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ENVIRONMENT

STAC grant will help in study of Narragansett Bay 'green tide'

By David Ortiz
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Two students studying marine biology at the University of Rhode Island recently donned hip waders and splashed into the chilly water off a Greenwich Bay beach, where they spent several minutes scooping up water and putting it into zip-lock bags.

The murky water samples were brought back to the lab of Carol Thornber, a marine ecologist and assistant professor at URI. Thornber has spent the past few years researching algae in Narragansett Bay in hopes of understanding – and possibly minimizing – the seaweed blooms that float in large mats through the bay and wash up on shore every spring and summer.

"Green tide," as the seasonal sea lettuce blooms is commonly known, has existed in Narragansett Bay for at least a century. But it has become more extensive, more frequent and much more problematic in recent years – probably as a result of increased nutrient pollution in the bay, scientists say.

Because green tide drives down oxygen levels in the bay, outbreaks threaten the fish and shellfish populations that live there. A major fish and shellfish kill in the summer of 2003 was caused by one of the worst green-tide seasons in memory. The green-tide event also caused the evacuation of residents in a handful of waterfront communities to escape the noxious odor of volumes of rotting sea lettuce that had washed up on shore.

PHOTO COURTESY CAROL THORNBER

EMILY FIELDS, a biological sciences student at the University of Rhode Island, conducts sampling of macroalgae in Greenwich Bay.

Thornber's team of graduate and undergraduate students collect algae samples monthly from eight locations in and around Greenwich Bay, an estuary on the western side of Narragansett Bay where green tide is particularly troublesome. Back in the lab, the sea lettuce they have collected is weighed and measured to document the distribution and abundance of different algal species. The goal is to understand which species of seaweed are showing up in particular parts of the bay at different times of the year, and how much, Thornber said.

"We want to be documenting the abundance and composition of the algal species that are out there," she said.

But identifying which species of sea lettuce they are looking at is surprisingly difficult for the scientists. Different species are notorious for looking the same. Conversely, sea lettuce samples that look very different – even under a microscope – are often actually the same species.

And being able to tell one kind of sea lettuce in Narragansett Bay from another is crucial to the research, because knowing which species are out there could help to find solutions to the green-tide problem.

For example, a number of studies have shown that different kinds of snails prefer eating specific species of algae. If scientists could determine which sea lettuce

species are most responsible for green-tide outbreaks, or whether particular species collect more in certain parts of the bay, they could try to curb green tide by introducing the kinds of snails that eat those species.

Thornber is collaborating with Brian Wysor, an assistant professor of biology at Roger Williams University, to identify the specific sea lettuce species that Thornber's team collects from the bay. Wysor will do the work using newly developed DNA Barcodes, which map and tag the genetic material of each sea lettuce specimen and store them in a library.

On Jan. 25, Thornber and Wysor received a $97,459 Research Alliance grant for their collaborative work from the R.I. Science and Technology Advisory Council (STAC), which awarded a total $1.5 million to nine projects that bring together scientists from industry, academia and the public sector.

The goal of the grant program is to break down institutional barriers to collaborative research and bring additional federal and corporate research investment into the state.

Wysor estimates there could be four to six sea lettuce species commonly found in Narragansett Bay, and perhaps half a dozen more that appear less often.

Aside from finding solutions to the green-tide problem, identifying sea lettuce species in the bay could help scientists working to develop new drugs and nutritional supplements, Wysor said. Several kinds of sea lettuce are known to produce compounds with important medical applications, including anti-cardiac, anti-inflammatory and neuron-protective properties.

"If we know what species are present, then we can move forward with some assurance about finding compounds in there, should we choose to look for them," Wysor said. •