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A new species of *Androctonus* Ehrenberg, 1828 from Togo (Scorpiones, Buthidae)

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(with 11 figures)

Abstract

A new species of scorpion belonging to the genus *Androctonus* Ehrenberg, 1828 (the family Buthidae C. L. Koch, 1837), is described on the basis of a large series of specimens collected in the savannah-like formations in the North of Togo. The new species is characterized by yellowish to pale yellow coloration and a moderate size in relation to other species of the genus. The species *Androctonus eburneus* (= *Prionurus eburneus* Pallary, 1928), previously synonymised to *Androctonus amoreuxi* (Audouin, 1826), is revalidated.

Key words: Scorpiones, Buthidae, *Androctonus togolensis* sp. n., Togo.

Introduction

As already discussed in several recent papers (Lourenço 2005, Lourenço & Qi 2006, 2007) the taxonomy of the genus *Androctonus* Ehrenberg, 1828 has long remained complex and confused. In his contributions to the study of North African scorpions, Vachon (1948, 1952) attempted to establish a better definition of the genus *Androctonus* and its species. He maintained, however, the status of several subspecies, and even described new ones for populations totally disconnected geographically. One of the best examples of this complexity is provided by *Androctonus*

amoreuxi (Audoin, 1826), originally described from Egypt, but considered by Vachon (1952) as having a very large range of distribution over most of North of Africa. Lourenço (2005) characterized the Senegal population as distinct and described a new species, *Androctonus dekeyseri*. More recently, Lourenço and Qi (2007) described another new species from Mauritania, *Androctonus aleksandrplotkini*, also related to *A. amoreuxi*. In fact, the range of distribution proposed by Vachon (1952) for the species *A. amoreuxi* is unsatisfactory, mainly because several populations distributed in the periphery of a core Saharan region prove to be distinct.

Recent investigation of a series of specimens collected in the savannah-like formations of the North of Togo has resulted in the description of yet one more new species of *Androctonus*. This is also the first citation of the genus *Androctonus* for Togo. The new species described below most certainly can be associated with a peri-Saharan zone of distribution.

Material and 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).

Considerations on the geographic distribution of North African scorpions

The patterns observed today in the distribution of North African scorpions can be summarised as follows. A core Saharan region which was defined by Vachon (1952) as the 'central compartment' in which only the species best adapted to xeric conditions, such as *A. amoreuxi* are distributed.

The existence of a peri-Saharan zone of distribution almost forming a ring around the most arid core region of the Sahara is quite evident. In this zone, several species that are totally excluded from the core region of the Sahara can be observed. Finally, several groups less well adapted to xeric environments have their populations limited to refugia. These can be represented in the Saharan massifs, such as Hoggar, Air and Adrar. This is the case of *Androctonus eburneus* (Pallary, 1928) (= *Prionurus eburneus* Pallary, 1928). This species originally described from Djanet, Hoggar massif in the South of Algeria, was placed in the synonymy of *A. amoreuxi* by Vachon (1955). More recently, El-Hennawy (1992) suggested that *A. eburneus* could be placed in the synonymy of *A. hoggarensis* (Pallary, 1929), also described from Hoggar. Naturally, this last proposition is inadequate since *A. eburneus* has priority over *A. hoggarensis*. Moreover, this last species was considered as valid by Lourenço (2005), whereas the discussion of the position of *A. eburneus* was postponed. The type material of *A. eburneus* was finally located in the collections of the Museum in Paris, and a more precise study reveals that this species can be considered as valid.

Androctonus eburneus (Pallary, 1928)

The type material of this species is composed of one male and one female specimen. Both are very poorly preserved, but most useful characters can be observed. The total size of both male and female is 47 mm (see Table 1), what makes this species to be much smaller than *A. amoreuxi*. Pectinal tooth count shows 38-37 teeth for the male and 24-22 for the female. These values are higher than those observed for *A. amoreuxi* (Lourenço 2005). Vachon (1955) indicated a variation of 28 to 33 teeth in the pectines of *A. amoreuxi*, but 32 to 37 teeth for the population found in the Hoggar massif. Consequently, he suggested that the Hoggar population could represent a 'particular form'. It looks obvious that the population present in the Hoggar massif is isolated in a kind of refugium, and can be considered as a distinct species, represented by *A. eburneus*. Male and female type specimens are designated at present as lectotype and paralectotype.

