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Buthus gabani sp. n. from Cape St. Vincent, Algarve,
Portugal (Scorpiones: Buthidae)**

Eric Ythier

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The southwesternmost scorpion species in Europe: *Buthus gabani* sp. n. from Cape St. Vincent, Algarve, Portugal (Scorpiones: Buthidae)

ERIC YTHIER

BYG Taxa, 382 rue des Guillates, 71570 Romanèche-Thorins, France. - contact@bygtaxa.com

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morphology;
Portugal;
Algarve.

Abstract. – A new species of *Buthus* is described on the basis of one male and one female collected from Cape St. Vincent (Cabo de São Vicente), located in the Algarve region, in the South of Portugal. This new scorpion taxon represents the 3rd known species of the genus *Buthus* reported from Portugal and the 14th reported from the Iberian Peninsula. In light of recent studies on the genus *Buthus* in the Iberian Peninsula (Teruel & Turiel, 2020, 2021; Lourenço, 2021) and considering the geographical distribution presented by the new species with respect to the geographically closest species and their respective habitats, previous records of specimens from Algarve originally considered to belong to *Buthus ibericus* (Lourenço & Vachon, 2004; Teruel, 2005) are now considered to belong to the new species described here.

Ythier E., 2021. – The southwesternmost scorpion species in Europe: *Buthus gabani* sp. n. from Cape St. Vincent, Algarve, Portugal (Scorpiones: Buthidae). *Faunitaxys*, 9(25): 1 – 6.

ZooBank: <http://zoobank.org/8E5ECF1D-D9E0-463A-8F5F-DF2C6071127D>

Introduction

Since the unexpected description by Lourenço & Vachon in 2004 of two new species of *Buthus* from the Iberian Peninsula (*B. ibericus* and *B. montanus* from Spain), another new species was described by Rossi in 2012 (*B. elongatus* from Spain), then six new species by Teruel & Turiel in 2020 (*B. alacanti*, *B. baeticus*, *B. delafulentei*, *B. garcialorcai*, *B. manchego* and *B. serrano* from Spain) and one new species by Lourenço in 2021 (*B. lusitanus* from Portugal). Finally, Teruel & Turiel (2021) recently revalidated two species described by C. L. Koch (1839a, b), *B. ajax* from Spain and *B. halius* from Portugal.

Recent examination of two *Buthus* specimens (one adult male and one adult female) found in the collection of the Musée d'Histoire Naturelle de Lyon, France and collected from Cape St. Vincent (Cabo de São Vicente) in the Algarve region, South of Portugal, led to the description of a new species, *Buthus gabani* sp. n. This new scorpion taxon represents the 3rd known species of the genus *Buthus* reported from Portugal and the 14th reported from the Iberian Peninsula.

In light of recent studies on the genus *Buthus* in the Iberian Peninsula (Teruel & Turiel, 2020, 2021; Lourenço, 2021) and considering the geographical distribution presented by the new species with respect to the geographically closest species and their respective habitats, previous records of specimens from Algarve (Praia da Rocha, Praia do Carvoeiro and Conceição de Faro) originally considered to belong to *Buthus ibericus* (Lourenço & Vachon, 2004; Teruel, 2005) are now considered to belong to the new species described here (Fig. 11).

Methods

Illustrations and measurements were made with the aid of a Motic SMZ-1713 stereo-microscope with an ocular micrometer, together with a digital camera Tucsen HD Lite, a Canon EOS 7D camera and a Wacom Intuos drawing tablet. Map was made using topographic-map.com and Adobe Photoshop software. Measurements follow Stahnke (1970) and are given in mm. Trichobothrial notations follow Vachon (1974) and morphological terminology mostly follows Vachon (1952) and Hjelle (1990). Specimens studied herein are deposited in the MHNL (Musée d'Histoire Naturelle de Lyon, Musée des Confluences, France) and EYCP (Eric Ythier Private Collection, Romanèche-Thorins, France).

