

# Digging in the graveyard of synonymy, in search of Portuguese species of *Candidula* Kobelt, 1871 (Mollusca: Gastropoda Pulmonata: Hygromiidae)

E. Gittenberger

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Next to the wide-spread *Candidula gigaxii* (Pfeiffer, 1848) and *C. intersecta* (Poiret, 1801), four endemic *Candidula* species are reported from Portugal and characterized conchologically, viz. *C. belemensis* (Servain, 1880) (provisionally), *C. codia* (Bourguignat, 1859), *C. olisippensis* (Servain, 1880) and *C. setubalensis* (Pfeiffer, 1850). Several nominal taxa are classified in the synonymy of these six species, after topotypes (that might be syntypes) or lectotypes.

E.Gittenberger, Nationaal Natuurhistorisch Museum, Postbus 9517, NL-2300 RA Leiden, The Netherlands.

## Introduction

While studying hygromiid shells from Portugal, especially those kept in the classical collections of J.R. Bourguignat (Geneva) and A. Locard (Paris), some forgotten species were discovered amidst the many varieties and aberrant specimens that once were provided with names by the prolific splitters of the Nouvelle École (see Dance, 1966: 191). Topotypes of nominal taxa described by G. Servain, found in the collection of J. R. Bourguignat, might in fact be syntypes donated by their author.

It turned out that Nobre (1930, 1941) has synonymized several nominal taxa somewhat too easily, thus burying some valid species. The present paper provides data concerning the six Portuguese species of *Candidula* Kobelt, 1871, some of which were poorly known or had been entirely forgotten. Only *C. gigaxii* (Pfeiffer, 1848) and *C. intersecta* (Poiret, 1801) are wide-spread in western Europe (Kerney & Cameron, 1979). The additional four species are endemic to parts of Portugal. The status of one of these, *C. belemensis* (Servain, 1880), is problematic. *C. olisippensis* (Servain, 1880), validly described nine times but nonetheless forgotten, is brought back on the scene as a very variable but easily identifiable species, if not a species complex. Data on the very characteristic *C. codia* (Bourguignat, 1859) and *C. setubalensis* (Pfeiffer, 1850) are added; these species inhabit very limited ranges, mentioned already in the original descriptions and not to be extended since because of new discoveries.

For collections the following abbreviations are used: MHNG = colln. J.R. Bourguignat, in Muséum d'Histoire Naturelle (Geneva); MNHN = colln. A. Locard, in Muséum National d'Histoire Naturelle (Paris); RMNH = Nationaal Natuurhistorisch Museum (Leiden); SMF = Forschungs-Institut Senckenberg (Frankfurt am Main).

### Systematic review

The nominal taxa listed in the synonymy lists are not all discussed separately. They fall within the range of the known variation of the various species.

#### *Candidula belemensis* (Servain, 1880) (figs. 1-3, 7-9, 33-35, 37)

*Helix belemensis* Servain, 1880: 86 ("Alluvions du Tage, au-dessous de la tour de Belem, près de Lisbonne", Estremadura); ? topotype, MHNG (figs. 33-35).

*Helix absidata* Locard, 1899: 112 ("Lisbonne", Estremadura); lectotype (design. nov.), MNHN (figs. 7-9).

Material.— Algarve: 4 km W of Boliqueime, NB70 (RMNH); 5 km NE of Boliqueime, NB81 (RMNH). Estremadura: Lisboa, MC88 (MNHN); Serra da Arabida, near Setúbal, 400 m alt., NC06 (RMNH).

Notes.— It is very uncertain still whether *C. belemensis* should be considered a separate species next to *C. intersecta*. It is characterized conchologically by (1) a depressed shell, with (2) a relatively wide, somewhat eccentric umbilicus, measuring c.  $\frac{1}{5}$ - $\frac{1}{6}$  of the total shell width, (3) a broad aperture and (4) a more or less obsolete sculpture, resembling that of *C. intersecta* when it is still rather prominent.

Two specimens from near Boliqueime could be dissected. The genitalia (fig. 36) turned out to be most similar to *C. intersecta*, especially in the shape of the dart-sac. However, the flagellum differs from that of NW European *C. intersecta* by being relatively longer, measuring (over) half the length of the epiphallus.

#### *Candidula codia* (Bourguignat, 1859) (figs. 23-26, 37)

*Helix codia* Bourguignat, 1859: 523, pl. 20 figs. 10-13 ("Faro" and "Loulé", Algarve) [separately: 1859: 137, pl. 17 figs. 10-13]; lectotype (design. nov.), from Faro, MHNG (figs. 23, 24).

