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THREE NEW SPECIES OF THE GENUS *HADRUIROIDES* POCOCK, 1893 FROM CENTRAL PERU

(Scorpiones: Caraboctonidae)

Abstract. Three new species of the neotropical genus *Hadruiroides* POCOCK, 1893 are described from different habitats in central Peru. *H. adrianae* n. sp. comes from a xeric area around San Josè de Los Molinos, Ica province, in the Ica region. This is also the first record of this genus for that region. *H. lourencoi* n. sp. and *H. tongiorgii* n. sp. come from the Junín region, respectively from Tarma province, at very high altitude, and from the Andinian forest of Satipo province, at medium altitude. Only few specimens of *Hadruiroides* are known from Junín and their identity was not clear. The total number of Peruvian species of *Hadruiroides* is now raised to sixteen.

Riassunto. Tre nuove specie del genere *Hadruiroides* POCOCK, 1893 dal Perù centrale (Scorpiones: Caraboctonidae). Tre nuove specie del genere neotropicale *Hadruiroides* POCOCK, 1893 sono descritte da habitat differenti nel Perù centrale. *H. adrianae* n. sp. proviene da una zona arida intorno a San Josè de Los Molinos, provincia di Ica, nella regione di Ica. Questa è anche la prima segnalazione di questo genere per quella regione. *H. lourencoi* n. sp. e *H. tongiorgii* n. sp. provengono dalla regione di Junín, rispettivamente dalla provincia di Tarma, ad altitudine molto elevata, e dalla foresta Andina della provincia di Satipo, a media altitudine. Solo pochi esemplari di *Hadruiroides* sono conosciuti da Junín e la loro identità non era chiara. Il numero totale delle specie peruviane di *Hadruiroides* è ora aumentato a sedici.

Key words. Scorpiones, Caraboctonidae, *Hadruiroides*, new species, Peru.

Introduction

The family Caraboctonidae KRAEPELIN, 1905 presently contains only four genera: *Hadrurus* THORELL, 1876, *Hoffmannihadrurus* FET & SOLEGLAD, 2004, *Caraboctonus* POCOCK, 1893 and *Hadruiroides* POCOCK, 1893 with a total of 26 species. The largest genus is *Hadruiroides* with a total of 16 species (19 including the three new species described in this study) distributed in Ecuador (including Galàpagos Islands), Chile and Peru (SISSOM, 1990; OCHOA & PRENDINI, 2010). Old records from other South-American countries are considered misidentifications (OCHOA & PRENDINI, 2010) and this consideration is supported also by two important regional monographies on the fauna of Venezuela (GONZALEZ-SPONGA, 1996) and the fauna of Brazil (LOURENÇO, 2002) that did not report them. *Hadruiroides* together with *Caraboctonus*, a Chilean monotypic genus, is placed in the subfamily Caraboctoninae KRAEPELIN, 1905 while the North-American genera *Hadrurus* and *Hoffmannihadrurus* are placed in the subfamily Hadrurinae STAHNKE, 1973. The genus *Hoffmannihadrurus* was synonymized by FRANCKE & PRENDINI (2008) with *Hadrurus* but was subsequently reinstated by FET & SOLEGLAD in the same year.

While scorpions of the subfamily Hadrurinae are quite large, sometimes exceeding 120 mm in total length (FET & SOLEGLAD 2004, FRANCKE & PRENDINI 2008, FET & SOLEGLAD 2008, SOLEGLAD, FET & LOWE, 2011), scorpions in the subfamily Caraboctoninae are small to medium in size, with a maximum length of 80 mm for *H. charcasus* (KARSCH, 1879) (MAURY, 1975; OCHOA & PRENDINI, 2010).

In the revision of the genus *Hadruioides* in Peru, OCHOA & PRENDINI (2010) did not report any species from the Ica and Junín regions, in central Peru. In the present study, *Hadruioides adrianae* n. sp. is described from the Ica province and it represents the first record of the genus *Hadruioides* for the region. In several recent papers (SOLEGLAD & SISSOM, 2001; SOLEGLAD & FET, 2003a; SOLEGLAD & FET, 2003b; FET *et al.*, 2004; FET & SOLEGLAD, 2008) *H. maculatus* (THORELL, 1876) was reported from Junín and other Peruvian regions, but OCHOA & PRENDINI (2010) restricted the distribution of this species to Ecuador and supposed that the specimens cited in those papers could be *H. bustamantei* OCHOA & CHAPARRO, 2008. Both *H. lourencoi* n. sp. and *H. tongiorgii* n. sp. are described from the Junín region and they are clearly different from *H. bustamantei*, as explained in the description.

