Euscorpius

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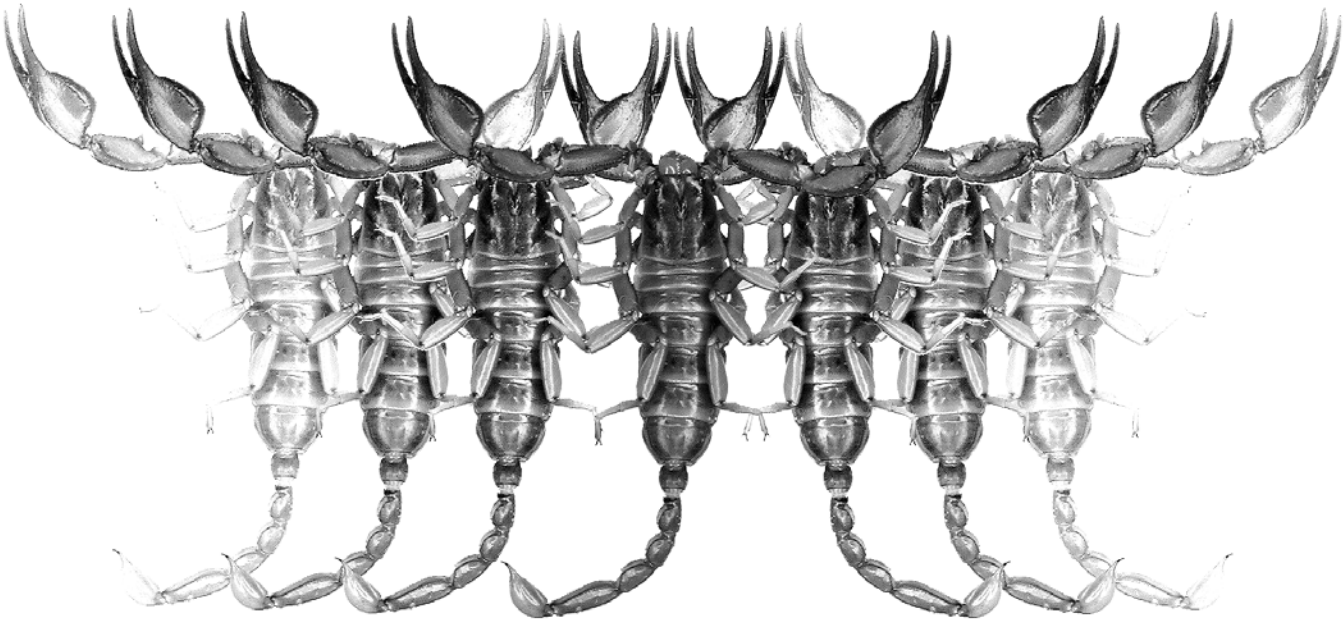

Revision and Taxonomic Position of Genera *Afghanorthochirus* Lourenço & Vachon, *Baloorthochirus* Kovařík, *Butheolus* Simon, *Nanobuthus* Pocock, *Orthochiroides* Kovařík, *Pakistanorthochirus* Lourenço, and Asian *Orthochirus* Karsch, with Descriptions of Twelve New Species (Scorpiones, Buthidae)

František Kovařík

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Euscorpius

Occasional Publications in Scorpiology

EDITOR: **Victor Fet**, Marshall University, **'fet@marshall.edu'**

ASSOCIATE EDITOR: **Michael E. Soleglad, 'soleglad@la.znet.com'**

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- **ZISP**, Zoological Institute, Russian Academy of Sciences, St. Petersburg, Russia
- **WAM**, Western Australian Museum, Perth, Australia
- **NTNU**, Norwegian University of Science and Technology, Trondheim, Norway

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Revision and taxonomic position of genera *Afghanorthochirus* Lourenço & Vachon, *Baloorthochirus* Kovařík, *Butheolus* Simon, *Nanobuthus* Pocock, *Orthochiroides* Kovařík, *Pakistanorthochirus* Lourenço, and Asian *Orthochirus* Karsch, with descriptions of twelve new species (Scorpiones, Buthidae)

František Kovařík[1]

[1]P.O. Box 27, CZ-145 01 Praha 45, Czech Republic

Summary

The genera *Baloorthochirus*, *Butheolus, Orthochiroides*, *Pakistanorthochirus*, and Asian species of the genus *Orthochirus* are revised and keys are presented to all species of *Butheolus* and *Orthochiroides*, Asian species of *Orthochirus*, and to species of all related genera. *Afghanorthochirus* Lourenço & Vachon, 1997 is synonymized with *Orthochirus* Karsch, 1892; *Nanobuthus* Pocock, 1895 is synonymized with *Butheolus* Simon, 1882; and *Pakistanorthochirus* Lourenço, 1997 is synonymized with *Baloorthochirus* Kovařík, 1996. *Orthochiroides socotrensis* **sp. n**. from Socotra Island and eleven new species of *Orthochirus* are described: *O. afghanus* **sp. n.,** *O. heratensis* **sp. n**., *O. jalalabadensis* **sp. n**. and *O. samrchelsis* **sp. n**. from Afghanistan; *O. iranus* **sp. n**., *O. sobotniki* **sp. n**., *O. varius* **sp. n**. and *O. zagrosensis* **sp. n**. from Iran; *O. iraqus* **sp. n.** from Iraq; *O. gromovi* **sp. n.** from Turkmenistan; and *O. feti* **sp. n.** from Uzbekistan. *Orthochirus luteipes* Roewer, 1943 is synonymized with *Orthochirus flavescens* (Pocock, 1897); *Pakistanorthochirus weitschati* Lourenço, 1997 is synonymized with *Baloorthochirus becvari* Kovařík, 1996; and *Butheolus insularis* Pocock, 1899 is moved to the genus *Orthochiroides*. Lectotypes are designated for *Orthochirus bicolor* (Pocock, 1897) and *Orthochirus pallidus* (Pocock, 1897). *Baloorthochirus becvari* Kovařík, 1996 is for the first time recorded from India; *Orthochirus fuscipes* (Pocock, 1900), from Iran and India; and *Orthochiroides vachoni* Kovařík, 1998, from Socotra Island. *Orthochirus krishnai* Tikader & Bastawade, 1983 from India is considered a *nomen dubium*.

Introduction

The genus *Orthochirus* has not been revised for many years, although most authors (recently, Fet & Lowe, 2000: 193) consider it complex and in need of a revision. The situation has often been oversimplified by labeling African populations as *O. innesi* and those from Asia as *O. scrobiculosus*. Levy & Amitai (1980) pointed out that *O. scrobiculosus* seems to have many local forms. In 1991, I examined a remarkable collection from Afghanistan housed at the MMBC. At that time, I tentatively labeled the material as *O. scrobiculosus*, but some of the specimens did not quite fit the description of that species and I had to conclude that a thorough revision of the collection will be necessary (Kovařík, 1993: 202–203). Since then, I assembled more material of *Orthochirus*, primarily from Iran, and recognized some of it as *Orthochirus* sp. n.? (Kovařík, 1997: 47–48) that differs from *O. scrobiculosus* by the presence of external granules on the movable fingers of pedipalp chela. Most recently, I was able to examine the pertinent types and to define characters which permit recognition of the Asian species.

ABBREVIATIONS. The institutional abbreviations listed below and used throughout are mostly after Arnett et al. (1993).

AVGC – Alexander V. Gromov Collection, Almaty, Kazakhstan;
BMNH – The Natural History Museum, London, United Kingdom;
CASC – California Academy of Sciences, San Francisco, California, USA;

FKCP – František Kovařík Collection, Praha, Czech Republic;
JFCP – Jan Farkač Collection, Praha, Czech Republic;
MCSN – Museo Civico de Storia Naturale "Giacomo Doria", Genua, Italy;
MMBC – Moravian Museum, Brno, Czech Republic;
MNHN – Muséum National d´Histoire Naturelle, Paris, France;
MZUF – Museo Zoologico de "La Specola", Firenze, Italy;
NMPC – National Museum (Natural History), Praha, Czech Republic;
NZSI – National Collection, Zoological Survey of India, Calcutta, India;
RTOC – Rolando Teruel Ochoa Collection, Santiago de Cuba, Cuba;
SMFD – Forschungsinstitut und Naturmuseum Senckenberg, Frankfurt am Main, Germany;
SOFM – National Museum of Natural History, Sofia, Bulgaria;
UWCP – Wroclaw University, Wroclaw (formerly Breslau), Poland;
ZISP – Zoological Institute, Russian Academy of Sciences, St. Petersburg, Russia;
ZMHB – Museum für Naturkunde der Humboldt-Universität zu Berlin, Germany;
ZMUH – Zoologisches Institut und Zoologisches Museum, Universität Hamburg, Germany.

Other abbreviations are: ♂: male; ♀: female; A: specimens preserved in alcohol; E: specimens mounted dry; im.: immature; juv.: juvenile.

Baloorthochirus Kovařík, 1996

Baloorthochirus Kovařík, 1996: 177; Kovařík, 1998: 117; Fet & Lowe, 2000: 80.
= *Pakistanorthochirus* Lourenço, 1997: 154 TS: *Pakistanorthochirus weitschati* Lourenço, 1997 = *Baloorthochirus becvari* Kovařík, 1996 **syn. n.**; Fet & Lowe, 2000: 199; Lourenço, 2001: 176. **Syn. n.**
Pakistanoorthochirus [sic]: Kovařík, 1998: 117.
TYPE SPECIES. *Baloorthochirus becvari* Kovařík, 1996

DIAGNOSIS: Patella of pedipalp without ventral trichobothria. Dorsal trichobothria of femur arranged in beta-configuration. Trichobothrium d_2 of pedipalp femur absent on dorsal surface. Tibial spurs present on third and fourth legs. Pectines with fulcra. Movable fingers of pedipalps with 8 or 9 rows of granules. Carapace, in lateral view, distinctly inclined downward from median eyes to anterior margin. Tarsomere I of first to third legs with bristlecombs. First to fourth metasomal segments with carinae. Fourth and fifth metasomal segments ventrally granulate, fifth metasomal segment may be partly punctate and granulated less conspicuously. Telson elongated, aculeus as long or longer than vesicle. Total length under 30 mm. Color uniformly yellow.

Baloorthochirus becvari Kovařík, 1996

Baloorthochirus becvari Kovařík, 1996: 178; Fet & Lowe, 2000: 80.
= *Pakistanorthochirus weitschati* Lourenço, 1997: 154; Kovařík, 1998: 116; Fet & Lowe, 2000: 200. **Syn. n.**

TYPE LOCALITY AND TYPE REPOSITORY. Pakistan, SE Balochistan, Khurkhra, 38 km S Uthal; FKCP.
TYPE MATERIAL EXAMINED. **Pakistan**, SE Balochistan, Khurkhra, 38 km S Uthal, 24.IV.1993, 1♂E (holotype), leg. S. Bečvář; Region of Karachi, 1953, 1♀A (holotype of *Pakistanorthochirus weitschati*), collector unknown, ZMUH.
OTHER MATERIAL EXAMINED. **India**, Barmer, Thar Desert, VIII.1955, leg. P.S. Nachar, 2♂1juv.A, CASC, 1♂A, FKCP. **Pakistan**, Dadu Dist., 6 mi S Sehwan, 12.VI.1959, 1♀A, leg. S. A. Minton under rubbish, FKCP.

DIAGNOSIS: Monotypic genus, see generic diagnosis.

COMMENTS. This species was based on a unique holotype, and only examination of more recently collected specimens has revealed variation in the number of rows of granules on the movable fingers of pedipalps (7–9 rows) and in the number of pectinal teeth (19–21 in males, 16–17 in females). Specimens with less conspicuously granulated metasomal segments have a well apparent medial ventral carina on the fifth segment and two parallel ventral carinae on the fourth segment. The fifth segment may also bear punctae, which, however, are not as well developed as in *Orthochirus*. Variable granulation of metasomal segments cannot be considered a species character, because at the same locality (India, Barmer) one male has the fifth segment nearly smooth whereas in another male it is strongly granulate, similarly to the holotype and also one female from Pakistan. Another female from Pakistan (the holotype of *Pakistanorthochirus weitschati*) has the metasomal segments less granulate, similarly to a male from India. Stable appear to be the four lateral eyes of each side, as in *Butheolus*, however the fourth eye is minute and out of line, and may possibly be overlooked.

DISTRIBUTION. India (first record), Pakistan (Kovařík, 1996: 178).

Butheolus Simon, 1882

Butheolus Simon, 1882: 248; Karsch, 1886: 76; Werner, 1934: 270; Vachon, 1980: 253; Sissom, 1990: 101;

Kovařík, 1996: 177; Kovařík, 1998: 117; Fet & Lowe, 2000: 88; Lourenço, 2001: 176, 179.
Butheolus (in part): Kraepelin, 1899: 34; Kraepelin, 1903: 564.
= *Nanobuthus* Pocock, 1895: 314, TS: *Nanobuthus andersoni* Pocock, 1895 = *Butheolus andersoni* (Pocock, 1895), **comb. n.**; Kraepelin, 1899: 38; Kraepelin, 1903: 564; Kraepelin, 1905: 337; Werner, 1934: 270; Perez, 1974: 27; Fet & Lowe, 2000: 186; Lourenço, 2001: 179. **Syn. n.**
Butheolus (*Nanobuthus*): Vachon, 1975: 1598.
= *Neobuthus* Hirst, 1911: 462; Werner, 1934: 270; Fet & Lowe, 2000: 186; Lourenço, 2001: 179 (syn. by Kovařík, 2003: 137).
Butheolus (*Neobuthus*): Vachon, 1975: 1598.
TYPE SPECIES: *Butheolus thalassinus* Simon, 1882.

DIAGNOSIS: Patella of pedipalp without ventral trichobothria. Dorsal trichobothria of femur arranged in beta-configuration. Trichobothrium d_2 of pedipalp femur present on dorsal surface but often smaller than other trichobothria. Tibial spurs present on third and fourth legs. Pectines with fulcra and densely hirsute. Movable fingers of pedipalps with 6–10 rows of granules and 3–5 distal granules. Carapace, in lateral view, distinctly inclined downward from median eyes to anterior margin. Mesosoma with three carinae, of which two may be less conspicuous. Metasomal segments ventrally smooth or granulated. Telson bulbous, aculeus shorter or as long as vesicle. Total length under 60 mm.

COMMENTS. Although the genus *Nanobuthus* is accepted in recent papers (Lourenço, 2001: 179; Kovařík, 2003: 142) as valid, after examination of most species of *Butheolus* and related genera I come to the conclusion that *Nanobuthus andersoni* Pocock, 1895 does not differ enough, namely from the similar *Butheolus anthracinus* (Pocock, 1895), to warrant placement in a separate genus. Opinions on what characters should be regarded as generic vary. In the species concerned the primary difference is in the width of the metasoma; however, this character cannot be deemed generic, as is clear from examples of other genera (*Babycurus*, *Uroplectes*, *Hottentotta*, *Parabuthus*, and others).

Butheolus andersoni (Pocock, 1895) **comb. n.**

Nanobuthus andersoni Pocock, 1895: 314; Kraepelin, 1899: 38; Pocock, 1900: 55; Kraepelin, 1903: 564; Werner, 1911: 186; Birula, 1917: 215; King, 1925: 80; Werner, 1934: 270; Moriggi, 1941: 91; Weidner, 1959: 99; Probst, 1973: 329; Pérez Minnocci, 1974: 27; Fet & Lowe, 2000: 186; Lourenço, 2001: 178; Kovařík, 2003: 142.
Nanobuthus andersonii: Lamoral & Reynders, 1975: 513.
Butheolus (Nanobuthus) andersonii: El-Hennawy, 1992: 115.
Butheolus (Nanobuthus) andersoni: Kovařík, 1998: 105.

TYPE LOCALITY AND TYPE REPOSITORY. Sudan, Duroor, 60 miles N of Suakin; BMNH.
TYPE MATERIAL EXAMINED. **Sudan**, Duroor, 60 miles N of Suakin, 1♀A (holotype), BMNH No. 1894.11.2.39.

DIAGNOSIS: First to fourth metasomal segments ventrally with two median carinae and granulated. Fifth metasomal segment ventrally with median carina and granulated. Metasoma very thin. Length to width ratio of fourth metasomal segment higher than 1.6. Movable fingers bear 6 rows of granules, usually with internal and external granules. Chela of pedipalp dorsally smooth, without strong carinae.

DISTRIBUTION. Sudan (Pocock, 1895: 315). Birula (1917: 215) listed this species for Somalia without any precise data. Since its taxonomic position is questionable and it can be easily confused with other species, namely of the genus *Butheolus*, I consider its occurrence unproven also in Djibouti (Moriggi, 1941: 91).

Butheolus anthracinus (Pocock, 1895)

Buthus anthracinus Pocock, 1895: 294; Kraepelin, 1899: 18; Táborský, 1934: 40; Weidner, 1959: 99; Pérez Minnocci, 1974: 43; Lamoral & Reynders, 1975: 504; Sissom, 1994: 36.
Buthus (? *Hottentotta*) *anthracinus*: Birula, 1917: 230.
Buthus (? *Hottentotta*) *antracinus*: Birula, 1937: 101.
Butheolus anthracinus: Fet & Lowe, 2000: 88.

TYPE LOCALITY AND TYPE REPOSITORY. Hadramaut, Yemen; ZMUH.
TYPE MATERIAL EXAMINED. **Yemen**, Hadramaut, 1♀A (lectotype hereby designated), ZMUH.

DIAGNOSIS: First to fourth metasomal segments ventrally with two median carinae. Fifth metasomal segments ventrally with median carina and several granules. Metasoma and mesosoma black, legs and pedipalps mostly yellow to yellowish green. Movable fingers bear 9 or 10 rows of granules that have internal and external granules. Chela of pedipalp dorsally smooth, without strong carinae. Tarsomere I of first to third legs with bristlecombs, tarsomere I of fourth legs without bristlecombs.

COMMENTS. The lectotype is being designated in order to stabilize the nomenclature. Fet & Lowe (2000: 88) listed 5 syntypes at BMNH and one paratype at ZMUH, but no specimens have been found at BMNH. Therefore,

I designate as the lectotype one specimen deposited at ZMUH.