Description of the new species*Androctonus togolensis* sp. n.
(Figs 1-11)

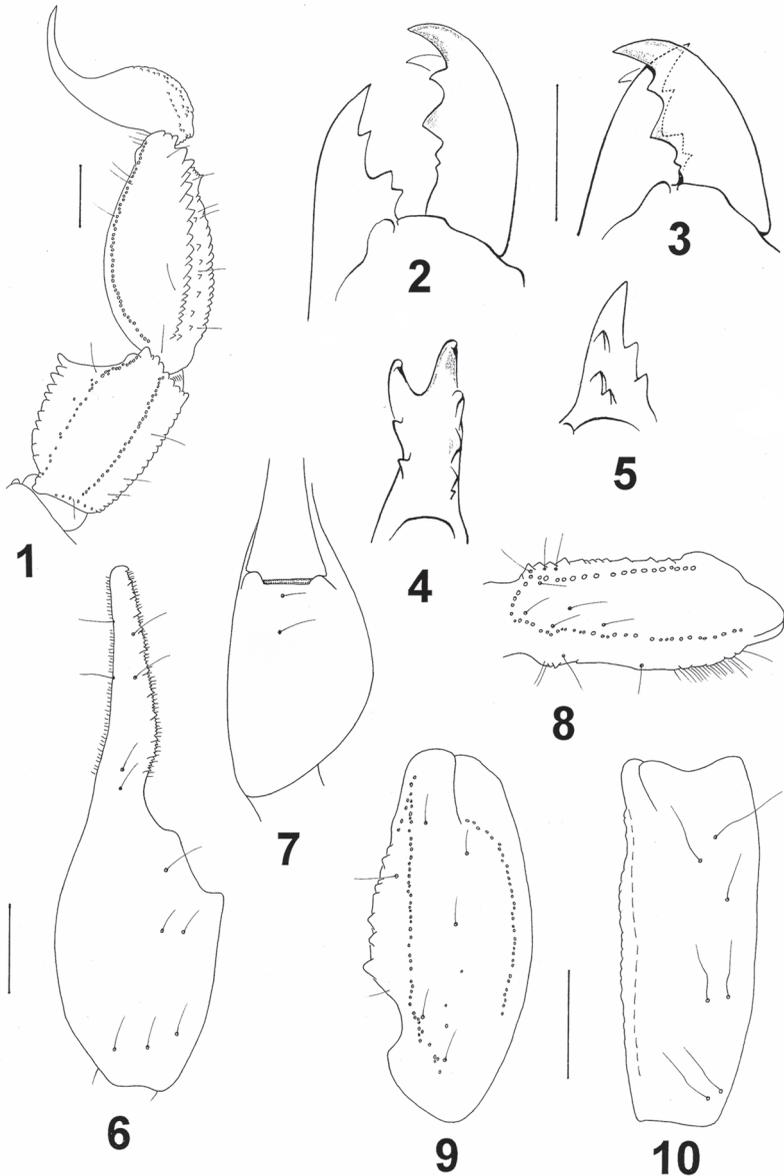
TYPE MATERIAL. Holotype (σ), 8 paratypes (6 σ , 2 f). Togo, Mandouri, NE region of Dapango (Dapaong), in a natural reserve, 16 December 1979, coll. M. Thomas, Savannah-like formation; sand soil with lateritic rocks (together with juveniles of *Hottentotta hottentotta*). Holotype (ZMH Acc.No. A35/08), 4 male and 1 female paratypes deposited in the collections of the Zoologisches Museum Hamburg (ZMH No. A36/08). 2 male and 1 female paratypes deposited in the collections of the 'Muséum national d'Histoire naturelle, Paris.

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

DIAGNOSIS. Scorpions of medium size, reaching a total length of 57 to 60 mm in males and 70 mm in females. General coloration yellowish to pale yellow without spots over the body and appendages. Carinae on carapace weakly to moderately developed. Metasomal segments I to V narrow and of approximately the same width; dorsal depression on segments I to IV moderately deep. Anal arc composed of 10 to 14 inconspicuous ventral teeth and with three sharp lateral lobes; in some specimens, followed by two small posterior denticles. Fixed and movable fingers with 11-12 rows of granules. Pectines with 30 to 36 teeth in males and 22 to 24 in females. External pedal spur with a tooth not bifid.

DESCRIPTION based on male holotype and one female paratype. Measurements in Table 1.

