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TERRESTRIAL MOLLUSCS OF ILHÉU DE VILA FRANCA DO CAMPO, SÃO MIGUEL, AZORES — AN ILLUSTRATED LIST

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ABSTRACT

Twenty-one species of terrestrial molluscs live on Ilhéu de Vila Franca do Campo, a small island located off the coast of São Miguel, Azores. Most of these species are found along the coastline of the nearby São Miguel Island and only 3 are Azorean endemics. This species richness is attributed to the proximity of São Miguel and to strong human influence; the maintenance of that diversity is made possible by the abundant vegetation cover, which includes arboreal and subarboreal species. The two parts of the island, Ilhéu Grande and Ilhéu Pequenino, are connected by a great extension of bare rock and appear to lack regular species exchange.

RESUMO

Vinte e uma espécies de moluscos terrestres vivem no Ilhéu de Vila Franca do Campo, uma pequena ilhota ao largo da costa de São Miguel, Açores. A maior parte dessas espécies encontra-se na linha de costa da vizinha ilha de São Miguel, e apenas 3 são endémicas dos Açores. Atribui-se esta riqueza de espécies à proximidade da ilha de São Miguel e a forte influência humana; a manutenção desta diversidade torna-se possível devido à abundante cobertura vegetal, que inclui espécies arbóreas e subarbóreas. Parece que as duas partes do ilhéu, o Ilhéu Grande e o Ilhéu Pequenino, ligados por uma grande extensão de rocha nua, não experimentam troca de espécies com regularidade.

INTRODUCTION

The "Ilhéu de Vila Franca do Campo" is a small volcanic islet about 400 m long and 350 m wide, located 500 m S of Ponta de São Pedro, Vila Franca do Campo, São Miguel Island, Azores. The "ilhéu" is composed of two distinct portions surrounding in amphitheater a drowned circular, inundated crater, the "bacia", connected at the southern side by a low isthmus.

The eastern, smaller portion, the roundish "Ilhéu Pequenino", has a diameter of 100 m. The northern half, which is covered with Gramineae, dominated by *Festuca petraea* Guthn. ex Seub., has some conspicuous tufts of *Juncus acutus* L., and is topped with sparse specimens of *Erica scoparia* ssp. *azorica* Hochst.

The larger unit, "Ilhéu Grande", comprising most of the islet, rises to an height of 60 m and is covered with more complex vegetation. The amphitheater facing the "bacia" has two groves of *Metrosideros tomentosa* A Cunn. about 50 years old; the groves are separated by a massive entanglement of *Arundo donax* L. with under-

