# DISTRIBUTION OF *TYLOS* SPP. (CRUSTACEA, ISOPODA) ON MALTESE SANDY BEACHES AND OBSERVATIONS ON *TYLOS EUROPAEUS*.

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## Abstract

The occurrence of *Tylos europaeus* and *T. sardous* on 10 Maltese beaches was investigated. *T. europaeus* occurred on two beaches on Gozo and *T. sardous* on a single beach on Malta. The largest population was of *T. europaeus* at Ramla l-Hamra on Gozo, but even here the isopods occupied a limited zone close to sea-level. The diurnal and nocturnal distribution of this population as well as temporal changes in distribution pattern over two years were studied in order to provide baseline information for the conservation of this rare psammophile in the Maltese Islands.

*Keywords: Beach, Conservation, Biodiversity, Coastal Systems*

### Introduction

Only 2.4% of the Maltese coastline is sandy [1]. This, and the intense human activity on beaches during the summer months, make most sand-associating species rare and potentially threatened, particularly if they are strictly psammophilic. Two species of the psammophilic isopod genus *Tylos*, *T. europaeus* and *T. sardous*, occur in the Maltese Islands [2], both of which appear to be rare not only because their habitat is limited, but also because even where they occur their populations are not large. To provide baseline information on these species in the Maltese Islands, their distribution on the larger beaches was studied by sampling surface-active animals at night and animals buried in the sand during the day. One beach had a relatively substantial population of *T. europaeus*, which allowed more detailed observations on the spatial and temporal distribution of this species to be made.

### Material and Methods

Pitfall traps were deployed 1m apart along shore-normal transects extending from mean sea-level (MSL) landwards, on 10 sandy beaches in the Maltese Islands. Each trap was set flush with the sand surface and was separated from adjacent traps by a 1m wooden walkway to deflect wandering animals towards the traps. Traps were deployed for eight seasons over two successive years (2002-2003). The daytime distribution of *Tylos europaeus* buried in the sand was studied at Ramla l-Hamra, Gozo, where the largest population occurs [3]. A 30x30cm quadrat was deployed at 1m-intervals along a shore-normal transect in the wet zone of the beach and at 1m, 3m, 5m and 10m intervals from the strandline in the dry zone. Sand within the quadrat was removed and wet sieved through a 0.5 mm mesh; this procedure was carried out successively for the 0-10 cm, 10-20cm and 20-30cm depth strata of the sand within each quadrat.

### Results and Discussion

Of the 10 beaches sampled, *Tylos* were only found on three: Ramla l-Hamra and San Blas on Gozo, and Paradise Bay on Malta. The sand from all three beaches had a median particle diameter of 0.25mm, classifying it as fine sand on the Wentworth Scale. Although *Tylos* was previously recorded from Mistra Bay [2], no individuals were collected from this site in the present study. The specimens from Ramla l-Hamra and San Blas were identified as *Tylos europaeus* on the basis of pleon morphology, while those from Paradise Bay were identified as *Tylos sardous*. The abundances of *T. europaeus* at San Blas and of *T. sardous* at Paradise Bay were very low (individual abundances of 0.05inds/trap/hr for *T. europaeus* at San Blas and 0.26inds/trap/hr for *T. sardous* at Paradise Bay) and these populations were not studied further. In summer, the daytime distribution of *T. europaeus* at Ramla l-Hamra was limited to a narrow zone 3-7m above mean sea level. Within this zone, adult population density ranged from 220 to 450 individuals/$m^3$ but juveniles had densities of 450-3200 individuals/$m^3$. Individuals were found at all three depth strata within the sand (0-10 cm, 10-20cm and 20-30cm), with most adults in the deepest stratum while juveniles were mainly restricted to the upper stratum. During winter, juveniles were again more abundant than adults at almost all the stations, but the isopods were recorded from the surface (0-10 cm) depth stratum only. Adults occurred in higher abundances than juveniles in the pitfall trap collections over all the eight sampling seasons except summer 2002 and summer 2003, and males outnumbered females at all times. Gravid females were found in the spring of both 2002 and 2003, implying that reproduction occurs once a year, as already noted by others (e.g. [4]), and that the preponderance of juveniles in summer was the result of recruitment.

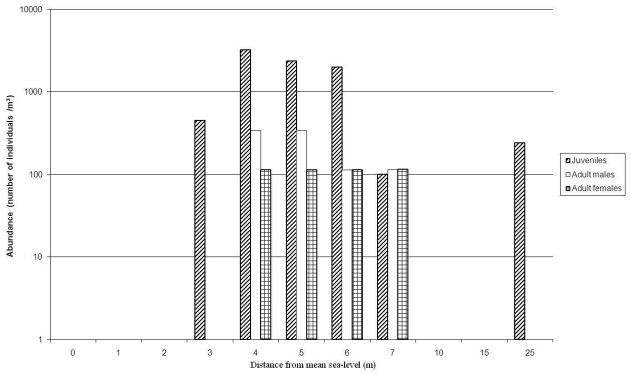


Fig. 1. Distribution of juvenile, adult male and adult female *Tylos europaeus* in the upper 0-10cm layer of sand relative to mean sea-level at Ramla l-Hamra, Gozo.

At Ramla - l Hamra, T.europaeus showed a clear seasonal shift in distribution along the shore, with individuals being zoned further away from MSL during the autumn and winter, and shifting progressively seaward during the spring and summer months, as also observed for the species on a Tyrrhenian beach [5]. There was a high degree of inter-annual variation in abundance of surface-active animals; just four individuals were collected in the pitfall traps in winter 2003, as compared to 619 individuals in winter 2002; this is probably related to colder air temperatures during the winter of 2003 which may have resulted in more inactive individuals. It has been suggested [5] that adverse climatic conditions, especially low air temperatures, could become a limiting factor and depress surface activity in *T. europaeus*. Although common on Mediterranean shores, both species of *Tylos* are overall rare in the Maltese Islands, especially *T. sardous*, which appears to only occur on a single beach, and even where found, populations are restricted to a limited zone of the shore. Therefore, if such species are to continue to survive locally, some management of the populations is necessary and studies such as the present one provide basic information on the populations on which conservation management actions may be based.

## References

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