

Remarks on the non-marine molluscan fauna of the Azores.

3. A new species of *Drouetia* from the Isle of São Miguel (Pulmonata: Zonitidae)

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A new species of the endemic Azorean zonitid subgenus *Drouetia*, *Oxychilus* (*D.*) *batalhana* nov. spec., is described from the Island of São Miguel. Its very long flagellum separates it from all known *Drouetia* species.

Key words: Gastropoda, Pulmonata, Zonitidae, *Oxychilus* (*Drouetia*), taxonomy, Azores, Atlantic Islands.

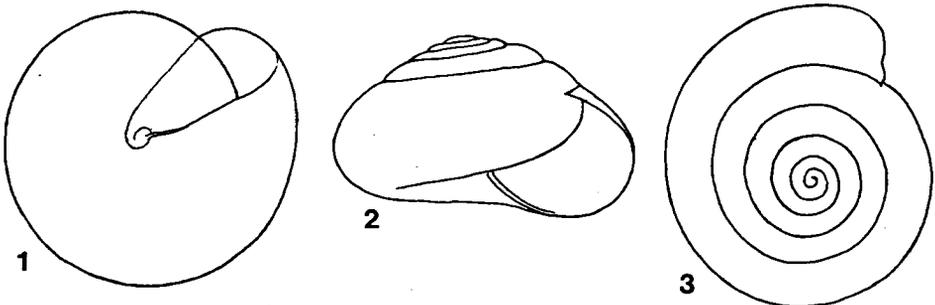
Drouetia Gude, 1911, a subgenus of *Oxychilus* Fitzinger, is endemic to the Azores. Riedel (1964) recognized one species with three subspecies, which he later (Riedel, 1980) raised to full species, viz. *O. (D.) atlanticus* (Morelet & Drouët, 1857) from São Miguel, *O. (D.) minor* (Morelet, 1860) from Faial, and *O. (D.) brincki* Riedel, 1964, from Santa Maria. Another species, *O. (D.) agostinhoi*, was described from Santa Maria by Frias Martins (1981). All these species differ in the relative dimensions of the genital system, and, to a lesser degree, in shell characters.

A species from the Wieringa collection (see De Winter, 1988) was found to diverge in genital characters to such an extent as to warrant description as a new species.

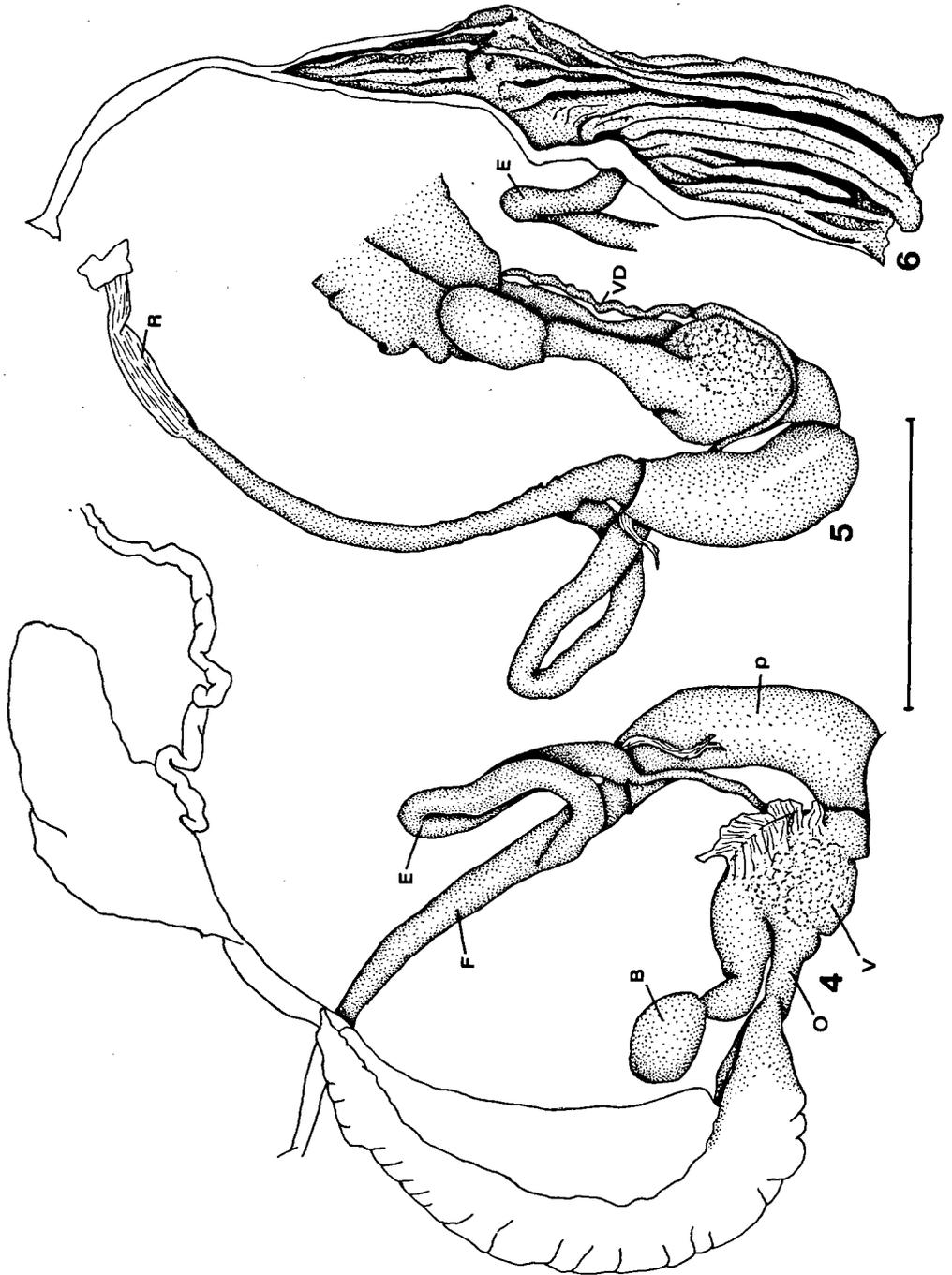
Oxychilus (*Drouetia*) *batalhana* nov. spec.

