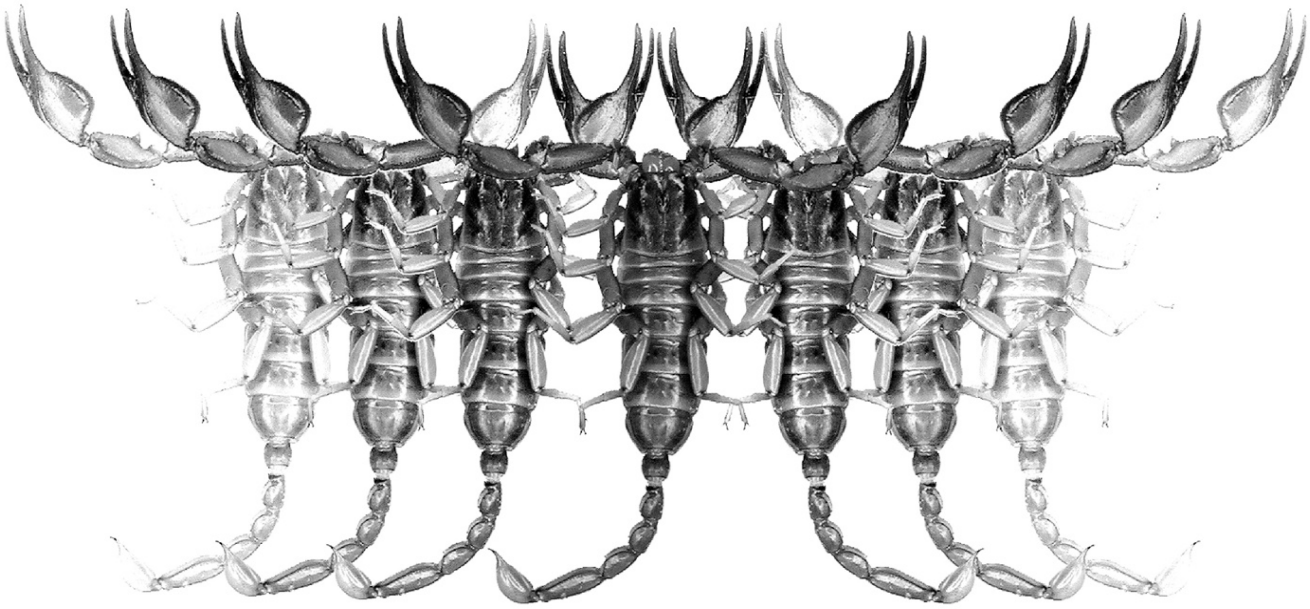
Euscorpius

Occasional Publications in Scorpiology



Scorpions of the Horn of Africa (Arachnida: Scorpiones). Part XXI. *Parabuthus* (Buthidae) (Part II), with description of five new species from Somaliland and Ethiopia

František Kovařík, Graeme Lowe, Hassan Sh Abdirahman Elmi & František Šťáhlavský

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Euscorpius

Occasional Publications in Scorpiology

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Euscorpius — Occasional Publications in Scorpiology. 2019, No. 290

Scorpions of the Horn of Africa (Arachnida: Scorpiones). Part XXI. *Parabuthus* (Buthidae) (Part II), with description of five new species from Somaliland and Ethiopia

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http://zoobank.org/urn:lsid:zoobank.org:pub:9D375F19-5715-49C1-A5A3-4EBCE7FDA0DA

Summary

The complex of *Parabuthus heterurus* Pocock, 1897 is split into four species: *P. heterurus* Pocock, 1897 s. str. whose type locality and real distribution are discussed and corrected, and three herein described species, *P. kabateki* **sp. n.**, *P. robustus* **sp. n.** and *P. somalilandus* **sp. n.** In the species complex of *Parabuthus liosoma* (Ehrenberg, 1828), *P. erigavoensis* **sp. n.** from Somaliland is described. Also described are *P. mazuchi* **sp. n.**, sympatric with *P. cimrmani* Kovařík, 2004 and *P. eritreaensis* Kovařík, 2003 from Somaliland. New data are presented on the distribution of the genus *Parabuthus* Pocock, 1890 in the Horn of Africa, mainly in Somaliland, acquired during expeditions in 2017–2019. Information is provided about *Parabuthus* species from Somaliland, their taxonomy, distribution, and ecology, fully complemented with color photos of live and preserved specimens, as well as their habitats. The hemispermatophores of *P. kabateki* **sp. n.**, *P. mazuchi* **sp. n.**, *P. robustus* **sp. n.** and *P. somalilandus* **sp. n.** are illustrated and described. In addition to the analyses of external morphology and hemispermatophores, we also described the karyotypes of *P. kabateki* **sp. n.**, *P. robustus* **sp. n.**, and *P. somalilandus* **sp. n.** All three species have karyotypes with 2n=16 and chromosomes gradually decreasing in length. Included is a key to *Parabuthus* Pocock, 1890 in the Horn of Africa. *Parabuthus terzanii* Rossi, 2017 is synonymized with *Parabuthus hamar* Kovařík et al., 2016 **syn. n.** as a junior synonym because the description dated July 2016 was in reality published/accessible in March 2017.

Introduction

Kovařík et al. (2016) revised all known species of *Parabuthus* Pocock, 1890 in the Horn of Africa for the first time. Analysis of a large number of specimens led to a splitting of the *P. liosoma* (Ehrenberg, 1828) complex into three sibling species with allopatric distributions. In that study, the authors assumed that all populations traditionally cited as *P. heterurus* Pocock, 1897 belonged to one unique species. However, detailed studies of newly collected specimens from four new expeditions conducted in 2017–2019 have revealed that the complex of *P. heterurus* sensu lato includes three other species and that *P. heterurus* sensu stricto does not occur in Somaliland, but only in Ethiopia and Somalia. We have therefore prepared a second paper on *Parabuthus* in the Horn of Africa, describing five new species and reporting new localities for *P. abyssinicus* Pocock, 1901 and *P. granimanus* Pocock, 1895. The first and the third authors visited the type locality of *P. granimanus* (Zeyla) where they collected samples showing that the species is variable in color, ranging from yellow to black.

Methods, Material & Abbreviations

Nomenclature and measurements follow Stahnke (1971), Kovařík (2009), and Kovařík & Ojanguren Affilastro (2013), except for trichobothriotaxy (Lowe & Kovařík, 2019; Vachon, 1974) and sternum (Soleglad & Fet, 2003). Hemispermatophore terminology follows Kovařík et al. (2016, 2018).

Karyotype analyses were based on chromosome preparations prepared by the spreading technique, which is frequently used in scorpions (e. g. Kovařík et al., 2009; Sadílek et al., 2015). The chromosomes were stained by 5% Giemsa solution in Sörensen phosphate buffer for 20 min. Five spermatocyte nuclei were measured using the software Image J 1.45r (http:// rsbweb.nih.gov/ij) with the plugin Levan (Sakamoto & Zacaro, 2009). The relative length of the chromosomes was calculated for the diploid set.

Specimen Depositories: BMNH (The Natural History Museum, London, United Kingdom); FKCP (František Kovařík, private collection, Prague, Czech Republic); GLPC (Graeme Lowe, private collecton, Auckland, New Zealand); MCSN (Museo



Figure 1. *Parabuthus abyssinicus*, male at locality 17SA.

Civico de Storia Naturale "Giacomo Doria", Genoa, Italy); MZUF (Museo Zoologico de "La Specola", Firenze, Italy); and NMPC, National Museum of Natural History, Prague, Czech Republic. *Morphometrics*: D, depth; L, length; W, width.

Systematics

Family Buthidae C. L. Koch, 1837
Parabuthus Pocock, 1890
(Figures 1–305, Tables 1–5)

Buthus (*Parabuthus*): Pocock, 1890: 124–125.

Parabuthus: Pocock, 1895: 309–314, plate IX, figs. 4a–d; Fet & Lowe, 2000: 200–211 (complete reference list until 2000); Kovařík, 2009: 22, 31; Prendini & Esposito, 2010: 673–710, figs. 1–17; Kovařík et al., 2016: 1–58, figs. 1–204, tables 1–2.

= *Heterobuthus* Kraepelin, 1891: 205–211 (63–69) (syn. by Kraepelin, 1895: 79 (7)).

= *Riftobuthus* Lourenço et al., 2010: 281, figs. 1 and 2 (syn. by Kovařík et al., 2016: 2).

Type species. *Androctonus* (*Prionurus*) *liosoma* Ehrenberg in Hemprich et Ehrenberg, 1828

Emended diagnosis. Total length 35–180 mm. Carapace without distinct carinae, in lateral view with entire dorsal surface horizontal or nearly so. Five pairs of lateral eyes and eyespot present. Pectines with fulcra, female pectines typically with dilated or lobate basal middle lamella. Pectine teeth number 18–62. Hemispermatophore flagelliform, capsule with '2+1' lobe configuration, with broad posterior lobe, small simple anterior lobe, and robust hook-like basal lobe; flagellum arising distally from posterior lobe, pars recta short and narrow, pars reflecta long and fusiform. Sternum subtriangular. Mesosoma with tergites I–VI monocarinate, sternites III–VI with slit-like spiracles. Dorsal surfaces of first and second metasomal segments with stridulatory areas. Telson without subaculear tubercle. Chelicera with typical buthid dentition, fixed finger with two ventral denticles. Orthobothriotaxic type A, dorsal trichobothria of pedipalp femur arranged in α-configuration. Patellar trichobothrium d_2 located external to dorsomedian carina (when carina is present). Chela manus with trichobothria V_1 and V_2 axis oblique, Eb_{1-3} in γ-configuration. Trichobothrium *eb* located on fixed finger of chela. Dentate margin of pedipalp chela movable finger with distinct granules divided into 9–14 rows, 3 terminal granules and one basal terminal granule. Tibial spurs present on third and fourth pairs of legs.

Remarks on the karyotypes. We analyzed male karyotypes of three different *Parabuthus* species from the Horn of Africa. The chromosomes of these species (Figs. 293–304) correspond to the cytogenetic characteristic typical for the family Buthidae: holocentric chromosomes, achiasmatic meiosis in males, and lower number of chromosomes (e.g. Mattos et al., 2013). The diploid sets of *Parabuthus kabateki* **sp**. **n**. (Figs. 293–298), *P. robustus* **sp**. **n**. (Figs. 299–301), and *P. somalilandus* **sp**. **n**. (Figs. 302–304) consist of 16 chromosomes, which gradually decrease in length in all observed males. These characteristics correspond to the known situation in three already cytogenetically analyzed *Parabuthus* species from Horn of Africa (2n=16–20, Table 5) (Kovařík et al., 2016). During meiosis we found only bivalents in all observed postpachytenes in both analyzed males of *P. robustus* **sp**. **n**. from locality 17SE (Fig. 300) and in one analyzed male of *P. somalilandus* from locality 18SK (Fig. 303). Interestingly, we observed differences between two analyzed males of *P. kabateki* (both from type locality, locality 18SJ) in multivalent association during postpachytene. One male has one quadrivalent (Fig. 294) whereas the second one has one hexavalent (Fig. 297). The multivalent associations are probably the result of heterozygous reciprocal translocations (e.g. Mattos et al., 2013) and cause the differentiation of chromosome length without change of diploid number (see Figs 295 and 298). This effect was observed frequently in different buthid species (e.g. Mattos et al., 2013; Šťáhlavský et al., 2014; Sadílek et al., 2015; Ubinski et al., 2018) and represents probably one of the typical cytogenetic characteristics in this scorpion family.

Parabuthus abyssinicus Pocock, 1901
(Figures 1–4, 274–277, 305, Table 5)

Parabuthus abyssinicus Pocock, 1901: 1; Kovařík et al., 2016: 12–19, figs. 1–6, 8–27, 166–167, 171, 181, 193, 204, Table 1.
Parabuthus liosoma abyssinicus: Kraepelin, 1913: 172; Lamoral & Reynders, 1975: 519.
Parabuthus leiosoma abyssinicus: Fet & Lowe, 2000: 206 (complete reference list until 2000).
= *Parabuthus liosoma dmitrievi* Birula, 1903: 113 (syn. by Kovařík, 2003: 144).
Parabuthus liosoma dimitrivi: Borelli, 1925: 12–13.
Parabuthus liosoma dmitrievi: Fet & Lowe, 2000: 206 (complete reference list until 2000).
Parabuthus leiosoma (in part): Fet & Lowe, 2000: 205–206 (complete reference list until 2000); Kovařík, 2003: 144, figs 8–9; Kovařík & Whitman, 2005: 110–111.

Type locality and type repository. Ethiopia, Abyssinia, Shoa (= now Ethiopia, Shewa Province); BMNH.

Additional material examined (not cited in Kovařík et al., 2016) (FKCP). **Somaliland**, Borama, campus Amoud University, 09°56‘49“N 43°13‘23“E, 1394 m a.s.l. (Locality No. **19SA** (=17SA/), 23.VI.2019, 1♂ (1691) 1♀2juvs. (1650, 1651), leg. F. Kovařík; Quljeet village, 10°05‘18.9“N 43°00‘43.9“E, 1575 m a.s.l. (Locality No. **19SK**), 4.VII.2019, 2♀ (1667), leg. F. Kovařík; between Borama and Rugi, 09°57‘48“N 43°18‘04.1“E, 1339 m a.s.l. (Locality No. **19SL**), 7.VII.2019, 1juv. (1669), leg. F. Kovařík; Cali Haidh, 10°02‘50.6“N 43°47‘08.7“E, 1056 m a.s.l. (Locality No. **19SN**), 8.VII.2019, 1♂3♀ (1692, 1671), leg. F. Kovařík.

Emended diagnosis. Adults from 72 mm (male) to 115 mm (female) long. Base color of adults uniformly yellow to yellowish brown; carapace, tergites, metasoma IV–V and telson are dark brown to black. Pectine teeth number 38–43 in males and 33–40 in females. Stridulatory area present on dorsal surface of metasomal segments I–II in both sexes, reduced or absent on third segment in adults. Metasoma sparsely hirsute. Metasomal segment V of male length/ width ratio 1.50–1.72. Movable and fixed fingers of pedipalp bearing 12–13 rows of granules, all with external and internal accessory granules. Fingers of pedipalp not elongated, movable finger length/ manus length ratio 1.54–1.72 in male. Pedipalp fingers of male with inner side of base smooth, no trace of tubercle. Manus of pedipalp of male broad, pedipalp chela length/ width ratio 2.95–3.11 in male and 4.25–4.40 in female. Pedipalp manus smooth, patella finely granulated. Tarsomere I of all legs with bristle-combs.

Distribution. Djibouti, Eritrea, Ethiopia, Somaliland (first record), ? Sudan.

Parabuthus cimrmani Kovařík, 2004
(Figures 284–285, 305)

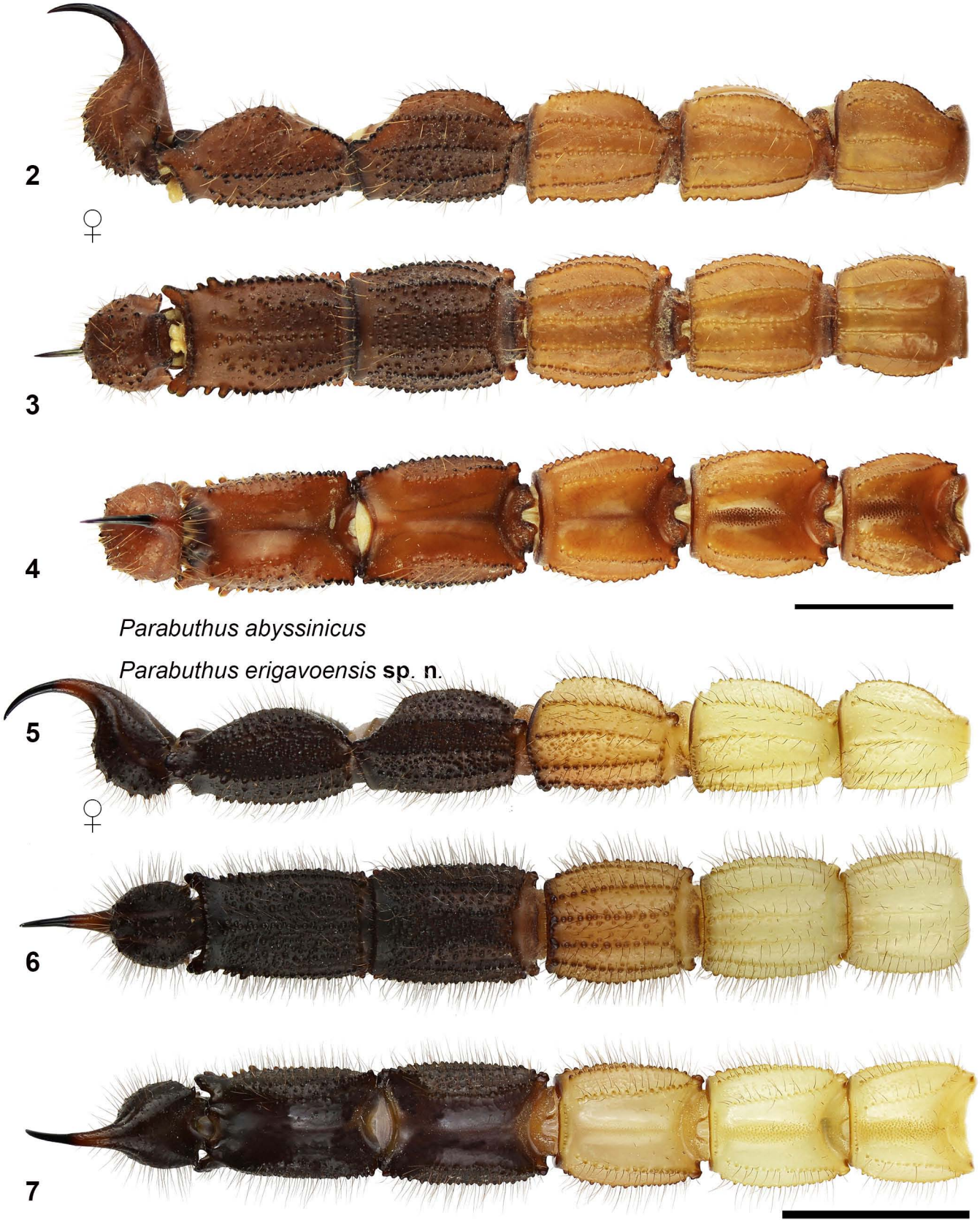
Parabuthus cimrmani Kovařík, 2004: 15–19, figs. 1–5, table 1; Kovařík et al., 2016: 19, figs. 36–39, 88, 172–173, 188, 197, 204.

Type locality and type repository. Somalia, Maxaans env; FKCP.

Type material examined. **Somalia**, Maxaans env., 1972, 1♂1♀ (holotype and allotypic paratype), FKCP.

Diagnosis. Adults from 83 mm (male) to 85.3 mm (female) long. Base color uniformly yellow to yellowish brown, only fourth and fifth metasomal segments and telson dark. Pectine teeth number 61–62 in male and 32–33 in female. Stridulatory area present on dorsal surface of first and second segments, absent on third segment in female and small, in a disc only, in male. Metasoma densely hirsute. Movable finger of pedipalp more than twice as long as manus, bearing 14 rows of granules which include external and internal granules. Manus of pedipalp smooth and very narrow in both sexes, pedipalp chela length/ width ratio 5.90 in male and 7.42 in female. Tarsomere I of all legs with bristle-combs.

Distribution. Somalia.



Figures 2–**7**: **Figures 2**–**4**. *Parabuthus abyssinicus*, female topotype from locality 12EX, metasoma and telson in lateral (2), ventral (3), and dorsal (4) views. **Figures 5**–**7**. *Parabuthus erigavoensis* **sp**. **n**., female holotype, metasoma and telson in lateral (5), ventral (6), and dorsal (7) views. Scale bars: 10 mm.

Dimensions (MM)		*P. erigavoensis* **sp. n.** ♀ **holotype**	*P. mazuchi* **sp. n.** ♂ **holotype**
Carapace	L / W	9.71 / 10.56	7.33 / 7.15
Mesosoma	L	18.03	17.36
Tergite VII	L / W	5.51 / 10.03	5.14 / 7.56
Metasoma + telson	L	52.06	38.31
Segment I	L / W / D	7.11 / 6.66 / 5.75	5.02 / 5.20 / 4.54
Segment II	L / W / D	7.63 / 6.68 / 5.94	5.55 / 5.43 / 4.59
Segment III	L / W / D	8.02 / 6.71 / 5.74	6.18 / 5.65 / 4.69
Segment IV	L / W / D	9.28 / 6.56 / 5.89	6.75 / 5.61 / 4.48
Segment V	L / W / D	10.10 / 6.14 / 5.34	8.24 / 4.97 / 4.12
Telson	L / W / D	9.92 / 4.79 / 4.00	6.57 / 3.07 / 2.44
Pedipalp	L	29.87	27.39
Femur	L / W	7.57 / 2.52	7.09 / 1.64
Patella	L / W	8.37 / 3.23	8.26 / 2.01
Chela	L	13.93	12.04
Manus	W / D	2.89 / 3.15	1.71 / 1.70
Movable finger	L	10.09	9.15
Total	**L**	**79.80**	**63.00**

Table 1. Comparative measurements of adults of *Parabuthus erigavoensis* **sp. n.** and *P. mazuchi* **sp. n.** Abbreviations: length (L), width (W, in carapace it corresponds to posterior width), depth (D).

***Parabuthus erigavoensis* sp. n.**
(Figures 5–29, 178–279, 305, Table 1)
http://zoobank.org/urn:lsid:zoobank.org:act:5DC5BE1A-9EFD-4E31-B37A-016905DFE6E9

Type locality and type repository. Somaliland, Buq vill. near Erigavo, 10°37‘25“N 47°10‘53“E, 1723 m a.s.l. (Locality No. **18SH**, Fig. 28); FKCP.

Type material (FKCP). **Somaliland**, Buq vill. near Erigavo, 10°37‘25“N 47°10‘53“E, 1723 m a.s.l. (Locality No. **18SH**), 27.VIII.2018, 2♀ (holotype 1552 and paratype) 1juv. (paratype), leg. F. Kovařík; near Erigavo, 10°38‘52“N 47°20‘25“E, 1762 m a.s.l. (Locality No. **17SJ**, Fig. 29), 2.IX.2017, 2♀3juvs. (paratypes), 26.VIII.2018, 3juvs. (paratypes), leg. F. Kovařík.

Etymology. Named after the occurrence around Erigavo city.

Diagnosis. Adult females are 75–80 mm long, male unknown. Base color uniformly light yellow, carapace and tergites yellow to yellowish brown, metasoma IV–V and telson black. Pectine teeth number 31–37 in females. Stridulatory area present on dorsal surface of metasoma I–II, reduced in metasoma III, and absent in metasoma IV–V. Metasoma densely hirsute. Metasoma V length/ width ratio is 1.60–1.70 in females. Dorsal carina of metasoma IV posteriorly composed of blunt denticles, of which the posterior-most denticle is not enlarged. Movable and fixed fingers of pedipalp bear 13–14 rows of granules, all with external and internal accessory granules. Fingers of pedipalp not elongated. Fingers of pedipalps of male with inner side of base smooth, no trace of tubercle. Pedipalp chela length/ width ratio 4.80–4.90 in females. Pedipalp chela smooth and patella finely granulated. Entire pedipalps hirsute with rather long setae which are longer on femur and trochanter. Tarsomere I of legs I–III with bristlecombs.

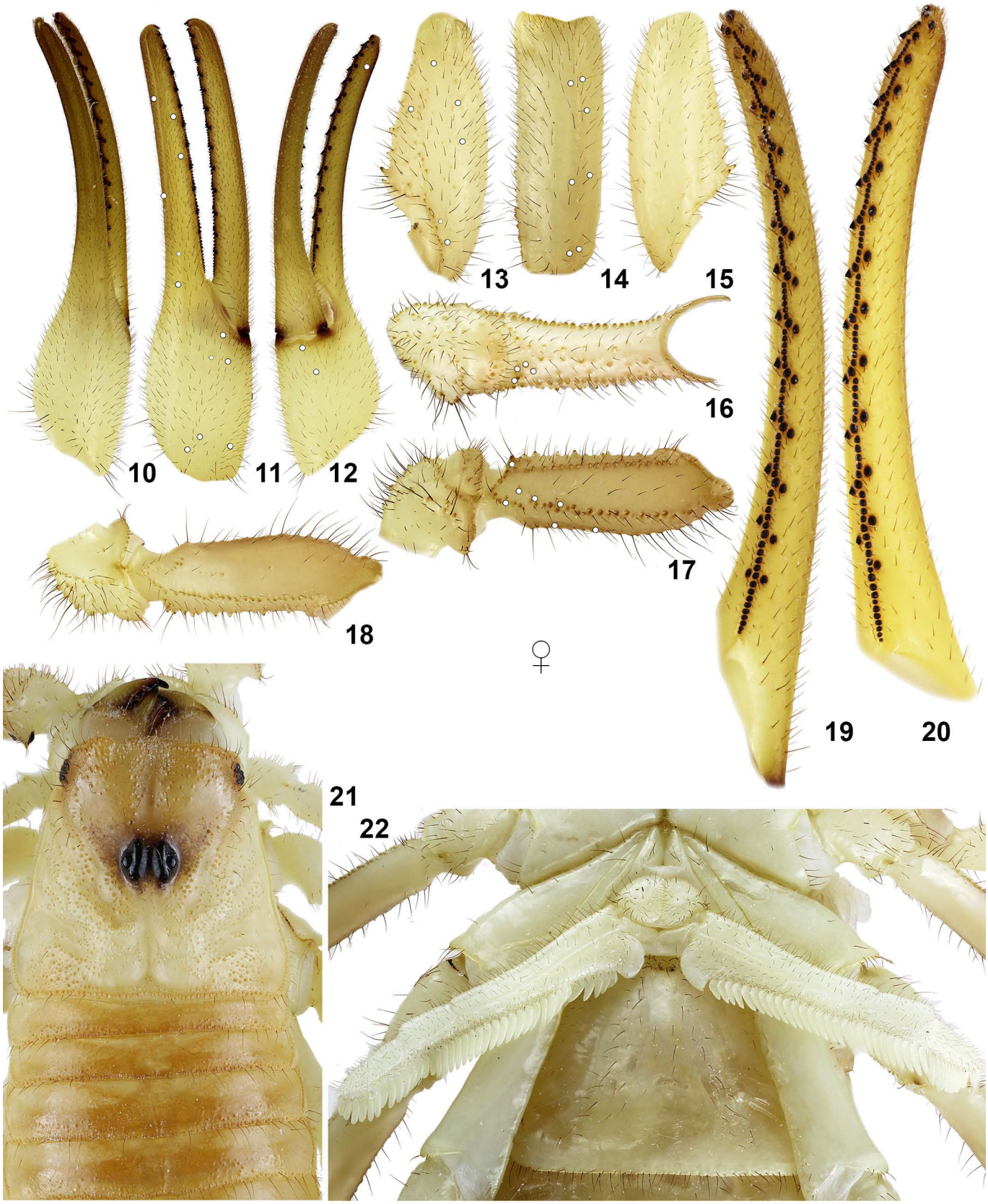
Description. The adult females are 75–80 mm long, adult male is unknown. The habitus is shown in Figs. 8–9. For position and distribution of trichobothria of pedipalps see Figs. 10–14 and 16–17. Female with basal pectinal tooth wide (Fig. 22).

