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On some shallow-water marine molluscs of the Azores

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Abstract: During recent investigations (2000 and 2001) of the shallow-water molluscan fauna on four of the islands of the Azores (Sao Miguel, Pico, Fayal and Terceira), 206 species (2 Polyplacophora, 160 Gastropoda and 44 Bivalvia) were collected. These species are listed following the systematics of the CLEMAM database and additional observations and comments are given.

The species marked with an asterisk are records not yet included in one of the recently published checklists for the Azores: Avila et al. (2002), Avila (2000), Avila et al. (1998), Avila & Azevedo (1997), Azevedo (1991), Azevedo & Martins (1989). Some are confirmations of older records, others are very recent finds and thirty-six of them are new finds for the shallow-water molluscan fauna of the islands: *Skenea sp.*, *Parviturbo cf. rolani* Engl, 2001, *Triphora sp.1*, *Triphora sp.2*, *Crinophteiros collinsi* Sykes, 1903, *Vitreolina philippi* (de Reyneval & Ponzi, 1854), *Pusillina sp.*, *Setia cf. lacourti* Verduin, 1985, *Assimineia sp.*, *Caecum sp.1*, *Carinaria mediterranea* Blainville, 1825, *Atlanta fusca* Souleyet, 1852, *Atlanta inflata* Souleyet, 1852, *Protatlanta souleyeti* (Smith, 1888), *Firoloidea desmarestia* Lesueur, 1817, *Raphitoma sp.*, *?Heliacus sp.*, *Mathilda sp.*, *Cima cylindrica* (Jeffreys, 1856), *Graphis albidus* (Kanmacher, 1798), *Odostomia sp.*, *Colpodaspis pusilla* Sars M., 1870, *Pyrunculus hoernesii* Weinkauff, 1886, *Clio pyramidata* Linnaeus, 1767, *Creseis acicula* Rang, 1828, *Creseis virgula* Rang, 1828, *Stiliola subula* (Quoy & Gaimard, 1827), *Cuvierina columnella* (Rang, 1827), *Limacina bulimoides* (d'Orbigny, 1836), *Limacina lesueurii* (d'Orbigny, 1836), *Solemya togata* (Poli, 1795), *Striarca lactea* Linnaeus, 1758, *Crenella arenaria* (Monterosato, 1875), *Dacrydium hyalinum* Monterosato, 1875, *Diplodonta apicalis* Philippi, 1836, *? Basterotia clancula* Von Cosel, 1995.

Introduction: Most of the examined material was collected personally out of shellgrit from the beach, between and under stones and by diving to -5m. Some specimens were obtained, by weedwashing and others by just picking them from the rocks.

Another part was collected out of shellgrit, taken at depths from 8m to 42m around Pico, Terceira and Faial by a diver (coll. F.Swinnen, Belgium).
Some specimens, ascribable to unidentified species, are the object of further study. Part of the material has been donated to the Universidade dos Azores at Ponta Delgada, Sao Miguel.

Taxonomic list:

Classis Polyplacophora

***Lepidochitona simrothi* (Thiele,1902)**

Two specimens of that endemic species, intertidal at Ponta Delgada, Sao Miguel. Avila also recorded the second species of the family, *Lepidochitona piceola* (Shuttleworth, 1853), from Sao Miguel. The distribution of the latter species is restricted to the Azores and the Canary Isl. (Van Belle, 1984).

***Acanthochitona fascicularis* (Linnaeus,1767)**

Only one complete specimen of this widespread species in the same location as the previous one.

Classis Gastropoda

***Patella candei gomesii* Drouet,1858**

Here I tend to follow Christiaens (1973) who regards this taxon as a subspecies within his *P. candei*-group together with *P. crenata*, *P. moreleti* and *P. candei*. More recently, Titselaar (1998) sees it as a valid and endemic species. I have the feeling that many authors, in case of doubt, choose for separation only because of its geographical isolation.

***Patella ulyssiponensis* Gmelin,1791**

Widespread and well known European species.

***Acmaea virginea* (O. F. Muller, 1776)**

***Anatoma crispata* Fleming, 1828**

***Sinezona cingulata* (Costa O. G.,1861)**

***Haliotis tuberculata coccinea* Reeve, 1846**

***Haliotis tuberculata tuberculata* Linnaeus, 1758**

***Jujubinus pseudogravinea* Nordsieck,1973 (fig.1&2)**

Cretella (1992) states: "A species known for only the single specimen described and figured by Nordsieck; its specific validity,... is to be regarded as provisional," If Nordsieck based his description, of this common and endemic species, on a single specimen from Ponta Delgada, this is very poor, but not the issue, as the meant species is in my opinion the only representative of the genus on the archi-

pelago. The closest and often erroneously cited species for the archipelago is *J. exasperatus* (Pennant, 1777). The differences with the latter are the less granulated spiral furrows of which there are usually only 3 above the carina instead of four in *J. exasperatus*, the darker coloration and the umbilical area which is often tinged with red and in my opinion the most solid reason for keeping them apart. I have never seen this in any specimens of *J. exasperatus* where the umbilical area is either colourless or slightly greenish.

***Gibbula delgadensis* Nordsieck, 1982 (fig.3)**

Already in 1988, a friend of mine (J. Verstraeten, Belgium) recognised this tiny endemic species in some shellgrit, collected by himself at Ponta Delgada, Sao Miguel. Curiously it was not mentioned in any checklist from the Azores, although it is a very common species. Recently, Avila (2000) mentioned a *Gibbula sp* that he introduced later, Avila et al. (2002) as *G. delgadensis*.

***Gibbula magus* (Linnaeus, 1758)**

Not common, although this well known European species is cited by several authors for the Azores, only a few empty juvenile shells were found by me.

Calliostoma sp.

A lot of *Calliostoma* species were dedicated to the Azores by several authors such as Mac Andrew (1856), Dautzenberg (1889), Dautzenberg & Fischer (1897), etc. Whether these species are valid ones and whether they really occur on the archipelago is still the question.

The genus *Calliostoma* Swainson, 1840 will be dealt with, in a revision of the Trochidae of the Azores by Sergio Avila and José Pedro Borges.

****Skenea sp* (fig.4)**

Ten specimens, -8m at Vila nova, Terceira. The shells have a microstructure of delicate weavy lines over the whole surface of the teleoconch.

