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THE GENUS *BUTHUS* LEACH, 1815 (SCORPIONES: BUTHIDAE) IN THE IBERIAN PENINSULA. PART 1: FOUR REDESCRIPTIONS AND SIX NEW SPECIES

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Abstract: The genus *Buthus* Leach, 1815 is taxonomically revised for the Iberian Peninsula. We examined 291 specimens from 48 localities, including topotypes of the four currently recognised species: *Buthus elongatus* Rossi, 2012, *Buthus ibericus* Lourenço & Vachon, 2004, *Buthus montanus* Lourenço & Vachon, 2004 and *Buthus occitanus* (Amoreux, 1789). In this first contribution, all of them are confirmed as valid and redescribed in detail, and their geographic distribution is clarified. Also, *Buthus europaeus tridentatus* Franganillo, 1918 is confirmed as a junior synonym of *B. occitanus* and neotypes are designated for both taxa to stabilise the nomenclature. Finally, six new species are described from southern Spain. The Western European diversity of *Buthus* now reaches 10 species, all of them being endemics and mostly having a limited geographic range.
Key words: Scorpiones, Buthidae, *Buthus*, taxonomy, redescriptions, new species, Iberian Peninsula.

El género *Buthus* Leach, 1815 (Scorpiones: Buthidae) en la Península Ibérica. Parte 1: cuatro redescripciones y seis especies nuevas
Resumen: Se revisa taxonómicamente el género *Buthus* Leach, 1815 en la Península Ibérica. Se examinaron 291 especímenes de 48 localidades, incluyendo topotipos de las cuatro especies actualmente reconocidas: *Buthus elongatus* Rossi, 2012, *Buthus ibericus* Lourenço & Vachon, 2004, *Buthus montanus* Lourenço & Vachon, 2004 y *Buthus occitanus* (Amoreux, 1789). En esta primera contribución, todas ellas son confirmadas como válidas y redescritas en detalle y se aclara su distribución geográfica. Por otra parte, *Buthus europaeus tridentatus* Franganillo, 1918, es confirmado como sinónimo posterior de *B. occitanus* y se designan neotipos de ambos taxones para estabilizar su nomenclatura. Por último, se describen seis especies nuevas del sur de España. La diversidad de *Buthus* en el Poniente europeo alcanza ahora 10 especies, todas endémicas y en su mayoría geográficamente microlocalizadas.
Palabras clave: Scorpiones, Buthidae, *Buthus*, taxonomía, redescripciones, especies nuevas, Península Ibérica.

Taxonomía/Taxonomy: *Buthus alacanti* **sp. n.**, *Buthus baeticus* **sp. n.**, *Buthus delafuentei* **sp. n.**, *Buthus garcialorcai* **sp. n.**, *Buthus manchego* **sp. n.**, *Buthus serrano* **sp. n.**

Introduction

The scorpion genus *Buthus* Leach, 1815 is native to and widespread in the Old World, occurring continuously from the Atlantic coast of Africa and Europe through the Middle East; apart from the referred seashores (Vachon, 1952), its known distribution limits reach Navarra and Galicia in northern Spain (Franganillo, 1918; Fernández de la Cigoña Núñez & Fernández de la Cigoña Rodríguez, 2000), Baghdad in central Iraq (Kovařík, 1992) and Loka in southern South Sudan (Lourenço, 2005). It is also highly diverse, with 58 nominal species currently recognized as valid (Sousa *et al.*, 2017; Rein, 2020), but essentially every year new species are described and the number grows continuously.

The taxonomic definition of the genus and its subordinate taxa (subgenera, species-groups and complexes, species, subspecies) has always been unstable and a permanent subject of controversy, sometimes even bitter. Its full taxonomic history was thoroughly cataloged by Fet & Lowe (2000) and more recently, it was revised and updated by Sousa *et al.* (2017). The interested reader is referred herein to both inevitable sources, for a complete and reliable information.

The taxonomic composition of *Buthus* in Western Europe, i.e., the Iberian Peninsula and adjacent France, has been equally unsettled. The first species was described by Amoreux (1789a) from southern France (Souvignargues) under two different names: *Scorpio occitanus* and *Scorpio rufus*; nevertheless, the former was fixed as the valid one in a subsequent paper by himself (Amoreux, 1789b). Half a century later, C. L. Koch (1839a–b) raised the total to four by describing *Androctonus halius*, *Androctonus eurialus* and *Androctonus ajax*, without any precision on their type locality further than Portugal, France and Spain, respectively. The four species were accepted as valid for 40 years, until Simon (1879) synonymized them all under *Scorpio europaeus* Linnaeus, 1758, a highly problematic name that caused constant nomenclatural confusion until 1957, when it was finally suppressed and included in the Official Index of Rejected and Invalid Specific Names in Zoology (see details in Fet & Lowe, 2000: 94).

For 125 years after Simon's synonymy, just a single nominal species of *Buthus* was recognized to occur in Western Europe, which according to each author's personal preference was named either *B. europaeus* or *B. occitanus*, until the latter name became the only one in 1957 (see above). Even Vachon (1952) followed this arrangement in his classic monograph, where he in turn recognized or named many hierarchically distinct taxa (species, subspecies, forms and varieties) from North Africa. The only exception was contributed by Franganillo (1918), who described the subspecies *Buthus europaeus tridentatus* from northern Spain (Javier, in Navarra), but this taxon went completely unnoticed in the literature until Fet & Lowe (2000) listed it as a "most likely invalid" subspecies of *B. occitanus*.

With the advent of the 21 century, the Western European membership of the genus was set back to four species. First, in a suspiciously coauthored paper (its second author had deceased 13 years earlier, in 1991), Lourenço & Vachon (2004) described two more species from southern Spain: *Buthus ibericus* (Cádiz) and *B. montanus* (Granada/Almería border); in the same paper, the geographical distribution of *B. occitanus* was implicitly restricted to Europe only. Then, Rossi (2012) described *Buthus elongatus*, also from southern Spain (Málaga). Last, Sousa *et al.* (2017) published a complete catalog of the genus, where all four species were accepted as valid and *B. o. tridentatus* was formally, yet tentatively synonymized as suggested earlier by Fet & Lowe (2000).

Since early 2011, the present authors started a thorough revision of *Buthus* in Western Europe, which proved much harder and longer than expected due to our limited budget. Despite this, it was planned with the highest taxonomic rigor and accomplished following its guidelines to the letter. First, we obtained all available literature on this subject, including sources as old as 1879 and thus, extremely difficult to obtain.

Second, we tested the validity of all implied subordinate taxa (species and subspecies) described so far from Western Europe. At this point, we faced a great problem: the name-bearing types of seven of the eight target taxa were out of reach by being either long lost (*Androctonus ajax*, *Androctonus halius*, *Androctonus eurialus*, *Buthus europaeus tridentatus* and *Scorpio occitanus*; see Fet & Lowe, 2000: 92–93) or deposited in the Muséum national d'Histoire naturelle in Paris (*B. ibericus* and *B. montanus*), which routinely denies loan requests on behalf of Wilson R. Lourenço. We overcame this by personally visiting in all type localities to collect representative samples (i.e., multiple adults of both sexes from each of them) to warrant an adequate morphological comparison.

Last, we aimed to clarify the actual diversity of the genus, as well as the geographical distribution of all taxa. This was done by conducting field trips to as many localities as possible, to cover the entire study area (fig. 1). It took us almost 10 years to get sound results, but it plenty fulfilled our expectations:

1. We obtained in total 48 samples of Western European *Buthus*, representing 46 localities in Spain (42), France (3) and Portugal (1).

2. These samples accounted for 291 specimens in total (136 of them included in the present Part 1), including topotypes of all described taxa.

3. Of the eight previously described taxa, we confirmed the validity of six of the seven species (four of them treated herein), while the single subspecies was confirmed as correctly synonymized.

4. We identified almost a dozen species that are new to science, all clearly recognizable by their external morphology.

Most of these results are introduced here, including the redescriptions of the four species previously regarded as valid, plus the description of six new ones. This represents only the first step of a long walk, as our interest in these scorpions remains as vivid as the first day and additional studies are already in progress by us. A second contribution will follow very soon (R. Teruel & C. Turiel, in preparation), which will add yet more Western European species of *Buthus* and include a dichotomic key and a thorough photographic atlas to cover the main morphological characters diagnostic to all of them.

Methods & Material

The complete list of bibliographic references covering the entire genus up to 1998 was compiled by Fet & Lowe (2000); Sousa *et al.* (2017) updated it up to 2016 and added a revision of the taxonomic history of the genus. Thus, to avoid unnecessarily echoing extensive information that is very recent and freely available online, we list herein only the most relevant taxonomic references for each taxon, such as the original description and posterior nomenclatural changes.

Specimens were studied under a Motic SMZ-171-TP trinocular microscope, equipped with a Moticam 5 digital camera and an ocular line-scale (calibrated to 20x for measuring). Nomenclature and measurements follow Stahnke (1971) except for trichobothriotaxy (Vachon, 1974), pedipalp chela carinae (Acosta *et al.*, 2008, as interpreted by Armas *et al.*, 2011), sternum (Soleglad & Fet, 2003) and metasomal carinae (Francke, 1977). Unless otherwise noted, all characters mentioned in Diagnosis and Comparison sections refer to adults of both sexes. Total length includes telson and pectinal tooth counts were given as fractions for left/right pectines; number of principal rows of denticles and inner and outer accessory denticles were also given as fractions for fixed/movable pedipalp fingers.

Habitus photographs were taken with a Nikon Coolpix B500 digital camera. Microscope photographs (most of them will appear in the forthcoming Part 2 of this revision), were taken following this precise protocol. First, a variable series of consecutive-plane shots was taken depending on the field depth, i.e., for a bulkier structure, more shots were necessary and vice versa. Then all images of the same structure were assembled into a single, fully focused image using the CombineZP free image stacking software. Last, all images were processed with Adobe Photoshop CS5, only for contrast and brightness optimization, removal of artifacts and/or unnecessary details from background and plate composition.
Distribution maps were constructed in Mapinfo Professional ver.10, using precise locality coordinates taken *in situ* with a portable GPS device (Datum WGS 84).

Localities were ordered cardinally from north to south and west to east, to make geographical orientation and map interpretation easier to the reader. The name of each locality and the administrative entities where it belongs (provinces and municipalities), all adhere to the official political-administrative division current for each country. Except for the country name, all are fully given in each country primary language (Portuguese, Spanish or French), to facilitate the geographic search and location by the interested reader.

Specimens studied herein are all preserved in ethanol 80% and housed in the following repositories: Instituto de Ecología y Sistemática, Havana, Cuba (IES) and personal collection of the first author (RTO, eventually to be deposited also at the former). All specimen labels were laser-printed or handwritten in Spanish, but were transcribed into English here for text coherence.

Last, but not least, it must be mentioned here that we largely confirmed herein the conclusions on the species-level diagnostic characters defined by Sousa *et al.* (2017), with some important additions. First, the precise identity of any Western European population of *Buthus* can be defined with absolute certainty only if adults of both sexes are available. The type and/or degree of expression of the sexual secondary dimorphism are both clearly species-specific, thus, compari-

son can be easily misleading if only one sex is analyzed. For example, females of non-closely related species such as *B. elongatus* and *B. montanus* are almost indistinguishable from each other, while males are very different. A less reliable but still accurate identification can be achieved if only adult males are available, but never upon females and/or juveniles alone.

Second, the adult size is useful as a differential character *per se* (e.g., it never overlaps on some species), but care must be taken to compare always specimens belonging to the same size-class to avoid bias. Moreover, the relative size of adults of both sexes must be analyzed too: the standard for Western European species is that male is clearly smaller than its corresponding size-class female, but the opposite is true for some others and yet in a few, there is no difference at all.

Last, the count of principal rows of denticles in pedipalp fingers invariably yielded values 1–2 rows higher than previously recorded in the literature for the same species and we are convinced that undercounting is the reason behind such discrepancy. We found that the 2–3 basalmost rows are usually irregularly separated from each other and sometimes aligned, thus, could be easily mistaken as fused into one or two (always much longer than the others) and thus, erroneously undercounted. The best way to count them accurately is under UV illumination, because it gives a very sharp contrast between the pale fluorescent tegument and the pitch-black non-fluorescent denticles. By doing this, it is always possible to detect the slightest distinction between two consecutive rows (e.g., a larger separation between two adjacent denticles, an alignment breakup and/or a smaller first proximal denticle of a row) and get an accurate count.

Systematics

Buthus elongatus Rossi, 2012

Figures 2–3, 27, 28a–b, 31a–b. Tables I–II, XIII–XIV

Buthus elongatus Rossi, 2012: 273–279; tabs. 1–2; figs. 1–3, 4a, 5a, 6–7. Teruel & Melic, 2015: 5–7, 9–12; tab. II; figs. 2a, 3a, 4b, 5b; pl. I8. Sousa *et al.*, 2017: 25–26, 29–31, 34, 43; tabs. 1–2; figs. 9–11.

TYPE DATA. **SPAIN**: ANDALUCÍA: Málaga Province: Marbella Municipality: Sierra Blanca: Refugio de Juanar, along the road from Ojén to Monda (36°34'25"N / 04°53'04"W to 36°36'56"N / 04°42'19"W / 300–848 m a.s.l. / **type locality**); 2008–2012; C. Turiel; 1♂ holotype (MZUF-1432), 1♀ paratype (ARPC). Playa del Alicate (36°30'N / 04°49'W); 26–27/May/1983; M. Borri; 1♂, 1♀ paratypes (MZUF-875). Not examined. **Notes**. The precise data of the type series and their type locality are emended here upon the field data of its collector (the junior author of the present revision); see further details below, in Remarks section. The correct toponym of the second locality was already emended by Sousa *et al.* (2017: 43), as followed here.

DIAGNOSIS (emended). Adult size large for the genus (48–69 mm in males, 69–83 mm in females), males markedly smaller than same size-class females. Coloration with base variable from orange to reddish brown; carapace, tergites pedipalps and metasoma with all carinae deeply infuscate; tergites with a dark trivittate pattern all along; pedipalps and legs faintly infuscate. Sexual secondary dimorphism very conspicuous in habitus (males smaller and remarkably more slender), pedipalps (manus very slender and narrower than patella in males, swollen and much wider than patella in females) and metasoma (longer and narrower in males). Pedipalp chela with many macrosetae scattered all over; manus with most carinae weakly granulose; fingers very long (movable finger/manus length ratio: 1.83–1.89 in male, 1.66–1.73 in females), fixed finger with 13–14 principal rows of denticles, movable with 12–14 (mode not defined in either finger), basal lobe/notch combination absent. Pectines with 31–35 teeth (mode 32) in males, 25–31 (mode 28) in females. Metasoma of male remarkably longer and slenderer than standard for the genus (see ratios in tab. XIII); dorsal lateral and lateral supramedian carinae weakly to moderately subcrenulate to subgranulose on segments II–IV, ventral submedians on II–III only feebly raised distally (stronger and coarser in females); intercarinal tegument smooth to coriaceous and minutely punctate, but densely, minutely granulose dorsally and on IV–V; setation sparse, with 2–3 pairs of dark macrosetae on almost all carinae (4–5 pairs on ventral laterals of V). Telson vesicle medium-sized and subglobose in adult males, large and globose in adult females.

REDESCRIPTION (adult male topotype; figs. 2, 28a; tabs. I, XII–XIV). **Coloration** (figs. 2, 28a) base light orange-brown, paler on chelicerae, legs, venter and telson. Chelicerae and pedipalps immaculate. Carapace with carinae deeply infuscate, irregularly interconnected by small, dark brown reticulations and with a pair of arrowhead-shaped, symmetric dark brown spots flanking median eyes; eyes black, ocular tubercles faintly infuscate. Tergites with all carinae and coarse granulation deeply infuscate to blackish and with diffuse, symmetric dark brown to blackish spots on lateral areas, defining altogether a clearly trivittate pattern (i.e., a narrow, median solid stripe plus two broad, variegated lateral stripes, all three well separated). Pectines pale yellowish, with basal portion and basal plate progressively darker due to heavier sclerotization, teeth whitish. Sternopectinal region and sternites immaculate. Legs immaculate. Metasoma concolor (i.e., no segments conspicuously darker) and essentially immaculate, with all carinae faintly to moderately infuscate (progressively darker distally and ventrally). Telson immaculate, distal half of aculeus blackish.

Chelicerae. With dentition typical for the genus, teeth standard-sized and sharp. Tegument glossy and minutely punctate, dorsodistal portion of manus with minute granulation scattered and small to medium-sized, glossy granules irregularly arranged around dorsodistal depression. Setation very dense ventrally, but essentially lacking dorsally except for a patch of macrosetae at fixed finger base and some setae around dorsodistal depression of manus.

Pedipalps. Size standard for the genus (3.89 times longer than carapace). Femur essentially straight (very slightly bent inwards distally), slender and with dark and pale macrosetae, which are mostly concentrated along ventrodistal edge; all carinae moderately strong and formed by medium-sized to coarse, isolated, glossy granules; intercarinal tegument coriaceous and minutely punctate on glossier areas, with few minute granules scattered on dorsal surface. Patella straight, slender and with only a few dark macrosetae scattered all over; all carinae moderate to weak and subgranulose to granulose; intercarinal tegument coriaceous and minutely punctate on glossier areas, with few minute granules scattered on all surfaces except ventral, internal surface with many conical denticles. Chela with manus suboval and very slender

(length/width ratio = 1.81, length/depth ratio = 1.61, median part widest), slightly narrower than patella (ratio 0.99) and with many dark and pale macrosetae scattered all over, more concentrated on ventral surface, all carinae obsolete to weak and costate to weakly granulose, intercarinal tegument smooth, glossy and minutely punctate; fingers very long (movable 1.84 times longer than underhand), slender and evenly curved, fixed finger with 14/14 principal rows of denticles plus 13/13 inner and 13/13 outer accessory denticles (much coarser than principal denticles), movable finger with 14/13 principal rows of denticles plus 12/12 inner and 13/13 outer accessory denticles (much coarser than principal denticles) and the standard apical subrow of three denticles (large terminal denticle not included), basal lobe/notch combination absent.

Carapace. Slightly wider than long (length/width ratio = 0.94). Anterior margin shallowly concave, with six pairs of dark macrosetae. Carinae with lyre-shaped configuration perfectly defined: anterior medians and superciliaries very strong, fused into a spoon-shaped figure and formed by coarse, isolated, glossy, conical to tuberculate granules; central laterals and posterior medians very strong, fused into an S-shaped figure and formed by coarse, isolated, glossy, conical to tuberculate granules; lateral oculars and central medians strong, not fused and formed by medium-sized to coarse, isolated, glossy, conical to tuberculate granules; posterior laterals moderate and formed by medium-sized, isolated, glossy, conical to tuberculate granules. Furrows: posterior laterals deep and wide, other furrows obscured by deeply depressed areas between adjacent carinae. Tegument coriaceous, minutely punctate on glossier areas and irregularly covered by moderately dense, fine to medium-sized, glossy, conical to tuberculate granules largely concentrated along lateral areas. Median eyes large, separated by about twice the ocular diameter; lateral eyes much smaller and mostly concealed below a granulose carina.

Sternum. Type 1, very small and subtriangular, with 1–2 pairs of dark macrosetae, plus some minor setae. Tegument finely and irregularly granulose.

Genital operculum. With 11–12 pairs of dark macrosetae and some inconspicuous minor setae. Valves roundly subtriangular and separated along distal third; tegument shallowly convex, coriaceous and with fine to medium-sized, dense granulation along anterior part and lateral margins. Genital papillae very large, narrow and completely concealed below valves.

Pectines. Long (almost reaching trochanter-femur joint of leg IV) and narrowly rectangular, setation very dense and dark. Tooth count 34/35, teeth not swollen. Fulcra large and bulky, paraboloid to round. Basal middle lamella trapezoidal. Prepectinal plate feebly sclerotized, very short, wide and folded transversely; tegument smooth. Basal plate heavily sclerotized, wider than long, with 2–3 pairs of dark macrosetae and some inconspicuous minor setae; anterior and posterior margins essentially straight; tegument very finely and densely granulose, with three conspicuous depressions: one anteromedian (transverse, narrow and progressively much deeper medially to become a pit) and two laterals (large, irregular and deep).

Legs. Very slender, with all carinae moderate and granulose to subserrate except on femur, where strong and crenulate to dentate. Intercarinal tegument coriaceous, external surface of femur densely and finely granulose. Bristlecombs very well developed on I–III. Tibial and pedal spurs very large and thin. Claws long and shallowly curved.

Mesosoma. Size and shape standard for the genus. Tergites coriaceous, minutely punctate and covered by dense, medium-sized, glossy, denticulate granules more concentrated along lateral areas, lateral margins finely dentate, posterior margin minutely granulose; carinae: median longitudinal straight, progressively longer and stronger backwards and formed by medium-sized, isolated, glossy granules, submedians anteriorly divergent, straight (I–VI) to inverted L-shaped (VII), progressively longer and stronger backwards and formed by medium-sized, isolated, glossy granules, laterals absent on I–VI, moderately strong, shallowly S-shaped and formed by coarse, isolated, glossy granules on VII. Sternites with few dark macrosetae scattered all over (denser on III); lateral margins of all sternites finely serratocrenulate to denticulate, posterior margin of all sternites minutely granulose; carinae: submedians weak but progressively stronger backwards, indistinct on III, present only on posterior half of IV–VI (smooth, subcostate to costate and parallel, but anteriorly divergent) and almost complete on VII (subcrenulate and very slightly divergent anteriorly), laterals moderate but progressively stronger backwards, absent on III, present only on posterior half of IV–VI (smooth, costate and slightly convergent anteriorly) and present only on median portion on VII (subcrenulate and very shallowly S-shaped); tegument coriaceous to glossy and minutely punctate, moderately covered by minute granules on lateral areas; spiracles very long and slit-like; sternite V with median smooth patch indistinct or absent.

Metasoma. Remarkably longer and slenderer than standard for the genus (5.38 times longer than carapace), progressively narrower and lower distally, with segment V both narrowest and lowest. Segment I with ten complete carinae, II–IV with eight, V with five: dorsal laterals weak and subcrenulate on I, very weak and subcrenulate on II–III, vestigial and subcrenulate to subgranulose on IV, absent on V; lateral supramedians moderate and subcrenulate on I, weak and subcrenulate to subgranulose on II–IV, weak and granulose on V; lateral inframedians moderate and subcrenulate, complete on I, present on distal two-thirds of II and distal half of III, absent on IV–V; ventral laterals weak and subcrenulate to subcostate on I, weak and subcrenulate on II, moderate and crenulate on III–IV, finely but irregularly serratocrenulate to lobate on V (with about 2–3 lobes much larger and sharper than the others); ventral submedians weak and subcrenulate to subcostate on I, moderate and subcrenulate to crenulate on II–III (only feebly raised distally), moderately strong and serratocrenulate on IV, absent on V (but indicated by an incomplete but raised row of coarse granules on more than basal two-thirds); ventral median absent on I–IV, strong and finely but irregularly serrate on V (bifurcate on distal third). Intercarinal tegument smooth to coriaceous and minutely punctate, but densely, minutely granulose dorsally and on IV–V; dorsal furrow complete, wide and shallow on all segments; setation sparse, with 2–3 pairs of dark macrosetae on almost all carinae (4–5 pairs on ventral laterals of V).

Telson. Vesicle medium-sized, subglobose (length/width ratio = 1.36, width/depth ratio = 1.00), with six pairs of dark macrosetae and several inconspicuous minor setae scattered all over; tegument coriaceous and minutely punctate, with coarse but moderate to weak, glossy granules scattered ventrally and laterally; ventral median carina obsolete, as are two accessory pairs of carinae (ventral laterals and lateral supramedians?),

subaculear tubercle obsolete. Aculeus shorter than vesicle (ratio = 0.87), sharp and shallowly curved.

FEMALE (adult paratopotypes; fig. 3; tabs. II, XIII–XIV). Sexual secondary dimorphism conspicuous, differing from described male by: **1)** size larger (68.7–82.7 mm); **2)** pedipalp manus much more robust, globose (length/width ratio = 1.35–1.46, length/depth ratio = 1.28–1.35) and wider than patella (ratio = 1.14–1.18); **3)** mesosoma much wider, with lateral sides markedly convex; **4)** pre-pectinal plate reduced to a tiny oval sclerite, invaginated into the membrane to look like a transverse pit; **5)** genital papillae absent; **6)** pectines smaller and narrower, with lower tooth counts (25–31, mode 28); **7)** metasoma with all carinae stronger (especially the ventral submedians on segments II–III and ventral laterals on V, which are stronger and coarser); **8)** telson with vesicle slightly wider (length/width ratio = 1.25–1.30, width/depth ratio = 1.09–1.11) and aculeus longer (ratio = 0.83–0.87).

VARIATION. The 34 specimens from two localities examined herein are all remarkably homogeneous and perfectly match the types photographed by Rossi (2012), see below.

Adult size varied in our topotype specimens from 47.5–68.7 mm in males and 68.6–82.7 mm in females (tab. I). The sample from Casarabonela (ca. 21 km air-distance from the nearest occurrence point of the type locality, at the same altitude but in a different mountain range) was composed of juveniles only, so it was impossible to find a difference in adult size between both populations, if any.

The coloration varies only subtly, without any correlation to geographical occurrence. In both localities, the base color varies from orange-yellow in some individuals to light yellowish brown in others, and the dark pattern varies from lighter and sparser to darker and denser, regardless the shade of the base color. Juveniles are very similarly colored to adults, but with base slightly paler.

Number of principal rows of denticles varied from 13–14 (exceptionally 12) on both fixed and movable fingers, with modes of 13 and 14, respectively. Specimens with asymmetrical counts between fixed/movable fingers and/or left/right pedipalps were the rule by far; only four specimens (11.8%) had the same count in its four fingers: two with 13 rows (one adult female and one juvenile female topotypes), plus two with 14 rows (one adult female topotype, one juvenile male from Casarabonela).

Pectinal tooth counts (tab. XIV) varied from 31–35 in males and 25–31 in females, with modes of 32 in the former sex and 28 in the latter. Single-tooth asymmetry was a very common occurrence: 9 out of 14 males and 13 out of 21 females (64.3% and 61.9%, respectively). Two specimens (5.7%) had two-tooth asymmetry (both females, one adult with 30/28, one juvenile with 28/26) and no bigger differences in tooth count were observed.

The smallest adult male is so tiny (47.55 mm), that most of its morphometric proportions do not match the other three males and in a few cases are closer or even fall within the range of juveniles (actually, two of the examined juveniles of the same sex are larger). Thus, we regarded this specimen as aberrant and excluded its ratios from the morphometric comparison.

COMPARISON. The remarkable attenuation of pedipalps and metasoma in adult males is a reliable character that distinguishes *B. elongatus* from all other Western European described congeners very easily, even to unaided eye. All of them have these appendages much shorter and/or robust. Apart from this, adults of these species can be separated from *B. elongatus* as follows:

- ***B. ibericus*: 1)** size smaller (males 52–64 mm, females 65–76 mm); **2)** pedipalp fingers with lobe/notch combination strong; **3)** males with pedipalp chelae remarkably heavier, much wider than patella; **4)** pedipalps and metasoma with carinae much weaker; **5)** mesosoma shorter and wider; **6)** telson with vesicle larger and more globose and aculeus shorter.
- ***B. montanus*: 1)** pedipalp fingers with lobe/notch combination vestigial; **2)** males with pedipalp chelae heavier and wider than patella; **3)** males with pedipalp fingers almost straight; **4)** females with ventral submedian carinae of metasomal segments II–III much stronger and coarsely lobate.
- ***B. occitanus*: 1)** size conspicuously smaller (males 54–64 mm, females 55–70 mm); **2)** coloration with base much paler and dark pattern greatly reduced (essentially immaculate and usually with a single, thin, dark stripe along tergites); **3)** pedipalp fingers with lobe/notch combination obsolete; **4)** males with pedipalp fingers almost straight; **5)** telson with vesicle smaller and less globose.

All the differences mentioned above are very easy to appreciate even to unaided eye, e.g., compare figs. 2–3 to 4–13 and see tabs. XIII–XIV.

DISTRIBUTION (fig. 27). According to our personal data and reliable information made available to us by collaborators (e.g., high-resolution photographs), *B. elongatus* is restricted to two adjacent, small limestone mountain ranges (Sierra Blanca and Sierra de las Nieves), from the Mediterranean shoreline up to 850 m a.s.l.

ECOLOGICAL NOTES. This is a lapidicolous scorpion, which digs short burrows and scrapes in mixed coarse sand/clay soil under rocks, both limestone and volcanic (fig. 28a–b). The vegetation is mixed oak and Spanish fir forest, with dense grass understorey (fig. 31a–b).

REMARKS. The holotype and paratype from Sierra Blanca were part of a much larger series of more than 30 specimens collected by one of us (CT) during various separate trips along the road from Ojén to Monda, which was originally mixed altogether without any distinction of punctual collecting sites. Thus, the actual type locality of *B. elongatus* corresponds to the entire 11 km road and we accordingly emended it here, following Recommendation 76.A and especially subsection 76.A.2 of the Code (CINZ, 1999: 89). This sample was examined herein (see below) and used for the redescription.

MATERIAL EXAMINED (34 specimens: 4♂♂, 9♀♀, 10 juvenile ♂♂, 11 juvenile ♀♀). **SPAIN**: ANDALUCÍA: Málaga Province: Marbella Municipality: Sierra Blanca: Refugio de Juanar, along the road from Ojén to Monda (36°34'25"N / 04°53'04"W to 36°36'56"N / 04°42'19"W / 300–848 m a.s.l. / **type locality**); 2008–2012; C. Turiel; 4♂♂, 9♀♀, 9 juvenile ♂♂, 9 juvenile ♀♀ (topotypes - RTO). Casarabonela Municipality: Sierra de las Nieves: 1.5 km north of Casarabonela, along road MA-5401 (36°48'28"N / 04°50'37"W / 692 m a.s.l. / **new record**); 11/June/2018; C. Turiel; 1 juvenile ♂, 2 juvenile ♀♀ (RTO).

Buthus ibericus Lourenço & Vachon, 2004

Figures 4–6, 27, 28c–e, 32. Tables III–IV, XIII–XIV

Buthus ibericus Lourenço & Vachon, 2004: 81, 88–93; tab. I; figs. 31–43 (in part: references to the types and type locality only). Sousa *et al.*, 2010: 206–211 [in part: samples labeled as "*Buthus ibericus* (mtDNA Lineage 2)" only]. Teruel & Melic, 2015: 6, 8–12; tab. II; figs. 6b, 8b, 9a, 10b; pl. I4–6 (in part: references to the types and type locality only). Rojas & Rojas, 2017: 82, 95; fig. 1d. Sousa *et al.*, 2017: 15, 26, 29–31, 34, 40, 44–45, 64; tabs. 1–2; figs. 9–11 (in part: references to the types and type locality only).

Buthus occitanus occitanus: Gantenbein & Largiadèr, 2003: 119–130; tab. 1; figs. 1a, 2–4 [misidentification: specimens and records from El Picacho and Benaocaz].

TYPE DATA. **SPAIN**: ANDALUCÍA: Cádiz Province: San José del Valle Municipality: Dehesa Picado Farm (36°37'29"N / 05°39'53"W / 200 m a.s.l.); 7/September/2003; Í. Sánchez; 1♂ holotype (MNHN), 2♀♀ paratypes (MNHN), 1♂, 2♀♀ paratypes (UB), 2♀♀ paratypes (MHNM). Not examined. **Notes**. The precise location data were completed here following Sousa *et al.* (2017) and our personal observations *in situ*; see further details below, in Remarks section.

DIAGNOSIS (emended). Adult size medium to moderately large for the genus (52–64 mm in males, 65–76 mm in females), males smaller than same size-class females. Coloration with base vivid yellow to light yellowish brown; carapace, tergites and metasoma with all carinae deeply infuscate; tergites with a dark trivittate pattern all along; pedipalps and legs almost immaculate. Sexual secondary dimorphism inconspicuous in habitus (size and shape very similar in both sexes), moderate in pedipalps (manus swollen and wider than patella in both sexes, but bulkier in males) and inconspicuous in metasoma (very similar in both sexes). Pedipalp chela with only a few dark macrosetae scattered on ventral surface; manus with all carinae absent; fingers long (movable finger/manus length ratio: 1.50–1.62 in male, 1.64–1.81 in females), both fingers with 12–14 (mode 13) principal rows of denticles, basal lobe/notch combination strong. Pectines with 26–31 teeth (mode 29) in males, 21–26 (mode 24) in females. Metasoma of male much shorter and heavier than standard for the genus (see ratios in tab. XIII); dorsal lateral and lateral supramedian carinae vestigially to weakly subcrenulate to subgranulose on segments II–IV, ventral submedians on II–III only feebly raised distally (slightly stronger in females); intercarinal tegument coriaceous to glossy and minutely punctate, but irregularly, minutely granulose on IV–V (much more densely on the latter); setation sparse, with 1–2 pairs of dark macrosetae on almost all carinae (4–5 pairs on ventral laterals of V). Telson vesicle very large and globose in adults of both sexes.

REDESCRIPTION (adult male topotype; figs. 4, 6a; tabs. III, XIII–XIV). **Coloration** (figs. 4, 6a) base light yellow, slightly paler on chelicerae, legs, venter and telson. Chelicerae with fine, dark brown reticulations on distal part of manus. Pedipalps almost immaculate, only with carinae of trochanter, femur and patella faintly infuscate and very slight traces of dark brown variegations on external surface of manus; fingers yellow, immaculate. Carapace with all carinae and coarse granulation deeply infuscate and with diffuse, symmetric dark brown reticulations and spots all over; eyes and ocular tubercles black. Tergites with all carinae and coarse granulation deeply infuscate and with diffuse, symmetric dark brown spots on lateral areas, defining altogether a blurred trivittate pattern (i.e., a narrow, median solid line plus two broad, variegated lateral stripes, all three interconnected by dark reticulations). Pectines pale yellowish, with basal portion and basal plate progressively darker due to heavier sclerotization. Sternopectinal region and sternites immaculate, except for very faint infuscation traces under carinae of VII. Legs almost immaculate, only with few carinae of femur and patella partially, faintly infuscate. Metasoma concolor (i.e., no segments conspicuously darker) and essentially immaculate, only with carinae faintly to moderately infuscate (progressively darker ventrally and posteriorly). Telson immaculate, distal half of aculeus blackish.

Chelicerae. With dentition typical for the genus, teeth standard-sized and blunt. Tegument glossy and minutely punctate, dorsodistal portion of manus with minute granulation scattered and coarse, glossy granules irregularly arranged around dorsodistal depression. Setation very dense ventrally, but essentially lacking dorsally except for a patch of macrosetae at fixed finger base and some setae around dorsodistal depression of manus.

Pedipalps. Size standard for the genus (3.77 times longer than carapace). Femur essentially straight (very slightly bent inwards distally) and with some dark macrosetae, which are mostly concentrated along ventrodistal edge; all carinae moderate to weak and formed by coarse, isolated, glossy granules; intercarinal tegument coriaceous, minutely punctate on glossier areas and with minute granulation scattered dorsally. Patella straight and robust, with only a few dark macrosetae scattered all over; all carinae weak to obsolete and smooth to subgranulose; intercarinal tegument coriaceous and minutely punctate on glossier areas, internal surface with only a few weak denticles. Chela with manus oval and bulky (length/width ratio = 1.30, length/depth ratio = 1.27, median part widest), much wider than patella (ratio 1.33) and with only a few dark macrosetae scattered on ventral surface, all carinae absent, intercarinal tegument smooth, glossy and minutely punctate; fingers long (movable 1.60 times longer than underhand), slender and evenly curved, fixed finger with 13/14 principal rows of denticles plus 13/14 inner and 13/13 outer accessory denticles (coarser than principal denticles), movable finger with 13/13 principal rows of denticles plus 12/12 inner and 13/13 outer accessory denticles (coarser than principal denticles) and the standard apical subrow of three denticles (large terminal denticle not included), basal lobe/notch combination strong.

