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A Major Play Role of Seagrass in Marine Environment

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Abstract

Seagrasses are submerged flowering plants found in shallow marine waters, such as bays and lagoons and along the continental shelf in the Gulf of Mexico. A vital part of the marine ecosystem due to their productivity level, seagrasses provide food, habitat, and nursery areas for numerous vertebrate and invertebrate species. The vast biodiversity and sensitivity to changes in water quality inherent in sea grass communities makes seagrasses an important species to help determine the overall health of coastal ecosystems. This article will provide a better knowledge about important role of the seagrass in marine environment.

Introduction

Seagrasses are found in shallow salty and brackish waters in many parts of the world, from the tropics to the Arctic Circle (Den *et al*., 1970). Seagrasses are flowering plants that grow submerged in shallow marine waters like bays and lagoons. With tiny flowers and strap-like or oval leaves, they require sunlight for photosynthesis. Seagrasses evolved from terrestrial plants that recolonized the ocean 70-100 million years ago. There are 60 species belonging to four families in the order Alismatales. Seagrasses occur all along the coastal areas of India. They are abundant in the Palk Strait and Gulf of Mannar in Tamil Nadu. Though seagrasses inhabit all types of substrates (layers) from mud to rock, the lush green seagrass beds are found extensively in muddy and sandy substrates. There are 21 islands in the Gulf of Mannar. Seagrasses abound in the waters around the islands of Kurusadi, Pumarichan, Pullivasal and Thalaiyari.

All six genera and 11 species of seagrasses are found here. Some of the important seagrasses are Sea Cow Grass (Cymodocea serrulata), Thready Seagrass (Cymodocea rotundata), Needle Seagrass (Syringodium isoetifolium), Flat-tipped Seagrass (Halodule uninervis), Spoon Seagrass (Halophila ovalis) and Ribbon Grass (Enhalus acoroides). These were once abundant in the Gulf of Mannar region but are now threatened. Like terrestrial plants, seagrass also photosynthesis and manufacture their own food and release oxygen (Duarte *et al*., 1999). Seagrasses reproduce through both sexual and asexual methods.

A Protector of the Vulnerable

Many sea creatures make their home in seagrass meadows. From large dugongs, manatees, sharks and turtles to tiny seahorses, shrimps and octopus. These meadows offer the perfect habitat for young fish that use the leaves to shelter from predators. Seagrass is the nursery of the ocean. There is now global recognition about the importance of seagrass as a habitat for sporting fisheries (Cullen *et al*., 2014).

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A Fighter against Climate Change

Much like rainforests, seagrass meadows absorb and store huge amounts of carbon dioxide. Like all plants, seagrasses are photosynthetic and absorb carbon dioxide from their surroundings, converting it into energy with the help of sunlight. They are so productive they can absorb carbon dioxide in excess of their needs. This excess carbon is transported into the roots, which often extend many meters below the surface, where it can be stored for thousands of years.

Another way seagrasses can absorb carbon dioxide is via other organisms, from both on land and under the water. Their leaves create dense meadows which slow the water column and force floating particles to settle, where they are then absorbed into the sediment. By trapping carbon in this way, seagrasses can remove carbon from the water column that might otherwise be processed through the normal carbon cycle and re-released back into the atmosphere.

In fact, some species are up to 35 times more effective at capturing and storing carbon than rainforests. However, currently no laws are in place to promote the protection of seagrass meadows as a way to mitigate climate change (Bjork *et al*., 2008).

A Cleaner of Water

As if supporting fisheries and helping slow down climate change isn't enough, seagrasses also clean the water. Often the closest habitat to land, seagrass meadows filter the water ensuring clean water flows into other adjacent ecosystems, such as coral reefs.

Seagrass Helps to Protect Shorelines

Seagrass meadows buffer coastal communities from the full impact of waves and protect coastlines from erosion, two services that are becoming more valuable with the increasing frequency and severity of storms.

Seagrass Captures and Stores Carbon

Through photosynthesis, seagrasses remove carbon dioxide from the water and use the carbon to build their leaves and roots. Plant material that collects on the low-oxygen sediment on the ocean floor decomposes much slower than on land. As this carbon slowly decays it becomes trapped and eventually buried in the soils below. In fact, scientist's estimate 10% of the total organic carbon sequestered in the ocean is buried in the soils below seagrass meadows.

Seagrass Naturally Improves Water Clarity

Seagrass leaves slow the flow of water, causing sediment and other suspended particles to settle quickly. Seagrass roots also stabilize ocean sediments. This ecological service improves water clarity and reduces coastal erosion.

Twenty Percent of the World's Largest Fisheries Depend on Seagrass

Seagrasses provide a leafy underwater canopy that creates shelter for invertebrates and juvenile fish. Experts estimate that one-fifth of the world's most-landed fish species use seagrass as nursery areas, including many commercially important species. Without this crucial habitat, there would be fewer fish to catch and livelihoods could be lost.

Seagrasses are "Ecosystem Engineers"

Seagrasses can create or significantly modify their environment and provide microhabitats that would not otherwise exist. For example, they take in carbon dioxide improving chemical conditions for species affected by ocean acidification and release oxygen, which marine animals need to breathe. The matted roots of seagrass stabilize ocean sediments, and the plant's canopy provides shelter and nursery for hundreds of species (Costanza *et al*., 2014).

Conclusion

Seagrasses are beautiful and important coastal systems that provide habitat, food, shelter, and nursery areas to biota in the world's oceans. They also contribute filtering, sediment stabilizing, and other ecosystem services worldwide. Seagrass in populated areas is declining as rapidly as any oceanic habitat with rapid coastal development and waste discharge the major impacts. Seagrasses must be restored and preserved. To stop and then reverse the decline of seagrasses, a powerful combination of reduced exploitation, increased conservation and monitoring, and improved near shore water clarity is needed globally.

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