*Helix codopsis* Servain, 1880: 100 ("Boliqueime", Algarve); topotype, MHNG (figs. 25, 26).

*Candidula codia*; Altimira, 1969: 106, fig. 3 [genitalia].

Material.— Algarve: Faro (type locality), NA99; Loulé, NB81 (Bourguignat, 1859: 523); 4 km W of Boliqueime, NB70 (RMNH); 5 km NE of Boliqueime, NB81 (RMNH); Estói, NB90 (RMNH); 11.5 km SW of Tavira, PB10 (RMNH).

Shell.— Shell relatively large, more or less depressed globular with a domed spire. With  $5\frac{1}{4}$ -6 whorls; the initial ones flattened and separated by a hardly or not indented suture. Sculptured with (very) prominent, more or less regularly arranged ribs; without hair-pits or conspicuous spiral striae. Umbilicus roundish, measuring  $\frac{1}{6}$ - $\frac{1}{8}$  of the total shell width. Body whorl abruptly descending in front. Aperture roundish to clearly oval, with a prominent, white apertural rib; apertural lip slightly reflected at the columellar and the adjoining basal side.

Shell whitish, with a very variable, more or less complicated pattern of light to dark corneous blotches or (interrupted) spiral bands; forms with a white band around the periphery and broad brown bands above and below are also known. The prominent ribs may be accentuated by being whitish.

Width 10.2-12.1 mm; height 6.3-8.3 mm.

Notes.— Altimira (1969: 106) has re-established *Candidula codia* as a species and published an illustration of its *Candidula*-type genitalia. Conchologically the species can be easily recognized by (1) its large size, (2) the domed spire, with flattened whorls, and (3) the coarse sculpture. *Helix codopsis* refers to strongly depressed specimens with widely spaced ribs (fig. 25) from Boliqueime, where the present author found shells more closely resembling the lectotype as well.

***Candidula gigaxii* (Pfeiffer, 1848)**  
(figs. 4-6)

*Helix gigaxii* Pfeiffer, 1848: 167 ("Arles Galliae", "Highbycombe Bueks [= High Wycombe, Bucks = Buckinghamshire] Britanniae"); 1850: 85.

*Helix xenilica* Servain, 1880: 81 ("alluvions du Xénil, à Grenade, et du Guadalquivir à Séville", Spain); topotype (from "Grenade et Séville"), MHNG (10.5 × 5.7 mm).

*Helix hispalina* Servain, 1880: 90 ("alluvions du Guadalquivir près de Séville", Sevilla, Spain); topotype, MHNG (6.3 × 3.8 mm).

*Helix andalusica* Kobelt, 1882: 70 ("Algesiras", Cádiz, Spain); lectotype (design. nov.), SMF 10106a (13.2 × 7.1 mm). Kobelt, 1888: 22, pl. 97 fig. 540.

*Helix limatula* Locard, 1899: 103 ("Lisbonne", Estremadura); lectotype (design. nov.), MNHN (figs. 4-6).

*Helicella* (*Candidula*) *andalucica* [sic]; Ortiz de Zárate, 1950: 24.

*Candidula gigaxii*; Kerney & Cameron, 1979: 160, 177, pl. 15 fig. 2.

Notes.— This species can be recognized conchologically by (1) its very regularly spaced, fine ribs, (2) the shape of the umbilicus, which is more than proportionally enlarged by the final quarter of the body whorl, and (3) a weakly developed microsculpture of spiral striae, without hair-pits.

***Candidula intersecta* (Poiret, 1801)**  
(figs. 27-30, 37)

*Helix intersecta* Poiret, 1801: 80, 81 ("Département de l'Aisne et aux environs de Paris", France).

*Helix scabiosula* Locard, 1899: 87 ("Estoy" [= Estói], Algarve); lectotype (design. nov.), MNHN (fig. 28).

*Helix expedenta* Locard, 1899: 113 ("Lisbonne", Estremadura); lectotype (design. nov.), MNHN (fig. 27).

*Helix imula* Locard, 1899: 113 ("Lisbonne", Estremadura); lectotype (design. nov.), MNHN (figs. 29, 30).

*Candidula intersecta*; Kerney & Cameron, 1979: 160, 177, pl. 15 fig. 1.

Notes.— *C. intersecta* is most frequently confused with *C. gigaxii*. It differs from that species by (1) the coarser and somewhat less regularly arranged ribs and (2) its more roundish umbilicus. See further with *C. belemensis*.

