



The genus *Buthus* Leach, 1815 in the basin countries of the Gulf of Guinea with the description of a new species from Ghana (Scorpiones: Buthidae)

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Abstract. The presence of the genus *Buthus* Leach, 1815 in the basin countries of the Gulf of Guinea was reported almost seventy years ago, but the precise identity of the species remained for a long time unknown. Up to now only three species of the genus *Buthus* are recorded in such region: *Buthus prudenti* Lourenço & Leguin, 2012 from Cameroon, *Buthus elizabethae* Lourenço, 2005 from Guinea (but also present in Senegal) and *Buthus elhennawy* Lourenço, 2005 from Niger (but also present in Senegal). A fourth species, *Buthus danyii* sp. n., is now described from Ghana.

Riassunto. Il genere *Buthus* Leach, 1815 nei paesi del bacino del Golfo di Guinea con la descrizione di una nuova specie dal Ghana (Scorpiones: Buthidae). La presenza del genere *Buthus* Leach, 1815 nei paesi del bacino del golfo di Guinea venne riportata quasi settanta anni fa, ma la precisa identità delle specie rimase sconosciuta per lungo tempo. Fino ad ora solo tre specie del genere *Buthus* erano registrate in tale regione: *Buthus prudenti* Lourenço & Leguin, 2012 dal Camerun, *Buthus elizabethae* Lourenço, 2005 dalla Guinea (ma presente anche in Senegal) e *Buthus elhennawy* Lourenço, 2005 dal Niger (ma presente anche in Senegal). Una quarta specie, *Buthus danyii* sp. n., viene qui descritta dal Ghana.

Key words. Scorpiones, Gulf of Guinea, Ghana, *Buthus danyii*.

Introduction

After the revision of the genus *Buthus* Leach, 1815 proposed by VACHON (1952), there was not any significant study for fifty years. However, since 2002, an impressive number of new species of *Buthus* were described, mainly from Africa (LOURENÇO, 2002, 2003, 2005a, 2005b, 2005c, 2013, 2015, 2016; LOURENÇO & SLIMANI, 2004; LOURENÇO & GENIEZ, 2005; LOURENÇO & QI, 2006; LOURENÇO *et al.*, 2009; LOURENÇO & CLOUDSEY-THOMPSON, 2012; LOURENÇO & SIMON, 2012; LOURENÇO & LEGUIN, 2012; LOURENÇO *et al.*, 2012a, 2012b; LOURENÇO & SADINE, 2016; KOVAŘÍK, 2006, 2011; TOULOUN & BOUMEZZOUGH, 2011; ROSSI, 2013; ROSSI & TROPEA, 2016a, 2016b; ROSSI *et al.*, 2013; SADINE *et al.*, 2016), but also from Europe (LOURENÇO & VACHON, 2004; ROSSI, 2012, LOURENÇO & ROSSI, 2013) and Asia (LOURENÇO, 2008; LOURENÇO *et al.*, 2010; YAĞMUR *et al.*, 2011). In addition, several subspecies of *Buthus occitanus* from Africa and Asia were raised to species status (LOURENÇO 2003, 2008; KOVAŘÍK, 2006; LOURENÇO *et al.*, 2010).

The presence of the genus *Buthus* in the basin countries of the Gulf of Guinea, which comprises Guinea, Liberia, Burkina Faso, Mali, Ivory Coast, Ghana, Togo, Benin, Niger, Nigeria, Cameroon, Equatorial Guinea, and Gabon was reported more than sixty years ago by VACHON (1952). However, the identity of the species remained unknown. In fact VACHON (1952) reported with a question mark the subspecies *Buthus occitanus occitanus* Amoreux, 1789 from a large area corresponding to the former French West Africa (AOF). The material examined by VACHON (1952) was not very useful, however, since represented by few specimens from several distant localities, belonging to the modern

