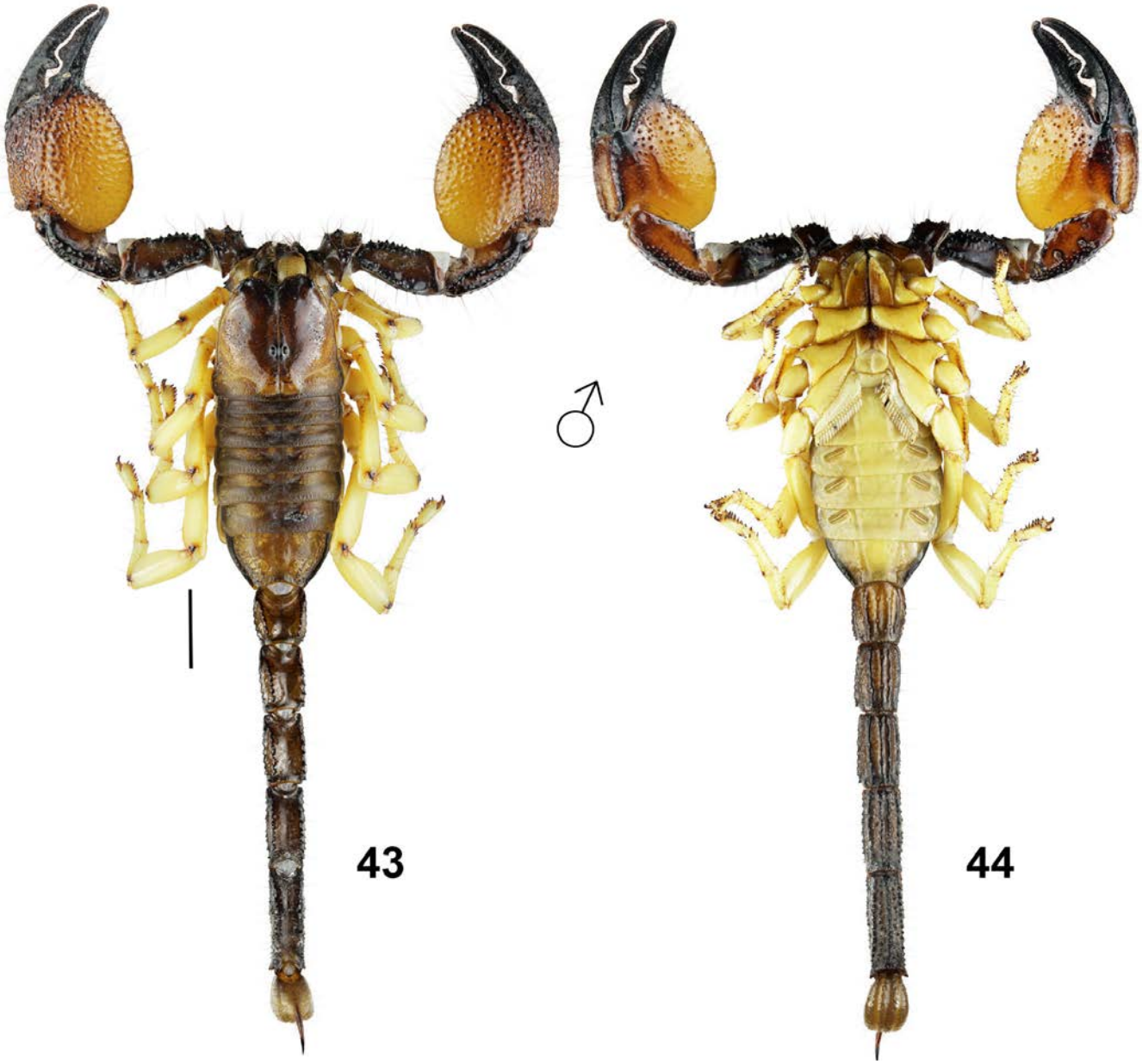
Table 1. Comparative measurements of male of *Pandiborellius maidensis* and types of *Pandinurus fulvipes* **sp. n.** from type locality Abbreviations: length (L), width (W, in carapace it corresponds to posterior width), depth (D).

Locality Comments. *P. meidensis* was based on a sole female from Somaliland, Maid (also spelt Meid, Maidh, Mait, Meith, Maydh, or Mayd) by Karsch in 1879. Pavesi (1895: 39) cited another specimen from Somalia, Ogaden collected in 1891, but we have not studied the specimen and we presume that it is a misidentification. Kovařík (2003: 152), Kovařík & Whitman (2005: 114), and Kovařík et al. (2017: 35) cited other specimens from Somalia (Sar Uanle; Chisimayo; Oasi di Galgala). Specimens from Somalia, Puntland, Oasi di Galgala were described as *Pandiborellius lanzai* (Rossi, 2015). The taxonomic position of other specimens from Somalia (Sar Uanle; Chisimayo) is uncertain and the accuracy of the locality labels has not been confirmed, so we did not address those specimens here. Maid, the type locality of *P. meidensis*, was indicated in a published map (fig. 396, Kovařík et al., 2017: 99) marked by a "green circle" instead of "orange circle" [*print error*].

