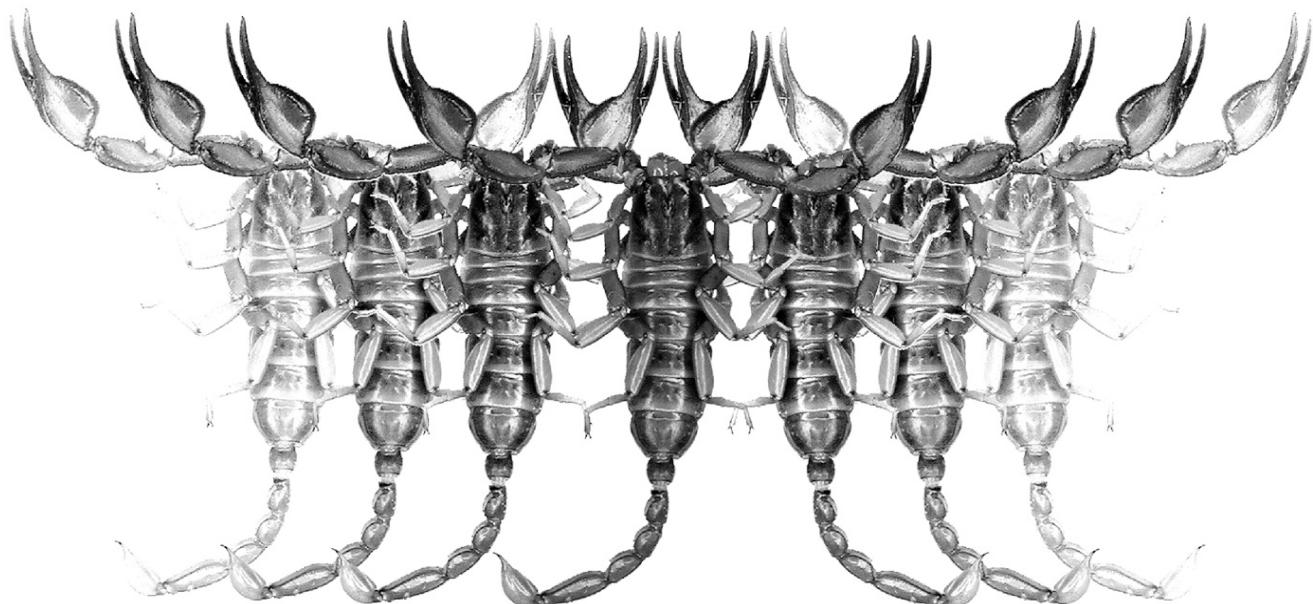


Euscorpius

Occasional Publications in Scorpiology



**Review of *Megacormus* Karsch, 1881,
with description of a new species
(Scorpiones: Euscorpiidae)**

František Kovářík

December 2019 — No. 296

Euscorpius

Occasional Publications in Scorpiology

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

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<http://zoobank.org/urn:lsid:zoobank.org:pub:658463F7-22CB-4A7F-9531-2C593DDE77C5>

Review of *Megacormus* Karsch, 1881, with description of a new species (Scorpiones: Euscorpiidae)

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<http://zoobank.org/urn:lsid:zoobank.org:pub:658463F7-22CB-4A7F-9531-2C593DDE77C5>

Summary

Megacormus frankei sp. n. from Mexico is described and compared with all other species of the genus. Additional information is provided on the morphology, taxonomy and localities of genus *Megacormus*, mainly through color photographs of live and preserved specimens of all *Megacormus* species, as well as their habitats. Included is a key for all six known species of the genus *Megacormus*.

Introduction

Our research team has been studying the European species of family Euscorpiidae for many years (see Štundlová et al., 2019; Kovářík et al., 2019). Recently, for a more comprehensive understanding of the entire family, we included in our studies a very interesting Mexican genus, *Megacormus*. During these studies, I found a new species, described here. Also, I had an opportunity to take many detailed photographs of all six species of *Megacormus*, which are published in this paper, along with a key.

Methods, Material & Abbreviations

Nomenclature and measurements follow Stahnke (1971), Soleglad & Sissom (2001), Kovářík (2009), and Kovářík & Ojanguren Affilastro (2013), except for trichobothriotaxy (Vachon, 1974; Lowe & Kovářík, 2019) and sternum (Soleglad & Fet, 2003).

Specimens examined here were collected by a local collector in 2018–2019 (author of Figs. 36–37, 88–89, 123, 156, 179, and 213–214) and are deposited in the author collection (FKCP). In the future they will be deposited at National Museum of Natural History, Prague, Czech Republic.

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

Systematics

Family Euscorpiidae Laurie, 1896

Megacormus Karsch, 1881

(Figures 1–215, Table 1)

Megacormus Karsch, 1881: 16–18; Francke, 1979: 223–230, figs. 1–6; Sissom, 1994: 265–271, figs. 1–10; Fet & Sissom, 2000: 377–378 (complete references list until

2000); Soleglad & Sissom, 2001: 25–111, figs. 10, 20, 55, 64, 81, 88, 107, 120–122, 135, 142, 153–154, 161–162, 167, 173, 182, 194, 205–215, 218, tables 2, 3, 5, 6, 9–10; Kovářík, 2009: 32; González-Santillán et al., 2017: 221–237, figs. 1–13, table 1.

TYPE SPECIES. *Scorpio granosus* Gervais, 1843

DIAGNOSIS. Inner accessory and outer accessory denticles present on pedipalp chelal fingers. Movable finger dentition with more than 35 outer accessory denticles, which create a second row of denticles. Pedipalp chelal finger median denticles aligned in straight row. Trichobothrial pattern type C. Neobothriotaxy is present in pedipalp patella external series eb, which has seven trichobothria. Two subdistal denticles present on the dorsal edge of cheliceral movable finger. Cheliceral movable finger ventral edge either smooth or with crenulations. Ventral edge of cheliceral movable finger is equipped with one to four denticles on distal half of edge, denticle 1 always present and the largest. Two pedal spurs present on legs. Tarsal spurs of legs absent. Sternum pentagonal in shape. Hemispermatophore lamelliform in shape. Telson without subaculear tubercle. Metasoma I–V with a single ventral carina. Carapace anterior edge with a slight to medium indentation.

SUBORDINATE TAXA.

Megacormus frankei sp. n.

Megacormus gertschi Díaz Nájera, 1966

Megacormus granosus (Gervais, 1843)

Megacormus grubbsi Sissom, 1994

Megacormus segmentatus Pocock, 1900

Megacormus xichu González-Santillán et al., 2017

DISTRIBUTION. Mexico (Guanajuato, Hidalgo, Oaxaca, Puebla, Querétaro, San Luis Potosí, Tamaulipas, and Veracruz).



Figures 1–2. *Megacormus franckei* sp. n., male holotype (1) and female paratype (2) in vivo habitus.

Dimensions (MM)		<i>M. franckei</i> sp. n. ♂ holotype	<i>M. franckei</i> sp. n. ♀ paratype
Carapace	L / W	4.61 / 4.62	6.38 / 6.49
Mesosoma	L	9.37	15.63
Tergite VII	L / W	1.73 / 3.88	3.10 / 5.53
Metasoma + telson	L	17.47	20.47
Segment I	L / W / D	1.56 / 2.23 / 2.05	1.87 / 2.94 / 2.47
Segment II	L / W / D	1.79 / 1.97 / 1.88	2.13 / 2.56 / 2.29
Segment III	L / W / D	1.87 / 1.80 / 1.83	2.24 / 2.42 / 2.31
Segment IV	L / W / D	2.39 / 1.67 / 1.72	2.78 / 2.20 / 2.28
Segment V	L / W / D	4.47 / 1.66 / 1.61	5.24 / 2.14 / 1.96
Telson	L / W / D	5.39 / 1.93 / 1.82	6.21 / 2.55 / 2.01
Pedipalp	L	14.39	19.11
Femur	L / W	3.39 / 1.45	4.60 / 2.04
Patella	L / W	3.75 / 1.82	5.14 / 2.24
Chela	L	7.25	9.37
Manus	W / D	2.67 / 2.33	3.37 / 2.89
Movable finger	L	3.88	5.00
Total	L	31.45	42.48

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

***Megacormus franckei* sp. n.**

(Figures 1–37, 47–49, 215, Table 1)

<http://zoobank.org/urn:lsid:zoobank.org:act:837913FC-ADFB-4796-A279-7DF9D33E70D5>

Megacormus gertschi: González-Santillán et al., 2017: 237 (in part).

TYPE LOCALITY AND TYPE REPOSITORY. Mexico, Querétaro, Pinal de Amoles, oak-pine forest, 21°08'004"N 99°39'988"W, 2,690 m a. s. l.; FKCP.

TYPE MATERIAL. Mexico, Querétaro, Pinal de Amoles, oak-pine forest, 21°08'004"N 99°39'988"W, 2690 m a. s. l., 1♂ (holotype) 2♂1♀2juvs.♀ (paratypes, No. 1618).

ETYMOLOGY. The specific epithet honors Oscar F. Francke (Mexico) for his lifelong dedication to understanding Mexican scorpions.

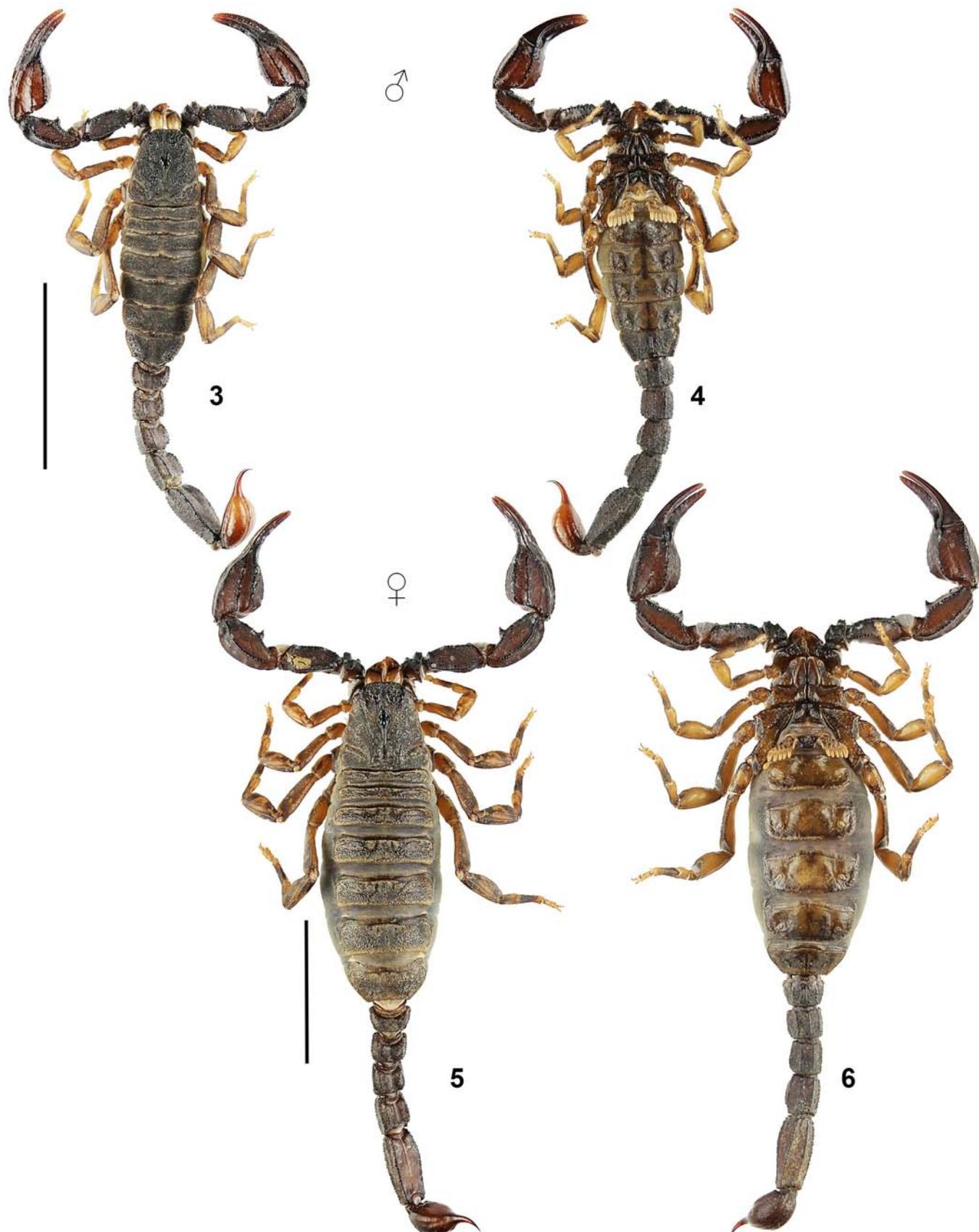
DIAGNOSIS. Total length of adult males 25–32 mm, adult female 42.5 mm. Coloration reddish black to black. Patella of pedipalp with 22 external trichobothria (7 eb, 2 esb, 5 em, 4 est, 4 et) and 6–8 ventral trichobothria. Chelal trichobothrium V_4 located on external surface. Pectinal teeth number 5–6 in males, 5 in females. Both males and females have the fingers

straight, without any flexure. Telson elongate, wider than metasoma V in both sexes. Metasoma V length/width ratio, 2.60–2.80 in males.

