Illustrated catalog of scorpions

Part II

Bothriuridae; Chaerilidae; Buthidae I., genera *Compsobuthus*, *Hottentotta*, *Isometrus*, *Lychas*, and *Sassanidotus*

František KOVAŘÍK
Andrés Alejandro OJANGUREN AFFILASTRO

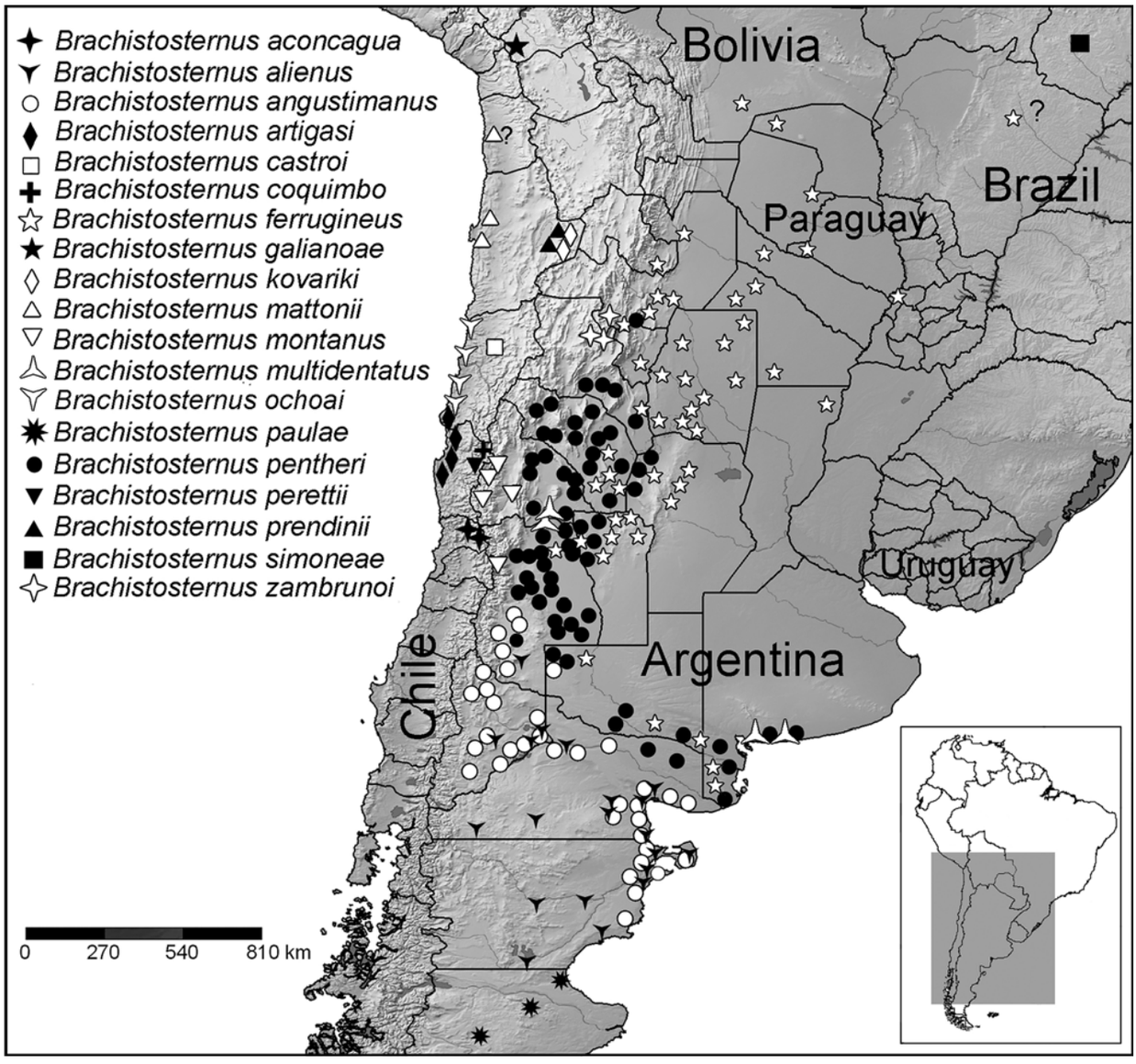
Lychas cernickai Kovařík, **sp**. **n**., male holotype.

B. **(*Brachistosternus*) *donosoi*** Cekalovic, 1974
(Figs. 185–188)

Brachistosternus (*Leptosternus*) *donosoi* Cekalovic, 1974: 250–252.
Brachistosternus (*Leptosternus*) *donosoi*: Lowe & Fet, 2000: 50 (complete reference list until 1998); Ojanguren Affilastro, 2005b: 183–187; Ojanguren Affilastro et al., 2007: 15 (complete reference list until 2007).
Brachistosternus (*Brachistosternus*) *donosoi*: Ojanguren Affilastro & Ramírez, 2009: 186, 187, 193.

Type locality and type repository. Chile, Tarapacá Region, Pampa del Tamarugal, 10 km west from Pica; MZCU.

Diagnosis. Total length 53–64 mm. Color yellow, with some spots on caparace and tergites. Tergites with two faint lateral spots. Sternites, metasomal segments, telson, pedipalps and pectines unpigmented. Some specimens almost completely unpigmented. Chelicerae with two subdistal teeth. Males with internal apophysis on pedipalp chela. Pedipalp femur with one macroseta associated with *d* and *e* trichobothria; chela with 5 ventral trichobothria; chela length/height ratio 2.87–2.97 in males, 2.85–3.15 in females. Pectinal teeth 28–33 in males, 25–31 in females. Tarsomere I of leg I with 7–8 dorsal, 3–4 ventrointernal and 0–1 ventroexternal setae; of leg II with 7–10 dorsal, 4–5 ventrointernal and 3–4 ventroexternal setae; of leg III with 11–13 dorsal, 6–8 ventrointernal and 5–6 ventroexternal setae; of leg IV with 5–6 dorsal, 4–5 ventrointernal and 4–5 ventroexternal setae. Metasomal segment V ventrally smooth near anterior margin and irregularly granular in posterior half, VM carina weakly developed or absent, VL carinae extend throughout entire length of segment. Ventral setae of metasomal segment V usually comprise 5 rows: two basal rows of 4–6 setae and three or four posterior rows of 2–4 setae. Caudal glands occupy more than 60% of dorsal surface. Length/width ratio of fifth metasomal segment 2.1–2.57 in males, 1.95–2.35 in females. Fourth metasomal segment with 26–32 ventral setae, fifth segment with 9–10 ventrolateral and 6–7 lateral setae. Telson densely granular in males and with scarce granulation in females. Vesicle with rounded ventral surface; aculeus slightly curved and as long as vesicle.



Timogenes mapuche Maury, 1975

(Figs. ZF.4, 527–530)

Timogenes mapuche Maury, 1975b: 66; Lowe & Fet, 2000: 42 (complete reference list until 1998); Ojanguren Affilastro, 2005a: 120–122.

