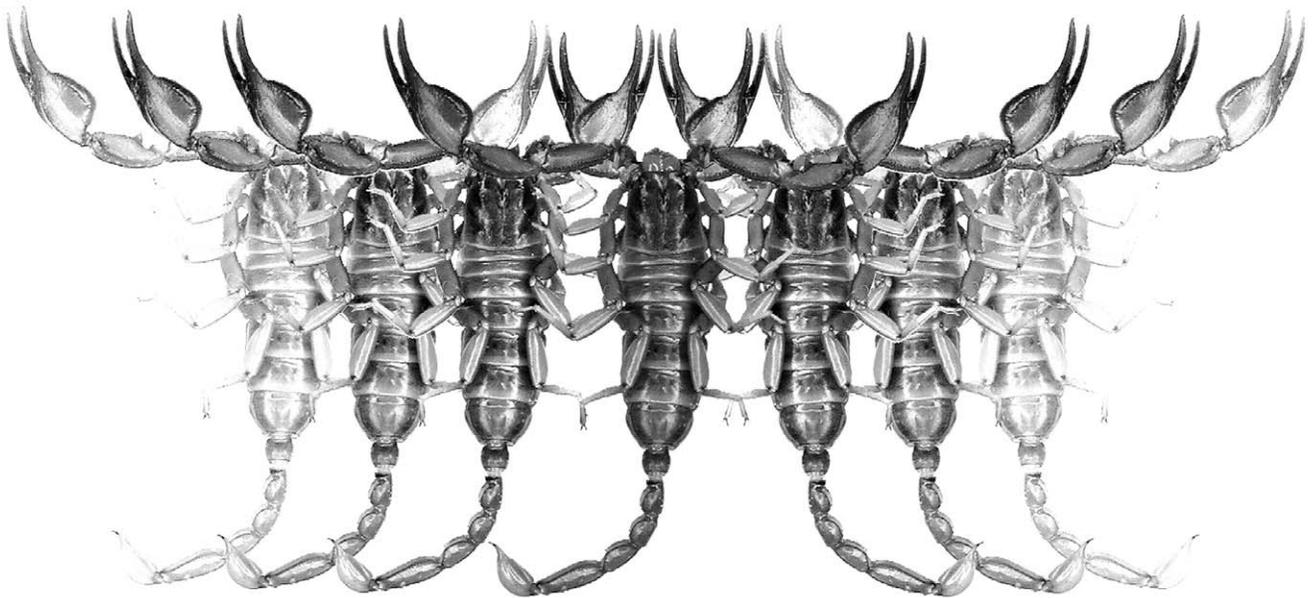


# ***Euscorpius***

**Occasional Publications in Scorpiology**



**Complements to the Taxonomy of Some Amazonian  
Scorpions (Scorpiones: Buthidae)**

**Rolando Teruel, František Kovařík, Graeme Lowe & Stefan Friedrich**

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# *Euscorpius*

## Occasional Publications in Scorpiology

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## Complements to the taxonomy of some Amazonian scorpions (Scorpiones: Buthidae)

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<http://zoobank.org/urn:lsid:zoobank.org:pub:06B983D8-7E7C-45BB-A280-0F0BC3DA5A90>

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### Summary

We describe and illustrate in detail the previously unknown adult male of *Ananteris ashaninka* Kovařík, Teruel, Lowe et Friedrich, 2015, based upon a specimen recently captured at the type locality. In addition, the taxonomic status of three Amazonian species of the genus *Tityus* C. L. Koch, 1836, is reevaluated and all are restored from unjustified synonymies: *Tityus carolineae* Kovařík, Teruel, Cozijn et Seiter, 2013, *Tityus dillerorum* Kovařík, Teruel, Lowe et Friedrich, 2015, and *Tityus wachteli* Kovařík, Teruel, Lowe et Friedrich, 2015.

