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Three new genera and species of Scorpiones (Buthidae) from Somalia

František KOVAŘÍK

P. O. Box 27, CZ–145 01 Praha 45, Czech Republic

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Abstract. *Orthochiroides* gen. n. (type species *O. vachoni* sp. n.) is related to *Baloorthochirus* Kovařík, 1996, and *Pakistanorthochirus* Lourenço, 1997, from Pakistan; *Birulatus* Vachon, 1974, from Jordan; *Butheolus* Simon, 1882, from Arabia; *Orthochirus* Karsch, 1892, from north Afrika and Arabia to India; and *Paraorthochirus* Lourenço & Vachon, 1995, from Iran. It differs from the above genera in having six pronounced keels on the tibia of pedipalps and lacking trichobothrium d2 of pedipalp femur on dorsal surface, but usually retaining it as an internal trichobotrium. *Somalicharmus* gen. n. (type species *S. whitmanae* sp. n.) is related to *Butheoloides* Hirst, 1925, from Africa; *Charmus* Karsch, 1879, from India and Sri Lanka; *Microcharmus* Lourenço, 1995, from Madagascar; and *Thaicharmus* Kovařík, 1995, from Thailand. It differs from the above genera in having the fingers shorter than the manus. *Somalibuthus* gen. n. (type species *S. demisi* sp. n.) is related to *Hemibuthus* Pocock, 1900, from India; *Isometroides* Keyserling, 1885, from Australia; and *Psammobuthus* Birula, 1911, from Tadzhikistan and Uzbekistan. It differs from the above genera in having keels on the carapace and three keels on the first throught sixth mesosomal segments.

Taxonomy, key, faunistics, descriptions, new genera, new species, Scorpiones, Buthidae, *Orthochiroides vachoni* gen. et sp. n., *Somalicharmus whitmanae* gen. et sp. n., *Somalibuthus demisi* gen. et sp. n., Afrotropic region

Designation of the basic trichobothrial pattern (alfa and beta configurations) is according to Sissom (1990).

Orthochiroides gen. n.
(Figs 1–5, 16–20, Tables 1–2)

TYPE SPECIES. *Orthochiroides vachoni* sp. n.

ETYMOLOGY. Denotes affinity to the genus *Orthochirus*; masculinum in gender. This name was formed, but never published, by Max Vachon (see below).

DIAGNOSIS. The basic trichobothrial pattern is beta (Fig. 16 and Sissom 1990: 70, fig. 3.3); the third and fourth legs have well developed tibial spurs; pectines bear fulcra (Sissom 1990: 92, fig. 3.17D); the dentate margin of pedipalp-chela movable finger has granules distinct, divided into rows, and spanning the length of the finger (Fig. 20); in lateral view, the carapace is inclined downward from the median eyes to the anterior margin (Sissom 1990: 92, fig. 3.17F).

This complex of characters is exhibited only by the genera *Baloorthochirus* Kovařík, 1996 and *Pakistanorthochirus* Lourenço, 1997 from Pakistan, *Birulatus* Vachon, 1974 from Jordan, *Butheolus* Simon, 1882 from Arabia, *Orthochirus* Karsch, 1892 from north Africa and Arabia to India, and *Paraorthochirus* Lourenço & Vachon, 1995 from Iran. See Kovařík 1996: 177; Lourenço 1997: 154; Vachon 1974: 949; Simon 1882: 248; Karsch 1892: 306; Lourenço & Vachon 1995: 299.

Orthochiroides gen. n. is also characterized by the number and distribution of trichobothria on the pedipalps (Figs 16–19), seven to nine cutting edges on the movable fingers of pedipalps (Fig.

Table 1. Measurements in millimeters of *Somalicharmus whitmanae* gen. et sp. n., *Orthochiroides vachoni* gen. et sp. n., and *Somalibuthus demisi* gen. et sp. n.

