

Scientists racing clock to find alternative bait

Horseshoe crab harvest ban will hurt Del. Bay fishermen

By MOLLY MURRAY, The News Journal

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In a research lab in Lewes, marine biologist Nancy M. Targett set out to find out why conch and eel are so attracted to horseshoe crabs.

After three years of research, Targett has an answer: It's all in the eggs.

As a two-year ban on the harvest of horseshoe crabs is set to take effect Dec. 11, Targett is on a research fast track to take what she and her team already know, work with scientists at the DuPont Co. and come up with an artificial bait -- hopefully by summer.

"We've set a very aggressive time line," said Targett, who also is a biochemist and dean of the University of Delaware College of Marine and Earth Studies.

Last week, as state environmental Secretary John Hughes ordered the harvest ban, he said he was optimistic that Targett, with the help of volunteers from DuPont, could come up with a bait alternative. After spending \$350,000 on research, the state hopes for a bait alternative that would be effective for fishing purposes and reduce harvests of horseshoe crabs for bait for conch and eel. Fishermen in the Delaware Bay receive as much as 50 percent of their income from conch and eel catches, which are worth millions up and down the East Coast.

The state also hopes to help turn around a decline in the population of the red knot, a migratory shorebird that some worry is teetering on the edge of extinction.

The red knots, birds that spend their winters at the southern tip of South America and breed in the Arctic in summer, spend a week or two each spring along the shores of Delaware Bay. They feed on the protein-rich eggs of the horseshoe crab.

Many conservationists believe the decline in the bird population is directly linked to a decline in crabs from overharvesting in the early 1990s.

While many scientists believe the crab population is stable, others worry it is nowhere near large enough to supply an abundance of crab eggs on the beach when shorebirds migrate.

Nick Fanandakis, vice president and general manager of DuPont Chemical Solutions Enterprise, said Hughes came to them and asked if company scientists would be willing to help with the artificial bait effort.

"It's very much calling on the competencies we already have," he said.

The plan is to take the attractant that Targett has already isolated and see if scientists can come up with a substitute.

"We're volunteering our time and effort," Fanandakis said. "We're not looking to retain any intellectual property."

DuPont technology director Henry Bryndza will lead the company's volunteer effort.

"Targett and her group have done some real pioneering work," he said. "We're doing analytical work" to see if there are substitutes that can be produced that have the same attractant power as natural horseshoe crabs."

Another step will be to come up with a system that can be used to "deliver" the bait.

Some artificial fishing baits are made from gel-like substances that are bound to mesh.

"We can make things that will hopefully stand up in salt water," Bryndza said. "We'd like to use natural materials because these things will be going into the environment."

The researchers are looking to use environmentally safe substances and a system that allows the attractant to be slowly released into the water.

Targett started her research by trying to isolate the compound that made horseshoe crabs such a powerful bait.

She and her team looked at the chemistry behind the predator-prey attraction to see if they could find a specific chemical trigger. She found the attractant was concentrated in the eggs.

Then she discovered it was a complex protein and that conventional chemical synthesis would not be likely.

Targett is not the first researcher to work on an artificial substitute for horseshoe crabs.

Three Massachusetts scientists, working for Associates of Cape Cod Inc., a biomedical research laboratory, applied for a patent for an artificial horseshoe crab bait in 2000.

The company was manufacturing *Limulus* amebocyte lysate, which is made from the blood of horseshoe crabs.

Michael Dawson, one of the researchers who worked on the alternative bait, said the company was looking for a way to use leftover plasma from the lysate manufacturing process.

That's how they came up with the artificial bait. The scientists found that the plasma attracted predators better than the horseshoe crabs themselves, according to patent documents.

Dawson said the alternative bait showed promise, but the project is no longer active.

While Hughes is optimistic that scientists can come up with an alternative bait, commercial fishermen aren't so sure.

"You don't really believe in that, do you?" asked fisherman Charles Auman about the artificial bait. "The only time I hear about it getting real close is when we take a cut. No one's believing that anymore."

Auman said commercial fishermen are keeping their options open and may consider challenging the moratorium in court.

"I was really disappointed with his decision," he said.