Coloration (Figs. 8–9, 23). The base color is uniformly light yellow, carapace and tergites yellow to yellowish brown. The pedipalps and legs are yellow. The metasoma I–III is yellow, the metasoma III could be light orange or light brown ventrally, metasoma IV–V and telson are black. Carapace and tergites are yellow to yellowish brown.

Carapace and mesosoma (Figs. 8–9, 21–22). The entire carapace is covered with large granules. Carinae are absent. The anterior margin of the carapace is almost straight, medially weakly convex, and bears 14–18 symmetrically distributed short, stout spiniform macrosetae. The tergites

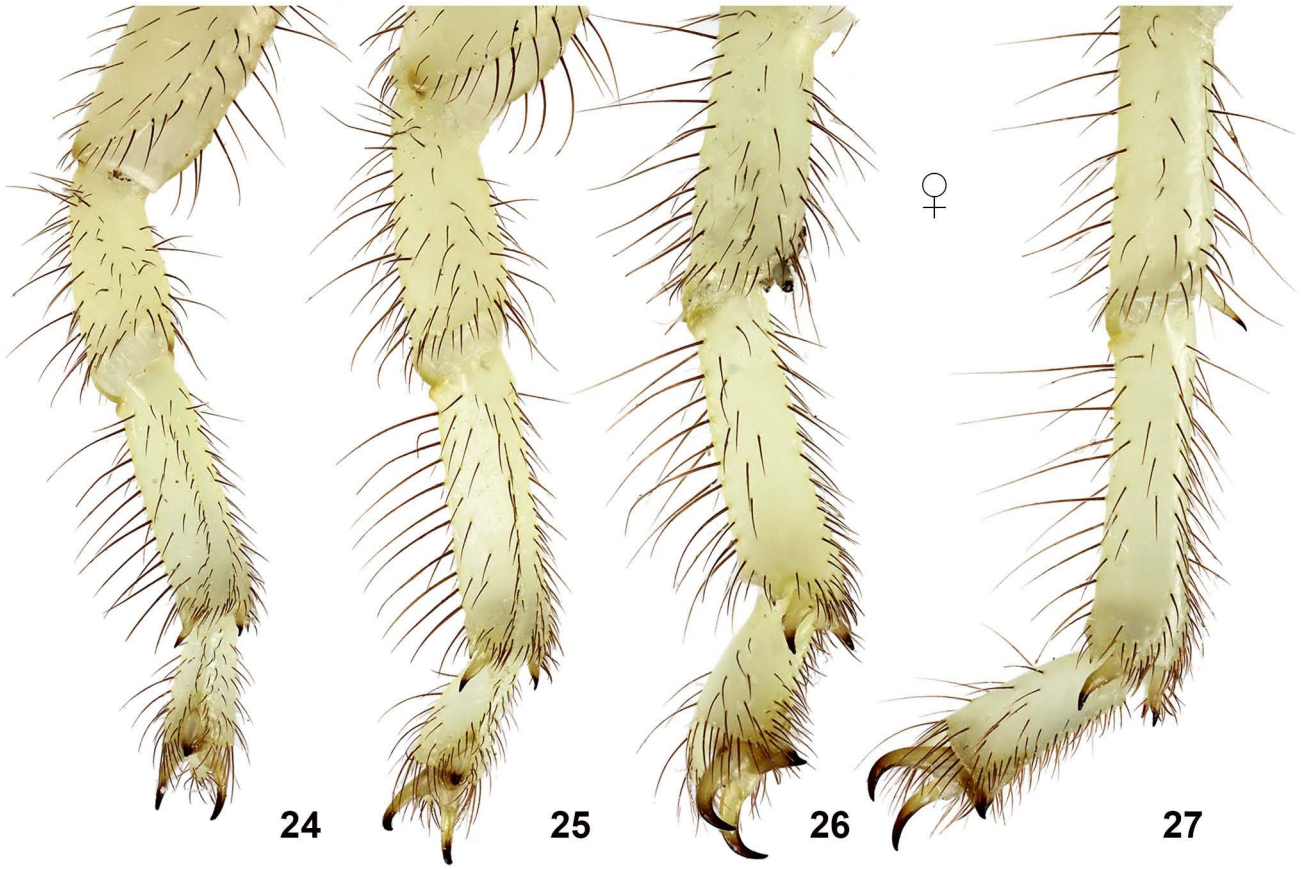


Figures 8–**9**. *Parabuthus erigavoensis* **sp**. **n**., female holotype in dorsal (8) and ventral (9) views. Scale bar: 10 mm.



Figures 10–**22**: *Parabuthus erigavoensis* **sp**. **n**., female holotype. **Figures 10**–**20**. Pedipalp segments. Chela dorsal (10), external (11) and ventral (12) views. Patella dorsal (13), external (14) and ventral (15) views. Femur and trochanter internal (16), dorsal (17), and ventral (18) views. Movable finger (19) and fixed finger (20) dentition. Trichobothrial pattern is indicated in Figures 10–14 and 16–17. **Figures 21**–**22**. Carapace and tergites I–IV (21) and coxosternal area and sternite III (22).





Figures 23–27. *Parabuthus erigavoensis* **sp. n.**, female holotype in vivo habitus at type locality (23) and left legs I–IV, retrolateral aspect (24–27 respectively).





Figures 28–**29**. *Parabuthus erigavoensis* **sp**. **n**., type locality 18SH (28) and locality 17SJ (29).

are granulated. Tergite VII is pentacarinate, with lateral pairs of carinae strong, serratocrenulate. The pectinal tooth count is 31–37 in females. The pectine marginal tips extend to the midpoint of the fourth sternite in the female. The pectines have three marginal lamellae and 10–13 middle lamellae. The lamellae and fulcra bear numerous dark setae. All sternites are smooth, except that there could be a stridulatory area on the third sternite but it is reduced to absent. Sternite VII bears four carinae.

Metasoma and telson (Figs. 5–7). The first to fourth metasomal segments bear a total of 10 granulated carinae. The fifth segment has five carinae, and its ventral and lateral surfaces are strongly granulated. The ventral surface of metasomal segment V has several strong paired granules symmetricaly located laterally in the middle part. Dorsolateral carinae of the third and fourth segments composed of blunt denticles, of which the posterior-most denticle is not enlarged. The stridulatory area is located on the dorsal surface of the first and second segments. On the third segment it is reduced and on fourth and fifth segments the stridulatory area is absent. The entire metasoma and the telson are densely pilose with long hairs. The ventral surface of the telson is strongly granulated. The metasomal segment V length/ width ratio is 1.60–1.70 in females. The telson is rather bulbous, with the aculeus approximately the same length as the vesicle in females.

Pedipalps (Figs. 10–20). The entire pedipalps are hirsute with rather long setae which are longer on femur and trochanter. The femur bears four carinae. The chela is smooth without carinae and the patella has carinae indicated. The patella is smooth with several solitary granules mainly internally. The movable and fixed fingers of chela bear 13–14 rows of granules, all with external and internal accessory granules. The fingers of pedipalps with inner side of base smooth, tubercle absent. The pedipalp chela length/ width ratio is 4.80–4.9 in females.

Legs (Figs. 24–29). Legs III and IV bear tibial spurs. Retrolateral and prolateral pedal spurs are present on all legs. All legs without distinct carinae, smooth and densely pilose. The tarsomeres bear two rows of macrosetae on the ventral surface and additional macrosetae on the other surfaces. Bristle-combs are present on all legs, although slightly reduced on the fourth leg.

Measurements. See Table 1.

Affinities. The described features distinguish *P. erigavoensis* **sp**. **n**. from all other species of the genus. They are recounted in the key below. *P. erigavoensis* **sp**. **n**. is a member of *P. liosoma* complex, which is characterized by non-elongated pedipalp fingers (Figs. 274–283) and black color of metasoma IV–V (Figs. 8–9).

Comments on locality and life strategy. The type locality 18SH is a mountain slope in rocky semi-desert terrain at 1,723 m a.s.l. (Fig. 28). One of the authors (FK) visited the locality in the dry season. Both specimens were collected among stones at night by UV detection together with *Neobuthus erigavoensis* Kovařík et al., 2018 (type locality), *Hottentotta* sp., and *Pandinurus fulvipes* Kovařík et al., 2019. 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).

Parabuthus eritreaensis Kovařík, 2003
(Figures 286–287, 305)

Parabuthus eritreaensis Kovařík, 2003: 142–143, 159, figs. 10–11, table 2; Kovařík, 2004: 18–19, fig. 6; Kovařík & Whitman, 2005: 110; Kovařík et al., 2016: 19–21, figs. 40–41, 89, 174–175, 189, 198, 204.

Type locality and type repository. Eritrea, Asmara env. (see comment in Kovařík et al., 2016: 19–21); FKCP.

Type material examined. **Eritrea**, Asmara env., 1♂ (holotype) 1♀ (allotypic paratype), 1983, leg. Dorsak; FKCP.

Additional material examined. **Somalia**, Gardo, Migiurtina, V. 1930, 1♂, leg. M. Milano & Luppi, FKCP No. 1133; Run, 16.VIII.1969, 1♂, S.B.S., MZUF No. 1127.

Diagnosis. Adults from 71.5 mm (male) to 90 mm (female) long. Base color uniformly yellow to yellowish brown, only fourth metasomal segment and telson dark. Pectine teeth number 39 in male and 35–36 in female. Stridulatory area present on dorsal surface of first to third segments, more pronounced on first and second segments. Metasoma densely hirsute. Movable finger of pedipalp more than twice as long as manus, bearing 13–15 rows of granules which include both external and internal granules. Manus of pedipalp smooth and very narrow in both sexes, pedipalp chela length/ width ratio 6.13 in male and 7.23 in female. Tarsomere I of all legs with bristle-combs.

Distribution. Probably restricted to Somalia.

Parabuthus granimanus Pocock, 1895
(Figures 30–80, 290–292, 305)

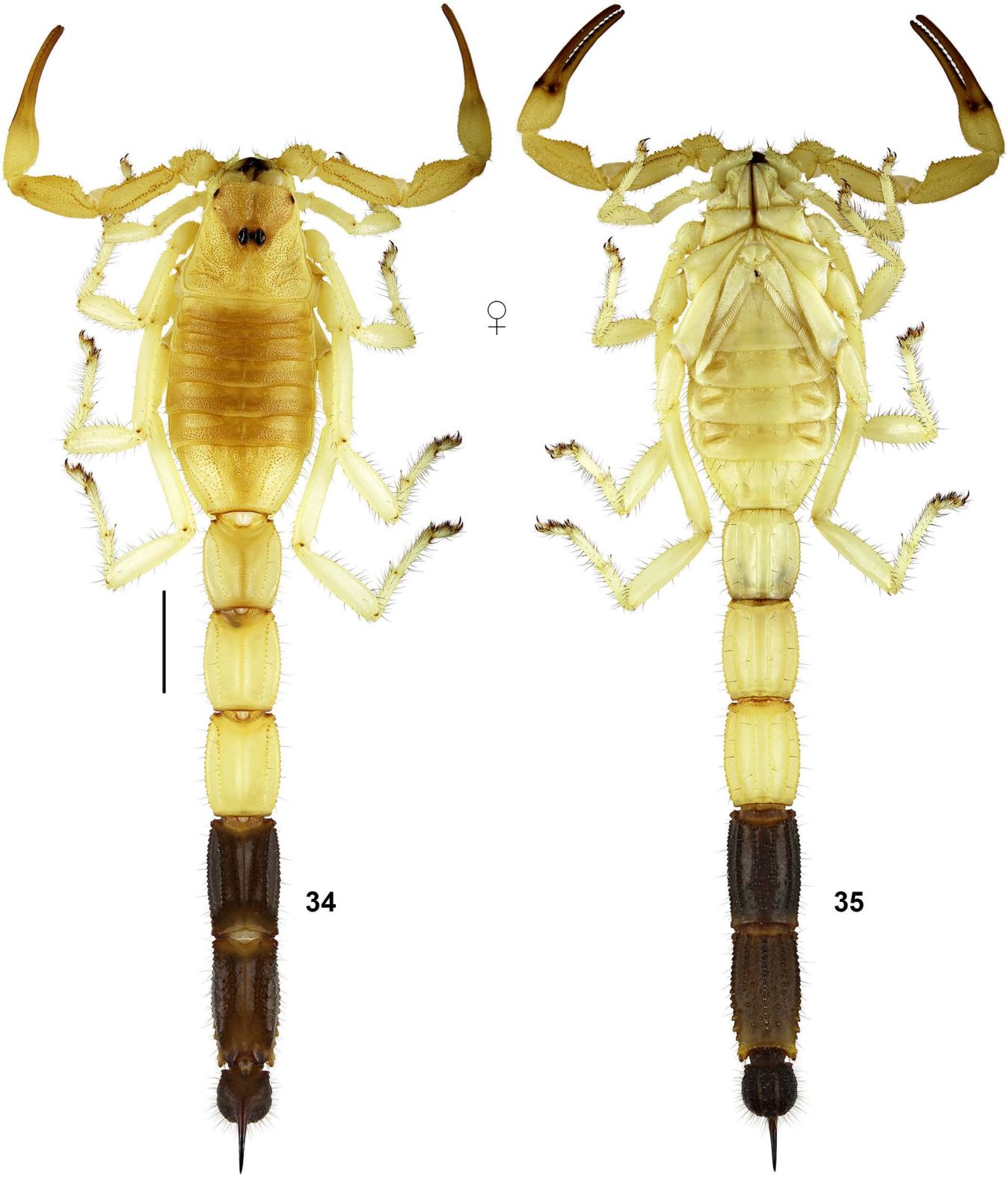
Parabuthus granimanus Pocock, 1895: 311–312, pl. IX, figs. 4–4d; Pocock, 1896: 178; Fet & Lowe, 2000: 202 (complete reference list until 2000); Kovařík, 2003: 144, fig. 7; Kovařík, 2004: 19, fig. 8; ? Kovařík & Whitman, 2005: 110; Kovařík et al., 2016: 22–23, figs. 42–49, 170–171, 186, 196, 204).

= *Parabuthus granimanus fuscicauda* Caporiacco, 1947: 228 (syn. by Kovařík, 2003: 144).

Type locality and type repository. Somalia (now Somaliland), Zeyla (now Zeila, in Somali Saylac, Fig. 79); BMNH.



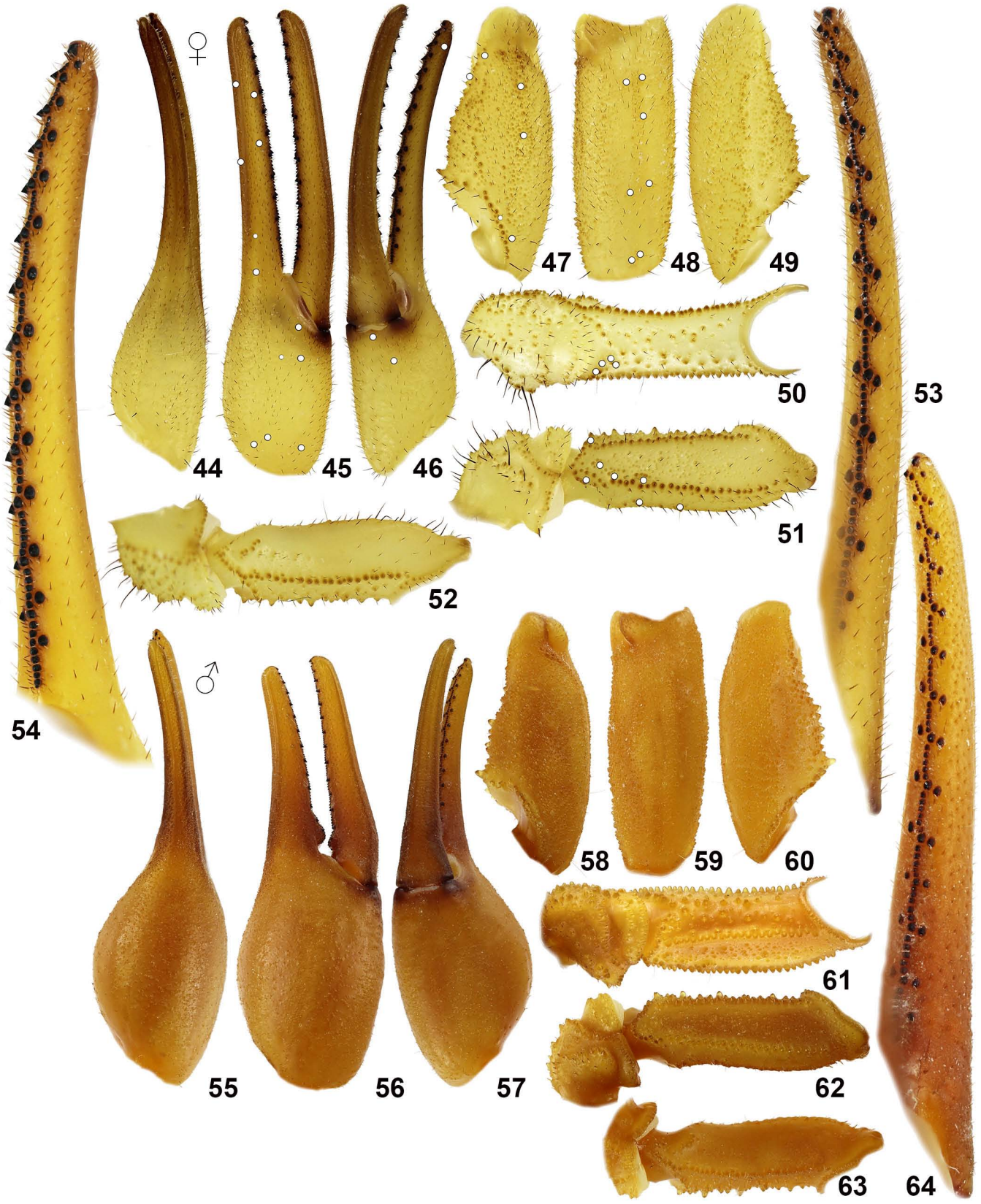
Figures 30–**33**: *Parabuthus granimanus*, dark colored specimens from locality 17ST. **Figures 30**–**31**. Male in dorsal (30) and ventral (31) views. **Figures 32**–**33**: Female in dorsal (32) and ventral (33) views. Scale bar: 10 mm.



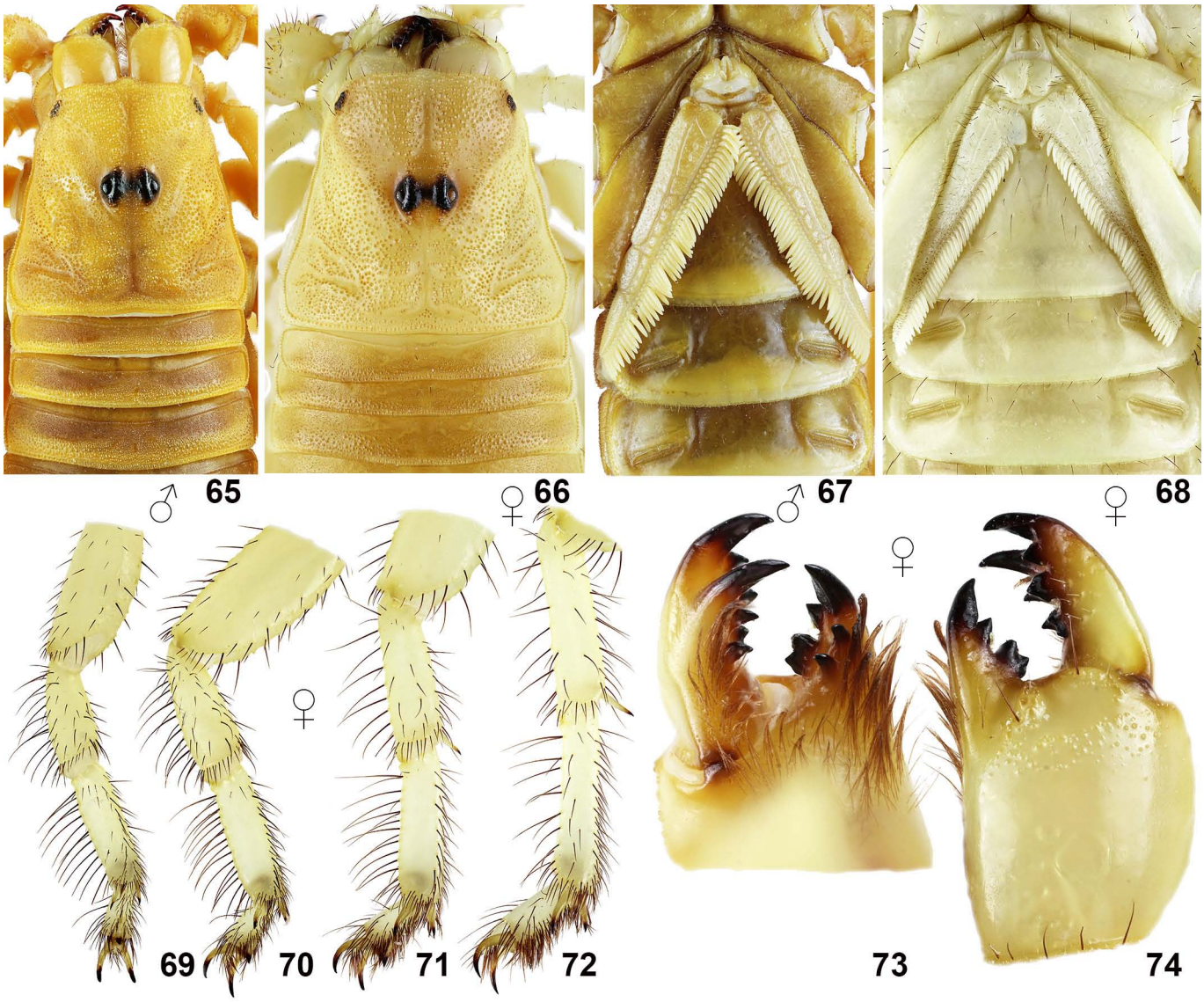
Figures 34–**35**. *Parabuthus granimanus*, light colored female from locality 18SG in dorsal (34) and ventral (35) views. Scale bar: 10 mm.



Figures 36–**43**: *Parabuthus granimanus*, metasoma and telson, differently colored specimens. **Figures 36**–**38**. Male from locality 17ST, lateral (36), dorsal (37), and ventral (38) views. **Figures 39**–**41**. Female from locality 17ST, lateral (39), dorsal (40), and ventral (41) views. **Figure 42**. Male from locality 11SE, lateral view. **Figure 43**. Male from locality 18SG, lateral view. Scale bar: 10 mm.



Figures 44–64: *Parabuthus granimanus* from locality 18SG, pedipalp segments. **Figures 44–54**. Female. Chela dorsal (44), external (45) and ventral (46) views. Patella dorsal (47), external (48) and ventral (49) views. Femur and trochanter internal (50), dorsal (51), and ventral (52) views. Movable finger (53) and fixed finger (54) dentition. Trichobothrial pattern is indicated in Figures 45–48 and 50–51. **Figures 55–64**. Male. Chela dorsal (55), external (56) and ventral (57) views. Patella dorsal (58), external (59) and ventral (60) views. Femur and trochanter internal (61), dorsal (62), and ventral (63) views. Movable finger (64) dentition.



Figures 65–74: *Parabuthus granimanus* from locality 18SG. **Figures 65**, **67**. Male, carapace and tergites I–III (65), coxosternal area and sternites III–V (67). **Figures 66**, **68–74**. Female, carapace and tergites I–III (66), coxosternal area and sternites III–V (68), left legs I–IV, retrolateral aspect (69–72 respectively), and right chelicera ventral (73) and dorsal (74) views.

Type material examined. **Somaliland**, Zeyla, 1♂1♀ (lectotype and paralectotype), BMNH. **Eritrea**, dint. Elghena (Hassi Habab), XI.-XII.1902, 1♂1♀ (lectotype and paralectotype of *Parabuthus granimanus fuscicauda* Caporiacco, 1947), MZUF, Nos 548 and 549 (see comments in Kovařík et al., 2016: 19–21).

Additional material examined (FKCP). **Somaliland**, Berbera env., 10°22.8‘N 45°02.2‘E, 107 m a.s.l. (fig. 48 in Kovařík et al., 2016, **11SE**), 8.-10.VII.2011, 3♂3♀ (figs. 42–49, 170–171, 186, 196 in Kovařík et al., 2016), leg. F. Kovařík; near Berbera, 10°16‘01“N 45°06‘21.3“E, 367 m a.s.l. (fig. 49 in Kovařík et al., 2016, **11SG**), 10.VII.2011, 1juv.♀, leg. F. Kovařík; Gerissa, N of Borama, 10°36‘01“N 43°26‘07“E, 245 m a.s.l., 11.-12.IX.2017 (**17ST**), 4♂(1319, 1334) 1♀8juvs., 3.VII.2019 (**19SH**), 1♂1♀, leg.F. Kovařík; Maid, 11°00‘03“N 47°06‘30“E, 52 m a.s.l. (**18SG** = 17SN), 25.VIII.2018, 1♀ (1553), leg. F. Kovařík et T. Mazuch; Habas village, 10°24‘42.6“N 42°48‘40.1“E, 866 m a.s.l. (**19SD**), 30.VI.2019, 1♂ (Fig. 80, 1693) 1♀ (1656), leg. F. Kovařík; Jidhi village, 10°37‘13.9“N 43°04‘09.4“E, 462 m a.s.l. (**19SE**), 1.VII.2019, 1♀ (1658), leg. F. Kovařík; 5 km of Jidhi village, 10°35‘04“N 43°02‘16.9“E, 515 m a.s.l. (**19SF**), 1.VII.2019, 1♂2juvs.♀ (1659, 1660, 1694), leg. F. Kovařík; near Zeyla, 11°19‘31.2“N 43°22‘16.9“E, 21 m a.s.l. (Fig. 79, **19SG**), 3.VII.2019, 1♂2juvs. (topotype, 1662), leg. F. Kovařík.

Emended diagnosis. Adults from 90 mm to 120 mm long. Base color uniformly yellow, yellowish brown, brown or black, metasoma IV–V and telson dark brown to black, darker than metasoma I–III. Pectine teeth number 42–49 in males and 36–44 in females. Stridulatory area present on dorsal surface of metasomal segments I–II, absent on third segment absent.





Figures 75–**76**: *Parabuthus granimanus*, dark colored specimens in vivo habitus at locality 17ST. **Figure 75**. Male. **Figure 76**. Female.





Figures 77–**78**: *Parabuthus granimanus*, in vivo habitus. **Figure 77**. Male in locality 19SD. **Figure 78**. Male in locality 19SF.





Figures 79–80. *Parabuthus granimanus*, type locality 19SG (79) and locality 18SD (80).

Metasoma hirsute. Metasoma of male narrow; metasomal segment V length/ width ratio 1.95–2.05 in male. Movable and fixed fingers of pedipalp bear 12–13 rows of granules, all with external and internal accessory granules. Fingers of pedipalp not elongated. Fingers of pedipalps of male with a tubercle on inner side of base. Male with chela of pedipalps broader than those of female, pedipalp chela length/ width ratio 3.10–3.3 in male. Pedipalp manus and patella strongly granulated. Tarsomere I of legs I–II with bristle-combs.

Distribution. ? Djibouti, ? Ethiopia, Somaliland.

