

FACTORS AFFECTING HEALTH OF THE OYSTER



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Introduction

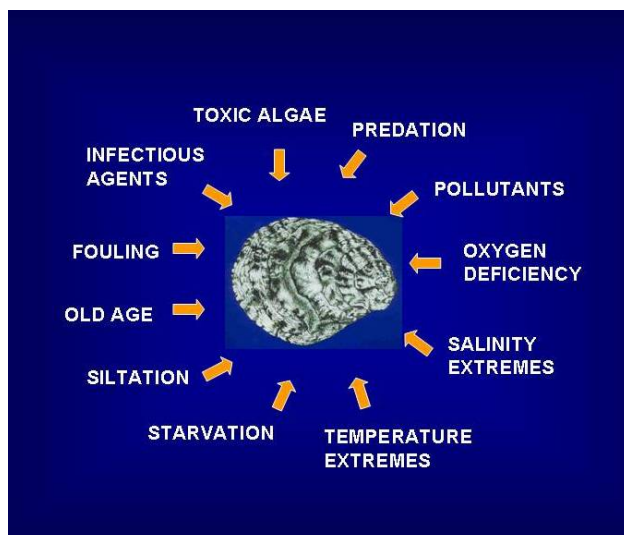
Oysters are long-lived, sessile animals, which feed by filtering large quantities, up to 100 gallons, of seawater per day. They accumulate hundred folds of micro-organisms and pollutants. These characteristics make them susceptible for diseases. Several factors can cause pathological changes in oysters. Different factors affect them during their planktonic, larval stage. The sum of environmental stimuli, together with the genetic make up of the oysters, will determine their likelihood to get ill.

Oysters are complicated animals with hearts, mouths, stomachs, and nerves, circulatory and excretory systems. Because of their advanced anatomy, they display all the same pathological

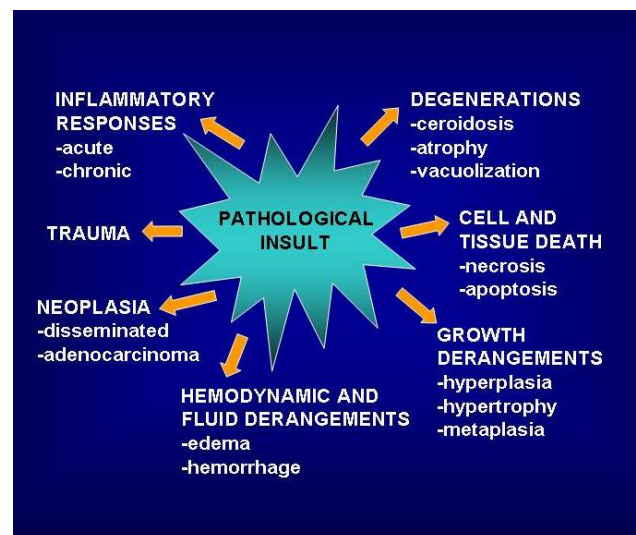
changes as higher organisms. For example, oysters have inflammatory responses, ulcers, kidney stones and tumors. Economically, most important are infectious diseases caused by parasites such as MSX (*Haplosporidium nelsoni*), SSO (*Haplosporidium costale*), Dermo (*Perkinsus marinus*), or bacteria such as ROD (*Roseovarius crassostreae*) which cause epizootics (disease outbreaks) with high mortalities.

Oysters have defense mechanisms. When oysters are exposed to pathological insults, defense mechanisms are activated. When the capacity of the defense mechanisms is exceeded, pathological changes follow.

FACTORS CAUSING PATHOLOGICAL CHANGES IN OYSTERS



CATEGORIES OF BIVALVE PATHOLOGY





State Shellfish Pathologist Inke Sunila sampling oysters for pathology in a commercial shellfishing vessel (Inke Sunila)

Oyster Health Survey

The Connecticut Department of Agriculture Bureau of Aquaculture samples oysters each fall for pathological examination and for counting set on oyster shells. Samples are collected from commercial leases and natural beds with the help of harvesters and shellfish commission members.

Factors Regulating Oyster Stock Density

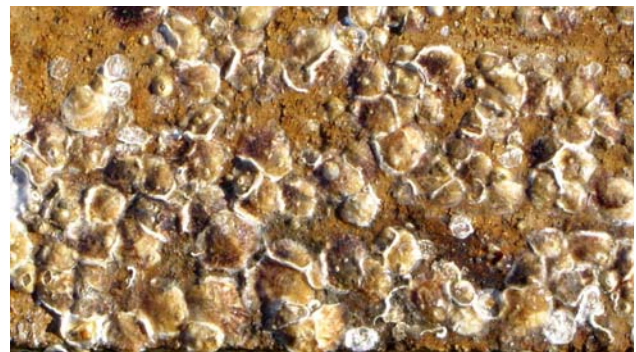
Two biological factors drive the oyster stock densities in Connecticut: recruitment (sets) and disease-associated mortality. Most of Connecticut's oyster production originates from natural sets. Oyster sets are irregular and several years may pass without successful commercial sets. However, a successful set supplies the industry for several years.

