

Putting the Biogeography of Marine Plants on the Global Map

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Seagrasses and mangroves form the major groups of vascular plants inhabiting bays, estuaries and coastal environments of the world. Together referred to as ‘marine plants’, they are foundational species at the beginning of several foodwebs, maintaining key ecosystem roles in sediment accumulation, nutrient cycling, carbon sequestration and as nurseries for many fish and invertebrates. Despite their recognized importance, however, their evolutionary history is rarely studied across large spatial scales and therefore is often poorly understood by policymakers, and inadequately utilized as a mechanism for understanding the fundamental processes by which species diversity is generated, distributed and maintained. Here, I present a spatially explicit application of phylogenetic methods in the context of two key questions relevant to the ecology and conservation biology of marine plants. First, what are the mechanisms underlying the processes by which marine plant diversity has evolved, is currently distributed and will be maintained? A phylogenetic regionalization of marine plants reveals a range of evolutionary processes underpinning their formation. Second, is the current network of marine protected areas sufficient to safeguard the evolutionary diversity of marine plants? Using emerging innovations in phylogenetics, genomics, and niche modeling, among other developments, I develop tools for conservation that will mitigate future species loss. Putting all these facets of marine plants diversity on the map can help formulate hypotheses about the mechanisms governing regional diversity patterns at scales relevant to research and conservation.