		Orthochiroides vachoni sp. n. male holotype	*Orthochiroides vachoni* sp. n. female allotype	*Somalicharmus whitmanae* sp. n. male holotype	*Somalibuthus demisi* sp. n. female holotype
Total	length	28.1	34.0	22.3	29.5
Carapace	length	3.1	3.8	2.8	3.0
	width	3.2	5.1	3.2	3.5
Metasoma	length	17.0	19.6	12.7	19.4
segment I	length	1.9	2.4	1.7	2.4
	width	2.8	3.4	2.0	2.2
segment II	length	2.3	2.6	1.9	2.7
	width	2.9	3.4	2.0	1.9
segment III	length	2.5	2.9	2.0	2.9
	width	3.0	3.5	2.0	1.8
segment IV	length	3.0	3.4	2.1	3.5
	width	3.1	3.6	2.0	1.8
segment V	length	3.6	4.1	2.3	3.8
	width	3.0	3.6	2.0	1.8
telson	length	3.2	4.1	2.3	3.7
Pedipalp					
femur	length	2.1	2.3	1.8	2.5
	width	0.9	1.0	0.9	0.9
patella	length	2.9	3.5	2.3	3.3
	width	1.3	1.5	1.1	1.1
tibia	length	4.0	4.5	3.8	4.4
	width	0.9	1.3	1.5	0.9
	height	1.0	1.3	1.7	0.9
finger mov.	length	2.7	3.0	1.9	2.7
Pectinal teeth		20:20	17:16	11:12	23:23

20), presence of four pairs of lateral eyes, shape of telson (Figs 1–3), mesosoma with one dorsal and four ventral keels, six pronounced keels on the tibia of pedipalps (Figs 18 and 19), dense granulation of nearly the entire body, and other features included in the description of *Orthochiroides vachoni* sp. n. below.

AFFINITIES. *Orthochiroides* gen. n. is easily recognized by the presence of six pronounced keels on the tibia of pedipalps. From the genera *Orthochirus*, *Paraorthochirus*, *Baloorthochirus*, and *Pakistanorthochirus* it also differs in shape of the telson, which is highly inflated (Fig. 1). The genera *Orthochirus* and *Paraorthochirus*, which have the fifth metasomal segment punctate, are distinguished by a very different type of this ornament which, moreover, is the same in males and females (see description of *Orthochiroides vachoni* sp. n. and Figs 1–6).

The inclusion in Sissom's (1990: 97) key to genera of the family Buthidae, after adding *Baloorthochirus*, *Pakistanorthochirus*, and *Paraorthochirus* described in 1995–97, is as follows:

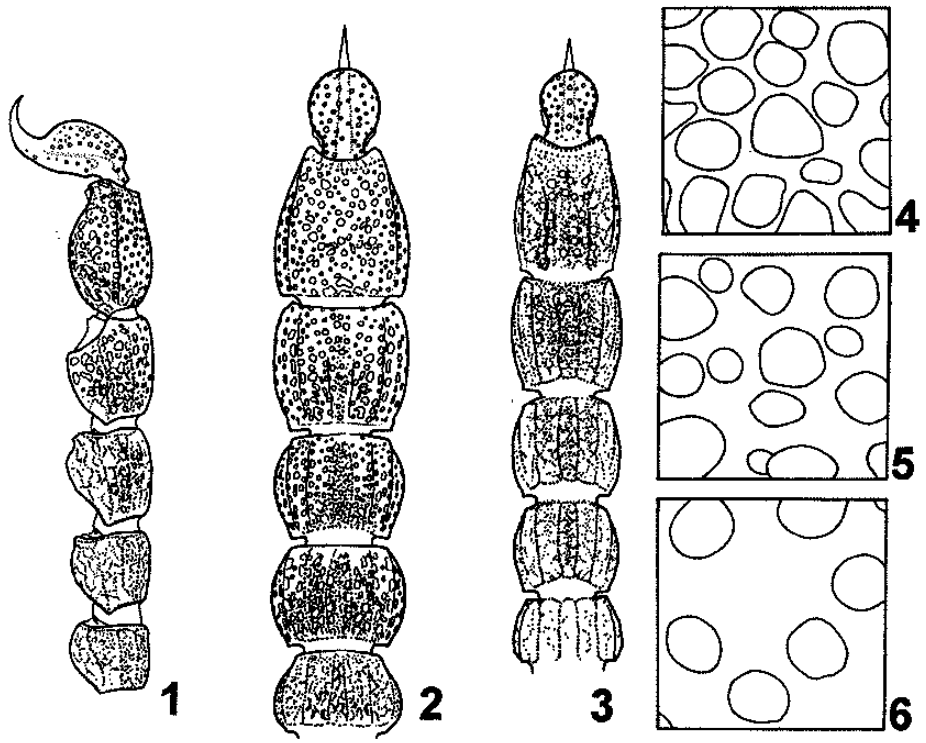
Carapace in lateral view with a distinct downward slope from median eyes to anterior margin (Sissom 1990: 92, fig. 3.17F):