Parabuthus hamar Kovařík, Lowe, Plíšková et Šťáhlavský, 2016
(Figures 280–283, 305)

Parabuthus hamar Kovařík et al., 2016: 23–34, figs. 50–83, 90–91, 168–169, 187, 195, 204, table 2.
= *Parabuthus terzanii* Rossi, 2017 (2016): 8–10, figs. 5–7. **Syn**. **n**.

Type locality and type repository. Ethiopia, SNNPR, 20 km SE Konzo, 05°14‘33“N 37°32‘06“E, 839 m a.s.l. (Locality No. 16EF, fig. 93 in Kovařík et al., 2016: 27), FKCP.

Diagnosis. Adults from 88 mm to 92 mm long. Base color uniformly yellow to yellowish brown, carapace, tergites, metasoma IV–V and telson dark brown to black. Pectine teeth number 38–44 in males and 30–35 in females. Stridulatory area present on dorsal surface of metasomal segments I–II in both sexes, absent on third segment in adult male and very reduced in female. Metasoma densely hirsute. Metasoma of male narrow; metasomal segment V length/ width ratio 1.82–2.05 in male. Movable and fixed fingers of pedipalp bearing 12–13 rows of granules, all with external and internal accessory granules. Fingers of pedipalp not elongated, movable finger length/ manus length ratio 1.7 in male. Fingers of pedipalps of male with inner side of base smooth, no trace of tubercle. Manus of pedipalp of male broad, pedipalp chela length/ width ratio 3.05–3.13 in male and 4.27 in female. Pedipalp manus smooth, patella strongly granulated. Tarsomere I of all legs with bristle-combs.

Comments. Kovařík et al. (2016, published 23rd August 2016) revised all *Parabuthus* species of Horn of Africa for the first time. After studying numerous specimens, the complex of *P. liosoma* was split into three sibling species with allopatric areas of distribution: *P. abyssinicus* Pocock, 1901 (Eritrea, Djibouti, central and north-eastern parts of Ethiopia), *P. liosoma* (Ehrenberg, 1828) (Yemen and Saudi Arabia), and *P. maximus* Werner, 1913 (Tanzania and Kenya). A fourth species, *P. hamar* was described from the south of Ethiopia.

Rossi (2017, dated 14th July 2016, published/accessible in March 2017) described *P. terzanii* based on specimens from 1939 without studying the whole *Parabuthus liosoma* complex. However, under affinities he discussed its relationship with “*Parabuthus abyssinicus*” without any explanation as to why he invoked that particular name combination. In fact, the combination *P. abyssinicus* was used only in the period 1901–1915, bookended by Pocock (1901: 1) and Borelli (1915: 461). Birula synonymized this taxon with *P. liosoma* in 1917, and henceforth from 1917 to 2016 all authors referenced either *P. liosoma abyssinicus*, or just *P. leiosoma* (e. g. Borelli 1919–1931, Caporiacco 1937–1941, see Fet & Lowe, 2000: 206). The name *P. leiosoma* was also used by Lourenço and Rossi in their paper in 2016 (2016: 26, dated 29th February 2016) for a population from Somalia (Sar Uanle). In fact, Kovařík et al. (2016) were the first authors in 100 years to use the combination *Parabuthus abyssinicus*, and to provide a detailed explanation of the characters and distributional data justifying its restoration to species status. In light of these suspiciously improbable circumstances, it is apparent that Rossi (2017) appropriated the information for his affinities from our revision, and then pre-dated his own paper.

Distribution. Ethiopia.

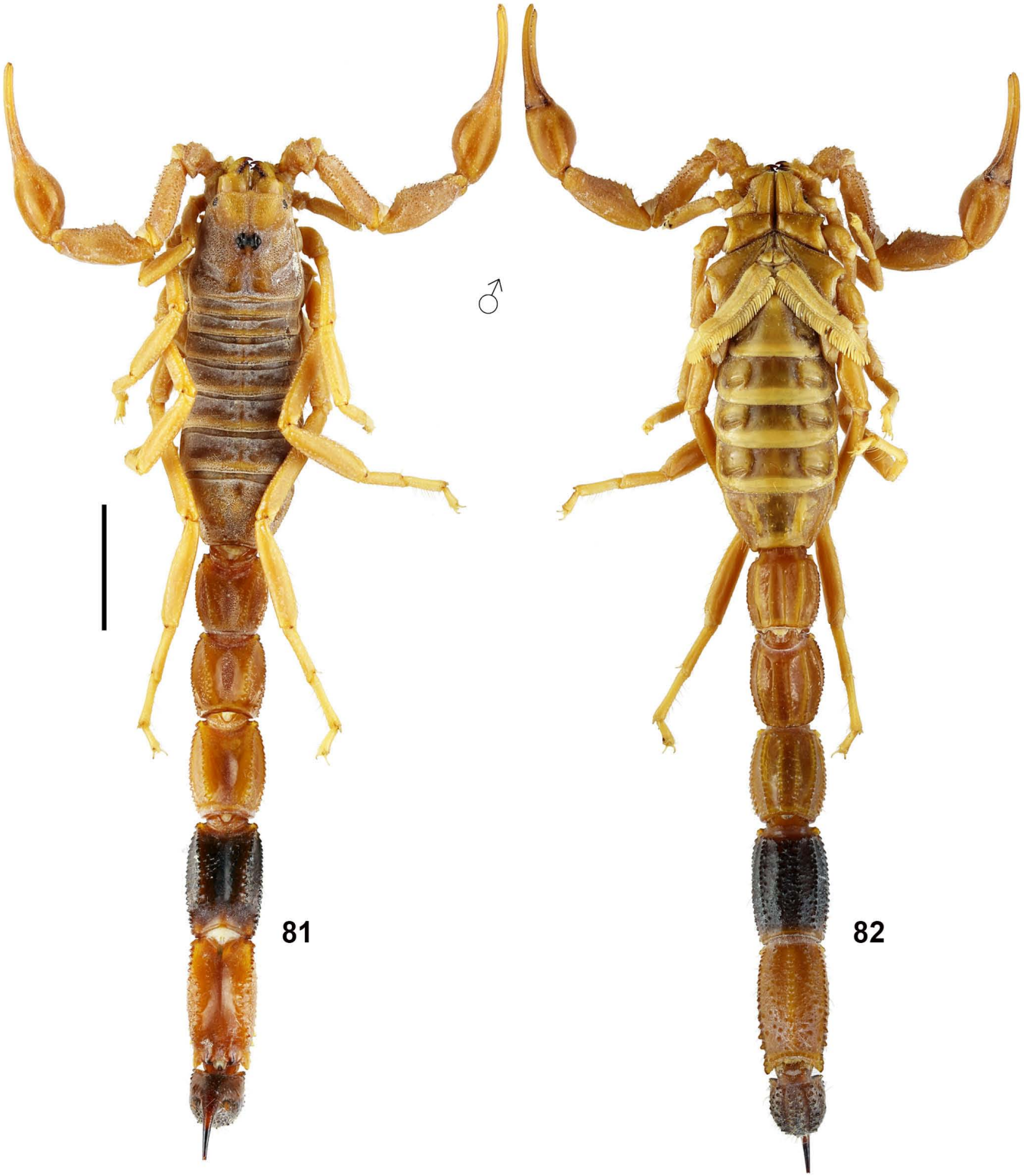
Parabuthus heterurus Pocock, 1897
(Figures. 81–104, 266–267, Tables 2, 4)

Parabuthus heterurus (in part) Pocock, 1897: 402; Fet & Lowe, 2000: 204 (complete reference list until 2000); Prendini, 2003: 19; Kovařík, 2003: 144; Kovařík, 2004: 19, fig. 9; Kovařík & Whitman, 2005: 110; Kovařík et al., 2016: 34 (in part, types only).
= *Parabuthus stefaninii* Caporiacco, 1927: 58; Kovařík & Whitman, 2005: 112 (syn. by Kovařík, 2003: 144, 159).

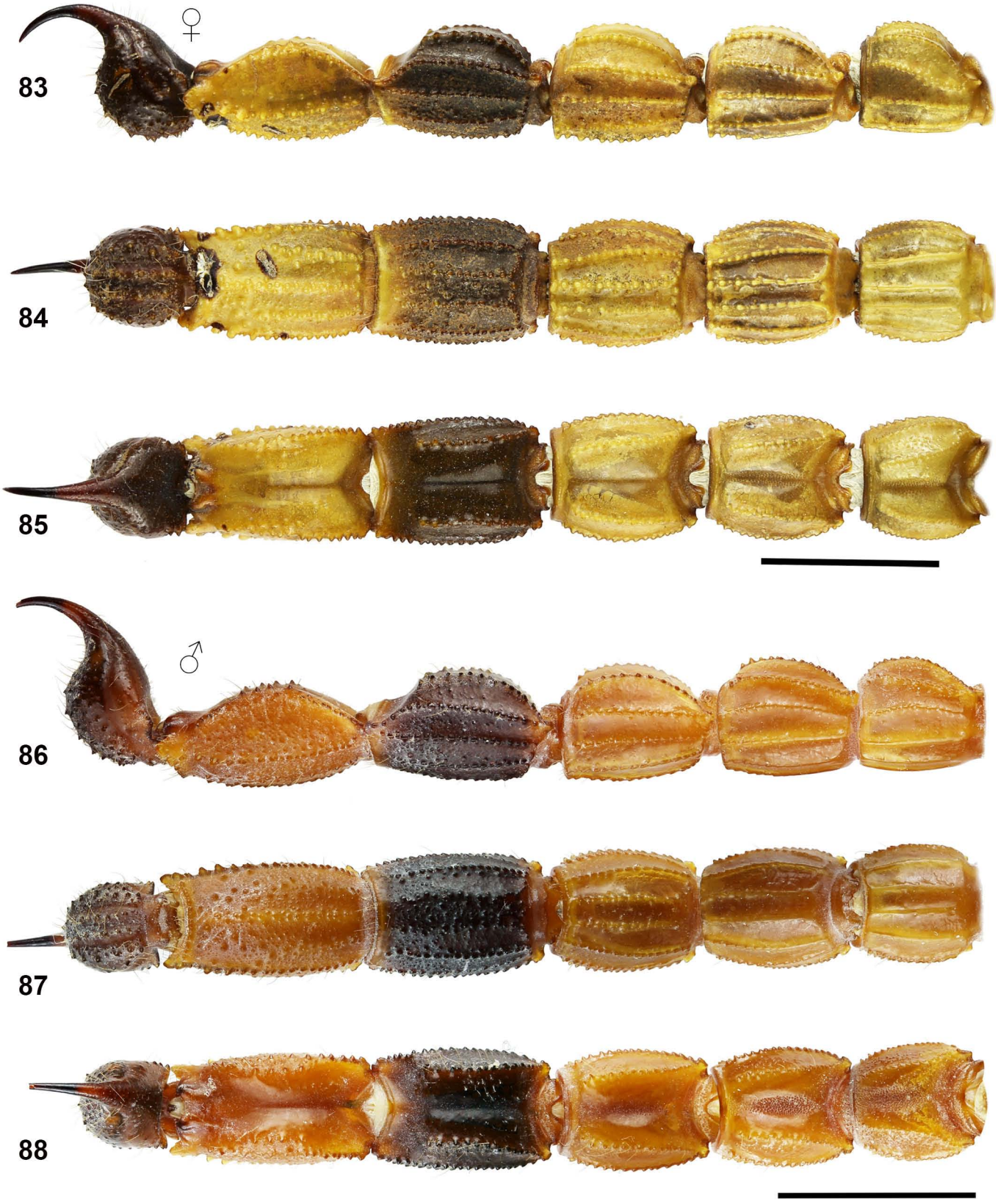
Type locality and type repository. Ethiopia, Shebeli River, 07°15‘38“N 42°28‘15“E (new designation, see comments below); BMNH.

Type material examined. Somaliland (now Ethiopia), Shebeli River, 07°15‘38“N 42°28‘15“E , 24.VIII.1894, leg, A. D. Smith, 1♂ (paralectotype) 1♀ (lectotype dsg. by Prendini, 2000), BMNH.

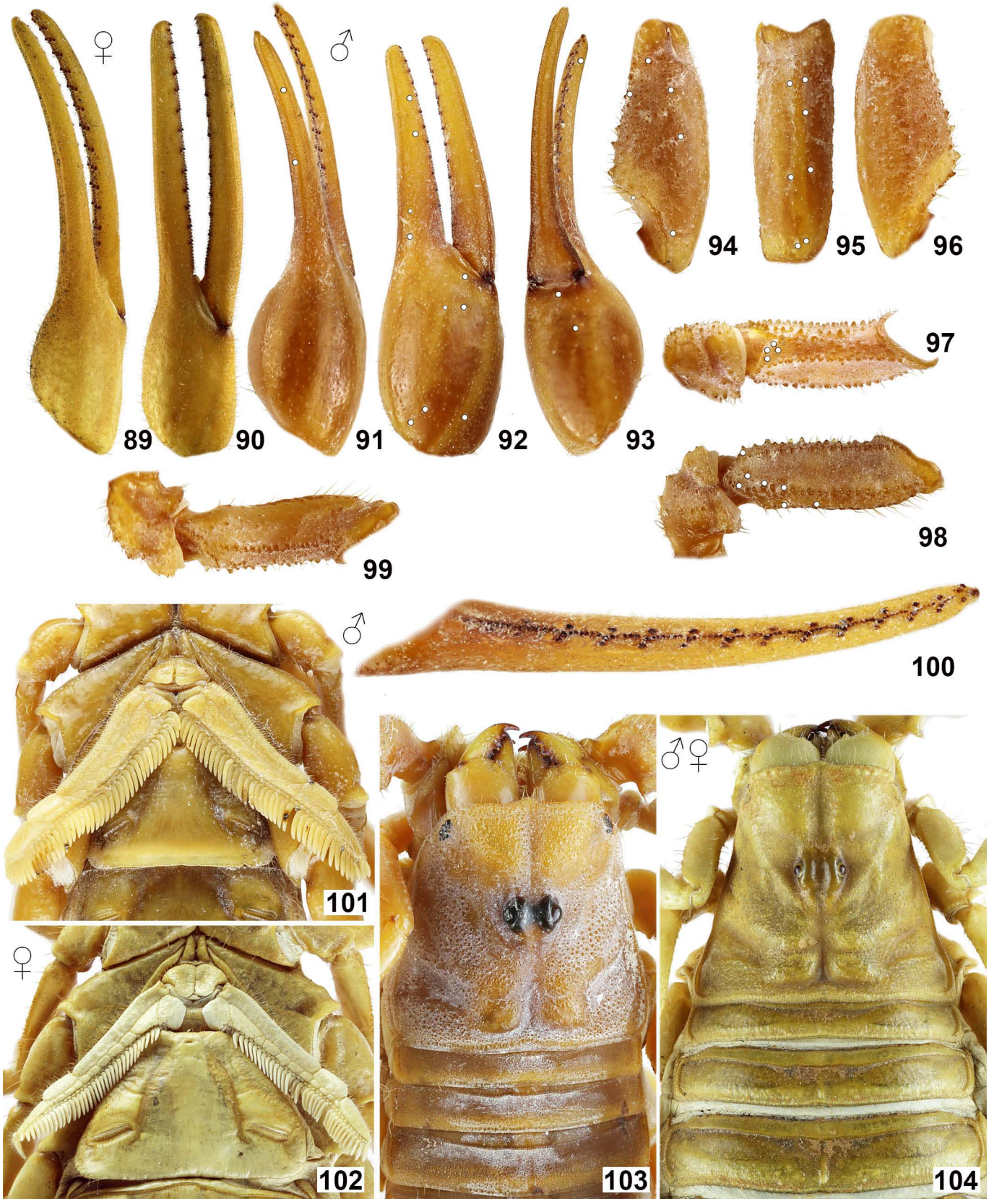
Additional material examined. **Somalia**, El Ueene, 03°49‘N 47°13‘E, VI.1980, 1juv.♂, leg. Dorsak, FKCP; Afgooye env., X. 1980, 1♂, FKCP; 1♀ no exact locality data, NMPC.
Additional material examined in 2003–2004. **Ethiopia**, Sagan-Omo, Neghelli (locality not verified), 15.III.1937, 1♂1juv., leg. E. Zavattari, MZUF No. 661. **Somalia**, Mogadischo, 1♀, leg. S. A. Nicotra, MZUF No. 1130; Belet Amin, VII.1934, 1juv., leg. S. Patrizi, MZUF No. 1131; Giumbo, 24.IX.1937, 1 juv., MZUF No. 1142; El Bur, 06.VIII.1959, 1♂, S.B.S., MZUF No. 1136; Afgoi (Afgooye), 1960, 2♀, leg. A. Sammicheli, MZUF Nos. 1161 et 1164, 13.I.1977, 1♂, leg. A. Simonetta, MZUF No. 1139, 1978, 2♂2 juvs., leg. A. Simonetta, MZUF No. 1125; 16 km N Mogadischo, Shebeli River, 6.VII.1962, 1♀, S.B.S., MZUF No. 1128; 45 km NE Dusa Mareb, 20.VIII.1964, 1♂, S.B.S.,



Figures 81–**82**. *Parabuthus heterurus*, male from Somalia, Afgooye env. in dorsal (81) and ventral (82) views. Scale bar: 10 mm.



Figures 83–**88**: *Parabuthus heterurus*, metasoma and telson. **Figures 83**–**85**. Female from Somalia, lateral (83), ventral (84), and dorsal (85) views. **Figures 86**–**88**. Male from Somalia, Afgooye env., lateral (86), ventral (87), and dorsal (88) views. Scale bars: 10 mm.



Figures 89–104: *Parabuthus heterurus*. **Figures 89–90**, **102**, **104**. Female from Somalia, pedipalp chela dorsal (89) and external (90) views, coxosternal area and sternite III (102), carapace and tergites I–III (104). **Figures 91–101**, **103**. Male from Somalia, Afgooye env., pedipalp chela dorsal (91), external (92) and ventral (93) views, pedipalp patella dorsal (94), external (95) and ventral (96) views, pedipalp femur and trochanter internal (97), dorsal (98), and ventral (99) views, pedipalp movable finger (100) dentition, coxosternal area and sternite III (101), carapace and tergites I–III (103). Trichobothrial pattern is indicated in Figures 91–95 and 97–98.

Dimensions (MM)		*P. heterurus* ♂	*P. heterurus* ♀	*P. kabateki* **sp. n.** ♂ **holotype**
Carapace	L / W	8.73 / 9.30	10.39 / 11.50	8.80 / 9.69
Mesosoma	L	19.95	30.15	22.55
Tergite VII	L / W	5.90 / 9.17	6.76 / 10.46	5.88 / 9.36
Metasoma + telson	L	50.18	54.09	51.58
Segment I	L / W / D	6.34 / 6.14 / 5.34	7.14 / 6.78 / 6.28	6.43 / 6.50 / 5.84
Segment II	L / W / D	7.18 / 6.20 / 5.49	8.03 / 6.97 / 6.58	7.34 / 6.67 / 6.29
Segment III	L / W / D	7.58 / 6.34 / 5.98	8.50 / 7.06 / 6.85	8.03 / 6.92 / 6.54
Segment IV	L / W / D	8.96 / 6.23 / 5.58	9.73 / 7.09 / 7.01	9.27 / 6.78 / 6.04
Segment V	L / W / D	10.26 / 5.64 / 5.16	10.26 / 6.80 / 6.40	10.24 / 6.27 / 5.56
Telson	L / W / D	9.86 / 4.57 / 4.27	10.43 / 5.70 / 5.19	10.27 / 4.83 / 4.64
Pedipalp	L	30.43	31.71	30.19
Femur	L / W	7.51 / 2.27	7.69 / 2.62	7.47 / 2.47
Patella	L / W	8.43 / 3.19	8.93 / 3.66	8.62/ 3.81
Chela	L	14.49	15.09	14.10
Manus	W / D	3.73 / 4.20	3.24 / 3.35	4.58 / 4.43
Movable finger	L	9.10	10.73	8.74
Total	**L**	**78.86**	**94.63**	**82.93**

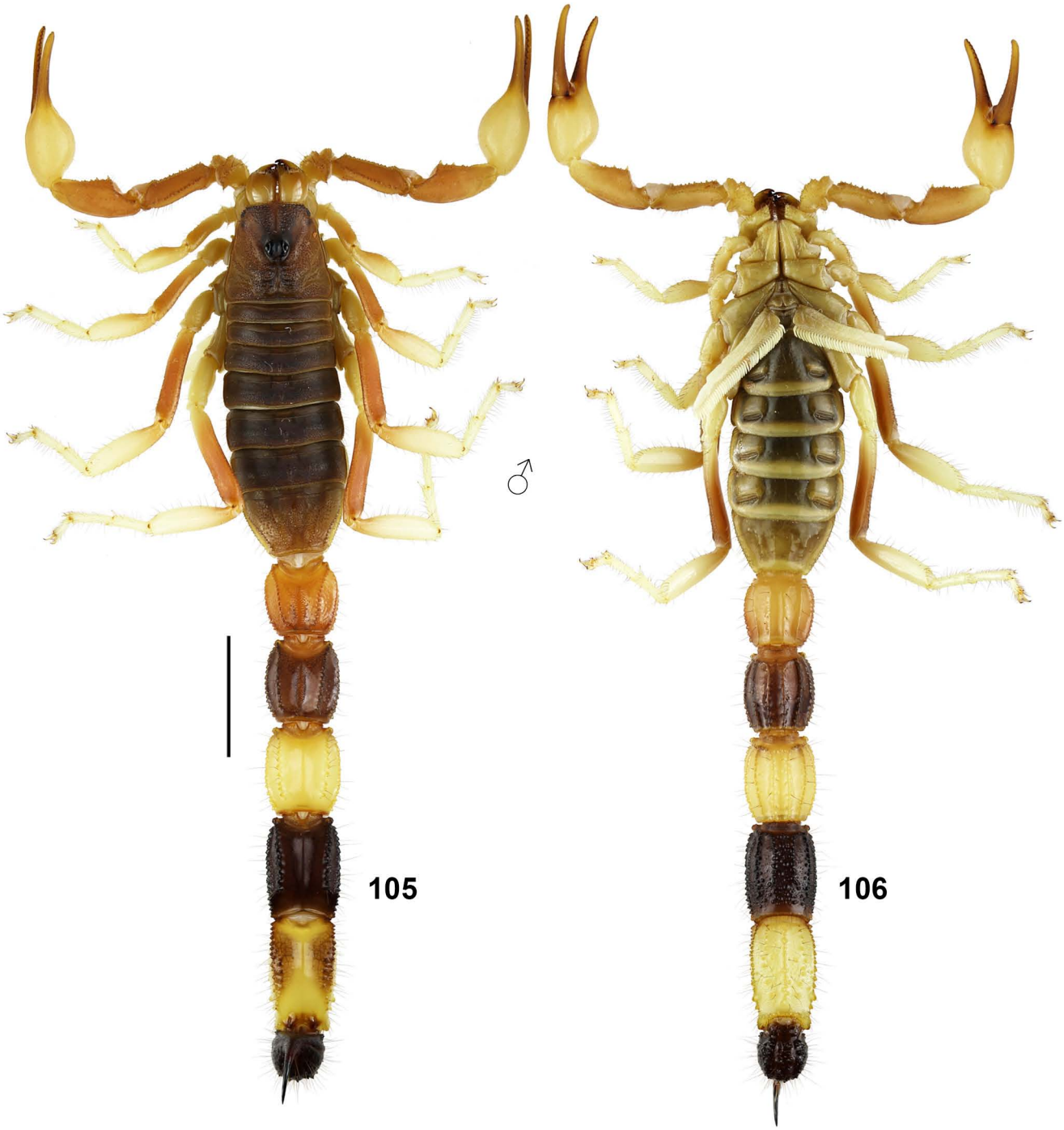
Table 2. Comparative measurements of adults of *Parabuthus heterurus* and *P. kabateki* **sp. n.** Abbreviations: length (L), width (W, in carapace it corresponds to posterior width), depth (D).

MZUF No. 1123; Jesomma, 11-15.VIII.1968, 1♂, S.B.S., MZUF No. 1126; Bud Bud, 15.-16.VIII.1968, 1♂2juvs., S.B.S., MZUF No. 1124. 1129, and 1132; Sar Uanle, *circa* 1972, 1juv., MZUF No. 1138; Sar Uanle, 14.IV.1975, 1 juv., S.B.S., MZUF No. 1140; Berdale, 13.VI.1978, 1juv., S.B.S., MZUF No. 1105.

Emended diagnosis. Adults from 75 (male) mm to 98 (female) mm long. Base color uniformly yellow to yellowish brown, tergites brown to black, fourth metasomal segment and telson dark. Pectine teeth number 36–42 in male and 32–39 in female. Stridulatory area on dorsal surface of first to third segments, more pronounced on first and second segments. Metasoma densely hirsute. Metasomal segment V of male length/ width ratio is 1.60–1.82 in male. Movable and fixed fingers of pedipalp bear 12–14 rows of granules, all with external and internal accessory granules. Fingers of pedipalp are not elongated. Fingers of pedipalps of male with inner side of base smooth, no trace of tubercle. Manus of pedipalp of male broad, pedipalp chela length/ width ratio 3.40–3.89 in male. Pedipalp manus smooth, patella granulated. Tarsomere I of legs I–III with bristle-combs.

Comments about type locality. Types of *P. heterurus* were collected by A. Donaldson Smith during "The first expedition from Somaliland to Lake Lamu" in 1894. Pocock (1897: 402) cited specimens from "*Hargesa*, *5,000 ft. and Silul*, *in Somaliland; Shebeli River*, *TYPES; and from pools of water to the west of Shebeli River*, *15.12.94*" and as the types he designated the specimens from "*Shebeli River*, *Somaliland*" from which Prendini designated the lectotype in 2000 (designation was published by Prendini in 2003: 19). The Shebeli River (cited also as Schabegh River, Shebelle River in English, and *Webi Shabeelle* in Somali) begins in the highlands of Ethiopia, and then flows southeast into Somalia towards Mogadishu. Fortunately the book published by Smith (1897) contained much detailed information which can help us to identify the localities where Smith could have been collecting near the Shebeli River in 1894. There we can find that the locality cited as "*pools of water to the west of Shebeli River*, *15.12.94*" has approximate coordinates 07°01'N 42°25'E. Pocock (1897: 402) added the date "*24.8.94*" for "*Shebeli River*" in the next paragraph. On that date, Smith was in "Crocodile Camp" on the bank of the Shebeli River and recorded the exact coordinates of the locality as 07°15'38"N 42°28'15"E on the map (Smith, 1897). We are convinced that we can cite this place as the true type locality of *P. heterurus* (see Fig. 305).

Another problem is that Pocock located "*Shebeli River*" and all other localities of the cited specimens in Somaliland which is accepted by recent authors (Kovařík et al, 2016). Fig. 36 in Kovařík et al. (2017: 15) shows a map of Africa published in 1885, which explains why Pocock cited the localities as these places in Somaliland and titled his 1897 paper "The first expedition from Somaliland to Lake Lamu"; and fig. 37 in Kovařík et al. (2017: 16) shows a map with the



Figures 105–106. *Parabuthus kabateki* **sp. n.**, male holotype in dorsal (105) and ventral (106) views. Scale bar: 10 mm.

Shebeli River (as Webi Shebeli) originally published by Smith (1897). However, nowadays the type locality (*Shebeli River*, *24.8.94*) and the localities "*Silul*" and "*pools of water to the west of Shebeli River*, *15.12.94*" are located in Ethiopia while "*Hargesa* (Hargeysa)" is the capital of Somaliland.

