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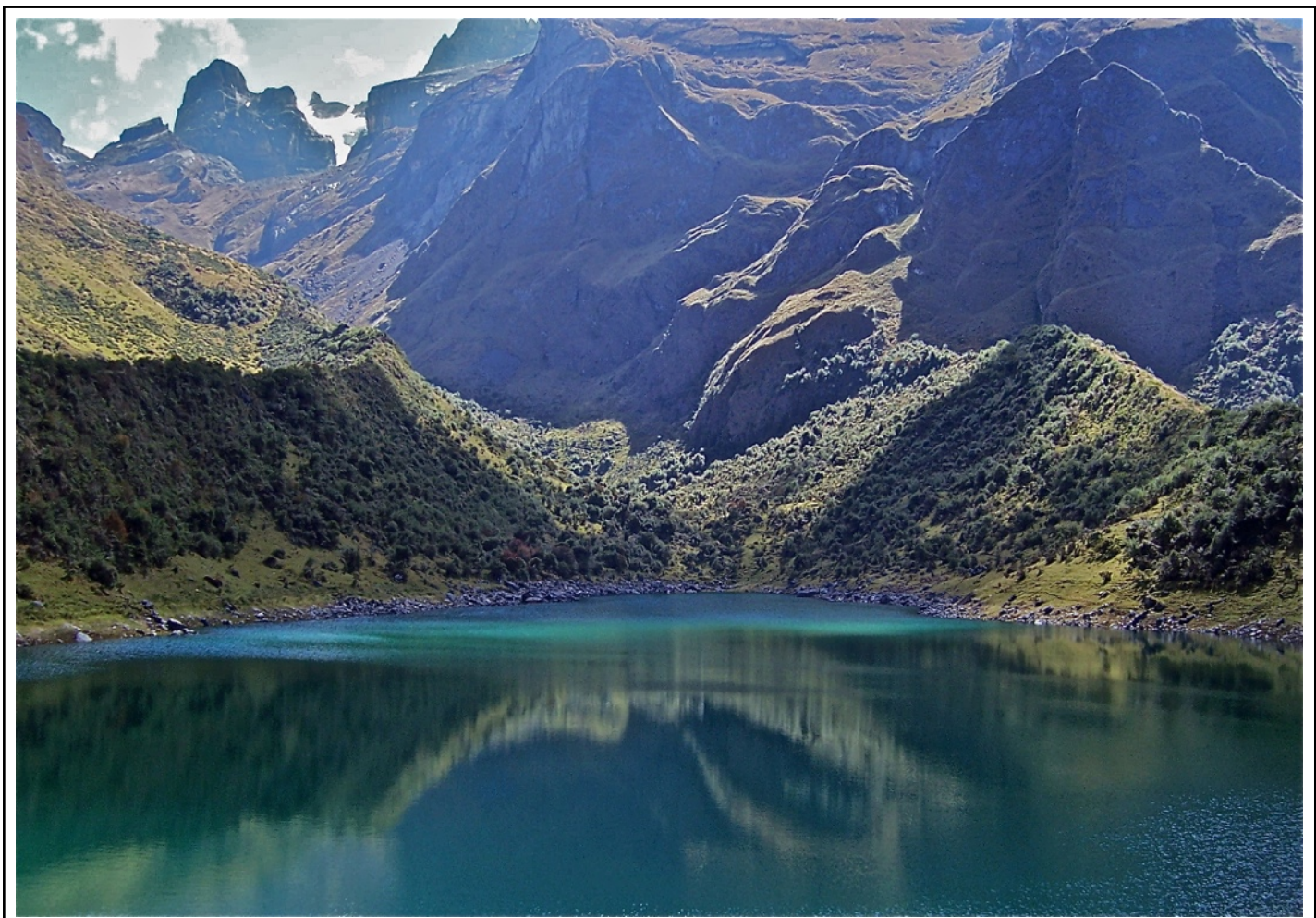
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A new species of *Hadruioides* Pocock, 1893 from Peru (Scorpiones: Caraboctonidae)

ERIC YTHIER (1, *) & WILSON R. LOURENÇO (2)

(1) BYG Taxa, 382 rue des Guillates, 71570 Romanèche-Thorins, France.

