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## About the presence of the genus *Buthus* Leach, 1815 in the Arabian Peninsula and description of a new species (Scorpiones, Buthidae)

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(with 8 figures)

### Abstract

In recent years several contributions to the genus *Buthus* Leach, 1815 (the family Buthidae) and in particular to the '*Buthus occitanus*' complex of species were proposed. These led to the definition of several species, previously considered only as subspecies or varieties, but also the description of new species. The species considered in these studies come mostly from North and Western Africa. At present, the questionable presence of the genus *Buthus* in the Arabian Peninsula is rediscussed and one new record from Yemen is confirmed with the description of a new species.

**Key words:** Scorpiones, Buthidae, *Buthus*, new species, Arabian Peninsula, Yemen.

### Introduction & historical notes

As discussed in previous papers (Lourenço 2002, 2003, 2005a,b,c, Lourenço & Slimani 2004, Lourenço & Vachon 2004, Lourenço & Geniez 2005, Lourenço & Qi 2006) the taxonomy of the genus *Buthus* Leach has long history which remains complex and confused. In his monograph about 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 publication by Lourenço (2003), a more precise definition of the *Buthus* species belonging to the '*Buthus occitanus*' complex, was attempted, followed by the description of several new species and the promotion of some subspecies to species rank. Other contributions (Lourenço 2005b,c, Lourenço & Geniez 2005), have also attempted to clarify the taxonomic status of some of the species of *Buthus* associated with *Buthus atlantis* Pocock, 1889.

Most of the recent studies focused on the species distributed in North and Northwestern regions of Africa, while little attention was given to the species of Eastern regions (Lourenço 2003, 2005a). In the same way, no attention was yet dedicated to some elements of Middle East. Accordingly to the Catalog of the Scorpions of The World (Fet & Lowe, 2000) the genus *Buthus* is distributed in Iraq, Israel, Jordan and Lebanon; the records for Turkey and Saudi Arabia are listed as questionable. The data on presence of *Buthus* in Turkey is most certainly the result of misidentifications of *Mesobuthus* Vachon, 1950.

Once again, according to Fet & Lowe (2000), *Androctonus tunetanus intermedius* Ehrenberg, 1829 (in fact, an element of the genus *Buthus*, see also Braunwalder & Fet, 1998), was described from Lohiae (now Al-Luhayyah) in Yemen, but records of *Buthus occitanus* or any other *Buthus* from the Arabian Peninsula were never confirmed (Levy & Amitai 1980, Braunwalder & Fet 1998).

In another recent publication about Tunisian *Buthus* species, Kovařík (2006) refers to *Androctonus tunetanus intermedius* Ehrenberg, 1829 and also to *Androctonus tunetanus intumescens* Ehrenberg, 1829, described from Egypt, and assigned both, in a new combination, to the genus *Buthus*. Furthermore, this author suggested that no differences could be found between these two old species of Ehrenberg, which by consequence should be placed in synonymy. In the same analysis he placed also *Buthus occitanus israelis* Shulov & Amitai, 1959 described from Israel, in the synonymy of *Buthus intumescens* (Ehrenberg). Having in account the poor state of preservation of the type material of Ehrenberg, it seems rather difficult to arrive to any definitive conclusion, however, I will not enter here in any polemics concerning the decisions taken by Kovařík (2006). To better justify such a decision, once again the type locality of *Buthus intermedius* (Ehrenberg) as Lohaie in Yemen is considered an incorrect locality. According to Braunwalder & Fet (1998) Hemprich and Ehrenberg did visit this coastal region of Yemen during their travels to Africa and Middle East. However, since no *Buthus* species have been subsequently recorded from the Arabian Peninsula, the question about the validity of this type locality remains.