1. First and second metasomal segments without keels. ..... *Birulatus* Vachon
– First and second metasomal segments with keels. 2
2. Tibia of pedipalps with pronounced keels (Figs 18 and 19). 3
– Tibia of pedipalps without keels or with feebly marked, inconspicuous keels. 4

3. Trichobothrium d2 of pedipalp femur absent on dorsal surface but usually present as internal trichobotrium (Fig. 16). ..... *Orthochiroides* gen. n.
– Trichobothrium d2 of pedipalp femur present on dorsal surface. ..... *Butheolus* Simon
4. Fifth metasomal segment punctate (Fig. 6). 5
– Fifth metasomal segment granulate. 6
5. Trichobothrium d2 of pedipalp femur absent on dorsal surface but usually present as internal trichobotrium (Fig. 16). ..... *Orthochirus* Karsch
– Trichobothrium d2 of pedipalp femur present on dorsal surface (Lourenço & Vachon 1995: 302 fig. 10 and 303 fig. 16). .....*Paraorthochirus* Lourenço & Vachon
6. Vesicle of telson narrow and smooth. Trichobothrium d2 of pedipalp femur absent on dorsal surface but present as internal trichobotrium (Fig. 16). 7
– Vesicle of telson inflate, granulate, often with rudimental subacular tubercle (Vachon 1980: 254 planche B). Trichobothrium d2 of pedipalp femur present on dorsal surface. ..... *Butheolus* Simon
7. Movable fingers of pedipalps with nine rows of granules. ..... *Baloorthochirus* Kovařík
– Movable fingers of pedipalps with six rows of granules. ..... *Pakistanoorthochirus* Lourenço & Vachon

Orthochiroides vachoni sp. n.
(Figs 1–5, 16–20, Tables 1–2)

TYPE MATERIAL. 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 males (holotype [MZUF No. 533] and paratypes Nos 1–17 [MZUF No. 536]), 11 females (allotype [MZUF No. 537] and paratypes Nos 18–27 [MZUF No. 538]), 9 juveniles (paratypes Nos 28–36) [MZUF No. 539]. All type specimens preserved in alcohol. Holotype, allotype, and paratypes Nos 1–9, 20–29, 31–35 are deposited in the Museo Zoologico de "La Specola", Firenze, Italy,



Figs 1–6. (1–5.) *Orthochiroides vachoni* gen. et sp. n. (1–3.) Metasoma. Fig. 1. Male holotype. Fig. 2. Female allotype. Fig. 3. Juvenile paratype No. 28. (4–6.) fifth metasomal segment, ventral view (details 1 mm²). Fig. 4. Male holotype. Fig. 5. Female allotype. Fig. 6. *Orthochirus scrobiculosus* (Grube, 1873), female from Turkmenistan, Repetek.

paratype No. 10 in the British Museum (Natural History), London, England, paratype No. 12 in the Muséum National d'Histoire Naturelle, Paris, France, paratype No. 17 in the Department of Invertebrate Zoology, National Museum (Natural History), Prague, Czech Republic, paratype No. 16 in the Forschungsinstitut und Naturmuseum Senckenberg, Frankfurt am Main, Germany, paratype No. 15 in the Museum für Naturkunde der Humboldt-Universität zu Berlin, Germany, paratype No. 13 in the Zoologisches Institut und Zoologisches Museum, Universität Hamburg, and paratypes Nos 11, 14, 18, 19, 30, and 36 in the author's collection.

TYPE LOCALITY. Somalia, Sar Uanle, about 20 km south of Chisimaio, 00°29'48"S – 42°25'30"E.

ETYMOLOGY. Named after the French arachnologist Max Vachon, who in 1976 examined all 38 specimens (No. VA 1405), separated them into males, females, and juveniles, and enclosed the label "*Orthochiroides* gen. nov."

DIAGNOSIS. The total length is 28.1 mm in the male holotype and 34.0 mm in the female allotype. The metasoma is shown in Figs 1–5. Measurements of the carapace, telson, segments of the metasoma and of the pedipalps, and numbers of pectinal teeth are given in Table 1. Pectinal teeth number 17–20 in males and 14–18 in females (Tab. 2).

