



A NEW SPECIES OF *BIOMPHALARIA* PRESTON, 1910 (GASTROPODA, PLANORBIDAE) FROM THE UPPER CRETACEOUS OF URUGUAY

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ABSTRACT – A new fossil species of *Biomphalaria* Preston is described for the Upper Cretaceous of Uruguay (Queguay Formation). The new species is characterized by a conspicuous spiral ornamentation, a unique character within the genus. This new *Biomphalaria* species is the third known for the Queguay Formation, in addition to *B. walteri* (Parodiz) and *B. reversa* Cabrera, Martínez & Norbis. They represent the oldest record of this genus worldwide.

Keywords: *Biomphalaria*, Late Cretaceous, Uruguay.

INTRODUCTION

Biomphalaria Preston, 1910, is a neotropical and afrotropical genus of freshwater, planorbid snails (Taylor, 1988). Its fossil record ranges from the Late Cretaceous to the present day, being common in Cenozoic lentic freshwater assemblages from South America (Parodiz, 1969; DeJong *et al.*, 2001; De Francesco *et al.*, 2007; De Francesco, 2010; Salvador & Simone, 2013; Cabrera *et al.*, 2016). This genus is indicative of several environmental parameters, being very useful in paleoecological reconstructions. The populations of *Biomphalaria* usually live in lentic, shallow and very low energy environments, such as temporary puddles, marshes and shallow lakes, commonly with abundant aquatic vegetation (Cridland, 1967; Pieri *et al.*, 1980; Olazarri, 1981a, 1981b; Bonetto *et al.*, 1982; Vianey-Liaud & Lancastre, 1986; Ohlweiler & Kawano, 2001, 2002; De Francesco, 2010; Hassan *et al.*, 2011; Cabrera *et al.*, 2018). A new species is described herein for the limestones of the Upper Cretaceous Queguay Formation, Uruguay.

The Queguay Formation is mainly distributed in two areas within the Uruguayan territory; with outcrops in the northwest, along the margins of the Uruguay River, and others in the Santa Lucía Basin in the south (Figure 1). It is composed by pedogenic calcretes, palustrine limestones, and paleosols (for stratigraphic details see Alonso-Zarza *et al.*, 2011; Martínez *et al.*, 2015). The fossil record of this unit comprises several gastropods, some terrestrial, such as *Eoborus charruanus*, *E. berroi*, *Bahiensis priscus*, *Bulimulus klappenbachi*, *Pupoides gnocco*, Succineidae indet. and Clausiliidae indet., and freshwater ones, such as *Biomphalaria walteri*, *B. reversa* and *Physa* sp. Other remains correspond

to dinosaur eggshells, hackberry endocarps, rhizoliths, insect nests and pupal chambers, characean gyrogonites and ostracods (Martínez *et al.*, 2001; Verde, 2012; Cabrera, 2015; Cabrera *et al.*, 2018). The molluscan and the paleobotanical fossil records of the Queguay Formation are strikingly similar to the recovered from beds of the Itaboraí Basin in the State of Rio de Janeiro, Brazil (Bergqvist *et al.*, 2009; Salvador & Simone, 2013). The new species here described, together with *Biomphalaria walteri* (Parodiz, 1969) and *B. reversa* Cabrera, Martínez & Norbis, 2016, represent the oldest record of this genus worldwide (Cabrera *et al.*, 2016; Cabrera *et al.*, 2018). **Abbreviations.** **FCDP-I**, Colección de Paleontología de la Facultad de Ciencias, Universidad de la República, Uruguay; **mxD**, maximum diameter; **mnD**, minimum diameter; **H**, height (Figure 2G).

SYSTEMATIC PALEONTOLOGY

Family PLANORBIDAE Rafinesque, 1815
Subfamily PLANORBINAE Rafinesque, 1815

Biomphalaria Preston, 1910

Type Species. *Biomphalaria smithi* Preston, 1910 by monotypy.

Biomphalaria manya sp. nov.
(Figures 2–3)

Diagnosis. *Biomphalaria* with conspicuous spiral ornamentation. Only last three whorls visible in umbilical view.

Description. Shell small (mxD 9 to 4 mm), subcircular, sinistral. Conspicuous spiral ornamentation in all whorls, parallel to the suture, composed of about 19 primary ribs, three per millimeter, and secondary ribs about three to five between primary ribs. Five rounded, convex whorls in apical view, last one larger than others. Sutures narrow well marked. The last three whorls cover the first ones in umbilical view. Umbilicus occupies about 4% of shell. Aperture oval, maximum dimension about 46% of maximum diameter.