Carapace. Wider than long (length/width ratio = 0.90). Anterior margin vestigially trilobed, with 4–5 pairs of dark macrosetae. Carinae with lyre-shaped configuration perfectly defined: anterior medians and superciliaries strong, fused into a spoon-shaped figure and formed by coarse, isolated, glossy granules; central laterals and posterior medians strong, fused into an S-shaped figure and formed by coarse, isolated, glossy granules; lateral oculars and central medians strong, not fused and formed by coarse, isolated, glossy granules; posterior laterals strong and formed by coarse, isolated, glossy granules. Furrows: posterior laterals deep and wide, other furrows inconspicuous, obscured by remarkably depressed areas between adjacent carinae. Tegument coriaceous, minutely punctate and irregularly covered by moderately dense, medium-sized, glossy granules largely concentrated along lateral areas. Median eyes large, separated by about twice the ocular diameter; lateral eyes much

smaller and mostly concealed below a granulose carina.

Sternum. Type 1, very small and triangular, with one pair of dark macrosetae. Tegument finely and densely granulose.

Genital operculum. With 3–4 pairs of dark macrosetae and some inconspicuous minor setae. Valves roundly subtriangular and separated; tegument medially depressed, coriaceous. Genital papillae very large, thick and slightly protruding.

Pectines. Long (but not reaching trochanter-femur joint of leg IV) and narrowly rectangular, setation moderately dense and dark. Tooth count 29/28, teeth slightly swollen. Fulcra large and bulky, paraboloid to round. Basal middle lamella trapezoidal. Pre-pectinal plate heavily sclerotized, very short, wide and folded transversely; tegument minutely granulose. Basal plate heavily sclerotized, about as long as wide, with 2–3 pairs of dark macrosetae; anterior margin shallowly concave, posterior margin very shallowly convex; tegument very finely and densely granulose, with three conspicuous depressions: one anteromedian (transverse, narrow and progressively much deeper medially to become a pit) and two laterals (large, irregular and shallow).

Legs. Slender, with all carinae obsolete and smooth to subgranulose except on femur, where weak to moderate and subgranulose to granulose. Intercarinal tegument smooth, minutely punctate, external surface of femur with a few vestiges of minute, glossy granules scattered. Bristlecombs well developed on I–III. Tibial and pedal spurs large and thin. Claws long and shallowly curved.

Mesosoma. Slightly wider than standard for the genus. Tergites coriaceous, minutely punctate and covered by dense, medium-sized, glossy granules largely concentrated along lateral areas, lateral margins granulose to subcrenulate, posterior margin smooth to minutely granulose; carinae: median longitudinal straight, progressively longer and stronger backwards (except on VII, where longer but weaker) and formed by coarse, isolated, glossy granules, submedians anteriorly divergent, essentially straight (I–VI) to inverted L-shaped (VII), progressively longer and stronger backwards (except on VII, where longer but weaker) and formed by coarse, isolated, glossy granules, laterals absent on I–VI, moderately strong, shallowly arcuate and formed by coarse, isolated, glossy granules on VII. Sternites with some dark macrosetae scattered all over (denser on III); lateral margins of all sternites finely crenulate, posterior margin of all sternites minutely denticulate to granulose; carinae: submedians weak but progressively stronger backwards, indistinct on III, present only on posterior half of IV–VI (smooth, subcostate and parallel) and almost complete on VII (subcrenulate and parallel, but anteriorly convergent), laterals moderate but progressively stronger backwards, absent on III, present only on posterior half of IV–VI (smooth, costate and parallel) and present only on median portion on VII (costate and parallel); tegument coriaceous to glossy and minutely punctate, densely covered by minute granules on lateral areas; spiracles very long and slit-like; sternite V with median smooth patch indistinct or absent.

Metasoma. Much shorter and heavier than standard for the genus (4.32 times longer than carapace), progressively narrower and lower distally, with segment V both narrowest and lowest. Segment I with ten complete carinae, II–IV with eight, V with five: dorsal laterals weak and coarsely subcrenulate on I, vestigial and coarsely subcrenulate on II–IV, absent on V; lateral supramedians vestigial and subcrenulate on I–IV, vestigial and subgranulose on V; lateral inframedians vestigial and coarsely subcrenulate, complete on I, present on distal two-thirds of II and distal half of III, absent on IV–V; ventral laterals weak to moderate, coarsely costate to subcrenulate on I–III, coarsely subcrenulate to crenulate on IV, coarsely but irregularly crenulate to lobate on V (with about 2–3 lobes much larger than the others); ventral submedians weak to moderate and coarsely costate to subcrenulate on I, moderate to strong, progressively stronger backwards and coarsely subcrenulate to crenulate on II–III (only feebly raised distally), moderate and coarsely subcrenulate on IV, absent on V (but indicated by an incomplete but raised row of coarse granules on more than basal two-thirds); ventral median absent on I–IV, strong and coarsely but irregularly serrate on V (bifurcate on extreme distal part). Intercarinal tegument coriaceous to glossy and minutely punctate, but irregularly, minutely granulose on IV–V (much more densely on the latter); dorsal furrow complete, wide and shallow on all segments; setation sparse, with 1–2 pairs of dark macrosetae on almost all carinae (4–5 pairs on ventral laterals of V).

Telson. Vesicle very large, globose (length/width ratio = 1.28, width/depth ratio = 1.11), with six pairs of dark macrosetae and several inconspicuous minor setae scattered all over; tegument glossy, with few vestiges of coarse but obsolete, glossy granules scattered ventrally and laterally; ventral median carina obsolete, as are two accessory pairs of carinae (ventral laterals and lateral supramedians?), subaculear tubercle absent. Aculeus remarkably shorter than vesicle (ratio = 0.71), sharp and moderately curved.

FEMALE (adult paratopotypes; figs. 5, 6d–f, 28c,e; tabs. IV, XIII–XIV). Sexual secondary dimorphism tenuous, differing from described male by: **1)** size slightly larger (65.4–76.0 mm); **2)** pedipalp manus more slender (length/width ratio = 1.37–1.50, length/depth ratio = 1.24–1.36); **3)** mesosoma slightly shorter and wider, with lateral sides more convex; **4)** pre-pectinal plate reduced to a tiny oval sclerite, invaginated into the membrane to look like a transverse pit; **5)** genital papillae absent; **6)** pectines smaller and narrower, with lower tooth counts (21–26, mode 24); **7)** metasoma with carinae slightly stronger.

VARIATION. Species from the three localities studied herein are remarkably homogeneous in morphology (figs. 6, 28c–e), except as noted below.

Adult size varied from 52.3–63.6 mm in males and 65.4–76.0 mm in females for the pooled sample (tabs. III–IV). There is a slight but evident positive correlation of size to altitude, more evident in females: even though the ranges widely overlap, the smallest adults are all from the lowest site (the type locality), while the largest come from the highest (Benaocaz).

The coloration varies only subtly (figs. 4–6, 28c–e), without any correlation to geographical occurrence nor maturity instar, i.e., adults and juveniles from all localities are similarly colored. Within each locality, the base color varies from pale yellow in some individuals to pale yellowish brown in others, and the dark pattern varies from lighter and sparser to darker and denser, regardless the shade of the base color.

Number of principal rows of denticles varied from 12–14 (mode 13) on both fixed and movable fingers. Specimens with asymmetrical counts between fixed/movable fingers and/or left/right pedipalps were the rule by far; only eight specimens (24.2%) had the same count in all four fingers: six with 13 rows (two adult males, one adult female and one

juvenile female topotypes, one adult male and two adult females from Benaocaz), plus two with 14 rows (one juvenile female topotype, one adult male from Benaocaz). As recorded above for adult size, there is a subtle but consistent positive correlation with altitude: at the highest site (Benaocaz), 14 rows were almost as frequent as 13, while only a single finger had a count of 12.

Pectinal tooth counts (tab. XIV) varied from 26–31 in males and 21–26 in females, with modes of 29 in the former sex and 24 in the latter. Single-tooth asymmetry was a very common occurrence: 10 out of 16 males and 8 out of 16 females (62.5% and 50.0%, respectively). Two specimens (6.2%) had two-tooth asymmetry (both adult females with 22/24 and 25/23), no bigger differences in tooth count were observed and one adult female topotype had both pectines too damaged for counting. As opposite to adult size and denticle rows of pedipalp fingers, pectinal tooth count was negatively correlated to altitude: even though the ranges widely overlap, counts decrease slightly but consistently from the lowest site (the type locality), to the highest (Benaocaz). The same variation has been widely recorded for other species of Buthidae, see e.g., Armas & Marcano Fondeur (1992), Teruel (1997, 2000, 2001, 2004) and Teruel & Armas (2006, 2012).

Comparison. The extreme reduction of most carinae of pedipalps (especially patella) and metasoma (especially on dorsal and lateral surfaces), the very robust, swollen metasomal segments and telson and the consistently lower pectinal tooth counts, are all reliable characters that distinguish adults of *B. ibericus* from all other Western European described congeners very easily, even to unaided eye. All of them have these appendages remarkably slenderer and more strongly carinate, plus higher pectinal tooth counts. Apart from this, adults of these species can be separated from *B. ibericus* as follows:

• ***B. elongatus*: 1)** size conspicuously larger (males 48–69 mm, females 69–83 mm); **2)** coloration with base darker and more reddish; **3)** pedipalp fingers with lobe/notch combination absent; **4)** pedipalps and legs much longer and slenderer (especially in males, which have chela much narrower than patella); **5)** carapace and tergites longer, narrower and with carinae and intercarinal granulation much stronger.

• ***B. montanus*: 1)** coloration with base darker and more reddish; **2)** pedipalp fingers with lobe/notch combination vestigial; **3)** males with pedipalp chelae slenderer, only slightly wider than patella; **4)** males with pedipalp fingers almost straight; **5)** females with pedipalp chelae much thicker, globose; **6)** metasomal segments II–III with ventral submedian carinae much stronger (especially in females, where coarsely lobate).

• ***B. occitanus*: 1)** coloration with base much paler and dark pattern greatly reduced (essentially immaculate and usually with a single, thin, dark stripe along tergites); **3)** pedipalp fingers with lobe/notch combination obsolete; **4)** males with pedipalp chelae slenderer and narrower than patella; **4)** males with pedipalp fingers almost straight.

All the differences mentioned above are very easy to appreciate even to unaided eye, e.g., compare figs. 4–6 to 2–3 and 7–13, and see tabs. XIII–XIV.

Distribution (Fig. 27). According to our personal data and reliable information made available to us by collaborators (e.g., high-resolution photographs), *B. ibericus* is a short-range endemic. It is restricted to a few nearby localities of the western foothills and lower slopes of the Betic Systems, were the Subbetic and Penibetic Ranges meet each other (especially in the Sierra de Grazalema). The extreme southern record of *B. ibericus* from Tarifa (Rojas & Rojas, 2017) is here accepted as correct, based on the color photograph provided in the figure 1d therein.

Ecological notes. This is a lapidicolous scorpion, which digs short burrows and scrapes in clay soil under rocks, both limestone and volcanic (fig. 28c–e). The vegetation is heterogeneous but open, hot and dry, e.g., chaparral, maquis, sparse pine and oak forests and the anthropogenic "garriga", with European fan palm and sparse grass understorey (fig. 32).

At the outskirts of Benaocaz, *B. ibericus* has successfully colonized a human-made structure: the stone-paved old Roman Road (fig. 32d). A nocturnal search there by one of us (CT) revealed that specimens were abundant under the paving stones.

A female with its first-instar litter was observed (but not collected) on 3/July/2019 at El Picacho; it was found during a daytime search, inside its parturition chamber: a self-dug, deep scrape or shallow burrow under a rock (fig. 28e).

A case of parasitism was detected here: an adult male topotype with a large Acari larva firmly attached to its right pecten, at the level of tooth # 25 from base to tip.

Remarks. This species has been widely recorded in the literature since its description; see an essentially complete list in Sousa *et al.* (2017). Nevertheless, the study of the samples available to us (especially topotypes) revealed that only the bibliographic references listed above actually involve *B. ibericus*. All others involve misidentifications, either totally or largely, with a particular case in Sousa *et al.* (2010): by the collecting coordinates given therein, the samples labeled as "*Buthus ibericus* (mtDNA Lineage 2)" and coded as "Boo IB7" and "Boo IB8", are the only ones actually referable to *B. ibericus* (all others represent misidentifications).

The collecting data of the type series of *B. ibericus* were originally given by Lourenço & Vachon (2004: 88) as "Espagne, Province de Cádiz, San José del Valle, 'finca Deesa [*sic*] Picado' 07/IX/2003 (I. Sanchez leg.)". In their recent catalogue of the genus, Sousa *et al.* (2017: 44–45) did not mention the exact site declared in the original description (Dehesa Picado private farm), but added precise coordinates provided by the original collector (Íñigo Sánchez, the owner of the farm). One of us (CT) made a collecting trip to this site and confirmed the coordinates were correct. By the way, our topotypic specimens were all collected just outside the private property (along the perimeter fence), but obviously belong to the same population.

The specimens recorded by Gantenbein & Largiadèr (2003) as *B. occitanus* from [El] Picacho and Benaocaz, both obviously correspond to *B. ibericus* instead.

Material examined (33 specimens: 14♂♂, 12♀♀, 2 juvenile ♂♂, 5 juvenile ♀♀). **SPAIN**: Andalucía: Cádiz Province: San José del Valle Municipality: Dehesa Picado Farm, along road A-2201 (36°37'53"N / 05°39'44"W / 100–240 m a.s.l. / **type locality**); 3/July/2019; C. Turiel; 10♂♂, 2♀♀, 3 juvenile ♀♀ (topotypes - RTO). Alcalá de los Gazules Municipality: El Picacho Recreation Area (36°31'19"N / 05°39' 01"W / 383 m a.s.l. / **new record**); 3/July/2019; C. Turiel; 1♂, 2♀♀, 1 juvenile ♀ (RTO). Benaocaz Municipality: Sierra de Grazalema: 1.5 km north of Benaocaz (36°42' 35"N /

05°25'28"W / 742 m a.s.l. / **new record**); 12/June/ 2018; C. Turiel; 7♀♀, 2 juvenile ♂♂, 1 juvenile ♀ (RTO). Benaocaz, along Roman Road (36°41'47"N / 05°25'32"W / 706 m a.s.l. / **new record**); 2/July/2019; C. Turiel; 3♂♂, 1♀ (RTO).

Buthus montanus Lourenço & Vachon, 2004

Figures 7–8, 27, 28f, 31c–d. Tables V, XIII–XIV

Buthus montanus Lourenço & Vachon, 2004: 81, 84, 86–88, 91–93; tab. I; figs. 16–30, 43. Rossi, 2012: 273–279; fig. 7. Teruel & Melic, 2015: 5–6, 8–12; tab. II; figs. 10a; pl. I7. Sousa *et al.*, 2017: 26, 29–31, 35, 51; tabs. 1–2; figs. 9–11.

TYPE DATA. SPAIN: ANDALUCÍA: border between Granada and Almería Provinces: Sierra Nevada: trail from Puerto de La Ragua to Cerro Pelado (2,600–2,700 m a.s.l.); 2/July/1951; G. Colas; 1♂ holotype (MNHN), 1♂, 3♀♀ paratypes (MNHN). Not examined.

DIAGNOSIS (emended). Adult size large for the genus (64 mm in males, 74–80 mm in females), males markedly smaller than same size-class females. Coloration with base medium brown; tergites with a dark trivittate pattern all along; carapace, tergites and metasoma with all carinae deeply infuscate; pedipalps and legs faintly infuscate. Sexual secondary dimorphism moderate in habitus (males smaller and slightly more slender), conspicuous in pedipalps (manus oval slender and slightly wider than patella in males, swollen and much wider than patella in females) and inconspicuous in metasoma (very similar in both sexes). Pedipalp chela with many dark macrosetae scattered on ventral surface; manus with all carinae obsolete to vestigial, smooth to subcostate; fingers long (movable finger/manus length ratio: 1.74 in male, 1.36–1.49 in females), both fingers with 12–13 (mode 13) principal rows of denticles, basal lobe/notch combination vestigial. Pectines with 28–30 teeth (mode 30) in males and 23–28 (mode 25) in females. Metasoma of male with size and shape standard for the genus (see ratios in tab. XIII); dorsal lateral and lateral supramedian carinae weakly to moderately subcrenulate to granulose on segments II–IV, ventral submedians on II–III moderately raised distally in males, strongly, coarsely and irregularly lobate in females; intercarinal tegument coriaceous and minutely punctate, but irregularly, minutely granulose on IV (dorsally only) and V (all surfaces); setation sparse, with 2–3 pairs of dark macrosetae on almost all carinae (5–6 pairs on ventral laterals of V). Telson vesicle large and globose in adults of both sexes.

REDESCRIPTION (adult male topotype; figs. 7; tabs. V, XIII–XIV). **Coloration** (fig. 7) base medium brown, slightly paler on chelicerae, pedipalps, legs and venter. Chelicerae almost immaculate, only with very few traces of faint, dark reticulations on dorsodistal part of manus. Pedipalps with carinae of femur and patella faintly infuscate and with very faint, diffuse, dark brown variegations on femur, patella and manus; fingers yellow, immaculate. Carapace with all carinae and coarse granulation deeply infuscate and with diffuse, symmetric dark brown reticulations and spots all over; eyes and ocular tubercles black. Tergites with all carinae and coarse granulation deeply infuscate and with diffuse, symmetric dark brown spots on lateral areas, defining altogether a trivittate pattern (i.e., a narrow, median solid line plus two broad, variegated lateral stripes, all three almost interconnected by dark reticulations). Pectines yellowish, with basal portion and basal plate progressively darker due to heavier sclerotization. Sternopectinal region and sternites immaculate. Legs with distal two-thirds of femur moderately infuscate and with carinae deeply infuscate, basal two-thirds of patella moderately infuscate. Metasoma concolor (i.e., no segments conspicuously darker) and essentially immaculate, only with carinae faintly to moderately infuscate (progressively darker ventrally and posteriorly) and few traces of faint, irregular, dark brown reticulations medially on lateral and ventral surfaces. Telson immaculate, except for few traces of faint, irregular, dark brown spots basally on vesicle, distal half of aculeus blackish.

Chelicerae. With dentition typical for the genus, teeth standard-sized and blunt. Tegument glossy and minutely punctate, dorsodistal portion of manus with minute granulation scattered and medium-sized, glossy granules irregularly arranged around dorsodistal depression. Setation very dense ventrally, but essentially lacking dorsally except for a patch of macrosetae at fixed finger base and some setae around dorsodistal depression of manus.

Pedipalps. Size standard for the genus (3.89 times longer than carapace). Femur essentially straight (very slightly bent inwards distally) and with some dark macrosetae, which are mostly concentrated along ventrodistal edge; all carinae strong and formed by medium-sized to coarse, isolated, glossy granules; intercarinal tegument coriaceous and minutely punctate on glossier areas. Patella straight and with only a few dark macrosetae scattered all over; all carinae moderate to weak and subgranulose to granulose; intercarinal tegument coriaceous and minutely punctate, internal surface with some conical denticles. Chela with manus narrow oval (length/width ratio = 1.64, length/depth ratio = 1.47, basal part widest), slightly wider than patella (ratio 1.13) and with many dark macrosetae scattered on ventral surface, all carinae obsolete to vestigial, smooth to subcostate, intercarinal tegument smooth, glossy and minutely punctate; fingers long (movable 1.74 times longer than underhand), robust and almost straight, fixed finger with 12/12 principal rows of denticles plus 12/12 inner and 12/12 outer accessory denticles (much coarser than principal denticles), movable finger with 12/12 principal rows of denticles plus 11/11 inner and 12/11 outer accessory denticles (coarser than principal denticles) and the standard apical subrow of three denticles (large terminal denticle not included), basal lobe/notch combination vestigial.

Carapace. Slightly wider than long (length/width ratio = 0.87). Anterior margin very shallowly convex, with six pairs of dark macrosetae. Carinae with lyre-shaped configuration perfectly defined: anterior medians and superciliaries strong, fused into a spoon-shaped figure and formed by coarse, isolated, glossy granules; central laterals and posterior medians strong, fused into an S-shaped figure and formed by coarse, isolated, glossy granules; lateral oculars and central medians strong, not fused and formed by medium-sized, isolated, glossy granules; posterior laterals strong and formed by medium-sized, isolated, glossy granules. Furrows: posterior laterals deep and wide, other furrows inconspicuous, obscured by remarkably depressed areas between adjacent carinae. Tegument coriaceous, minutely punctate and irregularly covered by moderately dense, fine to medium-sized, glossy granules more concentrated along lateral areas. Median eyes large, separated by about twice the ocular diameter; lateral eyes much smaller and mostly concealed below a granulose carina.

Sternum. Type 1, very small and triangular, with one pair of dark macrosetae. Tegument minutely and densely granulose.

Genital operculum. With 4–5 pairs of dark macrosetae and some inconspicuous minor setae. Valves roundly subtriangular and separated only along posterior third; tegument medially depressed, coriaceous to smooth and with fine to medium-sized, dense granulation along anterior part and lateral margins. Genital papillae very large, narrow and slightly protruding.

Pectines. Long (but not reaching trochanter-femur joint of leg IV) and narrowly rectangular, setation moderately dense and dark. Tooth count 30/30, teeth not swollen. Fulcra large and bulky, paraboloid to round. Basal middle lamella trapezoidal. Pre-pectinal plate heavily sclerotized, very short, wide and folded transversely; tegument smooth. Basal plate heavily sclerotized, wider than long, with 2–3 pairs of dark macrosetae; anterior margin shallowly concave, posterior margin convex; tegument very finely and densely granulose, with three conspicuous depressions: one anteromedian (transverse, narrow and progressively much deeper medially to become a pit) and two laterals (large, irregular and shallow).

Legs. Slender, with all carinae weak and subcrenulate to subcostate except on femur, where moderate and subgranulose to granulose. Intercarinal tegument coriaceous, external surface of femur with some minute, glossy granules scattered. Bristlecombs well developed on I–III. Tibial and pedal spurs large and thin. Claws long and shallowly curved.

Mesosoma. Size and shape standard for the genus. Tergites coriaceous, minutely punctate and covered by dense, medium-sized, glossy granules more concentrated along lateral areas, lateral margins finely serrate to denticulate, posterior margin minutely granulose; carinae: median longitudinal straight, progressively longer and stronger backwards (except on VII, where longer but weaker) and formed by fine, isolated, glossy granules, submedians anteriorly divergent, shallowly sinuose (I–VI) to shallowly S-shaped (VII), progressively longer and stronger backwards and formed by fine, isolated, glossy granules, laterals absent on I–VI, moderately strong, shallowly arcuate and formed by medium-sized, isolated, glossy granules on VII. Sternites with some dark macrosetae scattered all over (denser on III); lateral margins of all sternites finely serrate to crenulate, posterior margin of all sternites minutely denticulate to granulose; carinae: submedians progressively stronger backwards, absent to obsolete on III–V, present on posterior two-thirds of VI (weak, subgranulose and slightly divergent anteriorly) and almost complete on VII (crenulate and subparallel, but anteriorly convergent), laterals moderate but progressively stronger backwards, absent on III, present only on posterior half of IV–VI (smooth, subcostate and slightly divergent anteriorly) and present only on median portion on VII (crenulate and slightly divergent anteriorly); tegument coriaceous to glossy and minutely punctate, densely covered by minute granules on anterior and lateral areas; spiracles very long and slit-like; sternite V with median smooth patch indistinct or absent.

Metasoma. Size and shape standard for the genus (4.87 times longer than carapace), progressively narrower and lower distally, with segment V both narrowest and lowest. Segment I with ten complete carinae, II–IV with eight, V with five: dorsal laterals moderate and coarsely subcrenulate on I, weak and finely subcrenulate on II, very weak to vestigial and finely subcrenulate to smooth on III–IV, absent on V; lateral supramedians moderate and coarsely subcrenulate on I, moderate and finely subcrenulate to granulose on II–IV, moderate and finely granulose on V; lateral inframedians moderate and coarsely crenulate to subcrenulate, complete on I, present on distal two-thirds of II and distal half of III, absent on IV–V; ventral laterals moderate and coarsely subcrenulate to crenulate on I–II, strong and coarsely crenulate on III–IV, strong and coarsely but irregularly serratocrenulate to lobate on V (with about 3–4 lobes much larger than the others); ventral submedians strong and finely subcrenulate on I, strong, progressively stronger backwards and coarsely crenulate to serratocrenulate on II–III (moderately raised distally), strong and serratocrenulate on IV, absent on V (but indicated by an incomplete but raised row of coarse granules on more than basal two-thirds); ventral median absent on I–IV, moderately strong and coarsely but irregularly serrate on V (bifurcate on distal tip). Intercarinal tegument coriaceous and minutely punctate, but irregularly, minutely granulose on IV (dorsally only) and V (all surfaces); dorsal furrow complete, wide and shallow on all segments; setation sparse, with 2–3 pairs of dark macrosetae on most carinae (5–6 pairs on lateral supramedians and ventral laterals of V).

Telson. Vesicle large, globose (length/width ratio = 1.18, width/depth ratio = 1.15), with eight pairs of dark macrosetae and several inconspicuous minor setae scattered all over; tegument glossy, with few vestiges of coarse but obsolete, glossy granules scattered ventrally and laterally; ventral median carina obsolete, as are two accessory pairs of carinae (ventral laterals and lateral supramedians?), subaculear tubercle absent. Aculeus shorter than vesicle (ratio = 0.78), sharp and shallowly curved.

FEMALE (adult paratopotypes; figs. 8, 28f; tabs. V, XIII–XIV). Sexual secondary dimorphism moderate, differing from described male by: **1)** size larger (77.3–80.4 mm); **2)** pedipalp manus much more robust, with manus globose (length/width ratio = 1.47–1.49, length/depth ratio = 1.35–1.38) and remarkably wider than patella (ratio = 1.28–1.30); **3)** mesosoma wider, with lateral sides markedly convex; **4)** pre-pectinal plate reduced to a tiny oval sclerite, invaginated into the membrane to look like a transverse pit; **5)** genital papillae absent; **6)** pectines smaller and narrower, with lower tooth counts (23–28, mode 25); **7)** metasoma with all carinae stronger (especially the ventral submedians on segments II–III and ventral laterals on V, which are very strongly, coarsely and irregularly lobate); **8)** telson with vesicle wider (length/width ratio = 1.08–1.15, width/depth ratio = 1.09–1.15) and aculeus slightly longer (ratio = 0.79–0.87).

VARIATION. The topotypes examined herein and the types photographed in the original description (Lourenço & Vachon, 2004: 86; figs. 16–19), are all remarkably homogeneous in coloration, morphology and morphometrics. The only noteworthy exceptions are discussed as follows.

Adult size varied in our topotypes as follows: 64.2 mm in the single male, 77.3–80.4 mm in three females (tab. V). Lourenço & Vachon, (2004: 91; tab. I) gave an identical total length of 64.2 mm for the holotype male, plus 74.4 mm for a paratype female.

Number of principal rows of denticles was 12/12 in the single male and 12–13/12–13 in the four females (three adults, one juvenile).

Pectinal tooth counts were originally declared as 28–29 in males and 23–27 in females, but actual counts were given only for the holotype male and a paratype female as 28/29 and 23/23, respectively (Lourenço & Vachon, 2004: 84). Counts of our topotypes were again slightly higher (tab. XIV): male

with 30/30, females with 25/25 (2), 28/28 and 26/25 (juvenile).

COMPARISON. Amongst the Western European members of the genus, *B. montanus* is peculiar by lacking any unique character that *per se* distinguishes it reliably from its described congeners. Thus, adults of these species must be separated from *B. montanus* using different combinations of characters, as follows:

• ***B. elongatus*: 1)** pedipalp fingers with lobe/notch combination absent; **2)** males with pedipalps, legs and metasoma much longer and slenderer (especially chela, which is much narrower than patella); **3)** carapace and tergites with carinae and intercarinal granulation much stronger; **4)** metasomal segments II–III with ventral submedian carinae much weaker (especially in females, where not coarsely lobate).

• ***B. ibericus*: 1)** size smaller (males 52–62 mm, females 65–76 mm); **2)** coloration with base paler and yellowish; **3)** pedipalp fingers with lobe/notch combination strong; **4)** males with pedipalp chelae heavier, much wider than patella; **5)** females with pedipalp chelae slenderer; **6)** metasomal segments and telson remarkably more robust, swollen and with carinae much weaker; **7)** metasomal segments II–III with ventral submedian carinae much weaker (especially in females, where not coarsely lobate).

• ***B. occitanus*: 1)** size smaller (males 54–64 mm, females 55–70 mm); **2)** coloration with base much paler and dark pattern greatly reduced (essentially immaculate and usually with a single, thin, dark stripe along tergites); **3)** pedipalp chelae smaller and much slenderer (especially in males); **4)** carapace and tergites with intercarinal tegument matt; **5)** metasomal segments II–III with ventral submedian carinae much weaker (especially in males); **6)** telson with vesicle smaller and slenderer (especially in males).

All the differences mentioned above are very easy to appreciate even to unaided eye, e.g., compare figs. 7–8 to 2–6 and 9–13, and see tabs. XIII–XIV.

DISTRIBUTION (fig. 27). This species is known only from the type locality and its surroundings, i.e., the summits above 2,000 m a.s.l. at the central part of the Sierra Nevada, in the border of Granada and Almería.

ECOLOGICAL NOTES. This is a lapidicolous scorpion, which digs short burrows and scrapes in gravely soil under rocks, both volcanic and limestone (fig. 28f). The climate is harsh, typical of Mediterranean high mountains: summer (July through August) is short and temperate, while winter (December through April) is long and cold, with the soil covered by snow (Puerto de La Ragua is a well-known cross-country skiing station). Due to this, all known specimens have been collected in summer, see Lourenço & Vachon (2004: 84), Rossi (2012: 277) and our present data (see the Material Examined section, below).

By the way, the habitat of *B. montanus* was described by Lourenço *in* Lourenço & Vachon (2004: 84) wrongly as "*xeric scrub (dry) and/or high mountain tundra*". Neither scrub nor tundra is a tree-dominated vegetal formation and as shown here (figs. 31c–d), the vegetation of the area where *B. montanus* lives is the typical of the alpine belt of the Betic Systems: a moderately open pine forest with grassland patches.

REMARKS. Sousa *et al.* (2010) studied an early-instar specimen labeled as "*Buthus* sp. (mtDNA Lineage 4)" and coded as "Sc96", which they tentatively identified as *B. montanus* based on geographical proximity (ca. 83 km north-northeast of Puerto de La Ragua). During the present revision, we collected adult specimens around the collecting site of that specimen and their detailed study revealed that none is conspecific with our topotypes of *B. montanus*.

MATERIAL EXAMINED (five specimens: 1♂, 3♀♀, 1 juvenile ♀). **SPAIN**: ANDALUCÍA: Granada Province: Nevada Municipality: Sierra Nevada: Puerto de La Ragua, head of trail to Cerro Pelado (37°06'49"N / 03°01'46"W / 2,042 m a.s.l. / **type locality**); 25/June/2016; 1♂, 3♀♀, 1 juvenile ♀ (topotypes - RTO).

Buthus occitanus (Amoreux, 1789)

Figures 9–13, 27, 29, 33. Tables VI–VII, XIII–XIV

Scorpio occitanus Amoreux, 1789a: 41–43. Amoreux, 1789b: 9–15; pl. I; figs. 1–3.

Buthus occitanus: Leach, 1815: 391. Fet & Lowe, 2000: 6, 91–97, 662, 667, 670, 675, 678, 680–681 (in part: references to France and northern Spain only). Sousa *et al.*, 2017: 15, 18–19, 21, 23–26, 29–33, 35, 44, 51, 53–55; tabs. 1–2; figs. 3, 6b, 9–11 (in part: references to France and northern Spain only).

Buthus occitanus occitanus: Fet & Lowe, 2000: 94–975 (in part: references to France and Spain only).

Scorpio rufus Amoreux, 1789a: 43, 295; pl. I; fig. 2. Synonymized by Amoreux, 1789b.

Buthus europaeus tridentatus Franganillo, 1918: 122–123. Synonymized by Sousa *et al.*, 2017.

Buthus occitanus tridentatus: Fet & Lowe, 2000: 97.

TYPE DATA. *Scorpio occitanus*. FRANCE: LANGUEDOC-ROUSSILLON: Gard Department: Nimes District: Souvignargues (43°48'33"N / 04°08'44"E / 125 m a.s.l.); 23/September/2017; C. Turiel, M. Stockmann; 1♂ neotype (herein designated - IES). ***Buthus europaeus tridentatus*. SPAIN**: NAVARRA: Aoiz Municipality: Pyrenees: 1 km southwest of Javier Castle (42°35'00"N / 01°14'08"W / 554 m a.s.l.); 22/June/2016; C. Turiel; 1♂ neotype (herein designated - IES). **Note**. See a detailed discussion on both designations below, in Remarks section.

DIAGNOSIS (emended). Adult size medium to moderately large for the genus (54–64 mm in males, 55–70 mm in females), males smaller than same size-class females. Coloration with base variable from pale yellow to pale orange, almost completely immaculate; carapace with a large, dark median blotch; tergites with a dark univittate to faintly trivittate pattern all along; pedipalps and legs immaculate to faintly infuscate. Sexual secondary dimorphism moderate in habitus (males smaller and slightly more slender), conspicuous in pedipalps (manus slender and narrower than patella in males, swollen and much wider than patella in females) and inconspicuous in metasoma (very similar in both sexes). Pedipalp chela with only a few dark macrosetae scattered on ventral surface; manus with all carinae obsolete to vestigial, smooth; fingers long (movable finger/manus length ratio: 1.76–1.84 in male, 1.65–1.72 in females), both fingers with 13–14 principal rows of denticles (modes 13 and 14 in fixed and movable, respectively), basal lobe/notch combination obsolete. Pectines with 31–34 teeth (mode 31) in males, 26–30 (mode 28) in females. Metasoma of male with size standard for the genus, but slightly heavier (see ratios in tab. XIII); dorsal lateral and lateral supramedian carinae weakly subcrenulate to crenulate on segments II–IV, ventral submedians

on II–III only feebly raised distally (stronger and coarser in females); intercarinal tegument coriaceous to glossy and minutely punctate, but irregularly, minutely granulose (especially dorsally and much more densely on V); setation sparse, with 2–3 pairs of dark macrosetae on almost all carinae (4–5 pairs on ventral laterals of V). Telson vesicle small and subglobose in adult males, medium-sized and moderately globose in adult female.

REDESCRIPTION (adult male topotype; figs. 9, 13a; tabs. VI, XIII–XIV). **Coloration** (figs. 9, 13a) base vivid yellow, slightly paler on chelicerae, pedipalps, legs, venter and telson. Chelicerae immaculate. Pedipalps almost immaculate, only with very faint traces of grayish reticulations all over; fingers yellow, immaculate. Carapace almost immaculate, except for slight traces of faint infuscation under carinae and a large, diffuse dark brown blotch around median ocular tubercle; eyes and ocular tubercles black. Tergites almost immaculate, except for median carina moderately infuscate defining a univittate pattern (i.e., a narrow, median line) and slight traces of dark brown spots on anterolateral part of I–IV. Pectines whitish to pale yellowish, with basal portion and basal plate progressively darker due to heavier sclerotization. Sternopectinal region and sternites immaculate. Legs immaculate. Metasoma concolor (i.e., no segments conspicuously darker) and essentially immaculate, only with carinae feebly, partially infuscate (progressively darker posteriorly and ventrally) and few traces of diffuse, irregular, dark brown reticulations medially on V. Telson immaculate, distal half of aculeus blackish.

Chelicerae. With dentition typical for the genus, teeth standard-sized and blunt. Tegument glossy and minutely punctate, dorsodistal portion of manus with minute granulation scattered and coarse, glossy granules irregularly arranged around dorsodistal depression. Setation very dense ventrally, but essentially lacking dorsally except for a patch of macrosetae at fixed finger base and some setae around dorsodistal depression of manus.

Pedipalps. Size standard for the genus (3.59 times longer than carapace). Femur essentially straight (very slightly bent inwards distally) and with some dark and pale macrosetae, which are mostly concentrated along ventrodistal edge; all carinae moderate to weak and formed by medium-sized to coarse, isolated, glossy granules; intercarinal tegument coriaceous and minutely punctate on glossier areas. Patella straight and with only a few dark macrosetae scattered all over; all carinae weak to moderate and subgranulose to granulose; intercarinal tegument coriaceous and minutely punctate on glossier areas, internal surface with many conical denticles. Chela with manus suboval and very slender (length/width ratio = 1.79, length/depth ratio = 1.53, median part widest), slightly narrower than patella (ratio 0.98) and with only a few dark macrosetae scattered on ventral surface, all carinae obsolete to vestigial, smooth, intercarinal tegument smooth, glossy and minutely punctate; fingers long (movable 1.76 times longer than underhand), slender and almost straight, fixed finger with 13/13 principal rows of denticles plus 13/13 inner and 13/12 outer accessory denticles (coarser than principal denticles), movable finger with 13/14 principal rows of denticles plus 12/12 inner and 13/13 outer accessory denticles (coarser than principal denticles) and the standard apical subrow of three denticles (large terminal denticle not included), basal lobe/notch combination obsolete.

