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Importance of Seagrass and Seaweeds

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Introduction

In several parts of the world, from the tropics to the Arctic Circle, seagrass is found in shallow saline and brackish waters. Seagrasses are so-named because there is long green, grass-like leaves in most species. They are often confused with seaweeds, but the flowering plants you see on land are actually more closely related to them. Seagrasses have leaves, stems and roots, and grow seeds and flowers. Dense underwater meadows, some of which are large enough to be seen from space, can form seagrasses. They are one of the most active habitats in the world, even though they sometimes receive little recognition. Seagrasses provide an extremely diverse population of animals with shelter and food, from small invertebrates to big fish, crabs, turtles, marine mammals and birds.

Seaweeds or macroalgae, due to their cultivation ability in offshore marine farms, are desirable candidates for carbon capture while also providing a renewable photosynthetic bioenergy feedstock. Seaweed cultivation needs minimal external requirements for nutrients and allows for biomass production throughout the year. Despite this potential, the realization of large-scale, sustainable agronomics and the development of an effective biomass deconstruction and conversion platform for fuels and products remain major challenges. Recent developments in biotechnology in the detection of enzymatic deconstruction pathways, adapted to complex polymers in seaweeds, open up possibilities for a more complete use of components of seaweed biomass. For yield and efficiency improvements, efficient, scalable and economically viable conversion processes tailored to seaweed are discussed and gaps are established.

Discerption

Biodiversity of seagrasses

The 72 seagrass species are generally divided into four major groups: Zosteraceae, Posidoniaceae, Hydrocharitaceae, and Cymodoceaceae. In marine habitats, their common names, such as eelgrass, turtle grass, tape grass, shoal grass, and spoon grass, represent their many shapes and sizes and functions. Seagrasses vary from species with long flat blades to fern or paddle-shaped leaves, cylindrical or spaghetti blades, or branching shoots that look like ribbons. For ecosystem processes, the identification of herbivore taxa is essential; fish and sea urchins sometimes damage seagrasses by feeding on them, whereas most gastropods and crustaceans facilitate seagrasses by grazing their competitors.

Biodiversity can be thought of as having 2 dimensions within a food web: a 'vertical' portion summarized by the length of food chains and a 'horizontal' component reflecting within trophic levels the number of species or functional classes. Via evolving trophic interactions, changes in vertical diversity (e.g. food chain length) also strongly affect ecosystem properties. Seagrass beds also employ macroalgae, sponges, corals, large bivalves and other sessile invertebrates in addition to the seagrass beds themselves.

On un-vegetated bottoms, which are rare or absent? The structural complexity of seagrass beds derives from both the physical arrangement within beds of seagrass units, shoot density, leaf length, patch structure, and from the wealth and identity of other sessile species that co-occur.

Conclusion

Seagrasses help capture small sediments and particles in the water column that are suspended, which increases the clarity of the water. The sediments are more often stirred by wind and waves when a sea floor region lacks seagrass populations, reducing water clarity, impacting marine animal activity, and generally decreasing the recreational quality of coastal areas. Before these nutrients are swept out to sea and other vulnerable ecosystems such as coral reefs, seagrasses often work to filter nutrients that come from land-based industrial discharges and storm water runoff. The thick network of seagrass roots also helps prevent predators from digging through the substratum in order to detect infaunal prey species. Seagrass leaves provide an anchor for marine algae and animals such as bryozoans, sponges, and forms that are filter-feeding.

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