Type material. Holotype: FCDP-I 8719, figures 2a, b and c, mxD 9.37 mm, mnD 8.11 mm, H 3.51 mm; paratype 1:

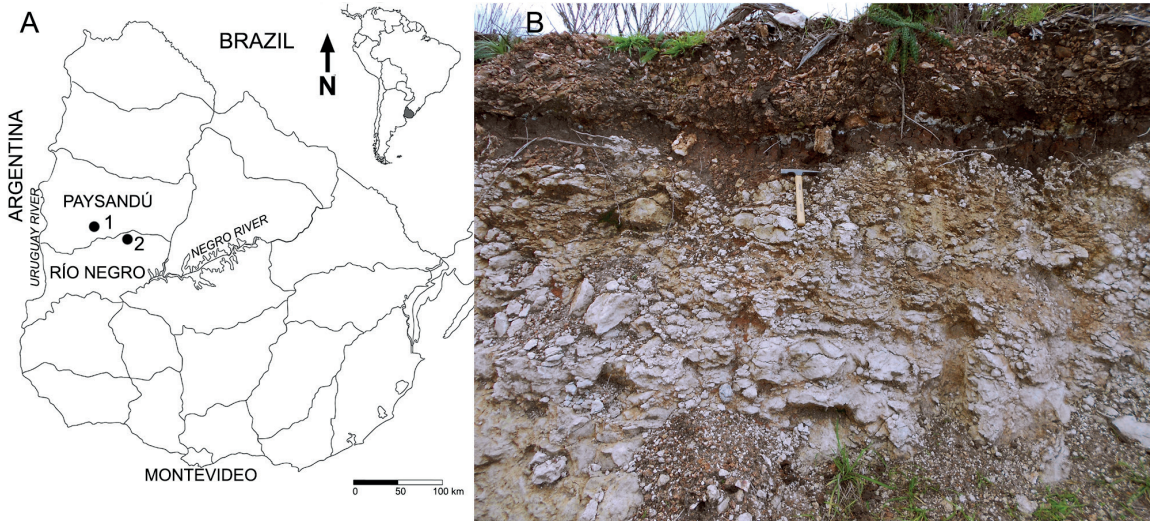


Figure 1. A, map showing the localities where the specimens were collected: 1, proximity of Piedras Coloradas Town, Paysandú Department; 2, nearby Algorta Town, Río Negro Department. B, type locality (nearby Algorta Town, Río Negro Department), on top siliceous bed altered by recent soil formation; below, massive limestone bed, both beds fossiliferous. Length of hammer = 28 cm.

