Entomol. Mitt. Zool. Mus. Hamburg	**16** (187): 11-18	Hamburg, 15. Juni 2012 ISSN 0044-5223

A new species of *Buthus* Leach, 1815 from Egypt (Scorpiones, Buthidae)

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(with 9 figures)

Abstract

During the last decade, the genus *Buthus* Leach, 1815 (family Buthidae) was the subject of several studies. These concerned in particular the '*Buthus occitanus*' complex of species. Several populations previously considered as subspecies or varieties were raised to the rank of species and many new species were also described. Most of the species considered in these studies come from Northwest Africa. At present, the records of the genus *Buthus* in Egypt from other regions than Sinai are questionable, but a new record from the region of Siwa is confirmed and the description of a new species, *Buthus egyptiensis*, is provided.

K e y w o r d s: Scorpiones, *Buthus*, new species, Siwa region, Egypt.

Introduction

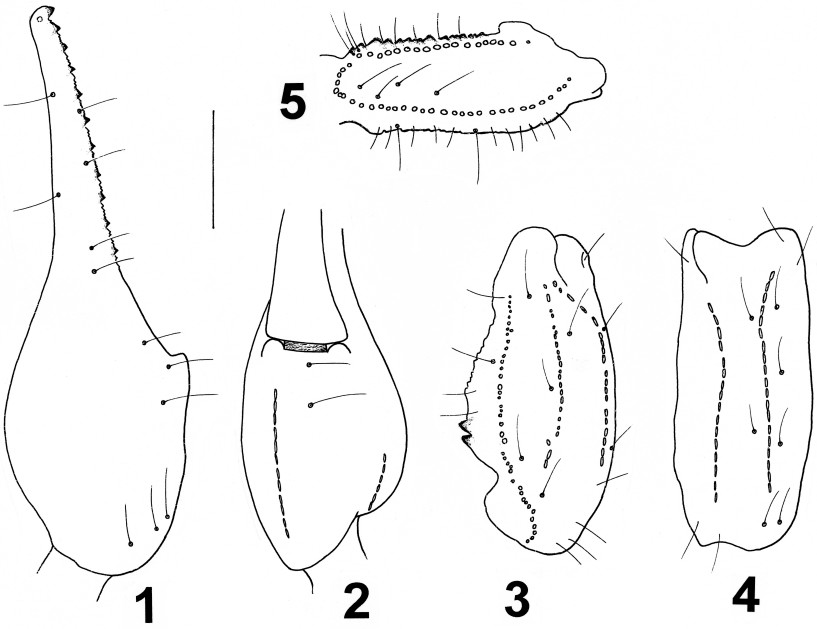
The problems and difficulties related to the taxonomy of the genus *Buthus* Leach have been the subject of discussions in various old papers (Kraepelin 1899). In his monograph on North African scorpions, Vachon (1952) attempted to establish a better definition of the genus and transferred to other genera several species previously included in it (Lourenço 2003). The classification proposed by Vachon (1952) for the species of *Buthus*, and in particular for those belonging to the '*Buthus occitanus*' complex of species remained unsatisfactory, mainly because of the existence of several poorly defined subspecies and even varieties.

Since the publications by Lourenço (2002, 2003), a more precise definition of the *Buthus* species belonging to the '*Buthus occitanus*' complex, has been attempted, followed by the description of several new species and the promotion of some subspecies to species rank (Lourenço 2002, 2003, 2005, 2008, Lourenço & Slimani 2004, Lourenço & Vachon 2004, Lourenço & Qi 2006, Lourenço *et al.* 2009a, 2010). This procedure, initiated by Lourenço, has also been followed by other authors (Kovařík 2006, 2011, Yağmur *et al.* 2011).

