



Nomenclature of the smaller Mediterranean *Cerithium* species

Serge Gofas, Vittorio Garilli & Marie-Catherine Boisselier-Dubayle

KEY WORDS: Cerithiidae, Mediterranean, taxonomy, lectotype designations.

ABSTRACT The Mediterranean morphotypes generally confused under the name *Cerithium rupestre* have been shown to belong to two different species. The correct name for one of the species, living in very shallow rocky areas including splashpools, is *Cerithium lividulum* Risso, 1826, and for the other, usually living in the shallow infralittoral community of photophilous algae, *C. renovatum* Monterosato, 1884. Type material is figured for all nominal species in this species group introduced prior to 1900, and for some of the species proposed later. Orientations for future work in the taxonomy of this species group are suggested.

RIASSUNTO È stato mostrato che le entità morfologiche generalmente confuse sotto il nome *Cerithium rupestre* appartengono a due specie distinte. I nomi corretti per questi taxa sono *Cerithium lividulum* Risso, 1826, per la specie vivente su fondali rocciosi in acque più superficiali dell'infralittorale superiore e nelle pozze di marea, e *Cerithium renovatum* Monterosato, 1884, per la specie solitamente vivente su fondali infralittorali ricoperti da alghe fotofile. *Cerithium lividulum* ha una conchiglia robusta con giri appena convessi, coste assiali talora tubercolate e cordoni spirali piani. La colorazione è data da screziature bruno-verdastre decorrenti spiralmente su uno sfondo bianco. La conchiglia di *Cerithium renovatum* è più piccola (inferiore ai 20 mm nel materiale esaminato), più delicata e snella, e presenta una serie regolare di tubercoli, costantemente di colore bianco, che iniziano nei primi giri e raggiungono il loro massimo sviluppo in corrispondenza del penultimo. *Cerithium renovatum* non mostra coste assiali evidenti. Le ovature delle due specie, deposte in acquario, sono differenti. Relativamente a questi taxa, viene illustrato il materiale tipo di tutte le specie nominali introdotte prima del 1900 e di alcune proposte successivamente. Sulla base del materiale studiato e dei dati desunti dalla letteratura, viene fornito un quadro schematico della distribuzione dei due taxa. Viene inoltre suggerita una guida per futuri lavori tassonomici su questo gruppo di specie.

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INTRODUCTION

The genus *Cerithium* is represented in the Mediterranean Sea and Ibero-Moroccan area by several species, which usually occupy nearshore environments and may be locally very common. There are discrepant views on their taxonomy at the species and genus level. One extreme view is that every recognizable morph should be named as a species (e.g. LOCARD, 1902; KOBELT, 1908; MONTEROSATO, 1910; NORDSIECK, 1974). BUCQUOY, DAUTZENBERG & DOLLFUS (1884) adopted the other extreme, accepting only two valid species, one of large size, *Cerithium vulgatum* Bruguière, 1792, and a smaller one for which they used the inappropriate name *C. rupestre* Risso, 1826. This has set the keynote for over a century of Mediterranean malacology.

The correct picture nevertheless lies somewhere in between. A quite realistic view is given in the "Atlante" of GIANNUZZI-SAVELLI *et al.* (1996), but without a discussion or justification. Recent work using allozyme electrophoresis (BOISSELIER-DUBAYLE & GOFAS, 1999) has demonstrated that two different species can be distinguished in what has been known hitherto as "*Cerithium rupestre*" *sensu* B.D.D.

The purpose of this paper is to provide a basis for naming correctly the two species of "smaller" *Cerithium* present in the Western Mediterranean. It is not within the scope to revise all available names, for which more taxonomic work is needed. This revision will be restricted to the species named before 1900, and to some of the later described forms for which we have examined type material. It is based mainly on material examined in Muséum National d'Histoire Naturelle, Paris (hereafter MNHN).

TAXONOMY

The arguments for separating *Cerithium* species have been investigated by BOISSELIER-DUBAYLE & GOFAS (1999), where we used the names *C. lividulum* for one species, and conservatively maintained the name "*C. rupestre*" for the other, which we show here to be correctly named *C. renovatum* Monterosato, 1884. Data from 11 informative allozyme loci yielded fixed alternative alleles in a sympatric population at les Embiez, France, for Aspartate-Aminotransferase (Aat), Glucose-6-phosphate isomerase (Gpi), Isocitrate dehydrogenase (Idh), Lactate dehydrogenase (Ldh), Mannose-6-phosphate isomerase (Mpi), D-octopine dehydrogenase (Odh), one locus of Phosphoglucosyltransferase (Pgm-2) and one of Superoxide dismutase (Sod-2), which is overwhelming evidence for a reproductive isolation. Considering genetic distances calculated from allele frequencies, the population of *C. renovatum* clusters with the local *C. vulgatum* and not with *C. lividulum*.

There are morphological features which allow recognition of the two species (Fig. 1). *Cerithium lividulum* has a sturdy shell, with hardly convex whorls, normally no varices along the early whorls. The sculpture consists of axial folds and of flat, poorly separated spiral cords. The axial folds sometimes bear some blunt tubercles along their midline. The external surface bears a pattern of greenish brown mottles organized along the spirals on a white background, and which may be darker on the abapical part of the whorls. The shell of *C. renovatum* is smaller (less than 20 mm in our material), more delicate and slender, with a regular series of knobs starting early on the spire and best developed on the penultimate whorl, but otherwise the whorls do not

