

**Central Tyrrhenian sea Mollusca: XI.
Description of *Callostracon tyrrhenicum* sp. nov.
(Gastropoda, Acteonidae) and remarks on the other Mediterranean
species of the family Acteonidae d'Orbigny, 1835**

Carlo SMRIGLIO

Via di Valle Aurelia 134, I-00167 Rome, Italy

& Paolo MARIOTTINI

Dipartimento di Biologia, Terza Università degli Studi di Roma, Via Ostiense 173, I-00154 Rome, Italy

A new acteonid species, collected in the Central Tyrrhenian Sea, is here described. It is placed in *Callostracon* Hamlin, 1884, and named *C. tyrrhenicum*. The description is based on shell morphology only. Remarks on the four bathyal and the three infralittoral species of the family Acteonidae known from the Mediterranean Sea, are also featured.

Key-words: Gastropoda, Opisthobranchia, Acteonidae, *Callostracon*, taxonomy, bathyal fauna, Central Tyrrhenian Sea, Italy.

INTRODUCTION

In the framework of an investigation carried out over the past decade, we continue to characterize the bathyal faunal assemblages from the Central Tyrrhenian Sea, off the Latial coast (Italy) (Smriglio et al., 1987, 1990, 1992, 1993). In particular, we are interested in the molluscan fauna occurring in the deep-sea coral (biocoenose des coraux blancs, CB) and muddy-bathyal (biocoenose des vases bathyales, VB) communities (Pérès & Picard, 1964) of this area. In this paper we describe a new species of acteonid, *Callostracon tyrrhenicum*, from material dredged in a deep-sea coral bank off the Latial coast. Among the molluscan fauna associated with *C. tyrrhenicum*, we have identified four bathyal acteonids, which we think worth reporting: *Acteon monterosatoi* Dautzenberg, 1889, *Crenilabium exile* (Jeffreys, 1870, ex Forbes ms.), *Japonacteon pusillus* (McGillivray, 1843), and *Liocarenus globulinus* (Forbes, 1844). In order to present a comprehensive picture of all the Mediterranean species of this family, we give some data on the remaining three infralittoral acteonids: *Acteon tornatilis* (Linné, 1758), *Pupa candidula* (Monterosato, 1923) and *Bullinopersilia sphaeroides* F. Nordsieck, 1972.

MATERIAL

The new taxon and the four bathyal acteonids reported have been identified from an analysis of about 90 kg of marine sediment dredged at a depth of 360-600 m from the Central Tyrrhenian Sea (coast of Latium, 41°51'N 11°28'E, 41°24'N 12°3'E). Unless stated otherwise, all specimens are stored in the authors' collections. The type material

of *P. candidula* belonging to the Monterosato collection deposited in the Museo Civico di Zoologia di Roma (MCZR) has been studied. A specimen of *Acteon tornatilis luteofasciatus* (Mühlfeldt, 1829) belonging to the private collection of Dr. C. Ciommei (Rome) has been examined.

THE NEW TAXON

Callostracon tyrrhenicum sp. nov. (figs. 1a-6)

General description of the shell. — Shell small, ovate-conical, cylindrical with the upper part slender (figs. 1a-b, 2b-5). Protoconch heterostrophic, submerged and semi-globose, consisting of a larval shell with non-planktotrophic development of about one and a half external whorl (fig. 1c). There are five convex teleoconch whorls, showing a microsculpture consisting of spiral striae. Strong magnification reveals that these striae are indeed shallow ovoid depressions, chain-like, close to each other and equidistant (fig. 1d). The suture is well impressed. Peristome straight and sub-romboid, narrower in the upper part. Columella straight with a little fold in the middle; outer lip crenulated. The aperture measures about 0.5 of the total height. Colour whitish hyaline. Operculum and soft parts unknown.

Derivatio nominis. — The specific name *tyrrhenicum* refers to the area of the Mediterranean where the type material has been collected.