With a few exceptions, most of the recent studies have focused on the species distributed in Northwest regions of Africa, while little attention have been given to the species of Eastern regions (Lourenço 2003). According to the Catalog of the Scorpions of The World (Fet & Lowe 2000) records of two

species of the genus *Buthus* are attributed to Egypt: *B. tunetanus* (Herbst, 1800) and *B. israelis* Shulov & Amitai 1959. Vachon (1952). However, they limited the distribution of *B. tunetanus* (typicus) to Algeria and Tunisia and, consequently, the records for Egypt are questionable. The presence of *B. israelis* in Egypt has been confirmed exclusively on the Sinai peninsula (Levy & Amitai 1980, Lourenço *et al.* 2010).

Some years ago, the senior author received from Prof. P. M. Brignoli a small collection of scorpions collected in Northwest Egypt, in the region of Siwa. In a recent publication (Lourenço *et al.* 2009b) a new species, *Compsobuthus egyptiensis* Lourenço, Sun & Zhu 2009 was described from this collection. Among the specimens in the collection, one female proved to be a member of the genus *Buthus*. Precise analysis of this specimen, showed that it could not correspond to *Buthus tunetanus* or *Buthus barcaeus* Birula, 1909 which was originally described from Libya. Consequently, a new species of *Buthus* from Egypt is described here. The presence of *Buthus tunetanus* is also confirmed in the central coastal region of Libya, also based also in new material collected by P. M. Brignoli.



Figs 1-5. *Buthus egyptiensis* sp. n., female holotype. Trichobothrial pattern. **1-2**. chela, dorso-external and ventral aspects, **3-4**. patella, dorsal and external aspects, **5**. femur, dorsal aspect. (Scale bar = 3 mm).

Methods

Illustrations and measurements were produced using a Wild M5 stereo-microscope with a drawing tube and an ocular micrometer. Measurements follow Stahnke (1970) and are given in mm. Trichobothrial notations follow Vachon (1974) while morphological terminology mostly follows Vachon (1952) and Hjelle (1990).

Taxonomy

Family Buthidae C. L. Koch, 1837
Genus *Buthus* Leach, 1815

Buthus egyptiensis sp. n.

(Figs 1-7)

TYPE MATERIAL: H o l o t y p e (female). Egypt, SW of Siwa, July 1983 (P. M. Brignoli leg.). Deposited in the Zoologisches Museum Hamburg, Germany (ZMH Acc. No. A20/12).

RELATED MATERIAL: *Buthus tunetanus* (Herbst, 1800) 4 males, 1 female: Libya, SE of Sirte, March 1982 (P. M. Brignoli leg.). Specimens deposited in the ZMH (Acc. No. A21/12).

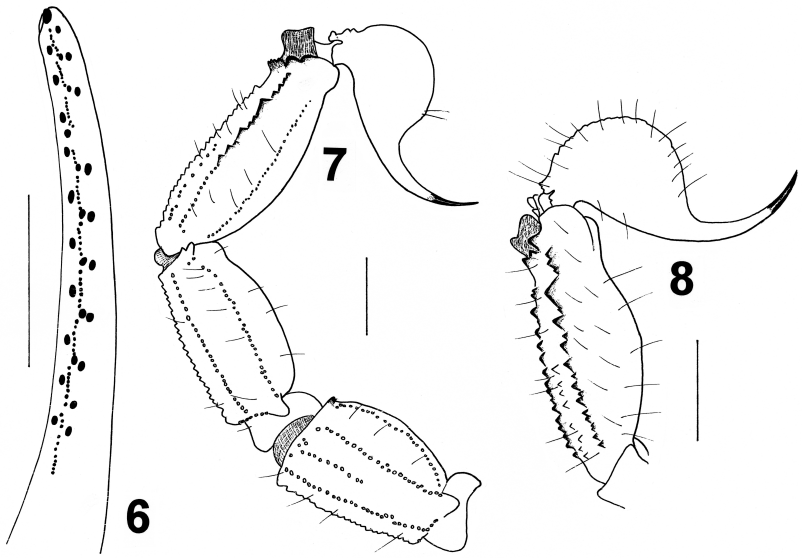
ETYMOLOGY: The specific name refers to the country where the new species was found.