Dicoleps cf cutleriana (Clark W., 1848) cited for Sao Miguel, Avila et al. (2002), is a misidentification for a juvenile *Gibbula sp.*

****Parviturbo cf rolani* Engl, 2001 (fig.5,6&7)**

Ten specimens, -5m at Sao Roque, Pico, 3 beached at Porto Martins, Terceira and 4 at -35m Madalena Islands.

This newly described species mainly differs from *P. fenestratus* (Chaster, 1896) in having only six instead of eight spiral ridges. The specimens I found have a slightly bigger protoconch and generally more planorbid first whorls. If the found specimens stay within the variability range of *P. rolani* its distribution is substantially extended to the north as it was only found on El Hierro and Lanzarote, Canary Islands.

***Tricolia pullus azorica* (Dautzenberg, 1889)**

According to Gofas (1982) *T. pullus canarica* Nordsieck, 1973, should have a more angular outline in the lower part of the aperture, should be bigger in size, should have a generally two toned polychromatism and the columnella tinged with orange. This last feature, and in my opinion the stronger one, is unfortunately also

present in many specimens from the Azores. Remarkably the specimens without it, have the typical coloration patterns of *T. p. pullus*.

On the contrary, what could be in favour of *T. p. azorica* viz. *T. p. canarica* is the green coloration pattern on the base of quite some specimens and only to be found on the Azores. Dautzenberg, in its original description, has already given this as one of his differentiation features with *T. pullus*.

***Bittium cf latreillei* (Payraudeau, 1826)**

The specimens from the Azores and the Canary Isl. differ from those from the Mediterranean in usually having more spirals, 5 or 6 instead of 4. Some of the former specimens have a light creamy color with a darker brown band on the suture, probably just a morph which most likely, Watson (1897) called *B. depauperatum*. I also noticed that many specimens were monstrous, due to disease or pollution?

***Fossarus ambiguus* (Linnaeus, 1758)**

Several specimens under stones and a lot of shells in grit on all islands. The more equally and less conspicuously ribbed form, described by Brusina (1865:29) as *Stomatia kutschigi*, was found too.

***Cheirodonta pallescens* (Jeffreys, 1817)**

***Marshallora adversus* (Montagu, 1803)**

***Monophorus thiriota* Bouchet, 1985**

****Triphora sp.1***

Only one fragment from Faial, -30m and one from Terceira -8m. As the protoconch is gone, a positive identification is impossible. It could be, either *Nototriphora canarica* (Nordsieck & Talavera, 1979), or *Pogonodon pseudocanarica* (Bouchet, 1985), as they are very similar in outline and have the same flamulate coloration.

****Triphora sp.2***

A few shells on Sao Miguel and Terceira.

The difference with *M. adversus* (Montagu, 1803), is the coloration of the first row of tubercles being whitish instead of the colour of the other two rows of tubercles. Shells with the same coloration can be found on the Can. Isl. and in the Mediterranean too. According to Bouchet (1984) it could as well be a simple morph as well as a new species.

S. tricolorata Bouchet, 1996 has, amongst others, the same characteristic but then on the third row. Three shells with such color pattern were also found at Vila Nova, Terceira. Whether they are that species is not known yet.

***Metaxia abruptum* (Watson, 1880)**

Only two shells at Lajes do Pico, but unmistakable that species. I was very surprised to find it beached here as it normally occurs in deeper water. Endemic species.

***Cerithiopsis barleei* Jeffreys, 1867**

****Cerithiopsis diadema* Monterosato, 1874**

Abundant on Sao Miguel, Pico and Terceira, between 0-30 m deep. First record

Watson (1886).

****Cerithiopsis scalaris* Locard,1892**

Two shells on Terceira and three shells on Sao Miguel.

Whether this species and *Cerithiopsis fayalensis* Watson, 1880 are distinct species, is not clear to me. Bouchet is preparing a revision on the European Cerithiopsidae and hopefully he can bring clearness in this matter and in the many other problems of this family.

***Cerithiopsis jeffreysi* Watson,1885**

***Cerithiopsis tubercularis* (Montagu,1803)**

***Janthina* sp.**

Only a fragment too small to make a positive identification.

***Cirsotrema cochlea* (G. B. Sowerby II,1844) (fig.8)**

One single and very juvenile, but beautifully sculptured shell at Horta, Faial -32m.

***Epitonium algerianum* (Weinkauff,1866)**

Three juvenile shells, one on Terceira and two on Pico.

This species is very close to *E. tiberii* (de Boury,1890) from which it can be separated by its bigger protoconch and the presence of several subsutural threads on it, opposed to only one in *E. tiberii*.

***Epitonium clathratulus* (Kammacher,1798)**

Although not many authors consider this Atlantic species synonymous with the merely Mediterranean *E. pulchellum* (A.Bivona ,1832), the differences are extremely minor. The only item that could be taken in consideration to keep them apart, is not the number of ribs as often suggested, but the fine horizontal striae on the younger whorls, one can observe in full grown specimens of the latter.

***Gyroscaia lamellosa* (Lamarck,1822)**

****Melanella* sp**

One specimen at Terceira. This is maybe the *Melanella* sp Avila et al. (2002) refer to. I have not seen their material.

****Crinophteiros collinsi* (Sykes,1903) (fig.9)**

One specimen at -32m Horta, Faial.

Its distribution up till now was given by Fretter & Graham (1982) as around the Channel Isl. and the West Coast of England and Ireland. The Mediterranean records are doubtful as I think this is an Atlantic species. I saw some specimens from the Canary Isl. too. The CLEMAM data base does not mention this species.

***Parvioris ibizenca* (Nordsieck,1968)**

E. microstoma Brusina,1869, not Piette, 1856 is a senior synonym.

****Vitreolina* sp1**

****Vitreolina* sp2**

***Vitreolina curva* (Monterosato ,1874)**

A few shells at -8m, Vila Nova, Terceira.

****Vitreolina philippi* (de Rayneval & Ponzi,1854)**

Common on all islands. Together with Van Aartsen (2000) I consider *V. incurva* (B.D.D.,1883) as a synonym of the former.

***Melarhappe neritoides* (Linnaeus,1758)**

***Littorina saxatilis* (Olivi,1792)**

***Littorina striata* (King,1832)**

***Skeneopsis planorbis* (O.Fabricius,1780)**

***Rissoa guernei guernei* Dautzenberg,1889**

Gofas (1990) states in his article "The littoral rissoidae and anabathridae of Sao Miguel, Azores" that *R. janusi* Nordsieck,1972, known from the Madeiran archipelago is, although most closely related, a different species. The author gives an accurate description of the shell and the animal, but does not point out the anatomical differences with *R. janusi*. The argument that *R. janusi* has an on average higher spire is, in my opinion, insufficient for separating them completely. I suggest considering them subspecies.