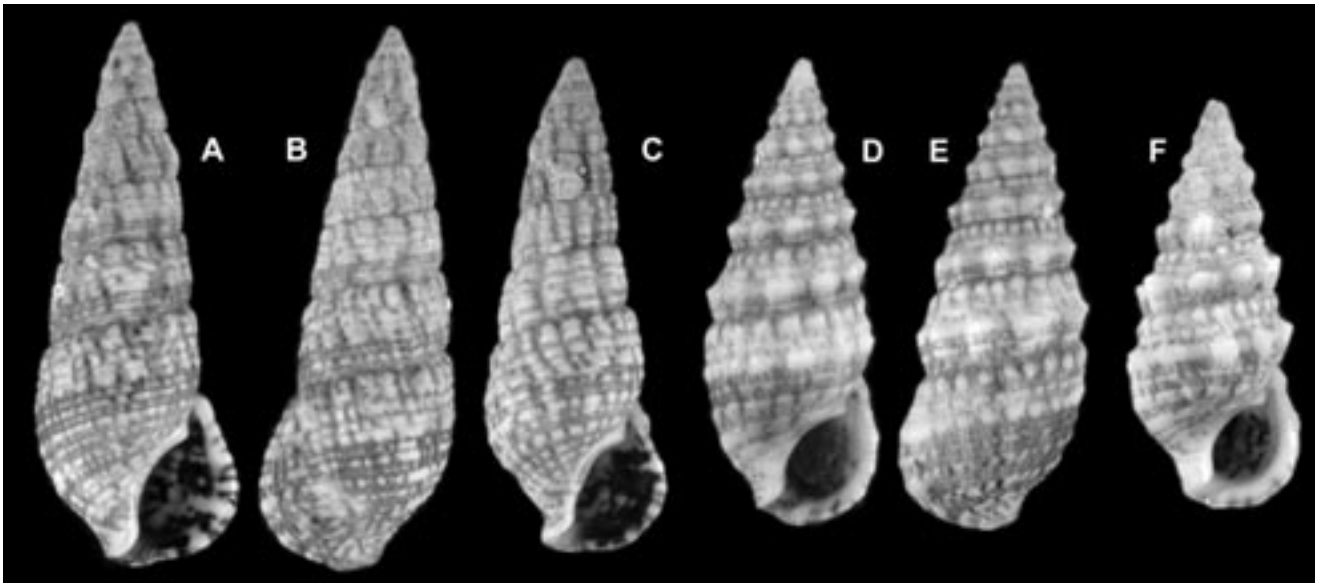


Fig.1. A, B, C: *Cerithium lividulum* Risso, 1826, actual sizes 24.1 and 22.1 mm; D, E, F: *C. renovatum* Monterosato, 1884, actual sizes 20.9 and 18.2 mm. Specimens from sympatric populations studied with allozyme electrophoresis, from Ile des Embiez, France. The specimen on Fig. D-E was maintained in aquarium for spawning (as in Fig. 2B).

Fig. 1. A, B, C: *Cerithium lividulum* Risso, 1826, dimensioni degli esemplari: 24,1 e 22,1 mm; D, E, F: *C. renovatum* Monterosato, 1884, dimensioni degli esemplari: 20,9 e 18,2 mm. Esemplari provenienti da popolazioni simpatriche (Ile des Embiez, Francia), studiati mediante elettroforesi degli alloenzimi. L'esemplare raffigurato in D-E è stato mantenuto in acquario fino alla deposizione dell'ovatura (riportata in Fig. 2B).

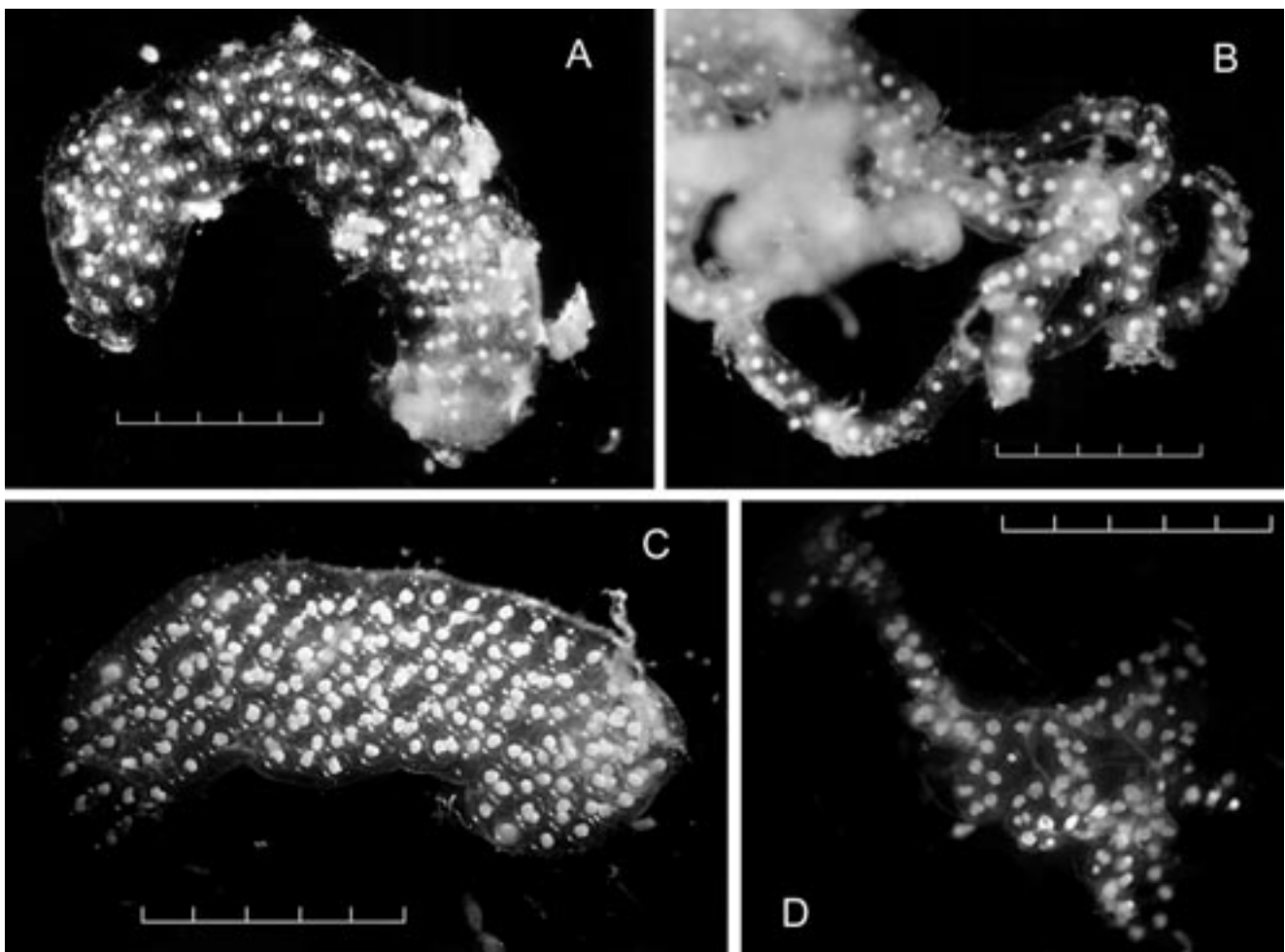


Fig.2. Egg masses of *Cerithium lividulum* (left) and *C. renovatum* (right) obtained in aquaria. A, B: from Les Embiez, France, collected in April 1999; C, D: from Palermo, NW Sicily, Italy, collected in June 2000. Scale bars are 5 mm.

Fig. 2. Ovatura di *Cerithium lividulum* (a sinistra) e di *C. renovatum* (a destra) deposte in acquario. A, B: da Les Embiez (Francia), raccolti nell'aprile 1999; C, D: da Palermo, raccolti nel giugno 2000. Scala: 5 mm.



show distinct axial folds. Compared to spinose forms attributed to *C. lividulum*, the tubercles are more aligned along a keel and are made more conspicuous by a whitish area running along them; the profile of the whorls shows a keel since very early teleoconch whorls. This paler area continues on the body whorl and interrupts the mottled pattern thereon.

The spawn of the two species is also different (Fig. 2). *Cerithium lividulum* lays a massive gelatinous mass across which 4-5 eggs may fit, whereas *C. renovatum* produces a single strand of eggs.

NOMENCLATURE

Cerithium rupestre Risso, 1826.

