

**Solecortus multistriatus (Scacchi, 1835), a good marine bivalve species
from the Mediterranean Sea (Bivalvia, Heterodonta: Solecurtidae)**

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Solecortus multistriatus (Scacchi, 1835) from the Mediterranean Sea is here reported as a bona fide species; the authors give additional data about its morphology, ecology and distribution.

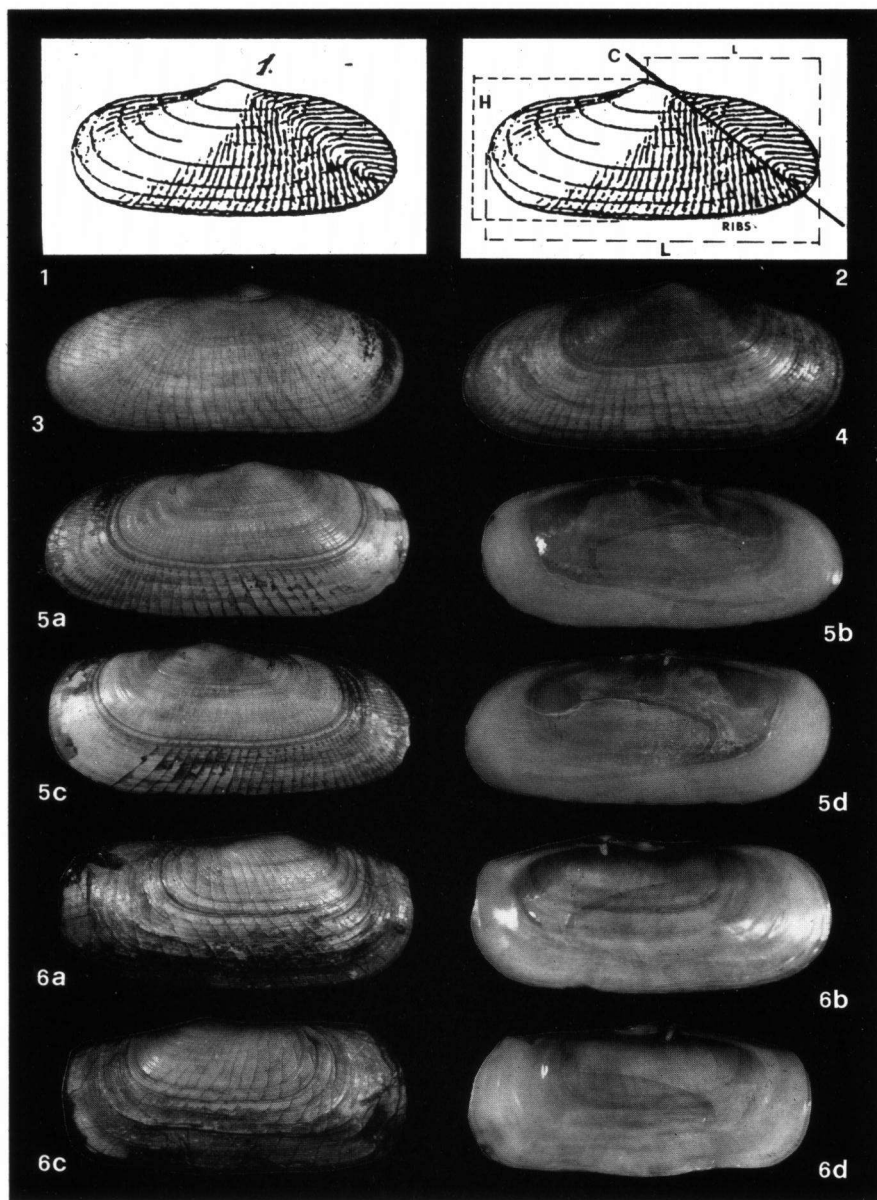
Key words: Bivalvia, Solecurtidae, *Solecortus*, morphology, distribution, Mediterranean Sea, Italy.