DIAGNOSIS. Scorpion large in relation to other species of the genus, reaching a total length of 85.6 mm. Base colour yellowish with carapace and tergites intensely marked with brown to blackish; carapace and tergites with blackish carinae; metasomal segments yellowish; metasomal carinae reddish-brown with ventral sides marked more intensely; telson yellowish; tip of the aculeus dark, almost blackish. Venter yellowish. Pedipalps yellowish with carinae reddish; chela with vestigial reticular (variegated) spots: legs yellowish without spots. Carinae and granulations moderately to strongly marked. All metasomal segments longer than wider; metasomal chetotaxy moderate to weak. Fixed and movable fingers with 10 rows of granules. Pectines with 27-26 teeth in female.

DESCRIPTION based on female holotype. Measurements after the description.

COLORATION. Base colour yellowish. Prosoma: carapace yellowish; carinae posterior regions and eyes marked with brown to blackish pigment. Mesosoma: yellowish with tergites intensely marked with blackish longitudinal stripes; only carinae are blackish on tergite VII. All metasomal segments yellowish; carinae reddish; vesicle yellowish; aculeus yellowish at its base and dark at its extremity. Venter yellowish; pectines pale yellow. Chelicerae yellowish without variegated spots; fingers yellowish with dark reddish teeth. Pedipalps: yellowish with carinae reddish; chela with vestigial reticular (variegated) spots laterally; fingers with the oblique rows of granules blackish. Legs yellowish, without spots.

MORPHOLOGY. P r o s o m a: Carapace strongly granular; anterior margin without any median concavity almost straight. Carinae strong; anterior median, central median and posterior median carinae strongly granular, with 'lyre' configuration. All furrows moderate to strong. Median ocular tubercle at the centre of carapace. Eyes separated by almost three ocular diameters. Four pairs of lateral eyes: the first three of moderate size, the last only vestigial. Sternum triangular and short; wider than long. M e s o s o m a: tergites strongly granular. Three longitudinal carinae strongly crenulate in all tergites; lateral carinae reduced in tergites I and II. Tergite VII pentacarinate. Venter: genital operculum divided longitudinally in two semi-oval plates. Pectines: pectinal tooth count 27-26 in female holotype; middle basal lamella of the pectines not dilated. Sternites without granules, smooth with elongated spiracles; four carinae on sternites VI and VII; other sternites acarinated and with two vestigial furrows. M e t a s o m a: segments I to III with 10 moderately crenulated carinae, ventral carinae moderately marked on segments I to IV without lobate denticles; segment IV with 8 carinae, moderately crenulated; the first four segments with a smooth dorsal depression; segment V with five carinae; the latero-ventral carinae crenulate with 3-4 lobate denticles posteriorly; ventral median carina not divided posteriorly; anal arc composed of ten ventral teeth, and two lateral lobes. Intercarinal spaces moderately to weaky granular. Chetotaxy moderate to weak. Telson with a strongly globular



Figs 6-7. *Buthus egyptiensis* sp. n., female holotype. **6**. movable finger of pedipalp chela with rows of granules, **7**. metasomal segments III to V and telson, lateral aspect, **8**. idem *Buthus tunetanus*, female from Libya. (Scale bars = 3 mm).

