



First confirmed species record of Hydroscaphidae from Peru: description of a new species of *Yara* Reichardt and Hinton, and key to species (Coleoptera: Hydroscaphidae)

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Introduction

The Hydroscaphidae (“skiff beetles”) is a family of minute aquatic beetles within the suborder Myxophaga comprising four genera: *Hydroscapha* Le Conte, 1874; *Scaphydra* Reichardt, 1973; *Yara* Reichardt & Hinton, 1976 and *Confossa* Short *et al.*, 2015. All genera are found within the Neotropical region, with the exception of *Hydroscapha*, which is widespread. Representatives of this family have been reported for Venezuela, Brazil, Panama (Short *et al.* 2015) and Nicaragua (Raudez *et al.* 2019).

Although the literature reports members of this family from Peru, we found that such reports are not supported by specimens. In their checklist of Myxophaga of Peru, Chaboo & Shepard (2015) cited *Hydroscapha* sp. as the only representative of the family in that country. However, though this citation seemingly traces back to Reichardt (1973), the original source of this record is actually attributable to Hinton (1969), who through written correspondence informed Reichardt on the presence of *Hydroscapha* in Peru; however, it remains unknown whether such record was based on actual specimens Hinton examined or it simply represents an inference derived from his expertise on the geographic distribution of this taxon. Likewise, Sphaeriusidae, another family of Myxophaga, was mentioned from “Peru” by Chaboo & Shepard (2015). This report was based on specimens, presumably from Peru, identified as *Sphaerius* by Beutel and Arce-Pérez (2005), and cited again by Arce-Pérez & Morón (2008). However, no locality nor depository of such specimens were given.

We herein present the first confirmed species-level record of Hydroscaphidae from Peru, a new species in the genus *Yara* from the San Martín region. We also take the opportunity to present an updated key to *Yara* spp.

Material and methods

Specimens were collected using a 500 µm surber sampler. A total of 14 specimens were collected during three different seasons: August 2014, June 2016 and December 2016. Specimens examined are deposited in Museo de Entomología “Klaus Raven Büller”, Universidad Agraria La Molina (UNALM); División de Limnología, Centro de Ornitología y Biodiversidad (CORBIDI), both in Lima, Peru; and Entomology Division, University of Kansas (KS, USA). We designated a holotype and eight paratypes.

Holotype and paratypes were examined using an AmScope stereoscope microscope under 90x magnification. The genitalia of some paratypes were examined under a compound microscope for enhanced magnification (400x) in order to observe genitalia and other small structures. A Quanta scanning electron microscope (MyAP - Microscopía Electrónica y Aplicaciones en el Perú SAC) was used to observe ultrastructural details. Illustrations of selected anatomical parts were performed using a DS-Fi3 Camera mounted on a SNZ25 NIKON Stereomicroscope with NIS ELEMENTS-D Software (Microscopios Perú). The final stroke was digitally performed in a cross-platform image editor (GIMP2).