Carapace. Slightly wider than long (length/width ratio = 0.96). Anterior margin vestigially trilobed, with 5–6 pairs of dark macrosetae. Carinae with lyre-shaped configuration perfectly defined: anterior medians and superciliaries strong, fused into a spoon-shaped figure and formed by coarse, isolated, glossy granules; central laterals and posterior medians strong, fused into an S-shaped figure and formed by coarse, isolated, glossy granules; lateral oculars and central medians strong, not fused and formed by medium-sized to coarse, isolated, glossy granules; posterior laterals strong and formed by medium-sized, isolated, glossy granules. Furrows: posterior laterals deep and wide, other furrows inconspicuous, obscured by remarkably depressed areas between adjacent carinae. Tegument coriaceous, minutely punctate on glossier areas and irregularly covered by moderately dense, fine to medium-sized, glossy granules largely concentrated along lateral areas. Median eyes large, separated by about twice the ocular diameter; lateral eyes much smaller and mostly concealed below a granulose carina.

Sternum. Type 1, very small and triangular, with 1–2 pairs of dark macrosetae, plus some minor setae. Tegument very finely and densely granulose.

Genital operculum. With six pairs of dark macrosetae and some inconspicuous minor setae. Valves roundly subtriangular and separated along distal two-thirds; tegument coriaceous and remarkably convex. Genital papillae very large, thick and slightly protruding.

Pectines. Long (almost reaching trochanter-femur joint of leg IV) and narrowly rectangular, setation moderately dense and dark. Tooth count 32/31, teeth slightly swollen. Fulcra large and bulky, paraboloid to round. Basal middle lamella trapezoidal. Pre-pectinal plate heavily sclerotized, very short, wide and folded transversely; tegument minutely granulose. Basal plate heavily sclerotized, about as long as wide, with 2–3 pairs of dark macrosetae; anterior margin shallowly concave, posterior margin very shallowly convex; tegument very finely and densely granulose, with three conspicuous depressions: one anteromedian (transverse, narrow and progressively much deeper medially to become a pit) and two laterals (large, irregular and shallow).

Legs. Slender, with all carinae weak and smooth to subgranulose except on femur, where weak to strong and granulose to dentate. Intercarinal tegument smooth, minutely punctate, external surface of femur with many vestiges of minute, glossy granules scattered. Bristlecombs well developed on I–III. Tibial and pedal spurs large and thin. Claws long and shallowly curved.

Mesosoma. Size and shape standard for the genus. Tergites coriaceous, minutely punctate and covered by dense, medium-sized, glossy granules more concentrated along lateral areas, lateral margins finely granulose to denticulate, posterior margin minutely granulose; carinae: median longitudinal straight, progressively longer and stronger backwards and formed by medium-sized, isolated, glossy granules, submedians anteriorly divergent, shallowly arcuate (I–VI) to inverted L-shaped (VII), progressively longer and stronger backwards and formed by medium-sized, isolated, glossy granules, laterals absent on I–VI, moderately strong, shallowly arcuate and formed by medium-sized, isolated, glossy granules on VII. Sternites with some dark macrosetae scattered all over (denser on III); lateral margins of all sternites finely crenulate, posterior margin of all sternites minutely granulose; carinae: submedians weak but progressively stronger backwards, indis-

tinct on III, present only on posterior half of IV–VI (smooth, subcostate and parallel, but anteriorly convergent) and almost complete on VII (subcrenulate and parallel, but very slightly convergent anteriorly), laterals moderate but progressively stronger backwards, absent on III, present only on posterior half of IV–VI (smooth, costate and slightly divergent anteriorly) and present only on median portion on VII (crenulate and slightly divergent anteriorly); tegument coriaceous to glossy and minutely punctate, densely covered by minute granules on lateral areas; spiracles very long and slit-like; sternite V with median smooth patch indistinct or absent.

Metasoma. Size standard for the genus (4.98 times longer than carapace), but slightly heavier, progressively narrower and lower distally, with segment V both narrowest and lowest. Segment I with ten complete carinae, II–IV with eight, V with five: dorsal laterals weak and crenulate on I, weak and subcrenulate on II, vestigial and subcrenulate to subgranulose on III–IV, absent on V; lateral supramedians weak and subcrenulate on I–IV, weak and subgranulose on V; lateral inframedians weak and subcrenulate, complete on I, present only on distal half of II–III, absent on IV–V; ventral laterals moderate and subcrenulate on I–IV, coarsely but irregularly serratocrenulate to lobate on V (with about 2–3 lobes much larger than the others); ventral submedians moderate and subcrenulate on I, moderately strong, progressively stronger backwards and subcrenulate to crenulate on II–III (only feebly raised distally), strong and serratocrenulate on IV, absent on V (but indicated by an incomplete but raised row of coarse granules on basal two-thirds); ventral median absent on I–IV, strong and coarsely but irregularly serrate on V (bifurcate on distal half). Intercarinal tegument coriaceous to glossy and minutely punctate, but irregularly, minutely granulose (especially dorsally and much more densely on V); dorsal furrow complete, wide and shallow on all segments; setation sparse, with 2–3 pairs of dark macrosetae on almost all carinae (4–5 pairs on ventral laterals of V).

Telson. Vesicle relatively small, subglobose (length/width ratio = 1.30, width/depth ratio = 1.06), with six pairs of dark macrosetae and several inconspicuous minor setae scattered all over; tegument glossy, with coarse but weak, glossy granules scattered ventrally and laterally; ventral median carina obsolete, as are two accessory pairs of carinae (ventral laterals and lateral supramedians?), subaculear tubercle absent. Aculeus shorter than vesicle (ratio = 0.86), sharp and shallowly curved.

Female (adult paratopotypes; figs. 10, 13d, 29d; tabs. VII, XIII–XIV). Sexual secondary dimorphism conspicuous, differing from described male by: **1)** size slightly larger (55.3–69.7 mm); **2)** pedipalp manus much more robust, subglobose (length/width ratio = 1.48–1.66, length/depth ratio = 1.29–1.41) and wider than patella (ratio = 1.11–1.22); **3)** mesosoma much wider, with lateral sides markedly convex; **4)** prepectinal plate reduced to a tiny oval sclerite, invaginated into the membrane to look like a transverse pit; **5)** genital papillae absent; **6)** pectines smaller and narrower, with lower tooth counts (26–30, mode 28); **7)** metasoma with all carinae stronger (especially the ventral submedians on segments II–III and ventral laterals on V, which are more strongly and coarsely lobate); **8)** telson with vesicle wider (length/width ratio = 1.15–1.19, width/depth ratio = 1.10–1.14) and aculeus slightly longer (ratio = 0.89–0.95).

Variation. Species from the five localities studied herein are remarkably homogeneous in morphology (figs. 13, 29), except as noted below.

Adult size varied from 54.4–63.6 mm in males and 55.3–69.7 mm in females for the pooled sample (tabs. VI–VII). There are only subtle differences in size and slenderness amongst localities (e.g., the largest and more robust specimens are all from Spain), but the ranges widely overlap without any visible correlation to altitude or any other ecological factor. Moreover, the variability range of the pooled sample matches that observed in other Western European species with enough specimens studied, such as *B. elongatus* and *B. ibericus* (see above).

The coloration varies only subtly (figs. 13, 29), without any correlation to geographical occurrence nor maturity instar, i.e., adults and juveniles are equally colored. The only noteworthy exception is that the base color is consistently orange in the easternmost locality (Gonfaron), an obvious adaptation to match the red sand substratum of this site (fig. 33b). In all other localities, the substratum is much lighter (fig. 33a,c–d) and the base color varies slightly in shade and the dark pattern in a few individuals (mostly juveniles) tends to define a very irregular trivittate pattern along tergites I–IV.

Number of principal rows of denticles varied from 13–14 (exceptionally 12) on both fixed and movable fingers, without a clearly defined mode in either finger. Specimens with asymmetrical counts between fixed/movable fingers and/or left/right pedipalps were the rule by far; only six specimens (25.0%) had the same count in all four fingers: two with 13 rows (one juvenile female topotype, one adult female from Javier), plus four with 14 rows (one adult female from Gonfaron, the adult female from Cintruéñigo, one adult male and one adult female from Javier). No evident differences in tooth count were found amongst different populations, despite existing differences in altitude and other ecological factors (see below).

Pectinal tooth counts (tab. XIV) varied from 31–34 in males and 26–30 in females, with modes of 31 in the former sex and 28 in the latter. Single-tooth asymmetry was a frequent occurrence: 3 out of 9 males and 6 out of 15 females (33.3% and 40.0%, respectively). Two specimens (8.3%) had two-tooth asymmetry (one adult male with 34/32, one juvenile female with 29/27) and one (4.2%) had a three-tooth asymmetry (an adult male with 34/31 and completely normal pectines). As for the previous parameter, no evident differences were found amongst different populations.

Comparison. The extreme reduction of the dark pattern in coloration (especially on tergites, where usually a single, thin, dark stripe all along is conspicuous), is a reliable character that distinguishes *B. occitanus* from all other Western European described congeners very easily, even to unaided eye. All of them have the dark pattern much denser and darker (despite the base color) and on tergites arranged into a trivittate pattern, sometimes blurred by confluent. Apart from this, adults of these species can be separated from *B. occitanus* as follows:

- ***B. elongatus*: 1)** size much larger (males 48–69 mm, females 69–83 mm); **2)** coloration with base darker and more reddish; **3)** pedipalp fingers with lobe/notch combination absent; **4)** pedipalps and metasoma remarkably longer and slenderer; **5)** telson with vesicle larger and more bulbous (especially in males).

• ***B. ibericus*: 1)** pedipalp fingers more curved and with lobe/notch combination strong; **2)** males with pedipalp chelae heavier, much wider than patella; **3)** metasomal segments and telson remarkably more robust, swollen and with carinae much weaker; **4)** metasomal segments II–III with ventral submedian carinae much weaker (especially in females).

• ***B. montanus*: 1)** size larger (males 64 mm, females 77–80 mm); **2)** coloration with base darker and more reddish; **3)** pedipalp chela heavier (especially in males, where wider than patella); **4)** males with pedipalp fingers shorter; **5)** metasomal segments II–III with ventral submedian carinae much stronger and more coarsely lobate (especially in females).

All the differences mentioned above are very easy to appreciate even to unaided eye, e.g., compare figs. 9–13 to 4–8, and see tabs. XIII–XIV.

DISTRIBUTION (fig. 27). According to our personal data and reliable information made available to us by collaborators (e.g., high-resolution photographs), *B. occitanus* is widely and continuously distributed along Western Europe, but only from the Ebro Basin through southeastern France (where it is the single species present).

ECOLOGICAL NOTES. This is a lapidicolous scorpion, which digs short burrows and scrapes in clay soil under rocks, both limestone and volcanic (figs rocks. 29, 33). It occurs in a wide range of Mediterranean-type vegetal formations (fig. 33), both primary and secondary but usually open, hot and dry, e.g., chaparral, maquis, sparse pine and oak forests, "garriga" and "dehesa" (the last two are anthropogenic, secondarily grown in places where the original Mediterranean chaparral and oak forests have been heavily altered by human activities such as overgrazing and burning).

REMARKS. This species was described by Amoreux (1789a), from an undisclosed number of specimens. As the collection locality, Amoreux (1789a: 41) declared "*the environs of Souvignargues, in the Nimes Diocese*" [originally in French, translated into English here], a village located roughly 30 km northeast of Montpellier, and it was unambiguously reaffirmed by Amoreux (1879b: 10) himself as the single origin for his specimens. Surprisingly, the type locality has been wrongly listed once and again in the literature as Sauvignargues, a different village located west of Montpellier, see e.g., Fet & Lowe (2000: 92), Gantenbein & Largiadèr (2003: 120), Lourenço (2003: 880), Lourenço *et al.* (2012: 21), Rossi (2012: 273) and Lourenço (2017: 59).

The composition and whereabouts of the type series is currently unknown (Fet & Lowe, 2000: 92; Sousa *et al.*, 2017: 54–55). It must be regarded as lost or destroyed and most likely never existed, i.e., in a crucial statement within the original description that has gone unnoticed so far, Amoreux (1879a: 42) himself literally declared to have based his description upon a living individual. Amoreux (1879a: 43) intentionally applied two equivalent but different binomial names to this species, i.e., *Scorpio rufus* and *Scorpio occitanus* (in that order), which are thus subjective synonyms. However, immediately then, Amoreux (1789b: 10) explicitly selected the latter binomen as the correct one, fulfilling the requirements of the Article 24.2.4 of the Code (CINZ 1999: 32) to be deemed the First Reviser.

By the way, the three black and white drawings reproduced by Sousa *et al.* (2017: 19; fig. 3) as "*Original illustration of Scorpio occitanus (Amoreux 1789a)*" are incorrectly cited, as these images were actually published by Amoreux (1789b: pl. 2, fig. 1). Conversely, another black and white drawing reproduced by Sousa *et al.* (2017: 24; fig. 6b) as "*Original drawings of the habits of* [...] *S. occitanus (B), according to Amoreux (1789b)*" actually correspond to Amoreux (1789a: pl. 1, fig. 2) who explicitly declared therein it was not of originally his authorship, but reproduced from Maupertuis (1731).

In order to stabilize nomenclature through the clarification of the precise taxonomic identity of *Scorpio occitanus*, there is an inevitable need to fix it by permanently linking it to an existing, representative and accessible name-bearing type. This becomes especially relevant today, when the diversity of the genus in Western Europe has proven to be far more diverse than previously assumed and some of these taxa are very close relatives of *B. occitanus*. Thus, we collected fresh specimens at the exact type locality (Souvignargues), selected a perfectly preserved adult male as the neotype and deposited it at IES (a public and well-recognized research institution), fulfilling **all** conditions and recommendations set by Article 75 of the Code for this nomenclatural act (CINZ, 1999: 86–89).

This taxon is currently monotypic, after all subspecies previously recognized have been either raised to species level or synonymized. The most recent case is *B. o. tridentatus*, which was described more than a century ago and by Franganillo (1918); the complete original description is extremely brief, as follows:

"***Buthus europaeus*** *L., var.* ***tridentatus*** *nov. Movable finger of chelicera with two series of teeth, in upper one three, in lower one two teeth. Caudal vesicle narrower than fifth segment. It lives in the surroundings of Javier (Navarra). August*" [originally in Latin and Spanish, translated into English here].

As seen above, neither the number of specimens nor their repository was declared in the original description and we could not find any supplementary sources where to gather this crucial information. This subspecies went unnoticed for 82 years, until Fet & Lowe (2000: 97) listed it, updated its taxonomic combination to *B. o. tridentatus* and regarded it as "*most likely invalid*". Last, Sousa *et al.* (2017) formally proposed its synonymy under *B. occitanus*, based on the subjective evidence that they only found specimens referable to this species in the left bank of the Ebro river, where Javier is located (although they did not list any specimens examined from this precise site).

During the present revision, we collected a representative series of 10 adult specimens from Javier (six males and four females, see details below in Material Examined section and fig. 29e). All were compared directly to the neotype and topotypes of *B. occitanus* and confirmed to be conspecific, thus, the synonymy proposed by Sousa *et al.* (2017) is upheld as correct. To stabilize nomenclature and permanently link the identity of *Buthus europaeus tridentatus* to an existing, representative and accessible name-bearing type, we designated a neotype herein fulfilling the same exact conditions as detailed above for *Scorpio occitanus* (see above).

There is at least one blatant misidentification of this species in the literature: the black and white photographs published by Lourenço & Vachon (2004: 82; figs. 1–2) and captioned therein textually as "*Buthus occitanus. Femelle du Département des Pyrénées Orientales*". It is shockingly obvious that the specimens depicted in that photographs (two adult females) do not belong even to the genus *Buthus*, but instead

to an Asian species of *Hottentotta* Birula, 1908, most likely *Hottentotta tamulus* (Fabricius, 1798) or *Hottentotta flavidulus* Teruel & Rein, 2008. The photographed specimens show two evident characters that are unambiguously diagnostic to distinguish *Hottentotta* from *Buthus*: the carapacial carinae not fused into a lyre-shaped configuration and the metasomal segment V with ventral lateral carinae evenly developed (i.e., lacking any lobes or noticeably larger denticles).

By the way, there is another grave error in the same paper. The male and female depicted in color photographs by Lourenço & Vachon (2004: 83; figs. 3–6) are not adults as declared in that text, but juveniles instead (most likely subadults). Their short-cylindrical pedipalp manus is unambiguously diagnostic to distinguish immatures from adults in both sexes of *B. occitanus* (e.g., compare these photographs to figs. 9–13 and 29 herein).

On the other hand, it has been repeatedly stated in the literature that the basal lobe/notch combination of pedipalp fingers is absent in *B. occitanus* (see, e.g., Lourenço & Vachon, 2004: 88; Rossi, 2012: 278), which is incorrect, however. The correct definition of this character is **obsolete**, i.e., both the lobe and notch are extremely weak, but still traceable in adults and subadults of both sexes.

Except for the northern area of the Ebro Basin through southeastern France (where it seems to be the only species present), all other European records of *B. occitanus* must be regarded as confirmation pending. As found during the present revision, most of them are actually erroneous and imply multiple species, many of them not even close relatives of *B. occitanus*.

MATERIAL EXAMINED (24 specimens: 8♂♂, 11♀♀, 5 juvenile ♀♀): **FRANCE**: LANGUEDOC-ROUSSILLON: Gard Department: Nimes District: Souvignargues (43°48'33"N / 04°08'44"E / 125 m a.s.l. / **type locality**); 23/September/2017; C. Turiel, M. Stockmann; 1♂ neotype (IES), 2♀♀, 2 juvenile ♀♀ (topotypes - RTO). PROVENCE-ALPES-CÔTE D'AZUR: Vaucluse Department: Avignon District: L'Isle-sur-la-Sorgue (43°55'07"N / 05°03'06"E / 150 m a.s.l.); X. Gaultier; 2♀♀, 1 juvenile ♀ (RTO). Var Department: Brignoles District: Gonfaron (43°20'52"N / 06°17'31"E / 241 m a.s.l.); 22/September/2017, C. Turiel, M. Stockmann; 1♂, 2♀♀, 2 juvenile ♀♀ (RTO). **SPAIN**: NAVARRA: Aoiz Municipality: Pyrenees: 1 km southwest of Javier Castle (42°35'00"N / 01°14'08"W / 554 m a.s.l.); 22/June/2016; C. Turiel; 1♂ (neotype of *Buthus europaeus tridentatus* - IES), 5♂♂, 4♀♀ (topotypes of *Buthus europaeus tridentatus* - RTO). Cintruéñigo Municipality: between Valverde and Cintruéñigo, along road N-113 (42°01'09"N / 01°50'03"W / 520 m a.s.l. / **new record**); 20/June/2016; C. Turiel; 1♀ (RTO).

Buthus alacanti sp. n.

Figures 14–15, 27, 30a, 34a. Tables VIII, XIII–XIV.

TYPE DATA. **SPAIN**: VALENCIA: Alicante Province: Sant Vicent del Raspeig Municipality: Costa Blanca: 2 km north of Sant Vicent del Raspeig (38°25'30"N / 00°31'40"W / 163 m a.s.l.); 26/October/2017; C. Domènech; 1♂ holotype (RTO), 1♀, 1 juvenile ♂, 2 juvenile ♀♀ paratopotypes (RTO).

ETYMOLOGY. The selected epithet is an indeclinable noun, directly taken from the Valencian word used locally to name the natives of Alicante, the province where the type locality is enclaved.

DIAGNOSIS. Adult size medium to moderately large for the genus (66 mm in male, 65 mm in female), male slightly larger than same size-class female. Coloration with base vivid yellow, largely immaculate; carapace with a large, dark median blotch; tergites with a dark univittate pattern all along; pedipalps, legs and metasoma almost immaculate. Sexual secondary dimorphism moderate in habitus (male slightly larger and more slender), conspicuous in pedipalps (manus oval and slightly wider than patella in male, swollen and much wider than patella in female) and moderate in metasoma (longer and heavier in males). Pedipalp chela with very few dark and pale macrosetae scattered all over; manus with all carinae obsolete to weak, smooth to coarsely costate; fingers long (movable finger/manus length ratio: 1.60 in male, 1.53 in female), both fingers with 12–13 (mode 13) principal rows of denticles, basal lobe/notch combination obsolete. Pectines with 32–33 teeth (mode 32) in males, 28/28 in females. Metasoma of male with size standard for the genus, but slightly heavier (see ratios in tab. XIII); dorsal lateral and lateral supramedian carinae obsolete to vestigially subcrenulate to smooth on segments II–IV, ventral submedians on II–III only feebly raised distally (stronger and coarser in females); intercarinal tegument coriaceous to glossy and minutely punctate, but irregularly, minutely granulose (especially dorsally and much more densely on V); setation sparse, with 2–4 pairs of dark macrosetae on most carinae (five pairs on lateral supramedians and ventral laterals of V). Telson vesicle globose in adults of both sexes, medium-sized in male, large in female.

DESCRIPTION (adult male holotype; figs. 14; tabs. VIII, XIII–XIV). **Coloration** (fig. 14) base vivid yellow, paler on chelicerae, pedipalps, legs, venter and telson. Chelicerae immaculate. Pedipalps immaculate, except for very subtle traces of tiny, faint, gray variegations on dorsal and external carinae of patella and manus; fingers light yellow, immaculate. Carapace almost immaculate, except for slight traces of faint infuscation under carinae and a large, diffuse dark brown blotch around median ocular tubercle; eyes and ocular tubercles black. Tergites almost immaculate, except for median carina deeply infuscate defining a univittate pattern (i.e., a narrow, median line) and three diffuse, faint gray spots on anterior part of I–VII (i.e., inconspicuous vestiges of a trivittate pattern). Pectines whitish to pale yellowish, immaculate, with basal portion and basal plate progressively darker due to heavier sclerotization. Sternopectinal region and sternites immaculate. Legs almost immaculate, only with carinae of patella very faintly, partially infuscate. Metasoma concolor (i.e., no segments conspicuously darker) and essentially immaculate, only with carinae very faintly infuscate. Telson immaculate, distal half of aculeus blackish.

Chelicerae. With dentition typical for the genus, teeth standard-sized and blunt. Tegument coriaceous, manus with minute granulation scattered all over and coarse, glossy granules irregularly arranged around dorsodistal depression. Setation very dense ventrally, but essentially lacking dorsally except for a patch of macrosetae at fixed finger base and few inconspicuous setae around dorsodistal depression of manus.

Pedipalps. Size standard for the genus (3.51 times longer than carapace). Femur essentially straight (very slightly bent inwards distally) and almost bare, only with 4–6 very short, inconspicuous dark setae, which are closely packed on ventrodistal position; all carinae moderate to weak and formed by medium-sized to coarse, isolated, glossy granules; intercarinal

tegument coriaceous, minutely punctate on glossier areas. Patella straight and almost bare; all carinae weak and subgranulose to costate, except for the dorsal internal, which is formed by medium-sized, weak, isolated glossy granules; intercarinal tegument coriaceous and minutely punctate on glossier areas, internal surface with several medium-sized denticles. Chela with manus oval (length/width ratio = 1.65, length/depth ratio = 1.47, median part widest), slightly wider than patella (ratio 1.02) and with very few dark and pale macrosetae scattered all over, all carinae obsolete to weak, smooth to coarsely costate, intercarinal tegument smooth, glossy and minutely punctate; fingers long (movable 1.60 times longer than underhand), slender and evenly curved, fixed finger with 13/12 principal rows of denticles plus 12/12 inner and 12/12 outer accessory denticles (coarser than principal denticles), movable finger with 13/13 principal rows of denticles plus 12/12 inner and 11/12 outer accessory denticles (coarser than principal denticles) and the standard apical subrow of three denticles (large terminal denticle not included), basal lobe/notch combination obsolete.

Carapace. As long as wide (length/width ratio = 1.00). Anterior margin very shallowly concave, with 3–4 pairs of dark macrosetae. Carinae with lyre-shaped configuration perfectly defined: anterior medians and superciliaries strong, fused into a spoon-shaped figure and formed by coarse, isolated, glossy granules; central laterals and posterior medians strong, fused into an S-shaped figure and formed by very coarse, isolated, glossy granules; lateral oculars and central medians strong, not fused and formed by coarse to very coarse, isolated, glossy granules; posterior laterals moderately strong and formed by coarse, isolated, glossy granules. Furrows: posterior laterals deep and wide, other furrows inconspicuous, obscured by remarkably depressed areas between adjacent carinae. Tegument coriaceous, minutely punctate on glossier areas and irregularly covered by moderately dense, medium-sized, glossy, conical granules largely concentrated along lateral areas. Median eyes large, separated by about twice the ocular diameter; lateral eyes much smaller and mostly concealed below a granulose carina.

Sternum. Type 1, very small and triangular, with single pair of long, dark macrosetae, plus a pair of tiny, pale setae. Tegument irregularly and densely granulose.

Genital operculum. With seven pairs of dark macrosetae and few inconspicuous minor setae. Valves roundly subtriangular and moderately separated; tegument shallowly convex, smooth and with fine to medium-sized, dense granulation along anterior and lateral margins. Genital papillae small and not protruding.

Pectines. Long (almost reaching trochanter-femur joint of leg IV) and narrowly rectangular, setation moderately dense and dark. Tooth count 33/33, teeth slightly swollen. Fulcra large and bulky, paraboloid to round. Basal middle lamella trapezoidal. Pre-pectinal plate heavily sclerotized, very short, wide and folded transversely; tegument coriaceous. Basal plate heavily sclerotized, wider than long, with two pairs of dark macrosetae; anterior margin straight, posterior margin very shallowly convex; tegument coriaceous, with fine granules scattered and three conspicuous depressions: one anteromedian (transverse, narrow and progressively much deeper anteromedially to become a triangular pit) and two laterals (large, oval and moderately deep).

Legs. Slender, with all carinae weak and subserrate to serrate except on femur, where moderate to strong and granulose to dentate. Intercarinal tegument coriaceous, minutely punctate on glossier areas, external surface of femur with many minute to medium-sized, glossy granules scattered. Bristlecombs very well developed on I–III. Tibial and pedal spurs large and thin. Claws long and moderately curved.

Mesosoma. Size and shape standard for the genus. Tergites coriaceous, minutely punctate and covered by dense, medium-sized, glossy granules more concentrated along lateral areas, lateral margins finely granulose to denticulate, posterior margin minutely granulose; carinae: median longitudinal straight, progressively longer and stronger backwards and formed by medium-sized to coarse, isolated, glossy granules, submedians anteriorly divergent, shallowly arcuate (I–VI) to inverted L-shaped (VII), progressively longer and stronger backwards and formed by medium-sized to coarse, isolated, glossy granules, laterals absent on I–VI, strong, shallowly arcuate and formed by coarse, isolated, glossy granules on VII. Sternites with some dark macrosetae scattered all over (denser on III and along transverse midline of IV–VII); lateral margins of all sternites finely crenulate, posterior margin of all sternites minutely granulose; carinae: submedians very weak to moderate and progressively stronger backwards, obsolete on III (smooth, subcostate and anteriorly convergent), present only on posterior half of IV–V (smooth, costate and parallel), present only on posterior half of VI (moderate, finely subcrenulate and very slightly divergent anteriorly) and almost complete on VII (subcostate and parallel), laterals moderate but progressively stronger backwards, absent on III, present only on posterior half of IV–VI (smooth, costate and slightly convergent anteriorly) and present only on median portion on VII (crenulate and parallel); tegument coriaceous to glossy and minutely punctate, densely covered by minute granules on lateral areas; spiracles very long and slit-like; sternite V with median smooth patch indistinct or absent.

Metasoma. Size standard for the genus (4.92 times longer than carapace), but slightly heavier, progressively narrower and lower distally, with segment V both narrowest and lowest. Segment I with ten complete carinae, II–IV with eight, V with five: dorsal laterals very weak and crenulate on I, vestigial to weak and subcrenulate to crenulate on II, obsolete to vestigial and subcrenulate to smooth on III–IV, absent on V; lateral supramedians very weak and subcrenulate to crenulate on I–III, very weak and granulose on IV, obsolete to weak and subgranulose on V; lateral inframedians moderate and coarsely crenulate, complete on I, present on distal half of II and distal third of III, absent on IV–V; ventral laterals weak and subcrenulate on I–III, vestigial and subcrenulate on IV, finely but irregularly serratocrenulate to acutely lobate on V (with about 3–4 lobes much larger than the others); ventral submedians weak and subcostate on I, moderate, progressively stronger backwards and subserrate to serratocrenulate on II–III (only feebly raised distally), weak and serratocrenulate on IV, absent on V (but indicated by an incomplete but raised row of serrate granules on basal two-thirds); ventral median absent on I–IV, moderately strong and finely but irregularly subserrate on V (bifurcate on distal half). Intercarinal tegument coriaceous to glossy and minutely punctate, but irregularly, minutely granulose (especially dorsally and much more densely on V); dorsal furrow complete, wide and shallow on all segments; setation sparse, with 2–4 pairs of dark macrosetae on most carinae (five pairs on lateral supramedians and ventral laterals of V).

Telson. Vesicle large, globose (length/width ratio = 1.18, width/depth ratio = 1.07), with eight pairs of dark macrosetae and several minor setae scattered all over; tegument glossy and minutely punctate, with many coarse but obsolete, glossy granules scattered ventrally and laterally; ventral median carina obsolete, as are two accessory pairs of carinae (ventral laterals and lateral supramedians?), subaculear tubercle absent. Aculeus shorter than vesicle (ratio = 0.86), sharp and shallowly curved.

FEMALE (adult paratopotype; figs. 15; tabs. VIII, XIII–XIV). Sexual secondary dimorphism conspicuous, differing from described male by: **1)** size slightly smaller (64.9 mm); **2)** dark patterns of pedipalps, carapace and tergites more conspicuous; **3)** pedipalp manus more robust, subglobose (length/width ratio = 1.45, length/depth ratio = 1.41) and wider compared to patella (ratio = 1.27); **4)** carapace wider than long (length/width ratio = 0.89); **5)** mesosoma wider, with lateral sides markedly convex; **6)** pre-pectinal plate reduced to a tiny transverse sclerite, slightly invaginated into the membrane; **7)** genital papillae absent; **8)** pectines smaller and narrower, with lower tooth count (28/28); **9)** metasoma with all carinae stronger (especially the ventral submedians on segments II–III and ventral laterals on V, which are more strongly and coarsely lobate); **10)** telson with vesicle wider (length/width ratio = 1.06, width/depth ratio = 0.97) and aculeus slightly shorter (ratio = 0.93).

VARIATION. The type series is remarkably homogeneous in coloration. The only noteworthy difference is that juveniles have base color paler and slightly greener, and the dark pattern slightly more developed.

Number of principal rows of denticles in the five available specimens varied from 12–13 (mode 13) on both fixed and movable fingers. Specimens with asymmetrical counts between fixed/movable fingers and/or left/right pedipalps were the rule by far; only a single specimen (20.0%) had the same count (13) in all four fingers.

Pectinal tooth counts (tab. XIV) were fixed in each sex amongst the four paratopotypes: two juvenile males with 32/32, one adult and one juvenile females with 28/28.

COMPARISON. This species is most similar to *B. occitanus*, being the only Western European congeners that share the same diagnostic combination of four key adult characters: **1)** coloration very pale, with a dark univittate pattern all along tergites; **2)** pedipalp chela much narrower in males than females; **3)** pedipalp fingers with lobe/notch combination obsolete; **4)** metasomal segments II–IV with ventromedian carinae not strongly and coarsely lobed.

But adults of *B. alacanti* **sp. n.** can be distinguished safely from it by: **1)** male slightly larger than same size-class female; **2)** male with pedipalp femur and patella remarkably less setose and with carinae much weaker; **3)** male with pedipalp manus markedly more robust (oval in shape) slightly wider than patella and with carinae stronger; **4)** telson with vesicle much larger and more globose; **5)** carapace and tergites with carinae stronger and coarser; **6)** male metasoma longer, heavier and with carinae weaker; **7)** female metasoma shorter, heavier and remarkably more setose. As opposite, in *B. occitanus* males are smaller than same size-class female, have pedipalps with femur and patella markedly more setose and more strongly carinate, and manus much slenderer, narrower than patella and with carinae weaker, and have metasoma shorter and slenderer, while females have metasoma longer, slenderer and markedly less setose, and both sexes have carapace and tergites with carinae weaker and finer, and telson vesicle much smaller and less globose.

All the differences mentioned above are very easy to appreciate even to unaided eye, e.g., compare figs. 14–15 to 9–13 and see tabs. XIII–XIV.

DISTRIBUTION (fig. 27). This species is known only from the type locality, which is enclaved in the Mediterranean coast, ca. 8 km inland.

ECOLOGICAL NOTES. According to the collecting data kindly supplied by the collector (Carles Domènech, personal communication), this is a lapidicolous scorpion that digs short burrows and scrapes in clay soil under limestone rocks (fig. 30a). The vegetation is completely anthropogenic, with isolated trees, dense low bushes and sparse grass understorey (fig. 34a).

REMARKS. There are multiple records of *B. occitanus* from Alicante, e.g., Lourenço & Vachon (2004: 92–93; fig. 43) and Rossi (2012: 276–279; fig. 7); most, if not all, may actually involve *B. alacanti* **sp. n.** This could also be the case for the specimen recently found in Ibiza (Baleares Islands) and recorded by Pons & Cardona (2019) as *B. occitanus*. All these records must be regarded as confirmation pending and their specific identity uncertain, until specimens become available for taxonomic comparison.

Buthus baeticus sp. n.

Figures 16–18, 27, 30c, 35a–b. Tables IX, XIII–XIV

TYPE DATA. SPAIN: ANDALUCÍA: Sevilla Province: Morón de la Frontera Municipality: 3 km south of Morón de la Frontera, along road A-361 (37°04'43"N / 05°30'52"W / 217 m a.s.l.); 12/June/2018; C. Turiel; 1♂ holotype (RTO), 1♂, 1♀, 2 juvenile ♂♂ paratypes (RTO). Málaga Province: Sierra de Yeguas Municipality: Sierra de los Caballos: Navahermosa, along road A-365 (37°09'33"N / 04°50'59"W / 487 m a.s.l.); 11/June/2018; C. Turiel; 2♂♂, 5♀♀, 3 juvenile ♀♀ paratopotypes (RTO).

ETYMOLOGY. The selected epithet was taken from the Latin toponym *Baetica*, an ancient Roman Province that existed from 29 BC through 711 AD, and largely matches modern Andalusia. The name alludes to the general area where this species occurs.

DIAGNOSIS. Adult size moderately large for the genus (64–69 mm in males, 59–70 mm in females), males slightly smaller than same size-class females. Coloration with base light yellowish brown; carapace and tergites with a dark trivittate pattern all along; carapace, tergites and metasoma with all carinae deeply infuscate; pedipalps, legs, venter and metasoma essentially immaculate. Sexual secondary dimorphism inconspicuous in habitus (males slightly smaller and slenderer), inconspicuous in pedipalps (manus very similar in both sexes, oval slender and wider than patella) and inconspicuous in metasoma (very similar in both sexes, only segments I–II slightly slenderer in males). Pedipalp chela with only a few dark macrosetae scattered on ventral surface; manus with all carinae absent to obsolete, smooth; fingers long (movable finger/manus length ratio: 1.67–1.71 in males, 1.65–1.66 in females), both fingers with 12–14 (mode 13) principal rows of

denticles, basal lobe/notch combination weak. Pectines with 31–33 teeth (mode 32–33) in males, 27–30 (mode 28–29) in females. Metasoma of male with size and shape standard for the genus (see ratios in tab. XIII); dorsal lateral and lateral supramedian carinae weakly crenulate to subgranulose on segments II–IV, ventral submedians on II–III only feebly raised distally (stronger and coarser in females); intercarinal tegument coriaceous to glossy (forming a reticulate pattern) and minutely punctate, but irregularly, minutely granulose to finely granulose on IV (dorsally and dorsolaterally only) and V (all surfaces); setation sparse, with 2–3 pairs of dark macrosetae on almost all carinae (four pairs on lateral supramedians and ventral laterals of V). Telson vesicle medium-sized and subglobose in adults of both sexes.