DESCRIPTION. Total length of adult males 25–32 mm, adult female paratype is 42.5 mm long. Measurements of the carapace, telson, segments of the metasoma and pedipalps are given in Table 1. For habitus, see Figs. 1–6. For position of trichobothria, see Figs. 7–14 and 16–18. Coloration reddish black to black, telson yellowish brown to reddish black, legs yellowish brown with black spots, chelicerae yellow with reticulation (Figs. 28–29). Sexual dimorphism minor, adult male has relatively larger pectines, the fingers are straight in both sexes, there is no sexual difference in length and width of the metasomal or pedipalp segments.

Pedipalp (Figs. 7–19). Femur granulated, with four granulose carinae. Patella granulated mainly on dorsal surface with five granulose carinae. Chela granulated, with six developed carinae. Movable and fixed fingers with 7–8 pair of inner denticles. The patella bears 22 external trichobothria (7 eb, 2 esb, 5 em, 4 est, 4 et) and 6–8 ventral trichobothria. Chelal trichobothrium V_4 located on external surface.

Carapace (Figs. 20–21). Slightly trapezoidal (narrower anteriorly) and approximately as long as wide; anterior margin almost straight, with some short microsetae. The entire carapace is strongly granulated, without carinae.



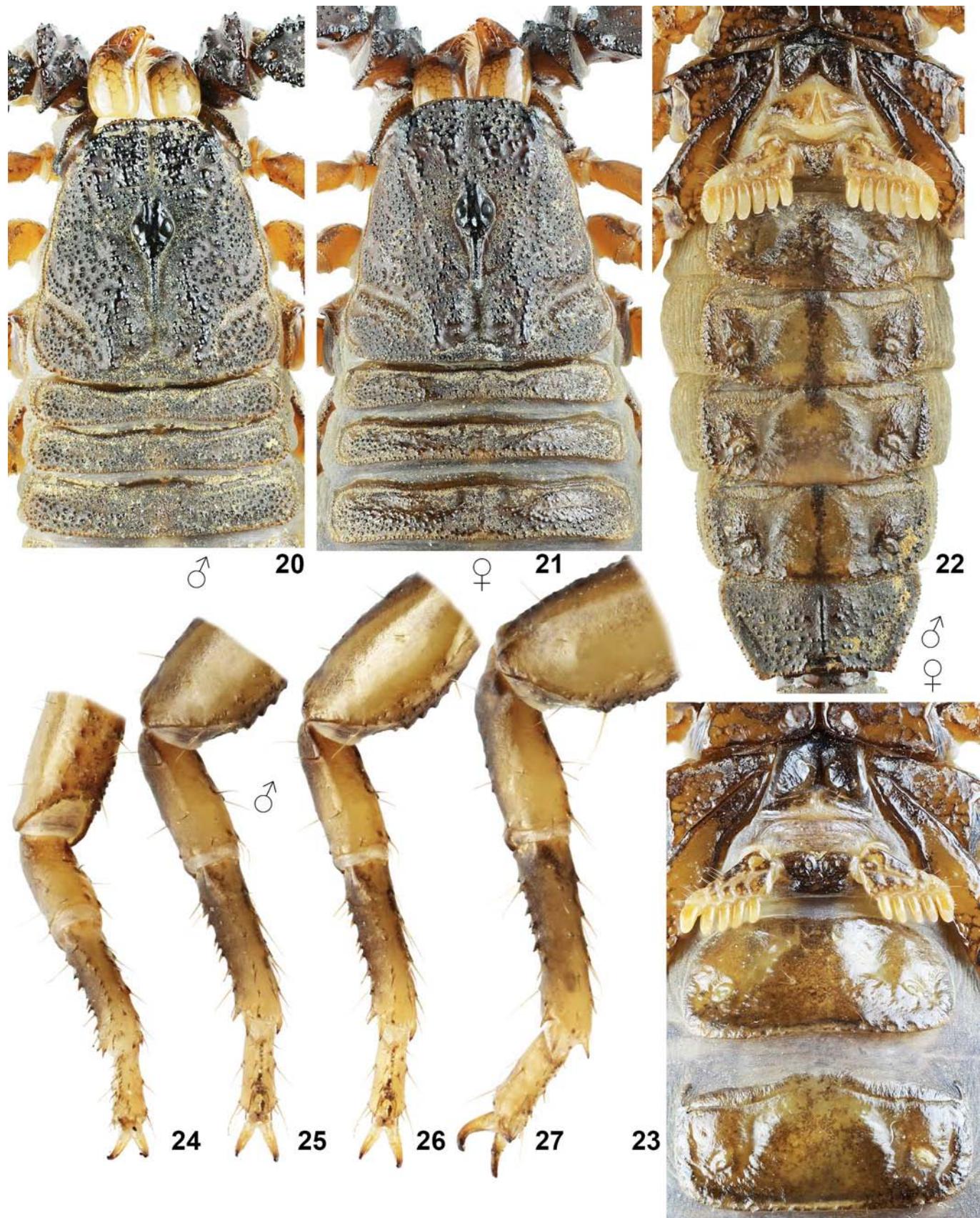
Figures 3–6: *Megacormus francke* sp. n. **Figures 3–4.** Male holotype in dorsal (3) and ventral (4) views. **Figures 5–6.** Female paratype in dorsal (5) and ventral (6) views. Scale bars: 10 mm.



Figures 7–15: *Megacormus franckei* sp. n. **Figures 7–14.** Male holotype, pedipalp chela dorsal (7), external (8) and ventral (9) views, patella dorsal (10), external (11) and ventral (12) views, femur and trochanter dorsal (13) and ventral (14) views. **Figure 15.** Female paratype, movable finger dentition.



Figures 16–19: *Megacormus frankei* sp. n., female paratype, pedipalp chela and patella dorsal (16), external (17) and ventral (18) views, and fixed finger dentition (19).



Figures 20–27: *Megacormus franckei* sp. n. **Figures 20, 22, 24–27.** Male holotype, carapace and tergites I–III (20), coxosternal area and sternites (22), and left legs I–IV, retrolateral aspect (24–27). **Figures 21, 23.** Female paratype, carapace and tergites I–III (21) and coxosternal area and sternites III–IV (23).



Figures 28–29. *Megacormus franckei* sp. n., female paratype, left chelicera dorsal (28) and ventral (29) views.

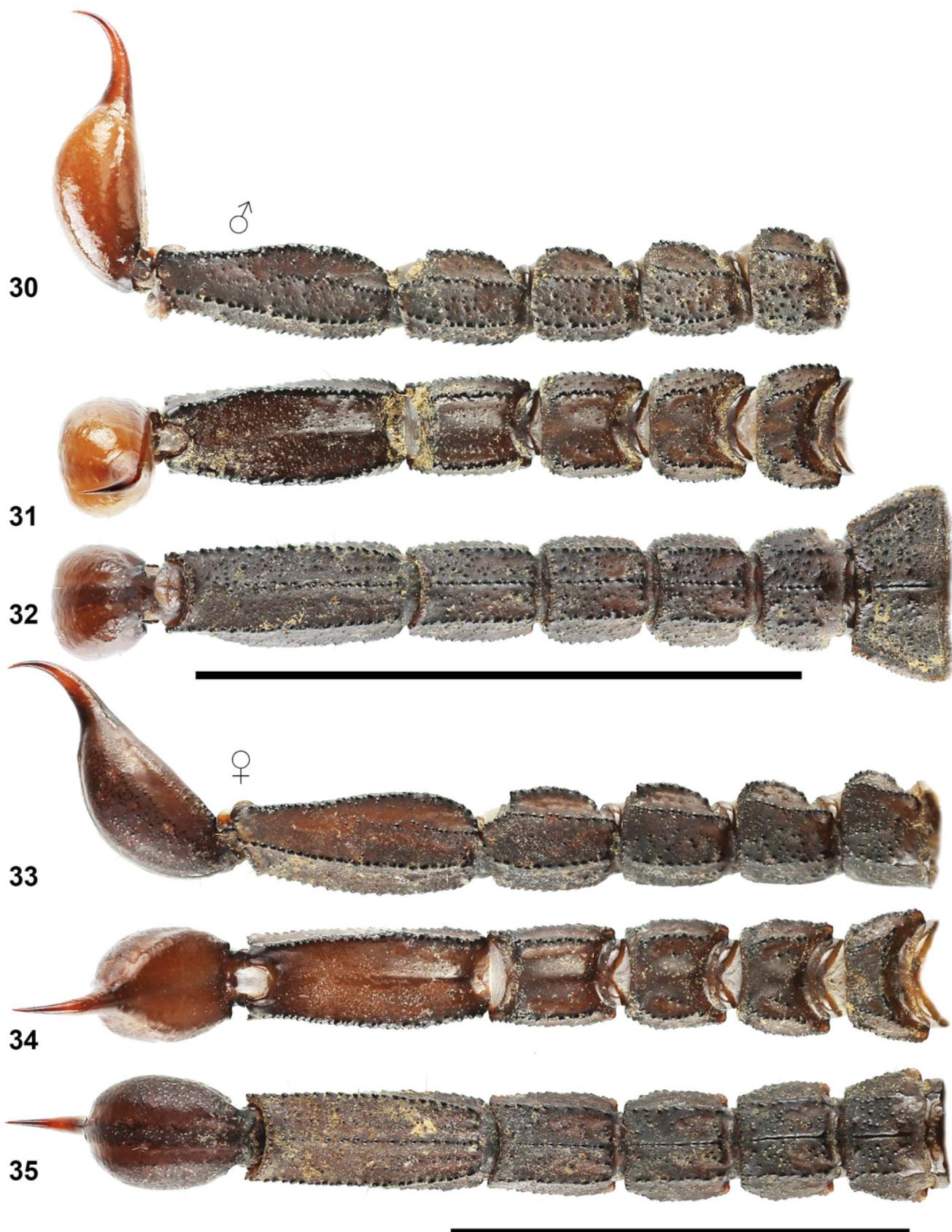
Mesosoma (Figs. 20–23). Tergites I–VI bear a single conspicuous median carina. All tergites densely and coarsely granulose. Pectinal teeth number 5–6 in males, 5 in females. Sternites III–VI lacking carinae, surfaces smooth medially and granulated laterally, more in males. Sternite VII strongly granulated, with a developed median carina.

Legs (Figs. 24–27). Typical for the genus (see diagnosis for genus above and in González-Santillán et al., 2017: 230). Tarsomeres I bearing median row of macrosetae on their ventral surface.

Metasoma and telson (Figs. 30–35). The metasoma segments I–IV have a total of 7, and metasoma V has 5 well defined carinae, granules on lateral surfaces of segments II and V can indicate another incomplete carina. All metasomal segments

are granulated sparsely by strong granules, and densely by smaller granules. Metasoma with only several solitary setae. Telson granulose in female and almost smooth in males. Subaculear tubercle absent. Vesicle elongate, ellipsoidal, telson length/depth ratio 2.95–3.10 in both sexes. Aculeus slender, curved, shorter than vesicle.