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### Methods & Material

Nomenclature and measurements follow Stahnke (1971), Kovařík (2009), and Kovařík & Ojanguren-Affilastro (2013), except for trichobothriotaxy (Vachon, 1974), metasomal carinae (Francke, 1977), pedipalp chela carinae (Acosta et al., 2008, as interpreted by Armas et al., 2011), and sternum (Soleglad & Fet, 2003).

Label data are transcribed literally here, but further information about localities (e.g., political-administrative divisions such as regions, provinces and districts) is added between brackets. Specimens studied herein are preserved in ethanol 80% ethanol and deposited in the following collections: FKCP (František Kovařík, private collection, Prague, Czech Republic), MUSM (Museo de Historia Natural, Universidad Nacional Mayor de San Marcos, Lima, Peru), ZSMC (Bavarian State Collection of Zoology, Munich, Germany).

### Systematics

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

*Ananteris ashaninka* Kovařík, Teruel, Lowe et Friedrich, 2015  
(Figures 1–17; Table 1)

*Ananteris ashaninka* Kovařík, Teruel, Lowe et Friedrich, 2015: 1, 4–11, 27, 33; figs. 7–34, 132; tab. 3.

TYPE LOCALITY AND HOLOTYPE DEPOSITORY. Peru, [Huánuco Region], Huánuco Department, [Puerto Inca Province, Yuyapichis District], ACP Panguana, Río Yuyapichis, 09°37'S - 74°56'W, 230–260 m a. s. l. MUSM.

TYPE MATERIAL. Peru, [Huánuco Region], Huánuco Department, [Puerto Inca Province, Yuyapichis District], ACP Panguana, Río Yuyapichis, 09°37'S - 74°56'W, 230–260 m a. s. l., 1.V–21.V.2015, leg. S. Friedrich, F. Wachtel & M. Steinherr, 1♀ holotype (MUSM), 1 juvenile ♀ paratype (ZSMC No. ZSMA20157512), 1 juvenile ♀ paratype (FKCP). Examined.

ADDITIONAL MATERIAL EXAMINED. Peru, [Huánuco Region], Huánuco Department, [Puerto Inca Province, Yuyapichis District], ACP Panguana, Río Yuyapichis (type locality), 09°37'S - 74°56'W, 230–260 m a. s. l., 23.IV–9.V.2016, leg. S. Friedrich, F. Wachtel, D. Hauth, 2♂♂, 2♀♀ topotypes (ZSMC, FKCP).

DIAGNOSIS (emended). Adult size medium (male 19 mm, female 26 mm) for the genus. Coloration predominantly dark: base yellowish brown, very densely spotted with blackish brown markings all over, but not clearly arranged into stripes on tergites; chelicerae densely reticulate with blackish brown, pedipalp chelae with manus immaculate pale and fingers blackish, metasomal segments IV–V and telson reddish brown.

