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ONE MORE NEW SPECIES OF *BUTHUS* LEACH, 1815 FROM ALGERIA (SCORPIONES: BUTHIDAE)

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Abstract: Since the early 2000s, the genus *Buthus* Leach, 1815 (Buthidae) has been the subject of an important number of studies, involving in particular the species of the '*Buthus occitanus*' complex. A number of populations previously considered as subspecies or varieties of *Buthus occitanus* Leach, 1815 have been raised to the rank of species, but also many new species have been described. Most of the species considered in these studies come from North Africa, in particular from Morocco, Mauritania, Chad, Sudan, Libya and Egypt, but only three of them have been recorded from Algeria. One more new species of *Buthus* is here described from the Algerian mountains, raising the number of confirmed *Buthus* in Algeria to six.
Key words: Scorpiones, Buthidae, *Buthus*, new species, mountains, Algeria.

Una especie nueva de *Buthus* Leach, 1815 de Argelia (Scorpiones: Buthidae)
Resumen: Desde el principio de la década de 2000 el género *Buthus* Leach, 1815 (Buthidae) ha sido objeto de una importante serie de estudios, dedicados especialmente a las especies del complejo '*Buthus occitanus*'. Diversas poblaciones previamente consideradas como subespecies o variedades de *Buthus occitanus* Leach, 1815 se han elevado a especies, pero además se han descrito muchas especies nuevas. La mayoría de las especies recogidas en esos estudios son del norte de África, especialmente de Marruecos, Mauritania, Chad, Sudán, Libia y Egipto, aunque sólo tres especies de ellas se han citado de Argelia. Aquí se describe otra especie nueva de las montañas de Argelia, elevando a seis el número de los *Buthus* confirmados de este país.
Palabras clave: Scorpiones, Buthidae, *Buthus*, especie nueva, montañas, Argelia.

Taxonomy / Taxonomía: *Buthus aures* **sp. n.**

Introduction

As already outlined in previous papers, during the last 15 years, following the preliminary revisions of the genus *Buthus* Leach, 1815 proposed by Lourenço (2002, 2003), several new species were described, in particular associated to the '*Buthus occitanus*' complex (Lourenço, 2013; Sadine *et al*., 2016). Most new species have been discovered and described from North African deserts (Lourenço, 2003) or from sub-Saharan regions (Lourenço, 2015; Lourenço & Leguin, 2012), with a few exceptions for European and Middle East countries (Lourenço, 2008; Lourenço & Vachon, 2004; Lourenço & Rossi, 2013; Lourenço *et al*., 2010; Rossi, 2012; Yağmur *et al*., 2011).

A majority of the new species from North Africa, were recorded and described from countries such as Morocco, Mauritania, Tunisia, Sudan, Libya, Chad and Egypt (Lourenço, 2003, 2015; Lourenço & Cloudsley-Thompson, 2012; Rossi *et al*., 2013), but only three new species were recently recorded from Algeria (Lourenço, 2002, 2013; Sadine *et al*., 2016).

Recent field work performed by the junior author in the Batna Mountains of the North of Algeria (Fig. 1), region located in the Mediterranean ecosystems of the country (Fig. 2-3), lead to the collection of some distinct *Buthus* specimens. Precise analysis of these specimens confirmed that they are distinct from *Buthus tunetanus* (Herbst, 1800) and *Buthus paris* (C. L. Koch, 1839), which are the two species currently distributed in the North of Algeria, but also from *Buthus pusillus* Lourenço, 2013, species recently described from the North of this country. Consequently, a new species of *Buthus* is described here.

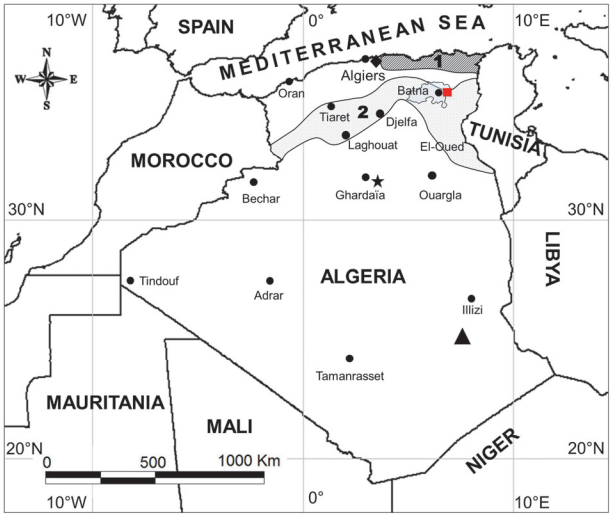


Fig. 1. Map of Algeria, showing the distribution of the known *Buthus* species. *Buthus paris* (dashed area 1). *Buthus tunetanus* (dashed area 2). *Buthus tassili* (black triangle). *Buthus pusillus* (black rhomb). *Buthus saharicus* (black star). *Buthus aures* sp. n. (red square).





