DESCRIPTION OF TWO NEW SPECIES OF HYALOGYRINIDAE (GASTROPODA, HETEROBRANCHIA) FROM THE MEDITERRANEAN

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Abstract: Two new species of the heterobranch gastropod family Hyalogyrinidae are described. Hyalogyrina amphorae Warén, Carozza & Rocchini, sp. n., was found in deep water in the Tuscan Sea and on sunken wood, south of Crete. Its protoconch morphology is puzzling in that some specimens give an impression of lacking heterostrophy. Hyalogyrus sibrowii Warén, sp. n., is described from a submarine cave at Iles d'Hyères (southern France). Both species are known from shells only and their systematic position is tentative.


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Introduction

The Tuscan and Ligurian Seas seem to be one of the richest parts of the Mediterranean regarding the mollusc fauna. To some extent this may be a bias caused by the interest in the area by several Italian amateur malacologists, who have explored the area thoroughly. The main source for material is sidecatches by fishing boats. This material is traded by the fishermen who are well aware of its value for the malacologists and consists of sediment samples caught by trawls, debris and pieces of "white coral" (Madreporaria) caught in the nets, and various objects like pieces of sunken wood with its associated fauna or, as in the present case, an amphora filled with sediment which was caught in a net. This material comes from depths down to several hundred meters, and rich samples are traded.

Many of these Italian malacologists are mainly concerned with the Mediterranean malacology and material from outside this area is of much less interest to them. The value of the samples and the species therefore enters an uncertainty factor because fishermen and dealers sometimes try to sell samples from outside the Mediterranean with erroneous locality information. Careful observations of accompanying fauna and caution are thus needed when this material is treated to avoid complications like those described by BOUCHET & GOFAS (1983), about Terebra cosentina, with species being known from numerous "reliable" records because every collector wanted his collection to contain a Mediterranean specimen.
Usually the deep water species obtained in this way are represented by empty shells only, and it is uncertain to what extent the species still live in the Mediterranean or if they are fossil (see for example *Neopilina zografi* (Dautzenberg & Fischer, 1896) in *Cesari et al.* 1987). Buchet & Taviani (1989) assumed some such species to be late glacial or older fossils and claimed that others may have Mediterranean pseudopopulations based on a continuous inflow of larvae from the Atlantic Ocean with the strong surface current through the Strait of Gibraltar. That is a possibility only for species with planktonic larval dispersal.


Contributing reasons for a very sparse proportion of live taken specimens is that these small shells are too small to become second hand housing for hermit crabs or other crustacea and are therefore not crushed by predators that prey on the tenants. Another reason is that the Mediterranean bottom water is less aggressive to shells then Atlantic water, especially in the North Atlantic, where the water has a tendency to dissolve the calcium carbonate. The result of this is that the shells in a sample of mud in the Mediterranean may represent an accumulation during a very long time, although they are perfectly preserved.

Some species, however, are known to maintain very sparse populations, or, perhaps, they are for some unknown reason caught very rarely:

A large material of the rissoid *Benthonella tenella* (Jeffreys) from the western Mediterranean, 500-3 000 m depth, consisted about 15 000 shells and 12 specimens with soft parts (Buchet, pers. comm.).

Warén has examined about 2 000 shells of the skeneid *Lissosiesta turrita* (Gaglini), but only a single livetaken specimen (collection of F. Giusti, off Capraia, 400 m depth).


*Cirsonella* (previously *Tharsiella*) *romettensis* (Granata, 1877) is quite common in the Mediterranean as empty shells, but has only very rarely been found living.

*Laevophitus verduini* Van Aartsen, Bogi, & Giusti, 1989. Known from many shells but taken alive only as swimming veliger larva (Buchet & Warén 1993: 704).

Some species which normally live associated with special substrates are rarely found as shells, and never alive except when the correct substrate is examined. Examples of such molluscs are choristellid gastropods in elasmobranch egg cases; xylodiscolid gastropods on pieces of wood; mytilids of then genus *Idas* on wood, whale, and dolphin skeletons; and some eulimid gastropods which live permanently attached on their host echinoderm.

It is thus possible that many of the Mediterranean species known from empty shells only, actually do live there, but in very sparse populations, in some cases "pseudopopulations" maintained by an Atlantic inflow of larvae; in other cases on rarely occurring or examined substrates.

