

Helping to save the crab

UM scientist says the population of the Chesapeake Bay's trademark crustacean can be brought back - if money for 'very aggressive' research can be found again



Yonathan Zohar of the University of Maryland Biotechnology Institute says saving the blue crab means protecting pregnant females. (Sun photo by André F. Chung / January 2, 2008)

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Eight years ago, a chance question at a Maryland General Assembly hearing put Yonathan Zohar on a path to unlocking the secrets of the [Chesapeake Bay](#) blue crab.

The Jerusalem-born, Paris-educated endocrinologist answered questions about techniques he used at his Inner Harbor lab to enhance the breeding stock of certain fish. Today, Zohar is using the same techniques to help reinvigorate the once-robust crustacean. He and his team have spent more than \$12 million - most of it courtesy of a federal earmark from Sen. Barbara A. Mikulski - mapping out the blue crab's life cycle in their hatchery and placing the crabs in the bay to watch how they lived.

The director of the Center for Marine Biotechnology at the University of Maryland Biotechnology Institute said researchers are ready for the next stage - creating millions of baby crabs in the hatchery, then releasing them into the bay to enhance breeding stocks. But their funding was not renewed this year, so the researchers are figuring out how to continue their project.

Meanwhile, the bay's blue crab population continues to slide. Last month, officials in Maryland and Virginia announced crabbing restrictions in hopes of reducing the harvest by a third.

The Sun sat down with Zohar to discuss what he's learned about the blue crab and how to best manage the species in the current crisis.

What have we learned in the past six years about the blue crab in the [Chesapeake Bay](#) that we didn't know when you started your work?

We learned how long it takes for a blue crab to grow to maturity, which we didn't know before. ... It's five months from hatch. From egg to adult female. It has huge implications to managing them.

Another striking example was the reproduction. The dogma was that a female crab only produces one sponge in her lifetime in the Chesapeake Bay. Here, all of a sudden, we demonstrated that a female crab can produce up to five successive sponges in the same season, in the same summer, in two- to three-week intervals. So it has a huge impacts in terms of their life cycle and to management. So if you think about it, now when you harvest a mated female, you harvest up to four to five times her potential to produce offspring compared to what was believed to be the case before.

We learned a lot about their migration routes. We mapped the location of those routes, and we also know the exact timing. We know that a baby we released into the Chesapeake Bay can, in the same year, make it down to the spawning grounds in Virginia as a mated female.

What are the things that we still don't know in terms of the blue crab? Are there secrets that remain?

We think we can develop a soft-shell blue crab industry based on aquaculture, hatchery-based babies we can produce every day of the year. But here we have a few secrets left to

understand.

The main bottleneck is to be able to control molting, when the crab sheds its shell and becomes soft. Cannibalism is one of our main issues. If we are able to control molting, there will be no cannibalism. We know what hormones control molting, and the idea is maybe to find natural sources of those, mimics of those hormones so maybe we can feed it to the crab, and then get those crabs to molt whenever we want them to.

What were the main objectives of your research program? What did you set out to accomplish?

There were four main issues. The first was to understand the basic biology of the blue crab, because very little was known about it. How they reproduce, how they molt, how they migrate, what type of food they eat, what type of habitats they prefer, what are their main predators.

The second goal was to see if we could develop hatchery and nursery technologies to mass-produce blue crab juveniles in captivity, which was thought to be something that could not be done.

The third goal is to very clearly test the feasibility of using hatchery-produced juvenile crabs to replenish the spawning stocks of the blue crab in the Chesapeake Bay. The abundance of the breeding stocks has dropped about 85 percent in the last 15 years.

And No. 4, if it was going to work, to scale it up and transfer the technology to the industry.

How much of that do you feel you were able to accomplish?

We know that the concept of using hatchery-raised crabs does work. What we were unable to do so far is to scale it up, to produce millions of crabs annually, to make a difference. Right now, we are doing hundreds of thousands, and while it is very good for the study, it is not enough to make a difference.

Are you still searching for funding to finish the work, and where might that come from?

We as scientists at the Center for Marine Biotechnology live and die by research grants from federal and state agencies. But they are very small grants. They do not allow the scope of work that needs to be done here. And I kept saying that, in order to make a difference, to quickly reach solutions to reverse the declines, we need a very aggressive type of a research program. ...

Everybody needs to keep in mind that, if we don't do anything now, soon it will be too late. ... If we don't want the blue crab in the Chesapeake to go where the oysters are in the Chesapeake, we need to act very quickly or it's going to be too late, and in order to do it,

we need large amounts of money.

We know that right now, the appropriation stopped, but we are trying to see if we can get another round. And we are going the traditional routes. National Science Foundation, the [National Oceanic and Atmospheric Administration](#). Maybe people who are very interested in the survival of the Chesapeake Bay and the heritage of the blue crab may help us. So we are going to throw fundraisers as well. One thing we cannot afford to do is stop that program.

Why do you think that up until recently we knew so little about the crab?

When the crabs were considered plentiful and you could harvest as much as you wanted, there was no reason to understand and study the crab. What drove the funding for our program was the fact that the crab all of a sudden started to drastically decline, and there was kind of a wake-up call. Unfortunately, that is how science works. Funding comes and goes by whatever is considered the crisis at the time.

What do you think of the measures the state has put into place to protect the blue crab? Will they result in a 34 percent reduction, and is that what's needed?

There are very positive things being done right now. No. 1, the states of Maryland and Virginia are working together. The blue crab does not have state boundaries. The blue crab is an animal of the entire Chesapeake Bay.

The other positive thing is that there is an understanding that, unless you protect the females, nothing will happen. You have to protect the mated, inseminated females. People talk about how they harvest sponge crabs in Virginia. There is no difference between harvesting a sponge female and a mated female. Mated females carry millions of babies for the next generation.

Thirty-four percent is a significant reduction. But I would argue that we just need to protect the majority of those mated females as they migrate. Just let them go down to the Chesapeake Bay. Let them go down to the spawning grounds and go about their business.

You have talked to state officials about protecting those migratory corridors by closing those areas to harvest when the females are moving down the bay. They have said the idea is interesting, but they haven't indicated they will do it. Why is that?

I'm not sure. They know about our findings. Maybe we need to do a better job communicating. It's new. It needs to be very well integrated between the two states. It will need good mapping, so maybe it needs a couple more years to be developed. But once it's done, there is no way it's not going to have an impact. It makes so much sense.

Do you think the species can be brought back?

I'm sure it can. We need to continue to protect the bay from pollution and make sure the

habitat is coming back. But right now that is not the problem. Right now, the problem is there are so few females left that we don't have enough juveniles recruiting back into the bay.

rona.kobell@baltsun.com