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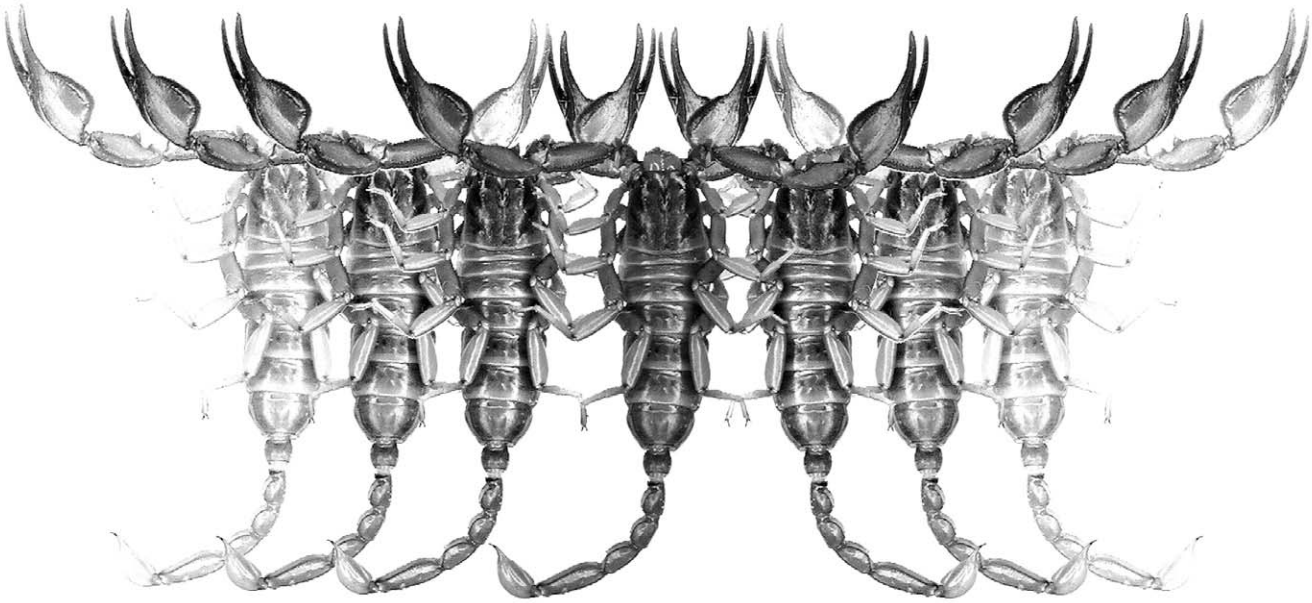

Scorpions of the Horn of Africa (Arachnida: Scorpiones). Part VI. *Compsobuthus* Vachon, 1949 (Buthidae), with a Description of *C. eritreaensis* sp. n.

František Kovařík, Graeme Lowe, Jana Plíšková & František Šťáhlavský

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Occasional Publications in Scorpiology

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Euscorpius — Occasional Publications in Scorpiology. 2016, No. 226

Scorpions of the Horn of Africa (Arachnida: Scorpiones). Part VI. *Compsobuthus* Vachon, 1949 (Buthidae), with a description of *C. eritreaensis* sp. n.

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Summary

All four *Compsobuthus* species of the Horn of Africa were newly collected, *C. werneri* firstly collected in Eritrea and *C. eritreaensis* **sp**. **n**. discovered during scorpiological expeditions in 2011–2016. Information is provided about their taxonomy, distribution, and ecology, fully complemented with color photos of live and preserved specimens, as well as their habitat. The hemispermatophore of *C. eritreaensis* **sp**. **n**. is illustrated and described. In addition to morphological analysis, we also describe the karyotype of *C. eritreaensis* **sp**. **n**. (2n=22).

Introduction

In the years of 2011–2016, two of the authors (FK and JP) have had an opportunity to participate in expeditions to the Horn of Africa, study scorpions at 83 localities and publish a number of articles on this fauna (Kovařík, 2011a, 2011b, 2012, 2013, 2015, Kovařík et Lowe, 2012, Kovařík et Mazuch, 2011, 2015, Kovařík et al., 2013, 2015, 2016, and Lowe & Kovařík, 2016). This paper is the sixth in a series of articles concerning the distribution of a particular genus in the Horn of Africa.

Compsobuthus is one of the most widely distributed genera of the family Buthidae, with species present throughout central Africa, the Arabian Peninsula, and in Asia to Pakistan and India (Kovařík & Ojanguren, 2013: 148). For the genus *Compsobuthus*, Ethiopian and Somaliland localities are southeastern limits of distribution.

Methods, Material & Abbreviations

Nomenclature and measurements follow Stahnke (1971), Kovařík (2009), and Kovařík & Ojanguren Affilastro (2013), except for trichobothriotaxy (Vachon, 1974), and sternum (Soleglad & Fet, 2003). Short, stout spiniform macrosetae are termed spiniform setae. Hemispermatophore terminology follows Kovařík et al., 2016.

We intentionally use here the name Somaliland (Hargeysa) for the northern territory corresponding to the former British colony (British Somaliland), which we distinguish from Somalia (Mogadisho). Somaliland has its own currency, a functional government with representation in several countries, and its officials contributed to our safe visit.

Specimens were found by ultraviolet (UV) detection by night, or by searching under surface debris and rocks by day. All collected material was preserved in 80% ethanol. *Specimen Depositories*: FKCP (František Kovařík, private collection, Prague, Czech Republic); MZUT (Museo Regionale di Scienze Naturali of Turin, Italy); and ZISP (Zoological Institute, Russian Academy of Sciences, St. Petersburg, Russia). *Morphometrics*: D, depth; L, length; W, width.

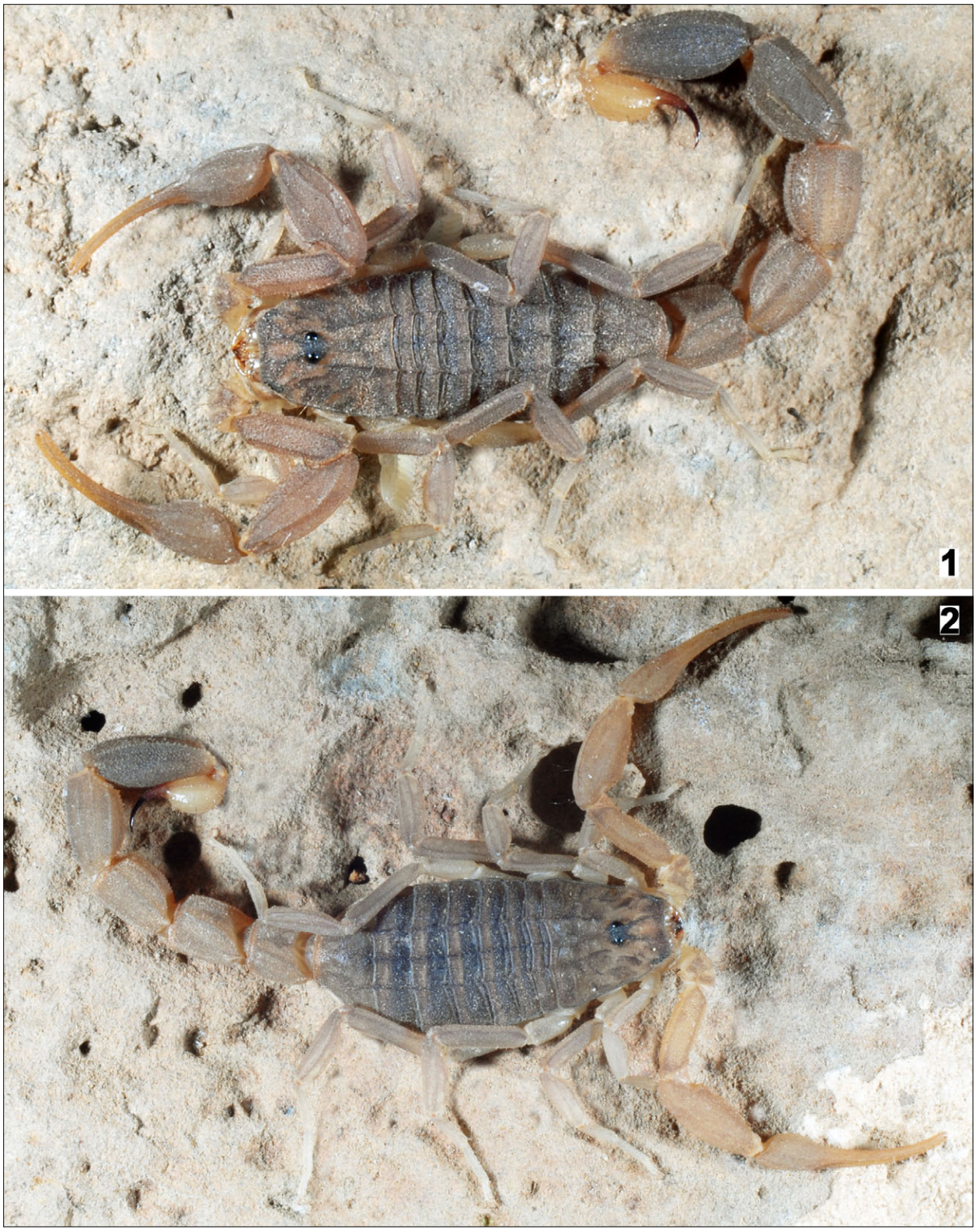
Systematics

Family Buthidae C. L. Koch, 1837
Compsobuthus Vachon, 1949
(Figs. 1–77)

Compsobuthus Vachon, 1949: 93 (1952: 213); Fet & Lowe, 2000: 124 (complete reference list until 1998); Kovařík, 2003a: 88 (in part); Kovařík, 2009: 31; Kovařík, 2012: 1; Kovařík & Ojanguren, 2013: 145–158, figs. 777–941.

TYPE SPECIES. *Buthus acutecarinatus* Simon, 1882.

DIAGNOSIS. Total length 20–55 mm. Dorsal trichobothria of femur arranged in *beta*-configuration. Trichobothrium d_3 of patella internal to dorsomedian carina. Trichobothrium *db* on chela of pedipalp basal to *est*.