DISTRIBUTION. Yemen (Pocock, 1895: 295).

Butheolus ferrugineus Kraepelin, 1898

Butheolus ferrugineus Kraepelin, 1898: 43; Kraepelin, 1899: 37; Kraepelin, 1901: 267; Weidner, 1959: 99; Pérez Minnocci, 1974: 20; Vachon, 1980: 255; Kovařík, 1998: 105; Fet & Lowe, 2000: 88; Lourenço, 2001: 177; Kovařík, 2003: 137.
= *Neobuthus berberensis* Hirst, 1911: 462; Borelli, 1919: 365; Borelli, 1931: 219; Werner, 1934: 270; Moriggi, 1941: 90; Caporiacco, 1947: 232; Probst, 1973: 329; Lamoral & Reynders, 1975: 513; Fet & Lowe, 2000: 186; Lourenço, 2001: 178, 179 (syn. by Kovařík, 2003: 137).
Butheolus (Neobuthus) berberensis: El-Hennawy, 1992: 115; Kovařík, 1998: 105.

TYPE LOCALITY AND TYPE REPOSITORY. Tadjura Bay, Golf of Aden, Djibouti; ZMUH.
TYPE MATERIAL EXAMINED. **Djibouti**, Gulf of Aden, Tadjura Bay, 1♂A (holotype), ZMUH. **Somalia**, Berbera, 1♀A (holotype of *Neobuthus berberensis* Hirst, 1911), BMNH No. 1906.3.25.125, purchased G. W. Bury.
OTHER MATERIAL EXAMINED. **Somalia**, Chisimaio, VI. 1980, 1♀E, leg. Dorsak, FKCP.

DIAGNOSIS: First to fourth metasomal segments ventrally with two median carinae and more or less granulated. Fifth metasomal segment ventrally with median carina and granulated. Metasoma, mesosoma, legs and pedipalps yellow. Movable fingers bear 6 to 8 rows of granules that have internal and external granules. Chela of pedipalp dorsally smooth, without strong carinae. Tarsomere I of first to third legs with bristlecombs, tarsomere I of fourth legs without bristlecombs.

DISTRIBUTION. Djibouti (Kraepelin, 1898: 43), Somalia (Hirst, 1911: 464). Since its taxonomic position is questionable and it can be easily confused with other species, namely of the genus *Butheolus*, I consider its occurrence unproven also in Eritrea (Borelli, 1931: 219).

Butheolus gallagheri Vachon, 1980

Butheolus gallagheri Vachon, 1980: 253; Vachon & Kinzelbach, 1987: 100; Fet & Lowe, 2000: 88; Kovařík, 2003: 137.
Butheolus (Butheolus) gallagheri: El-Hennawy, 1992: 114; Kovařík, 1998: 105.

TYPE LOCALITY AND TYPE REPOSITORY. Wadi Rabkut, Jabal Samhan, Dhofar, Oman; MNHN.
MATERIAL EXAMINED. **Oman**, main road above Khor Rori Beach, 17°03.22'N 54°25.33'E, 50m, 18.X.1993, 21:24, 1♂1♀E, UV detection, densely vegetated wadi, on ground, leg. G. Lowe, FKCP.

DIAGNOSIS: First to fourth metasomal segments ventrally with two median carinae (on fourth segment may be less developed) and densely granulated. Fifth metasomal segment ventrally without carina and densely granulated. Metasoma and mesosoma black or gray, legs and pedipalps yellow to olivaceous. Movable fingers bear 6 to 7 rows of granules that have internal and external granules. Chela of pedipalp dorsally smooth, without strong carinae. Tarsomere I of first to third legs with bristlecombs usually composed of less than 8 bristles, tarsomere I of fourth legs without bristlecombs.

DISTRIBUTION. Oman (Vachon, 1980: 253)

Butheolus thalassinus Simon, 1882

Butheolus thalassinus Simon, 1882: 248; Simon, 1889a: 122; Simon, 1890: 122; Pocock, 1895: 316; Laurie, 1896: 122; Kraepelin, 1899: 37; Kraepelin, 1903: 565; Birula, 1910: 171; Borelli, 1915: 461; Birula, 1917: 215; Roewer, 1943: 208; Vachon, 1966: 210; Vachon, 1980: 255; Sissom, 1994: 7; Fet & Lowe, 2000: 89; Lourenço, 2001: 171.
Butheolus talassinus: Birula, 1937: 101.
Butheolus talassimus: Pérez Minnocci, 1974: 20.
Butheolus (Butheolus) thalassinus: El-Hennawy, 1992: 114; Kovařík, 1998: 105.

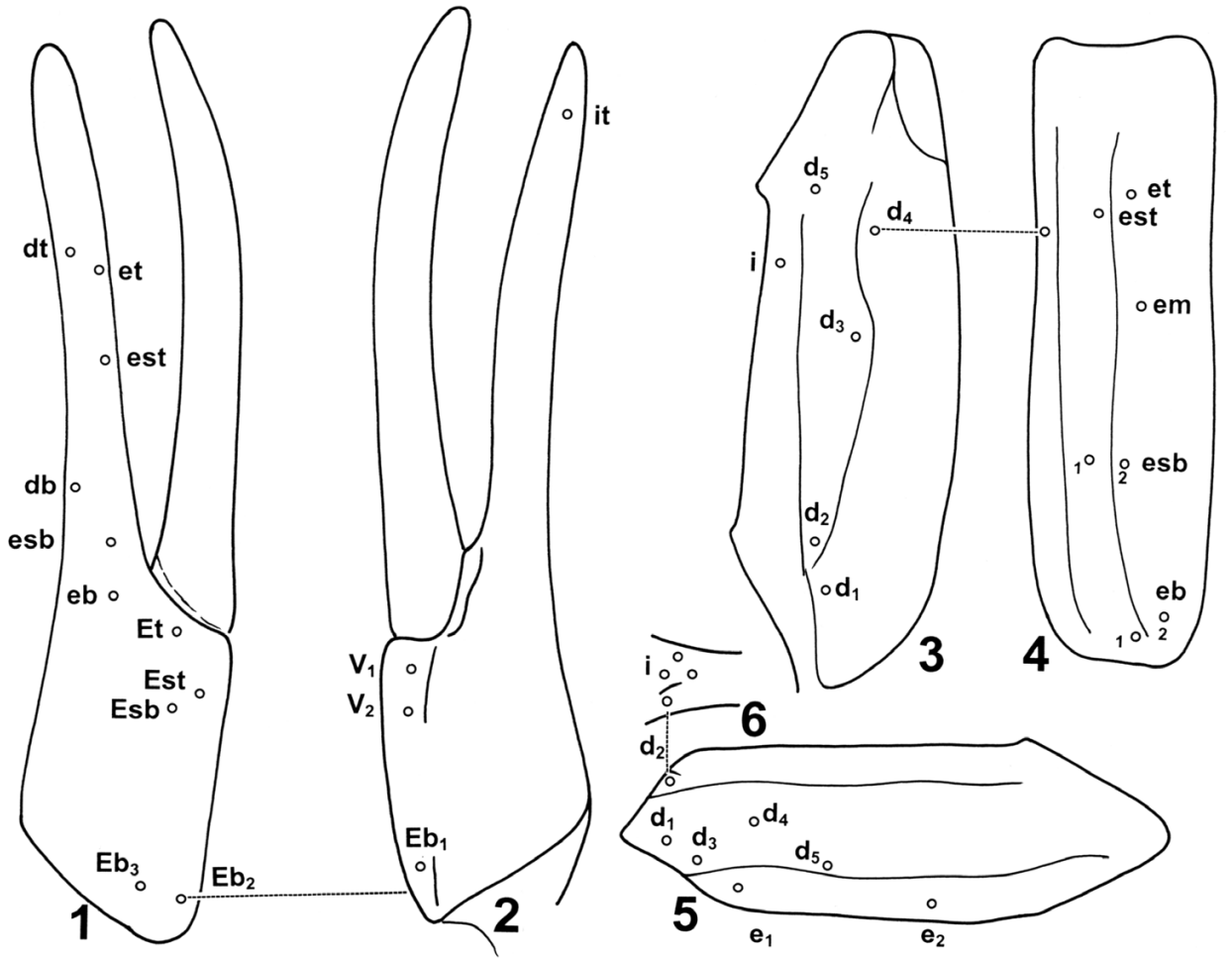
TYPE LOCALITY AND TYPE REPOSITORY. Aden, Yemen; MCSN.

COMMENTS. I have not been able to see any specimens of this species. A redescription including diagnosis was published by Sissom (1994: 7–8).

DISTRIBUTION. Yemen (Simon, 1882: 249; Sissom, 1994: 8)

Orthochirus Karsch, 1892
(Figs. 1–8, Table 1)

Orthochirus Karsch, 1892: 306; Kraepelin, 1895: 84; Birula, 1898: 280; Simon, 1910: 77; Werner, 1934: 270; Roewer, 1943: 208; Vachon, 1959: 166; Vachon, 1974: 910, 936; Tikader & Bastawade, 1983: 113; Fet, 1989: 112; Sissom, 1990: 102; Lourenço & Vachon, 1995: 298; Kovařík, 1996: 177; Lourenço & Vachon, 1997: 328; Kovařík, 1998: 117; Fet & Lowe, 2000: 193; Lourenço, 2001: 176; Fet et al., 2003: 69.



Figures 1–6: *Orthochirus afghanus* sp. n., female paratype. In Figs. **1** and **2** the first capital letters denote trichobothria situated on the manus, and the first lower-case letters denote those situated on the fixed finger of pedipalp. Figs. **3** and **4** show the distribution of trichobothria on the patella of pedipalp. Figs. **5** and **6** show the distribution of trichobothria on the femur of pedipalp.Explanations: First letters: *D*, dorsal, *E*, external, *I*, internal, *V*, ventral. Second or second plus third letters: *b*, basal, *sb*, suprabasal, *m*, medial, *st*, subterminal, *t*, terminal, *v*, ventral. Numerals distinguish individual trichobothria of the same classification. Designation and description of trichobothria according to Vachon (1974). Morphological terminology according to Stahnke (1970).

= *Orthodactylus* Karsch, 1881: 90, a junior homonym of *Orthodactylus* Hitchcock, 1858 (Reptilia), TS: *Orthodactylus olivaceus* Karsch, 1881 = *Orthochirus scrobiculosus* (Grube, 1873); Kraepelin, 1891: 73; Pocock, 1889: 117 (syn. by Kraepelin, 1895: 84).

Butheolus: Simon, 1889b: 386; Pocock, 1890: 121 (in part); Pocock, 1897: 108; Kraepelin, 1899: 34 (in part); Pocock, 1900: 28; Kraepelin, 1913: 131.

= *Afghanorthochirus* Lourenço & Vachon, 1997: 330, TS: *Afghanorthochirus erardi* Lourenço & Vachon, 1997 = *Orthochirus erardi* (Lourenço & Vachon, 1997) **comb. n.**; Kovařík, 1998: 120; Lourenço, 2001: 176. **Syn. n.**

TYPE SPECIES: *Orthodactylus olivaceus* Karsch, 1881 = *Orthochirus scrobiculosus* (Grube, 1873).

DIAGNOSIS: Patella of pedipalp without ventral trichobothria. Dorsal trichobothria of femur arranged in beta-configuration. Trichobothrium d_2 of pedipalp femur absent on dorsal surface. Tibial spurs present on third and fourth legs. Pectines with fulcra and densely hirsute. Movable fingers of pedipalps with 7–10 rows of granules and 2–5 distal granules. Carapace, in lateral view, distinctly inclined downward from median eyes to anterior margin. First and second metasomal segments with carinae. Fourth and fifth metasomal segment ventrally punctate. Telson elongate, aculeus as long or longer than vesicle. Total length under 60 mm.

COMMENTS. The genus was originally described as *Orthodactylus* Karsch, 1881. In 1892 Karsch discovered that the name was a homonym of *Orthodactylus*

Hitchcock, 1858 (Reptilia) and proposed *Orthochirus* as nomen novum. In due time this genus received several species from the genus *Butheolus* Simon, 1882, from which were also separated the genera *Nanobuthus* Pocock, 1895 and *Neobuthus* Hirst, 1911. Several related new genera followed, namely *Afghanorthochirus* Lourenço & Vachon, 1997; *Baloorthochirus* Kovařík, 1996; *Orthochiroides* Kovařík, 1998; *Pakistan-orthochirus* Lourenço, 1997; and *Paraorthochirus* Lourenço & Vachon, 1997. Some of these genera have already been synonymized. A key facilitating recognition of those deemed valid is presented further below in this paper.

Lourenço & Vachon (1997: 327) proposed *Afghanorthochirus* (with the type species *Afghanorthochirus erardi* Lourenço & Vachon, 1997) on the basis of presence and number of granules on the movable finger. As an example of *Orthochirus* they used a quite atypical specimen from the *Orthochirus innesi* group (fig. 1a in Lourenço & Vachon, 1997: 329), without either external or internal granules, and characterized the new genus by their fig. 1c (Lourenço & Vachon, 1997: 329), which includes external as well as internal granules and three distal granules. Most of the *Orthochirus innesi* group specimens that I have seen do possess external and internal granules. In the Asian species internal granules are present without exception, and only four species (*Orthochirus feti* **sp. n.**, *O. gromovi* **sp. n.**, *O. heratensis* **sp. n.**, and *O. scrobiculosus* (Grube, 1873)) lack external granules. The number of distal granules is of little value on the species level and entirely useless on the generic level. I have seen several dozen of *Orthochirus innesi* group specimens with three to five distal granules. In Asian species the number of distal granules ranges between three and five (see discussion below).

The above discussed characters cause me to conclude that *Afghanorthochirus* Lourenço & Vachon, 1997 is a synonym of *Orthochirus*, in which thus belong the species *Orthochirus danielleae* (Lourenço & Vachon, 1997) **comb. n.**, *Orthochirus erardi* (Lourenço & Vachon, 1997) **comb. n.,** and *Orthochirus monodi* (Lourenço & Vachon, 1997) **comb. n.**

Orthochirus afghanus sp. n.
(Figs. 1–7, Table 1)

Orthochirus scrobiculosus ?: Kovařík, 1993: 202, 203.

TYPE LOCALITY AND TYPE REPOSITORY. **Afghanistan**, Prov. Nengrahar, Jalalabad; MMBC. For locality details see Jakeš & Povolný (1967).

TYPE MATERIAL. **Afghanistan**, Prov. Nengrahar, Jalalabad, 2♀A (holotype and paratype), 1♀E (paratype), I.-III.1965, leg. D. Povolný. Holotype and one paratype is in MMBC, one paratype is in FKCP.

ETYMOLOGY. Named after the country of occurrence.

DIAGNOSIS: Fourth and fifth metasomal segments ventrally punctate and without median carinae. Spaces among punctae smooth except for anterior margin of fourth metasomal segment. Entire metasoma glabrous (short, thin setae may issue from some punctae). Dorsal surface of all metasomal segments mesially smooth. Several solitary granules may be present on first, second, and fifth segments. Mesosoma and metasoma black, telson reddish brown. Femur and patella of legs and pedipalps black or yellowish gray, chela more lightly colored. Manus of pedipalp darker than fingers. Movable fingers bear 8 or 9 rows of granules that have internal and external granules and 2 or 3 distal granules. Tarsomere I of first to third legs with bristlecombs, on third legs comprised of 9–13 bristles; tarsomere I of fourth legs without bristlecombs.

DESCRIPTION: The adults are about 36 mm long. The habitus is shown in Fig. 7. For position and distribution of trichobothria on chela, patella, and femur of pedipalps see Figs 1–6.

Measurements of the carapace, telson, segments of the metasoma and segments of the pedipalps, and numbers of pectinal teeth are given in Table 1.

COLORATION: The mesosoma and metasoma are black and the telson is reddish brown. The femur and patella of legs and pedipalps are black or yellowish gray; the chela is more lightly colored. The manus of pedipalp chela is darker than the fingers.

MESOSOMA AND CARAPACE: The mesosoma bears a median carina. Both the mesosoma and carapace are densely granulated, only the interocular area is smooth. The seventh sternite is more or less granulated and bears four granulated carinae. The other sternites are smooth, with four smooth carinae, only two lateral carinae on the sixth sternite are granulated. Pectinal teeth number 17-19 in the females; males are unknown.

METASOMA AND TELSON: The first segment bears 10 granulated carinae, is granulated, and lacks punctae. On the second and third segments the lateral carinae are inconspicuous or absent and punctae are shallow. The fourth segment is without carinae, and the fifth segment has two ventrolateral carinae. The fourth and fifth segments are ventrally punctate. Spaces among punctae are smooth except for the anterior margin of the fourth segment. The dorsal surface of all segments is mesially smooth. The entire metasoma is glabrous, but short, thin setae may issue from some punctae. The telson is punctate, lacks granules, and has several isolated hairs issuing from the punctae.