The specimen in Risso collection (Fig. 3) is small, slender and nodose, and belongs to the complex of *C. vulgatum*. The most similar morphology is found among morphs identified as *C. protractum* (Bivona, 1838) by GIANNUZZI SAVELLI *et al.* (1996: 26-27), which belongs to the *C. vulgatum* species group. Thus, it cannot be used for any of the two species considered here. Anyway, it is not desirable to use the name *C. rupestre* in the sense of BUCQUOY, DAUTZENBERG & DOLLFUS, 1884, since this would not be a clear statement of which species is intended. The possibility that the specimen has been substituted since Risso's publication must also be considered, although it does not essentially contradict Risso's laconic description. The specimen illustrated in Philippe Gény's plate produced ca. 1840 and published by ARNAUD (1978) is a totally different shell, probably exotic, with

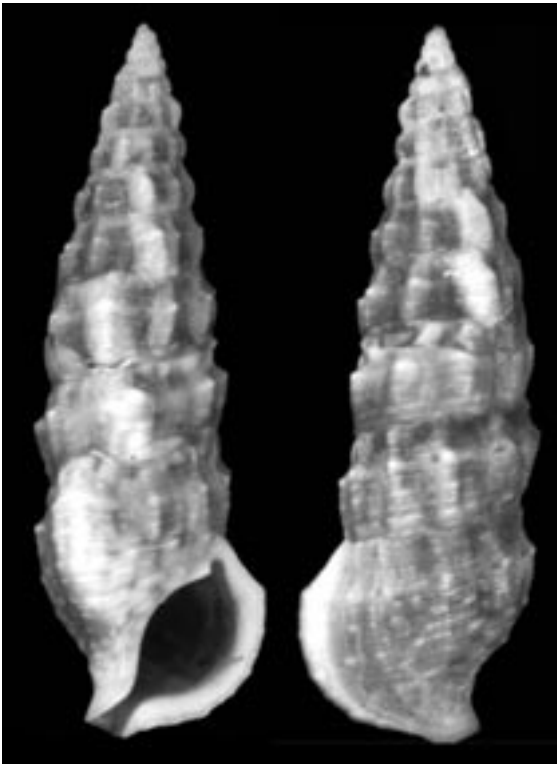


Fig. 3. The lectotype, designated by ARNAUD (1978) of *Cerithium rupestre* Risso, 1826. Actual size: 27 mm (photo MNHN).

Fig. 3. Lectotipo di *Cerithium rupestre* Risso, 1826 designato da ARNAUD (1978). Dimensione dell'esemplare: 27 mm (foto MNHN).

a definitely distorted siphonal canal like in *Cerithium aluco* (Liné, 1758).

Cerithium lividulum Risso, 1826 (Fig. 4)

Cerithium lividulum Risso, 1826: 154

Type locality: Alpes Maritimes, Mediterranean France

This species is represented in Risso's material, and a lectotype was designated by ARNAUD (1978: 122, pl. 8 fig. 25). The name has remained largely unused, mainly because the other name *C. rupestre* was being used in its place, but there were some clues to its identity since MONTEROSATO (1884: 120) used it as a valid name. This is the name to be applied to one of the species formerly known as *C. rupestre sensu* BUCQUOY, DAUTZENBERG & DOLLFUS, 1884.

The following synonyms are considered:

Cerithium pictum Anton, 1839

This name has remained obscure but has been clarified since SCHNIEBS (2000: 81-82) designated and figured a lectotype, undoubtedly conspecific with *C. lividulum*.

Cerithium mediterraneum Deshayes, 1843: 313-314

This name was proposed in the Deshayes edition of "Animaux sans vertèbres" and the original reference cites several authors who misused the names *Cerithium tuberculatum* Lamarck (*sensu* BLAINVILLE, 1826) and *C. fuscatum* (*sensu* COSTA, 1829). It should be noted that, although PHILIPPI (1836: 193, pl. 11, fig. 7) and KIENER (1841-42: 30-31) credited the name *C. fuscatum* to O.G. Costa, this name is not separately available and is merely a misuse of *C. fuscatum* Gmelin, 1791.

Deshayes indicates for *C. mediterraneum* a habitat in small, quiet pools with abundant vegetation, which is consistent with what we know for *C. lividulum*. There is in MNHN a lot of 5 syntypes transferred in 1978 from the Deshayes collection in Ecole des Mines de Paris (Fig. 4 C-F). The specimens bear conspicuous spines on the whorls, and their genuine morphology matches that of populations collected in Northeastern Algeria, around Djidjelli (collection Etienne Nelva, MNHN).

Cerithium rupestre var. *plicata* Bucquoy, Dautzenberg & Dollfus, 1884: 203, pl. 23 figs 5-6.

Cerithium rupestre var. *minor* Bucquoy, Dautzenberg & Dollfus, 1884

The specific epithet *plicata* is preoccupied by *Cerithium vulgatum* var. *plicata* Philippi, 1836: 193, and the name *minor*, probably intended as infrasubspecific, is preoccupied many times by other varietal names. The material figured by BUCQUOY, DAUTZENBERG & DOLLFUS (1884) is anyway the basis for the widespread usage of the name *C. rupestre*, and one specimen is figured herein (Fig. 4 G-H).

Cerithium strumaticum Locard, 1886: 181-182, 565-566.

Cerithium strumaticum Locard, 1886 is based on a description, on a large series of syntypes from Mediterranean France, and on an