Figures 1–2: *Compsobuthus abyssinicus*, in vivo habitus. Male (1) in Ethiopia, locality No. 12EQ and female (2) in Ethiopia, locality No. 12EO.

Trichobothrium *eb* located on fixed finger of chela. Pectines with fulcra. Pectinal teeth number 9–34. Tibial spurs present on third and fourth legs. Cheliceral fixed finger with two ventral denticles. Carapace with distinct carinae. Central lateral and posterior lateral carinae of carapace connected to form continuous linear series of granules extending to posterior margin. Carapace in lateral view with entire dorsal surface horizontal or nearly so. Dentate margin of pedipalp chela movable finger with distinct granules divided into 8–14 rows and 4 terminal granules and one basal terminal granule. Tergites I–VI of mesosoma bear three carinae projecting beyond posterior margin as distinct spiniform processes.

Compsobuthus abyssinicus (Birula, 1903)
(Figs. 1–4, 15–16, 19–22, 45–46, 77)

Buthus acutecarinatus abyssinicus Birula, 1903: 108.
Compsobuthus acutecarinatus abyssinicus: Kraepelin, 1913: 127.
Compsobuthus abyssinicus: Vachon, 1949: 99 (1952: 219); Fet & Lowe, 2000: 124; Kovařík, 2003a: 88–89; Kovařík, 2003b: 138; Kovařík & Whitman, 2005: 107 (in part); Kovařík & Ojanguren, 2013: 146–147, figs. 777–782, 921–925.
Compsobuthus acutecarinatus: Sissom, 1994: 9 (in part, record from Assab, Eritrea)
Compsobuthus maindroni: Kovařík, 2003b: 138, fig. 1 (misidentification).

TYPE LOCALITY AND TYPE REPOSITORY. Ethiopia (Abyssinia), Kachenuha; ZISP.

MATERIAL EXAMINED. **Ethiopia**, 30 km W Metahara, VIII.1982, 2♀; Awash, Metahara env., 08°54'N 39°54'E, 960-1050 m a.s.l. (Locality **11EA**), 2008, 1♀, leg. Trailin, 19.-22.VII.2011, 3♂1♀3ims., leg. F. Kovařík; Awash, 09°00'34.5"N 40°17'56.5"E, 1012 m a.s.l. (Locality **11EW**), 19.VII.2011, 1♂1♀, leg. F. Kovařík; Awash n. p., 08°52'N 40°05'E, 981 m a.s.l. (Locality **11EX**), 20.VII.2011, 1♀2juvs before first ecdysis, leg. F. Kovařík; 13°43'10"N 39°55'34"E, 879 m a.s.l. (Locality **12EI**), 18.XI.2012, 1im.1juv., leg. F. Kovařík; 11°29'47"N 40°25'07"E, 766 m a.s.l. (Locality **12EL**), 20.XI.2012, 1♂1♀, leg. F. Kovařík; Gewane, 10°09'38"N 40°39'45"E, 631 m a.s.l. (Locality **12EO**), 23.XI.2012, 1♀ (Fig. 2), leg. F. Kovařík; 09°34'06"N 40°23'45.9"E, 601 m a.s.l. (Locality **12EQ**), 24.XI.2012, 1♂ (Fig. 1), leg. F. Kovařík; Awash, 09°00'34.5"N 40°17'56.5"E, 1012 m. a.s.l. (Locality **12EW**), 1♀, 25.XI.2012, leg. F. Kovařík; Awash, Metahara env., 08°54'N 39°54'E, 960-1050 m a.s.l. (Locality **12EX**), 25.XI.2012, 1♀, leg. F. Kovařík; Afar State, Awash, 09°09'03.6"N 40°31'38.8"E, 1378 m a.s.l. (Locality **14ES**), 26.XI.2014, 1♀, leg. F. Kovařík; Afar State, 09°34'06"N 40°23'45.9"E, 601 m a.s.l. (Locality **14EU =12EQ**), 27.XI.2014, 1♀, leg. F. Kovařík; Oromia State, East Shewa, Fantale zone, volcanic crater Fantale near Metahara, 09°00'56.2"N 39°51'21"E, 1050 m a.s.l. 29.XI.2014, (Locality **14EV**, Fig. 4), 4♂3♀3juvs.(Fig. 3), leg. F. Kovařík. **Somaliland**, 4 km S of Borama, Awdal, 09°53'01"N 43°11'56"E, 1662 m a.s.l., 17.I.2015, 1♂, leg. T. Mazuch. All specimens are in the first authors collection (FKCP).

DIAGNOSIS. Total length 28–40 mm. Sexual dimorphism minor, adult males with chela of pedipalps broader and fingers of pedipalps flexed proximally; there is no difference in length and width of metasomal segments. Base color uniformly reddish to gray. Pedipalps with or without spots. Movable finger of pedipalp bears 10 rows of granules, all without external and with internal accessory granules (*acutecarinatus* group). Pedipalp chela length/width ratio 3.7–3.8 in males and 4.4–4.6 in females. Manus of chela shorter than fixed finger. Trochanter of pedipalps with numerous long setae. Anterior margin of carapace bears eight symmetrically distributed spiniform setae. First to third metasomal segments bear 10 carinae, fourth bears 8 or 10 carinae. All metasomal segments longer than wide. Pectinal teeth number 21–24 in males and 19–23 in females. Sternites and ventral surface of metasoma granulated and with numerous small black setae. Seventh sternite bears four crenulate carinae. Telson bulbous, aculeus shorter than vesicle. Subaculear tubercle present but not spinoid.

COMMENTS ON LOCALITIES AND LIFE STRATEGY. *C. abyssinicus* inhabits semi-desert, in the south limited by the town of Metahara, Ethiopia. This area is characterized by volcanic bedrock with lava fields around the lake, and this terrain transitions to sandy semi-desert with scattered volcanic boulders where *C. abyssinicus* prefers more rocky areas (Fig. 4). *C. abyssinicus* is often sympatric with *Buthus awashensis* Kovařík, 2011, *Neobuthus awashensis* Kovařík et Lowe, 2012, and *Parabuthus abyssinicus* Pocock, 1901.

***Compsobuthus eritreaensis* Kovařík, Lowe, Plíšková et Šťáhlavský, sp. n.**
(Figs. 5–14, 27–44, 47–60, 77, Table 1)
http://www.zoobank.org/urn:lsid:zoobank.org:act:633AEAE4-4650-4099-B572-62C7EE3341C1

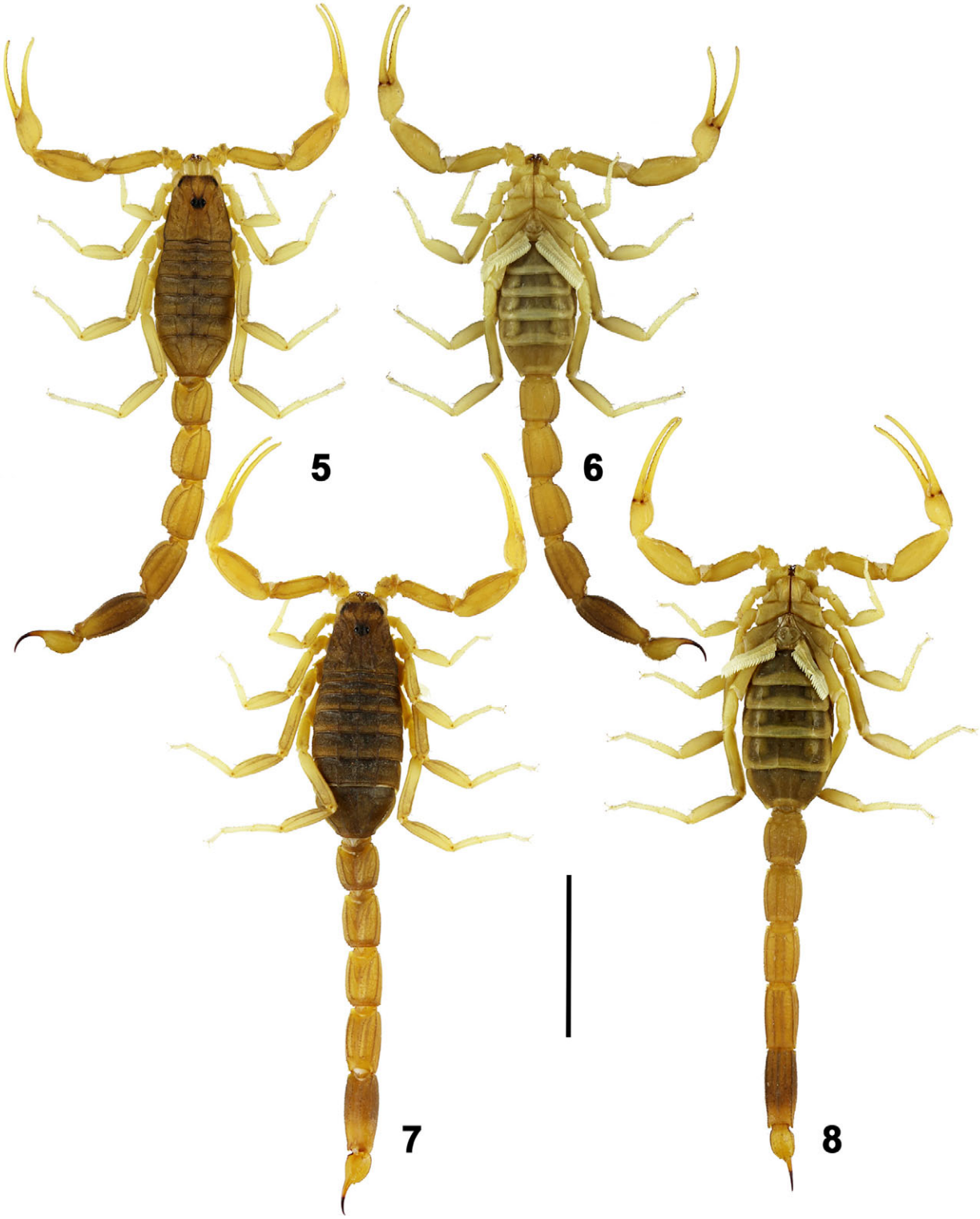
? *Compsobuthus abyssinicus*: Kovařík & Whitman, 2005: 107 (in part).

