

QPX DISEASE



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Introduction

QPX (Quahog Parasite Unknown) is a Protozoan parasite of hard clams, *Mercenaria mercenaria*. DNA analysis places the QPX in marine fungus-like protists (Labyrinthomorpha, Thraustochytriales). Organisms from this group occur commonly in marine and estuarine environments. While QPX has been well studied, scarcity of gene bank information of similar organisms makes accurate classification difficult. In clam tissues, QPX is present in different forms of its life cycle, named after mycological terms as thalli (4 – 15 μm), sporangia (10-25 μm) and endospores (2 μm).

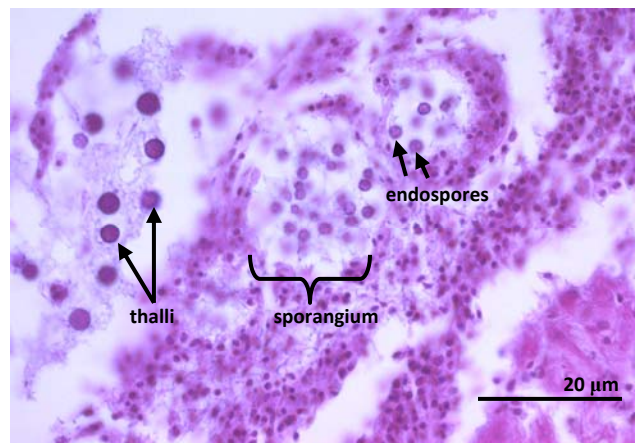
QPX causes massive inflammatory responses in the clams. Inflammatory responses are usually multifocal, granulomatous and encapsulated. Giant cells may be present. Clam hemocytes are unable to phagocytose the QPX cells, because the parasites are surrounded by large amounts of mucus. That's why the hemocytes try to isolate the parasites by surrounding them, causing the inflammatory response. The host response may be successful and the parasite degrades, or the parasites may continue proliferating causing eventually the death of the clam.

History

The parasite was first documented in the Atlantic coast of Canada in the 1950s. It did not cause major economic losses in hard clam stocks until 1989 in Prince Edward Island, and after that was documented in Massachusetts, New Jersey and Virginia. QPX caused significant mortalities in Raritan Bay, New York in 2002 and in Rhode Island in 2003. While the parasite has not been associated with disease outbreaks or mortalities along Connecticut's shoreline, a few clams have been diagnosed with QPX during the last ten years.



Northern quahog or hard clams ready for market (Inke Sunila)



QPX thalli, sporangia and endospores in histological section (Inke Sunila)

Infection and mortality

While most QPX-outbreaks have been documented among hatchery-raised clams, it has also affected clam populations originating from natural set (e.g. Raritan Bay). QPX is believed to be an opportunistic parasite that is ubiquitous in high-salinity estuaries. QPX doesn't absolutely depend on the clam host, but may cause disease outbreaks in stressed clam populations. High

planting densities and poor husbandry are believed to further parasite proliferation. The parasite has been detected only in market-size or nearly market-size clams. Mortalities of 80 – 95% have been reported in some instances.

Connecticut status

Only six cases out of 2,358 hard clams studied (0.3%) between 1997 and 2007 along Connecticut’s shoreline have been infected with QPX. None of the QPX-positive clams originated from commercial clam grounds. QPX-positive clams originated from natural oyster beds or shipping channels. QPX is not currently considered to pose a threat to Connecticut’s hard clam industry.

How do I know if my clams are infected QPX?

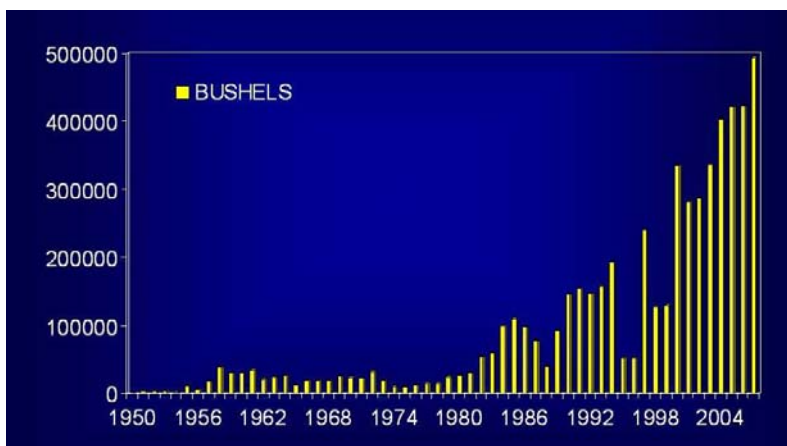
High mortality is an indication of QPX disease. Dead clams can be found on the surface of the sediment. Edges of the shells may be chipped and there may be visible pustules in the mantle tissue. The disease can be diagnosed by light microscopical examination of tissue sections. The Bureau of Aquaculture provides a diagnostic pathology service for clam harvesters. The Bureau also monitors QPX-disease yearly at several stations along the shoreline. However, QPX is difficult to detect by frequent monitoring and most outbreaks have been discovered when harvesters observe sudden mortalities in stocks. Harvesters are urged to report mortalities and sample clams from possible infected sites for pathology.



Location of quahog survey sites in Connecticut. Red stars indicate QPX-positive sites. (Inke Sunila)

GUIDELINES FOR QPX MANAGEMENT IN CONNECTICUT

- If a commercial clam ground is diagnosed positive for QPX, it should be kept in operation and as an active part of the transplantation programs.
- Clam seed imported from southern states is more susceptible to QPX disease than local or northern clam seed. Growers should pay attention to the origin of the seed as a disease avoidance strategy.
- Keep your predator nets clean of fouling. Major outbreaks have been connected to restricted water flow in the nursery systems.



Connecticut clam market harvest from 1950 through 2007. (Inke Sunila)