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NEW RESEARCH ILLUSTRATES RELATIONSHIP BETWEEN JUVENILE FISH AND AN INVASIVE SEAWEED

Sampling shows differences in the type and amount of fish between dense and sparse concentrations of seaweed patches in Charleston Harbor.

Invasive species often cause negative impacts on the biological communities which they invade. These invaders regularly outcompete and displace native species and can have long-term consequences for the broader ecosystem, including causing declines in biodiversity. Despite this trend, a new study is investigating positive benefits associated with an invasive seaweed, on local fisheries in the Charleston Harbor.

Gracilaria vermiculophylla, an invasive red algae seaweed native to the coasts of Japan, has established itself along the East Coast of the United States and throughout the world. Traveling through commercial oyster shipments, the settlement of *G. vermiculophylla* has introduced new habitat to estuaries and mudflats, regions historically lacking structured habitat of this type. This new habitat allows fishes in early-developmental stages to both find food and seek protection from predators. By supporting young fishes, this new habitat could potentially lead to an increase in productivity of economically-important fisheries in the Charleston Harbor and in similar estuaries throughout the world.

Nick Partington of St. Olaf College conducted research to answer this question through the National Science Foundation's (NSF) Research Experience for Undergraduates (REU) program at the College of Charleston. Partington worked with Dr. Tony Harold to build on previous studies that reported this algae bringing beneficial impacts to native organisms. The fact that *G. vermiculophylla* could be an asset to local fish populations "would be certainly unusual for a wide-spread and common invasive species," says Harold.

Under the mentorship of Dr. Harold, Partington has conducted research on how the amount of coverage of *G. vermiculophylla* in mudflats affects the native fish communities which take advantage of the habitat provided by the invasive seaweed. In

particular, he studied how the biodiversity of juvenile fishes differ between habitats containing dense coverage of *G. vermiculophylla* as compared to those containing relatively sparse coverage. Patches of the seaweed were considered dense if the amount of coverage was approximately 80% or greater (pictured below), while sparse coverage was approximately 20% or less.

Samples of fishes were collected from each habitat, at multiple times, throughout the summer. Specimens were identified to the lowest classification possible, species-level in most cases, with the aid of a dichotomous key and dissecting microscope. After identification, statistical analyses were performed to discern differences between the two habitat types.

Upon analysis, the data showed that, between the two habitat types, sparse patches supported a greater abundance of fishes, while dense patches supported greater diversity in species. Interestingly, this same study was conducted last summer and produced results opposite to those concluded this summer. Hence, this shows how productivity assemblages of *G. vermiculophylla* can be dynamic and change on a temporal scale.

Studies such as this one improve our understanding of how organisms interact with their habitats. Particularly, this study was a step toward the goal of "assess[ing] the degree to which the amount of coverage by [*G. vermiculophylla*] affects the survival and growth

of species of native fishes," according to Harold. The ability of *G. vermiculophylla* to provide habitat to juvenile fishes in an estuarine ecosystem shows how invasive species can sometimes provide benefits to the ecosystems which they invade. Similarly, this study brings to light how invasive species have the ability to increase and sustain biodiversity in the Charleston Harbor as well as ecosystems throughout the world.

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For more information on the NSF-funded REU program at the College of Charleston, visit:
http://reu.cofc.edu/

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