DESCRIPTION (adult male holotype; figs. 16, 18a; tabs. IX, XIII–XIV). **Coloration** (figs. 16, 18a) base light yellowish brown, paler on chelicerae, pedipalps, legs, venter and telson. Chelicerae almost immaculate, except for slight traces of irregular, dark variegations dorsodistally on manus. Pedipalps immaculate, except for a single, tiny, very faint, gray irregular spot on external surface of manus; fingers yellow, immaculate. Carapace with all carinae deeply infuscate, irregularly interconnected by dark brown reticulations and with a pair of diffuse arrowhead-shaped, symmetric dark brown spots flanking median eyes; eyes and ocular tubercles black. Tergites with all carinae and coarse granulation deeply infuscate and with symmetric dark brown spots on lateral areas, defining altogether a trivittate pattern (i.e., a narrow, median solid line plus two broad, variegated lateral stripes, all three interconnected by dark reticulations). Pectines pale yellowish to whitish, immaculate, with basal portion and basal plate progressively darker due to heavier sclerotization. Sternopectinal region and sternites immaculate. Legs with carinae of femur faintly infuscate, distal part of femur and basal part of patella faintly, irregularly infuscate. Metasoma concolor (i.e., no segments conspicuously darker) and essentially immaculate, only with carinae variably infuscate (progressively darker ventrally and posteriorly). Telson immaculate, distal half of aculeus blackish.

Chelicerae. With dentition typical for the genus, teeth standard-sized and sharp. Tegument coriaceous, manus with minute granulation scattered all over and medium-sized, glossy granules irregularly arranged around dorsodistal depression. Setation very dense ventrally, but essentially lacking dorsally except for a patch of macrosetae at fixed finger base and few inconspicuous setae around dorsodistal depression of manus.

Pedipalps. Size standard for the genus (3.67 times longer than carapace). Femur essentially straight (very slightly bent inwards distally) and with some dark macrosetae, which are mostly concentrated along ventrodistal edge; all carinae moderate and formed by medium-sized to coarse, isolated, glossy granules; intercarinal tegument coriaceous, minutely punctate on glossier areas and with sparse minute granulation scattered dorsally. Patella straight with only a few dark macrosetae scattered all over; all carinae weak to obsolete and smooth to subgranulose, the dorsal median and dorsal internal formed by very weak, coarse, isolated, glossy granules; intercarinal tegument coriaceous and minutely punctate on glossier areas, internal surface with only a few weak denticles. Chela with manus oval (length/width ratio = 1.50, length/depth ratio = 1.42, median part widest), slightly wider than patella (ratio 1.11) and with only a few dark macrosetae scattered on ventral surface, all carinae absent to obsolete, smooth, intercarinal tegument smooth, glossy and minutely punctate; fingers long (movable 1.72 times longer than underhand), slender, evenly curved and densely setose, fixed finger with 13/12 principal rows of denticles plus 13/14 inner and 12/12 outer accessory denticles (coarser than principal denticles), movable finger with 13/13 principal rows of denticles plus 12/12 inner and 12/12 outer accessory denticles (coarser than principal denticles) and the standard apical subrow of three denticles (large terminal denticle not included), basal lobe/notch combination weak.

Carapace. Slightly wider than long (length/width ratio = 0.96). Anterior margin very shallowly concave, with five pairs of dark macrosetae. Carinae with lyre-shaped configuration perfectly defined: anterior medians and superciliaries strong, fused into a spoon-shaped figure and formed by coarse, isolated, glossy granules; central laterals and posterior medians strong, fused into an S-shaped figure and formed by coarse, isolated, glossy granules; lateral oculars and central medians strong, not fused and formed by medium-sized, tuberculate, isolated, glossy granules; posterior laterals moderate and formed by medium-sized, isolated, glossy granules. Furrows: posterior laterals deep and wide, other furrows inconspicuous, obscured by remarkably depressed areas between adjacent carinae. Tegument coriaceous, minutely punctate and irregularly covered by moderately dense, medium-sized to small, glossy, tuberculate granules largely concentrated along lateral areas. Median eyes large, separated by about twice the ocular diameter; lateral eyes much smaller and mostly concealed below a granulose carina.

Sternum. Type 1, very small and triangular, with a single pair of dark macrosetae. Tegument coriaceous, with fine granulation scattered.

Genital operculum. With 9–10 pairs of dark macrosetae and some inconspicuous minor setae. Valves roundly subtriangular and moderately separated; tegument convex, smooth and with fine, dense granulation along anterior and lateral margins. Genital papillae large, narrow and not protruding.

Pectines. Very long (almost reaching trochanter-femur joint of leg IV) and narrowly rectangular, setation moderately dense and dark. Tooth count 33/33, teeth not swollen. Fulcra large and bulky, paraboloid to round. Basal middle lamella trapezoidal. Pre-pectinal plate heavily sclerotized, very short, wide and folded transversely; tegument coriaceous. Basal plate heavily sclerotized, wider than long, with three dark macrosetae; anterior margin straight, posterior margin very shallowly convex; tegument coriaceous, with three conspicuous depressions: one anteromedian (transverse, narrow and progressively much deeper medially to become a triangular pit) and two laterals (large, oval and moderately deep).

Legs. Slender, with all carinae obsolete to weak and subcrenulate to subserrate except on femur, where weak to moderate and subcrenulate to serrate. Intercarinal tegument coriaceous to glossy, minutely punctate, external surface of femur with many minute to small, glossy granules scattered. Bristlecombs very well developed on I–III. Tibial and pedal spurs large and thin. Claws long and moderately curved.

Mesosoma. Size and shape standard for the genus. Tergites coriaceous, minutely punctate and covered by dense, fine to medium-sized, conical to tuberculate granules largely concentrated along lateral areas, lateral margins finely dentate, posterior margin minutely granulose; carinae: median longitudinal straight, progressively longer and stronger backwards (except

on VII, where longer but weaker) and formed by medium-sized, tuberculate, isolated, glossy granules, submedians anteriorly divergent, shallowly arcuate (III–VI) to inverted L-shaped (VII), progressively longer and stronger backwards and formed by medium-sized to coarse, isolated, glossy granules, laterals absent on I–VI, moderate, shallowly arcuate and formed by coarse, isolated, glossy granules on VII. Sternites with dark macrosetae scattered all over (denser on III and along transverse midline of IV–VII); lateral margins of all sternites finely crenulate, posterior margin of all sternites minutely denticulate; carinae: submedians obsolete to moderate and progressively stronger backwards, indistinct on III, present only on posterior half of IV–V (smooth and parallel), present only on posterior half of VI (weak, coarsely subcostate and subparallel) and almost complete on VII (moderate, subcrenulate and subparallel), laterals moderate but progressively stronger backwards, absent on III, present only on posterior half of IV–VI (smooth, coarsely subcostate and parallel) and present only on median portion on VII (subcrenulate and parallel); tegument coriaceous to glossy and minutely punctate, with vestiges of minute granules on lateral areas; spiracles very long and slit-like; sternite V with median smooth patch indistinct or absent.

Metasoma. Size and shape standard for the genus (4.86 times longer than carapace), evenly narrower and lower distally, with segment V both narrowest and lowest. Segment I with ten complete carinae, II–IV with eight, V with five: dorsal laterals moderate and crenulate on I, moderately weak and crenulate on II–III, weak and subgranulose on IV, absent on V; lateral supramedians moderately weak and crenulate on I–IV, vestigial to moderately weak and subgranulose on V; lateral inframedians strong and coarsely crenulate, complete on I, present on distal two-thirds of II and distal half of III, absent on IV–V; ventral laterals moderately weak and subcostate to subcrenulate on I–II, moderate and subcrenulate to crenulate on III–IV, finely but irregularly serratocrenulate to acutely lobate on V (with 2–3 lobes much larger than the others); ventral submedians moderately weak and finely subcostate on I, moderate, progressively stronger backwards and finely subserrate to serratocrenulate on II–III (only feebly raised distally), moderately strong and finely serratocrenulate on IV, absent on V (but indicated by an incomplete but raised row of serrate granules on basal two-thirds); ventral median absent on I–IV, moderate and finely serrate on V (bifurcate on extreme distal part). Intercarinal tegument coriaceous to glossy (forming a reticulate pattern) and minutely punctate, but irregularly, minutely to finely granulose on IV (dorsally and dorsolaterally only) and V (all surfaces); dorsal furrow complete, wide and shallow on all segments; setation sparse, with 2–3 pairs of dark macrosetae on most carinae (four pairs on lateral supramedians and ventral laterals of V).

Telson. Vesicle medium-sized, subglobose (length/width ratio = 1.29, width/depth ratio = 0.98), with six pairs of dark macrosetae and several inconspicuous minor setae scattered all over; tegument glossy and minutely punctate, with many vestiges of fine to medium-sized but obsolete, glossy granules scattered ventrally and laterally; ventral median carina obsolete, as are two accessory pairs of carinae (ventral laterals and lateral supramedians?), subaculear tubercle absent. Aculeus shorter than vesicle (ratio = 0.80), sharp and shallowly curved.

FEMALE (adult paratopotype; figs.17, 18c; tabs. IX, XIII–XIV). Sexual secondary dimorphism very tenuous, differing from described male by: **1)** size slightly larger (58.8–70.3 mm); **2)** pre-pectinal plate reduced to a tiny transverse sclerite, slightly invaginated into the membrane; **3)** genital papillae absent; **4)** pectines smaller and narrower, with lower tooth count (27–30); **5)** metasoma with all carinae slightly stronger (especially the ventral submedians on segments II–III and ventral laterals on V); **6)** telson with vesicle wider (length/width ratio = 1.23–1.28, width/depth ratio = 1.11–1.13) and aculeus slightly longer (ratio = 0.80–0.86).

VARIATION. Specimens from the two localities studied herein are remarkably homogeneous in morphology (fig. 18), except as noted below.

Adult size varied from 63.8–68.8 mm in males and 58.8–70.3 mm in females for the pooled sample (tab. IX). There is no apparent difference between both populations.

Number of principal rows of denticles varied from 12–14 (mode 13) on both fixed and movable fingers. Specimens with asymmetrical counts between fixed/movable fingers and/or left/right pedipalps were slightly predominant; six out of 15 specimens (40.0%) had the same count in all four fingers: five with 13 rows (one adult male topotype, one adult male, one adult female and two juvenile females from Navahermosa), plus one with 14 rows (an adult female from Navahermosa). As recorded above for adult size, no differences were detected between both populations.

Pectinal tooth counts (tab. XIV) varied from 31–33 in males and 27–30 in females, with modes of 32–33 in the former sex and 28–29 in the latter. Single-tooth asymmetry was a minority occurrence: 2 out of 6 males and 4 out of 9 females (33.3% and 44.4%, respectively). Two specimens (13.3%) had two-tooth asymmetry (both juvenile females with 27/29 and 28/30) and no bigger differences in tooth count were observed. Again, no difference was evident between both populations.

COMPARISON. The great reduction of sexual secondary dimorphism (especially in pedipalp chela and metasomal segments, which are very similar in both sexes) is a reliable character that unambiguously distinguishes adults of *B. baeticus* **sp. n.** from all other Western European described congeners very easily to unaided eye. Amongst them, it is most similar to *B. ibericus*; both species live in close proximity (see fig. 27) and share the same diagnostic combination of two key adult characters: **1)** pedipalp chela heavier in males than females; **2)** metasomal segments II–IV with ventromedian carinae not strongly and coarsely lobed.

But adults of *B. baeticus* **sp. n.** can be safely distinguished from this species by: **1)** tergites with the trivittate pattern clearly defined; **2)** pedipalps slenderer and with carinae stronger; **3)** pedipalp fingers with basal lobe/notch combination much weaker; **4)** pectinal tooth counts higher; **5)** metasoma remarkably slenderer, with carinae stronger and intercarinal spaces flat; **6)** telson vesicle smaller and remarkably less globose. As opposite, in *B. ibericus* tergites have the trivittate pattern usually blurred, pedipalps and metasoma heavier and with carinae weaker, the latter also with intercarinal spaces swollen, pedipalp fingers with basal lobe/notch combination strong, pectinal tooth counts lower (non-overlapping in females, only slightly so in males) and telson vesicle larger and more globose.

All the differences mentioned above are very easy to appreciate even to unaided eye, e.g., compare figs. 16–18 to 4–6 and see tabs. XIII–XIV.

DISTRIBUTION (fig. 27). This species is known only from two nearby localities, separated by ca. 60 km air-distance. Both are enclaved in the northern foothills and lower slopes (below 500 m a.s.l.) of the Subbetic Range, along the border between Sevilla and Málaga Provinces.

ECOLOGICAL NOTES. This is a lapidicolous scorpion, which digs short burrows and scrapes in clay soil under rocks, both limestone and dolomitic conglomerates (fig. 30c). The vegetation is the anthropogenic "garriga" and "dehesa", which is composed of isolated low trees and bushes evenly scattered on low, grassy areas (fig. 35a–b).

Some specimens were found on both localities right after final ecdysis (fig. 30c).

Amongst the 10 specimens from Navahermosa, four adult females (40.0%) were infested with parasitic Acari, whose larvae were firmly attached to the intersegmental membranes of mesosoma. Infestation was extreme in almost all of them (fig. 18d–e), i.e., except for one that had a single larva between tergites, the other three had the following number of larvae each: 338 (262 between tergites, 76 between sternites), 93 (87 between tergites, 6 between sternites) and 38 (37 between tergites, 1 between sternites). The larvae could be readily seen to unaided eye, but were so closely packed that an accurate count was not easy to get even under the microscope. The larvae look very similar to the one recorded herein on a specimen of *B. ibericus* (see above, in the section pertinent to that species).

REMARKS. Lourenço *in* Lourenço & Vachon (2004: 82) stated the following: "*Some years before his death, M. Vachon had shared with me his opinion about a population of Buthus occurring in southern Spain, in Andalusia (Sevilla), which according to him could correspond to a species distinct from B. occitanus*" [originally in French, translated into English here]. Although implicitly associated therein to *B. ibericus* (which was described in the same paper also from Andalusia, but from Huelva), this population may be referable instead to *B. baeticus* **sp. n.**

Buthus delafuentei sp. n.

Figures 19–20, 27, 30b, 34b. Tables X, XIII–XIV

TYPE DATA. **SPAIN**: ANDALUCÍA: Huelva Province: Hinojos Municipality: Depresión Bética: Pinos de Hinojos (37°16' 54"N / 06°24'11"W / 78 m a.s.l.); 4/July/2019; 1♂ holotype (RTO), 3♂♂, 3♀♀ paratopotypes (RTO).

ETYMOLOGY. The selected epithet is a patronym honoring the great Spanish naturalist and documentary maker Félix Samuel Rodríguez de la Fuente (14/March/1928–14/March/1980), who tragically died in a plane crash on his 52th birthday, while filming in Alaska. His wildlife documentaries inspired a complete generation of biologists (ours) to observe and eventually study nature. A crucial part of his work was devoted to Doñana National Park, just south to the site where this new species was discovered.

DIAGNOSIS. Adult size moderately large for the genus (65–72 mm in males, 58–66 mm in females), males larger than same size-class females. Coloration with base vivid yellow to pale yellowish brown; carapace and tergites with a dark trivittate pattern all along; carapace, tergites and metasoma with all carinae deeply infuscate; pedipalps, legs, venter and metasoma essentially immaculate. Sexual secondary dimorphism very conspicuous in habitus (males larger and remarkably more slender), pedipalps (manus swollen and much wider than patella in males, oval slender and narrower than patella in females) and metasoma (much longer and slenderer in males). Pedipalp chela with only a few dark macrosetae scattered on ventral surface; manus with all carinae absent to obsolete, smooth; fixed finger with 12–13 principal rows of denticles (mode not defined), movable with 13, basal lobe/notch combination strong. Pectines with 31–34 teeth in males and 26–28 in females (mode not defined in either sex). Metasoma of male remarkably longer and slenderer than standard for the genus (see ratios in tab. XIII); dorsal lateral and lateral supramedian carinae moderately serratocrenulate to granulose on segments II–IV, ventral submedians on II–III only feebly raised distally (slightly stronger in females); intercarinal tegument coriaceous, but irregularly, minutely to finely granulose (especially dorsally and much more densely on V); setation sparse, with 2–3 pairs of dark macrosetae on almost all carinae (four pairs on ventral laterals of V). Telson vesicle large and globose in adults of both sexes.

DESCRIPTION (adult male holotype; figs. 19, 30b; tabs. X, XIII–XIV). **Coloration** (figs. 19, 30b) base vivid yellow, paler on chelicerae, pedipalps, legs, venter and telson. Chelicerae almost immaculate, except for a tiny, faint, irregular dorsodistal gray spot. Pedipalps almost immaculate, only with carinae of patella vestigially infuscate and very slight traces of dark variegations on external surface of manus; fingers yellow, immaculate. Carapace with all carinae blackish, irregularly interconnected by small, dark brown reticulations and with a pair of arrowhead-shaped, symmetric dark brown spots flanking median eyes; eyes black, ocular tubercles faintly infuscate. Tergites with all carinae and coarse granulation deeply infuscate and with diffuse, symmetric dark brown to blackish spots on lateral areas, defining altogether a clearly trivittate pattern (i.e., a narrow, median solid line plus two broad, variegated lateral stripes, all three well separated). Pectines whitish, with basal portion and basal plate progressively darker due to heavier sclerotization. Legs, sternopectinal region and sternites immaculate. Metasoma concolor (i.e., no segments conspicuously darker) and essentially immaculate, only with ventral lateral, ventral submedian and ventral median carinae faintly to moderately infuscate. Telson immaculate, distal half of aculeus blackish.

Chelicerae. With dentition typical for the genus, teeth standard-sized and blunt. Tegument glossy and minutely punctate, dorsodistal portion of manus with minute granulation scattered and coarse, glossy granules irregularly arranged around dorsodistal depression. Setation very dense ventrally, but essentially lacking dorsally except for a patch of macrosetae at fixed finger base and few inconspicuous setae around dorsodistal depression of manus.

Pedipalps. Size standard for the genus (3.69 times longer than carapace). Femur essentially straight (very slightly bent inwards distally) and with some dark macrosetae, which are mostly concentrated along ventrodistal edge; all carinae strong and formed by medium-sized, isolated, glossy granules; intercarinal tegument coriaceous, minutely punctate on glossier areas and with minute granulation scattered dorsally. Patella straight and with only a few dark macrosetae scattered all over; all carinae moderate to strong and costate to subgranulose except for the dorsal median and dorsal internal, which are formed by medium-sized, isolated, glossy granules;

intercarinal tegument coriaceous and minutely punctate on glossier areas, internal surface with several medium-sized denticles. Chela with manus oval and bulky (length/width ratio = 1.41, length/depth ratio = 1.31, median part widest), much wider than patella (ratio 1.39) and with only a few dark macrosetae scattered on ventral surface, all carinae absent to obsolete, smooth, intercarinal tegument smooth, glossy and minutely punctate; fingers long (movable 1.49 times longer than underhand), slender and evenly curved, fixed finger with 12/12 principal rows of denticles plus 12/12 inner and 11/11 outer accessory denticles (much coarser than principal denticles), movable finger with 13/13 principal rows of denticles plus 12/12 inner and 12/13 outer accessory denticles (much coarser than principal denticles) and the standard apical subrow of three denticles (large terminal denticle not included), basal lobe/notch combination strong.

Carapace. Very slightly wider than long (length/width ratio = 0.99). Anterior margin almost straight, with 5–6 pairs of dark macrosetae. Carinae with lyre-shaped configuration perfectly defined: anterior medians and superciliaries strong, fused into a spoon-shaped figure and formed by medium-sized, isolated, glossy granules; central laterals and posterior medians strong, fused into an S-shaped figure and formed by medium-sized, isolated, glossy granules; lateral oculars and central medians strong, not fused and formed by medium-sized, isolated, glossy granules; posterior laterals weak and formed by fine, isolated, glossy granules. Furrows: posterior laterals deep and wide, other furrows inconspicuous, obscured by remarkably depressed areas between adjacent carinae. Tegument coriaceous, minutely punctate and irregularly covered by moderately dense, fine, glossy, conical to tuberculate granules largely concentrated along lateral areas. Median eyes large, separated by about twice the ocular diameter; lateral eyes much smaller and mostly concealed below a granulose carina.

Sternum. Type 1, very small and triangular, with two pairs of dark macrosetae. Tegument finely and densely granulose.

Genital operculum. With 6–8 pairs of dark macrosetae and some inconspicuous minor setae. Valves roundly subtriangular and widely separated; tegument medially depressed, coriaceous and with fine to medium-sized, dense granulation along anterior part and lateral margins. Genital papillae very large, thick and exaggeratedly protruding.

Pectines. Long (but not reaching trochanter-femur joint of leg IV) and narrowly rectangular, setation moderately dense and dark. Tooth count 30/31, teeth not swollen. Fulcra large and bulky, paraboloid to round. Basal middle lamella trapezoidal. Pre-pectinal plate heavily sclerotized, very short, wide and folded transversely; tegument coriaceous. Basal plate heavily sclerotized, about as long as wide, with 1–2 pairs of dark macrosetae; anterior margin straight, posterior margin very shallowly convex; tegument coriaceous, with three conspicuous depressions: one anteromedian (transverse, narrow and progressively much deeper medially to become a pit) and two laterals (large, oval and shallow).

Legs. Slender, with all carinae weak and costate except on femur, where moderate and granulose. Intercarinal tegument coriaceous, minutely punctate, external surface of femur with many minute to small, glossy granules scattered. Bristlecombs well developed on I–III. Tibial and pedal spurs large and thin. Claws long and shallowly curved.

Mesosoma. Remarkably slenderer than standard for the genus. Tergites coriaceous and covered by dense, fine, tuberculate granules largely concentrated along lateral areas, lateral and posterior margins densely and finely tuberculate; carinae: median longitudinal straight, progressively longer and stronger backwards and formed by fine, isolated, glossy granules, submedians anteriorly divergent, shallowly arcuate (I–VI) to shallowly S-shaped (VII), progressively longer and stronger backwards and formed by fine, isolated, glossy granules, laterals absent on I–VI, strong, shallowly arcuate and formed by medium-sized, isolated, glossy granules on VII. Sternites with some dark macrosetae scattered all over (denser on III); lateral margins of all sternites finely serrate to denticulate, posterior margin of all sternites minutely denticulate; carinae: submedians weak but progressively stronger backwards, complete on III (smooth and anteriorly convergent into an inverted V-shape), present only on posterior half of IV–VI (smooth, costate and parallel) and almost complete on VII (subcrenulate and parallel, but anteriorly convergent), laterals moderate but progressively stronger backwards, absent on III, present only on posterior half of IV–VI (smooth, costate and parallel) and present only on median portion on VII (subcrenulate and parallel); tegument coriaceous to glossy and minutely punctate, densely covered by minute granules on lateral areas; spiracles very long and slit-like; sternite V with median smooth patch indistinct or absent.

Metasoma. Longer and remarkably slenderer than standard for the genus (5.05 times longer than carapace), progressively narrower and lower distally, with segment V both narrowest and lowest. Segment I with ten complete carinae, II–IV with eight, V with five: dorsal laterals moderate but progressively weaker backwards, finely serratocrenulate on I, finely serratocrenulate to subcrenulate on II, finely subgranulose on III–IV and absent on V; lateral supramedians moderate, finely serratocrenulate on I–IV and finely granulose on V; lateral inframedians moderate and finely serratocrenulate, complete on I, present only on distal third of II and distal fifth of III, absent on IV–V; ventral laterals moderate, finely subcostate to subcrenulate on I, finely subcrenulate to serratocrenulate on II, finely serratocrenulate III, finely crenulate on IV, finely but irregularly serrate to acutely lobate on V (with only one lobe much larger than the others); ventral submedians moderate and finely subcostate to subcrenulate on I, moderate to strong, progressively stronger backwards and finely subserrate to serrate on II–III (only feebly raised distally), moderate to strong and finely serrate on IV, absent on V (but indicated by an incomplete but raised row of serrate granules on basal two-thirds); ventral median absent on I–IV, strong and finely but irregularly serrate on V (bifurcate on more than distal half). Intercarinal tegument coriaceous, but irregularly, minutely to finely granulose (especially dorsally and much more densely on V); dorsal furrow complete but inconspicuous on all segments; setation sparse, with 2–3 pairs of dark macrosetae on almost all carinae (four pairs on dorsal laterals of IV).

Telson. Vesicle large, globose (length/width ratio = 1.31, width/depth ratio = 1.09), with five pairs of dark macrosetae and several inconspicuous minor setae scattered all over; tegument glossy, with many coarse but obsolete, glossy granules scattered ventrally and laterally; ventral median carina obsolete, as are two accessory pairs of carinae (ventral laterals and lateral supramedians?), subaculear tubercle absent. Aculeus shorter than vesicle (ratio = 0.78), sharp and moderately curved.

FEMALE (adult paratopotypes; figs. 20; tabs. X, XIII–XIV). Sexual secondary dimorphism very conspicuous, differing from described male by: **1)** size smaller (58.1–66.3 mm); **2)** pedipalp manus much slenderer (length/width ratio = 1.76–1.80, length/depth ratio = 1.55–1.56) and narrower than patella; **3)** mesosoma shorter and wider, with lateral sides markedly convex; **4)** pre-pectinal plate reduced to a tiny transverse sclerite, slightly invaginated into the membrane; **5)** genital papillae absent; **6)** pectines smaller and narrower, with much lower tooth counts (26–28); **7)** metasoma remarkably shorter (4.37–4.48 times longer than carapace), narrower distally but not evenly (segment IV narrowest) and with carinae slightly stronger.

VARIATION. Specimens from the type series are remarkably homogeneous in morphology, except as noted below.
Adult size varied as follows: 64.8–72.3 mm in males, 58.1–66.3 mm in females (tab. X).

Number of principal rows of denticles in the seven available specimens was always 13/13 on movable finger, but varied from 12–13 on fixed finger, usually symmetrical between both pedipalps of the same specimen, i.e., all have either 12/12 or 13/13, except one specimen of each sex with 13/12.

Pectinal tooth counts (tab. XIV) varied in the six paratopotypes as follows: males with 32/31, 32/32 and 34/34, females with 26/26, 26/28 and 27/28.

COMPARISON. The exaggerate expression of sexual secondary dimorphism (especially in pedipalp chela and metasomal segments) is a reliable character that distinguishes adults of *B. delafuentei* **sp. n.** from all other Western European described congeners very easily to unaided eye. Amongst them, it is most similar to *B. ibericus* and *B. baeticus* **sp. n.**; all three species live in close proximity (see fig. 27) and share the same diagnostic combination of three key adult characters: **1)** pedipalp chela heavier in males than females; **2)** pedipalp fingers with lobe/notch combination developed; **3)** metasomal segments II–IV with ventromedian carinae not strongly and coarsely lobed.

But adults of *B. delafuentei* **sp. n.** can be safely distinguished from both species by: **1)** sexual secondary dimorphism much more conspicuous; **2)** males larger and with mesosoma and metasoma remarkably more slender than same size-class females; **3)** metasoma much longer and slenderer in both sexes; **4)** pedipalp chelae remarkably more globose in males. As opposite, in both *B. ibericus* and *B. baeticus* **sp. n.** the sexual secondary dimorphism is feeble (i.e., both sexes are essentially same-sized, with mesosoma and metasoma very similar in length and shape) and male pedipalp chela is remarkably less globose. Apart from this, adults of both species further differ from *B. delafuentei* **sp. n.** as follows:

- ***B. ibericus*: 1)** pedipalps and metasoma with all carinae much weaker and smooth to vestigially granulose; **2)** pectinal tooth counts markedly higher; **3)** intercarinal tegument of metasoma swollen and glossy; **4)** ventrolateral carinae of metasomal segment V with more lobes, which are also much larger and blunt; **5)** telson with aculeus shorter and more curved.
- ***B. baeticus* sp. n.: 1)** pedipalps and metasoma with all carinae weaker and finer; **2)** pedipalp fingers with basal lobe/notch combination much weaker; **3)** carapace and tergites with carinae and intercarinal granulation stronger and coarser; **4)** ventrolateral carinae of metasomal segment V with more lobes, which are also much larger and blunt; **5)** telson with aculeus shorter and more curved.

All the differences mentioned above are very easy to appreciate even to unaided eye, e.g., compare figs. 19–20 to 4–6 and 16–18, and see tabs. XIII–XIV.

DISTRIBUTION (fig. 27). This species is known only from the type locality. Pinos de Hinojos is enclaved in the alluvial plain of the lower reaches of the Guadalquivir Basin, north of the river but away from the slopes of the Sierra Morena, ca. 34 km inland from seashore.

ECOLOGICAL NOTES. This species is a psammophile that digs burrows in alluvial sandy soil, totally devoid of superficial rocks. The burrows (fig. 34b) are typical of buthids that dig in horizontal ground: with a very wide, flattened oval entrance and in front a sweep of sand, fine gravel and pine litter scratched out by the scorpion. The vegetation is pine forest, with sparse grass understorey (fig. 34b).

REMARKS. Armas & González-Moliné (2009) recorded *B. ibericus* from eight sites scattered over most of Huelva Province (see fig. 1f therein). Part of these records could belong to *B. delafuentei* **sp. n.** instead, especially the southernmost ones.

Buthus garcialorcai sp. n.

Figures 21–22, 27, 34c. Tables VIII, XIII–XIV

Buthus occitanus: Rossi, 2012: 277 [misidentification: specimen and record from Puerto de la Mora mountain pass, between Granada and Guadix].

TYPE DATA. **SPAIN**: ANDALUCÍA: Granada Province: Víznar Municipality: Sierra de la Alfaguara: Víznar, 1 km north of road A-92 (37°14'06"N / 03°32'05"W / 1,212 m a.s.l.); 25/June/2016; C. Turiel; 1♂ holotype (RTO), 1♀ paratopotype (RTO).

ETYMOLOGY. The selected epithet is a patronym honoring the great Spanish poet and dramatist Federico García Lorca (5/June/1898–18/August/1936). Born in Granada, as a member of the Generation of '27 he became the greatest 20th century poet in Spain and one of the best dramatists and prose writers as well. Because of political reasons, during the Spanish Civil War he was assassinated by a fascist Falangist firing squad precisely at the type locality of the new species.

DIAGNOSIS. Adult size moderately large for the genus (64 mm in male, 72 mm in female), male smaller than same size-class female. Coloration with base light yellowish brown; carapace and tergites with a dark trivittate pattern all along; pedipalps, legs, venter and metasoma essentially immaculate. Sexual secondary dimorphism moderate in habitus (male smaller and slenderer), very conspicuous in pedipalps (manus very slender and narrower than patella in male, swollen and wider than patella in female) and moderate in metasoma (longer and slenderer in male). Pedipalp chela with many dark macrosetae scattered all over; manus with all carinae obsolete to weak, smooth; fingers long (movable finger/manus length ratio: 1.64 in male, 1.62 in female), both fingers with 12–13 principal rows of denticles, basal lobe/notch combination obsolete. Pectines with 31/31 teeth in male and 27/26 in fe-

male. Metasoma of male remarkably longer and heavier than standard for the genus (see ratios in tab. XIII); dorsal lateral and lateral supramedian carinae moderately crenulate to subgranulose on segments II–IV, ventral submedians on II–III strongly raised distally (stronger in female); intercarinal tegument coriaceous and minutely punctate, but irregularly, minutely to finely granulose on IV (dorsally only) and V (all surfaces); setation sparse, with 2–3 pairs of dark macrosetae on almost all carinae (four pairs on dorsal laterals of IV and ventral laterals of V, six pairs on lateral supramedians of V). Telson vesicle large and globose in adults of both sexes.

DESCRIPTION (adult male holotype; figs. 21; tabs. VIII, XIII–XIV). **Coloration** (fig. 21) base light yellowish brown, paler on chelicerae, pedipalps, legs, venter and telson. Chelicerae immaculate. Pedipalps immaculate except for carinae of patella vestigially infuscate and very slight traces of small, faint, gray variegations on external surface of manus; fingers yellow, immaculate. Carapace with all carinae infuscate, irregularly interconnected by dark brown reticulations and with a pair of arrowhead-shaped, symmetric dark brown spots flanking median eyes; eyes and ocular tubercles black. Tergites with all carinae and coarse granulation deeply infuscate and with diffuse, symmetric dark brown spots on lateral areas, defining altogether a blurred trivittate pattern (i.e., a narrow, median solid line plus two broad, variegated lateral stripes, all three interconnected by dark reticulations). Pectines pale yellowish to whitish, immaculate, with basal portion and basal plate progressively darker due to heavier sclerotization. Sternopectinal region and sternites immaculate. Legs with carinae of femur and patella moderately to faintly infuscate, distal part of femur and basal part of patella faintly, irregularly infuscate. Metasoma concolor (i.e., no segments conspicuously darker) and essentially immaculate, only with carinae variably infuscate (progressively darker ventrally and posteriorly). Telson immaculate, distal half of aculeus blackish.

Chelicerae. With dentition typical for the genus, teeth standard-sized and sharp. Tegument coriaceous, manus with minute granulation scattered all over and coarse, glossy granules irregularly arranged around dorsodistal depression. Setation very dense ventrally, but essentially lacking dorsally except for a patch of macrosetae at fixed finger base and few inconspicuous setae around dorsodistal depression of manus.

Pedipalps. Size standard for the genus (3.89 times longer than carapace). Femur essentially straight (very slightly bent inwards distally) and with some dark macrosetae, which are mostly concentrated along ventrodistal edge; all carinae strong and formed by medium-sized to coarse, isolated, glossy granules; intercarinal tegument coriaceous, minutely punctate on glossier areas. Patella straight and with some dark macrosetae scattered all over; all carinae moderate and subgranulose to granulose, especially the dorsal median and dorsal internal, which are formed by coarse, isolated, glossy granules; intercarinal tegument coriaceous and minutely punctate on glossier areas, internal surface with many medium-sized to coarse denticles. Chela with manus suboval and very slender (length/width ratio = 1.88, length/depth ratio = 1.73, median part widest), narrower than patella (ratio = 0.92) and with many dark and pale macrosetae scattered all over, more concentrated on external and ventral surfaces, all carinae obsolete to weak, smooth, intercarinal tegument smooth, glossy and minutely punctate; fingers long (movable 1.64 times longer than underhand), slender and evenly curved, fixed finger with 12/12 principal rows of denticles plus 12/12 inner and 12/12 outer accessory denticles (coarser than principal denticles), movable finger with 13/13 principal rows of denticles plus 12/12 inner and 13/13 outer accessory denticles (coarser than principal denticles) and the standard apical subrow of three denticles (large terminal denticle not included), basal lobe/notch combination obsolete.

Carapace. Slightly wider than long (length/width ratio = 0.88). Anterior margin almost straight, with six pairs of dark macrosetae. Carinae with lyre-shaped configuration perfectly defined: anterior medians and superciliaries strong, fused into a spoon-shaped figure and formed by medium-sized to coarse, isolated, glossy granules; central laterals and posterior medians strong, fused into an S-shaped figure and formed by coarse, isolated, glossy granules; lateral oculars and central medians strong, not fused and formed by medium-sized to coarse, isolated, glossy granules; posterior laterals weak and formed by medium-sized, isolated, glossy granules. Furrows: posterior laterals deep and wide, other furrows inconspicuous, obscured by remarkably depressed areas between adjacent carinae. Tegument coriaceous, minutely punctate and irregularly covered by moderately dense, medium-sized, glossy, conical granules largely concentrated along lateral areas. Median eyes large, separated by about twice the ocular diameter; lateral eyes much smaller and mostly concealed below a granulose carina.

Sternum. Type 1, very small and triangular, with 1–2 pairs of dark macrosetae. Tegument irregularly and densely granulose.

Genital operculum. With five pairs of dark macrosetae and some inconspicuous minor setae. Valves roundly subtriangular and moderately separated; tegument medially depressed, coriaceous to smooth and with fine to medium-sized, dense granulation along anterior and lateral margins. Genital papillae very large, narrow and slightly protruding.

