

— SHORT COMMUNICATION —

**Finding of a living population of *Panopea glycymeris*
(Von Born, 1778) (Bivalvia; Hiatellidae)
in Eastern Sicily (Mediterranean Sea)**

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Received: 24 September 2009

Accepted after revision: 11 June 2010

A consistent living population of *Panopea glycymeris* (von Born, 1778) was documented underwater along the eastern coast of Sicily. Twenty specimens were counted over an area of 1000 m², with an estimated total population of less than 300 individuals. The morphometric measurements of an adult specimen captured are provided. Proposals to adopt protection measures for this species are discussed.

Key words: *Panopea glycymeris*, Hiatellidae, vulnerable species, biodiversity, Mediterranean bivalves.

INTRODUCTION

There is little knowledge of the biology and ecology of most Mediterranean mollusk species; in many cases, their distribution in the Mediterranean Sea is also unknown, thus making the planning of their conservation particularly difficult (Scotti & Chemello, 2000; Bedulli *et al.*, 2002).

Only 14 species are included in the “Bern Convention” or the “Habitat Directive” lists. At present, there are no Mediterranean mollusks included in the CITES documents and no marine protected areas have been established to protect endangered or endemic mollusk species. The list of species in need of protection could easily include at least the few locally endemics (or those with very restricted range) and the so-called “rare species”, whose life cycles make them especially vulnerable (Scotti & Chemello, 2000; Bedulli *et al.*, 2002; Oliverio, 2003; Templado *et al.*,

2004). The urgent need for a comprehensive study on the status of the Italian malacofauna, from a conservation perspective, cannot be underestimated.

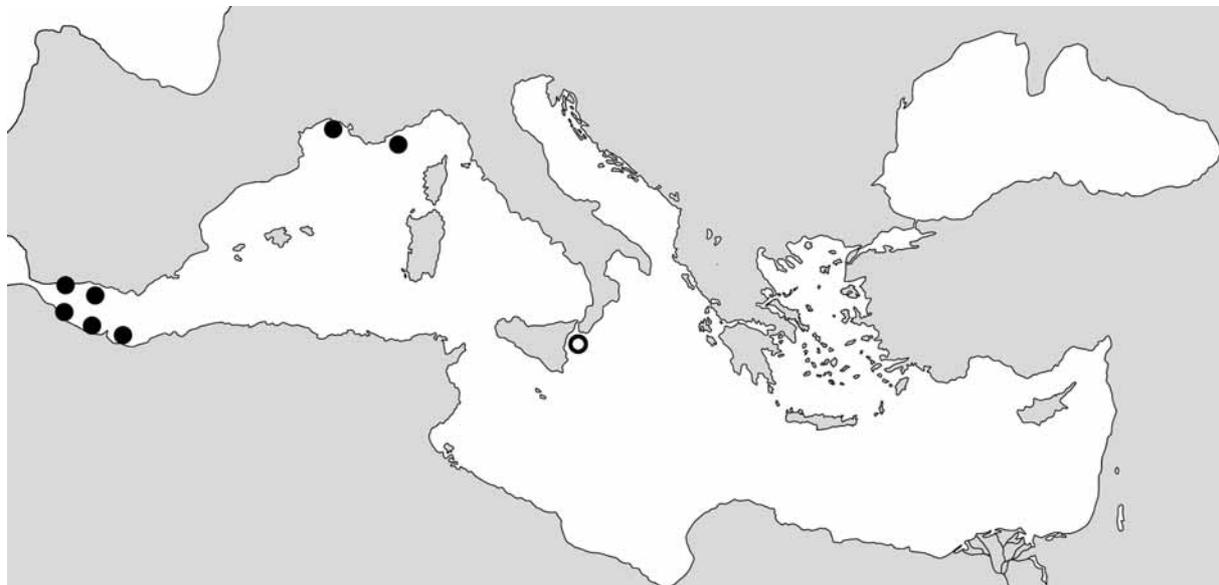
In this respect, the finding of a living population of *Panopea glycymeris* (Bivalvia, Hiatellidae) along eastern Sicily coasts is reported.

MATERIALS AND METHODS

A living population of *P. glycymeris* was found in the Taormina Bay (eastern Sicily, Ionian Sea), on a coarse sand bottom, at a depth of 18-20 m (Fig. 1). On 20 April 2009, after notification by the Nucleo Subacqueo dei Carabinieri (Carabinieri Scuba Divers Unit) of Messina, some specimens of *P. glycymeris* were recorded and photographed underwater in the Taormina Bay.