TYPE LOCALITY AND TYPE REPOSITORY. Eritrea, near Massawa, 15°36'58.7"N 39°22'32.8"E, 74 m a.s.l., 4.-5.XI.2015, (Locality 15EI, Fig. 56), first author's collection (FKCP).

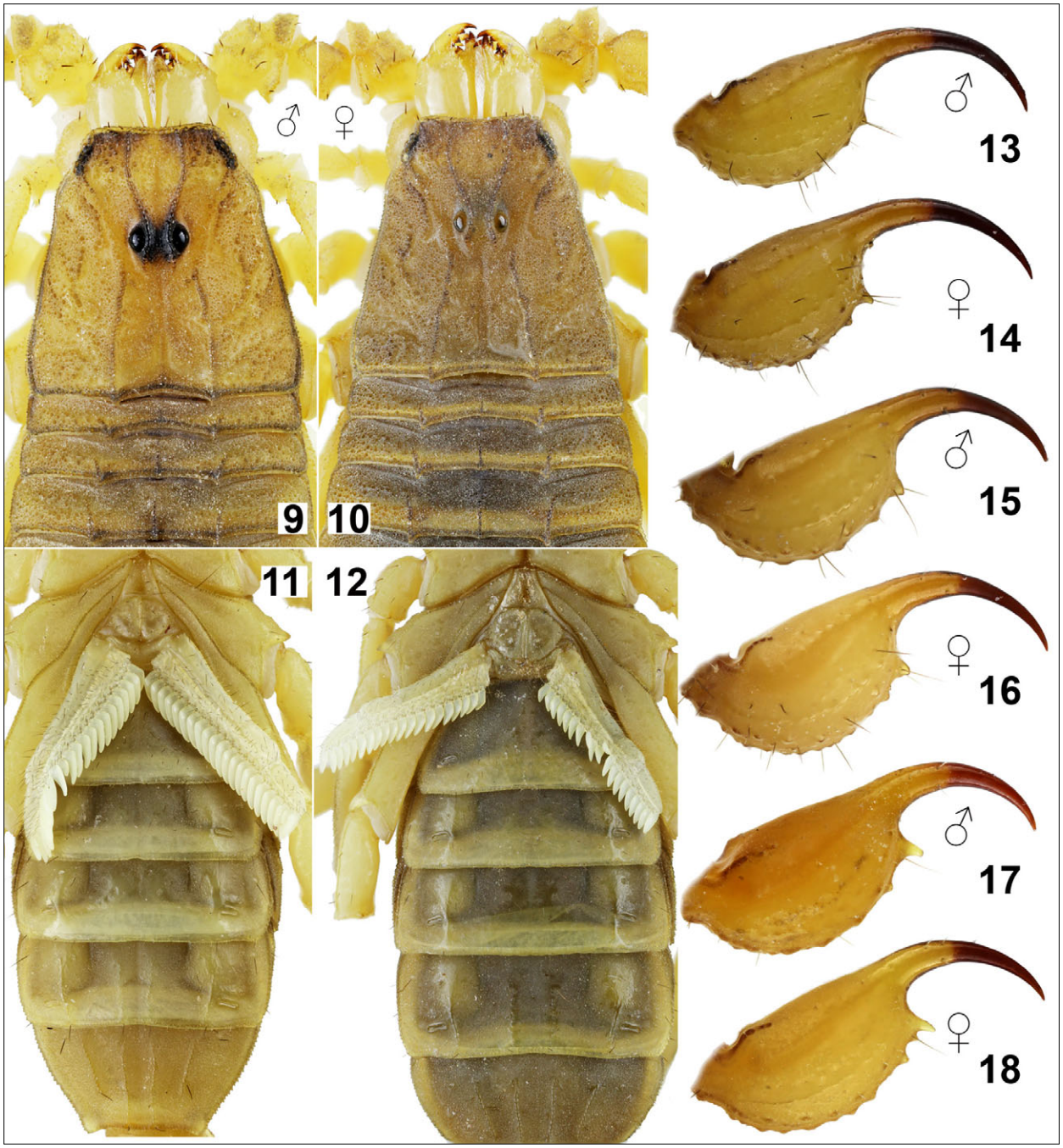
TYPE MATERIAL. **Eritrea**, near Massawa, 15°36'58.7"N 39°22'32.8"E, 74 m a.s.l., 4.-5.XI.2015, (Locality **15EI**,

Figures 3–4: *Compsobuthus abyssinicus*. Female with juveniles after first ecdysis at locality 14EV (3) and the locality 14EV, Ethiopia, Oromia State, volcanic crater Fantale near Metahara, 09°00'56.2"N 39°51'21"E, 1050 m a.s.l. (4).

Fig. 56), 7♂12♀ (holotype and paratypes, Figs. 27–44, 47–55), leg. F. Kovařík; Dese Island, 15°26'39.2"N 39° 45'32.7"E, 8 m a.s.l., 5.-7.XI.2015, (Locality **15EJ**, Fig. 59), 2♂8♀1juv. (paratypes, Figs. 57–58), leg. F. Kovařík; near Massawa, 15°36'55"N 39°24'22"E, 30 m a.s.l., 8.XI.2015, (Locality **15EK**), 1♀ (paratype), leg. F.



Figures 5–8: *Compsobuthus eritreaensis* **sp. n. Figures 5–6**. Male holotype in dorsal (5) and ventral (6) views. **Figures 7–8:** Female paratype in dorsal (7) and ventral (8) aspects. Scale bar: 10 mm.

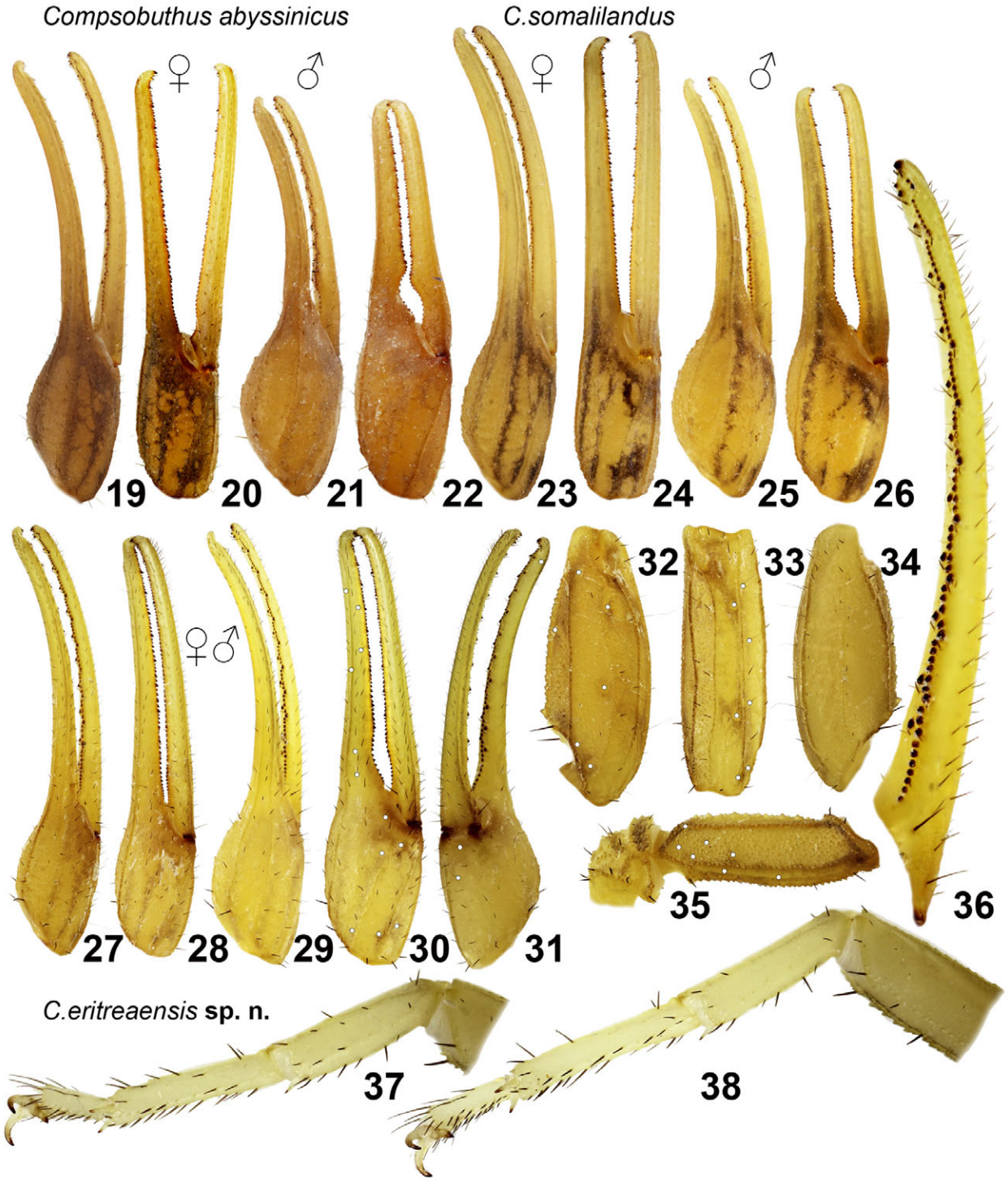


Figures 9–18: **Figures 9–14**. *Compsobuthus eritreaensis* **sp. n. Figures 9, 11, 13**. Male holotype, carapace and tergites I–III (9), coxosternal area and sternites (11), and lateral view of telson (13). **Figures 10, 12, 14**. Female paratype, carapace and tergites I–III (10), coxosternal area and sternites (12), and lateral view of telson (14). **Figures 15–16**. *C. abyssinicus*, lateral view of telson of male (15) and female (16) from locality 11EW. **Figures 17–18**. *C. somalilandus*, lateral view of telson of paratype male (17) and female (18) from type locality.

Kovařík; route Massawa to Gahtiela, 15°36'03.7"N 39° 16'38.4"E, 115 m a.s.l., 8.XI.2015, (Locality **15EL**, Fig. 60), 1♀1im., leg. F. Kovařík. All types are in the first author collection (FKCP).