When the first author (F. K.) visited Maid village, the type locality of *P. meidensis*, in 2017 and 2018, he considered it unlikely that a species of the genus *Pandiborellius* could inhabit the area. Maid village lies in the Guban area which is one of the hottest and driest areas along the sea coast in Somaliland with temperatures routinely exceeding 50° C (see fig. 38 in Kovařík, 2018: 8). The herein cited male and juvenile of *P. meidensis* were collected by the first author together with Tomáš Mazuch, Petra Frýdlová and Daniel Frynta in the vicinity of Rugay village, ca 30 km SE of Maid above 400 m a. s. l. (Figs. 41–42), where the recorded temperature was close to under 40° C. We believe that Hildebrandt collected the female holotype in this area and labeled it Maid because it was the nearest "larger" village. This is consistent with the fact that Karsch (1879: 127) cited "2000 alt." (= ca. 610 m a. s. l.) for the locality. More information was cited by Beentje (1998) where on page 843: "*In February 1875 Johannes Maria Hildebrandt visited Meith, Meid or Mait in the region of the 'Habr-Gehardyis-Somal' or 'Habr Gerhagis' and then visited the Serrut Mts* (*N of Erigavo*) *where he collected more than 200 plants and found many new taxa.*…" and on page 855: "*Maid* (*Maydh, 10°58'N 47°05'E. Note: a costal town, but collecting range from sea level to 1500 m so probably more of an area than a site*)*, Somalia 1875*". We can add the data that Maid village is at an elevation of ca. 50 m a. s. l., Rugay village at ca. 430 m a. s. l., and Mader Mage village at ca. 1200 m a. s. l.

Taxonomic remarks. *P. meidensis* was based solely on the holotype female. The male described herein is the first known male belonging to this species. Sexual dimorphism is one of the important characters in the taxonomy of *Pandinus* sensu lato, and Rossi (2015: 43) incorrectly assumed that the male of *P. meidensis* exhibits pronounced sexual dimorphism in the dentiform lobes of the pedipalp movable finger (*presenta il dimorfismo sessuale espresso da un dente pronunciato sul dito mobile del pedipalpo*) and incorrectly transfered *P. meidensis* to the subgenus *Pandipavesius* Rossi, 2015 (now in synonymy with *Pandiborellius*) entirely according to this speculation. In fact, *P. meidensis* lacks sexual dimorphism in this character (see Fig. 4 versus Fig. 11), and the sexes differ only in the development of the telson which is larger in the male than in the female (Figs. 23–24). Pectinal tooth count is 22–24 in the female, 20–22 in the male and 21 in the juvenile. There is some variability in the trichobothrial pattern (Figs.

3–21): in the female holotype there is an additional *Est* chelal trichobothrium (Fig. 4) that absent in both other specimens; chelal internal trichobothria are two in female and male, but three in the juvenile (Fig. 19); chelal ventral trichobothrial number is 13 in female, 14 in male, and 16 in juvenile; patella external trichobothrial number is 20 (7 *eb*, 7 *esb*, 2 *em*, 1 *est*, 3 *et*) in female, 17 (6 *eb*, 5 *esb*, 2 *em*, 1 *est*, 3 *et*) in male, and 19 (7 *eb*, 6 *esb*, 2 *em*, 1 *est*, 3 *et*) in juvenile; patella ventral trichobothria in number is 48 in female, 57 in male and juvenile.



Figures 43–44: *Pandinurus fulvipes* **sp. n.**, male holotype in dorsal (43) and ventral (44) views. Scale bar: 10 mm.

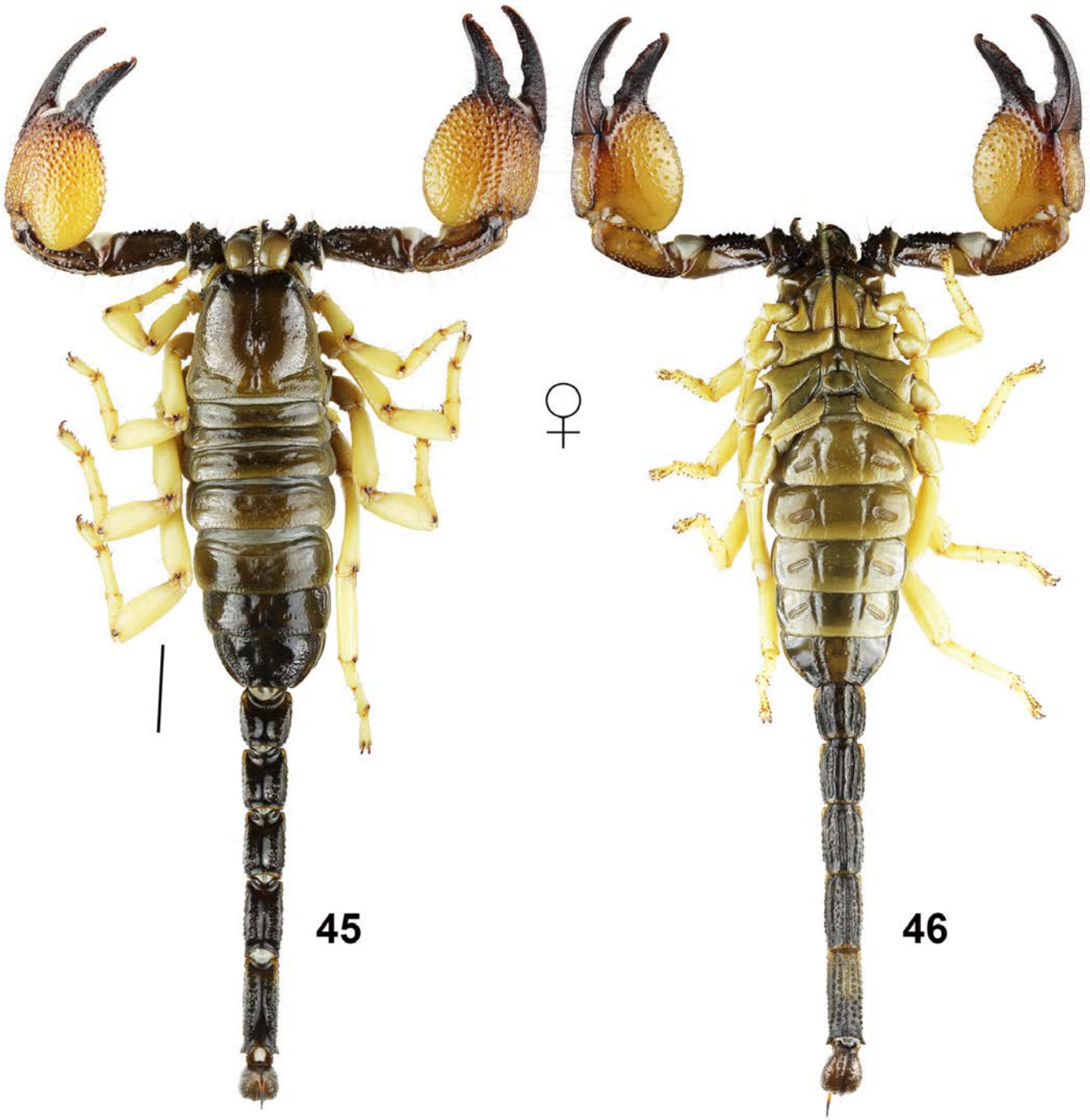
Pandinurus fulvipes sp. n.