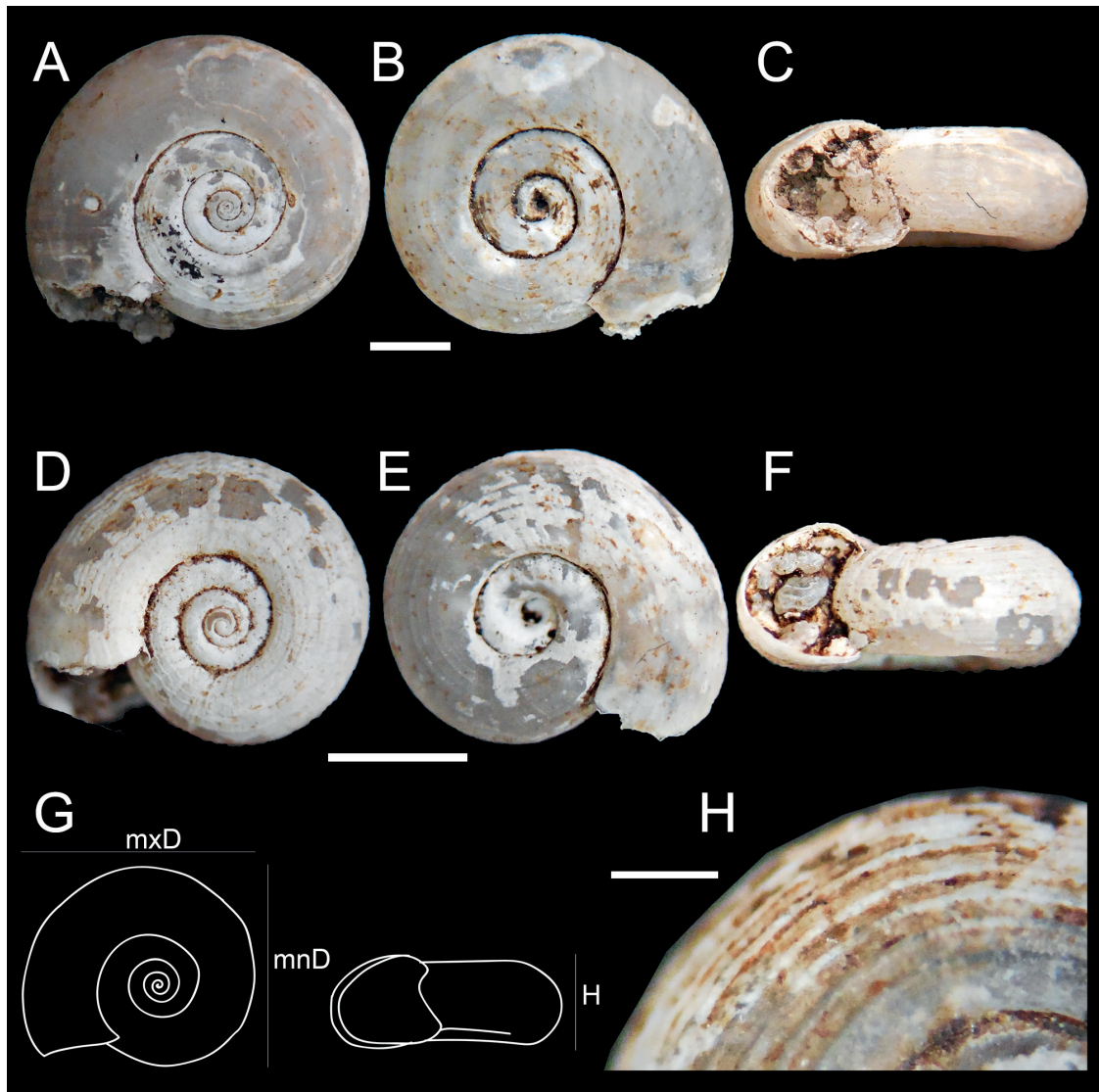


Figure 2. *Biomphalaria manya* sp. nov. A–C, FCDP-I 8719 holotype, apical view (A), umbilical view (B), apertural view (C). D–F, FCDP-I 8720 paratype I, apical view (D), umbilical view (E), apertural view (F). G, measures; H, detail of the ornamentation. **Abbreviations:** mxD, maximum diameter; mnD, minimum diameter; H, height. Scale bars: A–F = 2 mm; H = 1 mm.

