

Notes on *Drymaeus* species from Peru (Mollusca, Gastropoda, Bulimulidae), and description of a new species

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Critical remarks are made on *Drymaeus* species, reported from Peru in a study on land snails from National Parks at the eastern side of the Andes. Four of these species (*Drymaeus multilineatus*, *D. coniformis*, *D. glaucostomus*, all known from Venezuela or Central America, and *D. geometricus*, known from Colombia) appear to be misidentified as Peruvian species, which thus may lead to incorrect biogeographical interpretations. Correct identifications are given for all the disputed *Drymaeus* species. *Bulimulus* (*Bulimulus*) *inconspicuus* F. Haas, 1949, is now transferred to *Drymaeus* (*Mesembrinus*). Additionally, a new species, *Drymaeus* (*Drymaeus*) *verecundus* Breure & Mogollón, is described.

Key words: biogeography, taxonomy, land snails, misidentifications, Peru.

INTRODUCTION

The Peruvian land snail fauna is known to be very species rich, the number of species totalling 763 in a recent listing (Ramírez et al., 2003). Since then, several more new taxa have been described from this country (e.g., Breure, 2008; Breure & Mogollón, 2010, 2016; Miquel & Ramírez, 2011; Borda & Ramírez, 2013, 2016). A ‘grey literature’ publication (Guevara, 2005 [2008]), i.e. a dissertation from Hamburg University, dealt with the taxonomy of land molluscs collected in and around three National Parks in eastern Peru. Snails were collected in the vicinity of Moyobamba (Bosque de Alto Mayo), Tingo Maria (Parque Nacional Tingo

Maria), and Cuzco (Parque Nacional Manu). In total 5000 specimens were collected, belonging to 40 families and 136 species. The thesis gives more details for the families Helicidae (ten species, three of which new to science), Ceresidae (three species) and Bulimulidae (nine *Drymaeus* species). Of these nine bulimulid species, four were considered new to the Peruvian malacofauna: *Drymaeus multilineatus*, *D. coniformis*, *D. glaucostomus*, hitherto all known from Venezuela or Central America, and *D. geometricus*, hitherto only known from Colombia. Although we have strong doubts on some of the other identifications, we will focus on a critical review of the new records for the Peruvian malacofauna. Also we describe a new species of *Drymaeus* from northeastern Peru and transfer a *Bulimulus* species to this genus.

METHODS

The following abbreviations are used for the depositories of material: FMNH, Field Museum of Natural History, Chicago, U.S.A.; IFML, Instituto y Fundación Miguel Lillo, Tucumán, Argentina; NHMUK, Natural History Museum, London, U.K.; RBINS, Royal Belgian Institute of Natural Sciences, Brussels, Belgium; RMNH, Naturalis Biodiversity Center, Leiden, The Netherlands; VMA, private collection of V. Mogollón, Lima, Peru; ZMB, Museum für Naturkunde, Humboldt Universität, Berlin, Germany; ZMH, Zoologisches Museum, Universität Hamburg, Hamburg, Germany.