Yara oyaguei Trujillo & Cañote, new species

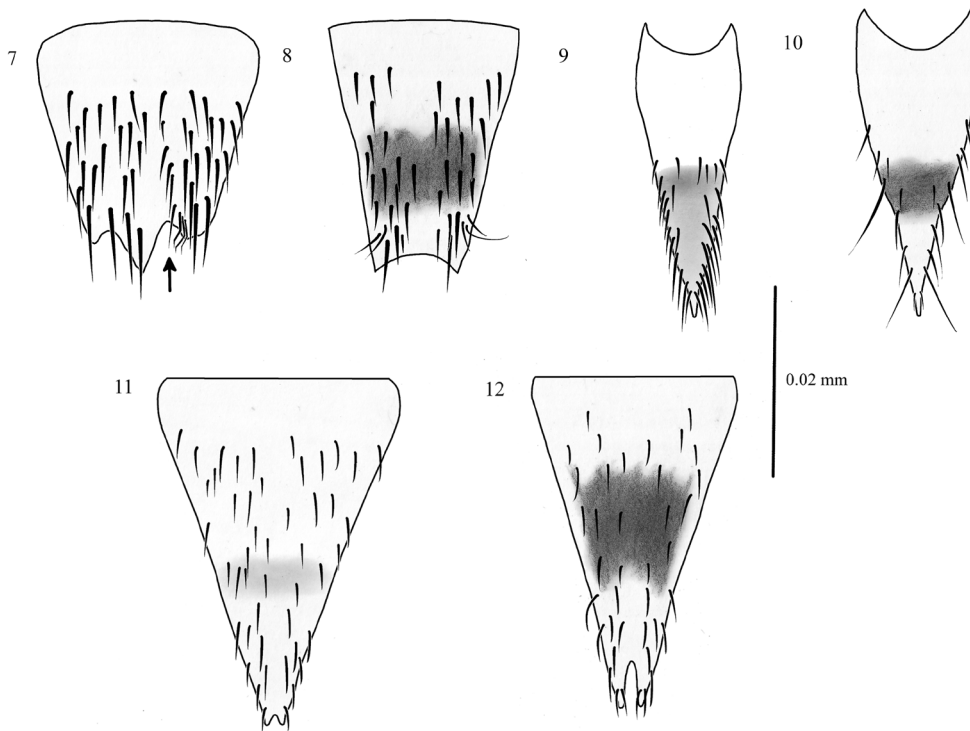
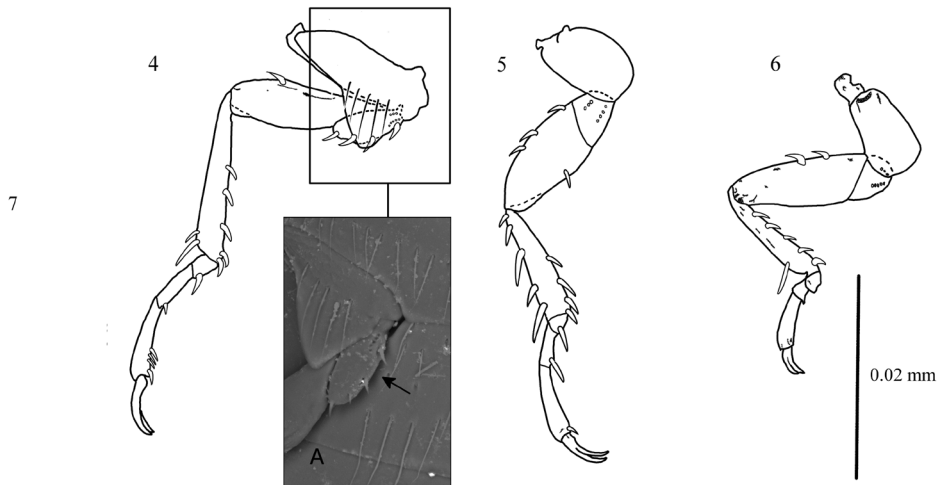
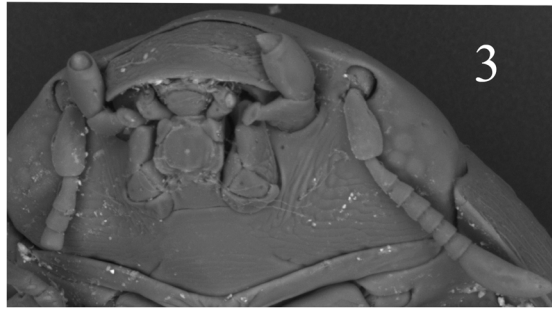
Holotype (♂): Peru: San Martin: Moyobamba: Soritor. 6° 8'23.87"S, 77° 4'8.69"O, 848 masl., 09.XII.2016. Leg G. Trujillo. Det. G. Trujillo, mounted on a card (UNALM); Paratypes: 1 ♂, same information as holotype and mounted on a card (CORBIDI), and 5 ♀ paratypes, distributed as follows: two specimens, same information as holotype and mounted on cards (CORBIDI); three specimens, same information as holotype (except 10.VIII.2014) and mounted on slides (UNALM). Two additional ♀ paratypes, same information as holotype (except 02.VI.2016) and mounted on cards, are deposited in Entomology Division, University of Kansas (Lawrence, KS, USA). Additional specimens, and dismembered body parts, are distributed in 6 slides, all with same information as holotype (except 02.VI.2016), and deposited in CORBIDI

Description: *Habitus.* Body fusiform and elongated (length, 1.18–1.34 mm).

Coloration. Head frons brown with yellow borders near eyes. Pronotum yellow, with a pair of faint brown spots. Elytra yellow with a brown central spot covering 1/3 of the elytra, and with a thick dark brown border extending from the middle to the posterior part of the elytra but with a thicker border toward the center of the body (Figs 1–2). Sternum brown. Abdominal Segment IV dark brown, abdominal segments V–VII yellow. MALE: tergite VIII and IX yellow, with a dark brown spot over its central part extending over 1/3 of the tergite (Fig. 1). FEMALE: tergite VIII yellow with a dark brown spot in the center extending over 1/3 of the tergite (Fig. 2).