We suspect that *P. heterurus* occurs only in Ethiopia and Somalia (region around the Shebeli River, see Fig. 305) and that the specimen cited by Pocock from Hargesa may belong to a different species, probably one of those described herein from Somaliland.

Affinities. The complex of species "*P. heterurus* group" characterized by the color combination of metasoma IV black and metasoma V yellow (Figs. 83–88) includes *P. heterurus* sensu stricto, *P. kajibu* Kovařík et al., 2016 from Ethiopia and *P. kabateki* **sp. n.**, *P. robustus* **sp. n.**, and *P. somalilandus* **sp. n.** from Somaliland. *P. heterurus* sensu stricto has the fingers of pedipalps more elongate and pedipalp chela trichobothrium *eb* is located on the fixed finger (Fig. 92). Other cited species have the trichobothrium *eb* located on the base of manus (Figs. 127, 140).

Distribution. Ethiopia, Somalia.

***Parabuthus kabateki* sp. n.**
(Figs. 105–136, 150–155, 161–164, 268, 293–298, 305, Tables 2, 4, 5)
http://zoobank.org/urn:lsid:zoobank.org:act:E270E2B2-2826-4ED7-8B9E-1287FDDACB18

Type locality and type repository. Somaliland, Shanshade vill., 08°39‘35“N 45°55‘49“E, 790 m a.s.l. (Locality No. 18SJ, Figs. 163–164); FKCP.

Type material. **Somaliland**, Shanshade vill., 08°39‘35“N 45°55‘49“E, 790 m a.s.l. (Locality No. **18SJ**), 29-31. VIII.2018, 7♂3♂juvs.3♀juvs. (holotype and paratypes, 1549, 1550), leg. F. Kovařík et al. (FKCP; hemispermatophores GLPC).

Etymology. The name honors Czech entomologist and friend Petr Kabátek who visited the type locality with us and helped to collect scorpions. However, when he collected an adult male paratype of this species by hand he was stung on a finger that was paralyzed for two days. Thanks to his enthusiasm in the field, we know about the capability of this scorpion to cause painful envenomation.

Diagnosis. Adult males from 75 mm to 85 mm long, adult female unknown. Base color yellow to brown, tergites brown, metasoma I yellow, orange, brown or black, metasoma II orange to black, metasoma III yellow, metasoma IV black, and metasoma V yellow with black pattern mainly on dorsal surface. Telson black. Pectine teeth number 42–48 in males and 40–43 in females. Stridulatory area present on dorsal surface of metasoma I–II, reduced or absent in metasoma III, and absent in metasoma IV–V. Metasoma hirsute. Metasoma V length/ width ratio is 1.58–1.67 in males. Dorsal carina of metasomal segment IV composed posteriorly of stronger non-pointed granules in males. Movable and fixed fingers of pedipalp bear 12–13 rows of granules, all with external and internal accessory granules. Fingers of pedipalp not elongated. Fingers of pedipalps of male with inner side of base smooth, no trace of tubercle. Manus of pedipalp of male broad, pedipalp chela length/ width ratio 2.90–3.25 in males. Pedipalp chela smooth and patella finely granulated. Tarsomere I of legs I–III with bristle-combs.

Description. The adults are 75–85 mm long. The habitus is shown in Figs. 105–106. For position and distribution of trichobothria of pedipalps see Figs. 126–130, 132–133. Sexual dimorphism: adult males with pedipalp chela broader. Female with basal middle lamella wide (Fig. 117) and smaller number of pectine teeth.

Coloration (Figs. 105–106). The base color is variable yellow to brown. The pedipalp chela in males is yellow. The metasoma I is yellow, orange, brown or black, metasoma II is orange to black, metasoma III is yellow, metasoma IV is black, and metasoma V is yellow with black pattern mainly on dorsal surface. Telson is black. Carapace and tergites can be yellowish brown or almost black.

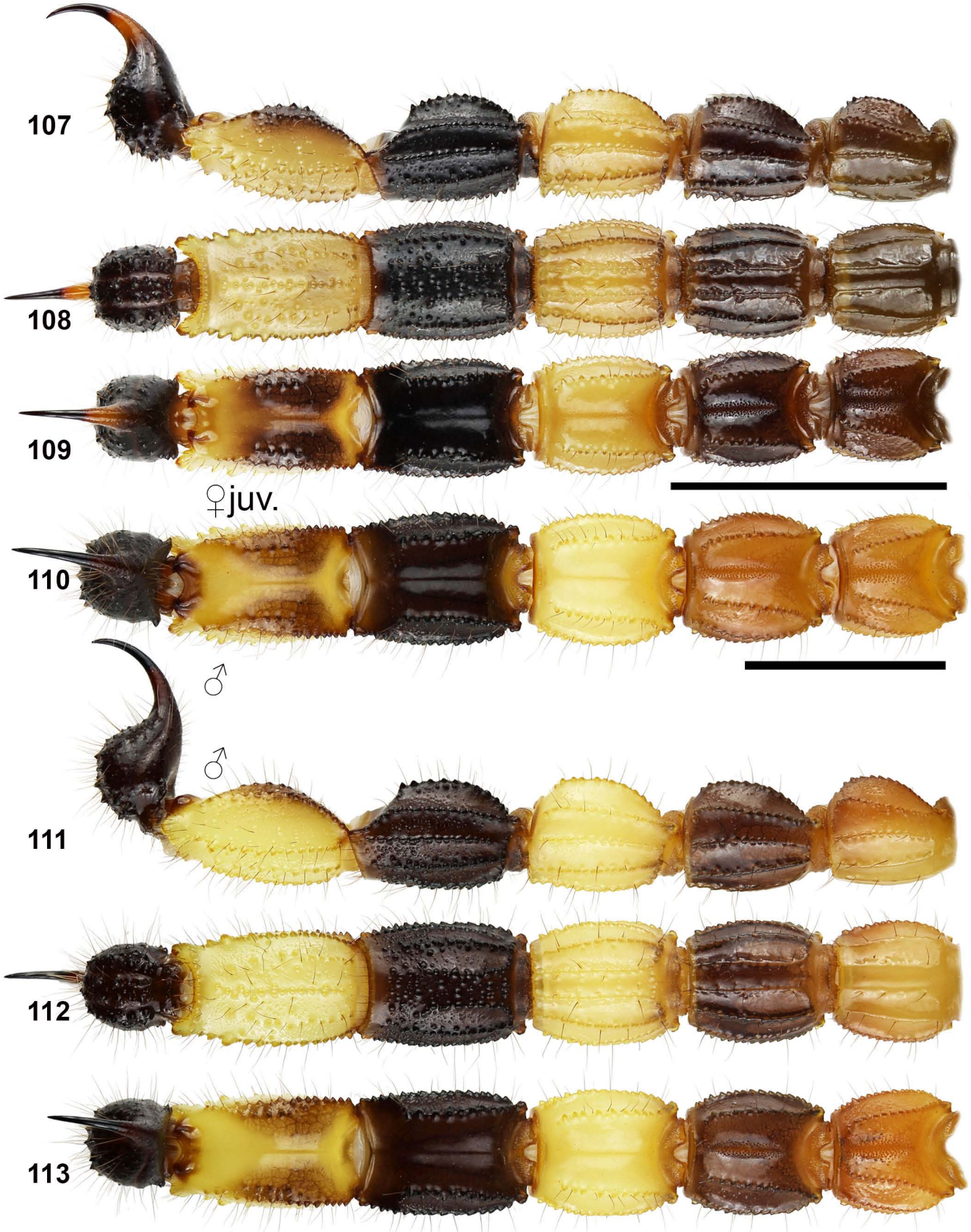
Carapace and mesosoma (Figs. 105–106, 114–117). The entire carapace is covered with large granules, more in males. Carinae are absent. The anterior margin of the carapace is almost straight, medially weakly convex, and bears 14–18 symmetrically distributed short, stout spiniform macrosetae. The tergites are granulated, more so in males. Tergite VII is pentacarinate, with lateral pairs of carinae strong, serratocrenulate. The pectinal tooth count is 42–48 (1x42, 2x43, 3x 44, 4x45, 5x46, 2x47, 1x48) in males and 40–43 (3x40, 1x41, 1x42, 1x43) in females. The pectine marginal tips extend to the end of the fourth sternite in the male and to a quarter of the fourth sternite in the female. The pectines have three marginal lamellae and 11–13 middle lamellae. The lamellae and fulcra bear numerous dark setae. All sternites are smooth, except that there is a stridulatory area on the third sternite that is more visible in the male. Sternite VII bears four carinae that are more visible in the male.

Metasoma and telson (Figs. 107–113). The first to fourth metasomal segments bear a total of 10 granulated carinae. The fifth segment has five carinae, and its ventral and lateral surfaces are granulated. The ventral surface of metasomal segment V has several strong paired granules symmetricaly located laterally in the middle part. Dorsolateral carinae of the third and fourth segments terminate in stronger denticles, of which the posterior-most denticle is not enlarged. The stridulatory area is located on the dorsal surface of the first and second segments in both sexes. On the third segment it is reduced or absent and on fourth and fifth segments the stridulatory area is absent. The entire metasoma and telson are pilose with long hairs. The ventral surface of the telson is strongly granulated. The metasomal segment V length/ width ratio is 1.58–1.67 in males. The telson is rather bulbous, with the aculeus approximately the same length as the vesicle in males and little bit shorter in female juvenile.

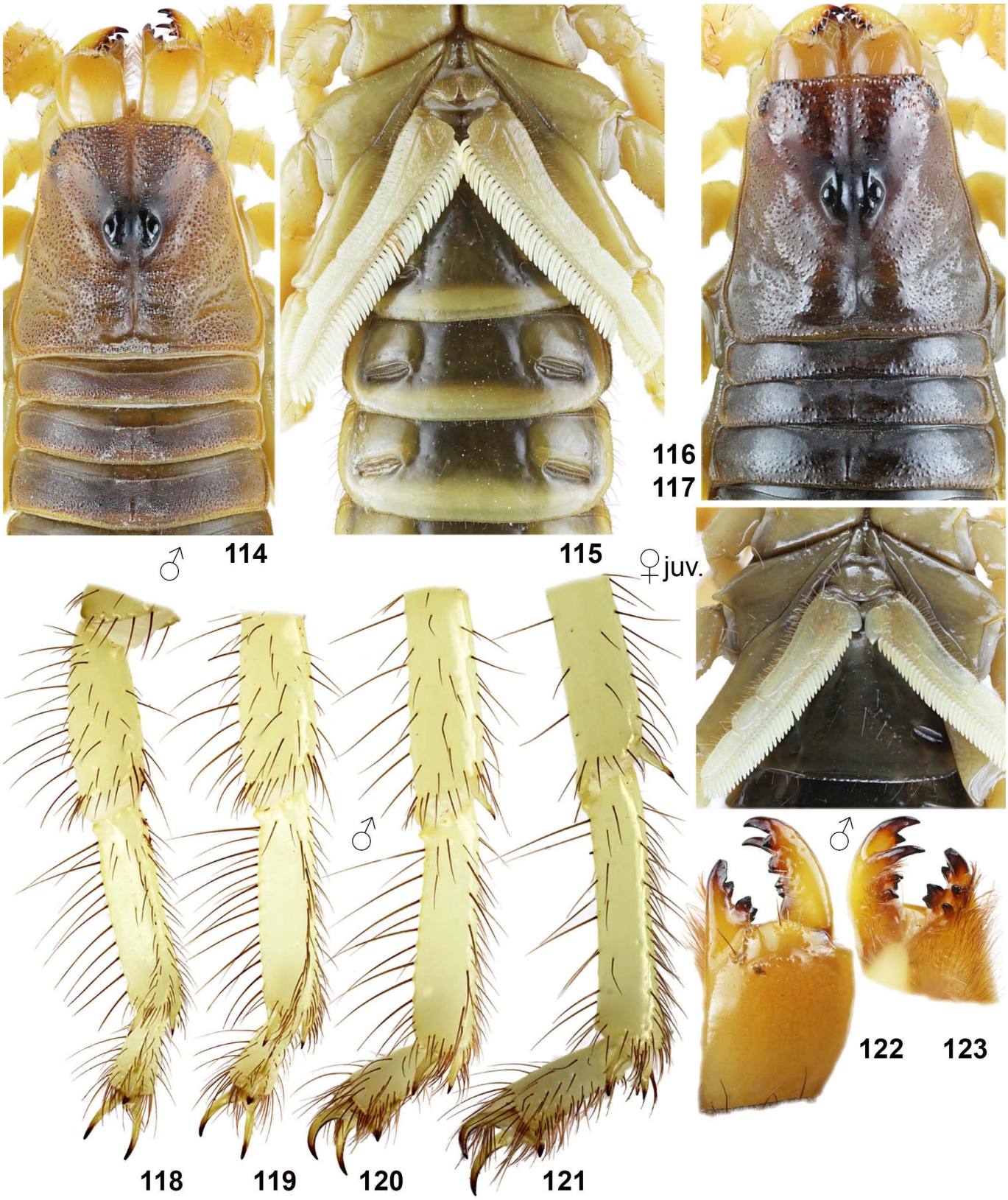
Pedipalps (Figs. 124–136). The pedipalps are hirsute with shorter setae on the chela and patella, and longer setae on the femur, and trochanter. The femur bears four carinae. The patella and chela lack carinae. The chela is smooth without carinae and the patella is finely granulated with carinae indicated. The movable and fixed fingers of pedipalp bear 12–13 rows of granules, all with external and internal accessory granules. The fingers of the pedipalp of male with inner side of base smooth, tubercle absent. The manus of the pedipalp of male broad, pedipalp chela length/ width ratio 2.90–3.25.

Legs (Figs. 118–121). Legs III and IV bear tibial spurs. Retrolateral and prolateral pedal spurs are present on all legs. All legs without distinct carinae and smooth. The tarsomeres bear two rows of macrosetae on the ventral surface and additional macrosetae on the other surfaces. The bristle-combs are present on all legs, although slightly reduced on the fourth leg.

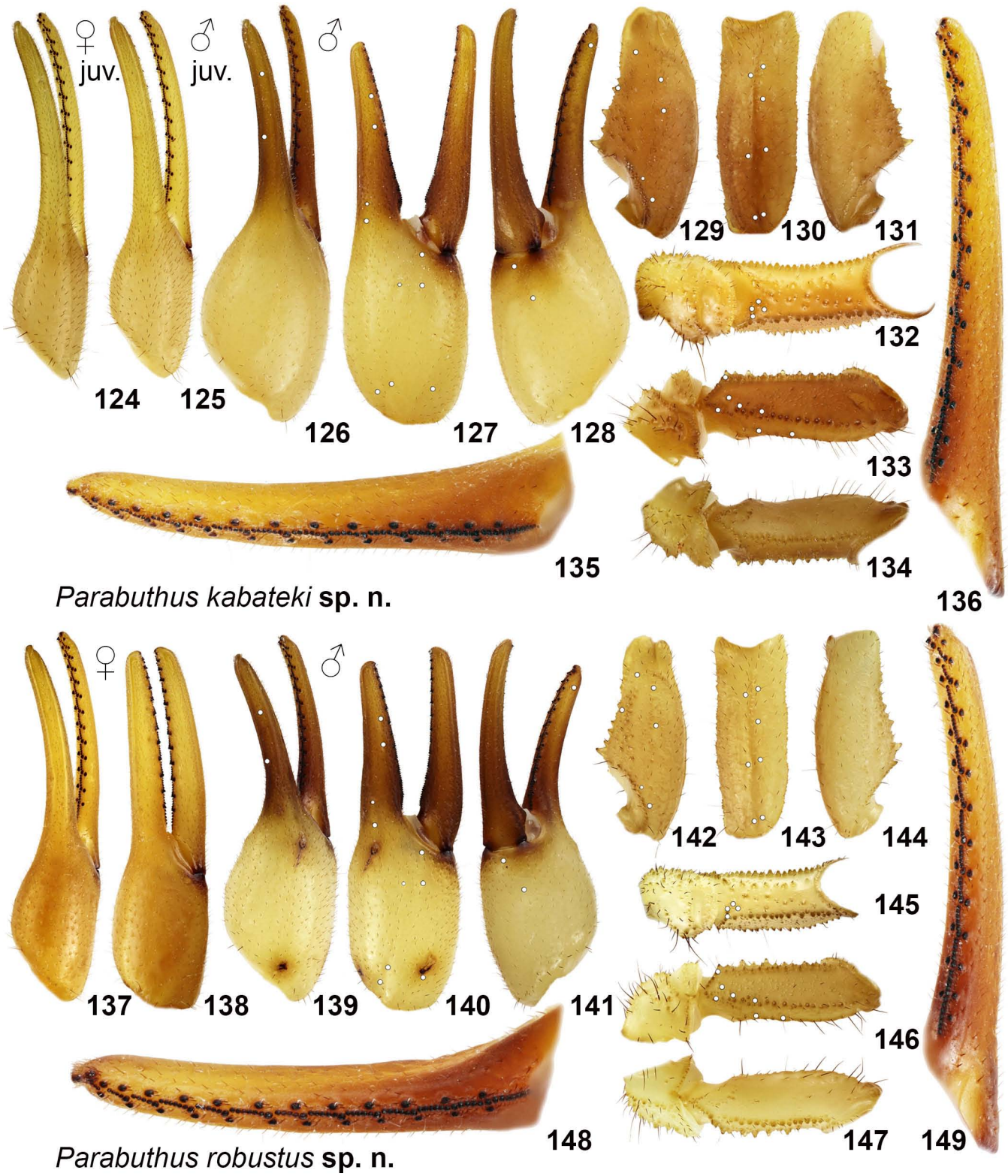
Hemispermatophore (Figs. 150–155). Flagelliform, elongate and slender, trunk ca. 10 times length of capsule region. Flagellum emanating from posterior lobe of capsule; pars recta narrow, hyaline, 0.9× length of capsule; pars reflecta hyaline in proximal 1/3 of length, becoming thicker, opaque white in distal 2/3 of length, in total ca. 5.5× length of



Figures 107–113: *Parabuthus kabateki* **sp. n.**, metasoma and telson. **Figures 107–109**. Female juvenile paratype, lateral (107), ventral (108), and dorsal (109) views. **Figure 110**. Male paratype, dorsal view. **Figures 111–113**. Male holotype, lateral (111), ventral (112), and dorsal (113) views. Scale bars: 10 mm.



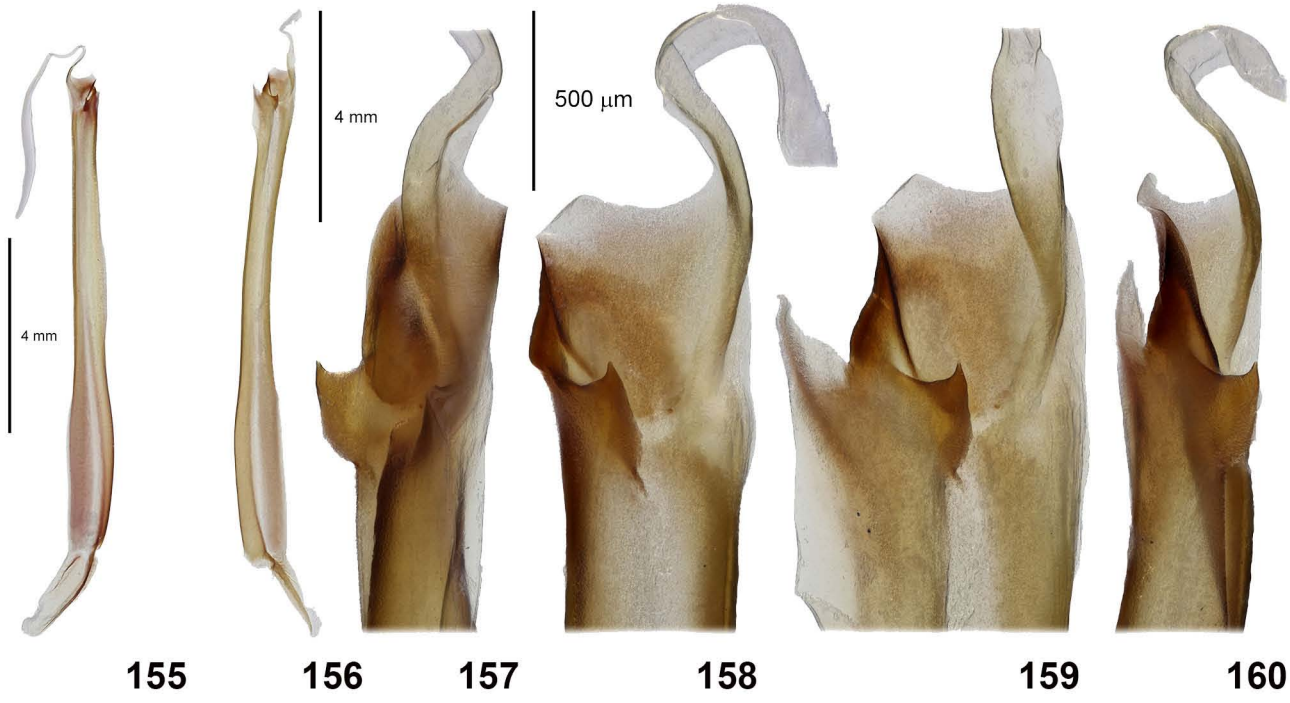
Figures 114–123: *Parabuthus kabateki* **sp. n.** **Figures 114–115**, **118–123**. Male holotype, carapace and tergites I–III (114), coxosternal area and sternites III–V (115), left legs I–IV, retrolateral aspect (118–121 respectively), right chelicera dorsal (122) and ventral (123) views. **Figures 116–117**. Female juvenile paratype, carapace and tergites I–III (116), coxosternal area and sternite III (117).



Figures 124–149: Pedipalps. **Figures 124–136**: *Parabuthus kabateki* **sp. n. Figure 124**. Female juvenile paratype, pedipalp chela dorsal (124) view. **Figure 125**. Male juvenile paratype, pedipalp chela dorsal (125) view. **Figures 126–132**. Male holotype, pedipalp chela dorsal (126), external (127) and ventral (128) views, pedipalp patella dorsal (129), external (130) and ventral (131) views, pedipalp femur and trochanter internal (132), dorsal (133), and ventral (134) views, pedipalp fixed (135) and movable (136) finger dentition. **Figures 137–149**: *Parabuthus robustus* **sp. n. Figure 137–138**. Female paratype, pedipalp chela dorsal (137) and external (138) views. **Figures 139–149**. Male holotype, pedipalp chela dorsal (139), external (140) and ventral (141) views, pedipalp patella dorsal (142), external (143) and ventral (144) views, pedipalp femur and trochanter internal (145), dorsal (146), and ventral (147) views, pedipalp fixed (148) and movable (149) finger dentition. Trichobothrial pattern is indicated in Figures 126–130, 132–133, 139–143, and 145–146.



Parabuthus kabateki **sp. n.**



P. kabateki **sp. n.** *P. mazuchi* **sp. n.**

Figures 150–**160**: Hemispermatophores. **Figures 150**–**155**. *Parabuthus kabateki* **sp**. **n**., male paratype 1549, right hemispermatophore, distal trunk, capsule and flagellum (150), capsule in posterior (151), convex (152), convex compressed (153), anterior (154) views, and whole hemispermatophore (155). Scale bars: 1 mm (150), 500 µm (151–154), 4 mm (155). **Figures 156**–**160**. *Parabuthus mazuchi* **sp**. **n**., male holotype, left hemispermatophore, whole hemispermatophore (156), capsule in posterior (157), convex (158), convex compressed (159), and anterior (160) views. Scale bars: 4 mm (156), 500µm (157–160).



Figures 161–162. *Parabuthus kabateki* **sp. n.**, male paratypes, in vivo habitus at type locality.





Figures 163–164. Somaliland, locality 18SJ, type locality of *Parabuthus kabateki* **sp**. **n**. and *P. mazuchi* **sp**. **n**.

capsule. Capsule region with 3 lobes: broad posterior lobe with angulate apical margin and strong anterior carina; small anterior lobe with narrowed apical tip; and robust basal lobe with sharp pointed tip. Similar morphology was found for 3 other hemispermatophores (including left and right) from this species (locality 18SJ, Sc1549, 1550). Hemispermatophore is similar to that reported for other *Parabuthus* species (Kovařík et al., 2016).

Measurements. See Table 2.

Affinities. The described features distinguish *P. kabateki* **sp**. **n**. from all other species of the genus. They are recounted in the key below. *P. kabateki* **sp**. **n**. is a member of the *P. heterurus* complex, which is characterized by both non-elongated pedipalp fingers (Figs. 266–273) and a combination of metasoma IV black and metasoma V yellow (Figs. 107–113). *P. kabateki* **sp**. **n**. is more variable in color than other species of the complex, and the black metasoma II is a striking color combination not found in any other *Parabuthus* species.

Comments on localities and life strategy. The type locality, **18SJ** is red sandy semidesert (Figs. 163–164 and figs. 60–61 in Kovařík et Lowe, 2019). The types of *P. kabateki* **sp**. **n**. were discovered at night during collecting by UV detection together with *Gint banfasae* Kovařík et Lowe, 2019 (type locality), *Hottentotta* sp., *Lanzatus somalilandus* Kovařík et Lowe, 2016, and *Parabuthus mazuchi* **sp**. **n**. The first author (F. K.) visited the locality on 29–31 August 2018 and recorded maximum daytime temperatures of 40 ºC and a minimum nighttime temperature of 23 ºC. The recorded humidity was between 24% (minimum at day) and 65% (maximum at night).

Lowe (2018) suggested that the contrasting dark black pigmentation of metasoma IV–V and telson of some buthids may be protective in guiding diurnal vertebrate predators towards the more heavily armored, venomous posterior end of the scorpion. This biphasic color pattern is characteristic of the *P. liosoma* complex. The multiphasic color patterns of *P. heterurus* complex, with alternating light and dark metasomal segments, could serve a similar purpose. However, another possibility is that such conspicuous patterns are aposematic, i.e. they warn potential predators to avoid contact with a venomous animal. Regular bright and dark banding patterns have of course evolved in many other venomous or toxic animals, e.g. elapid snakes (coral snakes, kraits, sea snakes, etc.), dendrobatic frogs, *Heloderma*, lepidopterous larvae (*Tyria jacobaeae*, *Danaus* spp., etc.), Diplopoda, Chilopoda and many aculeate Hymenoptera.

Parabuthus kajibu Kovařík, Lowe, Plíšková et Šťáhlavský, 2016
(Figures 269, 305, Tables 4–5)

Parabuthus kajibu Kovařík et al., 2016: 36–41, figs. 84–85, 104–143, 178–179, 191, 200, 204, Tables 1–2.

Type locality and type repository. Ethiopia, Oromia State, West Harerge, 07°49‘12.6“N 40°31‘54“E, 918 m a.s.l.; FKCP.

Diagnosis. Adults from 55 mm to 80 mm long. Base color uniformly yellow to yellowish brown, tergites yellow (male) or brown to black (female), fourth metasomal segment dark. Telson yellowish brown to orange. Pectine teeth number 37–39 in males and 33–35 in females. Stridulatory area present on dorsal surface of first and second metasomal segments, absent in metasomal segments III–V. Metasoma densely hirsute. Metasomal segment V length/ width ratio is 1.62 in male. Dorsal carina of metasomal segment IV composed posteriorly of strong pointed granules in males. Movable and fixed fingers of pedipalp bear 12–13 rows of granules, all with external and internal accessory granules. Fingers of pedipalp not elongated. Fingers of pedipalps of male with inner side of base smooth, no trace of tubercle. Manus of pedipalp of male broad, pedipalp chela length/ width ratio 3.52 in males and 5.25–5.45 in females. Pedipalp chela and patella smooth. Tarsomere I of legs I–III with bristle-combs.

