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Description of a new species of *Phaenonotum* from eastern Cuba (Coleoptera: Hydrophilidae: Sphaeridiinae)

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Abstract. A new species of the genus *Phaenonotum* Sharp, 1882, *P. delgadoi* sp. nov., is described from the Nipe-Sagua-Baracoa mountain range in eastern Cuba. The new species is diagnosed from other species of the genus, and compared in detail with *P. exstriatum* (Say, 1835) and *P. minor* Smetana, 1978. All specimens of the new species were collected by sifting forest leaf litter far from any known water source and the species is therefore likely terrestrial.

Resumen. La nueva especie perteneciente al género *Phaenonotum* Sharp, 1882, *P. delgadoi* sp. nov., es descrita, para el sistema montañoso Nipe-Sagua-Baracoa situado en el oriente de Cuba. La nueva especie es diagnosticada a partir de otras especies del género, y se compara en detalles con *P. exstriatum* (Say, 1835) y *P. minor* Smetana, 1978. *Phaenonotum delgadoi* sp. nov. fue recolectada tamizando hojarasca de bosques, alejados de cualquier fuente de agua, por lo que parece ser una especie terrestre.

Key words. Coleoptera, Hydrophilidae, Coelostomatini, new species, Cuba, Caribbean, Neotropical Region

Introduction

The hydrophilid genus *Phaenonotum* Sharp, 1882 currently contains 18 species, 17 of which occur in the New World and one in the Afrotropical Region (Equatorial Guinea: Bioko Island) (HANSEN 1999, SHORT & FIKÁČEK 2011). In Cuba and other Caribbean islands, the genus is

represented by the single species *P. exstriatum* (Say, 1835), which is otherwise widespread in North and Central America (SMETANA 1978). The species is mainly collected at margins of standing waters or at light (SPANGLER 1981; Short, pers. comm. 2013). Recent fieldwork in Cuba initiated by the Cuban-Canadian-Czech team has focused on the invertebrate fauna of the rainforest and pluviselva leaf litter, resulting in the discovery of new species of various beetle families, surprisingly including a new terrestrial species of *Phaenonotum*. The aim of this study is to describe this species and provide the data on its distribution and biology.

Materials and methods

Specimens used for this study were collected by sifting leaf litter in various kinds of forests in eastern Cuba. Beetles were extracted from the samples using Berlese funnels and Winkler traps, and preserved in 95% ethanol.

Habitus photographs were taken using Canon EOS 550D digital camera with attached Canon MP-E65mm f/2.8 1–5× macro lens, and subsequently adapted in Adobe Photoshop CS5. Photographs of genitalia were taken using Canon EOS 1100D digital camera attached to Olympus BX41 compound microscope and subsequently combined in Helicon Focus software. SEM micrographs of the holotype of the new species were taken using a Hitachi S-3700N environmental electron microscope at the Department of Paleontology, National Museum in Prague. General morphological terminology follows SMETANA (1978), ARCHANGELSKY (1989) and HANSEN (1991). We used specimens of *Phaenonotum* deposited in BMNH (including the types of species described by D. Sharp) and NMPC for comparative purposes. The present paper is a continuation of the study of the hydrophilid fauna of Cuba led by the first author (see DELER-HERNÁNDEZ & DELGADO 2010, DELER-HERNÁNDEZ et al. 2013).

Examined specimens are deposited in the following collections:

- BSC-E Departamento de Zoología, Centro Oriental de Ecosistemas y Biodiversidad, Santiago de Cuba, Cuba (A. Deler-Hernández);
BMNH The Natural History Museum, London, U.K. (M. Barclay);
CMN Canadian Museum of Nature, Ottawa, Canada (R. Anderson);
DZRJ Coleção Entomológica Prof. José Alfredo Pinheiro Dutra, Instituto de Biologia, Universidade Federal do Rio de Janeiro, Rio de Janeiro, Brazil (B. Clarkson);
NMPC National Museum, Prague, Czech Republic (M. Fikáček);
SEMC Division of Entomology, University of Kansas Natural History Museum, Lawrence, USA (A. Short).

Taxonomy

Phaenonotum delgadoi sp. nov.