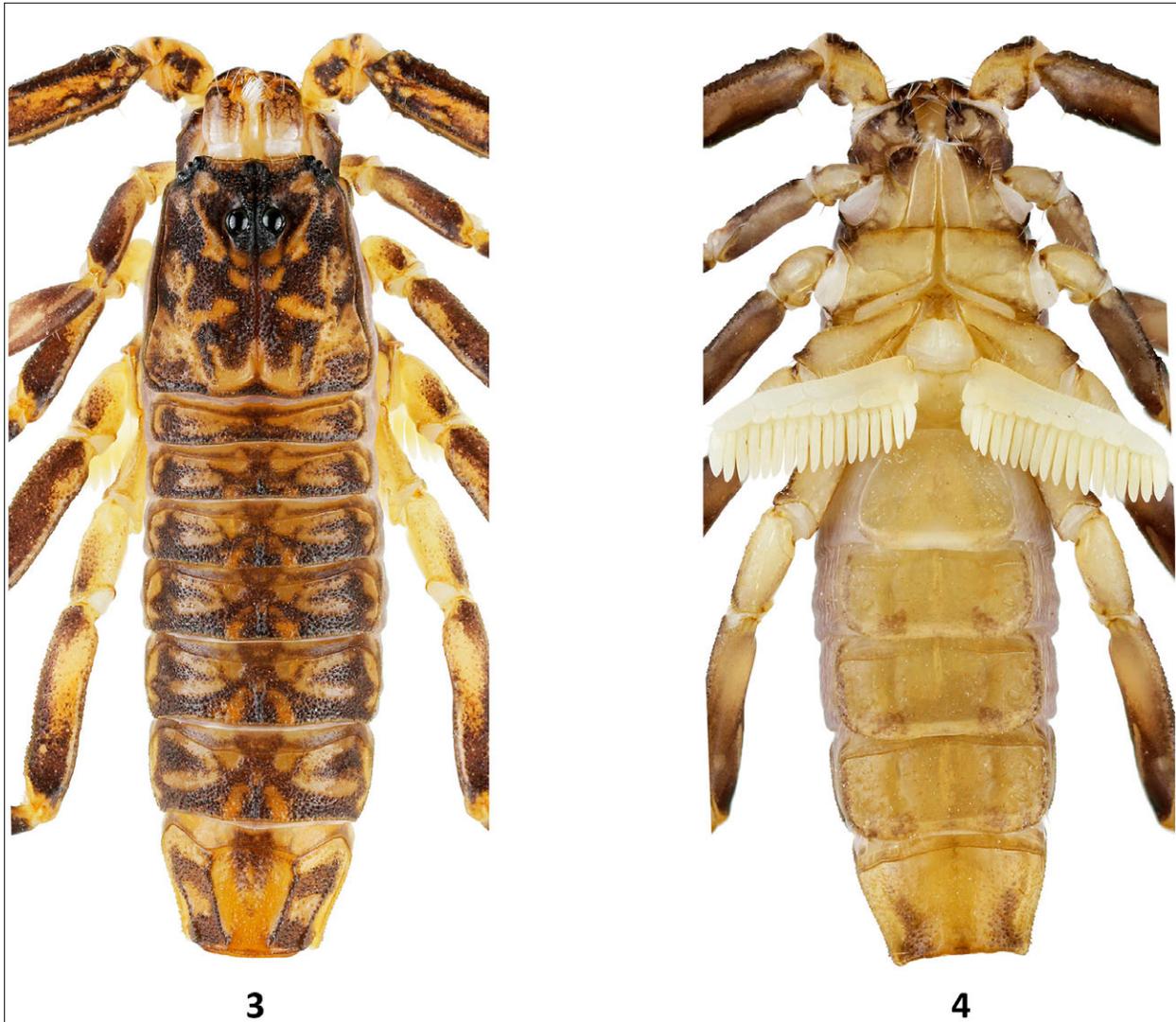


Figures 1–2: *Ananteris ashaninka*, adult male topotype. Habitus, dorsal (1) and ventral (2) views. Scale bar in millimeters.

Pedipalp chelae with manus very small, subcylindrical in male and oval in female, completely acarinate and lacking internal denticles; fixed and movable fingers both with six principal rows of denticles, basal lobe/notch combination absent. Carapace slightly longer than wide in male and wider than long in female. Pectines with 17–18 teeth in male and 16–18 teeth (mode 17) in females; fulcra entirely absent; basal middle lamella slightly enlarged and suboval in male, greatly enlarged and angulate in females. Sternite V with the smooth patch indistinct; spiracles short, slit-like. Metasoma short, slender in male and robust in female, with 10/10/8/8/5 complete to essentially complete, finely serrate to serratocrenulate carinae; dorsal lateral carinae on segments III–IV with terminal denticles conspicuously enlarged, especially in female; intercarinal spaces very densely granulose, coarser in female. Telson vesicle elongate oval, smooth and glossy, with subaculear tubercle large and spiniform.