Type locality and type repository. Argentina, Río Negro Province, Paso Córdova, General Roca; MACN.

Diagnosis. Total length 52–75 mm in males, up to 58 mm in females. Yellowish with faint dark pattern. Pectinal teeth 21–26 in males, 16–18 in females. Males with conspicuous excavation in internal surface of pedipalp chela. Pedipalp chela with its ventral carina well developed. Pedipalp patella with 4 or 5 ventral tirchobothria; pedipalp chela with 7–10 ventral trichobothria. Ungues of tarsomere II of legs I and II asymmetrical; distal pair of spines on tarsomere II almost parallel to lower margin of segment. Prolateral and retrolateral pedal spurs of legs I and II well developed. Metasomal segment IV with LSM carinae well developed. Metasomal segment IV with 7–9 LSM setae. Metasomal segment V with 13–17 LSM setae. Males with glands on dorsal surface of metasomal segment V and telson. Hemispermatophore (Fig. ZF.4): distal lamina narrow and elongated, conspicuously longer than basal portion; anterior margin of basal lobe ends in subcylindrical apex.

Comments. *T. mapuche* is most closely related to *T. sumatranus*. *T. mapuche* occurs in west-central Argentina. This area belongs to the Monte phytogeographic province.

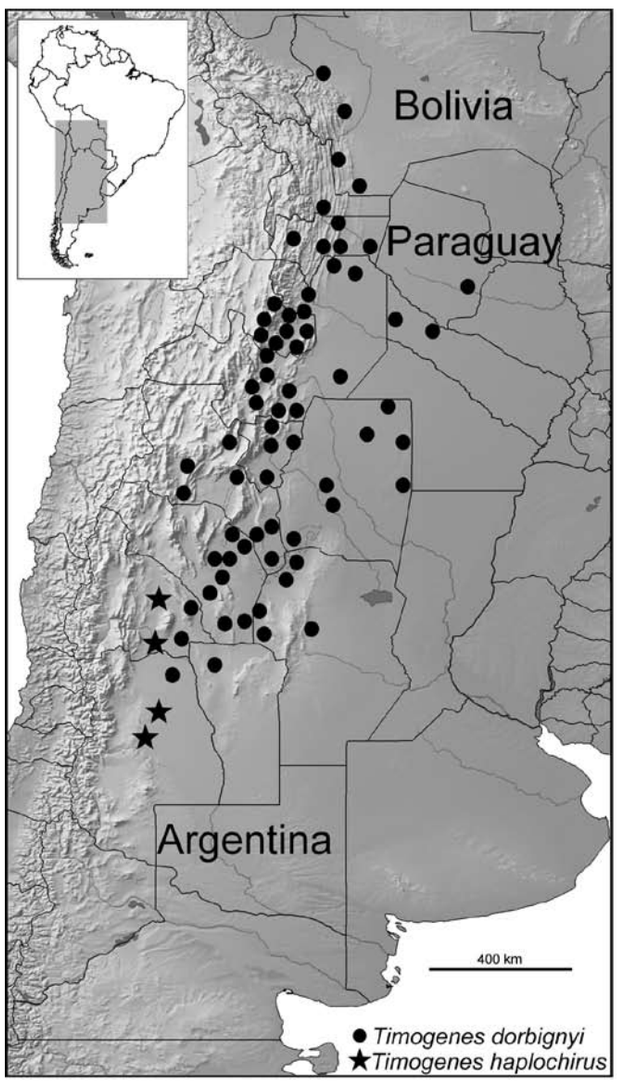
Distribution. Argentina (La Pampa, Mendoza, Neuquén and Rio Negro Provinces).

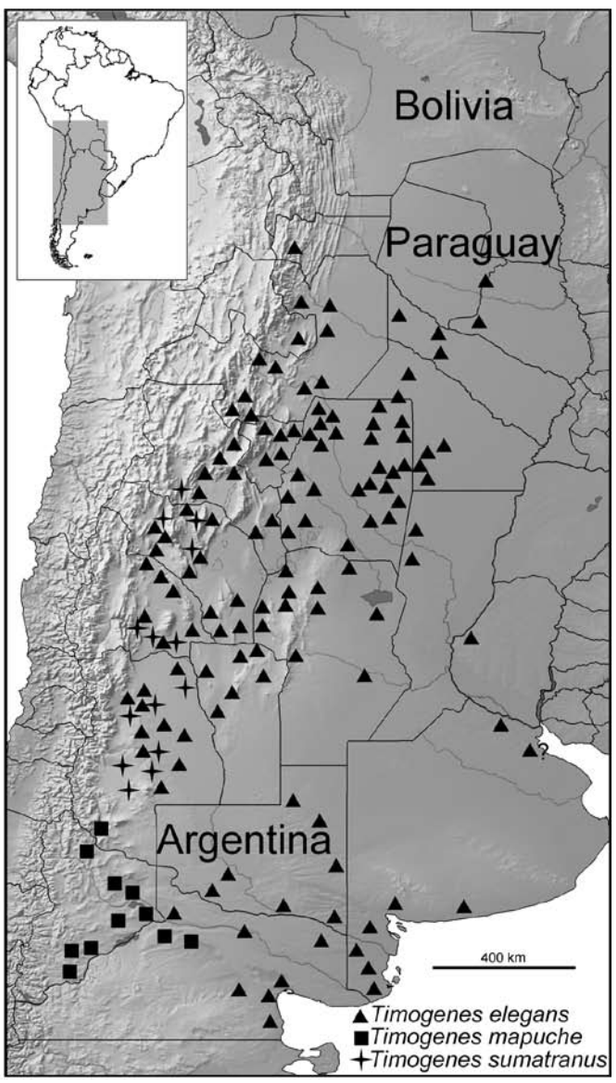
Figures 527–530 (page 268). ***T. mapuche***, Argentina, Rio Negro Province, Paso Córdova, General Roca, MACN, topotypes. **527–528**. Dorsal and ventral views, ♂(59 mm). **529–530**. Dorsal and ventral views, ♀(54 mm).

Timogenes sumatranus Simon, 1880

(Figs. ZE.1–2, ZF.5–6, 531–535)

Timogenes sumatranus Simon, 1880: 396–397; Lowe & Fet, 2000: 42 (complete reference list until 1998); Ojanguren Affilastro, 2005a: 121–123.