Distribution. Ethiopia (known only from type locality).

***Parabuthus mazuchi* sp**. **n**.
(Figs. 156–160, 163–189, 288–289, 305, Tables 1, 4)
http://zoobank.org/urn:lsid:zoobank.org:act:F9A99ACF-6690-4A72-92A4-E4D649EE4118

Type locality and type repository. Somaliland, Shanshade vill., 08°39‘35“N 45°55‘49“E, 790 m a.s.l. (Locality No. 18SJ, Figs. 163–164); FKCP.

Type material. **Somaliland**, Shanshade vill., 08°39‘35“N 45°55‘49“E, 790 m a.s.l. (Locality No. **18SJ**), 29-31. VIII.2018, 1♂ (holotype, 1554), leg. T. Mazuch and F. Kovařík (FKCP; hemispermatophore GLPC).

Etymology. The name honors Czech herpetologist and friend Tomáš Mazuch who visited the type locality with us and helped to collect scorpions by hand without any accident.

Diagnosis. Adult male holotype is 63 mm long, female unknown. Base color reddish brown to black, metasoma IV–V and telson black. Pectine teeth number 36 in male. Stridulatory area present on dorsal surface of first and second segments, reduced on third segment. Metasoma densely hirsute. Pedipalp movable finger with 14 rows of granules which include external and internal granules. Manus of pedipalp smooth and very narrow, pedipalp chela length/ width ratio 7.05 in male holotype. Tarsomere I of all legs with bristle-combs.

Description. The adult male holotype is 63 mm long, female is unknown. The habitus is shown in Figs. 165–166. For position and distribution of trichobothria of pedipalps see Figs. 173–176, 178–179.

Coloration (Figs. 165–166, 188–189). The base color is reddish brown to black. The pedipalps and the femora of legs are grey to reddish brown, tarsomeres and patella of legs are grey to white. The metasoma I–II are reddish brown, lighter

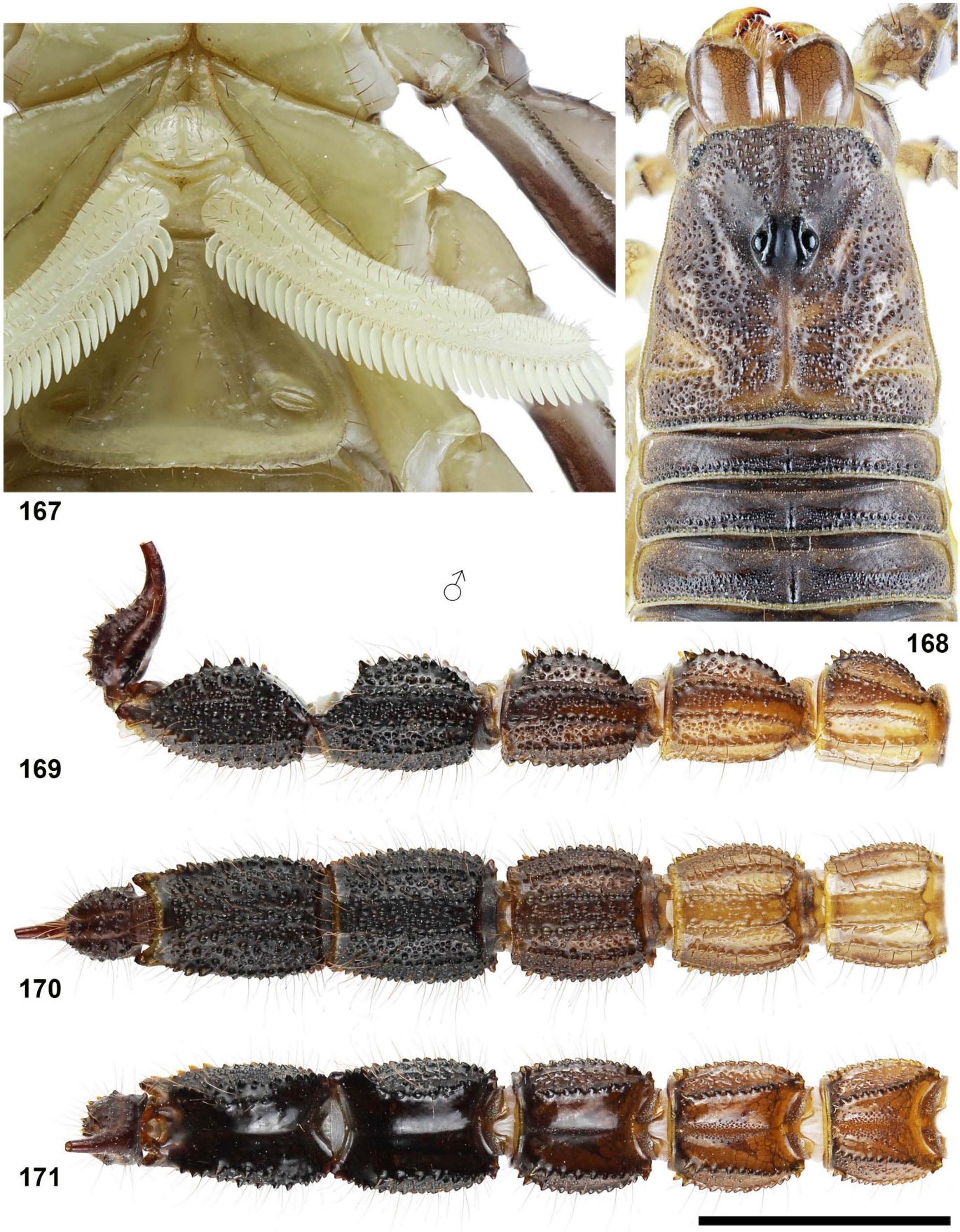


Figures 165–166. *Parabuthus mazuchi* **sp. n.**, male holotype in dorsal (165) and ventral (166) views. Scale bar: 10 mm.

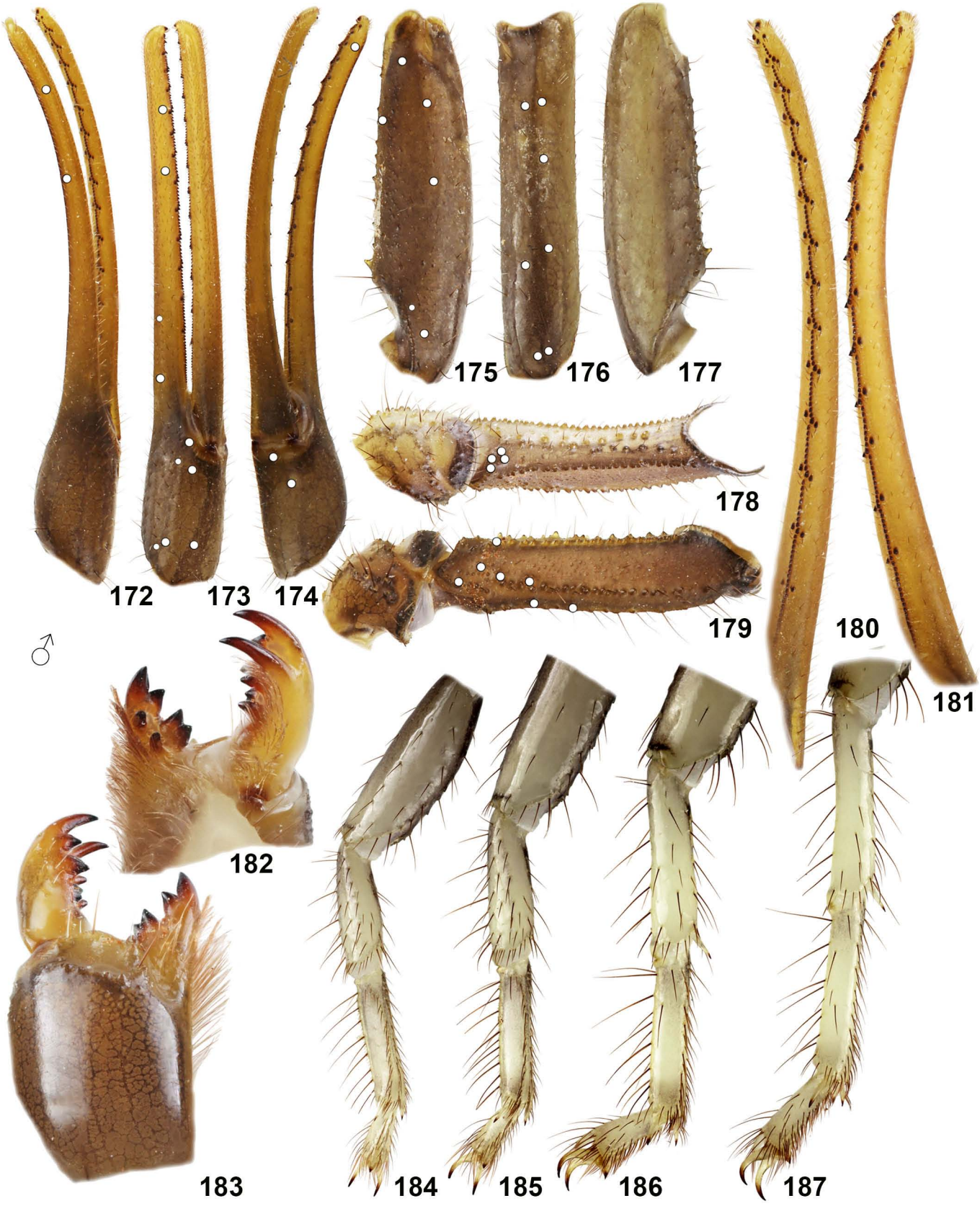
ventrally, metasoma III is reddish brown to black, metasoma IV–V and telson are black. Carapace and tergites are greyish black with several lighter spots on carapace.

Carapace and mesosoma (Figs. 165–168). The entire carapace is covered with large granules. Carinae are absent. The anterior margin of the carapace is almost straight, medially weakly convex, and bears 10–12 symmetrically distributed short, stout spiniform macrosetae. The tergites are granulated. Tergite VII is pentacarinate, with lateral pairs of carinae strong, serratocrenulate. The pectinal tooth count is 36–36 in male the holotype. The pectine marginal tips extend to the midpoint of the fourth sternite in the female. The pectines have three marginal lamellae and 10–12 middle lamellae. The lamellae and fulcra bear numerous dark setae. All sternites are smooth.

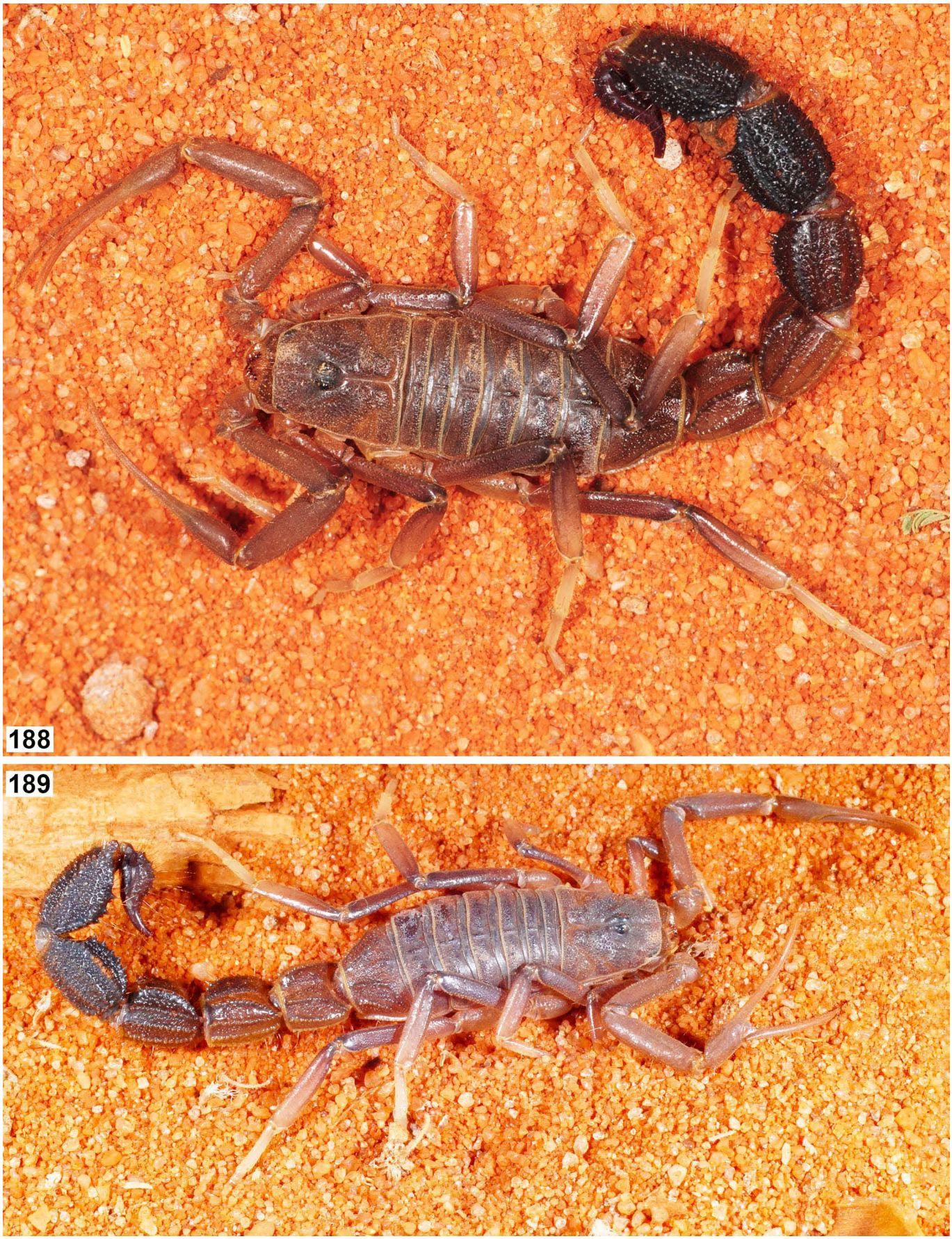
Metasoma and telson (Figs. 169–171). The first to fourth metasomal segments each bear a total of 10 granulated carinae. The fifth segment has five carinae, and its ventral and lateral surfaces are strongly granulated. The strong lateral and ventral granulation present also on metasoma II–IV. Dorsolateral carinae of the third and fourth segments terminate in stronger denticles, of which the posterior-most denticle is enlarged. Two parallel short rows of three pointed denticles present on ventral surface of metasoma V. The stridulatory area is located



Figures 167–171: *Parabuthus mazuchi* **sp. n.**, male holotype, posterior coxosternal area and sternite III (167) carapace and tergites I–III (168), metasoma and telson in lateral (169), ventral (170), and dorsal (171) views. Scale bar: 10 mm (169–171).



Figures 172–**187**: *Parabuthus mazuchi* **sp**. **n**., male holotype. **Figures 172**–**181**. Pedipalp chela dorsal (172), external (173) and ventral (174) views, pedipalp patella dorsal (175), external (176) and ventral (177) views, pedipalp femur and trochanter internal (178) and dorsal (179) views, pedipalp movable (180) and fixed (181) finger dentition. Trichobothrial pattern is indicated in Figures 173–176, 178–179. **Figures 182**–**183**. Left chelicera ventral (182) and dorsal (183) views. **Figures 184**–**187**. Left legs I–IV, retrolateral aspect, respectively.



Figures 188–189. *Parabuthus mazuchi* **sp. n.**, male holotype in vivo habitus at type locality.

on the dorsal surface of the first and second segments. On the third segment it is reduced and on fourth and fifth segments the stridulatory area is absent. The entire metasoma and the telson are densely pilose with long hairs. The ventral surface of the telson is strongly granulated. The metasomal segment V length/ width ratio is 1.66 in the male holotype. The telson is rather elongate, with the aculeus approximately the same length as the vesicle.

Pedipalps (Figs. 172–181). The entire pedipalps are rather sparsely hirsute with long setae. The femur bears five carinae. The chela is smooth without carinae. The patella is finely granulated without carinae. The movable and fixed fingers of pedipalp bear 14 rows of granules, all with external and internal accessory granules. The fingers of pedipalps of with inner side of base smooth, tubercle absent. The pedipalp chela length/ width ratio 7.05 in the male holotype.

Legs (Figs. 184–187). Legs III and IV bear tibial spurs. Retrolateral and prolateral pedal spurs are present on all legs. All legs without distinct carinae, smooth and densely pilose. The tarsomeres bear two rows of macrosetae on the ventral surface and other macrosetae on the other surfaces. Bristle-combs are present on all legs, although slightly reduced on the fourth leg.

Hemispermatophore (Figs. 156–160). Flagelliform, elongate and slender, trunk ca. 10 times length of capsule region. Flagellum emanating from posterior lobe of capsule; pars recta narrow, hyaline, same length as capsule; pars reflecta thicker, opaque white, ca. 3× length of capsule (damaged in dissection, not illustrated). Capsule region with 3 lobes: broad posterior lobe with angulate apical margin and strong anterior carina; small anterior lobe with narrowed apical tip; and robust basal lobe with sharp pointed tip. Hemispermatophore is similar to that reported for other *Parabuthus* species (Kovařík et al., 2016).

Measurements. See Table 1.

Affinities. The described features distinguish *P. mazuchi* **sp**. **n**. from all other species of the genus. They are recounted in the key below. *P. mazuchi* **sp**. **n**. is associated with *P. cimrmani* and *P. eritreaensis*, as all three species share characteristically elongated pedipalp fingers (Figs. 284–289) that are absent in all other known *Parabuthus* from the Horn of Africa (Figs. 266–283).

Comments on localities and life strategy. The type locality, **18SJ** is also the type locality for here described *P. kabateki* **sp**. **n**., see comments under the description of *P. kabateki* **sp**. **n**. above.

Parabuthus pallidus Pocock, 1895
(Table 5)

Parabuthus pallidus Pocock, 1895: 312–314; Fet & Lowe, 2000: 208–209 (complete reference list until 2000); Kovařík, 2003: 145; Kovařík, 2003: 145; Kovařík & Whitman, 2005: 111–112; Kovařík et al., 2016: 41–50, 53–54, figs. 87, 144–163, 192, 201, 204, Table 1.

= *Parabuthus mixtus* Borelli, 1925: 13–16; Caporiacco, 1941: 34; Fet & Lowe, 2000: 207 (syn. by Kovařík, 2003: 145).

= *Parabuthus mixtus obscurior* Caporiacco, 1941: 34; Fet & Lowe, 2000: 207; Kovařík & Whitman, 2005: 111 (syn. by Kovařík, 2003: 145).

= *Parabuthus zavattarii* Caporiacco, 1939: 305–306; Fet & Lowe, 2000: 211; Kovařík & Whitman, 2005: 112 (syn. by Kovařík, 2003: 145, 159).

= ? *Riftobuthus inexpectatus* Lourenço et al., 2010: 281, figs. 1 and 2. (syn. by Kovařík et al., 2016: 48).

Type locality and type repository. Kenya, Mombasa; BMNH.

Type material examined. Ethiopia, Sagan-Omo, El Banno, 2.V.1939, 1♀1im. (lectotype and paralectotype No. 1 of *Parabuthus mixtus obscurior* Caporiacco, 1941), leg. E. Zavattari, rev. M. Vachon (VA 1578), MZUF No. 547. Somalia, Balad, 2♀ (lectotype and paralectotype of *Parabuthus mixtus* Borelli, 1925), MCSN.

Diagnosis. Adults from 45 mm (male) to 90 mm (female) long. Base color uniformly yellow to yellowish brown to grey including metasomal segments and telson. Pectine teeth number 33–38 in males and 28–36 in females. Stridulatory area present on dorsal surface of metasomal segments I to IV in both sexes, more pronounced on first and second segments, reduced on third and fourth segments. Metasoma hirsute, more so in female. Metasomal segment V length/ width ratio 1.40–1.65 in males. Movable and fixed fingers of pedipalp bearing 10–12 rows of granules, all with external and internal accessory granules. Pedipalp fingers not elongated. Pedipalp fingers of males with inner side of base smooth, no trace of tubercle. Manus of pedipalp smooth and narrow in both sexes, pedipalp chela length/ width ratio 4.30–4.80 in both sexes. Tarsomere I of legs I–III with bristle-combs reduced, usually composed of 6–10 bristles.

Distribution. Ethiopia, Kenya, Somalia, Tanzania. Ethiopian material examined and marked in Fig. 305 is cited in Kovařík et al., 2016: 48, 53–54.

Parabuthus robustus **sp**. **n**.
(Figs. 137–149, 190–213, 219–227, 270–271, 299–301, 305,Tables 3–5)
http://zoobank.org/urn:lsid:zoobank.org:act:761318CC-056F-44DB-B5E7-004A40618161

Parabuthus heterurus (in part) Kovařík et al., 2016: 34–36, figs. 94–97, 99–102, 176–177, 190, 199, 204).

Type locality and type repository. Somaliland, Toon village near Hargeisa, 09°23‘30“N 44°07‘10“E, 1272 m a.s.l. (Locality No. **17SE**, Fig. 227); FKCP.

Type material (FKCP). **Ethiopia**, ca 20 km on road from Jijiga to Dagah Bur, 09°09.353‘N 43°07.962‘E, 1741 m a.s.l.,

Dimensions (MM)		*P. robustus* **sp. n.** ♂ **holotype**	*P. robustus* **sp. n.** ♀ **paratype**	*P. somalilandus* **sp. n.** ♂ **holotype**	*P. somalilandus* **sp. n.** ♀ **paratype**
Carapace	L / W	8.03 / 8.82	9.73 / 11.43	8.82 / 10.16	9.88 / 10.97
Mesosoma	L	14.71	30.28	17.61	28.63
Tergite VII	L / W	4.82 / 8.84	5.99 / 10.37	5.24 / 9.74	6.33 / 10.97
Metasoma + telson	L	44.98	48.41	49.26	48.58
Segment I	L / W / D	5.79 / 5.72 / 5.16	6.36 / 6.52 / 5.70	6.58 / 6.71 / 6.07	6.32 / 6.63 / 6.16
Segment II	L / W / D	6.63 / 5.97 / 5.55	7.07 / 6.49 / 5.77	7.33 / 6.92 / 6.45	7.11 / 6.74 / 6.03
Segment III	L / W / D	6.94 / 6.54 / 5.57	7.59 / 6.73 / 5.96	7.69 / 6.94 / 6.67	7.55 / 7.00 / 6.30
Segment IV	L / W / D	8.13 / 6.33 / 5.48	8.58 / 6.58 / 5.72	8.90 / 6.94 / 6.48	8.42 / 7.12 / 6.05
Segment V	L / W / D	8.83 / 5.64 / 4.82	9.24 / 6.24 / 5.18	9.63 / 6.10 / 5.39	9.55 / 6.50 / 5.44
Telson	L / W / D	8.66 / 4.13 / 3.61	9.57 / 5.22 / 4.42	9.13 / 5.75 / 3.95	9.63 / 2.35 / 4.69
Pedipalp	L	25.58	27.14	28.49	29.49
Femur	L / W	6.16 / 2.00	6.79 / 2.37	7.32 / 2.38	7.10 / 2.56
Patella	L / W	7.25 / 2.83	7.67 / 3.21	8.07 / 3.25	8.48 / 3.41
Chela	L	12.17	12.68	13.10	13.91
Manus	W / D	3.84 / 3.72	2.88 / 3.11	3.35 / 3.74	2.98 / 3.11
Movable finger	L	6.71	7.83	8.16	9.19
Total	**L**	**67.72**	**88.42**	**75.69**	**87.09**

Table 3. Comparative measurements of adults of *Parabuthus robustus* **sp. n.** and *P. somalilandus* **sp. n.** Abbreviations: length (L), width (W, in carapace it corresponds to posterior width), depth (D).

1♂1♀2juvs.♀ (paratypes), XI.2010, leg. T. Mazuch; beetwen Jijiga and Degehbur, 09°09‘18.7“N 43°08‘03.5“E, 1740 m a.s.l. (Locality No. **11EU**), 17.VII.2011, 4♀2juvs.♀1juv.♂ (paratypes), leg. F. Kovařík. **Somaliland**, between Hargeisa and Salahle, 09°12‘16“N 44°99‘51.5“E, 1229 m. a.s.l., (locality No. **11SQ**), 14.VII.2011, 1♂1♀ (paratypes), leg. F. Kovařík; Toon village near Hargeisa, 09°23‘30“N 44°07‘10“E, 1272 m a.s.l. (Locality No. **17SE**), 8.II.2017, 4♂ 1♀1juv.♂ (holotype and paratypes, 1557, 1572, 1590), leg. F. Kovařík (FKCP; hemispermatophores GLPC).

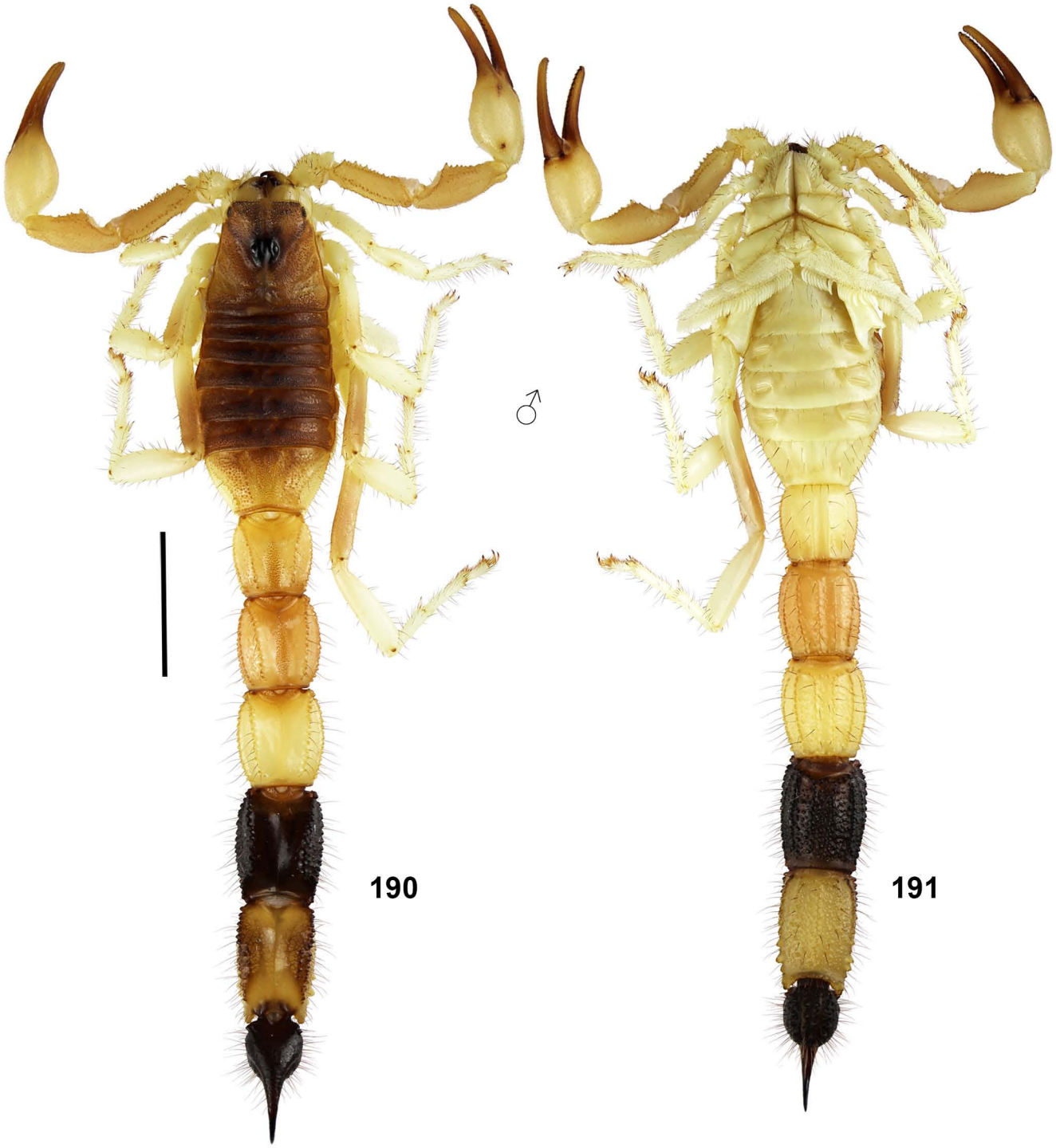
Etymology. The name conveys the visual impression when first encountering this species, especially the males with their wide pedipalp chelae.

