

NEW SOUTHERNMOST RECORDS OF THE GENUS *PUPISOMA* (VALLONIDAE) USING A NOVEL COLLECTING METHOD ON TREE BROMELIADS

Arboreal micromolluscs are underrepresented in natural collections probably because of the intrinsic difficulties involving their observation and collection in natural environments. Micromolluscs of the genus *Pupisoma* Stoliczka, 1873 (Vallonidae) usually live on the bark and leaves of trees and other plants and are distributed in tropical and subtropical regions of both hemispheres, except in arid regions and oceanic islands¹. Four species have been recorded in Argentina with records in tropical and temperate areas of the country (Fig. 1A, yellow circles)²⁻⁵: 1) *P. (Ptychopatula) dioscoricola* (C. B. Adams, 1845) recorded from El Zapallar and Resistencia (Chaco Province); Lumbreira (Salta Province) and San Miguel de Tucumán (Tucumán Province), as well from various localities in southern Brazil⁶⁻⁸; 2) *P. latens* Hylton Scott, 1960 from Cabana and Mina Clavero (Córdoba Province); San Miguel de Tucumán; Cerro San Javier and Horco Molle (Tucumán Province); 3) *P. puella* Hylton Scott, 1960 from Iguazú (Misiones Province); and 4) *P. macneilli* (Clapp, 1918), from Cerro San Javier (Tucumán Province) by Hausdorf⁴ in his revision of South American species of the genus. In the same paper that author synonymized *P. puella* and *P. latens* with *P. dioscoricola* and *P. comicolense*, respectively on the basis of conchological characters. An unidentified species of the genus has been recorded in various localities in the Misiones Province⁹. Here we present new records of the genus that extend the southern distribution of the genus *Pupisoma* by ~500km obtained using a method that, as far as we know, has not been previously utilised to collect micromolluscs on trees¹⁰. The molluscs were collected as part of an ongoing survey of the arachnid fauna associated with the bromeliads *Tillandsia aëranthos* (Loisel) L.B. Sm. and *T. recurvata* (L.) L. in Buenos Aires City and Buenos Aires Province, Argentina.

Collecting methodology

Micromolluscs were extracted from bromeliads with a shake and wash technique originally developed by Zacharda *et al.*¹¹ for collecting

eriophyid and phytoseid mites on plants¹². In our version of this technique, epiphyte bromeliads were collected in several trees. In the laboratory, they were immersed in 70–90% ethanol in a covered beaker and gently shaken several times. After resting for several hours to allow the precipitation of the invertebrate associated fauna, the plant material was carefully removed with forceps and the alcohol containing the preserved material was transferred to a Petri dish and studied under a dissecting microscope. All the collected molluscs belong to the genus *Pupisoma* and were deposited in the Invertebrates Division of the Museo Argentino de Ciencias Naturales “Bernardino Rivadavia” (MACN-In). Shells and radulae were sputter coated with gold-palladium and examined using a Phillips XL Series 30 scanning electron microscope.

Species collected

Pupisoma (Ptychopatula) dioscoricola (Figs 2A–C)

11 exs. MACN-In 42532. Paseo del Bosque, La Plata city, Buenos Aires Province, Argentina (Fig. 1A, L2) on *T. aëranthos* on *Celtis tala* Gillies ex Planch. and other trees; -34.9079°, -57.934° (+/-500m), 30m.a.s.l. Col. A. O. Porta, 05Jul2019.

Observations The shell of *P. (P.) dioscoricola* was described by Hausdorf⁴. Radula: a central tooth tricuspid (with central well-developed cuspid), 6 lateral teeth (endocone larger than the rest of cupids), and 5 marginal teeth (pectinated, with 3 large cuspid). Measurements of the figured specimen: height: 1.35mm, width: 1.35mm; 3.25 whorls.

Pupisoma (?Pupisoma) sp. (Figs 2D–F)

6 exs. MACN-In 42994. Parque Avellaneda: Ciudad Autónoma de Buenos Aires, Argentina (Fig. 1A, L1). -34.644871°, -58.478487° (+/-200m, GE); alt. 25m.a.s.l.. On *T. recurvata* over various species of trees. Col. A. O. Porta, 08Sept2019. 17 exs. MACN-In 42995. Chascomús, Buenos Aires (Fig. 1A, L3). -35.5787°, -58.0084° (+/-300m); alt.



Figure 1. A. Southern South America occurrences of the genus *Papisoma*, yellow circles, occurrences after Hausdorf (2007); new records, pink circles, *Papisoma (P.)* sp.; blue circles, *Papisoma (Ptychopatala) dioscoricola*, localities codes as in text. **B.** *Tillandsia aëranthos* (Bromeliaceae) on a tree branch. **C-D.** *Tillandsia recurvata* (Bromeliaceae) on tree trunks.