COMPLEMENTARY DESCRIPTION (adult male topotype). **Coloration** (Figs. 1–2) base light yellowish to orange brown, remarkably paler ventrally on prosoma and mesosoma. Very densely reticulated and spotted with blackish brown all over the body and appendages except on the ventral region, which is spotted densely only on coxae I–II and sternum, and lateral margins of

coxae III–IV and sternites. Chelicerae pale yellowish brown; manus densely reticulated with blackish brown, sparser basally and at fixed finger base; fingers deeply infuscate. Pedipalp femur predominantly dark, very densely spotted with blackish along all carinae, almost entirely suffused medially; patella almost entirely dark, even more densely spotted with blackish brown; chela strikingly bicolor, with manus immaculate whitish and fingers blackish with pale yellowish tips. Carapace predominantly dark, symmetrically and densely spotted with blackish brown, irregularly arranged into three parallel, wide and discontinuous oblique stripes; eyes and ocular tubercles black. Tergites predominantly dark, symmetrically and densely reticulated and spotted with blackish brown markings, not arranged into longitudinal stripes (except on VII) and with the pale, chevron-shaped lateral areas typical of most species of the genus well-marked. Pectines immaculate whitish, basally darker (yellowish) due to heavier sclerotization. Sternites predominantly pale, only with lateral marginal areas irregularly infuscate and two conspicuous dark spots on posterior area that define an irregular pair of longitudinal submedian stripes that become darker, better defined and more compact distally towards sternite VII; V with a translucent smooth patch. Legs very densely spotted with blackish brown on all surfaces but apically paler, with essentially all segments irreg-



**Figures 3–4:** *Ananteris ashaninka*, adult male topotype. Prosoma and mesosoma, dorsal (3) and ventral (4) views.

ularly to faintly annulated. Metasoma with base color progressively darker distally, dark reddish on segments IV–V; all surfaces very densely spotted with blackish brown, with pattern becoming denser and darker on distal half of every segment, but conspicuously discontinuous ventrally on I–III. Telson vesicle reddish, faintly infuscate as four parallel, longitudinal dark stripes, subaculear tubercle yellowish but infuscate basally; aculeus with basal third yellowish and distal two-thirds dark brown.

**Chelicerae** (Fig. 3–4). Teeth relatively large and sharp. Tegument smooth and glossy, dorsodistal portion of manus with coarse, glossy granules irregularly arranged transversally, defining a depressed area. Seta-tion very dense ventrally, but essentially lacking dorsally, except for 4–5 rigid, whitish macrosetae around depressed area of manus.

**Pedipalps** (Figs. 5–13). Size and shape standard for the genus, almost glabrous. Orthobothriotaxic A-β; manus  $Eb_3$  distal to  $Eb_2$  and basal to  $Eb_1$ ,  $Est$  slightly distal to  $Esb$ ; fixed finger with all trichobothria displaced to distal half,  $eb$  displaced to subdorsal position,  $est$  and  $et$  situated between  $db$  and  $dt$ , with all four trichobothria essentially equidistant in lateral view (the standard arrangement for most species of the genus). Femur slender, almost straight and essentially bare; all carinae moderate and irregularly granulose; intercarinal tegument coriaceous, with small granules irregularly scattered mostly around trichobothria; internal (*i*) trichobothria not surrounding any specially developed denticle or spur. Patella very slender, straight, essentially bare, and round in cross-section; all carinae obsolete to absent; intercarinal tegument coriaceous, internally with about 10 small to moderate, conical tu-



**Figures 5–17:** *Ananteris ashaninka*, adult male topotype. Pedipalp trochanter and femur, dorsal (5), inner (6) and ventral (7) views. Pedipalp patella, dorsal (8), outer (9) and ventral (10) views. Pedipalp chela, dorsal (11), outer (12) and ventral (13) views. Metasoma and telson, dorsal (14), lateral (15) and ventral (16). Telson, lateral view (17). Trichobothria marked with white dots in Figures 5–6, 8–9 and 11–13.

bercles. Chela very slender and sparsely setose; manus very small, subcylindrical (1.67 times longer than wide), much narrower than patella (ratio 0.70), and with all carinae absent, intercarinal tegument coriaceous, without any denticles on internal surface; fingers very long and slender (movable finger 3.16 times longer than underhand), evenly curved, sparsely setose, both fingers with 6/6 principal rows of denticles, movable finger with an apical subrow of four denticles (large terminal denticle not included, all rows with both internal and external accessory denticles very large and claw-like), basal lobe/notch combination absent.