– E-mail : contact@bygtaxa.com

– ZooBank : ZooBank: <https://zoobank.org/06FD0852-A88E-49E5-B8E6-E1494B86C4E1> – Orcid : <https://orcid.org/0000-0002-3194-5184>

(2) Muséum national d'Histoire naturelle, Sorbonne Universités, Institut de Systématique, Evolution, Biodiversité (ISYEB), UMR7205-CNRS, MNHN, UPMC, EPHE, CP 53, 57 rue Cuvier, 75005 Paris, France.

– E-mail : wilson.lourenco@mnhn.fr

– ZooBank : <https://zoobank.org/58448BD6-79D7-46CE-AFDD-91EFF2B7D4EF> – Orcid : <https://orcid.org/0000-0002-2386-363X>

* Corresponding author.

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Abstract. – A new species belonging to the genus *Hadruioides* Pocock, 1893 (family Caraboctonidae Kraepelin, 1905) is described on the basis of specimens collected in Apurimac region in Southern Peru. *H. (Lourencoides) apu* sp. n. appears to be related to *H. (L.) mauryi* Francke & Soleglad, 1980 and *H. (L.) bustamantei* Ochoa & Chaparro, 2008 but can be distinguished notably by a smaller size, different pigmentation pattern, reduced granulation, lower pectinal tooth count, metasoma with only the first segment wider than long and pedipalp chela slenderer in male and broader in female with fixed finger straight without proximal gap between fingers in both sexes. This new taxon represents the 18th known species of the genus *Hadruioides* reported from Peru and the 23rd species of the subgenus *Lourencoides* Rossi, 2014. The total number of *Hadruioides* species is now raised to 25.

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Introduction

As already discussed in a previous paper (Ythier, 2021), the genus *Hadruioides* Pocock, 1893, originally included in the family Iuridae Thorell, 1876, was transferred to the new family Caraboctonidae Kraepelin, 1905 (formerly a subfamily of Iuridae; Soleglad & Fet, 2003a) together with the genera *Caraboctonus* Pocock, 1893 and *Hadrurus* Thorell, 1876, later joined by a new genus *Hoffmannihadrurus* Fet & Soleglad, 2004 consisting of two species formerly placed in the genus *Hadrurus*. Within the family Caraboctonidae, these four genera were placed in two subfamilies: the South-American genera *Hadruioides* and *Caraboctonus* were included in Caraboctoninae Kraepelin, 1905, comprising small to medium size scorpions up to 80 mm in total length (Maury, 1975; Lourenço, 1995; Ochoa & Prendini, 2010), while the North-American genera *Hadrurus* and *Hoffmannihadrurus* were included in Hadrurinae Stahnke, 1974, comprising large scorpions often exceeding 120 mm in total length (Francke & Prendini, 2008; Fet & Soleglad, 2008). The subfamily Hadrurinae was then elevated to family status (Santibanez-Lopez *et al.*, 2020) and the family Caraboctonidae now only comprises the two genera *Hadruioides* and *Caraboctonus*. In 2014, Rossi defined two subgenera for the genus *Hadruioides*, mainly based on size of the species and carination of the pedipalp chela: *Lourencoides* Rossi, 2014 and the nominal subgenus *Hadruioides* Rossi, 2014.

The genus *Hadruioides* is distributed in Ecuador, Peru and Chile (Ochoa & Prendini, 2010; Rossi, 2012, 2014) and currently comprises 24 species. In the present paper, one new species is described on the basis of specimens collected in Apurimac region in Southern Peru. *H. (Lourencoides) apu* sp. n. represents the 18th known species of the genus *Hadruioides* reported from Peru and the 23rd species of the subgenus *Lourencoides* Rossi, 2014. The new species was collected at an elevation of 3,317 m a.s.l. which is among highest altitudes recorded for the genus. It is the fourth *Hadruioides* species recorded above 3,000 m altitude, together with three other species occurring in the inter-Andean valleys along the Cordillera: *H. (L.) lourencoi* Rossi, 2012 (3,400 m), *H. (L.) bustamantei* Ochoa & Chaparro, 2008 (2,600 m to 3,379 m) and *H. (L.) mauryi* Francke and Soleglad, 1980 (2,830 m to 3,100 m) (Fig. 10, 11).