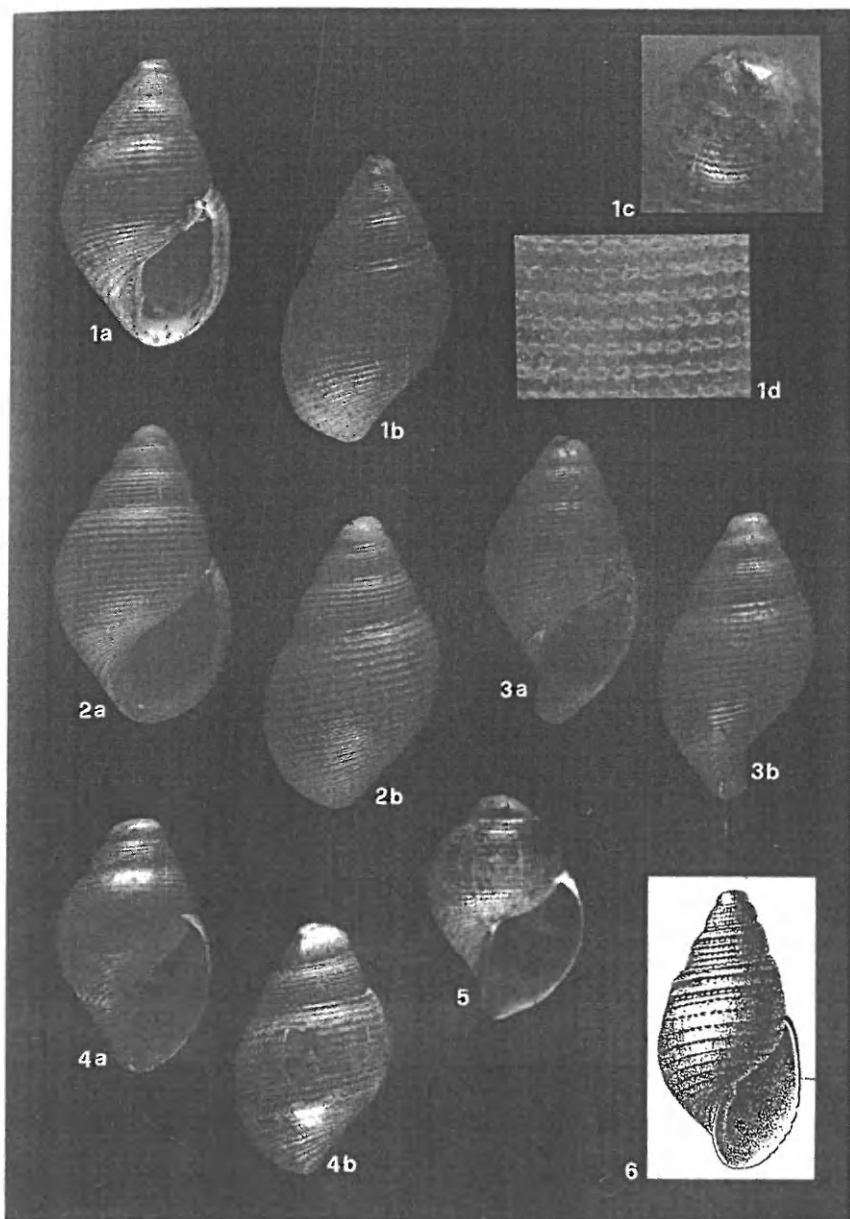
Locus typicus. — Central Tyrrhenian Sea off the Latial coast (41°41'N11°28'E).

Habitat. — Biocoenosis CB (biocoenose des coraux blancs; Pérès & Picard, 1964)