Observations were made in a large area of 300 × 200 m and at depths between 10 and 30 m. Ten quadrats (10 × 10 m) were randomly placed in the above area and underwater counts of living specimens within each quadrat were carried out, with direct visual

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FIG. 1. Mediterranean Sea distribution of *P. glycimeris*.

census by scuba divers. The number of specimens was obtained through the identification and count of all siphonal apertures present in each quadrat. This also allowed the measurement of the diameter of the siphons. An estimation of the total population was made relating the observed density and distribution with a habitat availability measure, obtained from the evaluation of the adult requirements, in terms of depth, sediment type and water quality.

Twelve isolated valves (5 sx and 7 dx) were also collected and measured in the area but only one specimen was caught in order to record its morphometric characteristics. Since the specimens pulled back their siphons rapidly, it was necessary to insert a meterstick with a 5 mm diameter equipped with a hook through the siphonal apertures to touch the animal's shell. Thus, the snared specimen could be captured and prevented from digging into the sand. The estimation

of the length of the siphons was also facilitated with this procedure.

The isolated valves collected in the Taormina Bay are deposited at the ISPRA Laboratory (Milazzo – Me).

RESULTS AND DISCUSSION

A total of 20 specimens of *P. glycimeris* were counted over a surface of 1000 m², with an estimated population of less than 300 individuals on a suitable area of 750000 m².

The shell is big and solid, equivalve, inequilateral, highly gaping at both ends. The valves are very convex, with contiguous umbones on the front. The anterior and posterior margins are oblique. The ventral and dorsal margins are almost parallel. The external shell surface shows many irregular growth lines, which become lamelliform on the front. The right valve has

TABLE 1. Distribution of *P. glycimeris* in the Mediterranean Sea, based on literature

<i>Localities</i>	<i>Author</i>
Spain: Algeiras, Gibraltar, Malaga, Balearic Islands	Hidalgo, 1917
France: Cote de Maguelone Nizza	Granger, 1884-86 Locard, 1892
Italy: Ionian coast Aci Castello Taormina Taormina-Giardini Naxos	Aradas & Benoit, 1870 Philippi, 1844 Priolo, 1964 present paper

a single, conical, prominent, cardinal tooth which is lamelliform in the left valve. The anterior adductor scar is sub-triangular while the posterior adductor scar is oval. The large dimension of this specimen and the unique morphology of its shell allowed us to avoid any taxonomical confusion or identification mistakes.

Panopea glycymeris is distributed from North-Western Spain, where marks the upper limit of the warm water fauna (Monegatti & Raffi, 2007), down to South Africa, along all the western coast of Africa. It is actually rare in the Mediterranean Sea, according to the criteria published by Bedulli *et al.* (2002). A thorough description of the distribution of this species in the Mediterranean was reported by Priolo in 1964 on the basis of very old literature (Table 1). Sicily represents the easternmost limit of the species distribution (Thomsen *et al.*, 2009), but many records are actually unconfirmed, mainly those along the Mediterranean French coasts and in the Gibraltar Strait. The Sicilian population could be the last actually living in the western Mediterranean.

The diameter of the siphonal apertures in the 20 specimens recorded underwater, ranged between 5 and 7 cm (Fig. 2). The living specimen gave a measure of the considerable length of the siphons, which appeared to be fused along their entire length and covered by a very thick and wrinkled epidermis (Fig. 3). The length of the siphons was calculated by using the sinking depth of the specimen captured, which, after being snared to prevent it from digging into the sand, was calculated to amount to 150 cm under the sediment.

The valves of the living specimen are 15 cm high and 24.5 cm long (anteroposterior). The single valves collected in the area vary from 14.5 cm to 17 cm (mean: 15.54 ± 0.84) in width and from 22.5 cm to 30.5 (mean: 27.49 ± 3.18) in length. All valves belonged to adult specimens.

The numerous records of fossil valves of *Panopea glycymeris*, dating back to the Pliocene, confirm the presence of this species up to the Quaternary (Thomsen *et al.*, 2009), while it is not included in the fauna lists of fossil mollusks of the Tyrrhenian stage (Malatesta, 1942; Priolo, 1964). Its actual distribution area registered a reduction, as confirmed by the very few and disperse living populations of this species in the Mediterranean Sea, probably due both to climatic variations and to human impact (above all over fishing and coastal changes). The Sicilian population is particularly important due to the piecemeal available information on the actual presence of this species in

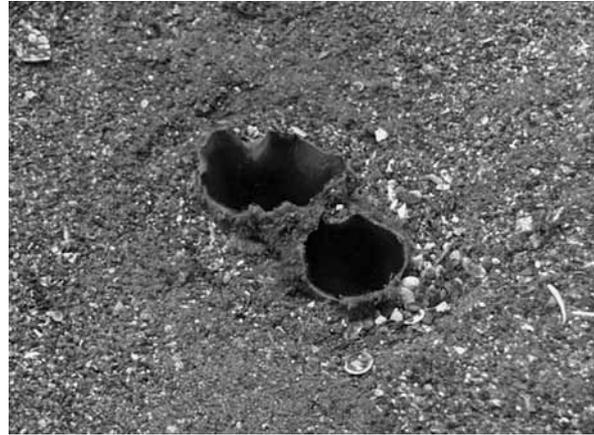


FIG. 2. Siphonal apertures of *P. glycymeris* specimens.

the Mediterranean Sea, which is drawn only from sporadic records of single valves in the central Tyrrhenian Sea (Barsotti & Frilli, 1970) and from accidental captures of specimens by trawl in the southern and northern Tyrrhenian Sea. This specific population in eastern Sicily, limited to the Taormina Bay, was previously cited by Crosse in 1851 and Priolo in 1964, but not really evaluated.