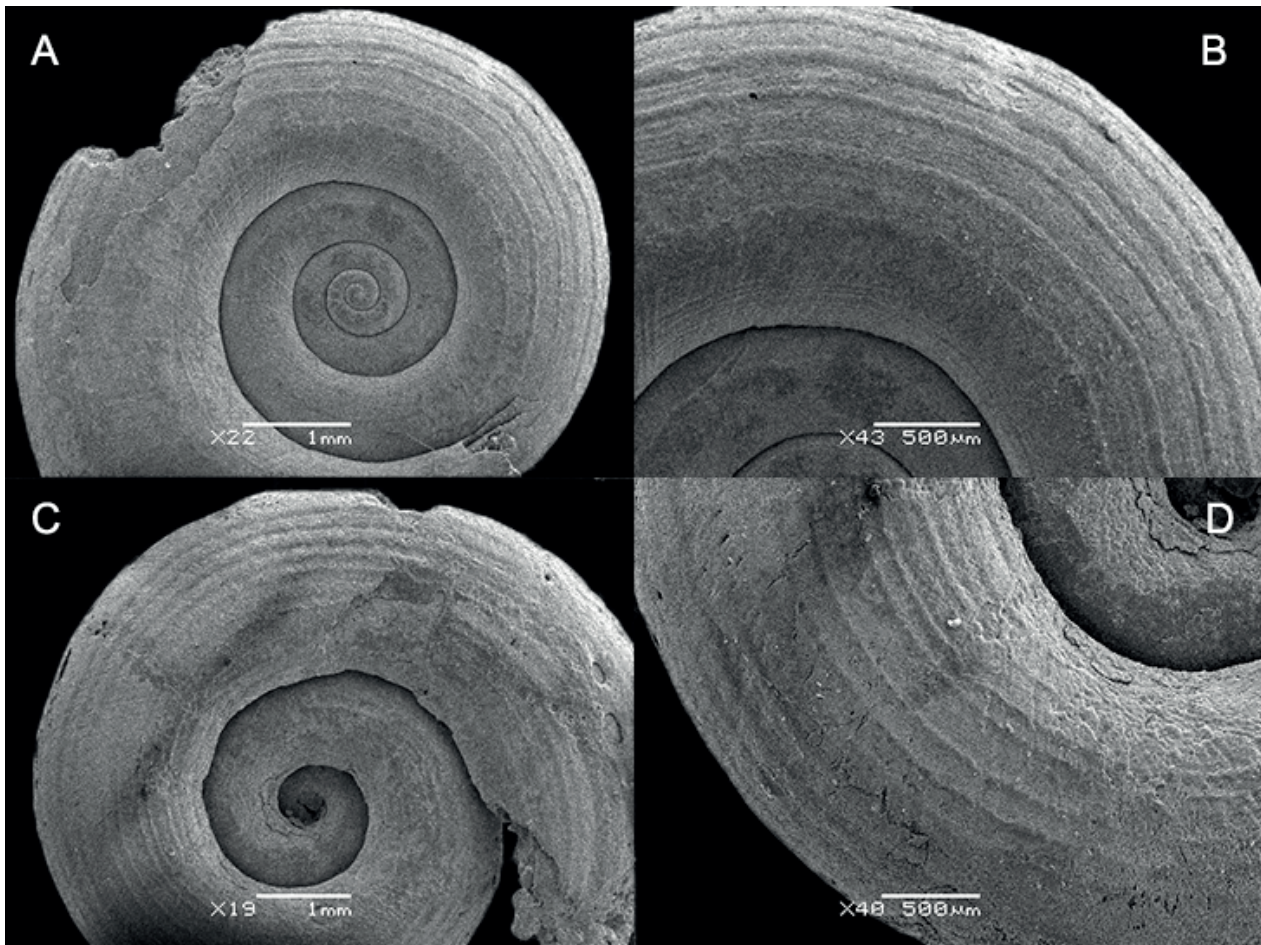


Figure 3. Scanning Electron Microscope (SEM) images of two specimens of *Biomphalaria manya* sp. nov. FCDP-I 7218. **A**, apical view; **B**, detail of the ornamentation in apical view, with secondary ribs between the primary ribs; **C**, umbilical view; **D**, detail of the ornamentation in umbilical view.

FCDP-I 8721, figures 2d, e and f, mxD 5.16 mm, mnD 4.28 mm, H 2.1 mm.

Type locality. Nearby Algorta Town, Río Negro Department. 32°28.640'S, 057°24.660'W (Figure 1B).

Other material. 75 specimens, FCDP-I 7218, 7228, 8720.

Geographic and stratigraphic range. Nearby Algorta Town, Río Negro Department; proximities of Piedras Coloradas Town, Paysandú Department, Uruguay. Queguay Formation, Upper Cretaceous.

Etymology. Dedicated to C.A. Peñarol, “Manyá”, inspired by the striped ornamentation of the shell.

Comparative remarks. The diagnosis of the genus *Biomphalaria* by Preston (1910) is: “Shell subdiscoidal, planulate with concave spire, last whorl very large; umbilicus open, but shallow; aperture gaping; labium greatly receding below”. With respect to the ornamentation, Paraense (1975) adds to the diagnosis “... whorls ornate only with growth striae”. Given the ornamentation of this new species, the original diagnosis (Preston, 1910) is more suitable than the revision by Paraense (1975). The major difference between *Biomphalaria manya* sp. nov. and the other species of the genus is the notorious spiral ornamentation of the shell, consisting of about 19 primary ribs with secondary ribs only visible by means of a Scanning Electron Microscope

(SEM) (Figures 2H, 3). In addition, and regarding the other *Biomphalaria* species from the Queguay Formation, *B. manya* sp. nov. differs from *B. walteri* by the rather smaller shell size of the new species. Besides, in umbilical view *B. walteri* shows only the latest two whorls, while in *B. manya* sp. nov. the last three whorls are visible. With respect to *B. reversa*, this species is dextrally coiled, while *B. manya* sp. nov. has a sinistral shell. In addition, *B. manya* sp. nov. is larger than *B. reversa*. In apical view, the whorls of *B. reversa* maintain a uniform distance between each other, while in the new species the whorls gradually increase their distance towards the aperture. In umbilical view *B. reversa* shows only the last two whorls, while *B. manya* sp. nov. shows the last three whorls.

ACKNOWLEDGMENTS

To M. Verde and the Quebracho team (A. Batista, N. Batalla, F. Montenegro, and G. Roland), who helped in field work. To L. Vivanco who helped in laboratory work. To Agencia Nacional de Investigación e Innovación (ANNI - Project FCE 3_2011_1_5702) and PEDECIBA Biología for financial support. To A. Rojas and two anonymous reviewers who made suggestions that improved the paper.

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Received in 23 May 2018; accepted in 23 October 2018.