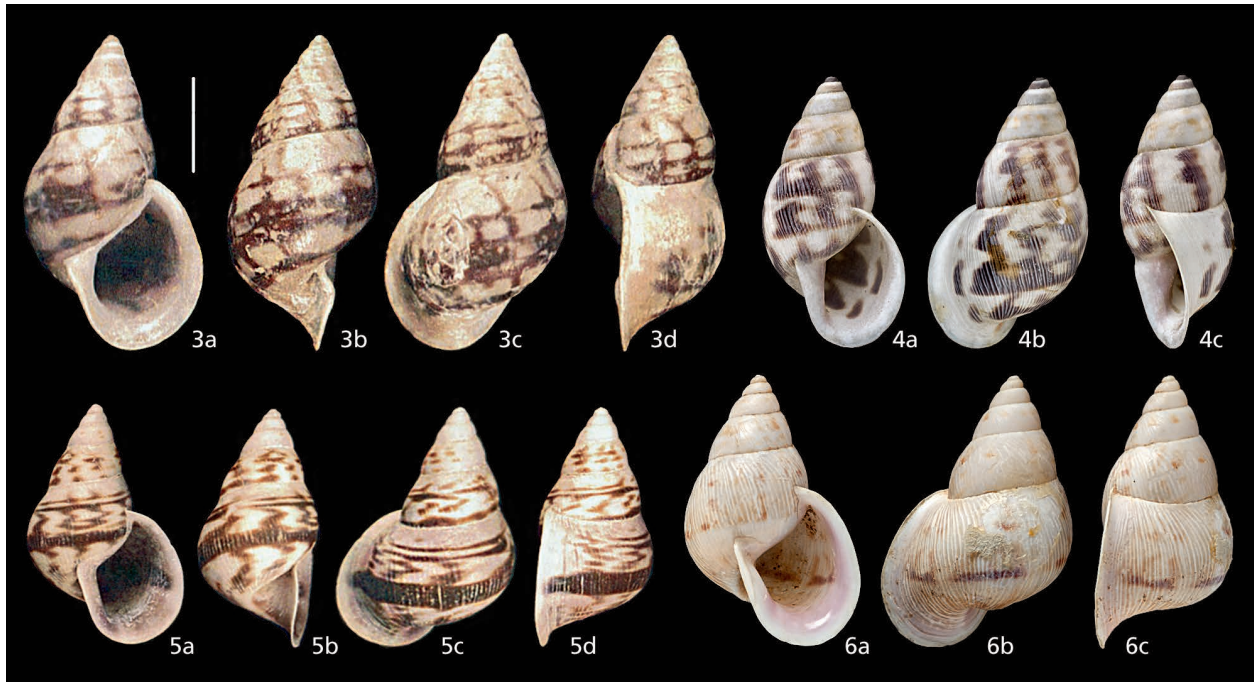
RESULTS

Drymaeus species supposedly new to the Peruvian malacofauna

Of the nine *Drymaeus* species mentioned in the survey of Guevara (2008), five were either described from or are



Figs 1-2. Comparison of ‘*Drymaeus multilineatus*’ sensu Guevara (2008: figs 2.95-2.97; ZMH 10334) [1a-c] with a syntype of *Drymaeus rectilineatus* (L. Pfeiffer, 1855), NHMUK 1975337 [2a-c]. Scale line 5 mm. Note that Guevara’s photos have been repositioned to make them better comparable.



Figs 3-6. Comparison of ‘*Drymaeus glaucostomus*’ sensu Guevara (2008: figs 2.64-2.67; ZMH 10283) [3a-d] with the lectotype of *Drymaeus arcuatostrigatus* (L. Pfeiffer, 1855), NHMUK 1975455 [4a-c]; and of ‘*Drymaeus geometricus*’ sensu Guevara (2008: figs 2.72-2.75; ZMH 10606) [5a-d] with the holotype of *Drymaeus expansus scitus* (H. Adams, 1867), NHMUK 18675.18.5 [6a-c]. Scale line 1 cm. Note that Guevara’s photos have been repositioned to make them better comparable.

known to occur in Peru: *D. euryostomus* (Philippi, 1867), *D. expansus* (L. Pfeiffer, 1848), *D. peelii* (Reeve, 1859), *D. pulcherrimus* (H. Adams, 1867), and *D. strigatus* (Sowerby, 1842). Four other species mentioned in Guevara (2008) were supposedly new to the Peruvian fauna: *D. multilineatus* (Say, 1825), *D. glaucostomus* (Albers, 1852), *D. geometricus*

(L. Pfeiffer, 1846), and *D. conformis* (L. Pfeiffer, 1847).