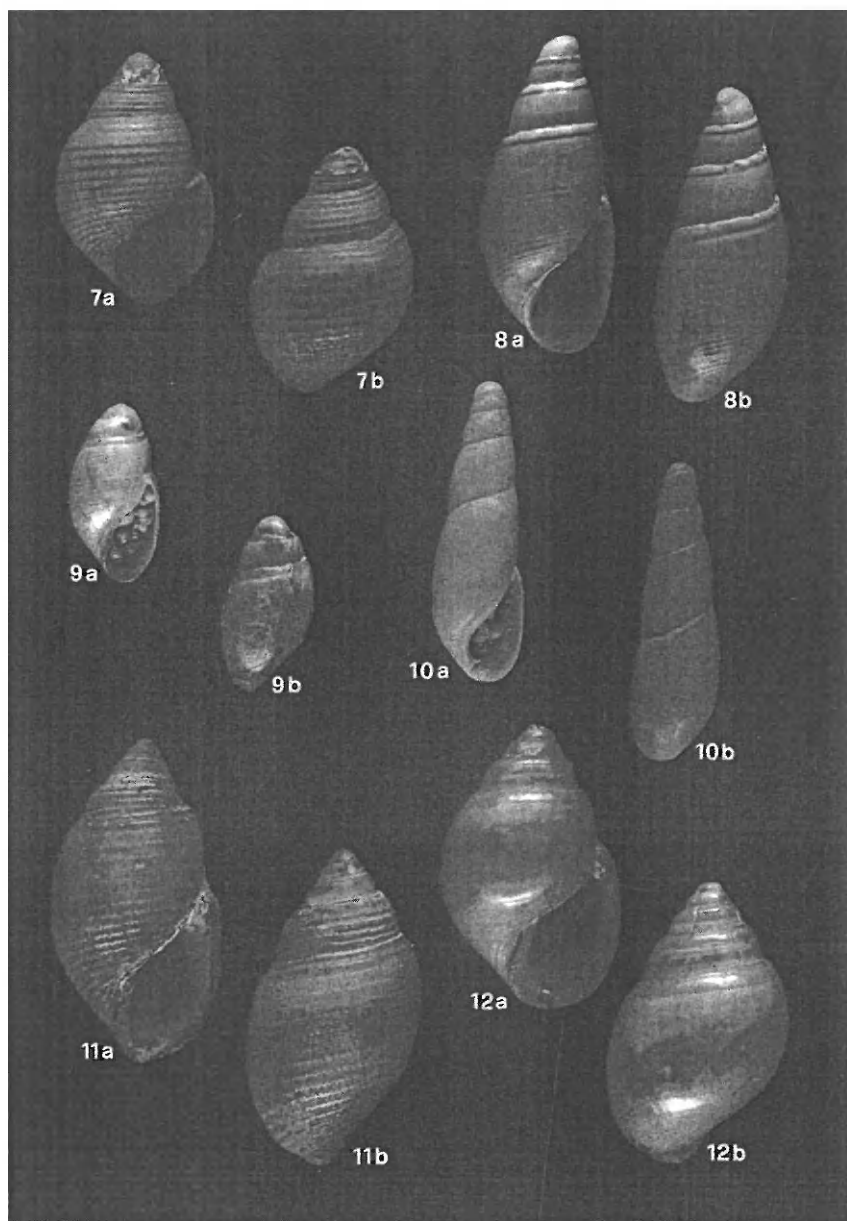
Type material. — The holotype is 3.4 mm long (H) and 2.0 mm wide (D), the ratio H/D is 1.7; paratype A is 3.4 mm (H) and 2.1 mm (D), the ratio H/D is 1.6; paratype B is 3.0 mm (H) and 1.8 mm (D), the ratio H/D is 1.7; paratype C is 3.4 mm (H) and 2.2 mm (D), the ratio H/D is 1.5; paratype D is 1.5 mm (H) and 1.1 mm (D), the ratio H/D is 1.9.

The holotype is stored in the Laboratorio di Malacologia, Università di Bologna (MZB no. 11624, Italy). Paratypes A, B, C and D are kept in the authors' collections.

Discussion. — Individuals of this new taxon have been reported twice in the past from the Mediterranean Sea (Cecalupo & Giusti, 1986, 1989); all specimens were dredged at a depth of 400-600 m in the Tuscan Archipelago (south-west of Capraia Island, Italy). In both cases the acteonid shells were tentatively referred to *Callostracon* cf. *amabilis* (Watson, 1886). Sabelli et al. (1990, 1992) quoted this species among the mediterranean acteonids, but s.n. *Ovulacteon* cf. *amabilis* (Watson, 1886), without commenting on the different genus collocation. *C. amabilis* is an Eastern Atlantic species which differs from *C. tyrrhenicum* in its general shell morphology and sculpture. In particular, in *C. amabilis* the last whorl is clearly carinate, the columellar fold is positioned at the beginning of the columella and the microsculpture has a smaller number of spiral striae. The distribution of *C. amabilis* seems to be limited to an oceanic area spanning the Western Azores, Madeira and the Canary Islands (Nordsieck, 1972). Illustration (fig. 6) and detailed description of the shell of *C. amabilis* are in Thomson & Murray (1886). We think that the two previous records of *C. cf. amabilis* in Cecalupo & Giusti (1986, 1989) are both incorrect identifications, because the figured individuals are *C. tyrrhenicum*. On the other hand, we keep the newly proposed taxon in the genus *Callostracon* Hamlin, 1884, since the features of the protoconch and the teleoconch (shape, sculpture, size) agree well with such a classification.