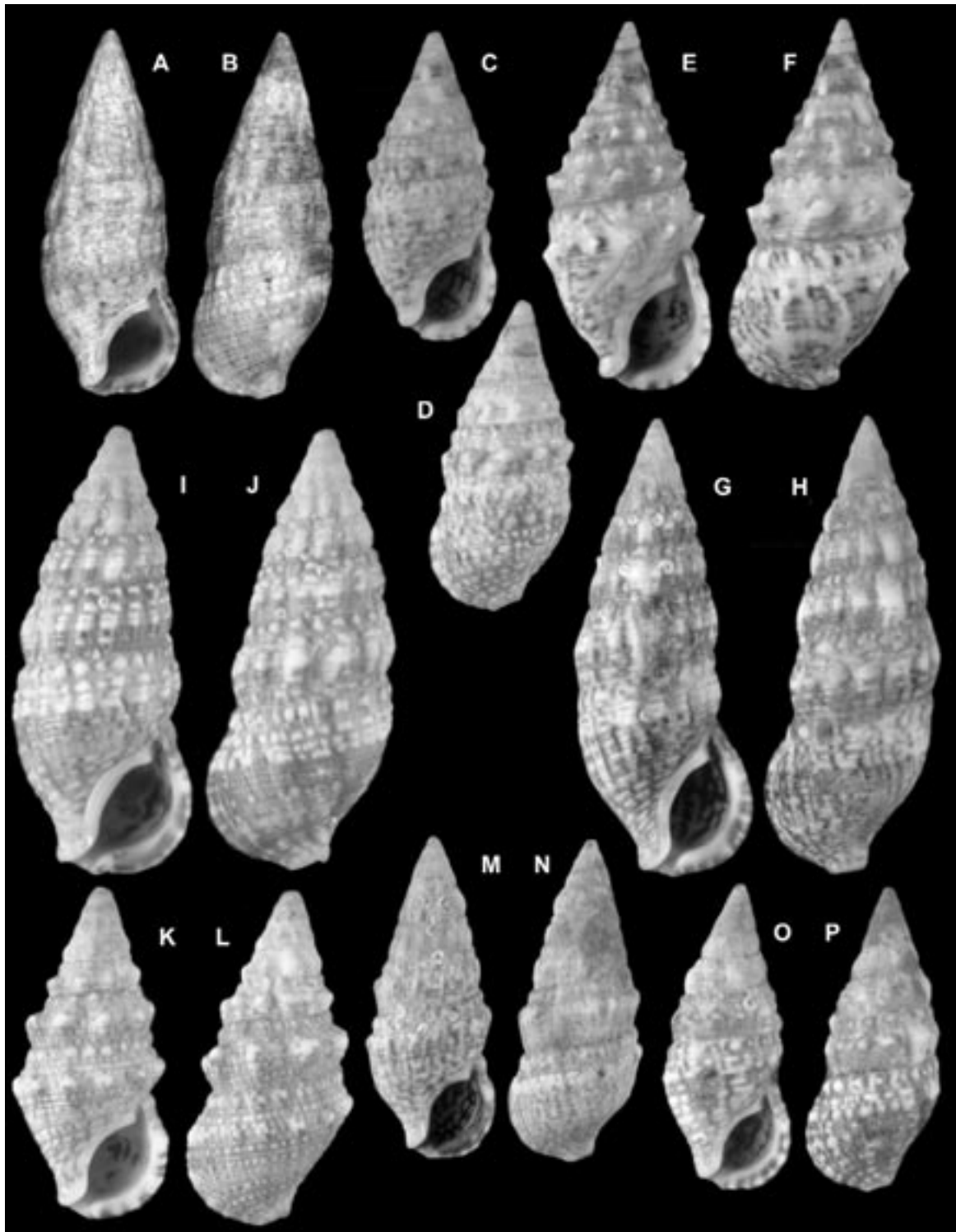


Fig. 4. Type specimens of nominal taxa assigned to *Cerithium lividulum*, all to scale. A, B: Lectotype of *Cerithium lividulum* Risso, 1826 designated by ARNAUD, 1978 (actual size 22 mm; photo MNHN). C, D, E, F: Syntypes of *Cerithium mediterraneum* Deshayes, 1843, no locality given (actual sizes 18.5 and 22.1 mm). G, H: Syntype of *Cerithium rupestre* var. *plicata* Bucquoy, Dautzenberg and Dollfus, 1884, from Roussillon, France (actual size 27.3 mm). I, J: Syntype of *Cerithium strumaticum* Locard, 1886 from Marseille, France (actual size 26.7 mm). K, L: Syntype of *Cerithium massiliense* from Marseille, France (actual size 20 mm). M, N: Lectotype, here designated, of *Cerithium requieni* Locard & Caziot, 1900 from Bonifacio, Corsica (actual size 19.2 mm). O, P: Syntype of *Cerithium palustre* Locard & Caziot, 1900 from Brando, near Bastia, Corsica (actual size 18.2 mm).

Fig. 4. Esempjari tipo di taxa nominali attribuiti a *Cerithium lividulum*; tutti alla stessa scala. A, B: lectotipo di *Cerithium lividulum* Risso, 1826 designato da ARNAUD, 1978 (dimensione: 22 mm; foto MNHN). C, D, E, F: sintipi di *Cerithium mediterraneum* Deshayes, 1843, senza località di provenienza (dimensioni: 18,5 e 22,1 mm). G, H: sintipo di *Cerithium rupestre* var. *plicata* Bucquoy, Dautzenberg e Dollfus, 1884, da Roussillon, Francia (dimensione: 27,3 mm). I, J: sintipo di *Cerithium strumaticum* Locard, 1886 da Marsiglia, Francia (dimensione: 26,7 mm). K, L: sintipo di *Cerithium massiliense* da Marsiglia, Francia (dimensione: 20 mm). M, N: lectotipo, qui designato, di *Cerithium requieni* Locard & Caziot, 1900 da Bonifacio, Corsica (dimensione: 19,2 mm). O, P: sintipo di *Cerithium palustre* Locard & Caziot, 1900 da Brando, nei pressi di Bastia, Corsica (dimensione: 18,2 mm).

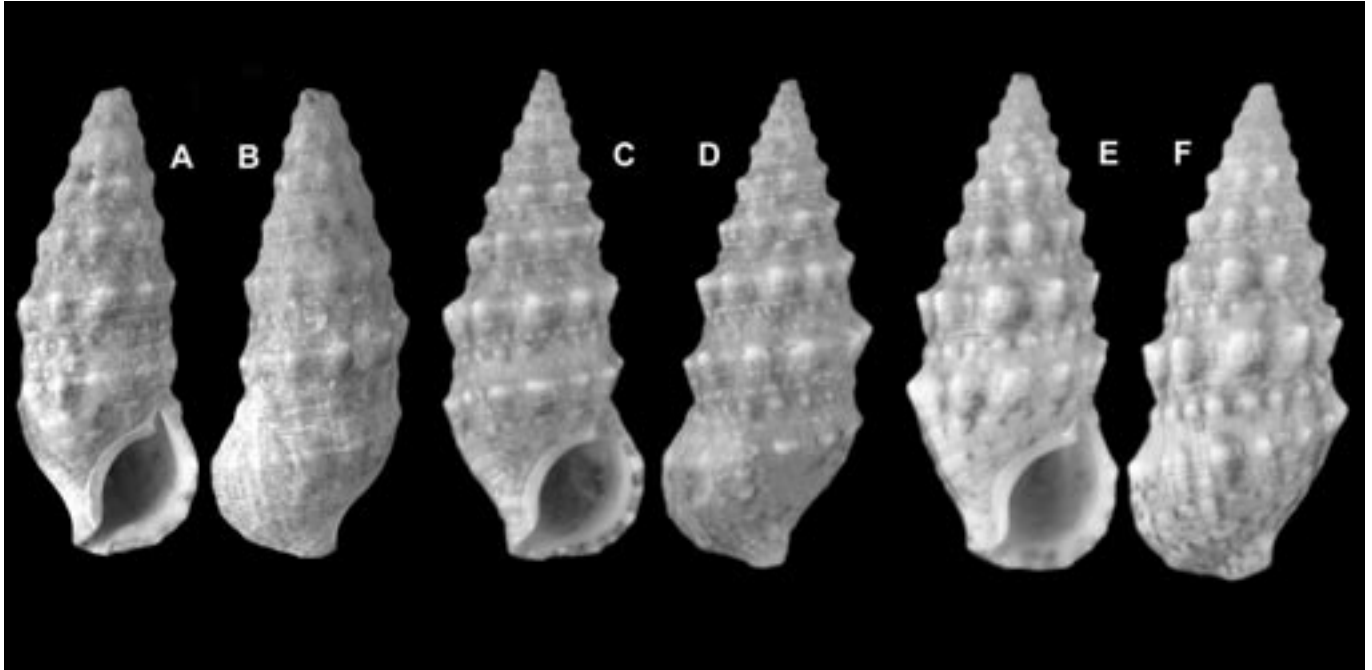


Fig. 5. Specimens of nominal taxa assigned to *Cerithium renovatum*, all to scale. A, B: Lectotype, here designated, of *Cerithium vulgatum* var. *pulchella* Philippi, 1836 (actual size 15.5 mm; ZMHU, Berlin). C, D: Specimen from Palermo, labeled as *C. renovatum* by Monterosato (actual size 16.2 mm; MNHN). E, F: Syntype of *C. payraudeaui* Locard & Caziot, 1900 from Brando, Corsica (actual size 16.5 mm).