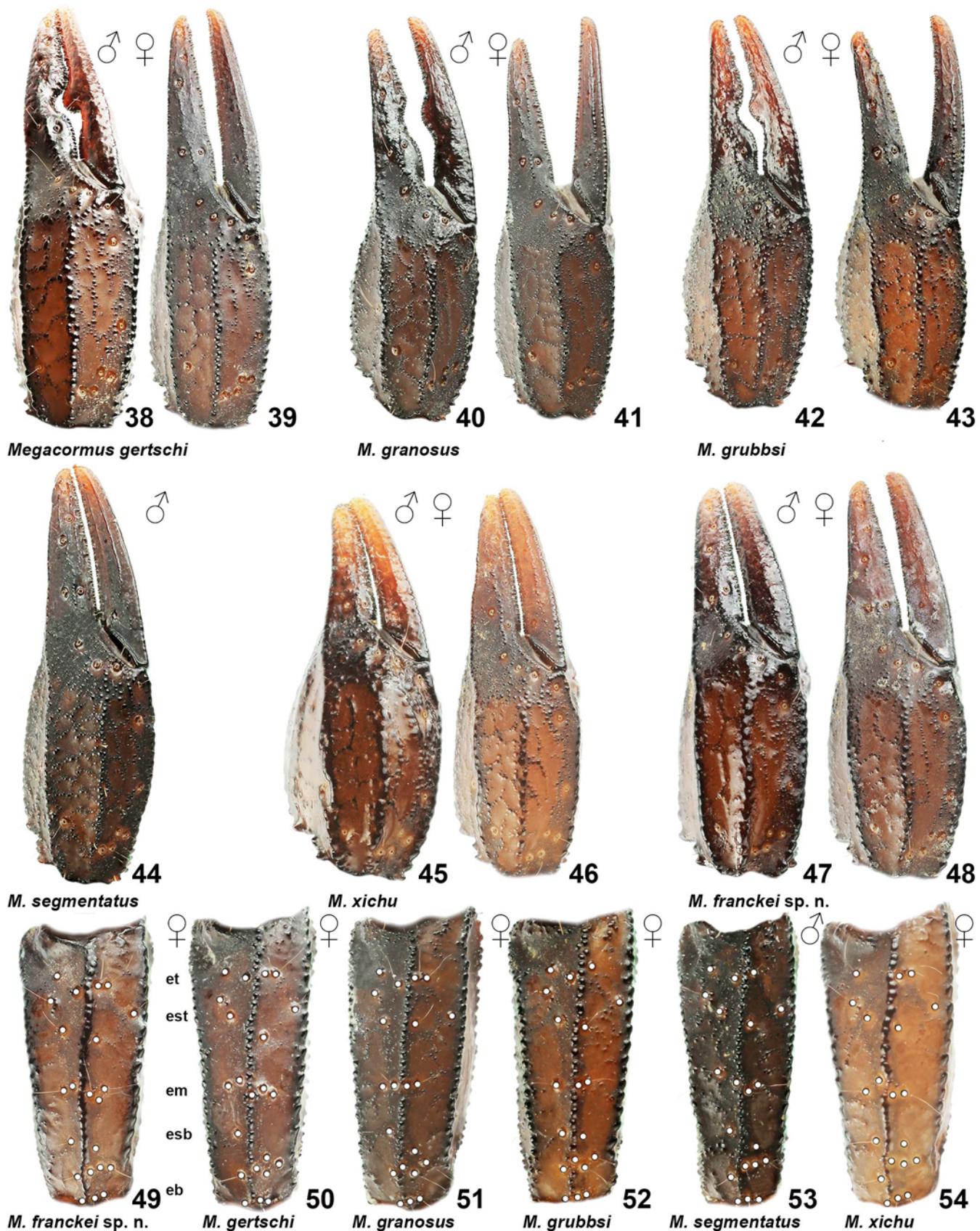
AFFINITIES. The described features distinguish *Megacormus franckei* sp. n. from all other species of the genus (see the key below). Figures 44–48 show that only *M. segmentatus* Pocock, 1900 and *M. xichu* González-Santillán et al., 2017 share with *M. franckei* sp. n. presence of straight fingers, without any flexure in both sexes. González-Santillán et al., (2017: 237) cited a population of *Megacormus franckei* sp. n. as *M. gertschi*;



Figures 30–35. *Megacormus frankei* sp. n. **Figures 30–32.** Male holotype, metasoma and telson in lateral (30), dorsal (31) and ventral together with sternite VII (32) views. **Figures 33–35.** Female paratype, metasoma and telson in lateral (33), dorsal (34) and ventral (35) views. Scale bars: 10 mm.



Figures 36–37. *Megacormus franckei* sp. n., type locality.



Figures 38–54. *Megacormus*, pedipalp chela external of males (38, 40, 42, 44, 45, 47) and females (39, 41, 43, 46, 48), and patella external of male (53) and females (49–52, 54). **Figures 38–39, 50.** *M. gertschi*. **Figures 40–41, 51.** *M. granosus*. **Figures 42–43, 52.** *M. grubbsi*. **Figures 44, 53.** *M. segmentatus*. **Figures 45–46, 54.** *M. xichu*. **Figures 47–49.** *M. franckei* sp. n.

however, they studied only females so they could not detect the sexual dimorphism. Figures 49–54 show number and position of pedipalp patella external trichobothria in studied specimens of all species of the genus *Megacormus*. This character, however, should be used with caution at the species level since it is variable; e.g. González-Santillán et al. (2017: 229) cited intraspecific variability in *M. xichu* as from 3 to 5 in *em* series, from 3 to 4 in *est* series, and from 2 to 4 in *et* series.

Key to species of *Megacormus*

1. In contrast to females, males have fingers of pedipalps strongly flexed (Figs. 38–43). 2
- Both males and females have the fingers straight, without any flexure (Figs. 44–48). 4
2. Pectines with marginal and median lamellae fused, sulcus indistinguishable in females and vestigial in males *M. granosus* (Gervais, 1843)
- Pectines with marginal and median lamellae completely separated by a deep sulcus in both sexes. 3
3. Telson wider than metasoma V. *M. grubbsi* Sissom, 1994
 - Metasoma V wider than telson. *M. gertschi* Diaz Nájera, 1966
4. Metasoma V wider than telson. *M. segmentatus* Pocock, 1900
 - Telson wider than metasoma V. 5
5. Metasoma narrow. Metasoma V length/width ratio, 2.60–2.80 in males. *M. francke sp. n.*
 - Metasoma V length/width ratio, 1.94–2.13 in males. *M. xichu* González-Santillán et al., 2017

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Appendix. Material examined.

Megacormus gertschi Díaz Nájera, 1966

Mexico, Hidalgo, Zacualtipan, pine forest, 20°40'407"N
98°40'079"W, 2117 m a. s. l., 8♂2♀ (Figs. 38–39, 50, 55–89),
topotypes, Nos. 1619, 1620, 1627, 1628.

Megacormus granosus (Gervais, 1843)

Mexico, Veracruz, Atotonilco, pine forest, 19°08'860"N
97°11'830"W, 2180 m a. s. l., 2♂2♀ (Figs. 40–41, 51, 90–
123), No. 1621.

Megacormus grubbsi Sissom, 1994

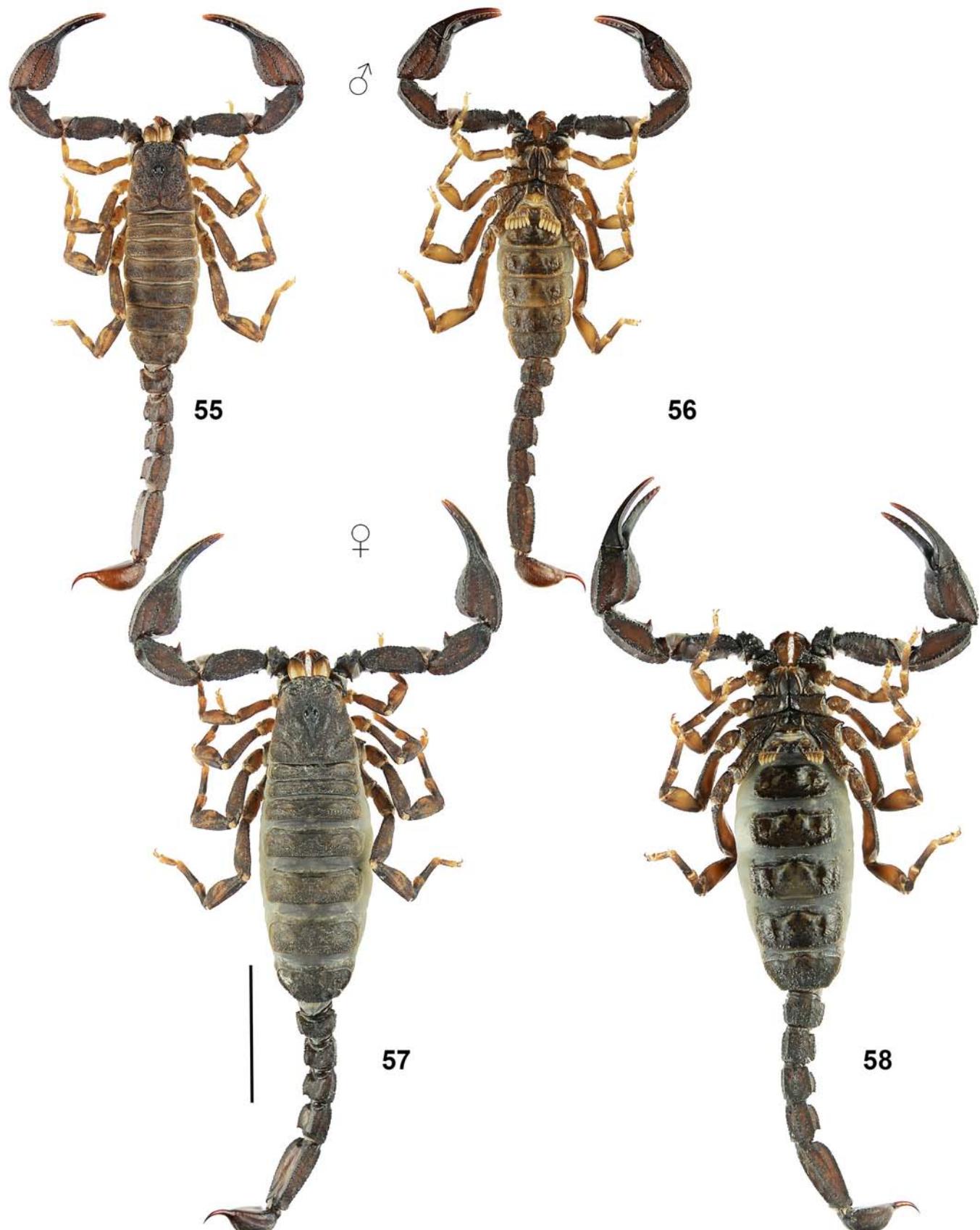
Mexico, Oaxaca, Huautla de Jiménez, green mountain tropical
forest, 18°09'248"N 96°59'290"W, 2400 m a. s. l., 2♂2♀
(Figs. 42–43, 52, 124–156), No. 1623.

Megacormus segmentatus Pocock, 1900

Mexico, Veracruz, Atoyac, green tropical forest, 18°55'205"N
96°46'100"W, 466 m a. s. l., 1♂ (Figs. 44, 53, 157–179),
topotype, No. 1622.

Megacormus xichu González-Santillán et al., 2017

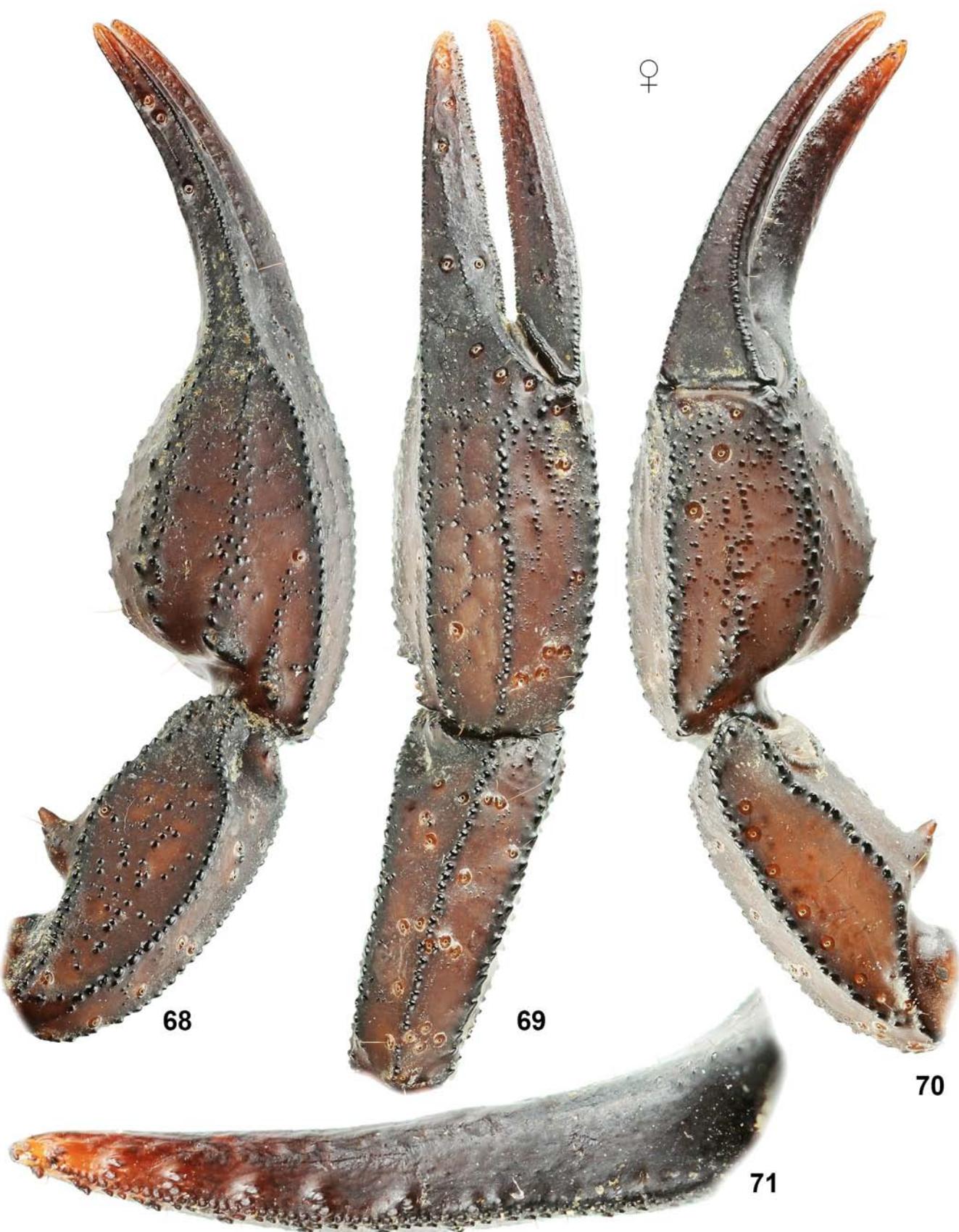
Mexico, Guanajuato, Xichú, Charco Azul, El Ocotero, ca 4
km NE of Xichú, oak forest, 21°18'54"N 100°06'38"W, 2283
m a. s. l., 5♂5♀ (Figs. 45–46, 54, 180–214), topotypes, Nos.
1617, 1626.