ETYMOLOGY. Named after the country of occurrence.

DIAGNOSIS. Total length 26 (male) – 41 mm (female). Sexual dimorphism minor, adult males with chela of



Figures 19–38: **Figures 19–22**. *Compsobuthus abyssinicus*, from locality 11EA. **Figures 19–20**. Female, pedipalp chela dorsal (19) and external (20). **Figures 21–22**. Male, pedipalp chela dorsal (21) and external (22). **Figures 23–26**. *C. somalilandus*, from type locality. **Figures 23–24**. Female paratype, pedipalp chela dorsal (23) and external (24). **Figures 25–26**. Male holotype, pedipalp chela dorsal (25) and external (26). **Figures 27–38**. *Compsobuthus eritreaensis* **sp. n. Figures 27–28**. Female paratype from type locality, pedipalp chela dorsal (27) and external (28). **Figures 29–36**. Male holotype from type locality, pedipalp segments. Chela dorsal (29), external (30), and ventral (31). Patella dorsal (32), external (33) and ventral (34). Femur dorsal (35). Movable finger dentition (36). The trichobothrial pattern is indicated in Figures 30–33 and 35. **Figures 37–38**. Male holotype, right legs III (37) and IV (38), retrolateral aspect.

pedipalps broader and fingers of pedipalps slightly flexed proximally; there is no difference in length and width of metasomal segments. Base color uniformly yellow to yellowish brown with dark spot on fifth metasomal segment. Movable finger of pedipalp bears 10–11 rows of granules, all without external and with internal accessory granules (*acutecarinatus* group of Levy & Amitati, 1980). Pedipalp chela length/width ratio 4.5 in males and 5.4 in females. Manus of chela shorter than fixed finger. Pedipalp chela length/movable finger length ratio 1.32–1.38 in both sexes. Trochanter of pedipalps with ten to twelve spiniform setae and two setae. Anterior margin of carapace bears 8 symmetrically distributed spiniform setae. First to third metasomal segments bear 10 carinae, fourth bears 8 or 10 carinae. All metasomal segments longer than wide. Pectinal teeth number 22–26 in males and 18–23 in females. Sternites and ventral surface of metasoma granulated, more so in males. Seventh sternite bears four crenulate carinae. Telson bulbous, aculeus shorter than vesicle. Subaculear tubercle present but not spinoid. Ratio of length vesicle/aculeus is 1.1–1.2.

DESCRIPTION. Total length 26–32 mm (male), 32–41 mm (female). The habitus is shown in Figs. 5–8. For position and distribution of trichobothria of pedipalps see Figs. 30–33 and 35. Sexual dimorphism minor, adult males with chela of pedipalps broader and fingers of pedipalps slightly flexed proximally (Figs. 28 and 30); there is no difference in length and width of metasomal segments.

Coloration (Figs. 57–58). The base color is uniformly yellow to yellowish brown, with dark spot on anterior half of the fifth metasomal segment; other spots missing or indicated only.

Carapace and mesosoma (Figs. 9–12). The entire carapace is covered by granules of different sizes. The carinae are moderately to strongly developed and granular. The anterior margin of the carapace is almost straight, medially weakly concave, and bears eight symmetrically distributed spiniform setae. The tergites are granulated. Tergites I–VI bear very strong, denticulate lateral carinae. Each carina terminates in a spiniform process that extends well past the posterior margin of the tergite. Tergite VII is pentacarinate, with lateral pairs strong, serrato-crenulate and the median carina moderate, crenulate and present only in the proximal half. The pectinal tooth count is 22–26 (1x22, 9x23, 1x24, 2x25, 1x26) in males and 18–23 (1x18, 12x19, 15x20, 9x21, 1x22, 3x23) in females. The pectine marginal tips extend to half of the fourth sternite in the female and to one-third of the fifth sternite in the male. The pectines have three marginal lamellae and seven to eight middle lamellae. The lamellae bear numerous dark setae, each fulcrum with three or four dark setae. All sternites are finely granulated. The sixth and seventh segments bear four ventral crenulate carinae, which are more strongly developed on the seventh segment. The other sternites bear two cari-nae.

Metasoma and telson (Figs. 39–44). The first to third segments bear 10 carinae, the fourth segment bears 8 or 10 carinae and the fifth segment bears five carinae. Intermediate carinae of the fourth segment are often replaced by isolated granules that may also form carinae. All segments are sparsely setose and densely granulated. Accessory rows of granules are present on dorsal surfaces of segments as well as on the ventral surface of the fifth segment. The telson is bulbous, with the aculeus a little shorter than the vesicle. The ratio of length vesicle/aculeus is 1.1–1.2. A subaculear tubercle is present and short.

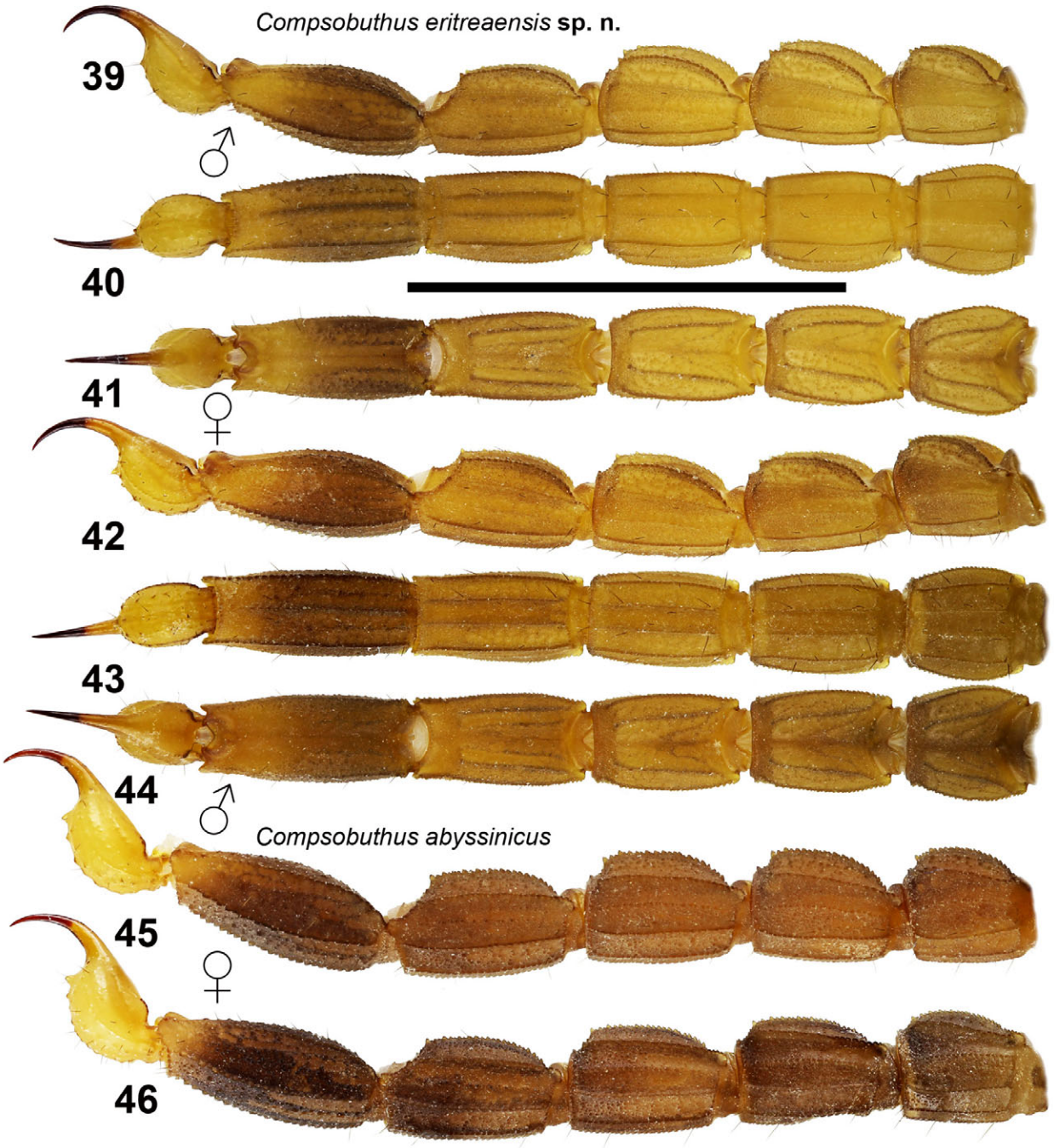
Pedipalps (Figs. 27–36). The pedipalps are granulated and hirsute. The femur bears five carinae. The patella bears seven granular carinae. The chela bears five carinae. The movable and fixed fingers bear 10–11 rows of granules, all without external and with internal granules. Pedipalp chela length/width ratio 4.5 in males, and 5.4 in females. Manus of chela shorter than fixed finger. Pedipalp chela length/movable finger length ratio 1.32–1.38 in both sexes. The trochanter of pedipalps bears ten to twelve spiniform setae and two setae.

Legs (Figs. 37–38). Legs III and IV bear tibial spurs. Retrolateral and prolateral pedal spurs are present on all legs. The tarsomeres bear two rows of macrosetae on the ventral surface and several macrosetae on the other surfaces. Bristlecombs are absent. The femur bears four carinae and the patella bears four to six carinae. The femur and patella bear only solitary macrosetae and are granulated except for external lateral surfaces which are smooth.

Measurements. See Tab. 1.