Some years ago, I received from Prof. C. Naumann a small collection of scorpions collected in Yemen. In fact, most of the specimens send by C. Naumann correspond to the species *Compsobuthus brevimanus* (Werner, 1936) and were collected in the region of Djebel Masnah in the Province of Damar (Sissom 1994). Among these, one female specimen, collected in the South of Ma'bar proved to be a member of the genus *Buthus*. Precise analysis of this specimen, showed that it could not correspond to *Buthus intermedius* (Ehrenberg), but showed some affinities with *Buthus berberensis* Pocock, 1900 (n. comb.) described from Somalia. In fact, Pocock (1900) described two subspecies from Somalia, *Buthus occitanus berberensis* and *Buthus occitanus zeylensis* Pocock, 1900. These two subspecies have been considered as synonyms by Levy & Amitai (1980), however, my own study of the types of Pocock, some years ago, lead me to think that both species have important differences in the pigmentation patterns to be distinct. Only the study of a more abundant material from Somalia, will authorise a final conclusion.

Finally, concerning the *Buthus* species found in Yemen, *Buthus intermedius* (Ehrenberg) was (allegedly) collected in Lohiae (Al-Luhayyah), a locality nearby the coastal zone of the Red Sea. In contrast, the new *Buthus* found in Yemen, comes from a locality in the region South of Ma'bar which is located at 2400 m a.s.l. Our past studies on the species of *Buthus*, in particular from African countries such as Morocco, showed that altitudinal gradients are very significant in the definition of scorpion populations (Lourenço 2003, Lourenço & Slimani 2004, Lourenço & Qi 2006). In face of these arguments, a new species of *Buthus* is described here.

### Methods

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

### Taxonomy

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

*Buthus yemenensis* sp. n.  
(Figs 1-8)



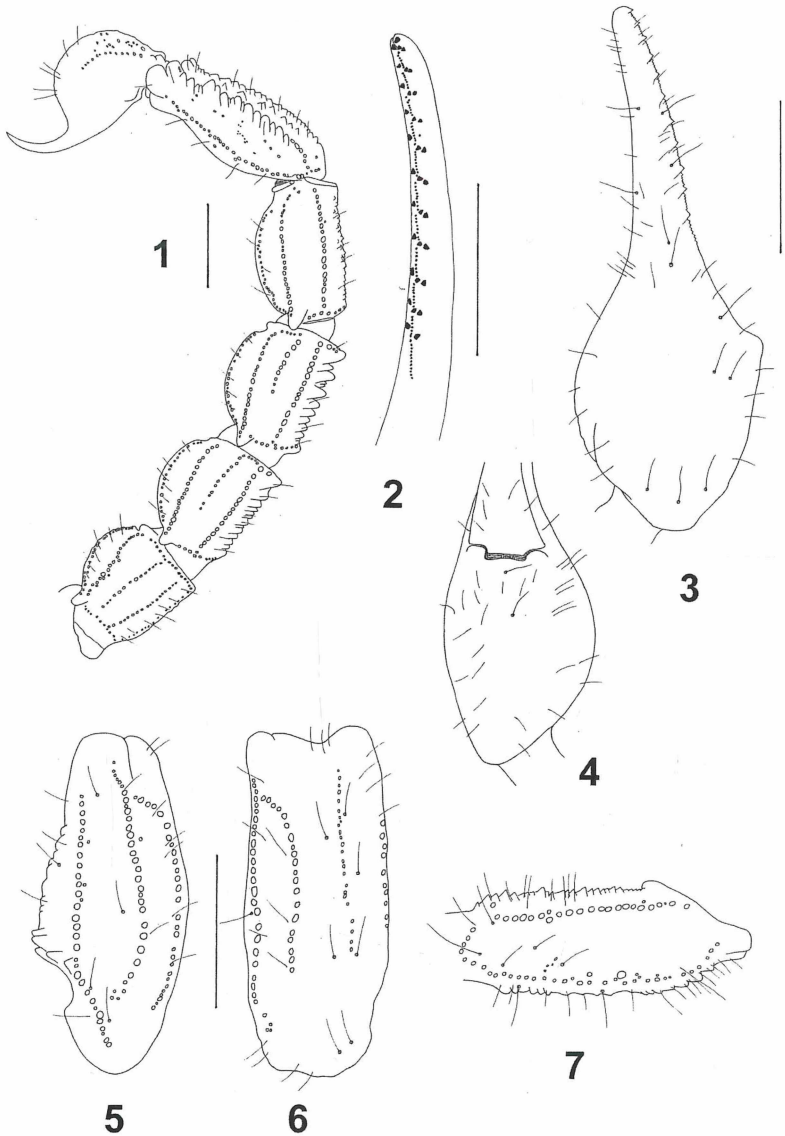
TYPE MATERIAL. Holotype (♀). Yemen, Prov. Dhamar, District Anis, South of Ma'bar (14°48'N, 44°18'E), 2420 m a.s.l., 1 January 1980, coll. C. Naumann. Deposited in the Zoologisches Museum Hamburg, Germany (ZMH Acc. No. A33/08).