Figs. 1-6. Shells of *Callostracon*. 1a-5. *Callostracon tyrrenicum* sp. nov. 1a-b, apertural and dorsal views of the holotype, MZB no. 1162+ (Bologna, Italy), 3.4 x 2.0 mm; 1c, protoconch of the holotype; 1d, detail of the shell surface showing the peculiar sculpture; 2a-b, apertural and dorsal views of paratype A, 3.4 mm x 2.1 mm; 3a-b, apertural and dorsal views of paratype B, 3.0 mm x 1.8 mm; 4a-b, apertural and dorsal views of paratype C, 3.4 mm x 2.2 mm; 5, apertural view of paratype D, 1.5 mm x 1.1 mm. 6. *Callostracon anabilis* (Watson, 1886). Type figure after Thomson & Murray (1886). All specimens figured in figs. 1-5 are from the Central Tyrrhenian Sea (41°41'N 11°28'E), all paratypes are kept in the authors' collections.



Figs. 7a-12b. Shells of Mediterranean bathyal acteonids and a pulmonate gastropod. 7a-b, *Acteon monterosatoi* Dautzenberg, 1889, apertural and dorsal views, 3.6 x 2.1 mm. 8a-b, *Crenilabium exile* (Jeffreys, 1870 ex Forbes ms.); 8a-b, apertural and dorsal views, 4.2 x 1.8 mm; 9a-b, apertural view of a juvenile specimen, 2.0 x 1.1 mm. 10a-b, *Ceciloides acicula* (Müller, 1774), apertural and dorsal views, 4.5 x 1.4 mm. 11a-b, *Japonacteon pusillus* (McGillivray, 1843), apertural and dorsal views, 6.5 x 3.4 mm. 12a-b, *Liocarenus globulinus* (Forbes, 1844), apertural and dorsal views, 3.4 x 2.3 mm. All specimens figured are from the Central Tyrrhenian Sea, (41°41'N 11°28'E), and are kept in the authors' collections.

THE MEDITERRANEAN BATHYAL ACTEONIDS

Acteon monterosatoi Dautzenberg, 1889 (figs. 7a-b)

More than 200 specimens, lacking soft parts but very fresh, of this species have been sorted out. *A. monterosatoi* has been already recorded from the Central Tyrrhenian Sea (Oliverio & Villa, 1981) with the finding of five individuals.

Crenilabium exile (Jeffreys, 1870 ex Forbes ms.) (figs. 8a-9b)