****Pusillina* sp.** (fig.10)

Two shells at Horta, Faial,-30m.

****Setia cf lacourti* Verduin, 1985** (fig.11)

One shell at the same location as the previous one.

***Setia quisquiliarum* (Watson,1886)**

Endemic species.

***Setia subvaricosa* Gofas,1990**

Endemic species.

***Alvania abstersa* Van der Linden & Van Aartsen,1994**

Endemic species.

***Alvania angioyi* Van Aartsen,1982**

Endemic species.

***Alvania cancellata* (da Costa,1778)**

***Alvania internodula* Hoenselaar & Goud, 1998**

Avila (2000) only mentions this endemic species from the Formigas Islets. I found 10 shells at Lajes do Pico, Pico.

***Alvania mediolittoralis* Gofas,1989**

Common species in the intertidal zone, living under rocks in sheltered places.

****Alvania platycephala* Dautzenberg & Fischer,1896**

Lajes do Pico, Pico, 2 shells. Normally a deeper water species and endemic for the islands.

***Alvania poucheti* Dautzenberg,1889**

Endemic species.

***Alvania sleursi* (Amati,1987)**

Species restricted to the Azores and the Selvagens archipelago.

***Alvania tarsodes* (Watson,1886)**

Endemic and rare species. Normally found from -35m to bathyal depths and surprisingly found beached at Praia do Popolo, Ponta Delgada, Sao Miguel, 3 shells.

***Cingula cingillus* (Montagu,1803)**

Abundant on all islands.

Whether *Turbo trifasciatus* (J. Adams, 1800) is a senior synonym of that species, as CLEMAM data base suggests, is still the question. The description is very brief and the drawing as well as its measurements (6.5mm-1.5mm) are those of a very slender species, in the kind of *Eulima bilineata* Alder, 1848 or *Eulima glabra* (DaCosta, 1778), not those of *C. cingillus* (4.5mm-2mm).

***Crisilla postrema* (Gofas, 1990)**

Species restricted to the Azores and Madeira.

***Manzonina unifasciata* Dautzenberg, 1889 (fig. 12&13)**

When only looking at the two photographs one could think that by mistake *M. boogi* Moolenbeek & Faber, 1987 and *M. talaverai* Moolenbeek & Faber, 1987, both species from the Canary islands, were pictured. Nevertheless, they both should be *M. unifasciata* as we follow Gofas (1990) who states that they are only morphs of the same species. If he is right one should consider the possibility that *M. boogi* and *M. talaverai* are the same species too. In fact, the resemblances as well as the differences between *M. boogi* and *M. talaverai* in the Canarian populations are the same as the ones between the two morphs of *M. unifasciata* in the Azores.

The protoconches and the coloration are identical in both morphs. Whereas the morph of *M. unifasciata* with fewer, more pronounced axial ribs which continue till over the periphery of the body whorl, also has flatter spiral bands with thinner interspaces and has a deeper basal groove, the other morph has more slender shells with a coarser outlook. I do admit that it is not always easy to separate both morphs, which is more the case with the Canarian species, at least in my material. More material and further research will be required in order to clear this matter.

***Onoba moreleti* Dautzenberg, 1889 (fig. 14)**

Endemic and rather rare species. A few shells on Sao Miguel and Faial.

***Botryfallus ovummuscae* (Gofas, 1990)**

Endemic species. A lot of specimens on all 4 islands.

****Teinostoma azoricum* (Dautzenberg & Fischer H, 1896)**

Only one damaged shell at Sao Roque, Pico, -5m.

***Pisina glabrata* (Von Muhlfeldt, 1824)**

**Assiminea* sp. (fig. 15&16)

Whether *Assiminea eliae* Paladilhe, 1875 is the species found, seems doubtful. Its distribution is given as being from La Rochelle, France, along the Golfe de Gascogne into Spain and from Coimbra, Portugal. Monterosato (1906) and Dollfus (1912) only regard this species as a variety of *A. grayana* Fleming, 1812. Further research on the *Assiminea* species from the Azores is being done by R. Ershler (Smithsonian, Washington) and J.J. Van Aartsen (Leiden, the Netherlands). *A. eliae* is not mentioned in the CLEMAM database.

***Palludinella littorina* (delle Chiaje, 1828)**

Several shells and specimens on Terceira and Pico, between stones in grit.

***Caecum armoricum* de Folin, 1869**

Caecum clarkii* Carpenter, 1858***Caecum wayae* Pizzini & Nofroni, 2001**

The main difference with *C. pollicare* Carpenter, 1859 is the coarser design of its microsculpture.

****Caecum gofasi* Pizzini & Nofroni, 2001**

The types of this species were found in deeper water down to -280m. This does not mean that the species actually lives there. I found it alive in shellgrit down to -25m.

****Caecum sp1* (fig. 17&18)**

Only a fragment at Ponta Delgada, Sao Miguel. Looking at the general shape of the shell, the rings and the presence of a microstructure, it could be *C. trachea* (Montagu, 1803). *C. searleswoodi* Carpenter, 1859 can be excluded I think, as it is much smaller.

****Caecum sp2***

Looks like *C. clarkii* but has a clear microsculpture.

Truncatella subcylindrica* (Linnaeus, 1767)**Thylaeodus rugulosus* Monterosato, 1878*****Vermetus triquetrus* Bivona-Bernardi, 1832*****Lamellaria perspicua* (Linnaeus, 1758)*****Trivia candidula* (Gascoïn, 1825)*****Trivia pullicina* Mollerat, 1890**

I follow Van Aartsen (1987) when he states that *Cypraea pulex* (Solander in Gray, 1827) is preoccupied by *Cypraea pulex* Link, 1807. Nevertheless the emendation *Trivia pullicina* was used for the first time by Mollerat in 1890 and only later on by Locard in 1892.

Luria lurida* (Linnaeus, 1758)**Natica adansoni* de Blainville, 1825**

All other shallow-water records of Naticidae, are surely misidentifications for this species.

Phalium granulatum* (Born, 1778)**Charonia lampas* (Linnaeus, 1758)**

One broken shell in a fisherman's boat at Mosteiros, Sao Miguel.