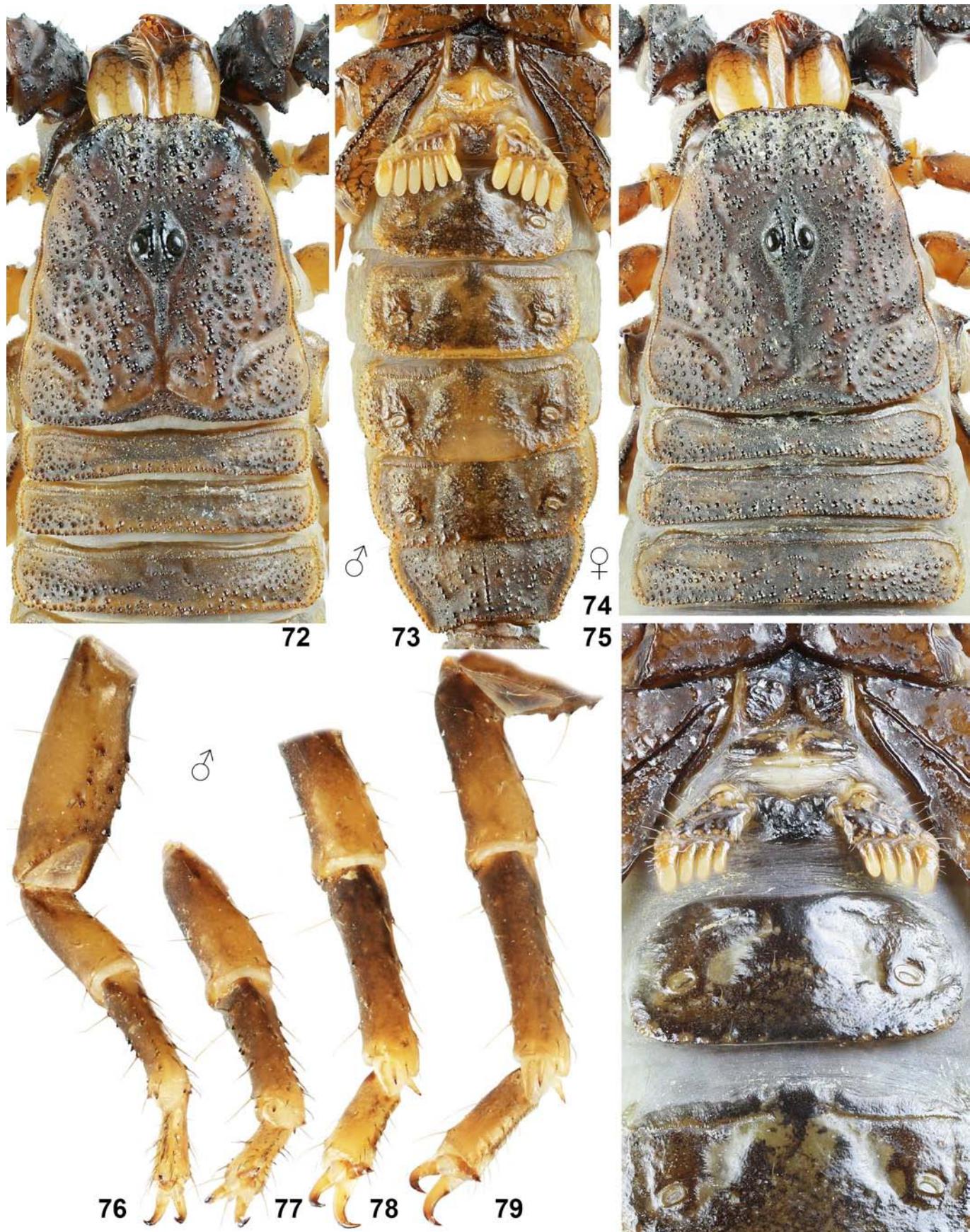
Figures 55–58: *Megacormus gertschi*. **Figures 55–56.** Male in dorsal (55) and ventral (56) views. **Figures 57–58.** Female in dorsal (57) and ventral (58) views. Scale bar: 10 mm.



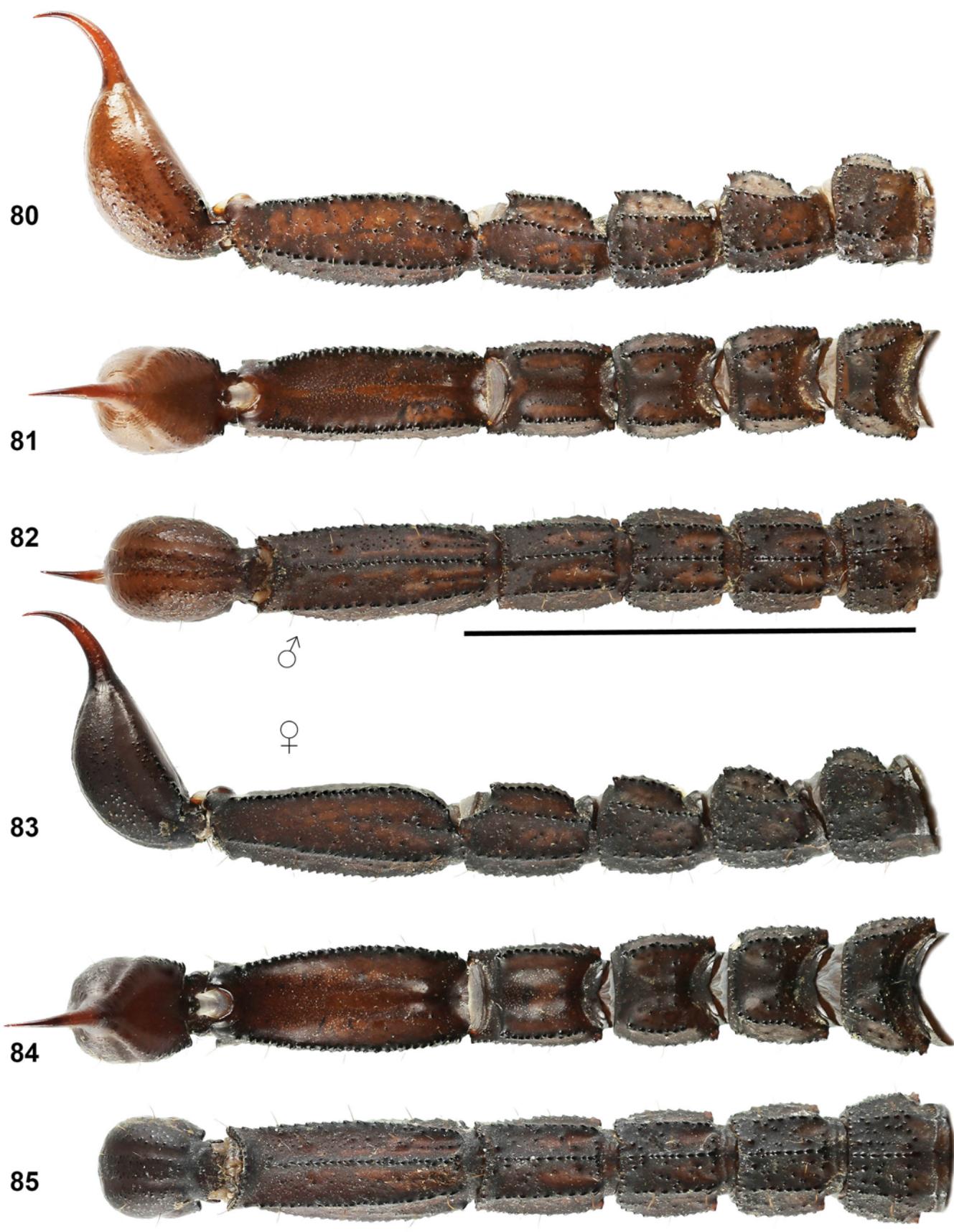
Figures 59–67: *Megacormus gertschi*. **Figures 59–66.** Male, pedipalp chela dorsal (59), external (60) and ventral (61) views, patella dorsal (62), external (63) and ventral (64) views, femur and trochanter dorsal (65) and ventral (66) views. **Figure 67.** Female, movable finger dentition.



Figures 68–71. *Megacormus gertschi*, female, pedipalp chela and patella dorsal (68), external (69) and ventral (70) views, and fixed finger dentition (71).



Figures 72–79: *Megacormus gertschi*. **Figures 72–73, 76–79.** Male, carapace and tergites I–III (72), coxosternal area and sternites (73), and left legs I–IV, retrolateral aspect (76–79). **Figures 74–75.** Female, carapace and tergites I–III (74) and coxosternal area and sternites III–IV (75).



Figures 80–85. *Megacormus gertschi*. **Figures 80–82.** Male, metasoma and telson in lateral (80), dorsal (81) and ventral (82) views. **Figures 83–85.** Female, metasoma and telson in lateral (83), dorsal (84) and ventral (85) views. Scale bars: 10 mm.



Figures 86–87. *Megacormus gertschi*, male (86) and female (87) *in vivo* habitus.