Material and methods

Illustrations and measurements were produced using a Motic DM143 digital stereo-microscope together with a Canon EOS 7D camera and a Wacom Intuos drawing tablet. Map was made using Google Maps and Adobe Photoshop software. Measurements follow Stahnke (1970) and are given in mm. Trichobothrial notations follow Vachon (1974), morphological terminology mostly follows Vachon (1952) and Hjelle (1990), and chelicerae dentition follows Vachon (1963). Specimens studied herein are deposited in the following collections: MNHN (Muséum national d'Histoire naturelle, Paris, France) and EYPC (Eric Ythier Private Collection, Romanèche-Thorins, France).

Reviewer : Gérard Dupré (France).



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Taxonomic treatment

Family **Caraboctonidae** Kraepelin, 1905

Genus **Hadruioides** Pocock, 1893

Diagnosis for the genus. – Scorpions of small to medium size with a total length ranging from 29 to 58 mm in subgenus *Lourencoides* and from 58 to 80 mm in subgenus *Hadruioides*. Anterior margin of carapace slightly convex, with three pairs of lateral ocelli. Sternum subpentagonal with Y-shaped sulcus (Soleglad & Fet, 2003b). Metasomal segment V with complete, granular ventrolateral and ventromedian carinae. Telson slightly concave dorsally, with short aculeus. Internal surface of cheliceral movable fingers with two subdistal teeth and one prominent basal tooth. Pedipalp chela acarinate, smooth and relatively slender in subgenus *Lourencoides*; robust and rounded with well-developed internomedian, dorsointernal and dorsal marginal carinae in subgenus *Hadruioides*. Pedipalp chela movable finger with 6 or 7 longitudinal series of granules and variable number of accessory denticles. Trichobothrial pattern of type C, neobothriotaxic (Vachon, 1974).

Composition of the genus *Hadruioides* (in order of description)

- *H. (Lourencoides) lunatus* (L. Koch, 1867) (Peru: Lima);
- *H. (Lourencoides) maculatus* (Thorell, 1876) (Ecuador: Guayas, Manabí, Santa Elena);
- *H. (Hadruioides) charcasus* (Karsch, 1879) (Peru: Lambayeque, Piura, Tumbes?);
- *H. (Lourencoides) carinatus* Pocock, 1900 (Peru: Cajamarca);
- *H. (Lourencoides) leopardus* Pocock, 1900 (Peru: Lambayeque);
- *H. (Lourencoides) galapagoensis* Maury, 1975 (Ecuador: Galápagos);
- *H. (Lourencoides) aguilar* Francke & Soleglad, 1980 (Peru: Lima);
- *H. (Lourencoides) mauryi* Francke & Soleglad, 1980 (Peru: Cusco);
- *H. (Lourencoides) udvardyi* Lourenço, 1995 (Ecuador: Azuay, Loja);
- *H. (Lourencoides) bustamantei* Ochoa & Chaparro, 2008 (Peru: Ayacucho, Huancavelica);
- *H. (Lourencoides) chinchaysuyu* Ochoa & Prendini, 2010 (Peru: Tumbes);
- *H. (Lourencoides) geckoi* Ochoa & Prendini, 2010 (Peru: Cajamarca);
- *H. (Lourencoides) graceae* Ochoa & Prendini, 2010 (Peru: Ancash);
- *H. (Lourencoides) juanchaparro* Ochoa & Prendini, 2010 (Peru: Ancash, Trujillo);
- *H. (Lourencoides) tishqu* Ochoa & Prendini, 2010 (Peru: Ancash: Isla Santa);
- *H. (Lourencoides) vichayitos* Ochoa & Prendini, 2010 (Peru: Piura);
- *H. (Lourencoides) adrianae* Rossi, 2012 (Peru: Ica);
- *H. (Lourencoides) lourencoi* Rossi, 2012 (Peru: Junín);
- *H. (Lourencoides) tongiorgii* Rossi, 2012 (Peru: Junín);
- *H. (Lourencoides) doriai* Rossi, 2014 (Ecuador: El Oro);
- *H. (Lourencoides) elenae* Rossi, 2014 (Ecuador: Santa Elena);
- *H. (Lourencoides) moreti* Rossi, 2014 (Ecuador: Bolívar);
- *H. (Lourencoides) inti* Ythier, 2021 (Peru: Arequipa);
- *H. (Hadruioides) pachamama* Ythier, 2021 (Ecuador: Loja);
- ***H. (Lourencoides) apu sp. n.*** (Peru: Apurímac).