(Figs. 43–84, Table 1)

http://zoobank.org/urn:lsid:zoobank.org:act:33435D53-CD5B-4260-B23E-1639ABD8957A

Type locality and type repository. **Somaliland**, near Mader Mage village, between Erigavo and Maid, 10°48'03"N 47°17'46"E, 1389 m a.s.l; FKCP.

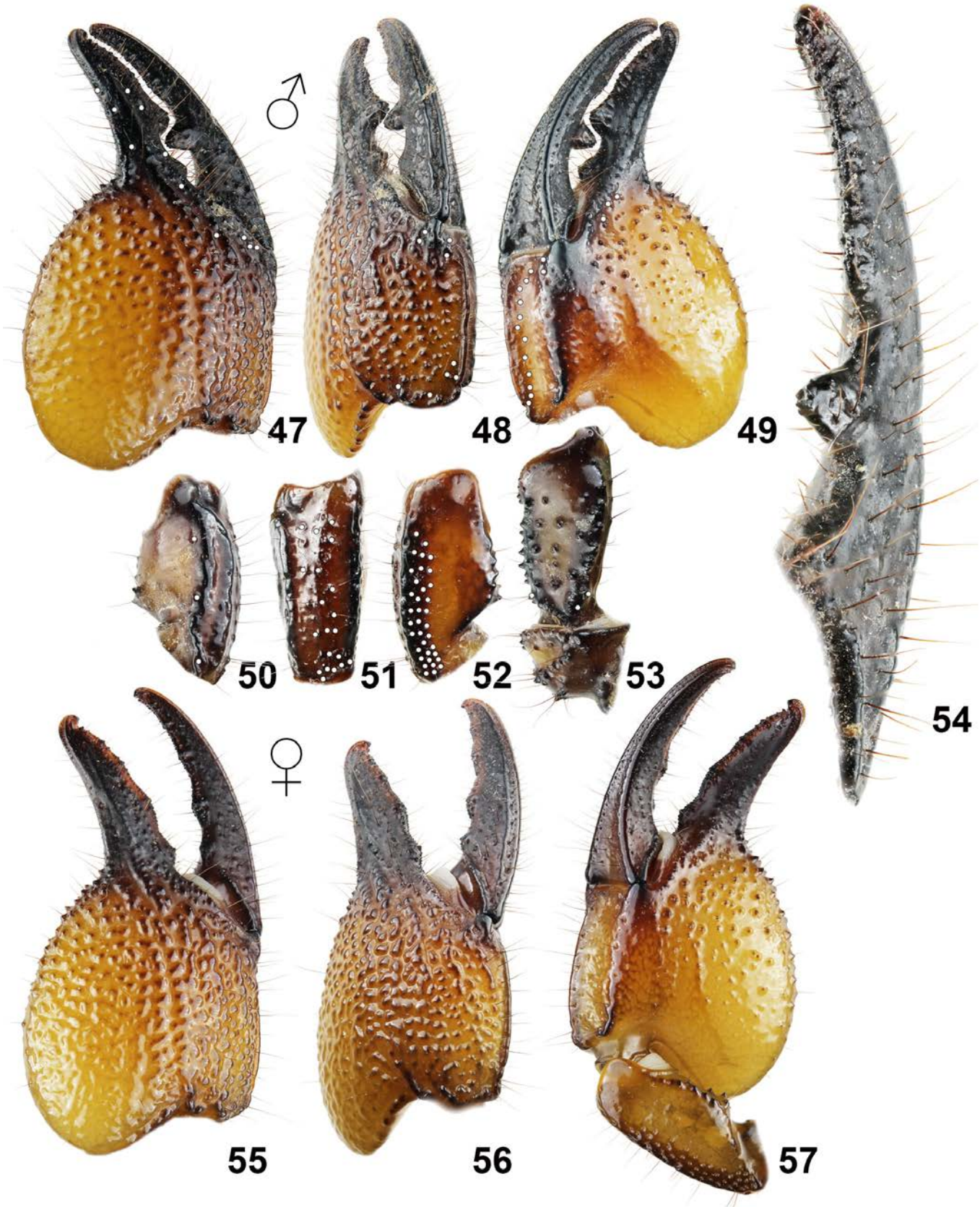
Type material. **Somaliland**, near Mader Mage vill., between Erigavo and Maid, 10°48'03"N 47°17'46"E, 1389 m a. s. l. (Locality No. **18SD**), 23.VIII.2018, leg. F. Kovařík, 1♂ (holotype, No. 1529) 2♀3juvs. (paratypes, two juveniles are still alive), FKCP, GLPC (hemispermatophore); Buq village, 20 km W of Erigavo, 10°37'25"N 47°10'53"E, 1723 m a. s. l. (Locality No. **18SH**), 27.VIII.2018, leg. F. Kovařík, 1♀2juvs. (paratypes, two juveniles are still alive), FKCP.