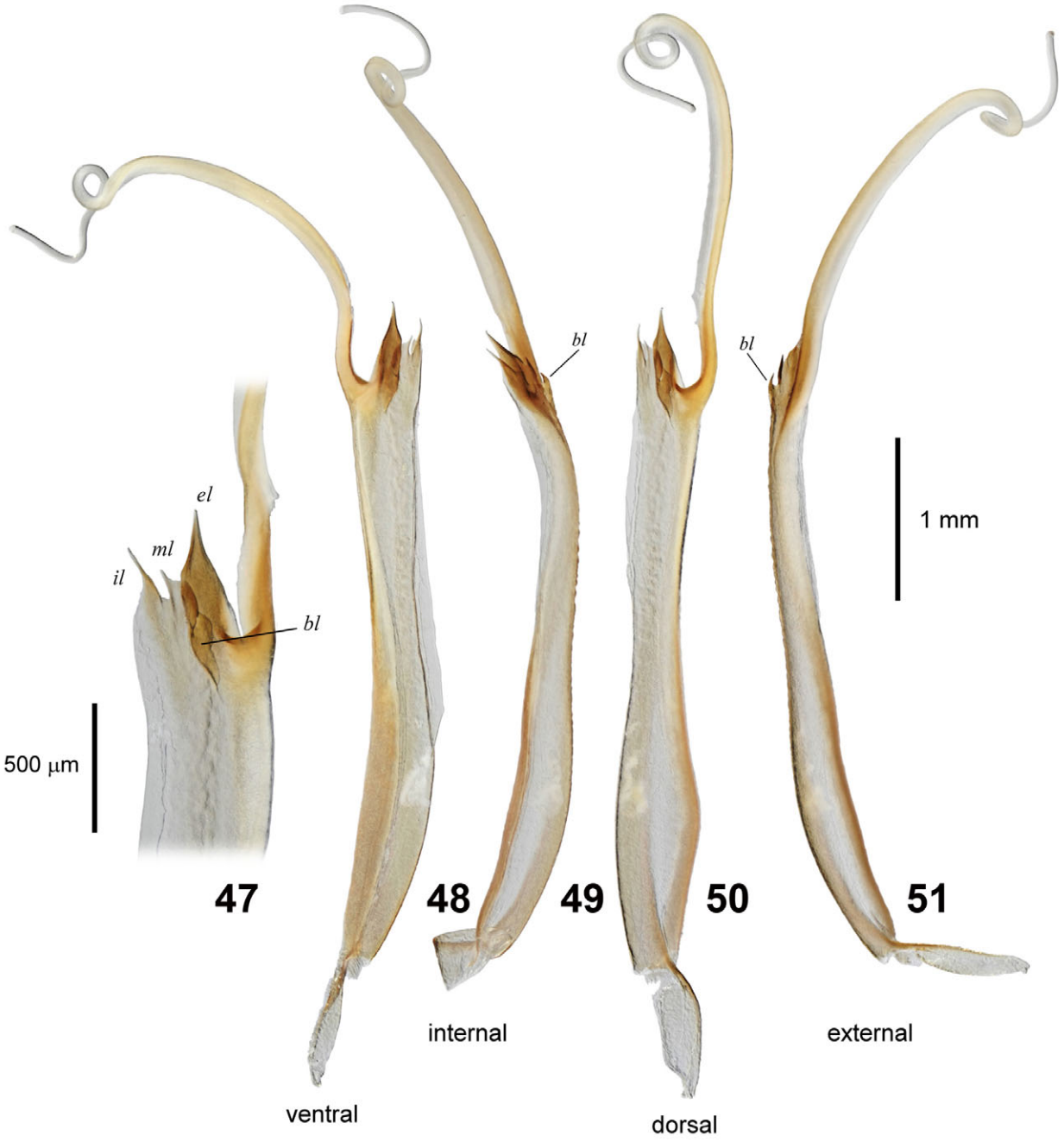
Hemispermatophore (Figs. 47–51). Flagelliform, elongate and slender, with trunk 4.8 times length of capsule region. Flagellum is well separated from the external lobe, unfolded, slightly longer than the trunk, the proximal 70% of its length with narrow lamina running along internal side of cylindrical core. Distal 30% of flagellum without lamina, narrower, coiled. Capsule region with 4 lobes at base of flagellum, conforming to 3 + 1 configuration prevalent in *Buthus* group (Kovařík et al., 2016) (Fig. 47). External lobe longest, apically acuminate with symmetric vertex; median lobe shortest, apically truncate with acuminate internal vertex. Median lobe carina not well developed. Internal lobe acuminate with long thin vertex, slightly shorter than median lobe. Basal lobe strongly developed, broad, hamate, about same size as median lobe. External and basal lobes darker, more sclerotized than other lobes.

The shapes and relative dimensions of the capsule lobes are quite similar to those that have been described in other *Compsobuthus* species, including *C. carmelitis*



Figures 39–46: **Figures 39–44**. *Compsobuthus eritreaensis* **sp. n.**, metasoma and telson. **Figures 39–41**. Male holotype, lateral (39), ventral (40), and dorsal (41). **Figures 42–44**. Female paratype from type locality, lateral (42), ventral (43), and dorsal (44). Scale bar: 10 mm. **Figures 45–46**. *Compsobuthus abyssinicus*, from locality 11EA, metasoma and lateral view of telson in male (45) and female (46).

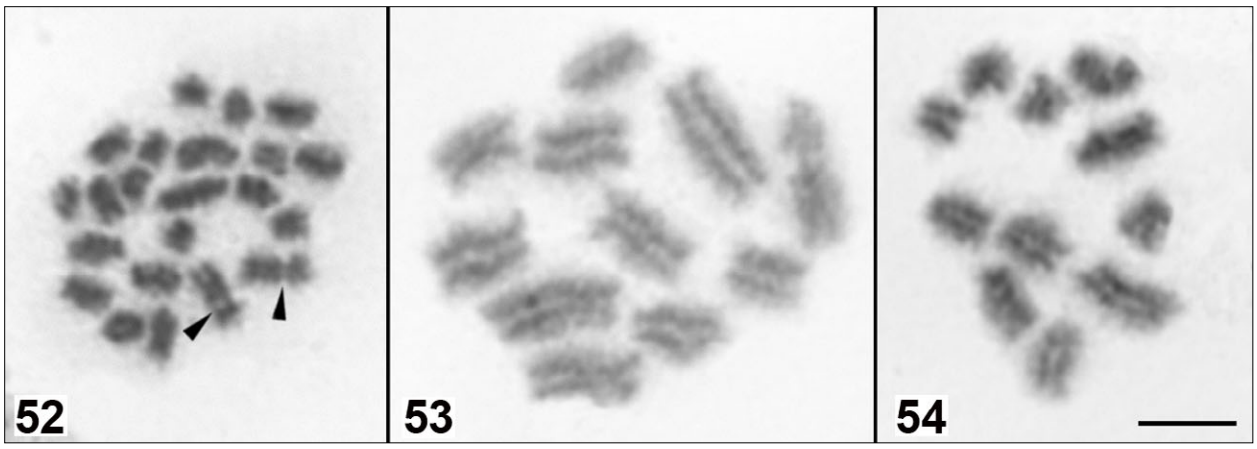
Levy et al., 1973, *C. jordanensis* Levy et al., 1973, *C. levyi* Kovařík 2012, *C. nematodactylus* Lowe, 2009, *C. polisi* Lowe, 2001, and *C. werneri* (Birula, 1908) (Levy et al., 1973; Levy & Amitai, 1980; Lowe, 2001, 2009; Vachon, 1949, 1952). The *Compsobuthus* lobes differ significantly from the lobes of some other *Buthus* group genera. For example, the broad, robust basal lobe of *Compsobuthus* contrasts with the smaller basal lobes of *Androctonus*, *Apistobuthus*, *Buthacus*, *Hottentotta*, *Leiurus*, *Odontobuthus* and *Vachoniolus* (Levy & Amitai, 1980; Lowe, 2009a, 2010a, 2010b, 2010c; Lowe et al., 2014; Vachon, 1949, 1952, 1958; Vachon & Stock-



Figs. 47–51: *Compsobuthus eritreaensis* **sp. n.**, male paratype from type locality, left hemispermatophore. **Figure 47**. Dorsal view of capsule region, compressed to show form of lobes at base of flagellum. Scale bar: 500 μm. **Figures 48–51**. Whole hemispermatophore oriented to show capsule region in ventral (48), internal (49), dorsal (50) and external (51) views. Scale bar: 1 mm. Abbreviations: *bl*, basal lobe; *el*, external lobe; *il*, internal lobe; *ml*, median lobe.

mann, 1968). These consistent differences support the usefulness of hemispermatophore characters in the genus level taxonomy of buthids (Kovařík et al., 2016).

Karyotype (Figs. 52–54). We analyzed one male paratype using standard cytogenetic methods (e. g. Kovařík et al., 2009). The diploid complement of this specimen is composed of 22 chromosomes (Fig. 52). This diploid number has also been documented in one more species of this genus, *C. matthiesseni* (Birula, 1905) from Turkey (Šťáhlavský et al., 2014). The chromosomes of the analyzed *C. eritreaensis* **sp. n.** specimen gradually decrease in size from 6.70 % to 2.81 % of the diploid set. The chromosomes exhibit holocentric organization without localized centromere region and achiasmatic behavior during meiosis, these characters are typical for



Figures 52-54: *Compsobuthus eritreaensis* **sp. n.**, male paratype from type locality, chromosomes (2n = 22). Arrowheads indicate constrictions on one pair of chromosome. **Figure 52**. Male mitotic metaphase. **Figure 53**. Postpachytene. **Figure 54**. One sister metaphase II. Scale bar: 5 μm.

buthid scorpions (e. g. Mattos et al., 2013). Prominent constrictions are visible on one pair of large chromosomes during mitotic metaphase (Fig. 52). These constrictions may correspond to the position of nucleolar organizing regions (NORs) as was documented also in *Androctonus* Ehrenberg, 1828 species (Sadílek et al., 2015). Similar to this genus, the position of constriction is also approximately in one third of the chromosome in *C. eritreaensis* **sp. n.** During meiosis we found only bivalents in all observed pachytene (Fig. 53) and all analyzed metaphases II exhibited the same number of chromosomes (n=11; Fig. 54).

AFFINITIES. The described features distinguish *C. eritreaensis* **sp. n.** from all other species of the genus. They are recounted in the key below. It differs from *C. abyssinicus* in having lighter colored tergites and metasoma, and longer pedipalp fingers mainly in male; and from *C. somalilandus* in the shape of the chela, and also in reduced or missing dark spots; shorter and non-spinoid subaculear tubercle; and longer aculeus of telson. A subaculear tubercle is present and variable in size in *C. eritreaensis* **sp. n.**, but is never as long and spinoid as in *C. somalilandus* (Figs. 13–14 versus Figs. 17–18). The aculeus of the telson is in *C. eritreaensis* **sp. n.** only a little shorter than the vesicle (Figs. 13–14). The ratio of length vesicle/aculeus is 1.1–1.2 in *C. eritreaensis* **sp. n.**, while in *C. abyssinicus* the ratio is 1.3–1.4 and in *C. somalilandus* is 1.55–1.6.