Fig. 5. Esemplari di taxa nominali attribuiti a *Cerithium renovatum*; tutti alla stessa scala. A, B: lectotipo, qui designato, di *Cerithium vulgatum* var. *pulchella* Philippi, 1836 (dimensione: 15,5 mm; ZMHU, Berlino). C, D: esemplare proveniente da Palermo, classificati da Monterosato come *C. renovatum* (dimensione: 16,2 mm; MNHN). E, F: sintipo di *C. payraudeaui* Locard & Caziot, 1900 da Brando, nei pressi di Bastia, Corsica (dimensione: 16,5 mm).

explicit reference to the description and figure of *C. rupestre* var. *plicata* in BUCQUOY, DAUTZENBERG & DOLLFUS (1884). LOCARD (1886) further named two varieties *major* and *ventricosa* after B.D.D.'s figures 5 and 6. Localities given are Sète, Martigues, Marseille, Toulon, St. Nazaire (now Sanary s/mer, not to be confused with the St. Nazaire on the French Atlantic coast), La Seyne, Cannes, Menton, "etc". There are syntypes in Coll. Locard from Sète, Marseille, Sanary, Toulon, La Seyne, all conspecific, as well as non-type material from other Mediterranean localities. We illustrate here a syntype from Marseille (Fig. 4 I-J).

***Cerithium massiliense* Locard, 1886: 182, 566.**

This is a morph which we consider conspecific with *C. lividulum*, but is characterized by a spinose ornamentation of the shell. Locard cites material from Marseille, Toulon, Nice, "etc...". There are syntypes in Coll. Locard from Marseille (Fig. 4 K-L) and Toulon, and non-type material from several other Mediterranean localities.

***Cerithium palustre* Locard & Caziot, 1900: 110-111.**

The localities mentioned in the original description are in Corsica: Ajaccio, and Brando (a small place near Bastia, to the North; Fig. 4 O-P). These are smaller than the specimens from the same localities on which the authors recognize *C. strumaticum*, and have a quite blunt sculpture. We consider them

conspecific as well with *C. lividulum*. LOCARD & CAZIOT (1900) describe a *C. palustre* var. *elongata*, which they state being found on the coast of mainland France; this latter name is preoccupied several times (*Cerithium elongatum* Anton, 1839, *Cerithium elongatum* Sowerby G.B. II, 1855).

***Cerithium requieni* Locard & Caziot, 1900 ; p. 110.**

The syntypes present in MNHN consist of three lots from Brando, Bonifacio and Pietranera, and may contain a mixture of *C. lividulum* and *C. renovatum*. One specimen from Bonifacio, which we identify as *C. lividulum*, has been selected here as lectotype (Fig. 4 M-N), in good agreement with the diagnosis which states that it is recognized by its blunt sculpture. The specimens from Brando are rather spinose and belong to *C. renovatum*.

***Lithocerithium bellicosum* Monterosato, 1917: 19**

This species is based on Monterosato's material from Libya, but also on Figs 44-46 of PALLARY (1913). It is similar to specimens collected in Djerba, Tunisia ascertained as *C. lividulum*. We do not know the whereabouts of Pallary's Egyptian material.

***Cerithium archipelagicum* Gaglioli, 1992**

This was a *nomen nudum*, alluded to only by MONTEROSATO (1917) in connection with *L. bellicosum*, and is based on specimens from the Greek Aegean islands. It was described by GAGLIOLI (1992: 126-127, 147) but introduced as a synonym,



thus not available.

Cerithium renovatum Monterosato, 1884 (Fig. 5)

Cerithium renovatum is a replacement name for *Cerithium vulgatum* var. *pulchella* Philippi, 1836, preoccupied by *Cerithium pulchellum* J. de C. Sowerby, 1832 and senior homonym of *Cerithium pulchellum* Dujardin, 1837. Thus the type material and type locality are of Philippi (1836).

Cerithium vulgatum var. *pulchella* Philippi, 1836: 193, pl. 11, fig. 9.

Two syntypes were found in Berlin Museum, with labels that allow to trace them to Philippi's material. We here select as lectotype (Fig. 5 A-B) the smallest specimen (15.5 x 6.1 mm), which is quite worn but agrees with the concept that MONTEROSATO (1884) had of the species when he introduced the replacement name. It is also this specimen which best agrees with the "natural size" of 18 mm which can be measured on Philippi's plate 11, fig. 9. The other specimen is larger (24.0 x 9.4 mm) and probably does not belong to the same species. We also figure (Fig. 5 C-D) a specimen selected in a lot of 4 specimens from Palermo sent by Monterosato (with manuscript label "*C. vulgatum* var. *pulchella* Ph.") to MNHN. This and several other lots from Palermo in MNHN, (H. Fischer collection: 4 specimens; Vignal collection 5 + 3 specimens, Locard collection, 18 specimens, probably from the same source), represent an abundant material which we consider conspecific.

Cerithium payraudeaui Locard & Caziot, 1900: 109-110 (ex Monterosato ms.).

This is based on specimens from Corsica which are somewhat stouter than the Sicilian *C. renovatum*. There are five lots of syntypes in MNHN, all conspecific: Pietranera (3 specimens), Bastia (5 specimens), Brando (4 specimens; Fig. 5 E-F), St Florent (1 specimen) and Bonifacio (2 specimens). It may be attributed to *C. renovatum*, but also resembles some corsican populations which go to *C. lividulum* based on spawn and allozymes. *Theridium locardi* Nordsieck, 1974; p. 11 is an unnecessary replacement name for *Cerithium payraudeaui* Locard & Caziot 1900, which is a senior homonym of *Theridium payraudeaui* Nordsieck, 1974 ex Monterosato (*nomen nudum*, 1910), a representative of the *C. vulgatum* group.

Discussion of the name *Cerithium aluchensis* "Chiereghini"

BRUSINA (1898) suggested that *Cerithium aluchensis* "Chiereghini" should have priority over *C. renovatum*. We disagree with his view and hold *C. aluchensis* as a synonym of *C. vulgatum*. In the same paper, BRUSINA (1898) introduces in synonymy (thus, not making it available) another name *C. monterosatoi*, which he had intended at one time for what Monterosato renamed *C. renovatum*.