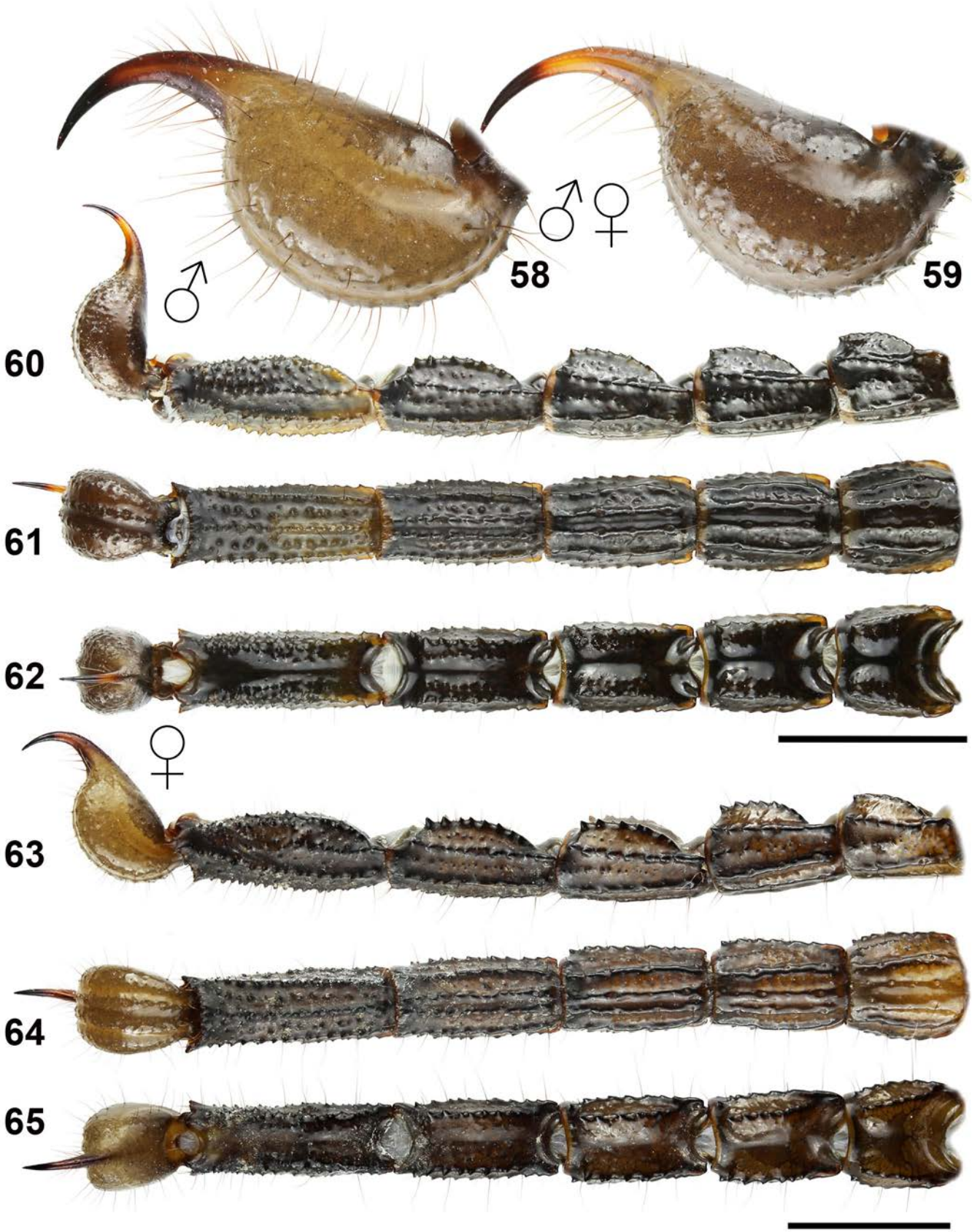
Figures 45–46: *Pandinurus fulvipes* **sp. n.**, female paratype from type locality in dorsal (45) and ventral (46) views. Scale bar: 10 mm.

Etymology. The latin word "fulvipes" (means "with yellow legs"), indicating that the new species is among the four or five *Pandinurus* species with bright yellow legs in both adults and juveniles.