Composition of the genus *Buthus* in the Iberian Peninsula (in order of description)

- *Buthus occitanus* (Amoreux, 1789) (Spain)
- *Buthus ajax* (C. L. Koch, 1839) (Spain)
- *Buthus halius* (C. L. Koch, 1839) (Portugal)
- *Buthus ibericus* Lourenço & Vachon, 2004 (Spain, Gibraltar)
- *Buthus montanus* Lourenço & Vachon, 2004 (Spain)
- *Buthus elongatus* Rossi, 2012 (Spain)
- *Buthus alacanti* Teruel & Turiel, 2020 (Spain)
- *Buthus baeticus* Teruel & Turiel, 2020 (Spain)
- *Buthus delafulentei* Teruel & Turiel, 2020 (Spain)
- *Buthus garcialorcai* Teruel & Turiel, 2020 (Spain)
- *Buthus manchego* Teruel & Turiel, 2020 (Spain)
- *Buthus serrano* Teruel & Turiel, 2020 (Spain)
- *Buthus lusitanus* Lourenço, 2021 (Portugal)
- *Buthus gabani* sp. n. (Portugal)

Taxonomic treatment

Family **Buthidae** C. L. Koch, 1837

Genus ***Buthus*** Leach, 1815

***Buthus gabani* sp. n.**

(Fig. 1-10, Tab. I)

ZooBank: <http://zoobank.org/C1789847-E964-4593-ADD1-8BCA2D351558>

Buthus ibericus: Lourenço & Vachon, 2004: 93; Teruel & Pérez-Bote, 2005: 275-276; Stockmann & Ythier, 2010: 338.

Holotype, ♂, Portugal, Algarve region (Faro district), Vila do Bispo municipality, Cape St. Vincent, S. Rojkoff coll., 15/VIII/1993, deposited in the MHNL (47037912).

Paratype, 1 ♀, Portugal, Algarve region (Faro district), Vila do Bispo municipality, Cape St. Vincent, S. Rojkoff coll., 15/VIII/1993, deposited in the MHNL (47037911).

Comparative material examined. – *Buthus baeticus*, Spain, Seville province, around Seville, 1 ♂ (EYCP, 0010); *Buthus ibericus*, Spain, Cádiz province, location unknown, 1 ♂, 1 ♀, 1 juvenile ♂ (EYCP, 0117).

Etymology. – The specific name honours Mr. David (Dave) Gaban (Hollister, USA, 1963-2021), for his important contribution to the study of scorpions.

Diagnosis. – Scorpion of moderate size for the genus, with a total length of 61.6 mm for the male holotype and 63.4 mm for the female paratype. General coloration yellowish orange; carapace and tergites densely spotted; tergites with conspicuous confluent spots on lateral areas, forming a blurred dark trivittate pattern; metasomal segments yellowish with carinae slightly infuscate; legs yellowish with carinae of femur and patella slightly infuscate. Carinae and granulations moderately to strongly marked on carapace, tergites and metasomal segments. Pedipalp patella with carinae moderately to strongly marked. Pectines with 30-32 teeth in male holotype and 28-28 teeth in female paratype. Sexual secondary dimorphism inconspicuous in habitus (size and shape very similar in both sexes) and very tenuous in pedipalps and metasoma. Telson with vesicle slightly more globose in female (length/width ratio 1.17, length/depth ratio 1.35) than in male (length/width ratio 1.35, length/depth ratio 1.46). Pedipalp chela manus slightly more globose in male (length/width ratio 1.38, length/depth ratio 1.18) than in female (length/width ratio 1.43, length/depth ratio 1.25). Chela fingers with lobe/notch combination moderately developed; fingers slightly longer in female (movable fingers 1.68 times longer than manus) than in male (movable fingers 1.54 times longer than manus); fixed finger with 11 rows of granules, movable finger with 12 rows of granules. Leg tibial spurs strongly developed.

Description (based on male holotype and female paratype; measurements in Table I).

Coloration. – Basically yellow to yellowish orange. Prosoma: carapace yellowish with carinae and ocular tubercle marked with dark pigments. Mesosoma yellowish with conspicuous dark to blackish confluent spots on lateral areas, forming a blurred dark trivittate pattern; carinae and granulation marked with dark pigments. Metasomal segments yellowish with carinae slightly infuscate; aculeus yellowish, aculeus yellowish orange at its base and blackish at its extremity. Venter yellowish; genital operculum and pectines paler than the other zones. Chelicerae yellowish; fingers yellowish orange with dark red teeth. Pedipalps yellowish without spots; fingers with the oblique rows of granules dark red. Legs yellowish with carinae of femur and patella slightly infuscate.