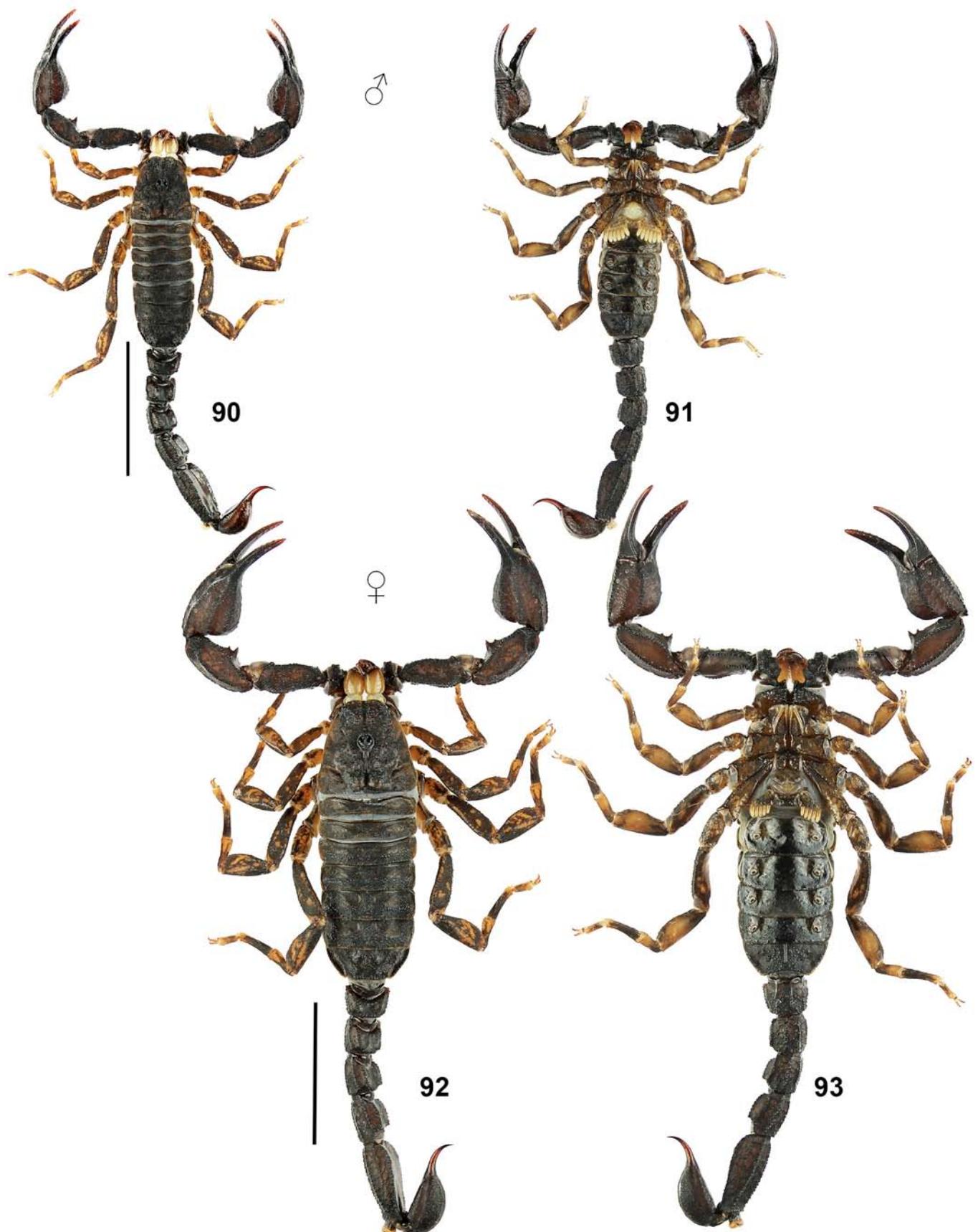


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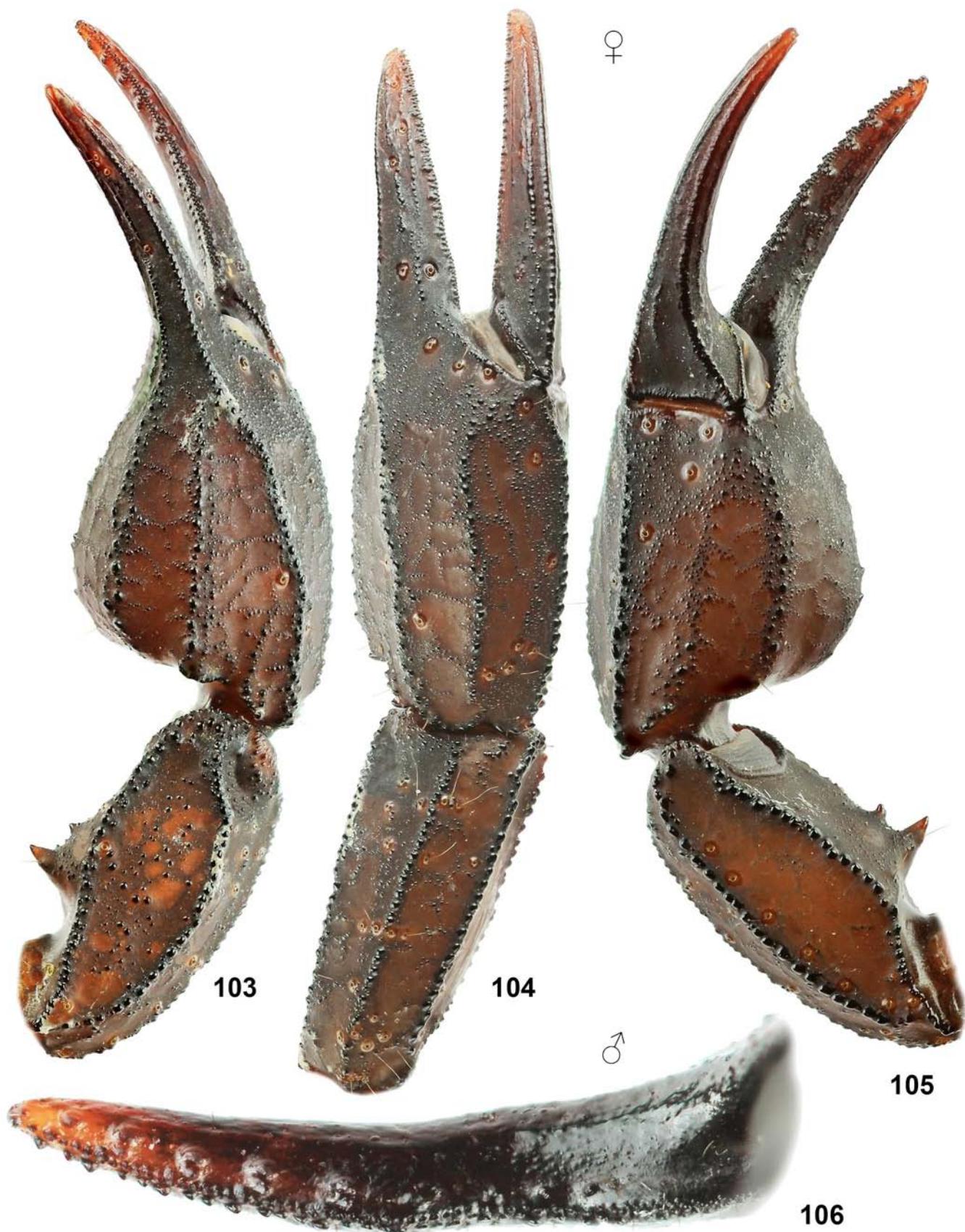
Figures 88–89. *Megacormus gertschi*, locality, Mexico, Hidalgo, Zacualtipan, pine forest, 20°40'407"N 98°40'079"W, 2117 m a. s. l.



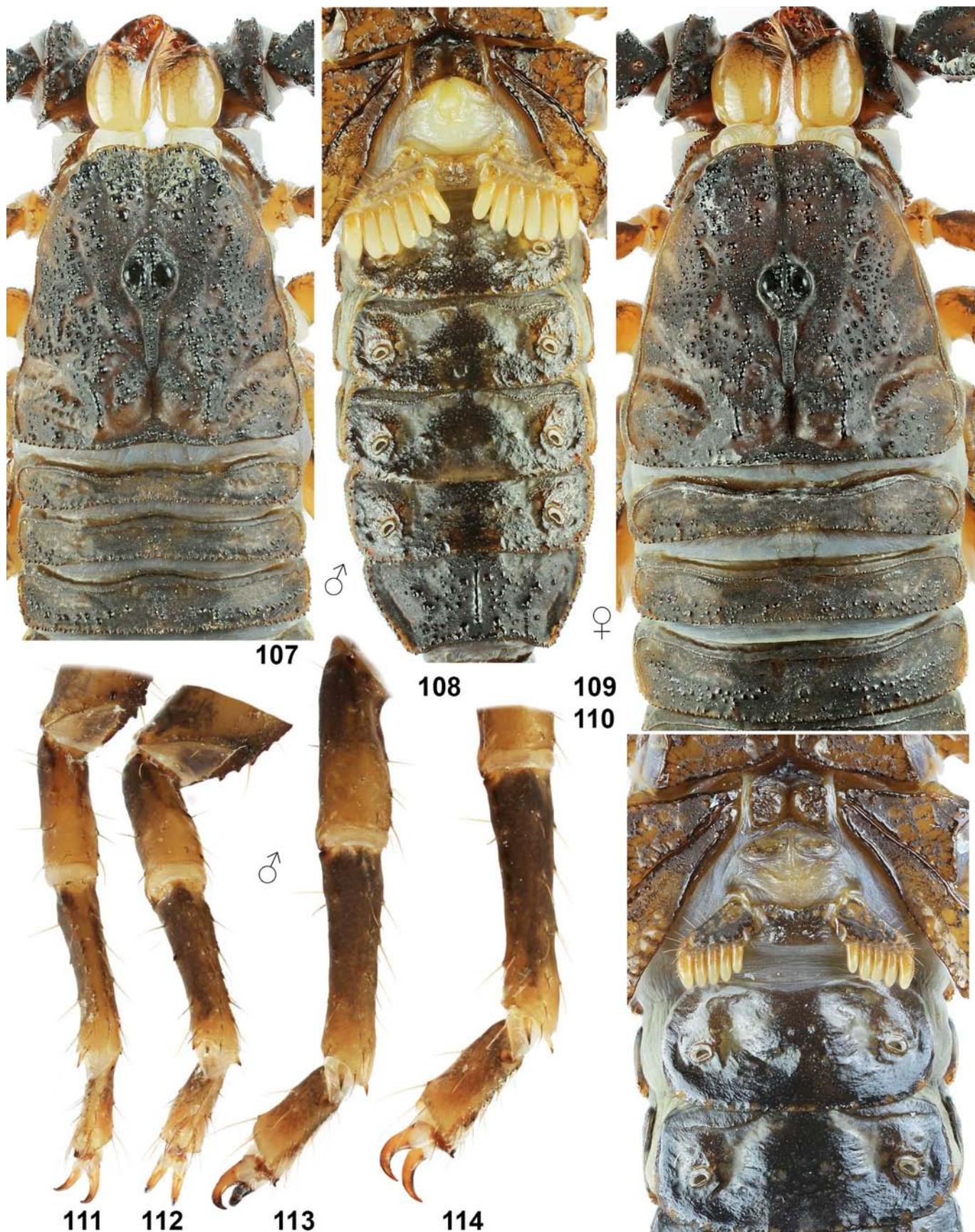
Figures 90–93: *Megacormus granosus*. **Figures 90–91.** Male in dorsal (90) and ventral (91) views. **Figures 92–93.** Female in dorsal (92) and ventral (93) views. Scale bars: 10 mm.



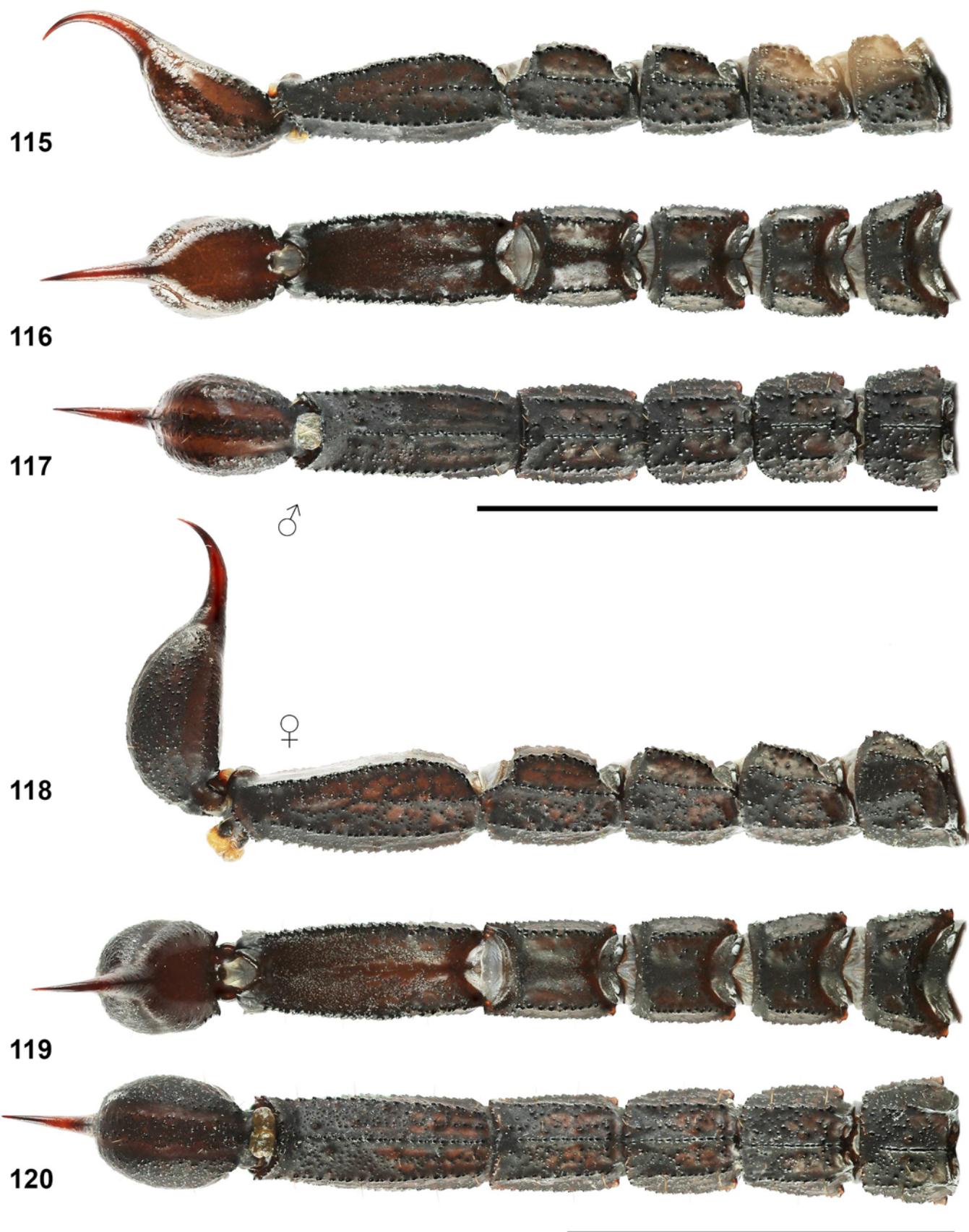
Figures 94–102. *Megacormus granosus*, male, pedipalp chela dorsal (94), external (95) and ventral (96) views, patella dorsal (97), external (98) and ventral (99) views, femur dorsal (100) and ventral (101) views, and movable finger dentition (102).



Figures 103–106: *Megacormus granosus*. **Figures 103–105.** Female, pedipalp chela and patella dorsal (103), external (104) and ventral (105) views. **Figure 106.** Male, fixed finger dentition.