Fig. 2-3. The plateau and massifs of the Aurès montains in North Algeria, type locality of the new species with its typical Mediterranean vegetation.

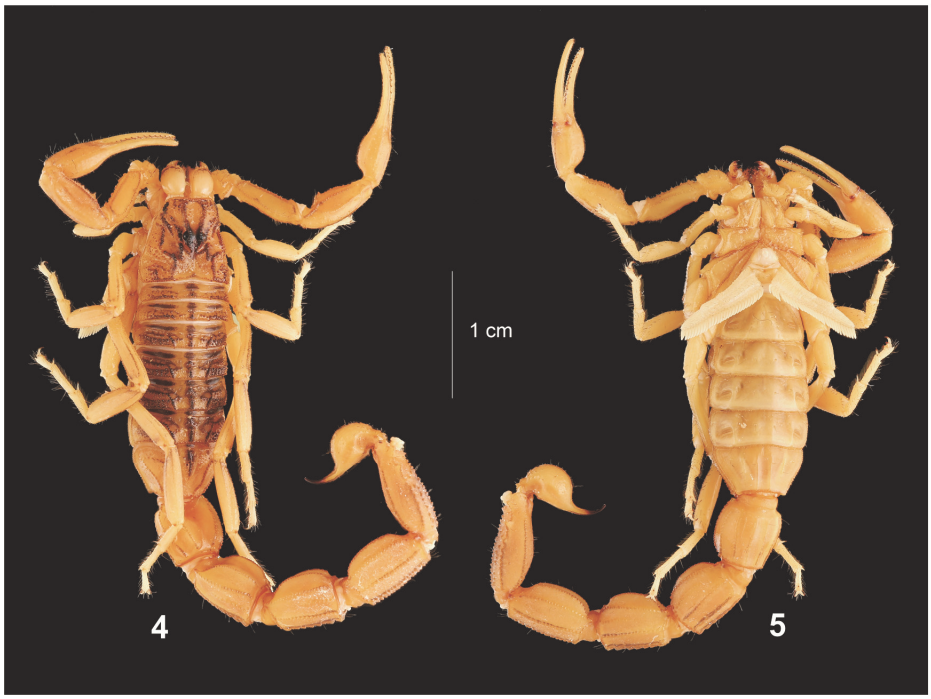


Fig. 4-5. *Buthus aures* sp. n., male holotype. Habitus, dorsal and ventral aspects.

Methods

Illustrations and measurements were made with the aid of a Wild M5 stereo-microscope with a drawing tube (camera lucida) 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).

Taxonomic treatment

Family Buthidae C. L. Koch, 1837

Genus *Buthus* Leach, 1815

***Buthus aures* sp. n.** (Fig. 4-13)
Algeria, Region of Batna (35° 31' 55''N – 005° 55' 10''E), in forest formation, 1556 m, 07/VII/2006 (S. E. Sadine), 1 male holotype; 01/V/2014 (A. Youcef), 1 male paratype. Holotype deposited in Muséum national d'Histoire naturelle, Paris; paratype deposited in the University of Ghardaïa, Algeria.

ETYMOLOGY: The specific name is a noun in apposition to the generic name and refers to the Aurès mountains of the region of Batna in which the new species was collected.

DIAGNOSIS: Scorpion of moderate to large size, reaching a total length of 61 mm in males. General coloration orange-yellowish; carapace and tergites moderately spotted; three longitudinal stripes over tergites; legs and pedipalps with diffused spots. Carinae strongly marked; granulations moderately to strongly marked. Fixed and movable fingers with 11-12 rows of granules. Pectines with 28-29 (holotype) and 30-31 (paratype) teeth in males. Tibial spurs strongly developed.

RELATIONSHIPS: *Buthus aures* sp. n. belongs to the '*Buthus occitanus*' complex of species. By a number of characters the new species shows similarities with *Buthus pusillus* Lourenço 2013 described from north of Algeria (Lourenço, 2013). It can, however, be distinguished from this last species and from *Buthus tunetanus* and *B. paris* by the following characters: (i) The new species is much bigger in size than *B. pusillus* and shows stronger carinae and granulations, (ii) *B. tunetanus* and *B. paris* are larger species, measuring up to 70-80 mm in total length, (iii) the new species probably has a reduced number of pectinal teeth in relation to *B. tunetanus* and *B. paris*, if only Algerian populations are taken in consideration (iv) *B. paris* has 12-14 rows of granules on the chela fingers whereas the new species has 11-12, (v) the new species shows a weak