PEDIPALPS: The femur has four granulose to crenulate carinae. The patella is smooth, with 7 smooth carinae, and the chela is smooth, without carinae. The movable

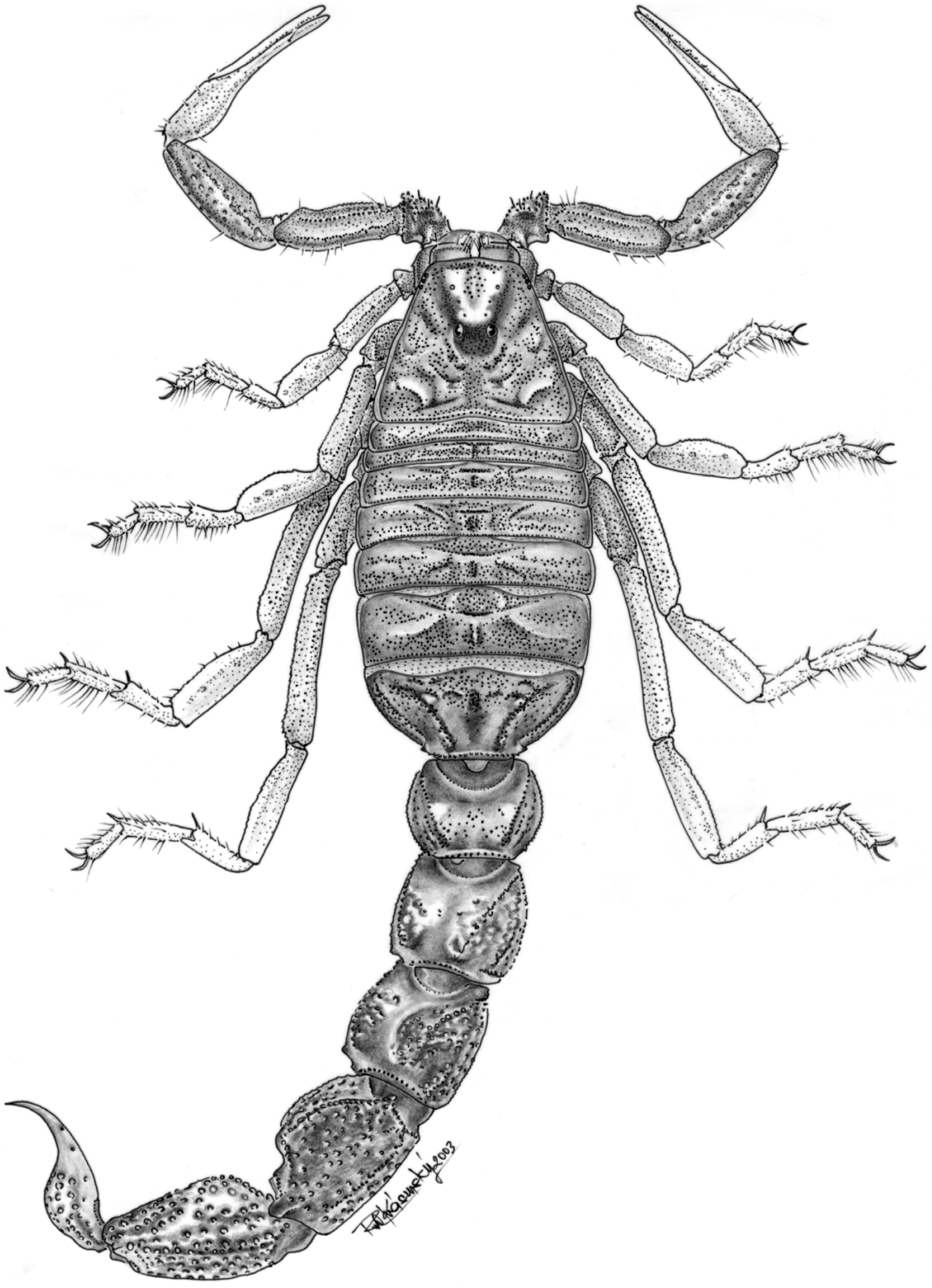


Figure 7: *Orthochirus afghanus* **sp. n**., female paratype, dorsal aspect.

fingers bear 8 or 9 rows of granules that have internal and external granules and 2 or 3 distal granules.
LEGS: The femur and patella bear only several solitary hairs and bristles. The tibiae of the first to third legs bear several spines and bristles, namely on the outer side. Tarsomere I of the first to third legs bears bristlecombs composed of approximately 9–13 bristles. The inner sides of all legs bear one or two rows of spines. The fourth legs lack bristlecombs and bear only sparse, short spines.

AFFINITIES. The described features distinguish *Orthochirus afghanus* **sp. n.** from all other species of the genus. They are recounted in the key below. *O. afghanus* **sp. n.** is close to *O. jalalabadensis* **sp. n.** These two species are similarly colored; however, *O. jalalabadensis* **sp. n.** has the spaces among ventral punctae on the fourth and fifth metasomal segments granulated, whereas in *O. afghanus* **sp. n.** they are smooth. Additional differences are given in the diagnoses.

Orthochirus bicolor (Pocock, 1897)

Butheolus bicolor Pocock, 1897: 108; Kraepelin, 1899: 36; Pocock, 1900: 31; Kraepelin, 1903: 565; Takashima, 1945: 77.
Butheolus melanurus bicolor: Kraepelin, 1913: 131.
Orthochirus scrobiculosus bicolor: Birula, 1928: 83.
Orthochirus bicolor: Roewer, 1943: 208; Tikader & Bastawade, 1983: 124; Fet, 1989: 116; El-Hennawy, 1992: 129; Kovařík, 1993: 203; Kovařík, 1998: 116; Fet & Lowe, 2000: 194; Bastawade, 2002: 294.
Orthochirus bicolor bicolor: Levy & Amitai, 1980: 94; Fet & Lowe, 2000: 194.

TYPE LOCALITY AND TYPE REPOSITORY. Kandala Tal, Satara, S. Dekhan, India; BMNH.
TYPE MATERIAL EXAMINED. **India**, Kandala Tal, Satara, S. Dekhan, 1♂1♀A (lectotype and paralectotype hereby designated), BMNH No. 1896.9.26.8-14.
OTHER MATERIAL EXAMINED. **India**, Maharashtra, 15 mi SE Sinnar, alt. 700 m, 16.I.1962, 1im., leg. E. S. Ross et D. Q. Cavagnaro, CASC; Maharashtra, S. Poona, 5km N Sartara, 17.VII.1996, 1♂1im. ♀A, leg. Werner & Lorenz, FKCP.

DIAGNOSIS: Fourth and fifth metasomal segments ventrally without carinae and deeply punctate. Spaces among punctae smooth and without hairs. Dorsal surface of all metasomal segments bears conspicuous pointed granules arranged in median belt with wider anterior and posterior ends. First to third metasomal segments yellow to yellowish brown, fourth and fifth segments black. Legs mostly yellow, only femur may bear dark spots. Movable fingers bear 8 or 9 rows of granules that have internal and external granules and 4 distal granules. Tarsomere I of first to third legs with bristlecombs, tarsomere I of fourth legs without bristlecombs.

COMMENTS. The lectotype is being designated in order to stabilize the nomenclature. Fet & Lowe (2000: 194) consider a female No. 1896.9.26.10 to be the holotype, but Pocock (1897: 109) listed a female and a male and did not designate one of them as the holotype.

DISTRIBUTION. India (Pocock, 1897: 109; Tikader & Bastawade, 1983: 124). This species is listed also from Afghanistan and Pakistan (Levy & Amitai, 1980: 94), but these records need to be further verified.

Orthochirus danielleae (Lourenço & Vachon, 1997), **comb. n.**

Afghanorthochirus danielleae Lourenço & Vachon, 1997: 334; Kovařík, 1998: 102; Fet & Lowe, 2000: 57.

TYPE LOCALITY AND TYPE REPOSITORY. Afghanistan, Région sud, Prov. Farah, Delaram; MNHN.

AFFINITIES. According to the original description, *Orthochirus danielleae* has the fifth metasomal segment and telson hirsute. This character is otherwise present only in *O. feti* **sp. n.**, *O. gromovi* **sp. n**., and *O. heratensis* **sp. n.**, which, however, have the rows of granules on the movable fingers of pedipalps without external granules.

DISTRIBUTION. Afghanistan (Lourenço & Vachon, 1997: 334).

Orthochirus erardi (Lourenço & Vachon, 1997), **comb. n.**

Afghanorthochirus erardi Lourenço & Vachon, 1997: 332; Kovařík, 1998: 102; Fet & Lowe, 2000: 57.

TYPE LOCALITY AND TYPE REPOSITORY. Afghanistan, Région sud á 95 km au NE de Zaranj; MNHN.

COMMENTS. This species has been inadequately defined, and verification of its status thus requires examination of the holotype. In my opinion, it could be a synonym of *Orthochirus fuscipes* (Pocock, 1900) or a related species.

DISTRIBUTION. Afghanistan (Lourenço & Vachon, 1997: 332), Pakistan (Lourenço & Vachon, 1997: 332).

Orthochirus	*afghanus*	*feti*	*gromovi*		*heratensis*		*iranus*		*iraqus*		*jalalabadensis*		*samrchelsis*	*sobotniki*		*varius*		*zagrosensis*	
new species	♀	♀	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀	♀	♂	♀	♂	♀	♂	♀
	HT	**HT**	**HT**	**AT**	**HT**	**AT**	**HT**	**AT**	**PT**	**HT**	**HT**	**AT**	**HT**	**HT**	**AT**	**HT**	**AT**	**HT**	**AT**
Total length	36.2	42.3	26.3	40.2	29.8	38.8	32.1	38.5	23.4	30.2	33.7	42.4	35.6	30.4	41.1	22.3	34.8	28.4	46
Carapace length	4.2	4.5	3.0	4.0	3.1	4.4	3.3	3.8	2.7	3.2	3.5	4.2	4.0	3.3	4.1	2.1	3.8	3.2	4.7
width	5.5	5.3	3.7	5.4	3.6	5.1	4.0	4.6	3.2	3.5	4.3	5.3	5.4	3.8	5.1	3.7	4.9	3.9	6.1
Metasoma and telson																			
length	22.2	24.8	15.8	23.7	18.3	22.8	20.9	20.5	14.9	18.4	21.2	23.7	22	18.6	24.3	15.1	20.2	18.2	25.5
segment I length	2.5	2.7	1.8	2.6	1.9	2.5	2.1	2.2	1.7	2.1	2.3	2.6	2.3	2.1	2.6	1.6	2.3	1.9	2.8
width	3.6	3.9	2.6	3.9	2.8	4.0	3.1	3.7	2.2	2.6	2.9	3.6	3.9	2.8	3.5	2.1	3.5	2.7	3.9
segment II length	2.8	3.1	2.1	3.0	2.2	2.9	2.6	2.7	2.0	2.6	2.7	3.0	2.8	2.3	3.2	1.8	2.5	2.2	3.2
width	3.7	4.0	2.7	4.0	3.1	4.0	3.3	3.7	2.2	2.9	2.9	3.5	3.9	2.9	3.5	2.1	3.5	2.9	4.0
segment III length	3.1	3.5	2.3	3.5	3.0	3.2	2.9	3.1	2.4	2.9	3.0	3.4	3.1	2.8	3.5	2.1	3.0	2.6	3.8
width	3.9	4.7	2.9	4.4	3.4	4.3	3.3	3.9	2.4	3.0	3.0	3.6	4.2	3.0	4.0	2.3	3.6	3.1	4.3
segment IV length	4.4	4.9	3.2	4.8	3.6	4.6	4.0	4.0	2.9	3.5	4.0	4.5	4.5	3.6	4.5	2.7	4.0	3.4	4.8
width	4.1	4.9	3.0	4.7	3.5	4.6	3.7	3.9	2.5	3.2	3.3	3.8	4.4	3.3	4.2	2.4	3.7	3.2	4.6
segment V length	4.9	5.2	3.3	4.5	3.7	4.7	4.1	4.2	3.1	3.7	4.5	5.2	4.7	3.5	5.1	2.9	4.5	4.0	5.3
width	3.9	4.8	2.9	4.6	3.7	4.7	3.7	3.9	2.4	3.2	3.3	3.8	4.2	3.2	4.1	2.3	3.7	3.1	4.5
telson length	4.0	5.3	2.9	4.5	3.9	4.7	3.7	3.9	2.8	3.3	3.9	4.7	4.0	4.0	5.2	2.7	3.8	3.8	5.1
Pedipalp																			
femur length	3.1	3.5	2.5	3.1	2.7	3.3	2.7	2.5	2.2	2.4	2.8	3.2	2.9	2.7	3.2	2.0	3.0	2.6	3.5
width	1.0	1.1	0.7	1.0	0.7	1.0	0.8	1.0	0.6	0.7	0.8	1.0	1.2	0.8	1.0	0.6	0.9	0.9	1.2
patella length	3.7	4.3	2.5	4.1	3.2	4.0	3.4	3.5	2.6	3.1	3.8	4.2	3.6	3.4	4.3	2.3	3.6	3.2	4.3
width	1.3	1.4	0.9	1.3	0.9	1.3	1.1	1.3	0.8	0.9	1.0	1.3	1.4	0.9	1.3	0.7	1.2	1.2	1.7
tibia length	5.0	6.2	4.0	5.6	4.6	5.8	4.9	5.1	3.9	3.9	4.5	5.7	5.5	4.5	5.6	3.4	4.9	4.7	6.1
width	1.1	1.3	0.7	1.1	0.9	1.2	1.1	1.0	0.6	0.9	0.9	1.0	1.1	0.7	1.1	0.6	0.9	1.0	1.3
finger mov. length	3.5	4.0	3.1	3.6	3.1	3.9	3.2	3.4	2.5	2.6	3.0	3.9	3.6	2.9	3.9	2.2	3.2	3.2	3.8
Pectinal teeth	19: ?	20:20	18:19	17:17	19:18	16:16	20:19	18:18	21: ?	21:21	20:22	17:18	18:19	22:23	22:22	22:23	21:21	21:22	18:18

Table 1: Measurements (in millimeters) of type specimens of new *Orthochirus* species.

Orthochirus feti sp. n.
(Table 1)

TYPE LOCALITY AND TYPE REPOSITORY. **Uzbekistan**, Surkhandarya Region, Baisun [=Boysun] District, ca. 27 km W of Shurchi [=Shorchi], ca. 3 km W of Kaganyata, (38°01'N, 67°29'E); FKCP.
TYPE MATERIAL. **Uzbekistan,** Surkhandarya Region, Baisun [=Boysun] District, ca. 27 km W of Shurchi [=Shorchi], ca. 3 km W of Kaganyata, (38°01'N, 67°29'E), 12.V.1994, leg. A.V.Gromov, 1♀1♂im.A (holotype and paratype), FKCP, 1♀2♂imsA. (paratypes), AVGC.
ETYMOLOGY. Named after Dr. Victor Fet, an arachnologist at Marshall University, West Virginia, USA.

DIAGNOSIS: Fourth and fifth metasomal segments ventrally punctate and without carinae. Spaces among punctae smooth, without granules. Dorsal surface of all metasomal segments mesially smooth, without granules. Entire metasoma and telson densely hirsute. Mesosoma and metasoma black, telson reddish brown, femur and patella of legs and pedipalps brown to black, tibia of legs and chela of pedipalps brownish yellow. Movable fingers of pedipalps bear 8 or 9 rows of granules with internal granules and without external granules. Movable fingers with 3-5 distal granules. Tarsus of first to third legs with bristlecombs, fourth partly with bristlecombs. Pectinal teeth number 18–20 in females and 22–23 in males.

DESCRIPTION: The adults are about 42 mm long. Measurements of the carapace, telson, segments of the metasoma and segments of the pedipalps, and numbers of pectinal teeth are given in Table 1.
COLORATION: The mesosoma and metasoma are black, the telson is reddish brown, the femur of legs and pedipalps are black, the patella of legs and pedipalps are brownish to black, and the tibia of legs and chela of pedipalps are brownish yellow.
MESOSOMA AND CARAPACE: The mesosoma bears a median carina. Both the mesosoma and carapace are densely granulated, only the interocular area is smooth. The seventh sternite is granulated and bears four granulated carinae. Other sternites are less granulated, with four or two carinae. Pectinal teeth number 18–20 in females and 22–23 in males.
METASOMA AND TELSON: The first segment bears 10 granulated carinae, is granulated, and lacks punctae. On the second and third segments the lateral carinae are inconspicuous or absent and punctae are partly present. The fourth and fifth segments have only inconspicuous dorsal and ventrolateral carinae. In immature specimens the ventrolateral carinae are pronounced and in posterior half consist of approximately 10 well developed tubercles. The fourth and fifth segments are ventrally punctate. Spaces among punctae are smooth, without granules. The dorsal surface of all metasomal segments is mesially smooth, without granules. The entire metasoma and telson are densely hirsute.
PEDIPALPS: The femur of pedipalp has four granulose to crenulate carinae. The patella has seven smooth carinae, and the chela is smooth, without carinae. The movable fingers bear eight to nine rows of granules with internal and without external granules and three to five distal granules. The entire pedipalps are hirsute.
LEGS: The femur and patella bear several hairs and spines. The tibiae bear several spines, namely on the outer side. Tarsomere I of the first to third legs and partly of the fourth legs bears bristlecombs. The inner sides of all legs bear two rows of spines.

AFFINITIES. The described features distinguish *Orthochirus feti* **sp. n.** from all other species of the genus. This species can be mistaken for *O. scrobiculosus* (Grube, 1873), from which it differs in coloration and dense pubescence. Like *O. gromovi* **sp. n.**, *O. scrobiculosus* has the entire legs yellow, whereas *O. feti* **sp. n.** has at least the femur and patella of legs dark.

Orthochirus flavescens (Pocock, 1897)

Butheolus flavescens Pocock, 1897: 110; Kraepelin, 1899: 36; Pocock, 1900: 30; Kraepelin, 1913: 131; Takashima, 1945: 77; Pérez Minnocci, 1974: 20.
Orthochirus pallidus flavescens: Birula, 1917: 241.
Orthochirus flavescens: Roewer, 1943: 208; Tikader & Bastawade, 1983: 114; Fet, 1989: 116; Kovařík, 1993: 203; Fet & Lowe, 2000: 194.
Orthochirus bicolor flavescens: Levy & Amitai, 1980: 94; Kovařík, 1998: 116.
= *Orthochirus luteipes* Roewer, 1943: 209 (TL: Anamalei, Dekan, India SMFD); ? Levy & Amitai, 1980: 94; Kovařík, 1996: 180; Kovařík, 1998: 116; Fet & Lowe, 2000: 196; Kovařík, 2002: 9. **Syn. n.**
Orthochirus fuscipes luteipes: Pérez Minnocci, 1974: 28.

TYPE LOCALITY AND TYPE REPOSITORY. Karagora in Kathiawar; BMNH.
TYPE MATERIAL EXAMINED. **India**, Karagora, Khandesh, 1♂A (lectotype designated by Stahnke), BMNH No. 1896.7.30.70; Dekan, Anamalei., 1♂1♀A (lectotype and paralectotype of *Orthochirus luteipes* Roewer, 1943 (lectotype designated by Kovařík, 1996)), SMFD No. 2124/21.
OTHER MATERIAL EXAMINED. **India**, Deccan, 5 mi SE Indapur, alt. 450 m, 9.II.1962, 1im.♀A, CASC.