Figures 107–114: *Megacormus granosus*. **Figures 107–108, 111–114.** Male, carapace and tergites I–III (107), coxosternal area and sternites (108), and left legs I–IV, retrolateral aspect (111–114). **Figures 109–110.** Female, carapace and tergites I–III (109) and coxosternal area and sternites III–IV (110).



Figures 115–120. *Megacormus granosus*. Figures 115–117. Male, metasoma and telson in lateral (115), dorsal (116) and ventral (117) views. Figures 118–120. Female, metasoma and telson in lateral (118), dorsal (119) and ventral (120) views. Scale bars: 10 mm.



Figures 121–122. *Megacormus granosus*, male (121) and female (122) in vivo habitus.

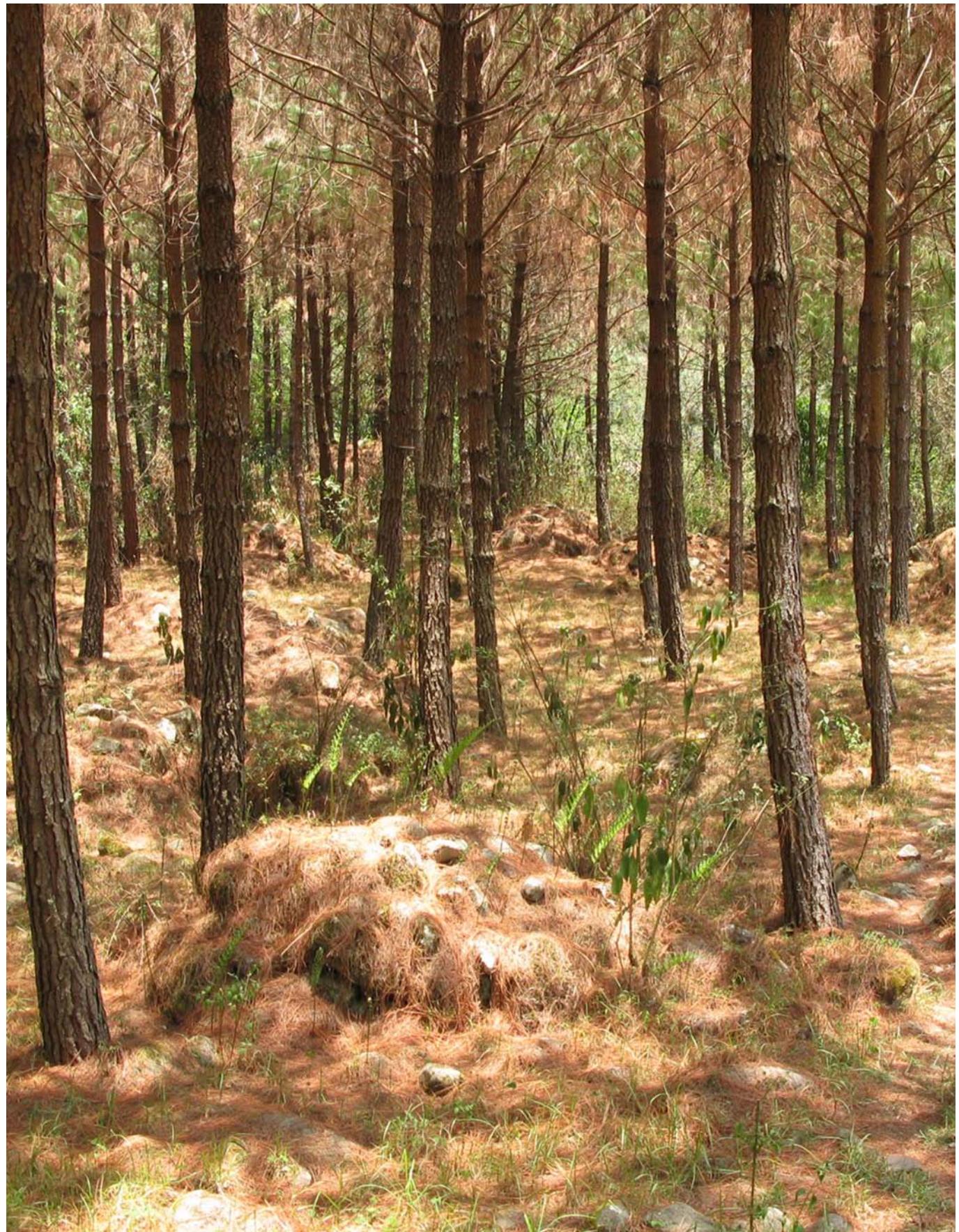
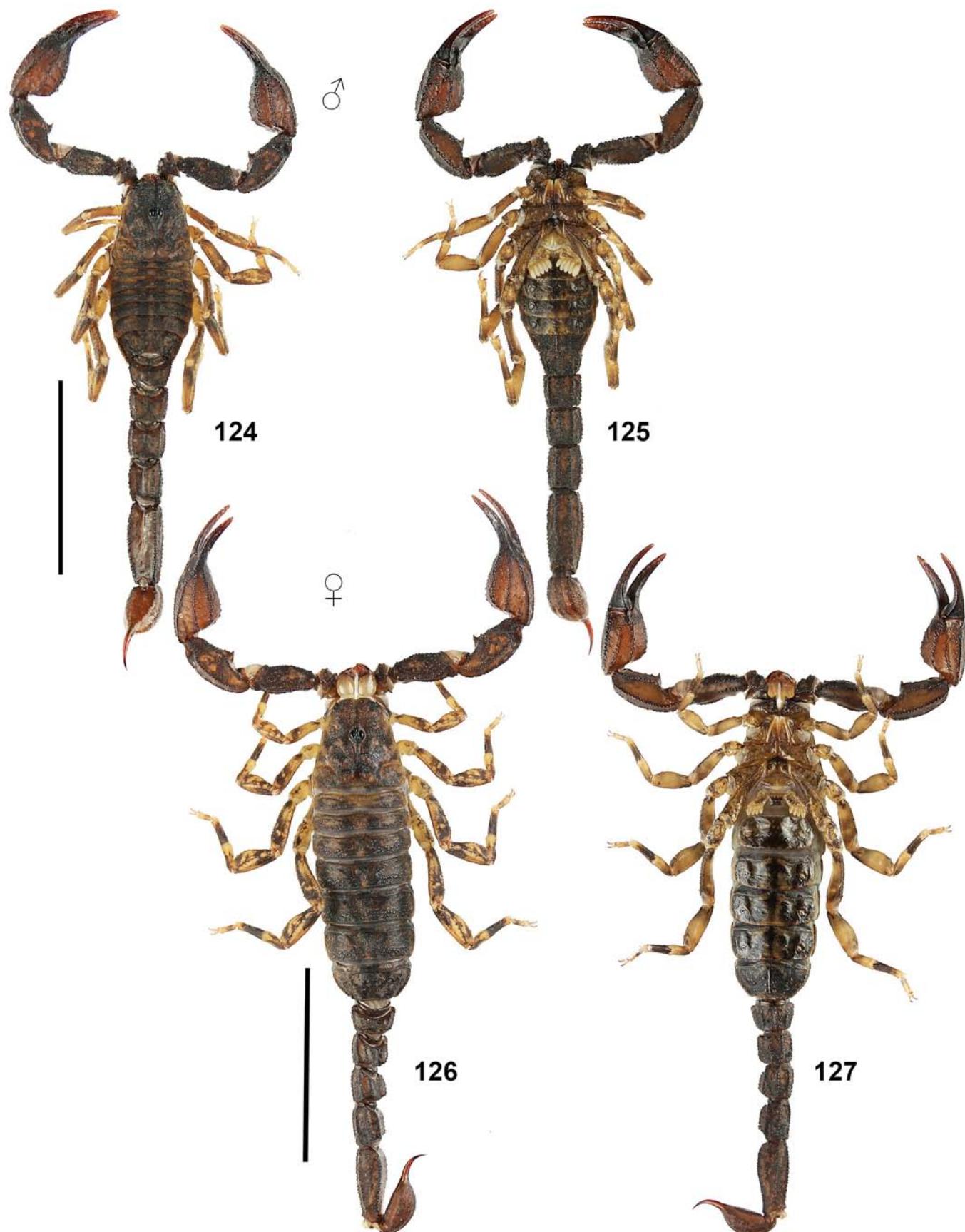


Figure 123. *Megacormus granosus*, locality, Mexico, Veracruz, Atotonilco, pine forest, 19°08'860"N 97°11'830"W, 2180 m a. s. l.



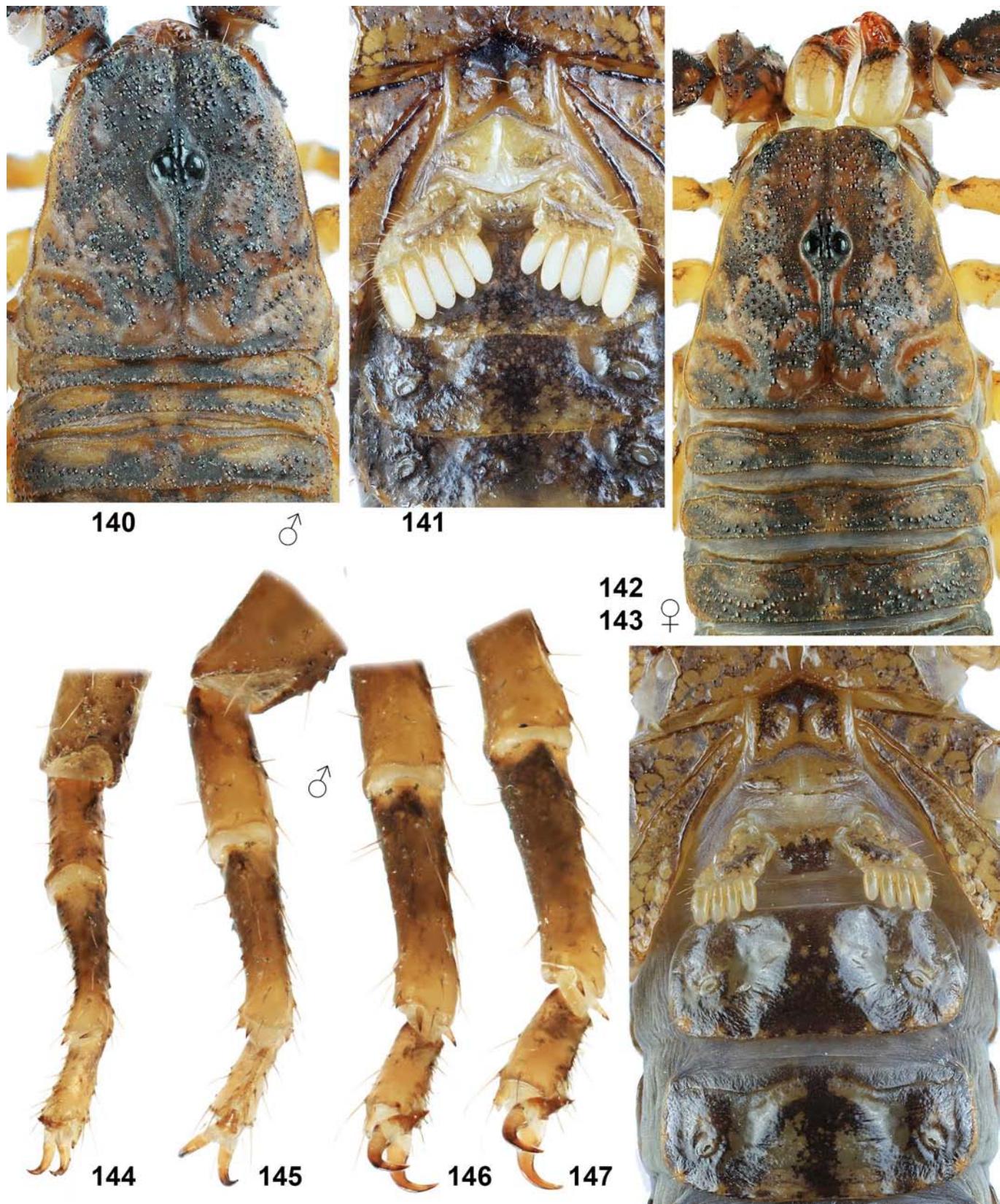
Figures 124–127: *Megacormus grubbsi*. **Figures 124–125.** Male in dorsal (124) and ventral (125) views. **Figures 126–127.** Female in dorsal (126) and ventral (127) views. Scale bars: 10 mm.