The color is uniformly brown to black. The manus of pedipalps is brown and fingers, tibia, and tarsomeres of legs are yellow to yellowish brown. The entire metasoma is black, only the telson may be dark brown.

The pedipalps except tibia, carapace, mesosoma, coxae, and legs of adult specimens are densely covered by large granules of approximately equal size. The posterior margins of mesosomal segments dorsally terminate in granules which overlap the margins, especially in males.

The mesosoma has one poorly defined median keel on the dorsal side and four keels on the ventral side. The four ventral keels are most pronounced on the sixth and seventh segments.

The femur of pedipalps (Fig. 16) has five keels, the patella has seven keels (Fig. 17), and the tibia has six keels (Figs 18 and 19). All keels are pronounced in both sexes as well as in juveniles. For the position and distribution of trichobothria on the pedipalps see Figs 16–19. Trichobothrium d1 on the tibia of pedipalps (Fig. 17) is poorly discernible and often absent. Trichobothrium Eb3 on the manus is shifted to ventral side (Figs 18 and 19). The movable fingers of pedipalps bear seven (Fig. 20) to nine rows of granules, most frequently eight; similarly to *Orthochirus*, variability is rather high in this regard. The proximal row of granules may have zero to two external and internal granules.

The first and second metasomal segments bear 10 keels. On the third metasomal segment of males the keels are poorly indicated, and on the fourth and fifth segments there are only dorsal keels or their edges, which are rounded in females. In contrast to adults, the first four metasomal segments of juveniles bear 10 pronounced keels, and the fifth segment bears a ventral median keel and pronounced ventrolateral keels that terminate in several large granules, like in *Baloorthochirus*.

The first and second metasomal segments of males are granulated, and the third and fourth segments bear a granular network. The fifth metasomal segment is punctate (except for the dorsal

Table 2. Number of pectinal teeth in *Orthochiroides vachoni* gen. et sp. Each pecten is regarded as a unit. Where both pectens are complete, they are counted twice. In contrast, pectens which are obviously abnormal or incomplete are not included

	number of teeth in pecten							number of specimens
	14	**15**	**16**	**17**	**18**	**19**	**20**	
males	–	–	–	3	15	13	5	18
females	1	4	8	7	2	–	–	11
juveniles	–	–	2	6	8	2	–	9

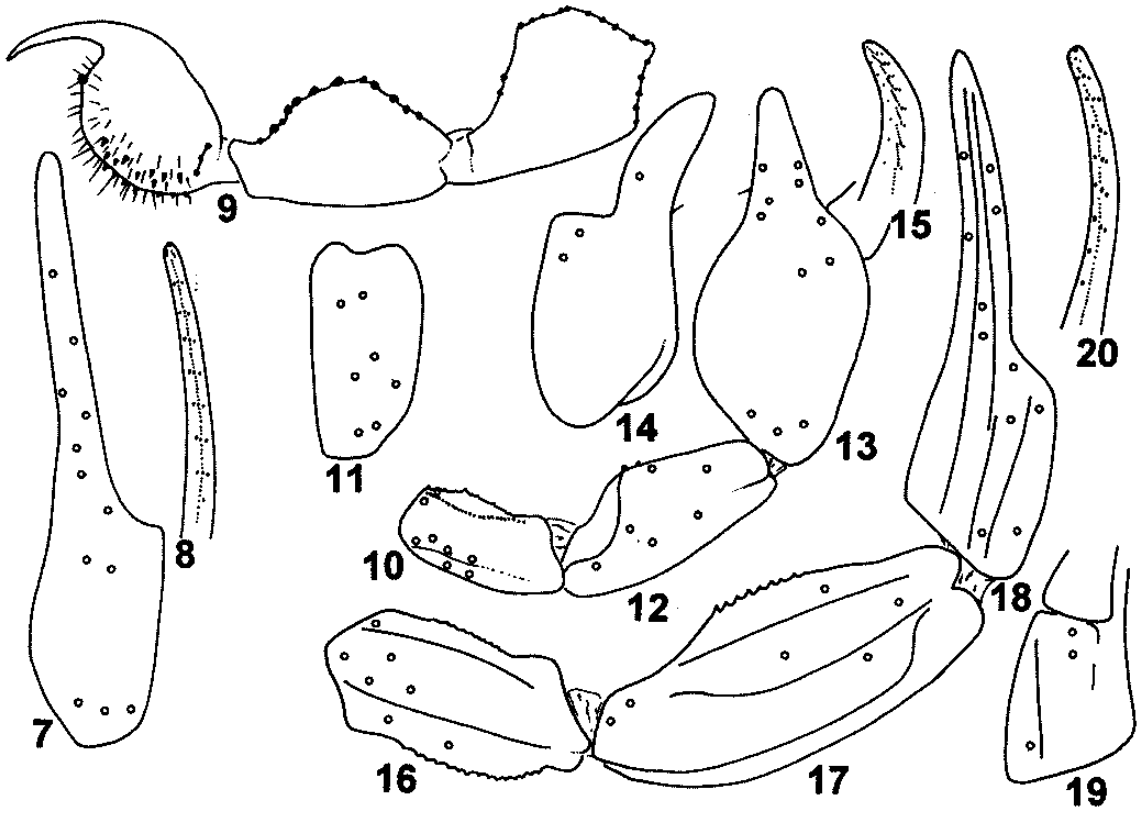
surface), but the punctae are larger than in *Orthochirus* and take much more of the surface area than the spaces separating them (Figs 1 and 4). Females have the first metasomal segment granulated, the second segment bears a granular network, and the third to fifth segments are punctate (Fig. 2). The punctae on the fifth segment are more rounded in females (Fig. 5) than in males (Fig. 4) and the surfaces separating them are smooth. In juveniles the first to fourth metasomal segments are granulated, the fifth segment bears a granular network, and only the telson of both sexes is punctate (Figs 1–3), with spaces separating the punctae always taking more surface area of the telson (Figs 1–3).