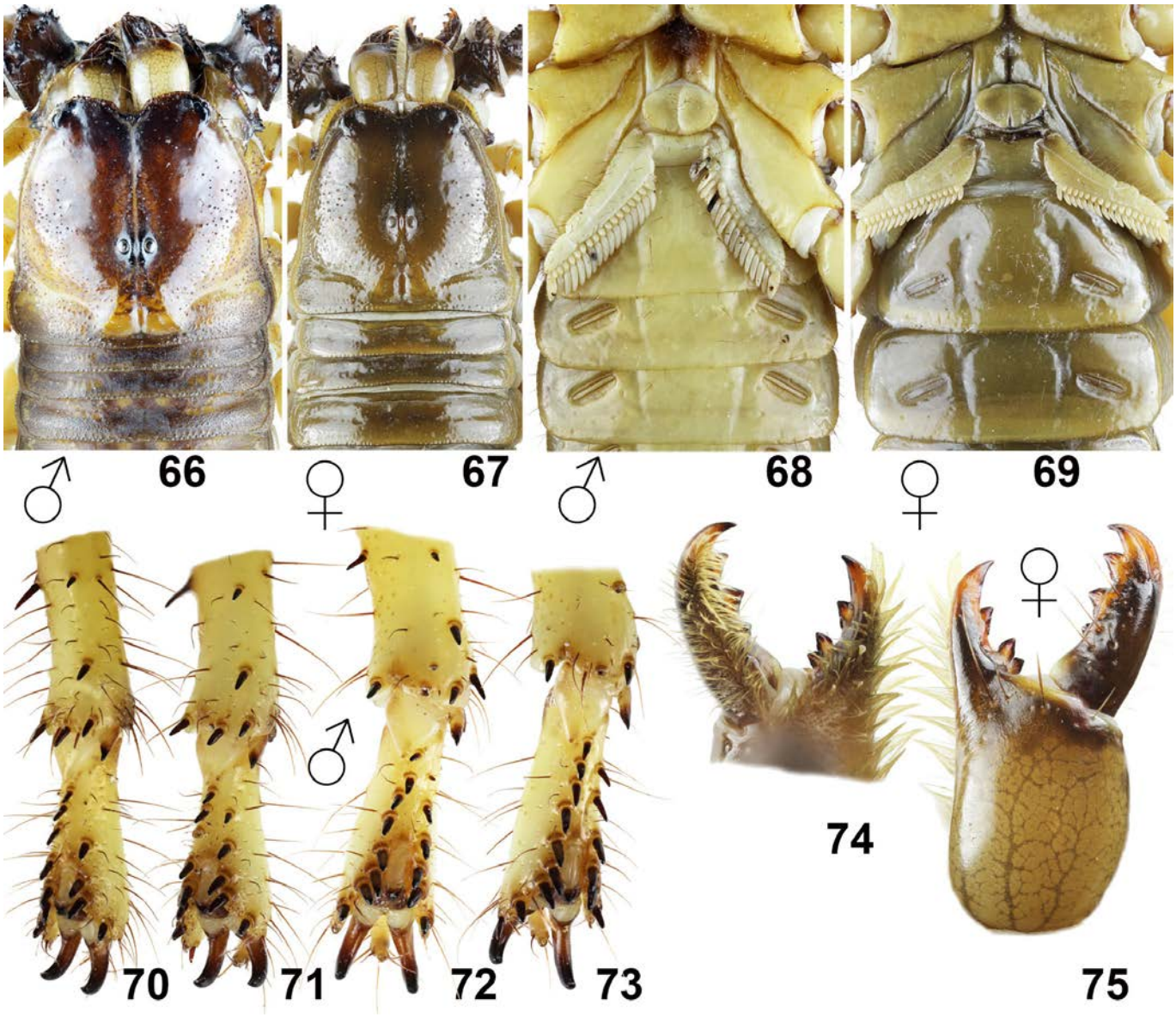
Diagnosis. Total length 102–105 mm. Color uniformly reddish brown to black; legs bright yellow; chela orange; telson yellowish brown. Chelicerae yellowish brown, reticulate, with black fingers and anterior margin. Carapace lacking carinae but with very fine sparse granules, anterior part smooth. External trichobothria on patella number 20–22 (6 *eb*, 6–8 *esb*, 2 *em*, 3 *est*, 3 *et*); ventral trichobothria on patella number 35–38; internal trichobothria on chela number 3 or 4, accessory external trichobothrium *ea* on chela absent, ventral trichobothria on chela number 12–14. Pedipalp hirsute, mainly on chela. Granules on dorsal surface of chela of pedipalp not conical and pointed, their apices may be confluent. Lobe of chela without granules, only rugose. External surface of chela with granules and without carinae. Chela of male length/ width ratio 1.88. Pectine teeth 17–19 in both sexes.



Figures 47–57: *Pandinurus fulvipes* **sp. n.**, pedipalp segments. **Figures 47–54**. Male holotype, pedipalp chela, dorsal (47), external (48), and ventral (49) views, pedipalp patella, dorsal (50), external (51) and ventral (52) views, pedipalp femur and trochanter dorsal (53) view, movable finger dentate margin (54). **Figures 55–57**. Female paratype from type locality, pedipalp chela, dorsal (55), external (56), and together with patella ventral (57) views. The trichobothrial pattern is indicated in Figures 47–53 (white circles).



Figures 58–65: *Pandinurus fulvipes* **sp. n.**, metasoma and telson. **Figures**. **58, 60–62**. Male holotype, telson lateral (58), metasoma and telson lateral (60), ventral (61), and dorsal (62) views. **Figures 59, 63–65**. Female paratype from type locality, telson lateral (59), metasoma and telson lateral (63), ventral (64), and dorsal (65) views. Scale bars: 10 mm (60–65).



Figures 66–75: *Pandinurus fulvipes* **sp. n. Figures 66, 68, 70–73**. Male holotype, carapace and tergites I–III (66), and coxosternal area and sternites III–V (68), and legs, retrolateral aspect (70–73). **Figures 67, 69, 74–75**. Female paratype from type locality, carapace and tergites I–III (67), coxosternal area and sternites III–IV (69), and chelicera ventral (74) and dorsal (75) views.