DIAGNOSIS: Fourth and fifth metasomal segments ventrally without carinae and deeply punctate. Spaces among punctae nearly smooth and without hairs. Dorsal

surface of all metasomal segments bears median strip of densely spaced, pointed granules. Mesosoma and metasoma brown to reddish brown. Legs and pedipalps yellow. Femur of pedipalp with four granulose to crenulate carinae. Patella and chela smooth, with smooth carinae conspicuous namely on fixed finger. Movable fingers bear 7 or 8 rows of granules that have internal and external granules and 3 distal granules. Tarsomere I of first to third legs with bristlecombs.

COMMENTS. Pocock (1897: 110) mentions only one male, which thus should be the holotype. However, it bears Stahnke's lectotype label.

In 1996, I published the opinion that *Orthochirus luteipes* Roewer, 1943 is a valid species; however, examination of the type of *O. flavescens* convinces me that it is the same species. Especially characteristic are the punctation and granulation of metasomal segments. It needs to be pointed out that the lectotype is damaged and bristlecombs on tarsomere I of legs are mostly broken off.

DISTRIBUTION. India (Pocock, 1897: 110; Tikader & Bastawade, 1983: 119). Levy & Amitai (1980: 94) list also Afghanistan and Pakistan, but due to a strong possibility of misidentifications only the occurrence in India can be regarded as unequivocal.

Orthochirus fuscipes (Pocock, 1900)

Butheolus melanurus fuscipes Pocock, 1900: 29; Kraepelin, 1913: 131.
Orthochirus scrobiculosus fuscipes: Birula, 1917: 241.
Orthochirus fuscipes: Vachon, 1949: 139 (1952: 225); Vachon, 1959: 166; Pérez Minnocci, 1974: 28; Fet & Lowe, 2000: 195; Capes & Fet, 2001: 303.
? *Orthochirus scrobiculosus melanurus*: Levy & Amitai 1980: 94.

TYPE LOCALITY AND TYPE REPOSITORY. Northern Baluchistan, now Pakistan; ? BMNH.
MATERIAL EXAMINED. **India**, Barmer, Thar Desert, VIII.1955, leg. P.S. Nachar, 1♂3♀1juv.A, CASC. **Iran**, Kuh-e-Bazman, about 40 km N of Bazman by road, 28°12'603"N, 60°07'616"E, alt. 1212m, 9.4.2000, 1juv.A, leg. J. Šobotník, FKCP; S of Espake, 26°48'463"N, 60°10'206"E, alt. 2477 ft., 10.4.2000, 1♂1juv.A, leg. J. Šobotník, FKCP; 10 km S of Firuz Abad, 28°55'892"N, 52°31'770"E, alt. 1412 m, 20.-21.4.2000, 1juv.A, leg. J. Šobotník, FKCP. **Pakistan**, Tatta Dist, 1 mi NW Kalri, 17.I.1959, leg. S. Minton, 3♂3♀1juv.A, CASC; Las Bela Dist, 7 mi NW Uthal, 2.I.1960, leg. S. Minton, 1♂5♀A, CASC; Las Bela Dist, 7 mi A Diwana, 21.II.1960, leg. S. Minton, 1♀A, CASC; 7 mi NW Karachi, 20.XII.1958, leg. S. Minton, 2♂3♀A, CASC; 1,75 mi NW Karachi, Airport, 4.I.1959, leg. S. Minton, 1M1juv.A, CASC; 2.II.1959, leg. S. Minton, 1F, CASC; SE Balochistan, Khurkhra, 38 km S Uthal, 1♂1♀E 1♀A, 24.IV.1993, leg. S. Bečvář, FKCP.

DIAGNOSIS: Fourth and fifth metasomal segments ventrally without carinae and deeply punctate, dorsally weakly punctate only on margins and lacking punctae on smooth median surface. Medial area of fifth metasomal segment may be in part granulated. Spaces among punctae smooth, dorsally as well as ventrally without granules. Entire metasoma glabrous (very short, thin setae may issue from punctae). Mesosoma and metasoma dark brown to black, first two metasomal segments may be more lightly colored. Legs and pedipalps predominantly yellow, femur grayish green or black, patella grayish yellow or yellow. Movable fingers of pedipalps bear 8 or 9 rows of granules with internal and external granules and 2 to 4 distal granules. Tarsus of first to third legs with bristlecombs usually composed of 8 or less bristles, tarsus of fourth leg without bristlecombs. Pectinal teeth number 21-24 in males and 19-22 in females.

COMMENTS. The type, purportedly at BMNH, cannot be found. The above diagnosis is based on FKCP specimens and published information. Examination of CASC specimens reveals that the dorsal medial area of the fifth metasomal segment may bear several granules, usually not as closely spaced as in *O. iranus* **sp. n**.

DISTRIBUTION. Iran (first record), India (first record), Pakistan (Pocock, 1900: 29).

***Orthochirus gromovi* sp. n.**
(Table 1)

TYPE LOCALITY AND TYPE REPOSITORY. **Turkmenistan**, Lebap [=Chardzhou, Chardzhev] Region, Chardzhou [=Chardzhev] District, Karakum Desert, Repetek Nature Reserve, NW env. of Repetek, ca. 200 m, sands (38°33'59"N, 63°09'46"E–38°33'57"N, 63°10'13"E); FKCP.
TYPE MATERIAL. **Turkmenistan**, Repetek, 14.IV–2.V.1990, leg. J. Farkač, 1♂2♀2juvs.E (paratypes), FKCP, 2♀3juvs.E (paratypes), JFCP; Lebap [=Chardzhou, Chardzhev] Region, Chardzhou [=Chardzhev] District, Karakum Desert, Repetek Nature Reserve, NW env. of Repetek, ca. 200 m, sands, 38°33'59"N, 63°09'46"E–38°33'57"N, 63°10'13"E, 15.IV.2002, leg. A.V. Gromov, 5♂A (holotype and paratypes) 14♀A (allotype and paratypes) 14juvs.A (paratypes), 38°33'54"N, 63°10'51"E, 16.IV.2002, leg. A.V.Gromov, 1♂3♀6juvs.A (paratypes). Holotype, allotype and 12 paratypes (3♂5♀4juvs.) in FKCP, 16 paratypes (2♂5♀9juvs.) in AVGC, two paratypes (1♀1juvs.) in NMPC and ZISP, one paratype (♀ or juv.)

each in BMNH, CASC, MMBC, MZUF, RTOC, SMFD, SOFM, ZMHB, ZMUH.

ETYMOLOGY. Named after Alexandr Gromov, who collected most of the types and helped me with this revision.

DIAGNOSIS: Fourth and fifth metasomal segments ventrally punctate and without carinae. Spaces among punctae smooth, without granules. Dorsal surface of all metasomal segments mesially smooth, without granules. Entire metasoma and telson hirsute. Mesosoma and metasoma black, telson reddish brown, legs yellow, pedipalps yellow to greenish yellow. Movable fingers of pedipalps bear 8 or 9 rows of granules with internal granules and without external granules. Movable fingers with 3–5 distal granules. Tarsus of first to third legs with bristlecombs, fourth without. Pectinal teeth number 15–18 in females and 17–20 in males.

DESCRIPTION: The adults are about 35 mm long. Measurements of the carapace, telson, segments of the metasoma and segments of the pedipalps, and numbers of pectinal teeth are given in Table 1.

COLORATION: The mesosoma and metasoma are black, the telson is reddish brown, and the legs and pedipalps are yellow to greenish yellow.

MESOSOMA AND CARAPACE: The mesosoma bears a median carina. Both the mesosoma and carapace are densely granulated, only the interocular area is smooth. The seventh sternite is smooth or granulated and bears four granulated carinae. The other sternites are smooth or granulated, with four smooth carinae (two lateral carinae are granulated on the sixth and fifth sternites) and posteriorly with hairs. Pectinal teeth number 15–18 in females and 17–20 in males.

METASOMA AND TELSON: The first segment bears 10 granulated carinae, is granulated, and lacks punctae. On the second and third segments the lateral carinae are inconspicuous or absent and punctae are present in adult females but absent in juveniles. The fourth and the fifth segments have only inconspicuous dorsal carinae. The fourth and fifth segments are ventrally punctate. Spaces among punctae smooth, without granules. Dorsal surface of all metasomal segments mesially smooth, without granules. The entire metasoma and telson are hirsute.

PEDIPALPS: The femur of pedipalp has four granulose to crenulate carinae. The patella has seven smooth carinae, and the chela is smooth. The movable fingers bear 8–9 rows of granules with internal and without external granules and 3 to 5 distal granules. The entire pedipalps are hirsute.

LEGS: The femur and patella bear several hairs and spines. The tibiae bear several spines, namely on the outer side. Tarsomere I of the first to third legs bears bristlecombs. The inner sides of all legs bear two rows of spines.

AFFINITIES. The described features distinguish *Orthochirus gromovi* **sp. n.** from all other species of the genus. They are recounted in the key below. *O. gromovi* **sp. n.** is close to *O. heratensis* **sp. n.**, with which it shares the hirsuteness of metasoma and pedipalps and absence of external granules on movable fingers. *O. heratensis* **sp. n.** is somewhat smaller, has broader metasomal segments, and its metasoma and pedipalps are not as densely hirsute.

COMMENTS. This species can be easily mistaken for *O. scrobiculosus* (Grube, 1873). It is therefore likely that some references to *O. scrobiculosus* from Repetek in reality concern *O. gromovi* **sp. n.**

Orthochirus heratensis sp. n.

(Table 1)

Orthochirus scrobiculosus?: Kovařík, 1993: 202, 203.

TYPE LOCALITY AND TYPE REPOSITORY. **Afghanistan**, Prov. Herat, Rašíd; MMBC. For locality details see Jakeš & Povolný (1967).

TYPE MATERIAL. **Afghanistan**, N., Prov. Herat, Rašíd, 700 m, (loc. No. J. 17) 18.V.1964, 3♂A (holotype and paratypes) 4♀A (allotype and paratypes) 4im.A (paratypes), leg. O. Jakeš; Prov. Herat, Bala Murghab, 400 m, 20.III–2.VII.1964, 1im. ♂A (paratype), leg. O. Jakeš; Prov. Herat, Bala Murghab, 550 m, 3.IV–15.IV.1964 (loc. No. J. 10), 1♀1im.E (paratypes), leg. O. Jakeš; Prov. Herat, Bala Murghab, 470 m, 18.IX–6.XI.1964, 1♀A (paratype), leg. O. Jakeš. Holotype, allotype and 8 paratypes in MMBC, 5 paratypes in FKCP. For details on localities see Jakeš & Povolný (1967).

ETYMOLOGY. Named after the province of Afghanistan.

DIAGNOSIS: Fourth and fifth metasomal segments ventrally punctate and without carinae. Spaces among punctae smooth, without granules. Dorsal surface of all metasomal segments medially smooth, without granules. Metasoma and telson hirsute, posterior margin of fourth and fifth metasomal segments with row of horizontal hairs. Mesosoma and metasoma black, telson reddish brown. Legs and pedipalps yellow, femur and patella may be yellowish green. Movable fingers of pedipalps with 8 or 9 rows of granules, without external granules, with internal granules, and with 2 or 3 distal granules. Tarsus of first to third legs with bristlecombs, fourth without. Pectinal teeth number 18–21 in the males and 15–17 in the females.

DESCRIPTION: The adult males are 25–30 mm long and the females are up to 40 mm long. Measurements of the carapace, telson, segments of the metasoma and segments of the pedipalps, and numbers of pectinal teeth

are given in Table 1. The distance between trichobothria d_1 and d_3 on the femur of pedipalp is approximately equal to that between d_3 and d_4; trichobothrium e_1 is situated between d_3 and d_4.
COLORATION: The mesosoma and metasoma are black, and the telson is reddish brown. The legs and pedipalps are usually yellow (namely in males), however the femur and patella may be yellowish green to reddish brown. The seventh sternite is black, other sternites are black or yellow.
MESOSOMA AND CARAPACE: The mesosoma usually bears a median carina (it may be absent in some specimens). Both the mesosoma and carapace are densely granulated, only the interocular area is smooth. The seventh sternite is smooth or granulated and bears four granulated carinae. The other sternites are smooth or finely granulated, with four smooth carinae (only the sixth sternite has two lateral carinae granulated). Pectinal teeth number 18–21 in the males and 15–17 in the females.
METASOMA AND TELSON: The first and second segments bear 10 granulated carinae, are granulated, tuberculate or smooth, and lack punctae (exceptionally, there may be punctae on the second segment). On the third segment the lateral carinae are inconspicuous or absent and punctae are present. The fourth segment has inconspicuous dorsolateral carinae, and the fifth segment has two ventrolateral carinae. The fourth and fifth segments are ventrally punctate. Spaces among punctae are smooth. The dorsal surface of all segments is mesially smooth except occasional sparse granules primarily on the first segment. The entire metasoma and telson are sparsely hirsute. The telson is punctate and lacks granules.
PEDIPALPS: The femur of pedipalp has four granulose to crenulate carinae. The patella has seven smooth carinae, and the chela is smooth. The entire pedipalps are sparsely hirsute. The movable fingers bear 8 or 9 rows of granules without external granules, with internal granules (except at the last two or three rows), and with 2 or 3 distal granules.
LEGS: The femur is granulated, whereas the patella and tibia are smooth. The patella bears only a few solitary hairs and spines. The tibiae bear several spines, namely on the outer side. Tarsomere I of the first to third legs bears 7–13 bristles on the outer side, which form bristlecombs.

AFFINITIES. The described features distinguish *Orthochirus heratensis* **sp. n.** from all other species of the genus. They are recounted in the key below. *O. heratensis* **sp. n.** is close to *O. scrobiculosus*, from which it differs in the hirsuteness of the metasomal segments and telson. *O. heratensis* **sp. n.** is also well characterized by broad metasomal segments, namely the fifth segment which is as broad as long in the adults of both sexes.

Orthochirus iranus sp. n.
(Table 1)

Orthochirus sp. n.?: Kovařík, 1997: 47 (in part).

TYPE LOCALITY AND TYPE REPOSITORY. **Iran**, prov. Chamak, cca 17km NW. Bandar-e Gonárer, 10 m, 29°38'32"N 50°26'56"E; FKCP.
TYPE MATERIAL. **Iran**, prov. Chamak, cca 17km NW. Bandar-e Gonárer, 10 m, 29°38'32"N 50°26'56"E, 1♂1♀E 2♂1♀A (holotype and paratypes), 13–14.X.1998, leg. P. Kabátek; prov. Bushehr, Chahak 15 km NW Bandar-e-Gonaveh by road, 29°40'N, 50°25'E, 20m, 3–5.V.1996 (loc No. 19 in Frynta et al, 1997: 4), 1♀A (allotype), leg. D. Král, 1♂1♀A (paratypes), leg. M. Kaftan; prov. Khuzestan, Choqa-Zanbil (Zikkurat), 32°00'N, 48°31'E, 100 m, 5–6.V.1996 (loc No. 20 in Frynta et al., 1997: 4), 1im.♂A (paratype), leg. M. Kaftan. All types are in FKCP.
ETYMOLOGY. Named after the country of occurrence.

DIAGNOSIS: Fourth and fifth metasomal segments ventrally punctate and without carinae. Dorsal surface of metasomal segments smooth except for fifth segment which bears median row of minute granules that widens in posterior half. Spaces among punctae on ventral surface smooth, only fourth metasomal segment may be sparsely granulated. Entire metasoma glabrous (very short, thin setae may issue from some punctae). Mesosoma and metasoma black. Telson reddish brown. Femur and patella of legs and pedipalps black, chela of pedipalps and tibiae of legs pale yellow to yellowish brown. Movable fingers of pedipalps bear 8 or 9 rows of granules with internal and external granules and four or five distal granules. Tarsomere I of first to third legs usually with bristlecombs composed of only 5 or 6 bristles, which may be irregular and not always form bristlecombs.

DESCRIPTION: Adult males are about 32 mm and females up to 38.5 mm long. Measurements of the carapace, telson, segments of the metasoma and segments of the pedipalps, and numbers of pectinal teeth are given in Table 1.
COLORATION: The mesosoma and metasoma are black and the telson is reddish brown. The femur and patella of legs and pedipalps are black (patella of legs may be more lightly colored); the chela of pedipalp and tibiae of legs are pale yellow to yellowish brown.
MESOSOMA AND CARAPACE: The mesosoma bears a median carina. Both the mesosoma and carapace are densely granulated, only the interocular area is smooth.

The seventh sternite is usually granulated and bears four granulated carinae. The other sternites are smooth, with four smooth carinae. Pectinal teeth number 17 or 18 in the females and 19 to 21 in the males.
METASOMA AND TELSON: The first to third segments bear 10 granulated carinae; lateral carinae may be poorly develped on the second and third segments. Ventral and lateral surfaces of these segments are granulated and weakly punctate. The fourth and fifth segments have two dorsolateral carinae and two ventrolateral carinae, which on the fourth segment may appear only as rows of granules. The fourth and fifth segments are ventrally punctate. Spaces among punctae are smooth exept for the fourth segment which may be sparsely granulated, especially in males. The dorsal surface of the first four segments is mesially smooth, but a few solitary granules may be present, especially on the first segment. The dorsal surface of the fifth segment bears a median row of minute granules, which widens in posterior half. The entire metasoma is glabrous, but short, thin setae may issue from some punctae. The telson is punctate, lacks granules, and has several isolated hairs issuing from the punctae.
PEDIPALPS: The femur has four granulose to crenulate carinae. The patella has seven smooth carinae, and the chela has smooth carinae which may be discernible throughout the length of the fixed fingers. The movable fingers bear 8 or 9 rows of granules with internal and external granules and four or five distal granules.
LEGS: The femur has four granulated carinae, the patella has five smooth carinae, and smooth carinae may be present also on the tibia. The tibiae and tarsomeres bear several spines, namely on the outer side where they form two rows. Tarsomere I of first to third legs bears 5 or 6 bristles which usually form bristlecombs.