Drymaeus multilineatus (Say, 1825) was reported from Dept. San Martín, Cataratas del Gera near Moyobamba, with two specimens (dimensions are given as 23 and 25 mm for height, and 7 and 7.5 whorls). The specimen illustrated (a broken shell) makes nevertheless clear that this species,

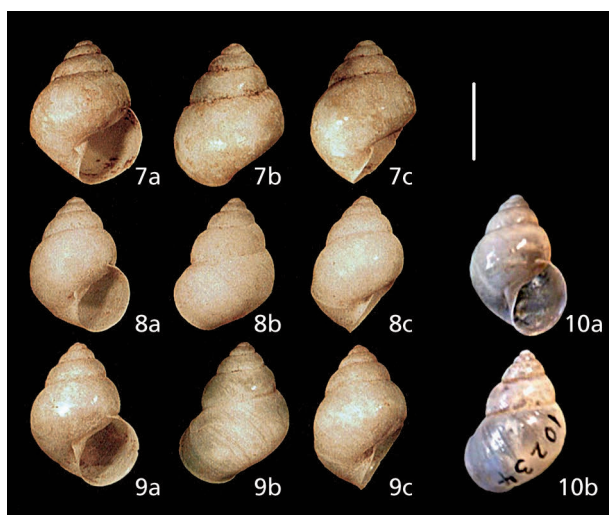
which occurs in Florida and has also been reported from coastal areas in Central America and Venezuela, has been confused with a Peruvian species. We compared the figure of Guevara with photos from type material in the Natural History Museum, London (see Figs 1a-c versus 2a-c), and found that this shell is a specimen of *Drymaeus rectilineatus* (L. Pfeiffer, 1855); this species is known from the same region having its type locality as “Meobamba” [= Moyobamba].

Drymaeus glaucostomus (Albers, 1852) was described from Venezuela and a subspecies has been described from Suriname by Breure (1976), *Drymaeus glaucostomus meesi*, which was considered a separate species by Masmsein et al. (2009). The lectotype of Albers’ species is ZMB 101784 (Köhler, 2007: 145, fig. 91). The material identified by Guevara (2008) as *D. glaucostomus* was collected at Dept. San Martín, Cueva Pequeña, 54 km NW Moyobamba, 1016 m, as a single shell with shell height 31 mm and 6 whorls. Her fig. 2.69 (Guevara, 2008: 141) shows a characteristic bend in the columellar margin of the lip; in the description longitudinal threads on the shell surface are mentioned. A careful comparison with the known Peruvian taxa, leads us to believe that this shell belongs to *D. expansus* (L. Pfeiffer, 1848). The typical form was described by Pfeiffer from Huallaga, which is in the same general region. However, *D. expansus* belongs to a species complex including other taxa occurring in Peru which have been either regarded as varieties, subspecies or separate species. These taxa include among others *altorum* Weyrauch, 1958 (Chanchamayo), *aurisratti* Philippi, 1867 (Tarapoto), *branneri* F. Baker, 1914 (Puerto Maldonado), *flavilabrum* Weyrauch, 1967 (Tingo

Maria), *scitus* H. Adams, 1867 (type locality “Eastern Peru”), and *arcuatostriatatus* L. Pfeiffer, 1855 (from “Peru”); see Pilsbry, 1897-1898; Neubert & Janssen, 2004; Breure & Mogollón, 2010; Breure, 2012; Breure & Ablett, 2014. Taking into account the locality where the material was collected, and comparing Guevara’s figures with those of the papers mentioned, we conclude that the specimen regarded by her as *D. glaucostomus* (Figs 3a-d) is closely related to *Drymaeus* (*D. arcuatostriatatus*) (L. Pfeiffer, 1855) (Figs 4a-c). The latter species is somewhat smaller but belongs undoubtedly to the same *Drymaeus expansus* species complex.