Material and methods

Five specimens of *H. adrianae* n. sp. were collected in February 2010. They were eviscerated with a short cutting on the sternites and later preserved in a dry condition to conserve their patterns. Spots and patterns are very important in *Hadruioides* and other marbled scorpions, thus, it is important to study fresh material (LOURENÇO & YTHIER, 2008). The same problem was reported by MAURY (1975) in the redescription of the holotype of *H. lunatus* (L. KOCH, 1867) that was faded by alcohol. Besides, three specimens of *H. lourencoi* n. sp. and three specimens of *H. tongiorgii* n. sp. were collected and preserved in dry condition. Subsequently the holotypes were deposited in MZUF and preserved in alcohol 75%, while the paratypes are kept in ARPC and preserved dry. Specimens were photographed using a Nikon D50 camera. Digital images edited with the assistance of Gimp 2.6® and Adobe Photoshop®. Descriptions and measurements, given in mm, mostly follow SISSOM *et al.* (1990), except for measurements of metasomal segments (VACHON, 1952) and description of metasomal carinae (PRENDINI, 2004).

Abbreviations

ARPC = Andrea Rossi Private Collection, Massa, Italy
MCSN= Museo Civico di Storia Naturale "Giacomo Doria", Genoa, Italy
MRSN= Museo Regionale di Scienze Naturali, Turin, Italy
MZUF = Museo di Storia Naturale Università di Firenze - Sezione di Zoologia "La Specola", Florence, Italy

Description of the new species

Hadruioides adrianae n. sp.

Type material. Peru: San José de Los Molinos, Ica province, Ica region, 535 m a.s.l., 1 adult M holotype deposited in MZUF and 1 adult M and 3 adult F paratypes in the author's collection (ARPC), leg. local collector, II.2010.

Note. 2 females paratypes have the patterns not well preserved.

Etymology. Named in honour of Mrs Adriana Ratto Politi, who financed this research.

Diagnosis. Scorpion of small size, 40-45 mm. General coloration yellowish to orange with several darker spots on prosoma, mesosoma and metasoma. Movable fingers with 4 subrows of granules. Pectines with 14 teeth in males and 11-12 in females (Fig. 1A,1B).

Description. Measurements in table 1. Basic coloration yellowish-orange with several dark spots on carapace, mesosoma and metasoma. Prosoma: anterior carapace lighter (yellowish) and smooth; ocular area and posterior carapace darker and densely granulated. Median eyes orange and three pairs of lateral ocelli black. Anterior border of carapace slightly convex. Mesosoma (Fig. 2): yellowish-orange with four irregular dark grey spots in tergites I to VI, two submedian and two sublateral. The submedian spots are

smaller and quite rectangular. The distance between sublateral spot and submedian spot in tergites III–VI is about as large as the space occupied by the two submedian spots and the area between them. Tergites I to IV are almost smooth; several granules in tergite V and VI, especially on the posterior area; tergite VII strongly granulated. Venter light yellow with genital operculum dark yellow and pectines pale yellow. Pectinal teeth count: 14–14 in males holotype and paratype and 12–12 in females paratypes. Sternum subpentagonal, as long as wide with a deep longitudinal furrow. All sternites are smooth. The spiracles are oval. Chelicerae: orange and densely reticulated with black hairs; typical dentition of genus *Hadruroides* (fig. 3): movable fingers with two subdistal teeth and one prominent basal tooth on internal surface. Pedipalps: uniformly yellowish or orange; femur with three marked carinae; patella with four marked carinae; femur with 3 trichobothria and patella with 20 which 3 on the ventral aspect: V1, V2 and V3. Chela smooth, without carinae, with 26 trichobothria. Movable fingers with 6 subrows. Chela with sexual dimorphism: gap more evident in males (Fig. 4A) than in females (Fig. 4B). Legs: yellowish-orange; coxa, femur and patella with black hairs; tarsus with two rows of spinule clusters. Tibial spurs absent but prolateral and retrolateral pedal spurs present. Metasoma: uniformly yellow with several very light grey spots, scarcely visible, arranged in two longitudinal rows surround the insertion of setae on ventral aspect of segment I–IV. Segment I to IV with marked dorsal and dorsolateral carinae; ventral and ventrolateral carinae smooth. Segment V with dorsal and ventral carinae scarcely granulated. Length to width ratio of V segment about 2.3 in males. Telson: orange vesicle without subaculear tubercle; aculeus black; vesicle slightly more swollen and almost smooth in males, with only few granules in the anterior side of ventral aspect (Fig. 5A); very rough in females (Fig. 5B). Hemispermatophore unknown.

