

Examining the Health of Horseshoe Crab Populations in South Carolina

Class of 2010 Oregon High School graduate Rachel Walsh is participating in a Research Experience for Undergraduates (REU) program at the College of Charleston. Walsh is examining the genetic health of horseshoe crabs from harvested and unharvested beaches in South Carolina. Horseshoe crab blood is harvested non-lethally to provide an important biomedical product. Measuring genetic health will allow improved management and ensure long-term sustainability of horseshoe crab populations.

Through the National Science Foundation (NSF)-funded program, Walsh is working with the South Carolina Department of Natural Resources (SCDNR) to analyze the genetic population health of horseshoe crabs in SC. The two beaches sampled differ in that one is harvested by Endosafe, the local biomedical producer of *Limulus* Amebocyte Lysate (LAL), while the other is a non-harvested beach. LAL is derived from the aqueous solution in horseshoe crab blood cells. It is critically important in the biomedical industry for its ability to ensure patient safety by detecting harmful endotoxins, toxic substances released by *E. coli* and other gram negative bacteria.

During the May – June breeding season, horseshoe crabs spawn in large aggregations during high tides. At this time horseshoe crabs are harvested for bleeding and returned to the environment. Walsh is comparing horseshoe crab DNA to determine if crabs from the two sites represent a single or separate population(s), as well as evaluate their genetic health to provide an indication of potential risk for inbreeding or loss in their ability to adapt to change in their environment.

“Understanding the genetic health of horseshoe crab populations is needed to ensure they are managed and harvested in a sustainable manner,” said Dr. Tanya Darden of SCDNR. Researchers at SCDNR are also tagging adults and collecting sediment cores to measure the density of horseshoe crab eggs and larvae on several beaches throughout SC to evaluate horseshoe crab reproductive success.



Left: Tagged horseshoe crabs (photo credit: Robin Frede)

Right: Walsh in the genetics lab.

Walsh is one of 10 visiting students participating in an NSF program that immerses undergraduates in a 10-week marine biology research experience. This project is funded by SCDNR and Endosafe, in association with the South Carolina Sea Grant Consortium, and represents an effective industry and state agency partnership aimed at protecting the health of horseshoe crab populations for generations to come.

For more information on NSF’s REU Program at CofC’s Grice Marine Laboratory see:
<http://reu.cofc.edu/> and youtube video: <https://www.youtube.com/watch?v=9silEToQ5yY>

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