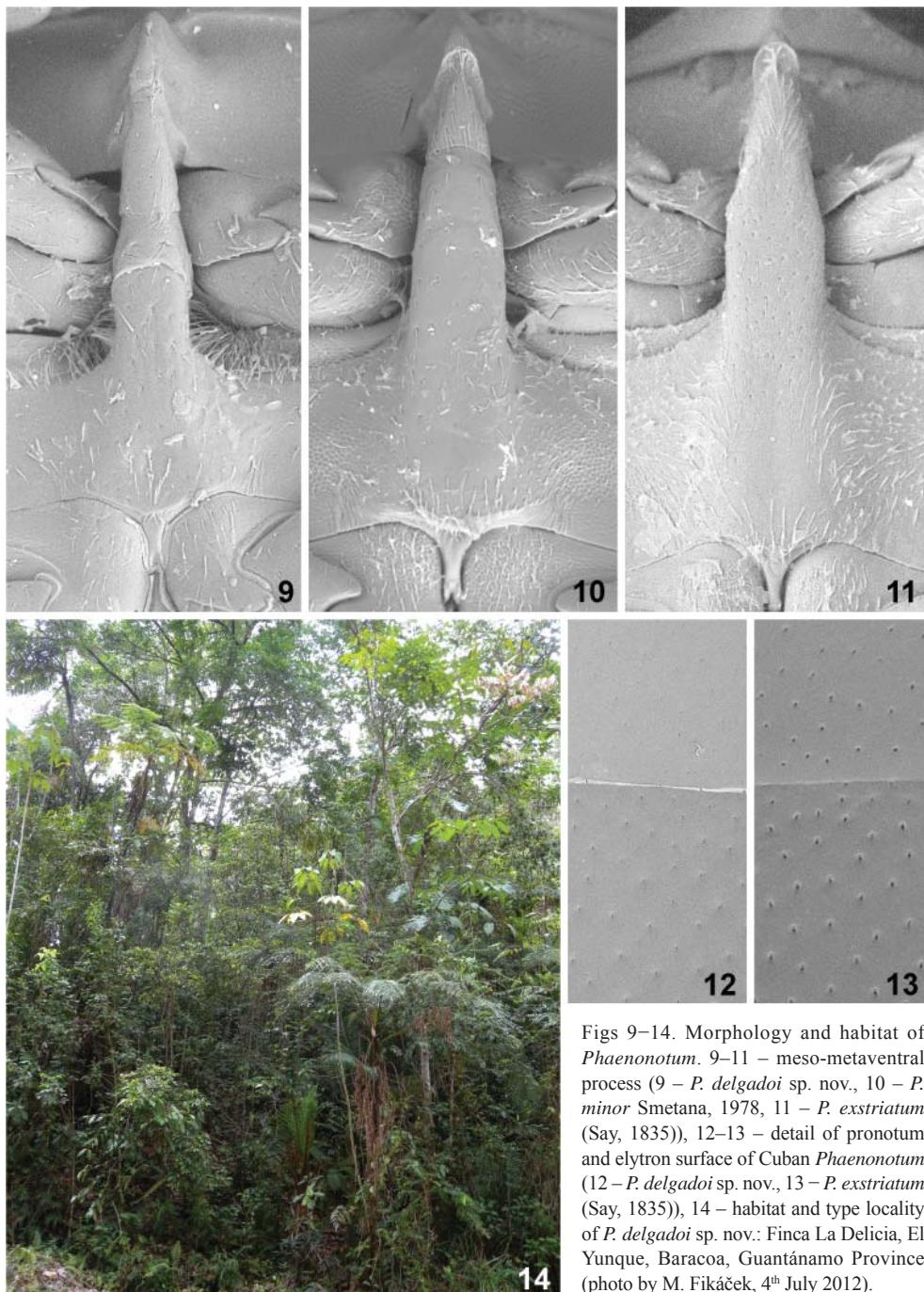
(Figs 1–8, 9–14, 15)

Type locality. Cuba, Guantánamo Province, Baracoa Municipality, El Yunque, Finca La Delicia, 20.313°N 74.574°W, 200 m a.s.l.