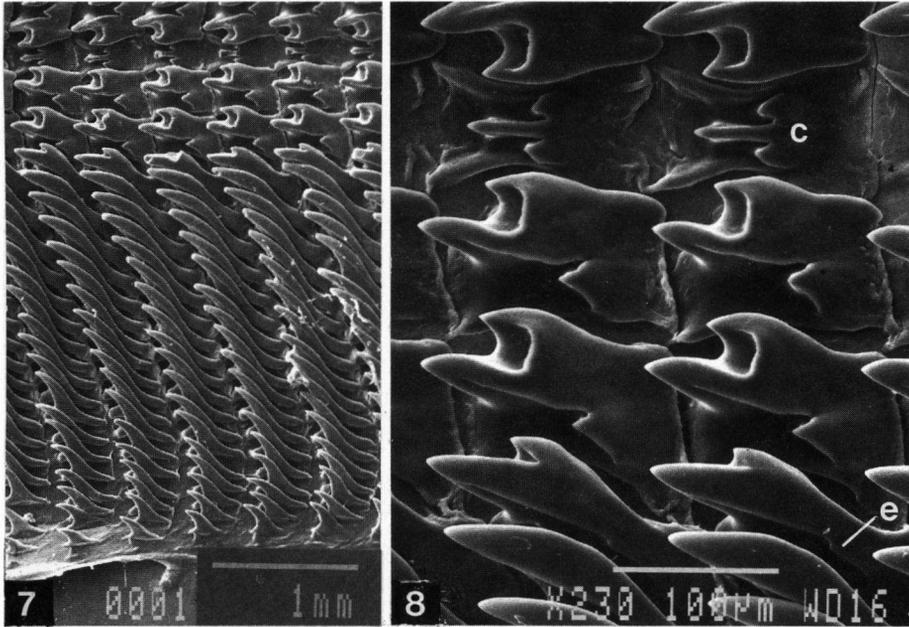
(figs. 1-8)

Material. — Holotype (RMNH 56030) and paratypes (RMNH 56031/8; RMNH alc. 9229/2). Type locality: Azores, São Miguel, Pico da Batalha, 7 km NNE. of Ponte



Figs. 1-3. Outline of holotype of *Oxychilus* (*Drouetia*) *batalhana* nov. spec. (RMNH). Maximum diameter 7.12 mm.





Figs. 7-8. Radula of paratype of *O. (D.) batalhana* nov. spec. (RMNH). 7, half a row from central part of radula; 8, central tooth (c), laterals, and transitional tooth; rudimentary outer cusp of transitional tooth indicated (e).

Delgada; alt. 270 m (UTM PG1983); 18.VII.1987; J. Wieringa leg.; *Cryptomeria* forest with undergrowth of *Laurus* and *Hedichium*. Accompanying land molluscs: '*Napaeus*' *pruninus* (Gould, 1848), *Actinella horripila* (Morelet & Drouët, 1857), *Lauria fasciolata* (Morelet, 1860), *Oestophora barbula* (Rossmässler, 1838), and *Leptaxis erubescens* (Lowe, 1831).