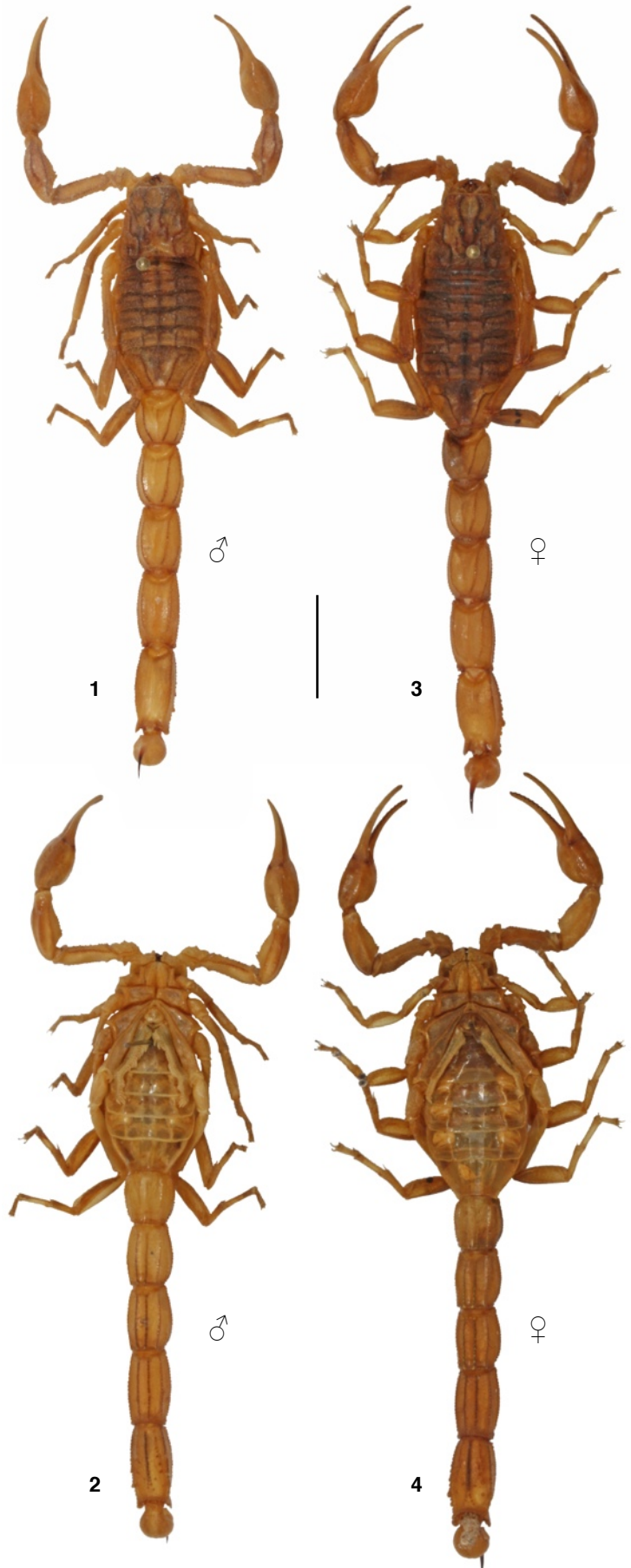


Fig. 1-4. *Buthus gabani* sp. n., habitus (dried specimens) (Scale bar = 1 cm). 1-2. ♂ holotype. 3-4. ♀ paratype. 1-3. Dorsal aspect. 2-4. Ventral aspect.