AFFINITIES. The described features distinguish *Orthochirus iranus* sp. n. from all other species of the genus. They are recounted in the key below. *O. iranus* **sp. n.** is close to *O. zagrosensis* **sp. n**., from which it differs in granulation of the metasomal segments and a more lightly colored manus of pedipalp.

Orthochirus iraqus **sp. n.**
(Table 1)

?*Orthochirus scrobiculosus*: Khalaf, 1962: 2; Khalaf, 1963: 64.
Orthochirus innesi: Kovařík, 1992: 90; Kovařík, 1992: 184 (in part).
Orthochirus sp.: Fet & Kovařík, 2003: 180.

TYPE LOCALITY AND TYPE REPOSITORY. **Iraq**, Najaf Province, Ash-Shabakah (Shabachah, Shabicha), Geophysics Brno base camp, 150 km SW of An-Najaf (Najaf), 262 m asl, 31°06'N 43°95'E; FKCP.

TYPE MATERIAL. **Iraq**, Najaf Province, Ash-Shabakah (Shabachah, Shabicha), Geophysics Brno base camp, 150 km SW of An-Najaf (Najaf), 262 m asl, 31°06'N 43°95'E, X.-XII.1978, 1♀A (holotype) 1♂A (paratype), leg. O. Jakeš, FKCP; Baghdad, 1♂E (paratype), 1929-1932, leg. V. Kálalová, NMPC.
ETYMOLOGY. Named after the country of occurrence.

DIAGNOSIS:. Fourth and fifth metasomal segments ventrally without carinae and distinctly punctate. Dorsal surface of metasomal segments delimited by two lateral carinae, smooth, without punctae, with sparse granules only in posteromedian part of fifth segment. Ventral surface punctate, spaces among punctae smooth. Entire metasoma glabrous (very short, thin setae may issue from punctae). Mesosoma and metasoma black. Telson reddish brown. Femur and patella of legs and pedipalps reddish brown, tibiae of legs and chela of pedipalps yellow to reddish yellow. Movable fingers of pedipalps bear 7 or 8 rows of granules with internal and external granules and 4 distal granules. Tarsus of first to third legs with bristlecombs usually composed of 6 bristles, fourth legs without bristlecombs.

DESCRIPTION: The male is 23.4 mm long and the female is 30.2 mm long. Measurements of the carapace, telson, segments of the metasoma and segments of the pedipalps, and numbers of pectinal teeth are given in Table 1. The distance between trichobothria d_1 and d_3 on the femur of pedipalp is approximately equal to that between d_3 and d_4; trichobothrium e_1 is situated between d_3 and d_4.
COLORATION: The mesosoma and metasoma are black; the telson, femur, and patella of legs and pedipalps are reddish brown; and the chela of pedipalps and tibiae of legs are yellow to reddish yellow.
MESOSOMA AND CARAPACE: The mesosoma bears a median carina. Both the mesosoma and carapace are densely granulated, only the interocular area is smooth.The seventh sternite is smooth, with four smooth carinae. Pectinal teeth number 21.
METASOMA AND TELSON: The first segment bears 10 granulated carinae. On the second and third segments lateral carinae are absent in the female and inconspicuous in the male. The fourth and fifth segments bear dorsolateral and ventralolateral carinae in the male; the female lacks ventralolateral carinae on the fourth segment and has them shortened on the fifth segment. All segments are smooth and punctate. Punctation on the first three segments is almost indiscernible in the males but conspicuous in the female; on the fourth and fifth segments it is better developed in the males, but not as well as in the female. Spaces among punctae are smooth. The dorsal surface of all segments is smooth and well delimited by conspicuous dorsolateral carinae. The fifth segment bears several mesially situated granules. The

entire metasoma and telson are glabrous. The telson is punctate and lacks granules.
PEDIPALPS: The femur of pedipalp has four granulated carinae. The patella has seven smooth carinae, and the chela has smooth carinae which may span the entire length of fixed fingers. The movable fingers of pedipalps bear 7 or 8 rows of granules which usually have internal and external granules and four distal granules.
LEGS: The femur has four granulated carinae, the patella may have five carinae, and the tibia is smooth. The tibiae bear several spines, namely on the outer side. Tarsomere I of first to third legs bears bristlecombs composed of 6 bristles, on the fourth legs lacks bristlecombs.

AFFINITIES. The described features distinguish *Orthochirus iraqus* **sp. n.** from all other species of the genus. *Orthochirus iraqus* **sp. n.** is close to *Orthochirus fuscipes* (Pocock, 1900) from Pakistan, which differs by features given in the key below. Another difference is in the shape of metasomal segments, which in *Orthochirus iraqus* sp. n. are longer and narrower.

COMMENTS. Both males lack parts of legs, pedipalp, and pecten. The female is entire, and is designated as the holotype because of its good condition.

COMMENTS ON THE LOCALITY. The collecting site in Iraq was a base camp for oil and gas exploration by Geophysics Brno, at the edge of a limestone region called Al-Hajara. The terrain was described to me (O. Jakeš, pers. comm.) as rocky, partially weathered, with numerous limestone outcrops, locally with harder and more weathering-resistant cementstone layers up to 1 m thick. The camp itself was located in a broad depression which in the rain season received water from several otherwise dry riverbeds. In the rain season it formed extensive ephemeral lakes which took 2–3 weeks to dry out. After the rain season (December through March) the locality had only sparse vegetation that by April was scorched by the sun. Climate of the area is that of a hot and dry subtropical desert with daily fluctuation of temperatures up to 20°C. From spring to fall the weather was sunny with frequent desert storms. In November a sudden temperature drop, in December–January frequent rains and thunderstorms. Water lasted for several days and depressions were filled by the above noted ephemeral ponds or lakes for 2–3 weeks. Daily temperatures reached 52°C in July and only 12°C in November and December. The highest night temperature reached 40°C in July and only 3°C in November, when at 6 a.m. they were around freezing and frequently accompanied by fog. Other species of scorpions collected at this site belonged to the typical arid desert fauna of the Middle East: *Androctonus crassicauda* (Olivier, 1807), *Buthacus tadmorensis* (Simon, 1892), *Compsobuthus jakesi* Kovařík, 2003 (see Kovařík, 2003) (all Buthidae), *Scorpio maurus* Linnaeus, 1758 (Scorpionidae). A disjunct (introduced) population of *Euscorpius italicus* (Herbst, 1800) (Euscorpiidae) was also found in this locality (see Fet & Kovařík, 2003).

Orthochirus jalalabadensis sp. n.
(Fig. 8, Table 1)

Orthochirus scrobiculosus?: Kovařík, 1993: 202 and 203.

TYPE LOCALITY AND TYPE REPOSITORY. **Afghanistan**, Prov. Nengrahar, Jalalabad; MMBC. For locality details see Jakeš & Povolný (1967).
TYPE MATERIAL. **Afghanistan**, Prov. Nengrahar, Jalalabad, I–III.1965, 1♂A (holotype), 4♂5♀2juvs.A (paratypes), leg. D. Povolný; 9 km EES Jalalabad, 28.III.1966, 580 m (loc. No. PT 46), 1♀A (allotype), leg. D. Povolný & Tenora; Prov. Nengrahar, 8 km EES Jalalabad, 8.II.1966, 620 m (loc. No. PT 3), 1♀A (paratype), 2 km EES Jalalabad, 13.II.1966, 600 m (loc. No. PT 8), 1♀A (paratype), 10 km EES Jalalabad, 23.II.1966, 620 m (loc. No. PT 18), 1♀A (paratype), 8 km EES Jalalabad, 28.II.1966, 620 m (loc. No. PT 22), 3♀A (paratypes), 8 km EES Jalalabad, 1.III.1966, 620 m (loc. No. PT 23), 3♀A (paratypes), 8 km EES Jalalabad, 2.III.1966, 620 m (loc. No. PT 24), 1♂E 4♀A (paratypes), 8 km EES Jalalabad, 5.III.1966, 620 m (loc. No. PT 25), 2♀A (paratypes), 12–20 km EES Jalalabad, 7.III.1966, 600 m (loc. No. PT 26), 3♀A (paratypes), 16.III.1966, 600 m (loc. No. PT 36), 3♀A (paratypes), Jalalabad, V.1967, 580 m, 1♀A (paratype), leg. D. Povolný & coll. For locality details see Jakeš & Povolný (1967). Holotype, allotype and 22 paratypes in MMBC, 10 paratypes in FKCP, one paratype (♀) each in BMNH, CASC and MZUF.
ETYMOLOGY. Named after the type locality.

DIAGNOSIS: Fourth and fifth metasomal segments ventrally without median carinae and usually only shallowly punctate. Spaces among punctae granulated equally on fourth and fifth segments. Entire metasoma glabrous (short, thin setae may issue from some punctae). Dorsal surface of all metasomal segments mesially smooth. Several solitary granules may be present. Females with mesosoma and metasoma black, telson brown to reddish brown, legs yellow, and pedipalps yellowish gray. Males with mesosoma and first to fourth segments of metasoma yellow, fifth metasomal segment and carapace dark brown to black, and legs and pedipalps light yellow. Movable fingers bear 8 or 9 rows of granules with internal and external granules and 2 or 3 distal granules. Tarsomere I of first to third legs with bristlecombs, tarsomere I of fourth legs lacks bristlecombs.

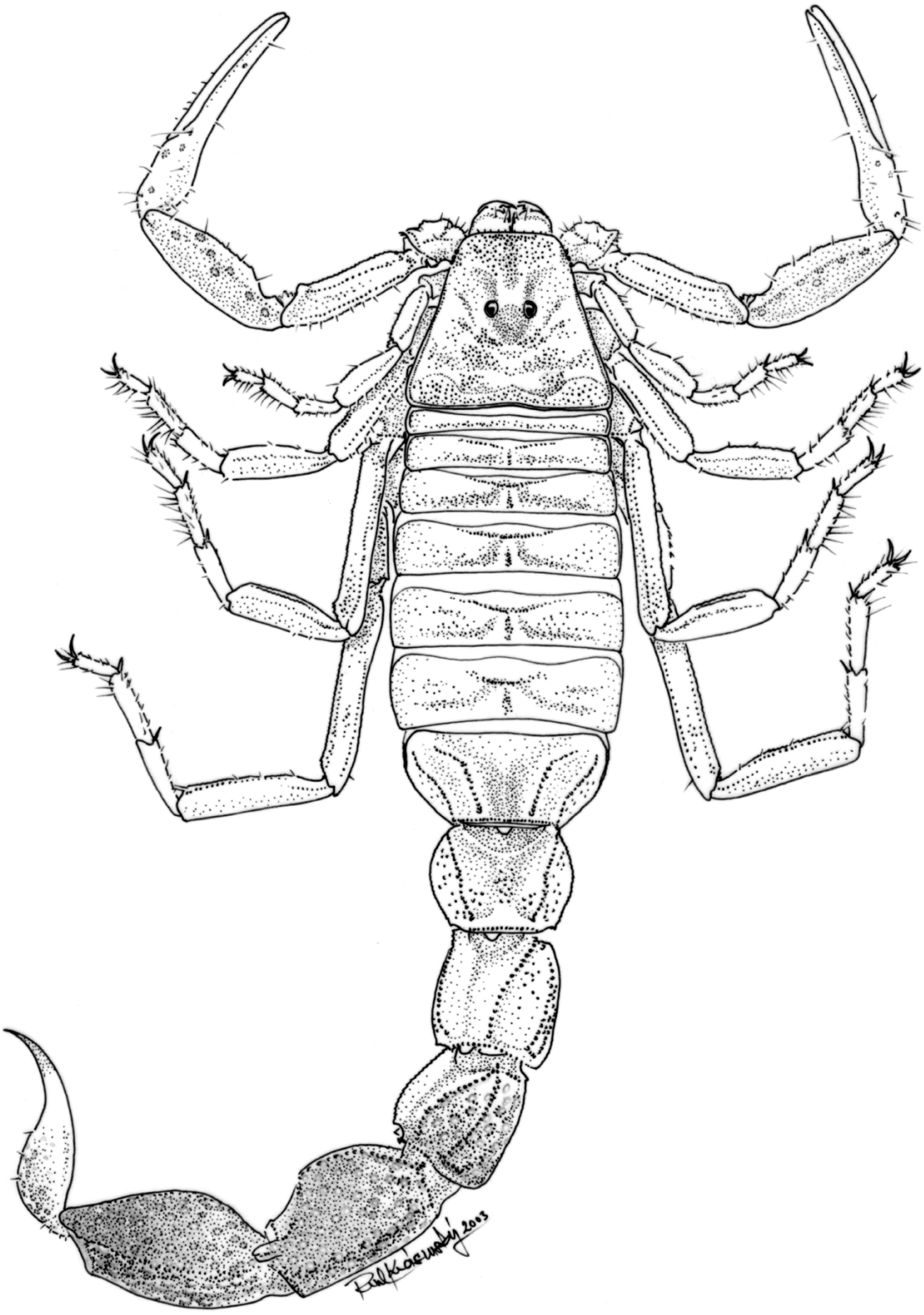


Figure 8: *Orthochirus jalalabadensis* **sp. n.**, male paratype, dorsal aspect.

DESCRIPTION: Most adults are about 33 mm long, but some females may reach 42.4 mm. The habitus is shown in Fig. 8. Measurements of the carapace, telson, segments of the metasoma and segments of the pedipalps, and numbers of pectinal teeth are given in Table 1. In contrast to female, the male has much lighter coloration and higher numbers of teeth in the pectens.
COLORATION: Females have the mesosoma and metasoma black, the telson brown to reddish brown, legs yellow, and pedipalps yellowish gray. Males have the mesosoma and the first to fourth metasomal segments yellow, the fifth metasomal segment and carapace dark brown to black, and legs and pedipalps light yellow.
MESOSOMA AND CARAPACE: The mesosoma bears a median carina. Both the mesosoma and carapace are densely granulated, only the interocular area is smooth. The seventh sternite is smooth or granulated and bears four granulated carinae. The other sternites are smooth or granulated, with four smooth carinae and posteriorly with several solitary hairs. Pectinal teeth number 20–23 in the males and 16–21 (usually 18–19, in one instance 21) in the females.
METASOMA AND TELSON: The first to third segments bear 10 granulated carinae, which are especially pronounced in juveniles. Central lateral carinae on the third segment may be obliterated or lacking. Spaces among the carinae are finely granulate and shallowly punctate. The third segment is more conspicuously punctate than the first. The fourth and fifth segments lack ventral median carinae, bear two lateral carinae, are shallowly punctate ventrally, and spaces among the punctae are granulated. The dorsal surface of all segments is mesially smooth, with a few isolated granules occasionally present only on the first two segments. The entire metasoma is glabrous, but short, thin setae may issue from some punctae.The telson is tuberculate and punctate, lacks granules, and bears several isolated hairs.
PEDIPALPS: The femur of pedipalp has four granulose to crenulate carinae. The patella and chela are smooth, with smooth carinae which may be difficult to discern. The movable fingers bear 8 or 9 rows of granules with internal and external granules and 2 or 3 distal granules.
LEGS: The femur and patella bear only several solitary hairs and bristles. The tibiae of the first to third legs bear several spines and bristles, namely on the outer side. Tarsomere I of the second and third legs bears bristlecombs composed of approximately 10 long bristles on the outer side; on the first legs the number of bristles is lower. The inner sides of all legs bear one or two rows of spines. The fourth legs lack bristlecombs and bear only sparse, short spines.

AFFINITIES. The described features distinguish *Orthochirus jalalabadensis* **sp. n**. from all other species of the genus. They are recounted in the key below. This species has an extraordinarily thin metasoma. Its unusual sexual dimorphism causes the males look like *O. bicolor* and the females like *O. scrobiculosus*.

Orthochirus krishnai Tikader & Bastawade, 1983**; nomen dubium**

Orthochirus krishnai Tikader & Bastawade, 1983: 129; Kovařík, 1993: 203; Kovařík, 1996: 181; Kovařík, 1998: 116; Fet & Lowe, 2000: 195.

TYPE LOCALITY AND TYPE REPOSITORY. Mogara vill., Rajasthan, India; NZSI.

COMMENTS. Regrettably, I have not been able to see this species. The original description is inadequate, and the status and taxonomic position of *O. krishnai* thus cannot be evaluated without examination of the holotype. The presence of the trichobothrium d_2 on the femur of pedipalp in Fig. 361 of Tikader & Bastawade (1983: 132) seems to indicate that this species belongs in *Paraorthochirus* rather than *Orthochirus*.

DISTRIBUTION. India (Tikader & Bastawade, 1983: 134).

Orthochirus monodi (Lourenço & Vachon, 1997), **comb. n.**

Afghanorthochirus monodi Lourenço & Vachon, 1997: 333; Kovařík, 1998: 102; Fet & Lowe, 2000: 57.

TYPE LOCALITY AND TYPE REPOSITORY. Afghanistan, Bozbai (entre Bala Morghah et Qal éh Now); MNHN.

AFFINITIES. According to the original description, *Orthochirus monodi* has a hirsute fifth metasomal segment and a glabrous telson. This combination is otherwise present only in *O. zagrosensis* **sp. n**.; however, *O. monodi* has hairs primarily on the ventral side of the fifth segment, whereas *O. zagrosensis* **sp. n**. has them only on the dorsolateral surface and only in some specimens.

DISTRIBUTION. Afghanistan (Lourenço & Vachon, 1997: 333).

Orthochirus pallidus (Pocock, 1897)

Butheolus pallidus Pocock, 1897: 109; Kraepelin, 1899: 36; Pocock, 1900: 30; Kraepelin, 1903: 565; Kraepelin, 1908: 187; Kraepelin, 1913: 131; Takashima, 1945: 77; Pérez Minnocci, 1974: 20.
Orthochirus pallidus: Birula, 1917: 215; Roewer, 1943: 208; Tikader & Bastawade, 1983: 119; Fet, 1989: 116; Kovařík, 1993: 203; Fet & Lowe, 2000: 196.