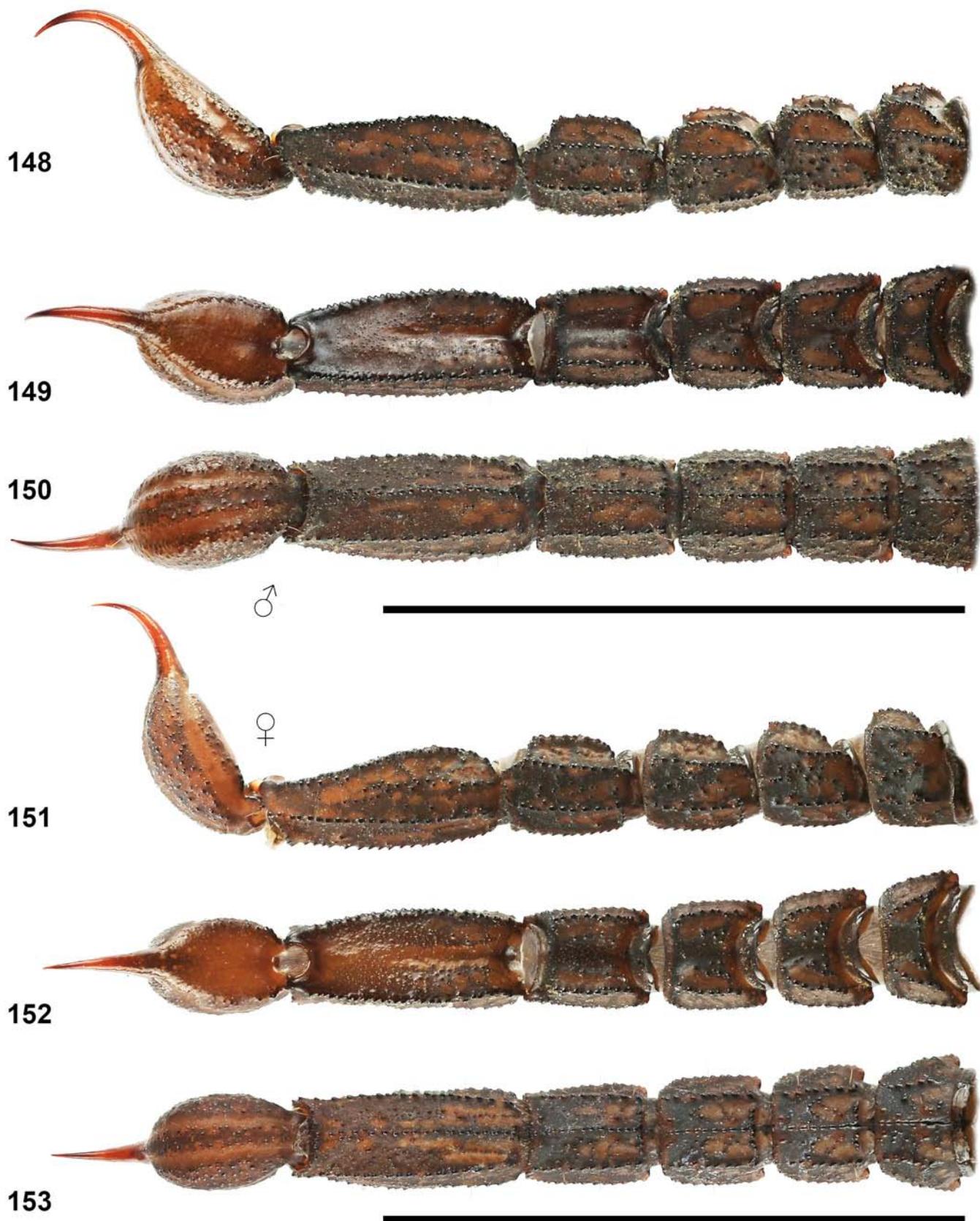
Figures 128–136. *Megacormus grubbsi*, male, pedipalp chela dorsal (128), external (129) and ventral (130) views, patella dorsal (131), external (132) and ventral (133) views, femur and trochanter dorsal (134) and ventral (135) views, and movable finger dentition (136).



Figures 137–139. *Megacormus grubbsi*, female, pedipalp chela and patella dorsal (137), external (138) and ventral (139) views.



Figures 140–147: *Megacormus grubbsi*. **Figures 140–141, 144–147.** Male, carapace and tergites I–III (140), coxosternal area and sternites III–V (141), and left legs I–IV, retrolateral aspect (144–147). **Figures 142–143.** Female, carapace and tergites I–III (142) and coxosternal area and sternites III–IV (143).



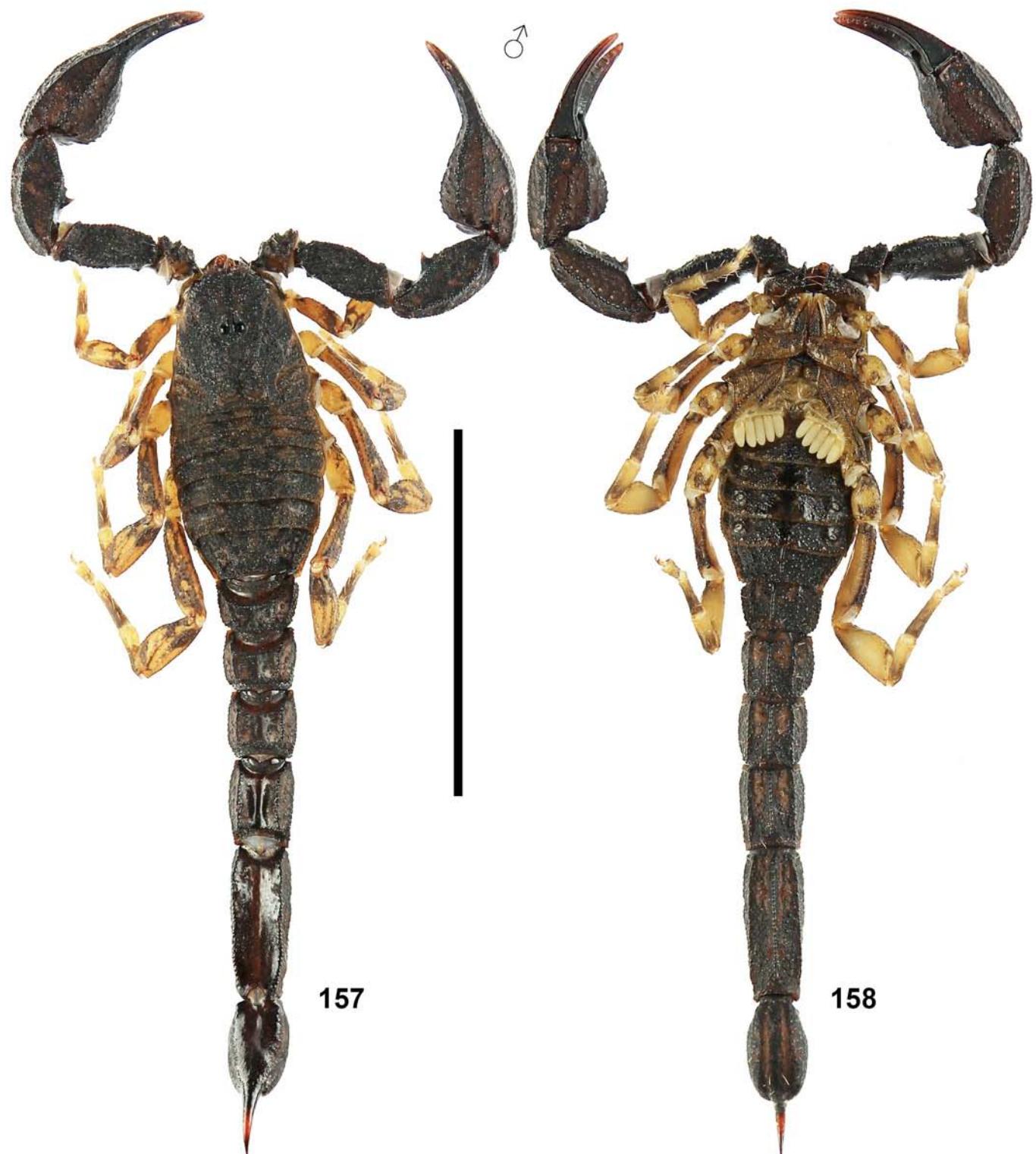
Figures 148–153. *Megacormus grubbsi*. **Figures 148–150.** Male, metasoma and telson in lateral (148), dorsal (149) and ventral (150) views. **Figures 151–153.** Female, metasoma and telson in lateral (151), dorsal (152) and ventral (153) views. Scale bars: 10 mm.



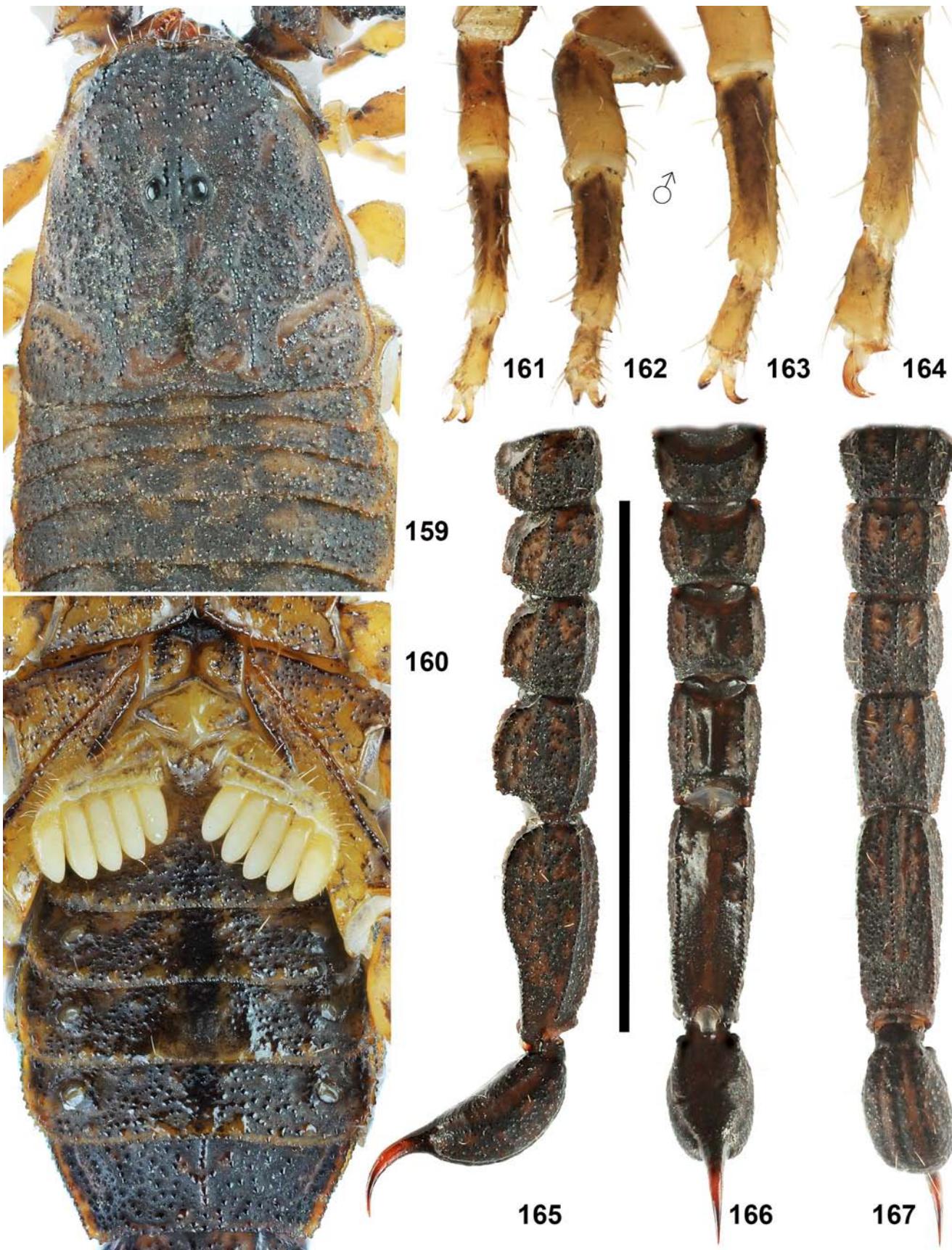
Figures 154–155. *Megacormus grubbsi*, male (154) and female (155) in vivo habitus.



Figure 156. *Megacormus grubbsi*, locality, Mexico, Oaxaca, Huautla de Jiménez, green mountain tropical forest, 18°09'248"N 96°59'290"W, 2400 m a. s. l.



Figures 157–158. *Megacormus segmentatus*, male in dorsal (157) and ventral (158) views. Scale bar: 10 mm.



Figures 159–167. *Megacormus segmentatus*, male, carapace and tergites I–III (159), coxosternal area and sternites (160), left legs I–IV, retrolateral aspect (161–164), metasoma and telson in lateral (165), dorsal (166) and ventral (167) views. Scale bar: 10 mm (165–167).



Figures 168–177. *Megacormus segmentatus*, male, pedipalp chela dorsal (168), external (169) and ventral (170) views, patella dorsal (171), external (172) and ventral (173) views, femur and trochanter dorsal (174) and ventral (175) views, and movable (176) and fixed (177) finger dentition.

