Orthochirus katerinae sp. n. (Scorpiones: Buthidae) from Saudi Arabia

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Orthochirus katerinae sp. n. (Scorpiones: Buthidae) from Saudi Arabia

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Summary

We describe a new species Orthochirus katerinae sp. n. from Saudi Arabia, previously cited as Orthochirus innesi Simon 1910, ssp. ?, the name many years used as an ‘umbrella’ for various Orthochirus from North Africa and Arabia. The new species is described based on males characterized mainly by: total length 26–30 mm; pectinal teeth number 16–20; movable finger of pedipalps with 7–8 rows of denticles, 8–9 ID and 7 OD; tarsomere I of legs I–III with 3–5 long setae; ratio length/width of metasoma V 1.13–1.16; pedipalp femur length/width ratio 3.30–3.32.

Introduction

This contribution continues our research group’s broader study of the genus Orthochirus Karsch, 1892 (Buthidae), which traditionally included several apparently morphologically uniform species found in the large area from North Africa through the Middle East, Arabia, and Central Asia to India. During a recent study of scorpions of Saudi Arabia (October 2022) we identified a new species, described here.

Methods, Material & Abbreviations


Specimen Depositories: FKCP (František Kovařík, private collection, Prague, Czech Republic; will in future be merged with the collections of the National Museum of Natural History, Prague, Czech Republic).

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

Movable finger dentition: ID, inner denticles; OD, outer denticles.

Systematics

Family Buthidae C. L. Koch, 1837

Orthochirus Karsch, 1892

(Figures 1–27, Table 1)

http://zoobank.org/urn:lsid:zoobank.org:act:79D5A7E7-F14F-4D64-90ED-89BF47023562

Orthochirus Karsch, 1892: 306; Kovařík et al., 2020: 1–73, figs. 1–352, tables 1–4 (complete reference and synonyms list until 2020).


Orthochirus scrobiculosus (?) in part): Alqahtani et al., 2019: 23, fig. 3i.

Orthochirus sp. (?) in part): Alqahtani & Badry, 2021: 7, fig. 4.

Type locality and type depository. Saudi Arabia, Hajrah District, 5 km NW of At-Tinah, 20.1107947°N 40.8434278°E, 1400 m a. s. l.; FKCP.
Type material examined. **Saudi Arabia**, Hajrah District, 5
km NW of At-Tinah, 20.1107947°N 40.8434278°E, 1400 m
a. s. l., 24–25 October 2022, 12♂ (holotype and paratypes)
2♂ juveniles (paratypes) leg. F. Kovařík & P. Just.

Etymology. The specific epithet is a patronym honoring
Kateřina Rosová, a zoologist who assisted us during many
field trips, helped to collect the material and supported us in
our research.

Diagnosis (♂). Total length 26–30 mm in males.
Trichobothrium \( d_2 \) on dorsal surface of pedipalp femur
absent. Pectinal teeth number 16–20 in males. Movable
finger of pedipalps with 7–8 rows of denticles, 8–9 ID and
7 OD. Dorsal carinae on pedipalp patella developed and
smooth. Pedipalp femur granulated. Metasoma V dorsal
surface mesially finely granulated. Metasoma I–II with 10
carinae, metasoma III with 8 carinae, metasoma IV–V with 2
dorsolateral carinae; complete ventrolateral carinae present
also on metasoma V. Ventral carinae of metasoma I–III
consist of small granules irregularly in wide row. Metasoma
IV–V ventrally and laterally with fine punctuation developed,
spaces among punctae rather smooth in central part and partly
granulated mainly on margins; metasoma I–III ventrally and
laterally granulated and bumpy with punctuation reduced.
Tergites roughly to finely granulated. Sternite VII densely
granulated, with four irregularly granulated carinae present.
Pedipalp, metasoma and telson glabrous. Moderate to strong
tibial spurs present on legs III and IV. Tarsomere 1 of legs
I–III with 3–5 long setae. Ratio length/width of metasoma
V 1.13–1.16 in males. Pedipalp femur length/width ratio
3.30–3.32 in males.