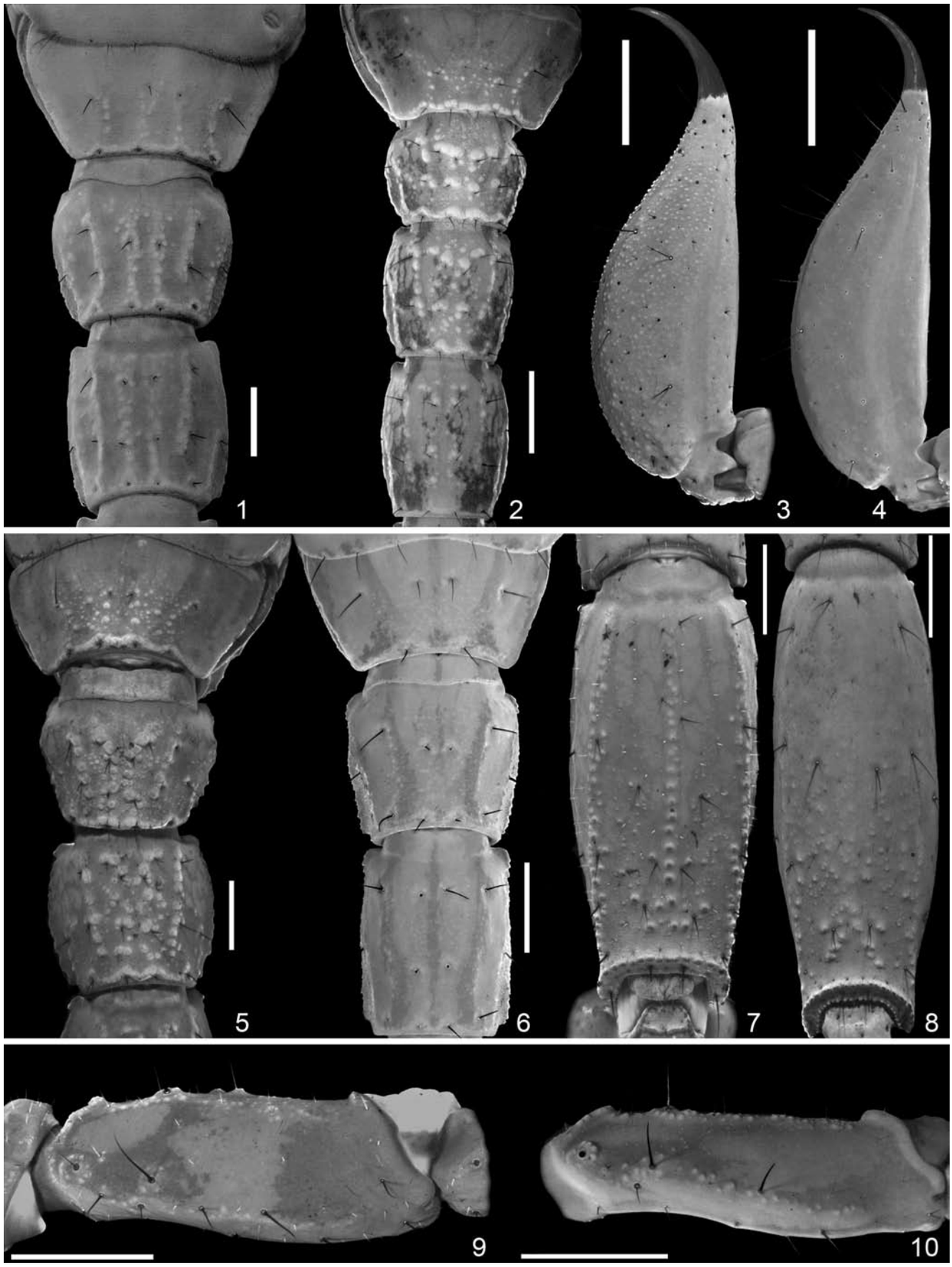


Plate ZG.**1**–**10**. *Urophonius*. **1**–**2**, **5**–**6**. Sternite VII and metasomal segments I and II, ventral views. **1**. *U. granulatus*, male. **2**. *U. tumbensis*, male. **5**. *U. transandinus*, female. **6**. *U. somuncura*, male. **3**–**4**. *U. somuncura*, telson, lateral view. **3**. Female. **4**. Male. **7**. *U. transandinus*, metasomal segment V, female, ventral view. **8**. *U. mondacai*, metasomal segment V, male, ventral view. **9**. *U. transandinus*, right pedipalp femur, male, dorsal view. **10**. *U. tregualemuensis*, right pedipalp femur, male, dorsal view. Scale bars: 1 mm.

OBSERVATIONS OF CAPTIVE *CHAERILUS*

This genus requires higher humidity but captive specimens do not pose any problems, individuals tolerate each other and cannibalism is rare. The species are medium size, most of them between 20 and 45 mm long. The largest species *Chaerilus tichyi* Kovařík, 2000 reaches up to 75.4 mm. The toxicity of the venom is low and, moreover, specimens usually do not attempt to sting when handled by hand. Species of *Chaerilus* belong among infrequently encountered scorpions. Few museums have this genus well represented in collections, and any species is only rarely found and bred in captivity. I have been able to procure and breed six species: *C. celebensis*, *C. petrzelkai*, *C. pictus*, *C. rectimanus*, *C. sejnai* and *C. solegladi*.

C. petrzelkai Kovařík, 2000. The holotype female was brought to me gravid and gave birth to eight young that underwent the first ecdysis on the back of their mother at the age of five days and then began to accept minute food items. The second ecdysis took place at the age of 62–70 days and the third ecdysis at the age of 121–130 days. Unfortunately, all the young perished after the third ecdysis.

C. pictus (Pocock, 1890). I obtained two immature specimens from India (Tripura) and was able to bring them to maturity, but they both turned out to be males. However, following them through ecdyses allowed me to observe that the extremely long metasomal segments form only during the last ecdysis. One of the immature males was 37 mm long, of which the metasoma amounted to only 17 mm and the telson only to 5.5 mm. After the last, maturation ecdysis the male measured 67 mm, of which the metasoma amounted to 33 mm and the telson to 12 mm. This is the largest percentual increase in length achieved during a single ecdysis that I have ever seen in any scorpion. Figures 771 and 773 show the noted male before and after the maturation ecdysis.

C. rectimanus Pocock, 1899. I had several adult specimens from Malaysia, which are shown in Figures 750–753. Unfortunately, all attempts at breeding them were unsuccessful.

C. sejnai Kovařík, 2005. All specimens of both sexes matured after the fourth ecdysis at the age of 321 to 529 days and measured 16 to 22 mm. One female, which matured at the age of 353 days, was kept together with a male until the age of 650 days and at the age of 854 days gave birth to four young (Fig. 758 shows the birth of two of the young).

The largest breeding group which I had an opportunity to keep was that of ***C. celebensis*** Pocock, 1894 from the Philippines north of Luzon, region of Appari, i.e. topotypes of *C. philippinus*, which is hereby synonymized with *C. celebensis*. This group produced several dozens of young which I further propagated in order to obtain data on longevity and number of litters produced during a lifespan. These data are presented in table below. They show that specimens from five litters underwent the first ecdysis at the age of 4–7 days, the second ecdysis at the age of 92–249 days, the third ecdysis at the age of 135–490 days, the fourth ecdysis at the age of 179–549 days, the fifth ecdysis at the age of 243–610 days, and in some cases the sixth ecdysis at the age of 582–674 days. Females became mature after the fifth or sixth ecdysis and males after the fourth to sixth ecdysis. The maximum age of a male after the fourth ecdysis was 986 days, of a male after the fifth ecdysis 1583 days, and of a male after the sixth ecdysis 1530 days; the maximum age of a female was 1996 days. The females in my group gave birth up to four times and their gravidity varied between 160 and 374 days.

