81° Congresso
Unione Zoologica Italiana

BOOK OF ABSTRACTS

20 - 23 Settembre 2022
Trieste

UNIVERSITÀ DEGLI STUDI DI TRIESTE
Dipartimento di Scienze della Vita
COMITATO SCIENTIFICO PER LA FAUNA D'ITALIA
comune di trieste
UDINE MUSEI MUSEO FRIULANO DI STORIA NATURALE
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Unione Zoologica Italiana 2022

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EFFECTS OF GEOTEXTILES FOR COASTAL EROSION CONTROL ON MARINE FOULING SETTLEMENT

In recent years, the prevention of coastal erosion has arisen as a top priority for reducing the damage to structures and loss of lands. Climatic change is making the erosion rates worse by increasing in storm frequency and intensity. The high coastline recession rates cause significant concern in heavily populated locations. New tools are represented by nonwoven geotextiles. They are made of polypropylene (PP) and polyester (PET) fibres, which are useful in artificial structures for coastal protection. On the other hand, they represent an alternative to natural hard substrates and could interfere with the settlement of fouling species in respect of natural substrates. To better understand the effects of geotextiles on the colonisation capability of macrofouling organisms, a 10-months study was carried out in the Lagoon of Venice (Italy).

Three different needle-punched staple fibre geotextiles were chosen: 1) White-PP, 2) hot-calendered White PP&PET, and 3) multi-layered Coloured PP&PET. Fouling settlement was monitored and analysed on panels replaced monthly with the aim to investigate significant differences among the covering surfaces of each fouling species. The measures of the areas (cm^2) per month were compared using PERMANOVA considering two fixed factors, i.e., geotextiles and month.

All geotextiles revealed a negative effect on the settlement of green and red algae, bivalve molluscs and barnacles. Conversely, they showed a positive selective effect towards both solitary and colonial ascidians. As regards the 18 organisms observed, PERMANOVA showed that for four of the organisms (*Ulva rigida*, *Ceramium ciliatum*, *Janua heterostropha*, *Bugula neritina*) the settlement takes place according to a significant negative selection on basis of both fixed parameters considered in the analysis (month and geotextile). Conversely, for two tunicates (*Ciona robusta* and *Diplosoma listerianum*) the positive selection on settlement capacity appears to be significantly dependent only according to month and not to the type of geotextiles.

Therefore, it must be considered that a long-term and extensive use of geotextiles worldwide could negatively affect local biodiversity and community growth on coasts. The progressive loss of pivot species in favour of the selection of dominant and/or invasive species could trigger negative consequences in both trophic chains of coastal ecosystems and in economical relevant activities of fishing industry and aquaculture.

POSTER N. 11