Description. Total length of adult males 26–30 mm.
Measurements of the carapace, telson, segments of the
metasoma and segments of the pedipalps are given in Table 1.
For habitus, see Figures 1–3.

Coloration (Figs. 1–3). Carapace, tergites, and metasoma
black. Femur of pedipalps black and patella of pedipalps
black to reddish black, chela of pedipalps yellow. Femur of

![Figure 1. Orthochirus katerinae sp. n., paratype male in vivo habitus.](image-url)
legs black and patella of legs black to reddish black, other segments of legs yellowish brown. Sternites black with yellow median area in posterior margin of sternites IV–VI, mainly on sternite V. Telson black to reddish brown.

**Mesosoma and carapace** (Figs. 21–22). Mesosoma with a median reduced carina and is roughly to finely granulated. Carapace without carinae, roughly granulated except smooth interocular area. Seventh sternite densely granulated and with four irregularly granulated carinae, the other sternites densely granulated but smooth in middle and posteriorly. Pectinal teeth number 16–20 (4 x 16, 5 x 17, 10 x 18, 4 x 19, 1 x 20) in males.

**Metasoma and telson** (Figs. 15–20). Metasoma I–II with 10 granulated carinae. Metasoma III lacks lateral and metasoma IV lacks lateral and ventromedian carinae. Ventrolateral carinae are developed on metasoma I–III, V and indicated on metasoma IV, dorsolateral carinae are present on all metasomal segments. Ventral carinae of metasoma I–III consist of small granules irregularly in wide row. Metasoma I–IV and partly metasoma V are granulated laterally, metasoma III–V laterally punctate; granulation present on dorsal surfaces of metasoma I and V and absent on metasoma II–IV except several solitary granules mainly on metasoma II. Fine punctuation on metasoma IV–V ventrally developed, spaces among punctae rather smooth in central part and partly granulated mainly on margins. Entire metasoma and telson glabrous. Telson without punctuation and granulation.

**Pedipalps** (Figs. 4–14). Trichobothrium $d_2$ on dorsal surface of pedipalp femur absent; trichobothrium $e_1$ is situated at level with $d_1$. Femur of pedipalps with five granulated carinae and is granulated. Patella has seven smooth carinae, and the chela has smooth carinae which may be discernible throughout the length of the fixed finger. The entire pedipalps are glabrous, with several short setae only. Movable fingers with 7–8 rows of denticles, 8–9 ID and 7 OD.

**Legs** (Figs. 23–26). Moderate to strong tibial spurs present on legs III and IV. Femur with four partly granulated carinae; patella with five rather smooth carinae; tibia smooth. Patella with only a few setae. Tibia with several short setae. Tarsomere I of legs I–III with 3–5 long setae, legs IV without these setae. Tarsomeres I–II of all legs internal with two rather irregular rows of setae.

**Measurements.** See Table 1.

**Affinities.** The described features distinguish *O. katerinae* sp. n. from all other species of the genus. Vachon (1979, fig. 36) cited several widely spread populations from Saudi Arabia as “*Orthochirus innesi* Simon 1910, ssp. ?” but did not further pursue their taxonomy. In reality, the type locality of *O. innesi* is in Egypt (Djebel Mokattam). Vachon probably assumed similarity with *O. innesi negebensis* Shulov & Amitai, 1960 described from Israel (Wadi Nafha, Central Negev), which is currently considered as valid species, *Orthochirus negebensis* (see, e.g., Lourenço, 2007: 477). Validity of *O. katerinae* sp. n. is confirmed also by our DNA analysis (paper in preparation), which identified these taxa as related but separate species. Morphologically, *O. katerinae* sp. n., based on the males, is characterized mainly by the total length of 26–30 mm; pectinal teeth number 16–20; movable finger of pedipalps with 7–8 rows of denticles, 8–9 ID and 7 OD; tarsomere I of

### Table 1. Comparative measurements of *Orthochirus katerinae* sp. n. male holotype. Abbreviations: length (L), width (W, in carapace it corresponds to posterior width), depth (D).