***Candidula olisippensis* (Servain, 1880)**  
(figs. 10-22, 31, 32, 37)

*Helix olisippensis* Servain, 1880: 93 ("Lisbonne", Estremadura); topotype, MHNG (figs. 10-12).

*Helix strucki* Von Maltzan, 1886: 26 ("Almadena et St. Vincent, Algarve"; locus typicus, restr. nov.: Cabo de São Vicente, Algarve).

*Helix defectiva* Locard, 1899: 85 ("Coimbra", Beira Litoral); lectotype (design. nov.), MNHN (width 8.3 mm, height 5.8 mm).

*Helix micida* Locard, 1899: 86 ("Faro", Algarve); lectotype (design. nov.), MNHN (figs. 17, 18).

*Helix portionalis* Locard, 1899: 88 ("Lisbonne", Estremadura); lectotype (design. nov.), MNHN (fig. 21).

*Helix callisona* Locard, 1899: 93 ("Estoy" [= Estói], Algarve); lectotype (design. nov.), MNHN (fig. 19).

*Helix putilla* Locard, 1899: 97 ("Lisbonne", Estremadura); lectotype (design. nov.), MNHN (fig. 20).

*Helix ofellata* Locard, 1899: 98 ("Sernache" [do Bom Jardim], Beira Baixa); lectotype (design. nov.), MNHN (figs. 1-3).

*Helix protumida* Locard, 1899: 99 ("Faro", Algarve); lectotype (design. nov.), MNHN (fig. 22).

Material.— Algarve: Cabo de São Vicente Sagres, NA09 (RMNH). Faro, NA99 (MNHN); Estói, NB90 (MNHN). Beira Baixa: Sernache do Bom Jardim, NE60 (RMNH). Beira Litoral: Coimbra, NE45 (MNHN). Douro Litoral: Praia da Granja, NF34 (RMNH); Porto, NF35 (RMNH). Estremadura: Lisboa, MC88 (MNHN).

Shell.— Shell very variable in general shape, relatively thin-walled, with a rounded to slightly angular periphery. With  $4\frac{1}{2}$ -6 flattened whorls, separated by an indented suture. Radial sculpture not very prominent; microsculptural of spiral striae clearly discernible. The roundish umbilicus is very narrow, measuring  $\frac{1}{7}$ - $\frac{1}{10}$  of the shell width. Aperture broader than high, with a very faint to prominent rib inside, broadly interrupted by the penultimate whorl. Colour pattern very variable, more or less clearly spirally arranged; often with a narrow corneous band just above the periphery, rarely a whitish peripheral band accompanied by broad brown bands above and below it. The bands may be interrupted into rows of blotches.

Width 5.8-9.5 mm; height 3.8-5.8 mm.

Notes.— Several nominal taxa based on material from Portugal apply to relatively small and fragile shells that are characterized by a very narrow, roundish umbilicus and a prominent microsculpture of spiral striae. In general shape the various shells are strikingly variable. However, because very small samples are involved, it remains unclear whether this concerns extreme forms of a single species (maybe selected by the authors) or a species complex. For the moment being, the former alternative is accepted by the present author. From one locality only (along the road between Cabo de São Vicente and Sagres) more than 20 shells are available for study; they agree perfectly well with the description of *Helix strucki* by Von Maltzan (1886), and vary in general shape between the forms represented in fig. 10 and fig. 31. Figs. 10, 20 and 21 represent specimens from "Lisboa", whereas figs. 13 and 16 show shells from "Sernache"; at these two localities, maybe in different populations, the shells are quite variable. Detailed data concerning the structure of the genitalia are not available, and therefore, the present interpretation of *C. olisippensis* is proposed with all reservation, pending further research. A dried and secondarily softened specimen in poor condition, from Sernache do Bom Jardim, was studied anatomically; this only enabled the generic assignment of the species.

This (complex of) species is apparently endemic to Portugal. It is surprising that only a single recently collected large sample is available for study.

### *Candidula setubalensis* (Pfeiffer, 1850)

*Helix setubalensis* Pfeiffer, 1850: 88 ("Setubal", Estremadura). Nobre, 1930: 89; 1941: 98.

*Candidula setubalensis*; Gittenberger, 1985: 61.

Notes.— This species is easily recognizable conchologically, because it is the only *Candidula* species of the Iberian peninsula with a sharp peripheral keel. It is known from near Setúbal only. Outside Portugal hygromiid species with similarly keeled shells occur. Those species belong to other genera, however.