Relationships. *Hadruroides adrianae* n. sp. is closely related to *H. lunatus*, that occurs only in the Lima department and Isla Pachacamac (OCHOA & PRENDINI, 2010). *H. lunatus* was also reported from other regions and other countries but those records are considered erroneous. It is important to note that several specimens of Ecuadorian *Hadruroides*, conserved in the Italian museums, were incorrectly mentioned as *H. lunatus*. MAURY (1975) studied a specimen in MRSN but, now, in the Ecuadorian mainland only *H. maculatus* and *H. udvardyi* LOURENÇO 1995 are known. Besides, the syntypes of *Hadrurus robustus* (BOERIS, 1889), synonym of *Hadruroides lunatus*, deposited in MCSN seem to be lost or wrongly identified. According to the director of the museum, Dr G. Doria, only a specimen of *Hadruroides* from Ecuador, labeled as *H. lunatus*, is present in their collections. For the same reason of the specimen from Turin, probably it was not *H. lunatus*. *H. adrianae* n. sp. can be distinguished from *H. lunatus* by a combination of characters. The dorsosubmedian spots on the tergites I–VI are rectangular and quite large in *H. lunatus* whereas in *H. adrianae* n. sp. they are rectangular but more irregular and narrower. In fact the distance from the lateral side of the left dorsosubmedian spot to the lateral side of the right dorsosubmedian spot in V tergite is much bigger than the lighter area around them. In *H. adrianae* n. sp. the same distance has about the same length of the lighter area. There is no pigmentation on the ventral aspect of I metasomal segment in *H. lunatus* but there are several spots surrounding the insertion of setae in *H. adrianae* sp. n. as in *H. juanchaparroi* OCHOA & PRENDINI, 2010. Males of *H. lunatus* have a length to width ratio of the chela manus of 3.44–3.54 whereas males of *H. adrianae* n. sp. have a length to width ratio of 3.58–3.60. Males of *H. lunatus* have a gap on the fixed fingers of the pedipalps but in the females it is hardly evident. In males of *H. adrianae* n. sp. the gap is wider than in *H. lunatus*, and also in females it is easily visible.

H. adrianae n. sp. can be differentiated from *H. juanchaparroi* by its larger size, 40–45 mm, compared with 31.9–35.8 mm, and also by different patterns on the mesosoma and metasoma. Dorsosubmedian spots on tergites I–VI are almost rectangular in *H. adrianae* n. sp. but totally irregular in *H. juanchaparroi*. The pigmentation on the ventral aspect of metasomal segments II to IV is pale in *H. adrianae* n. sp. but very evident in *H. juanchaparroi*.

H. aguilar FRANCKE & SOLEGLAD, 1980 also occurs in central Peru (Lima Region) but can be easily distinguished by more elongated metasomal segments I–IV: the II is longer than wide but in *H. adrianae* n. sp. it is as long as wide. Besides in males, the V metasomal

segment has a length to width ratio always larger than 3, whereas in *H. adrianae* n. sp. the ratio is only 2.2–2.4.

H. tishqu OCHOA & PRENDINI, 2010 has a less pigmentation on the carapace and mesosoma; the ventral aspect of the telson is completely smooth in both sexes.

All other Peruvian species of the genus *Hadruioides* have two or four carinae on sternite VII while in *H. adrianae* n. sp. is acarinate.

***Hadruioides lourencoi* n. sp.**

Type material. Peru: Carretera central, Tarma province, Junín region, 3400 m a.s.l., 1 adult F holotype deposited in MZUF and 1 adult M and 1 adult F paratypes in the author's collection (ARPC), leg. local collector, V-2010.

Etymology. Named in honour of Prof. Wilson Roberto Lourenço for his great contribution to the knowledge of the neotropical scorpions.

Diagnosis. Scorpion of small size, 35–40 mm. General coloration brownish-orange with several spots on prosoma, mesosoma, metasoma, pedipalps and legs. Movable fingers with 6 subrows of granules. Pectines with 16–16 teeth in male and 12–12 in females (Fig. 6A, 6B).