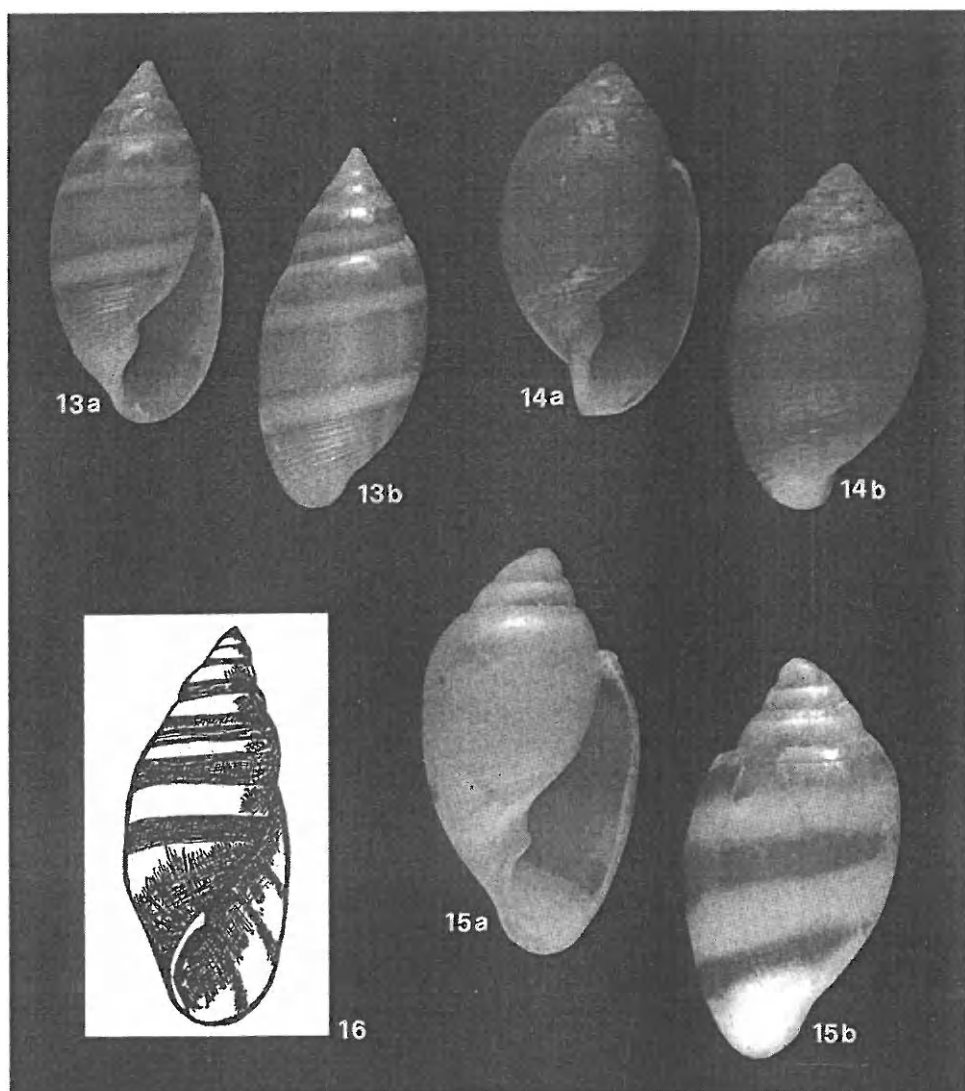
About 30 specimens, lacking soft parts but very fresh and representing adult, subadult and juvenile shells, of *C. exile* have been screened. This species was already recorded from the Central Tyrrhenian Sea, coast of Latium by Oliverio & Villa (1981). Fasulo et al. (1982) pointed out that the presence of spiral striae on the shell surface of this species was a contradictory matter, not solved by the authors who reported *C. exile* from the Mediterranean Sea in the past. The individuals examined show indeed this kind of fine sculpture, which is also present in the young specimens. The only figure found in the literature showing a specimen of *C. exile* without sculpture is by Nordsieck (1972); in fact, he mentions a smooth shell surface without spiral striae: "Mit sehr obsoleten spiralen". The figure in his work is referred to *Ceciloides acicula* (O. F. Müller, 1774), a European pulmonate gastropod (Kerney & Cameron, 1979). Finding this species, and other land and also freshwater shells, in material dredged even at a very great depth (Gaglioli, 1981) is a not altogether rare event. This sort of contamination is due to the well-known resedimentation processes from the shelf down to the basin (Bonfitto et al., 1994). To support our interpretation, during the analysis of a marine sediment dredged in the same area of the Central Tyrrhenian Sea at a depth of 450 m, we have identified several individuals of *C. acicula* (figs. 10a-b). It must be mentioned that the general shape of this pulmonate gastropod strongly resembles that of *C. exile*, which is the reason why some erroneous records of this acteonid occurred in the past (Nordsieck, 1972; Tenekidis, 1989; Arduino et al., 1995).

Japonacteon pusillus (McGillivray, 1843) (figs. 11a-b)

Fifteen specimens, lacking soft parts, of this species have been identified screening a marine sediment from the muddy bathyal bottoms surrounding the coral banks investigated. *J. pusillus* seems to occur in a wide bathymetric range, from the deep circalittoral to the bathyal, but always in muddy and muddy-detritic bottoms (Terreni, 1981; Fasulo et al., 1982). A record of an individual of this species collected at a very low depth (24-49 m) from Haifa (Israel), has been given by Barash & Danin (1992). This peculiar finding can be interpreted as an accidental import to shallow water by fishermen operating in that area. Our report of *J. pusillus* is the first one from the Latial coast.