Cymatium parthenopeum* (Von Salis, 1793)**Bursa scrobiculata* (Linnaeus, 1758)**

Several crabbed shells at Sao Miguel. I have never seen that species elsewhere in the Atlantic, in the intertidal zone.

****Carinaria mediterranea* Blainville, 1825**

Only 3 very juvenile shells in grit at Ponta Delgada, Sao Miguel.

****Atlanta fusca* Souleyet, 1852**

Two shells, in grit at Praia do Popolo, Ponta delgada, Sao Miguel.

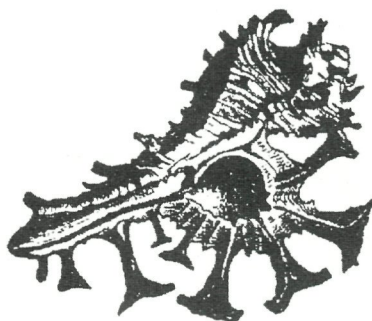
****Atlanta inflata* Souleyet, 1852**

One specimen in the same locality as the previous one and one at, Vila Nova, Terceira.

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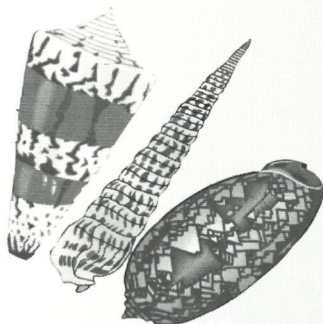
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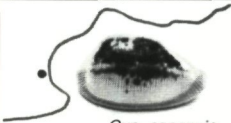


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****Atlanta peronii* Lesueur,1817**

Four shells at Ponta Delgada, Sao Miguel. Dautzenberg has already recorded this species in 1889.

****Protatlanta souleyeti* (Smith,1888)**

Two shells at Ponta Delgada, Sao Miguel and one shell at SaoRoque, Pico.

****Firoloida desmarestia* Lesueur,1817**

Not rare between 30 and 50m depth at Terceira and Faial.

***Ocenebra erinaceus* (Linnaeus,1758)**

***Ocenebrina aciculatus* (Lamarck,1822)**

***Stramonita haemastoma* (Linnaeus,1766)**

***Coralliophila meyendorffi* (Calcara, 1845)**

***Pollia dorbignyi* (Payr.,1826)**

***Nassarius corniculum* (Olivi,1792)**

***Nassarius cuvierii* (Payr.,1826)**

***Nassarius incrassatum* (Strom,1768)**

***Columbella adansoni* Menke,1853**

***Anachis avaroides* Nordsieck,1975**

****Gibberula lazaro* Contreras,1992**

A few shells on all four islands.

The other representative of the genus recorded from the islands is *G. vignalii* Dautz. & Fisher,1896, a deep water species. Two other records in the Marginellidae, are *V. oceanica* Gofas,1989 and *V. ptychasthena* Gofas,1989, both belonging to the genus *Volvarina*, the former a shallow water species, the latter a deep water species. All four species are endemic to the archipelago.

***Mitra cornea* Lamarck,1811**

***Crassopleura maravignae* (Bivona Ant. In Bivona And.,1838)**

***Mitromorpha azorensis* Mifsud,2001**

In his fine work on the genus *Mitromorpha* Carpenter,1865, Mifsud (2001) described this endemic species. Avila et al.(2002) recorded it for Sao Miguel, and I also found it abundantly in grit on all four islands, together with *M. crenipicta* Dautz.,1889, the second endemic representative (I didn't find it, as it seems to be a rather rare species). Mifsud also states that all records of *M. crenipicta* in the Mediterranean are misidentifications for *M. karpathoensis* (Nordsieck,1969).

Finally, the two last representatives of the genus *M. dalli* (Dautzenberg & Fischer,1896) and *M. smithi* (Dautzenberg & Fischer,1896), are also endemic to the islands, but they are deep water species.

***Bela nebula* (Montagu,1803)**

***Mangelia coarctata* (Forbes,1840)**

One specimen and two fragments at -35m Baixa do Sul, Pico- Faial.

***Raphitoma linearis* (Montagu,1803)**

***Raphitoma leufroyi* (Michaud,1838)**

***Raphitoma purpurea* (Montagu,1803)**

***Raphitoma sp.**

Maybe an undescribed species, but only one specimen found.

***Teretia anceps (Eichwald,1830)**

One shell at Lajes do Pico, Pico and one at Vila Nova, Terceira. First record Dautz. & Fisher, 1896

?*Heliacus sp.

One specimen at, -35m Baixa do Sul, Pico- Faial. The specimen is too small to make a positive identification, even on the generic level.

Philippia hybridus (Linnaeus,1758)***Mathilda sp**

A few juvenile specimens on Pico and Faial, -20 to -40m, too small to give a positive identification on specific level.

Rissoella diaphana (Alder,1848)***Rissoella inflata Locard,1892**

In earlier checklists from the Azores, Avila et al.(2000 & 2002), this common European and Atlantic species is always cited as *Rissoella sp.*

CLEAMAM database does not consider it as a valid species, but as a synonym of *R. globularis*.

Omalogyra atomus (Philippi,1841)**Ammonicera fisheriana (Monterosato,1869)*****Cima cylindrica (Jeffreys,1856)**

Rare, two shells, one on Terceira and one on Pico. The present species is always more slender and more cylindrical than the next one, although sometimes it is not easy to separate them. The key to differentiation, is the occurrence of a fine spiral sculpture over the total height of the whorls, exclusively in shells of *C. cylindrica*. See Van Aartsen (1981).

Both species are also to be found, in the Mediterranean, on the Atlantic coasts of Europe and on the Canary islands.

Cima minima (Jeffreys, 1858)***Graphis albidus (Kanmacher, 1798)**

Rare, one shell on Sao Miguel, one on Terceira and one on Faial.

***Chrysallida stefanisi (Jeffreys, 1869)**

Two juvenile specimens, one on Terceira, -32m and one on Faial, -43m. This merely deep water species was earlier reported by Van Der Linden & Eikenboom (1992) East of Santa Maria, -65m. This species together with *Chr. flexuosa* (Monterosato, 1874), found off several islands, -225m to -480m and introduced as *Chr. interspatiosa* by the same authors, seem to be the only representatives of the genus for the islands.