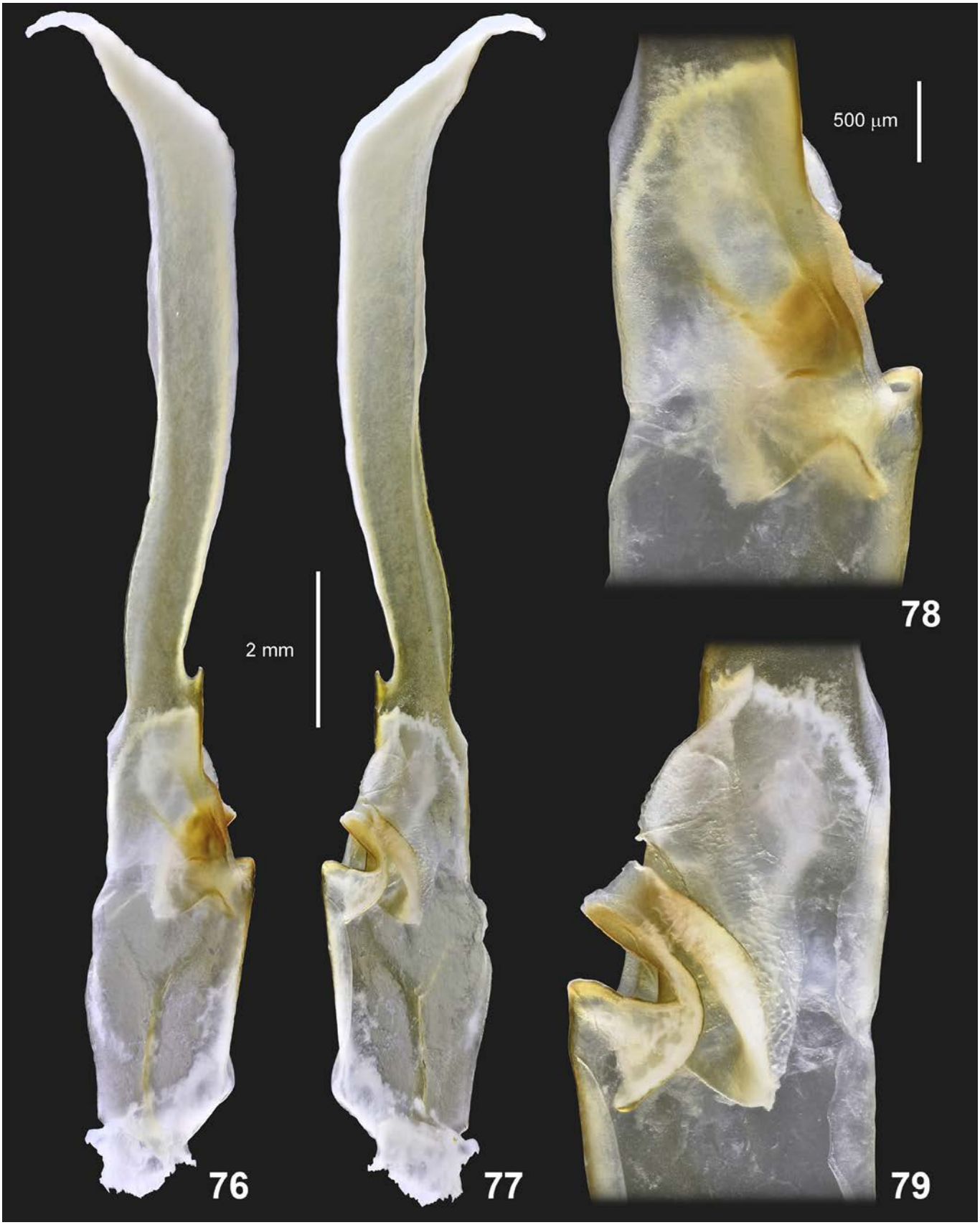
Dorsal carinae on first through fourth metasomal segments sparsely granulate and usually terminate in a larger denticle most conspicuous on fourth segment. Spiniform formula of tarsomere II = 7-8/5: 7-8/5: 8-9/6: 9/6. Tarsomere II with 2 spines on inclined anteroventral surface, but there could be additional spiniform seta on external margin indicated by another not well developed spina. Length to width ratio of male 5th metasomal segment 2.60–2.77.

Description. The habitus is shown in Figs. 43–46. The total length is 102–105 mm.

Coloration (Figs. 43–46, 80–81). The base color is uniform reddish brown to black, legs are bright yellow, pedipalp chela is orange and telson is yellowish brown. Chelicerae are yellowish brown, reticulate, with black fingers and anterior margin.

Carapace and mesosoma (Figs. 66–69). The entire carapace is smooth in the middle and in anterior part, sparsely covered by granules laterally and posteriorly. The anterior margin of the carapace is bilobate, strongly emarginate medially, and bears several macrosetae. The tergites are finely granulated in the male and almost smooth in the female. The pectinal tooth count is 17–19 in both sexes. The pectine marginal tips extend to the first quarter of the fourth sternite in the male and the third quarter of the third sternite in the female. The sternites are smooth, without carinae, but with two longitudinal furrows.