Liocarenus globulinus (Forbes, 1844) (figs. 12a-b)

Six individuals, lacking soft parts but rather fresh, of *L. globulinus* have been identified in the dredged material. The outer surface of the teleoconch shows a fine sculpture consisting of spiral striae, which, under strong magnification, appear as dotted lines. The distribution of *L. globulinus* ranges from the Eastern Atlantic Ocean (Lusitanic area)



Figs. 13-16. Shells of *Acteon* and *Pseudoacteon*. 13a-15b. *Acteon tornatilis* (Linné, 1758). 13a-b, apertural and dorsal views, 9.8 x 4.0 mm, Civitavecchia (RM), Central Tyrrhenian Sea, -22 m; 14a-b, apertural and dorsal views, 10.2 x 6.0 mm, Hornaijarmia, Atlantic Ocean, collected ashore; 15a-b, apertural and dorsal views, colln. Ciommei (Rome, Italy), 2.2 x 1.2 mm, Civitanova Marche (MC), Central Adriatic Sea, -40m. 16. *Pseudoacteon luteofasciatus* (Mühlfeldt, 1829), type figure after Nordsieck (1972). Unless stated otherwise, the specimens figured are stored in the authors' collections.

to the Mediterranean Sea (Aegean Sea) (Fasulo et al., 1982; Koutsoubas & Koukouras, 1993). This is the first record of *L. globulinus* from the Latial coast.

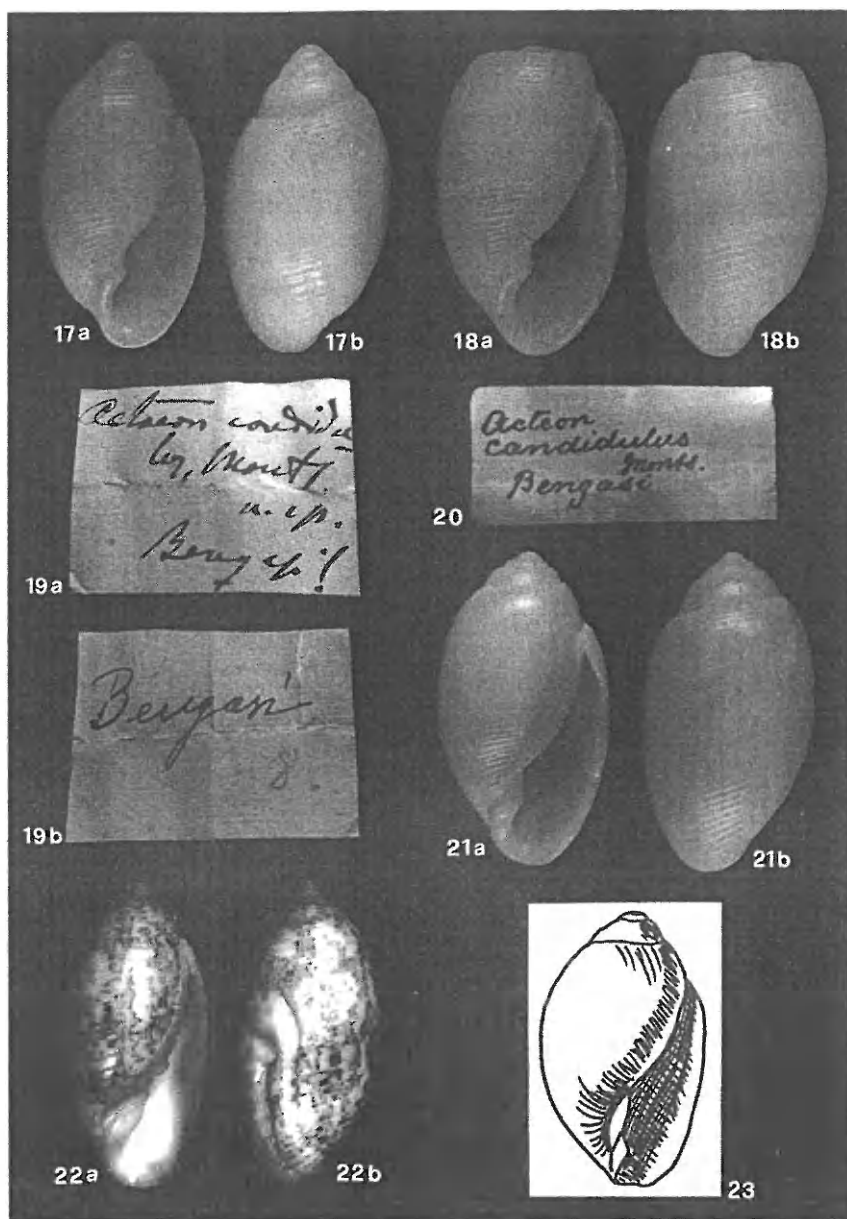
THE MEDITERRANEAN INFRALITTORAL ACTEONIDS