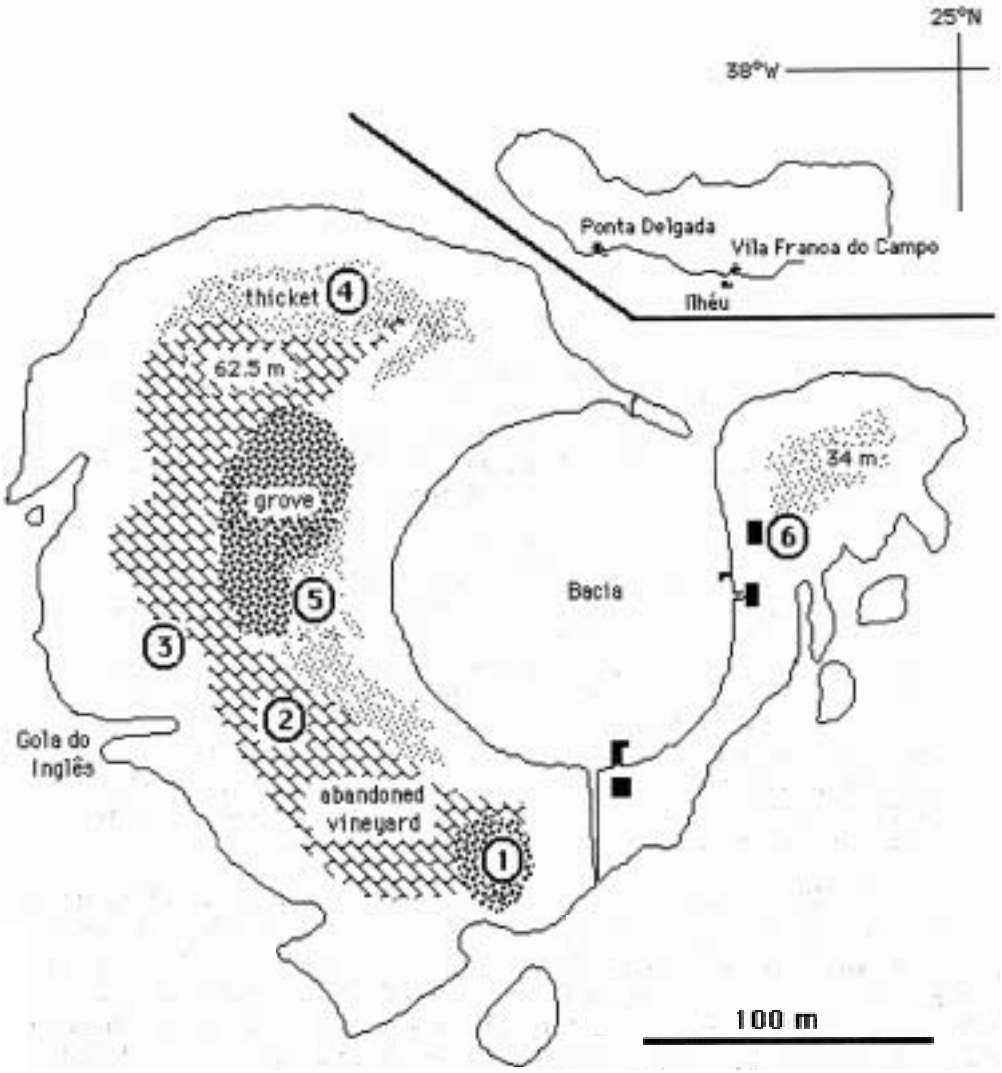


FIG. 1. Ilhéu de Vila Franca do Campo, its location relative to São Miguel (inset) and the collecting stations (1-6). See text for explanation of stations.

growing patches of *Parietaria punctata* Willd. The top, cultivated with vineyards until the 1960s, is now covered by an impenetrable growth of *Arundo donax*, carpeted with a dense undergrowth of Gramineae. In some openings, shadowed by sparse young specimens of *Metrosideros* and *Myrica faya* (Aitt), a matt of fine *Selaginella* sp. covers the ground. On top of the vertical cliffs, *Festuca petraea* marks the southern and western boundaries of the vegetative cover; a thick patch of waist-high

Urtica dubia Forsk. covers the area from the outside opening of "gola do Inglês" northward. The northern slope, where the steep cliff is protected from strong wave action, shows a remnant of the original vegetation, with *Erica scoparia* ssp. *azorica* and *Myrica faya* dominating.

A more elaborate description of "Ilhéu de Vila Franca do Campo" was given in Martins (1978), where the halophile ellobiids of the islet were dealt with in detail.

The present list gives an account of the terrestrial molluscan fauna inhabiting the islet.

MATERIALS

This list is based on material collected throughout "Ilhéu Grande" during various field trips from 1971-1976 and on "Ilhéu Pequenino" in 1976 (see Table 1). More recently (1994) an attempt was made to document the distribution of the terrestrial mol-luscs on the islet; five stations on "Ilhéu Grande" and one on "Ilhéu Pequenino" were selected, as follows (see Fig. 1; Table 2):

- Sta.1. Ilhéu Grande, southwestern slope of amphitheater; sparse undergrowth and dead leaves of *Metrosideros tomentosa*
- Sta.2. Top of Ilhéu Grande; old vineyard with dense *Arundo donax*; openings covered by *Selaginella* sp. and shadowed by *Myrica faya*, *Pittosporum undulatum* Vent and young *Metrosideros tomentosa*.
- Sta.3. Near top of Ilhéu Grande; *Arundo donax*, *Foeniculum vulgare* Mill, *Parietaria punctata* Willd and Gramineae.
- Sta.4. Ilhéu Grande, north slope, under Gramineae and *Rubus ulmifolius* Schott in a thicket of *Erica scopparia* ssp. *azorica*, *Myrica faya* and *Pittosporum undulatum*; patches of *Phormium tenax* Forst.
- Sta.5. Ilhéu Grande, northwestern slope of amphitheater, under a patch of *Parietaria punctata* amidst *Arundo donax*; *Agave americana* L.
- Sta.6. Ilhéu Pequenino, near the house, under a patch of *Daucus carotta* L. and underneath *Plantago coronopus* L. and *Juncus acutus* L.

The systematic treatment here adopted follows that of Backhuys (1975) which, with Kerney & Cameron (1979), served as basis for species identification. The Helicoidea were updated according to Shileyko (1991). No stand is taken on the familial relationships of *Cochlicella barbara*, questioned by Shileyko (1991); Nordsieck (1987) was followed for that matter.