Subgenus ***Lourencoides*** Rossi, 2014

Hadruioides (Lourencoides) apu sp. n.

(Fig. 1-9, Tab. 1)

ZooBank: <https://zoobank.org/DAD8C7EB-DAF9-476B-BA2C-C6CD858DEC85>

Holotype, ♂, Peru, Apurímac, Abancay, nr. Bosque Ampay, 13°36.61 S, 72°54.95 W, 10,884 f. (3,317 m) alt., baited pitfall, forest, 30/IV/1998-18/V/1998 (P. Parrillo), deposited in the MNHN.

Paratypes, 2 ♀, same as holotype (1 ♀ deposited in the MNHN & 1 ♀ deposited in the EYCP (EY0436)).

Etymology. – The specific name is placed in apposition to the generic name and refers to the Incan god (or spirit) of the mountains,

reflecting the high-altitude habitat of the new species. Indeed, *Hadruioides apu sp. n.* has been collected at an elevation of 3,317 m a.s.l. which is among highest altitudes recorded for the genus (Fig. 11).

Diagnosis. – Species of small to moderate size when compared with the average size of the other species of the genus; total length of adult male 31.5 mm, adult female 34.1-39.9 mm (see measurements of male holotype and one female paratype in Table 1). General coloration yellowish to yellowish brown with darker pigmented zones on carapace, mesosoma, metasoma and appendages. Mesosoma yellowish with confluent brownish spots on all tergites but not forming longitudinal stripes. Legs pale yellow with variegated greyish spots on both prolateral and retrolateral faces. Carapace and tergites I-VI smooth except for some minute granulation laterally. Pectines with 14-14 teeth in male, 12-12 teeth in female; 10-12 middle lamellae in male, 7-9 in female. Metasomal segment I wider than long and II-V longer than wide. Pedipalp chela slender in male (length to width ratio 3.82, length to depth ratio 3.42), broad in female (length to width ratio 2.96-3.03, length to depth ratio 2.96-2.97); fixed finger straight in both sexes, without proximal gap between fixed and movable fingers.

Description (based on male holotype and females paratypes; measurements in Table I).

Coloration. – General coloration yellowish to yellowish brown with darker pigmented zones on carapace, mesosoma, metasoma and appendages. Prosoma: carapace yellowish with dark spots on posterior, lateral and interocular areas; eyes surrounded by black pigment. Mesosoma yellowish with confluent brownish spots on all tergites but not forming longitudinal stripes. Metasoma yellowish with variegated brownish spots on all segments, more pronounced posteriorly. Vesicle yellowish (male) to reddish yellow (female) with the base of the aculeus reddish yellow and the tip reddish. Venter pale yellow. Chelicerae pale yellow with greyish reticulation at the base of fingers; fingers pale yellow with teeth reddish. Pedipalps: femur and patella yellowish with variegated brownish spots, chela manus yellowish, fingers reddish yellow. Legs pale yellow with variegated greyish spots on both prolateral and retrolateral faces of all segments except on telotarsus.

Morphology. – Carapace smooth except for some minute granulation laterally; anterior margin slightly convex. Median eyes separated by one ocular diameter. Three pairs of lateral ocelli. Mesosoma: tergites I-VI smooth except for some minute granulation on lateral areas; tergite VII coarsely granular. Sternum subpentagonal. Pectines: pectinal teeth count 14-14 in male, 12-12 in females; 10-12 middle lamellae in male, 7-9 in females. Sternites smooth; spiracles suboval. Metasomal segments I-IV with marked dorsal and dorsolateral carinae; ventral and ventrolateral carinae smooth in male, scarcely granulated on I-III and smooth on IV in female; segment V with dorsal carinae obsolete and ventral carinae strongly granulated. Metasomal segment I wider than long and II-V longer than wide in both sexes. Telson moderately elongated; vesicle smooth in male, moderately granulated ventrally in female. Cheliceral dentition characteristic of the genus; movable finger with two subdistal teeth and one prominent basal tooth on internal surface; dorsal surface with two macrosetae near base of fingers. Pedipalps: femur with three complete carinae; patella with four complete carinae; chela acarinate. Pedipalp femur with some granulation internally; patella and chela smooth. Chela slender in male (length to width ratio 3.82, length to depth ratio 3.42), broad in female (length to width ratio 2.96-3.03, length to depth ratio 2.96-2.97). Chela with 6 longitudinal series of granules on movable and fixed fingers; fixed finger straight in both sexes, without proximal gap between fixed and movable fingers when fingers are closed. Trichobothriotaxy: typical of the genus; femur with three trichobothria, patella with 20 trichobothria, chela with 26 trichobothria. Legs: tibial spurs absent, prolateral and retrolateral pedal spurs present. Sexual dimorphism present with metasoma and chela slenderer in male than in female.