Acteon tornatilis (Linné, 1758) (figs. 13a, 15b)

This species is commonly occurring on the infralittoral sandy-muddy bottoms of the Mediterranean Sea (Terreni, 1981); in spite of a relatively simple shell form and sculpture, *A. tornatilis* shows a lot of intraspecific polymorphism. Shell length up to 25 mm, elongate, cylindrical, solid, uniformly light pinkish; but some shells show two pale spiral bands edged by dark brown lines. The teleoconch exterior surface has a fine sculpture consisting of many spiral striae which can extend throughout the entire shell, but generally are more evident at the base of the last whorl. This species can be commonly collected on the shore after storms; a good percentage of the specimens is generally already dead and the shells are utilized by hermit crabs (Crustacea Decapoda, Paguridea). For this reason, many of the individuals examined are pale (bleached) little sculptured or almost smooth because of the prolonged abrasion on the sand. This colour and sculpture variation (figs. 13a-14b), due to both genetic factors and sampling conditions, has lead some authors in the past to create many forms of *A. tornatilis* or even distinct taxa whose validity is still doubtful. For instance, Nordsieck (1972) has reported *Pseudoacteon luteofasciatus* (Mühlfeldt, 1829) from the Adriatic Sea (Rimini, Italy) as a valid taxon (fig. 16). Fasulo et al. (1982) already considered it a simple colour form of *A. tornatilis*. We have figured a young individual of *A. tornatilis* which represents this colour form and was also collected in the Adriatic Sea (figs. 15a-b); we agree with Fasulo et al. (1982) in considering it as a peculiar variant of the colour pattern shown by this species, maybe typical of the Mediterranean Sea. We propose *Pseudoacteon luteofasciatus* (Mühlfeldt, 1829) as a synonym of *Acteon tornatilis* (Linné, 1758).

Pupa candidula (Monterosato, 1923) (figs. 17a-18b)

The original description of *P. candidula* by Monterosato (1923), referring to only three individuals from the coast of Cyrenaica (Libya), is: "*A. candidulus*, Monts. nov. sp. — Tre soli esemplari, dei quali uno intero. E' una forma più piccola del conosciuto *A. tornatilis*, interamente candida, solida, come una specie del genere *Solidula*, che manca da noi. La superficie é ben levigata con poche strie spirali alla base". Nordsieck (1972) reported this species but surprisingly changing its genus to *Pupa* Röding, 1798. This genus has as a peculiar diagnostic feature consisting of two strong columellar folds on the inner lip, which are not present in the genus *Acteon* Montfort, 1810. Nordsieck (1972: 9) gives a short description of *P. candidula*, which is defined as a very solid shell, totally white, 10-15 mm in height, almost smooth with spiral striae present only at the base of the last whorl: "Sehr fest und ganz weiss. Glatt und nur mit basisspiralen". Unexpectedly Nordsieck does not mention the two columellar plicae. Fasulo et al. (1982) commenting on *P. candidula* in their paper, add to the description of the shell this very important diagnostic character: "Doppia denticolazione alla base della columella". To solve this taxonomic controversy, we examined the type material of *P. candidula* kept in the Monterosato collection (MCZR). Under no. 16053 we found only two specimens (figs. 17a-18b), together with the original labels in the handwriting of



Figs. 17-23. Shells of *Pupa*, *Acteon* and *Bullinopiersilia*. 17a-18b. *Pupa candidula* (Monterosato, 1923), colln. Monterosato MCZR no. 16053 (Rome, Italy). 17a-b, apertural and dorsal views, 8.0 x 4.0 mm; 18a-b, apertural and dorsal views, 8.8 x 4.8 mm; 19a-20. original labels in Monterosato's handwriting referring to specimens of figs. 17a-18b. 21a-b. *Acteon tornatilis* (Linné, 1758), apertural and dorsal views, 12.0 x 7.0 mm, San Teodoro (SS), Eastern Sardinian Sea, collected ashore. 22a-b. *Pupa* cf. *solidula* (Linné, 1758), apertural and dorsal views, 17.0 x 8.2 mm, South Molle Island, South Australia, collected ashore. 23. *Bullinopiersilia sphaeroides* Nordsieck F., 1972, type figure after Nordsieck (1972). Unless stated otherwise, the specimens figured are stored in the authors' collections.