The name *Murex aluchensis* was first published by NARDO (1847: 61-62), in synonymy of *Cerithium vulgatum* var. *tuberculata* Philippi, 1836. Nardo's text is organized in two columns (pagi-

nated separately), the left one listing the names as in Chiereghini's manuscript, the right one giving the "modern synonymy" (which we understand as the names that Nardo deemed valid); when no "modern" name was stated, the Chiereghini name was formally made available with a short description. Thus, we interpret all other names as introduced in synonymy, and not immediately available according to the terms of the code of zoological nomenclature. The name *Murex aluchensis* was made available (with author and date Nardo, 1847) when BRUSINA (1898) used it as a valid name and cited Nardo.

PHILIPPI (1836), in turn, had based his *C. vulgatum* var. *tuberculata* on figure 82 of BUONANNI (1684). This figure represents a tall, nodose form of the *C. vulgatum* group. Furthermore, Nardo states that Chiereghini's material originates from the Golfo Veneto (the Northern Adriatic), where such forms are found, whereas neither *C. lividulum* nor *C. renovatum* are represented. BRUSINA (1866) stated that *C. renovatum* (which he then called *C. minutum* Serres) is found only in Southern Dalmatia, not north of Lesina (now Hvar Island, Croatia).

However, BRUSINA (1870) had used the name *C. aluchensis* with a different meaning. There, he did not refer to Nardo's publication, and made the name available by giving two references:

- *Cerithium vulgatum* var. *tuberculata* Philippi, 1836
- "*Cerithium minutum*" as figured in Sowerby, 1855: 865, pl. 181, fig. 122.

Thus the name *C. aluchensis* Brusina, 1870 ex Chiereghini ms. is separately available and is a junior homonym of *C. aluchensis* (Nardo, 1847 ex Chiereghini ms.). Also, the specimen figured in Sowerby's Thesaurus conchyliorum is not conspecific with *C. aluchensis* (Nardo, 1847). *Cerithium minutum* in SOWERBY (1855: 865) is given with a reference to Philippi and can be traced to "*C. vulgatum* var. *minuta* M. de Serres" as misapplied in PHILIPPI (1836). Thus, it is not a separately available taxon. It is a stout, spinose form resembling the types of *C. mediterraneum* (our Fig. 4 E-F), and probably belongs to *C. lividulum*.

MONTEROSATO (1899) ironically pointed out how Brusina's views on *Cerithium aluchensis* changed from 1870 to 1898, and how both interpretations disagree with Nardo's (1847) which has priority.

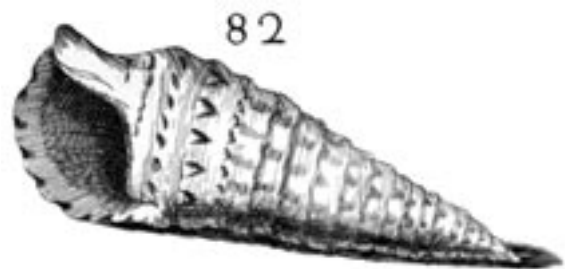


Fig. 6. Reproduction of fig. 82 in BUONANNI (1684), as mirror image so as to restore the aspect of the original woodcut. The figured specimen is hereby designated as lectotype of *Cerithium vulgatum* var. *tuberculata* Philippi, 1836, of *Murex aluchensis* Nardo, 1847 ex Chiereghini ms. and of *Cerithium aluchensis* Brusina, 1870, ex Chiereghini ms.

Fig. 6. Riproduzione della fig. 82 di BUONANNI (1684), riflessa in modo da ripristinare l'aspetto originale della xilografia. L'esemplare figurato viene qui designato come lectotipo di *Cerithium vulgatum* var. *tuberculata* Philippi, 1836, di *Murex aluchensis* Nardo, 1847 ex Chiereghini ms. e di *Cerithium aluchensis* Brusina, 1870, ex Chiereghini ms.



We hereby designate the specimen figured in BUONANNI (1684: fig. 82, here reproduced Fig. 6) as lectotype of *C. vulgatum* var. *tuberculata* Philippi, 1836, of *C. aluchensis* (Nardo, 1847 ex Chiereghini ms.) and of *C. aluchensis* Brusina, 1870, ex Chereghini ms. in order to make these taxa objective synonyms.

Other names which require further investigation.

There are many more names, all posterior to 1900, available in this species group but most of them cannot be soundly evaluated in the light of the evidence at hand. First, there is a need to settle the taxonomic issues and to make clear statements of which morphological entities represent valid species or subspecies, and this requires genetic investigation. There is at this time no evidence for the status of such forms as found in the eastern Mediterranean or the Atlantic archipelagos, which may, or may not, have genetic continuity with the two species we presently recognize in the Western Mediterranean. The following notes, not exhaustive, could be made in the course of this study of type material in MNHN.

Cerithium tingitanum Pallary, 1920 ex Monterosato ms.: 45, pl. 1, figs 3, 4.

Pallary introduced validly this name with a figure, but stated *C. renovatum* as a synonym. There are several possible syntypes of this species in MNHN (Fig. 7 A-B), but the figured specimen

was not found. We also collected specimens with a similar morphology in several localities of the Strait of Gibraltar (Barbate, Getares, Tangiers, Ceuta, M'diq), but not on the northern shore of the Alboran sea which one of us (S.G.) has intensely prospected. Their morphology is confusing, with many traits of *C. renovatum* allied to a size more usual for *C. lividulum*. One possibility is that this represents the westernmost occurrence of *C. renovatum*, in continuity with the main range of the species along the Moroccan Mediterranean coast, but these populations need to be investigated for enzyme polymorphism and spawn.

Hirtocerithium fartulum Monterosato, 1923: 9.

There are three possible syntypes (Fig. 7 C-D) from the type locality Benghazi, Libya, in Vignal collection from Monterosato. These might represent spinose morphs of *C. lividulum*, but a genetic characterization of these North African populations is needed before anything more can be said.

Cerithium syriacum Pallary, 1938: 34, pl. 1 fig. 22.