Pectines. Long (but not reaching trochanter-femur joint of leg IV) and narrowly rectangular, setation moderately dense and dark. Tooth count 31/31, teeth not swollen. Fulcra large and bulky, paraboloid to round. Basal middle lamella trapezoidal. Pre-pectinal plate heavily sclerotized, very short, wide and folded transversely; tegument coriaceous. Basal plate heavily sclerotized, wider than long, with 2–3 pairs of dark macrosetae; anterior margin straight, posterior margin very shallowly convex; tegument coriaceous, with fine granules scattered and three conspicuous depressions: one anteromedian (transverse, narrow and progressively much deeper medially to become a pit) and two laterals (large, oval and shallow).

Legs. Very slender, with all carinae moderate and costate to subserrate except on femur, where strong and granulose to dentate. Intercarinal tegument coriaceous, minutely punctate on glossier areas, external surface of femur with many minute to small to medium-sized, glossy granules scattered. Bristlecombs very well developed on I–III. Tibial and pedal spurs large and thin. Claws long and moderately curved.

Mesosoma. Size and shape standard for the genus. Tergites coriaceous, minutely punctate and covered by dense, fine, conical to tuberculate granules largely concentrated along lateral areas, lateral margins finely dentate, posterior margin minutely granulose; carinae: median longitudinal straight, progressively longer and stronger backwards and formed by fine to medium-sized, isolated, glossy granules, submedians anteriorly divergent, shallowly arcuate (I–VI) to shallowly S-shaped (VII), progressively longer and stronger backwards

and formed by medium-sized, isolated, glossy granules, laterals absent on I–VI, strong, shallowly arcuate and formed by coarse, isolated, glossy granules on VII. Sternites with dark macrosetae scattered all over (denser on III and along transverse midline of IV–VII); lateral margins of all sternites finely crenulate, posterior margin of all sternites minutely denticulate; carinae: submedians weak to moderate and progressively stronger backwards, obsolete on III (smooth and parallel), present only on posterior half of IV–V (smooth, costate and anteriorly divergent), present only on posterior half of VI (moderate, finely subcrenulate and anteriorly divergent) and almost complete on VII (crenulate and slightly divergent anteriorly), laterals moderate but progressively stronger backwards, absent on III, present only on posterior half of IV–VI (smooth, costate to subcrenulate and parallel) and present only on median portion on VII (subcrenulate and slightly divergent anteriorly); tegument glossy and minutely punctate, densely covered by minute granules on anterolateral areas; spiracles very long and slit-like; sternite V with median smooth patch very short and wide, slightly bulky and translucent.

Metasoma. Longer and remarkably heavier than standard for the genus (5.25 times longer than carapace), evenly narrower and lower distally, with segment V both narrowest and lowest. Segment I with ten complete carinae, II–IV with eight, V with five: dorsal laterals moderate and finely crenulate on I, moderate to weak and finely subcrenulate to subgranulose on II–III, weak and finely subcrenulate to subgranulose on IV and absent on V; lateral supramedians moderately strong and coarsely crenulate on I, moderate and coarsely crenulate on II, moderate and finely crenulate on III–V; lateral inframedians strong and coarsely crenulate, complete on I, present on distal two-thirds of II and distal half of III, absent on IV–V; ventral laterals moderately strong and finely subcrenulate on I, moderate and coarsely crenulate to subcrenulate on II–IV, finely but irregularly serrate to acutely lobate on V (with 3–5 lobes much larger than the others); ventral submedians moderately strong and finely subserrate on I, strong, progressively stronger backwards and finely serrate on II–III (strongly raised distally), strong and finely serrate on IV, absent on V (but indicated by an incomplete but raised row of serrate granules on basal two-thirds); ventral median absent on I–IV, strong and finely but irregularly serrate on V (bifurcate on distal part). Intercarinal tegument coriaceous and minutely punctate, but irregularly, minutely to finely granulose on IV (dorsally only) and V (all surfaces); dorsal furrow complete but inconspicuous on all segments; setation sparse, with 2–3 pairs of dark macrosetae on most carinae (four pairs on dorsal laterals of IV and ventral laterals of V, six pairs on lateral supramedians of V).

Telson. Vesicle large, globose (length/width ratio = 1.29, width/depth ratio = 1.08), with 8–9 pairs of dark macrosetae and several inconspicuous minor setae scattered all over; tegument coriaceous, with many coarse but obsolete, glossy granules scattered ventrally and laterally; ventral median carina weak and coarsely granulose, as are two accessory pairs of carinae (ventral laterals and lateral supramedians?), subaculear tubercle absent. Aculeus shorter than vesicle (ratio = 0.71), sharp and shallowly curved.

FEMALE (adult paratopotype; figs. 22; tabs. VIII, XIII–XIV). Sexual secondary dimorphism very conspicuous, differing from described male by: **1)** size larger (72.2 mm); **2)** pedipalp much more robust, with manus globose (length/width ratio = 1.44, length/depth ratio = 1.22) and wider than patella; **3)** mesosoma wider, with lateral sides markedly convex; **4)** prepectinal plate reduced to a tiny transverse sclerite, slightly invaginated into the membrane; **5)** genital papillae absent; **6)** pectines conspicuously smaller and narrower, with lower tooth count (27/26); **7)** metasoma with all carinae stronger (especially the ventral submedians on segments II–III and ventral laterals on V, which are more strongly and coarsely lobate); **8)** telson with vesicle wider (length/width ratio = 1.09, width/depth ratio = 1.16) and aculeus longer (ratio = 0.96).

VARIATION. Apart from the data given above, the adult female paratype possesses fixed and movable fingers with 13 and 12 principal rows of denticles, respectively.

COMPARISON. The unique combination of a very slender, long-fingered pedipalp chela and a heavy metasoma in adult male reliably distinguishes adults of *B. garcialorcai* **sp. n.** from all other Western European described congeners, even to unaided eye. Amongst them, it is most similar to *B. elongatus* and *B. montanus*; all three species live in close proximity (see fig. 27) and share the same diagnostic combination of five key adult characters: **1)** size large; **2)** tergites with a dark trivittate pattern all along; **3)** pedipalp chela much narrower in males than females; **4)** pedipalp chela with many dark macrosetae scattered; **5)** pedipalp fingers with lobe/notch combination vestigial to absent.

But adults of *B. garcialorcai* **sp. n.** can be safely distinguished from both species by: **1)** coloration with base much paler, yellowish; **2)** female with pedipalps slightly longer in proportion to carapace; **3)** female with metasomal segment I wider than long. As opposite, in both *B. elongatus* and *B. montanus* the coloration is much darker (light orange-brown to reddish brown) and females have pedipalps slightly shorter and metasomal segment I as long as wide or longer than wide. Apart from this, adults of both species further differ from *B. garcialorcai* **sp. n.** as follows:

- ***B. elongatus*: 1)** pedipalp fingers with basal lobe/notch combination entirely absent; **2)** males with pedipalp manus narrower; **3)** males with metasoma much slenderer; **4)** telson with vesicle less globose. Moreover, although values overlap, this species tends to have higher counts of pectinal teeth and principal rows of denticles in pedipalp fingers.
- ***B. montanus*: 1)** males with pedipalp manus shorter and wider; **2)** males with metasoma slightly slenderer; **3)** female metasomal segments II–III with ventral submedian carinae markedly more strongly, coarsely and irregularly lobate.

All the differences mentioned above are very easy to appreciate even to unaided eye, e.g., compare figs. 21–22 to 2–3 and 7–8, and see tabs. XIII–XIV.

DISTRIBUTION (fig. 27). This species is known only from the type locality, in the upper altitudinal belt slopes (1,200–1,400 m a.s.l.) of the Sierra de la Alfaguara, in central Granada. There is a potential second collecting locality nearby, see below in Remarks section.

ECOLOGICAL NOTES. This is a lapidicolous scorpion, which digs short burrows and scrapes in clay soil under volcanic rocks. The vegetation is a moderately open pine forest with sparse grass understorey (fig. 34c).

Remarks. The single specimen recorded by Rossi (2012: 277) from "*mountain pass of Puerto de la Mora, between Granada and Guadix*" [originally in Italian, translated into English here] as an adult female of *B. occitanus*, most likely belongs to *B. garcialorcai* **sp. n.** instead. Puerto de la Mora (37°15'54"N / 03°28'05"W / 1,380 m a.s.l.) is located only 8 km air-distance to the northeast of Víznar and in the same mountain range, slope and altitude belt, so both sites almost surely represent a single continuous *Buthus* population.

Buthus manchego sp. n.

Figures 23–24, 27, 30d, 35c. Tables XI, XIII–XIV

Type data. **SPAIN**: Castilla-La Mancha: Ciudad Real Province: Argamasilla de Alba Municipality: Lagunas de Ruidera: Peñarroya Castle, along road CM-3115 (39°03'47"N / 03°00'10"W / 751 m a.s.l.); 10/June/2018; C. Turiel; 1♂ holotype (RTO), 2♀♀, 1 juvenile ♂, 1 juvenile ♀ paratopotypes (RTO).

Etymology. The selected epithet is an indeclinable noun, directly taken from the Spanish word used locally to name the natives of Castilla-La Mancha, the province where the type locality is enclaved.

Diagnosis. Adult size very large for the genus (81 mm in male, 79–80 mm in females), male slightly larger than same size-class females. Coloration with base light orange-brown; carapace and tergites with a discontinuous, dark trivittate pattern all along; carapace, tergites and metasoma with all carinae deeply infuscate; pedipalps, legs, venter and metasoma with carinae deeply infuscate. Sexual secondary dimorphism moderate in habitus (male slightly larger and more robust), conspicuous in pedipalps (manus oval slender and as wide as patella in male, swollen and wider than patella in females) and very conspicuous in metasoma (much longer and heavier in male). Pedipalp chela with many dark macrosetae scattered on ventral surface; manus with all carinae obsolete, smooth; fixed and movable fingers with 12–13 principal rows of denticles (mode not defined), basal lobe/notch combination weak. Pectines with 32–34 teeth (mode 33) in males, 28–31 (mode 28–29) in females. Metasoma of male remarkably longer and heavier than standard for the genus (see ratios in tab. XIII); dorsal lateral and lateral supramedian carinae moderately subcrenulate to subgranulose on segments II–IV, ventral submedians on II–III moderately raised distally (slightly stronger in female); intercarinal tegument coriaceous to smooth, with few medium-sized granules scattered dorsally and irregularly, minutely granulose on IV (dorsally only) and V (all surfaces); setation sparse, with 2–3 pairs of dark macrosetae on almost all carinae (5–6 pairs on lateral supramedians and ventral laterals of V). Telson vesicle very large and globose in adults of both sexes.

Description (adult male holotype; figs. 23; tabs. XI, XIII–XIV). **Coloration** (fig. 23) base pale orange-brown, paler on chelicerae, legs, venter and telson. Chelicerae immaculate. Pedipalps with carinae of femur and patella deeply infuscate and carinae of manus faintly infuscate; fingers yellow, immaculate. Carapace with carinae deeply infuscate and with a pair of arrowhead-shaped, symmetric dark brown spots flanking median eyes; eyes and ocular tubercles black. Tergites with all carinae and coarse granulation deeply infuscate and with diffuse, symmetric dark brown to blackish spots on anterior and lateral areas, defining altogether a clearly trivittate pattern (i.e., a narrow, median solid stripe plus two broad, variegated lateral stripes, all three well separated). Pectines whitish, with basal portion and basal plate progressively darker due to heavier sclerotization. Sternopectinal region and sternites immaculate. Legs with distal tip of femur and most carinae deeply infuscate. Metasoma concolor (i.e., no segments conspicuously darker) and essentially immaculate, with all carinae moderately to deeply infuscate (progressively darker ventrally). Telson immaculate, distal half of aculeus blackish.

Chelicerae. With dentition typical for the genus, teeth standard-sized and blunt. Tegument glossy and minutely punctate, dorsodistal portion of manus with dense, fine and medium-sized granulation and many coarse, glossy granules irregularly arranged around dorsodistal depression. Setation very dense ventrally, but essentially lacking dorsally except for a patch of macrosetae at fixed finger base and some conspicuous setae around dorsodistal depression of manus.

Pedipalps. Size standard for the genus (3.59 times longer than carapace). Femur essentially straight (very slightly bent inwards distally) and with few short, dark macrosetae, which are mostly concentrated along ventrodistal edge; all carinae very strong and formed by coarse, isolated, glossy granules; intercarinal tegument coriaceous, minutely punctate on glossier areas and with few minute and fine granulation scattered dorsally. Patella straight and with only a few dark macrosetae scattered all over; all carinae moderate and subgranulose to granulose, except for the dorsal median and dorsal internal, which are strong and formed by coarse, isolated, glossy granules; intercarinal tegument coriaceous and minutely punctate on glossier areas, internal surface with many medium-sized denticles. Chela with manus narrow oval (length/width ratio = 1.54, length/depth ratio = 1.42, median part widest), slightly wider than patella (ratio 1.17) and with many dark macrosetae scattered on ventral surface, all carinae obsolete and smooth, intercarinal tegument smooth, glossy and minutely punctate; fingers long (movable 1.62 times longer than underhand), robust and shallowly curved, fixed finger with 12/13 principal rows of denticles plus 12/12 inner and 11/12 outer accessory denticles (much coarser than principal denticles), movable finger with 13/13 principal rows of denticles plus 11/11 inner and 12/13 outer accessory denticles (much coarser than principal denticles) and the standard apical subrow of three denticles (large terminal denticle not included), basal lobe/notch combination weak.

Carapace. Slightly wider than long (length/width ratio = 0.98). Anterior margin almost straight, with two pairs of dark macrosetae. Carinae with lyre-shaped configuration perfectly defined: anterior medians and superciliaries strong, fused into a spoon-shaped figure and formed by coarse, isolated, glossy granules; central laterals and posterior medians strong, fused into an S-shaped figure and formed by coarse, isolated, glossy granules; lateral oculars and central medians strong, not fused and formed by coarse, isolated, glossy granules; posterior laterals weak and formed by medium-sized, isolated, glossy granules. Furrows: posterior laterals deep and wide, other furrows inconspicuous, obscured by remarkably depressed areas between adjacent carinae. Tegument coriaceous, minutely punctate and irregularly covered by dense, medium-sized, glossy, conical to tuberculate granules largely concentrated along lateral areas. Median eyes large, separated by about twice the ocular diameter; lateral eyes much smaller and mostly concealed below a granulose carina.

Sternum. Type 1, very small and triangular, with 1–2 pairs of dark macrosetae. Tegument irregularly and densely granulose.
Genital operculum. With 7–8 pairs of dark macrosetae and some inconspicuous minor setae. Valves roundly subtriangular and widely separated; tegument medially depressed, coriaceous to smooth and with fine to medium-sized, dense granulation along anterior and lateral margins. Genital papillae very large, narrow and protruding.
Pectines. Long (but not reaching trochanter-femur joint of leg IV) and narrowly rectangular, setation dense and dark. Tooth count 34/33, teeth not swollen. Fulcra large and bulky, paraboloid to round. Basal middle lamella trapezoidal. Pre-pectinal plate heavily sclerotized, very short, wide and folded transversely; tegument coriaceous. Basal plate heavily sclerotized, about as long as wide, with two pairs of dark macrosetae; anterior margin straight, posterior margin very shallowly convex; tegument coriaceous, with three conspicuous depressions: one anteromedian (transverse, narrow and progressively much deeper medially to become a pit) and two laterals (large, oval and shallow).
Legs. Very slender, with all carinae moderate and costate to subserrate except on femur, where strong and serrate. Intercarinal tegument coriaceous, minutely punctate, external surface of femur with many minute to small, glossy granules scattered. Bristlecombs very well developed on I–III. Tibial and pedal spurs large and thin. Claws long and shallowly curved.
Mesosoma. Size and shape standard for the genus. Tergites coriaceous and covered by dense, medium-sized, tuberculate granules except anteriorly and medially, lateral margins finely tuberculate, posterior margin minutely granulose; carinae: median longitudinal straight, progressively longer and stronger backwards and formed by medium-sized, isolated, glossy granules, submedians anteriorly divergent, shallowly arcuate (I–VI) to shallowly S-shaped (VII), progressively longer and stronger backwards and formed by fine, isolated, glossy granules, laterals absent on I–VI, strong, shallowly S-shaped and formed by coarse, isolated, glossy granules on VII. Sternites with some dark macrosetae scattered all over (denser on III); lateral margins of all sternites finely serrate, posterior margin of all sternites minutely denticulate; carinae: submedians progressively stronger backwards, absent to obsolete on III–V, present on posterior two-thirds of VI (weak, subgranulose and slightly divergent anteriorly) and almost complete on VII (crenulate and subparallel, but anteriorly convergent), laterals moderate but progressively stronger backwards, absent on III, present only on posterior half of IV–VI (smooth, subcostate and slightly divergent anteriorly) and present only on median portion on VII (crenulate and divergent anteriorly); tegument coriaceous to glossy and minutely punctate, densely covered by minute granules on lateral areas; spiracles very long and slit-like; sternite V with median smooth patch indistinct or absent.
Metasoma. Longer and remarkably heavier than standard for the genus (5.49 times longer than carapace), progressively narrower and lower distally, with segment V both narrowest and lowest. Segment I with ten complete carinae, II–IV with eight, V with five: dorsal laterals moderate but progressively weaker backwards, finely serratocrenulate on I, finely subcrenulate to subgranulose on II, finely subgranulose on III–IV and absent on V; lateral supramedians moderate, coarsely subcrenulate to subgranulose on I–IV and finely granulose to subgranulose on V; lateral inframedians moderate and coarsely crenulate to subcrenulate, complete on I, present only on distal half of II and distal third of III, absent on IV–V; ventral laterals moderate, finely subcrenulate on I, finely serratocrenulate on II, finely serratocrenulate III, coarsely crenulate on IV, coarsely but irregularly serratocrenulate to lobate on V (with only 1–2 lobes much larger than the others); ventral submedians moderately weak and finely subcostate to subcrenulate on I, moderate to strong, progressively stronger backwards and finely subserrate to serrate on II–III (moderately raised distally), strong and coarsely serratocrenulate on IV, absent on V (but indicated by an incomplete but raised row of serrate granules on basal two-thirds); ventral median absent on I–IV, strong and coarsely but irregularly serrate on V (bifurcate on distal third). Intercarinal tegument coriaceous to smooth and minutely punctate on glossier areas, with few medium-sized granules scattered dorsally and irregularly, minutely granulose on IV (dorsally only) and V (all surfaces); dorsal furrow complete but inconspicuous on all segments; setation sparse, with 2–3 pairs of dark macrosetae on most carinae (5–6 pairs on lateral supramedians and ventral laterals of V).
Telson. Vesicle very large, globose (length/width ratio = 1.17, width/depth ratio = 1.11), with five pairs of dark macrosetae and several inconspicuous minor setae scattered all over; tegument glossy, with few coarse but obsolete, glossy granules scattered ventrally and laterally; ventral median carina obsolete, as are two accessory pairs of carinae (ventral laterals and lateral supramedians?), subaculear tubercle absent. Aculeus shorter than vesicle (ratio = 0.78), sharp and very shallowly curved.

Female (adult paratopotypes; figs. 24, 30d; tabs. XI, XIII–XIV). Sexual secondary dimorphism very conspicuous, differing from described male by: **1)** size slightly smaller (79.0–79.9 mm); **2)** pedipalp manus much more robust, with manus globose (length/width ratio = 1.31–1.40, length/depth ratio = 1.19–1.29) and much wider than patella (ratio = 1.71–1.72); **3)** mesosoma wider, with lateral sides more convex; **4)** pre-pectinal plate reduced to a tiny oval sclerite, invaginated into the membrane to look like a transverse pit; **5)** genital papillae absent; **6)** pectines smaller and narrower, with lower tooth counts (28–31); **7)** metasoma remarkably slenderer, with carinae stronger (especially the ventral submedians on segments II–III and ventral laterals on V, which are more strongly, coarsely and irregularly lobate).

Variation. Specimens from the type series are remarkably homogeneous in morphology, except as noted below.

Number of principal rows of denticles in the five available specimens varied from 12–13 on both fixed and movable fingers. Symmetrical counts were as equally common as asymmetrical for the two possible combinations, i.e., both fingers of the same pedipalps and both pedipalps of the same specimen. One adult female paratype has mid part of left movable finger with denticles not arranged into defined rows (a teratology apparently due to post-molt regeneration after a trauma), making count impossible.

Pectinal tooth counts (tab. XIV) varied among paratopotypes as follows: juvenile male with 32/33, two adult females with 28/28 and 31/30, one juvenile female with 29/29.

Comparison. By the very large size of adults coupled to the unique habitus of the adult male that combines a slender pedipalp chela with a very large and heavy metasoma, this species

is very easy to distinguish from all of its congeners from Western Europe, even to unaided eye. Apart from this, adults of the other species further differ from *B. manchego* **sp. n.** as follows:

• ***B. elongatus*: 1)** males markedly smaller than same size-class females; **2)** coloration with base darker and more reddish; **3)** pedipalps longer, much slenderer (especially in males, where manus slightly narrower than patella) and with carinae stronger and finer; **4)** pedipalp fingers markedly longer and with lobe/notch combination absent; **5)** carapace with anterior margin shallowly concave; **6)** metasoma much slenderer (especially in males); **7)** telson with vesicle less bulbous and with aculeus longer (especially in males).

• ***B. ibericus*: 1)** size conspicuously smaller (males 52–64 mm, females 65–76 mm), with males smaller than same size-class females; **2)** coloration with base paler and more yellowish; **3)** habitus much stockier (especially pedipalps and metasoma); **4)** sexual secondary dimorphism of pedipalps opposite, with manus markedly heavier in males; **5)** sexual secondary dimorphism of metasoma inconspicuous (size and shape very similar in both sexes); **6)** pedipalp chela with only few dark macrosetae scattered; **7)** pedipalp fingers with lobe/notch combination strong; **8)** pedipalps and metasoma with carinae much weaker; **9)** pectinal tooth count clearly lower (26–31 in males, 21–26 in females).

• ***B. montanus*: 1)** males markedly smaller than same size-class females; **2)** coloration with base darker and more reddish; **3)** pedipalps longer and slender (especially chela); **4)** pedipalp fingers with lobe/notch combination vestigial; **5)** males with metasoma shorter and slenderer, with segment I wider than long; **6)** pectinal tooth count lower (28–30 in males, 23–28 in females); **7)** metasomal segments II–III with ventral submedian carinae more strongly and coarsely lobate (especially in females); **8)** telson with vesicle less bulbous (especially in males).

• ***B. occitanus*: 1)** size conspicuously smaller (males 54–64 mm, females 55–70 mm), with males smaller than same size-class females; **2)** coloration very different, with base paler and tergites with a dark univittate pattern all along (rarely faintly trivittate); **3)** pedipalps slightly longer and with manus markedly slenderer (especially in males, where slightly narrower than patella); **4)** pedipalp chela with only few dark macrosetae scattered; **5)** pedipalp fingers with lobe/notch combination obsolete; **6)** male with metasoma shorter; **7)** female metasomal segment V with larger lobes of ventral lateral carinae coarser, rounder and usually more numerous as well; **6)** telson with vesicle much smaller and less bulbous (especially in males).

• ***B. alacanti* sp. n.: 1)** size much smaller (male 66 mm, female 65 mm); **2)** coloration very different, with base paler, almost immaculate and with a dark univittate pattern all along tergites; **3)** habitus slenderer in male, stockier in female; **4)** pedipalp chela longer and slenderer (especially in female), and with only few dark macrosetae scattered; **5)** pedipalp fingers with lobe/notch combination obsolete; **6)** carapace and tergites with carinae shorter, weaker and finer; **7)** telson with vesicle smaller and less bulbous in male.

• ***B. baeticus* sp. n.: 1)** size smaller (males 64–69 mm, females 59–70 mm), with males slightly smaller than same size-class females; **2)** sexual secondary dimorphism of pedipalps inconspicuous and opposite (manus very similar in both sexes, but slightly heavier in males); **3)** sexual secondary dimorphism of metasoma inconspicuous (size and shape very similar in both sexes); **4)** pedipalp chela with only few dark macrosetae scattered; **5)** females with pedipalp chela remarkably slenderer; **6)** pedipalps and metasoma with carinae weaker and finer; **7)** males with metasoma slightly shorter and much slenderer; **8)** telson with vesicle much less bulbous.

• ***B. delafuentei* sp. n.: 1)** size smaller (males 65–72 mm, females 58–66 mm); **2)** coloration with base paler and yellowish; **3)** sexual secondary dimorphism of pedipalps opposite, with manus much heavier in males; **4)** pedipalps longer (especially in females, which also have chela much slenderer and slightly narrower than patella); **5)** pedipalp chela with only few dark macrosetae scattered; **6)** pedipalp fingers with lobe/notch combination strong; **7)** pectinal tooth count consistently lower in females; **8)** males with metasoma much slenderer; **9)** telson with vesicle less bulbous and with aculeus longer (especially in males).

• ***B. garcialorcai* sp. n.: 1)** size smaller (male 64 mm, female 72 mm), with male smaller than same size-class female; **2)** coloration with base paler and more yellowish; **3)** pedipalps longer and slenderer (especially in male, which also has chela slightly narrower than patella); **4)** pedipalps and metasoma with carinae weaker and finer; **5)** pedipalp fingers with lobe/notch combination obsolete; **6)** female with metasoma heavier; **7)** metasomal segment I wider than long; **8)** telson with vesicle less bulbous.

All the differences mentioned above are very easy to appreciate even to unaided eye, e.g., compare figs. 23–24 to 2–22, and see tabs. XIII–XIV.

DISTRIBUTION (fig. 27). This species is known only from the type locality. Peñarroya is enclaved in the core of the Submeseta Sur, in the Alto Guadiana Basin, southern Castilla-La Mancha.

ECOLOGICAL NOTES. This is a lapidicolous scorpion, which digs short burrows and scrapes in clay soil under limestone rocks (fig. 30d). The vegetation is the anthropogenic "dehesa", which is composed of isolated trees scattered on low, grassy areas (fig. 35c).

REMARKS. The geographical extension of *B. manchego* **sp. n.** is unknown and especially intriguing. The single locality known is not delimited by any clear geographical barriers (the Submeseta Sur is largely homogeneous in landscape and altitude), thus, a larger occurrence area is expected. Nevertheless, we obtained samples of many localities within 200 km radius around Peñarroya and although several different *Buthus* species are represented, none of them is conspecific to *B. manchego* **sp. n.**

Buthus serrano sp. n.

Figures 25–26, 27, 30e–f, 35d. Tables XII–XIV

TYPE DATA. **SPAIN**: ANDALUCÍA: Granada Province: Galera Municipality: Sierra de Orce: 1 km southwest of Orce (37°42'53"N / 02°30'09"W / 1,002 m a.s.l.); 25/June/2016; C. Turiel; 1♂ holotype (RTO), 1♂, 3♀♀, 1 juvenile ♂ paratopotypes (RTO).

ETYMOLOGY. The selected epithet is an indeclinable noun, directly taken from the Spanish word used locally to name the natives of a mountain range. It alludes to the occurrence area of this species, i.e., the Sierra de Orce.

DIAGNOSIS. Adult size medium to moderately large for the genus (65–67 mm in males, 59–69 mm in females), males slightly smaller than same size-class females. Coloration with base light yellowish orange; carapace and tergites with a discontinuous, dark trivittate pattern all along; carapace, tergites and metasoma with all carinae deeply infuscate; pedipalps, legs, venter and metasoma essentially immaculate. Sexual secondary dimorphism conspicuous in habitus (male smaller and slenderer), moderate in pedipalps (manus slender and as wide as patella in male, oval and wider than patella in female) and moderate in metasoma (longer and slenderer in male). Pedipalp chela with many dark macrosetae scattered all over; manus with all carinae obsolete to absent, smooth; fixed and movable fingers with 12–13 principal rows of denticles (mode not defined), basal lobe/notch combination absent. Pectines with 31–33 teeth (mode 33) in male and 27–29 (mode 27) in female. Metasoma of male remarkably longer and slenderer than standard for the genus (see ratios in tab. XIII); dorsal lateral and lateral supramedian carinae weakly serratocrenulate to subcrenulate on segments II–IV, ventral submedians on II–III feebly raised distally (stronger in female); intercarinal tegument coriaceous and minutely punctate, but irregularly, minutely granulose on IV (dorsally and dorsolaterally only) and V (all surfaces); setation sparse, with 3–4 pairs of dark macrosetae on most carinae (5–6 pairs on dorsal laterals and lateral supramedians of IV–V). Telson vesicle large and globose in adults of both sexes.

DESCRIPTION (adult male holotype; figs. 25, 30e; tabs. XII–XIV). **Coloration** (figs. 25, 30e) base light yellowish orange, paler on chelicerae, pedipalps, legs, venter and telson. Chelicerae immaculate. Pedipalps immaculate except for carinae of patella and femur vestigially infuscate; fingers yellow, immaculate. Carapace with all carinae deeply infuscate, irregularly interconnected by few, small dark brown reticulations and with a pair of arrowhead-shaped, symmetric dark brown spots flanking median eyes; eyes and ocular tubercles black. Tergites with all carinae and coarse granulation deeply infuscate and with diffuse, symmetric dark brown spots on anterior and lateral areas, defining altogether a discontinuous trivittate pattern (i.e., a narrow, median solid line plus two broad, variegated lateral stripes, all three partially interconnected anteriorly by dark reticulations). Pectines pale yellowish to whitish, immaculate, with basal portion and basal plate progressively darker due to heavier sclerotization. Sternopectinal region and sternites immaculate. Legs almost immaculate, only with distal part of femur and basal part of patella very faintly, irregularly infuscate. Metasoma concolor (i.e., no segments conspicuously darker) and essentially immaculate, only with carinae variably infuscate (progressively darker ventrally and posteriorly). Telson immaculate, distal half of aculeus blackish.

Chelicerae. With dentition typical for the genus, teeth standard-sized and sharp. Tegument coriaceous, manus with minute granulation scattered all over and medium-sized to coarse, glossy granules irregularly arranged around dorsodistal depression. Setation very dense ventrally, but essentially lacking dorsally except for a patch of macrosetae at fixed finger base and few inconspicuous setae around dorsodistal depression of manus.

Pedipalps. Size standard for the genus (3.71 times longer than carapace). Femur essentially straight (very slightly bent inwards distally) and with some dark macrosetae, which are mostly concentrated along ventrodistal edge; all carinae moderately strong and formed by coarse, isolated, glossy granules; intercarinal tegument coriaceous, minutely punctate on glossier areas. Patella straight and with several dark macrosetae scattered all over; all carinae vestigial to weak and costate to subgranulose, especially the dorsal median and dorsal internal, which are formed by coarse, weak, isolated, glossy granules; intercarinal tegument coriaceous and minutely punctate, internal surface with only a few weak, medium-sized to coarse denticles. Chela with manus suboval and very slender (length/width ratio = 1.78, length/depth ratio = 1.69, median part widest), exactly as wide as patella (ratio 1.00) and with many dark and pale macrosetae scattered all over, all carinae obsolete to absent, smooth, intercarinal tegument smooth, glossy and minutely punctate; fingers very long (movable 1.65 times longer than underhand), slender and evenly curved, fixed finger with 13/13 principal rows of denticles plus 12/12 inner and 11/12 outer accessory denticles (coarser than principal denticles), movable finger with 12/12 principal rows of denticles plus 11/11 inner and 11/11 outer accessory denticles (coarser than principal denticles) and the standard apical subrow of three denticles (large terminal denticle not included), basal lobe/notch combination absent.

Carapace. Slightly wider than long (length/width ratio = 0.92). Anterior margin almost straight, with 5–6 pairs of dark macrosetae. Carinae with lyre-shaped configuration perfectly defined: anterior medians and superciliaries strong, fused into a spoon-shaped figure and formed by coarse, isolated, glossy granules; central laterals and posterior medians strong, fused into an S-shaped figure and formed by coarse, isolated, glossy granules; lateral oculars and central medians strong, not fused and formed by medium-sized to coarse, isolated, glossy granules; posterior laterals indistinct from surrounding granulation. Furrows: anterior median, median ocular, central transverse, central median, posterior median and posterior marginal fused, wide and shallow, posterior laterals very deep and wide, other furrows inconspicuous, obscured by remarkably depressed areas between adjacent carinae. Tegument coriaceous, minutely punctate and irregularly covered by moderately dense, medium-sized to coarse, glossy granules largely concentrated along anterior and lateral areas. Median eyes large, separated by more than twice the ocular diameter; lateral eyes much smaller and mostly concealed below a granulose carina.

Sternum. Type 1, very small and triangular, with single pair of long, dark macrosetae, plus a pair of tiny, pale setae. Tegument coriaceous, with scattered fine granulation.

Genital operculum. With 3–4 pairs of dark macrosetae and some inconspicuous minor setae. Valves roundly subtriangular and moderately separated; tegument medially depressed, smooth and with fine, dense granulation along anterior and lateral margins. Genital papillae large, narrow and not protruding.

Pectines. Long (but not reaching trochanter-femur joint of leg IV) and narrowly rectangular, setation moderately dense and dark. Tooth count 31/32, teeth not swollen. Fulcra large and bulky, paraboloid to round. Basal middle lamella trapezoidal. Pre-pectinal plate heavily sclerotized, very short, wide and folded transversely; tegument coriaceous. Basal plate heavily sclerotized, wider than long, with two pairs of dark macrosetae; anterior margin straight, posterior margin very shallowly convex; tegument coriaceous, with fine granules scattered and three conspicuous depressions: one anteromedian (trans-

verse, narrow and progressively much deeper medially to become a triangular pit) and two laterals (large and shallow).
Legs. Very slender, with all carinae weak and costate to subserrate except on femur, where moderate and granulose to dentate. Intercarinal tegument coriaceous, minutely punctate on glossier areas, external surface of femur with many minute to small, glossy granules scattered. Bristlecombs very well developed on I–III. Tibial and pedal spurs large and thin. Claws long and moderately curved.
Mesosoma. Slightly longer and slenderer than standard for the genus. Tergites coriaceous and covered by sparse, fine to medium-sized granules largely concentrated along lateral areas, lateral margins finely dentate, posterior margin minutely granulose; carinae: median longitudinal straight, progressively longer and stronger backwards and formed by fine, isolated, glossy granules, submedians anteriorly divergent, shallowly arcuate (I–VI) to inverted L-shaped (VII), progressively longer and stronger backwards and formed by fine to medium-sized, isolated, glossy granules, laterals absent on I–VI, strong, shallowly arcuate and formed by fine to medium-sized, isolated, glossy granules on VII. Sternites with dark macrosetae scattered all over (denser on III and along transverse midline of IV–VII); lateral margins of all sternites finely crenulate, posterior margin of all sternites minutely denticulate; carinae: submedians progressively stronger backwards, obsolete to vestigial on III–VI (smooth and parallel) and almost complete on VII (subcrenulate and subparallel), laterals moderate but progressively stronger backwards, absent on III, present only on posterior half of IV–VI (smooth, subcostate and parallel) and present only on median portion on VII (subcrenulate and slightly divergent anteriorly); tegument coriaceous to glossy and minutely punctate, sparsely covered by minute granules on lateral areas; spiracles very long and slit-like; sternite V with median smooth patch indistinct or absent.
Metasoma. Much longer and slenderer than standard for the genus (5.33 times longer than carapace), progressively narrower and lower distally, with segment V both narrowest and lowest. Segment I with ten complete carinae, II–IV with eight, V with five: dorsal laterals weak and finely crenulate on I, very weak and finely subcrenulate to subgranulose on II–III, obsolete and subcostate to subgranulose on IV and absent on V; lateral supramedians weak and crenulate on I, very weak and subcrenulate to subgranulose on II–V; lateral inframedians moderate and coarsely subcrenulate, complete on I, present on distal half of II and distal third of III, absent on IV–V; ventral laterals very weak and subcostate to subcrenulate on I, weak and coarsely subcrenulate on II–IV, coarsely but irregularly serratocrenulate to acutely lobate on V (with 2–3 lobes much larger than the others); ventral submedians weak and subcostate to subcrenulate on I, moderate, progressively stronger backwards and coarsely subcrenulate to serratocrenulate on II–III (feebly raised distally), moderate and coarsely serratocrenulate on IV, absent on V (but indicated by an incomplete but raised row of serrate granules on basal two-thirds); ventral median absent on I–IV, strong and serratocrenulate on V (bifurcate on extreme distal part). Intercarinal tegument coriaceous and minutely punctate, but irregularly, minutely granulose on IV (dorsally and dorsolaterally only) and V (all surfaces); dorsal furrow complete but inconspicuous on all segments; setation sparse, with 3–4 pairs of dark macrosetae on most carinae (5–6 pairs on dorsal laterals and lateral supramedians of IV–V).
Telson. Vesicle large, globose (length/width ratio = 1.22, width/depth ratio = 1.04), with 11–12 pairs of dark macrosetae and several minor setae scattered all over; tegument glossy and minutely punctate, with many fine to medium-sized but obsolete, glossy granules scattered ventrally and laterally; ventral median carina obsolete and smooth to subgranulose, as are two accessory pairs of carinae (ventral laterals and lateral supramedians?), subaculear tubercle absent. Aculeus shorter than vesicle (ratio = 0.79), sharp and shallowly curved.