Drymaeus geometricus (L. Pfeiffer, 1846) was described from the Magdalena valley in northern Colombia. So far it was only known from that country. Guevara (2008: 143-147; our Fig. 5a-d) collected the material identified by her as this species at Dept. Huánuco, Catarata la Quinceañera, 6 km SE Tingo Maria, 350 m; it includes ten specimens with an average shell height of 24.5 mm and 6.6 whorls. In our opinion, this material also should be regarded as a form of *D. expansus* (L. Pfeiffer, 1848). Guevara’s specimen (her fig. 2.72; our Fig. 5a) respectively her fig. 2.74 [our Fig. 5d] closely resembles the comparable views of *D. expansus scitus* (H. Adams, 1867) (our Figs 6a-c) from the same general area. We also compared Guevara’s photos to the material of *D. expansus flavilabrum* Weyrauch, 1967; the latter shows also similarities but this is a larger taxon.

Drymaeus coniformis (L. Pfeiffer, 1847) (incorrectly mentioned as “Pfeiffer, 1846” in Guevara, 2008) was described from “Merida, Andes of Bolivia”, which Breure (1979: 118) corrected to Venezuela. Guevara collected her material at six localities in the vicinity of Tingo Maria (Guevara, 2008:



Figs 7-10. Comparison of ‘*Drymaeus coniformis*’ sensu Guevara (2008: fig. 2.99; ZMH 10451, 10610 and 10385) [7-9] with the holotype of *Drymaeus coelestini obesus* Weyrauch, 1964, IFML (after Breure, 2012) [10a-b]. Scale line 5 mm.

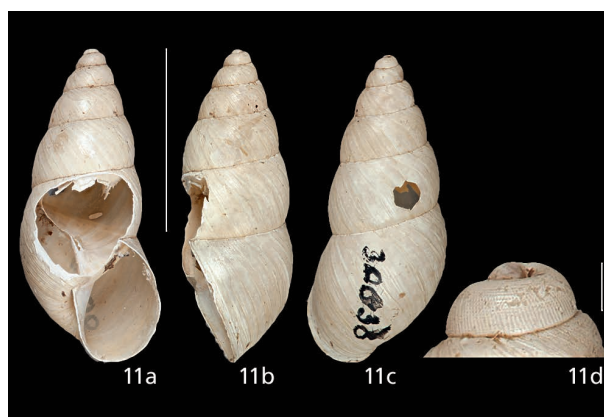
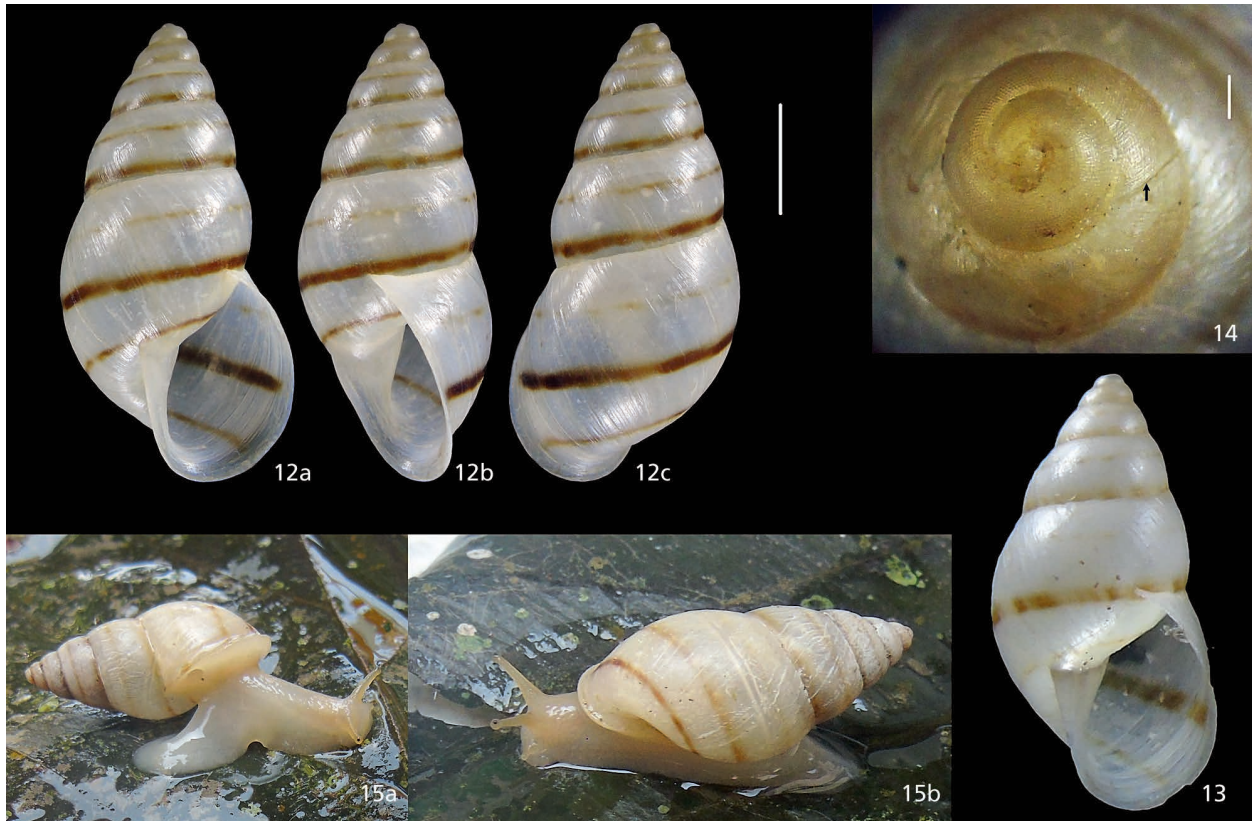