The Pallary collection in MNHN contains several syntypes (Fig. 7 G-H) from Beyrouth, Lebanon, which have a genuine mosaic-like sculpture and uniform whitish colour. There is also a need for investigation of their relationship with the main range of *C. lividulum*. PALLARY (1938) also described a *Cerithium*

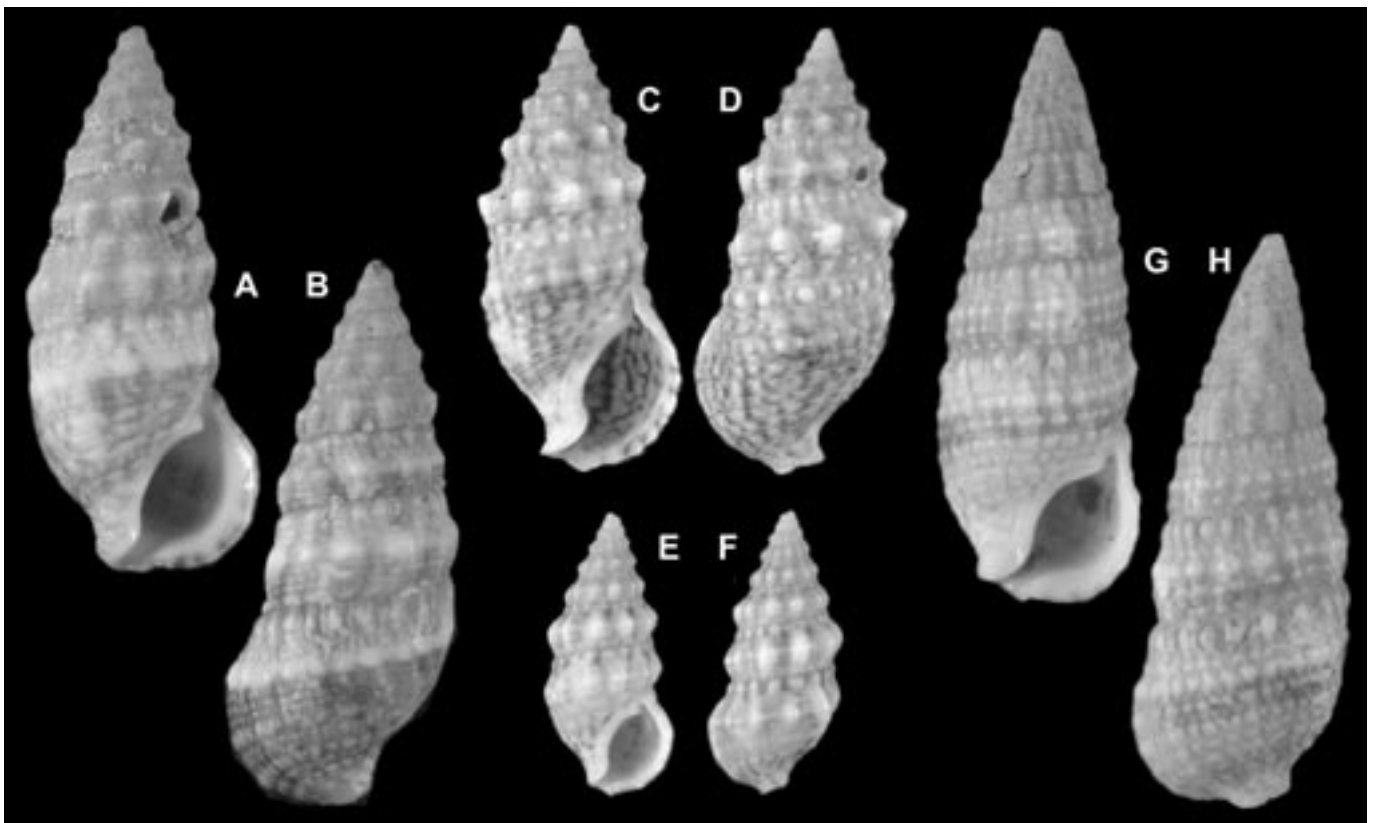


Fig. 7. Type specimens of some nominal taxa introduced after 1900, all to scale. A, B: Syntype of *Cerithium tingitanum* Pallary, 1920 ex Monterosato ms., from Tangiers, Morocco (actual size 22.7 mm). C, D: Possible syntype of *C. fartulum* Monterosato, 1923 from Benghazi, Libya (actual size 18.6 mm; specimen in Vignal collection, MNHN, obtained from Monterosato). E, F: Syntype of *C. phaeniacum* Pallary, 1938 from Tartous, Syria (actual size 11.9 mm). G, H: Syntype of *C. syriacum* Pallary, 1938 from Beyrouth, Lebanon (actual size 24 mm).

Fig. 7. Esemplari tipo di alcuni taxa nominali introdotti dopo il 1900; tutti alla stessa scala. A, B: sintipo di *Cerithium tingitanum* Pallary, 1900 ex Monterosato ms., da Tangeri, Marocco (dimensione: 22,7 mm). C, D: possibile sintipo di *C. fartulum* Monterosato, 1923 da Bengasi, Libia (dimensione: 18,6 mm; collezione Vignal, MNHN, esemplare ottenuto da Monterosato). E, F: sintipo di *C. phaeniacum* Pallary, 1938 da Tartous, Siria (dimensione: 11,9 mm). G, H: sintipo di *C. syriacum* Pallary, 1938 da Beirut, Libano (dimensione: 24 mm).

syriacum var. *strigosa* Pallary, 1938: 34, pl. 1, fig. 13, of which we did not find any type material.

Cerithium phaeniciacum Pallary, 1938 ; p. 33, pl. 1 figs 7-8. This small form was described from Tartous, Syria and is morphologically very distinct from the sympatric *C. syriacum*. There is a possibility that these are the eastern Mediterranean representatives of, respectively, *C. renovatum* and *C. lividulum*, but this has to be demonstrated. There is a lot of three possible syntypes (Fig. 7 E-F) of *C. phaeniciacum* from Tartous, obtained from Pallary, in coll. Vignal, MNHN.

The following names are available for Atlantic insular populations, in which future research may find support for separating different subspecies or species.

- *Thericium strumaticum canariense* Nordsieck, 1974 (type locality Puerto la Cruz, Tenerife).
- *Thericium medrickyi* Nordsieck, 1974 (type locality Lanzarote).
- *Thericium stomum* Nordsieck, 1974 (type locality Lanzarote).

Distribution of the species

The maps of Figs 8-9 have been established on material examined in MNHN collection, and allow a rough representation