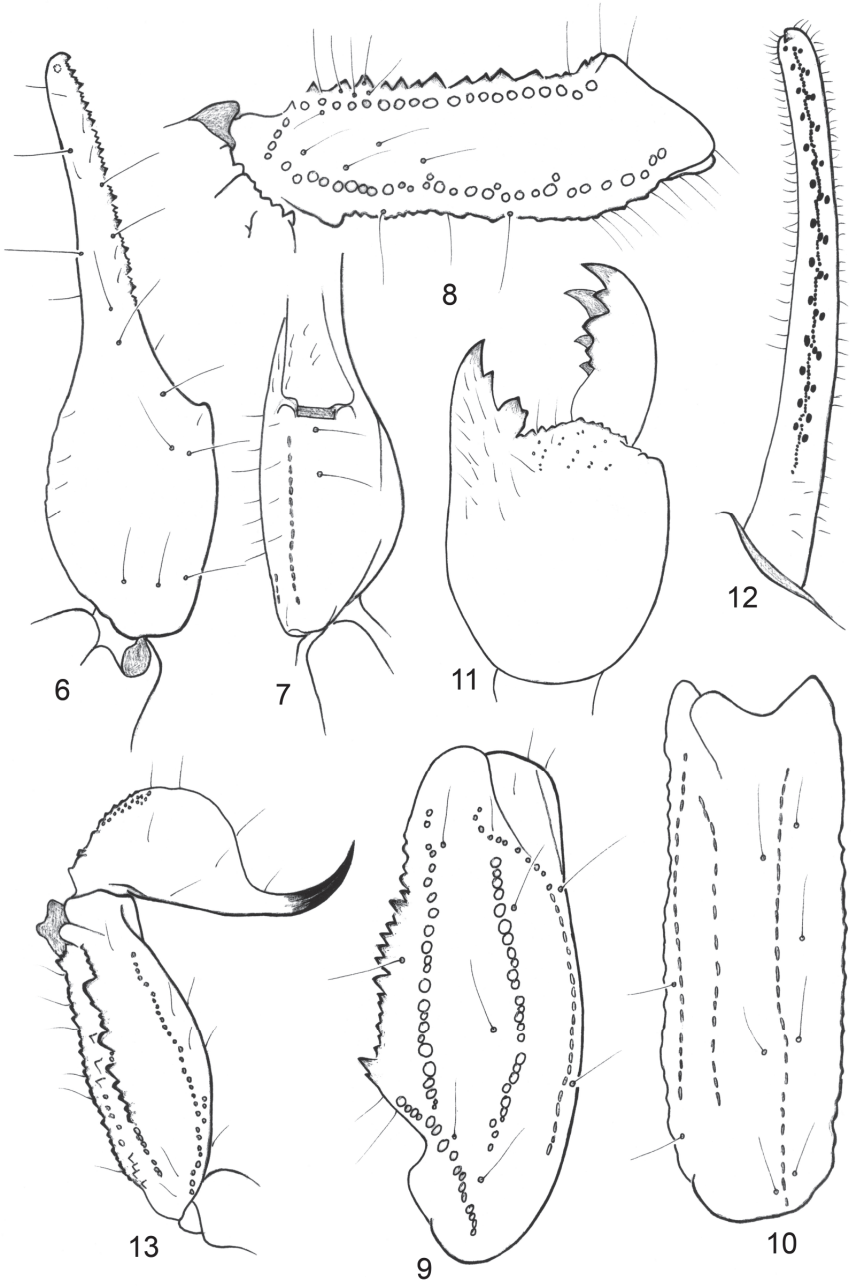


Fig. 6-13. *Buthus aures* sp. n., male holotype. **6-10**. Trichobothrial pattern. **6-7**. Chela, dorso-external and ventral aspects. **8**. Femur, dorsal aspect. **9-10**. Patella, dorsal and external aspects. **11**. Chelicera, dorsal aspect. **12**. Cutting edge of movabe finger with rows of granules. **13**. Metasomal segment V and telson, lateral aspect.

setation on pedipalps, metasomal segments and telson ('oligotriche', sensu Vachon, 1952); this setation is better marked in both *B. tunetanus* and *B. paris*, (v) metasomal segments I to III present 10 carinae on the new species, whereas in *B. tunetanus* and *B. paris* these segments present 10-8-8 carinae.

DESCRIPTION based on male holotype and male paratype.
Measurements after the description.
Coloration basically yellow to orange-yellowish. Prosoma: Carapace yellowish; carinae and eyes marked by dark pigment. Mesosoma yellowish with three longitudinal stripes; the median one narrower than the lateral. Metasomal segments yellow with some light brown spots over carinae; vesicle yellow without lateral stripes; aculeus yellowish at its base and reddish at its extremity. Venter yellowish; pectines pale yellow. Chelicerae yellowish with variegated spots at the base of fingers; fingers yellow with blackish teeth. Pedipalps yellow with diffuse brownish spots; fingers with the oblique rows of granules dark red. Legs yellow with diffuse brown spots over carinae.

