Oyster Diseases and Resistance

REFERENCE A

Oyster diseases

MSX and Dermo are not caused by viruses, but rather by single-celled protozoa. Neither parasite is harmful to humans.

In the Chesapeake Bay, oysters become infected with **MSX** from mid-May through October. Infections develop rapidly in susceptible oysters and result in mortalities from July through October. Oysters that survive their first season may still harbor the parasite over the winter and succumb the following spring or early summer.

Temperature and salinity regulate MSX. Both parasite and oyster are inactive at temperatures <5°C (41°F). At 5-20°C (41-68°F), the parasite proliferates more rapidly than the oyster can control it. Above 20°C (68°F), resistant oysters can overcome the parasite while susceptible oysters are killed. A salinity of 10 ppt or below results in expulsion of the parasite at temperatures above 20°C. A salinity of 15 ppt is required for infection, 20 ppt is required for rapid and high mortality.

Fortunately, some oysters are resistant to MSX and this resistance is heritable. For several decades hatchery-based breeding programs have made use of this to selectively breed strains of oysters that are highly resistant to MSX. If you are growing oysters in waters where the salinity regularly exceeds 10 ppt, you should be sure to use one of these lines of oysters.

Dermo infections occur throughout the warm months, May through October, with maximum mortalities observed in September and October. Low numbers of parasites remain over the winter, and these parasites proliferate once temperatures increase in late spring. Infective stages of the parasite are released from infected and dying oysters, so it is imperative to avoid moving infected oysters into an area containing uninfected oysters.

Temperature and salinity greatly influence Dermo. The parasite proliferates and infections intensify above a threshold of 20°C (68°F). At temperatures above 25°C (77°F), the parasite rapidly multiplies, spreads, and kills oysters. Infections decline at temperatures below 15°C (59°F). Prevalence and infection intensities of Dermo increase with increasing salinity. High intensity infections and high mortalities often occur in areas with salinities above 12-15 ppt. Infection intensities remain low in areas with salinity consistently below 9 ppt.

Unfortunately, selective breeding has yet to produce a strain of oysters that is truly resistant to Dermo, though different strains do have varying degrees of tolerance to the parasite. When growing oysters at sites with salinities above 9 ppt it is important to use one of the selected strains that have been demonstrated to have some Dermo tolerance. The timing of planting your oyster seed can also affect their exposure to Dermo (see Page 6). Growing oysters rapidly and harvesting prior to a second summer of exposure to the disease can reduce mortality.

Creating a disease resistant oyster

Many hope that a disease resistant oyster will someday be available for aquaculture and restoration of wild stocks. Research related to this goal has followed three lines: (1) the search for natural strains of the native oyster which exhibit some disease tolerance; (2) selective breeding programs; and (3) investigations with non-indigenous oyster species.

Selective breeding is an ongoing process and as one generation of oysters has been distributed to hatcheries, another generation is being developed and tested. Selective breeding programs are, however, unlikely to develop the “perfect oyster” and diseases likely will remain a significant issue.

For more about these diseases visit the VIMS MSX and Dermo Fact Sheet at www.vims.edu/newsmedia/pdfs/oyster-diseases-CB.pdf.