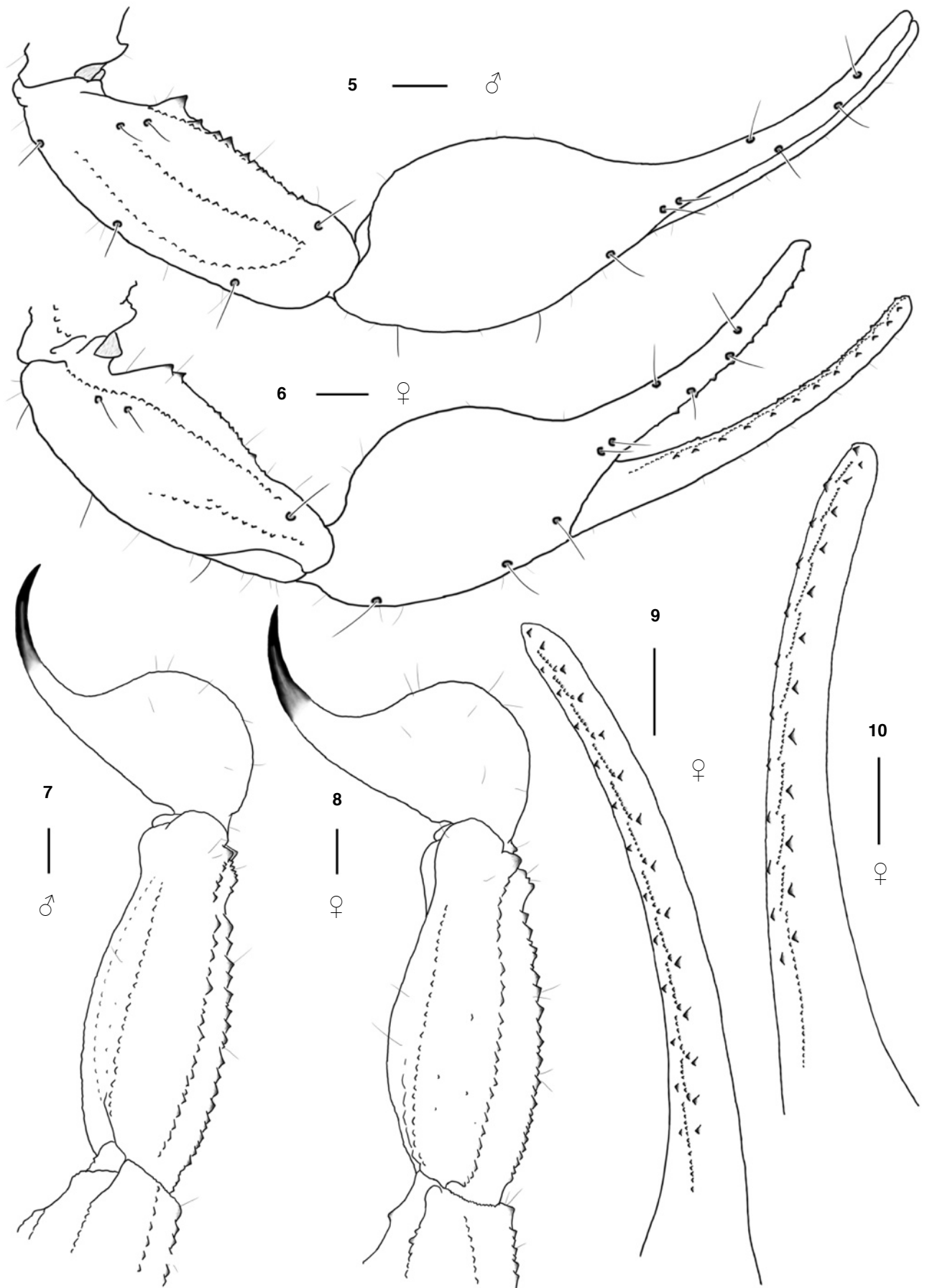


Fig. 5-10. *Buthus gabani* sp. n. (Scale bars = 1 mm).

5-6. Right pedipalp patella and chela, dorsal aspect, showing the trichobothrial pattern. 5. ♂ holotype. 6. ♀ paratype.

7-8. Metasomal segment V and telson, lateral aspect. 7. ♂ holotype. 8. ♀ paratype.

9-10. Cutting edge of right pedipalp chela fingers with longitudinal series of granules, ♀ paratype. 9. Movable finger. 10. Fixed finger.