Odostomella doliolum (Philippi,1844)***Odostomia bernardi Van Aartssen, Gittenberger & Goud,1998**

First of three endemic species, in the family, recently described by these authors. Common.

****Odostomia duureni* Van Aartssen, Gittenberger & Goud, 1998**

The second endemic species, I only found on Sao Miguel, Praia do Popolo, 5 shells. Nevertheless surprisingly, as the authors give a depth range from 50-125m.

****Odostomia eulimoides* Hanley, 1844**

Very common and widespread European species and not rare here either. Three other shallow water representatives are recorded for the islands: *Od. acuta* Jeffreys, 1848, by Nordsieck & Talavera (1979), *Od. scalaris* MacGillivray, 1843 and *Od. unidentata* (Montagu, 1803) by Dautzenberg (1889) but to my knowledge not confirmed yet.

****Odostomia kuiperi* Van Aartsen, Gittenberger & Goud, 1998**

Many shells of the third endemic species on all islands. Van Aartsen et al., add a fourth endemic species, *O. fehrae*, to the list, but it is of no concern here as it is a deep water species, down from about -90m.

****Odostomia lukisii* Jeffreys, 1859**

The first record for the archipelago, of this and the two following species, Van Aartsen et al. (1998). Common.

****Odostomia striolata* Forbes & Hanley, 1850**

Common.

****Odostomia turrata* Hanley, 1844**

Common.

****Odostomia* sp.**

Five specimens at Horta, Faial, -32m. The found specimens differ from *Odostomia (Megastomia) winfriedi* (Penas & Rolan, 1999) by the protoconch and growthlines. Further research is in progress.

***Turbonilla lactea* (Linnaeus, 1758)**

***Ebala nitidissimus* (Montagu, 1803)**

****Colpodaspis pusilla* Sars M., 1870**

One shell at Sao Roque, Pico, -5m.

***Retusa multiquadrata* Oberling, 1970**

Although CLEMAM, with reason, has put this taxon in *Cephalaspidea* "incertae sedis" (nominal taxa in need of reassessment), I provisionally still use this name as it has been cited as such in earlier checklists from the Azores. See Avila (2000) and Avila et al. (2002). Van Aartsen (pers. comm.) even suggests to consider it a nomen nudum.

***Retusa truncatula* (Bruguière, 1792)**

***Cylichnina umbilicata* (Montagu, 1803)**

****Pyrrunculus hoernesii* Weinkauff, 1886**

Only one shell at -32m, Horta, Faial. This species also occurs on the Can. Isl., where I found it more frequently.

***Runcina* sp.**

***Haminoea cf. ortei* Talavera, Murillo & Templado, 1987**

***Atys macandrewii* E.A. Smith, 1872**

***Cavolinia inflexa* (Lesueur, 1813)**

Only two whole shells and one fragment, divided over three islands.

***Diacria trispinosa* (Lesueur, 1813)**

Only fragments

****Clio pyramidata* Linnaeus, 1767**

A few as well on Sao Miguel as on Pico and Terceira.

****Creseis acicula* Rang, 1828**

I only found this species on Sao Miguel, Ilheu de Vila Franca, 4 shells.

****Creseis virgula* Rang, 1828**

Five specimens at Vila Nova, Terceira.

****Styliola subula* (Quoy & Gaimard, 1827)**

Eight shells on three islands.

****Cuvierina columnella* (Rang, 1827)**

One fragment at Baixa do Sul, Pico-Faial, -35m.

Limacina inflata* (d'Orbigny, 1836)***Limacina bulimoides* (d'Orbigny, 1836)**

Only on Pico, in two different localities, I found 3 shells.

****Limacina lesueurii* (d'Orbigny, 1836)**

Seemingly rare species as I found only one shell at Praia do Popolo, Ponta Delgada, Sao Miguel.

Umbraculum umbracula* (Röding, 1798)**Pleurobranchus testudinarius* Cantraine, 1835*****Aplysia* sp.*****Williamia gussonii* (da Costa, 1829)*****Pseudomelampus exiguus* (Lowe, 1831)*****Ovatella vulcani* (Morelet, 1860)**

Endemic species. Martins (1995, 1999) compared this species with the other two representatives of the genus, *O. firminii* (Payraudeau, 1826) and *O. aequalis* (Lowe, 1832) and concluded that they are all valid species, where they were often previously regarded as synonymous.

Auriculinella bidentata* (Montagu, 1808)**Myosotella cf myosotis* (Draparnaud, 1801)**

The specimens I found from the Azores, differ from those from the mainland by their umbilical area, which is much more prominent.

***Pedipes afra* (Gmelin, 1791)**

Classis Bivalvia

****Solemya togata* (Poli, 1795)**

Ilheu de Vila Franca, Sao Miguel, -2m one fragment.

***Arca tetragona* Poli, 1795**

****Striarca lactea* Linnaeus, 1758**

One valve beached at Lajes do Pico, Pico.

****Crenella arenaria* (Monterosato, 1875)**

Several valves at Sao Roque, Pico, -5m and at Horta, Faial, -32m.

***Gregariella semigranatus* (Reeve, 1858)**

***Rhomboidella prideauxi* (Leach, 1815)**

****Dacrydium hyalinum* Monterosato, 1875**

Already recorded by Dautz., 1889 as *D. vitreum* AA non Holboll in Moeller, 1842.

A few valves and one shell at Sao Roque, Pico, -5m and three valves at Horta, Faial, -32m.

***Aequipecten commutatus* (Monterosato, 1875)**

***Nodipecten corallinoides* (d'Orbigny, 1840)**

***Palliolum incomparabile* (Risso, 1826)**

***Crassadoma pusio* (Linnaeus, 1758)**

***Chlamys flexuosa* (Poli, 1795)**

***Anomia ephippium* Linnaeus, 1758**

***Limaria hians* (Gmelin, 1791)**

***Neopyncnodonta cochlear* (Poli, 1795)**

***Lucinoma borealis* (Linnaeus, 1767)**

****Diplodonta apicalis* Philippi, 1836**

A few valves and one shell at -5m, Sao Roque, Pico and some fragments at -8m Vila Nova, Terceira.

****Chama gryphoides* Linnaeus, 1758**

Three valves at Sao Miguel and Pico. First record Dautzenberg (1889).

***Kellia suborbicularis* (Montagu, 1803)**

***Lasaea rubrum* (Montagu, 1803)**

***Montacuta ferruginosa* (Montagu, 1808)**

One valve at Sao Roque, Pico, -5m.