REMARKS

The presence of 21 species of terrestrial stylommatophorans on Ilhéu de Vila Franca do Campo can be attributed to its close proximity to the island of São Miguel and to the strong human influence it has suffered since the 1500s. The latter factor is of paramount importance, since only 3 of the 21 species reported are Azorean endemics. Notwithstanding the recorded species richness and the overwhelming percentage of introduced taxa, the absence of the ubiquitous *Helix asper-*

TABLE 1. Species and specimens collected during the various field trips. *, only on Ilhéu Pequenino.

Species	Field trips				
	28-XII-71	20-II-72	4-IX-74	VIII-76	17-VII-76*
Vertigo pygmaea	1	-	-	-	-
Lauria fuscidula	33	13	5	22	1
Lauria fasciolata	75	31	85	90	7
Lauria anconostoma	15	10	30	48	-
Vallonia pulchella	8	-	4	1	9
Toltecia pusilla	4	-	-	-	3
Discus rotundatus	11	-	10	38	3
Vitrea contracta	6	10	-	-	-
Oxychilus draparnaudi	11	-	-	48	-
Oxychilus cf. *alliarius*	4	1	-	-	-
Lehmania valentiana	-	-	-	1	-
Milax gagates	2	-	-	-	-
Euconulus fulvus	1	-	-	2	-
Cecilioides acicula	-	-	3	-	4
Testacella maugei	2	-	-	1	-
Caracollina lenticula	3	-	15	-	2
Microxeromagna armillata	66	9	16	17	-
Cochlicella barbara	30	2	10	-	-

TABLE 2. Species and specimens collected in the various stations (Sta.1-Sta.6) during the field trip of 29-III-1994. (See text for explanation of stations).

Species	Stations					
	Sta.1	Sta.2	Sta.3	Sta.4	Sta.5	Sta.6
Lauria fuscidula	2	25	-	36	1	-
Lauria fasciolata	44	75	7	110	6	1
Lauria anconostoma	-	-	2	5	12	1
Vallonia pulchella	-	-	-	-	15	-
Punctum azoricum	-	55	-	4	-	5
Toltecia pusilla	-	45	-	2	-	-
Discus rotundatus	19	31	3	-	1	-
Vitrea contracta	-	-	-	-	-	-
Oxychilus draparnaudi	10	5	3	10	4	-
Lehmania valentiana	5	-	-	-	-	1
Deroceras reticulatum	2	-	-	-	-	-
Deroceras caruanae	1	-	-	-	-	-
Euconulus fulvus	-	6	-	1	-	-
Testacella maugei	-	-	-	1	1	-
Caracollina lenticula	-	-	-	-	-	20
Microxeromagna armillata	18	-	5	3	8	5
Cochlicella barbara	8	-	4	1	2	3

SYSTEMATICS

Class GASTROPODA Cuvier, 1797

Subclass PULMONATA Cuvier, 1817

Order STYLOMMATOPHORA Schmidt, 1855

Family Vertiginidae
Vertigo pygmaea (Draparnaud, 1801) (Fig. 2)

Family Pupillidae
Leiostyla fuscidula (Morelet, 1860) (Fig. 3)
Lauria fasciolata (Morelet, 1860) (Figs. 4-6)
Lauria anconostoma (Lowe, 1831) (Fig. 7)

Family Valloniidae
Vallonia pulchella (Müller, 1774) (Fig. 8)

Family Endodontidae
Punctum azoricum de Winter 1988 (Fig. 9)
Toltecia pusilla (Lowe, 1831) (Fig. 10)
Discus rotundatus (Müller, 1774) (Fig. 11)

Family Zonitidae
Vitrea contracta (Westerlund, 1871) (Fig. 12)
Oxychilus (Oxychilus) draparnaudi (Beck, 1837) (Fig. 13)
Oxychilus(Ortizius) cf. *alliarius* (Miller, 1822) (Fig. 14)

Family Milacidae
Milax gagates (Draparnaud, 1805

Family Limacidae
Lehmania valentiana (Férussac, 1823)
Deroceras reticulatum (Müller, 1774)
Deroceras caruanae (Pollonera, 1891)