Morphology. – Carapace moderately to strongly granular; anterior margin with a weak concavity. Carinae strongly marked; anterior median, central median and posterior median carinae strongly granular, with ‘lyre’ configuration. Furrows deep. Median ocular tubercle located in the centre of the carapace; eyes separated by about two ocular diameters; three pairs of lateral eyes of moderate size in relation to median eyes. Sternum triangular, weakly 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 pentacarinat. Venter: genital operculum divided longitudinally, each plate with a semi-oval shape. Pectines: pectinal tooth count 30-32 in male holotype and 28-28 in female paratype; middle basal lamella of the pectines not dilated. Sternites without granules, smooth with elongated spiracles; four moderate carinae on sternite VII; two weak on VI; other sternites acarinated and with two vestigial furrows. Metasomal segments with a weak setation; segment I with ten complete carinae, II-IV with eight, V with five; intermediate carinae complete on segment I, present on distal half of II-III, absent on IV-V; ventral carinae moderately marked and slightly raised distally on II-III; segment V with latero-ventral carinae crenulate with 2-3 lobate denticles posteriorly; ventral median carina divided posteriorly, over 1/3 of the total length; anal arc composed of 11-12 ventral teeth and two lateral lobes. Intercarinal spaces weakly granular. Telson with some vestigial granulations ventrally; aculeus curved and slightly shorter than the vesicle, without a subaculear tubercle; telson with vesicle slightly more globose in female (length/width ratio 1.17, length/depth ratio 1.35) than in male (length/width ratio 1.35, length/depth ratio 1.46). 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 and not fused; ventral aspect of both fingers and manus covered with long dense setae. Pedipalps with a weak setation; femur pentacarinat; patella with 9 carinae moderately to strongly marked, internal with 7-8 spinoid granules, all faces weakly granular; chela with vestigial carinae, almost smooth; chela manus slightly more globose in male (length/width ratio 1.38, length/depth ratio 1.18) than in female (length/width ratio 1.43, length/depth ratio 1.25); fingers with lobe/notch combination moderately developed; fingers slightly longer in female (movable fingers 1.68 times longer than manus) than in male (movable fingers 1.54 times longer than manus); fixed finger with 11 rows of granules, movable finger with 12 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: tibial spurs 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).

Relationships. – *Buthus gabani* sp. n. shows similarities with regard to several characters (mainly coloration and pedipalp fingers with lobe/notch combination developed in both sexes) with four species in the Iberian Peninsula: *B. baeticus* (most similar species), *B. delafuentei*, *B. halius* and *B. ibericus*. Adults of these species can however be easily distinguished from *B. gabani* sp. n. notably by the following main features:

- *B. baeticus*

- (i) tergites with the trivittate pattern clearly defined (blurred in *B. gabani* sp. n.);
- (ii) fingers longer in males with movable finger/manus length ratio 1.67-1.71 (1.54 in *B. gabani* sp. n.) which are equivalent to those of females with movable finger/manus length ratio 1.65-1.66 (fingers of *B. gabani* sp. n. are longer in females with movable finger/manus length ratio 1.68);
- (iii) fixed finger with 12-13 rows of granules (11 in *B. gabani* sp. n.) and movable finger with 13 rows of granules (12 in *B. gabani* sp. n.), with accessory granules only slightly coarser than principal granules (strong in *B. gabani* sp. n.).

- *B. delafuentei*

- (i) males larger than same size-class females (male slightly smaller than female in *B. gabani* sp. n.);
- (ii) sexual secondary dimorphism very conspicuous with males having pedipalp chela manus much more globose and mesosoma and metasoma longer and slenderer than in females (dimorphism inconspicuous to very tenuous in *B. gabani* sp. n. with size and shape very similar in both sexes);
- (iii) fixed finger with 12-13 rows of granules (11 in *B. gabani* sp. n.) and movable finger with 13 rows of granules (12 in *B. gabani* sp. n.).

- *B. halius*

- (i) size generally larger with 76-79 mm in females (63.4mm in *B. gabani* sp. n.) and 67 mm in male (61.6 mm in *B. gabani* sp. n.);
- (ii) sexual secondary dimorphism conspicuous in habitus with males smaller and slenderer than females (dimorphism inconspicuous to very tenuous in *B. gabani* sp. n. with size and shape very similar in both sexes);
- (iii) fingers longer in males with movable finger/manus length ratio 1.76 (1.54 in *B. gabani* sp. n.) which are longer than those of females with movable finger/manus length ratio 1.46-1.52 (fingers of *B. gabani* sp. n. are longer in females with movable finger/manus length ratio 1.68);
- (iv) fixed finger with 12-13 rows of granules (11 in *B. gabani* sp. n.) and movable finger with 13 rows of granules (12 in *B. gabani* sp. n.).