Diagnosis. Adult from 65 mm (male) to 80 mm (female) long. Base color uniformly yellow to yellowish brown, tergites brown to black, fourth metasomal segment and telson black. Pectine teeth number 34–42 in males and 33–37 in females. Stridulatory area present on dorsal surface of metasoma I–II, reduced in metasoma III, and absent in metasoma IV–V. Metasoma densely hirsute. Metasoma V length/ width ratio is 1.46–1.57 in males. Dorsal carina of metasoma IV posteriorly composed of blunt denticles, of which the posterior-most denticle is not enlarged. Movable and fixed fingers of pedipalp bear 12–13 rows of granules, all with external and internal accessory granules. Fingers of pedipalp not elongated. Fingers of pedipalps of male with inner side of base smooth, no trace of tubercle. Manus of pedipalp of male broad, pedipalp chela length/ width ratio 2.93–3.16 in males. Pedipalp chela smooth and patella finely granulated. Tarsomere I of legs I–III with bristle-combs.

Description. The adults are 65 mm (male) – 85 mm (female) long. The habitus is shown in Figs. 190–193. For position and distribution of trichobothria of pedipalps see Figs. 138–143, and 145–146. Sexual dimorphism: adult males with pedipalp chela broader. Female with basal middle lamella wide (Fig. 204).

Coloration (Figs. 190–193, 219–223). The base color is uniformly yellow to yellowish brown, tergites brown to black. The pedipalps and legs are yellow. The metasoma I–III is yellow, the metasoma II could be light orange, metasoma IV is black, and metasoma V is yellow with fuscous patterns mainly on dorsal surface towards the lateral edges. Telson is black. Carapace and tergites can be yellowish brown or almost black, tergite VII in male could be yellowish brown.

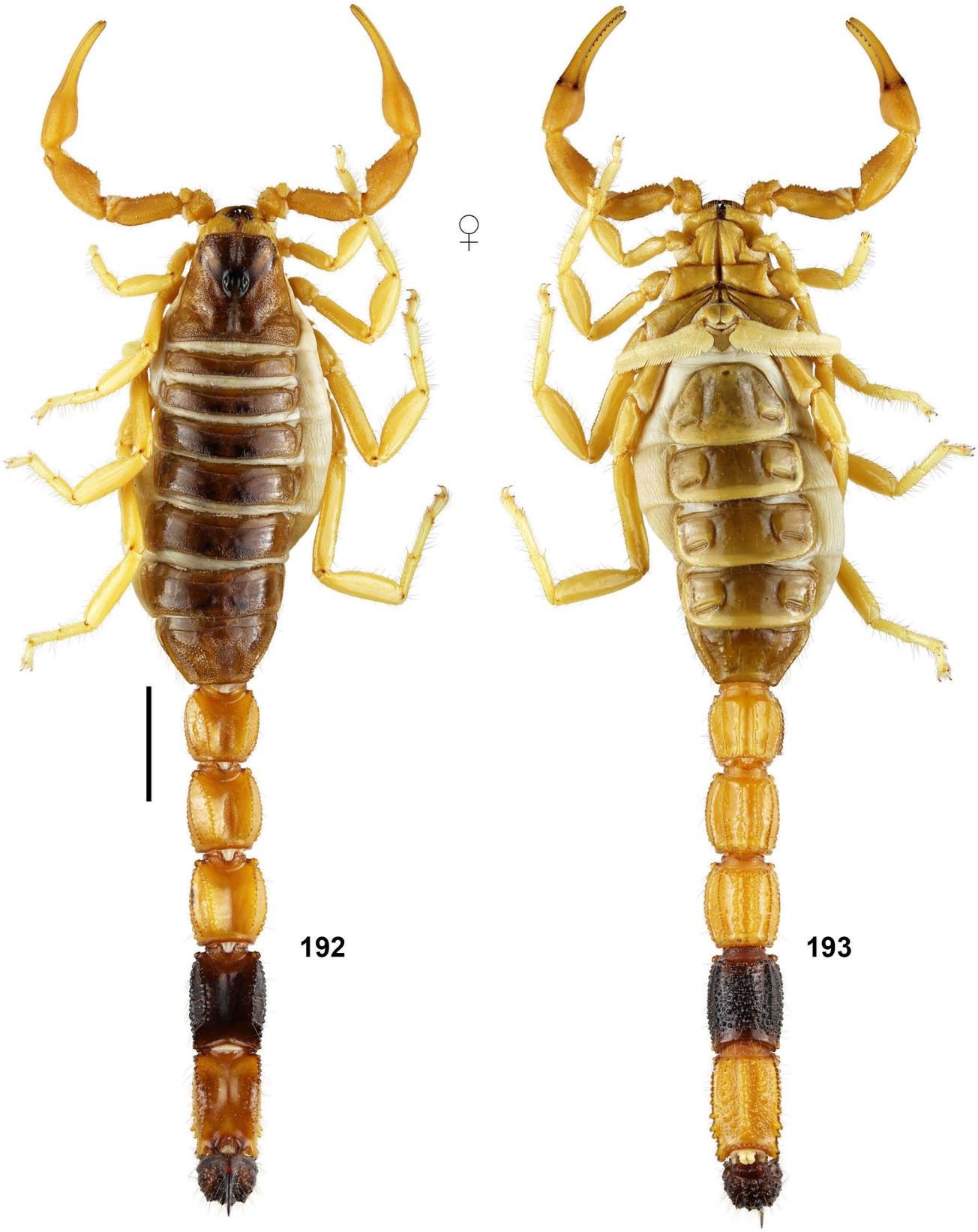
Carapace and mesosoma (Figs. 190–193, 200–204). The entire carapace is covered with large granules, more in males. Carinae are absent. The anterior margin of the carapace is almost straight, medially weakly convex, and bears 14–18 symmetrically distributed short, stout spiniform macrosetae. The tergites are granulated, more so in males. Tergite VII is pentacarinate, with lateral pairs of carinae strong, serratocrenulate. The pectinal tooth count is 34–42 (1x34, 1x36, 1x37, 3x38, 5x39, 4x40, 1x42) in males and 33–37 (1x33, 9x35, 7x36, 2x37, 2x38) in females. The pectine marginal tips extend to the end of the fourth sternite in the male and to the



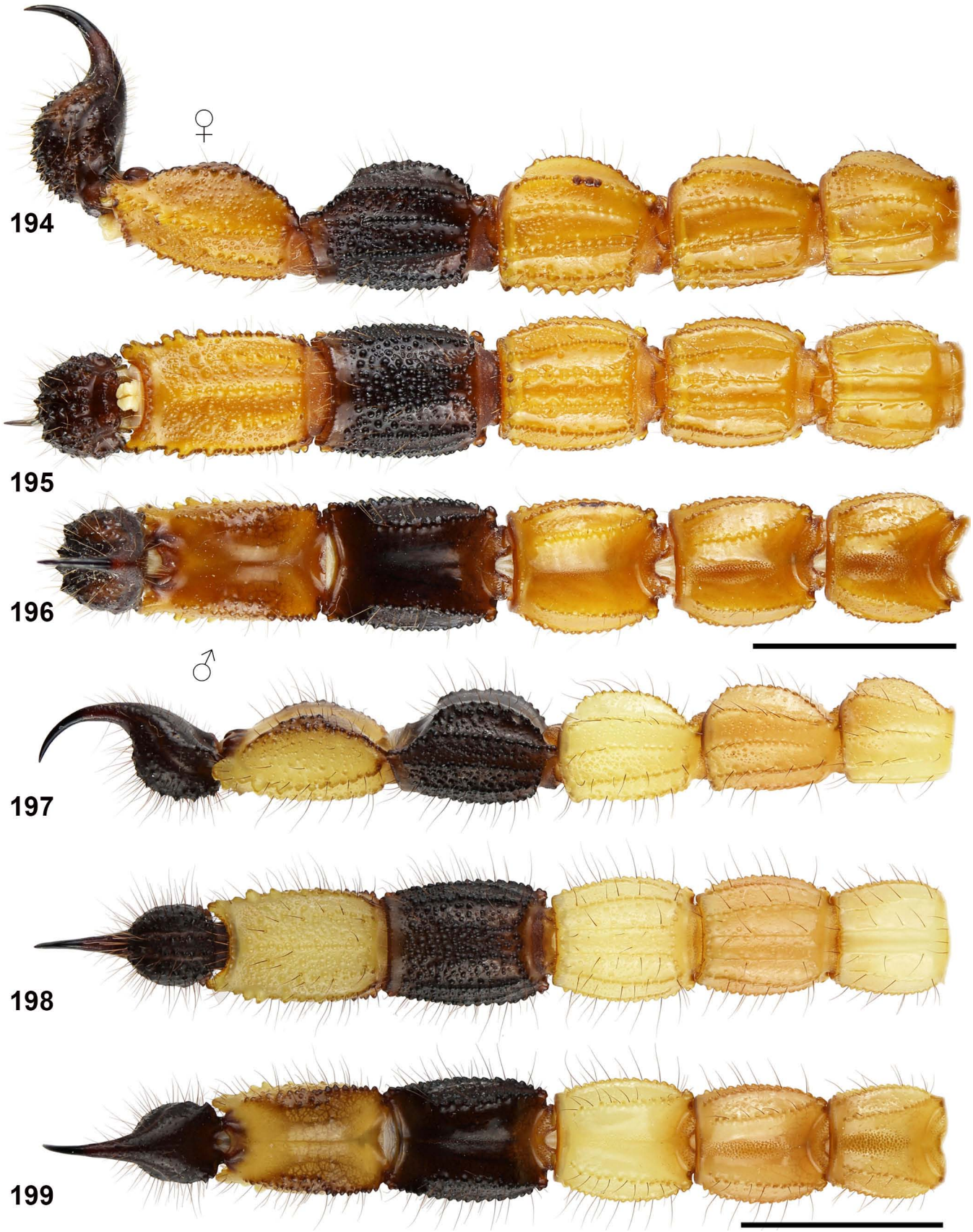
Figures 190–191. *Parabuthus robustus* **sp. n.**, male holotype in dorsal (190) and ventral (191) views. Scale bar: 10 mm.

end of the third sternite in the female. The pectines have three marginal lamellae and 10–13 middle lamellae. The lamellae and fulcra bear numerous dark setae. All sternites are smooth, except that there is a stridulatory area on the third sternite that is more visible in the male. Sternite VII bears four carinae that are more visible in the male.

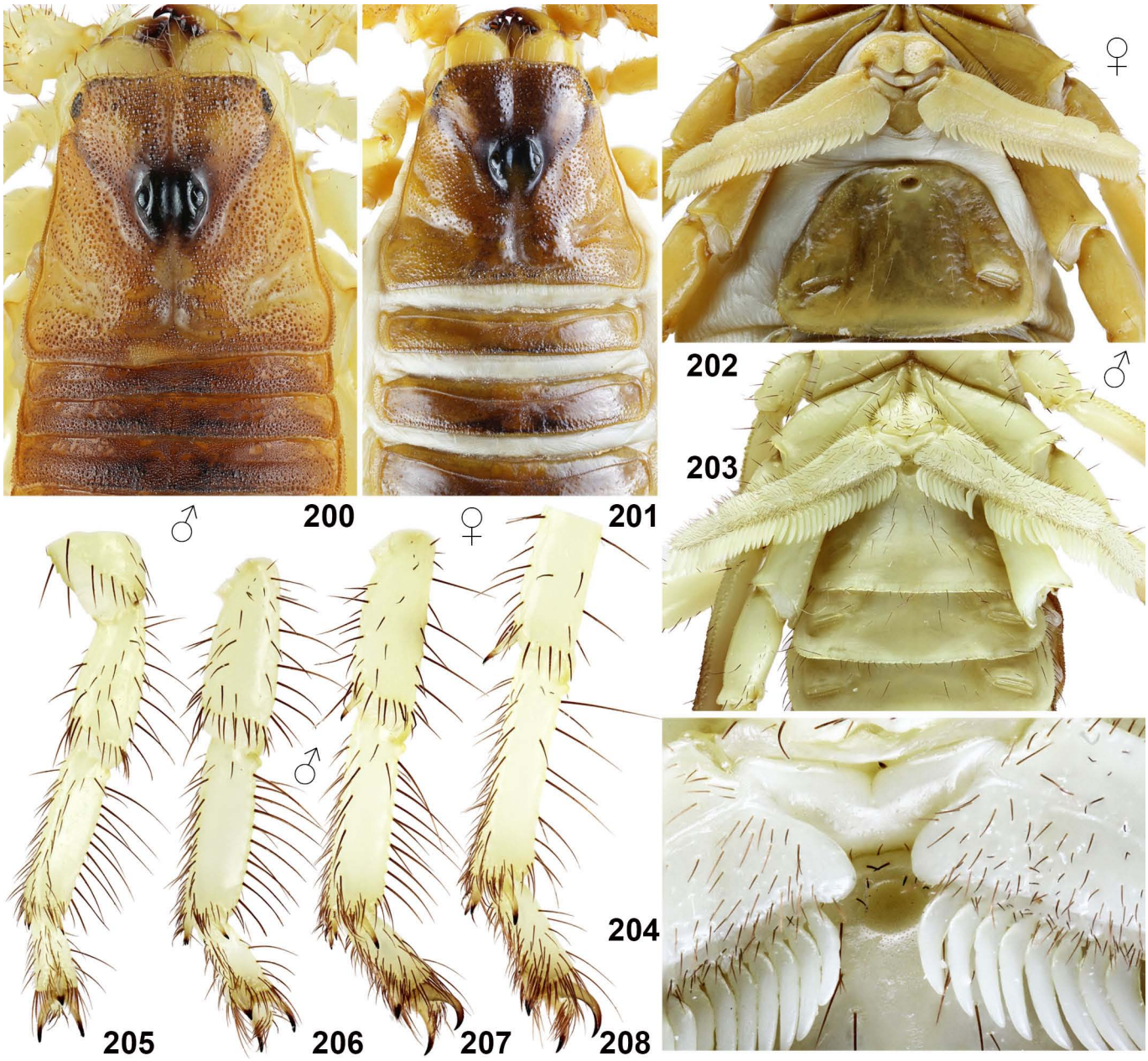
Metasoma and telson (Figs. 194–199). The first to fourth metasomal segments bear a total of 10 granulated carinae. The fifth segment has five carinae, and its ventral and lateral surfaces are strongly granulated. The ventral surface of metasomal segment V has several strong paired granules symmetrically located laterally in the middle part. Dorsolateral carinae of the third and fourth segments composed of blunt denticles, of which the posterior-most denticle is not enlarged. The stridulatory area is located on the dorsal surface of the first and second segments in both sexes. On the third segment



Figures 192–193. *Parabuthus robustus* **sp. n.**, female paratype in dorsal (192) and ventral (193) views. Scale bar: 10 mm.



Figures 194–199: *Parabuthus robustus* **sp. n.**, metasoma and telson. **Figures 194–196**. Female paratype, lateral (194), ventral (195), and dorsal (196) views. **Figures 197–199**. Male holotype, lateral (197), ventral (198), and dorsal (199) views. Scale bars: 10 mm.

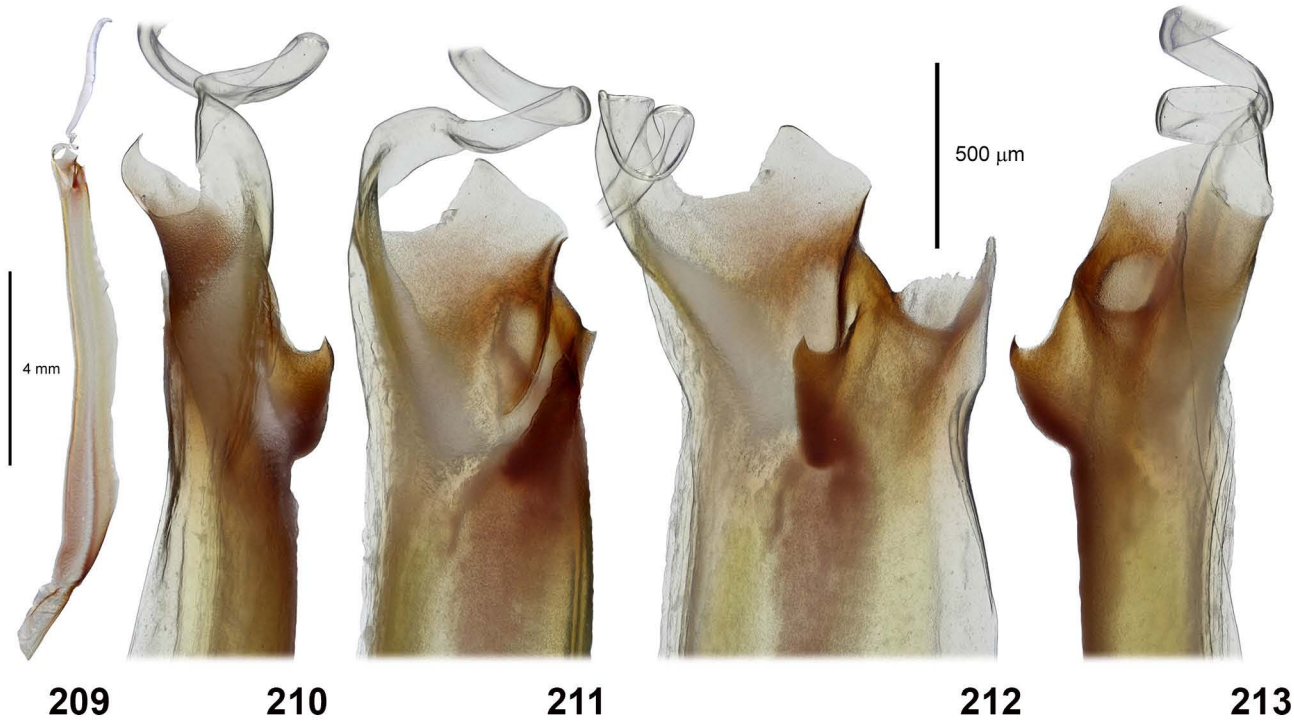


Figures 200–208: *Parabuthus robustus* **sp. n. Figures 200, 203–208**. Male holotype, carapace and tergites I–III (200), posterior coxosternal area and sternites III–V (203–204), right legs I–IV, retrolateral aspect (205–208 respectively). **Figures 201–202**. Female paratype, carapace and tergites I–III (203) and posterior coxosternal area and sternite III (202).

it is reduced or absent and on fourth and fifth segments the stridulatory area is absent. The entire metasoma and the telson are pilose with long hairs. The ventral surface of the telson is strongly granulated. The metasomal segment V length/ width ratio is 1.46–1.57 in males and 1.48–1.52 in females. The telson is rather bulbous, with the aculeus approximately the same length as the vesicle in males and little bit shorter in females.

Pedipalps (Figs. 137–149). The pedipalps are hirsute with shorter setae on the chela and the patella, and longer setae on the femur, and trochanter. The femur bears four carinae. The chela is smooth without carinae and the patella is finely granulated with carinae indicated. The movable and fixed fingers of pedipalp bear 12–13 rows of granules, all with external and internal accessory granules. The fingers of pedipalps of male with inner side of base smooth, tubercle absent. The manus of pedipalp of male broad, pedipalp chela length/ width ratio 2.93–3.16 in males and 4.38–4.44 in females.

Legs (Figs. 205–208). Legs III and IV bear tibial spurs. Retrolateral and prolateral pedal spurs are present on all legs. All legs without distinct carinae and smooth. The tarsomeres bear two rows of macrosetae on the ventral surface and other macrosetae on the other surfaces. Bristlecombs are present on all legs, although slightly reduced on the fourth leg.



Parabuthus robustus **sp. n.**

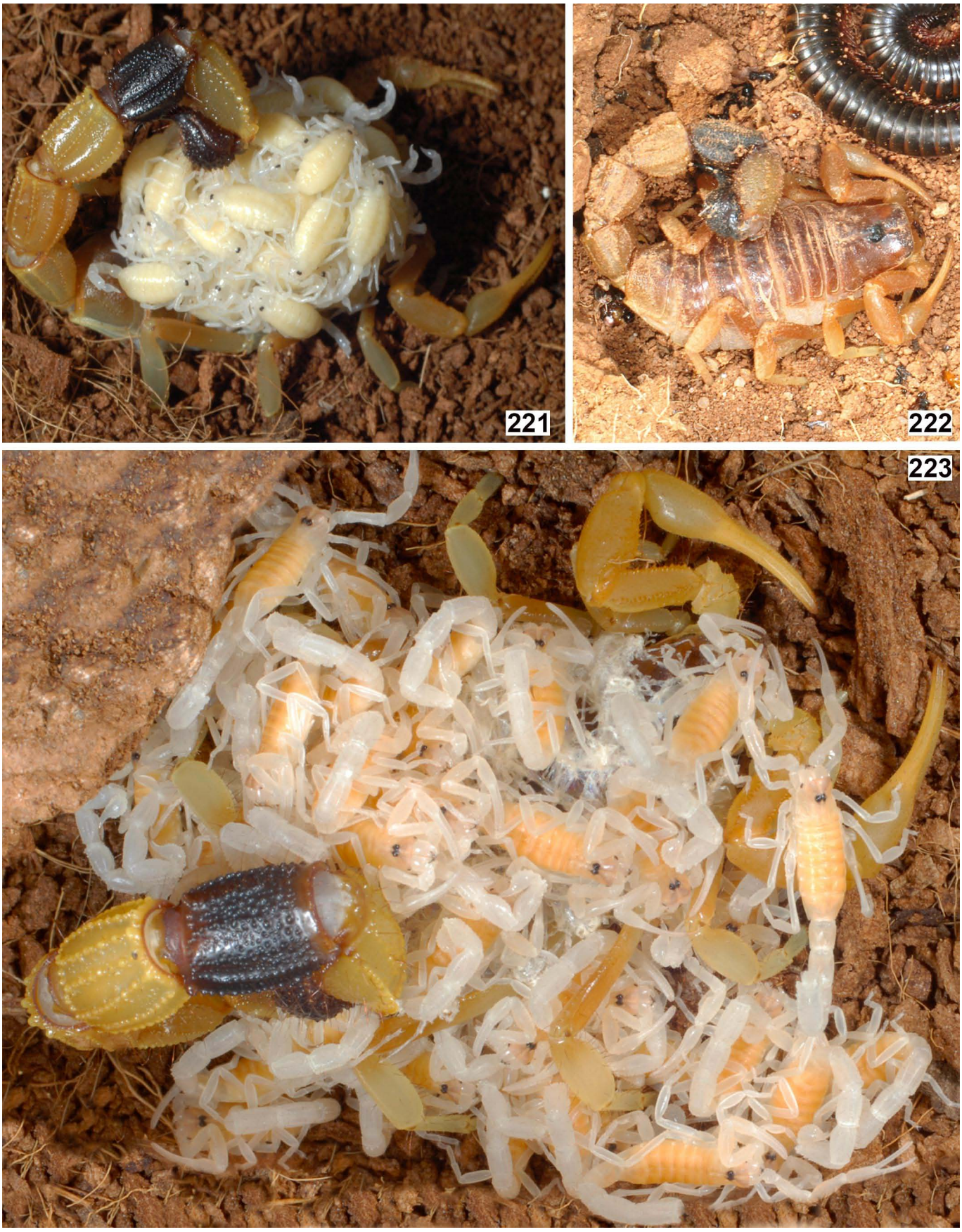


Parabuthus somalilandus **sp. n.**

Figures 209–**218**: Hemispermatophores. **Figures 209**–**213**. *Parabuthus robustus* **sp**. **n**., male paratype 1572, right hemispermatophore, whole hemispermatophore (209), capsule in posterior (210), convex (211), convex compressed (212), and anterior (213) views. Scale bars: 4 mm (209), 500 µm (210–213). **Figures 214**–**218**. *Parabuthus somalilandus* **sp**. **n**., male holotype, right hemispermatophore, whole hemispermatophore (214), capsule in posterior (215), convex (216), convex compressed (217), and anterior (218) views. Scale bars: 2 mm (214), 500 µm (215–218).



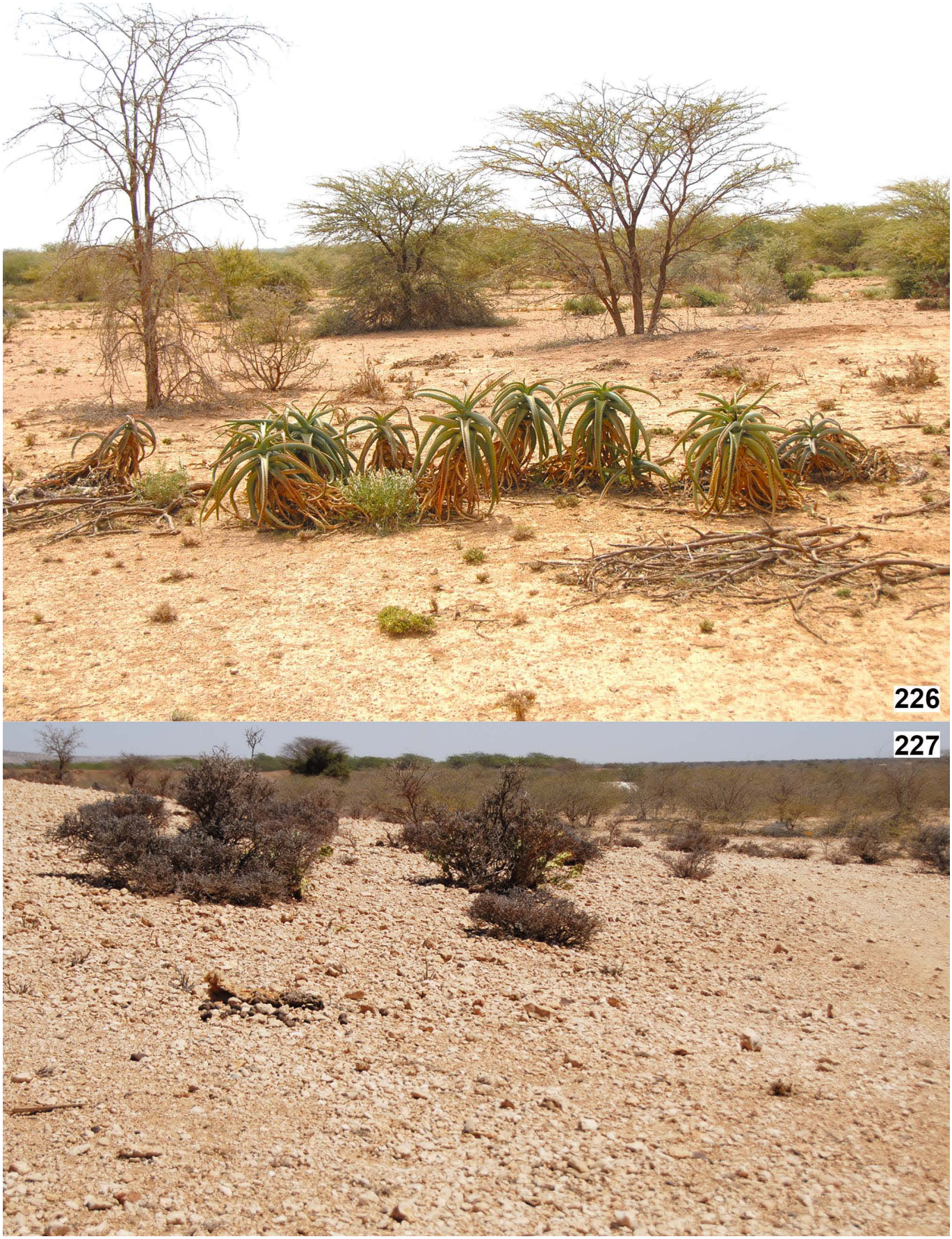
Figures 219–**220**. *Parabuthus robustus* **sp**. **n**., female (219) and male (220) paratypes from type locality in vivo habitus.