FEMALE (adult paratopotype; figs. 26; tabs. XII–XIV). Sexual secondary dimorphism very conspicuous, differing from described male by: **1)** size slightly larger (59.5–69.1 mm); **2)** pedipalp manus much more robust, globose (length/width ratio = 1.43–1.50, length/depth ratio = 1.32–1.36) and wider than patella (ratio = 1.11–1.31); **3)** mesosoma wider, with lateral sides markedly convex; **4)** pre-pectinal plate reduced to a tiny transverse sclerite, slightly invaginated into the membrane; **5)** genital papillae absent; **6)** pectines smaller and narrower, with lower tooth count (27–29); **7)** metasoma with all carinae stronger (especially the ventral submedians on segments II–III and ventral laterals on V, which are more strongly and coarsely lobate); **8)** telson with vesicle wider (length/width ratio = 1.15–1.20, width/depth ratio = 1.07–1.12) and aculeus slightly shorter (ratio = 0.76–0.84).

VARIATION. Specimens from the type series are remarkably homogeneous in morphology, except as noted below.
Adult size varied as follows: 64.9–67.1 mm in males, 59.5–69.1 mm in females (tab. XII).

Number of principal rows of denticles in the six available specimens varied from 12–13 on both fixed and movable fingers, with poorly defined modes of 13 and 12, respectively. None had the same count in all four fingers.

Pectinal tooth counts (tab. XIV) varied in the five paratopotypes as follows: adult male with 33/33, juvenile male with 32/33, adult females with 27/27, 28/27 and 29/28.

COMPARISON. This species is most similar to *B. occitanus* and *B. alacanti* **sp. n.**, being the only Western European congeners that share the same diagnostic combination of four key adult characters: **1)** size medium to moderately large; **2)** pedipalps not especially elongate, but with chela much narrower in males than females; **3)** pedipalp fingers with lobe/notch combination obsolete to absent; **4)** metasomal segments II–IV with ventral submedian carinae not strongly and coarsely lobed.

But adults of *B. serrano* **sp. n.** can be safely distinguished from both species by: **1)** dark spots of tergites arranged into a discontinuous trivittate pattern; **2)** pedipalp chela much more densely setose; **3)** pedipalp fingers with basal lobe/notch combination absent; **4)** males with metasoma longer and slenderer; **5)** females with pedipalp manus markedly narrower and oval-elongate in shape; **6)** telson with vesicle larger and more globose (especially in males). As opposite, in *B. occitanus* and *B. alacanti* **sp. n.** the dark spots of tergites form a univittate pattern, pedipalp chela has setation remarkably fewer and sparser, pedipalp fingers have basal lobe/notch combination obsolete, males have metasoma shorter and heavier, females have pedipalp manus markedly more swollen and globose in shape, and telson with vesicle smaller and less globose (especially in males). Apart from this, adults of both species further differ from *B. serrano* **sp. n.** as follows:

• ***B. occitanus*: 1)** males with pedipalp manus slightly narrower than patella; **2)** metasoma with setation sparser; **3)** female metasomal segment V with larger lobes of ventral lateral carinae coarser, rounder and usually more numerous as well.

• ***B. alacanti* sp. n.: 1)** male slightly larger than same size-class female; **2)** male with pedipalp manus more swollen and slightly wider than patella; **3)** carapace and tergites with carinae shorter, weaker and finer.

All the differences mentioned above are very easy to appreciate even to unaided eye, e.g., compare figs. 25–26 to 2–24, and see tabs. XIII–XIV.

DISTRIBUTION (fig. 27). This species is known only from the type locality, which is enclaved in the Sierra de Orce, in western Granada.

ECOLOGICAL NOTES. This is a lapidicolous scorpion, which digs scrapes in clay soil under limestone rocks (fig. 30e–f). The vegetation is mixed oak, pine and gall oak forest, with variable grass understorey (fig. 35d). Sierra de Orce has a peculiar, extreme climate, with very hot summers and very cold winters, and is very arid.

REMARKS. The juvenile specimen tentatively identified as *B. montanus* by Sousa *et al.* (2010) could belong instead to *B. serrano* **sp. n.**, as both localities are only 20 km apart (see further details above, in the section pertinent to *B. montanus*). Nevertheless, they are located in different mountain ranges (Sierra de Segura and Sierra de Orce) and another sample collected by us at a third site located less than 30 km north of both, seems to represent another distinct species (it will be treated in the forthcoming second part of the present revision). Thus, we refrain to assign the population recorded by Sousa *et al.* (2010) to any nominal species until additional samples from exactly the same site become available for study.

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* Available at www.sea-entomologia.org

Table I. Measurements of four adult male topotypes of *Buthus elongatus*.
Abbreviations: length (L), width (W), posterior width (Wp), depth (D).

Dimensions (mm)		Refugio de Juanar, Marbella, Málaga (SPA)			
		♂ topotype	♂ topotype	♂ topotype	♂ topotype
Carapace	L / Wp	5.40 / 5.85	6.60 / 6.80	6.85 / 7.30	6.95 / 7.30
Mesosoma	L	11.00	12.50	14.00	16.20
Metasoma	L	25.00	36.15	36.87	37.45
Segment I	L / W / D	3.75 / 3.60 / 3.25	5.60 / 4.90 / 4.30	5.80 / 5.10 / 4.40	6.00 / 5.15 / 4.45
Segment II	L / W / D	4.35 / 3.35 / 3.20	6.55 / 4.50 / 4.20	6.80 / 4.75 / 4.30	6.80 / 4.80 / 4.30
Segment III	L / W / D	4.55 / 3.20 / 3.15	7.00 / 4.45 / 4.10	7.00 / 4.60 / 4.20	7.10 / 4.65 / 4.20
Segment IV	L / W / D	5.55 / 3.08 / 2.85	7.90 / 4.15 / 3.80	8.00 / 4.15 / 4.05	8.25 / 4.30 / 3.80
Segment V	L / W / D	6.80 / 2.95 / 2.50	9.10 / 3.50 / 3.30	9.27 / 3.65 / 3.50	9.30 / 3.70 / 3.50
Telson	L	6.15	7.80	8.40	8.10
Vesicle	L / W / D	3.60 / 2.55 / 2.40	4.20 / 3.20 / 3.20	4.50 / 3.30 / 3.30	4.50 / 3.30 / 3.35
Aculeus	L	2.55	3.60	3.90	3.60
Pedipalp	L	19.70	25.20	26.65	26.70
Femur	L / W	4.70 / 1.45	6.20 / 1.70	6.50 / 1.85	6.60 / 1.85
Patella	L / W	5.60 / 2.10	7.10 / 2.40	7.35 / 2.50	7.40 / 2.55
Chela	L	9.40	11.90	12.80	12.70
Manus	L / W / D	3.00 / 1.70 / 2.00	4.20 / 2.25 / 2.70	4.50 / 2.48 / 2.80	4.40 / 2.30 / 2.70
Movable finger	L	6.40	7.70	8.30	8.30
Total	**L**	**47.55**	**63.05**	**66.12**	**68.70**

Table II. Measurements of four adult female topotypes of *Buthus elongatus*.
Abbreviations: length (L), width (W), posterior width (Wp), depth (D).

Dimensions (mm)		Refugio de Juanar, Marbella, Málaga (SPA)			
		♀ topotype	♀ topotype	♀ topotype	♀ topotype
Carapace	L / Wp	7.80 / 8.60	8.80 / 9.40	8.90 / 9.80	9.00 / 9.90
Mesosoma	L	18.50	20.10	22.20	23.50
Metasoma	L	33.55	37.45	38.35	39.90
Segment I	L / W / D	5.00 / 5.00 / 4.40	5.80 / 5.60 / 5.05	5.80 / 5.55 / 4.90	6.00 / 5.45 / 5.10
Segment II	L / W / D	6.00 / 4.75 / 4.45	6.55 / 5.20 / 5.00	6.85 / 5.25 / 4.90	7.20 / 5.35 / 4.95
Segment III	L / W / D	6.20 / 4.50 / 4.30	7.00 / 5.00 / 4.80	7.10 / 5.05 / 4.70	7.50 / 5.20 / 4.90
Segment IV	L / W / D	7.20 / 4.40 / 4.00	7.90 / 4.80 / 4.25	8.30 / 4.80 / 4.30	8.50 / 4.95 / 4.40
Segment V	L / W / D	9.15 / 4.05 / 3.55	10.20 / 4.40 / 3.95	10.30 / 4.60 / 3.90	10.70 / 4.65 / 4.00
Telson	L	8.80	10.10	10.15	10.30
Vesicle	L / W / D	5.00 / 3.85 / 3.45	5.50 / 4.40 / 3.97	5.55 / 4.30 / 4.10	5.60 / 4.30 / 4.00
Aculeus	L	3.80	4.60	4.60	4.70
Pedipalp	L	28.00	31.45	31.90	33.40
Femur	L / W	6.70 / 2.00	7.50 / 2.20	7.55 / 2.30	7.90 / 2.30
Patella	L / W	7.90 / 3.05	8.50 / 3.50	8.75 / 3.55	9.00 / 3.60
Chela	L	13.40	15.45	15.60	16.50
Manus	L / W / D	4.90 / 3.50 / 3.75	5.75 / 4.25 / 4.50	5.85 / 4.05 / 4.25	6.20 / 4.25 / 4.60
Movable finger	L	8.50	9.70	9.75	10.30
Total	**L**	**68.65**	**76.45**	**79.60**	**82.70**

Table III. Measurements of four adult males of *Buthus ibericus*.
Abbreviations: length (L), width (W), posterior width (Wp), depth (D).

Dimensions (mm)		Dehesa Picado ♂ topotype	Benaocaz ♂	Dehesa Picado ♂ topotype	El Picacho ♂
Carapace	L / Wp	6.00 / 6.40	7.00 / 7.50	7.10 / 7.90	7.10 / 7.50
Mesosoma	L	13.50	14.50	17.30	17.30
Metasoma	L	26.00	30.90	30.65	31.00
Segment I	L / W / D	3.90 / 4.40 / 3.85	4.60 / 5.10 / 4.30	4.60 / 4.80 / 4.20	4.60 / 5.00 / 4.40
Segment II	L / W / D	4.60 / 4.20 / 3.80	5.30 / 4.90 / 4.35	5.35 / 4.60 / 4.25	5.40 / 4.85 / 4.40
Segment III	L / W / D	4.80 / 4.17 / 3.80	5.70 / 4.75 / 4.40	5.65 / 4.50 / 4.25	5.65 / 4.70 / 4.30
Segment IV	L / W / D	5.70 / 3.90 / 3.50	6.80 / 4.60 / 4.00	6.70 / 4.40 / 3.95	6.75 / 4.50 / 4.10
Segment V	L / W / D	7.00 / 3.50 / 3.05	8.50 / 4.00 / 3.50	8.35 / 3.97 / 3.45	8.60 / 4.20 / 3.70
Telson	L	6.80	8.05	8.10	8.25
Vesicle	L / W / D	4.00 / 3.10 / 2.65	4.75 / 3.70 / 3.38	4.75 / 3.70 / 3.33	4.80 / 3.98 / 3.43
Aculeus	L	2.80	3.30	3.35	3.45
Pedipalp	L	22.35	26.25	26.76	25.90
Femur	L / W	5.15 / 1.70	6.15 / 1.95	6.18 / 1.98	6.00 / 1.90
Patella	L / W	6.05 / 2.50	7.10 / 2.90	7.08 / 3.00	7.10 / 2.80
Chela	L	11.15	13.00	13.50	12.80
Manus	L / W / D	4.25 / 3.00 / 3.20	5.20 / 3.85 / 4.15	5.20 / 4.00 / 4.10	5.00 / 3.60 / 3.90
Movable finger	L	6.90	7.80	8.30	7.80
Total	**L**	**52.30**	**60.45**	**63.15**	**63.65**

Table IV. Measurements of four adult females of *Buthus ibericus*.
Abbreviations: length (L), width (W), posterior width (Wp), depth (D).

Dimensions (mm)		Dehesa Picado ♀ topotype	Dehesa Picado ♀ topotype	El Picacho ♀	Benaocaz ♀
Carapace	L / Wp	7.30 / 8.20	8.00 / 9.00	8.00 / 8.77	8.70 / 10.10
Mesosoma	L	18.50	18.50	19.70	22.00
Metasoma	L	31.20	33.00	32.00	35.30
Segment I	L / W / D	4.60 / 5.15 / 4.40	4.90 / 5.35 / 4.70	4.90 / 5.55 / 4.80	5.30 / 6.05 / 5.15
Segment II	L / W / D	5.50 / 4.80 / 4.50	5.65 / 5.10 / 4.70	5.60 / 5.20 / 4.80	6.20 / 5.65 / 5.15
Segment III	L / W / D	5.80 / 4.70 / 4.40	6.00 / 5.00 / 4.70	5.80 / 5.05 / 4.85	6.70 / 5.40 / 5.10
Segment IV	L / W / D	6.75 / 4.50 / 4.10	7.20 / 4.80 / 4.40	6.90 / 4.85 / 4.45	7.60 / 5.20 / 4.60
Segment V	L / W / D	8.55 / 4.02 / 3.50	9.25 / 4.50 / 3.95	8.80 / 4.50 / 3.90	9.50 / 4.90 / 4.20
Telson	L	8.40	9.05	9.22	10.00
Vesicle	L / W / D	4.90 / 3.90 / 3.40	5.25 / 4.30 / 3.70	5.10 / 4.30 / 3.70	5.50 / 4.60 / 4.00
Aculeus	L	3.50	3.80	4.12	4.50
Pedipalp	L	27.15	28.55	28.30	31.10
Femur	L / W	6.20 / 2.08	6.50 / 2.30	6.60 / 2.20	7.30 / 2.50
Patella	L / W	7.50 / 3.00	7.90 / 3.40	7.80 / 3.35	8.25 /3.55
Chela	L	13.45	14.15	13.90	15.55
Manus	L / W / D	4.80 / 3.20 / 3.55	5.35 / 3.63 / 4.00	4.95 / 3.62 / 3.98	5.85 / 3.90 / 4.30
Movable finger	L	8.65	8.80	8.95	9.70
Total	**L**	**65.40**	**68.55**	**68.92**	**76.00**

Table V. Measurements of four adult topotypes of *Buthus montanus*.
Abbreviations: length (L), width (W), posterior width (Wp), depth (D).

Dimensions (mm)		Puerto de La Ragua, Sierra Nevada, Granada/Almería (SPA)		
		♂ topotype	♀ topotype	♀ topotype
Carapace	L / Wp	7.10 / 8.20	8.50 / 10.50	10.10 / 1.30
Mesosoma	L	14.50	20.50	22.00
Metasoma	L	34.60	38.80	38.40
Segment I	L / W / D	5.30 / 5.40 / 4.60	6.50 / 5.60 / 4.90	6.00 / 5.90 / 5.10
Segment II	L / W / D	6.40 / 5.05 / 4.60	6.80 / 5.30 / 5.50	7.00 / 5.30 / 5.10
Segment III	L / W / D	6.50 / 4.90 / 4.50	7.00 / 5.10 / 4.90	7.10 / 5.20 / 4.90
Segment IV	L / W / D	7.70 / 4.60 / 4.20	8.50 / 3.90 / 4.30	8.30 / 4.40 / 4.30
Segment V	L / W / D	8.70 / 4.40 / 3.50	11.00 / 5.00 / 3.70	10.00 / 4.80 / 3.80
Telson	L	8.00	9.50	9.90
Vesicle	L / W / D	4.50 / 3.80 / 3.30	5.30 / 4.60 / 4.00	5.30 / 4.90 / 4.50
Aculeus	L	3.50	4.20	4.60
Pedipalp	L	27.60	31.45	32.80
Femur	L / W	6.50 / 2.00	7.60 / 2.30	7.70 / 3.30
Patella	L / W	7.40 / 2.70	9.00 / 3.30	8.90 / 3.40
Chela	L	13.70	14.85	16.20
Manus	L / W / D	5.00 / 3.05 / 3.40	6.30 / 4.30 / 4.65	6.50 / 4.35 / 4.70
Movable finger	L	8.70	8.55	9.70
Total	**L**	**64.20**	**77.30**	**80.40**

Table VI. Measurements of four adult males of *Buthus occitanus*.
Abbreviations: length (L), width (W), posterior width (Wp), depth (D).

Dimensions (mm)		Souvignargues (FRA) ♂ neotype	Javier (SPA) ♂	Gonfaron (FRA) ♂	Javier (SPA) ♂
Carapace	L / Wp	6.00 / 6.25	6.10 / 6.70	6.50 / 7.00	6.75 / 7.30
Mesosoma	L	12.00	13.25	13.50	15.00
Metasoma	L	29.90	29.30	32.78	34.25
Segment I	L / W / D	4.60 / 4.30 / 4.00	4.60 / 4.48 / 4.00	5.25 / 4.75 / 4.15	5.50 / 5.20 / 4.50
Segment II	L / W / D	5.45 / 4.10 / 3.80	5.30 / 4.18 /3.90	6.05 / 4.50 / 4.00	6.30 / 5.00 / 4.50
Segment III	L / W / D	5.85 / 4.00 / 3.60	5.50 / 4.05 / 3.70	6.10 / 4.38 / 3.95	6.55 / 4.75 / 4.40
Segment IV	L / W / D	6.55 / 3.80 / 3.35	6.40 / 3.85 / 3.45	7.18 / 4.15 / 3.65	7.30 / 4.40 / 3.90
Segment V	L / W / D	7.45 / 3.30 / 2.90	7.50 / 3.40 / 3.00	8.20 / 3.70 / 3.10	8.60 / 3.75 / 3.50
Telson	L	6.50	6.80	7.15	7.60
Vesicle	L / W / D	3.50 / 2.70 / 2.55	3.70 / 2.85 / 2.60	3.90 / 3.08 / 2.90	4.10 / 3.20 / 2.95
Aculeus	L	3.00	3.10	3.25	3.50
Pedipalp	L	21.55	22.30	24.05	25.00
Femur	L / W	5.20 / 1.48	5.40 / 1.52	5.90 / 1.55	6.05 / 1.70
Patella	L / W	6.00 / 2.15	6.10 / 2.25	6.60 / 2.30	6.85 / 2.50
Chela	L	10.35	10.80	11.55	12.10
Manus	L / W / D	3.75 / 2.10 / 2.45	3.80 / 2.15 / 2.53	4.10 / 2.27 / 2.60	4.30 / 2.48 / 2.80
Movable finger	L	6.60	7.00	7.45	7.80
Total	**L**	**54.40**	**55.45**	**59.93**	**63.60**

Table VII. Measurements of four adult females of *Buthus occitanus*.
Abbreviations: length (L), width (W), posterior width (Wp), depth (D).

Dimensions (mm)		Gonfaron (FRA)	Souvignargues (FRA)		Javier (SPA)
		♀	♀ topotype	♀ topotype	♀
Carapace	L / Wp	6.40 / 7.40	7.40 / 7.90	7.60 / 8.40	7.80 / 8.85
Mesosoma	L	13.00	15.70	15.90	19.10
Metasoma	L	28.65	30.30	31.25	33.95
Segment I	L / W / D	4.40 / 4.18 / 3.70	4.75 / 4.50 / 4.20	4.90 / 4.60 / 4.28	5.25 / 5.15 / 4.70
Segment II	L / W / D	5.05 / 3.90 / 3.60	5.00 / 4.20 / 4.00	5.50 / 4.30 / 4.10	6.10 / 4.90 / 4.60
Segment III	L / W / D	5.20 / 3.85 / 3.55	5.70 / 4.10 / 3.90	5.80 / 4.15 / 3.95	6.20 / 4.70 / 4.55
Segment IV	L / W / D	6.30 / 3.70 / 3.25	6.75 / 4.00 / 3.50	6.80 / 4.10 / 3.50	7.40 / 4.55 / 4.05
Segment V	L / W / D	7.70 / 3.50 / 2.98	8.10 / 3.80 / 3.15	8.25 / 4.05 / 3.20	9.00 / 4.45 / 3.55
Telson	L	7.30	7.90	8.20	8.90
Vesicle	L / W / D	3.80 / 3.20 / 2.85	4.10 / 3.50 / 3.18	4.20 / 3.60 / 3.25	4.70 / 4.10 / 3.60
Aculeus	L	3.50	3.80	4.00	4.20
Pedipalp	L	24.60	26.50	27.15	29.60
Femur	L / W	5.70 / 1.65	6.10 / 1.70	6.35 / 1.80	7.00 / 1.95
Patella	L / W	6.70 / 2.50	7.20 / 2.70	7.30 / 2.80	7.90 / 3.00
Chela	L	12.20	13.20	13.50	14.70
Manus	L / W / D	4.60 / 2.77 / 3.27	4.90 / 3.21 / 3.60	5.00 / 3.30 / 3.75	5.40 / 3.65 / 4.17
Movable finger	L	7.60	8.30	8.50	9.30
Total	**L**	**55.35**	**61.30**	**62.95**	**69.75**

Table VIII. Measurements of the adult types of *Buthus alacanti* sp. n. and *Buthus garcialorcai* sp. n.
Abbreviations: length (L), width (W), posterior width (Wp), depth (D).

Dimensions (mm)		*Buthus alacanti* sp. n.		*Buthus garcialorcai* sp. n.	
		♂ holotype	♀ paratopotype	♂ holotype	♀ paratopotype
Carapace	L / Wp	7.40 / 7.40	7.30 / 8.20	6.40 / 7.30	8.00 / 9.40
Mesosoma	L	14.40	17.00	16.00	19.70
Metasoma	L	36.40	32.50	33.60	35.30
Segment I	L / W / D	5.90 / 5.35 / 4.70	4.90 / 4.80 / 4.25	5.20 / 5.30 / 4.50	5.50 / 5.60 / 4.90
Segment II	L / W / D	6.70 / 5.00 / 4.70	5.70 / 4.60 / 4.20	6.20 / 4.85 / 4.50	6.30 / 5.30 / 4.80
Segment III	L / W / D	7.05 / 4.60 / 4.50	6.10 / 4.60 / 4.20	6.40 / 4.70 / 4.40	6.50 / 5.10 / 4.70
Segment IV	L / W / D	8.05 / 4.45 / 4.10	7.10 / 4.40 / 3.90	7.30 / 4.30 / 4.00	7.50 / 4.90 / 4.30
Segment V	L / W / D	8.70 / 4.25 / 3.40	8.70 / 4.30 / 3.40	8.50 / 4.00 / 3.40	9.50 / 4.70 / 3.70
Telson	L	8.00	8.10	7.70	9.20
Vesicle	L / W / D	4.30 / 3.65 / 3.40	4.20 / 3.95 / 3.40	4.50 / 3.50 / 3.25	4.70 / 4.30 / 3.70
Aculeus	L	3.70	3.90	3.20	4.50
Pedipalp	L	26.00	27.60	24.90	29.95
Femur	L / W	6.50 / 1.90	6.50 / 2.00	6.10 / 1.80	7.25 / 2.00
Patella	L / W	7.30 / 2.80	7.20 / 3.00	6.90 / 2.60	8.00 / 3.30
Chela	L	12.20	13.90	11.90	14.70
Manus	L / W / D	4.70 / 2.85 / 3.20	5.50 / 3.80 / 3.90	4.50 / 2.40 / 2.60	5.60 / 3.90 / 4.60
Movable finger	L	7.50	8.40	7.40	9.10
Total	**L**	**66.20**	**64.90**	**63.70**	**72.20**

Table IX. Measurements of four adult types of *Buthus baeticus* sp. n.
Abbreviations: length (L), width (W), posterior width (Wp), depth (D).

Dimensions (mm)		Morón	Morón	Navahermosa	Morón
		♂ holotype	♂ paratopotype	♀ paratype	♀ paratopotype
Carapace	L / Wp	6.80 / 7.10	7.30 / 7.90	6.80 / 7.30	8.00 / 8.55
Mesosoma	L	16.10	18.00	16.00	20.00
Metasoma	L	33.05	35.00	28.65	33.30
Segment I	L / W / D	5.20 / 4.90 / 4.30	5.50 / 5.15 / 4.60	4.15 / 4.30 / 3.80	5.00 / 5.05 / 4.35
Segment II	L / W / D	5.90 / 4.50 / 4.05	6.30 / 4.65 / 4.50	5.10 / 4.10 / 3.70	6.00 / 4.80 / 4.30
Segment III	L / W / D	6.25 / 4.40 / 4.00	6.70 / 4.90 / 4.30	5.25 / 3.96 / 3.70	6.20 / 4.65 / 4.30
Segment IV	L / W / D	7.10 / 4.30 / 3.65	7.60 / 4.45 / 4.10	6.15 / 3.80 / 3.30	7.10 / 4.50 / 3.80
Segment V	L / W / D	8.60 / 3.60 / 3.20	8.90 / 4.05 / 3.60	8.00 / 3.40 / 3.00	9.00 / 4.15 / 3.55
Telson	L	7.90	8.50	7.35	9.00
Vesicle	L / W / D	4.40 / 3.40 / 3.10	4.80 / 3.52 / 3.40	3.95 / 3.20 / 2.82	5.00 / 3.90 / 3.50
Aculeus	L	3.50	3.70	3.40	4.00
Pedipalp	L	24.95	26.30	23.55	28.80
Femur	L / W	5.95 / 1.80	6.30 / 2.00	5.50 / 1.75	6.60 / 2.20
Patella	L / W	6.80 / 2.70	7.20 / 2.85	6.50 / 2.54	7.90 / 3.15
Chela	L	12.20	12.80	11.55	14.30
Manus	L / W / D	4.50 / 3.00 / 3.20	4.80 / 3.33 / 3.40	4.35 / 2.57 / 2.90	5.40 / 3.45 / 3.80
Movable finger	L	7.70	8.00	7.20	8.90
Total	**L**	**63.85**	**68.80**	**58.80**	**70.30**

Table X. Measurements of four adult types of *Buthus delafuentei* sp. n.
Abbreviations: length (L), width (W), posterior width (Wp), depth (D).

Dimensions (mm)		Pinos de Hinojos, Hinojos, Huelva (SPA)			
		♂ paratopotype	♂ holotype	♀ paratopotype	♀ paratopotype
Carapace	L / Wp	6.70 / 6.80	7.50 / 7.60	6.60 / 7.30	7.50 / 7.90
Mesosoma	L	16.00	18.50	14.00	17.40
Metasoma	L	34.50	37.90	29.60	32.75
Segment I	L / W / D	5.40 / 4.65 / 4.07	6.00 / 5.10 / 4.40	4.50 / 4.20 / 3.80	5.10 / 4.80 / 4.30
Segment II	L / W / D	6.40 / 4.45 / 4.00	8.00 / 4.90 / 4.30	5.30 / 4.00 / 3.60	5.90 / 4.50 / 4.08
Segment III	L / W / D	6.70 / 4.25 / 3.90	7.10 / 4.80 / 4.10	5.60 / 3.90 / 3.80	6.15 / 4.40 / 4.10
Segment IV	L / W / D	7.70 / 4.05 / 3.50	8.30 / 4.50 / 3.70	6.50 / 3.80 / 3.15	7.10 / 4.30 / 3.50
Segment V	L / W / D	8.30 / 3.85 / 3.20	8.50 / 4.20 / 3.50	7.70 / 3.90 / 3.00	8.50 / 4.50 / 3.40
Telson	L	7.60	8.35	7.90	8.60
Vesicle	L / W / D	4.20 / 3.35 / 3.00	4.70 / 3.60 / 3.30	4.20 / 3.40 / 3.10	4.40 / 3.70 / 3.50
Aculeus	L	3.40	3.65	3.70	4.20
Pedipalp	L	24.90	27.70	24.35	26.80
Femur	L / W	5.80 / 1.75	6.50 / 1.85	5.60 / 1.80	6.10 / 1.95
Patella	L / W	6.80 / 2.60	7.50 / 2.80	6.75 / 2.60	7.10 / 2.95
Chela	L	12.30	13.70	12.00	13.60
Manus	L / W / D	5.00 / 3.50 / 3.80	5.50 / 3.90 / 4.20	4.50 / 2.50 / 2.90	5.10 / 2.90 / 3.30
Movable finger	L	7.30	8.20	7.50	8.50
Total	**L**	**64.80**	**72.25**	**58.10**	**66.25**

Table XI. Measurements of the adult types of *Buthus manchego* sp. n.
Abbreviations: length (L), width (W), posterior width (Wp), depth (D).

Dimensions (mm)		Peñarroya, Lagunas de Ruidera, Ciudad Real (SPA)		
		♂ holotype	♀ paratype	♀ paratype
Carapace	L / Wp	8.10 / 8.30	9.10 / 10.10	9.20 / 10.10
Mesosoma	L	19.00	21.50	21.60
Metasoma	L	44.50	38.90	39.35
Segment I	L / W / D	7.10 / 6.20 / 5.30	5.90 / 5.70 / 5.00	6.10 / 5.65 / 5.00
Segment II	L / W / D	8.00 / 5.85 / 5.30	6.80 / 5.25 / 5.00	7.20 / 5.30 / 4.95
Segment III	L / W / D	8.30 / 5.70 / 5.30	7.30 / 5.20 / 4.90	7.40 / 5.25 / 4.90
Segment IV	L / W / D	9.60/ 5.10 / 4.90	8.40 / 5.10 / 4.40	8.45 / 5.10 / 4.40
Segment V	L / W / D	11.50 / 4.50 / 4.00	10.50 / 5.00 / 3.80	10.20 / 5.00 / 3.90
Telson	L	9.10	9.50	9.80
Vesicle	L / W / D	5.10 / 4.35 / 3.90	5.10 / 4.40 / 3.80	5.30 / 4.75 / 4.15
Aculeus	L	4.00	4.40	4.50
Pedipalp	L	29.05	31.30	32.05
Femur	L / W	7.30 / 2.05	7.45 / 2.30	7.50 / 2.40
Patella	L / W	8.00 / 2.90	8.50 / 2.50	8.55 / 2.85
Chela	L	13.75	15.35	16.00
Manus	L / W / D	5.25 / 3.40 / 3.70	6.15 / 4.40 / 4.75	6.40 / 4.90 / 5.20
Movable finger	L	8.50	9.20	9.60
Total	**L**	**80.70**	**79.00**	**79.95**

Table XII. Measurements of four adult types of *Buthus serrano* sp. n.
Abbreviations: length (L), width (W), posterior width (Wp), depth (D).

Dimensions (mm)		Orce, Galera, Granada (SPA)			
		♂ paratopotype	♂ holotype	♀ paratopotype	♀ paratopotype
Carapace	L / Wp	6.75 / 7.50	6.80 / 7.40	6.60 / 7.90	7.70 / 9.00
Mesosoma	L	15.50	16.50	16.40	18.00
Metasoma	L	35.25	36.25	28.80	34.60
Segment I	L / W / D	5.60 / 5.00 / 4.40	5.65 / 5.00 / 4.20	4.40 / 4.30 / 4.00	5.40 / 5.15 / 4.50
Segment II	L / W / D	6.50 / 4.80 / 4.20	6.70 / 4.60 / 4.20	5.30 / 4.10 / 3.90	6.35 / 4.75 / 4.45
Segment III	L / W / D	6.70 / 4.60 / 4.10	7.00 / 4.50 / 4.05	5.50 / 4.00 / 3.70	6.50 / 4.70 / 4.40
Segment IV	L / W / D	7.80 / 4.30 / 3.75	7.90 / 4.10 / 3.75	6.10 / 4.00 / 3.20	7.35 / 4.70 / 3.90
Segment V	L / W / D	8.65 / 3.65 / 3.20	9.00 / 3.60 / 3.30	7.50 / 3.65 / 3.00	9.00 / 4.50 / 3.50
Telson	L	7.40	7.50	7.70	8.80
Vesicle	L / W / D	4.20 / 3.30 / 3.00	4.20 / 3.45 / 3.32	4.20 / 3.50 / 3.20	4.70 / 4.10 / 3.70
Aculeus	L	3.20	3.30	3.50	4.10
Pedipalp	L	25.05	25.25	23.10	28.80
Femur	L / W	6.25 / 1.65	6.30 / 2.70	5.60 / 1.80	6.70 / 2.00
Patella	L / W	6.95 / 2.40	6.90 / 2.55	5.70 / 2.70	7.80 / 3.00
Chela	L	11.85	12.05	11.80	14.30
Manus	L / W / D	4.30 / 2.40 / 2.82	4.55 / 2.55 / 2.70	4.50 / 3.00 / 3.30	5.60 / 3.92 / 4.25
Movable finger	L	7.55	7.50	7.30	8.70
Total	**L**	**64.90**	**67.05**	**59.50**	**69.10**

Table XIII. Comparison amongst the 10 nominal species of *Buthus* from Western Europe, based upon 14 selected morphometric ratios of adults of both sexes.
Abbreviations: length (L), width (W), depth (D).

