

FOULING ASSEMBLAGES FROM TWO MALTESE PORTS STUDIED AS PART OF THE PORTAL PROJECT

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Abstract

Within the context PORTAL project, which was initiated by CIESM in 2003, a wharf in the Grand Harbour, and a fuel jetty and buoy in Marsaxlokk Harbour were sampled to collect baseline data on alien species. 86 species belonging to 7 targeted taxa were collected, with Crustacea being the dominant taxon in terms of both species richness and individual abundance. The highest species richness and evenness values were recorded at 3 m at both sites. Multivariate analyses and SIMPER showed that the degree of separation of fouling assemblages between the two sites was minimal. The fouling assemblages investigated are broadly similar to those occurring in Italian waters. The only alien species found in the samples was a single juvenile of the grapsid *Percnon gibbesi*.

Keywords : *Biodiversity, Coastal Waters, Fouling.*

Introduction

PORTAL is a research programme of the International Commission for the Scientific Exploration of the Mediterranean Sea (CIESM) that aims at implementing a Mediterranean-wide port and port-proximate survey using standardized protocols to collect baseline data on alien species, particularly those which might be introduced by shipping. The Valletta harbours (Marsamxett Harbour and Grand Harbour) and Marsaxlokk Bay are the major harbours of the Maltese Islands. Information on fouling assemblages within the Maltese harbours and harbour-like environments is very scarce. Practically, the only work carried out has been a preliminary study of fouling organisms in oyster cultures in three Maltese bays, including at Rinella within the Grand Harbour [1].

Methods

Pinto Wharf in Grand Harbour, a fuel jetty and a buoy at Birzebbuga in Marsaxlokk Bay were sampled using the PORTAL standard methodology. Fouling biota was collected from three replicate 0.1 m² quadrats at each of three depths (0.5 m, 3 m, 7 m), on the vertical wall of the wharf or jetty at three different stations, while on the buoy three replicates were sampled at 0.5 m.

Results and discussion

A total of 86 species belonging to the taxa targeted by the PORTAL project and to some other taxa for which good taxonomic knowledge was available (Algae: Chlorophyta, Rhodophyta, Phaeophyta; Cnidaria; Polychaeta; Sipuncula; Crustacea: Cirripedia, Amphipoda, Tanaidacea, Isopoda, Mysidacea, Decapoda; Mollusca: Polyplacophora, Gastropoda, Bivalvia; and Ascidiacea) were recorded from the two sampling sites: 77 species from Birzebbuga (73 from the fuel jetty and 21 from the buoy) and 43 species from Pinto Wharf. In terms of individual abundance, Crustacea was the most abundant taxon, followed by Polychaeta and Ascidiacea, whilst in terms of species richness, Crustacea was the most important taxon (25 species), followed by Mollusca (23 species) and algae (17 species). The melitid amphipod *Elasmopus* sp. was overall the most abundant species, followed by the sabellid polychaete *Sabellidae* sp. Other species of the targeted groups were collected, but they have not yet been identified, in particular Bryozoa, while species belonging to groups other than those targeted were present. Surprisingly, no Hydrozoa were found in the samples. Only one alien species of the targeted taxa was present: a single young juvenile of the grapsid crab *Percnon gibbesi* was collected from the Birzebbuga fuel jetty at 3 m depth; dense populations of this species are now found in suitable habitats all along the Maltese coast [2]. At both sites, the abundance of ascidians, polychaetes, molluscs and algae decreased with depth whilst that of crustaceans and sipunculans increased. The highest species richness and evenness values were recorded at 3 m at both sites; this suggests that in the localities sampled, this depth provides the most favourable conditions for fouling assemblages. The majority of species were recorded in both harbours. In addition, the fouling assemblages from the two sites were not significantly different from each other in terms of species richness and individual abundance. Mean species richness at Birzebbuga was 6.5 (s.d. 1.8) at 0.5 m, 7.9 (2.0) at 3 m; 6.8 (1.2) at 5 m, and 3.4 (0.8) for the buoy, while mean species richness at Pinto Wharf was 3.3 (s.d. 1.17) at 0.5 m, 4.3 (1.3) at 3 m; and 3.4 (1.18) at 7 m. The mean Shannon-Wiener Index (H') was 1.08 (s.d. 0.13) for the Birzebbuga jetty and buoy, and 0.93 (s.d. 0.1) for Pinto Wharf, whilst the mean Pielou's Evenness was 0.25 (s.d.0.03) for the Birzebbuga jetty and buoy and 0.21 (s.d.0.02) for Pinto Wharf. Multivariate classifica-

tion (group average linkage hierarchical cluster analysis and nMDS) of species-abundance data separated out the Pinto Wharf samples from the Birzebbuga ones (jetty and buoy), however, the degree of separation was low. nMDS also indicated a bathymetric separation of the Birzebbuga samples; the samples from 0.5 m depth and the buoy were different from those at 3 m and 5 m depths. This suggests that for this site, depth, rather than site-specific environmental conditions, is the most important physical factor influencing the distribution of fouling assemblages. There was also a weak separation between the samples from Birzebbuga buoy and the jetty at 0.5 m depth. SIMPER analysis confirmed the low degree of separation between assemblages from the two harbours. The present results are broadly similar to those obtained for fouling assemblages in Italian waters [3,4], although there are some differences in the dominant taxa. The complete absence of hydroids in the present samples is surprising, especially since, along with barnacles and oysters, hydroids are amongst the first organisms to colonise man-made structures and are common in ports [5]. The absence of alien species, except for *Percnon gibbesi*, was somewhat unexpected in view of the large volumes of marine traffic that passes through Malta ports and their strategic geographic location in the central Mediterranean. Although not recorded in the present study, a number of alien species have been recorded from Malta ports, including the bryozoans *Celleporaria pilaefera* and *C. aperta* [1], the slipper limpet *Crepidula fornicata* [6,7], the oyster *Crassostrea gigas* [8], and the echinoid *Eucidaris tribuloides* [9].

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