

Long Island Native Studies Effects of Climate Change on Marine Animals in Nationally Funded Research Program

Emily Hall, a native of Copiague, NY and a rising senior at the SUNY College of Environmental Science and Forestry in Syracuse, is spending her summer at the Fort Johnson REU (Research Experience for Undergraduates) program at the College of Charleston. This highly competitive program is funded by the National Science Foundation to give undergraduates real world and hands-on experience in scientific research.

Hall is how marine organisms may respond to a more acidic ocean. Ocean acidification, considered “the other CO₂ problem”, is caused when the ocean absorbs carbon dioxide emissions from the atmosphere. That absorbed CO₂ reacts with seawater to form carbonic acid, making the ocean more acidic. In acidified oceans, calcium carbonate and other minerals become more soluble so that structures like shells and other skeletons can begin to dissolve and are harder to build. This loss of skeleton can result in weaker organisms that have a decreased chance of survival. There will be detrimental impacts to the environment, as marine organisms decline, as they play diverse and important roles in marine ecosystems.

In particular, Hall is studying the effects of ocean acidification on the development of sea urchin larvae, which build an internal skeleton. Sea urchins are being used as a model study organism because they act as a keystone species, regulating the growth of many different types of algae. Hall is examining whether larvae show different levels of resistance to ocean acidification based on their genetic makeup. To create genetic diversity, she cross-bred sets of males and females and compared their larvae reared under two CO₂ condition; current and those predicted 50-100 years in the future. By comparing the skeletal growth of larvae, Hall was able to determine if there is genetic variation for resistance to the harmful effects of ocean acidification. As noted by her mentor Dr. Robert Podolsky, Associate Professor and Director of the Grice Marine Lab at the College of Charleston “future adaptation to climate change requires genetic variation, and populations will show the potential for future responses only if they harbor some genetic variation for resistance to acidification.”

With information from her project, Hall and other scientists can begin to understand whether marine organisms like sea urchins will adapt the multiple effects of climate change, including ocean acidification. If such organisms lack the genetic potential to adapt quickly enough to these changing conditions, marine populations will decline, leading to disruptions in the health of marine ecosystems.



(Photo Credit – Bob Podolsky)

Further Information on the REU Program and Hall's Research:

<https://www.youtube.com/watch?v=9silEToQ5yY>

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