

Researchers find virus plaguing soft crabs

February 1 2011, By Timothy B. Wheeler

Not long after Lee Carrion and her partner launched Coveside Crabs in Dundalk, Md., five years ago, they realized their seafood business had a serious problem.

Up to half of the molting crabs they were holding in dockside tanks to sell as soft crabs died before they could be sold to customers.

"I was horrified. I couldn't believe they were dying like that," said Carrion, 50, a former teacher who'd left the classroom to join 54-year-old waterman Richard Young in the crab business. Alarmed by the losses, they methodically tweaked their operations and equipment, and managed to reduce the crab mortality, but couldn't eliminate it. Carrion began to look for help.

Her search led to the Columbus Center in the Inner Harbor. There, as it turned out, scientists with the University of Maryland's Institute of Marine and Environmental Technology were looking for a soft-crab business in the Baltimore area willing to provide some crabs to study.

Working together, they have found a virus in [Chesapeake Bay blue crabs](#) that they believe routinely kills a quarter or more of all soft crabs produced baywide before the premium seafood can get to market. They hope the discovery will lead to a way to spot and screen out infected animals, making soft-crab businesses more profitable while easing harvest pressure on the bay's iconic crustacean.

The findings, published in the December issue of the journal *Diseases of*

Aquatic Organisms, go a long way toward explaining the significant die-off seen in soft-crab shedding operations, said Eric J. Schott, a research assistant professor with UM's Center for Environmental Science at the Inner Harbor institute.

The researcher said the virus appears to affect only blue crabs, and there's no evidence it poses any hazard to humans. In any case, he pointed out, pathogens would be eliminated when the crabs are cooked.

"It's an expected part of soft-crab production," Schott said of the mortality. "Peeler" crabs showing signs of being nearly ready to molt are harvested from the wild and held in tanks until they wriggle out of their shells. They're plucked from the water before they can grow new shells. In the tanks, Schott said, soft-crab operations have reported losing 30 to 40 percent of their inventory.

Until now, most watermen had written off the crabs' demise to poor water quality or the stress and injuries they get in being caught, handled and kept in captivity.

"This is something that has been talked about off and on forever," said Bill Sieling, executive director of Chesapeake Bay Seafood Industries Association, based in Annapolis.

But Schott, who specializes in aquatic viruses, suspected something more may be involved. Aquaculture operations, with fish raised in close confinement, are often beset by diseases, he noted. So he and his colleagues set out to look for a hidden killer in soft-crab shedding operations.

They first extracted nucleic acids from obviously sick crabs - they become sluggish a few days before dying - and processed the samples to see if they could see any double-stranded RNA, the genetic material

typical of viruses. They spotted a virus, and found the same one in more than half the dead and dying soft crabs they examined. It showed up in less than 5 percent of the healthy crabs they checked.

As a further test of the virus's potency, researchers put it in healthy crabs - all became ill and died.

Schott said the virus doesn't appear to be that prevalent in the wild - they found it in less than 4 percent of more than 200 crabs sampled from around the bay. But in the close quarters of a soft-crab shedding operation, it appeared to spread readily and take a significant toll.

"Typically, during harvest, crabs become injured, with nicks and scratches," Schott explained. Normally, that's not a big deal, since crabs' hemolymph, or circulating fluid, clots just as human blood does. But crabs with the virus lose their ability to clot, the researcher said. And while the virus itself may not have killed all the crabs, it likely paved the way. The virus affects the animals' immune system, so they can't defend themselves from other germs or viruses.

Some soft-crab operations pump outside water through their shedding tanks, while others recirculate their water. Coveside gets its crabs from the bay and its water from Tabasco Cove, at the head of Bear Creek. But Schott said the type of water system used in the shedding operation doesn't appear to affect how many crabs get sick.

What does seem to matter, he said, is the length of time crabs are together in tanks. "The longer they're in there, the greater the chances that they'll contract the virus," he said.

Schott said researchers next plan to see if they can use the virus-spotting technique to help soft-crabbers keep more of their catch alive to sell. Researchers have funding from the state Department of Natural

Resources to continue their work, and Schott said he's in discussions with the National Aquarium on pursuing another, related line of inquiry.

"Obviously, that would be a benefit for anybody that's in the crab shedding business," said Sieling, the seafood industry official. With soft crabs selling for roughly five times the price of hard crabs per animal, any reduction in losses would help the businesses boost profits without needing to catch more crabs.

There may be some telltale behaviors or exterior signs a crab is infected before it becomes obviously sick, Schott said. Or it may boil down to only harvesting crabs that are much closer to shedding their shells, so they won't be held as long.

"We're very excited about this," said Carrion, who is listed as a co-author on the study in recognition of her unpaid collaboration with researchers. Their crab business, run from April to October, by all appearances has a loyal following, but Carrion would like to grow and make it even better.

"I hope it can lead to other things we can do," she said, "come up with a way to recognize which crabs are sick and get them out of the tank." The ultimate goal, she said, is to be able to sell all the [crabs](#) they catch and "have our customers walk up the driveway happy."

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