Morphology. Carapace moderately to strongly granular; anterior margin with a weak concavity, almost straight. Carinae moderately to strongly marked; anterior median, central median and posterior median carinae strongly granular, with 'lyre' configuration. All furrows moderate. Median ocular tubercle slightly anterior to the centre of carapace. Eyes separated by two and half ocular diameters. Three pairs of lateral eyes of moderate size in relation to median eyes. Sternum triangular, not narrowed; slightly wider than long. Mesosoma: tergites moderately granular. Three longitudinal carinae moderately to strongly crenulate in all tergites; lateral carinae reduced in tergites I and II. Tergite VII pentacarinate. Venter: genital operculum divided longitudinally, which plate with a semi-oval to semi-triangular shape. Pectines: pectinal tooth count 29-28 in male holotype (male paratype with 30-31); middle basal lamella of the pectines not dilated. Sternites without granules, smooth with elongated spiracles; four carinae on sternite VII; four vestigial carinae on VI; other sternites almost acarinated and with two vestigial furrows. Meta-

somal segments with a weak to moderate setation; segments I to III with ten crenulated carinae, ventral slightly better marked on II-III but without lobate granules; segment IV with eight carinae, crenulated; the first four segments with a smooth dorsal depression; segment V with five carinae; the latero-ventral carinae crenulate with 2-3 lobate denticles posteriorly; ventral median carina divided posteriorly over ¼ of the segment length; anal arc composed of 6-7 ventral teeth, and two lateral lobes. Intercarinal spaces weakly to moderately granular. Telson with some granulations ventrally; other faces smooth; aculeus curved and slightly shorter than the vesicle, without a subaculear tubercle. 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 to moderate and not fused; ventral aspect of both fingers and manus covered with long dense setae. Pedipalps with a weak to moderate setation; femur pentacarinate; patella with nine carinae, moderately marked; all faces weakly granular; chela smooth, with vestigial carinae. Fixed and movable fingers with 11-12 oblique rows of granules. Internal and external accessory granules present, moderately strong; three accessory granules on the distal end of the movable finger next to the terminal denticle. Legs: tarsus with two longitudinal rows of short setae ventrally; tibial spurs very strong on legs III and IV; pedal spurs strong on legs I to IV. Trichobothriotaxy: trichobothrial pattern of Type A, orthobothriotaxic as defined by Vachon (1974). Dorsal trichobothria of femur arranged in β (beta) configuration (Vachon, 1975).

Morphometric values of the male holotype of *Buthus aures* sp. n. Total length including the telson, 60.9. Carapace: length 6.6; anterior width 4.6; posterior width 7.5. Mesosoma length: 16.7. Metasomal segments. I: length 4.9, width 5.3; II: length 5.6, width 5.0; III: length 5.8, width 4.7; IV: length 6.5, width 4.4; V: length, 8.0, width 3.8, depth 3.5. Telson length 6.8; vesicle: width 3.2, depth 2.9. Pedipalp: femur length 5.8, width 1.9; patella length 6.4, width 2.7; chela length 10.8, width 2.5, depth 2.5. Movable finger length 7.1 (paratype total length = 60.2 mm).

ECOLOGY OF THE TYPE LOCALITY. The wilaya of Batna is located in the Oriental region of Algeria, between 4 and 7 degrees of longitude E and 35 and 36 degrees of latitude N. The relief in the area of Batna is basically composed of high plains in the Mountainous Massif of Aurès and of a portion of the basin of Hodna. This globally mountainous relief crosses the region from east to west. The highest point is the Djebel Chelia which reaches 2328 m (Dekhinet *et al.*, 2007).

The climate in the region of Batna can vary from Mediterranean to semi-arid in the North to almost arid in the South (Berkane & Yahiaoui, 2007). Precipitations can range from 5 to 9 mm in July to 44.5 mm in January. The sum of precipitations during the year can reach 350 mm. Temperatures can vary from 0 to 8 °C in January, the coldest month in the year, and reach up to 30 to 35 °C in July, the most hot period of the year (Chenchouni *et al*., 2010). During the summer season the Sirocco, a hot and dry wind, is responsible for an important reduction of humidity and the very high temperatures observed (Zemoura, 2005).

The Mediterranean type of vegetation is dominated by trees such as *Cedrus atlantica*, *Quercus ilex*, *Ilex aquifolium*, *Juniperus phoenicea*, *Juniperus oxycedrus*, *Fraxinus dimopha* and *Pinus halepensis* (Chenchouni *et al*., 2008).

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