Type material. HOLOTYPE: ♂, ‘CUBA: Guantánamo: El Yunque, Finca La Delicia, 01.ii.2012, R. Anderson leg. 20.313°N 74.574°W, elevation 200 m [printed] / Holotype, *Phaenonotum delgadoi* sp. n., Deler-Hernández & Fikáček det. 2013 [red, printed]’ (NMPC). PARATYPES (14 spec.): **CUBA: HOLGUÍN PROVINCE:** PN Pico Cristal, Frank País, road to Pico Cristal, ca. 565 m a.s.l., 20°34'12.61"N 75°25'42.17"W, 11.v.2013, R. Anderson leg. (2013-007) (5 spec., BSC-E, SEMC, NMPC, DZRJ). **GUANTÁNAMO PROVINCE:** same data as holotype (5 spec., BMNH, CMN, NMPC,



Figs 1–8. Habitus and genitalia of *Phaenonotum* species from Cuba and Florida.
1–3 – *P. delgadoi* sp. nov. (1 – dorsal view, 2 – lateral view, 3 – anterodorsal view). 4–5 – *P. minor* Smetana, 1978 (4 – lateral view, 5 – anterodorsal view). 6–8 – aedeagophores (6 – *P. delgadoi* sp. nov., 7 – *P. minor* Smetana, 1978, 8 – *P. exstriatum* (Say, 1835)).



Figs 9–14. Morphology and habitat of *Phaenonotum*. 9–11 – meso-metaventral process (9 – *P. delgadoi* sp. nov., 10 – *P. minor* Smetana, 1978, 11 – *P. exstriatum* (Say, 1835)), 12–13 – detail of pronotum and elytron surface of Cuban *Phaenonotum* (12 – *P. delgadoi* sp. nov., 13 – *P. exstriatum* (Say, 1835)), 14 – habitat and type locality of *P. delgadoi* sp. nov.: Finca La Delicia, El Yunque, Baracoa, Guantánamo Province (photo by M. Fikáček, 4th July 2012).

NHMW); El Yunque, 3.2 km SW of Campismo, 20°19'N 74°34'W, ca. 150 m a.s.l., 13.vi.2012, Deler-Hernández leg. (3 spec., BSC-E, NMPC); La Melba, 2 km NW of Tetas de Julia, ca. 350 m a.s.l., 20°28'20" N 74°46'43" W, 15/18. ii.2004, without collector (El 26) (1 spec., NMPC).

Description. Habitus as in Figs 1–3. Body size 2.2–2.5 mm (2.3 mm in the holotype). Body form oval in dorsal view, highly convex in lateral view (Fig. 2). Dorsal surface dark brown to reddish brown. Antennae and maxillary palpi testaceous. Head and pronotum slightly paler than elytra. Lateral and posterolateral margins of pronotum and lateral margins of elytra paler than the disc. Ventral surface reddish brown. Leg reddish, tarsomeres paler in coloration. Head with fine and sparse setiferous punctures. Pronotum with punctures of same size as on head. Elytral punctuation (Figs 1–3, 12) strongly impressed, much coarser than the pronotal and head punctuation. Pronotum wider than long and very convex. Epipleura very broad throughout. Meso- and metaventral processes fused into a common keel, mesoventral process arrow-head shaped, elevated anteromedian portion of metaventrete ca. as long as mesoventral process, with a transverse subanterior ridge and basal cavities bearing dense pubescence (Fig. 9). Profemora with long sparse pubescence in basal 0.75. Meso- and metafemora with very sparse and short pubescence only. All tarsi with long setae on ventral surface. Aedeagus (Fig. 6) 0.4 mm long, with median lobe slightly shorter than parameres, basal region rounded, apical region elongate and stout. Parameres moderately wide and indistinctly sinuate in median region. Phallobase short, without distinct manubrium.

Differential diagnosis. *Phaenonotum delgadoi* sp. nov. differs from *P. exstriatum* (which is the only other *Phaenonotum* species known in Cuba) by the smaller body size (*P. exstriatum* is 2.3–4.0 mm long), head and pronotum with very fine, nearly obsolete punctures being in contrast to very coarsely punctate elytra (whole dorsal surface bears uniform, moderately coarse punctuation in *P. exstriatum*), the slender meso-metaventral process with basal pubescent cavities (stout and broad and without dense basal pubescence in *P. exstriatum*), and the shape of the aedeagus (phallobase is short and parameres are nearly continually arched on outer margin in *P. delgadoi* sp. nov. whereas the phallobase is long and parameres are distinctly sinuate externally in *P. exstriatum* (compare Figs 4 and 5).