Fig. 1-4. *Hadruioides* (L.) *apu* sp. n., habitus.

1-2. ♂ holotype. 1. Dorsal aspect. 2. Ventral aspect. 3-4. ♀ paratype. 3. Dorsal aspect. 4. Ventral aspect.

Comparisons. – *Hadruioides* (L.) *apu* sp. n. appears to be related to *Hadruioides* (L.) *mauryi* Francke & Soleglad, 1980, described from Cusco region and *Hadruioides* (L.) *bustamantei* Ochoa & Chaparro, 2008, distributed in Ayacucho and Huancavelica regions (Fig. 10). All three species may represent vicariant species.

The new species can however be distinguished from *H.* (L.) *mauryi* by the following main features:

- (i) smaller general size with 31.5 mm in male and 34.1-39.9 mm in female (40-50 mm in both sexes of *H.* (L.) *mauryi*),
- (ii) general coloration yellowish to yellowish brown with evident darker spots on carapace, mesosoma, metasoma and appendages (brownish with only faint darker spots along the posterior margin of tergites in *H.* (L.) *mauryi*),
- (iii) carapace and tergites I-VI smooth except for some minute granulation laterally (carapace moderately to densely granulate except on anterior half of interocular area and tergites I-VI sparsely granulate on anterior half and moderately granulate on posterior half in *H.* (L.) *mauryi*),
- (iv) lower pectinal tooth count with 14-14 teeth in male and 12-12 teeth in female (19-20 teeth in male and 15-18 teeth in female *H.* (L.) *mauryi*)

and higher number of middle lamellae with 10-12 in male and 7-9 in female (7-8 in male and 6-8 in female *H.* (L.) *mauryi*),

- (v) metasomal segment I wider than long and II-V longer than wide (I-III wider than long and IV-V longer than wide in *H.* (L.) *mauryi*),
- (vi) chela slenderer in male with length to width ratio 3.82 (2.70-2.80 in *H.* (L.) *mauryi*) and length to depth ratio 3.42 (2.97 in *H.* (L.) *mauryi*) and broader in female with length to width ratio 2.96-3.03 (3.23 in *H.* (L.) *mauryi*) and length to depth ratio 2.96-2.97 (3.33 in *H.* (L.) *mauryi*),
- (vii) fixed finger straight in both sexes, without proximal gap between fixed and movable fingers (curved, with a proximal gap in *H.* (L.) *mauryi*).

H. (L.) *apu* sp. n. can also be readily distinguished from *H.* (L.) *bustamantei* by the following main features:

- (i) smaller general size with 31.5 mm in male and 34.1-39.9 mm in female (44.0-49.5 mm in male and 44.8-47.6 mm in female *H.* (L.) *bustamantei*),
- (ii) mesosoma with confluent darker spots on tergites but not forming longitudinal stripes (paired dorsosubmedian and dorsolateral darker spots forming four distinct longitudinal stripes along mesosoma in *H.* (L.) *bustamantei*),
- (iii) legs with variegated spots on both prolateral and retrolateral faces (only on prolateral face in *H.* (L.) *bustamantei*),