Coloration. Mainly yellowish to pale yellow without any spots over the body or appendages. Prosoma: carapace yellowish; eyes marked by dark pigment. Mesosoma: yellowish; carinae not pigmented. Metasomal segments yellowish without spots over the ventral carinae; carinae



Figs. 1-10. *Androctonus togolensis* sp. n., male holotype. 1. Metasomal segments IV, V and telson, lateral aspect; 2-5. chelicera; 2-3. dorsal aspect with opened and closed fingers; 4-5. movable and fixed fingers, internal aspect; 6-10. trichobothrial pattern: 6-7. Chela, dorso-external and ventral aspects; 8. femur, dorsal aspect; 9-10. patella, dorsal and external aspects (scale bar = 2 mm).

slightly coloured of reddish; vesicle yellowish; aculeus yellowish at its base and dark reddish at its extremity. Venter yellowish; pectines pale yellow. Chelicerae yellowish without any variegated spots; fingers yellowish with reddish teeth. Pedipalps pale yellow; fingers with the oblique rows of granules reddish. Legs pale yellow without spots.

MORPHOLOGY. P r o s o m a. Carapace weakly to moderately granular; anterior margin straight, without a median concavity. Carinae weakly to moderately marked; anterior median and posterior median carinae moderately granular; central lateral carinae vestigial; other carinae weak. All furrows weak. Median ocular tubercle only slightly anterior to the centre of carapace. Eyes separated by two and a half to three ocular diameters. Five pairs of lateral eyes: the first three of moderate size, the last two

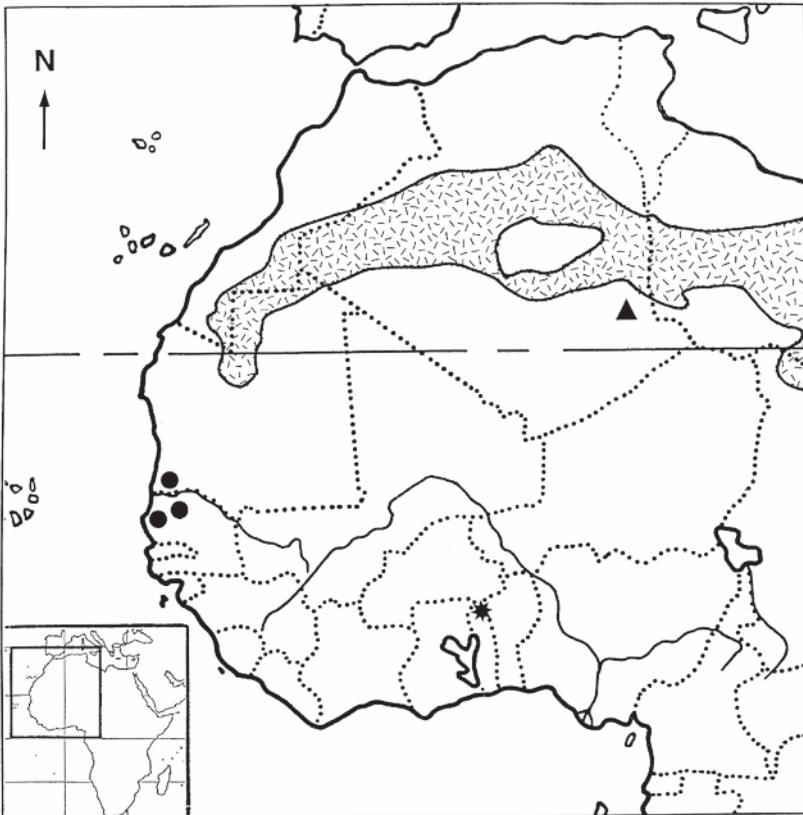


Fig. 11. Northwestern Africa with the possible zone of distribution of *Androctonus amoreuxi* (Audoin) (hachured area) in the 'central compartment' (adapted from Vachon, 1952) and the type localities of *A. eburneus* (Pallary) (black triangle), *A. dekeyseri* (Lourenço) (black circles) and of the new species (black star).