?Basterotia clancula* Von cosel, 1995 (fig.19-22)**

Numerous valves at Praia do Popolo, Ponta Delgado, Sao Miguel.

Probably most records of *Hiatella arctica* (Linnaeus, 1767) on the archipelago are misidentifications for this species. I found *B. clancula* on the Canary isl. too, although it is not mentioned by Rodriguez & Sanchez (1997), I think for the same reason. I could not get a confirmation of my identification from Von cosel, but if it is this species, its range is far extended to the north. Earlier records are from Senegal to southern Angola and the Cape Verde islands.

***Neolepton cancellatum* Salas & Gofas, 1998 (figs 23, 24)**

This species differs from the European species *N. sulcatulum* (Jeffreys, 1859) by its more reticulated teleoconch, its granulated central area of the protoconch and by its peculiar cardinals of the left valve, fused at some distance along the posterior cardinal to form a hammer-shaped structure.

***Cardita calyculata* (Linnaeus, 1758)**

***Parvicardium vroomi* Van Aartsen, Menkhorst & Gittenberger, 1984**

This species was cited for the first time for the Azores by Smith (1885) as *Cardium transversale* Deshayes, 1855, originally described from the Mediterranean (Alboran). Avila et al. (1998) and Avila (2000) listed this species as *Parvicardium ovale* (Sowerby, 1840) regarding it synonymous with *C. transversale* like Spada & Della Bella (1990) did. In his recent checklist on Sao Miguel Island, Avila (2002) follows Van Aartsen & Goud (2000) in stating that *P. ovale* is really *P. pinulatum* (Conrad, 1831) a boreal species, which does not occur on the islands.

Plagiocardium papillosum* (Poli, 1795)***Planctomya nilae* Van Aartsen & Engl, 2001.**

One valve at SaoRoque, Pico, -5m. Paratype.

***Spisula solidum* (Linnaeus, 1758)**

Two valves. Avila states that these finds could be imported as remainders from meals from fishermen

***Tellina pygmaea* Loven, 1846**

Some shells and several valves on all four islands. I think all records of *Tellina donacina* Linnaeus, 1758, on the islands, are misidentifications for this species.

Tellina incarnata* Linnaeus, 1758**Gari costulata* (Turton, 1822)*****Ervilia castaneus* (Montagu, 1803)*****Venus casina* Linnaeus, 1758*****Timoclea ovata* (Pennant, 1777)*****Globivenus effossa* (Bivona, 1836)******Acropagia balaustina* Linnaeus, 1758**

Only one fragment at -8m Vila Nova, Terceira. First record Rodriguez & Sanchez, 1997

Gouldia minima* (Montagu, 1803)**Pitar rudis* (Poli, 1795)*****Callista chione* (Linnaeus, 1758)*****Paphia aurea* (Gmelin, 1791)*****Hiatella arctica* (Linnaeus, 1767)**

This species seems to be very rare on the archipelago. It was only recorded in 1993 by Poppe & Goto and later by Morton et al.(1998). I only found a single valve at Vila Nova, Terceira.

Nototeredo norvegica* (Spengler, 1792)**Xylophaga dorsalis* (Turton, 1819)*****Tracia papyracea* (Poli, 1791)**

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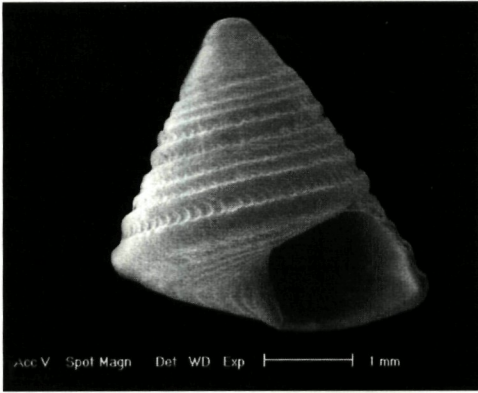


fig 1: *Jujubinus pseudogravinae*

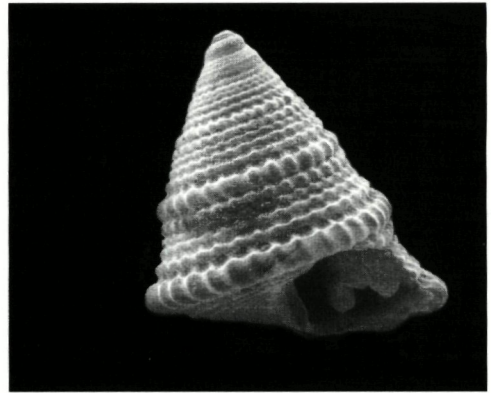


fig 2: *Jujubinus exasperatus* (Can.ISL.)