Lourenço et al. (2008: 896–900) provide information on their breeding of *C. celebensis* from the same population (topotypes of *C. philippinus*). All their specimens of both sexes reached maturity after the fifth ecdysis, at the age of 323–332 days (mean 327).

C. solegladi Kovařík, 2012. My captive specimens are direct descendants of the paratypes. The care and propagation are not difficult and the growth is relatively fast despite the large size of this species, which reaches 42–45 mm and is the largest *Chaerilus* that I have so far bred. The young should be kept separate from each other because of relatively high incidence of cannibalism during ecdysis, but mature specimens can be kept together. The first ecdysis of all juveniles took place at the age of 11 days, the second ecdysis at 75–106 days, the third ecdysis at 133–158 days, the fourth ecdysis at 176–201 days, the fifth ecdysis at 236–290 days, and the sixth ecdysis at 296–380 days. All specimens of both sexes became mature after the sixth ecdysis, are kept together, the females are gravid, and litters are expected soon.

	Time of ecdyses counted in days from date of birth						First Delivery (number of larvae)	Second Delivery (number of larvae)	Third Delivery (number of larvae)	Fourth Delivery (number of larvae)	Age at Death
	First	Second	Third	Fourth	Fifth	Sixth					
Chaerilus petrzelkai	5	62-70	121-130	–	–	–	–	–	–	–	–
Chaerilus sejnai	5	162	222	324 ♂HT	–	–	–	–	–	–	–
		154	243	321 ♂PT	–	–	–	–	–	–	–
		202	257	529 ♀AT	–	–	–	–	–	–	–
		63	182	353 ♀	–	–	854(4)	–	–	–	1450
Chaerilus celebensis	6	95	160	280	340 ♀	–	554(21)	735(16)	–	–	1019
B	7	98-116	146-177	187-211	243 ♂	–	–	–	–	–	1296
					261 ♂	–	–	–	–	–	1308
					293 ♂	–	–	–	–	–	1420
					254 ♀	–	535(18)	904(15)	–	–	1374
					293 ♀	–	610(10)	984(16)	1284(12)	–	1426
				242	336	582 ♀	872(22)	1206(24)	1501(20)	–	1550
C	7	99-249	154	204	510 ♀	–	–	–	–	–	897
		160	280 ♂	–	–	–	–	–	–	–	756
		200	340	499 ♂	–	–	–	–	–	–	1068
		211	342	501 ♂	–	–	–	–	–	–	1583
D	4	96-200	193	269	356	674 ♂	–	–	–	–	1530
		309	391 ♂	–	–	–	–	–	–	–	986
		394	494	591 ♂	–	–	–	–	–	–	865
		382	490	549	610 ♀	–	882(8)	1062(6)	1252(8)	1437(12)	1996
E	5	92-128	135-195	179-200	253 ♀	–	510(19)	740(19)	1028(18)	1310(13)	1480
					339 ♀	–	583(16)	983(14)	1205(11)	1365(8)	1510
				230 ♂		–	–	–	–	–	940
Chaerilus solegladi	11	75-106	133-158	176-201	236-290	296-380					

Hottentotta Birula, 1908
(Figs. 942–1250)

Androctonus: C. L. Koch, 1838a: 45 (in part).
Buthus: Kraepelin, 1898: 3; Kraepelin, 1899: 9; Pocock, 1903:178; Hewitt, 1918: 103.
Buthus (*Hottentotta*) Birula, 1908: 141.
Hottentotta: Werner, 1934: 269; Sissom, 1990: 101; Fet & Lowe, 2000: 133 (complete reference list until 1998): Kovařík, 2007: 2; Kovařík, 2009: 31; Navidpour, 2012: 94.
= *Dasyscorpio* Pallary, 1938: 279 (syn. by Vachon, 1949: 146 (1952: 233)).
= *Buthotus* Vachon, 1949: 143 (1952: 229); Vachon, 1979: 233; Tikader & Bastawade, 1983: 164 (syn. by Francke, 1985: 4).
Mesobuthus: Tikader & Bastawade, 1983: 186.
= *Buthotus* (*Balfourianus*) Vachon, 1979: 236 (syn. by Kovařík, 2007: 2).
Hottentotta (*Balfourianus*): Francke, 1985: 4; Fet & Lowe, 2000: 145.
= *Hottentotta* (*Deccanobuthus*) Lourenço, 2000b: 192 (syn. by Kovařík, 2007: 2).

Type species. *Scorpio hottentotta* Fabricius, 1787.

Diagnosis. Total length 30–130 mm. Dorsal trichobothria of femur arranged in *beta*-configuration with *d2* situated on dorsal surface. Trichobothrium *d3* of patella situated dorsal of dorsomedian carina. Trichobothrium *db* on the fixed finger of pedipalp usually located between *est* and *et*, or may be on level with trichobothrium *est*, rarely between *est* and *esb*. Trichobothrium *eb* clearly on fixed finger of pedipalp. Pectines with fulcra. Dentate margin of pedipalp-chela movable finger with distinct granules divided into 11–16 rows and (4)5–7 terminal granules. Cheliceral fixed finger with two ventral accessory denticles. Tergites I–VI of mesosoma bear three carinae. Carapace with distinct carinae, entire dorsal surface nearly planate. Third and fourth legs with well developed tibial spurs, first and second tarsomeres with paired ventral setae. First sternite with two granulated lateral stridulatory areas, which however may be reduced in some species (e. g. in *H. pachyurus* and *H. trilineatus*). Ventrolateral carinae of fifth metasomal segment with all granules more or less equal in size and never lobate.

Comments. *Hottentotta* is one of the most widely distributed genera of the family Buthidae, with species present throughout Africa, the Arabian Peninsula, and in Asia to Pakistan and India. Most *Hottentotta* species are morphologically and colorwise sufficiently distinct and their distributions rarely overlap, which makes identifications relatively easy. In contrast, generic-level characters remain to be clearly defined, which has caused erroneous transfers of Indian species to the genus *Mesobuthus* and the creation of two subgenera that were synonymized.

