

INSULIVITRINA RAQUELAE, A NEW SPECIES OF VITRINIDAE FROM LA GOMERA (CANARY ISLANDS) (GASTROPODA: PULMONATA: LIMACOIDEA)

M.J. VALIDO¹, Y. YANES², M.R. ALONSO³ & M. IBÁÑEZ³

¹Valsequillo, Gran Canaria, Canary Islands, Spain

²Department of Geology, University of Cincinnati, Cincinnati, OH 45221, USA

³Santa Cruz de Tenerife, Canary Islands, Spain

Abstract A new species of Vitrinidae is described from the north-west of La Gomera Island. This is the only Canarian Vitrinidae species with the shell uniformly ribbed on the teleoconch, each rib being provided with a longitudinal row of numerous, small but prominent granules.

Key words taxonomy, genital anatomy, island endemic, species richness, shell ribbed and granulated.

INTRODUCTION

The family Vitrinidae is mainly of Palearctic distribution. It has been revised recently by Giusti *et al.* (2011) in a phylogenetic study of both European and Macaronesian species. Three genera of Vitrinidae are restricted to the Canary Islands: *Insulivitrina* Hesse, 1923, with 15 species (three of them from La Gomera Island: Morales *et al.*, 1988), *Canarivitrina* Valido & Alonso in: Alonso *et al.*, 2000, with five species (three from La Gomera Island: Alonso *et al.*, 2000) and *Guerrina* Odhner, 1954, with two species (one from La Gomera Island: Valido *et al.*, 1993). Canarian Vitrinidae are present in the five westernmost islands of the archipelago, mainly living in the laurel forest, but also in other relatively humid habitats from the littoral up to 1800 metres elevation. Thus, *Insulivitrina ezeroensis* Alonso & Ibáñez, 1987, from El Hierro Island occurs from 10–1400 m, and *Canarivitrina taburientensis* (Groh & Valido in: Alonso *et al.*, 2000), from La Palma Island from 300–1800 m. Members of this family have not been found in the two easternmost islands (Lanzarote and Fuerteventura), probably because of their dry climates (<200 mm of annual precipitation) and the shortage of suitable habitats.

METHODS

Maps of geographical distribution (Fig. 1) were drawn using the MapViewer software (Golden

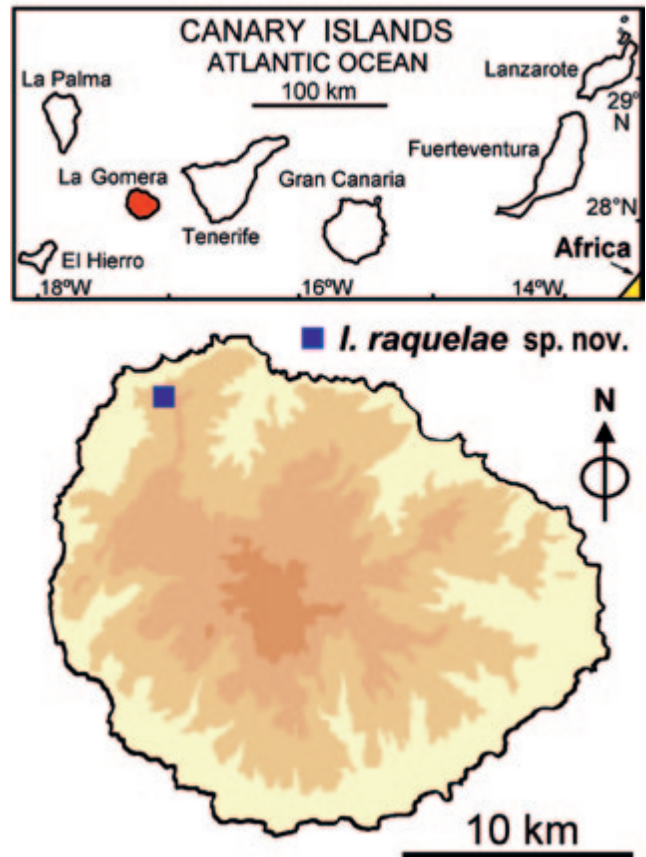


Figure 1 Geographic location of *Insulivitrina raquelae* sp. nov., on La Gomera Island.

Software Inc.). The photographic methodology was described by Ibáñez *et al.* (2006). “Proximal” and “distal” in the genital system refer to positions in relation to the ovotestis.