Fig. 11. *Drymaeus* (*Mesembrinus*) *inconspicuus* (F. Haas, 1949), holotype FMNH 30038. Scale line 1 cm (a-c), 0.5 mm (d).



Figs 12-15. *Drymaeus (D.) verecundus* Breure & Mogollón spec. nov. **12a-c**, holotype, RBINS MT. 3654. **13**, paratype VMA 1184. Scale line 5 mm. **14**, top view of juvenile paratype, with arrow to indicate the transition between proto- and teleoconch. Scale 0.5 mm. **15a-b**, living paratype specimen.

165-166; Figs 7-9); most of her material has an average shell height of 11 mm and 5.5 whorls. The type material of *D. conformis* has not been located, but after careful searching and comparing, we come to the conclusion that this material has also been misidentified and represents the similar sized *Drymaeus coelestini obesus* Weyrauch, 1964 (Fig. 10). Weyrauch's material was collected at Boquerón del Padre Abad, near Tingo Maria, and the holotype was re-figured by Breure (2012).

Further notes on Peruvian *Drymaeus*

- I While sorting figures we noticed that *Bulimulus (Bulimulus) inconspicuus* F. Haas, 1949 is actually a *Drymaeus* species as evidenced by the reticulate sculpture, with equally strong axial and spiral elements, of the protoconch (Fig. 11d). This species was described from Peru, Dept. Loreto, Río Ucayali, Contamana; the holotype is FMNH 30038 (Fig. 11a-c). The current status is *Drymaeus (Mesembrinus) inconspicuus* (F. Haas, 1949) comb. nov.
- II During research in Dept. Loreto, around Iquitos, a new species of *Drymaeus* was collected, which we describe here.

***Drymaeus (Drymaeus) verecundus*
Breure & Mogollón spec. nov.
(Figs 12-15)**

Diagnosis. — A small, fragile species of *Drymaeus*, up to 18.7 mm height, with rather convex whorls, the last one 0.7 times the shell height. Suture slightly ascending in front. Aperture with a transparent-white, expanded and broad lip, especially in its basal part.

