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A Shell of Their Former Selves

THE AMERICAN LOBSTER long has been a vital commodity for the coastal communities of New England and the provinces of Canada. Valued at hundreds of millions of dollars, the lobster fishery is one of the few remaining viable, traditional, natural fisheries in eastern North America. There is growing concern that this natural resource may be in peril in the face of emerging diseases and climatic and environmental changes.

During the past six years, normally robust lobster populations, particularly in the southernmost extent of their natural range (New York's Long Island Sound), have suffered from a number of ailments that significantly have reduced the volume and worth of catches. Diseases are not new, but increased incidences and spread are raising new questions, especially since oysters, clams, and other mollusks also are affected.

Diseases that harm harvest and post-harvest lobsters are well known and some are the cause of systemic infections that already have induced economic losses to the industry. We have spent years studying the impact of the two newest diseases—epizootic shell disease and paramoebiasis—on lobster populations.

Epizootic induces deterioration of the lobster's normally hard shell while leaving behind unsightly lesions. This renders affected lobsters unappetizing, thus reducing their marketability and commercial value. This disease has spread from its original locale (Buzzard's Bay, Mass.) to the eastern Long Island Sound; Cape Cod Bay, Mass.; Kittery, Maine; and the offshore waters of New England. Paramoebiasis, meanwhile, is an infection of the internal tissues, particularly those of the nervous system. It is caused by the single-celled amoeba. Because of the deterioration, the shells are so unsightly that the infected lobsters cannot be marketed as live.

During the autumn of 1999, there was a large-scale die-off of lobsters in Long Island Sound. There also were reports of increased numbers of dead or dying crabs and sea urchins. Many theories about the cause have been put forth, including pesticide applications, effluents from sewage treatment plants, dredging sediment, ecological and climatic factors, and infection by a parasitic paramoeba species. At present, little can be done to stop it.

Although not as well known as the lobster trade, the aquaculture production of bivalves is an industry valued at approximately \$26,000,000. The eastern oyster and hard clam are the most common types of bivalves, and both have become more prone to disease, likely due to poor water quality.

High levels of reproduction, growth, and product quality are essen-

tial for profitability in bivalve culture systems. Just as in land-based animal production, "herd" health is key to producing a quality product. Diseases can be devastating, reducing the quantity and quality of the sealife produced. The intimate association of bivalve agriculture with publicly owned marine waters presents monumental challenges for aquaculturists, as they have no real control over the pollutants or potential disease-causing organisms to which the animals are exposed—or to the quality of the animals' food in the marine environment.

Bivalves acquire food from their environment. Because both host and infectious agents are ectothermic, meaning they exchange heat with their surroundings, the marine environment plays an important role in the frequency and severity of disease. Any change in water temperature or salinity can impact production negatively. Harmful algal blooms, which are a result of poor water quality and other global environmental factors, can affect the quantity and quality of food in the waters, as well as the health of cultured bivalves.

Current research suggests that various types of algal blooms may be responsible for some of the emerging diseases. The blooms appear to be increasing, due in part to a growing influx of organic nutrients (especially phosphates and nitrates from sewage and urban runoff) in the oceans. Changes in water quality also may be causing alterations in the populations and types of "grazer" animals that normally feed on algae and keep it in check.

While most of the emphasis on algal blooms has focused on the harmful effects on humans and land-based animals, some do cause disease or starvation in bivalves. A bloom occurring at an inopportune time can result in the loss of an entire population simply by displacing the food that the larval or juvenile seed normally feeds upon. Evidence strongly suggests that the bay scallop population in some

areas has been decreased markedly because the larvae could not feed on the brown tide organisms that dominated the food supply.

Water borne diseases have had a devastating impact on fisheries in the Northeast and continue to threaten their future economic well-being. Veterinary pathologists are urging industry workers and lobstermen to be especially observant and report where any large numbers of affected sealife is fished to the Department of Marine Fisheries.

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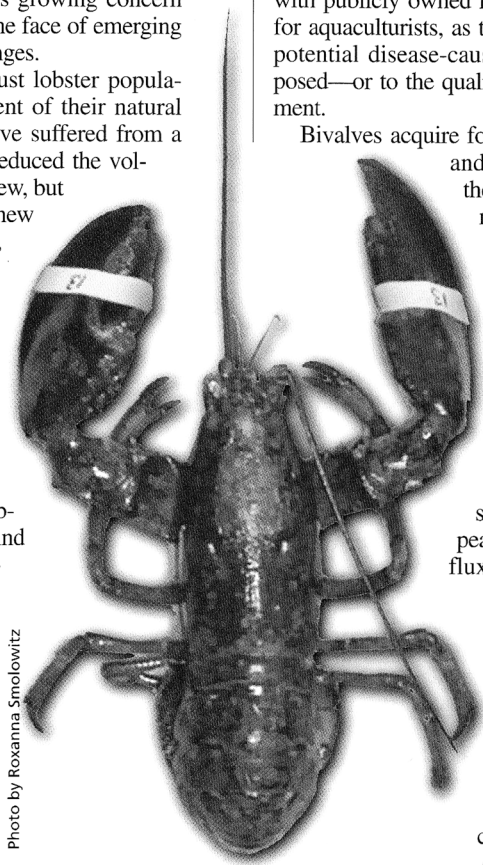


Photo by Roxanna Smolowitz

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