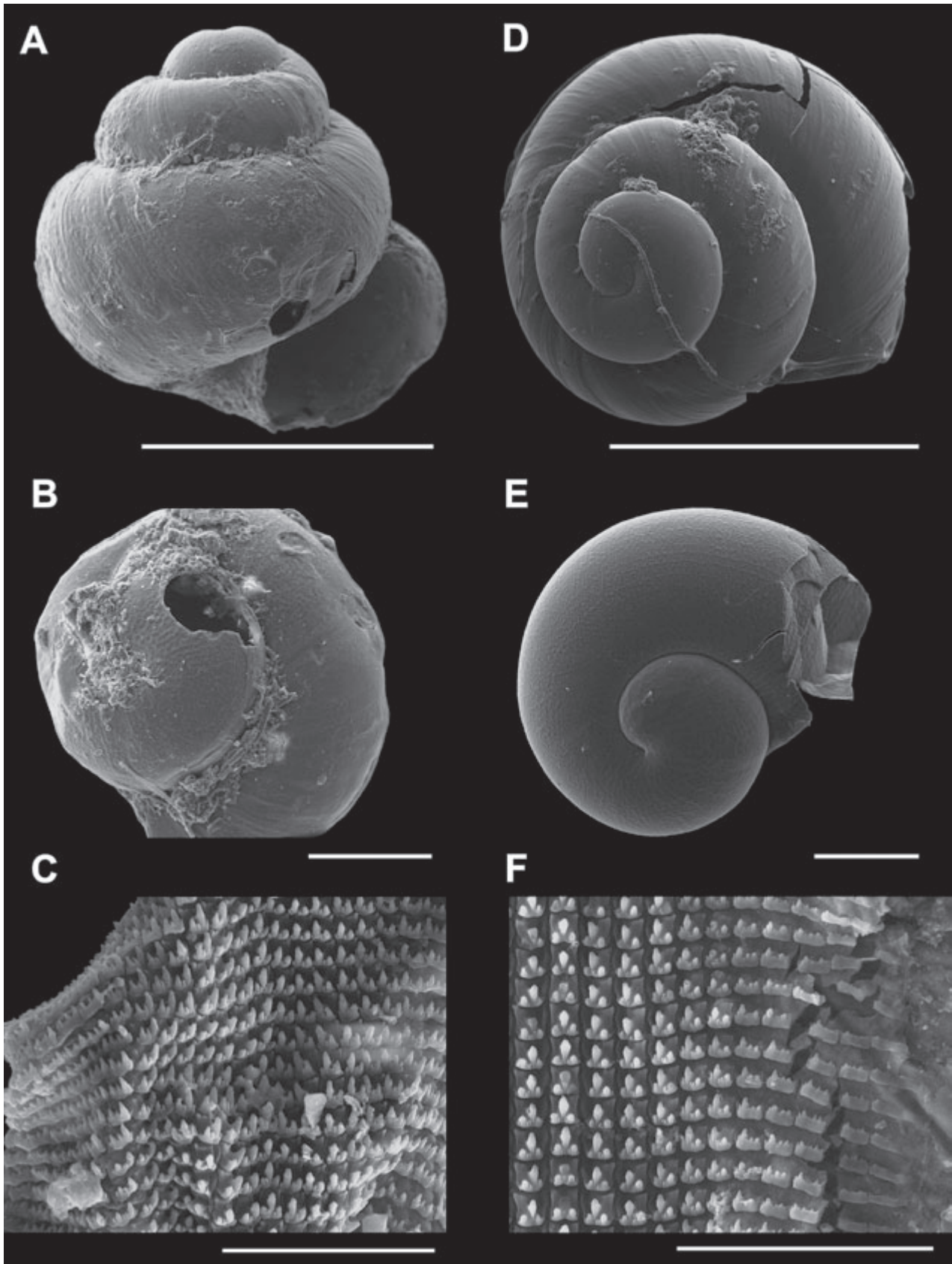


Figure 2. A-C, *Pupisoma* (*Ptychopatala*) *dioscoricola*, (MACN- In 42532). A. Apertural view; B. Protoconch. C. Radula. D-E, *Pupisoma* (*P.*) sp. (MACN- In 42995). A. Dorsal view. B. Embryo, dorsal view. C. Radula. Scale bars: A, D: 1 mm, B, E: 0.2 mm; C, F: 0.05 mm.

17m.a.s.l. On *Tillandsia recurvata* and *Tillandsia aëranthos* over various species of trees of the boulevards of Avda. Tte. Gral. Juan Domingo Perón y Lastra. Col. A. O. Porta, 06Oct2019. 2 exs. MACN-In 42996. Instituto Tecnológico Chascomús (Intech), Chascomús, Buenos Aires (Fig. 1A, L4). -35.6237°, -57.9935° (+/-50m), on *Tillandsia recurvata* and *Tillandsia aëranthos* over *Celtis tala*; alt. 15m.a.s.l. Col. A. O. Porta, 06Oct2019.

Observations The shell of *Pupisoma* (?*Pupisoma*) sp. is globose, conical, with obtuse apex; umbilicate, cinnamon-brown; whorls are strongly convex, joined by a very deeply impressed suture; the last whorl rounded, basally around the open umbilicus; aperture slightly oblique; lip thin, the columellar margin broadly reflected, half covering the umbilicus; sculpture of fine, close wrinkles, irregularly developed, being weak or nearly effaced in places, and absent on the embryonic 1.5 whorls; also a weak and very minute pitting, which is also quite irregularly developed, and in some places replaced by granulation; there is no spiral striation. Radula: a central tooth tricuspid (with a central well-developed cuspid), 5 lateral teeth (mesocone large), and 5 marginal teeth (pectinated with a large cuspid). Measurements of the figured specimen (MACN-In 42995): height: 1.30mm, width: 1.17mm; 3 whorls.

As mentioned before, these new records extend the distribution of the genus *Pupisoma* nearly 500km to the south and constitute the first record of the genus in the Pampa biome. The presence of the collected taxa in densely populated and highly modified areas suggest that this population could be the result of recent anthropogenic dispersal (anthropocory). *P. (Ptychopatala) dioscoricola*, shows a very wide distribution in South America, including Galapagos Islands (Ecuador) where it is considered an alien species. On the other hand, despite the scarce representation of this genus in collections, we have collected exemplars in all sampled localities, suggesting that the presence of these gastropods is very common. This last observation suggests that this low representation is a bias originated by the sampling methods, and the use of specific collecting techniques could shed new light in the distribution.

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