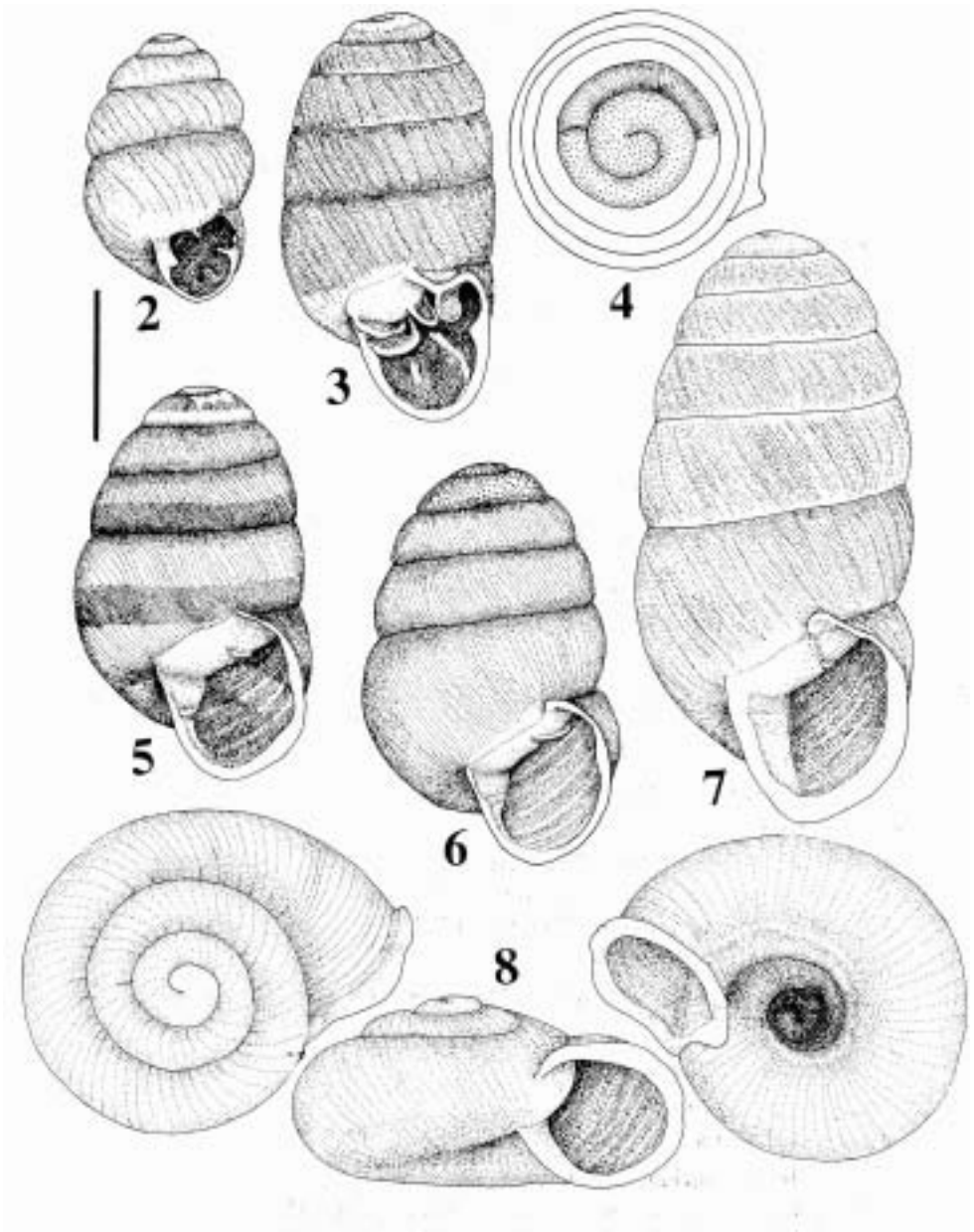
Family Euconulidae
Euconulus fulvus (Müller, 1774) (Fig. 15)

Family Ferussaciidae
Cecilioides acicula (Müller, 1774 (Fig. 16)