Orthochirus pallidus pallidus: Birula, 1917: 241.
Orthochirus bicolor pallidus: Levy & Amitai, 1980: 94; Kovařík, 1998: 116.

TYPE LOCALITY AND TYPE REPOSITORY. Upper Scinde, Khelat Frontier; BMNH.
TYPE MATERIAL EXAMINED. **Pakistan**, Upper Scinde, Khelat Frontier, 1♀A (lectotype hereby designated), BMNH No. 1896.10.20.24.

DIAGNOSIS: Fourth and fifth metasomal segments only shallowly punctate ventrally. Spaces among punctae granulated, with largest and most closely spaced granules on fourth segment. Fifth metasomal segment with one median ventral granulated carina, fourth segment with two less granulated median ventral carinae. Entire metasoma glabrous (very short, thin setae may issue from punctae). Dorsal surface of all metasomal segments mesially nearly smooth, sparse granules not arranged in distinct strip. Metasoma, mesosoma, and legs pale yellow to green. Movable fingers of pedipalps bear 8 rows of granules with internal and external granules and 3 distal granules.

COMMENTS. Fet & Lowe (2000: 196) regard the female that I have examined as the holotype, but Pocock did not label it as such. Stahnke subsequently labeled this female as "type". In order to stabilize the nomenclature, I hereby designate this specimen the lectotype. The above diagnosis lacks information on the presence of bristlecombs on the legs, because the lectotype is damaged and this feature cannot be adequately discerned. Also, due to long years in alcohol the original color of femur and patella of legs and pedipalps cannot be reliably determined.

DISTRIBUTION. Afghanistan (Fet & Lowe, 2000: 196), India (Tikader & Bastawade, 1983: 124), Pakistan (Pocock, 1897: 110).

Orthochirus samrchelsis sp. n.
(Table 1)

Orthochirus scrobiculosus?: Kovařík, 1993: 202 and 203.

TYPE LOCALITY AND TYPE REPOSITORY. **Afghanistan**, Prov. Nengrahar, Samrchel; MMBC. For locality details see Jakeš & Povolný (1967).
TYPE MATERIAL. **Afghanistan**, Prov. Nengrahar, Samrchel, 7.II.1966, 800 m (loc. No. PT 2), 1juv.A (paratype), 15.II.1966, 800 m, (loc. No. PT 9), 1♀A (holotype) 1♀2im.♂1juv.A (paratypes), leg. D. Povolný & Tenora. Holotype, and three paratypes in MMBC, two paratypes in FKCP.
ETYMOLOGY. Named after the province of Afghanistan.

DIAGNOSIS: Fourth and fifth metasomal segments ventrally without median carinae and punctate. Spaces among punctae smooth (only in one juvenile with scattered granules). Entire metasoma glabrous (short, thin setae may issue from some punctae). Dorsal surface of fourth metasomal segment mesially smooth (several solitary granules may be present). Mesosoma and metasoma black, telson reddish brown, legs and pedipalps yellow to yellowish gray. Movable fingers bear 9–10 rows of granules with internal and external granules and 2 or 3 distal granules. Tarsi of all legs without bristlecombs. Pectinal teeth number 17–19.

DESCRIPTION: The adults are about 35 mm long. Measurements of the carapace, telson, segments of the metasoma and segments of the pedipalps, and numbers of pectinal teeth are given in Table 1.
COLORATION: The mesosoma and metasoma are black, the telson is reddish brown, and the legs and pedipalps are yellow to yellowish gray. The posterior margin of the fifth mesosomal sternite often bears a conspicuous yellow triangle.
MESOSOMA AND CARAPACE: The mesosoma bears a median carina. Both the mesosoma and carapace are densely granulated, only the interocular area is smooth. The seventh sternite is smooth or granulated and bears four granulated carinae. The other sternites are smooth or granulated, with four smooth carinae (two lateral carinae are granulated only on the sixth sternite) and posteriorly with several solitary hairs. Pectinal teeth number 17–19.
METASOMA AND TELSON: The first segment bears 10 granulated carinae, is granulated, and lacks punctae. On the second and third segments the lateral carinae are inconspicuous or absent and punctae are present in adult females but absent in juveniles. The fourth segment has weakly developed dorsolateral carinae, and the fifth segment has two ventrolateral carinae. The fourth and fifth segments are ventrally punctate. Spaces among punctae are smooth in adults, in juveniles they may be partially granulated. The dorsal surface of all segments is mesially smooth, only in juveniles it may bear sparse granules, namely on the first segment. The entire metasoma is glabrous, but short, thin setae may issue from some punctae. The telson is punctate, lacks granules, and has several isolated hairs issuing from the punctae.
PEDIPALPS: The femur of pedipalp has four granulose to crenulate carinae. The patella has seven smooth, dark carinae, and the chela is smooth. The movable fingers bear 9–10 rows of granules with internal and external granules and 2 or 3 distal granules.
LEGS: The femur and patella bear only several solitary hairs and spines. The tibiae bear several spines, namely on the outer side. Tarsomere I of the first to third legs bears on the outer side 5–7 bristles of varying length,

which, however, do not form bristlecombs. The inner sides of all legs bear two rows of spines.

AFFINITIES. The described features distinguish *Orthochirus samrchelsis* **sp. n.** from all other species of the genus. They are recounted in the key below. *O. samrchelsis* **sp. n.** is close to *O. jalalabadensis* **sp. n.** Females of these two species are similarly colored; however, *O. samrchelsis* **sp. n.** has tarsi of all legs without bristlecombs. Additional differences are given in the diagnoses. *O. samrchelsis* **sp. n.** is most similar to *O. sobotniki* **sp. n.** from Iran (see under affinities of *O. sobotniki* **sp. n.**).

Orthochirus scrobiculosus (Grube, 1873)

Androctonus scrobiculosus Grube, 1873: 56.
Butheolus melanurus: Kraepelin, 1899: 35; Pocock, 1900: 28; Birula, 1900: 13; Birula, 1900: 373; Kraepelin, 1901: 267; Kraepelin, 1903: 566; Birula, 1903: 74; Birula, 1904: 32; Birula, 1905: 125; Schenkel, 1932: 381; Caius, 1938: 579; ? Moriggi, 1941: 90; Hadži, 1943: 124; ? Bücherl, 1959: 257; ? Pérez Minnocci, 1974: 20.
Orthochirus melanurus: Kraepelin, 1895: 84; Birula, 1898: 281; Roewer, 1943: 208; ? Tikader & Bastawade, 1983: 134.
Orthochirus melanurus forma *typica*: Birula, 1900: 13.
Butheolus scrobiculosus: Birula, 1909: 356; Birula, 1911: 174; Lampe, 1918: 194.
Butheolus scrobiculatus: Roewer, 1943: 208.
Orthochirus scrobiculosus: Birula, 1917: 215; Vachon, 1940: 181; Whittick, 1947: 124 (in part); Vachon, 1949: 136 (1952: 222); Vachon, 1959: 166; ? Khalaf, 1962: 2; ? Khalaf, 1963: 64; Habibi, 1971: 44; Farzanpay & Pretzmann, 1974: 216; Pérez Minnocci, 1974: 28; Fet, 1980: 225; Fet, 1981: 168; Levy & Amitai, 1980: 94; Farzanpay, 1988: 40; Fet, 1989: 113; Polis & Sissom, 1990: 185; Simard & Watt, 1990: 421; Sissom, 1990: 92; El-Hennawy, 1992: 129; Kovařík, 1993: 203; Amr & El-Oran, 1994: 187; Fet, 1994: 529; Lourenço, 1997: 153; Kovařík, 1998: 117; Kovařík, 1998: 116; Fet & Lowe, 2000: 196; Soleglad & Fet, 2003: 5.
Orthochirus scrobiculosa: ? Pringle, 1960: 78.
Butheolus scrobiculosus scrobiculosus: Birula, 1909: 359.
Orthochirus scrobiculosus scrobiculosus: Birula, 1917: 241; Birula, 1928: 83; Pérez Minnocci, 1974: 28; Levy & Amitai, 1980: 94; Fet, 1989: 116; Fet, 1994: 529; Kovařík, 1997: 49; Fet & Lowe, 2000: 197.
= *Androctonus melanurus* Kessler, 1874: 16 (TL: Novoaleksandrovskoye, Mangyshlak Region, now Kazakstan; ZISP) (syn. by Birula, 1909: 358).
Butheolus scrobiculosus melanurus: Birula, 1909: 359.
Orthochirus scrobiculosus melanurus: Birula, 1917: 241; Birula, 1918: 40; Birula, 1928: 83; Vachon, 1959: 169; Vachon, 1966: 214; Levy & Amitai, 1980: 94; Fet, 1989: 117; Fet, 1994: 529; Kovařík, 1997: 49; Kovařík, 1998: 116; Fet & Lowe, 2000: 198.
Orthochirus melanurus forma *beta* (intermedia): Birula, 1898: 282.
Butheolus melanurus typicus Birula, 1900: 373; ? Pocock, 1900: 29.
= *Buthus schneideri* L. Koch, 1878: 61 (TL: Krasnowodsk; MNHN) (syn. by Pocock, 1890: 121).
Butheolus schneideri: Simon, 1889b: 386.
Orthodactylus schneideri: Karsch, 1886: 76 (in part); Pocock, 1889: 117; Kraepelin, 1891: 215 (in part).
= *Orthodactylus olivaceus* Karsch, 1881: 91 (TL: Sicily (incorrect type locality); ZMHB); Moritz & Fischer, 1980: 321 (syn. by Karsch, 1886: 76)
Orthochirus olivaceus: Birula, 1928: 83; Vachon, 1959: 166.
= *Butheolus conchini* Simon, 1889b: 386 (TL: Bely-Bugor [=Aktepe], Turkmenistan; MNHN); Kraepelin, 1895: 84; Kraepelin, 1899: 36; Birula, 1905: 126; Roewer, 1943: 208; Pérez Minnocci, 1974: 20; (syn. by Birula, 1898: 281).
Butheolus melanurus conchini: Birula, 1900: 374; Birula, 1904: 32; Birula, 1905: 128.
Orthochirus conchini: Levy & Amitai, 1980: 94.
= ? *Orthochirus melanurus* forma *gama* (*concolor*) Birula, 1898: 282 (TL: Karshi, Uzbekistan; ZISP).
Butheolus melanurus concolor: Birula, 1900: 374; Birula, 1904: 32.
Butheolus scrobiculosus concolor: Birula, 1909: 359; Werner, 1916: 81; Birula, 1918: 40; Lampe, 1918: 194.
Orthochirus scrobiculosus concolor: Birula, 1917: 241; Birula, 1918: 40; Vachon, 1959: 169; Pérez Minnocci, 1974: 29; Levy & Amitai, 1980: 94; Fet, 1989: 118; Fet, 1994: 530; Kovařík, 1998: 116; Fet & Lowe, 2000: 198.
= ? *Butheolus melanurus dentatus* Birula, 1900: 375; Pérez Minnocci, 1974: 20 (Husseinabad, Seistan, Persia; ZISP).
Orthochirus scrobiculosus dentatus: Fet, 1989: 116; Fet, 1994: 530; Kovařík, 1997: 49; Kovařík, 1998: 116; Fet & Lowe, 2000: 198.
= ? *Orthochirus scrobiculosus mesopotamicus* Birula, 1918: 35 (TL: Mesopotamia inferior, Iraq; ZISP); Birula, 1928: 83; Vachon, 1966: 214; Pérez Minnocci, 1974: 28; Levy & Amitai, 1980: 94; Fet, 1989: 116; El-Hennawy, 1992: 130; Fet, 1994: 530; Kovařík, 1998: 116; Fet & Lowe, 2000: 199.
= ? *Butheolus melanurus persa* Birula, 1900: 374 (TL: Seistan, Kirman, Birdschan, Iran; ZISP); Birula, 1903: 75; Birula, 1905: 145; Weidner, 1959: 99; Pérez Minnocci, 1974: 20.
Butheolus scrobiculosus persa: Birula, 1909: 359; Penther, 1912: 114; Birula, 1918: 35.
Orthochirus scrobiculosus persa: Birula, 1917: 241; Birula, 1918: 40; Birula, 1928: 83; Levy & Amitai, 1980: 94; Fet, 1989: 116; Fet, 1994: 530 (statut ?);

Kovařík, 1997: 49; Kovařík, 1998: 116; Fet & Lowe, 2000: 199.
Orthochirus persa: Vachon, 1966: 213; Habibi, 1971: 44; El-Hennawy, 1992: 129.

TYPE LOCALITY AND TYPE REPOSITORY. Lenkoran (incorrect type locality; see Fet & Lowe, 2000: 196); UWCP.
TYPE MATERIAL EXAMINED. **Italy**, Sicily (incorrect type locality), 1♂A (holotype of *Orthodactylus olivaceus* Karsch, 1881), leg. Schneider, ZMHB No. 3629.
OTHER MATERIAL EXAMINED. **Afghanistan**, Prov. Mazar-i-Sharif, 9.XII–17.I.1964, 365 m (loc. No. J. 2), 1♂E, leg. Jakeš, MMBC, for locality details see Jakeš & Povolný (1967); Old Balkh, 6.V.1970, 1♂2♀A, leg. E. S. Ross, CASC; 20 km SW Dosi, 7.V.1970, 1♂(im.)A, leg. E. S. Ross, CASC. **Iran**, 10 km W of Baqbaqú (Khorásán), 36°05'N 60°25'E, 10.V.1997, 680 (–) m, 2♀A, leg. M. Kaftan, FKCP. **Turkmenistan**, Ashkhabad, 27.IV.1987, 1♂E, leg. P. Slabý, FKCP; Ashkhabad, 1988, 1♀E, leg. Šeda, FKCP; V.1988, 1♀E, leg. M. Král, FKCP; South Ashkhabad, V.1990, 2♀E, leg. Podhajský, FKCP; Ashgabat, Bagir, 800 m, 16.V.1996, 1♂E, leg. Liehtfang, FKCP; Badkhyz Nature Reserve, ca. 14–16 km SSW of Kyzyldzhar cordon, near Eroilanduz Salt Lake, 340–350 m, (35º40'33"N 61º49'18"E - 35º42'04"N 61º48'53"E), 1♂2♀A, leg. A. V. Gromov, FKCP. **Uzbekistan**, Derbent, 2.V.1981, 1juv.E, leg. S. Bečvář, FKCP; Muratan Range, V.1989, 1♂1♀1juv.E, leg. D. Král, FKCP; Bukhara, Djeiran Pitomnik (Gazelle Nursery), VI.1989, 1♂1♀E, leg. J. Růžička, FKCP; Nuratinski Reserve, Chajatsaj, 1400 m, 15.V.1996, 1♀A, FKCP.

DIAGNOSIS: Fourth and fifth metasomal segments ventrally punctate and without carinae. Spaces among punctae smooth, without granules. Dorsal surface of all metasomal segments mesially smooth, without granules. Entire metasoma glabrous (very short, thin setae may issue from punctae). Mesosoma and metasoma black, telson reddish brown, legs yellow, pedipalps yellow to greenish yellow. Movable fingers of pedipalps bear 8–10 rows of granules with internal granules and without external granules. Movable fingers with 2–5 distal granules. Tarsus of first to third legs with bristlecombs, fourth without. Pectinal teeth number 15–18 in females and 19–20 in males.

DISTRIBUTION. Afghanistan (Pocock, 1889: 118), Iran (Vachon, 1966: 214; Habibi, 1971: 44), Kazakhstan (Fet, 1989: 117), Tajikistan (Fet, 1989: 117), Turkmenistan (Simon, 1889b: 386), and Uzbekistan (Fet, 1989: 118).

Published records for Djibouti (Kraepelin, 1901: 267), Egypt (Kraepelin, 1899: 36), India (Pérez Minnocci, 1974: 28; Tikader & Bastawade, 1983: 140), Iraq (Khalaf, 1962: 2), Israel (Bücherl, 1959: 257), Pakistan (Kraepelin, 1899: 36; Pérez Minnocci, 1974: 28), and Somalia (Moriggi, 1941: 90) must be regarded as erroneous.

COMMENTS: Despite several attempts, it has unfortunately not been possible to examine the types of taxa described by Birula, which have hitherto been regarded as subspecies of *O. scrobiculosus*. It concerns *O. s. concolor* Birula, 1898, *O. s. dentatus* (Birula, 1900), *O. s. mesopotamicus* Birula, 1918, and *O. s. persa* (Birula, 1900). In order to complete the revision, I thus have no choice but to leave the taxonomic positions of those taxa unresolved, and hope that the situation can be corrected in a near future. Birula (1918: 39–40) clearly characterized *O. s. concolor* Birula, 1898 as lacking external granules on movable fingers, and *O. s. mesopotamicus* (Iraq) and *O. s. persa* (Iran, Pakistan) as possessing these granules. It is therefore very likely that these two taxa in reality are separate species of which *O. s. mesopotamicus* is close to *O. iraqus* **sp. n**., which may even prove to be its junior synonym. Similarly, one of the four new species described here from Iran could prove to be a junior synonym of *O. s. persa*.

Orthochirus sobotniki sp. n.
(Table 1)

TYPE LOCALITY AND TYPE REPOSITORY. **Iran**, 5 km SE of Posht Chenár, 29°12'941"N, 53°20'014"E, alt. 1692 m; FKCP.
TYPE MATERIAL. **Iran**, 5 km SE of Posht Chenár, 19–20.4.2000, 29°12'941"N, 53°20'014"E, alt. 1692 m, 1♂A (holotype) 1♀A (allotype) 1im. ♂A (paratype), leg. J. Šobotník, FKCP.
ETYMOLOGY: Named after Jan Šobotník, who collected the types.

DIAGNOSIS: Fourth and fifth metasomal segments ventrally punctate and without carinae. Spaces among punctae smooth, without granules. Entire metasoma glabrous (short, thin setae may issue from punctae). Dorsal surface of all metasomal segments mesially smooth, without granules (several scattered granules may be present on fifth segment). Mesosoma and metasoma black, telson reddish brown, femur of pedipalp gray. In adults legs and pedipalps yellow, in juveniles femur of legs and pedipalps black. Movable fingers of pedipalps bear 8 rows of granules with internal and external granules and 2 distal granules. Tarsi of all legs without bristlecombs.