**Carapace** (Fig. 3). Trapezoidal and slightly longer than wide; anterior margin very widely W-shaped (i.e., frontal lobes widely concave, converging into a widely convex median projection), with scattered setation. Carination essentially absent to obscured by surrounding granulation: the only clearly definable carinae are the coarsely, irregularly granulate superciliaries. Furrows: anterior median, median ocular, central median, posterior median and posterior marginal fused, narrow and very deep, posterior laterals and lateral centrals long,

narrow and shallow. Tegument very densely and evenly covered by glossy granules of different sizes (mostly medium and coarse), except along furrows and a few symmetrical, narrow, oblique to sinuose smooth patches. Median eyes very large and separated by much less than one ocular diameter, lateral eyes much smaller but also relatively large, subequal and conspicuously protruding anteriorly.

**Sternum** (Fig. 4). Standard for the genus: type 1, very small, longer than wide, and subtriangular in shape, with three pairs of macrosetae. Tegument coriaceous.

**Genital operculum** (Fig. 4). Medium-sized, halves moderately separated and roundly subtriangular in shape, with two pairs of macrosetae and some smaller setae scattered; tegument coriaceous. Genital papillae present. Pre-pectinal plate vestigial, transverse and very narrow.

**Pectines** (Fig. 4). Size and shape standard for the group: not reaching leg IV femur, subrectangular and moderately setose. Tooth count 18/17, teeth which are fingerlike, i.e., long, narrow and straight. Basal middle lamella slightly enlarged, suboval. Fulcra entirely ab-

Dimensions (mm)		♂ topotype	♀ holotype
Carapace	L / W	2.05 / 2.02	2.70 / 2.87
Mesosoma	L	4.80	8.25
Tergite VII	L / W	1.20 / 1.70	1.38 / 2.87
Metasoma + Telson	L	12.02	15.14
Segment I	L / W / D	1.15 / 1.12 / 1.01	1.50 / 1.72 / 1.42
Segment II	L / W / D	1.35 / 1.07 / 0.95	1.78 / 1.57 / 1.42
Segment III	L / W / D	1.55 / 1.05 / 0.99	2.05 / 1.55 / 1.42
Segment IV	L / W / D	2.00 / 1.05 / 1.00	2.55 / 1.53 / 1.50
Segment V	L / W / D	3.05 / 1.10 / 1.00	4.00 / 1.50 / 1.46
Telson	L / W / D	2.92	3.25
Vesicle	L	1.90 / 0.57 / 0.55	2.25 / 0.85 / 0.80
Aculeus	L	0.97	1.30
Pedipalp	L	7.16	9.77
Femur	L / W	2.00 / 0.49	2.75 / 0.70
Patella	L / W	2.37 / 0.57	2.95 / 0.95
Chela	L	2.79	4.07
Manus	L / W / D	0.67 / 0.40 / 0.47	0.97 / 0.62 / 0.67
Movable finger	L	2.12	3.10
<b>Total</b>	<b>L</b>	<b>18.87</b>	<b>26.09</b>

**Table 1:** Measurements (mm) of *Ananteris ashaninka*, male topotype and female holotype.

sent. Basal plate moderately sclerotized, about as long as wide; anterior margin with deep, narrow V-shaped anteromedian notch that continues through posterior margin as a longitudinal furrow; tegument coriaceous.

**Legs** (Figs. 1–2). Long and slender, with all carinae finely granulose to serrate, intercarinal tegument coriaceous to densely granulose. Tibial spurs absent on I–II, strong on III–IV; prolateral and retrolateral pedal spurs short and thick, increasing in development backwards. Ventral surface of telotarsi round and with less than 10 dark, thin spiniform setae not clearly arranged into rows. Claws long and strongly curved.