External appearance. — Two living animals could be studied. The head-foot has a deep orange colour, somewhat dimmed by greyish pigmentation. After preservation the orange colour disappears, and only the grey colour remains. Sole and foot-fringe cream. From the kidney to about the position of the albumen gland the mantle carries irregular white blotches. The darkly stained spermooviduct and albumen gland are visible through the body wall.

Shell (figs. 1-3). — Shell pale olive-brown, somewhat transparent, shining. Except for weak, irregular growth lines no sculpture apparent; only at high magnification (500 ×) under a S.E.M. microscope some very faint radial lines are discernable above

Figs. 4-6. *Oxychilus (Drouetia) batalhana* nov. spec. (RMNH). 4-5, genitalia of paratype, viewed from different angles; 6, internal organization of penis and flagellum of paratype. B, bursa copulatrix; E, epiphallus; F, flagellum; O, free oviduct; P, penis; R, penial retractor muscle; V, vagina; VD, vas deferens. Scale 2 mm.

Specimen	Maximum diameter (D)	Height (H)	Aperture height	Aperture width	Number of whorls	H/D	Ap. H/ Ap. W
Holotype	7.12	4.80	3.29	4.18	5 1/2	0.67	0.79
Paratypes							
1	7.05	4.04	3.01	4.04	5 1/3	0.57	0.75
2	7.47	4.73	3.15	4.25	5 1/2	0.63	0.74
3	6.78	3.77	2.88	3.90	5 1/5	0.56	0.74
4	6.44	3.56	2.81	3.70	5-	0.55	0.76
5	6.71	4.18	3.01	3.84	5	0.62	0.78
6	6.64	3.77	2.88	3.77	4 2/3	0.57	0.76
7	8.2	4.5	---	---	5 2/3	0.55	---
8	7.9	4.9	---	---	5 1/2	0.62	---

Table 1. Shell measurements (in mm) of *Oxychilus (Drouetia) batalhana* nov. spec. Shells of paratypes 7 and 8 were destroyed in order to study the animal. Whorl counting according to Gittenberger et al., 1984: fig. 4a.

the suture. Dimensions are given in table 1. The height/width ratio is rather variable. Fortunately, of the two available specimens containing the soft parts, one has a relatively flat shell, while the other is more conical. As their genital morphology turned out to be very similar, it seems safe to assume that all shells belong to the same species. Umbilical region depressed, umbilicus completely covered by a parietal callus. Last whorl evenly rounded.

Genitalia (figs. 4-6). — Penis for about $\frac{3}{4}$ of its length covered by a thin sheath. Lower part of penis muscular and shining, upper part more glandular in appearance. Epiphallus over $1\frac{1}{2}$ times as long as penis. Flagellum very long, about as long as penis, flattened, tapering towards the point of attachment of penial retractor muscle. Penial retractor short and compact, inserting on the diaphragma near the position of the kidney. Inner wall of penis with about nine longitudinal folds, which anastomose to some extent. Inner wall of flagellum with low, less pronounced folds. Genital atrium virtually absent. Vagina short and wide. Perivaginal gland not very strongly developed, leaving one side uncovered, where some muscles attach the vagina to the body wall. Duct of bursa copulatrix short and wide, tapering towards the oval bursa. Spermoviduct, prostate, and albumen gland covered by blackish pigmented tissues.

Radula (figs. 7-8). — The radula of one paratype was examined. There are about 60 rows of teeth. Central tooth tricuspid, with a long and slender mesocone. Apart from the central tooth, there are two lateral, one transitional, and 18 marginal teeth. Laterals tricuspid, with relatively large ectocones. The transitional tooth has a clear endocone as well as a rudimentary ectocone, which are both completely lost in the marginals.

Discussion. — *O. (D.) batalhana* differs from all known *Drouetia* species by its very long flagellum. The long epiphallus separates it from all except *O. (D.) minor*, which differs, among others, by the presence of a caecum at the base of the flagellum.

As regards the size of the shell, *O. (D.) batalhana* resembles the species treated by Riedel (1964). *O. (D.) agostinhoi* has a smaller, more depressed shell, of which the last quarter whorl expands more strongly towards the aperture (Frias Martins, 1981, figs.

1-6). *O. (D.) brincki* has more whorls at the same size. Shell characters given by Riedel (1964) do not allow to distinguish the species here described from *O. (D.) atlanticus* and *O. (D.) minor*.

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