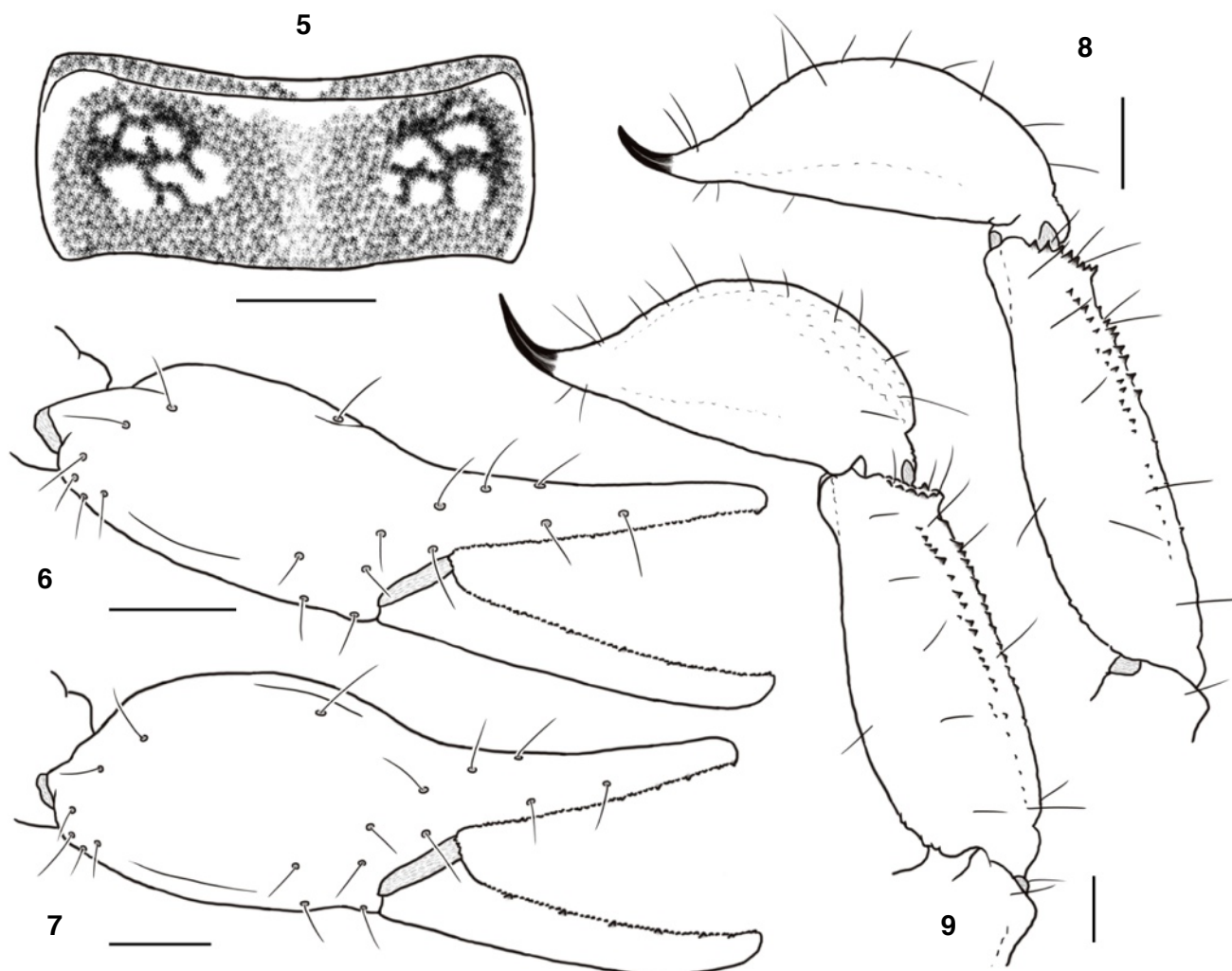


Fig. 5-9. *Hadruioides (L.) apu* sp. n. (Scale bars = 1 mm).

5. Tergite V showing the pigmentation pattern, ♂ holotype. 6-7. Right pedipalp chela, external aspect, showing the trichobothrial pattern. 6. ♂ holotype. 7. ♀ paratype. 8-9. Metasomal segment V and telson, lateral aspect. 8. ♂ holotype. 9. ♀ paratype.