See Gittenberger (1985) for additional notes on *C. setubalensis*.

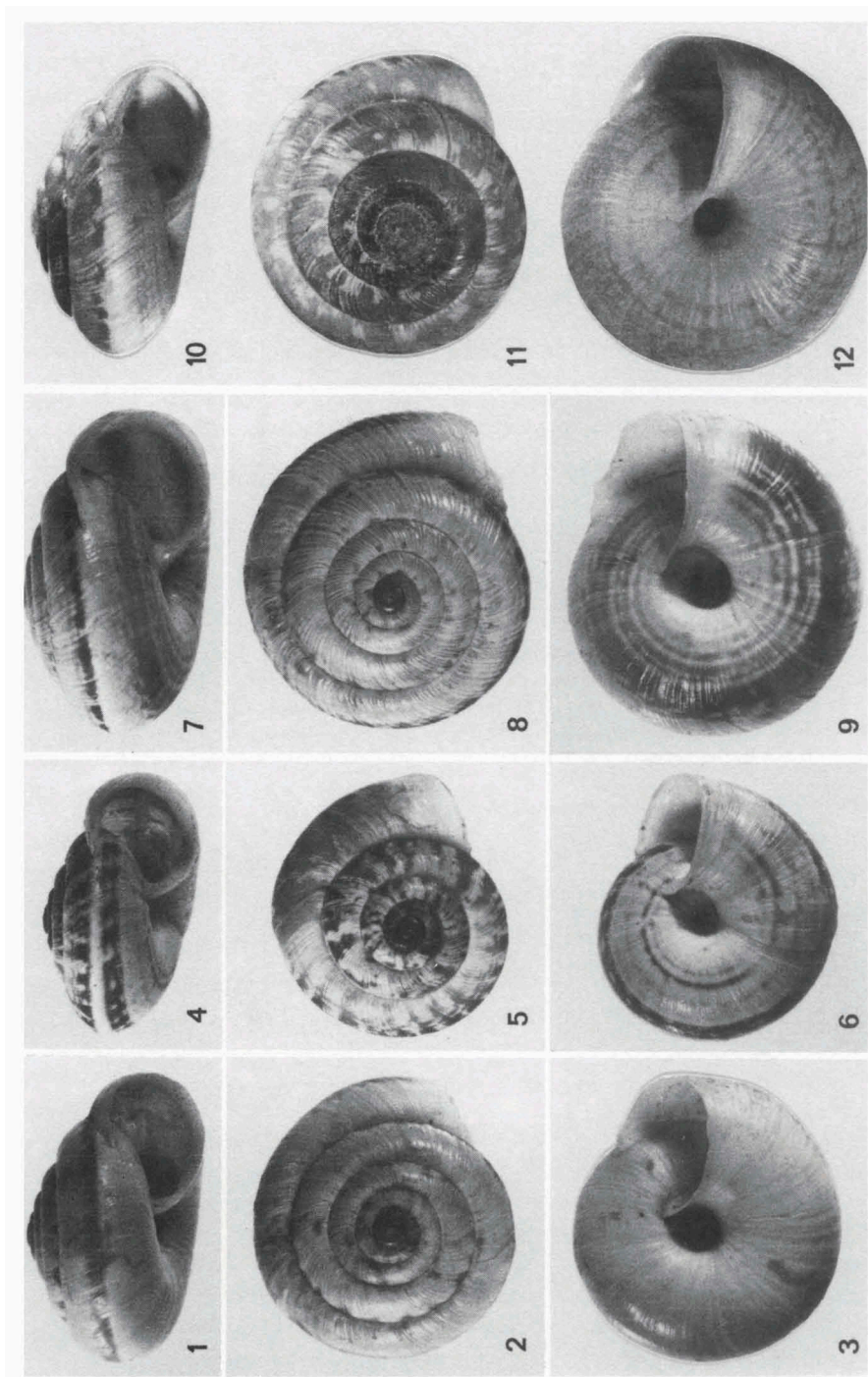
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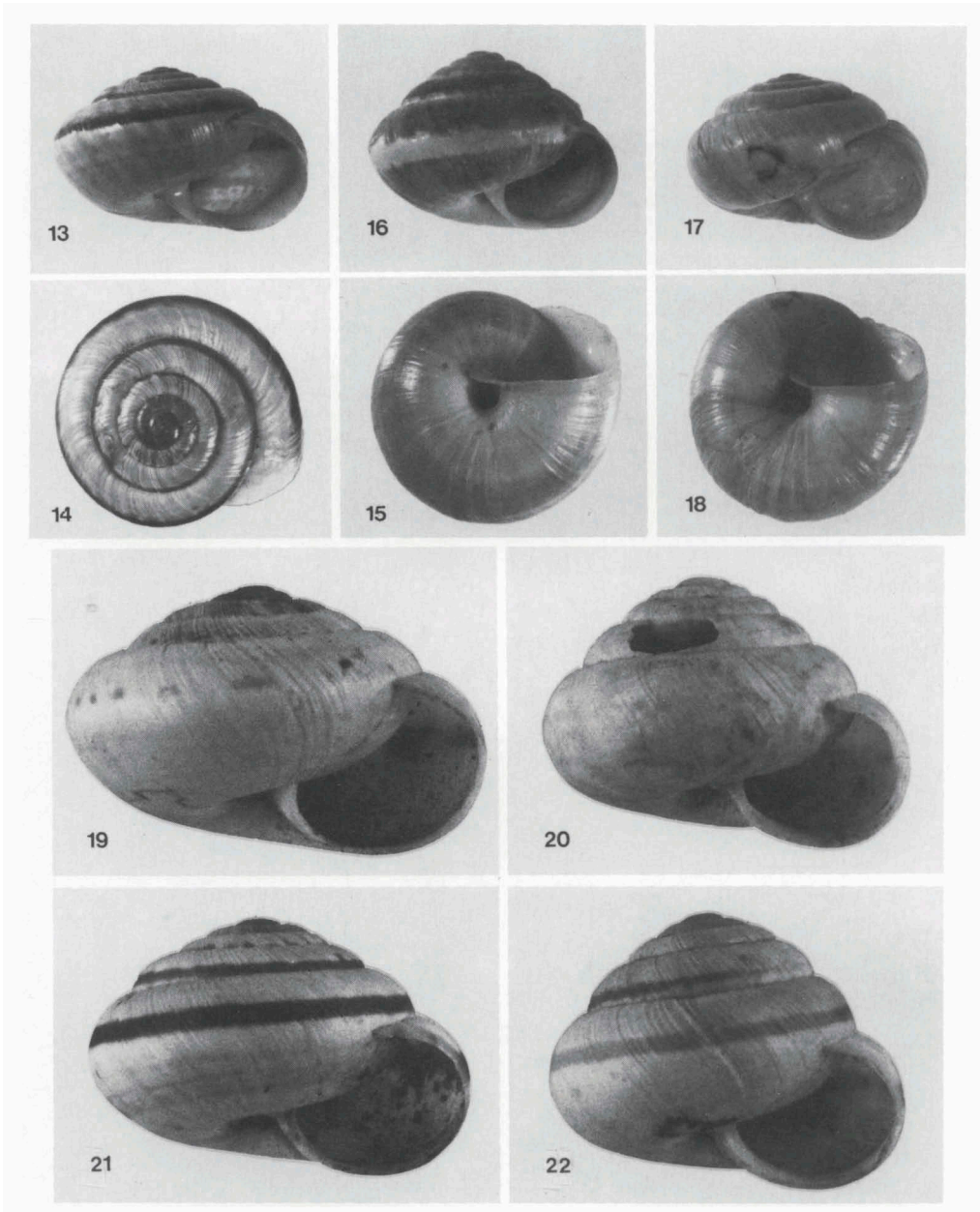
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