KEY TO SPECIES OF *HOTTENTOTTA* OCCURRING IN ASIA AND ARABIA

1. Color black except reddish brown chela of pedipalp. Legs may also be reddish brown. Does not occur in India. 2
– Color not entirely black except for specimens from India, which may be entirely brown to black. 3

2. Movable fingers of pedipalps with 16 rows of granules. Ventral surfaces of metasomal segments and vesicle densely hirsute. Occurs in Iran. ..... ***H. zagrosensis*** Kovařík, 1997
– Movable fingers of pedipalps with 13–14 rows of granules. Metasoma bears only a few hairs. Does not occur in Iran. ..... ***H. judaicus*** (Simon, 1872)

3. Chela (manus) of pedipalp always darker than femur of pedipalp. 4
– Chela (manus) of pedipalp of same color as femur of pedipalp, not darker. 7

4. Patella of pedipalp as yellow to yellowish brown as femur. 5
– Patella of pedipalp as dark as chela. 6

5. First to third metasomal segments yellow to yellowish green. .... ***H. salei*** (Vachon, 1980)
– First metasomal segment reddish, second segment reddish yellow, third segment yellowish. ..... ***H. mesopotamicus*** Lourenço & Qi, 2007

6. Total length 100–130 mm. Dorsal surface of third metasomal segment yellow to yellowish green. .... ***H. schach*** (Birula, 1905)
– Total length 65–90 mm. Dorsal surface of third metasomal segment brown to black. ..... ***H. jayakari*** (Pocock, 1895)

7. All metasomal segments uniformly colored. 12
– One or more metasomal segments darker than others. 8

8. First two or three metasomal segments brown or greenish gray, first may be lighter. 9
– First two or three metasomal segments yellowish. 10

9. Ventral surfaces of metasomal segments and vesicle densely hirsute. ..... ***H. lorestanus*** Navidpour et al., 2010
– Metasoma only sparsely hirsute. ..... ***H. alticola*** (Pocock, 1895)

10. First metasomal segment of both sexes always wider than long, in female also second metasomal segment wider than long. ..... ***H. scaber*** (Ehrenberg, 1828)
– First and second metasomal segments of both sexes longer than wide. 11

11. Metasoma densely hirsute (Fig. 978). ***H. saulcyi*** (Simon, 1880)
– Metasoma only sparsely hirsute (Fig. 974). ..... ***H. minusalta*** Vachon, 1959, **stat. n.**

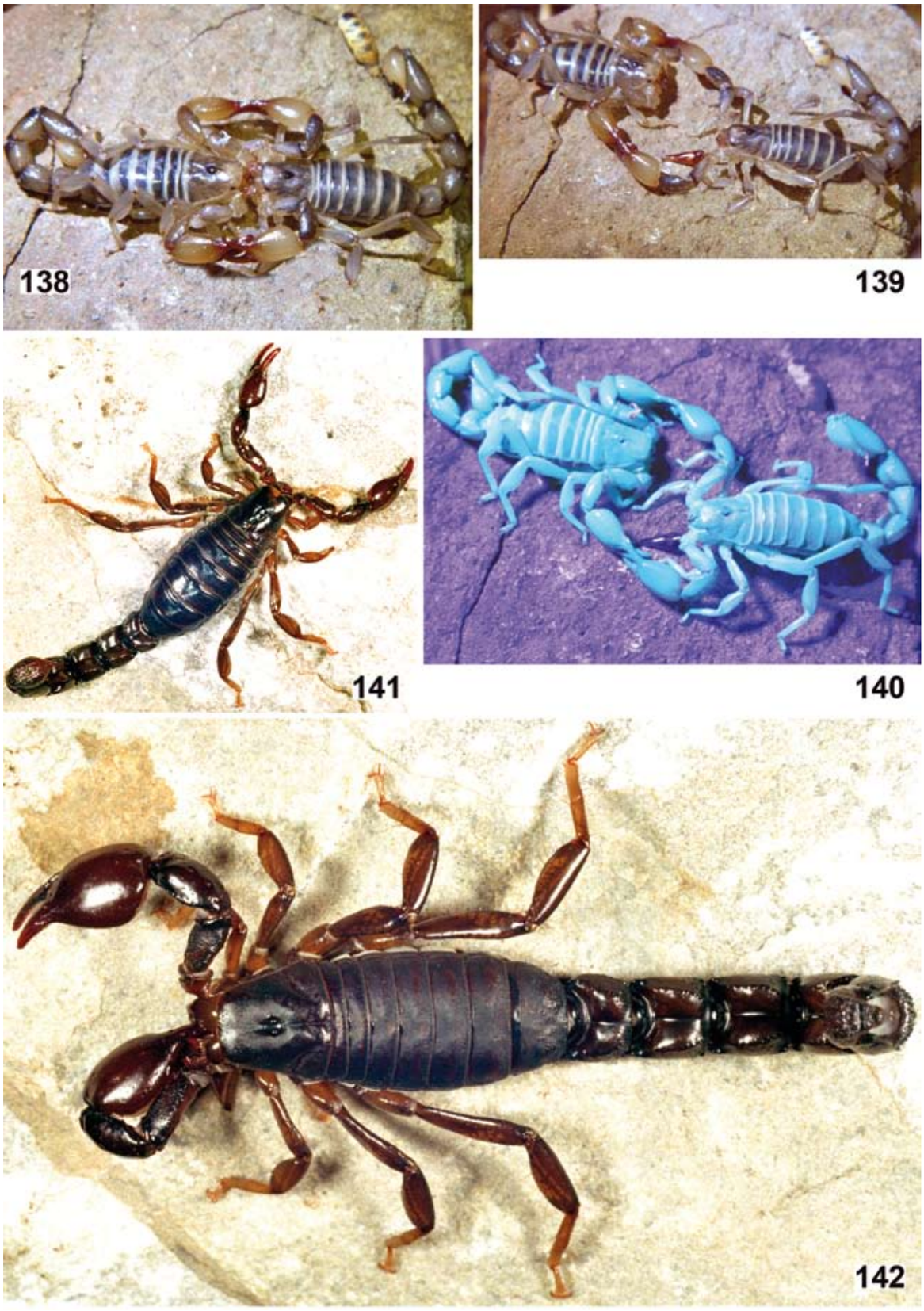
12. Male manus of pedipalp markedly broader than in female. ... 19
– Width of manus of pedipalp same in both sexes or narrower in male. 13

13. Male pedipalp segments longer and narrower than in female. Occurs in Socotra Island. ..... ***H. socotrensis*** (Pocock, 1889)
– Male pedipalp segments similar in both sexes. Does not occur in Socotra Island. 14