(iv) carapace and tergites I-VI smooth except for some minute granulation laterally (carapace granulose especially laterally and posteriorly and tergites I-VI finely granulose especially posteriorly in *H. (L.) bustamantei*),

(v) lower pectinal tooth count with 14-14 teeth in male and 12-12 teeth in female (19-21 teeth in male and 14-19 teeth in female *H. (L.) bustamantei*),

(vi) chela slenderer in male with length to width ratio 3.82 (3.09-3.36 in *H. (L.) bustamantei*) and length to depth ratio 3.42 (2.96-3.14 in *H. (L.) bustamantei*) and broader in female with length to width ratio 2.96-3.03 (3.17-3.57 in *H. (L.) bustamantei*) and length to depth ratio 2.96-2.97 (3.04-3.41 in *H. (L.) bustamantei*),

(vii) fixed finger straight in both sexes, without proximal gap between fixed and movable fingers (curved, with a proximal gap in *H. (L.) bustamantei*).

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Fig. 10. Map of Southern Peru showing the known distribution of *Hadruioides* species in the region, including the type locality of *Hadruioides* (L.) *apu* sp. n. (red star).

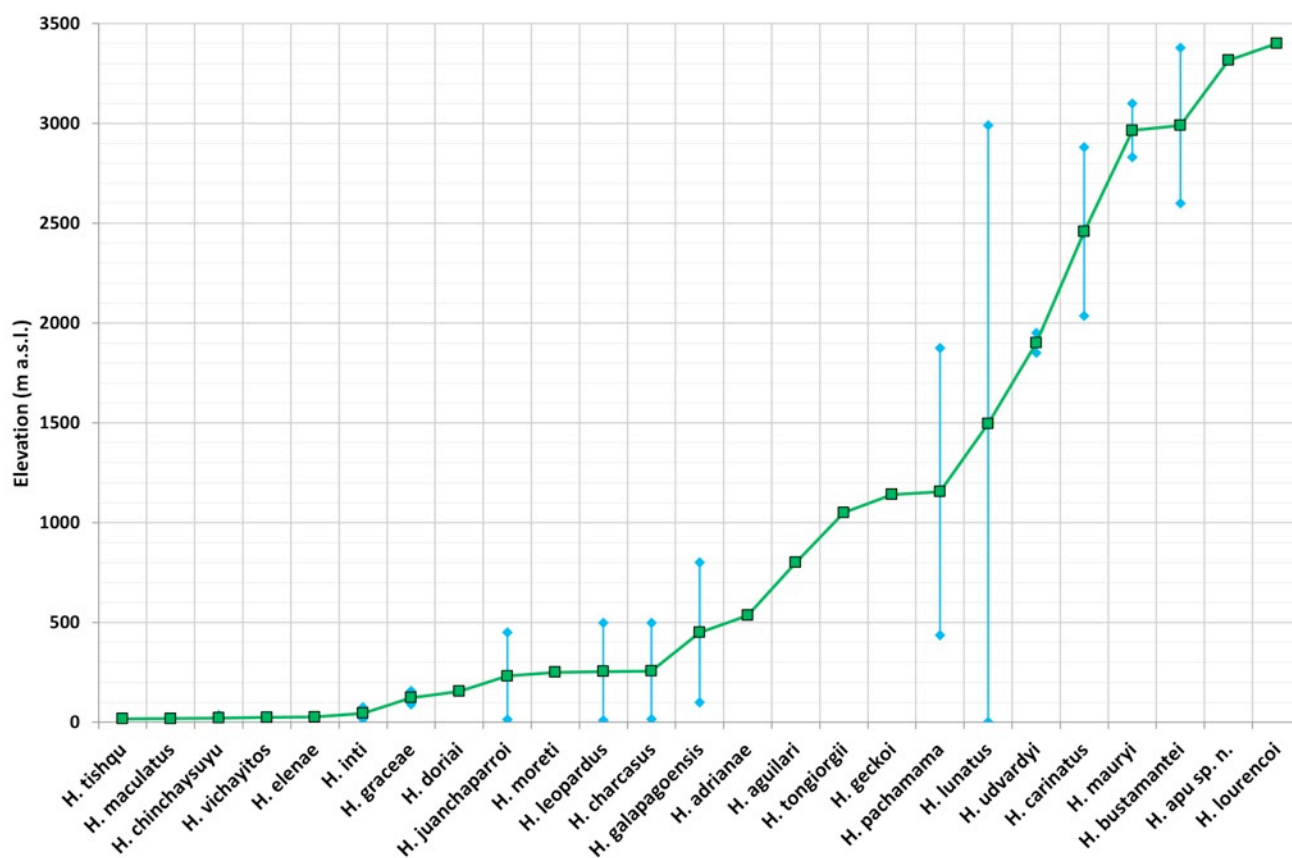


Fig. 11. Elevational patterns of *Hadruioides* species (blue dots = min/max recorded elevations; green dots = mean elevations).