Monterosato (figs. 19a-20). The smaller individual fits perfectly with the original description published by Monterosato (1923), but it does not show the two columellar folds! We do not understand the reason why it has been moved from *Acteon* to *Pupa*, because of the lack of such an important diagnostic feature. Moreover, a careful examination of the type material revealed the presence of spiral striae on the shell surface. More strikingly, notwithstanding the general pale white colour of the shell, the bigger and incomplete individual shows the typical pattern consisting of two lighter bands which commonly occurs in *A. tornatilis* (figs. 18a-b). We think that these two specimens were probably collected ashore, which could be the reason of their pale colour and smoothness. During the analysis of many specimens of *A. tornatilis* we found several cases of shells presenting the same features; one of these cases is figured as an example (figs. 21a-b). Probably Monterosato ignored the incomplete specimen when describing *P. candidula*, but in this case broken does not mean less important! As an example of a shell belonging to the genus *Pupa* Röding, 1798, we figured *Pupa* cf. *solidula* (Linné, 1758) (figs. 22a-b). We propose *Pupa candidula* (Monterosato, 1923) as a synonym of *Acteon tornatilis* (Linné, 1758).

Bullinopersilia sphaeroides F. Nordsieck, 1972 (fig. 23)

The species and the genus were proposed by Nordsieck (1972: 8) on a single specimen collected in the littoral bottoms of Ibiza (Balearic Islands, Spain). The original descriptions of the genus and species is: "**Bullinopersilia** nov. gen. Typus: *sphaeroides* n. sp. Oval mit stumpfer Spira und schlanker Basis. Glatt, nur mit wenigen Anwachsrisen. Letzter Umgang sehr gross, Mündung sehr hoch, fast gleichbreit. Lippe scharf. Spindel geknickt, unterer Teil kallos und steil, mit einer schwachen oberen Drehfalte und einer stärkeren unteren Stutzfalte, darunter ausgussartig ausgeschnitten. Zwischen *Persilia* und *Bullina* stehend.

Bullinopersilia sphaeroides n. sp. - 2,5/1,5 mm. O I 4, Typus von Ibiza. - Ibiza, Sublitoral. Form eines auf der Spitze stehenden Eies mit aufgesetzter stumpfer Spira. Beidseitig gleichmässig gerundet, glöbulos. Ziemlich fest, opak bis semitransparent, blass weissrosa. Apex flachkuppelförmig abgestumpft. 3½ Umgänge, flachkonvex, mit flacher Naht. Letzter Umgang = 7/8 der Höhe. Mündung etwa 4/5 der Höhe. Schale glatt, bis auf feine Anwachsältchen an der Naht. Letzter Umgang nach unten verschmälert, Mündungsrand desgleichen. Mündung langgestreckt, oben etwas verschmälert. Spindel steil, kallos, mit einer schwachen oberen Drehfalte und einer stärkeren unteren Stutzfalte, darunter ausgussartig ausgeschnitten".

The iconography accompanying the description of this taxon raises strong doubts about the validity of it (fig. 23). We could not examine the type material kept in the collection of the Senckenberg Museum of Frankfurt am Main (SMF), but Dr. R. Janssen has kindly communicated us (in litt., 23.01.1996) that the type material is indeed a juvenile of the land snail *Ferussacia folliculus* (Gmelin, 1791), a Mediterranean pulmonate species (Cossignani & Cossignani, 1995), mainly occurring in Catalonia (Spain) (Haas, 1991). This is another case of a terrestrial shell collected in the sea by the above mentioned resedimentation processes (Bonfitto et al., 1994). We propose *Bullinopersilia sphaeroides* Nordsieck F., 1972 as a synonym of *Ferussacia folliculus* (Gmelin, 1791).

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