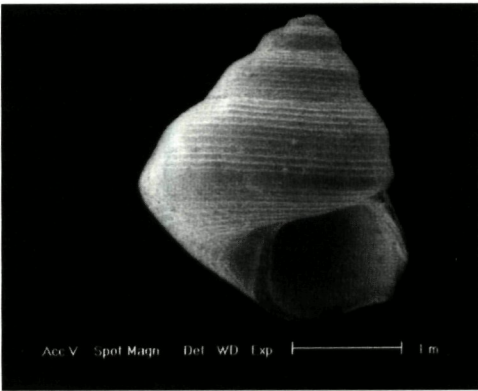


fig 3: *Gibbula delgadensis*



fig 4: *Skenea* sp

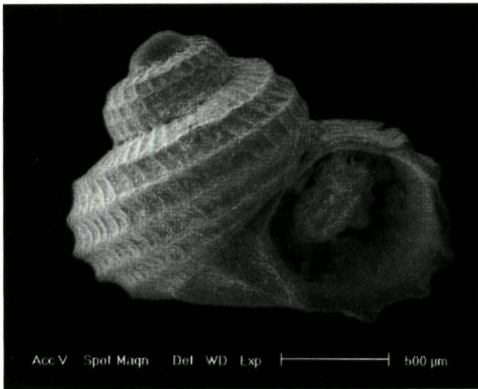


fig 5: *Parviturbo fenestratus*

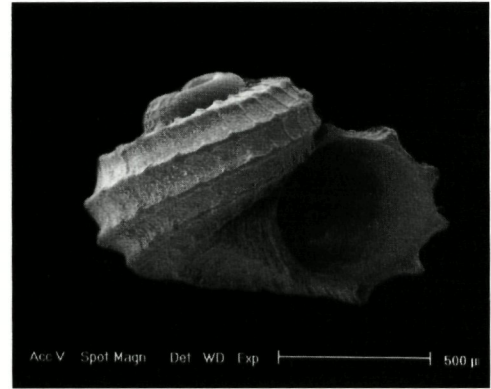


fig 6: *Parviturbo* cf. *rolani*

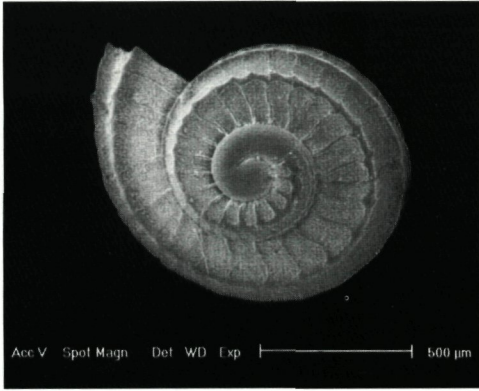


fig 7: *Parviturbo cf. rolani*

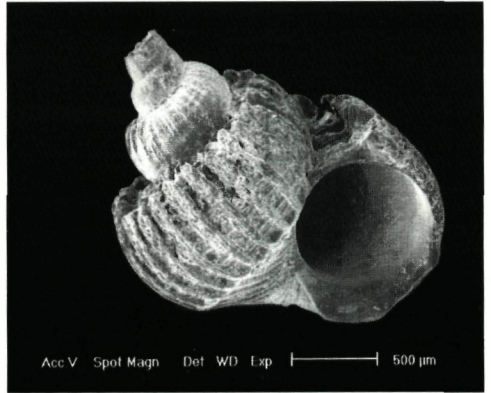


fig 8: *Cirsotrema cochlea, juvenile*

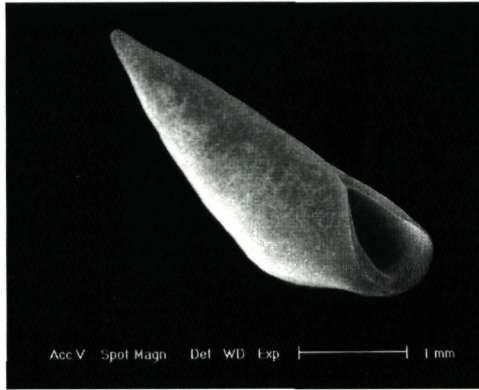


fig 9: *Crinophteiros collinsi*

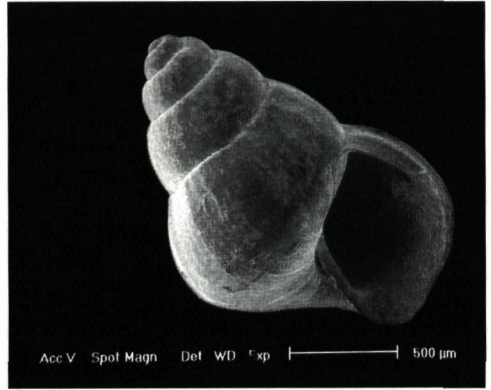


fig 10: *Pusillina* sp

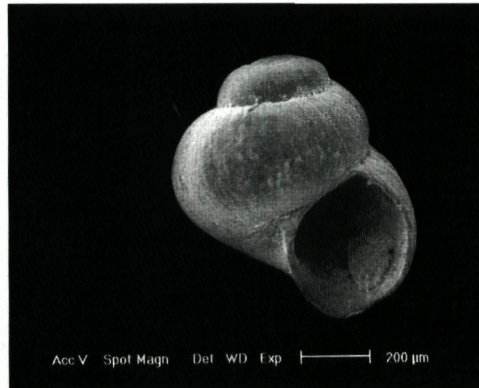


fig 11: *Setia cf. lacourti*

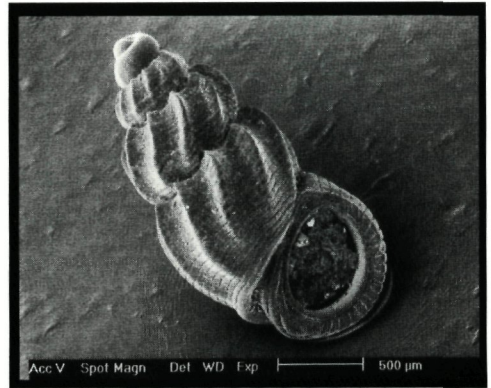


fig 12: *Manzonia unifasciata*

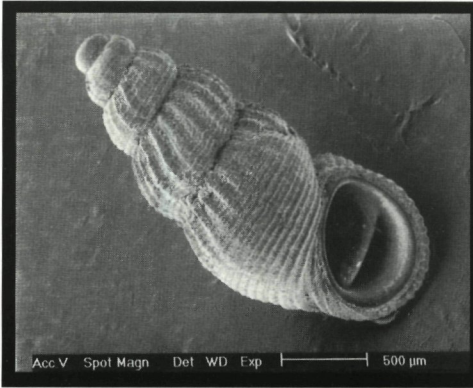


fig 13: *Manzonia unifasciata*

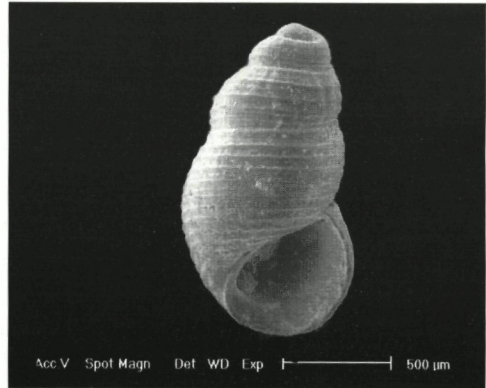