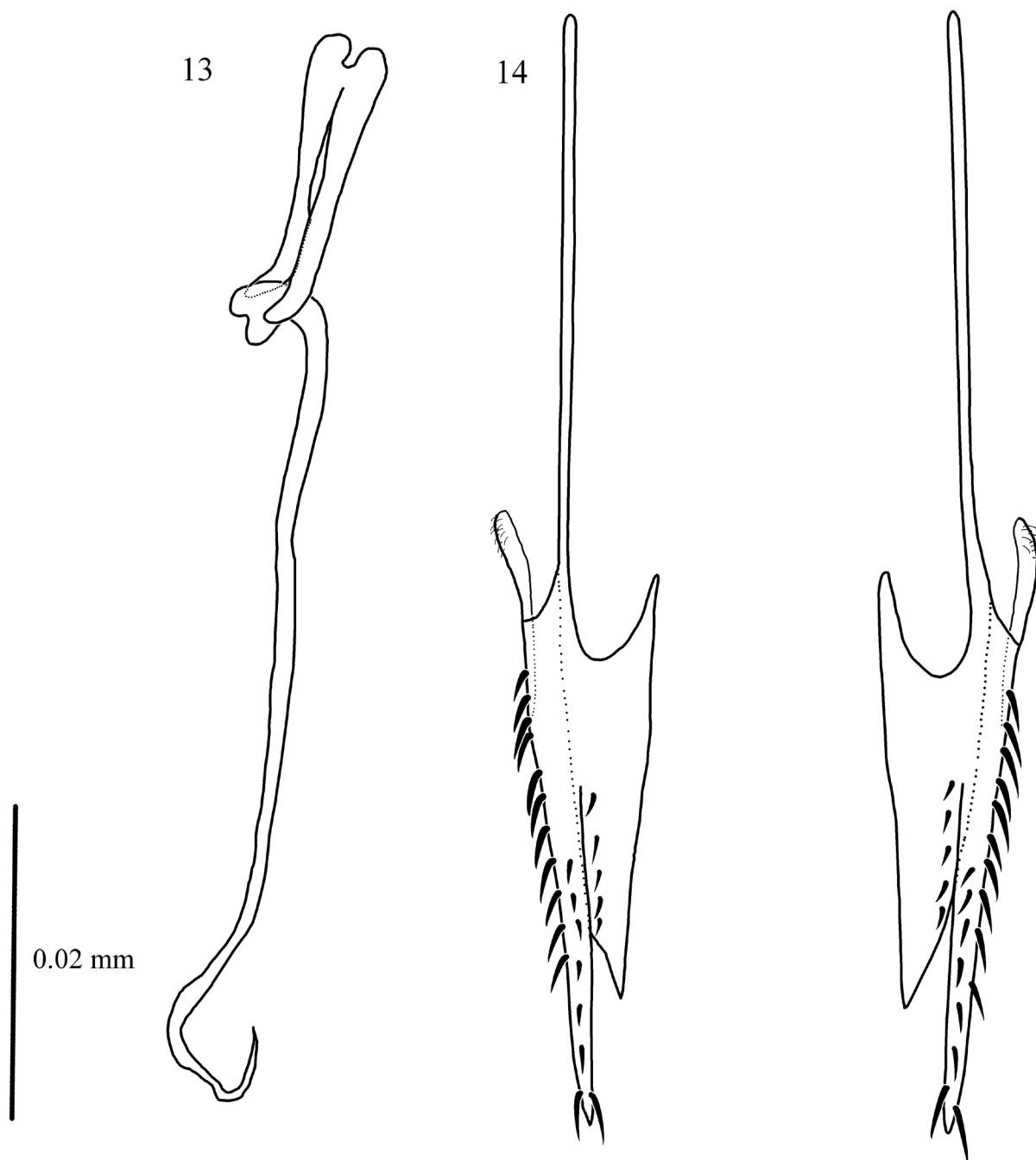


FIGURES 1–2. 1. Habitus of male, 2. Habitus of female



FIGURES 3–12. 3. Ventral view of head, 4. Hind leg with details of coxae and trochanter, 5. Middle leg, 6. Front leg, 7. Sternite VIII of male, 8. Tergite VIII of male, 9. Sternite IX of male, 10. Tergite IX of male, 11. Sternite VIII of female, 12. Tergite VIII of female