Figures 221–**223**. *Parabuthus robustus* **sp**. **n**., female paratype in vivo habitus at type locality (222), in laboratory with newborn (221) and with juveniles after first ecdysis (223).



Figures 224–225. *Parabuthus robustus* **sp. n.**, paratypes in vivo habitus at type locality.



Figures 226–**227**. *Parabuthus robustus* **sp**. **n**., locality 11SQ (226) and type locality 17SE (227).

Hemispermatophore (Figs. 209–213). Flagelliform, elongate and slender. Trunk ca. 9.2 times length of capsule region. Flagellum emanating from posterior lobe of capsule; pars recta narrow, hyaline, ribbon-like, 0.75× length of capsule; pars reflecta narrow, hyaline in proximal 20% of length, becoming thicker, opaque white in distal 80% of length, in total ca. 4× length of capsule. Capsule region with 3 lobes: broad posterior lobe with angulate apical margin and strong anterior carina; small anterior lobe with narrowed apical tip; and robust basal lobe with sharp pointed tip. Similar morphology was found for 3 other hemispermatophores (including left and right) from this species (locality 17SE, Sc1557, 1572). Hemispermatophore is similar to that reported for other *Parabuthus* species (Kovařík et al., 2016).
Measurements. See Table 3.

Affinities. The described features distinguish *P. robustus* **sp**. **n**. from all other species of the genus. They are recounted in the key below. *P. robustus* **sp**. **n**. is a member of *P. heterurus* complex, which is characterized by both non-elongated pedipalp fingers (Figs. 266–273) and a combination of metasoma IV black and metasoma V yellow (Figs. 194–199). *P. robustus* **sp**. **n**. is characterized by relatively stable color pattern and differs from other species by metasomal granulation and morphometrically.

Comments on localities and life strategy. *P. robustus* **sp**. **n**. inhabits semidesert to rocky areas on the Ethiopia/ Somaliland border. The types were collected by day under rocks, often in short burrows (Figs. 224–225) together with *Gint calviceps* (Pocock, 1900) and *Pandinurus hangarale* Kovařík et al., 2017 (type locality).

Parabuthus somalilandus **sp**. **n**.
(Figs. 228–265, 272–273, 302–305, Tables 3–5)
http://zoobank.org/urn:lsid:zoobank.org:act:128EC132-75AF-4B0A-BC46-2C73C8786885

Parabuthus heterurus (in part) Kovařík et al., 2016: 34–36, figs. 98, 103).

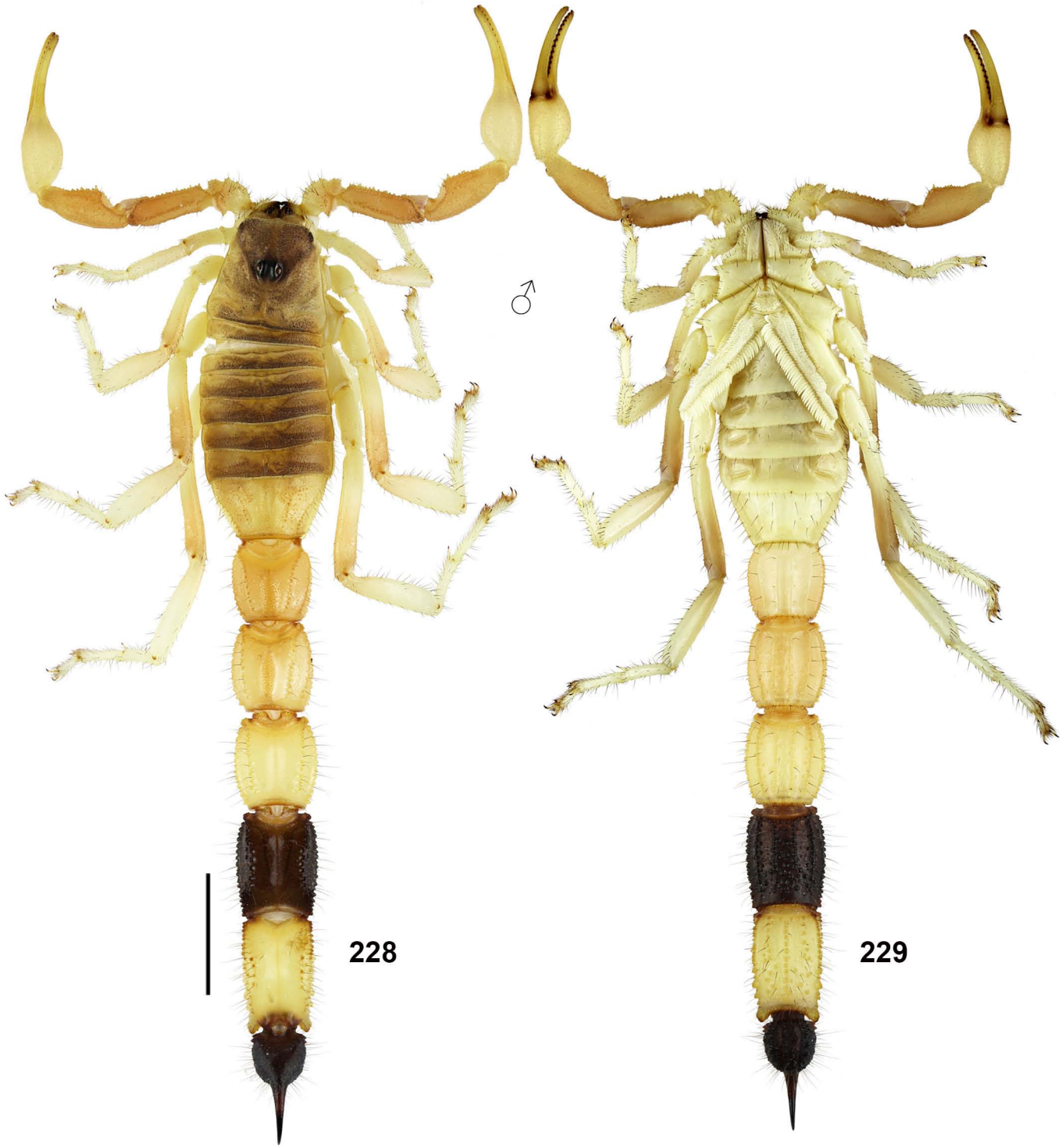
Type locality and type repository. Somaliland, Sheikh, Goolis Mts., 09°56‘38“N 45°10‘59“E, 1418 m a.s.l (Locality No. 18SK = 17SO, Fig. 265); FKCP.

Type material (FKCP). **Somaliland**, Sheikh, Goolis Mts., 09°56‘38“N 45°10‘59“E, 1418 m a.s.l (Locality No. **18SK**), 1♂ (holotype, 1551; FKCP; hemispermatophores GLPC), 31.VIII.2018, leg. F. Kovařík, (Locality No. **17SO**), 1♂3juvs. (paratypes), 6.-7.IX.2017, leg. F. Kovařík; Sheikh, 09°57‘25.9“N 45°09‘52.2“E, 1492 m a.s.l. (locality No **11SN**, Fig. 264), 12.VII.2011, 1♀1juv.♂ (paratypes), leg. F. Kovařík; near Sheikh, foothills of Goolis Mts, 09°59.881‘N 45°09.762‘E, 896 m a.s.l., 1♀1juv.♀ (paratypes), XI.2010, leg. T. Mazuch; Burao, airport, 09°31‘51“N 45°33‘15“E, 1040 m a.s.l (Locality No. **17SC**), 6.II.2017, 1juv.♂ (paratype), leg. F. Kovařík; Laas Gel, 50 km NE Hargeisa, 09°46‘47“N 44°26‘43“E, 1043 m a.s.l., XI.2010, 1♂ (paratype), leg. T. Mazuch, (Locality No. **17SF**=17SD), 28.-30.VIII.2017, 2juvs.♂♀ (paratypes), leg. F. Kovařík; Agabar, 09°53‘04.8“N 43°57‘40.9“E, 982 m a.s.l. (Locality No. **19SO**), 9.VII.2019, 1♀ (paratype, 1672), leg. F. Kovařík et T. Mazuch.

Etymology. Named after the country of occurence.

Diagnosis. Adult from 70 mm (male) to 95 mm (female) long. Base color uniformly yellow to yellowish brown, tergites brown to black, fourth metasomal segment and telson black. Pectine teeth number 39–44 in males and 36–39 in females. Stridulatory area present on dorsal surface of metasoma I–II, reduced or absent in metasoma III, and absent in metasoma IV–V. Metasoma densely hirsute. Metasoma V length/ width ratio is 1.58–1.60 in males. Dorsal carina of metasoma IV composed posteriorly of blunt denticles, of which the posterior-most denticle is not enlarged. Movable and fixed fingers of pedipalp bear 13–14 rows of granules, all with external and internal accessory granules. Fingers of pedipalp not elongated. Fingers of pedipalps of male with inner side of base smooth, no trace of tubercle. Manus of pedipalp of male broad, pedipalp chela length/ width ratio 3.38–3.91 in males. Pedipalp chela smooth and patella finely granulated. Tarsomere I of legs I–III with bristle-combs.

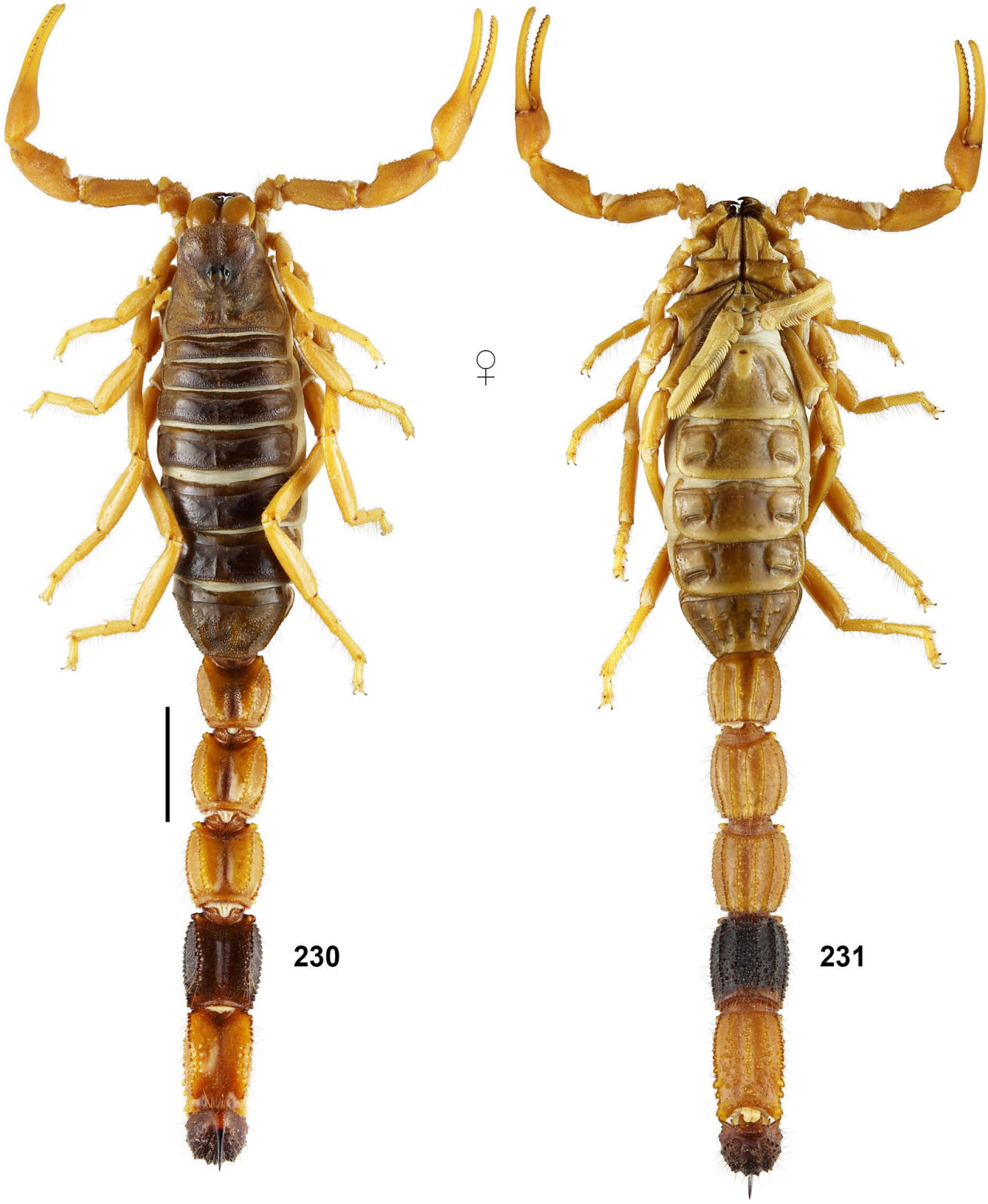
Description. The adults are 75 mm (male) – 90 mm (female) long. The habitus is shown in Figs. 228–231. For position and distribution of trichobothria of pedipalps see Figs. 239–243, 245–246. Sexual dimorphism: adult males with pedipalp chela broader. Female with basal middle lamella wide (Fig. 255) and a smaller number of pectine teeth.
Coloration (Figs. 228–231, 260–263). The base color is uniformly yellow to yellowish brown, tergites brown to black. The pedipalps and legs are yellow. The metasoma I–III is yellow, metasoma IV is black, and metasoma V is yellow with black pattern mainly on dorsal surface laterally. Telson is black. Carapace and tergites can be yellowish brown or almost black, tergite VII in male could be yellow to yellowish brown.
Carapace and mesosoma (Figs. 228–231, 252–255). The entire carapace is covered with large granules, more in males. Carinae are absent. The anterior margin of the carapace is almost straight, medially weakly convex, and bears 14–18 symmetrically distributed short, stout spiniform macrosetae. The tergites are granulated, more so in males. Tergite VII is pentacarinate, with lateral pairs of carinae strong, serratocrenulate. The pectinal tooth count is 39–44 (1x39, 2x40, 3x40, 5x42, 1x44) in males and 36–39 (4x36, 4x37,1x39) in females. The pectine marginal tips extend to the end of the fourth sternite in the male and to the end of the third sternite in the female. The pectines have three marginal lamellae and 11–13 middle lamellae. The lamellae and fulcra



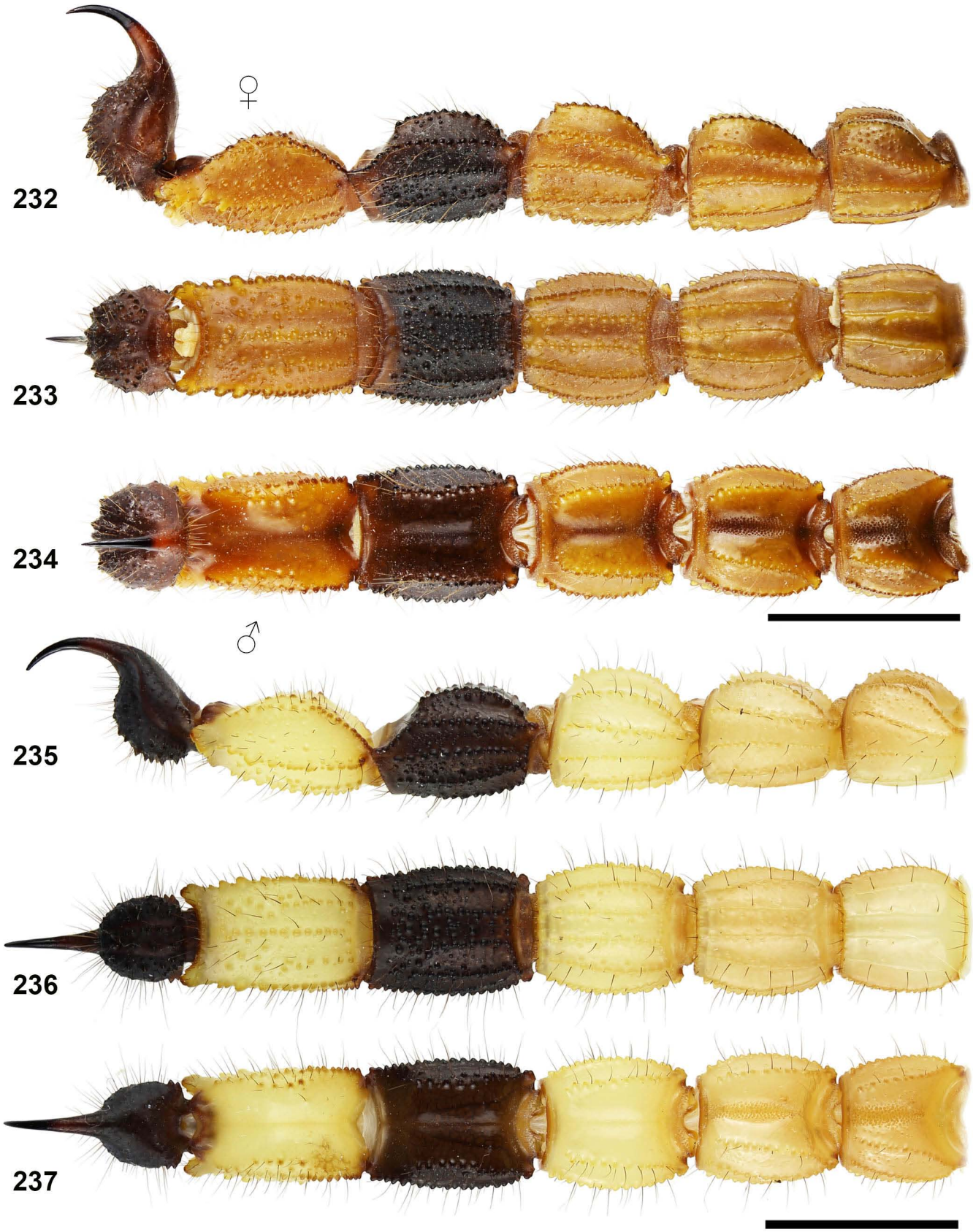
Figures 228–229. *Parabuthus somalilandus* **sp. n.**, male holotype in dorsal (228) and ventral (229) views. Scale bar: 10 mm.

bear numerous dark setae. All sternites are smooth, except that there is a stridulatory area on the third sternite that is more visible in the male. Sternite VII bears four carinae that are more visible in the male.

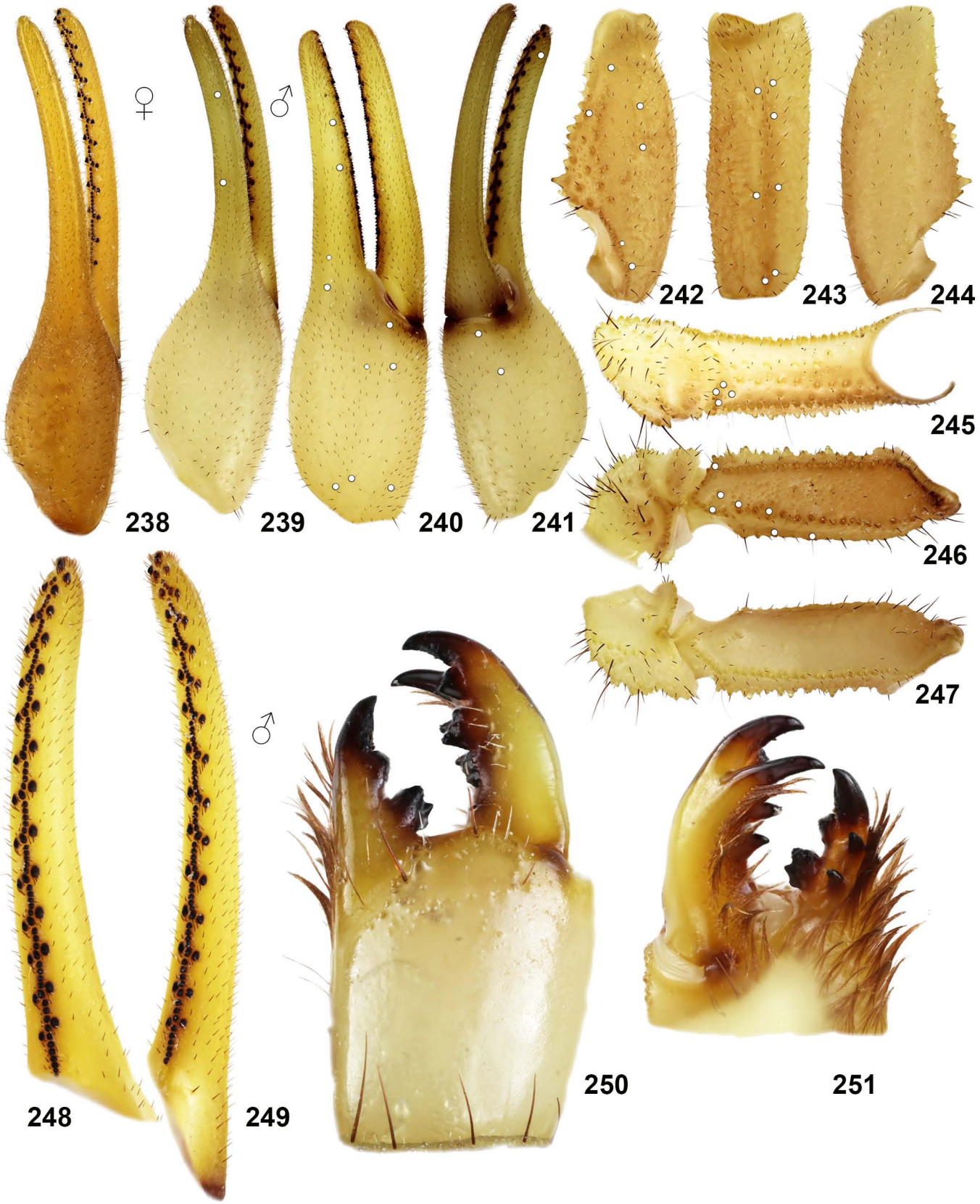
Metasoma and telson (Figs. 232–237). The first to fourth metasomal segments bear a total of 10 granulated carinae. The fifth segment has five carinae, and its ventral and lateral surfaces are strongly granulated. The ventral surface of metasomal segment V has several strong paired granules symmetrically located laterally in the middle part. Dorsolateral carinae of the third and fourth segments composed of blunt denticles, of which the posterior-most denticle is not enlarged. The stridulatory area is located on the dorsal surface of the first and second segments in both sexes. On the third segment



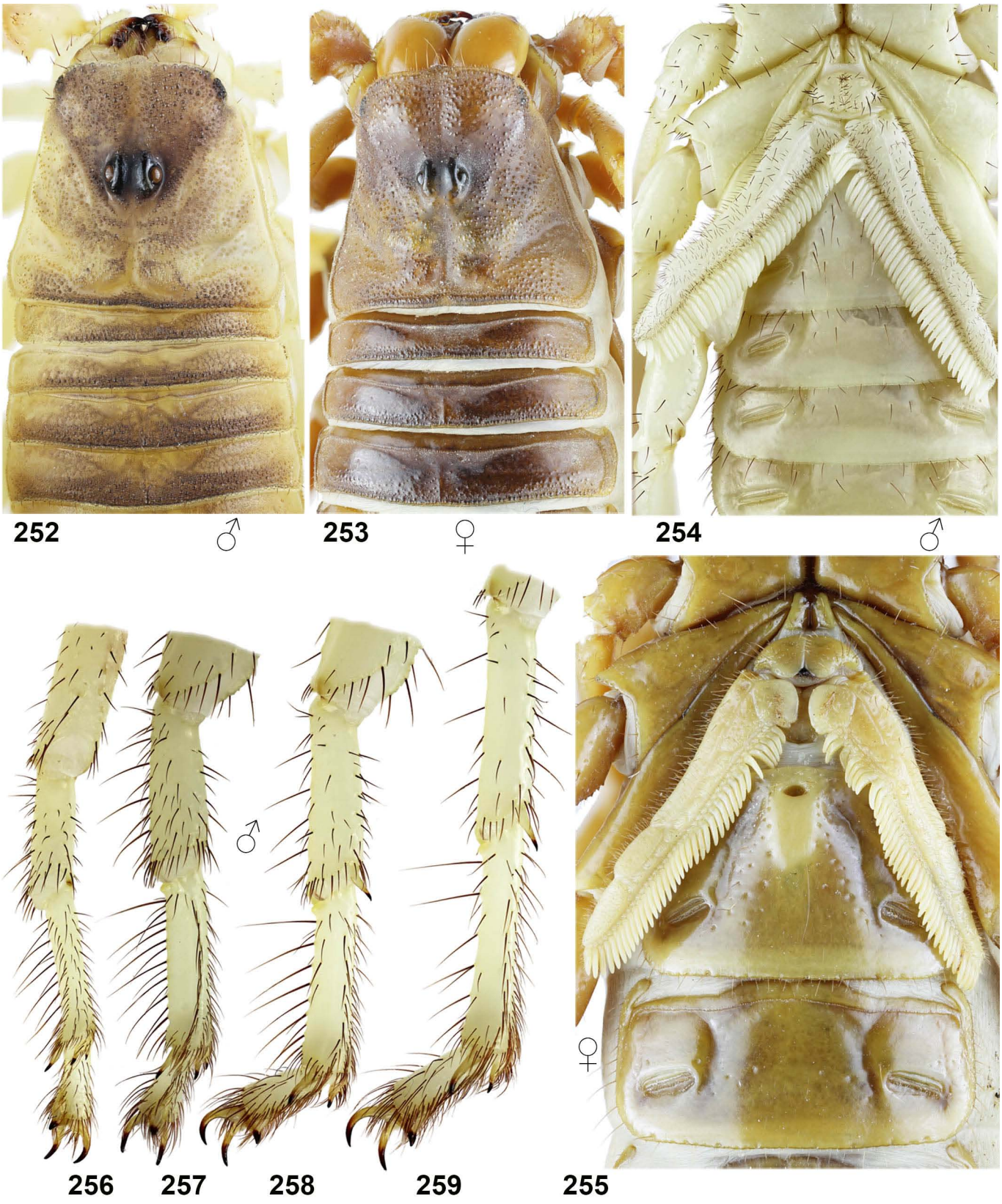
Figures 230–231. *Parabuthus somalilandus* **sp. n.**, female paratype from Somaliland, near Sheikh, foothills of Goolis Mts, 09°59.881‘N 45°09.762‘E, in dorsal (230) and ventral (231) views. Scale bar: 10 mm.



