

## NOTES ON THE ECOLOGICAL IMPORTANCE OF THE BEACH MACROFAUNAL ASSEMBLAGES AT IX-XATT L-AHMAR, GOZO (MALTESE ISLANDS)

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### ABSTRACT

No data from comprehensive, multi-seasonal macrofaunal studies for the two secluded beaches at Xatt L-Ahmar (Gozo) has been published to date. This paper reports on the deployment of pitfall trap constellations (for nocturnal surface-active macrofauna) and hand-towed nets in shallow water (for infralittoral macrofauna emerging at night in the water column) for eight consecutive seasons. Despite their small size, the beaches at ix-Xatt l-Ahmar harbour relatively high macrofaunal individual abundances, high fractions of psammophilic (i.e. sand-specific species) species and high fractions of rare or endangered species. On the basis of the results reported in this study, it is suggested that the current conservation regime afforded to the ix-Xatt L-Ahmar environs (mainly on cultural and historical grounds) is revised and extended in order to safeguard this ecologically important site.

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### INTRODUCTION

Ix-Xatt L-Ahmar ('Red Beach') actually consists of two secluded and largely inaccessible (except by sea and by narrow winding paths at the base of clay slopes) beaches found along the south-eastern coastline of Gozo, at a short distance from the main port of Mgarr and beneath the Fort Chambray fortifications. The 'main' beach has a bare-sand length of 80m, with a width of 18m, whilst a smaller sandy stretch is found behind the rocky peninsula (known as 'is-Salina' or 'il-Ponta tal-Mellieha'), having just a few metres in length. Despite its limited dimensions, the smaller sandy stretch is still considered as a beach and as a functional ecological unit in view of its persistence over time, which in turn enables colonization and establishment of macrofaunal communities.

The 'main' beach receives large inputs of *Posidonia* seagrass debris which accumulate due to the sheltered position of the beach and due to the general absence of any 'beach-cleaning' activity on site. However, occasional severe storms, such as that which hit the Maltese coasts in winter 2005, carry out to sea all the accumulated seagrass debris.

The conservation importance of the sandy beaches at Ix-Xatt L-Ahmar is to date considered only on the basis of the rare floral species occasionally recorded from the incipient pockets of dune vegetation found at the base of the clay slopes and globigerina escarpments which back the beaches. These pockets are mainly dominated by *Salsola soda* and *Cakile maritima* and rare dune plants recorded on site include *Euphorbia peplis* and *Polygonum maritimum* (Cassar & Stevens, 2002) and the recently rediscovered *Otanthus maritimus* (Tabone, personal communication). At the time of writing of this short note, no data from extensive multi-seasonal faunal surveys conducted at Xatt L-Ahmar had been published, but just the data from snapshot sampling events (e.g. Nardi & Mifsud, 2003). The Malta Environment and Planning Authority (MEPA) carried out brief surveys in the ix-Xatt l-Ahmar area, on two occasions (in 1999 and in 2000), and according to its records, the endemic beetle subspecies *Allophylax picipes melitensis* was present in the area (Marie-Therese Gambin, Darrin Stevens, personal communication). The area surveyed by MEPA, however, extends far beyond the two beaches and includes the clay slopes – *A. picipes*

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*melitensis* is widely distributed across the Maltese Islands and was recorded in the ix-Xatt l-Ahmar area in large numbers by MEPA. This psammophilic (sand-specific) beetle species was also recorded in the present study in spring 2002 from the beaches at ix-Xatt l-Ahmar.

## MATERIALS AND METHODS

This short note reports on some of the data emerging from multi-seasonal sampling conducted on the beaches at Ix-Xatt L-Ahmar, for eight consecutive seasons, from autumn 2001 to summer 2003, as part of a wider study focusing on the beach macrofaunal assemblages of four different beaches in the Maltese Islands. Sampling was conducted by means of pitfall trap constellations and handnets. The pitfall trap constellations consisted of five 7.5cm-diameter surface-flush plastic cups (half-filled with a mixture of water and glycerol to minimize the possibility of faunal individuals crawling back out of the same traps and the occurrence of predator-prey interactions within the traps), connected in a cross-like pattern by means of wooden walkways, which were used to maximize sampling efficiency. Pitfall trap constellations were deployed at dusk in the supralittoral, at 5 metres away from the Mean Sea Level, and emptied at dawn. Note was taken of the length of time the traps were deployed on each occasion, so as to be able to standardize and compare (in temporal terms) faunal collections from different seasons and from different beaches. The number of pitfall trap constellations deployed on every beach reflected the dimensions of the beach – for example, just one pitfall trap constellation on each of the ix-Xatt L-Ahmar beaches was used due to the limited dimensions of the same beaches.

The handnet technique consisted of standardised nocturnal towing of a 0.5mm-mesh handnet, of mouth area 0.1m<sup>2</sup>, through the water column to cover an area of seabed *ca* 25m<sup>2</sup>. Each haul using handnets was made parallel to the shore, in water less than 1 metre deep and lasted for 20 minutes. These hauls were designed to collect upper infralittoral infauna that emerged to swim in the water column at night – hence, care was taken not to disturb the seabed during the handnet towing so as not to collect non-target benthic species. Again, the number of handnet hauls conducted on different beaches was related to the dimensions of the same beach – just one haul per beach was conducted at the ix-Xatt L-Ahmar beaches.

