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Marine Alien Macrophyte in Sicilian Marine Protected Areas: an updated overview

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Abstract.
Non-indigenous species (NIS), widely recognized as one of the main drivers of global change, may in time become invasive, determining significant environmental impacts, such as biodiversity loss and ecosystem services degradation. Sicilian Islands and all the Marine Protected Areas (MPAs) they host, are 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.
This updated overview on NIS within Sicilian MPAs, is based on the analyses of the most up-to-date available literature and personal observations.
In Sicilian MPAs (7) 26 NIS are currently reported against 27 registered for the Italian MPAs. Egadi and Ciclopi MPAs registered the highest number of NIS, 13 and 11 respectively, followed by Pelagie (7), Ustica (6) and Plemmirio (6) MPAs. Moreover, some first Mediterranean and Italian records concern precisely Sicilian MPAs. Among NIS, *Caulerpa cylindracea* was the most frequently recorded species.
Our results evidence that protection does not hinder the introduction and spreading of NIS within MPAs. Differences among the Sicilian MPAs are essentially due to different geographic positions and distribution of researchers and interest. Gaps in the information about NIS presence within Sicilian MPAs actually exist.
Despite the impact of NIS within MPAs can be significant, they are rarely considered in conservation planning. This is also because MPAs do not receive enough government funds for planning

regular monitoring activities on NIS. To manage this phenomenon within MPAs, surveillance actions and regular monitoring activities are mandatory in the Management planning. The creation of a network among Sicilian MPAs could be useful to early detect new introduction and to follow the spread of NIS already present. This work represents an important base to create a regularly updated list of NIS within the Sicilian MPAs.

Keywords: Biodiversity, Marine Protected Areas, Mediterranean Sea, Non-Indigenous Species, Sicily.