- *B. ibericus*

- (i) very robust and swollen metasomal segments (slenderer in *B. gabani* sp. n.);
- (ii) lower pectinal tooth count with 21-26 teeth in females (28 in *B. gabani* sp. n.) and 26-31 teeth in males (30-32 in *B. gabani* sp. n.);
- (iii) pedipalp patella with carinae extremely reduced (moderately to strongly marked in *B. gabani* sp. n.);
- (iv) fixed finger with 13-14 rows of granules (11 in *B. gabani* sp. n.) and movable finger with 13 rows of granules (12 in *B. gabani* sp. n.).

In addition to the main features described above, a significant number of morphometric ratios distinguishes *B. gabani* sp. n. from the four mentioned species as well as from other species in the Iberian Peninsula. Another feature is the disjointed pattern of geographical distribution presented by the new species with respect to the geographically closest species and their respective habitats, leading previous records of specimens from Algarve (Praia da Rocha, Praia do Carvoeiro and Conceição de Faro) originally considered to belong to *Buthus ibericus* (Lourenço & Vachon, 2004; Teruel, 2005) to be now considered to belong to *B. gabani* sp. n. (Fig. 11).

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Fig. 11. Map of Portugal and Western Spain showing the distribution of the known *Buthus* species present in the area, with surrounded symbols showing the type locality in each species.

Fig. 12-13. Natural habitat of *Buthus gabani* sp. n., Cape St. Vincent (Cabo de São Vicente), Algarve, Portugal.

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Table I. Morphometric values (mm) of the adult types of *Buthus gabani* sp. n.

	♂ holotype	♀ paratype
Total length (including telson)	61.63	63.40
Carapace:		
- Length	7.11	7.50
- Anterior width	3.75	4.63
- Posterior width	7.50	8.25
Mesosoma length	13.13	15.63
Metasomal segment I:		
- Length	5.38	4.88
- Width	4.88	5.00
Metasomal segment II:		
- Length	6.13	6.00
- Width	4.63	4.63
Metasomal segment III:		
- Length	6.50	6.13
- Width	4.50	4.50
Metasomal segment IV:		
- Length	7.50	7.13
- Width	4.25	4.38
Metasomal segment V:		
- Length	8.38	8.63
- Width	4.00	4.63
- Depth	3.25	3.50
Telson length	7.50	7.50
Vesicle:		
- Length	4.38	4.38
- Vesicle width	3.25	3.75
- Vesicle depth	3.00	3.25
Femur:		
- Length	6.25	6.25
- Width	1.75	1.88
Patella:		
- Length	7.13	7.25
- Width	2.88	3.13
Chela:		
- Manus length	4.88	5.00
- Manus width	3.50	3.50
- Manus depth	4.13	4.00
Movable finger length	7.50	8.38

Résumé

Ythier E., 2021. – L'espèce de scorpion la plus au sud-ouest de l'Europe : *Buthus gabani* sp. n. du Cap Saint-Vincent dans l'Algarve, Portugal (Scorpiones: Buthidae). *Faunitaxys*, 9(25): 1 – 6.

Une nouvelle espèce appartenant au genre *Buthus* est décrite sur la base d'un mâle et d'une femelle collectés au Cap Saint-Vincent (Cabo de São Vicente), dans la région de l'Algarve, au sud du Portugal. Ce nouveau taxon représente la 3^{ème} espèce de *Buthus* décrite pour le Portugal et la 14^{ème} décrite pour la péninsule Ibérique. A la lumière d'études récentes sur le genre *Buthus* dans la péninsule Ibérique (Teruel & Turiel, 2020, 2021; Lourenço, 2021) et en considérant la distribution géographique de la nouvelle espèce par rapport aux espèces géographiquement proches et leur habitats respectifs, les spécimens collectés dans l'Algarve précédemment associés à *B. ibericus* (Lourenço & Vachon, 2004; Teruel, 2005) sont dorénavant considérés comme appartenant à la nouvelle espèce décrite dans cet article.

Mots clés. – Scorpion, *Buthus*, *gabani*, taxonomie, nouvelle espèce, description, morphologie, Portugal, Algarve.

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Illustration de la couverture : Cap Saint-Vincent (Cabo de São Vicente), Algarve, Portugal.

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