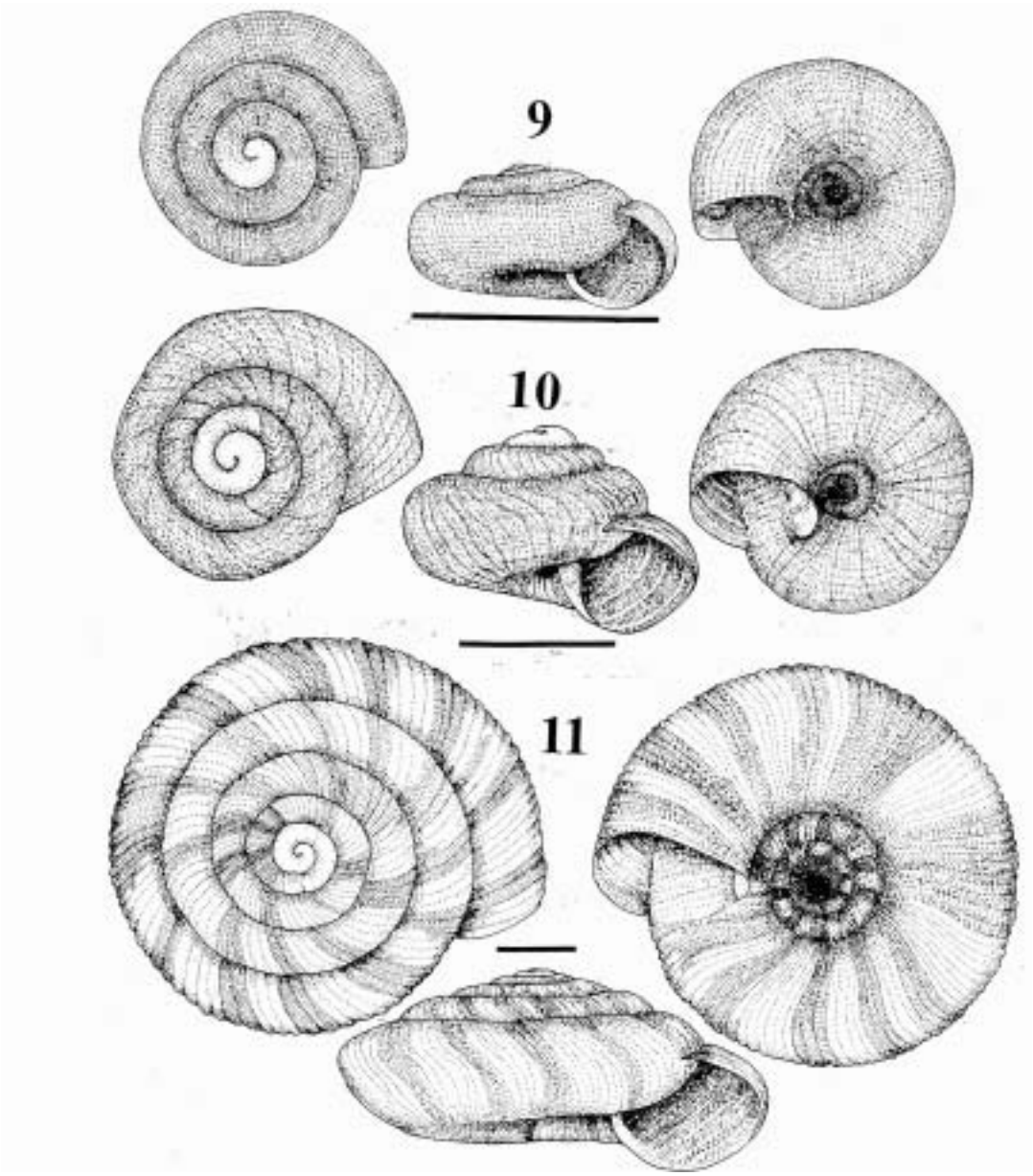
Family Testacellidae
Testacella maugei Férussac, 1819 (Fig. 17)

Family Helicodontidae Kobelt, 1904
Caracollina lenticula (Férussac, 1822) (Fig. 18)