AFFINITIES. See generic affinities.

DISCUSSION. The large type series permits to discern a surprising variability and sexual dimorphism.

Similarly to *Orthochirus* (Kovařík 1996: 181), variability is pronounced in the number of rows of granules on movable fingers (7–9) and the presence and number of external and internal granules at the proximal row (0–2).

Most surprising, however, is the variation in the number of keels and punctate or granulate sculpture on the metasomal segments of both sexes and juveniles (Figs 1–3). Males have the third



Figs 7–20. (7–8.) *Somalibuthus demisi* gen. et sp. n. (holotype). Fig. 7. Tibia, dorsal and external views. Fig. 8. Movable finger. (9–15.) *Somalicharmus whitmanae* gen. et sp. n., holotype. Fig. 9. Fourth and fifth metasomal segments and telson. Fig. 10. Femur, dorsal view. Fig. 11. Patella, external view. Fig. 12. Patella, dorsal view. Fig. 13. Tibia, dorsal and external views. Fig. 14. Tibia, ventral view. Fig. 15. Movable finger. (16–20.) *Orthochiroides vachoni* gen. et sp. n. holotype. Fig. 16. Femur, dorsal view. Fig. 17. Patella, dorsal view. Fig. 18. Tibia, dorsal and external views. Fig. 19. Tibia, ventral view. Fig. 20. Movable finger.

to fifth metasomal segments without keels, in females the keels on the third and fourth metasomal segments are poorly indicated, and juveniles before the last ecdysis (before adulthood) have 10 pronounced keels on the third and fourth metasomal segments and conspicuous ventrolateral keels on the fifth metasomal segment. Furthermore, punctate sculpture is absent in juveniles, although this character is commonly used to differentiate genera (see the key above). For instance in both sexes as well as juveniles of *Orthochirus* the fifth metasomal segment always is clearly punctate.

This surprising variability must be taken into account when dealing with the group of genera included in the key and when describing new species and genera.

The genus *Afghanorthochirus* Lourenço & Vachon (1997: 330) is not included in the above key, because I fail to see how it is supposed to differ from the genus *Orthochirus*.

Somalicharmus gen. n.

(Figs 9–15, Table 1)

TYPE SPECIES. *Somalicharmus whitmanae* sp. n.

ETYMOLOGY. Denotes affinity to the genus *Charmus* and the geographic distribution; masculinum in gender.

