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ABSTRACTS



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An overview on alien macrophytes in Sicilian Marine Protected Areas (southern Mediterranean Sea)

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Non-indigenous species (NIS) are widely recognized as one of the main drivers of global change, threatening native biodiversity, ecosystem functioning and services. NIS may in time become invasive (Invasive Alien Species – IAS), determining significant environmental impacts, such as biodiversity loss and ecosystem services degradation. Sicilian Islands and all the Marine Protected Areas (MPAs) they host, are notably vulnerable to biological invasions, due to their strategic position at the crossroads between the south-western and eastern Mediterranean Sea, by virtue of the intense maritime traffic. The impact of NIS on marine habitats within MPAs, whose major aim is biodiversity conservation, can be significant, even highly detrimental. Therefore, monitoring NIS distribution is crucial in these areas for planning effective conservation strategies.

To date, a total of 25 macrophytes was recorded for the Sicilian MPAs, belonging to the following taxonomic groups: *Rhodophyta* (15), *Ochrophyta* (6), *Chlorophyta* (3) and *Tracheophyta* (1). Pelagian Islands, Plemmirio and Ciclopi MPAs, located in the Strait of Sicily and the Ionian Sea respectively, registered the highest number (13), followed by the Egadi Islands MPA (12), located in the Tyrrhenian Sea. The red alga *Asparagopsis armata* Harvey and the green alga *Caulerpa cylindracea* Sonder were the most frequently recorded species. The presence of *C. cylindracea* in all the Sicilian MPAs, confirms the invasiveness of this species, which is able to compete with native macrophytes, and may also change native benthic communities. Despite their fundamental role in the conservation of marine biodiversity, MPAs are not immune to NIS, evidencing their vulnerability to this phenomenon and confirming that protection does not hinder the introduction and spreading of NIS. Maritime traffic is certainly the main vector for the introduction and spread of NIS in the Mediterranean Sea. Since MPAs are popular touristic destinations, the expansion of NIS by recreational vessels represents a risk for MPAs. NIS will continue to increase in the Mediterranean Sea, so implementing effective policies and management action is urgently required within MPAs but also in their surrounding areas in order to manage continuous spillover effects. The creation of permanent observatories and alarm systems, able to early detect new introductions and to follow the spread of species already present might be an effective tool in the management of present and future introductions of NIS in MPAs. To this end, the citizen science initiatives may provide a valuable contribution in raising awareness, collect data, and also flagging early-warning signs.