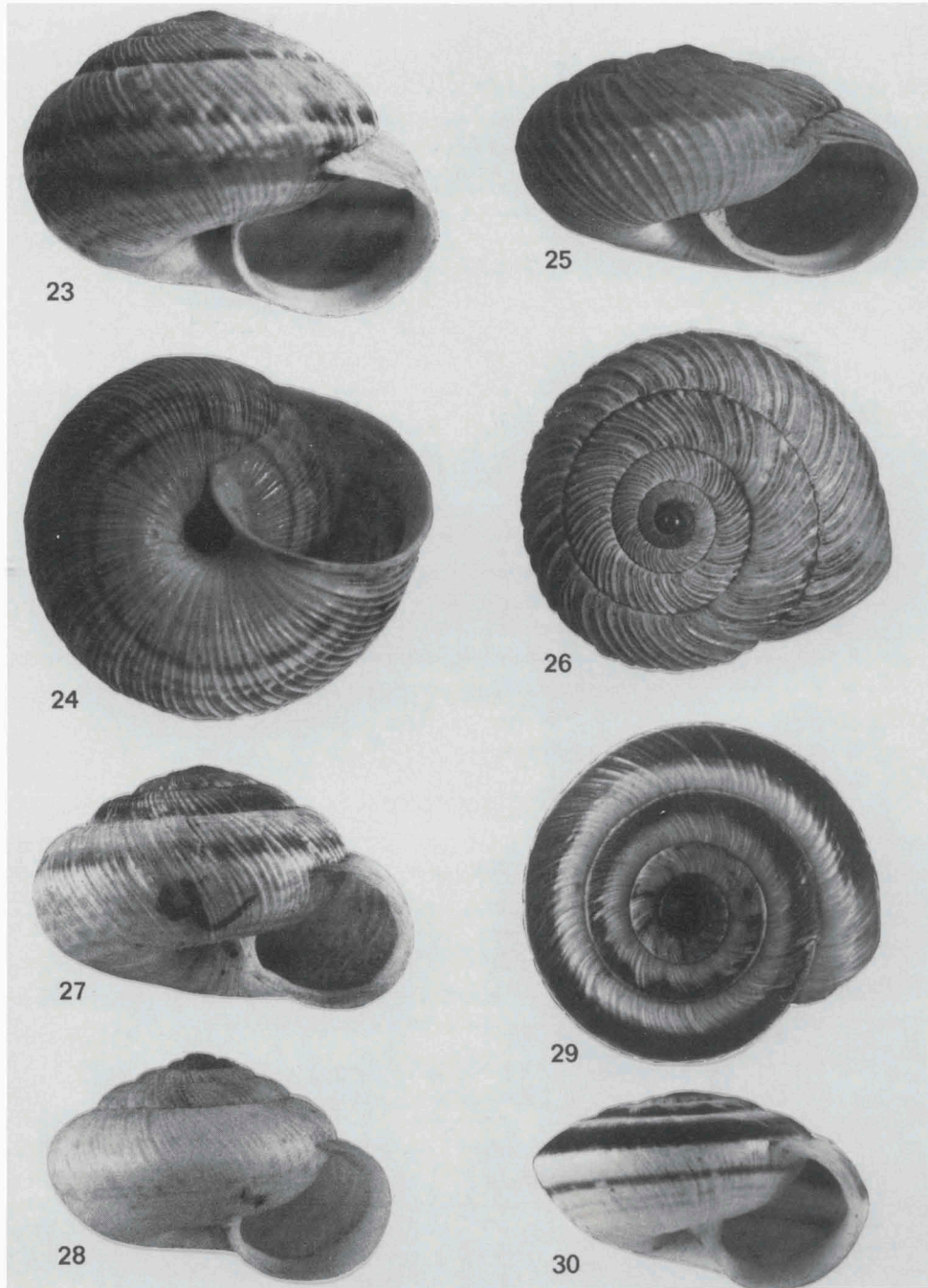
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Figs. 1-12. *Candidula* spec. 1-3, *C. belemensis* (Servain). 1-3, paralectotype of *Helix absidata*, "Lisbonne" (MNHN), actual width 8.5 mm; 7-9, idem, lectotype, actual width 9.6 mm. 4-6, *C. gégarii* (Pfeiffer), lectotype of *Helix limatula*, "Lisbonne" (MNHN), actual width 7.9 mm. 10-12, *C. olisippensis* (Servain), topotype, "Lisbonne" (MHNG), actual width 8.6 mm.