DIAGNOSIS. The basic trichobothrial pattern is alfa (Fig. 10 and Sissom 1990: 70, fig. 3.3), the third and fourth legs have well developed tibial spurs, the sternum is subpentagonal, and the pedipalp manus has 3 Eb trichobothria on the palm (Fig. 13). This complex of characters is exhibited only by the genera *Butheoloides* Hirst, 1925 from Africa, *Charmus* Karsch, 1879 from India and Sri Lanka, *Microcharmus* Lourenço, 1995 from Madagascar, and *Thaicharmus* Kovařík, 1995 from Thailand. See Hirst 1925: 414; Karsch, 1879: 104; Lourenço 1995: 98; Kovařík, 1995: 195.

Somalicharmus gen. n. is also characterized by the number and distribution of trichobothria on the pedipalps (Figs 10–14), short movable and fixed fingers of pedipalps (Figs 13–15 and Tab. 1), wide manus (Figs 13–14 and Tab. 1), pectines with fulcra, three pairs of lateral eyes, and nine cutting edges on the movable fingers of pedipalps (Fig. 15). Other characters are given in the description of *Somalicharmus whitmanae* sp. n. below.

AFFINITIES. Inclusion in Sissom's (1990: 94) key to genera of the family Buthidae, with the genera *Thaicharmus* and *Microcharmus* described in 1995 added, is as follows:

Pedipalp chela with 3 Eb trichobothria on palm:

1. Movable finger of pedipalps longer than manus. 2
– Movable finger of pedipalps shorter than manus (Figs 13. and 15). ..... *Somalicharmus* gen. n.
2. Telson with distinct subaculear tubercle. 3
– Telson lacking subaculear tubercle. 4
3. Cutting edges on movable fingers of pedipalps number nine (including apical row). ..... *Butheoloides* Hirst
– Cutting edges on movable fingers of pedipalps number 12 (including apical row). ..... *Thaicharmus* Kovařík
4. Pectines with fulcra. ..... *Charmus* Karsch
– Pectines without fulcra. ..... *Microcharmus* Lourenço

Apart from the character given in the key, *Somalicharmus* gen. n. differs from the other included genera in number and distribution of trichobothria on the pedipalps (Figs 10–14 and figs 7–11 in Kovařík 1995: 191), pectines with fulcra, three pairs of lateral eyes, nine cutting edges on the movable fingers of pedipalps (Fig. 15), and other features included in the description of *Somalicharmus whitmanae* sp. n. below.

From *Charmus* and *Microcharmus* it also differs in the presence of a subaculear tooth, which is wider than in *Thaicharmus* and *Butheoloides*. Furthermore, the telson is partly covered by conspicuous, pointed granules (Fig. 9).

Somalicharmus whitmanae sp. n.
(Figs 9–15, Table 1)

TYPE MATERIAL. Holotype – a male preserved in alcohol, labeled "Somalia, El Meti" and deposited in the Museo Zoologico de "La Specola", Firenze, Italy [MZUF No. 534]. This specimen was revised in 1983 by Max Vachon under his number VA 956, and marked by him as "gen. n.".

TYPE LOCALITY. Somalia, El Meti.

ETYMOLOGY. Named after Sarah Whitman, curator at the Museo Zoologico de "La Specola", Firenze, Italy.

DIAGNOSIS. The length of the holotype is 22.3 mm. Measurements of the carapace, telson, segments of metasoma and segments of pedipalps, and numbers of pectinal teeth are given in Table 1. Pectinal teeth number 11 and 12. For the position and distribution of trichobothria on the pedipalps see Figs 10–14. Trichobothrium esb on the tibia is smaller than other trichobothria (Fig. 13).

