

# THE RESURRECTION OF *GIBBULA NIVOSA* (GASTROPODA: TROCHIDAE)

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## Abstract

The rediscovery of *Gibbula nivosa* from two widely separated cobble beds in 2006, after some 25 years during which no living specimens had been found, suggested that such beds may be an important habitat for this species. Systematic sampling of cobble patches at 15 different locations resulted in the discovery of another three populations, confirming the importance of cobble accumulations as a habitat for this species, but also showing that while certainly not extinct, *G. nivosa* is still quite rare within the Maltese Islands. This, together with its very narrow geographical range, being endemic to Malta, renders *G. nivosa* highly vulnerable to extinction.

**Keywords:** *Biodiversity, Conservation, Endemism, Gastropods, Sicily Channel*

## Introduction

The Maltese top-shell, *Gibbula nivosa*, is a critically endangered marine trochid gastropod endemic to the Maltese Islands [1,2,3]. This species has always been rare and no live individuals were recorded between 1981 and 2006, despite intensive searches in localities where it used to occur [3]. In 2006, a population of *G. nivosa* was discovered within Sliema Creek, Marsamxett Harbour, while two individuals were also recorded off south-west Comino [1]. Although the main habitat of the Maltese top-shell has been considered to be leaves of the seagrass *Posidonia oceanica*, it has also been reported from under stones in shallow water [4], and the recently discovered populations were all recorded from such a habitat, indicating that cobble beds may be a more important habitat for *G. nivosa* than previously thought [1]. The present study was undertaken to assess the current status of the Maltese top-shell.

## Material and Methods

A preliminary survey was carried out along the low-lying coasts of the Maltese Islands to map the presence of shallow-water 'cobble beds', defined as areas  $\geq 25$  m<sup>2</sup> having a continuous cover of pebbles and cobbles. Fifteen such beds were selected (Fig. 1), and four random samples were collected from each by SCUBA divers, using a 0.1-m<sup>2</sup> circular corer. The length and width of the sampled patches were also measured to estimate coverage. Samples were sorted in the laboratory, all molluscs present were identified, and any live individuals of *G. nivosa* were counted to obtain a measure of population density. Coverage and population density values were used to estimate the total population size within each of the sampled cobble beds with *G. nivosa*.

## Results and Discussion

Live *G. nivosa* were recorded from three of the 15 sampled locations: Hondoq ir-Rummien (Site 10), Xatt l-Ahmar (Site 13) and Fomm ir-Rih (Site 15) (Fig. 1), with mean ( $\pm$ SD) densities of  $2.0 \pm 2.7$ ,  $0.5 \pm 0.6$  and  $11.0 \pm 13.4$  ind./0.1 m<sup>2</sup>, respectively. Given the restricted size of the cobble patches at the three sites, none of which exceeded 50 m<sup>2</sup>, estimated population sizes were low, ranging between 250 and 4400 individuals. In the case of Hondoq ir-Rummien and Fomm ir-Rih, the bottom consisted of a sublittoral boulder scree adjacent to the coast, with *P. oceanica* meadows in deeper waters. Small patches of cobbles and pebbles were present as an enclave between these two habitats at depths of 7–12 m. Only the largest cobble patch was sampled at each site, and it is therefore possible that *G. nivosa* also occurred in cobble patches other than the ones sampled.

Following its rediscovery in 2006, *G. nivosa* has now been recorded from five separate locations around the Maltese Islands (Fig. 1), and other small populations may also exist in cobble patches around the Maltese coastline that have not been sampled. While never formally considered to be extinct, its reappearance after a 25-year period during which dedicated searches were unsuccessful [2] makes it a good example of a 'Lazarus species' [5]. All five presently known populations occur within accumulations of cobbles and pebbles, which therefore seem to be the main habitat for this species; past records from seagrass meadows may have resulted from collection of individuals during foraging excursions. This implies that past searches may have been unsuccessful because they were not made in the gastropod's primary habitat. Nevertheless, the present results also indicate that the Maltese top-shell is still a very rare species, being recorded from only three of the 15 sample sites, which, together with its very narrow geographical range (the Maltese Islands), renders it highly vulnerable to extinction.

**Acknowledgements:** Work on this protected species is in full conformity with the laws of Malta. We thank the Environment Protection Directorate of the Malta Environment and Planning Authority for issuing the necessary permits and for partial financial assistance; additional funding was provided through the European Social Fund under a STEPS scheme grant awarded to JE.

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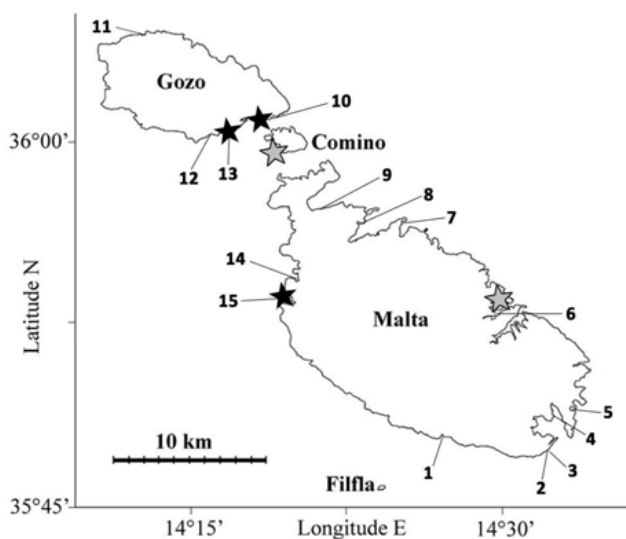


Fig. 1. Map of the Maltese Islands showing the location of the 15 sites with cobble/pebble habitats that were sampled (numbered 1-15); locations where live *Gibbula nivosa* populations were found in the present (black-filled stars) or recent [1,2] (grey-filled stars) studies are also indicated.