SYSTEMATICS

Family **Vitrinidae** Fitzinger, 1833
Type genus: *Vitrina* Draparnaud, 1801

Genus *Insulivitrina* Hesse, 1923
Type species *Helicolimax lamarckii* A. Férussac,
1821

Insulivitrina raquelae, new species

Holotype (shell: Museum of Natural Sciences, Tenerife, TFMC MT 855 and genital system: TFMC MT 856); leg. R. Hutterer and M. Ibáñez, 28 December 2001, from the type locality.

Paratype One specimen (TFMC MT 857), collected with the holotype.

Type locality Montaña de La Caldera, north-western La Gomera Island (Fig. 1); UTM: 28RBS7420; 700 m altitude).

Diagnosis A species of *Insulivitrina* with the teleoconch shell ornamented with numerous radial, granulated ribs that are most developed on the last whorl.

Description Animal small (fixed specimen with length ca 22 mm). Body semislug-like, pale



Figure 2 Shells. **A** *Insulivitrina raquelae* sp. nov., holotype. **B** *Insulivitrina reticulata* (Mousson, 1872), from Cabezo Las Mesas, Tenerife Island.

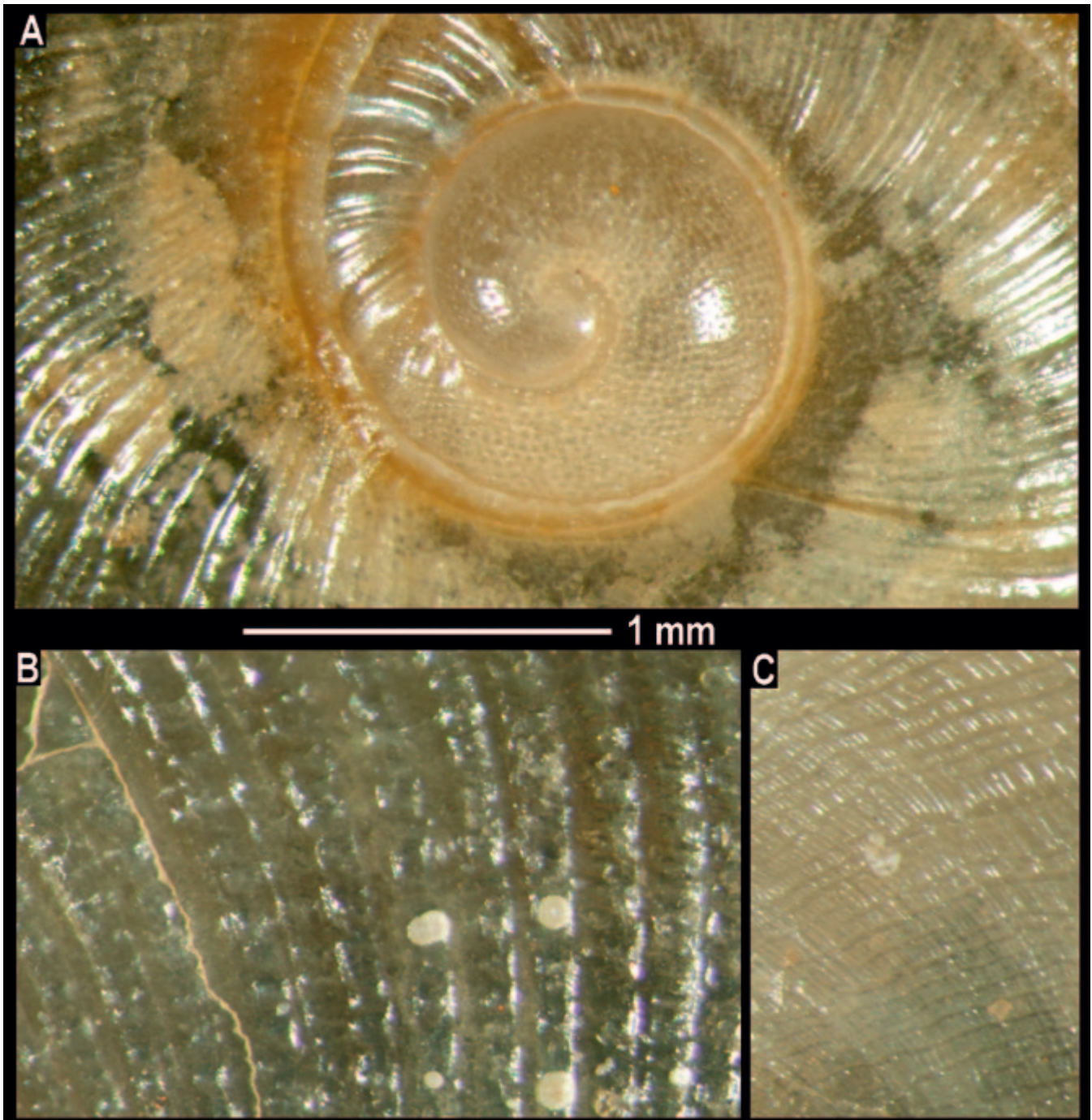


Figure 3 Details of shell ornamentation: **A** protoconch of *Insulivitrina raquelae* sp. nov. **B** teleoconch of *I. raquelae* sp. nov. **C** teleoconch of *I. reticulata* (Mousson, 1872).

brown; mantle also pale brown, with small irregular areas slightly darker. Right side of mantle with a shiny, longitudinal blackish “lateral band”, present on both sides of the pneumostome. Sole tripartite, pale brown; tail tip dorsally keeled.