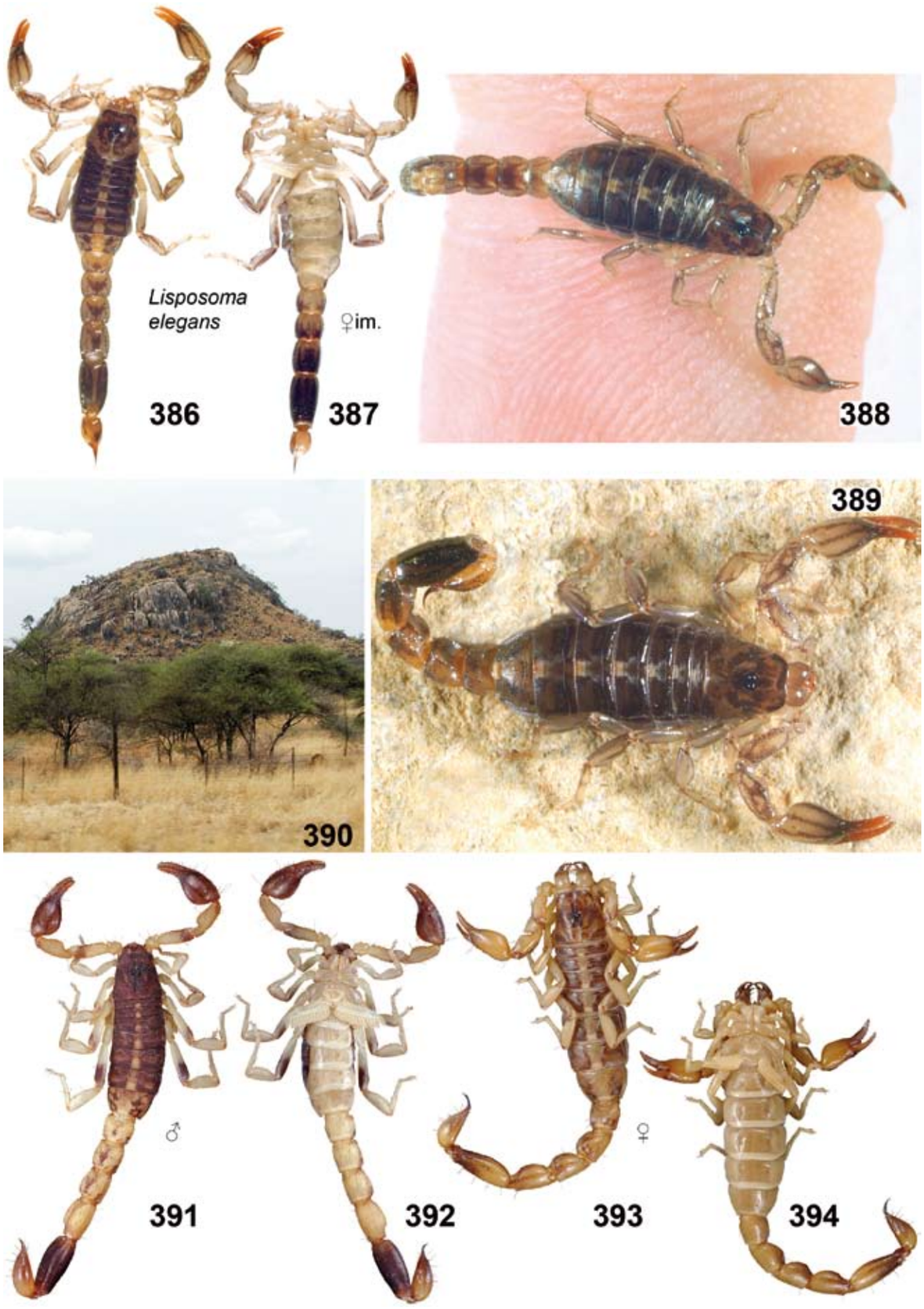
14. First metasomal segment of both sexes always wider than long, in female also second metasomal segment wider than long. Second to fourth metasomal segment width ratio in females 1.26–1.29. ..... ***H. jalalabadensis*** Kovařík, 2007
– First and second metasomal segments of both sexes usually longer than wide (in females may be as wide as long). Second to fourth metasomal segment width ratio less than 1.2. 15

15. Color of carapace and mesosoma uniformly yellow, without contrasting markings. 16
– Carapace and mesosoma black or at least with a black spot in anterior part of carapace. 17

16. Pedipalps, legs, metasoma and telson very sparsely hirsute, nearly bare, macrosetae short, fine. ..... ***H. saxinatans*** Lowe, 2010
– Pedipalp femur and patella, legs, metasoma and telson densely hirsute, with numerous long and short macrosetae. ..... ***H. pellucidus*** Lowe, 2010

