# Seagrass meadows—critical habitats for juvenile fish and dugongs in the Johor islands

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Turtles were some of the frequent visitors in seagrass meadows. Credit: Jillian Ooi Lean Sim

Scientists at University of Malaya, Malaysia, have found that the seagrass meadows in Johor harbor three times more juvenile fish than coral reefs. They also found that the dugong herds there prefer certain types of meadows over others.

Seagrass, the world's oldest living thing, is a marine flowering plant that forms vast underwater meadows throughout all the oceans of the world, except in the Antarctic. These flowering plants first appeared in fossil records 100 million years ago and are the key to the survival of our seas, by providing oxygen, filtering out pollutants and bacteria, and capturing large stores of carbon that would otherwise contribute to climate warming. Despite these, seagrasses do not enjoy as high a public profile as coral reefs and mangroves. A team of researchers at the University of Malaya is motivated to raise the profile of seagrass by studying how these plants contribute to something that is naturally compelling to most people – as a rich, productive habitat and a source of food.

The researchers began their project by documenting the types and numbers of fish life in the seagrass meadows around the islands of Johor, and did the same in coral reefs as a way of juxtaposing the two ecosystems. The usual way of doing this kind of study is to drag a trawl net to dredge up all the marine life on the sea-bed. However, the researchers wanted to avoid destructive sampling as they were working in marine parks. As such, GoPro underwater cameras were deployed in a series of 2 x 2 m plots within the seagrass beds and coral reefs to view the types of fishes that visited the ecosystems, and how they utilized the space. The method was painstaking, because it took roughly one day to collect just three samples in the field, and they needed at least sixty! After eighteen months of sampling across different seasons and locations, Nina Ho Ann Jin, MSc student of the project, found three times more juvenile fishes than adult fishes in the seagrass video recordings. She also noted that fishes in the seagrass meadows spent most of their time feeding, while those in the adjacent coral reefs were more occupied by defending their territory. Clearly, the two ecosystems have very different roles from the viewpoint of the average fish: seagrasses are nursery and feeding areas, whereas coral reefs are the home of adult fish. These two ecosystems complement each other in supporting the survival needs of marine organisms at different parts of their life cycle. Thus, seagrasses are no less important than coral reefs in providing us with marine resources, and deserve much more public attention than they have currently received.

Recently, the researchers turned their attention to studying the feeding ecology of dugongs because they depend almost entirely on seagrass as a food source. These shy 'sea cows' have great popular appeal, and by showing the public how closely

linked their fates are with that of their seagrass habitats, the profile for seagrass conservation is also raised. There is a thriving dugong population in the researchers' long-term study area in the Johor islands. The researchers tracked the feeding patterns of dugongs by mapping out their feeding trails across different seasons. Feeding trails are sinuous, bare tracks left behind by dugongs when they graze by ripping the seagrass up from the roots upward. Using the geographical approach, Harris Heng Wei Khang, MPhil student, was able to identify dugong feeding hotspots within the meadows, where dugongs return to feed on preferentially over and over again. Harris Heng is now focusing on finding out why these locations are preferred over others, and has a hypothesis that plant nutrient content may be the key factor. As a result of this work, the researchers' local NGO collaborator has been able to zone the meadows for different levels of protection, based on whether the dugongs use them consistently as feeding grounds or not. This information has also been used to present a persuasive case for establishing a State-sanctioned dugong sanctuary in the area.

Dugong feeding trail in seagrass meadow, Johor islands (October 2017). Credit: Jillian Ooi Lean Sim

**More information:** Ooi, J.L.S., Goh, H.C., Then, A.Y.H. & Affendi, Y.A. (2017) Status Report on the Marine Environment of the Mersing Marine Park Islands, and Indicative Proposal for a Marine Protected Area (MPA) Network. Scientific Report for the Department of Marine Park Malaysia.

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