**Mesosoma** (Figs. 3–4). Tergites very densely and evenly covered by glossy granules of different sizes, mostly small and medium; I–VI with only one median longitudinal carina which is long, very strong, granulose and formed by glossy granules that do not project beyond posterior margin; VII with only four carinae (paired submedians and laterals, the median longitudinal carina is either absent or became obscured by sur-

rounding granulation), which are very long and serrate. Sternites moderately setose; spiracles oblique, short but slit-like; tegument of III–VI with a satin sheen and essentially smooth (only with traces of vestigial granules posterolaterally) and acarinate, of VII densely granulose and with four weakly subserrate carinae (paired submedians and laterals); posterior margin of III–VI weakly bilobed, of VII shallowly biconcave; III with a postero-medial smooth patch which is large, triangular, as long as wide, flat, glossy, and translucent; smooth patch of V indistinct, translucent.

**Metasoma** (Figs. 14–16). Size and shape standard for the genus. Relatively short and slender, essentially parallel-sided. Segments I–II with ten complete carinae, III–IV with eight, V with five: dorsal laterals finely serrate on I–IV, absent on V, terminal denticle markedly enlarged as a sharp tubercle on III–IV; lateral supra-medians finely serrate to serratocrenulate on I–V; lateral inframedi-ans finely serrate to serratocrenulate on I–II, absent on III–V (with irregular remnants on III that do

dot form a true carina); ventral laterals finely serrate to serratocrenulate on I–V; ventral submedians finely serrate on I–IV, absent on V (but suggested by irregular remnants on anterior half); ventral median absent on I–IV, complete and finely serrate to serratocrenulate on V. Intercarinal tegument very finely and densely granulose, with some coarser granules scattered on all surfaces (becoming progressively coarser and denser distally in every segment); dorsal furrow complete, moderately narrow and deep on segments I–IV, spatulate and shallower on V; setation sparse and irregular on all segments.

**Telson** (Figs. 14–17) very long and slender. Vesicle elongate oval (3.33 times longer than wide, 1.04 times wider than deep) and essentially bare; tegument smooth and glossy; ventral median carina obsolete, represented only by 2–3 vestigial but coarse granules, stronger distally, subaculear tubercle abruptly raised, very large, spiniform, smooth, and straight, sparsely setose. Aculeus very sharp, shorter than vesicle and shallowly curved.

**AFFINITIES.** The adult male now available confirms the affinities and comparisons of the species proposed in the original description by Kovařík et al. (2015).

**DISTRIBUTION.** *A. ashaninka* remains known only from the type locality, in Amazonian Peru (see Kovařík et al., 2015).

### General remarks on the status of three Amazonian species of *Tityus* synonymized by Lourenço (2016)

First of all, science is based upon objectivity, not authority, i.e., it depends upon logical presentation of convincing evidence, not outright declaration of personal opinion or dogma. In our papers (Kovařík et al., 2013, 2015), we have adhered to the accepted rigorous standards of taxonomic work: i.e., all species were described in detail, fully illustrated by high quality photographs, and our taxonomic decisions were explicitly justified by comprehensive arguments. With these *bona fide* procedures, we upheld the fundamental scientific principle of reproducibility, i.e., any independent investigator can subsequently review our data and revise our analysis, considering the same available information to test our hypotheses and conclusions.

In contrast, Lourenço (2016) merely exercised authoritarianism in basing his decision to synonymize these species entirely upon subjective opinions recycled from previous works authored (singly or mainly) by himself, without presenting any new specimens, additional data or analyses to support his synonymies.

