

IS THE ENDEMIC MALTESE TOP-SHELL *GIBBULA NIVOSA* EXTINCT?

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Abstract

The trochid gastropod *Gibbula nivos*a, endemic to the Maltese Islands, has recently only been found in two Maltese bays, where it occurred on seagrass leaves and under stones at depths of 1-4m. Intensive sampling of *Cymodocea nodosa* and *Posidonia oceanica* meadows, sediment and pebbles at depths of 2-12m, carried out in 2000 and 2002, resulted only in empty shells but no live animals, suggesting that the species is extinct from these localities where previously good populations were found. However, the occurrence of fresh shells from other Maltese sites suggests that small undiscovered populations may exist. *G.nivos*a is considered to be 'critically endangered'.

Keywords : *Biogeography, Conservation, Endemism, Gastropods, Mollusca.*

Introduction

The trochid gastropod *Gibbula nivos*a, first described 1851 has been reported many times from Malta [1,2,3] but not from elsewhere in the Mediterranean or any other sea, and is now widely accepted as endemic to the Maltese Islands [4,5], providing a rare example of a marine point endemism. Within the Maltese Islands, *G. nivos*a appears to be uncommon. Systematic searches in 13 localities distributed round the Maltese Islands made by Palazzi in 1978 [2] resulted in records of empty shells from nine of them, but living animals were only found at St. Thomas Bay, on *Posidonia oceanica* leaves at 1-4m. A later survey [3] reported live specimens from Delimara, close to St. Thomas Bay, and from Santa Marija Bay (Comino) at 2-3m under stones. The most recent catalogue of the marine Mollusca of the Maltese Islands [6] gives this species as common only at St Thomas Bay.

Because of its very restricted regional distribution and rarity, *G. nivos*a is internationally protected (Bern Convention; Protocol Concerning Specially Protected Areas and Biological Diversity in the Mediterranean of the Barcelona Convention) and with the accession of Malta to the European Union, also by the EU's 'Habitats Directive'. As such, there is an obligation to safeguard this species and *G. nivos*a is protected by Maltese legislation. However, no information on its present status exists. To address this, surveys of the two sites from where *G. nivos*a has been reported in recent years - St Thomas Bay (island of Malta) and Santa Marija Bay (island of Comino) - were made in order to assess the status of the species at these localities.

Methods

Surveys were made in summer 2000 at St Thomas Bay and in summer 2002 at St Thomas Bay and Santa Marija Bay. Three shore-normal transects were laid at St Thomas Bay varying in length from 150-750m and passing through shallow water (<4m) *Cymodocea nodosa* meadows, continuous *Posidonia oceanica* meadows, and reticulate *P. oceanica* meadows interspersed with sparse patches of sand and pebble beds (4-12m). At Santa Marija Bay, two 400m-long shore-normal transects were laid over *P. oceanica* meadows interspersed with patches of sand and small pebbles and beds of larger pebbles. In both bays, stations (2m, 4m, 6m, 8m, 10m, and 12m) within these transects were sampled in different ways depending on the substratum. The upper 5cm of sediment was collected from within 0.25m² random quadrats (three replicates per station). Seagrass foliar molluscs were sampled using a 20cm x 40cm aperture hand-held net fitted with a 0.5mm mesh pushed 60 times through a 1m distance in the leaves moving forward with each stroke, thus sampling an area of 20m² per station (two replicates per station). Sediment and rhizomes at the base of *P. oceanica* shoots were sampled by pushing a 45cm-diameter circular corer with a toothed edge [7] into the rhizomes, and using a suction sampler to collect sediment and plant debris into a 1mm-mesh net bag (two replicates per station). In the laboratory the molluscs from all samples were sorted by hand, identified and counted, including broken shells of *G.nivos*a.

Results and discussion

A total of 24 whole empty shells and 10 broken shells of *G.nivos*a were collected from St Thomas Bay in summer 2000, with the largest number of whole shells (11) being collected from seagrass from the 6m station using suction sampling. In summer 2002, 100 whole empty shells (and no broken shells) were collected from this bay with the largest number of

whole shells (59) coming from the quadrat sediment samples at the 2m station. At Santa Marija Bay, only 4 whole empty shells (and no broken shells) were collected, half of which came from seagrass at 4m using the suction technique.

*G. nivos*a has been reported from two habitats: on seagrass (*P. oceanica*) leaves and under stones in shallow water (1-4m) [2,3]. In spite of intensive sampling of sediment, pebbles, and seagrass leaves and rhizomes at depths of 2-12m at St Thomas Bay and Santa Marija Bay, no live animals were found. Given that these two bays were a stronghold for *G. nivos*a [2,3], this suggests that this species is almost certainly extinct from these localities.

Although *G. nivos*a has recently only been reported live from these two bays and from Delimara [2,3], empty shells of this species are to be found in sediment from embayments along the entire southeast, east and north-east coasts of the Maltese Islands [6, and authors' unpublished data]. While the bulk of these shells are old and partially eroded, we also have some very fresh-looking shells that suggest that small undiscovered populations may exist in some localities. It is obvious that the status of *G. nivos*a in the Maltese Islands can only be ascertained by intensive sampling of the entire coastline where the reported habitats of this species occur. It is also equally obvious that even if not extinct, this species must now be considered 'critically endangered' under the 2001 IUCN Red List criteria [8,9].

References

- 1 - Ghisotti F. and Melone G.C., 1972. Catalogo illustrato delle conchiglie marine del Mediterraneo. *Conchiglie* suppl., 4: 79-144.
- 2 - Palazzi S., 1978. Osservazioni sull'habitat di *Gibbula nivos*a A. Adams, 1851. *Conchi g lie*, 14: 177-180.
- 3 - Cachia C., 1981. Notes on some common species of Mollusca from the Maltese Islands. *Boll. Malacol.*, 17: 291-294.
- 4 - Ghisotti F., 1976. Considerazioni su *Gibbula nivos*a A. Adams, 1851. *Conchi g lie*, 12: 79-88.
- 5 - Giannuzzi-Savelli R., Pusateri F., Palmeri A., Ebreo C., 1997. Atlante delle conchiglie marine del Mediterraneo. Vol. 1 Archaeogastropoda. [2nd ed] La Conchiglia, Rome, Italy, 125pp.
- 6 - Cachia C., Mifsud C., Sammut P.M., 1991. The marine shelled Mollusca of the Maltese Islands, Part One: Archaeogastropoda. Grima Publishing, Marsa, Malta, 112pp.
- 7 - Borg J.A., Attrill M.J., Rowden A.A., Schembri P.J., Jones M.B., 2002. A quantitative technique for sampling motile macroinvertebrates in beds of the seagrass *Posidonia oceanica* (L.) Delile. *Scient. Mar.*, 66: 53-58.
- 8 - IUCN, 2001. IUCN Red List categories and criteria: Version 3.1. IUCN Species Survival Commission, IUCN, Gland, Switzerland and Cambridge, U.K., ii + 30pp.
- 9 - Scotti G. and Chemello R., 2000. I molluschi marini mediterranei degni di protezione: stato delle conoscenze e forme di tutela. *Boll. Malacol.*, 36: 61-70.