DESCRIPTION: The adults are about 30 mm male and 41 mm female long. Measurements of the carapace, telson, segments of the metasoma and segments of the pedipalps, and numbers of pectinal teeth are given in Table 1. The distance between trichobothria d_1 and d_3 on

the femur of pedipalp is approximately equal to that between d_3 and d_4; trichobothrium e_1 is situated between d_4 and d_5, or at the level of d_4.

COLORATION: The mesosoma and metasoma are black, the telson is reddish brown, legs are yellow, and pedipalps are yellow with a slight greenish tint primarily on femur. Only the immature male have the femora of legs and pedipalps black. The seventh sternite is black, other sternites are brown with a yellow strip on the posterior margin.

MESOSOMA AND CARAPACE: The mesosoma bears a median carina, which may be absent. Both the mesosoma and carapace are densely granulated, only the interocular area is smooth. The seventh sternite is smooth and bears four granulated carinae. The other sternites are smooth, with four or two smooth carinae. Pectinal teeth number 21 or 23.

METASOMA AND TELSON: The first segment bears 10 granulated carinae, is smooth but may bear several large granules, and lacks punctae. On the second and third segments the lateral carinae are inconspicuous or absent and shallow punctae are present. The fourth and fifth segments have inconspicuous two dorsolateral carinae and two ventrolateral carinae, which on the fourth segment are smooth or absent (males) and on the fifth segment are incomplete, present only in the posterior half, and composed of large teeth. The fourth and fifth segments are ventrally punctate. Spaces among punctae are smooth. The dorsal surface of all segments is smooth and delimited by well developed dorsolateral carinae. The entire metasoma is glabrous, but short, thin setae may issue from some punctae. The telson is punctate, lacks granules, and has several isolated hairs issuing from the punctae.

PEDIPALPS: The femur of pedipalp is smooth and has four granulose to crenulate carinae. The patella has seven smooth carinae, which may be absent, and the chela is smooth. The movable fingers bear 8 rows of granules with internal and external granules and 2 distal granules.

LEGS: All legs lack long hairs, only tibiae bear several short hairs and spines, namely on the outer side. The tarsomeres bear two rows of spines on inner sides and several hairs on the outer distal margin. Tarsi of all legs lack bristlecombs but may bear 3–5 bristles of varying length.

AFFINITIES. The described features distinguish *Orthochirus sobotniki* **sp. n**. from all other species of the genus. They are recounted in the key below. *O. sobotniki* sp. n. is close to *O. samrchelsis* **sp. n**., which, however, has 17–19 pectinal teeth and 9–10 rows of granules on the movable fingers. Another difference is in the shape of metasomal segments, which are longer and narrower in *O. sobotniki* **sp. n**. (Table 1).

Orthochirus varius sp. n.
(Table 1)

TYPE LOCALITY AND TYPE REPOSITORY. **Iran**, Hormozgan prov., Beshagerd Mts., Davari vil., 26º27'N - 57º38'; FKCP.

TYPE MATERIAL. **Iran**, Hormozgan prov., Beshagerd Mts., Davari vil., 26º27'N–57º38'E, 6-11.IV.2000, 3♀E (allotype and paratypes) 4♂A 1♂E (holotype and paratypes), leg. V. Siniaev & A. Plutenko, FKCP.

ETYMOLOGY. From Latin, in reference to the unusually strong variation found in the type series (see comments below).

DIAGNOSIS: Fourth and fifth metasomal segments ventrally without carinae and shallowly punctate (punctation absent in some males). Spaces among punctae smooth, without granules. Entire metasoma glabrous (short, thin setae issue from punctae). Dorsal surface of all metasomal segments smooth, without granules and with lateral granulated carinae. Mesosoma and metasoma brownish or greenish black, telson reddish brown, femur and most of patella of legs and pedipalps greenish gray to black, tibiae yellow to greenish gray or dark brown. Movable fingers of pedipalps bear 7–9 rows of granules with internal and external granules and 2 distal granules. Tarsomere I of first to third legs with 1–6 variably long bristles which may or may not form bristlecombs.

DESCRIPTION: The males range between 20 and 25 mm in length, and the females are up to 35 mm long. Measurements of the carapace, telson, segments of the metasoma and segments of the pedipalps, and numbers of pectinal teeth are given in Table 1.

COLORATION: The mesosoma and metasoma are black, the telson is reddish brown, and the legs and pedipalps may be either entirely black or may have the tibia and patella of legs and the chela and patella of pedipalps yellowish gray.

MESOSOMA AND CARAPACE: The mesosoma bears a median carina. Both the mesosoma and carapace are densely granulated, only the interocular area is smooth. The seventh sternite is smooth or granulated and bears four granulated carinae. Pectinal teeth number 21–23.

METASOMA AND TELSON: The first to third segments bear 10 granulated carinae, are smooth (several granules may be present), and lack punctae. The fourth and fifth segments have dorsolateral and ventrolateral carinae, are ventrally only shallowly punctate, and in some males punctation may be altogether absent. Spaces among punctae are smooth. The dorsal surface of all segments is smooth and delimited by well developed dorsolateral carinae. In some males the dorsal surface lacks a median trough and instead bears a ridge. The entire metasoma is

glabrous, but short, thin setae may issue from some punctae. The telson is punctate and lacks granules.
PEDIPALPS: The femur of pedipalp is smooth and bears four granulose or smooth carinae. The patella has seven smooth carinae and the chela is smooth. The movable fingers bear 7–9 rows of granules with internal and external granules and 2 distal granules.
LEGS: The femur has four and the patella five granulated carinae. Tarsomere I of the first to third legs bears 1–6 variably long bristles which may or may not form bristlecombs. The inner sides of all legs bear one or two rows of spines. The fourth legs lack bristlecombs and bear only sparse, short spines.

AFFINITIES. The described features distinguish *Orthochirus varius* **sp. n**. from all other species of the genus. They are recounted in the key below. *Orthochirus varius* **sp. n**. is close to *O. fuscipes* (Pocock, 1900), from which it differs in the weak to absent punctation on the fourth and fifth metasomal segments.

COMMENTS: This species is surprisingly variable even in characters which in other species are quite stable. Whereas some females may have on the third legs 6 bristles forming bristlecombs, some males may instead have only a single bristle. Females and some males have the ventral surface of the fifth metasomal segment shallowly punctate, whereas in other males punctae are absent. One male lacks the median trough on the dorsal surface of metasomal segments and has a ridge in its place.

Orthochirus zagrosensis sp. n.
(Table 1)

Orthochirus sp. n. ?: Kovařík, 1997: 47 (in part).

TYPE LOCALITY AND TYPE REPOSITORY. **Iran**, Dasht-E-Arzhan, 29°34'644"N, 51°56'889"E, alt. 2000 m; FKCP.
TYPE MATERIAL. **Iran**, Dasht-E-Arzhan, 21–22.4.2000, 29°34'644"N, 51°56'889"E, alt. 2000 m, 1♂A (holotype), leg. J. Šobotník; prov. Boyerahmad-va-Kuhgiluyeh, alt. ca. 1800–2500 m, Zagros Mts., Kuh-e-Dinar ridge, Yasuj 10 km N by road, 30°39'N, 51°36'E, 1–2.V.1996 (loc. No. 13 in Frynta et al., 1997: 4), 1♀A (allotype) A, leg. J. Pitulová; prov. Esfahan, alt. ca. 2000–2200 m, Zagros Mts., Qamishlu, 32°02'N, 51°29'E, 27–28.IV.1996, (loc. No. 5 in Frynta et al., 1997: 4), 1♀E (paratype), leg. M. Kaftan; prov. Yazd, E of Taft, 31°44'N, 54°13'E, 1542 m, 7.IV.2004, 1im.A (paratype), leg. V. Vignoli & P. Crucitti; prov. Yazd, W of Baghdadabad, Taft, 31°35'N, 54°24'E, 1502 m, 9.IV.2004, 1♀A (paratype), leg. V. Vignoli & P. Crucitti; prov. Yazd, 23 km W of Ardakan, 32°09'N, 53°49'E, 1450 m, 12.IV.2004, 1♀A (paratype), leg. V. Vignoli & P. Crucitti. All types are in FKCP.

ETYMOLOGY. Named for the Zagros Mountains, where the entire type series has been collected.

DIAGNOSIS: Fourth and fifth metasomal segments ventrally punctate and without carinae. Spaces among punctae smooth, without granules. Metasoma ventrally glabrous (short, thin setae may issue from punctae), dorsolateraly may bear marginal row of long hairs. Dorsal surface of all metasomal segments mesially smooth, without granules. Mesosoma and metasoma black, telson reddish brown to black, femur and patella of legs and pedipalps black, tibiae of legs yellow to yellowish green, manus of pedipalp black, fingers yellow to yellowish green. Movable fingers of pedipalps bear 8 or 9 rows of granules with internal and external granules and 2 distal granules. Tarsomere I of first to third legs with bristlecombs composed of only 4–6 bristles, fourth legs without bristlecombs.

DESCRIPTION: The adult male is 28.4 mm long and the females are about 45 mm long. Measurements of the carapace, telson, segments of the metasoma and segments of the pedipalps, and numbers of pectinal teeth are given in Table 1. The distance between trichobothria d_1 and d_3 on the femur of pedipalp is approximately equal to that between d_3 and d_4; trichobothrium e_1 is situated between d_3 and d_4.
COLORATION: The mesosoma and metasoma are black, the telson is reddish brown, the femur and patella of legs and pedipalps are black, and the manus of pedipalp is also black; only the fingers of pedipalps and tibia of legs are yellowish green. The seventh sternite is black, other sternites are yellowish green.
MESOSOMA AND CARAPACE: The mesosoma bears a median carina. The carapace is densely granulated, only the interocular triangle is smooth. The seventh sternite is smooth or granulated and bears four smooth or granulated carinae. The other sternites are smooth. Pectinal teeth number 18 to 20 in the females and 21 or 22 in the male.
METASOMA AND TELSON: The first segment bears 10 granulated carinae, only lateral carinae may be smooth. The second and third segments lack lateral carinae, the fourth segment bears only dorsal carinae, and the fifth segment bears dorsal carinae and two incomplete ventrolateral carinae present only in the posterior half and composed of large teeth. All segments are smooth and punctate. Punctation is weak on the first three segments and better developed on the fourth and fifth segments of adults, but less so in juveniles. Spaces among punctae are smooth. The dorsal surface of all segments is mesially smooth except for several tubercles along dorsolateral carinae. The entire metasoma and

telson are nearly glabrous, only the dorsolateral edges of segments, particularly of the fifth segment, bear a single row of long hairs in the allotype and of short, inconspicuous hairs in the holotype and paratype. The telson is punctate and lacks granules.
PEDIPALPS: The femur of pedipalp bears four smooth carinae of which the ventral carinae are poorly developed. The patella has seven smooth carinae, and the chela has smooth carinae which may be discernible throughout the length of the fixed fingers. The pedipalps may be hirsute, especially the femur. The movable fingers bears 8 or 9 rows of granules with external and internal granules and 2 distal granules.
LEGS: The femur bears four granulated carinae, the patella may have five carinae, and the tibia is smooth. The patella bears only a few solitary hairs and spines. The tibia bears several spines, namely on the outer side where they form two rows. Tarsomere I of first to third legs bears bristlecombs composed of 4-6 bristles, fourth legs lack bristlecombs.

AFFINITIES. The described features distinguish *Orthochirus zagrosensis* **sp. n**. from all other species of the genus. *O. zagrosensis* **sp. n**. is close to *O. fuscipes* (Pocock, 1900) from Pakistan, which differs in coloration (see the key below).

Orthochiroides Kovařík, 1998

Orthochiroides Kovařík, 1998: 115; Fet & Lowe, 2000: 192.
TYPE SPECIES. *Orthochiroides vachoni* Kovařík, 1998.

DIAGNOSIS. Patella of pedipalp without ventral trichobothria. Dorsal trichobothria of femur arranged in beta-configuration. Trichobothrium d_2 of pedipalp femur absent on dorsal surface. Pectines with fulcra. Tibial spurs present on third and fourth legs. Tarsomere I of first to third legs with bristlecombs in females, often without bristlecombs in males. Movable fingers of pedipalps bear 7–9 rows of granules. Carapace, in lateral view, slopes distinctly downward from median eyes to anterior margin. First and second metasomal segments with carinae. Fourth and fifth metasomal segments of adults ventrally punctate. Telson bulbous, aculeus shorter than vesicle. Total length under 40 mm.

Orthochiroides insularis (Pocock, 1899), **comb. n.**

Butheolus insularis Pocock, 1899: 8; Pocock, 1903: 180; Kraepelin, 1903: 565; Vachon, 1979: 237.
Orthochirus insularis: Birula, 1917: 215.
Orthochirus bicolor insularis: Levy & Amitai, 1980: 94; El-Hennawy, 1992: 129; Kovařík, 1998: 116; Fet & Lowe, 2000: 194.
TYPE LOCALITY AND TYPE REPOSITORY. Socotra (Mt. Raggit); BMNH.
TYPE MATERIAL EXAMINED. Yemen, **Socotra** Island, Hadibu Plain, 1♀A (holotype), leg. Grant and Forbes, BMNH No. 1899.7.4.180.
OTHER MATERIAL EXAMINED. Yemen, **Socotra** Island, Qalansiyah env., DITWAH (lagoon), 23m, N 12°41'42'' E 53°30'08'', 9.XII.2003, 1♂A, David Král lgt, FKCP; GUBBAH vill. env., 7 m, N 12°36'35'' E 53°46'56'', 23.XI.2003, 1♀1im.A, leg. D. Král, FKCP. QAARIAH vill. env., 11 m, N 12°38'05'' E 54°12'39'', 28.XI.2003, 1♂A, leg. J. Farkač, FKCP.

DIAGNOSIS. Fourth and fifth metasomal segments of adults ventrally punctate. Punctae on ventral surface of fifth metasomal segment much smaller than smooth spaces among them. Metasoma glabrous, only fifth segment may bear dorsolateral row of hairs. Hairs may be present also on dorsal surface of telson. Dorsal surface of all metasomal segments smooth, without granules. Color uniformly brown to black. Femur, patella and manus of pedipalp brown to black, fingers, tibia, and tarsomeres of legs yellowish brown to green. Chela with conspicuously elevated carinae. Movable fingers bear 7–9 rows of granules with internal and external granules and with 3 or 4 distal granules.

COMMENTS. The so far unpublished placement of this taxon in the genus *Orthochiroides* was known already to Vachon, who labeled the holotype "*Orthochiroides insularis* (Pocock, 1899) = *Butheolus insularis* Pocock, 1899, M. Vachon det.". A color photo of a live female is in Kovařík (2000: 64).

DISTRIBUTION. Yemen (Socotra Island) (Pocock, 1899: 9).

Orthochiroides socotrensis **sp. n.**

TYPE LOCALITY AND TYPE REPOSITORY. Yemen, **Socotra** Island, Noged plain, Qaareh (waterfall), 57m, N 12°20'10'' E 53°37'56'; FKCP.

TYPE MATERIAL. Yemen, **Socotra** Island, Noged plain, Qaareh (waterfall), 57m, N 12°20'10'' E 53°37'56', 5–6.XII.2003., 1♂A (holotype), leg. D. Král; Noged plain, Wadi Ireeh, 95 m, N12°23'11''E53°59'47'', 6–7.XII.2003, 1♂A (paratype), leg. D. Král; Noged plain, 12.318N, 53.678E, 250 m, 1♀E 1♂2juvs.A (paratypes), XI.1999, 1♀A (allotype), III.2001, leg. V. Bejček & K. Šťastný. All types are in FKCP.
ETYMOLOGY. Named for its geographic distribution.

DIAGNOSIS. Fourth and fifth metasomal segments of adults ventrally punctate, without carinae. Punctae on ventral surface of fifth metasomal segment much smaller

than smooth spaces among them. Metasoma glabrous, only fifth segment may bear dorsolateral row of hairs. Hairs may be present also on dorsal surface of telson. Dorsal surface of second to fifth metasomal segments smooth, without punctae and granules. Color of mesosoma dark green, metasoma and telson reddish brown, pedipalps and legs of adults yellow to yellowish green. Chela tuberculate, with conspicuously elevated carinae. Movable fingers bear 7 or 8 rows of granules with internal and external granules and with 5 distal granules.

DESCRIPTION: The adult male (holotype) is 27.1 mm long.
COLORATION: The mesosoma is dark green, the metasoma and telson are reddish brown, and the pedipalps and legs of adults are yellow to yellowish green. Juveniles have the femur and partly also the patella of pedipalps and legs dark green.
MESOSOMA AND CARAPACE: The mesosoma bears a median carina. The carapace is densely granulated. The seventh sternite is granulated and bears four smooth or granulated carinae. Pectinal teeth number 16 to 18 in the females and 18 to 20 in the male.
METASOMA AND TELSON: The first segment bears 10 granulated carinae, only dorsal carinae may be smooth. The second segment lacks lateral carinae, the third segment bears only dorsal and ventral carinae, the fourth segment of adults is without carinae, and the fifth segment may bear dorsolateral carinae (namely in males). Females may be entirely without carinae even on the third segment, whereas juveniles have ventral carinae also on the fourth and fifth segments. The second to fifth segments of adults are smooth and punctate. Punctation is weak on the second and third segments and better developed on the fourth and fifth segments of adults, but less so in juveniles. Spaces among punctae are smooth. The dorsal surface of all segments is mesially smooth except for several tubercles on the first segment. The entire metasoma and telson are nearly glabrous, only the fifth segment may bear a dorsolateral row of hairs. Hairs may be present also on the dorsal surface of telson. The telson is punctate and lacks granules.
PEDIPALPS: The femur has four or five carinae, the patella has seven carinae, and the chela has six less pronounced carinae. Carinae on the femur and patella are pronounced in both sexes as well as in juveniles. The movable fingers bears 7 or 8 rows of granules with external and internal granules and 5 distal granules.
LEGS: The femur bears four granulated carinae, the patella and tibia have four or five carinae. The tibia and tarsomeres bear irregularly spaced spines, namely on the outer side. Tarsomere I of the first to third legs may bear bristlecombs composed of 4–6 bristles, the fourth legs lack bristlecombs.

