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

František Kovařík

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ASSOCIATE EDITOR: Michael E. Soleglad, ‘msoleglad@gmail.com’

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Publication date: 23 December 2019

Introduction

Our research team has been studying the European species of family Euscorpiidae for many years (see Štundlová et al., 2019; Kovařík 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


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)


**Type species.** Scorpio granosus Gervais, 1843

Diagnosis. Inner accessory and outer accessory denticles present on pedipalp chelal fingers. Movable finger dention 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 franckei 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 Potosi, Tamaulipas, and Veracruz).
Figures 1–2. *Megacormus franckei* sp. n., male holotype (1) and female paratype (2) in vivo habitus.
Kovařík: *Megacormus* Karsch, 1881

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Megacormus franckei* sp. n.*

(Figures 1–37, 47–49, 215, Table 1)


Type locality and type repository. Mexico, Queretáro, Pinal de Amoles, oak-pine forest, 21°08'004"N 99°39'988"W, 2,690 m a. s. l.; FKCP.

Type material. Mexico, Queretáro, 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* 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* 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.

<table>
<thead>
<tr>
<th>Dimensions (MM)</th>
<th>M. franckei sp. n. ♂ holotype</th>
<th>M. franckei sp. n. ♀ paratype</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carapace</td>
<td>L / W</td>
<td>4.61 / 4.62</td>
</tr>
<tr>
<td>Mesosoma</td>
<td>L</td>
<td>9.37</td>
</tr>
<tr>
<td>Tergite VII</td>
<td>L / W</td>
<td>1.73 / 3.88</td>
</tr>
<tr>
<td>Metasoma + telson</td>
<td>L</td>
<td>17.47</td>
</tr>
<tr>
<td>Segment I</td>
<td>L / W / D</td>
<td>1.56 / 2.23 / 2.05</td>
</tr>
<tr>
<td>Segment II</td>
<td>L / W / D</td>
<td>1.79 / 1.97 / 1.88</td>
</tr>
<tr>
<td>Segment III</td>
<td>L / W / D</td>
<td>1.87 / 1.80 / 1.83</td>
</tr>
<tr>
<td>Segment IV</td>
<td>L / W / D</td>
<td>2.39 / 1.67 / 1.72</td>
</tr>
<tr>
<td>Segment V</td>
<td>L / W / D</td>
<td>4.47 / 1.66 / 1.61</td>
</tr>
<tr>
<td>Telson</td>
<td>L / W / D</td>
<td>5.39 / 1.93 / 1.82</td>
</tr>
<tr>
<td>Pedipalp</td>
<td>L</td>
<td>14.39</td>
</tr>
<tr>
<td>Femur</td>
<td>L / W</td>
<td>3.39 / 1.45</td>
</tr>
<tr>
<td>Patella</td>
<td>L / W</td>
<td>3.75 / 1.82</td>
</tr>
<tr>
<td>Chela</td>
<td>L</td>
<td>7.25</td>
</tr>
<tr>
<td>Manus</td>
<td>W / D</td>
<td>2.67 / 2.33</td>
</tr>
<tr>
<td>Movable finger</td>
<td>L</td>
<td>3.88</td>
</tr>
<tr>
<td>Total</td>
<td>L</td>
<td>31.45</td>
</tr>
</tbody>
</table>

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).
Figures 3–6: *Megacormus franckei* 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 franckei* sp. n., female paratype, pedipalp chela and patella dorsal (16), external (17) and ventral (18) views, and fixed finger dentition (19).
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 28–29. *Megacormus franckei* sp. n., female paratype, left chelicera dorsal (28) and ventral (29) views.
Figures 30–35. *Megacormus franckei* 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.
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 est series, from 3 to 4 in et 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. grubssi Sissom, 1994
   – Metasoma V wider than telson. .............................................. M. gertschi Díaz 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. francki sp. n.
   – Metasoma V length/width ratio, 1.94–2.13 in males. .......
   .............................................. M. xichu González-Santillán et al., 2017

References


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 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.
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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).
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Figures 86–87. *Megacormus gertschi*, male (86) and female (87) in vivo habitus.
Figures 88–89. *Megacormus gertschi*, locality, Mexico, Hidalgo, Zacualtipan, pine forest, 20°40′407″N 98°40′079″W, 2117 m a. s. l.
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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 115–117. *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.
Kovařík: *Megacormus* Karsch, 1881

Figure 123. *Megacormus granosus*, locality, Mexico, Veracruz, Atotonilco, pine forest, 19°08'860"N 97°11'830"W, 2180 m a. s. l.
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.
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 211–212. *Megacormus xichu*, male (211) and female (212) in vivo habitus.
Figure 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 franckei* sp. n. female paratype with newborn.