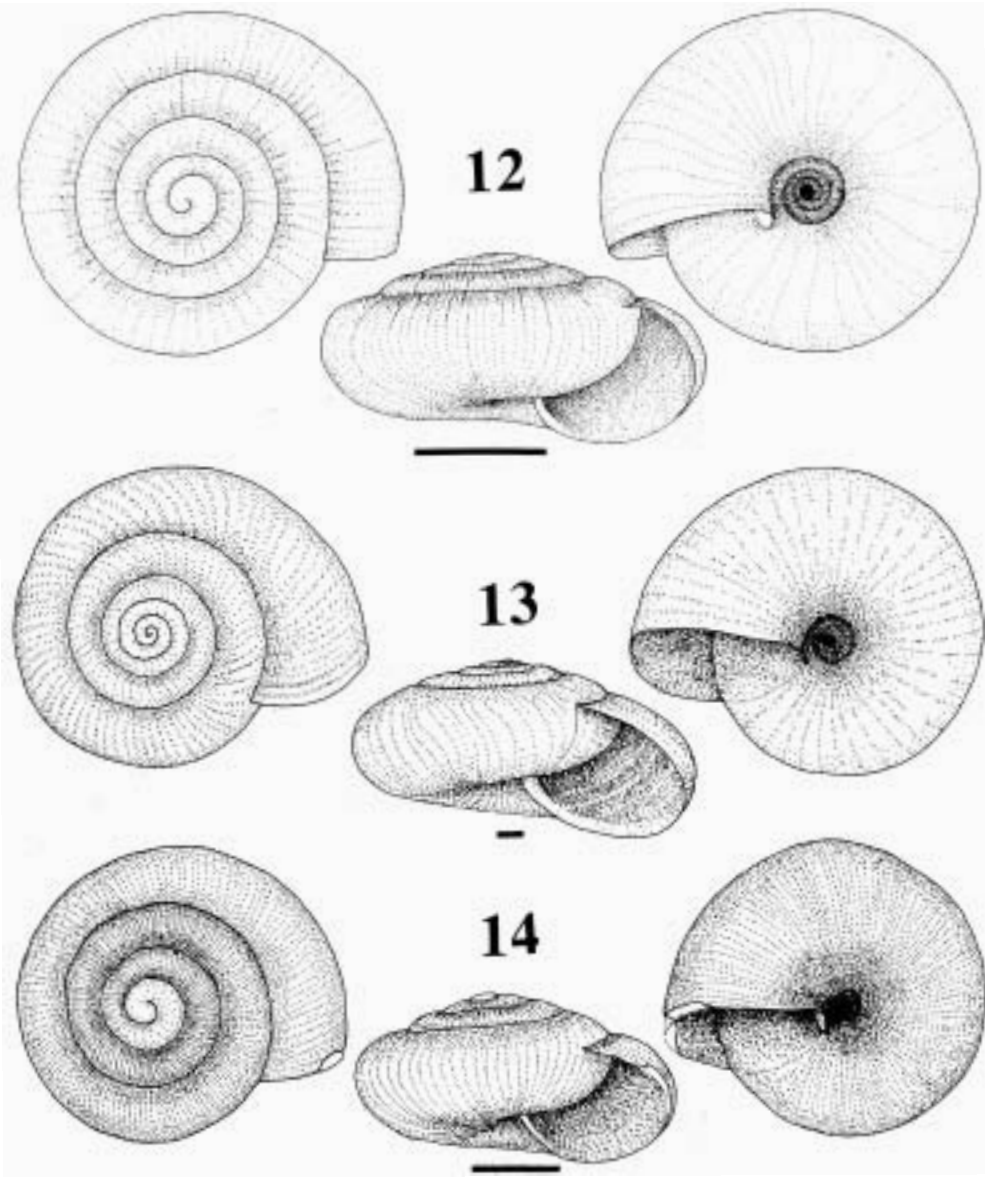
Family Hygromiidae Tryon, 1866
Microxeromagna armillata (Lowe, 1852) (Figs. 19-20)
Cochlicella barbara (Linnaeus, 1758) (Fig. 21)