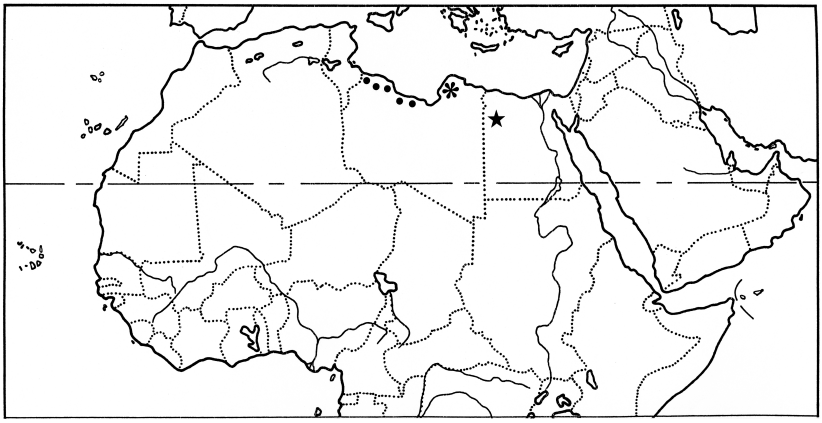


Fig. 9. North Africa, with the type locality of *Buthus egyptiensis* sp. n., (black star), the type locality of *B. barcaeus* Birula (black flower) and the known distribution area of *B. tunetanus* Herbst in Libya (black circles).

vesicle, almost smooth; aculeus weakly curved and slightly shorter than the vesicle, without a subaculear tooth. C h e l i c e r a l dentition as defined by Vachon (1963) for the family Buthidae; external distal and internal distal teeth approximately the same length; basal teeth on movable finger small but not fused; ventral aspect of both fingers and manus covered with long dense setae. P e d i p a l p s: femur pentacarinate; patella with eight carinae moderately marked; chela without carinae, smooth. Fixed and movable fingers with 10 oblique rows of granules. Internal and external accessory granules present, strong; three accessory granules on the distal end of the movable finger next to the terminal denticle. Legs: tarsus with two longitudinal rows of spinoid setae ventrally; tibial spur strong on legs III and IV; pedal spurs moderate to strong on legs I to IV. Trichobothriotaxy: trichobothrial pattern of Type *A*, orthobothriotaxic as defined by Vachon (1974). Dorsal trichobothria of femur arranged in *Beta* (*β*) configuration (Vachon 1975).

RELATIONSHIPS. *Buthus egyptiensis* sp. n., belongs to the '*Buthus occitanus*' complex of species. It can be distinguished from other species of *Buthus*, in particular from *B. tunetanus* known from Libya and Tunisia and, from *Buthus barcaeus* Birula, 1909 also known from Libya, by the following characters: (i) larger global size, (ii) much darker coloration on carapace and tergites, (iii) stronger marked carinae on carapace and tergites, but less marked carinae on metasoma, (iv) all metasomal segments longer than wider, (v) moderate to weak chetotaxy on metasomal segments, (vi) metasomal segment IV without intermediary (lateral median) carinae as in *B. barcaeus* (Levy & Amitai, 1980). Moreover, the new species comes from a distinct locality in Egypt whence no specimens of *Buthus* have previously been recorded.

Table 1. Morphometric values (in mm) of female holotype of *Buthus egyptiensis* sp. n. and a female of *Buthus tunetaus* from Libya.

	***Buthus egyptiensis* sp. n.**	*Buthus tunetanus*
Total length*	85.6	68.3
Carapace:		
- length	9.2	7.4
- anterior width	6.3	5.5
- posterior width	10.8	8.8
Mesosoma length	26.0	19.0
Metasomal segment I:		
- length	6.7	5.4
- width	6.2	5.4
Metasomal segment V:		
- length	10.2	8.4
- width	5.1	4.1
- depth	4.4	3.3
Telson length	9.1	7.8
Vesicle:		
- width	4.2	3.5
- depth	3.7	3.2
Pedipalp:		
- Femur length	7.1	6.3
- Femur width	2.7	2.1
- Patella length	8.7	7.2
- Patella width	3.8	2.8
- Chela length	15.2	12.2
- Chela width	4.2	3.2
- Chela depth	4.5	3.6
Movable finger:		
- length	9.5	7.8

* Including telson length

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