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Horseshoe crabs spawn in state's Inland Bays

UD student's research identifies nesting areas

By Leah Hoenen

Horseshoe crabs famously lay millions of eggs along the beaches of the Delaware Bay each spring. Scientists are discovering they just as frequently spawn along sandy shores in the Inland Bays. University of Delaware undergraduate Kathleen McCole has been studying the number of crabs that spawn on Inland Bays beaches and how many eggs they leave behind. Her work is setting precedents for understanding the role of Inland Bays habitat for horseshoe crabs.

Even scientists are surprised how little is known about the population demographics of horseshoe crabs, said Douglas Miller, associate professor of oceanography at the university's College of Marine and Earth Studies, who is supervising McCole's research.

Over two years, McCole has found crabs spawn in Inland Bays sand as much as they do on other Delaware beaches.

Ed Lewandowski, executive director of the Center for the Inland Bays, said McCole's research supports the observations of center staff and volunteers. The center has tagged horseshoe crabs to learn more about their migrations and habits, Lewandowski said, and has observed nesting behavior on the beaches of the James Farm Ecological Preserve.

Horseshoe crabs are important to the medical industry and to traveling shorebirds, which rely on their eggs as a key food source.

Red knots, in particular, are renowned for their dependence on horseshoe crab eggs, feasting on them each spring to increase their body weight as they migrate from South America to the Canadian Arctic.

Lewandowski said the crabs are a key part of the food web in the Inland Bays. “It’s neat to think these bays are sustaining a reproducing population of horseshoe crabs,” he said.

In more than a dozen trips to beaches along the Inland Bays in 2007 and 2008, McCole and a team of volunteers recorded the number of crabs that reached the shore during new and full moons. “It’s almost impossible to walk through them sometimes,” she told the Scientific and Technical Advisory Committee of the Center for the Inland Bays, as she presented her senior thesis to the committee Friday, April 3. Miller said the work is made possible by the help of volunteers who pair up with university students to count crustaceans.

McCole compared the density of crabs along the shorelines of the Inland Bays to data for several Delaware Bay beaches and found the number of crabs at James Farm and Holts Landing corresponded with those at Broadkill Beach and Cape Henlopen State Park at the same time of year.

She also took cores of beach sand to calculate how many horseshoe crab eggs they contained.

The pale green or light orange, BB-sized eggs are easy to spot, she said. Under a microscope, it’s easy to see a tan-colored baby crab moving around within a translucent egg.

In both egg counts, McCole said she and her team found a lot of eggs, as many as have been counted along Delaware Bay. She also said researchers found eggs and larvae alive in the sand as late as November.

Miller said overwintering has been seen in Delaware Bay, but little is known about it. Horseshoe crabs typically deposit their eggs in the sand in May and June and within two to four weeks, scientists expect them to hatch, he said. More overwintering eggs were seen at Holts Landing than along the shores of the James Farm, McCole said, but scientists do not know why.

Delaware Department of Natural Resources and Environmental Control scientist Robin Tyler said regardless of how many mature into adult crabs, those larvae provide a valuable food source for other animals.

Inland Bays crabs: a subspecies?

The horseshoe crabs living and nesting in the Inland Bays may be a subspecies of the Delaware Bay population, crabs that were hatched in the bays and return there to spawn their own eggs. That's a theory posed by world horseshoe crab expert Carl Schuster, who visited the Inland Bays during a horseshoe crab spawning some years ago, said Ed Lewandowski, executive director of the Center for the Inland Bays. An interesting question, said Lewandowski, but he said nobody has stepped forward to research the issue.

Volunteers needed for upcoming Delaware Bay spawning survey

The Delaware National Estuarine Research Reserve is seeking volunteers to help during the annual horseshoe crab spawning survey at Ted Harvey Wildlife Area, Kitts Hummock and North Bowers Beach.

Training sessions for volunteers will be 6 to 7:30 p.m., Wednesday, April 22, and 10 to 11:30 a.m., Saturday, April 25, at the St. Jones Reserve, 818 Kitts Hummock Road, Dover.

Volunteers will learn how to conduct the survey, record data and determine the difference between male and female horseshoe crabs. During training sessions, volunteers will also learn the results of surveys conducted since 2001.

Reserve manager Kimberly McCole said, "Horseshoe crabs occupy an important ecological niche in Delaware's coastal habitat. The survey will gather valuable information that will help us better manage and conserve this valuable resource."

Each May and June since 1990, volunteers have descended on beaches to count horseshoe crabs laying eggs at key locations. Surveys take up to three hours per night. Counts will be held 12 nights in May and June. To register for training, contact McCole at kimberly.mccole@state.de.us or Harvey Zendt at harvey.zendt@state.de.us or call 739-3436.

Want to help?

The University of Delaware College of Marine and Earth Studies and the Center for the Inland Bays need volunteers for this year's Inland Bays horseshoe crab surveys. The training session will be held 7 p.m., Tuesday, May 5, at the Center for the Inland Bays. For more information, call the center at 302-226-8105.

Did you know?

As a species, ruddy turnstones play an important role in the ecology of the Delaware Bay. Using their strong bills as shovels, or more accurately, brooms, they dig holes in the sand, exposing buried horseshoe crab eggs and making them available as food.

The circulatory fluid, or hemolymph, of horseshoe crabs is analogous to human blood. The horseshoe crab's blood is blue due to a chemical reaction between copper and an oxygen-carrying protein called hemocyanin.

Why do horseshoe crabs lay so many eggs? It's a numbers game in the quest for survival. After laying her eggs, the female horseshoe crab crawls away, leaving the shallow nest unattended. Predators and natural conditions take their toll on the developing eggs, trilobite larvae, and young horseshoe crabs. Only a very small percentage actually grow to reach adulthood and engage in reproductive activity.

American Indians called this unique critter a "Se-ekanau." In 1588, British naturalist Thomas Hariot called it the "horsefoot" crab - probably because the shape of the crab resembles the foot of a horse. Somehow, through time, horsefoot was corrupted to "horseshoe."

Two of the Asian species of horseshoe crabs, *Carciniscorpius rotundicauda* and *Tachypleus tridentatus*, are considered a delicacy in China, Hong Kong, and Vietnam. Harvested by local fishermen or imported from China and Malaysia, female horseshoe crabs are prized for their eggs and large quantity of meat.