Description. Measurements in table 1. Basic coloration brownish-orange with several lighter spots on carapace and mesosoma; pedipalps and legs dark orange. Prosoma: anterior carapace lighter (orange) and quite smooth; ocular area and posterior carapace darker and densely granulated. Median eyes orange and three pairs of lateral ocelli black. Carapace anterior margin slightly convex. Mesosoma (Fig. 7): very dark brown with several brownish-orange rectangular spots in tergites I to VI; the spots are in the posterior half of tergite; tergites I–IV are quite smooth, only punctated in the lateral sides; several granules in tergite V and VI, especially on the posterior area; tergite VII well granulated. Venter light brown with genital operculum and pectines dark orange. Pectinal teeth count: 16–16 in male paratype and 12–12 in females holotype and paratype. Sternum subpentagonal, as long as wide with a deep longitudinal furrow. All sternites are smooth. The spiracles are oval. Chelicerae: orange and densely marbled; typical dentition of genus *Hadruioides*: movable fingers with two subdistal teeth and one prominent basal tooth on internal surface (Fig. 8). Pedipalps: uniformly orange; femur with three marked carinae; patella with four moderately marked carinae; femur with 3 trichobothria and patella with 20 which 3 on the ventral aspect: V1, V2 and V3; chela smooth, without carinae, with 26 trichobothria; movable fingers with 6 subrows; chela without sexual dimorphism in gap: scarcely evident both in males (Fig. 9) and in females; chela in male (with a L/W ratio of 4.08) is narrower than in female. Legs: orange; coxa, femur and patella with few black hairs; tarsus with two rows of spinule clusters. Tibial spurs absent but prolateral and retrolateral pedal spurs present. Metasoma: brownish-orange with several darker spots on ventral aspect of all segments, in male; spots scarcely evident in females; segment I to IV with marked dorsal and dorsolateral carinae; ventrosulmedian carinae absent; ventrolateral carinae smooth; segment V with dorsal carinae evident only in proximal and distal part; ventrosulmedian and ventrolateral carinae marked. Length to width ratio of V segment about 2.1 in male. Telson: brownish-orange vesicle without subaculear tubercle; aculeus orange to black at the end, shorter than vesicle; vesicle with few granules in the anterior side of ventral aspect in females and uniformly granulated in the ventral aspect in male. Hemispermatophore unknown.

Relationships. *Hadruioides lourencoi* n. sp. is closely related to *H. juanchaparroi*, *H. luntas* and *H. adrianae* n. sp. but can be distinguished by a combination of characters. *H. lourencoi* n. sp. has a dark mesosoma with lighter spots whilst *H. lunatus* and *H. adrianae* n. sp. have a lighter mesosoma with dark spots; there is no sexual dimorphism in the gap of the pedipalp chela of *H. lourencoi* n. sp. but it is evident in *H. adrianae* n. sp., *H. juanchaparroi* and *H. lunatus*; pectinal teeth count in females of *H. lourencoi* n. sp. is 12,

unlike the female of *H. juanchaparro* with 11; pectinal teeth count in male of *H. lourencoi* n. sp. is 16 while it is 14 in male of *H. adrianae* n. sp. and 16-18 (usually 17) in males of *H. juanchaparro*; there is pigmentation on the ventral aspect of I metasomal segment in *H. lourencoi* n. sp. (as in *H. juanchaparro* and *H. adrianae* n. sp.) but there is no pigmentation in *H. lunatus*; chela L/W ratio in male of *H. lourencoi* n. sp. is higher than 4, in males of *H. lunatus* it is 3.44–3.54, in males of *H. juanchaparro* it is 3.29–3.70 and in males of *H. adrianae* n. sp. it is 3.58–3.60. Besides, *H. lourencoi* n. sp. lives at very high altitude (3400 m a. s. l.) while *H. juanchaparro* and *H. adrianae* n. sp. come from much lower areas: respectively 13–450 and 535 m a.s.l.

***Hadruroides tongiorgii* n. sp.**

Type material. Peru: Rio Venado, Satipo province, Junín region, 1050 m a.s.l., 1 adult M holotype deposited in MZUF and 1 adult M and 1 adult F paratypes in the author's collection (ARPC), leg. local collector, 21-X-2011.

Etymology. Named in honour of Prof. Paolo Tongiorgi, scientific director of "Aracnofilia – Centro Studi sugli Aracnidi", previously Italian Arachnological Society.

Diagnosis. Scorpion of medium size for the genus: 45–50 mm. General coloration brown to dark brown, only legs are dark yellow. Movable fingers with 6 subrows of granules. Pectines with 17–18 teeth in males and 15 in females (Fig. 10A, 10B).