INTRODUCTION

In the Mediterranean Sea the genus *Solecortus* Blainville, 1824, is represented by three species: *S. scopula* (Turton, 1822), *S. strigilatus* (Linné, 1758) and *S. multistriatus* (Scacchi, 1835). The last taxon was based by Scacchi (1835) (and not Scacchi, 1834, according to Cretella et al., 1992) on a fossil specimen collected near Gravina, Puglia (Italy). Here the original description is given: "*Testa ovali-oblonga, subaequilatera, antice oblique striata, striis approximatis angulo acuto inflexis. Lata lin. 8, alta lin. 3*". In the description 'lin.' (which stands for linea) is a standard size unit. The one adopted by the authors of that time corresponded to 2.25 mm; but, in this case, it is also possible that 'linea' represents a local Sicilian size unit (1.8 mm) as reported by Giannuzzi-Savelli et al. (1986).

The author clearly stated that this species differs from the fossil and Recent specimens of "Solene bianco del Renieri" [*S. candidus* (Renier, 1804), synonym of *S. scopula*] and of "Solene strigilato" (*S. strigilatus*). Nowadays the status of *S. multistriatus* is still doubtful (Sabelli et al., 1992), since in the past several authors have not considered it as a species by itself (Monterosato, 1884; Bucquoy et al., 1895; Nordsieck, 1969; Parenzan, 1976). In particular, at the very beginning Monterosato (1872, 1875, 1878) considered *S. multistriatus* as a Recent species with a broad geographical distribution, from the Mediterranean to the North Atlantic Ocean, and differing from *S. candidus* (= *S. scopula*). Later on, the author changed his mind as regards this species, considering it a synonym of *S. candidus*, but unfortunately giving no explanation why (Monterosato, 1884). Bucquoy et al. (1895), having so little data on this species, agreed with this last statement, mentioning again that *S. multistriatus* is indeed a Recent species: "*Le Solen multistriatus* publié par Scacchi (*Not.int.alle Conch. ed a Zoofiti fossili di Gravina in Puglia*, p. 76, pl. I, fig. 1), est une

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Figs. 1-6. Shells of *Solecurtus* species. 1, *S. multistriatus*, original figure by Scacchi (1835). 2, *S. multistriatus*, schematic representation of shell measurements, modified from fig. 1, I = umbo-posterior margin length, L = total length, H = height, C = carina (keel). 3, *S. multistriatus*, Capraia Island (Italy), L 24.8 mm, H 10.8 mm. 4, *S. multistriatus*, Tricase (Italy), L 16.4 mm, H 7.5 mm. 5, *S. multistriatus*, Torre Valdaliga (Italy), L 28.1 mm, H 12.8 mm. 6, *S. scopula*, Torre Valdaliga (Italy), L 25.5 mm, H 11.9 mm.

petite coquille qui ne ressemble à aucun des échantillons vivants que nous avons pu examiner. Aussi croyons-nous devoir réserver toute opinion à son sujet, bien qu'Aradas et quelques autres naturalistes l'aient citée comme habitant encore actuellement la Méditerranée". Furthermore, they also mention that the original figure of Scacchi does not look like the one given by Jeffreys (1867): "Quant au *S. multistriatus*, nous avons fait connaitre plus haut notre opinion à son égard et nous pouvons ajouter que les figurations de ce fossile dans les publications de Scacchi et de Philippi n'ont pas d'analogie avec celle donnée par Jeffreys dans son *British Conchology*".

Nordsieck (1969) reported *S. multistriatus* as a subspecies of *S. scopula* (*S. scopulus scopulus* Turton — no. 71.41 and *S. scopulus multistriatus* Scacchi — no. 71.42). More recently, Parenzan (1976) considered *S. multistriatus* a synonym of *S. candidus* (= *S. scopula*). Sabelli et al. (1990) listed it in the annotated checklist of Mediterranean marine molluscs, but afterwards they quoted *S. multistriatus* as a doubtful species (Sabelli et al., 1992).