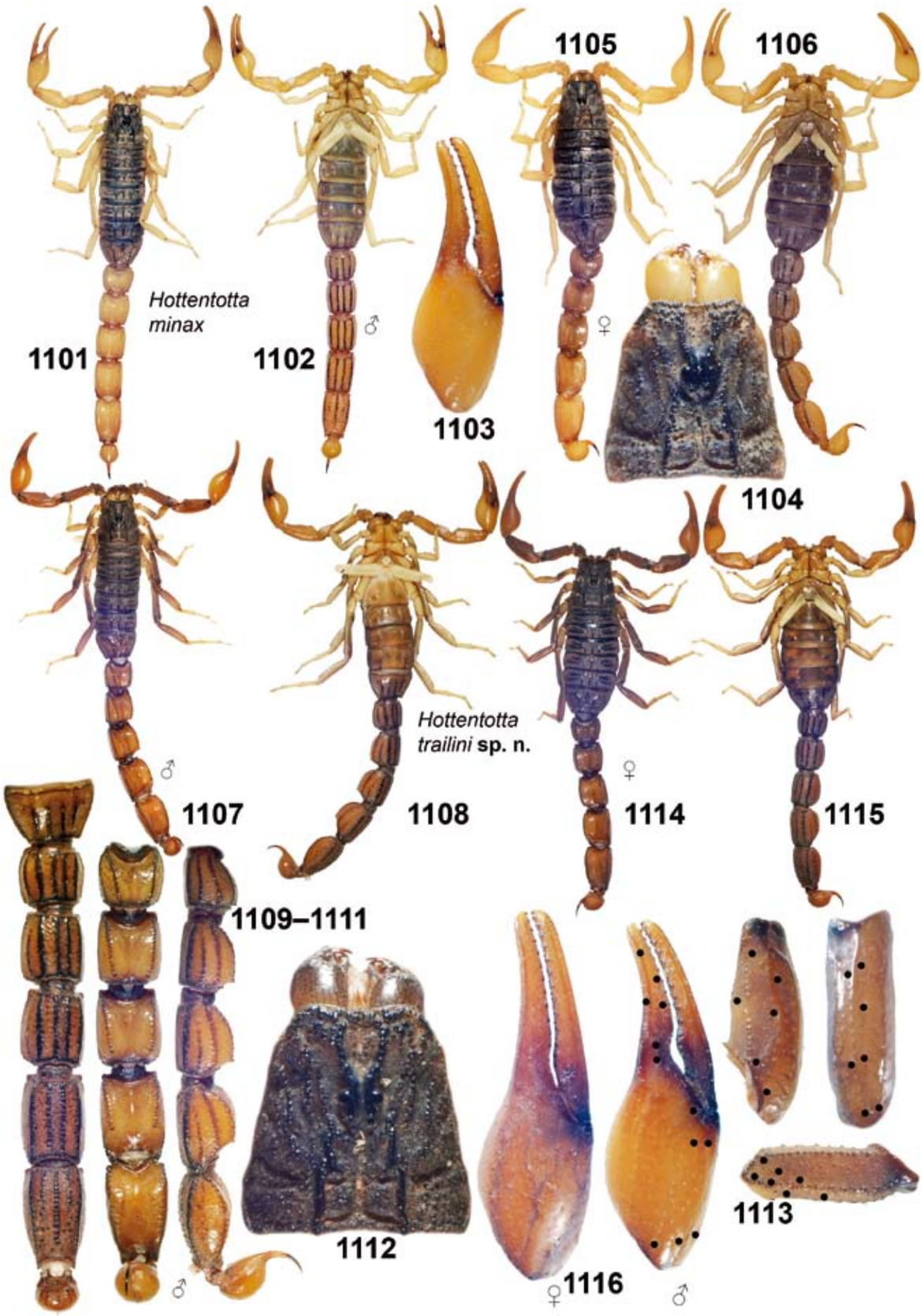


Figures 138–142. ***Bothriurus***. **138–140**. ***B. dumayi***, mating, male at right (see page 21). **141–142**. ***B. keyserlingi***, ♀(141) and ♂(142) (see page 23).

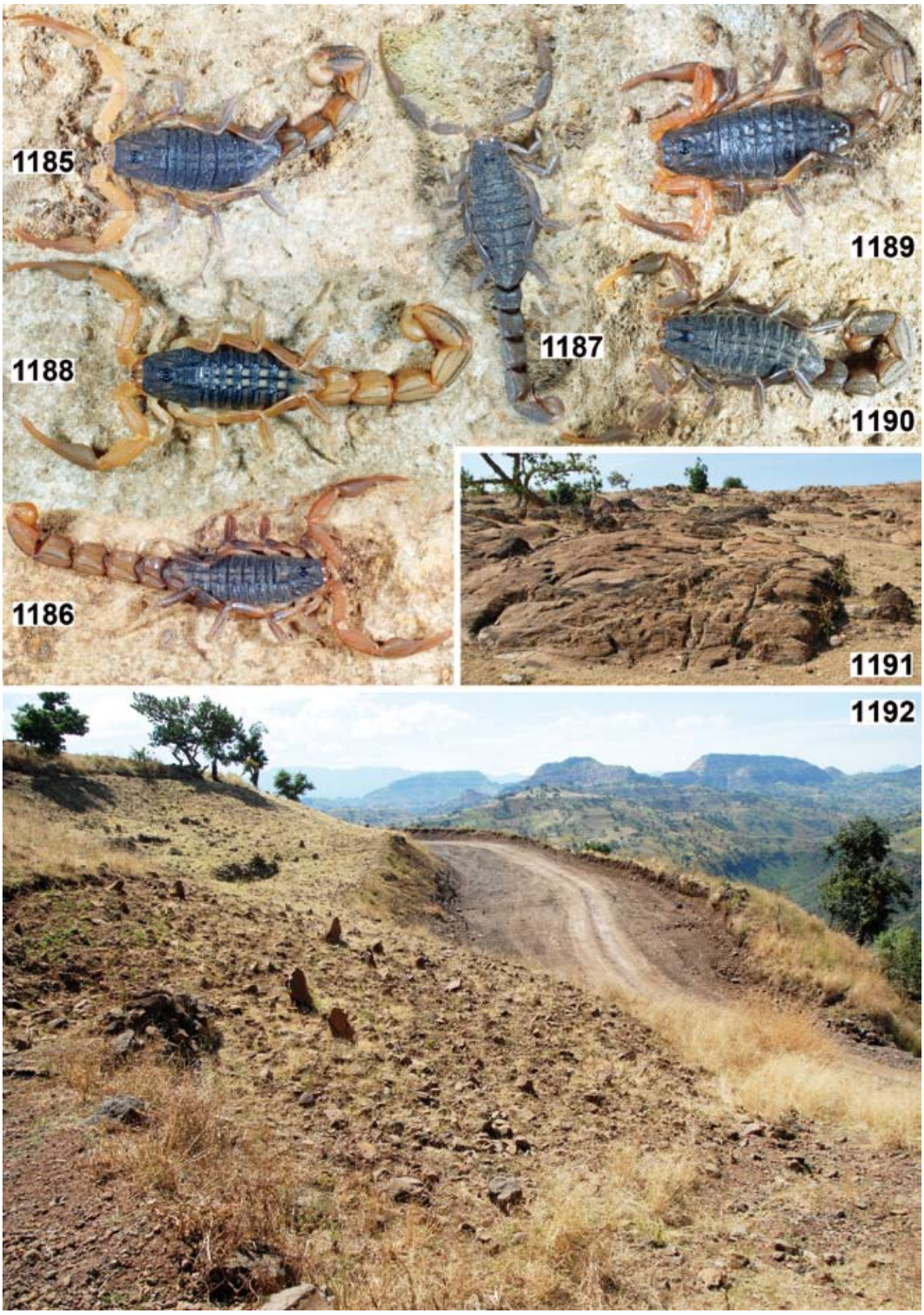


Figures 386–394. ***Lisposoma elegans*** (see page 78).