Description. Measurements in table 1. Basic coloration brownish-orange with several spots dark brown on mesosoma; legs dark yellow with several spots. Prosoma: anterior carapace moderately granulated; ocular area, median and posterior carapace densely granulated with very big granules. Median eyes brownish-orange and three pairs of lateral ocelli black. Anterior border of carapace convex. Mesosoma (Fig. 11) with longitudinal spots, lighter than general colour. Tergites I–V moderately punctated, especially in the lateral sides; tergite VI with many granules in the posterior half; tergite VII strongly granulated with four marked carinae. Venter brown with genital operculum and pectines pale brown. Pectinal teeth count: 17–18 in males holotype and paratype and 15–15 in female paratype. Sternum subpentagonal, as long as wide with a deep longitudinal furrow. All sternites are smooth, except sternite VII with obsolete ventral lateral carinae. The spiracles are oval. Chelicerae: dark yellow and slightly marbled, with few hairs; typical dentition of genus *Hadruroides*: movable fingers with two subdistal teeth and one prominent basal tooth on internal surface. Pedipalps: uniformly brown; femur with three marked carinae; patella with four marked carinae; femur with 3 trichobothria and patella with 20 which 3 on the ventral aspect: V1, V2 and V3. Chela smooth, without carinae, with 26 trichobothria. Movable fingers with 6 subrows. Chela robust (L/W ratio in males 2.88–2.93) with evident sexual dimorphism: gap extremely pronounced in males (Fig. 12). Legs: dark yellow with several brownish-grey small spots; coxa, femur and patella with black hairs; tarsus with two rows of spinule clusters. Tibial spurs absent but prolateral and retrolateral pedal spurs present. Metasoma: basically brown with several reddish-orange highlights; longitudinal darker (blackish) strips on ventral aspect. Segment I–IV with marked and spinoid dorsal and dorsolateral carinae; vetrosubmedian carinae absent on segment I, II and III; only obsolete on IV; ventrolateral carinae moderately marked on segment I to IV; segment V with ventrolateral spinoid carinae and dorsal smooth carinae. Length to width ratio of V segment about 2.1 in males. Telson: reddish-black elongated vesicle without subaculear tubercle; aculeus black, shorter than vesicle; sexual dimorphism present: vesicle more swollen in males (Fig. 13A) than in females (Fig. 13B). Vesicle smooth in both sexes with only a few scattered hairs. Hemispermaphore unknown.

Relationships. *Hadruroides tongiorgii* n. sp. is closely related with *H. bustamantei* and *H. mauryi* FRANCKE & SOLEGLAD, 1980 and can be distinguished by a combination of characters. *H. tongiorgii* n. sp. differs from *H. bustamantei* in: spots of pigmentation on tergites I–IV, scarcely evident and irregular in *H. tongiorgii* n. sp. and forming four

longitudinal stripes in *H. bustamantei*; shape of male chela, more robust in *H. tongiorgii* n. sp. with a L/W ratio of 2.88–2.93 and more slender in *H. bustamantei* with a L/W of 3.09–3.36; count of pectinal teeth in males, only 17–18 in *H. tongiorgii* and 19–21 in *H. bustamantei*. *H. tongiorgii* n. sp. is different from *H. mauryi* for: pigmentation on tergites I–IV, irregular and scarcely evident in *H. tongiorgii* n. sp. but completely absent in *H. mauryi*; spots on legs, present in *H. tongiorgii* n. sp. but absent in *H. mauryi*; shape of chela in male, more slender in *H. tongiorgii* n. sp. with a L/W ratio of 2.88–2.93 and stocky in *H. mauryi* with a L/W ratio of 2.7–2.8. Besides, both *H. bustamantei* and *H. mauryi* live at higher altitude, from 2600 m a.s.l. to 3300 m a.s.l., whereas *H. tongiorgii* n. sp. is present at a lower altitude, about 1000 m a.s.l. in Junín, a region where both *H. bustamantei* and *H. mauryi* do not occur.

Ecological and biogeographical notes on the new species

H. adrianae n. sp. was found in desertic area in San José de Los Molinos, Ica province, in the Ica region at low altitude for the genus (535 m a.s.l.). The sternites of all specimens were crusted or covered by several grains of beige sand: the colour is typical of desertic species. No other *Hadruioides* is known from the Ica region, so further studies should be necessary to clarify the real distribution of *H. adrianae* n. sp. and other species that may occur in the Ica region. *H. lourencoi* n. sp. was found at very high altitude (3400 m a.s.l.) for the genus *Hadruioides*, in a hill area with several cultivations. *H. tongiorgii* n. sp. was found at medium altitude (1050 m a.s.l.) in “Selva central del Perú”, part of the Amazonian forest, in a very moist habitat (Fig. 14).