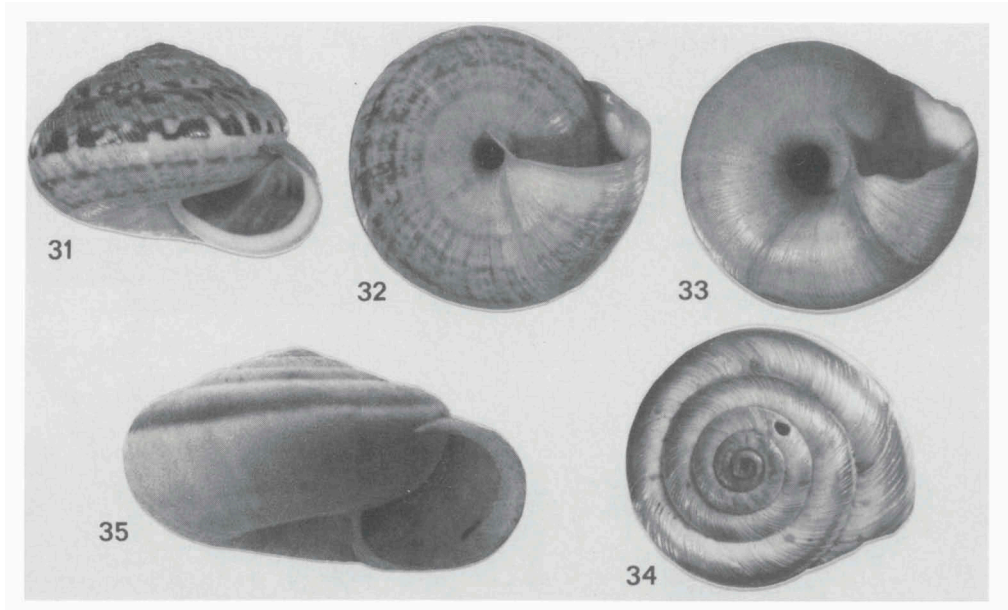


Figs. 13-22. *Candidula olisippensis* (Servain). 13-15, lectotype of *Helix ofellata*, "Sernache" (MNHN), actual width 7.8 mm; 16, unnamed specimen, "Sernache" (MNHN), actual width 6.0 mm; 17, 18, lectotype of *Helix micida*, "Faro" (MNHN), actual width 7.4 mm; 19, lectotype of *Helix callisona*, "Estoy" (MNHN), actual width 7.8 mm; 20, lectotype of *Helix putilla*, "Lisbonne" (MNHN), actual width 7.3 mm; 21, lectotype of *Helix portionalis*, "Lisbonne" (MNHN), actual width 7.0 mm; 22, lectotype of *Helix protumida*, "Faro" (MNHN), actual width 6.7 mm.



Figs. 23-30. *Candidula* spec. 23-26, *C. codia* (Bourguignat). 23, 24, lectotype, "Faro" (MHNG), actual width 11.4 mm; 25, 26, topotype of *Helix codopsis*, "Boliqeime" (MHNG), actual width 11.9 mm. 27-30, *C. intersecta* (Poiret). 27, lectotype of *Helix expedenta*, "Lisbonne" (MNHN), actual width 8.9 mm; 28, lectotype of *Helix scabiosa*, "Estoy" (MNHN), actual width 6.9 mm; 29, 30, lectotype of *Helix imula*, "Lisbonne" (MNHN), actual width 7.7 mm.





Figs. 31-35. *Candidula* spec. 31, 32, *C. olisippensis* (Servain), topotype of *Helix strucki*, Cabo de São Vicente – Sagres (RMNH), actual width 8.7 mm; 33-35, *C. belemensis* (Servain), ? topotype, "Lisbonne" (MHNG), actual width 8.7 mm.