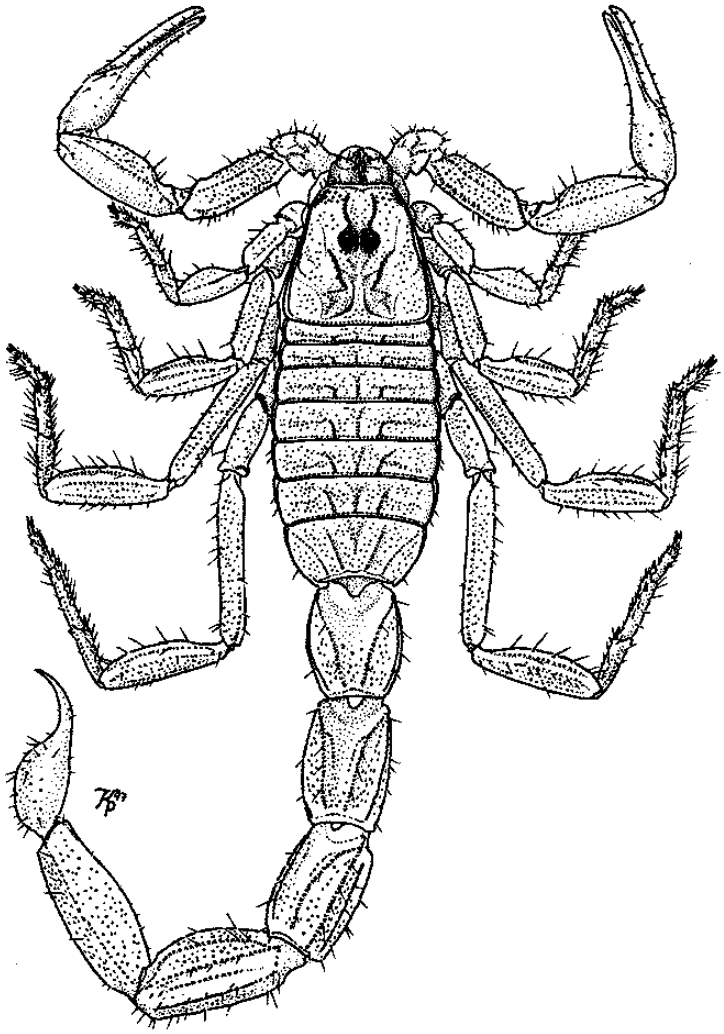


Fig. 21. *Somalibuthus demisi* gen. et sp. n. (holotype). Dorsal view.

The color is uniformly yellowish brown, only the proximity of the median and lateral eyes is black. However, due to the length of preservation in alcohol it is necessary to presume some alteration of the original color.

The entire femur and patella of pedipalps are covered with fine granules. Keels are inconspicuous, composed of but a few somewhat larger granules. The internal surfaces of femur and patella bear two to four conspicuous granules on lateral keels. The tibia of pedipalps lacks keels and is rounded and nearly smooth, with but a few isolated granules chiefly on the internal surface. The tibia is taller than wide (Figs 13–14 and Tab. 1).

The carapace lacks keels and its entire surface is evenly granulated. The median eyes are situated only 0.8 mm from the anterior margin. A deep median trough runs from them to the posterior margin.

The mesosoma is also covered with fine granules and lacks keels except for a barely discernible median keel which is indicated by more closely packed granules. The seventh mesosomal segment bears three large but low elevations which cover nearly the entire dorsal surface. The ventral surfaces of mesosomal segments are smooth, without keels and granules. The pectines bear fulcra.

The legs are less granulated, and the third and fourth legs have well developed, long tibial spurs.

All metasomal segments are granulated. The ventral sides of the first through third segments bear four keels, of which the outer ones posteriorly converge and at the hind margin of each segment connect to form the letter "u". The inner keels remain parallel and are less pronounced, being composed of isolated granules. The ventral and lateral sides of the fourth and fifth segments are granulated, rounded, and without keels. The dorsal surface of all metasomal segments bears a median trough and two lateral keels composed of several large, mutually distant granules whose size increases with each consecutive segment, i. e. they are the smallest on the first segment and the largest on the fifth, where the keels are composed of 12 to 15 granules (Fig. 9).

The telson is highly inflated, nearly spherical, with a minute subaculear tubercle. Its ventral surface is densely hirsute and covered with pronounced, pointed, dark-brown to black granules (Fig. 9).

AFFINITIES. See generic affinities.

***Somalibuthus* gen. n.**

(Figs 7–8, 21, Table 1)

TYPE SPECIES. *Somalibuthus demisi* sp. n.

ETYMOLOGY. Denotes affinity to the genus *Buthus* and geographic distribution; masculinum in gender.

DIAGNOSIS. The basic trichobothrial pattern is beta (Fig. 16 and Sissom 1990: 70, fig. 3.3); the third and fourth legs have well developed tibial spurs; the pectines bear fulcra (Sissom 1990: 92, fig. 3.17D); the dentate margin of pedipalp-chela movable finger bears distinct granules divided into rows and spanning the length of the finger (Fig. 8); the entire dorsal surface of the carapace is nearly horizontal in lateral view; the cheliceral fixed finger has a single ventral denticle; and the telson lacks a subaculear tubercle (Fig. 21).