countries of Mali, Mauritania, Niger, Guinea, Ivory Coast, and also Senegal, a country not included in the basin of the Gulf of Guinea. LOURENÇO (2005b) clarified the status of a population from Guinea and Senegal and described it as a new species, *Buthus elizabethae* Lourenço, 2005. LOURENÇO (2005b) recalled also that such species was most closely related to *Buthus atlantis* Pocock, 1889 rather than to *Buthus occitanus* as possibly suggested by VACHON (1952). Later LOURENÇO (2005c) described a further new species, *Buthus elhennawi* Lourenço, 2005, from Senegal and Niger. In that case, the new described species really seemed to be conspecific with the population already reported by VACHON (1952) from some localities of the former French West Africa (AOF). More recently LOURENÇO & LEGUIN (2012) described an additional new species, *Buthus prudenti* Lourenço & Leguin, 2012, from northern Cameroon. Some years before, KOVAŘÍK (1997) reported *Buthus occitanus occitanus* from Ghana, evidently considering such population identical to the subspecies from the former French West Africa cited by VACHON (1952). Indeed VACHON (1952) was not completely sure about the status of the specimens from AOF, in fact he indicated them with a question mark. Later FET & LOWE (2000) regarded as questionable the decision by KOVAŘÍK (1997) since they did not accept as realistic the idea that a species from Europe could be distributed also in Ghana, very far from its usual distribution. In recent years, morphological, but especially molecular studies, confirmed that *Buthus* populations from Europe and Africa are totally distinct (GANTENBEIN & LARGIADÈR 2003; SOUSA *et al.*, 2010, 2012). In fact the species *Buthus occitanus* was restricted to Europe (France and Spain) and consequently all populations from Africa are regarded as different species. Here the status of the population from Ghana is clarified and it is described as a new species. The new species seems to be most closely related to *Buthus prudenti* from Cameroon rather than to *B. elizabethae* and *B. elhennawi*.

Material and methods

Measurements, given in mm, follow HJELLE (1990), and terminology follows SISSOM *et al.* (1990).

Abbreviations

L = length; W = width; H = height.

ARPC = Andrea Rossi, Private Collection, Massa, Italy.

HNHM = Hungarian Natural History Museum, Budapest, Hungary.

MNHN = Muséum Nationale d'Histoire Naturelle, Paris, France.

MZUF = Museo di Storia Naturale dell'Università degli Studi di Firenze, sezione di Zoologia "La Specola", Florence, Italy.

Taxonomy

Family Buthidae C.L. Koch, 1837

Genus *Buthus* Leach, 1815

***Buthus danyii* sp. n.** (Figs 1-5)

? *Buthus occitanus occitanus*: Vachon, 1952: 269-271 (possibly, in part?)

Buthus occitanus occitanus: Kovařík, 1997: 179 (misidentification).

Type material. Holotype ♂, Garu, Ghana, 27/X/1971, leg. S.Y. Endrody (HNHM 82), 1 ♂ paratype, same data as holotype (HNHM 82), 1 ♂ paratype, same data as holotype (ARPC 0606); 1 ♂ paratype, Tumu, Ghana, 27/X/1971, leg. S.Y. Endrody (HNHM 85); 1 ♂ paratype, same data as HNHM 85 (MZUF).

Etymology. The name of the new species is in honour to Dr. László Dányi (HNHM), for his kind help and support.

Diagnosis. Scorpion of medium size for the genus, reaching a maximum of 60 mm in length in the males (the range is 55-60 mm). General coloration uniformly yellow without dark stripes or pigmentation on pedipalp carinae. Carinae of carapace, tergites and metasomal segments moderately marked. Movable and fixed fingers of pedipalps with 11-12 rows of granules. Pectines with 28-31 teeth in males. Pedipalp chela with a L/W ratio of 4.4 in males.



Figs 1-4. *Buthus danyii* sp. n. male holotype (HNHM). 1. Dorsal aspect. 2. Ventral aspect. 3. Ventral aspect of pedipalp chela (trichobothria indicated in green colour). 4. Dorsal aspect of pedipalp (trichobothria indicated in green colour).

Description. Based on male holotype. Coloration basically yellowish. Prosoma: anterior median carinae moderately marked; central lateral and posterior median carinae are less marked; posterior lateral carina with the typical lyre carinae configuration of the genus *Buthus*. Median eyes and

three/four pairs of lateral eyes black. Mesosoma yellow with three longitudinal moderate carinae without dark strips. Carinae on tergite I and II weakly evident. Only tergite VII has five carinae. Venter yellow with pale yellow genital operculum and pectines. Pectinal teeth count is 31/30. Sternum triangular, longer than wide. Sternites smooth except for sternite VII, which bears four carinae. Other sternites show two vestigial furrows. Spiracles elongated. Metasoma with all its segments longer than wide; segment I with 10 complete moderate carinae; segments II and III with 10 carinae but lateral carinae incomplete and ventral carinae with several little marked granules; segment IV with eight carinae; segment V with five carinae, with tubercles of latero-ventral carinae marked. Anal arc with two lateral lobes. Telson almost smooth. Vesicle and base of aculeus yellowish. Tip of aculeus reddish. Aculeus curved and approximately as long as vesicle. Subaculear tubercle absent. Pedipalps: femur pentacarinat with carinae moderately marked; patella with eight moderate carinae; all carinae without dark pigmentation. Dorsal trichobothria of femur arranged in β -configuration (VACHON, 1974). Chela smooth, without carinae. Fixed and movable fingers with 11-12 oblique rows of granules. Chelicerae: yellow without reticulations; typical dentition of family Buthidae (VACHON, 1963). Legs: yellow; coxa, femur and patella with moderate carinae and sparsely hirsute; tarsus with two ventrally longitudinal rows of setae. Robust tibial spurs present on legs III and IV.

