



VHS Test Fishes for Faster Answers

by Stacy Brannan, Ohio Sea Grant Communications

If you bought live bait fish in Ohio before 2006, chances are good that they were wild caught in the New York waters of Lake Erie's eastern basin and transported to bait shops all along the Lake Erie Coast. Once viral hemorrhagic septicemia (VHS) entered the scene in 2006, however, the fish became seasonally hard to come by thanks to the federal government's limit on the transport of fish over state lines. Beyond that, the fish virus has also caused concerns in the state's \$3.1 million aquaculture industry, where a single outbreak could devastate multiple species of fish in a farming facility.

Current testing for the disease costs hundreds of dollars and can take more than a month, as cells are grown in a laboratory and carefully examined under a microscope over a period of weeks for evidence of the virus. But a new test being developed by Ohio Sea Grant researchers Dr. Carol Stepien and Dr. James Willey at the University of Toledo's Lake Erie Center and Health Science campus could cut that timeframe considerably, using fingerprints from the virus' genetic code to make results available in a matter of hours and at a fraction of the cost.

The team's test will also allow for a more detailed picture of a VHS outbreak, which can affect many species of fish, including several important commercial species in Ohio. Beyond a simple positive or negative, they will be able to tell what strain of the virus is present, how much of the virus is there, and, perhaps most importantly, if the virus is actively replicating. To be contagious, a virus has to be creating copies of itself inside the cells of a living organism.

"With VHS, the virus gets into the fish through its mouth and gills," Stepien explains. "It tricks some of the fish's cells into letting it inside, and then it takes over the cell's machinery and starts to replicate, packing the cell full of virus until the cell bursts and releases them. Those new viruses then attack more and more cells in the fish, causing it to bleed internally and externally."

The coldwater virus, which is not dangerous to humans, tends to break out when the waters are just starting to warm up in May and June, correlating closely with the time many fish species crowd

together to lay and fertilize their eggs. Being in close proximity to each other, releasing reproductive fluids makes infection much more likely. At fish farms, where thousands of fish can be raised in quarter-to half-acre ponds, this is cause for concern and is one reason state and federal governmental agencies have restricted transport.

"Although VHS has yet to be found on a fish farm, and we hope it never is, aquaculture producers have had to bear a heavy financial burden because of this disease," says Laura Tiu, Aquaculture Specialist at Ohio State University's Center for Aquaculture Research and

Development. "This has especially hit our food fish producers hard, as some of their major markets are in Chicago and New York and they can no longer ship their fish over those state lines."

A rapid VHS test could provide peace of mind to resource managers and industry members, potentially reopening the lines of commerce. The test would also reduce the financial burden on smaller producers, both because of its more affordable price tag and because the farmers would no longer have to

sacrifice numerous fish, as is currently required with traditional cell culture tests.

"It could free up the bait fish trade," says Stepien. "They would be able to test to make sure there's no virus present, and then transport uninfected fish over state lines. It would also protect the aquaculture industry, since you could test eggs and juveniles before they're sent to fish farmers."

Though Stepien, Willey, and Ph.D. student Lindsey Pierce have already developed the test, they will use their Sea Grant funding to finely tune it, making sure it can correctly identify the active virus in Ohio's susceptible species of fish and at many different levels of infection. If things progress well, the test could hit the market in two or three years with a price tag of just \$20 to \$50 and may even pave the way for a vaccine.

For more information about this Ohio Sea Grant-funded research, contact Dr. Carol Stepien at cstepie@utnet.utoledo.edu. TL