This complex of characters is exhibited only by the genera, *Hemibuthus* Pocock, 1900 from India, *Isometroides* Keyserling, 1885 from Australia, and *Psammobuthus* Birula, 1911 from Tadzhikistan and Uzbekistan. See Pocock 1900: 34; Keyserling 1885: 16; Birula 1911: 69.

Somalibuthus gen. n. is also characterized by the number and distribution of trichobothria on the tibia of pedipalps (Fig. 7); eight rows of granules on the movable fingers of pedipalps, which are not slanted and form an interrupted line (Fig. 8); three pairs of lateral eyes; the shape of telson (Fig. 21); the first throught sixth mesosomal segments with three dorsal keels (Fig. 21) and the seventh

mesosomal segment with five dorsal keels; and other features included in the description of *Somalibuthus demisi* sp. n. below. The carapace bears an anterior median keel and central lateral keels (Fig. 21), and sometimes also well developed posterior lateral keels.

AFFINITIES. Inclusion in Sissom's (1990: 97) key to genera of the family Buthidae is as follows:

Telson with tubercle either very subtile or absent:

1. Carapace with keels. 2
– Carapace without keels. 3
2. First throught sixth mesosomal segments with a single keel. ..... *Isometroides* Keyserling
– First throught sixth mesosomal segments with three keels. ..... *Somalibuthus* gen. n.
3. Tibiae and tarsi of first through third legs with bristlecombs along retrolateral margins. ..... *Psammobuthus* Birula
– Tibiae and tarsi of first through third legs with setae, but not arranged as above. ..... *Hemibuthus* Pocock

Somalibuthus demisi sp. n.

(Figs 7–8, 21, Table 1)

TYPE MATERIAL. 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), 1 female (holotype) labeled "zona 3, ora 9" (see Messana et al. 1977: 151), 16.XI. probably 1971, and 2 juveniles (paratypes Nos 1–2) labeled "zona 4, ora 24" and "zona 6. ora 7" (see Messana et al. 1977: 151), 31.V.1973. All type specimens are preserved in alcohol. Holotype [MZUF No. 535], and paratype No. 2 are deposited in the Museo Zoologico de "La Specola", Firenze, Italy, and paratype No. 1 is in the author's collection. These specimens were revised in 1976 by Max Vachon under his numbers VA 1397 and VA 1399, and marked by him as "genre n.".

TYPE LOCALITY. Somalia, Sar Uanle, about 20 km south of Chisimaio, 00°29'48"S – 42°25'30"E.

ETYMOLOGY. Named after my friend.

DIAGNOSIS. The length is 29.5 mm in the female holotype and 12.7 mm (without missing third through fifth metasomal segments and telson) and 15.4 mm in the juvenile paratypes Nos 1–2. Measurements of the carapace, telson, segments of metasoma and segments of pedipalps, and numbers of pectinal teeth are given in Table 1. There are 23 pectinal teeth in the holotype and 21–22 in the paratypes. For the position and distribution of trichobothria on the tibia of pedipalps see Fig. 7.

The color is uniformly yellow to yellowish brown, only the closest proximity of the median and lateral eyes is black.

The femur of pedipalps has four keels, and the patella has three keels confined to the internal surface. Other edges of the patella are rounded. The tibia of pedipalps lacks keels and is rounded and smooth.

The carapace has an anterior median keel and central lateral keels (holotype – Fig. 21), and the paratypes have also well developed posterior lateral keels.

The first through sixth mesosomal segments bear three keels, with the outer keels of each segment diverging outward. The seventh mesosomal segment bears five dorsal keels (Fig. 21). The ventral surface of all mesosomal segments is smooth, without keels and granules.

The third and fourth legs have well developed tibial spurs. The tibia and even more so the tarsomeres of legs are covered with long hairs. Especially the inner sides of tarsomeres of the third and fourth legs are densely hirsute, but the hairs are shorter than the more spaced out hairs on the outer sides of these tarsomeres.

All metasomal segments are sparsely granulated and bear conspicuous keels (Fig. 21). The first throught fourth segments have 10 keels, and the fifth segment has three keels only on the ventral surface. Other edges of the fifth segment are rounded.

The telson is slender, smooth, and lacks a subaculear tooth or tubercle (Fig. 21).

AFFINITIES. See generic affinities.

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