Head. Eyes not protruding off the head outline. Maxillary palp 4-segmented, maxillary palpomere IV retractable, third maxillary palp with a few setae along the lateral margin. Mentum and submentum not fused. Antennae 8-segmented, antennal scape approximately as long as the pedicel, antennomeres III and IV combined, short and very similar in size and shape to antennomeres III–VII, segment VIII elongated and as long as antennomeres III to VII altogether (Fig. 3)



FIGURES 13–14. 13. Aedeagus, 14. Female genitalia

Thorax. Elytra with moderately long setae covering its dorsal surface and lateral margins. Hind wings developed, bearing a marginal fringe. Metacoxae with a triangular projection extending to the trochanter (Fig. 4). Ventral and dorsal part of the trochanter of the front, middle and hind legs with a few circular indentations near the base; Metatrochanter with a series of 4 spine-like setae along lateral margin (Fig. 4A). Foretibia with only a single long and rather blunt spine on its posterior, distal margin, mesotibiae and metatibiae with spines ending in sharp point (Fig. 6).

Abdomen. Tergite IV nor covered by a dense patch of setae, instead with a few moderately elongated setae that are thickened at their base. Abdominal segments V–VII with elongated setae. MALE: posterior margin of sternite VIII asymmetric, with 3 differentiated setae that are curved and located on its left side (Fig. 7). Tergite VIII with asymmetrical posterior part, with a brown spot in the middle (Fig. 8). Sternite and tergite IX ending in a sharp point with moderately long setae, the sternite IX with a faint central spot that diffuses towards its posterior section (Fig. 9), tergite IX has a well-marked dark brown spot on its center (Fig. 10). FEMALE: Apex of sternite VIII emarginated, with a very slight spot near its center (Fig. 11); tergite VIII with a more pronounced emargination compared to sternite VIII, with a dark brown spot in the center of the tergite (Fig. 12). Abdominal segment IX absent or reduced.



FIGURES 15–16. Habitat

Genitalia. Aedeagus with a short, forked base that articulates almost from the front margin to a basal bulb of the long, filamentous median lobe (Fig. 13). Female genitalia as in Fig. 14.

Etymology. The new species is named after Eduardo Oyague, director of Division de Limnología of CORBIDI, who introduced us to the world of aquatic insects.

Discussion. The number of spine-like setae in the metatrochanter was found to be variable across examined specimens. In most specimens the number of spines was four, however some individuals presented three and five spines. While the number of metatrochanter spines is cited as fixed and thus a diagnostic feature for *Yara maculata* (Short *et al.* 2010) and *Yara marmontsedu* (Raudez *et al.* 2019), this is not the case in *Yara oyaguei*. The apex of the sternite VIII and the tergite VIII of the female of *Yara oyaguei* resemble those of *Yara dybasi* and *Yara marmontsedu*, however *Yara oyaguei* has well-developed wings like *Yara marmontsedu*, unlike *Y. dybasi*. In addition, Reichardt and Hinton (1976) did not mention spots on the elytra of *Yara dybasi*, while *Yara oyaguei* has well-defined spots; the same are rather diffused in *Yara marmontsedu*.

Habitat. We found specimens studied in a shallow shore and run of a stream, with rock mixed with boulders and devoid of vegetation (Fig. 15–16). Four males and 10 females were collected in June, August, and December, which coincides with the dry season. Sampling effort was considerable relative to the few individuals found. No specimen was observed alive and individual specimens were found scattered across their habitat. The distribution of *Yara* spp is shown in Figure 17.