The submarine cave fauna of the Mediterranean, on the contrary, is largely unexplored malacologically, although it has yielded some highly interesting animals of other phyla, for example the carnivorous cladohizid sponge *Asbestopluma* (Vacelet et al 1994, Vacelet &
BOURY - ESNAULT 1995) found in a cave at a depth of 17-23 m. This animal belongs to a family which occurs mainly in abyssal depths, and never in places available by SCUBA diving. HAYAMI & KASE (1993) and KASE & HAYAMI (1992) have reported spectacular findings of submarine cave molluscs from Japan, but probably the Mediterranean area has not been stable for enough long a time to allow the evolution of anything similar.

Systematics

Gastropoda, Heterobranchia J. E. Gray, 1840

The more "primitive" species of Heterobranchia were discussed by PONDER (1991). WARÉN et al. (1993) transferred two Mediterranean species, Skenea (now Xenoskenea) pellucida Monterosato, 1874 and Oxystele (now Tomura) depressa Granata, 1877 to the families Hyalogyrinidae and Cornirostridae respectively in the Heterobranchia.

Family HYALOGYRINIDAE Warén & Bouchet, 1993

This family was recognized by WARÉN & BOUCHET (1993) for two genera of skeneimorph gastropods which live associated with sunken driftwood and hydrothermal vents, Hyalogyrina and Hyalogryra. WARÉN et al. (1993) described a third genus, Xenoskenea Warén & Gofas, 1993, for the Mediterranean species Skenea pellucida Monterosato, 1874.

Genus Hyalogyrina Marshall, 1988


Remarks. One additional species has been described from deep-water hydrothermal vents in the Gulf of California (Hyalogyrina grasslei Warén & Bouchet, 1993).

Hyalogyrina amphorae Warén, Carozza & Rocchini sp.n.


Type locality. Off Italy, Tuscan Sea, in an amphora from ca 400 m depth.

Material examined. Only known from the type series, and: south of Crete, METEOR 1987, 17 January 1987, station 19, 34°42'N, 25°51'E, 1626-1433 m (from a sunken piece of wood), 1 shell (Senckenberg Museum, Frankfurt).

Etymology. From amphora (Latin), alluding to where it was found.

Description. Shell (Figs 1-3, 5-10) small, transparent, fragile, skeneimorph, with heterostrophic larval shell. The limit between protoconch I and II can not be separated (Figs. 11-15) and their combined diameter is 225 μm (±3 μm in 5 specimens measured). The initial part is sculptured by an irregularly formed net sculpture caused by rounded, irregularly shaped impressions, 2-3 μm diameter. This part is also distinctly depressed and twisted and unusually narrow. When the coiling becomes more normal, half a whorl from the teleoconch, the net sculpture fades out and the surface becomes perfectly smooth. In some specimens the initial part is covered by some kind of callus or deposit, concealing the sunken central part and the heterostrophy (Figs 13-15). The teleoconch has about 2.2-2.3 whorls in the largest specimens, and is sculptured by distinctly flexuous growth lines, more obvious around the large umbilicus. The whors are very inflated, slightly flattened above the periphery and the suture is deep. The
diameter of the shell varies between 0.98 and 1.16 times its height. The peristome is rounded, its inner side distinctly straighter, with an indistinct corner at its apical part, giving the aperture an oblique, D-shaped appearance. In large specimens the last whorl is only very loosely connected to the preceding one.

Dimensions. Holotype heigh 1.48 mm, diameter 1.47 mm; max. diameter of the species 1.6 mm.

Remarks. All specimens in the type lot were found in a small quantity of mud in an amphora. This probably means that they have been living there, perhaps attracted by the capacity of the amphora to trap suspended sediment or by presence of sulphides caused by oxygen deficit due to the stagnant water, or accompanying sulphide oxidizing bacteria. It is of interest to notice that the additional shell from the METEOR cruise was found on sunken driftwood, like the type species of the genus.

Many specimens had the inside partly covered by secondary growth of calcium carbonate (Figs 8, 10), deposited after the death of the snails which gives them an impression of belonging to a different, much more sturdily built species.

Some specimens had, as mentioned in the description, the nucleus of the larval shell concealed by some kind of deposit, giving a very deceptive impression of a normally coiled protoconch (Fig. 15). The deposit, however, seems to be formed gradually (Figs 13-14) and is only rarely complete as in Fig. 15. We can not give any explanation of this phenomenon.

The specimen from south of Crete was reported by JANSSEN (1989: 269) as Lissospira (?) sp. SEM examination of the shell and well preserved protoconch revealed no differences from the type specimens.