The situation differs from more southern estuaries on the east coast of the US, where frequent sets supply ample seed, but stocks are reduced yearly by disease associated mortality before oysters reach market size. This mortality is mainly attributed to Dermo-infection (*Perkinsus marinus*) that reaches higher prevalences and intensities in oysters as they grow older. Connecticut's oysters are comparatively fast growing, and they are marketed before Dermo-intensities reach the level required to cause significant mortalities.

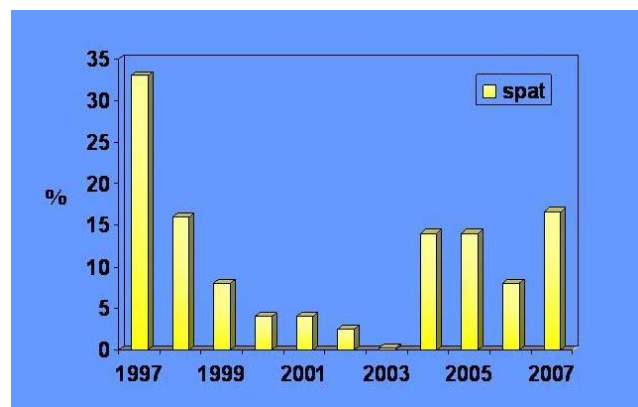
However, another commercially important oyster parasite, MSX (*Haplosporidium nelsoni*),



Location of oyster health sampling stations (Inke Sunila)



Oyster seed setting on a stone in Milford Harbor (Inke Sunila)



Percentage of oyster shells with spat on collected from on an average of 45 sites/year, 1370 shells/year. (Inke Sunila)

has caused major mortality events in Connecticut with major impacts on standing stocks and aquaculture industry. The last outbreak occurred in 1997-1998.

Connecticut's production has historically been able to rebound from a very low number of oysters. Between 2000 and 2005, CT oyster production has been affected more by the absence of sets than by disease associated mortality.

PREVENTATIVE CARE—Q & A

What can I do to keep my oysters healthy?

- Do not transplant infected oysters or import new bivalve species to the area. Most major epizootics have been initiated by importing infected oysters.
- Remove predators such as starfish.
- Provide appropriate substrate by planting cultch.
- Plant on traditional oyster habitats to provide appropriate substrate, nutrition, salinity, temperature and oxygen.

Can I treat my oysters with antibiotics to get rid of parasites?

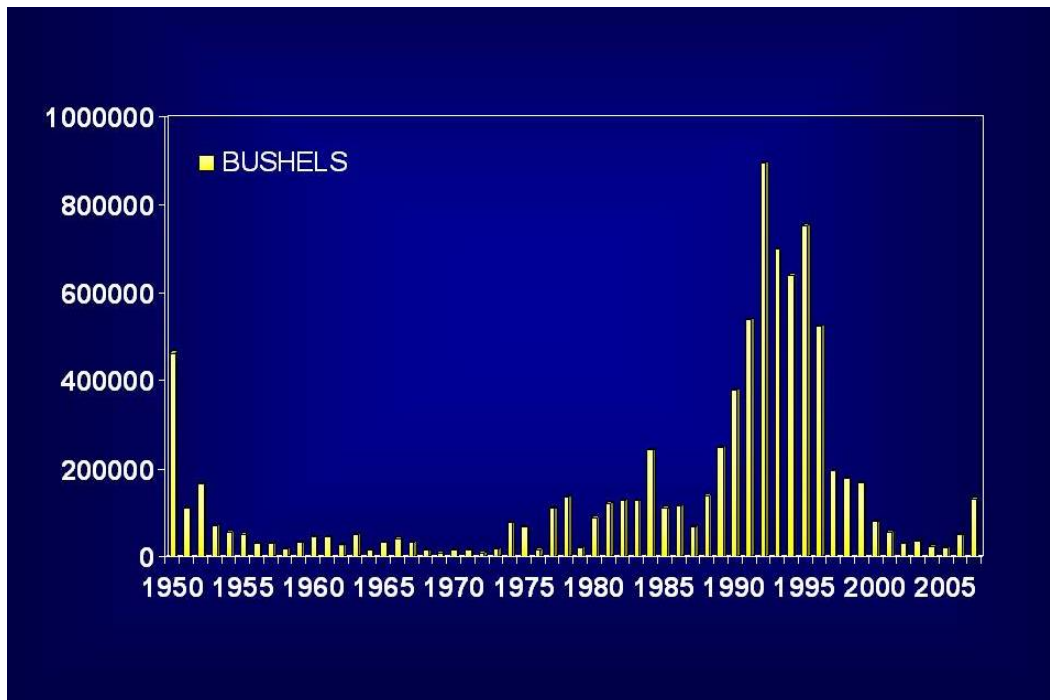
- Antibiotics are directed against bacterial diseases, not parasites. There are chemicals, which would potentially clear parasites off the oysters. Since oysters accumulate chemicals hundred folds and have a relatively primitive excretion system, treated oysters would not be accepted as food products.
- Use hatchery raised, disease-resistant oyster seed during epizootics.

Can I vaccinate my oysters against parasitic infection and diseases?

- No. Oysters do not have demonstrable protective immunity (antibody and memory cell system), which is a prerequisite for vaccination.

Where can I have my oysters tested for disease?

- If you observe mortalities in your oyster bed, bring oysters to the Bureau of Aquaculture for diagnostic pathology testing.



Connecticut oyster market harvest 1950 through 2007. (Inke Sunila)

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