Therefore, as a matter of principle, we have no choice but to ignore these synonymies and regard these

three species as valid, until credible new evidence is published that can provide rigorous unbiased tests of our hypotheses:

1. *Tityus carolineae* Kovařík, Teruel, Cozijn et Seiter, 2013
2. *Tityus dillerorum* Kovařík, Teruel, Lowe et Friedrich, 2015
3. *Tityus wachteli* Kovařík, Teruel, Lowe et Friedrich, 2015

Moreover, in future papers we will routinely disregard any nomenclatural acts published by Wilson Roberto Lourenço that fail to meet the most basic scientific standards as highlighted above. Last, but not least, we do not impose our views, but leave readers to independently decide for themselves which taxonomic decisions to accept, based on critical evaluation of presented evidence.

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We cordially thank Dr. Juliane Diller and Erich Diller for kindly inviting one of us (Stefan Friedrich) to Panguana, Franz Wachtel (Grünwald, Germany) and David Hauth (Fürstenfeldbruck, Germany) for assistance in the field, Dr. Gerardo Lamas Müller and Dr. Diana Silva Dávila (both Museo de Historia Natural, Universidad Nacional Mayor de San Marcos, Lima, Peru) for cooperation, and the Servicio Nacional Forestal y de Fauna Silvestre (SERFOR) for issuing a collecting permit (# 007-2014-SERFOR-DGGSPFFS) and export permit (# 003052-SERFOR). We thank two anonymous reviewers for their comments.

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### References

- ACOSTA, L. E., D. M. CANDIDO, E. H. BUCKUP & A. D. BRESOVIT. 2008. Description of *Zabius gaucho* (Scorpiones, Buthidae), a new species from southern Brazil, with an update about the generic diagnosis. *The Journal of Arachnology*, 36: 491–501.
- ARMAS, L. F. DE, R. TERUEL & F. KOVAŘÍK. 2011. Redescription of *Centruroides granosus* (Thorell, 1876) and identity of *Centruroides granosus simplex* Thorell, 1876 (Scorpiones: Buthidae). *Euscorpius*, 127: 1–11.
- FRANCKE, O. F. 1977. Scorpions of the genus *Diplocentrus* Peters from Oaxaca, Mexico. *The Journal of Arachnology*, 4: 145–200.

- KOVAŘÍK, F. 2009. *Illustrated catalog of scorpions. Part I. Introductory remarks; keys to families and genera; subfamily Scorpioninae with keys to Heterometrus and Pandinus species*. Prague: Clairon Production, 170 pp.
- KOVAŘÍK, F. & A. A. OJANGUREN AFFILASTRO. 2013. *Illustrated catalog of scorpions. Part II. Bothriuridae; Chaerilidae; Buthidae I. Genera Compsobuthus, Hottentotta, Isometrus, Lychas, and Sassanidotus*. Prague: Clairon Production, 400 pp.
- KOVAŘÍK, F., R. TERUEL, M. A. C. COZIJN & M. SEITER. 2013. *Tityus carolineae* sp. n. from Surinam and Guyana (Scorpiones, Buthidae). *Euscorpius*, 178: 1–5.
- KOVAŘÍK, F., R. TERUEL, G. LOWE & S. FRIEDRICH. 2015. Four new scorpion species (Scorpiones: Buthidae) from Amazonian Peru. *Euscorpius*, 209: 1–15.
- LOURENÇO, W. R. 2016. A propos de quelques amendements sur quelques espèces du genre *Tityus* C. L. Koch, 1836 (Scorpiones: Buthidae) de la région amazonienne. *Arachnida, Rivista Arachnologica Italiana*, 2(7): 2–17.
- SOLEGLAD, M. E. & V. FET. 2003. The scorpion sternum: structure and phylogeny (Scorpiones: Orthosterni). *Euscorpius*, 5: 1–34.
- STAHNKE, H. L. 1971. Scorpion nomenclature and mensuration. *Entomological News*, 81: 297–316.
- VACHON, M. 1974. Études des caractères utilisés pour classer les familles et les genres des scorpions (Arachnides). 1. La trichobothriotaxie en arachnologie. Sigles trichobothriaux et types de trichobothriotaxie chez les Scorpions. *Bulletin du Muséum national d'Histoire naturelle*, 3e série, 140 (Zoologie, 104): 857–958.