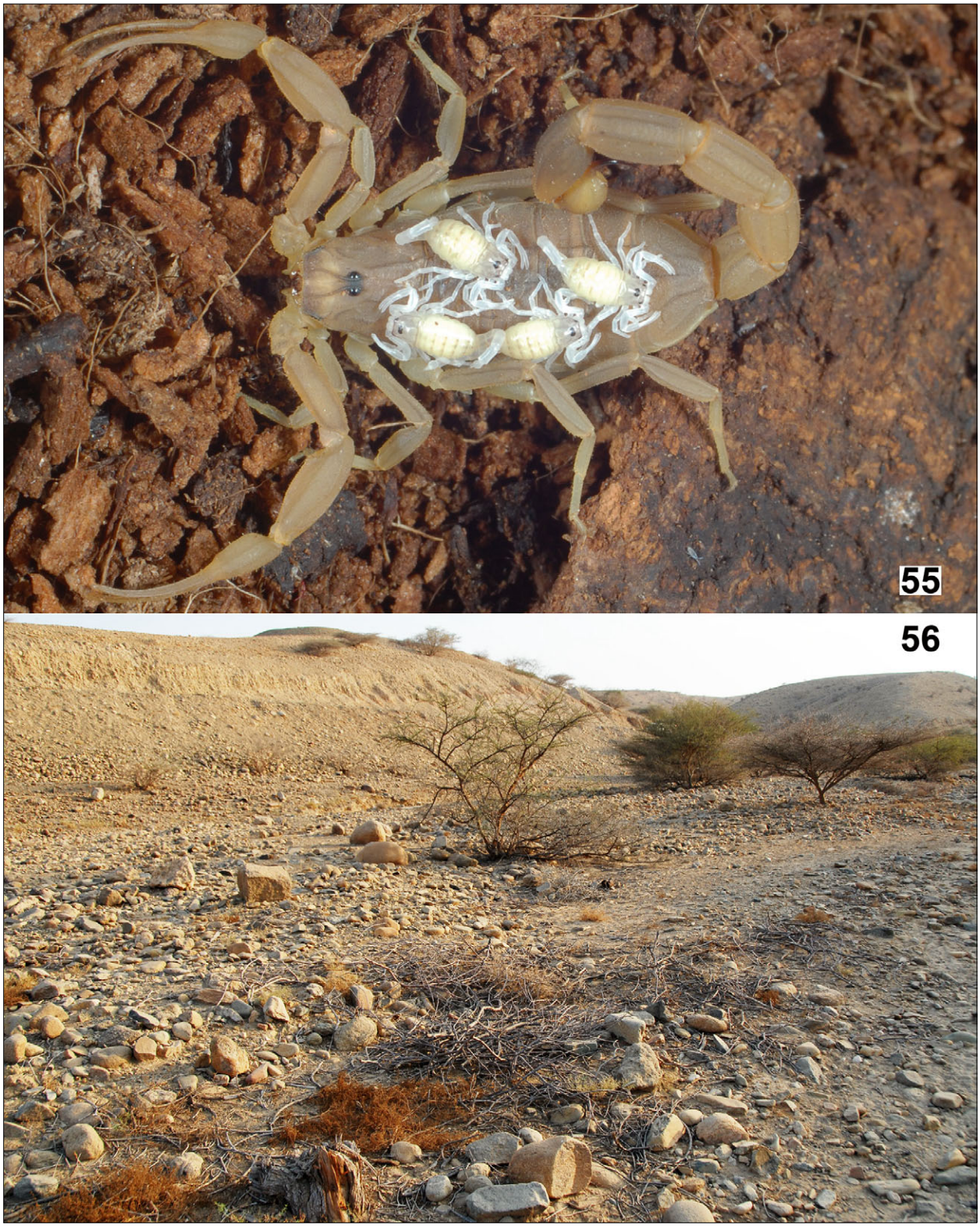
COMMENTS ON LOCALITIES AND LIFE STRATEGY. The first author visited the type locality **15EI** (Fig. 56) on 4 November 2015 and collected with UV light. *C. eritreaensis* **sp. n.** was commonly active immediately after sunset. At the locality, the first author recorded after sunset air temperature 31.5°C. In addition to *C. eritreaensis* **sp. n.,** there was also recorded at this locality *Neobuthus eritreaensis* Lowe et Kovařík, 2016 (type locality). Between 5th and 7th November 2015 the first author visited the locality **15EJ** (Fig. 59) and collected two nights with UV light. *C. eritreaensis* **sp. n.** was commonly active immediately after sunset and was the most common scorpion species. At this locality, the first author recorded temperature 34.2 ºC– 28.8 ºC (minimum temperature at night) and humidity varied between 56% and 77%. In addition to *C. eritreaensis* **sp. n.** there was also recorded at this locality *Microbuthus litoralis* (Pavesi, 1885) and *Pandinus magrettii* Borelli, 1901. On 8 November 2015 the first author stopped at the locality **15EK** very near to 15EI and found another female paratype during the day under stones. In addition, there was recorded at this locality *Neobuthus eritreaensis* and *Parabuthus abyssinicus* Pocock, 1901. On 8 November 2015 the first author stopped at the locality **15EL** (Fig. 60) very near to 15EI and 15EK localities and found two other paratype specimens during the day under stones, and in addition recorded at this locality *Hemiscorpius* sp.

Compsobuthus somalilandus Kovařík, 2012
(Figs. 17–18, 23–26, 61–62, 77)

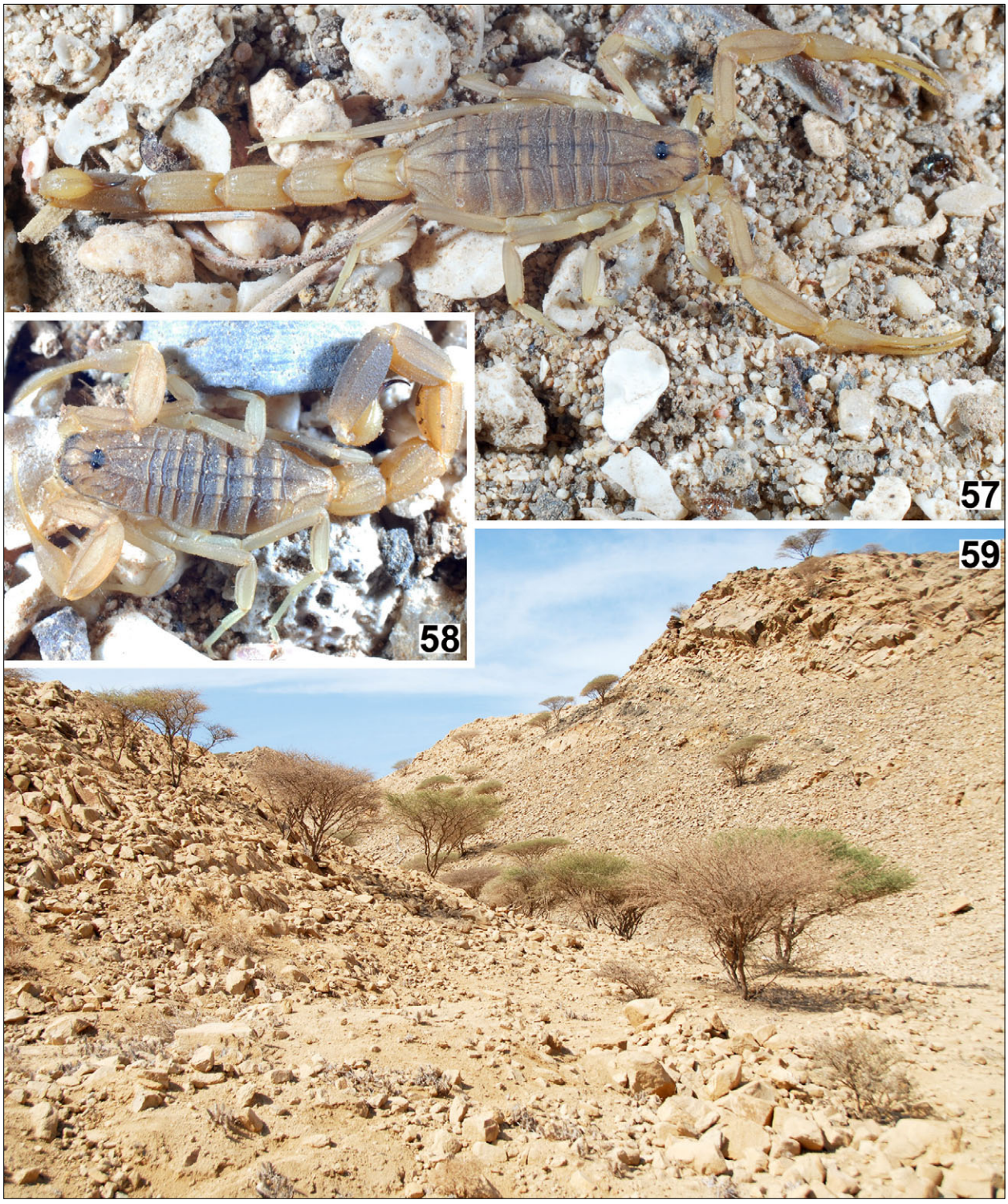
Compsobuthus somalilandus Kovařík, 2012: 7–8, figs. 8–19, 37–42; Kovařík & Ojanguren, 2013: 157, figs. 783–794, 926–931.

TYPE LOCALITY AND TYPE REPOSITORY. Somaliland, near Berbera, 10°14'25.8"N 45°04'55.4"E, 407 m a.s.l.; first author's collection (FKCP).