The presence of numerous valves from dead specimens and the absence of juveniles may be considered as destabilizing factors for the population. The absence of findings of recruits in the Taormina Bay may indicate that this is a relict population in which only old individuals survive in an environment unfavourable for the settlement of the larvae or the recruits. Although juvenile specimens of *P. glycymeris* have never been found to date, there may be a neighboring area fit for the settlement of the larvae of this species.



FIG. 3. Specimen of *P. glycymeris* found in the Taormina Bay.

Due to little information on the consistency of the Mediterranean population of *P. glycymeris*, greater knowledge on this species is urgently needed in order to evaluate its real status. The importance of the living population of *P. glycymeris* in the Taormina Bay and its potentially endangered status require urgent planning of management and protection measures.

Therefore, future studies should focus on thorough investigations of the living populations of *P. glycymeris* over a larger research area.

ACKNOWLEDGEMENTS

We are grateful to Francesco Pusateri for providing helpful literature sources and for his valuable help in writing this paper. Our special thanks also go to Nucleo Subacqueo Carabinieri of Messina for their precious contribution to our research and sampling activities.

REFERENCES

- Aradas A, Benoit L, 1870. Conchigliologia vivente marina della Sicilia e delle Isole che la circondano. *Atti Accademia Gioenia di Scienze Naturali*, Catania, 6: 324 pp. 5 pls.
- Barsotti G, Frilli G, 1970. *Panopea glycymeris* (Born, 1778) nel porto di Livorno. *Atti dell'Unione Malacologica Italiana*, anno 1 fasc. 1. All. a Conchiglie, 11-12: 3-6.
- Bedulli D, Bassignani F, Bruschi A, 2002. Use of biodiversity hotspots for conservation of Marine Molluscs : a regional approach. *Mediterranean Marine Science*, 3: 113-121.
- Crosse H, 1851. Note sur l'habitat de la panopaea Aldrovandi de Sicile. *Journal de Conchyliologie*, Paris, 2: 120-122.
- Granger A, 1884-86. *Mollusques*. Parti VI e VII de l'histoire Naturelle de la France (Deyrolle), Paris.
- Hidalgo JC, 1917. *Fauna malacologica de Espana, Portugal y las Baleares*. Madrid.
- Locard A, 1892. *Les Coquilles Marines des Cotes de France*. Paris.
- Lucas M, 1976. Le Hiatellidae delle coste europee. Parte III. *La Conchiglia*, 8: 10-15.
- Malatesta A, 1942. Le formazioni pleistoceniche del Livornese. *Atti della Società Toscana di Scienze Naturali – Memorie*, 51: 145-206.
- Monegatti P, Raffi S, 2007. Mediterranean-Middle Eastern Atlantic Façade: Molluscan biogeography & ecobiostratigraphy throughout the Late Neogene. *Açoreana*, suppl. 5: 126-139.
- Oliverio M, 2003. The Mediterranean molluscs: the best known malacofauna of the world ... so far. *Biogeographia*, 24: 189-202.
- Philippi RA, 1844. Enumeratio Molluscorum Siciliae cum viventium tum in tellure tertiaria fossilium, quae in itinere suo observavit II vol. Eduard Anton, Halle (Halis Saxorum) iv + 303 pp., 16 tavv.
- Priolo O, 1964. Sulla *Panopea glycymeris* vivente e fossile. *Bollettino dell'Accademia Gioenia di Scienze Naturali*, 8: 668-679.
- Scotti G, Chemello R, 2000. I molluschi marini mediterranei degni di protezione: stato delle conoscenze e forme di tutela. *Bollettino Malacologico*, 36: 61-70.
- Templado J, Calvo M, Garvia A, Luque AA, Maldonado M, Moro L, 2004. *Guia de Invertebrados y Peces Marinos protegidos por la legislación nacional e internacional*. Naturaleza y Parques Nacionales, Serie técnica, Organismo Autonomo Parques Nacionales, Madrid.
- Thomsen E, Knudsen J, Koskeridou E, 2009. Fossil panopeans (Bivalvia, Hiatellidae) from Rhodes, Greece. *Steenstrupia*, 30: 163-176.