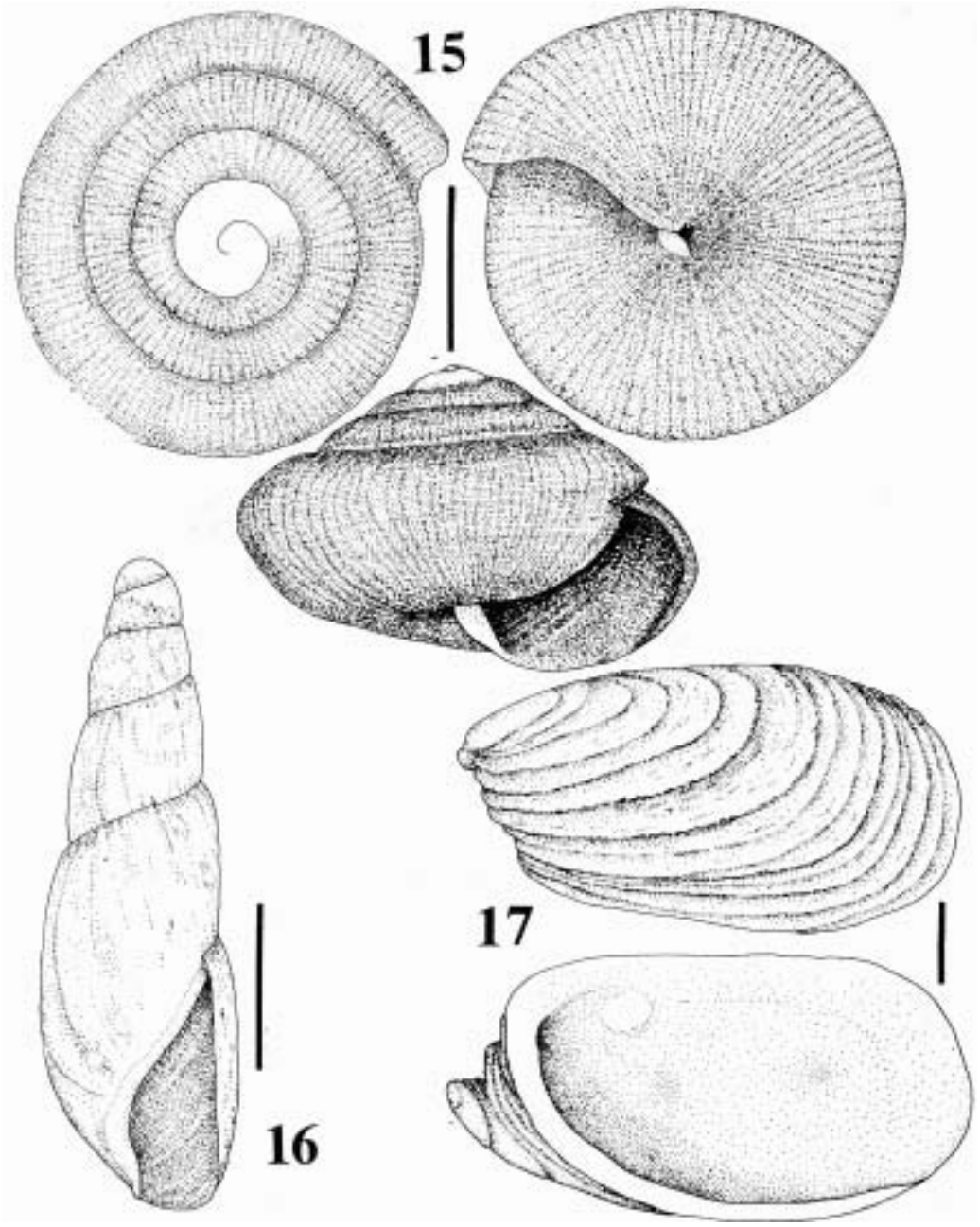
FIGS. 2-8. 2, *Vertigo pygmaea* (28-XII-71.). 3, *Leiostyla fuscidula* (VIII-76). 4-6, *Lauria fasciolata* (Sta. 1). 7, *Lauria anconostoma* (Sta. 5). 8, *Vallonia pulchella* (4-IX-74). Scale bar = 1 mm.



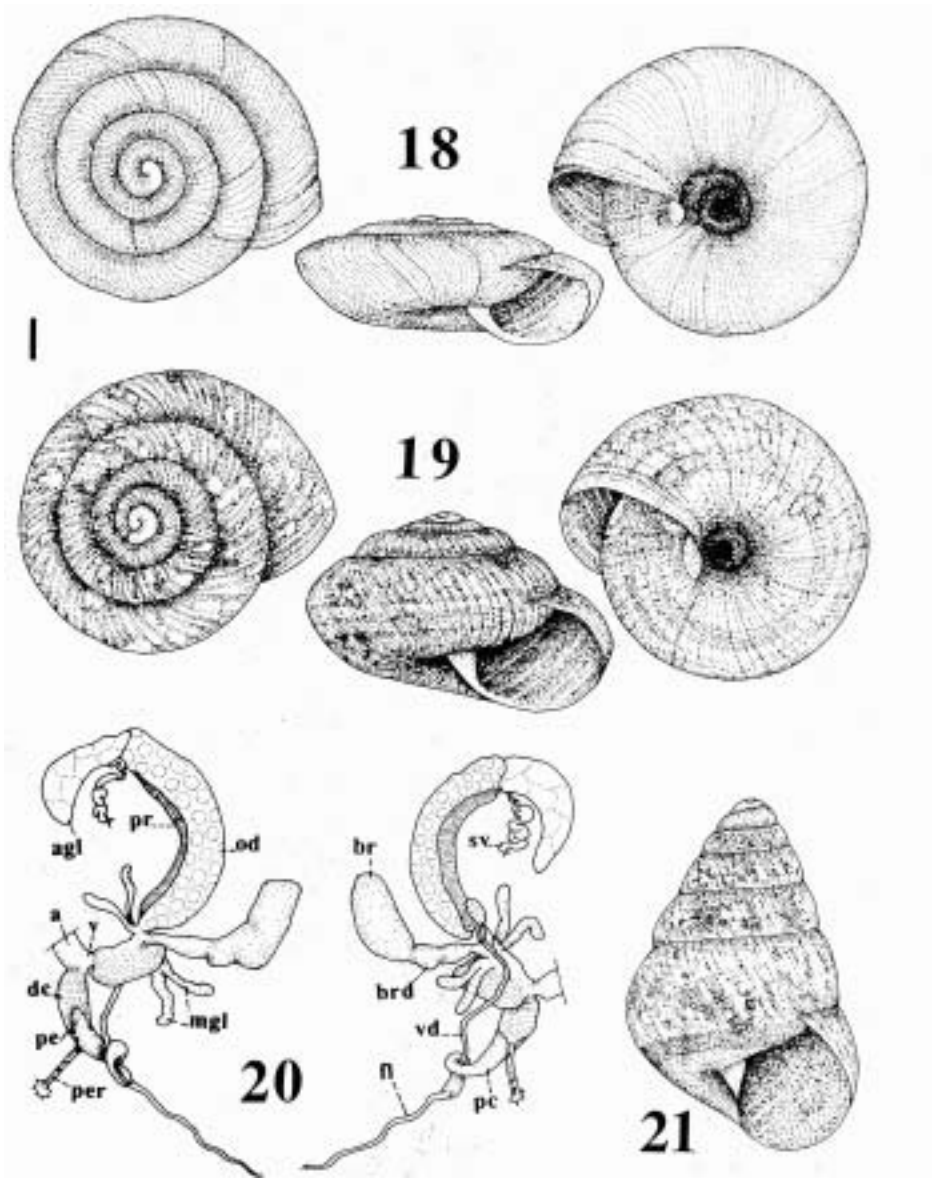
FIGS. 9-11. 9, *Punctum azoricum* (Sta. 2). 10, *Toltecia pusilla* (28-XII-71). 11, *Discus rotundatus* (28-XII-71). Scale bars = 1 mm.