Ratios	*B. alacanti*	*B. baeticus*	*B. delafuentei*	*B. elongatus*	*B. garcialorcai*	*B. ibericus*	*B. manchego*	*B. montanus*	*B. occitanus*	*B. serrano*
♂ pedipalp L / carapace L	3.51	3.60–3.67	3.69–3.72	3.82–3.89	3.89	3.65–3.77	3.59	3.89	3.59–3.70	3.71
♀ pedipalp L / carapace L	3.78	3.46–3.60	3.57–3.69	3.57–3.71	3.74	3.54–3.72	3.44–3.48	3.25–3.70	3.57–3.84	3.50–3.74
♂ pedipalp chela L/W	4.28	3.84–4.07	3.51–3.52	5.16–5.53	4.96	3.37–3.72	4.04	4.49	4.88–5.09	4.73–4.94
♀ pedipalp chela L/W	3.66	4.14–4.53	4.69–4.80	3.64–3.88	3.77	3.84–4.20	3.27–3.49	3.45–3.72	4.03–4.40	3.65–3.93
♂ pedipalp manus L/W	1.65	1.44–1.50	1.41–1.43	1.81–1.91	1.87	1.30–1.42	1.54	1.64	1.73–1.81	1.78–1.79
♀ pedipalp manus L/W	1.45	1.57–1.71	1.76–1.80	1.35–1.46	1.44	1.37–1.50	1.31–1.40	1.47–1.49	1.48–1.66	1.43–1.50
♂ pedipalp chela L / movable finger L	1.63	1.58–1.60	1.67–1.68	1.53–1.55	1.61	1.62–1.67	1.62	1.57	1.54–1.57	1.57–1.61
♀ pedipalp chela L / movable finger L	1.65	1.60–1.61	1.59–1.60	1.58–1.60	1.62	1.55–1.61	1.66–1.67	1.67–1.74	1.58–1.61	1.62–1.64
♂ pedipalp manus W / patella W	1.02	1.11–1.17	1.35–1.39	0.90–0.99	0.92	1.20–1.33	1.17	1.13	0.96–0.99	1.00
♀ pedipalp manus W / patella W	1.27	1.01–1.10	0.96–0.98	1.14–1.18	1.18	1.07–1.10	1.72–1.76	1.28–1.30	1.11–1.22	1.11–1.31
♂ metasoma L / carapace L	4.92	4.79–4.86	5.05–5.15	5.38–5.48	5.25	4.32–4.41	5.49	4.87	4.80–5.07	5.22–5.33
♀ metasoma L / carapace L	4.45	4.16–4.21	4.37–4.48	4.26–4.43	4.41	4.00–4.27	4.27–4.28	3.80–4.56	4.09–4.48	4.36–4.49
♂ metasomal segment I L/W	1.10	1.06–1.07	1.16–1.18	1.14–1.16	0.98	0.89–0.96	1.15	0.98	1.03–1.11	1.12–1.13
♀ metasomal segment I L/W	1.02	0.96–0.99	1.06–1.07	1.00–1.10	0.98	0.88–0.92	1.03–1.08	1.02–1.16	1.02–1.07	1.02–1.05
♂ metasomal segment I L/D	1.26	1.20–1.21	1.33–1.36	1.30–1.35	1.16	1.01–1.09	1.34	1.15	1.15–1.26	1.27–1.35
♀ metasomal segment I L/D	1.16	1.09–1.15	1.18–1.19	1.14–1.18	1.12	1.02–1.05	1.18–1.22	1.18–1.33	1.12–1.19	1.10–1.20
♂ metasomal segment IV L/W	1.81	1.65–1.71	1.84–1.90	1.90–1.93	1.70	1.46–1.52	1.88	1.67	1.66–1.73	1.81–1.93
♀ metasomal segment IV L/W	1.61	1.58–1.62	1.65–1.71	1.64–1.72	1.53	1.42–1.50	1.65–1.66	1.89–2.18	1.63–1.70	1.52–1.56
♂ metasomal segment IV L/D	1.96	1.85–1.95	2.20–2.24	1.98–2.17	1.82	1.63–1.70	1.96	1.83	1.86–1.97	2.08–2.11
♀ metasomal segment IV L/D	1.82	1.86–1.87	2.03–2.06	1.80–1.93	1.74	1.55–1.65	1.91–1.92	1.93–1.98	1.83–1.94	1.88–1.91
♂ metasomal segment V L/W	2.05	2.20–2.39	2.02–2.16	2.51–2.60	2.12	2.00–2.12	2.56	1.98	2.21–2.29	2.37–2.50
♀ metasomal segment V L/W	2.02	2.17–2.35	1.89–1.97	2.26–2.32	2.02	1.94–2.13	2.04–2.10	2.08–2.20	2.02–2.20	2.00–2.05
♂ metasomal segment V L/D	2.56	2.47–2.69	2.43–2.59	2.65–2.76	2.50	2.29–2.43	2.87	2.49	2.46–2.65	2.70–2.73
♀ metasomal segment V L/D	2.56	2.54–2.67	2.50–2.57	2.58–2.67	2.57	2.26–2.44	2.62–2.76	2.63–2.97	2.54–2.58	2.50–2.57
♂ telson L/W	2.19	2.32–2.41	2.27–2.32	2.44–2.55	2.20	2.07–2.19	2.09	2.11	2.32–2.41	2.17–2.24
♀ telson L/W	2.05	2.30–2.31	2.31–2.32	2.29–2.40	2.14	2.10–2.17	2.06–2.16	2.02–2.07	2.17–2.28	2.15–2.20
♂ telson L/D	2.35	2.50–2.55	2.53–2.54	2.42–2.55	2.37	2.38–2.57	2.33	2.42	2.47–2.62	2.47–2.51
♀ telson L/D	2.38	2.57–2.61	2.46–2.55	2.54–2.57	2.49	2.45–2.50	2.36–2.50	2.20–2.37	2.47–2.56	2.38–2.41

Table XIV. Pectinal tooth count variation in the 10 nominal species of *Buthus* from Western Europe, based upon data taken from the specimens examined herein. Abbreviations: number of pectines (N), average (Ave.), standard deviation (SD).

Species	Sex	N	Pectinal tooth count															Ave.	SD
			21	22	23	24	25	26	27	28	29	30	31	32	33	34	35		
B. alacanti **sp. n.**	♂♂	6												4	2			32.33	± 0.47
	♀♀	4								4								28.00	± 0.00
B. baeticus **sp. n.**	♂♂	12											1	6	5			32.33	± 0.62
	♀♀	18							4	6	6	2						28.33	± 0.94
B. delafuentei **sp. n.**	♂♂	10										1	2	3		2	2	32.00	± 1.32
	♀♀	6						3	1	2								26.83	± 0.90
B. elongatus	♂♂	28											4	12	6	5	1	32.54	± 1.05
	♀♀	42					1	7	11	14	4	4	1					27.69	± 1.32
B. garcialorcai **sp. n.**	♂	2											2					31.00	± 0.00
	♀	2						1	1									26.50	± 0.50
B. ibericus	♂♂	32						1	6	5	10	6	4					28.81	± 1.36
	♀♀	32	1	7	6	9	7	2										23.62	± 1.29
B. manchego **sp. n.**	♂♂	4												1	2	1		33.00	± 0.71
	♀♀	6								2	2	1	1					29.17	± 1.07
B. montanus	♂♂	4								1	1	2						29.25	± 0.83
	♀♀	10			2		5	1		2								25.30	± 1.62
B. occitanus	♂♂	18											7	5	3	3		32.11	± 1.10
	♀♀	30						2	5	14	7	2						28.07	± 0.96
B. serrano **sp. n.**	♂♂	6											1	2	3			32.33	± 0.75
	♀♀	6							3	2	1							27.67	± 0.75

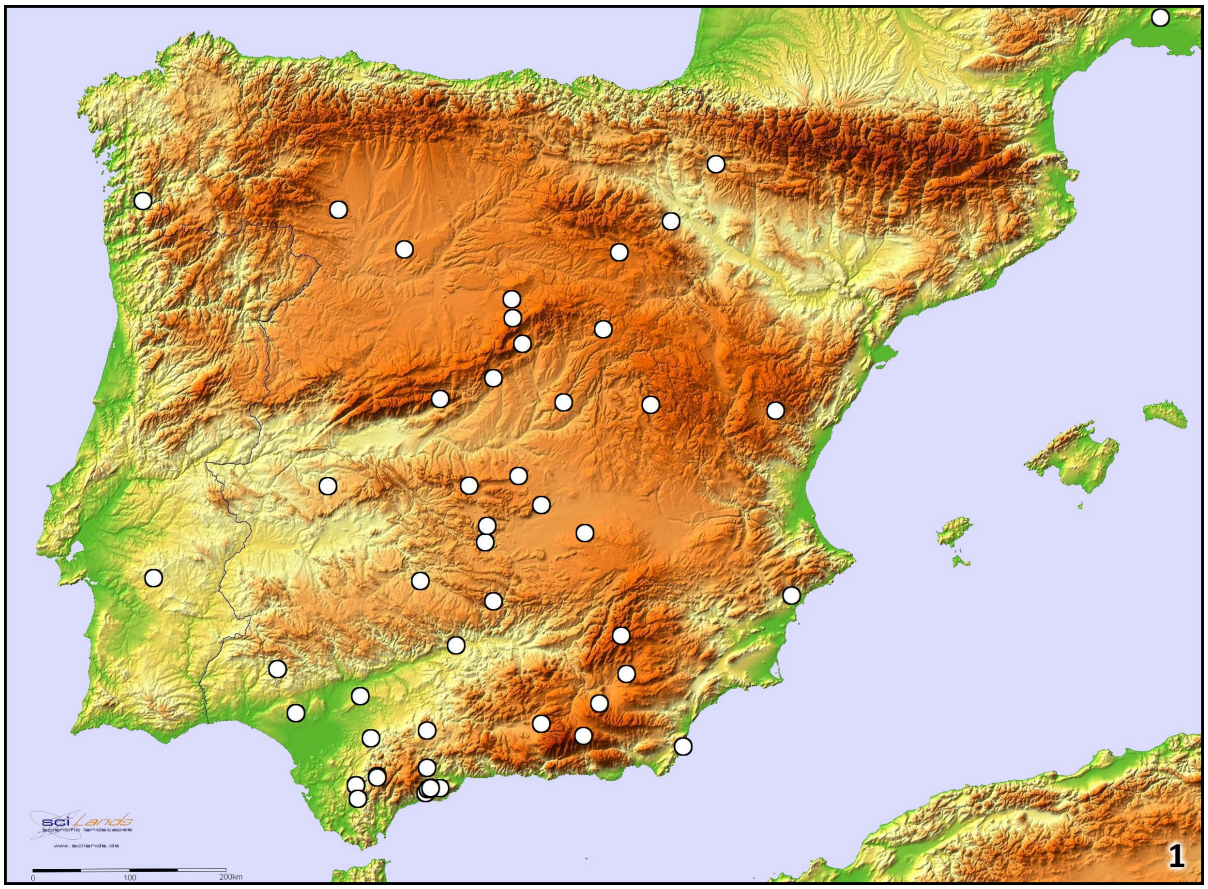


Fig. 1. Iberian Peninsula, showing all localities sampled there during the present study. See the text for additional sites in France.

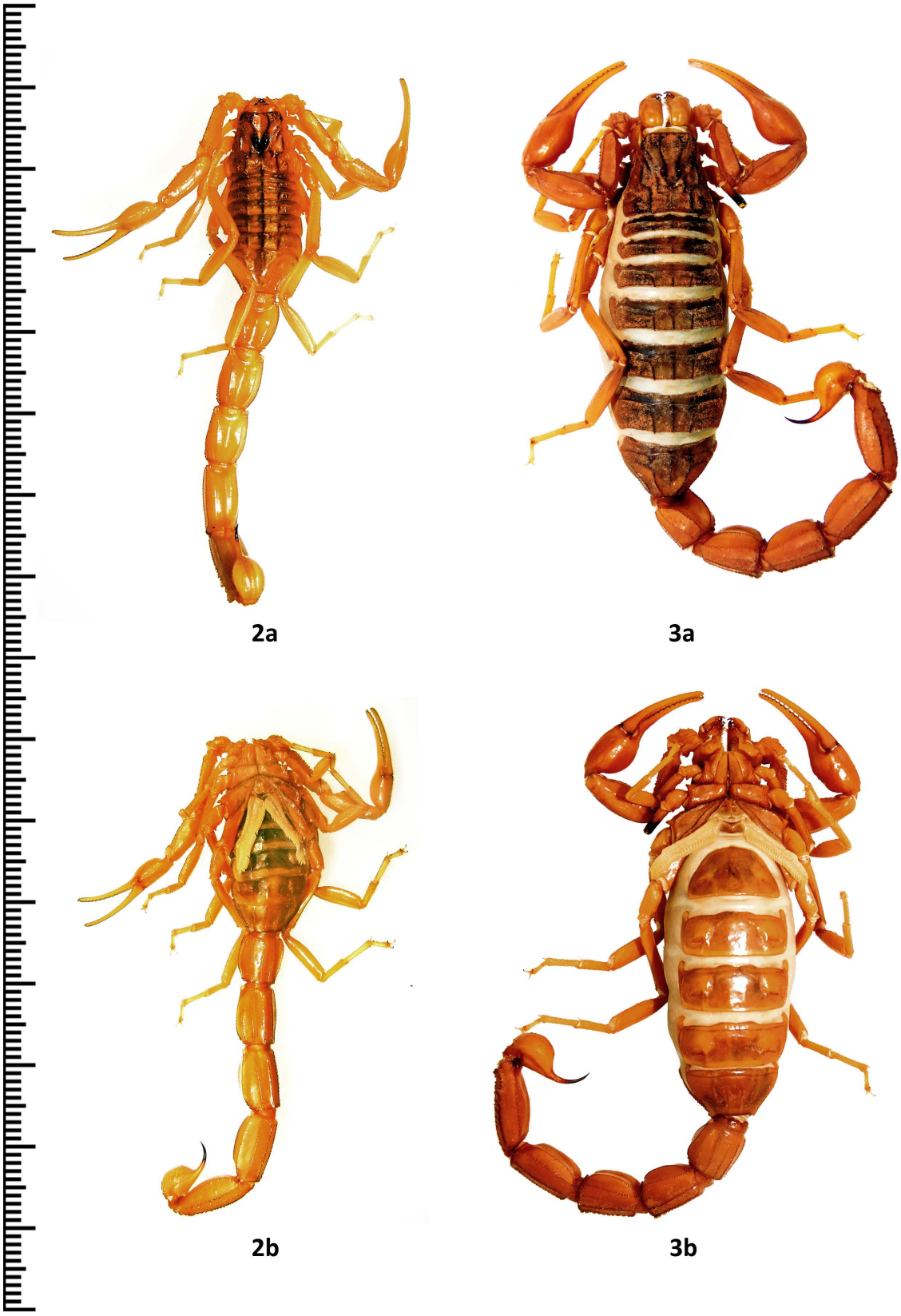


Fig. 2–3. *Buthus elongatus*, adult male topotype (**2**) and adult female topotype (**3**), habitus: **a)** dorsal; **b)** ventral. Scale bar in millimeters (mm).

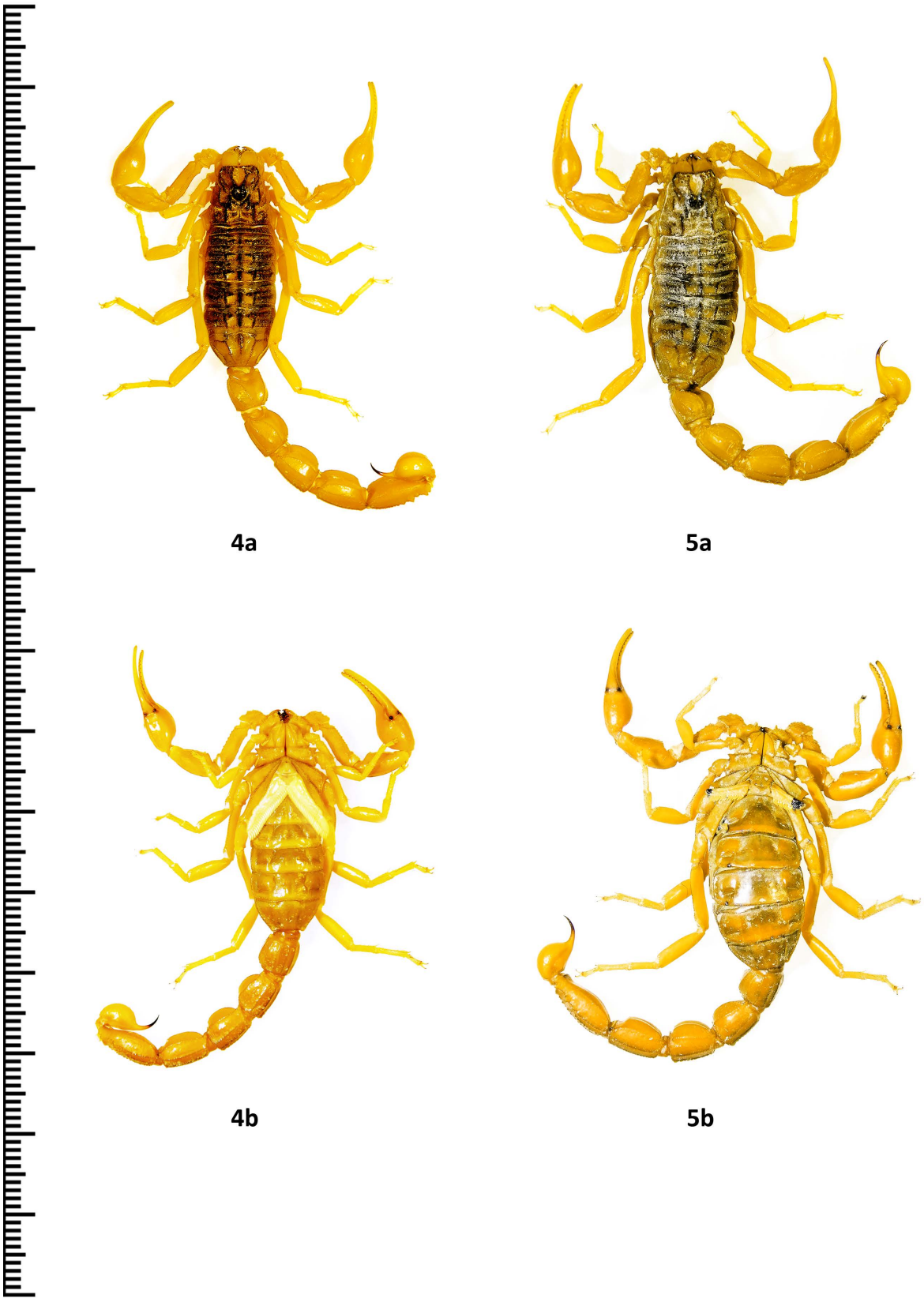


Fig. 4–5. *Buthus ibericus*, adult male topotype (**4**) and adult female topotype (**5**), habitus: **a)** dorsal; **b)** ventral. Scale bar in millimeters (mm).

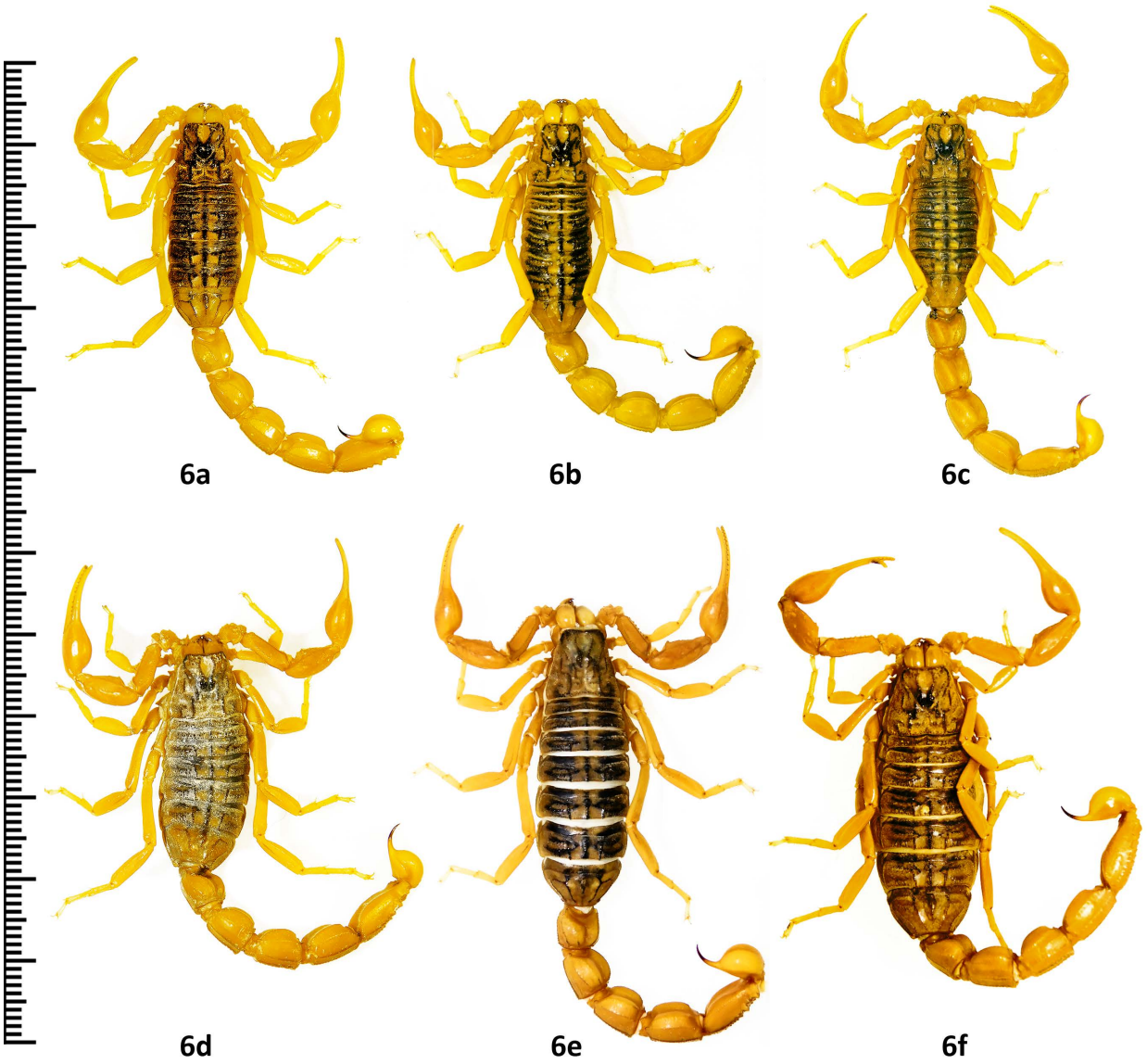


Fig. 6. *Buthus ibericus*, dorsal habitus of adults from three localities scattered across its entire range, showing morphological homogeneity: **a)** adult male topotype; **b)** adult male from El Picacho; **c)** adult male from Benaocaz; **d)** adult female topotype; **e)** adult female from El Picacho; **f)** adult female from Benaocaz. Scale bar in millimeters (mm).

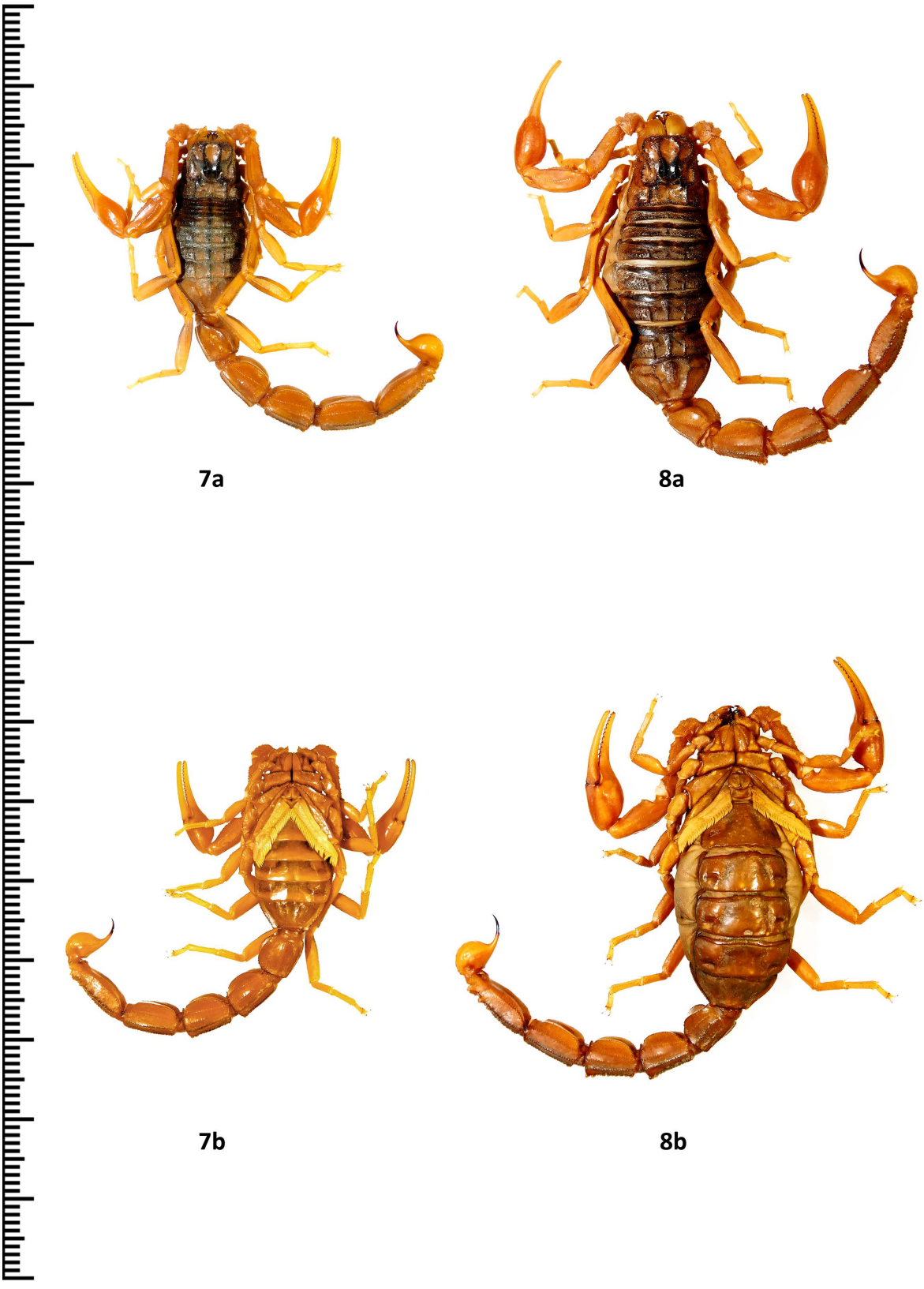


Fig. 7–8. *Buthus montanus*, adult male topotype (**7**) and adult female topotype (**8**), habitus: **a)** dorsal; **b)** ventral. Scale bar in millimeters (mm).

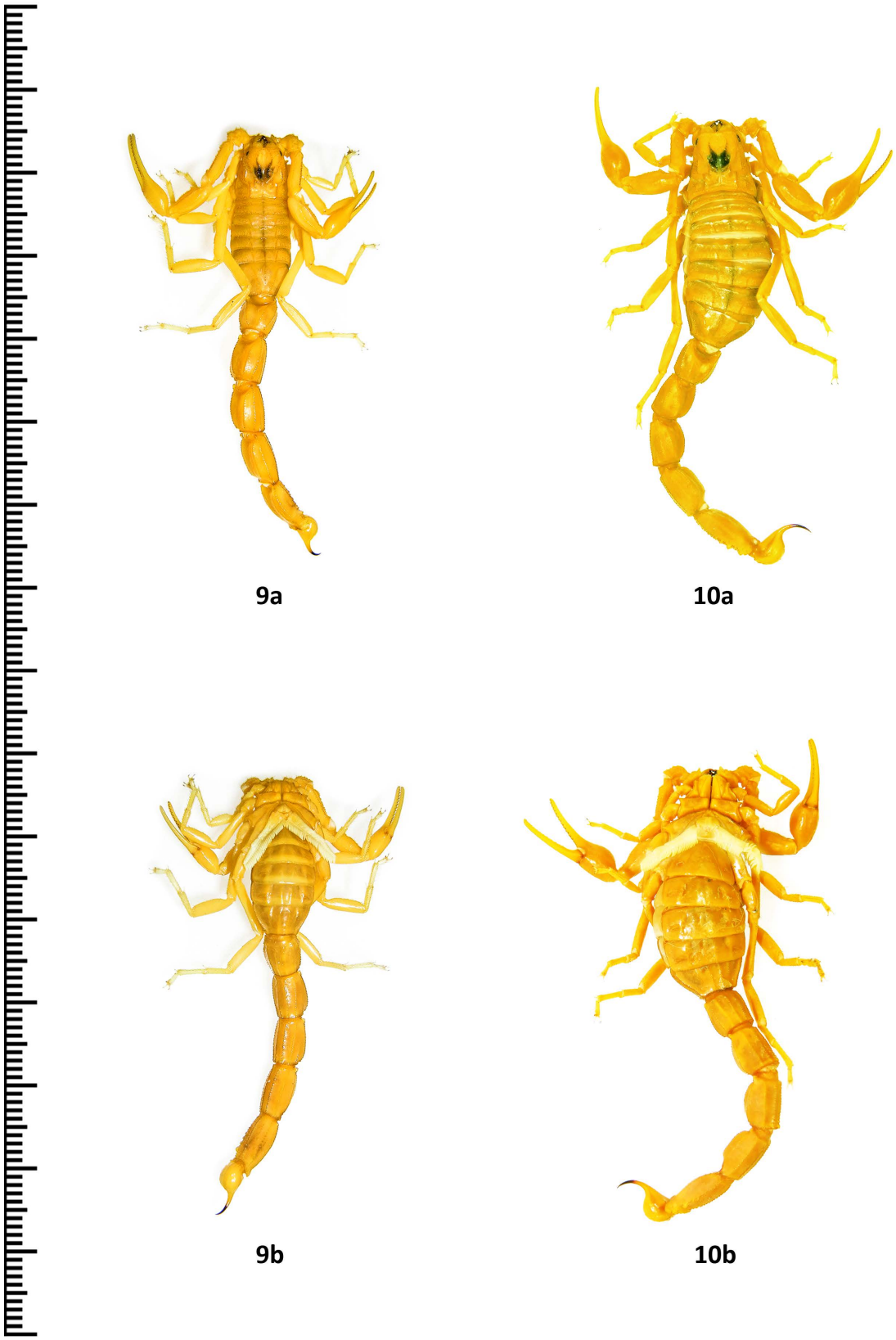


Fig. 9–10. *Buthus occitanus* from Souvignargues (France), adult male neotype (**9**) and adult female topotype (**10**), habitus: **a)** dorsal; **b)** ventral. Scale bar in millimeters (mm).

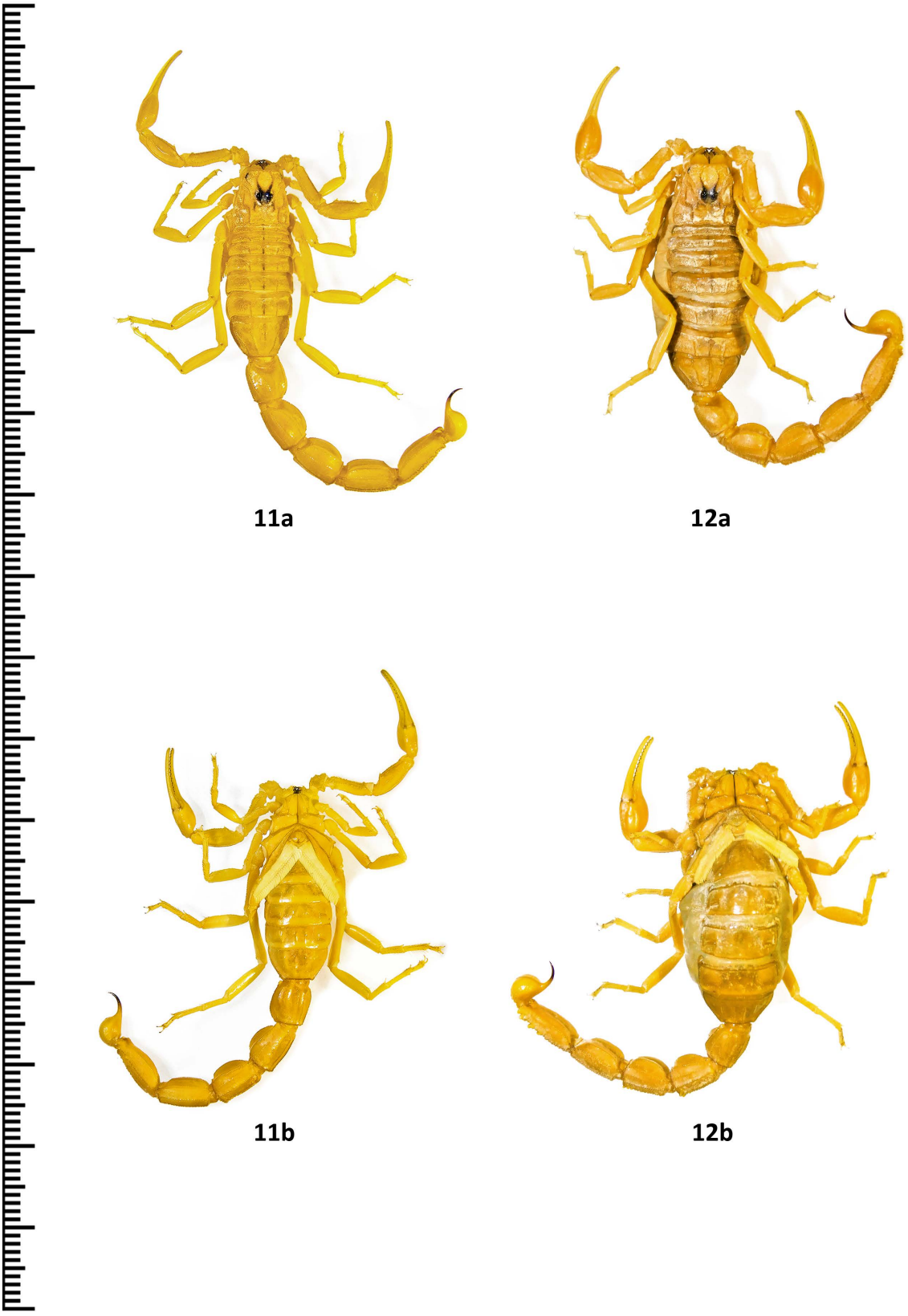


Fig. 11–12. *Buthus occitanus* from Javier (Spain), adult male neotype of *Buthus europaeus tridentatus* (**11**) and adult female (**12**), habitus: **a)** dorsal; **b)** ventral. Scale bar in millimeters (mm).

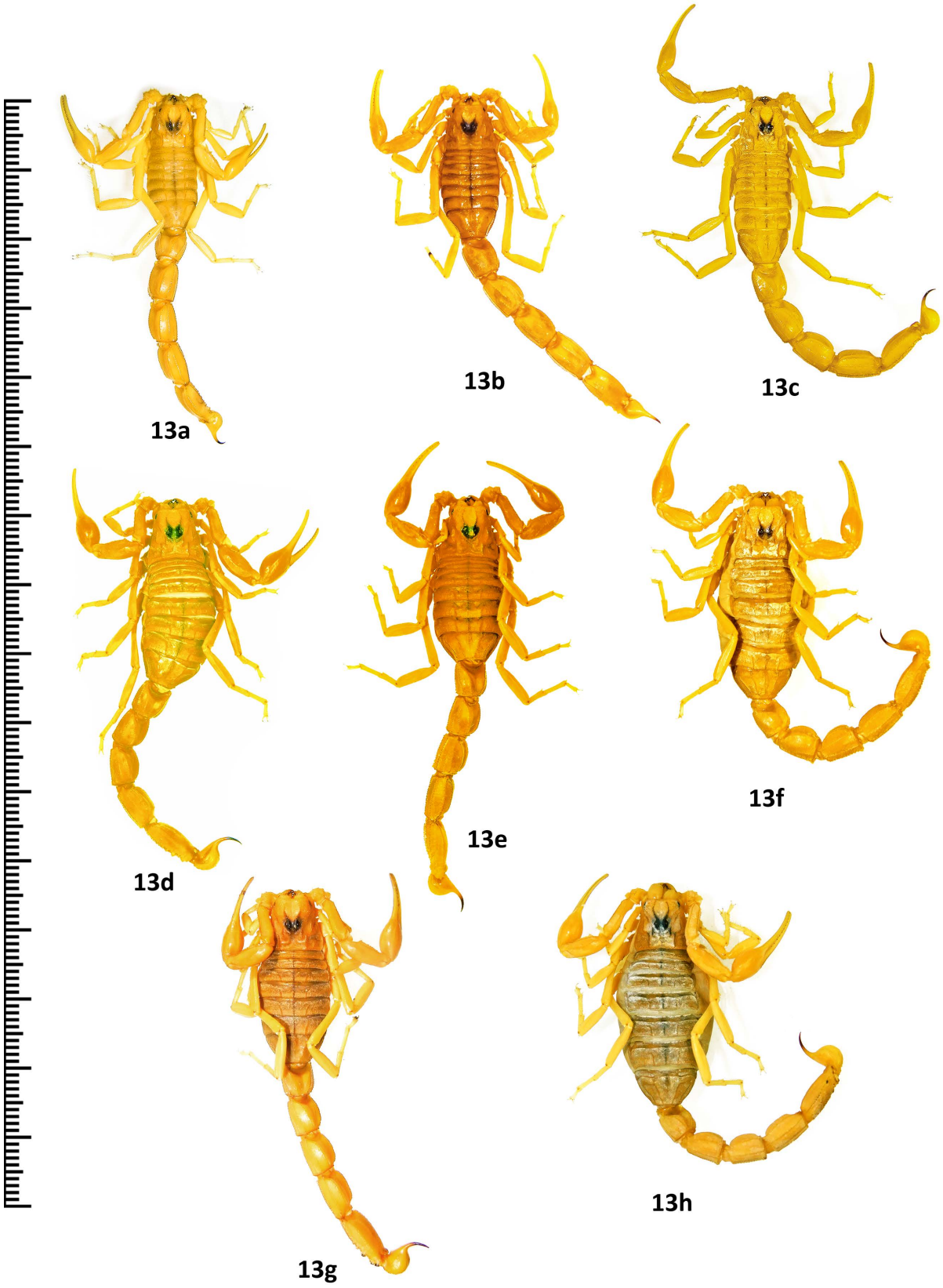


Fig. 13. *Buthus occitanus*, dorsal habitus of adults from five localities scattered across its entire range, showing morphological homogeneity: **a)** adult male neotype; **b)** adult male from Gonfaron (France); **c)** adult male from Javier (Spain, neotype of *Buthus europaeus tridentatus*); **d)** adult female topotype; **e)** adult female from Gonfaron (France); **f)** adult female from Javier (Spain); **g)** adult female from L'Isle-sur-la-Sorgue (France); **h)** adult female from Cintruéñigo (Spain). Scale bar in millimeters (mm).