TYPE MATERIAL EXAMINED. Somaliland, near Berbera, 10°14'25.8"N 45°04'55.4"E, 407 m a.s.l. (Fig. 62), 9.VII. 2011, 4♂4♀(holotype and paratypes, Figs. 17–18, 23–26, 61), leg. F. Kovařík; near Berbera, 10°15'30.5"N 45°06'04.2"E, 376 m a.s.l., 12.VII.2011, 1♀, leg. F.



Figures 55–56: *Compsobuthus eritreaensis* **sp. n.**, female paratype with newborns from type locality (55) and the type locality 15EI, Eritrea, near Massawa, 15°36'58.7"N 39°22'32.8"E, 74 m a.s.l. (56).



Figures 57–59: **Figures 57–58**. *Compsobuthus eritreaensis* **sp. n.**, paratypes in vivo habitus at locality 15EJ. Female (57) and male (58). **Figure 59**. Locality 15EJ, Eritrea, Dese Island, 15°26'39.2"N 39°45'32.7"E.

Kovařík; near Sheikh, foothills of Goolis Mts., 09°59. 881'N 45°09.762'E, 896 m a.s.l., 2♀(allotype and paratype), XI.2010, leg. T. Mazuch and P. Novák. All types are in the first authors collection (FKCP).

DIAGNOSIS. Total length 28–32 mm. Sexual dimorphism minor, adult males with chela of pedipalps broader and fingers of pedipalps flexed proximally; there is no difference in length and width of metasomal segments.

Figure 60: *Compsobuthus eritreaensis* **sp. n.**, Locality 15EL, Eritrea, route Massawa to Gahtiela, 15°36'03.7"N 39°16'38.4"E, 115 m a.s.l.

Dimensions (MM)		*C. eritreaensis* **sp. n.** ♂ **holotype**	*C. eritreaensis* **sp. n.** ♀ **paratype**
Carapace	L / W	3.800 / 3.800	4.950 / 5.300
Mesosoma	L	7.400	11.100
Tergite VII	L / W	2.400 / 3.800	2.800 / 5.750
Metasoma et telson	L	19.800	24.638
Segment I	L / W / D	2.625 / 2.375 / 2.100	3.300 / 2.825 / 2.575
Segment II	L / W / D	2.950 / 2.175 / 2.100	3.625 / 2.550 / 2.525
Segment III	L / W / D	3.050 / 2.100 / 2.050	3.825 / 2.450 / 2.525
Segment IV	L / W / D	3.525 / 1.975 / 1.975	4.313 / 2.275 / 2.425
Segment V	L / W / D	4.200 / 1.875 / 1.900	5.050 / 2.213 / 2.250
Telson	L / W / D	3.450 / 1.438 / 1.288	4.525 / 1.700 / 1.700
Pedipalp	L	13.400	17.550
Femur	L / W	3.200 / 1.050	4.050 / 1.325
Patella	L / W	4.050 / 1.525	5.200 / 1.925
Chela	L	6.150	8.300
Manus	L / W / D	1.650 / 1.350 / 2.260	2.100 / 1.525 / 1.500
Movable finger	L	4.500	6.200
Total	**L**	**31.00**	**40.69**

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

Base color uniformly yellow to yellowish brown, with dark spots. Movable finger of pedipalp bears 10 rows of granules, all without external and with internal accessory granules (*acutecarinatus* group of Levy & Amitai, 1980). Pedipalp chela length/width ratio 4.0 in males and 4.8 in females. Manus of chela shorter than fixed finger. Trochanter of pedipalps with one to twelve spinules and without setae. Anterior margin of carapace bears 8 symmetrically distributed setae. First to third metasomal segments bear 10 carinae, fourth bears 8 or

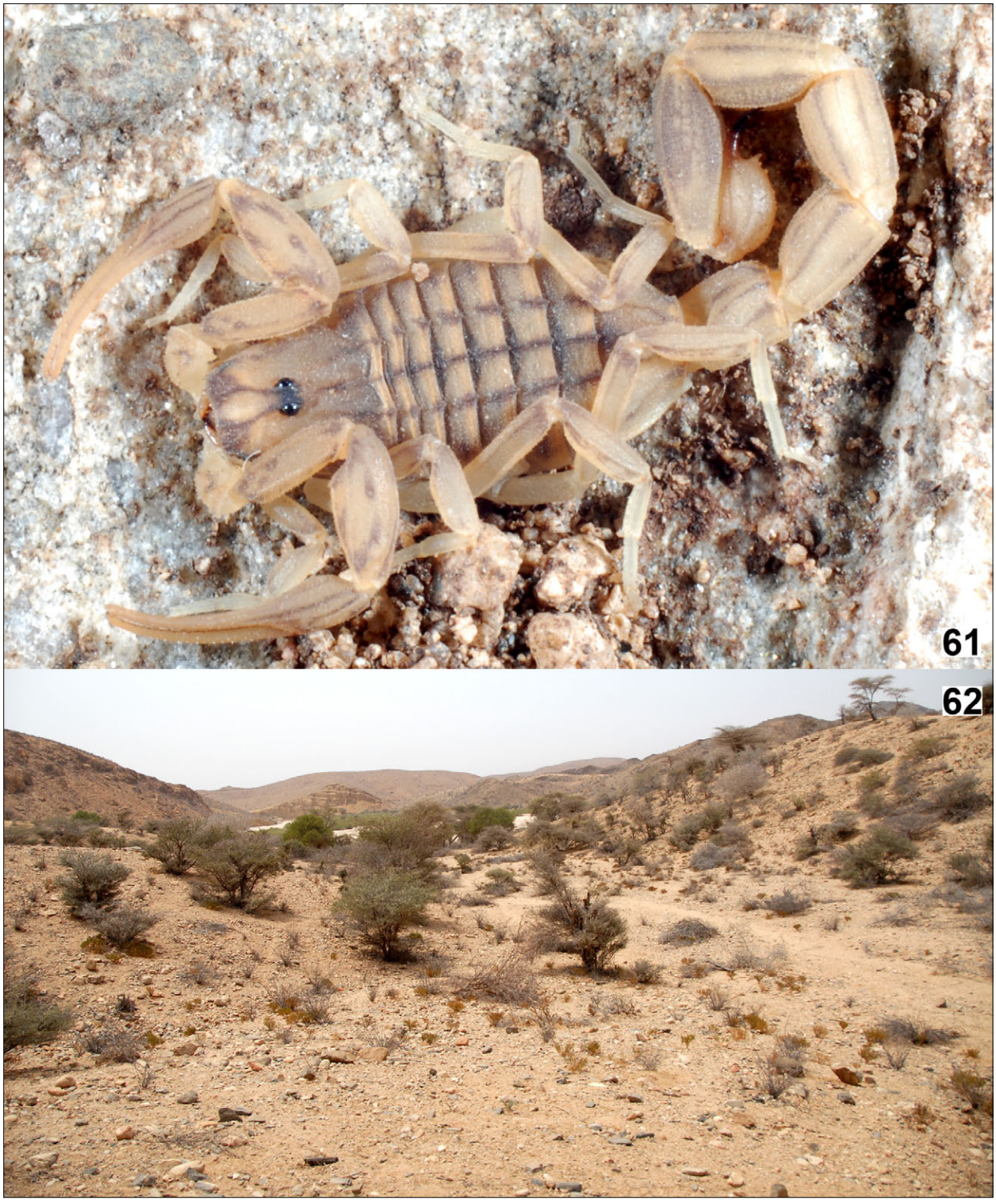
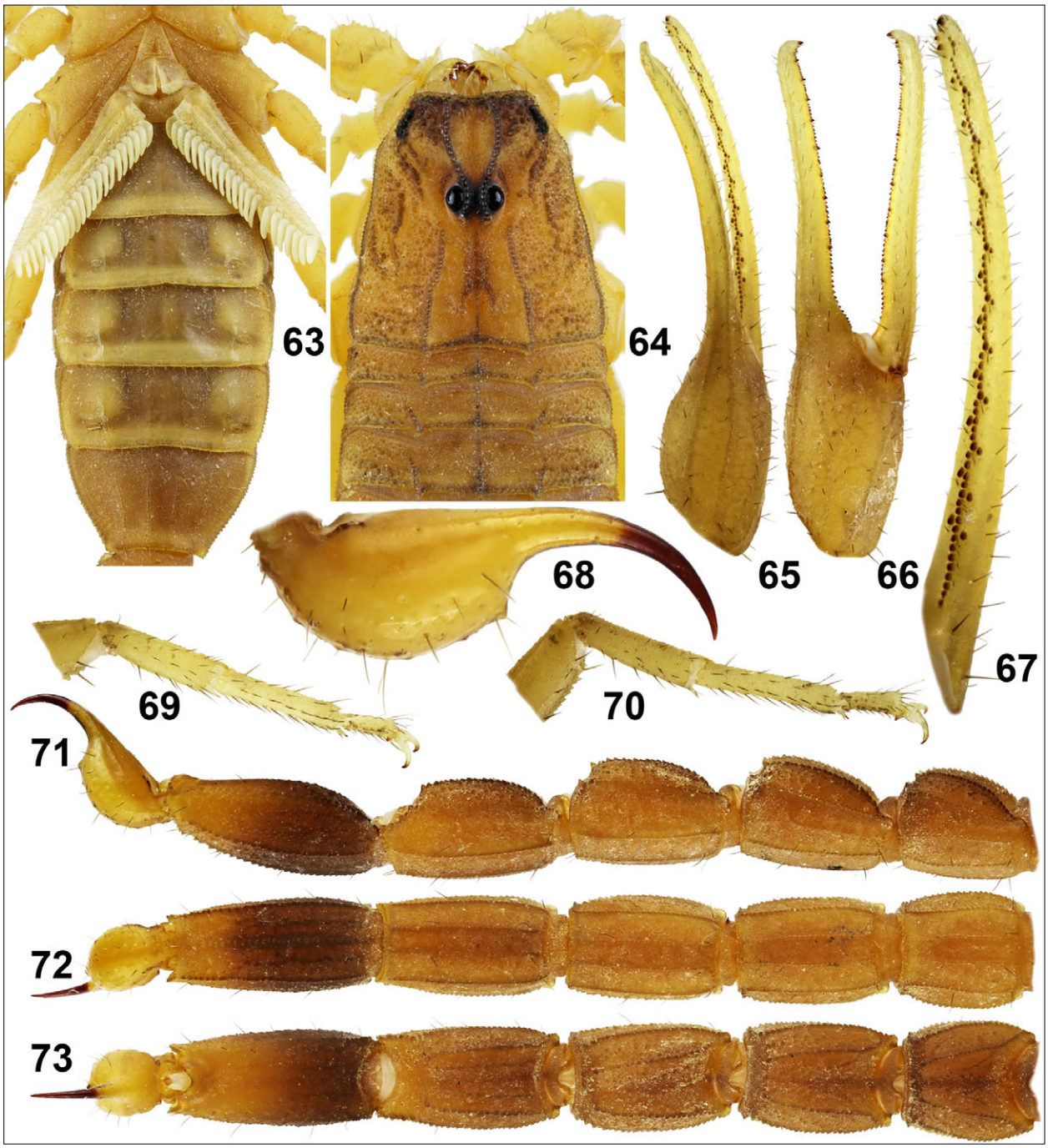


Figure 61–62: *Compsobuthus somalilandus*, male paratype in vivo habitus at type locality (61) and the type locality (62).

