University of North Carolina Sea Grant Coast Watch January 1989

Disease Strikes Oyster Crop

Everything pointed toward a record harvest of oysters.

A year ago, the red tide had closed down most of the state's shellfish beds, leaving the oyster crop largely untouched. Fishermen reasoned that it would mean a bumper crop awaited their tongs this year.

But by early summer, well before the season opened, their hopes were dashed.

In the Newport River, clammers started noticing "boxes" in nearby oyster beds. The oysters were still hinged shut as though they were alive, but there was nothing inside.

And in Lockwood Folly River and Virginia Creek in Topsail Sound, the story was the same.

The oysters were dead.

Once plentiful beds were full of empty shells. Every now and then, a twist of the oyster knife revealed an animal inside. But more often than not, the mollusk was wasting away.

By November, the N.C. Division of Marine Fisheries confirmed the fishermen's worst fears.

The parasites that had decimated the once prolific oyster beds of the Chesapeake Bay had spread into Tar Heel waters.



Dermo and MSX, parasites that kill oysters, are leaving slim pickings for the state's oystermen.

Dermo and MSX had shown up here.

Both are single-celled parasites, invisible to the human eye. They thrive in warm, salty waters typical of tidal creeks and sounds during drought conditions. The organisms attack oysters, eventually killing them.

DMF officials stress neither organism is harmful to humans, so shellfish beds will not be closed.

Of the two parasites, Dermo is the most prevalent here. In samples from the Newport River, 40 percent of the oysters contained Dermo. Lockwood Folly and Virginia Creek samples showed that nearly 85 percent of the oysters were affected with Dermo. The parasite has also been identified in Jones Bay in Pamlico County.

MSX has been identified in the Newport River, Wysocking Bay in Hyde County and the Crab Slough area near Oregon Inlet.

Until recently, it seemed North Carolina would escape the problems that have plagued our Northern neighbors since the 1950s.

So, when Maryland Sea Grant agent Don Webster heard Dermo and MSX had been identified here, he had four quick words. "Oh, God help you," he said.

Oysters once dominated the seafood industry there. At one time, as many as 3,000 oystermen plied the waters of the Chesapeake Bay. Now fewer than 500 fishermen harvest the bivalves.

And Maryland, a state that once was the biggest supplier of oysters on the East Coast and claimed harvests of as much as 2.5 million bushels of oysters a year, now records about half a million bushels a year, Webster says.

In North Carolina, about 50 percent of the state's oyster crop is dead, estimates Mike Marshall, chief of DMF's Fisheries Development Section.

He attributes most of the oyster mortalities to Dermo.

Under normal circumstances, as much as 5 to 10 percent of the oysters die each year, Marshall says.

Last year, even though most of the shellfish beds were closed to red tide just a few weeks after opening, the state recorded one of its best harvests of oysters. Fishermen gathered 225,000 bushels of the bivalves at a value of \$2.9 million, Marshall says.

Then, Marshall estimates an oysterman on the Newport River could bring in 15 to 18 bushels of oysters a day. This year, that same oysterman would be lucky to find three to five bushels, he says.

Oysterman Raymond Graham agrees. Last year he harvested 25 bushels of oysters from the Newport River before 10 a.m. on opening day for the harvest. This year, it took him five hours to come up with four bushels.

Newport River oystermen say the mortality figures for their area are much higher than the estimated state figure of 50 percent. They believe more than 90 percent of the oyster crop there is dead.

As proof, on a recent December morning. Mill Creek fisherman David Oglesby pulled up a tongful of oyster shells from public bottom in the Newport River. Only two oysters were alive; the rest were empty shells.

Marshall says this may not be the first time Dermo has struck oyster beds in the Newport River. He believes the state has had outbreaks of Dermo before, but it simply wasn't identified. In 1981, for example, large numbers of oysters in the river died. Then, the mortalities were attributed to environmental conditions.

And interestingly enough, Marshall says, those environmental conditions were the same conditions under which Dermo is thriving now. The hotter and saltier the water, the better for Dermo and MSX.

"Those situations would be tough on an oyster anyway," Marshall says. "The stress of that, coupled with the parasitic protozoan in the system, causes a lot of mortality."



Newport River oystermen say as much as 90 percent of their oysters are dead.

In the Chesapeake Bay where Dermo and MSX have ravaged oyster beds, scientists agree that Dermo is more of a problem.

When it rains and salinities drop below 10 parts of salt per thousand parts of water, MSX is quickly eliminated, says Eugene Burreson, a biologist at the College of William and Mary's Virginia Institute of Marine Science.

"But Dermo doesn't get eliminated or killed," he says. "It just sits there and redevelops when salinities go back up."

"Dermo is much more of a long-term problem than MSX," Burreson says.



Dermo and MSX attack the oyster, leaving only the shell.

Scientists aren't sure how Dermo and MSX got into North Carolina waters. Some believe the parasites have always been present, just waiting for the right conditions.

Dermo has killed oysters in Atlantic and Gulf of Mexico waters. MSX has been recorded from Maine to Florida.

And although the two parasites cause similar results—death of oysters they are very different organisms, Burreson says.

Dermo is a slow killer, Burreson says. Usually an oyster has to be infected with Dermo for a year to 18 months before mortalities begin to occur.

The mollusks probably ingest Dermo as they are filtering water for food. Eventually, the parasite spreads throughout the oyster's system, overwhelming it until it finally wastes away.

Burreson believes that since shellfish beds were closed last year because of red tide, the denser populations may have contributed to the spread of Dermo this year.

MSX deals a swifter blow to oysters, killing in five to six months. But so far, facts about how MSX enters the oysters have eluded scientists.

MSX, or multinucleate sphere x for unknown, was first spotted in Delaware Bay in 1957. Because researchers couldn't identify it, they named it for its spherical shape and numerous nuclei. Now, 30 years later, scientists are still baffled. They haven't been able to culture the parasite in a laboratory, and they still aren't sure how it attacks oysters.

Some scientists believe other marine animals may carry MSX and transfer it to oysters. But they haven't been able to identify the carriers.

At Rutgers University Shellfish Research Laboratory, researchers are breeding oysters that show some resistance to MSX, says biologist Susan Ford. The oysters are produced by selectively breeding survivors of MSX infections.

These oysters may offer some hope to fishermen with private leases.

But until researchers find more clues and answers about how to control Dermo and MSX, they say the only thing to do is hope for wetter weather.