FIGS. 12-14. 12, *Vitrea contracta* (20-II-72). 13, *Oxychilus (Oxychilus) draparnaudi* (Sta 4). 14, *Oxychilus (Ortizius)* cf. *alliarius* (Sta. 4). Scale bars = 1 mm.



FIGS. 15-17. 15, *Euconulus fulvus* (28-XII-71). 16, *Cecilioides acicula* (4-IX-74). 17, *Testacella maugei* (28-XII-71). Scale bars = 1 mm.



FIGS. 18-21. 18, *Caracollina lenticula* (Sta. 6). 19-20. *Microxeromagna armillata* (28-XII-71); 20, reproductive system. 21, *Cochlicella barbara* (28-XII-71). a, atrium; agl, albumen gland; br, bursa; brd, bursa duct; dc, distal chamber; fl, flagellum; mgl, mucus glands; od, oviduct; pc, proximal chamber; pe, penial papilla; per, penial retractor; pr, prostate; sv, seminal vesicle; v, vagina; vd, vas deferens. Scale bar = 1 mm.

sa (Müller, 1774) is surprising.

The rocky nature of the Ilhéu, the small depth of soil that crowns it and its continuous exposure to the heat of the sun and to the salt of the sea create a xeric environment. Most species living therein are the same that can be encountered throughout the Azorean coastline, such as *Vertigo pygmaea*, *Lauria fasciolata*, *L. anconostoma*, *Vallonia pulchella*, *Caracollina lenticula*, *Microxeromagna armillata* and *Cochlicella barbara*. However, the profuse vegetation coverage, mostly the presence of arboreal and subarboreal species, creates conditions for the establishment of taxa that dwell in more humid areas of inland forests; such are *Leiostyla fuscidula*, *Punctum azoricum*, *Discus rotundatus* and *Euconulus fulvus*, to which could be added the Zonitidae and the slugs; this fact is particularly apparent on Sta.2. Nevertheless, these species occupy a wide range of habitats throughout the island, a sign of their strong adaptive capacity.

The relative scarcity of taxa on Ilhéu Pequenino may be explained by its much smaller area and less diverse vegetation cover. In addition, contact between Ilhéu Grande and Ilhéu Pequenino is almost impossible, due to the extension of bare rock connecting both plant communities. Colonization would usually happen independently to both units, and human influence, stronger on the once cultivated Ilhéu Grande, may have played a decisive role on the observed distribution. This conjecture seems to be supported not only by the absence, on Ilhéu Pequenino, of some small (*Toltecia pusilla, Euconulus fulvus*) or common (*Oxychilus draparnaudi*) species, but also by the presence of a population of *Caracollina lenticula*, not represented on Ilhéu Grande; however, this latter fact can also be explained by a recent introduction.

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