Related material: *Compsobuthus brevimanus*: 4 males, 9 females: Dhamar, District Anis, Djebel Masnah: Al Qubba, 2300 m alt., 3 March 1980, coll. Edeln & C. Naumann. Nine specimens deposited in the Zoologisches Museum Hamburg, Germany, four specimens deposited in the Muséum national d'Histoire naturelle, Paris.

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

DIAGNOSIS. Scorpion of medium size in relation to the genus, reaching a total length of 50 mm. Base colour yellowish with carapace and tergites intensely marked with blackish; tergite VII with blackish carinae; metasomal segments yellowish; segment V with dark zones on lateral and ventral aspects; metasomal carinae dark to blackish with dorsal and lateral more intensely marked; telson yellowish with vestigial dark zones on lateral aspects; tip of the aculeus dark. Venter yellowish. Pedipalps yellowish with dorsal and external carinae blackish; chela with reticular (variegated) blackish spots; legs yellowish intensely marked with blackish zones. Carinae and granulations strongly marked. Fixed and movable fingers with 10 rows of granules. Pectines with 26-27 teeth in female.

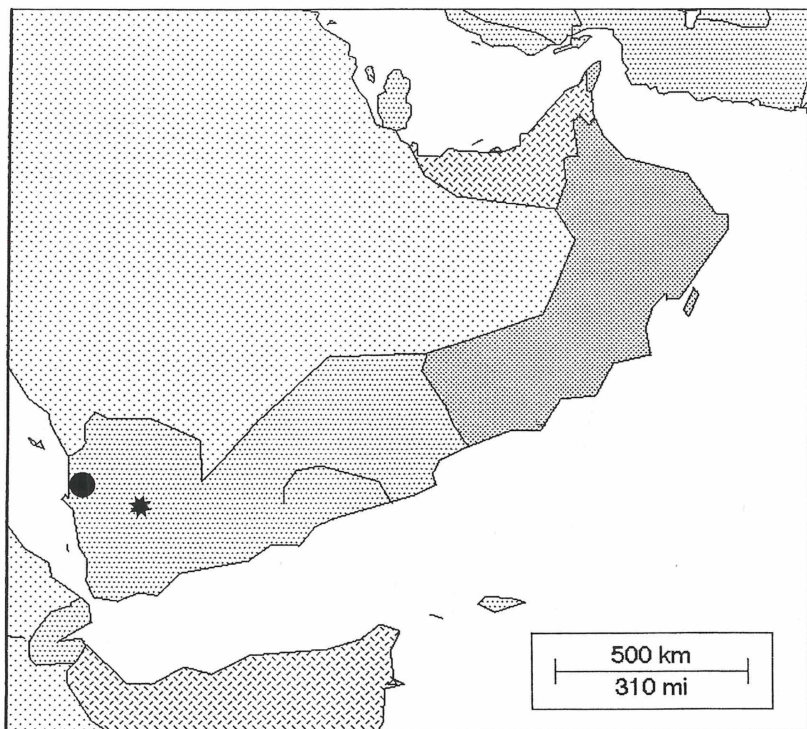
DESCRIPTION based on female holotype. Measurements after the description.