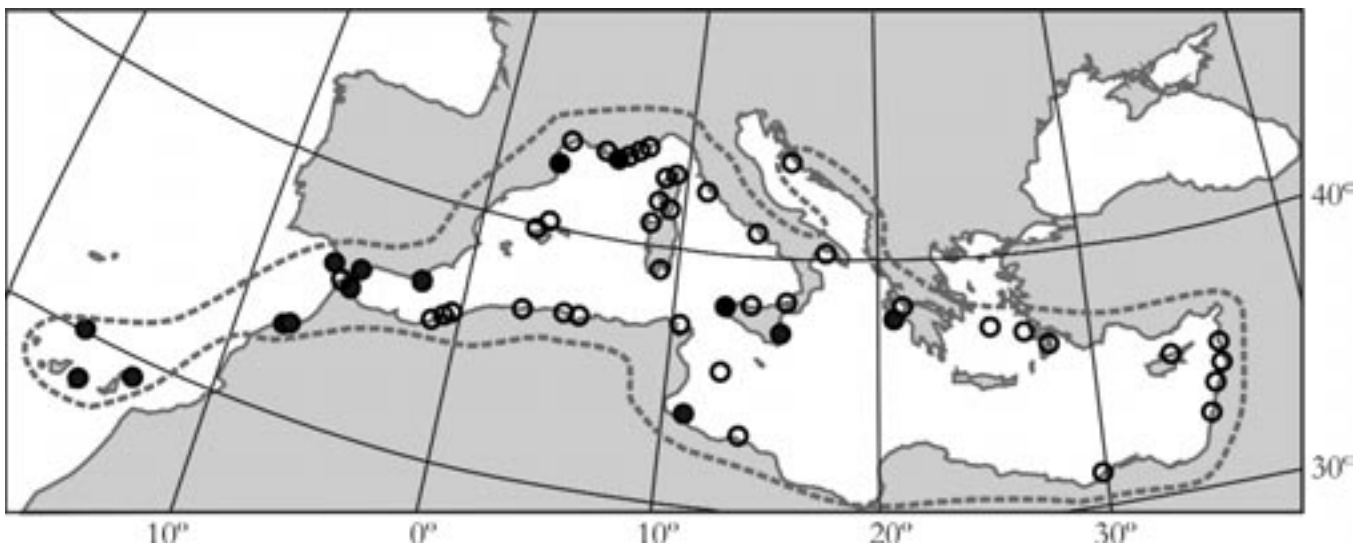


Fig. 8. Distribution of *Cerithium lividulum* according to material examined in MNHN. Open circles: material collected prior to 1950 (mostly, prior to 1900); solid circles: material collected later than 1950 (mostly, later than 1980). Broken line: generalized track deduced from this material and literature data.

Fig. 8. Distribuzione di *Cerithium lividulum* in base al materiale esaminato al MNHN. Cerchi vuoti: materiale raccolto antecedentemente al 1950 (ed in gran parte prima del 1900); cerchi pieni: materiale raccolto dopo il 1950 (principalmente dopo il 1980). Linea tratteggiata: distribuzione della specie in base al materiale studiato ed a dati presenti in letteratura.

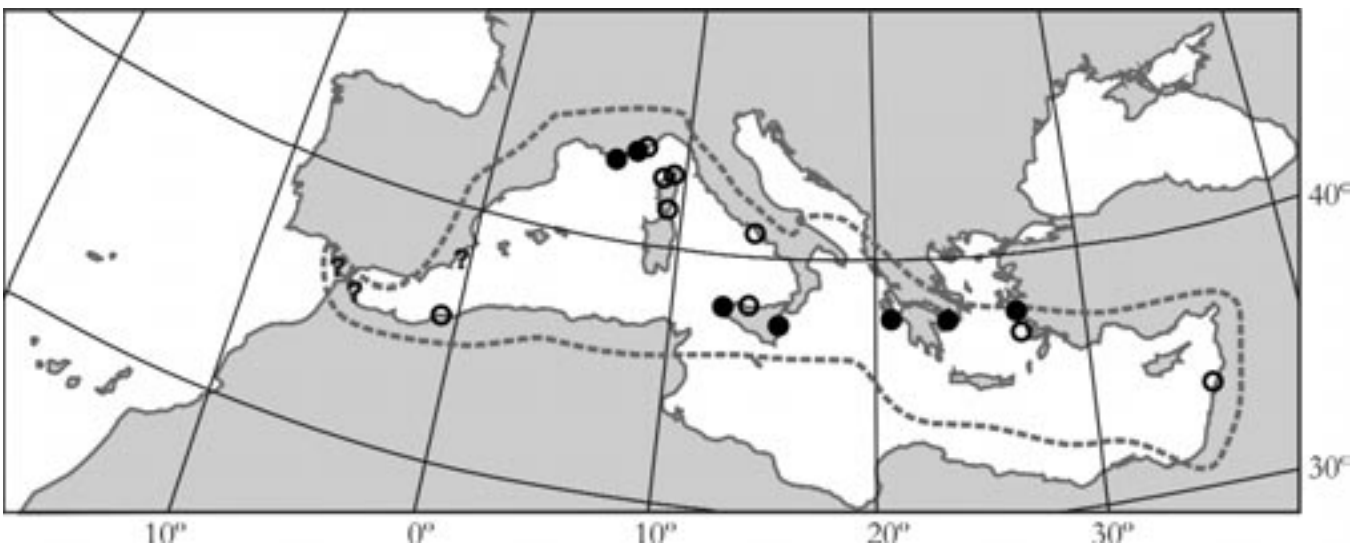


Fig. 9. Distribution of *Cerithium renovatum* according to material examined in MNHN. Open circles: material collected prior to 1950 (mostly, prior to 1900); solid circles: material collected later than 1950 (mostly, later than 1980). Broken line: generalized track deduced from this material and literature data. The (?) refer to localities with *C. tingitanum* morphs.

Fig. 9. Distribuzione di *Cerithium renovatum* in base al materiale esaminato al MNHN. Cerchi vuoti: materiale raccolto antecedentemente al 1950 (ed in gran parte prima del 1900); cerchi pieni: materiale raccolto dopo il 1950 (principalmente dopo il 1980). Linea tratteggiata: distribuzione della specie in base al materiale studiato ed a dati presenti in letteratura. I punti interrogativi si riferiscono a località in cui sono stati rinvenuti esemplari attribuibili al morfotipo *C. tingitanum*.



of the distribution of these species. The distribution of *C. lividulum* is the broadest, with a range extending from the Eastern Mediterranean to the Canary Islands, Selvagens and Madeira. The conspecificity of the macaronesian populations on one side, of Eastern mediterranean populations on the other needs confirmations, but populations on the Atlantic coast of Morocco agree in morphology and habitat with those of the Western Mediterranean, and the population from Malaga province has been checked with allozyme electrophoresis. Some gaps in the distribution may reflect a lack of data but others are real. The species has been searched for, and not found, on the rocky shore of Granada province, where *C. vulgatum* is common. It seems absent from the northernmost Adriatic (BRUSINA, 1866; COSSIGNANI *et al.*, 1992); the only Adriatic sample in our material originates from Veli Rat, near Zadar, Croatia (Vignal collection, MNHN).

The distribution of *C. renovatum* is more restricted. It includes the Mediterranean coast of France, Corsica, and Sicily. Smaller morphs which may be this species are found in the Eastern Mediterranean, in Greece and (as *C. pheniciacum*) on the Levantine coast. If *C. tingitanum* were to be proved conspecific, the range would include also the Straits of Gibraltar; the continuity with other parts of the range would be through North African populations, given that the species is absent on the shores of Málaga and Granada provinces.

ACKNOWLEDGEMENTS

We are extremely grateful to Matthias Glaubrecht, curator of Mollusca at the Museum für Naturkunde, Berlin, for making available to us the syntypes of *C. vulgatum* var. *pulchella*, to Luca Galletti (Monreale, Palermo) for providing the photos of the egg masses coming from Sicily, to Sarah Samadi (Institut de Recherche pour le Développement) for the egg masses coming from France, and to Stefano Palazzi (Modena) for help in the bibliographical search. The contribution of one of us (V.G.) was carried out in the Muséum National d'Histoire Naturelle thanks to funds of the European Commission (Environment and Climate Program-Marie Curie, contract n° ENV4-CT98-5125).

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