## RESULTS and DISCUSSION

Despite their small size, a mean macrofaunal individual abundance of 29.8 inds/trap/hour was recorded from the beaches at Ix-Xatt L-Ahmar through the use of the pitfall trap constellations, much higher a value than for other larger, local beaches such as Golden Bay and White Tower Bay, sampled for the same frequency and using the same sampling technique (Deidun & Schembri, in press), with only Ramla l-Hamra reporting a higher value.

Ix-Xatt L-Ahmar also recorded the highest fraction (98.3%) of psammophilic macrofaunal individuals amongst the local beaches sampled seasonally and the second highest fraction (50.0%) of psammophilic species through the use of the same sampling technique. In addition, the highest fraction of species collected from one beach only (55.6% of all the species collected on the same beach) was also recorded from Ix-Xatt L-Ahmar (Deidun & Schembri, submitted). These species include endemic ones, like *Erodius erodius melitensis* and *Stenosis schembrii*, and like *Clithobius ovatus*, the latter species being restricted to the Maltese Islands and Tunisia. Another macrofaunal species recorded from Ix-Xatt L-Ahmar and having a restricted local distribution is the psammophilic anthicid *Cyclodinus minutus minutus*, which, along with other dune- and marsh-associated anthicids, is considered to be locally threatened by Nardi & Mifsud (2003).

A total of 36 species was recorded from the beaches at Ix-Xatt L-Ahmar over the entire two-year sampling period. Whilst some psammophiles are not considered as rare, the local paucity in the sandy habitat to which they are restricted still underpins their conservation importance. Mifsud (1999), in fact, considers all beach-associated tenebrionid beetles, along with other psammophilic species, to be threatened. The tenebrionid beetle *Phaleria bimaculata* was recorded in large individual densities from the beaches at Ix-Xatt L-Ahmar, reaching a maximum of 50 individuals/trap/hour in summer 2003. The closely-related *Phaleria acuminata* was not recorded from the beaches at Ix-Xatt L-Ahmar. *Erodius siculus melitensis*, *Clithobius ovatus*, *Stenosis schembrii* and *Phaleria acuminata* are all listed in the Red Data Book for the

Maltese Islands (Schembri & Sultana, 1989). In addition, *Bembix oculata*, one of the few locally-known sand-associated bee species, was commonly encountered on the shorter sandy beach at Ix-Xatt L-Ahmar. In addition, all local endemic species are protected in terms of paragraph 26 of the Flora, Fauna and Natural Habitats Protection Regulations 2006 (except those found in Schedule X). None of the faunal species reported in this study are listed in this schedule.

The ecological importance of Ix-Xatt L-Ahmar is also evident from handnet collections, which were distinct from those recorded on other local similarly sampled beaches. This distinctiveness of the Ix-Xatt L-Ahmar samples appears related to the exclusive presence of many fish species (mainly *Atherina* sp. and *Labrus* sp.) and the absence of most species of mysids (e.g. *Siriella clausii*) and amphipods (e.g. *Atylus swammerdami* and *Gammarus subtypicus*) in the uppermost levels of the infralittoral zone on this beach. Surf zones are often important nursery areas for fish due to their high levels of secondary production by resident crustacean populations (Brown & McLachlan, 1990); hence, the inverse relationship between fish and mysids at Ix-Xatt L-Ahmar may be related to this. Ix-Xatt L-Ahmar is one of the most sheltered local beaches and this fact may also contribute to the high population density of fish found here in autumn and winter, when juvenile fish seek shelter from the turbulence of the open coast.

To date, the beach at Ix-Xatt L-Ahmar and its environs are not scheduled (protected) under local legislation, which only affords protection to a nearby freshwater wetland (at Ghajn Klin) and its buffer zone (as per Government Notice 288/95), scheduled as a Level 1 Area of Ecological Importance and as a Level 1 Site of Scientific Importance, and to the Fort Chambray fortifications, adjacent glaciis and underlying clay slopes (as per Government Notice 840 of 2005), for their historical and cultural value. This, despite Schembri *et al.* (1987) listing the Chambray-Mgarr ix-Xini coastal stretch (which includes Ix-Xatt L-Ahmar) as a site of conservation importance. Policy GZ-RLCN-1 of the Gozo and Comino Local Plan (approved in July 2006) however proposes the Ix-Xatt L-Ahmar area as a Level 2 SSI/AEI (Site of Scientific Importance/Area of Ecological Importance) and as an Area of High Landscape Sensitivity.

In view of the data presented in this paper (especially the endemic and rare species recorded from ix-Xatt L-Ahmar beaches) which supplements existing faunal data possesses by MEPA and in view of the reported 'compartmentalisation' and high beta diversity values of different beach assemblages, whereby no beach assemblage is expendable due to its distinctiveness (Deidun *et al.*, 2003; Gauci *et al.*, 2004; Deidun & Schembri, submitted), the current protection regime afforded to part of the ix-Xatt L-Ahmar environs should also be extended to the two beaches and their associated habitats. This so as not to protect the ix-Xatt L-Ahmar area only on cultural and historical grounds (as is mainly the case, to date) but also on ecological and scientific ones. This would also be in line with the recommendations of the Gozo and Comino Local Plan and in compliance with the Habitats Directive (transposed into local legislation as LN 311 of 2006) which defines all endemic, rare, vulnerable and endangered species as species 'of community interest'.

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