As it happens with many other species of the genus *Hadruioides*, it is probable that these new species have a small distribution around the type locality (OCHOA & PRENDINI, 2010).

An identification key for the species of *Hadruioides* that occur in central Peru (Ancash, Lima, Junín, Huancavelica, Ica, Ayacucho, Cusco) is given.

Identification key of *Hadruioides* species that occur in central Peru:

1. Sternite VII with carinae 2
- Sternite VII without carinae 5
2. Chela fixed finger in adult males curved, creating distinct proximal gap with movable finger when fingers closed; chela L/W ratio in males lower than 5.0 3
- Chela fixed and movable fingers in males straight, no proximal gap evident when fingers closed; chela L/W ratio in males higher than 5.0 *graceae* OCHOA & PRENDINI, 2010
3. Tergites I–IV unpigmented; legs I–IV without spots of pigmentation; chela with L/W ratio in males 2.7–2.8 *H. mauryi* FRANCKE & SOLEGLAD, 1980
- Tergites I–IV each with spots of pigmentation; legs I–IV each with several spots of pigmentation; chela with L/W ratio in males higher than 2.8 4
4. Spots of pigmentation on tergites I–IV forming four longitudinal stripes; chela L/W ratio in males 3.09–3.36; pectinal teeth in males 19–21; found at high altitude (over 2600 m a.s.l.) *H. bustamantei* OCHOA & CHAPARRO, 2008
- Spots of pigmentation on tergites I–IV scarcely evident and not forming four longitudinal stripes; chela L/W ratio in males 2.88–2.93; pectinal teeth in males, only 17–18
..... *H. tongiorgii* n. sp.
5. Metasomal segments I–IV elongated; segment II longer than wide; segment V in males approximately three times longer than wide, with L/W ratio: 3.18
..... *H. aguilaris* FRANCKE & SOLEGLAD, 1980
- Metasomal segment II not longer than wide; length to width ratio of V metasomal segment in males always lower than 2.6 6

6. Sexual dimorphism in chela not evident; no pronounced gap when fingers are closed; chela L/W ratio in male higher than 4 *H. lourencoi* n. sp.
 - Sexual dimorphism in males evident; pronounced or very pronounced gap when fingers are closed; chela L/W ratio in male lower than 3.7 7
7. Tergites I–VI with irregular dorsosubmedian spots of pigmentation; total length 31.9–35.8 mm *H. juanchaparroi* OCHOA & PRENDINI, 2010
 - Tergites I–VI with rectangular dorsosubmedian spots of pigmentation; total length 35–45 mm 8
8. Ventral aspect of I metasomal segment without spots of pigmentation surrounding the insertion of setae; dorsosubmedian spots on the tergites I to VI quite large: the space between dorsosubmedian spots and dorsolateral spots about as the width of a dorsosubmedian spot; chela L/W ratio in males of 3.44–3.54 ... *H. lunatus* (L. KOCH, 1867)
 - Ventral aspect of I metasomal segment with several spots of pigmentation surrounding the insertion of setae; dorsosubmedian spots on the tergites I to VI very thin: the space between dorsosubmedian spots and dorsolateral spost about as three time the width of a dorsosubmedian spot; chela L/W ratio in males of 3.58–3.60 *H. adrianae* n. sp.

Conclusion

The addition of these three new species to Peruvian fauna confirms that several new species could occur in poorly explored areas. LOURENÇO & DASTYCH (2001), studying a rich material from Peru, reported the existence of several possible undescribed species within the genus *Hadruoides*. OCHOA & PRENDINI (2010) mentioned an undescribed species, related to *H. lunatus*, from the coastal desert of southern Peru (Tacna and Arequipa) and northern Chile.

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Legends

Fig. 1A, 1B: *Hadruides adrianae* n. sp., dorsal and ventral aspect of male holotype (MZUF) and female paratype (ARPC).

Fig. 2: Mesosoma of *Hadruides adrianae* n. sp. showing pattern.

Fig. 3: Chelicera of *Hadruides adrianae* n. sp., ventral aspect.

Fig. 4A: Chela of *Hadruides adrianae* n. sp. male.

Fig. 4B: Chela of *Hadruides adrianae* n. sp. female.