**Figs 1-7.** *Buthus yemenensis* sp. n., female holotype. 1. Metasomal segments I to V and telson, lateral aspect; 2. movable finger of pedipalp chela with rows of granules; 3-7. trichobothrial pattern: 3-4. chela, dorso-external and ventral aspects; 5-6. patella, dorsal and external aspects; 7. femur, dorsal aspect. (Scale bars = 3 mm).

**Coloration.** Base colour yellowish. **Prosoma:** carapace yellowish; carinae posterior regions and eyes marked by dark to blackish pigment. **Mesosoma:** yellowish with tergites intensely marked with blackish confluent zones; only carinae are blackish on tergite VII. **Metasoma:** segments I to IV yellowish; segment V with dark blackish zones on lateral and ventral aspects; vesicle yellowish with vestigial dark zones laterally; aculeus yellowish at its base and dark at its extremity. Venter yellowish; pectines pale yellow. **Chelicerae** yellowish with dark variegated spots; fingers yellowish with dark reddish teeth. **Pedipalps:** yellowish with dorsal and external carinae blackish; chela with reticular (variegated) blackish zones; fingers with the oblique rows of granules dark reddish. Legs yellowish, intensely marked with blackish zones.

**MORPHOLOGY.** Carapace strongly granular; anterior margin without any median concavity, 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.



**Fig. 8.** Map of Yemen with the type locality of the new species (black star), and that of *Buthus intermedius* (Ehrenberg) (black circle).

Four pairs of lateral eyes: the first three of moderate size, the last only vestigial. Sternum triangular and short; longer than wide. Mesosoma: tergites strongly granular. Three longitudinal carinae strongly crenulate in all tergites; lateral carinae reduced in tergites I and II. Tergite VII pentacarinata. Venter: genital operculum divided longitudinally in two semi-oval plates. Pectines: pectinal tooth count 26-27 in female holotype; middle basal lamella of the pectines not dilated. Sternites without granules, smooth with elongated spiracles; four carinae on sternite VII; other sternites acarinated and with two vestigial furrows. Metasoma: segments I to III with 10 crenulated carinae, ventral carinae strongly marked on segments II and III with lobate denticles; segment IV with 8 carinae, 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 slightly divided posteriorly; anal arc composed of seven ventral teeth, and two lateral lobes. Intercarinal spaces moderately to weakly granular. Telson with a strongly globular vesicle and some granulations on the lateral and ventral surfaces; aculeus curved and shorter than the vesicle, without a subaculear tooth. Cheliceral 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. Pedipalps: femur pentacarinata; patella with eight carinae; chela with only vestigial carinae; all faces weakly granular. 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- $\beta$ -configuration (Vachon 1975).

Morphometric values (in mm) of the female holotype. Total length 50.4 (excluding the vesicle). Carapace: length 7.2, anterior width 5.2; posterior width 9.1; Metasomal segments. I: length 4.6, width 5.2; V: length 7.9, width 4.4, depth 3.5; Vesicle: width 4.1, depth 3.8; Pedipalp: femur length 5.5, width 2.2; patella length 6.4, width 3.0; chela length 11.1, width 3.2, depth 3.6; movable finger length 7.1.

REMARKS. *Buthus yemenensis* sp. n., belongs to the '*Buthus occitanus*' complex of species. It can be distinguished from other species of *Buthus* and in particular from *B. intermedius* which was also recorded from Yemen and from *B. berberensis* Pocock, 1900, by the following characters: (i) much darker coloration, (ii) stronger marked carinae and granulations, (iii) telson with a strong globular vesicle and a very short aculeus, (iv) anal arc with 2 lobes. Moreover, the new species comes from a very distinct locality in the mountain range of Yemen.

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