In this paper we report the presence of *S. multistriatus* in the Mediterranean Sea as a Recent and bona fide species, and we give data about its morphology, ecology and distribution.

MATERIAL

Five very fresh specimens of *S. multistriatus* from different areas of the Mediterranean Sea, collected along the coast of Italy, viz. two individuals (A-B) from Capraia Island, Northern Tyrrhenian Sea (fig. 3); one (C) from Tricase, Strait of Otranto, collected at a depth of 30 m on sandy-muddy bottom (fig. 4); two (D-E) from Torre Valdaliga, Central Tyrrhenian Sea, collected at a depth of 30 m on sandy-muddy bottom (figs. 5a-d). All the specimens listed above were lacking soft parts.

Forty-five specimens of *S. scopula* from different areas of the Mediterranean Sea, collected along the coast of Italy, viz. two individuals from Santa Margherita, Ligurian Sea; six from Capraia Island, Northern Tyrrhenian Sea; eight from Torre Valdaliga (figs. 6a-d), one from Santa Marinella and six from Fiumicino, Central Tyrrhenian Sea; six from San Teodoro, Sardinian Sea; ten from Taranto, Ionian Sea; six from Civitanova Marche, Central Adriatic Sea.

One specimen of *S. scopula* from the Atlantic Ocean, collected in Vigo, Spain.

Twenty-three specimens of *S. strigilatus* from different areas of the Mediterranean Sea, collected along the coast of Italy, viz. one individual from Viareggio and one from Tirrenia, Northern Tyrrhenian Sea; two from Torre Valdaliga, one from Palo and one from San Felice Circeo, Central Tyrrhenian Sea; six from San Teodoro and four from La Maddalena Island, Sardinian Sea; one from Le Castella and three from Taranto, Ionian Sea; one from Tricase, Strait of Otranto; one from Cupra Marittima, Central Adriatic Sea; one from the Northern Adriatic Sea. All specimens discussed are in the authors' collections.

DISCUSSION

The material of *S. multistriatus* examined is in excellent agreement with the original diagnosis and figure (fig. 1) of Scacchi (1835). *S. multistriatus* (figs. 3-5d) clearly differs from *S. scopula* (figs. 6a-d) in the overall shape, sculpture and size of the shell. In fact, *S. multistriatus* is more equilateral, less gaping and with the extremities more rounded than

S. scopula. The sculpture of *S. multistriatus* shows a higher number of ribs than that of *S. scopula*. The average size of the two *Solecortus* adult shells clearly differs, *S. multistriatus* being much smaller than *S. scopula*. We will describe the *S. multistriatus* sample examined in more detail; to make reading easy, we refer to the five individuals with letters as defined under Material. Is the shell of *S. multistriatus* inequilateral? In order to evaluate this, the length from the umbo to the posterior margin of the valve (I) has been divided by the total length (L). The calculated ratio I/L is 0.60, 0.57, 0.59, 0.57, and 0.56 for the individuals A-E, respectively; this shows that the shell of this species is a little inequilateral.

The counting of the ribs has been carried out with the carina (keel) as a reference line. So some ribs start from the posterior margin of the valve to end in the central-ventral region of the shell after crossing the carina and changing dramatically their curvature; the remaining ones radiate from the umbo to reach the ventral-anterior margin of the valve (fig. 2). The individuals A-E show 33, 36, 24, 32 and 42 ribs, respectively. Considering the corresponding L for each specimen (25.2, 24.8, 16.4, 19.3, and 28.1 mm), we could calculate the ratio number of ribs/total length (R/L), which gives a relative measurement of the frequency of these ribs in the various specimens observed. The values R/L are 1.32, 1.43, 1.43, 1.68, and 1.49 for the individuals A-E, respectively; so it looks that the ratio remains about constant in the five individuals examined. In order to compare the morphological observations obtained for the *S. multistriatus* material to the data from the two other mediterranean *Solecortus* species, we think it useful to give four average values (I/L, L, H and R/L), in spite of the restricted number of individuals examined. The average values are: I/L = 0.58, L = 22.7 mm, H = 11.0 mm and R/L = 1.46, which summarize the shape, size and sculpture of the *S. multistriatus* shells observed.