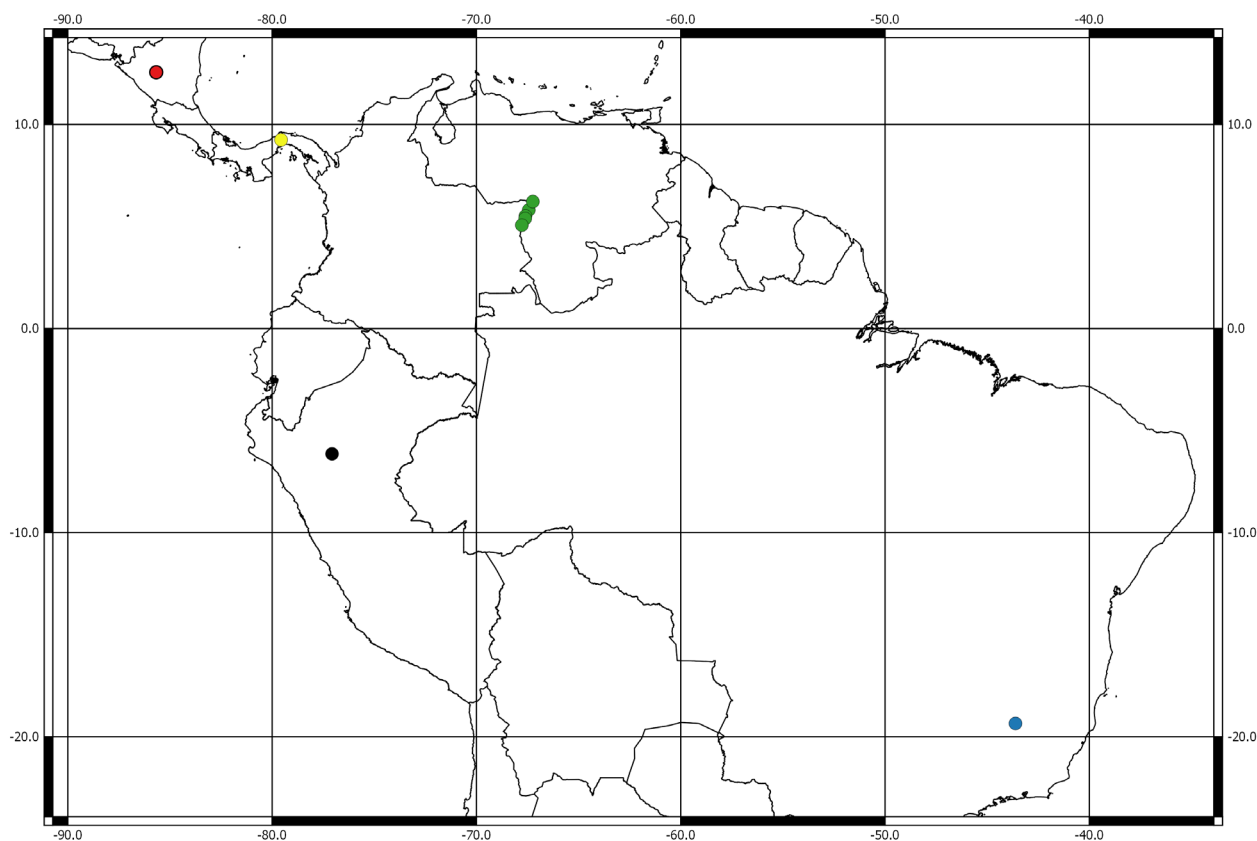


FIGURE 17. Map for species of *Yara* (black circle: *Yara oyaguei*, blue circle: *Yara vanini*, green circle: *Yara maculata*, yellow circle: *Yara dybasi*, red circle: *Yara marmontsedu*)

Key to species of *Yara* (modified from Raudez *et al.* (2019))

- 1. Size smaller (1.1–1.4 mm); apex of sternite VIII with an apical emargination 2
- Size larger (>1.4 mm); apex of sternite VIII of female without apical emargination 4
- 2. Hind wings atrophied (Panama) *Y. dybasi*
- Hind wings well-developed 3
- 3. Each elytrum with a well-defined, central dark brown spot. *Y. oyaguei*
- Each elytrum with a diffused patterning. *Y. marmontsedu*

4. Color dark brown, almost black; apex of tergite IX of male tapered to rounded, blunt apex (Brazil). *Y. vanini*
 - Color light brown with yellow markings on elytra and abdomen; apex of tergite IX of male tapered to acute point (Venezuela)
 *Y. maculata*

Conclusions

This is the first confirmed record of Hydroscaphidae, and thus of the suborder Myxophaga, in Peru. This report increases the number of species within the genus *Yara* up to five. Judging from the literature, collections done in shallow waters (up to 1 meter deep) within temporal water bodies that persist through the dry season seemed to have yielded more specimens than other fresh water habitats (Short *et al.*, 2015; Raudez *et al.*, 2019; this study). More intensive prospection in similar habitats across the neotropics could result in collecting additional, unrecognized species.

Acknowledgments

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