10 carinae. All metasomal segments longer than wide. Pectinal teeth number 18–21 in males and 15–18 in females. Sternites and ventral surface of metasoma granulated. Seventh sternite bears four crenulate carinae. Telson bulbous, aculeus shorter than vesicle. Subaculear tubercle present, long and spinoid.



Figures 63–73: *Compsobuthus werneri*, male from Eritrea, locality 15EG, coxosternal area and sternites (63), carapace and tergites I–III (64), pedipalp chela dorsal (65) and external (66), pedipalp movable finger dentition (67), lateral view of telson (68), right legs III (69) and IV (70), retrolateral aspect, metasoma and telson, lateral (71), ventral (72), and dorsal (73) views.

Compsobuthus werneri (Birula, 1908)
(Figs. 63–77)

Buthus acutecarinatus werneri Birula, 1908: 131.
Compsobuthus werneri (in part): Vachon, 1949: 97 (1952: 217); Fet & Lowe, 2000: 128; Kovařík, 2003a: 104, fig. 5; ?Kovařík, 2003b: 138, fig. 2; ?Kovařík & Whitman, 2005: 107.
Compsobuthus werneri: Kovařík & Ojanguren, 2013: 158, figs. 831–838, 850.

Figure 74–76: *Compsobuthus werneri*, two males in vivo habitus at locality 15EG (74–75) and the locality 15EG, Eritrea, Keren, 15°48'33"N 38°28'14.6"E, 1328 m a.s.l. (76).

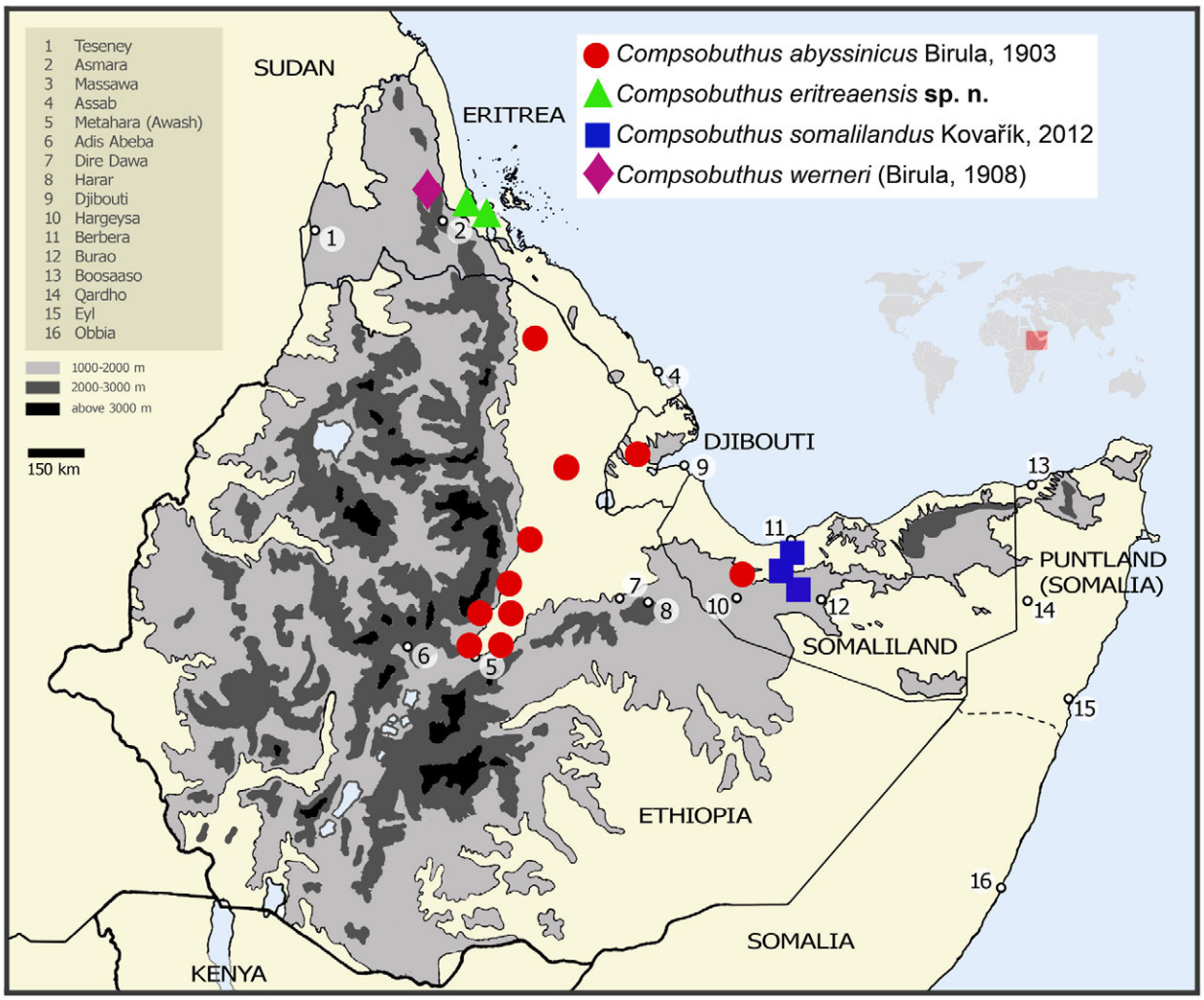


Figure 77: Map showing the distribution of *Compsobuthus* in Eritrea, Ethiopia and Somaliland. Marks indicate sites checked during 2011–2016 expeditions (except for *C. abyssinicus* from Djibouti which is verified record).

TYPE LOCALITY AND TYPE REPOSITORY. Sudan, Wadi-Halfa, northern Nubia; MZUT.

MATERIAL EXAMINED. **Eritrea** (first report), Keren, 15°48'33"N 38°28'14.6"E, 1328 m a.s.l. (Locality No. **15EG**, Fig. 76), 2.XI.2015, 3♂ (Figs. 63–75), leg. F. Kovařík. **Sudan**, Khartoum, I.-III.1966, 2♀, leg. P. Štys; Sabaloro, 16.VIII.1966, 1juv., leg. P. Štys; Hasa Heisa, 1♂, XI.1973, leg. V. Seichert; Sabaloka Mt., ca 16°20'N 32°30'E, 24.X.–14.XI.2011, 10♂3♀, leg. P. Pokorný. All specimens are in the first authors collection (FKCP).

DIAGNOSIS. Total length 24–40 mm. Movable finger of pedipalp bears 10–11 rows of granules, with external and internal accessory granules. Sexual dimorphism minor, there is no difference between males and females in length of pedipalps and metasomal segments. Male with fingers of pedipalps very slightly flexed proximally. Carapace, mesosoma, metasoma, telson, and pedipalp femur and patella of adults densely granulated. First and second metasomal segments bear 10 carinae, third bears 8 or 10 carinae. Fifth metasomal segment length/width ratio less than 2.4. All metasomal segments sparsely setose and densely granulated. Telson with very small subaculear tubercle. Pectinal teeth number 16–22. Seventh sternite bears 4 well developed carinae. Telson elongate, with aculeus aproximately as long as vesicle.

COMMENTS ON LOCALITIES AND LIFE STRATEGY. The first author visited the locality **15EG** (Fig. 76) on 2 November 2015 and collected with UV light. *C. werneri* was active immediatelly after sunset. At the locality, the first author recorded nighttime temperatures of 28.6 ºC shortly after sunset, dropping to 21.3 ºC (minimum temperature) before sunrise and humidity varied between 41% and 64%. In addition to *C. werneri* the first author also recorded at this locality *Hottentotta minax* (L. Koch, 1875), *Parabuthus abyssinicus* Pocock, 1901, and *Pandinus magrettii* Borelli, 1901 (type locality).

KEY TO SPECIES OF HORN OF AFRICA *COMPSOBUTHUS*

(for key to all species of *Compsobuthus* see Kovařík & Ojanguren, 2013: 145–146)

1. Rows of granules on movable finger without external accessory granules (Fig. 36). ……..... **2**
– Rows of granules on movable finger with external, often very small accessory granules (Fig. 67). ……..... ……. ***C. werneri*** (Birula, 1908)

2. Base color uniformly reddish to gray (Figs. 1–3). Pedipalp chela length/width ratio 3.7–3.8 in males and 4.4–4.6 in females (Figs. 19–22). .....……..... ……... ***C. abyssinicus*** (Birula, 1903)
– Base color uniformly yellow to yellowish brown with or without dark spots. Pedipalp chela fingers long, pedipalp chela length/width ratio 4.0–4.6 in males and 4.8–5.5 in females (Figs. 23–31) ……...…….... **3**

3. Base color uniformly yellow to yellowish brown with characteristic considerable dark spots (Fig. 61). Subacular tubercle present, long and spinoid (Figs. 17–18). ……..… ***C. somalilandus*** Kovařík, 2012
– Base color uniformly yellow to yellowish brown with dark spots reduced or missing (Fig. 55, 57–58). Subacular tubercle present, but not spinoid (Figs. 13–14). …...……..... ***C. eritreaensis*** **sp. n.**

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