*Hyalogyrina amphorae* is similar to *Akritogyra conspicua* (Monterosato, 1880) (Skeneidae?, see WARÉN 1992), which also has been found in amphorae, but that species has a normally coiled, almost smooth protoconch of a diameter of about 265 μm (Fig. 16), a proportionally larger peristome which is not deformed by the preceding whorl and the shape of the shell is more depressed (Fig. 4) with whorls of perfectly round cross section (not flattened above the periphery).

**Genus Hyalogyrus** Marshall, 1988


Remarks. One additional species has been described from deep-water hydrothermal vents in the Fiji Basin (*Hyalogyrus virinelloides* WARÉN & BOUCHET, 1993).

*Hyalogyrus zibrowii* WARÉN, sp. n.

Type material. Holotype and 7 paratypes (4 partly broken) in Muséum National d’Histoire Naturelle, Paris. Type locality. Mediterranean France, Iles d’Hyères, northwestern part of Ile de Bagaud, 43°00.9’N, 06°21.6’E, in a dark cave with walls covered by manganese oxides, at 7 m depth, 10 m from the opening (innermost part) in mud rich in *Posidonia* fibres.

Etymology. Named after Dr HELMUT ZIBROWIUS, Marseille, who collected the bottom sample that contained the new species.

Description. Shell (Figs 17-19) small, transparent, fragile, skeneimorph, with paucispiral protoconch. The protoconch (Fig. 19) consists of about 0.75 whorls and its diameter is ca 265 μm. It is smooth, except some distal incremental lines, and its initial part is rather small and
depressed. The distal part is somewhat abruptly expanded. The teleoconch (Figs 17-18) has about 2.1 whorls in the largest specimens, and is sculptured by distinctly flexuous growth lines, slightly more obvious around the umbilicus. The whorls are not very convex, slightly flattened above the periphery and the suture is shallow. The diameter of the shell corresponds to 1.3 times its height. The peristome is rounded, its inner side distinctly straighter, with an indistinct corner at its apical and basal parts, giving the aperture an obliquely elongate, D-shaped cross section. Its profile is more radial than tangential, prosocline and its basal and central parts distinctly flexuous.

Dimensions. Holotype height 1.00 mm, diameter 1.30 mm; this is also the known maximum diameter of the species.

Remarks. The systematic placement in Hyalogyrinae is tentative; the species is known from shells only and examination of the radula is necessary for correct allocation. The protoconch gives some indication that it may be a heterobranch in the vicinity of the families Corniostridae and Hyalohyrinidae by having a comparatively small and slightly depressed initial part and rapidly expanding width at the distal part. In archaeogastropods the initial part usually is more inflated, but this character is not very easy to use. Hyalogyrinae zibrowii resembles Xenoskenea pellucida (Monterosato, 1874), but has a slightly larger protoconch (250 μm in pellucida), taller spire and the aperture is almost circular in X. pellucida.

_Hyalogyra zibrowii_ was found in a sample of mud together with the following species:
_Dacrydium hyalinum_ (Monterosato, 1875) (common, this is unusually shallow)
_Arca scabra_ (Poli, 1795) (many small, unusually shallow)
_Manzonia crassa_ (Kamachter, 1798) (two living, normally under stones in slightly anoxic condition)
_Xenoskenea pellucida_ (Monterosato, 1874) (shells, known to live in mud in _Zostera_ beds)
_Gibbula vimontiae_ (Monterosato, 1884) (living, normally among decaying _Posidonia_ leaves)
_Scissurella costata_ d'Orbigny, 1824 (common, normally living under rocks)

There were also shells of several species obviously derived from the _Posidonia_ bed in front of the cave. _Dacrydium hyalinum_ is a common inhabitant of submarine caves (ZIBROWIUS pers. comm.), which otherwise is rare and usually in deeper water. Together the list above gives an impression of an unusual assemblage of species, but still the cave faunas of the Mediterranean are too poorly known to allow any general conclusions.

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REFERENCES


Figures 1-3. *Hyalogyrina amphorae* Warén, Carozza & Rocchini, sp. n. holotype, diameter 1.47 mm.
4. *Akritygyra conspicua* (Monterosato), Corsica, off Calvi, 120 m depth, diameter 1.45 mm.

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Figures 5-10. *Hyalogyrina amphorae* Warén, Carozza & Rocchini, sp. n. variation, Tuscan Sea, 400 m, paratypes. 5-7. Unusually broad specimen, diameter 1.43 mm. 8-10. Compact specimen, diameter 1.51 mm. The protoconch in Fig. 9 is seemingly paucispiral.