	<i>Hadruioides (L.) apu</i> sp. n.	
	♂ holotype	♀ paratype
Total length	31.53	39.91
Carapace (L - W)	3.24 - 3.52	4.57 - 4.86
Mesosoma (L)	8.57	11.43
Metasoma		
- segment I (L - W)	2.00 - 2.10	2.38 - 3.05
- segment II (L - W)	2.48 - 1.90	2.86 - 2.76
- segment III (L - W)	2.67 - 1.90	3.24 - 2.76
- segment IV (L - W)	2.95 - 1.62	3.81 - 2.57
- segment V (L - W)	4.76 - 1.62	5.52 - 2.67
Telson (L - W - D)	4.86 - 1.90 - 1.71	6.10 - 2.67 - 2.67
Pedipalp		
- femur (L - W)	3.05 - 0.95	3.62 - 1.62
- patella (L - W)	3.52 - 1.05	4.10 - 1.71
- chela (L - W - D)	6.19 - 1.62 - 1.81	7.62 - 2.57 - 2.57
- movable finger (L)	3.33	3.90
Ratios		
- metasomal segment I L/W	0.95	0.78
- metasomal segment II L/W	1.31	1.04
- metasomal segment III L/W	1.41	1.17
- metasomal segment IV L/W	1.82	1.48
- metasomal segment V L/W	2.94	2.07
- metasoma L / segment V L	9.17	6.67
- telson vesicle L / W	2.56	2.28
- telson vesicle L / D	2.84	2.28
- chela L / W	3.82	2.96
- chela L / D	3.42	2.96
- chela L / movable finger L	1.86	1.95

Table. I. Morphometric values (in mm) and selected morphometric ratios of adult specimens of *Hadruioides (L.) apu* sp. n.

Abbreviations

L : length,

W : width (in carapace it corresponds to posterior width, in telson it corresponds to vesicle width),

D : depth (in telson it corresponds to vesicle depth).

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Authors contribution ¹

Publisher Correspondence. – EY

Writing the article. – EY & WL

Description. – EY & WL

Article proofreading. – EY & WL

Bibliographic work. – EY & WL

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Author of the figures. – EY

¹ EY = Eric Ythier – WL = Wilson Lourenço

Résumé

Ythier E. & Lourenço W. R., 2023. – Une nouvelle espèce d'*Hadruioides* Pocock, 1893 du Pérou (Scorpiones: Caraboctonidae). *Faunitaxys*, 11(76): 1 – 7.

Une nouvelle espèce d'*Hadruioides* Pocock, 1893 est décrite sur la base de spécimens collectés dans la région d'Apurimac dans le sud du Pérou. *H. (Lourencoides) apu* sp. n. semble être apparenté à *H. (L.) mauryi* Francke & Soleglad, 1980 et *H. (L.) bustamantei* Ochoa & Chaparro, 2008 mais peut être différencié notamment par une taille plus petite, un motif de pigmentation différent, une granulation réduite, un nombre de dents de peignes plus faible, le metasoma avec uniquement le premier segment plus large que long, ainsi que les pinces plus fines chez le mâle et plus larges chez la femelle avec le doigt fixe droit, sans encoche proximale entre les doigts chez les deux sexes. Ce nouveau taxon représente la 18^e espèce décrite pour le genre *Hadruioides* au Pérou et la 23^e espèce décrite pour le sous-genre *Lourencoides* Rossi, 2014. Le nombre d'espèces appartenant au genre *Hadruioides* est porté à 25.

Mots-clés. – Scorpiones, Caraboctonidae, *Hadruioides*, *apu*, taxonomie, nouvelle espèce, description, morphologie, Pérou.

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Illustration de la couverture :

Usphaqucha lake with Mount Ampay in the background, near the type locality of *Hadruides* (*L*) *apu* **sp. n.**, north of Abancay, Apurimac, Peru.

Crédits:

Eric Ythier : Fig. 1-11.

Peter Stewart (Wikipedia) : couverture.

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