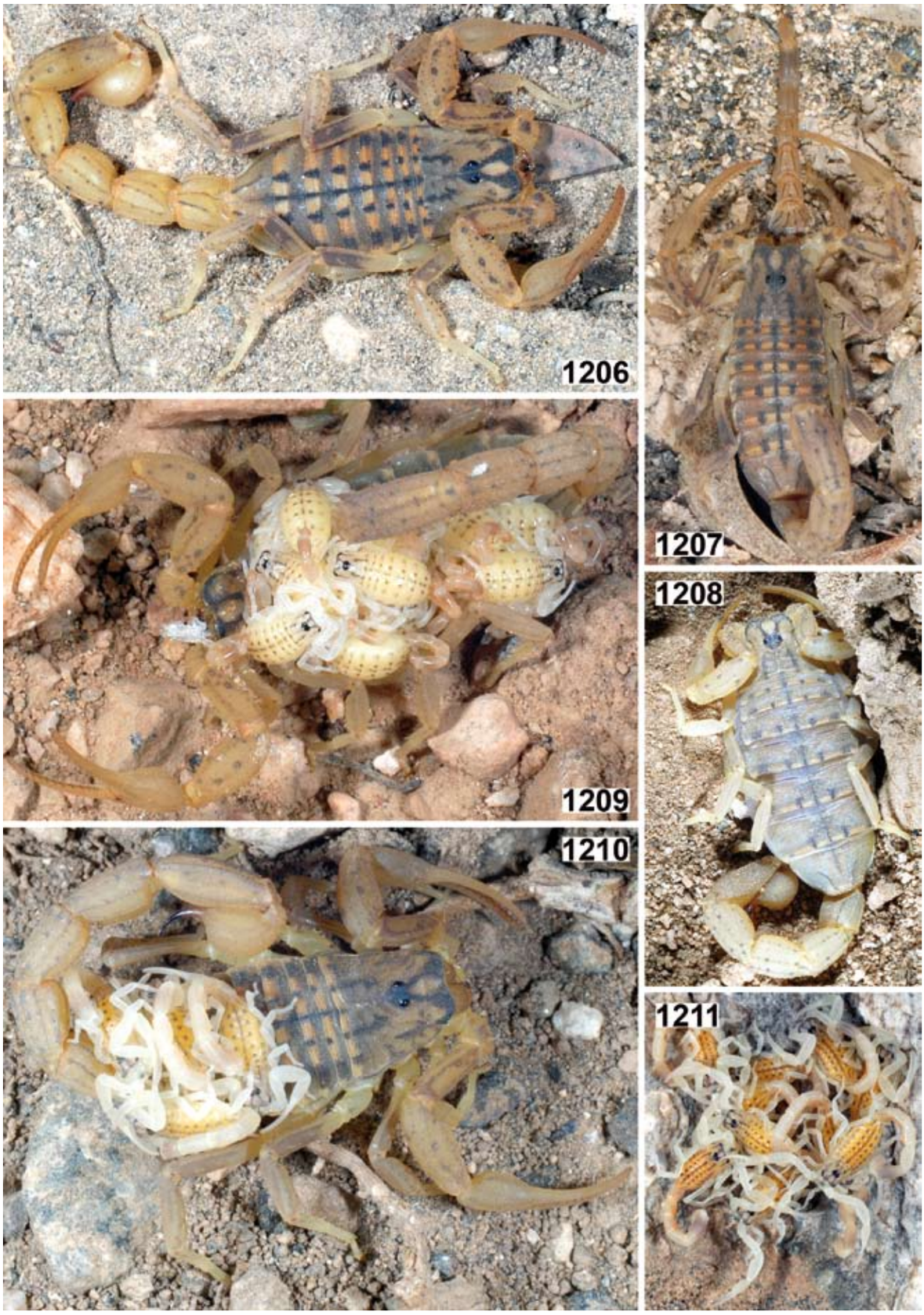
Figures 921–925. ***Compsobuthus abyssinicus*** (see page 147).



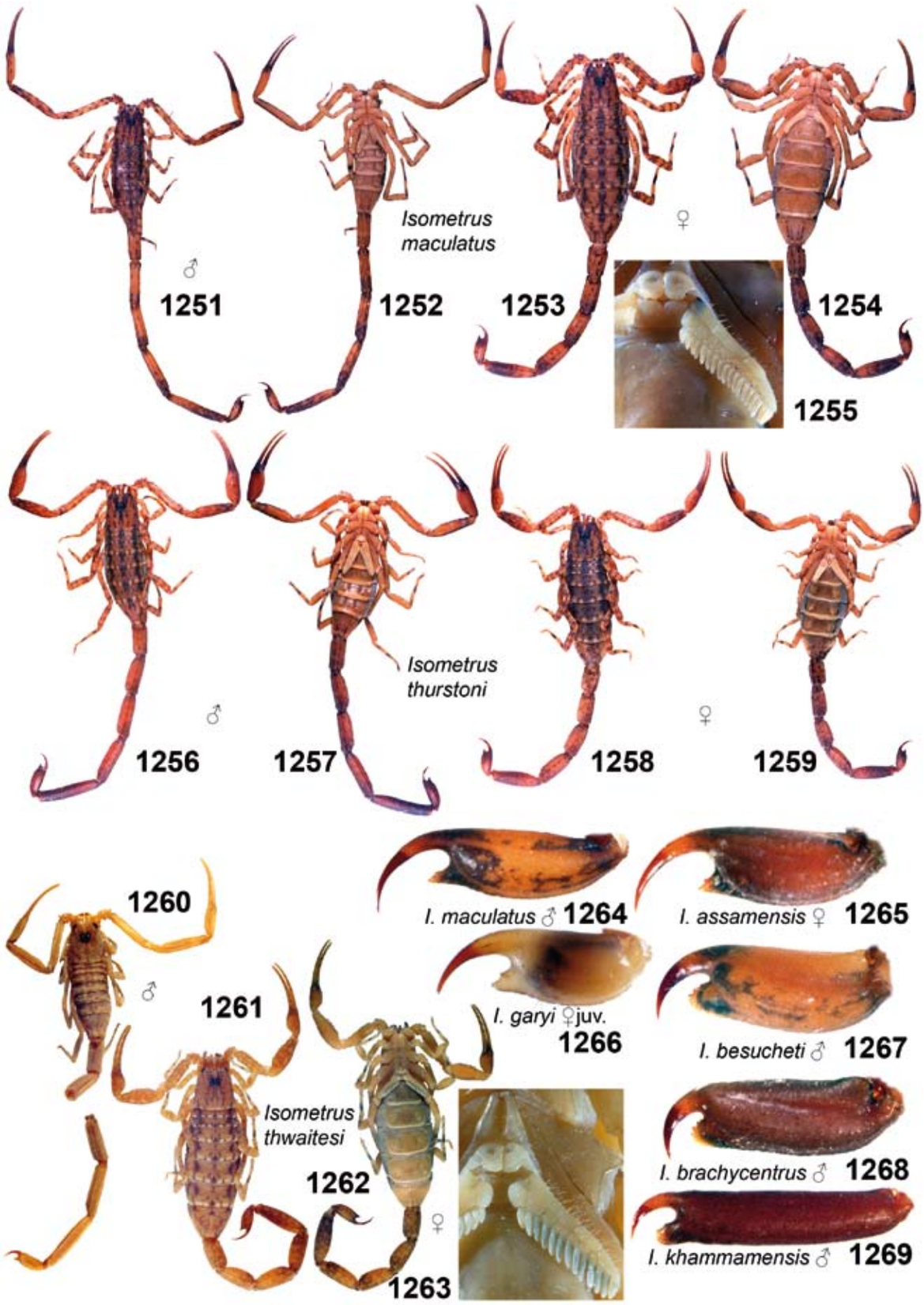
Figures 1101–1116. ***Hottentotta***. **1101–1106**. ***H. minax*** (see page 169). **1107–1116**. ***H. trailini*** (see page 178).



Figures 1185–1192. ***Hottentotta minax***, differently colored juveniles (**1185–1190)** and localities in Ethiopia (see page 169).



Figures 1206–1211. ***Hottentotta polystictus***, ♂(1206), ♀♀ and juvs. (see page 172).



Figures 1251–1269. ***Isometrus* 1251–1255, 1264**. ***I.maculatus*** (see page 184). **1256–1259**. ***I. thurstoni*** (see page 184). **1260–1263**. ***I. thwaitesi*** (see page 184). **1264–1269**. Telsons.

Figures 1555–1558. ***Lychas***. **Figure 1555**. ***L. aareyensis***, ♀ holotype (see page 196). **1556**. ***L. hosei***, ♂ (see page 202). **1557–1558**. ***L. albimanus***, ♀ and locality (see page 196).