fig 14: *Onoba moreleti*

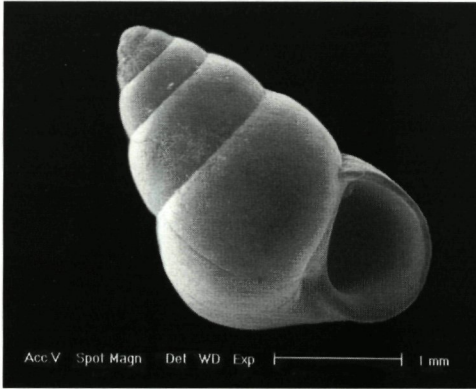


fig 15: *Assiminea sp*

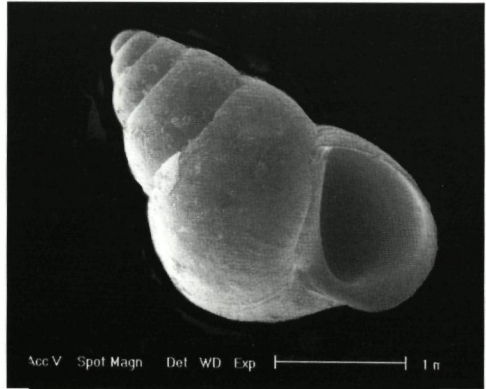


fig 16: *Assiminea sp (Italy)*

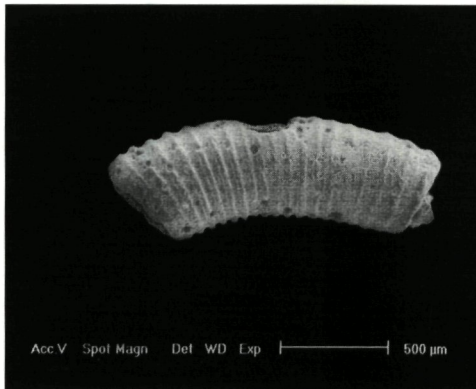


fig 17: *Caecum sp1*

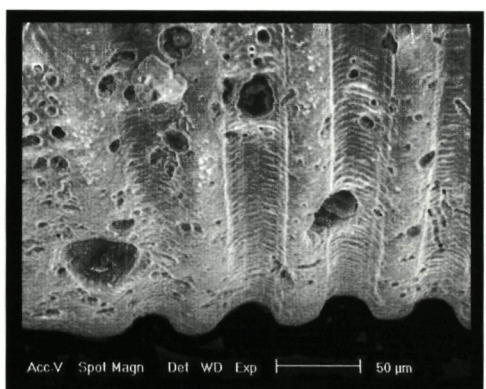


fig 18: *Caecum sp1, microsculpture*

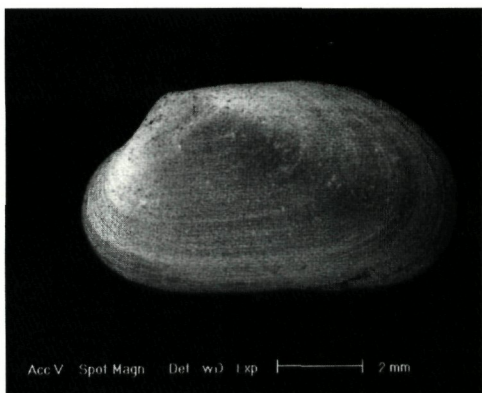


fig 19: ? *Basterotia clancula*
RV outside

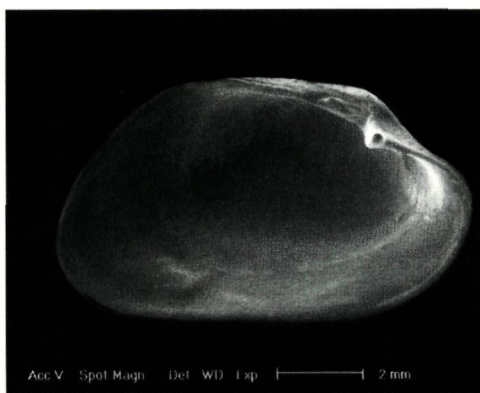


fig 20: ? *Basterotia clancula*
RV inside

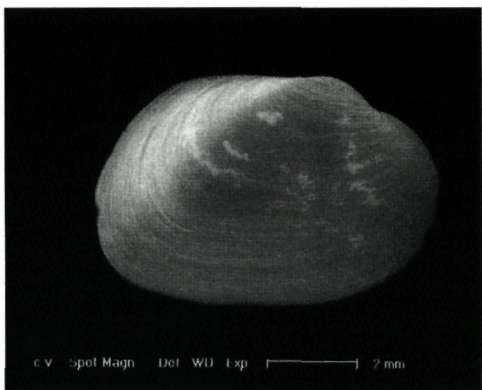


fig 21: ? *Basterotia clancula*
LV outside

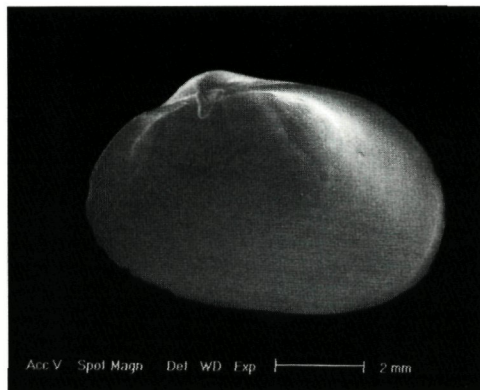


fig 22: ? *Basterotia clancula*
LV inside

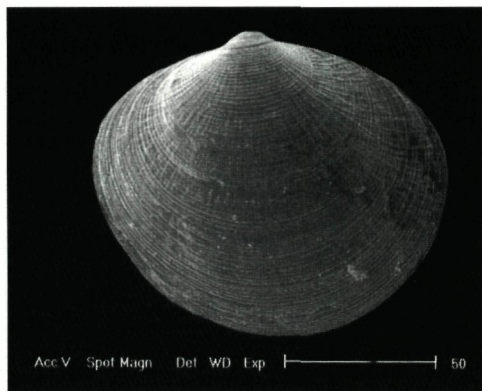


fig 23: *Neolepton cancellatum*

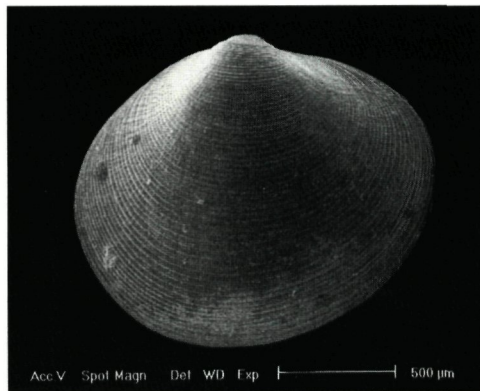


fig 24: *Neolepton sulcatulum* (Malta)