The new species is unique among other known *Phaenonotum* by its small highly convex body (Fig. 2), extremely coarse elytral punctuation being in contrast to very weak pronotal one (Figs 1–3, 12), and the presence of the pubescent cavities on the base of the meso-metaventral keel (Fig. 9). It may be also easily recognized by slightly elevated elytral suture in posterior half making the elytra arched at the suture (best seen when examined in anterodorsal or anterolateral view, see Fig. 3; all other species have evenly convex elytra). By the size, highly globular body and big difference between the size of punctuation on the pronotum and elytra, it is most similar to *P. minor* Smetana, 1978 from the southeast USA, but differs from it by much more coarse elytral punctuation (compare Figs. 2 and 4), elytra arched at suture posteriorly (compare Figs 3 and 5), the presence of the pubescent cavities at the base of meso-metaventral keel (compare Figs 9 and 10) and the morphology of the aedeagus (compare Figs 6 and 7). *Phaenonotum delgadoi* sp. nov. resembles *P. apicale* Sharp, 1882, *P. collare* Sharp, 1882, *P. flavitarse* (Kirsch, 1871), *P. globulosum* (Mulsant, 1844) and *P. rotundulum* Sharp, 1882 by the very minute pronotal punctuation, but easily differs from all these species by the above unique characters.



Fig. 15. Known distribution of *Phaenonotum delgadoi* sp. nov. in Cuba.

Etymology. The new species is dedicated to our excellent friend Dr. Juan Antonio Delgado Iniesta (Universidad de Murcia, Spain) for his contribution and help to the senior author's studies on aquatic beetles.

Habitat. All available specimens of the new species were collected from wet rainforest and pluviselva litter (e.g., Fig. 14). No collecting site was situated near water.

Distribution. Based on the material available to us, *Phaenonotum delgadoi* sp. nov. is a Cuban endemic species currently known only from the eastern part of the island (Holguín and Guantánamo provinces) (Fig. 15). All known localities are situated in the Nipe-Sagua-Baracoa mountain range which is considered the main center of diversity in Cuba and the Caribbean as a whole (CENAP 2004, TOLEDO et al. 2011).

Discussion

The knowledge on the Neotropical Coelostomatini remains very limited both concerning the proportion of described species, information on their taxonomy and morphology, and the data on biology and distribution. Most described species are actually known only from their historical original descriptions (e.g. SHARP 1882, 1887; SCOTT 1912; ORCHYMONT 1937, 1943). The only recent additions are the descriptions of two new *Phaenonotum* from USA (Florida, Alabama; SMETANA 1978) and Venezuela (ARCHANGELSKY 1989) and the revision of the genus *Phaenostoma* Orchymont, 1937 (GUSTAFSON & SHORT 2010). The recently described genus *Badioglobus* Short, 2004 from Costa Rica was also originally assigned to the Coelostomatini (SHORT 2004), but new data suggest it not a member of that clade (SHORT & FIKÁČEK 2013). Examination of museum collections and material accumulated during recent fieldwork, moreover, reveals that the majority of Neotropical Coelostomatini remain undescribed (M. Fikáček, unpubl. data; A. E. Z. Short, pers. comm. 2013).

Phaenonotum was usually considered as morphologically rather uniform genus containing species associated with various aquatic habitats, much in the way the better known genera *Coelestoma* Brullé, 1835 and *Phaenostoma* Orchymont, 1937 (e.g. HANSEN 1991). Our discovery of

an aberrant *P. delgadoi* sp. nov. in Cuba indicates that *Phaenonotum* actually includes species of diverse morphology and biology. The comparison of the meso-metaventral morphology of *P. delgadoi* sp. nov. with that of *P. exstriatum* and *P. minor* we made in this contribution revealed surprising differences and illustrates the morphological diversity of the genus quite well. Our new species was always collected from leaf litter during both rainy and dry seasons, never in association with aquatic habitats. It is hence likely terrestrial, which may be the reason for the aberrant morphology. In a similar way, *P. caribense* Archangelsky, 1989 also clearly differs from other species of *Phaenonotum* (including *P. delgadoi* sp. nov.) by its meso-metaventral morphology and the tiny body size (with its 1.5 mm it is actually easy to confuse with an omicrine), and is also a terrestrial species inhabiting leaf litter based on the samples collected recently in Ecuador and Venezuela (Fikáček, unpubl. data; Short, pers. comm. 2013). Alternatively, the aberrant morphology of *P. delgadoi* sp. nov. and *P. caribense* may have nothing to do with the life style and may actually indicate that *Phaenonotum* in our current understanding is not a monophyletic taxon. Therefore, further studies are necessary to understand the diversity and taxonomy of *Phaenonotum* and the Neotropical Coelostomatini in general.

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