In two cases the *S. multistriatus* material has been collected during field research (specimens from Torre Valdaliga and Tricase, see under Material) by SCUBA-diving in the intralittoral and circalittoral zones. In both cases the kind of bottom (sandy-muddy) and depth (about 30 m) of collecting were similar. According to Pérès & Picard (1964), we can consider the biocoenosis as MI (biocoenose des fonds meubles instables). It is noteworthy, that in the sample from Torre Valdaliga, together with the characteristic mollusc species of this well-defined biocoenosis, we have also found eight specimens of *S. scopula*, albeit with a small average size (L = 20.6 and H = 9.9 mm). In the material collected from Capraia Island, we also found four specimens of *S. scopula*. This is another piece of evidence showing that *S. multistriatus* is probably a true species, since it cannot be considered a subspecies of *S. scopula*, having been found sympatrically in two different faunal assemblages in the Tyrrhenian Sea.

In the sample from Torre Valdaliga, we have identified several other mollusc species associated with *S. multistriatus*, some occurring with such a high frequency, that we think it interesting to list them here. Among the Bivalvia, we have found *Nuculoma tenuis* (Montagu, 1808), *Nuculana pella* (Linné, 1767), *Glycymeris glycymeris* (Linné, 1758), *Pecten jacobaeus* (Linné, 1758), *Chlamys varia* (Linné, 1758), *Astarte fusca* (Poli, 1795), *Spisula subtruncata* (Da Costa, 1778), *Lutraria angustior* Philippi, 1844, *Lutraria magna* (Da Costa, 1778), *Tellina balaustina* Linné, 1758, *Tellina crassa* Pennant, 1777, *Tellina donacina* Linné, 1758, *Tellina serrata* Brocchi, 1814, *Donax variegatus* Gmelin, 1791, *Psammobia fervensis* (Gmelin, 1791), *Abra alba* (Wood, 1802), *Solecortus scopula* (Turton, 1822), *Azorinus chamasolen* (Da Costa, 1778), *Clausinella brongniartii* (Payraudeau, 1826), *Timoclea ovata* (Pennant, 1777), *Gouldia minima* (Montagu, 1803), *Pitar rudis* (Poli, 1795), *Corbula gibba*