Fig. 5A: Telson of *Hadruides adrianae* n. sp. male.

Fig. 5B: Telson of *Hadruides adrianae* n. sp. female.

Fig. 6A, 6B: *Hadruides lourencoi* n. sp., dorsal and ventral aspect of male paratype (ARPC) and female holotype (MZUF).

Fig. 7: Mesosoma of *Hadruides lourencoi* n. sp. showing pattern.

Fig. 8: Movable finger of chelicera of *Hadruides lourencoi* n. sp., ventral aspect.

Fig. 9: Chela of *Hadruides lourencoi* n. sp. male.

Fig. 10A, 10B: *Hadruides tongiorgii* n. sp., dorsal and ventral aspect of male holotype (MZUF) and female paratype (ARPC).

Fig. 11: Mesosoma of *Hadruides tongiorgii* n. sp. showing pattern.

Fig. 12: Chela of *Hadruides tongiorgii* n. sp. male.

Fig. 13A: Telson of *Hadruides tongiorgii* n. sp. male.

Fig. 13B: Telson of *Hadruides tongiorgii* n. sp. female.

Fig. 14: Map with type localities of the new species (circle = *H. adrianae* n. sp.; triangle = *H. lourencoi* n. sp.; square = *H. tongiorgii* n. sp.)

10 mm

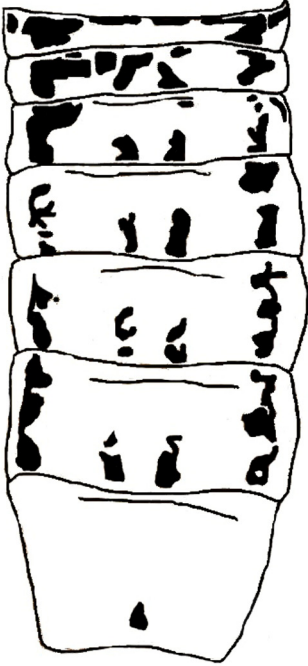


1A



1B

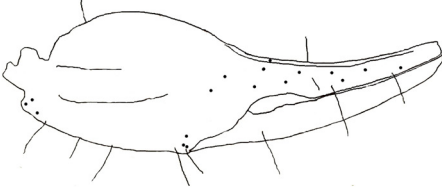
2



3



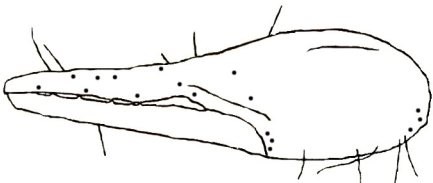
4A



5A

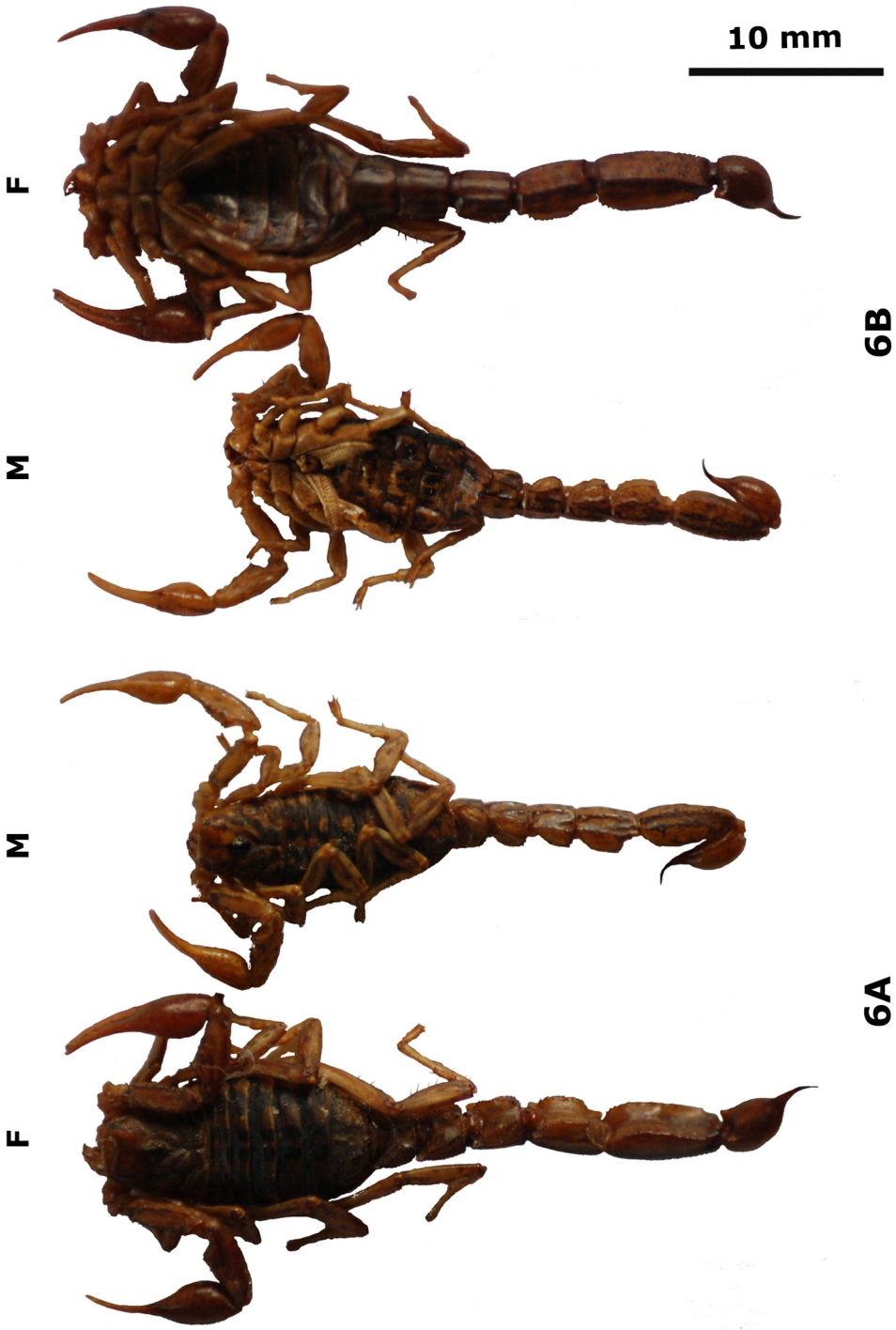


4B

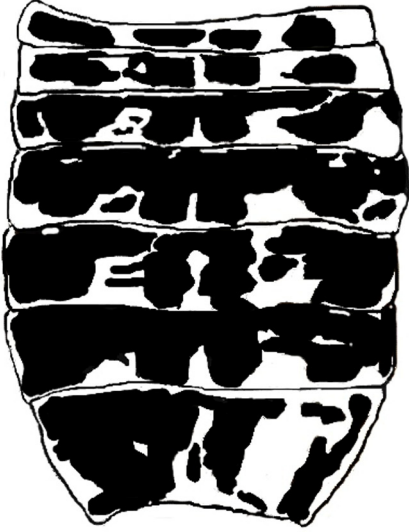


5B





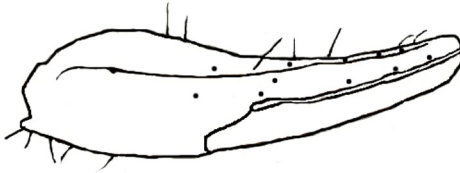
7



8



9





M

F

F

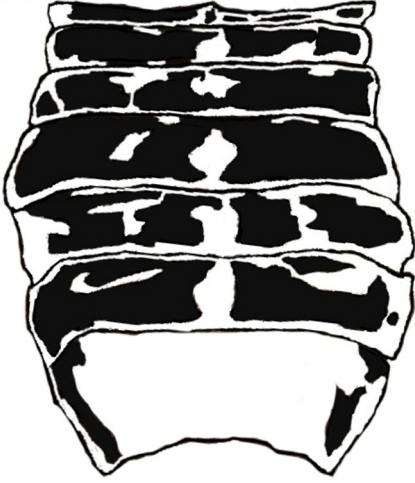
M

5 mm

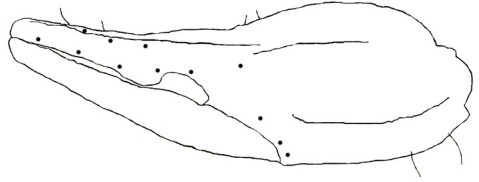
10B

10A

11



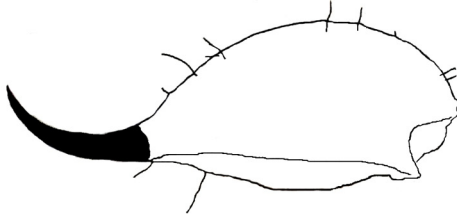
12



13B



13A





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