Jessie Lowry
(843) 530-7795
jessica.lowry@coker.edu

August 3, 2015

Microalgal Communities as Potential Bioindicators of Environmental Health

Research seeks to identify spatial and environmental influences on community structure

Human impacts lead to marine ecosystem responses that should be monitored in order to conserve and maintain these environments. Variation in pH, temperature, nutrients, or introduction of pollutants, can be assessed using different methods, from basic water chemistry testing to more integrative analyses. One method of assessment is the use of biological indicators, or bioindicators, which are organisms used as tools to reflect changes and provide information about the overall health of the environment. Microscopic photosynthetic organisms, or microalgae, in sediment may provide an efficient and representative bioindicator for monitoring the status of marine ecosystems and benthic habitats.

Jessie Lowry, a rising senior at Coker College, is studying benthic microalgal communities under the mentorship of Dr. Craig Plante and Kristina Hill-Spanik at the College of Charleston's Grice Marine Laboratory. Lowry's research focuses on the use of diatoms, a group of microscopic algae that dominate in study habitats, as a proposed bioindicator.

Diatoms are sedentary primary producers and may be useful bioindicators because they are easier to sample and study than other organisms such as seaweeds, fish, or coral. Further, previous studies show that diatom community composition is influenced by environmental conditions, such as pH and nutrient availability. By studying microalgal community structure, it may be possible to determine the impact of certain environmental conditions on marine ecosystems.

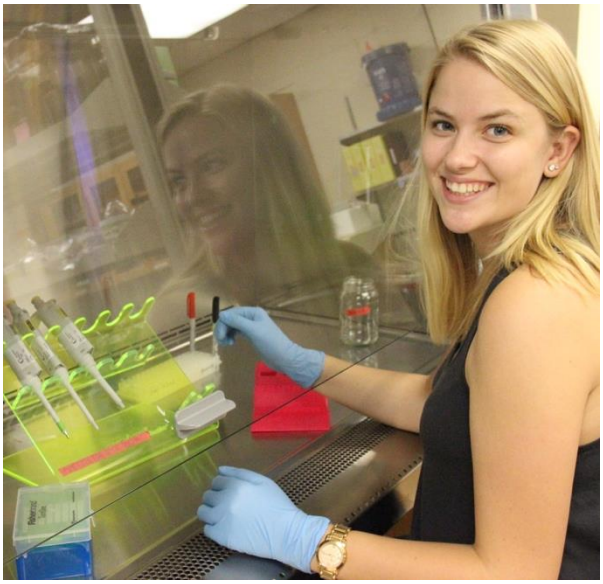
Lowry's research seeks to identify additional factors influencing microalgal communities at four South Carolina beaches at Kiawah Island, Folly Beach, Isle of Palms, and Pawley's Island. Molecular techniques were used to identify taxa present in these microalgal communities. To identify influences on community structure, community similarity was compared to environmental factors comprising pH, temperature, nutrients, salinity, and grain size, and geographic distance. Analyzing these relationships help us better understand what environmental or spatial variables may be shaping microalgal communities.

Dr. Craig Plante explains that "in theory, microbes are so abundant that they should not be subject to dispersal limitation, but rather their distributions should be determined by the environmental conditions we hope to monitor." If these communities are shaped by environmental factors, this may be utilized to study how an ecosystem is responding to changes in the environment.

This research furthers knowledge about the factors that influence microalgal communities in sediment, which will also provide a clearer understanding of how these communities could be used as bioindicators.

Lowry is one of ten selected students participating in the National Science Foundation (NSF)'s Research Experience for Undergraduates (REU) through a partnership with the College of Charleston. To learn more about her research and the CofC REU program visit the blog: http://www.blogreu.wordpress.com/ and CofC Web site: http://reu.cofc.edu/.

Dr. Craig Plate (left) and Jessie Lowry (right) collect samples of sediment at Folly Beach. Photo by Kristina Hill-Spanik.



Lowry uses molecular tools to study the community structure of microalgae. Photo by Bob Podolsky.

JESSICA LOWRY
Coker College
(843) 530-7795
jessica.lowry@coker.edu

CRAIG PLANTE
College of Charleston
Grice Marine Lab
PlanteC@cofc.edu

KRISTINA HILL-SPANIK
College of Charleston
Grice Marine Lab
HillKM1@cofc.edu