Vitriniform dorsal shell (Fig. 2A) small (the shell photographed with maximum diameter *ca* 10.1 mm), dextral, thin and fragile, translucent, greenish, with about 3 whorls, last whorl

expanded; the prominent protoconch has *ca* 1½ whorls. Protoconch pits ornamentation (Fig. 3A) of “type III” in the Ibáñez *et al.* (1987, fig. 2) classification. Teleoconch ornamentation (Figs 2A, 3B) with very numerous ribs radially disposed, each rib with a longitudinal row of numerous, small but prominent granules, most strongly developed on the last whorl. Aperture wide, with columellar and basal margins bordered by

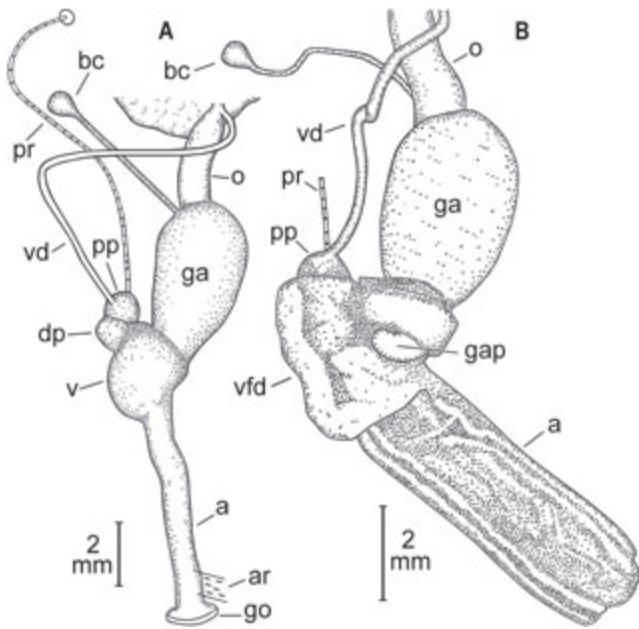


Figure 4 *Insulivitrina raquelae* sp. nov. **A** genital system. **B** detail of the vagina and atrium dissected, showing the vaginal crest and the curled papilla of the vaginal stimulator (glandula amatoria). **a** atrium; **ar** atrial retractor muscle; **bc** bursa copulatrix; **dp** distal penis; **ga** glandula amatoria; **gap** papilla of the glandula amatoria; **go** genital orifice; **o** oviduct; **pp** proximal penis; **pr** penial retractor muscle; **v** vagina; **vfd** vaginal folded crest; **vd** vas deferens.

small periostracal fringe. Umbilicus very small, almost closed.

Genital system (Figs 4A, 4B). Atrium tubular, very long, its length being similar to that of vagina plus the stimulator (the glandula amatoria). The stimulator has a complete external glandular covering.

Penial retractor muscle long, arising from diaphragm, running in front of right optic nerve, below right ommatophore retractor and ending on proximal end of penis. Epiphallus absent. Vas deferens opens on spherical, proximal penis, near retractor muscle insertion. Distal part of penis tubular, smooth, folded and turned backed on itself, giving it a small, globular appearance.

Vagina short with a large internal, semicircular, folded crest (Fig. 4B), which connects with the papilla of the accessory vaginal stimulator (glandula amatoria). This papilla is curled, like a hook (Fig. 4B).

Derivation of name The species epithet is dedicated to Raquel Valido de Armas, the first author's daughter.

Distribution and habitat Endemic to La Gomera, where it was collected only at the type locality, among native vegetation dominated by scrub of *Erica arborea* L. ("Brezo").