Measurements of the male holotype (HNHM 82).

Carapace L/posterior W: 6.4/6.8; mesosoma L: 13.4; metasomal segment I L/W/H: 5.1/4.7/4.0; metasomal segment II L/W/H: 5.8/4.5/3.9; metasomal segment III L/W/H: 5.9/4.4/3.9; metasomal segment IV L/W/H: 6.9/4.2/3.5; metasomal segment V L/W/H: 7.6/3.8/2.9; telson L/W/H: 6.5/2.7/2.5; pedipalp patella L/W: 5.4/2.3; pedipalp chela L/W: 10.1/2.3; pedipalp movable finger L: 7.1; total L: 57.6.

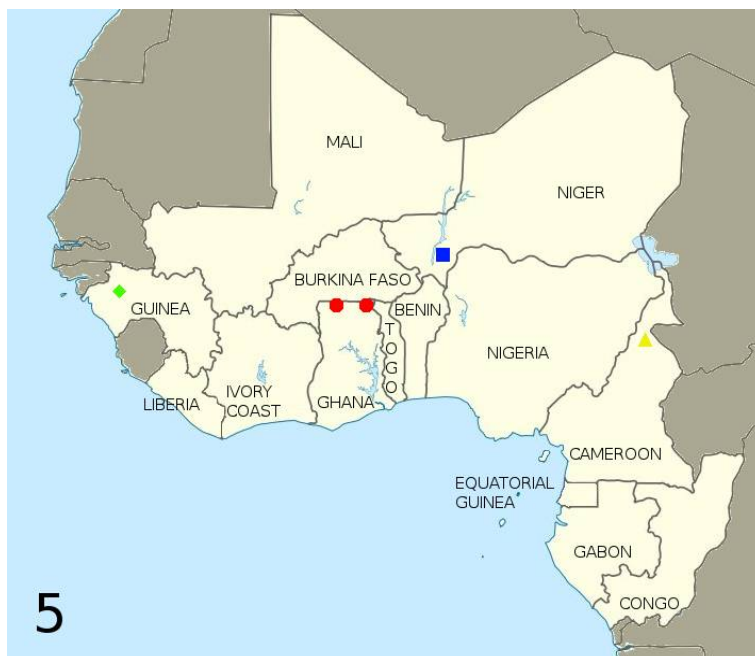


Fig. 5. Map of the basin countries of the Gulf of Guinea (indicated in white) with the distribution of the four known species of the genus *Buthus*: *B. elizabethae* Lourenço, 2005 (green rhombus), *B. elhennawy* Lourenço, 2005 (blue square), *B. prudenti* Lourenço & Leguin, 2012 (yellow triangle), *B. danyii* sp. n. (red circles). Note: for *B. elizabethae* and *B. elhennawy* the localities in Senegal are not indicated because the country is not included in the basin of the Gulf of Guinea.

Relationships. *Buthus danyii* sp. n. appears to be most closely related to *Buthus prudenti*, rather than *Buthus elizabethae* and *Buthus elhennawyi*. From the latter two species *Buthus danyii* sp. n. can be distinguished respectively for carinae of carapace and of tergites (especially the first two) marked in contrast to carinae very less marked (or partially absent from the first two tergites) and for a bigger size; in fact, according to LOURENÇO (2005c), but also to VACHON (1952), the populations from Niger are very small, up to 45 mm in total length. Besides, according to LOURENÇO (2005c), the males of *B. elhennawyi* have the pectines which strongly overlap in their proximal regions but in the males of the new species the pectines are well separated (Fig. 2).

Buthus danyii can be distinguished from *Buthus prudenti* by the following characters: i) a slender pedipalp chela with a L/W ratio of 4.4 in males of *Buthus danyii* versus 3.8 in the males of *Buthus prudenti*; ii) less marked ventral carinae with smaller granules on second and third metasomal segments; iii) a lighter colour of the tergites, which are yellow in contrast to yellowish brown; iv) a smaller size reaching a maximum of 60 mm in total length versus 70 mm.

Comparative material examined

Buthus prudenti Lourenço & Leguin, 2012

Type locality and type depository. Region of Sanguéré-Djoi (9°23.229' N 13°500.68' E), Cameroon, MNHN.

Material examined. 6 ♂♂ topotypes, Region of Sanguéré-Djoi (9°23.229' N 13°500.68' E), Cameroon, leg. P. Prudent, VIII-XI/2011, cotton field, scorpions collected with Barber traps (ARPC 0288, 0289, 0290, 0291, 0292, 0293).

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