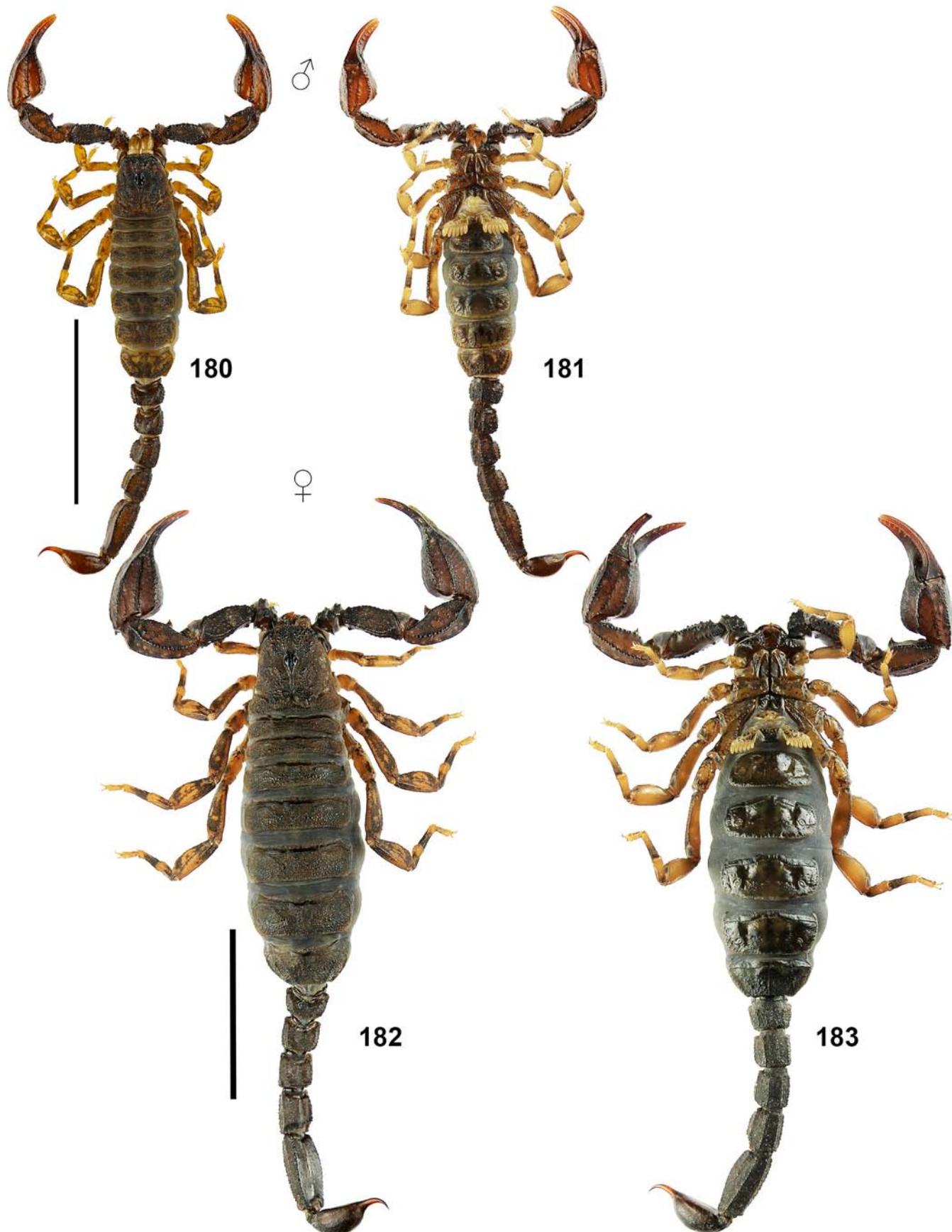


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Figures 178–179. *Megacormus segmentatus*, male in vivo habitus (178) and locality, Mexico, Veracruz, Atoyac, green tropical forest, 18°55'205"N 96°46'100"W, 466 m a. s. l., (179).



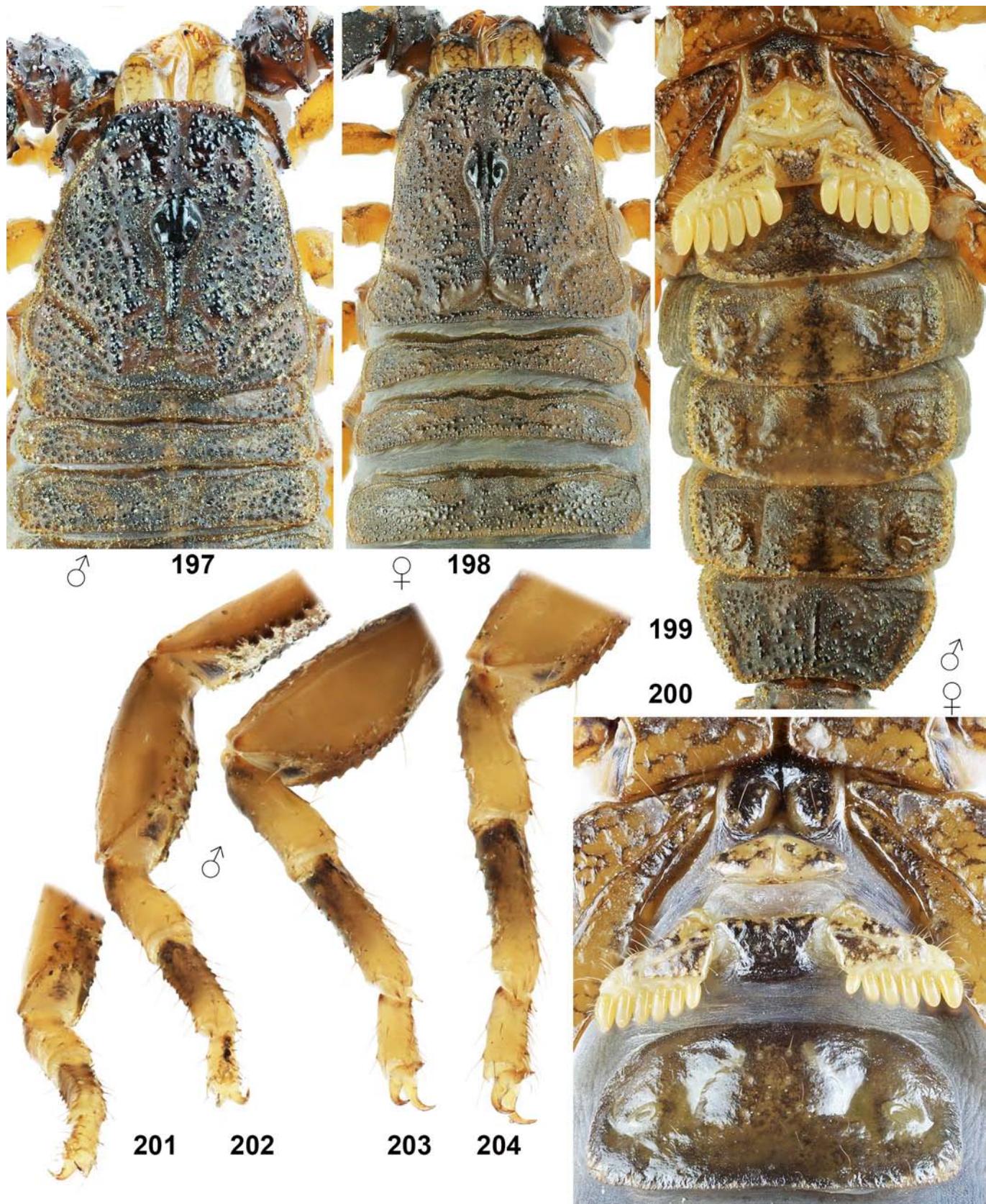
Figures 180–183: *Megacormus xichu*. **Figures 180–181.** Male in dorsal (180) and ventral (181) views. **Figures 182–183.** Female in dorsal (182) and ventral (183) views. Scale bars: 10 mm.



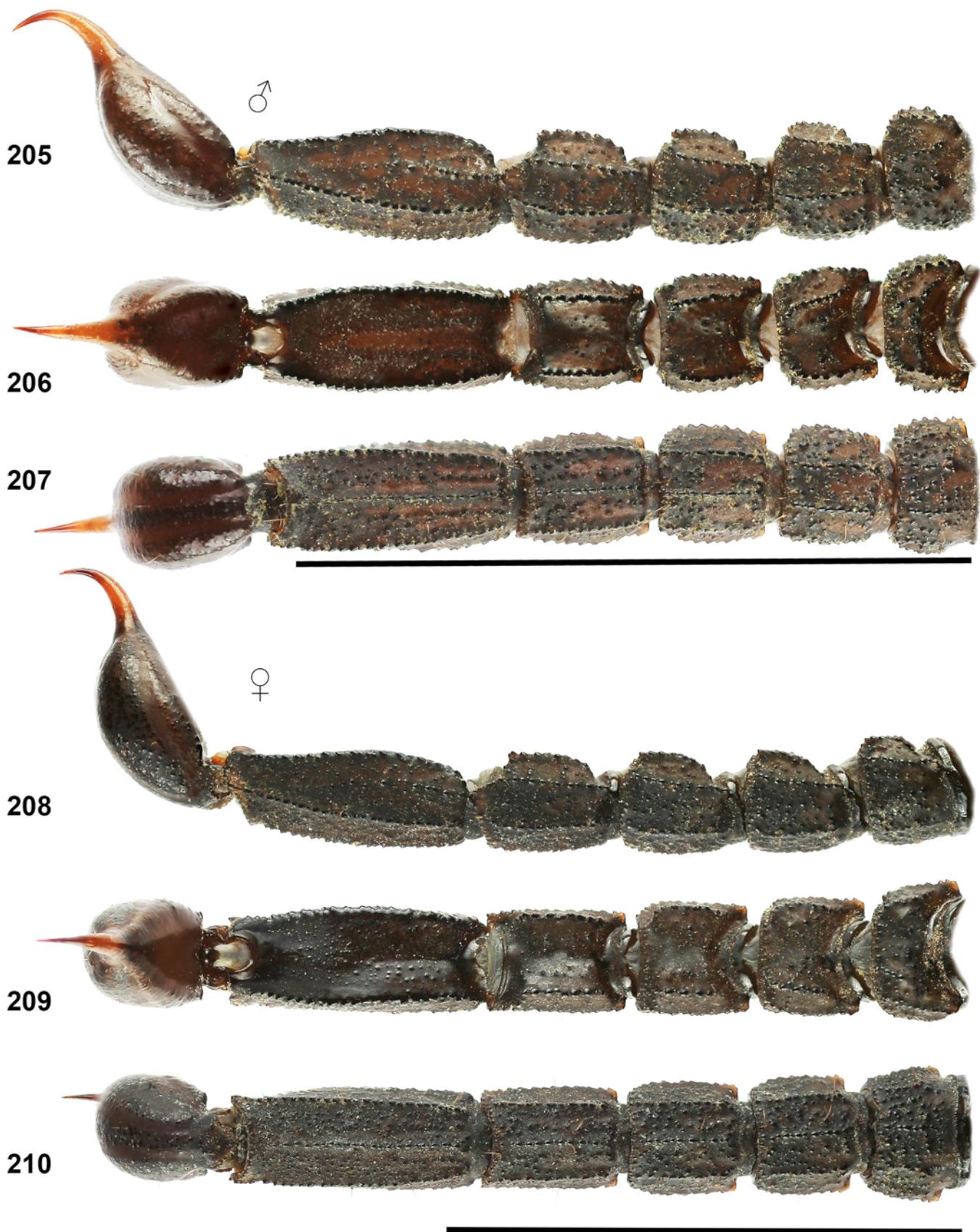
Figures 184–192: *Megacormus xichu*. **Figures 184–191.** Male, pedipalp chela dorsal (184), external (185) and ventral (186) views, patella dorsal (187), external (188) and ventral (189) views, femur and trochanter dorsal (190) and ventral (191) views. **Figure 192.** Female, movable finger dentition.



Figures 193–196. *Megacormus xichu*, female, pedipalp chela and patella dorsal (193), external (194) and ventral (195) views, and fixed finger dentition (196).



Figures 197–204: *Megacormus xichu*. **Figures 197, 199, 201–204.** Male, carapace and tergites I–III (197), coxosternal area and sternites (199), and left legs I–IV, retrolateral aspect (201–204). **Figures 198, 200.** Female, carapace and tergites I–III (198) and coxosternal area and sternite III (200).



Figures 205–210. *Megacormus xichu*. **Figures 205–207.** Male, metasoma and telson in lateral (205), dorsal (206) and ventral (207) views. **Figures 208–210.** Female, metasoma and telson in lateral (208), dorsal (209) and ventral (210) views. Scale bars: 10 mm.



Figures 211–212. *Megacormus xichu*, male (211) and female (212) *in vivo* habitus.



Figures 213–214. *Megacormus xichu*, locality, Mexico, Guanajuato, Xichú, Charco Azul, El Ocotero, ca 4 km NE of Xichú, oak forest, 21°18'54"N 100°06'38"W, 2283 m a. s. l.



Figure 215. *Megacormus frankei* sp. n., female paratype with newborn.