AFFINITIES. The described features distinguish *Orthochiroides socotrensis* **sp. n**. from all other species of the genus. Punctae on the fourth and fifth metasomal segments are similar to *O. insularis*. The new species differs from other species of the genus especially in the light coloration of legs and pedipalps (see the key below).

Orthochiroides vachoni Kovařík, 1998

Orthochiroides vachoni Kovařík, 1998: 117; Kovařík, 1998: 115; Fet & Lowe, 2000: 193; Kovařík, 2002: 9; Kovařík, 2003: 142.

TYPE LOCALITY AND TYPE REPOSITORY. Somalia, Sar Uanle, about 20 km south from Chisimaio, 00°29'48"S–42°25'30"E; MZUF.
TYPE MATERIAL EXAMINED. **Somalia**, Sar Uanle, about 20 km South from Chisimaio, 00°29'48"S - 42°25'30"E, (for locality details see Messana et al., 1977, and Vanini et al., 1977), 18♂A (holotype and paratypes No. 1–17), 11♀A (allotype and paratypes No. 18–27), 9 juvs.A (paratypes No. 28–36). Holotype (No. 533), allotype (No. 537), and paratypes No. 1–9, 20–29, 31–35 (No. 539) in MZUF. Other paratypes in BMNH, FKCP, MNHN, NMPC, SMFD, ZMHB, ZMUH (see Kovařík, 1998).
OTHER MATERIAL EXAMINED. Yemen, **Socotra** Island, XI.2000, 1♂A, leg. V. Bejček & K. Šťastný, FKCP.

DIAGNOSIS. Fourth and fifth metasomal segments of adults ventrally punctate, in females without carinae, in juveniles and males with carinae. Ventral punctae on fifth metasomal segment large, irregularly shaped, occupy much of surface; some spaces may be granulated. Entire metasoma glabrous. Dorsal surface of all metasomal segments smooth, without granules. Color uniformly brown to black. Femur, patella and manus of pedipalps brown, fingers, tibia, and tarsomeres of legs yellow to yellowish brown. Chela with conspicuously elevated carinae. Movable fingers bear 7–9 rows of granules with internal and external granules and zero to four distal granules.

DISTRIBUTION. Somalia (Kovařík, 1998), Yemen, Socotra Island (first report).

Keys to Genera and Species

See Table 2 for a key to the genera related to *Orthochirus*, and Table 3 for a key and synopsis of the geographical distribution of the Asian species of *Orthochirus*.

Characters	123
Baloorthochirus Kovařík, 1996 = *Pakistanorthochirus* Lourenço, 1997, **syn. n.**	101
Butheolus Simon, 1882 = *Nanobuthus* Pocock, 1895, **syn. n.** = *Neobuthus* Hirst, 1911 (syn. by Kovařík, 2003: 137)	000
Orthochirus Karsch, 1892 = *Afghanorthochirus* Lourenço & Vachon, 1997, **syn. n.**	111
Orthochiroides Kovařík, 1998	110
Paraorthochirus Lourenço & Vachon, 1997	011

Characters:
1 - Trichobothrium d_2 of pedipalp femur absent on dorsal surface.
2 - Fifth metasomal segment punctate.
3 - Telson elongate, aculeus equal to or longer than vesicle.

Explanatory notes: 1 = yes, 0 = no.

Table 2: Key to genera related to *Orthochirus.*

Key to species of *Butheolus*

1. Metasoma very thin. Length to width ratio of fourth metasomal segment higher than 1.6 .....
B. andersoni (Pocock, 1895), **comb. n.**
– Length to width ratio of fourth metasomal segment lower than 1.5 2

2. Mesosoma and metasoma yellow …….
B. ferrugineus Kraepelin, 1898
– Mesosoma and metasoma gray or black ……. 3

3. Chela of pedipalp dorsally with strong carinae …… ***B. thalassinus*** Simon, 1882
– Chela of pedipalp dorsally smooth, without strong carinae …… 4

4. Fifth metasomal segment ventrally with a median carina ……. ***B. anthracinus*** (Pocock, 1895)
– Fifth metasomal segment ventrally without carinae and densely granulated ……. ***B. gallagheri*** Vachon, 1980

Key to species of *Orthochiroides*

1. Manus of pedipalps brown or black, darker than fingers …… 2
– Entire chela of pedipalps yellow ……..
O. socotrensis **sp. n.**

2. Fifth metasomal segment ventrally smooth, only sparsely punctate. Punctae minute, round, occupy much smaller area than smooth spaces among them. …….
O. insularis (Pocock)
– Fifth metasomal segment ventrally covered by dense, irregularly shaped punctae that usually occupy area larger than spaces among them (namely in males) …...
O. vachoni Kovařík

Recognition of Asian species of *Orthochirus*

Species that cannot be placed in the key is because I have not had an opportunity to examine them. Comments on their probable positions and affinities are included in the taxonomic section above.

Orthochirus danielleae (Lourenço & Vachon, 1997), **comb. n.**
Orthochirus erardi (Lourenço & Vachon, 1997), **comb. n.**
Orthochirus krishnai Tikader & Bastawade, 1983 **– nomen dubium**
Orthochirus monodi (Lourenço & Vachon, 1997), **comb. n.**

Species groups that are not separable by the characters used in the key in Table 3

01010001
Orthochirus feti **sp. n.**
Orthochirus gromovi **sp. n.**
Orthochirus heratensis **sp. n.**
DISTINGUISHING CHARACTERS IN FORM OF KEY
1. Metasoma and pedipalps less densely hirsute. The difference is apparent namely on the patella of pedipalps, where there are less than 15 hairs ……...
O. heratensis **sp. n**. (Afghanistan)
– Metasoma and pedipalps more densely hirsute. The difference is apparent namely on the patella of pedipalps, where there are more than 30 hairs ……. 2

2. Entire legs are yellow. Pectinal teeth number 15–18 in females and 17–20 in males. ……..
O. gromovi **sp. n**. (Turkmenistan)
– At least femur and patella of legs dark. Pectinal teeth number 18–20 in females and 22–23 in males. This species is the most hirsute and has the longest hairs. ……..... ***O. feti*** **sp. n.** (Uzbekistan)

10110001
Orthochirus samrchelsis **sp. n.**
Orthochirus sobotniki **sp. n.**
DISTINGUISHING CHARACTERS. *O. samrchelsis* sp. n. from Afghanistan has 17–19 pectinal teeth, movable fingers with 9–10 rows of granules, and shorter and broader metasomal segments than *O. sobotniki* sp. n.

Characters and geographic distributions	12345678	Af	In	Ir	Iq	Ka	Ta	Tu	Uz	Pa
***Orthochirus afghanus* sp. n.**	11110001	x	–	–	–	–	–	–	–	–
Orthochirus bicolor (Pocock, 1897)	11110111	?	x	–	–	–	–	–	–	?
***Orthochirus feti* sp. n.**	01010001	–	–	–	–	–	–	–	x	–
Orthochirus flavescens (Pocock, 1897)	12110111	?	x	–	–	–	–	–	–	?
Orthochirus fuscipes (Pocock, 1900)	11110021	–	–	x	–	–	–	–	–	x
***Orthochirus gromovi* sp. n.**	01010001	–	–	–	–	–	–	x	–	–
***Orthochirus heratensis* sp. n.**	01010001	x	–	–	–	–	–	–	–	–
***Orthochirus iranus* sp. n.**	12112011	–	–	x	–	–	–	–	–	–
***Orthochirus iraqus* sp. n.**	11110001	–	–	–	x	–	–	–	–	–
***Orthochirus jalalabadensis* sp. n.**	11111002	x	–	–	–	–	–	–	–	–
Orthochirus pallidus (Pocock, 1897)	1?101000	x	x	–	–	–	–	–	–	x
***Orthochirus samrchelsis* sp. n.**	10110001	x	–	–	–	–	–	–	–	–
Orthochirus scrobiculosus (Grube, 1873)	01110001	x	?	x	?	x	x	x	x	?
***Orthochirus sobotniki* sp. n.**	10110001	–	–	x	–	–	–	–	–	–
***Orthochirus varius* sp. n.**	12110000	–	–	x	–	–	–	–	–	–
***Orthochirus zagrosensis* sp. n.**	11110001	–	–	x	–	–	–	–	–	–

Characters:

1 - Rows of granules on movable fingers of pedipalps with external granules.
2 - Tarsi of first to third legs with bristlecombs.
3 - Entire telson glabrous (short, thin setae may issue from some punctae).
4 - Fourth and fifth metasomal segments of adults ventrally without median carinae.
5 - Spaces among punctae on ventral surface of fourth and fifth metasomal segments granulated in adults.
6 - Dorsal surface of fourth metasomal segment mesially densely granulated.
7 - Dorsal surface of fifth metasomal segment mesially densely granulated.
8 - Fourth and fifth metasomal segments of adults clearly punctate, punctation to some extent discernible also on third segment.

Explanatory notes: 1 = yes, 0 = no, 2 = character may be variable or related to sexual dimorphism; Af = Afghanistan, In = India, Ir = Iran, Iq = Iraq, Ka = Kazakhstan, Ta = Tajikistan, Tu = Turkmenistan, Uz = Uzbekistan, Pa = Pakistan.

Table 3: Key to Asian species of *Orthochirus.*

from Iran, which has 21–23 pectinal teeth and movable fingers with 8 rows of granules.

11110111
Orthochirus bicolor (Pocock, 1897)
Orthochirus flavescens (Pocock, 1897)
DISTINGUISHING CHARACTERS. *O. bicolor* is easily separated from *O. flavescens* and all other species of the genus by having the first three metasomal segments yellow and the fourth and fifth segments black.

12112011
Orthochirus fuscipes (Pocock, 1900)
***Orthochirus iranus* sp. n.**
DISTINGUISHING CHARACTERS. *O. iranus* **sp. n**. is easily separated from *O. fuscipes* by having the femur and patella of pedipalp black (the chela of pedipalp is yellow). In *O. fuscipes* the chela and patella are yellow, and only the femur of pedipalp may be black in darker-colored specimens.

11110001
***Orthochirus afghanus* sp. n.**
Orthochirus fuscipes (Pocock, 1900)
***Orthochirus iraqus* sp. n.**
***Orthochirus zagrosensis* sp. n.**
DISTINGUISHING CHARACTERS IN FORM OF KEY

1. Dorsal surface of fourth metasomal segment smooth and sharply delimited by two lateral carinae .....……***O. iraqus* sp. n.** (Iraq)
– Dorsolateral surface of fourth metasomal segment punctate or tuberculate, lateral carinae often absent, if present then do not sharply delineate border between smooth and punctate/tuberculate areas .....….. 2

2. Bristlecombs on third legs composed of 9-13 bristles..... ***O. afghanus* sp. n.** (Afghanistan)
– Bristlecombs on third legs composed of from 4-8 bristles. .....….. 3

3. Manus of pedipalp dark brown, mesosoma, metasoma, and femur and patella of pedipalp black……. ……..…***O. zagrosensis* sp. n.** (Iran)
– Manus and patella of pedipalp yellow, mesosoma, metasoma, and femur of pedipalp greenish gray or sometimes black. … ***O. fuscipes*** (Pocock, 1900) (Iran, India and Pakistan)

Comments on African and Arabian Species of *Orthochirus*

Three species are known from Africa. The first one described was *Orthochirus aristidis* (Simon, 1883) from Egypt, to which the same author subsequently added *Orthochirus innesi* Simon, 1910, also from Egypt. *Orthochirus innesi* was characterized by the describer (Simon, 1910: 78–79) as having the ventral surface of the fifth metasomal segment posteriorly punctate to weakly granulose. Granules may be present also on the fourth metasomal segment, whereas in *Orthochirus aristidis* (Simon, 1883) the spaces among punctae are entirely smooth. However, examination of numerous specimens from populations occurring in Morocco and Egypt convinces me that the spaces among punctae may be either entirely smooth or slightly granulose, although not as much as in Asian species. The third species is *Orthochirus seurati* Pallary, 1929 from Algeria, which was synonymized with *O. innesi* by Foley (1945: 84). Unfortunately, the types of these three species are deposited at MNHN, and I was not afforded an opportunity to study them. I can only hope that MNHN will change its policy, which is detrimental to research and against the spirit of the Code (ICZN, 1999, Recommendation 72F.3).

In the region between Egypt and Syria there occurs a taxon which was described as *Orthochirus innesi negebensis* Shulov & Amitai, 1960, and is also sometimes labeled as *O. scrobiculosus negebensis* (e.g. Levy & Amitai, 1980: 96; Fet & Lowe, 2000: 199). I suspect it to be a separate species, but this issue can be resolved only by study of MNHN types and their comparison with more recently collected samples of various populations.

General Discussion

The genus *Orthochirus* has never been revised and no acceptable key has been published. The reason may well lie in the surprising variability of characters which in other genera are considered species- and even genus-diagnostic. Searching for characters usable in a key to *Orthochirus* species, I have assessed the degree of variability on species available to me in reasonably large series and numbers of populations.

Buthids normally have an orthobothriotaxic pattern with 4 internal and 5 dorsal trichobothria on the femur of pedipalp; however *Baloorthochirus*, *Orthochiroides*, and *Orthochirus* lack trichobothrium d_2 (see Sissom 1990: 67). I at first assumed that d_2 migrated to the internal spect (Kovarik 1996: 178) and one of the internal trichobothria was lost. It appeared to be supported by the fact that this trichobothrium is as large as d_1 and d_3–d_5, whereas the remaining three internal trichobothria are much smaller. However, subsequent examination of *Butheolus* and *Paraothochirus*, which have d_2 situated on the dorsal surface, convinced me that it was the d_2 which was lost. The reason is that in those two genera the d_2 is smaller than the other dorsal trichobothia and on the internal surface they have one large and three small trichobothria situated exactly in place where *Baloorthochirus*, *Orthochiroides* and *Orthochirus* have the large internal trichobothium (Figs. 5, 6).

One of the most important characters in scorpion taxonomy is the distribution pattern of trichobothria. For *Orthochirus* and its separation from related genera, the absence of trichobothrium d_2 (Fig. 5) is an important criterion, which was used by Lourenço & Vachon (1997: 327) to establish a new genus, *Paraorthochirus.* However, the absence of a single trichobothrium is the only character distinguishing *Paraorthochirus* from *Orthochirus*, which makes the status of *Paraorthochirus* open to question. Moreover, the two genera inhabit the same region.

Tikader & Bastawade (1983: 113) used the position of trichobothrium *Est* on the pedipalp chela as a chief character in their key to the Indian species of *Orthochirus*. I checked the position of this trichobothrium in many specimens and found it to be so intraspecifically variable and population-dependent that it clearly is useless in separating species.

In a single instance, I decided to use the mutual positions of trichobothria d_1, d_3, d_4, and e_1 on the femur of pedipalp as a supplemental character. These positions, however, cannot be used as an independent character and cannot be extrapolated to the entire genus, because in the holotype of *O. samrchelsis* **sp. n**. on the left femur the distance between d_1 and d_3 is shorter than that between d_3 and d_4, and e_1 is located between d_3 and d_4 (Fig. 5), whereas on the right femur the distance between d_1 and d_3 approximately equals that between d_3 and d_4, and e_1 is between d_4 and d_5.

As an independent character, mutual positions of any trichobothria cannot, in my opinion, be used to separate species of *Orthochirus.*

Another variable feature frequently encountered in the family Buthidae is the number of rows of granules on the movable fingers, existence of external and internal granules at these rows, and presence of distal granules. In *Orthochirus* there are 7–10 rows, most frequently 8, and they cannot be used as a principal differentiating character. The last rows are usually not slanted and often lack some accessory external and internal granules. However, all Asian species of *Orthochirus* have internal granules present at least at the first five rows and usually possess also external granules. Only four species (*O. feti* **sp. n**., *O. gromovi* **sp. n**., *O. heratensis* **sp. n**., and *O. scrobiculosus* (Grube, 1873)) completely lack external granules. The number of distal granules can be used as only a supplemental

character and only for certain species. In the Asian species the number of distal granules varies between two and five. Two are in the Iranian *O. sobotniki* **sp. n**., *O. varius* **sp. n.,** and *O. zagrosensis* **sp. n**.; all the above described new species from Afghanistan have two or three distal granules; *O. fuscipes* has two to four, *O. bicolor* and *O. iraqus* **sp. n**. have four or five, and *O. scrobiculosus* has three to five distal granules.

A convenient way of distinguishing species is also the coloration of the femur and patella of legs and pedipalps, which may be yellow (*O. scrobiculosus*) or black (*O. feti* **sp. n.** and *O. zagrosensis* **sp. n**.). However, examination of larger collections indicates that this can be used only as a supplemental character and only in adult specimens. It is highly variable in juveniles, and, furthermore, it often is part of sexual dimorphism. A notable example is *O. jalalabadensis* **sp. n**. with yellow males and black females.

Hirsuteness of metasomal segments and telson is used to characterize *O. danielleae* (Lourenço & Vachon, 1997) and *O. monodi* (Lourenço & Vachon). Of the examined species only specimens of *O. feti* **sp. n**., *O. gromovi* **sp. n**., and *O. heratensis* **sp. n.** are markedly hirsute. Apart from these species, *O. zagrosensis* **sp. n.** is notable in having the metasoma ventrally glabrous and dorsally hirsute on the margins, especially of the fifth segment, either with long hairs (allotype) or short, inconspicuous hairs (holotype and paratype).

Granulation and presence of carinae on the sixth and seventh mesosomal segments are so highly variable in relation to ontogeny and sex that they can be confidently discarded as possible characters.

Based on the assessment of variability of individual features, I have defined eight basic characters that permit either differentiation of species or of species groups within which it is possible to use also supplemental characters that are to some extent variable. These eight characters can be regarded as stable in adults (the problem of juveniles is so complex in this genus that their identification is often impossible) except for the bristlecombs on legs, which turn out to be variable in two studied species and in *Orthochiroides* are sex-related.

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