Comparisons *Insulivitrina raquelae* sp. nov. differs from all other *Insulivitrina* species and also from all the other Canarian Vitrinidae species in the ornamentation of the teleoconch. Thus, it is the only species with the teleoconch ornamented with numerous radially disposed riblets, each riblet with a longitudinal row of numerous, small but prominent granules (Figs 2A, 3B). In contrast, the other *Insulivitrina* species, with the exception of *I. reticulata* (Mousson, 1872) from Tenerife Island, have a nearly smooth teleoconch. In *I. reticulata* the protoconch is non-prominent and the teleoconch is partly ornamented in some specimens (Fig. 2B), completely ornamented in others. Its shell ornamentation is significantly different to from that of *I. raquelae* sp. nov., consisting of numerous, regularly interlaced, small but clear spiral and radial grooves (Fig. 3C).

The genital system of *I. raquelae* sp. nov. differs from that of *I. reticulata* (described by Ibáñez *et al.*, 1987, fig. 13) mainly in the form of the penis (small, globose and not turned back on itself in *I. reticulata*) and in the length of the atrium and the bursa duct (each of them about 3–4 times longer than those of *I. reticulata*). In contrast, the genital system of *I. raquelae* sp. nov. is more similar to that of *I. gomerensis* Alonso & Ibáñez, 1988 (Alonso & Ibáñez, 1988, fig. 4), from the laurel forest of the Garajonay National Park of La Gomera Island, demonstrating a close relationship between these species. However, the bursa duct of *I. gomerensis* is shorter than the free oviduct (Alonso & Ibáñez, 1988, fig. 4), whereas it is longer in *I. raquelae* sp. nov. In *I. gomerensis* the teleoconch of the shell is smooth, thin and glossy, lacking ornamentation (Alonso & Ibáñez, 1988, fig. 12).

Remarks The island of La Gomera represents only ca 5% of the total area of the Canarian archipelago (ca 378 out of ca 7496 km²) but it is disproportionately rich in the number of species of land Mollusca living there. Among the most species-rich families on La Gomera, two stand out: the Enidae with 26 out of 70 known Canarian species (Santana *et al.*, 2013), and the Vitrinidae with 8 out of 23 known species. The numbers of species of both families living on La Gomera comprise

more than one-third of the total numbers for each of them from the entire archipelago: a proportion that is clearly greater than that predicted by the most parsimonious species number–island age model (Cameron *et al.*, 2013).

ACKNOWLEDGEMENTS

Special thanks go to Dr. David T. Holyoak and an anonymous referee for suggestions that greatly improved the manuscript.

REFERENCES

- ALONSO MR, VALIDO MJ, GROH K & IBÁÑEZ M 2000 *Plutonia (Canarivitrina)*, new subgenus, from the Canary Islands, and the phylogenetic relationships of the subfamily Plutoniinae (Gastropoda: Limacoidea: Vitrinidae). *Malacologia* **42**(1–2): 39–62.
- CAMERON RAD, TRIANTIS KA, PARENT CE, GUILHAUMON F, ALONSO MR, IBÁÑEZ M, MARTINS AM FRIAS, LADLE RJ & WHITTAKER RJ 2013 Snails on oceanic islands: testing the general dynamic model of oceanic island biogeography using linear mixed effect models. *Journal of Biogeography* **40**(1): 117–130.
- GIUSTI F, FIORENTINO V, BENOCCI A & MANGANELLI G 2011 A survey of vitrinid land snails (Gastropoda: Pulmonata: Limacoidea). *Malacologia* **53**(2): 279–363.
- IBÁÑEZ M, MORALES P & ALONSO MR 1987 La familia Vitrinidae en Canarias. I. Revisión de las especies de Tenerife, con descripción de 2 especies nuevas (Gastropoda: Pulmonata). *Archiv für Molluskenkunde* **117**(4–6): 117–149.
- IBÁÑEZ M, SIVERIO F, ALONSO MR & PONTE-LIRA CE 2006 Two *Canariella* species (Gastropoda: Helicoidea: Hygromiidae) endemic from the Northwest Tenerife (Canary Islands). *Zootaxa* **1258**: 33–45.
- MORALES P, IBÁÑEZ M & ALONSO MR 1988 La familia Vitrinidae en Canarias. III. 3 nuevas especies de La Gomera (Gastropoda: Pulmonata). *Archiv für Molluskenkunde* **118**(4–6): 153–166.
- SANTANA J, ARTILES M, YANES Y, DENIZ F, ALONSO MR & IBÁÑEZ M 2013 Three undescribed species of *Napaeus* (Gastropoda: Pulmonata: Enidae) from La Gomera (Canary Islands), the richest centre of species radiation for the genus. *Journal of Conchology* **41**(3): 271–286.
- VALIDO MJ, GROH K, IBÁÑEZ M & ALONSO MR 1993 La familia Vitrinidae en Canarias. V. El género *Guerrina* (Gastropoda: Pulmonata). *Archiv für Molluskenkunde* **121**(1–6): 117–124.