Description. — Shell up to 18.7 mm height, 1.87 times longer than wide, imperforate, the spire profile with rather convex sides, rather elongated, thin. Colour pale buff to greyish, with a pattern of one to three reddish-brown spiral bands on the last whorl. Upper whorls in the same ground colour as the rest of the shell. Surface dull to rather shining; the upper whorls smooth, on the remaining whorls the growth striae slightly thickened, most noticeable on the last whorl. Protoconch with a reticulate sculpture of axial riblets and spiral striae, which are of equal strength. Whorls 5.8, slightly convex, regularly rounded; suture slightly impressed and bordered by a paler line below. Aperture ovate, 1.65 times longer than wide, 0.50 times the total length. Peristome slightly thickened, expanded, especially

H	D	HA	WA	LW	W	
17.7	8.95	8.24	5.40	12.0	6.2	holotype
17.9	9.07	8.71	5.62	12.8	6.0	RBINS
16.6	9.43	9.19	4.84	11.9	4.9	RBINS
16.5	9.6	8.70	5.44	12.0	5.1	RBINS
18.7	9.68	8.95	5.21	12.9	6.2	RMNH
18.2	9.65	8.35	5.22	12.5	6.1	RMNH
16.9	8.54	8.63	5.20	12.1	5.7	VMA
17.3	9.56	8.61	5.51	11.9	5.8	VMA
17.5					5.7	VMA

Table 1. Measurements in *Drymaeus (D.) verecundus* Breure & Mogollón sp.n. Third paratype in VMA collection partly damaged, making comparable measurements impossible. Abbreviations: D, shell diameter; H, shell height; HA, height of aperture; LW, last whorl; W, number of whorls; WA, width of aperture.

below. Columellar margin curved, reflexed, receding. Parietal wall with a very thin, transparent callus.

Type material. — Peru, Dept. Loreto, Iquitos, Quistococha, 104 m, -73.322086 W, -3.826123 S, V. Mogollón leg., 16.i.2018. Holotype RBINS MT.3654; paratypes RBINS MT.3655 (3), MT.3656 (1 juvenile), RMNH.MOL.282881 (2); VMA 1148 (3 + 1 juv.). Measurements of the material are given in Table 1.

Remarks. — This new taxon resembles *Drymaeus (D.) rosenbergi* S.I. Da Costa, 1900, from Pozuzo, from which it differs by (1) being slightly smaller; (2) having the aperture regularly rounded at base; and (3) having a different colour pattern. From *D. (D.) castaneostriatus* S.I. Da Costa, 1906, described from the same locality, it differs in (1) being slightly smaller; (2) more fragile; (3) having a less expanded peristome. It may also be compared to *Drymaeus (Mesembrinus) rectilinearis* (L. Pfeiffer, 1855), from Moyobamba, in having a similar colour pattern, but differs in (1) being smaller; (2) more fragile; (3) having more convex whorls; and (4) a more expanded peristome at base.

Etymology. — (L.) *verecundus*, modest. Epithet chosen to mark the relative small size among its congeners.

DISCUSSION

If a species is recorded in a region not mentioned in the literature and relatively far from which it was originally described, a taxonomist should always become suspicious. Is it likely to be the supposed taxon, or rather a species of similar appearance? Accurate identification is key to biodiversity science. Misidentifications hamper the study of biogeography as incorrect names may also turn up in online databases, which may e.g. be used for meta-studies without

studying the source material. The occurrence of these misinterpreted species in or around national parks may also lead to the risk of their names being mentioned in studies related to conservation issues. Therefore it should be clear that these four disputed taxa mentioned in the Guevara study do not occur in the Peruvian malacofauna.

The finding of a new species in the immediate vicinity of the city of Iquitos alerts us that even well-known areas may still harbour novelties in the Neotropical malacofauna.

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