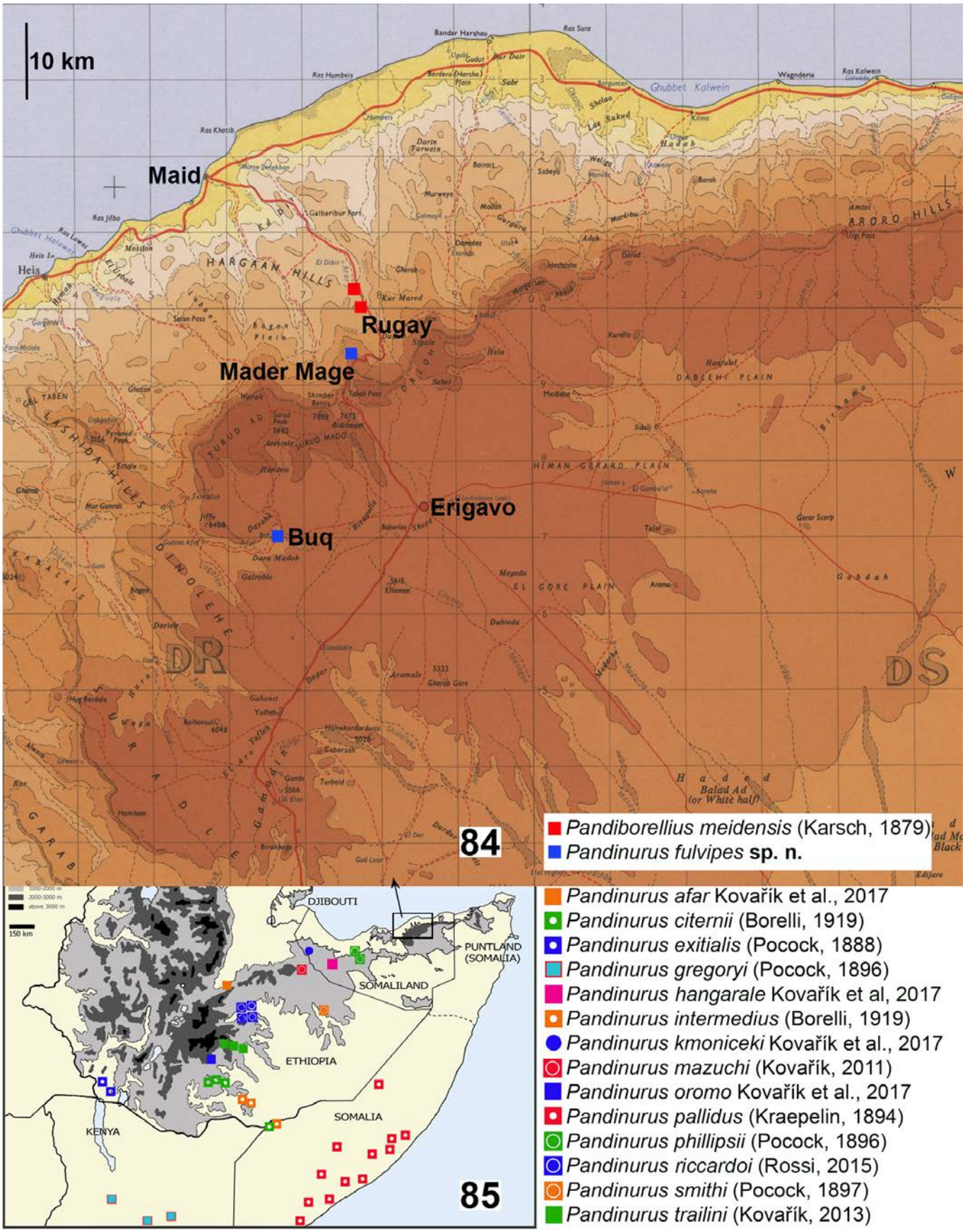
Chelicerae (Figs. 74–75). Movable finger dorsal edge with one large subdistal (*sd*) denticle; ventral edge smooth; ventral distal (*vd*) denticle longer than prominent dorsal (*dd*) denticle. Fixed finger with four denticles, median (*m*) and basal (*b*) denticles fused into bicusp; no ventral accessory denticles.



Figs 76–79: *Pandinurus fulvipes* **sp**. **n**., right hemispermatophore. **Figures 76, 77.** Entire hemispermatophore, convex (76) and concave (77) views. **Figures 78, 79.** Capsule region, convex (78) and concave (79) views. Scale bars: 2 mm (76–77) and 500 μm (78–79).

Figures 80–81: *Pandinurus fulvipes* **sp**. **n**. in vivo habitus in type locality. Female paratype (80) and male holotype (81).

Figures 82–83: *Pandinurus fulvipes* **sp**. **n**., type locality 18SD (82) and locality 18SH (83).



Figures 84–85: Figure 84. Map showing distribution of *Pandiborellius meidensis* and *Pandnurus fulvipes* **sp. n.** in Somaliland, Erigavo area. **Figure 85**. Map showing confirmed Horn of Africa distribution of *Pandinurus* Fet, 1997.

Pedipalps (Figs. 47–57). The pedipalps are hirsute, mainly on chela. The femur is smooth with several large granules dorsally and bears four carinae composed of several strong granules. The patella is smooth and rugose externally, with five rather smooth carinae, only the internal carina composed of several large granules. The granules on the dorsoexternal surface of chela are not conical and pointed, their apices are often confluent. The margin of lobe of chela rugose, usually with the same density as the whole lobe of the chela. The internal surface of chela smooth, with several conical granules in anterior part and two short, smooth carinae. The dentate margins of movable and fixed fingers of the pedipalp with distinct granules in two parallel rows, present in anterior half of the fingers. Posterior half of fingers almost without granules in male, with distinct granules in a row in female. *Trichobothriotaxy* (Figs. 47–53). External trichobothria on the patella number 20–22 (6 *eb*, 6–8 *esb*, 2 *em*, 3 *est*, 3 *et*); accessory external trichobothrium *ea* on chela absent, ventral trichobothria on patella number 35–38; internal trichobothria on chela number 3 or 4, ventral trichobothria on chela number 12–14.

Metasoma and telson (Figs. 58–65). The metasomal segments I–IV each bear a total of 8 complete carinae of which the ventral on segments I–III are smooth; lateral median carinae are indicated on segments I–IV by incomplete rows of granules. Other carinae are sparsely granulated. Segment V has five or seven carinae developed and granulated. The dorsal and lateral surfaces of the segments are rugose with several granules, segments IV–V are more granulated. The dorsal carinae on segments I–IV are sparsely granulated and terminate in a larger denticle most conspicuous on fourth segment. The entire metasoma and telson are sparsely hirsute with long setae. The telson is hirsute, smooth to rugose, bulbous, with the aculeus shorter than vesicle.