Figures 232–**237**: *Parabuthus somalilandus* **sp**. **n**., metasoma and telson. **Figures 232**–**234**. Female paratype from Somaliland, near Sheikh, foothills of Goolis Mts, lateral (232), ventral (233), and dorsal (234) views. **Figures 235**–**237**. Male holotype, lateral (235), ventral (236), and dorsal (237) views. Scale bars: 10 mm.



Figures 238–**251**: *Parabuthus somalilandus* **sp**. **n**. **Figure 238**. Female paratype from Somaliland, near Sheikh, foothills of Goolis Mts, pedipalp chela dorsal view. **Figures 239**–**251**. Male holotype, pedipalp chela dorsal (239), external (240) and ventral (241) views, pedipalp patella dorsal (242), external (243) and ventral (244) views, pedipalp femur and trochanter internal (245), dorsal (246), and ventral (247) views, pedipalp fixed (248) and movable (249) finger dentition. Trichobothrial pattern is indicated in Figures 239–243, 245–246. **Figures 250**–**251**. Right chelicera dorsal (250) and ventral (251) views.

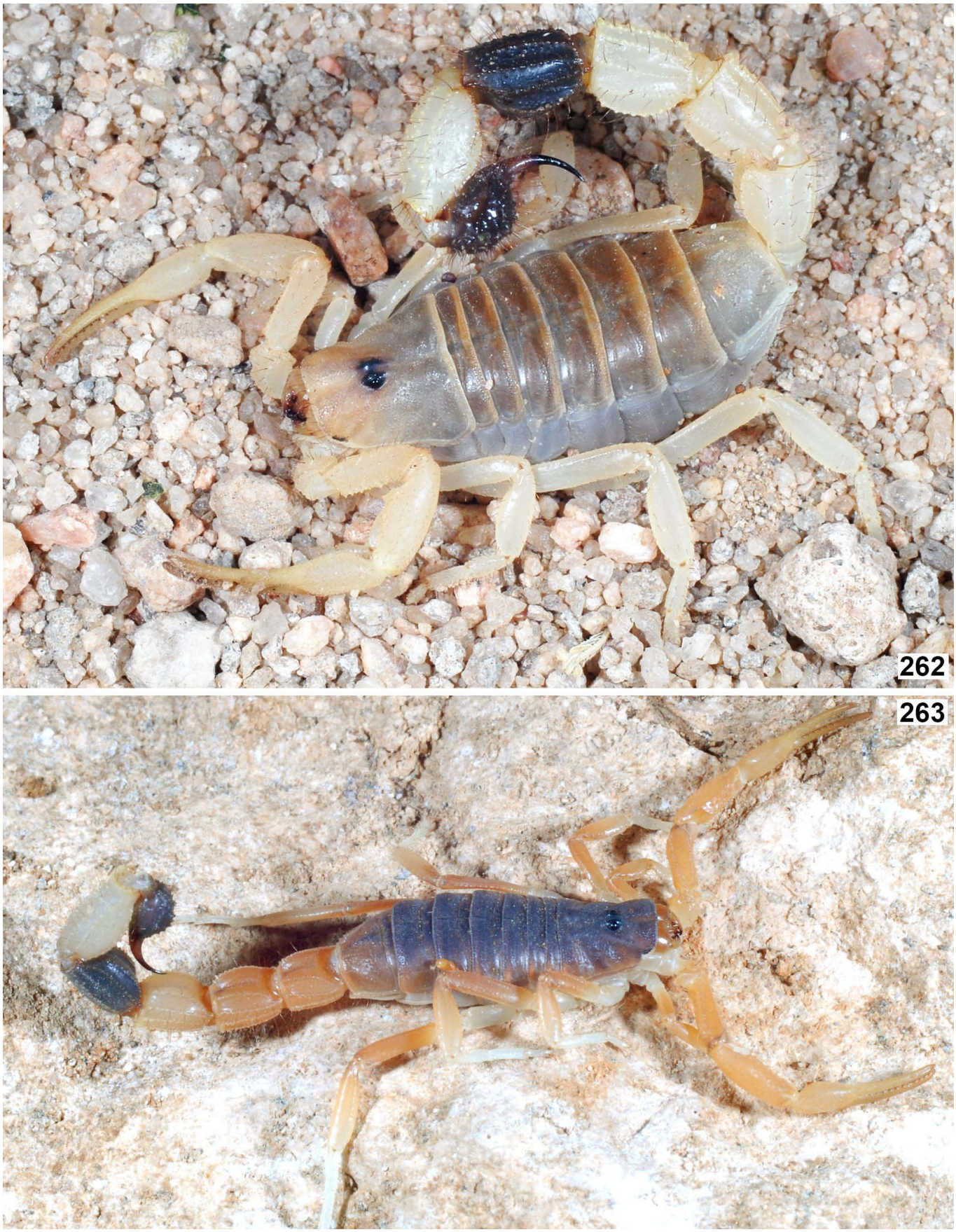


Figures 252–259: *Parabuthus somalilandus* **sp. n.** **Figures 252**, **254**, **256–259**. Male holotype, carapace and tergites I–IV (252), coxosternal area and sternites III–VI (254), left legs I–IV, retrolateral aspect (256–259 respectively). **Figures 253**, **255**. Female paratype from Somaliland, near Sheikh, foothills of Goolis Mts, carapace and tergites I–III (253), coxosternal area and sternites III–IV (255).





Figures 260–**261**. *Parabuthus somalilandus* **sp**. **n**., male holotype (260) and female paratype at locality 11SN (261) in vivo habitus.



Figures 262–263. *Parabuthus somalilandus* **sp. n.**, juveniles female (262) and male (263) paratypes in vivo habitus at locality 17SF.





Figures 264–265. *Parabuthus somalilandus* **sp. n.**, locality 11SN (264) and type locality 18SK (265).

Ratios of adult males	*P. heterurus* (n = 2)	*P. kabateki* sp. n. (n = 7)	*P. kajibu* (n = 1)	*P. mazuchi* sp. n. (n = 1)	*P. robustus* sp. n. (n = 3)	*P. somalilandus* sp. n. (n = 2)
Metasomal segment I (L/W)	0.99–1.05	0.99–1.05	1.03	0.96	0.96–1.01	0.98–1.01
Metasomal segment II (L/W)	1.09–1.15	1.09–1.15	1.02	1.02	0.99–1.11	1.06–1.12
Metasomal segment IV (L/W)	1.35–1.43	1.31–1.39	1.42	1.20	1.20–1.28	1.28–1.33
Metasomal segment IV (L/D)	1.52–1.60	1.48–1.56	1.50	1.50	1.35–1.48	1.37–1.41
Metasomal segment V (L/W)	1.60–1.82	1.58–1.67	1.62	1.66	1.46–1.57	1.58–1.60
Metasomal segment V (L/D)	1.68–1.98	1.75–1.87	1.78	2.00	1.76–1.83	1.79–1.82
Telson (L/D)	2.31–2.33	2.12–2.50	2.51	2.69	2.14–2.40	1.59–2.38
Pedipalp chela (L/W)	3.40–3.89	2.90–3.25	3.52	7.05	2.93–3.16	3.38–3.91
Ped. chela / mov. finger (L)	1.58–1.59	1.61–1.65	1.63	1.32	1.64–1.82	1.61–1.70
Total (L)	**78–86**	**73–88**	**56**	**56**	**65–77**	**75–83**

Table 4. Comparison among species (males) from *Parabuthus heterurus* complex and *P. mazuchi* **sp. n.**, based upon selected morphometric ratios of adult males. Abbreviations: length (L), width (W), depth (D).

it is reduced or absent and on fourth and fifth segments the stridulatory area is absent. The entire metasoma and the telson are pilose with long hairs. The ventral surface of the telson is strongly granulated. The metasomal segment V length/ width ratio is 1.58–1.60 in males and 1.46–1.50 in females. The telson is rather bulbous, with the aculeus approximately the same length as the vesicle in males and little bit shorter in females.

Pedipalps (Figs. 238–249). The pedipalps are hirsute with shorter setae on the chela and the patella, and longer setae on the femur, and trochanter. The femur bears four carinae. The chela is smooth without carinae and the patella is finely granulated with carinae indicated. The movable and fixed fingers of pedipalp bear 13–14 rows of granules, all with external and internal accessory granules. The fingers of pedipalps of male with inner side of base smooth, tubercle absent. The manus of pedipalp of male broad, pedipalp chela length/ width ratio 3.38–3.91 in males and 4.50–4.69 in females.

Legs (Figs. 256–259). Legs III and IV bear tibial spurs. Retrolateral and prolateral pedal spurs are present on all legs. All legs without distinct carinae and smooth. The tarsomeres bear two rows of macrosetae on the ventral surface and other macrosetae on the other surfaces. The bristle-combs are present on all legs, although slightly reduced on the fourth leg.

Hemispermatophore (Figs. 214–218). Flagelliform, elongate and slender. Trunk ca. 14 times length of capsule region. Flagellum emanating from posterior lobe of capsule; pars recta narrow, hyaline, ribbon-like, 0.85× length of capsule; pars reflecta narrow, hyaline in proximal 30% of length, becoming thicker, opaque white in distal 70% of length, in total ca. 5.3× length of capsule. Capsule region with 3 lobes: broad posterior lobe with angulate apical margin and strong anterior carina; small anterior lobe with narrowed apical tip; and robust basal lobe with sharp pointed tip. Left and right hemispermatophores were similar. Hemispermatophore is similar to that reported for other *Parabuthus* species (Kovařík et al., 2016).

Measurements. See Table 3.

Affinities. The described features distinguish *P. somalilandus* **sp. n.** from all other species of the genus. They are recounted in the key below. *P. somalilandus* **sp. n.** is a member of the *P. heterurus* complex, which is characterized by both non-elongated pedipalp fingers (Figs. 266–273) and a combination of metasoma IV black and metasoma V yellow (Figs. 194–199). *P. somalilandus* **sp. n.** is characterized by relatively stable color pattern and differs from other species by metasomal granulation and morphometrically. The pedipalp chela length/ width ratio is 3.38–3.91 in males, whereas the similar species from Somaliland, *P. kabateki* **sp. n.** and *P. robustus* **sp. n.**, have ratio 2.90–3.25.

Comments on localities and life strategy. *P. somalilandus* **sp. n.** inhabits semi-desert to rocky mountain areas in central Somaliland. The types were collected by day under rocks, and at night in open terrain by UV detection together with *Hottentotta polystictus* (Pocock, 1896) and *Gint dabakalo* Kovařík & Mazuch, 2015 on locality 17SD; *Hottentotta polystictus*, *Neobuthus factorio* Kovařík et al., 2018 and *Pandinurus phillipsii* (Pocock, 1896) on locality 17SF; *Hottentotta polystictus* and *Pandinurus phillipsii* on locality 17SO; *Neobuthus factorio* on locality 18SK; *Hottentotta polystictus*, *Neobuthus* sp., *Pandinurus* sp., and *Hemiscorpius* sp. on locality 19SO. The first author (FK) visited the type locality (18SK) on 31th August 2018 and recorded a minimum nighttime temperature of 18.6 ºC. The recorded humidity was between 29% and 50%. At the locality 17SC a paratype juvenile was collected at 22:00 h when the temperature was 16 ºC and humidity 20%; at the locality 17SF between 28th and 30th August 2017 the maximum recorded daytime temperature was 33.8 ºC, minimum nighttime temperature 22.8 ºC, and humidity was between 26% and 54%; and at the locality 17SO between 6th and 7th September 2017, the minimum recorded nighttime temperature was 18.6 ºC, and the minimum humidity 29%.



Figures 266–**292**: *Parabuthus* chelae, dorsal and external views. **Figures 266**–**267**. *P. heterurus*, male holotype (266) and male from Somalia, Afgooye (267). **Figure 268**. *P. kabateki* **sp**. **n**., male holotype. **Figure 269**. *P. kajibu*, male holotype. **Figure 270**–**271**. *P. robustus* **sp**. **n**., male holotype (270) and paratype from locality 11SQ (271). **Figures 272**–**273**. *P. somalilandus* **sp**. **n**., male holotype (272) and paratype from Laas Gel (273). **Figures 274**–**277**. *P. abyssinicus*, male (274–275) and female (276–277) from locality 17SR. **Figures 278**–**279**. *P. erigavoensis* **sp**. **n**., female holotype. **Figures 280**–**283**. *P. hamar*, male (280–281) and female (282–283) paratypes. **Figures 284**–**285**. *P. cimrmani*, male holotype. **Figures 286**–**287**. *P. eritreaensis*, male holotype. **Figures 288**–**289**. *P. mazuchi* **sp**. **n**., male holotype. **Figures 290**–**292**. *P. granimanus*, male from locality 18ST (290–291) and male lektotype (292).

Key to species of *Parabuthus* in the Horn of Africa

1. All metasomal segments yellow or yellowish brown. . ... ***P. pallidus*** Pocock, 1895
– Fourth metasomal segment black (Figs. 194–199). 2

2. Fifth metasomal segment yellow or yellowish brown, at least on ventral and lateral surfaces (Figs. 194–199). 3
– Fifth metasomal segment entirely black (Figs. 36–43). . . 8

3. Manus of pedipalp of male very narrow in both sexes, pedipalp chela length/ width ratio 6.13 in male and 7.23 in female (Figs. 285–286). ..... ***P. eritreaensis*** Kovařík, 2003
– Manus of pedipalp of male broad, pedipalp chela length/ width ratio 2.90–3.91 in male and 3.90–5.45 in female (Figs. 266–283) 4

4. Pedipalp chela length/ width ratio 3.38–3.94 in male. Dorsal surface of metasoma V entirely yellow (Figs. 232–237). 5
– Pedipalp chela length/ width ratio 2.90–3.25 in male. Dorsal surface of metasoma V with dark reticulation or spots laterally (Figs. 107–113). 7

5. Telson black (Fig. 235). Dorsal carina of metasoma IV composed of small blunt granules in male (Fig. 235). 6
– Telson yellowish brown to orange (fig. 117 in Kovařík et al., 2016: 35). Dorsal carina of metasoma IV composed posteriorly of strong pointed granules in male (fig. 114 in Kovařík et al., 2016: 35). ... ***P. kajibu*** Kovařík et al., 2016

6. Pedipalp fingers more elongate, pedipalp chela trichobothrium *eb* located on fixed finger (Fig. 91) .... ***P. heterurus*** Pocock, 1897
– Pedipalp chela trichobothrium *eb* located at the base of manus (Fig. 240). ..... ***P. somalilandus*** **sp. n.**

7. Metasoma III ventrally and laterally almost smooth. Dorsolateral carinae of the third and fourth segments terminate in stronger denticles. Metasoma I–II orange to black, always darker than metasoma III (Figs. 107–113). ..... ***P. kabateki*** **sp. n.**
– Metasoma III ventrally and laterally densely granulated. Dorsolateral carinae of the third and fourth segments composed of blunt denticles. Metasoma I–II yellow to orange, obviously the same color as metasoma III (Figs. 194–199). ..... ***P. robustus*** **sp. n.**

8. Manus of pedipalp smooth and very narrow, pedipalp chela length/ width ratio 5.90–7.05 in male (Figs. 284–289).... 9
– Manus of pedipalp of male broad, pedipalp chela length/ width ratio 2.95–3.30 in male and 4.25–4.90 in female (Figs. 290–292) 10

9. Third metasomal and all pedipalp segments yellow or yellowish brown. (figs. 36–39, 197 in Kovařík et al., 2016). Male holotype is 83 mm long and has 61–62 pectinal teeth. ..... ***P. cimrmani*** Kovařík, 2004
– Third metasomal segment reddish brown to black and all pedipalp segments dark. Fifth metasomal segment entirely black (Figs. 162–166). Male holotype is 63 mm long and has 36 pectinal teeth. ..... ***P. mazuchi*** **sp. n.**

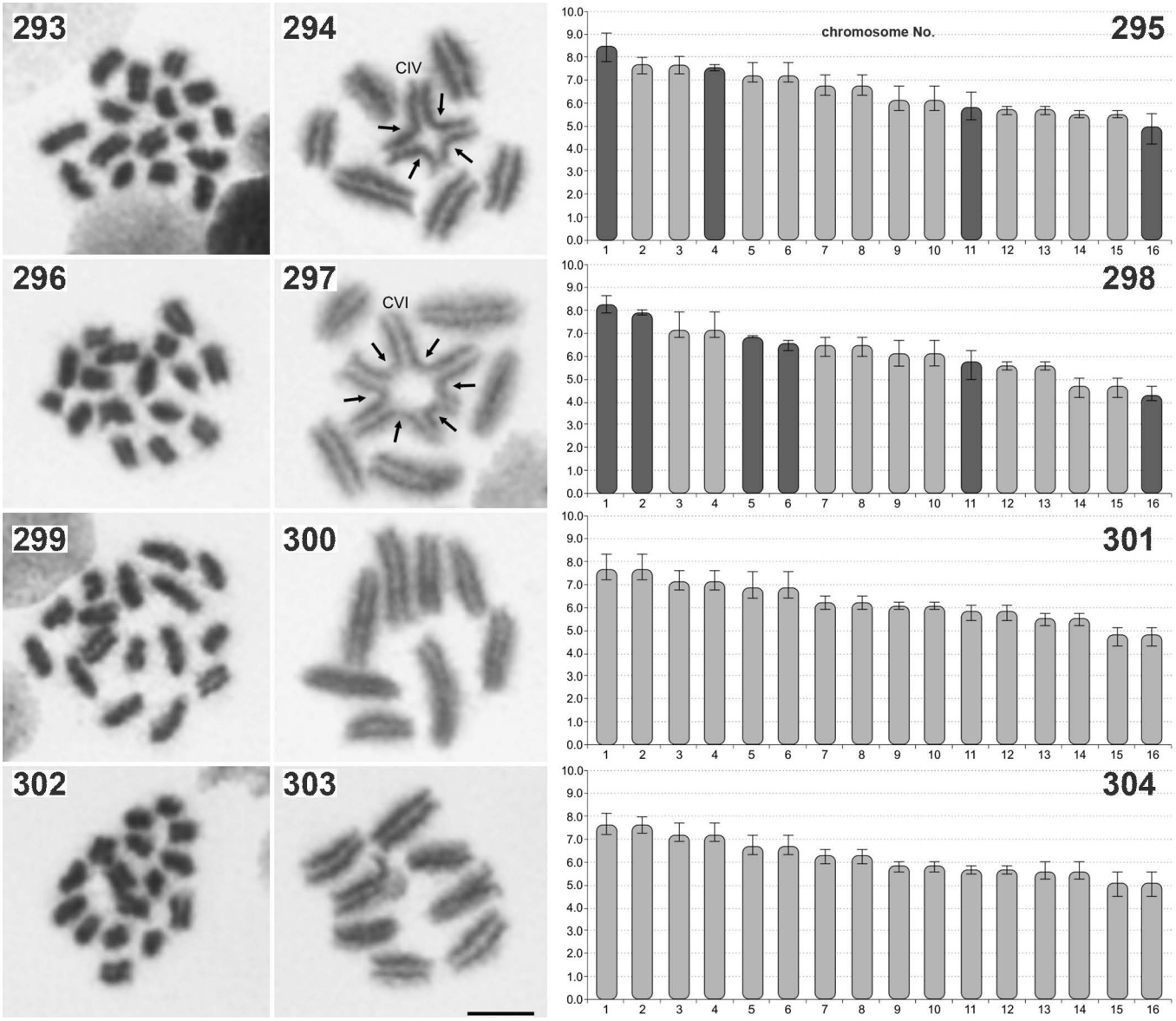
10. Manus granulated. Fingers of pedipalps of male with a tubercle on inner side of base (Figs. 290–292). ..... ***P. granimanus*** Pocock, 1895
– Manus smooth. Fingers of pedipalps of male with inner side of base smooth, no trace of tubercle (Figs. 266–283) 11

11. Patella of pedipalp strongly granulated..... ..... ***P. hamar*** Kovařík et al., 2016
– Patella of pedipalp finely granulated or smooth. 12

12. Pedipalp chela length/ width ratio 4.25–4.40 in female. Metasoma sparsely hirsute and relatively broder, metasoma III length/ width ratio around 1.15 in females (Figs. 2–4). Base color uniformly yellow to yellowish brown, carapace and tergites dark (Fig. 1). .... ***P. abyssinicus*** Pocock, 1901
– Pedipalp chela length/ width ratio 4.80–4.90 in female. Metasoma densely hirsute and relatively narrower, metasoma III length/ width ratio more than 1.19 in females (Figs. 5–7). Base color uniformly light yellow, carapace and tergites yellow to yellowish brown (Fig. 23). ..... ***P. erigavoensis*** **sp. n.**

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Figures 293–**304**: Male mitotic metaphases (293, 296, 299, 302), postpachytenes (294, 297, 300, 303) and ideograms (295, 298, 301, 304) (y axis - % of the diploid chromosome length, dark grey marks chromosomes in multivalent association) of *Parabuthus* species. Arrows show chromosomes in multivalent association during postpachytene. **Figures 293**–**298**. *Parabuthus kabateki* **sp**. **n**., paratypes, 2n=16, 6II+CIV (293–295), 2n=16, 5II+CVI (296–298). **Figures 299**–**301**. *P. robustus* **sp**. **n**., paratype, 2n=16, 8II. **Figures 302**–**304**. *P. somalilandus* **sp**. **n**., holotype, 2n=16, 8II. Scale bar: 5 μm (293–294, 296–297, 299–300, 302–303).

Species	2n	Postpachytene configuration	% TCL	Locality	Reference
P. abyssinicus	16	8II	7.51 – 4.84	Ethiopia (11EW)	Kovařík et al., 2016
P. abyssinicus	16	8II	7.34 – 5.04	Eritrea (15EG)	Kovařík et al., 2016
P. kabateki **sp. n.**	16	6II+CIV	8.44 – 4.95	Somaliland (18SJ)	present study
P. kabateki **sp. n.**	16	5II+CVI	8.27 – 4.30	Somaliland (18SJ)	present study
P. kajibu	18	9II	7.17 – 3.81	Ethiopia (16EA)	Kovařík et al., 2016
P. pallidus	20	8II+CIV	7.11 – 3.31	Ethiopia (13EL)	Kovařík et al., 2016
P. robustus **sp. n.**	16	8II	7.65 – 4.79	Somaliland (17SE)	present study
P. somalilandus **sp. n.**	16	8II	7.63 – 5.09	Somaliland (18SK)	present study

Table 5. The diploid numbers, the postpachytene configuration, the percentage of the total chromosome length of the diploid set (% TCL) and the localities of *Parabuthus* species from the Horn of Africa.

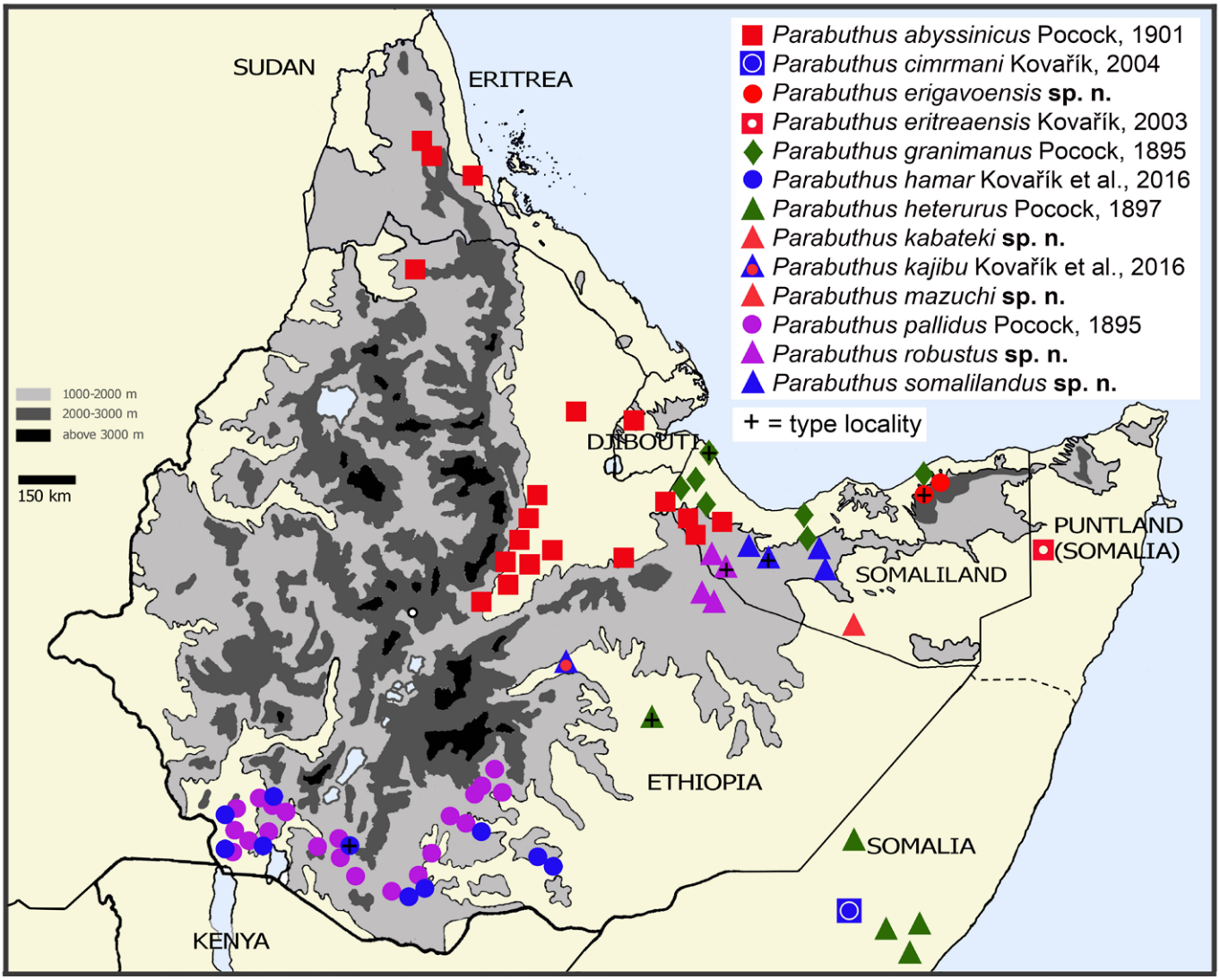


Figure 305. Map showing confirmed distribution of *Parabuthus* spp. in Djibouti, Eritrea, Ethiopia, Somalia, and Somaliland. Most points indicate sites sampled during 2011–2019 expeditions. We have not included in the map locality data for old specimens mainly from Somalia deposited in Italian museums which include large collections from this region (Kovařík & Whitman, 2005: 110–112), because these specimens are often mislabeled. Without corroboration from recently collected specimens, it is problematic to verify which of the locality labels are correct.

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