strongly reduced. Sternum triangular and narrow; longer than wide. *Mesosoma*: tergites moderately granular. Three longitudinal carinae, obsolete on tergites I and II, weakly crenulate on tergites III to VI. Tergite VII pentacarinata. Venter: genital operculum divided longitudinally, forming two oval plates. Pectines: pectinal tooth count 35-33 in male holotype and 25-24 in female paratype; middle basal lamella of the pectines not dilated. Sternites without granules, smooth with elongated spiracles; four weakly marked carinae on sternite VII; other sternites acarinate and with two vestigial furrows. *Metasomal* segment I with 10 carinae, crenulated; segments II to IV with 8 carinae, strongly crenulated; lateral inframedian carinae represented on segment II by 3-4 granules, absent from III; dorsal carinae of segments II to IV with one bigger posterior spinoid granule; the first four segments with a smooth and moderately deep dorsal depression; segment V with five carinae; the latero-ventral carinae strongly crenulate with several lobate denticles; ventral median carina not divided posteriorly; anal arc composed of 10 to 14 inconspicuous ventral teeth, three sharp lateral lobes, followed, in some specimens, by two small posterior denticles. Intercarinal spaces slightly granular to smooth. Telson with a few strong granulations on ventral surface; aculeus moderately curved and slightly shorter than the vesicle, without a subaculear tooth. *Chelicer*al 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 very small but not fused; ventral aspect of both fingers and manus covered with long dense setae. *Pedipalps*: femur pentacarinata; patella with seven carinae but only dorso-internal and internal are better marked; other carinae weak; chela with only vestigial carinae; all faces very weakly granular to smooth. Fixed and movable fingers with 11-12 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 several thin setae ventrally, arranged in more or less two rows; tibial spur moderate on legs III and IV; pedal spurs moderate to strong on legs I to IV; external spur not bifid. Trichobothriotaxy: trichobothrial pattern of Type A, orthobothriotaxic as defined by Vachon (1974). Dorsal trichobothria of femur arranged in β (Beta) configuration (Vachon 1975).

REMARKS. By its general morphology and yellowish coloration, the new species can be associated to both *Androctonus eburneus* (Pallary, 1928) and *A. dekeyseri* Lourenço, 2005. It can, however, be distinguished from these two species by several distinct characters: (i) paler yellowish coloration, without any spots, (ii) a smaller total size than that of *A. dekeyseri* and a bigger size than that of *A. eburneus* (for detailed morphometric values see Table 1), (iii) less marked carinae and furrows on carapace and metasomal segments, (iv) eight carinae on metasomal segment II, versus ten in the other two species, (v) metasomal segments I to V narrow and of approximately the same width (vi) 11-12 oblique rows in the pedipalp chela fingers, versus 12-13 rows in the other two species. Finally, the new species was found in a distinct type of habitat, the savannah-like formations of North of Togo.

Table 1. Morphometric values (in mm) of the male holotype and female paratype of *Androctonus togolensis* sp. n., male lectotype and female paralectotype of *Androctonus eburneus* (Pallary) and male holotype and female paratype of *Androctonus dekeyseri* Lourenço.

	<i>A. togolensis</i> sp. n.		<i>A. eburneus</i>		<i>A. dekeyseri</i>	
	♂	♀	♂	♀	♂	♀
Total length	56.7	70.4	47.6	47.3	76.6	86.1
Carapace:						
- length	7.2	9.3	6.8	6.7	9.8	10.9
- anterior width	4.8	6.6	4.5	4.5	6.3	7.2
- posterior width	7.8	11.0	7.2	7.4	11.1	12.8
Metasomal segment I:						
- length	4.8	6.1	4.1	3.8	6.9	6.8
- width	4.9	6.1	4.3	4.3	6.7	7.8
Metasomal segment V:						
- length	8.5	10.2	7.2	7.4	11.2	12.2
- width	4.5	5.9	3.6	3.7	6.8	6.9
- depth	3.8	4.7	3.1	3.2	5.5	5.8
Vesicle:						
- width	3.0	3.8	2.6	2.6	4.0	4.7
- depth	2.5	3.2	2.3	2.2	3.5	3.9
Pedipalp:						
- Femur length	5.8	6.7	5.1	5.3	8.4	8.1
- Femur width	2.2	2.7	1.8	2.2	2.9	2.3
- Patella length	7.0	8.4	6.3	6.6	9.9	10.2
- Patella width	3.2	3.9	2.6	2.6	4.3	4.8
- Chela length	12.2	15.1	10.7	10.7	17.6	17.5
- Chela width	3.6	4.1	2.3	2.3	4.4	4.9
- Chela depth	3.6	4.2	2.5	2.5	4.5	5.2
Movable finger: length	7.9	10.1	7.3	7.7	10.8	11.3

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