Legs (Figs. 70–73). All legs without distinct carinae and smooth. The tarsomeres hirsute with setae and macrosetae. Spiniform formula of tarsomere II = 7-8/5: 7-8/5: 8-9/6: 9/6. Tarsomere II with 2 spines on inclined anteroventral surface but there could be additional spiniform seta on external margin indicated by another not well developed spina.

Hemispermatophore. (Figs. 76–79). Lamelliform. Distal lamina long, section distal to hook slightly constricted, straight throughout most of length, slightly internally angled relative to trunk, gradually widening distally. Apex of distal lamina abruptly deflected in external direction 35° relative to axis of straight section, tapering to narrow curved tip. Short, robust hook projecting near base of internal margin of distal lamina. Proximal section of distal lamina below hook much shorter than distal section above it, with deep dorsal trough bordered internally by a strong, prominent ridge. Median lobe with angled ridge. Internobasal reflection of sperm duct broad, with truncated end. Proximal lobe wide, rounded in profile. Basal lobe subtriangular, blunt, symmetric in profile, distally directed. Trunk relatively short, broad, tapering quickly at base, with distinct rib diagonal in distal half, axial in proximal half. The overall structure of the hemispermatophore and form of the distal lamina are consistent with other known members of the genus *Pandinurus* (Kovařík et al., 2017).

Measurements. See Table 1.

Affinities. *Pandinurus fulvipes* **sp**. **n**. is reliably distinguished from all other *Pandinurus* species by the following unique combination of characters: accessory external trichobothrium *ea* on pedipalp chela absent; granules on dorsal surface of chela of pedipalp not conical and pointed, their apices may be confluent; legs bright yellow in both, adults and juveniles; internal trichobothria on chela number 3 or 4, ventral trichobothria on chela number 12–14; spiniform formula of tarsomere II = 7-8/5: 7-8/5: 8-9/6: 9/6.

Comments on locality and life strategy. The type locality **18SD** is a mountain slope with trees and bushes (Fig. 82). All specimens were collected from crevices in rocks near Mader Mage village in 1389 m a. s. l. At this locality, the first author recorded a minimum nighttime temperature of 24 ºC. The minimum recorded humidity was 37%.

The locality **18SH** is a mountain slope in rocky semi-desert terrain in 1723 m a. s. l. (Fig. 83). Two of the authors (F. K. and T. M.) visited the locality in the dry season. All specimens were collected among stones at night by UV detection. At this locality, the first author recorded a maximum daytime temperature of 27 ºC, and a minimum nighttime temperature of 17 ºC. The recorded humidity was between 37% (minimum at day) and 69% (maximum at night).

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References

BEENTJE, H. J. 1998. J. M. Hildebrandt (1847-1881): notes on his travels and plant collections. *Kew Bulletin*, 53(4): 835–856.

FET, V. 2000. Family Scorpionidae Latreille, 1802. Pp. 427–486 *in* Fet, V., W. D. Sissom, G. Lowe & M. E. Braunwalder. *Catalog of the Scorpions of the World* (*1758–1998*). New York: The New York Entomological Society, 689 pp.

KARSCH, F. 1879. Skorpionologische Beiträge I. and II. *Mitteilungen des Münchener Entomologischen Vereins*, 3: 6–22, 97–136.

KOVAŘÍK, F. 2003. Scorpions of Djibouti, Eritrea, Ethiopia, and Somalia (Arachnida: Scorpiones), with a key and descriptions of three new species. *Acta Societatis Zoologicae Bohemicae*, 67: 133–159.

KOVAŘÍK, F. 2009. *Illustrated catalog of scorpions. Part I. Introductory remarks*; *keys to families and genera*; *subfamily Scorpioninae with keys to* Heterometrus *and* Pandinus *species*. Prague: Clairon Production, 170 pp.

KOVAŘÍK, F. & A. A. OJANGUREN AFFILASTRO. 2013. *Illustrated catalog of scorpions. Part II. Bothriuridae*; *Chaerilidae*; *Buthidae I. Genera* Compsobuthus, Hottentotta, Isometrus, Lychas, *and* Sassanidotus. Prague: Clairon Production, 400 pp.

KOVAŘÍK F., G. LOWE, P. JUST, A. I. AWALE, H. SH A. ELMI & F. ŠŤÁHLAVSKÝ. 2018. Scorpions of the Horn of Africa (Arachnida: Scorpiones). Part XVI. Review of the genus *Gint* Kovařík et al., 2013, with description of three new species from Somaliland (Scorpiones, Buthidae). *Euscorpius*, 259: 1–41.

KOVAŘÍK F., G. LOWE, M. E. SOLEGLAD & J. PLÍŠKOVÁ 2017. Scorpions of the Horn of Africa (Arachnida, Scorpiones). Part X. *Pandiborellius* stat. n. and *Pandinurus* (Scorpionidae) with description of four new species from Eritrea and Ethiopia, and review of *Pandinus* sensu lato taxonomy. *Euscorpius*, 238: 1–103.

ROSSI, A. 2015. Ulteriori commenti sulla tassonomia dei generi *Pandinus* e *Pandinurus*, con la definizione di un nuovo sottogenere ed una nueva specie di *Pandinurus* dalla Somalia (Scorpiones: Scorpionidae). *Arachnida, Rivista Aracnologica Italiana,* 4: 41–55.

STAHNKE, H. L. 1971. Scorpion nomenclature and mensuration. *Entomological News*, 81: 297–316.

VACHON, M. 1974. Études des caractères utilisés pour classer les familles et les genres des scorpions (Arachnides). 1. La trichobothriotaxie en arachnologie. Sigles trichobothriaux et types de trichobothriotaxie chez les Scorpions. *Bulletin du Muséum national d'Histoire naturelle*, 3e série, 140 (Zoologie, 104): 857–958.