<table>
<thead>
<tr>
<th>Dimensions (MM)</th>
<th>Orthochirus katerinae sp. n.</th>
<th>♂ holotype</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carapace L / W</td>
<td>3.30 / 3.70</td>
<td>3.30 / 3.70</td>
</tr>
<tr>
<td>Mesosoma L</td>
<td>7.78</td>
<td>7.78</td>
</tr>
<tr>
<td>Tergite VII L / W</td>
<td>1.91 / 3.88</td>
<td>1.91 / 3.88</td>
</tr>
<tr>
<td>Metasoma + telson L</td>
<td>17.31</td>
<td>17.31</td>
</tr>
<tr>
<td>Segment I L / W / D</td>
<td>2.06 / 2.87 / 2.19</td>
<td>2.06 / 2.87 / 2.19</td>
</tr>
<tr>
<td>Segment II L / W / D</td>
<td>2.38 / 3.04 / 2.35</td>
<td>2.38 / 3.04 / 2.35</td>
</tr>
<tr>
<td>Segment III L / W / D</td>
<td>2.80 / 3.24 / 2.55</td>
<td>2.80 / 3.24 / 2.55</td>
</tr>
<tr>
<td>Segment IV L / W / D</td>
<td>3.75 / 3.35 / 2.77</td>
<td>3.75 / 3.35 / 2.77</td>
</tr>
<tr>
<td>Segment V L / W / D</td>
<td>3.77 / 3.29 / 2.62</td>
<td>3.77 / 3.29 / 2.62</td>
</tr>
<tr>
<td>Telson L / W / D</td>
<td>2.55 / 1.26 / 0.95</td>
<td>2.55 / 1.26 / 0.95</td>
</tr>
<tr>
<td>Pedipalp L</td>
<td>9.54</td>
<td>9.54</td>
</tr>
<tr>
<td>Femur L / W</td>
<td>2.41 / 0.73</td>
<td>2.41 / 0.73</td>
</tr>
<tr>
<td>Patella L / W</td>
<td>2.97 / 1.01</td>
<td>2.97 / 1.01</td>
</tr>
<tr>
<td>Chela L</td>
<td>4.16</td>
<td>4.16</td>
</tr>
<tr>
<td>Manus W / D</td>
<td>0.74 / 0.78</td>
<td>0.74 / 0.78</td>
</tr>
<tr>
<td>Movable finger L</td>
<td>2.81</td>
<td>2.81</td>
</tr>
<tr>
<td><strong>Total L</strong></td>
<td><strong>28.39</strong></td>
<td><strong>28.39</strong></td>
</tr>
</tbody>
</table>
Figures 2–3. *Orthochirus katerinae* sp. n., holotype male, dorsal (2) and ventral (3) views. Scale bar: 10 mm.
Figures 4–17: Orthochirus katerinae sp. n., holotype male. Figures 4–14. Segments of pedipalps. Pedipalp chela, dorsal (4), external (5), and ventral (6) views. Pedipalp patella, dorsal (7), external (8), and ventral (9) views. Pedipalp femur and trochanter, internal (10), dorsal (11), and ventral (12) views. Pedipalp chela, movable (13) and fixed (14) fingers dentate margins. The trichobothrial pattern is indicated in Figures 5–8, 10–11 (white circles). Figures 15–17. Metasoma and telson, lateral (15), dorsal (16) and ventral (17). Scale bar: 10 mm (15–17).
Figures 18–20: *Orthochirus katerinae* sp. n., holotype male. **Figure 18.** Telson lateral. **Figure 19.** Metasoma IV–V and telson in lateral view. **Figure 20.** Metasoma I–III in dorsal view.
legs I–III with 3–5 long setae; ratio length/width of metasoma V 1.13–1.16; pedipalp femur length/width ratio 3.30–3.32 and granulation present on dorsal surfaces of metasoma I and V and absent on metasoma II–IV except several solitary granules mainly on metasoma II.

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References


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Figure 27. Type locality of Orthochirus katerinae sp. n.