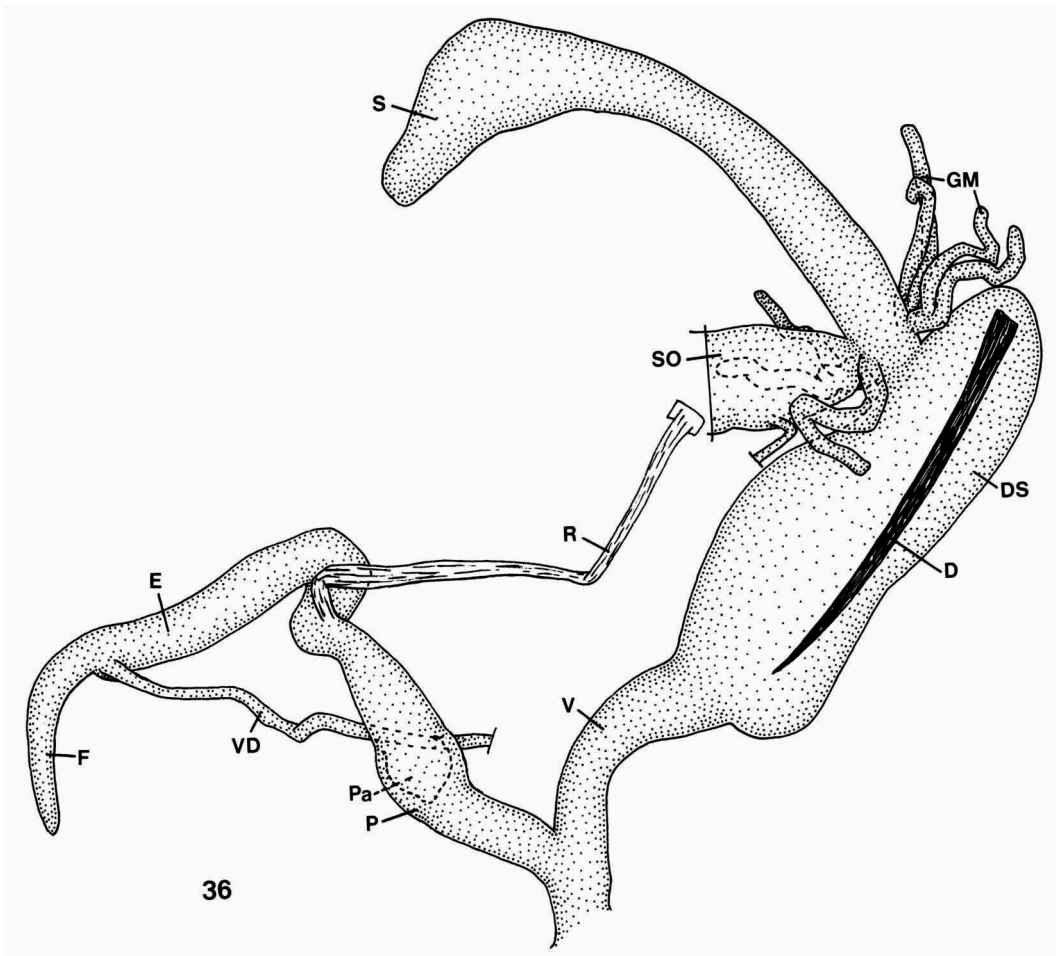


Fig. 36. *Candidula belemensis* (Servain), proximal genitalia. Abbreviations: D = dart; DS = dart-sac; E = epiphallus; F = flagellum; GM = glandulae mucosae; P = penis; Pa = penial papilla; R = penial retractor muscle; S = spermatheca; SO = spermoviduct; V = vagina; VD = vas deferens.

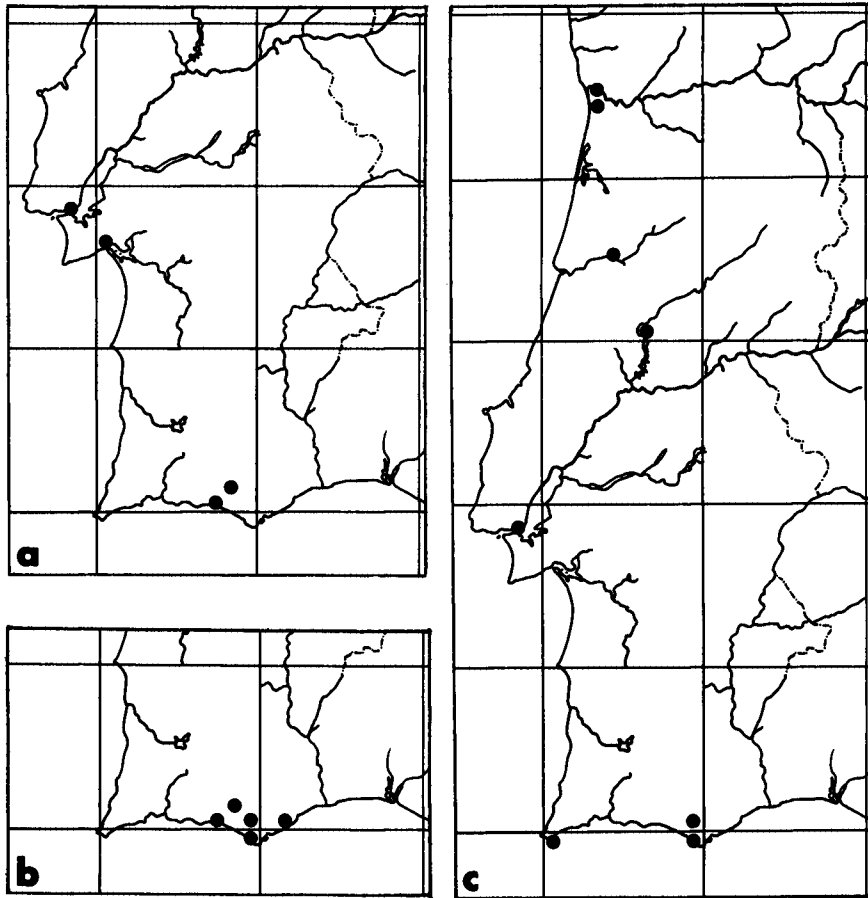


Fig. 37a-c. UTM-map with records of (a) *Candidula belemensis* (Servain), (b) *C. codia* (Bourguignat), and (c) *C. olisippensis* (Servain).