

FUNCTIONAL TRAITS AS PREDICTORS OF RARITY AND INVASIVENESS IN MEDITERRANEAN WETLAND PLANT COMMUNITIES

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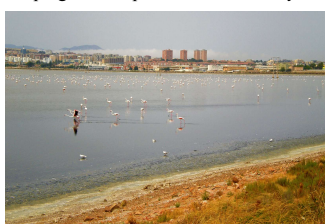
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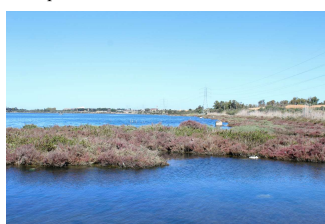
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INTRODUCTION

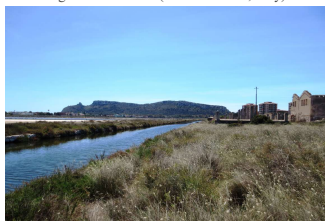
Mediterranean wetlands are of critical conservation importance due to their rich biodiversity, ecological functions, societal value, and the substantial declines they have experienced in recent decades. To support species conservation and ecosystem resilience, it is essential to understand the biological and environmental factors shaping the composition and diversity of wetland plant communities.



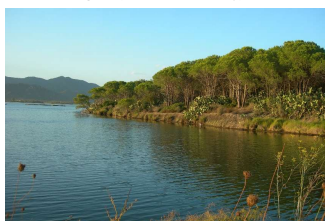
Molentargius salt marshes (South Sardinia, Italy).



Santa Gilla lagoon (South Sardinia, Italy).



Molentargius wetland (South Sardinia, Italy).



Colostrai lagoon (South-East Sardinia, Italy).

AIMS

In this study we compiled an updated and comprehensive list of vascular plant species from Sardinian wetlands and analyzed 13 functional and habitat traits to model the nativeness, rarity, and invasiveness of 224 species, including 184 native and 40 non-native taxa. The aim is to apply this information to prevent threats to rare native species and the invasion of non-native ones.



Some of the native plants in the Mediterranean wetland: *Elatine macropoda*, *Isoetes* sp., *Baldellia ranunculoides*.



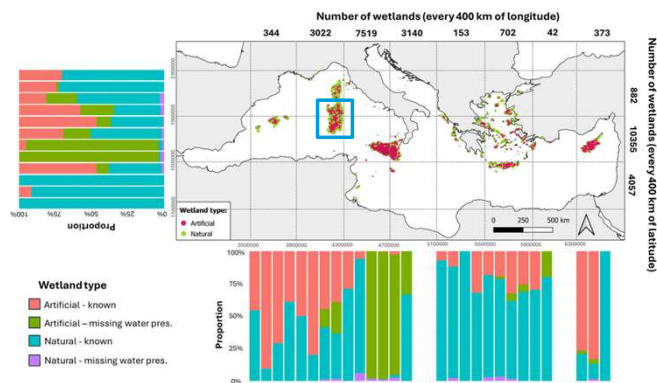
Pontederia crassipes and *Hydrocotyle ranunculoides*, Sardinian IAS Union concern (Reg. UE 1143/2014).



Myriophyllum aquaticum, Sardinian IAS Union concern.



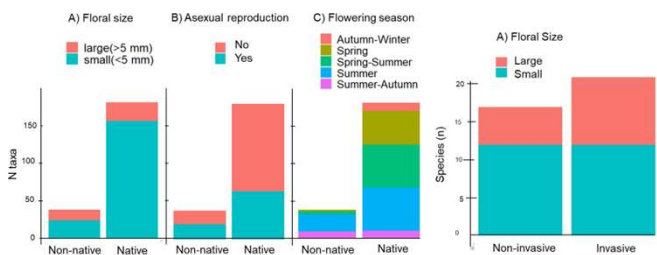
Cotula coronopifolia, common IAS Sardinian wetlands.



SARDINIA: 2,538 wetlands (16% of Mediterranean island wetlands)

RESULTS

Native species generally had smaller flowers compared to non-natives, which tended to flower later and reproduce more often through vegetative means. Rare native species were typically confined to narrower elevation ranges, exhibited shorter flowering periods, and showed reduced vegetative reproduction relative to more common species. Invasive species, on the other hand, were characterized by larger flowers than their non-invasive counterparts. The high rates of both rarity and invasiveness observed in Sardinian wetlands likely reflect the natural fragmentation of freshwater habitats and extensive anthropogenic alterations in the region. Furthermore, variations in reproductive traits may play a key role in shaping species' rarity and invasive potential in these ecosystems.



Difference between native and non-native plants: nativeness and invasiveness model.

CONCLUSIONS

Our findings emphasize the role of reproductive and morphological traits in determining plant distribution patterns and invasion potential. Traits such as floral size and reproductive strategy emerge as key predictors for both rarity and invasiveness, offering valuable indicators for early detection and management. Continuous monitoring of wetland habitats and their plant communities is therefore essential to detect ecological shifts, track invasive spread, and guide timely conservation actions.

This study provides a comprehensive floristic and functional framework for wetland management in Mediterranean contexts, supporting evidence-based strategies aimed at enhancing native and rare species persistence while mitigating biological invasions.

Acknowledgements: We acknowledge financial support under the National Recovery and Resilience Plan (NRRP), Mission 4 Component 2 Investment 1.5 - Call for tender No.3277 published on December 30, 2021 by the Italian Ministry of University and Research (MUR) funded by the European Union - NextGenerationEU. Project Code ECS0000038 - Project Title eINS Ecosystem of Innovation for Next Generation Sardinia - CUP F53C22000430001- Grant Assignment Decree No. 1056 adopted on June 23, 2022 by the Italian Ministry of Ministry of University and Research (MUR).