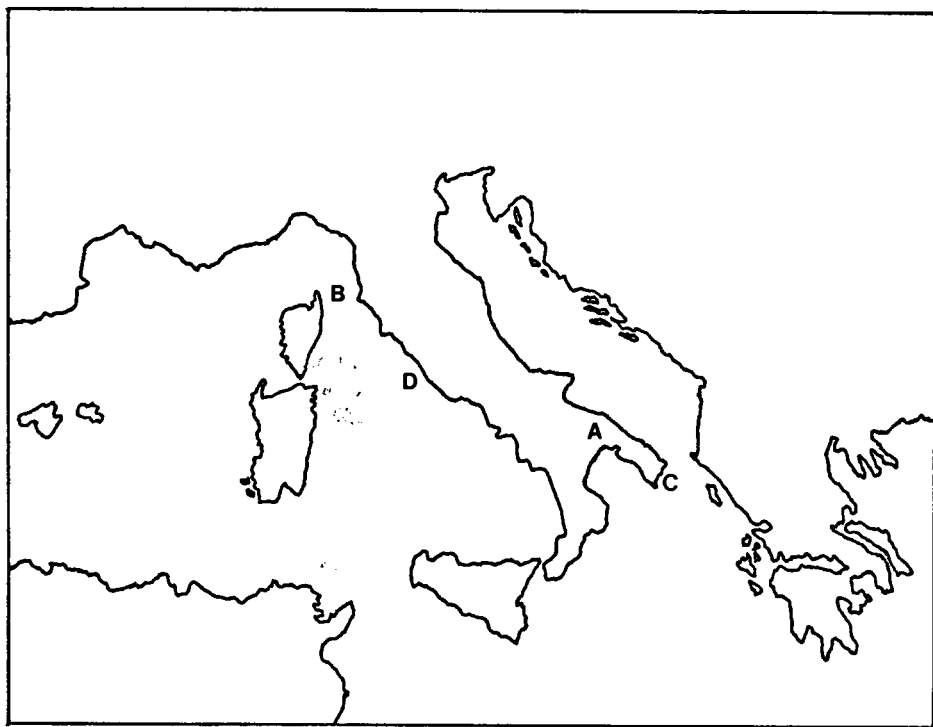


Fig. 7. Type locality (A) and geographical distribution of Recent shell records of *S. multistriatus*. (A) Gravina; (B) Capraia Island; (C) Tricase; (D) Torre Valdaliga (all in Italy).

(Olivi, 1792), *Thracia corbuloides* Deshayes, 1830, *Pandora pinna* (Montagu, 1803), and *Lyonsia norvegica* (Gmelin, 1791).

Among the Gastropoda, we have found *Cerithium aluaster* (Brocchi, 1814), *Turritella turbona* Monterosato, 1877, *Phalium granulatum* (Born, 1778), *Cabestana cutacea cutacea* (Linné, 1767), *Bolinus brandaris* (Linné, 1758), and *Hexaplex trunculus* (Linné, 1758). As shown above, another species of the family Solecortidae found associated with *S. multistriatus*, was *A. chamasolen*, which interestingly is one of the major components of this biocoenosis in the Central Tyrrhenian Sea.

The occurrence of *S. multistriatus* in three different areas of the Mediterranean Sea clearly shows that the distribution of this species along the coast of Italy is very extensive, ranging from the Tyrrhenian Sea to the Strait of Otranto (fig. 7). We should also mention that the type locality of this species (Gravina) is not so far from one of the localities (Tricase) here reported, both localities in the same area of Italy (Puglia).

Since the taxonomic controversy concerns the synonymy of *S. multistriatus* with *S. scopula*, the same kind of analysis described above for *S. multistriatus* has been carried out on specimens of *S. scopula* and, to extend the comparison within the genus *Solecortus*, also on specimens of *S. strigilatus*. The four average values (I/L, L, H and R/L) calculated for the three species are given in table 1. It turns out that the shell of *S. multistriatus* is less

Species	Number of individuals	I/L	L (mm)	H (mm)	R/L
<i>S. multistriatus</i>	5	0.58	22.7	11.0	1.46
<i>S. scopula</i>	46	0.63	51.2	23.4	0.66
<i>S. strigilatus</i>	23	0.59	61.0	27.3	0.46

Table 1. Average I/L, L, H and R/L values of the three species of *Solecortus* examined.

inequilateral than that of *S. scopula*, and it is as inequilateral as the one of *S. strigilatus*. As regards shell size, it is clear that the shell of *S. multistriatus* has about half the size of that of the other two *Solecortus* species. Regarding the sculpture, ribs occur in *S. multistriatus* with higher frequency than is the case in *S. scopula* and *S. strigilatus*.

Probably, the taxonomic confusion about this species was due to its small size, which has induced several authors in identifying specimens of *S. multistriatus* as young individuals of *S. scopula*. With this report we intend to demonstrate that *S. multistriatus*, described originally on fossil material by Scacchi (1835), is indeed a Recent bona fide species living in the Mediterranean Sea.

ACKNOWLEDGEMENTS

We thank Mr. Gianni Bulgarini for technical assistance. We want to express our gratitude to Dr. Giorgio Polsonetti for his cooperation in supplying literature. We are grateful to Mr. Carlo Cavalieri for generously providing references. We are very indebted to the staff of the National Library of Rome, particularly to Mrs. Vera Sciò, who allowed us to examine the rare Scacchi title.

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