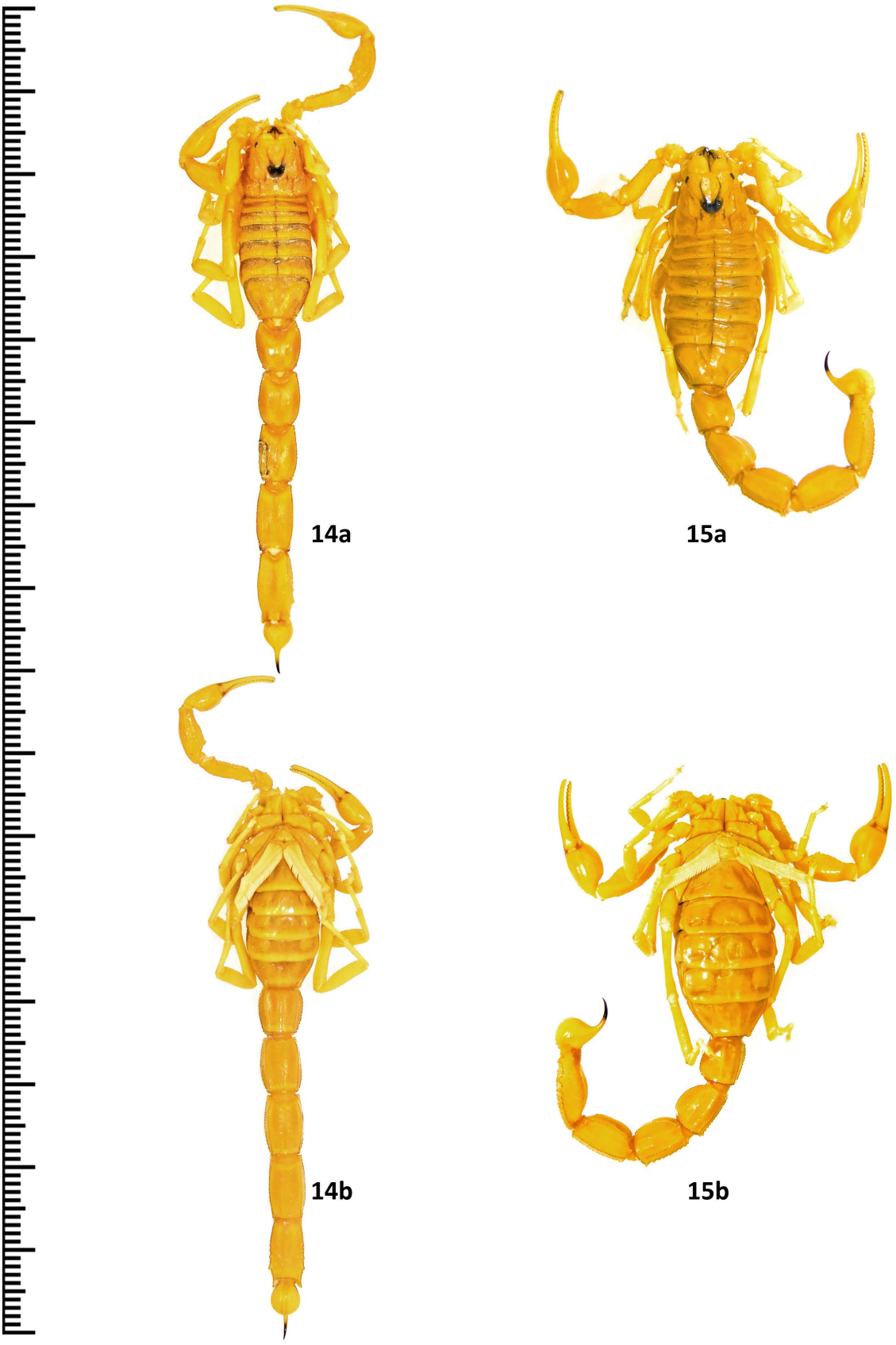


Fig. 14–15. *Buthus alacanti* **sp. n.**, adult male holotype (**14**) and adult female paratopotype (**15**), habitus: **a)** dorsal; **b)** ventral. Scale bar in millimeters (mm).

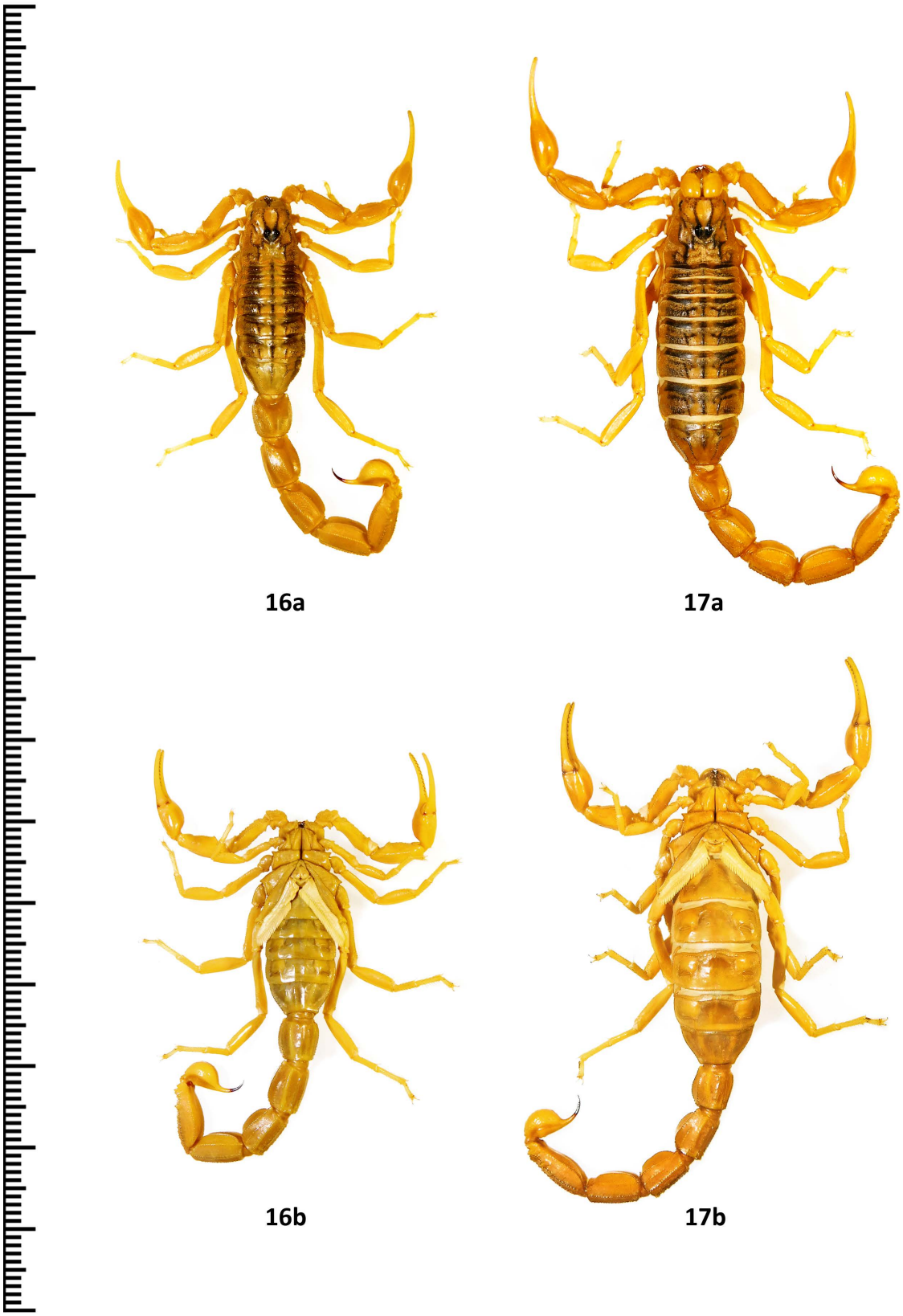


Fig. 16–17. *Buthus baeticus* **sp. n.**, adult male holotype (**16**) and adult female paratopotype (**17**), habitus: **a)** dorsal; **b)** ventral. Scale bar in millimeters (mm).

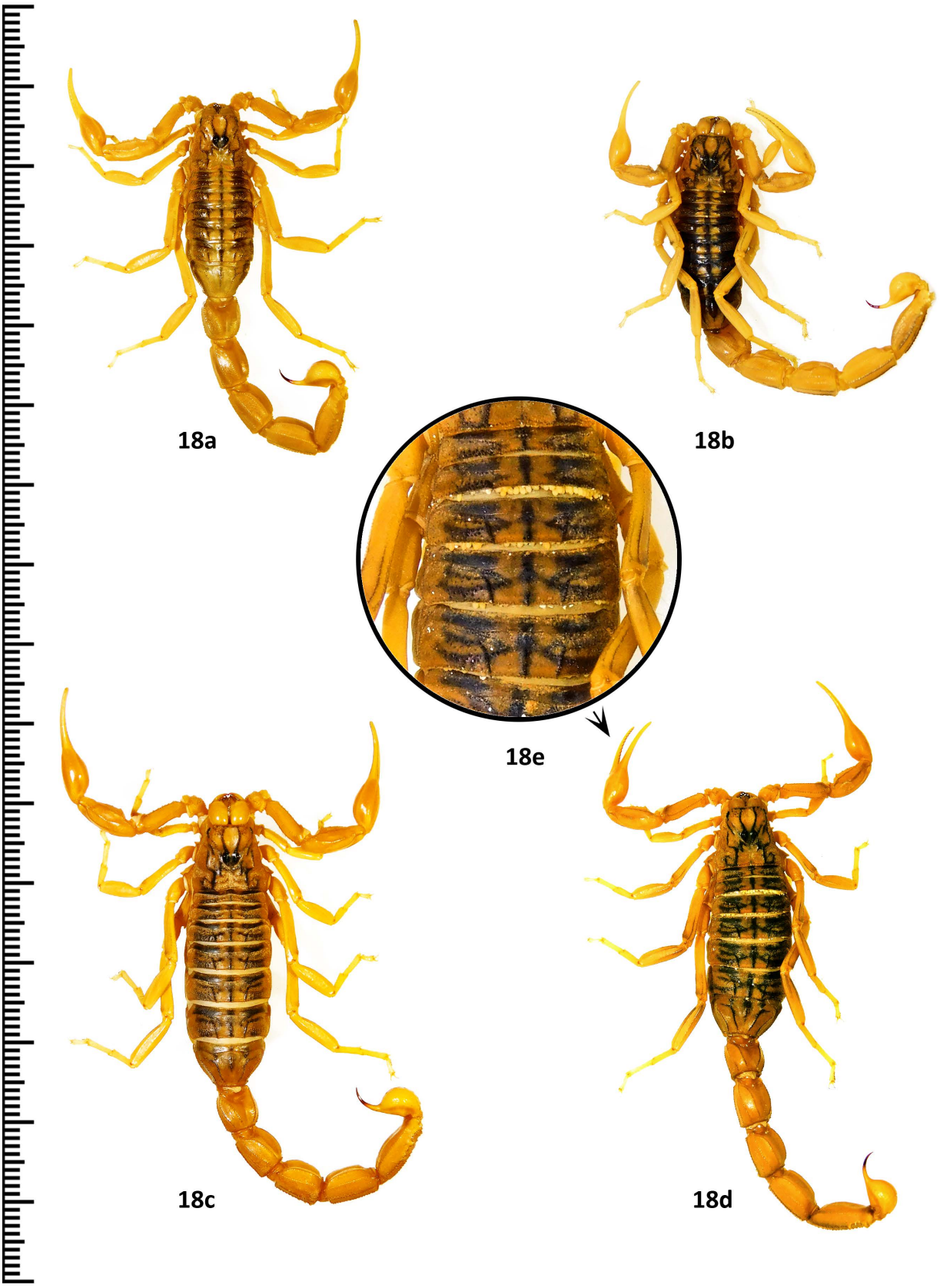


Fig. 18. *Buthus baeticus* **sp. n.**, dorsal habitus of adults from the two localities known, showing morphological homogeneity: **a)** adult male holotype; **b)** adult male paratype from Navahermosa; **c)** adult female paratopotype; **d–e)** adult female paratype from Navahermosa, heavily infested with parasitic Acari larvae (e). Scale bar in millimeters (mm).

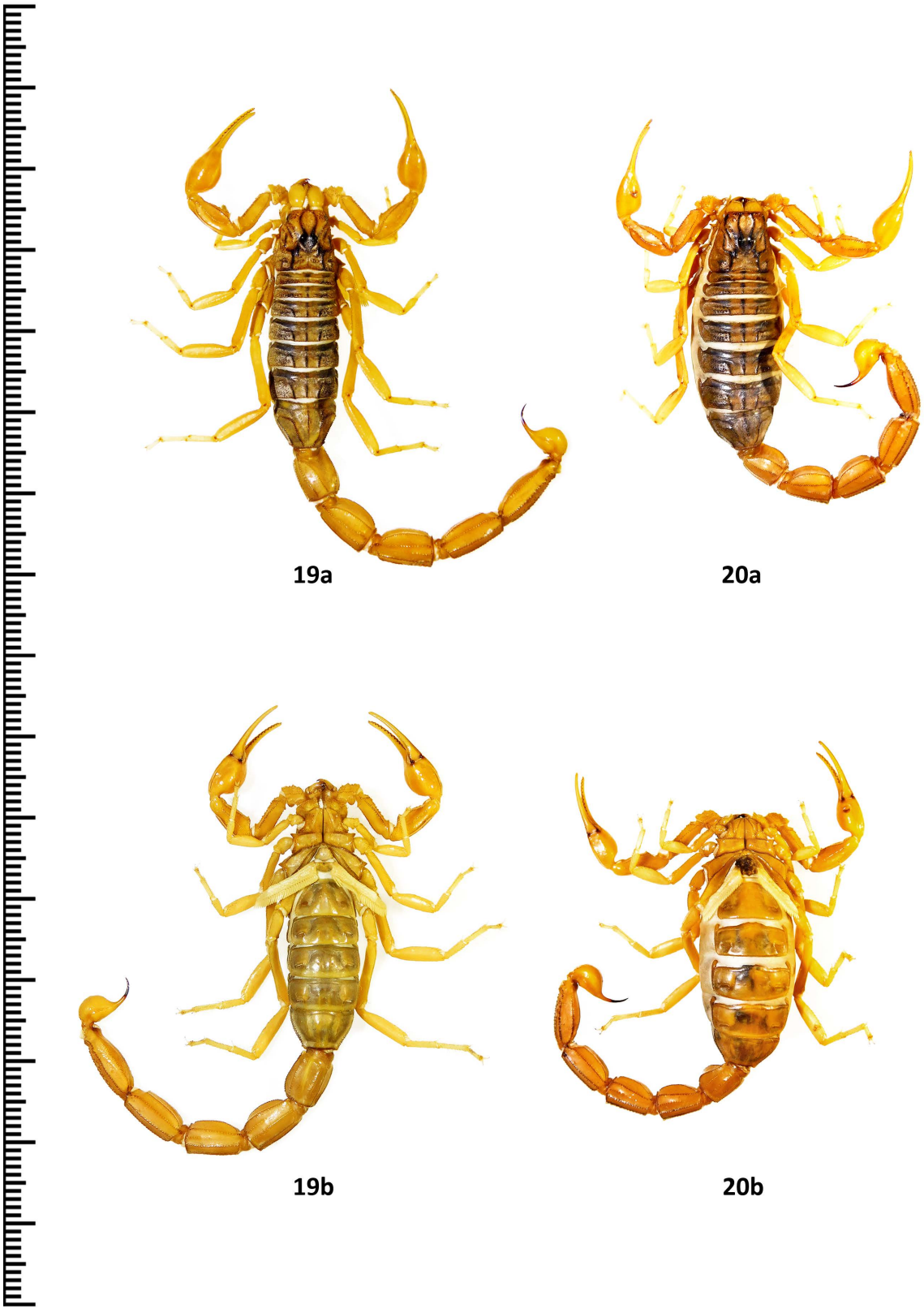


Fig. 19–20. *Buthus delafuentei* **sp. n.**, adult male holotype (**19**) and adult female paratopotype (**20**), habitus: **a)** dorsal; **b)** ventral. Scale bar in millimeters (mm).

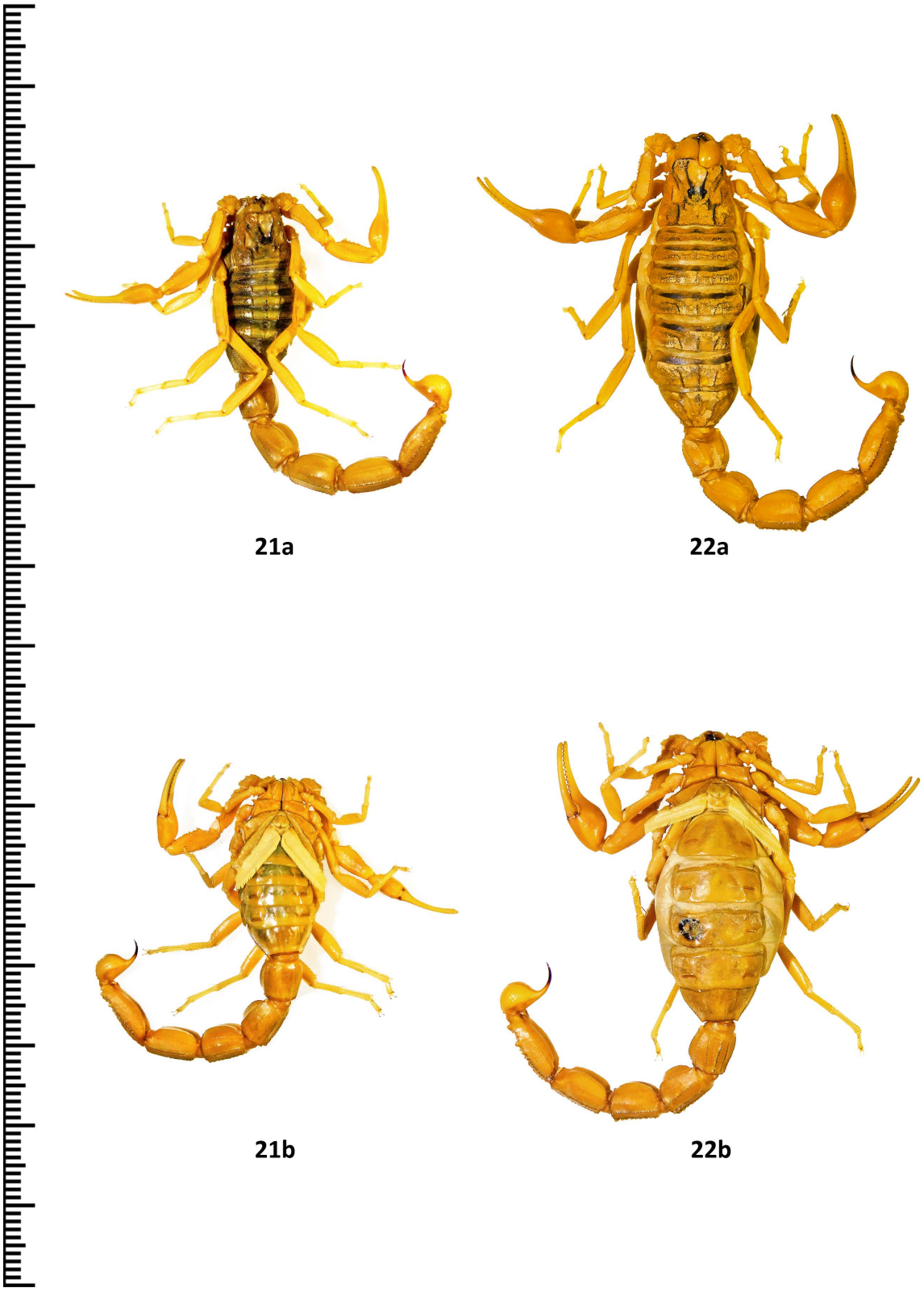


Fig. 21–22. *Buthus garcialorcai* **sp. n.**, adult male holotype (**21**) and adult female paratopotype (**22**), habitus: **a)** dorsal; **b)** ventral. Scale bar in millimeters (mm).

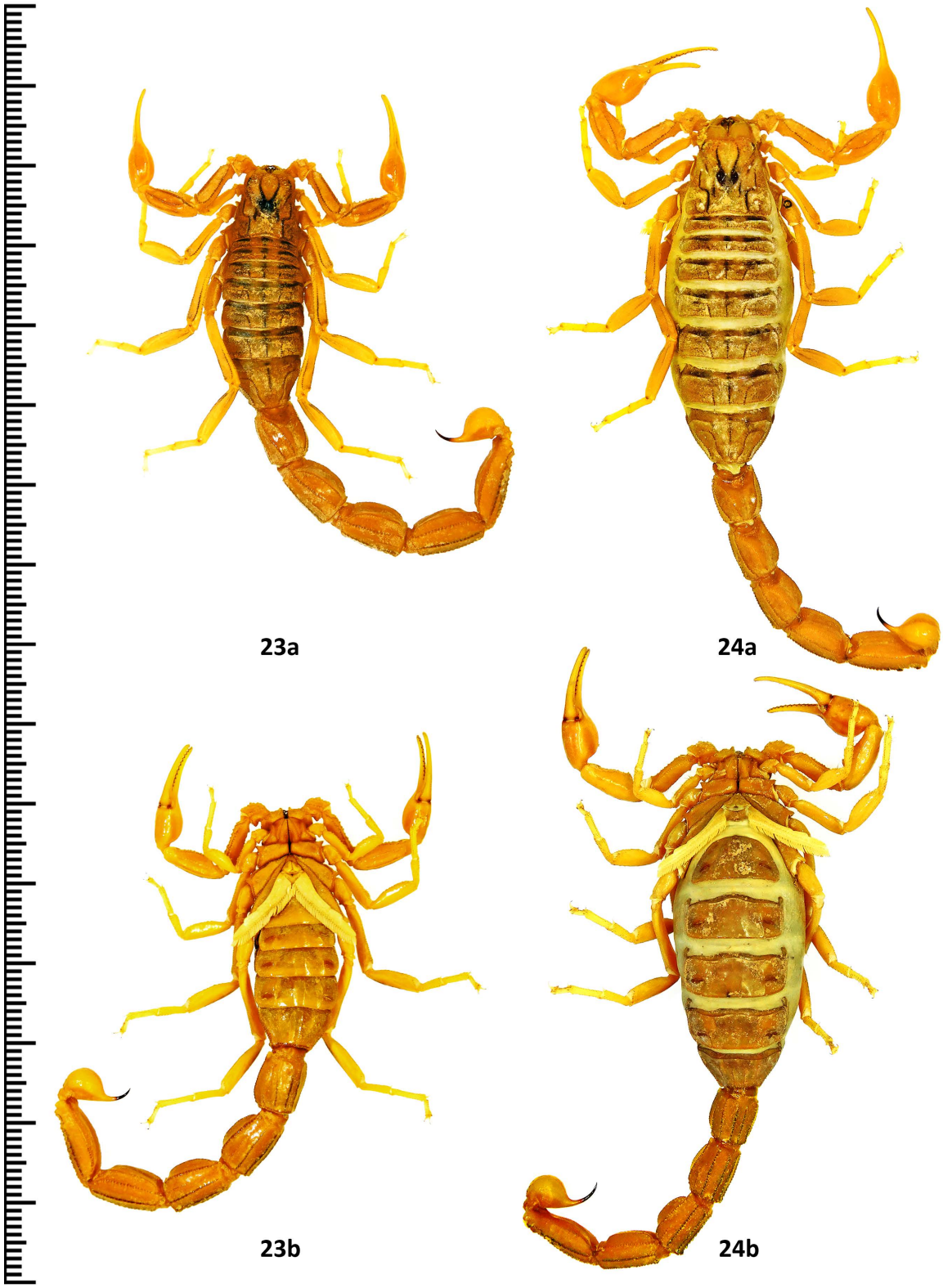


Fig. 23–24. *Buthus manchego* **sp. n.**, adult male holotype (**23**) and adult female paratopotype (**24**), habitus: **a)** dorsal; **b)** ventral. Scale bar in millimeters (mm).

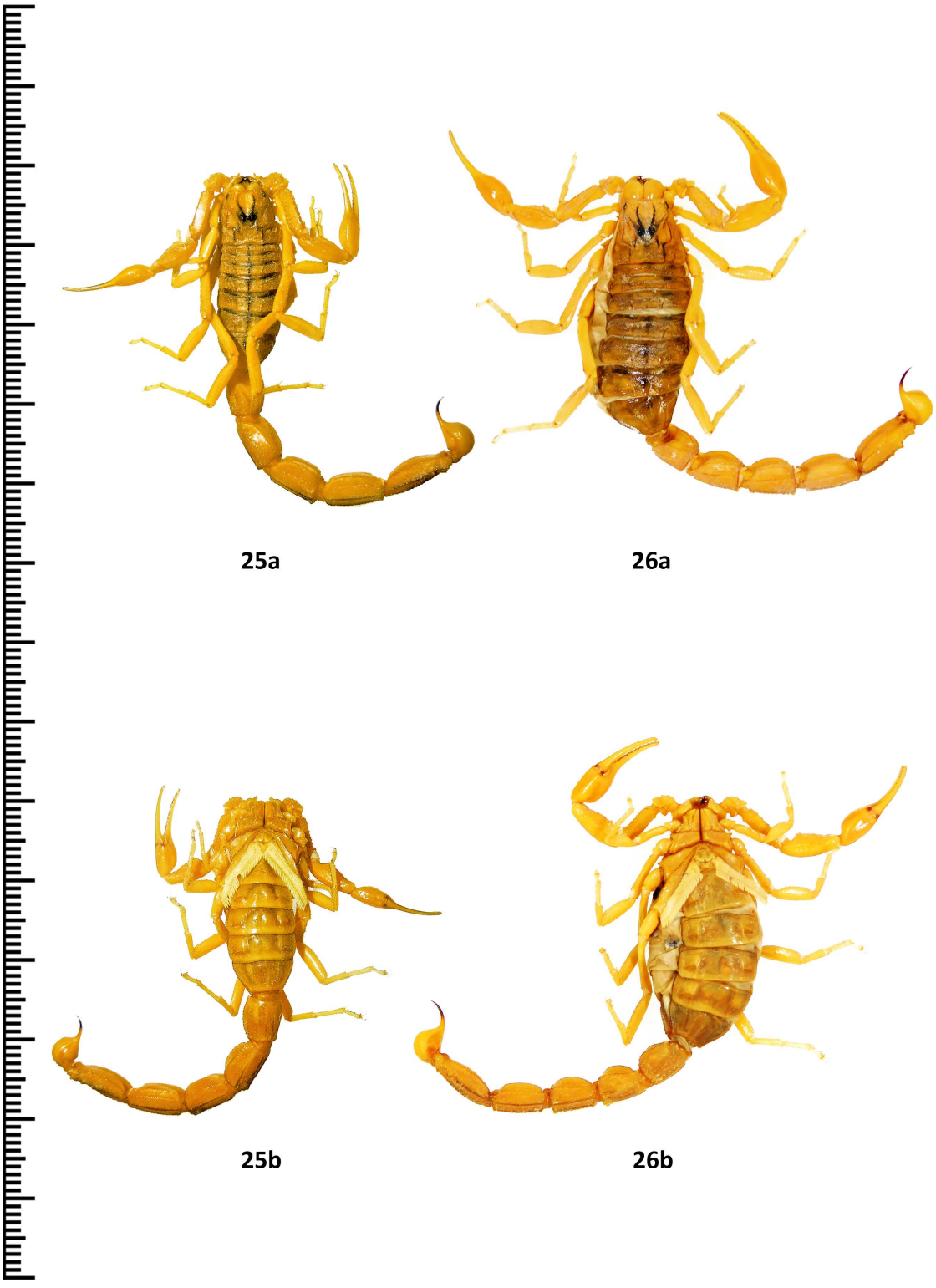


Fig. 25–26. *Buthus serrano* **sp. n.**, adult male holotype (**25**) and adult female paratopotype (**26**), habitus: **a)** dorsal; **b)** ventral. Scale bar in millimeters (mm).

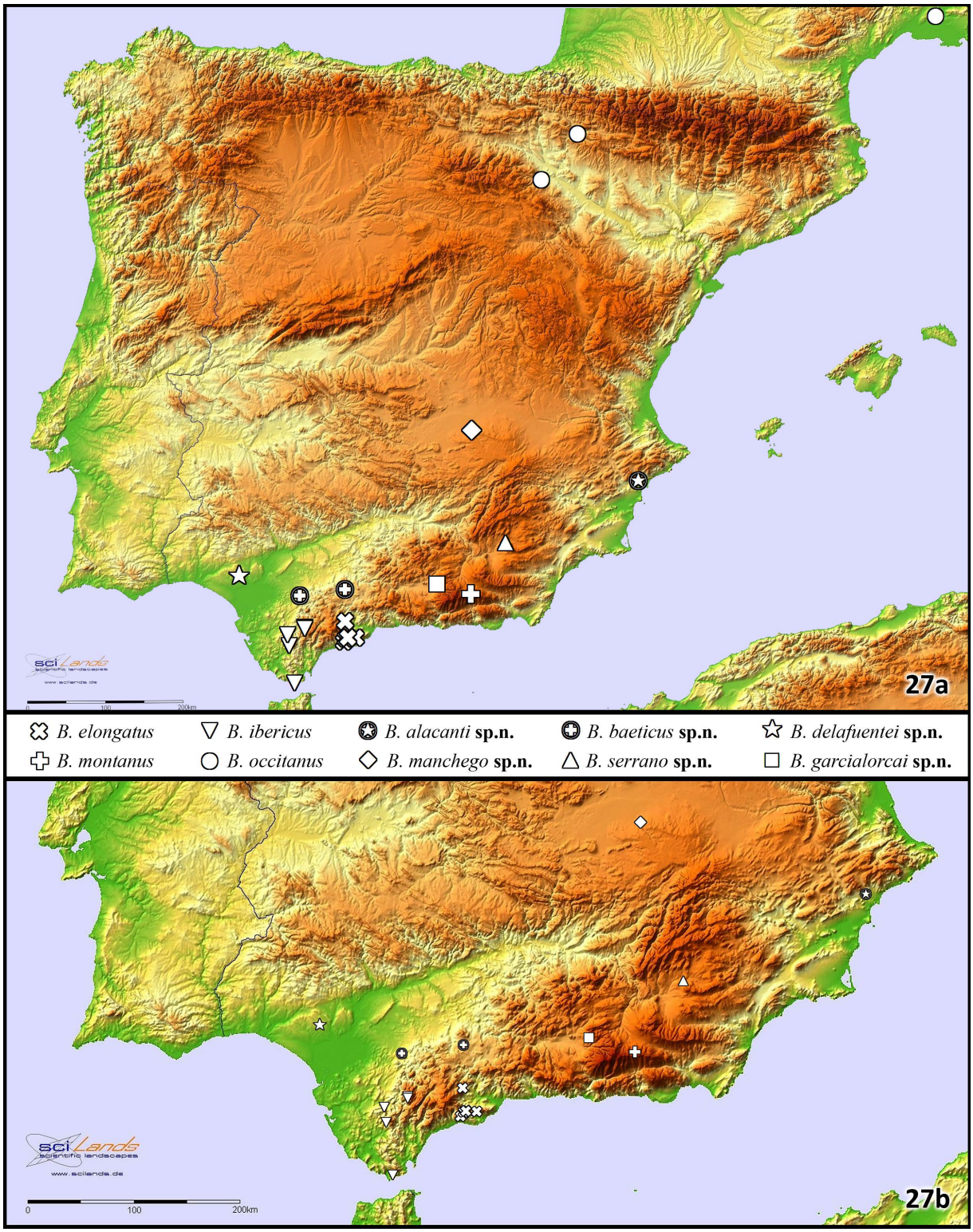


Fig. 27. Iberian Peninsula, showing the geographical distribution of the 10 species of *Buthus* treated herein: **a)** overview of the complete peninsula (see type locality of *B. occitanus* outside at top-right and text for additional localities in France); **b)** close-up of southern Spain.



Fig. 28. Live individuals of *Buthus* from Western Europe, photographed *in situ* unless otherwise noted: **a)** *B. elongatus*, adult male topotype (see mixed sand/clay soil where it digs burrows); **b)** *B. elongatus*, juvenile topotype (in captivity); **c)** *B. ibericus*, adult female from Benaocaz; **d)** *B. ibericus*, juvenile from Benaocaz; **e)** *B. ibericus*, adult female with first-instar litter from El Picacho (see parturition chamber: shallow scrape under rock); **f)** *B. montanus*, adult female topotype.



Fig. 29. Live individuals of *Buthus occitanus*, photographed in situ unless otherwise noted: **a)** adult male from Gonfaron, France (in captivity, photo courtesy Mark Stockmann); **b)** adult female from Gonfaron, France (in captivity, photo courtesy Mark Stockmann); **c)** juvenile from Gonfaron, France, sit-and-wait hunting on leaf-litter at night (under UV light); **d)** adult female topotype (in captivity, photo courtesy Mark Stockmann); **e)** four adult males and three adult females from Javier, Spain, right after being captured; **f)** juvenile at Javier, Spain, during ecdysis (see molting chamber: shallow scrape under rock).



Fig. 30. Live individuals of *Buthus* from Western Europe, photographed in situ: **a)** *B. alacanti* **sp. n.**, juvenile paratopotype (photo courtesy Carles Domènech); **b)** *B. delafuentei* **sp. n.**, adult male paratopotype (see sand soil where it digs burrows); **c)** *B. baeticus* **sp. n.**, adult male paratopotype just after maturity ecdysis (see molting chamber: shallow scrape under rock); **d)** *B. manchego* **sp. n.**, adult female paratopotype, at burrow entrance under rock; **e)** *B. serrano* **sp. n.**, adult male holotype; **f)** *B. serrano* **sp. n.**, juvenile paratopotype.



Fig. 31. Habitat of *Buthus elongatus* (a–b) and *Buthus montanus* (c–d): **a)** Sierra Blanca just above of Marbella, Málaga, Spain; **b)** Sierra Blanca between Ojén and Monda, Málaga, Spain (type locality); **c)** Puerto de La Ragua Lodge, Granada, Spain; **d)** trail from Puerto de La Ragua to Cerro Pelado, border between Granada and Almería, Spain (type locality).



Fig. 32. Habitat of *Buthus ibericus*: **a)** outside Dehesa Picado Farm, Cádiz, Spain (type locality); **b)** El Picacho Recreation Area, Cádiz, Spain (all specimens were found around the muddy pond); **c)** 1.5 km north of Benaocaz, Cádiz, Spain (highest locality); **d)** Roman Road of Benaocaz, Cádiz, Spain (all specimens were found along the old road).



▲ **Fig. 33.** Habitat of *Buthus occitanus*: **a)** Souvignargues, Gard, France (type locality); **b)** Gonfaron, Var, France; **c)** Javier, Navarra, Spain (type locality of *Buthus europaeus tridentatus*); **d)** between Valverde and Cintruéñigo, Navarra, Spain.



►**Fig. 34.** Habitat of *Buthus alacanti* **sp. n.** (a), *Buthus delafuentei* **sp. n.** (b) and *Buthus garcialorcai* **sp. n.** (c): **a)** Sant Vicent del Raspeig, Alicante, Spain (type locality, photo courtesy Carles Domènech); **b)** Pinos de Hinojos, Huelva, Spain (type locality, see holotype burrow in foreground); **c)** Víznar, Granada, Spain (type locality).



Fig. 35. Habitat of *Buthus baeticus* **sp. n.** (a–b), *Buthus manchego* **sp. n.** (c) and *Buthus serrano* **sp. n.** (d): **a)** 3 km south of Morón de la Frontera, Sevilla, Spain (type locality); **b)** Navahermosa, Málaga, Spain; **c)** Peñarroya Castle, Ciudad Real, Spain (type locality); **d)** 1 km southwest of Orce, Granada, Spain (type locality).