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What's Putting Some Aquaculturists in a "Foul" Mood?

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What's putting some aquaculturists in a "foul" mood?

Fouling organisms are taking their toll on marine aquaculture

Tessa S. Getchis

Worldwide, fouling organisms such as mussels, barnacles, seaweeds and sponges, among others, have wreaked havoc on commercial and recreational marine operations, colonizing docks and pilings and the hulls of boats. Biofoulers weigh down floating docks, and can cause drag and reduced fuel efficiency in vessels. Even with the development of "state of the art" antifouling materials, most docks and boats still need to be cleaned and treated on a yearly basis.

Fouling organisms has become a particular problem in suspended marine aquaculture operations, where shellfish and finfish are contained in or attached to nets, cages, floats, etc. Fouling can dramatically increase the weight of the cultivation gear causing problems with buoyancy, and reduce the exchange of food, oxygen, and wastes.

Today, a growing number of non-native fouling species have been introduced or unintentionally released, from other areas of the world. In their new environment, many of these invasive organisms have no natural predators or endemic diseases, making their introduction extremely successful, and often more destructive than their native counterparts. Of particular concern are a group of animals called tunicates, more commonly known as "sea squirts." (see article on page 2.) Tunicates can rapidly colonize and outcompete indigenous species.

Mussel aquaculture businesses in Eastern Canada have been hit particularly hard with the introduction of the clubbed tunicate, *Styela clava*. In New Zealand, South Africa, and other areas, another ascidian, *Ciona intestinalis*, commonly known as the "sea vase," has dramatically reduced harvests of mussels. In both cases the economic losses has been substantial.

In Long Island Sound, where aquaculture is limited to shellfish farming, biofouling has become a major concern to growers. Take, for instance, the blue mussel *Mytilus edulis*. Although they are considered a staple of many diets and consumed throughout the world, mussels can cause problems when they settle onto gear that is not intended for their culture. Tim Rollins, a

shellfisherman from Stonington, says mussels can infiltrate his gear so strongly that they create a "web" that blocks flow in and out of his high-growth oyster trays. He has attributed slow growth and mortalities to the set



photo: Tessa Getchis

Boaters and marina operators are plagued by a number of native and invasive fouling organisms that weigh down floats and buoys, and cause drag when attached to boat bottoms.

of seed mussels on his gear. Invasive "squirts," as he calls them, are also a problem, but are less predictable and cyclical in nature as native fouling organisms.

"Although they don't seem to cause a problem every season, when they do settle, they can clog and weigh down the gear," Rollins says. A pattern has developed, he adds, in which the invasive species tend to colonize on the gear closest to the bottom of the water column, but he does not know why this occurs.

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"While it may not be possible to eradicate these species entirely, reducing their spread and impact is imperative to growers."

—Tessa Getchis, Sea Grant Extension

Larry Williams, a shellfish grower from Milford, has experimented with longline culture of blue mussels. The dropper ropes he uses to collect seed mussels have a great amount of surface area for attachment. He chose his growing area particularly because of the slow current and high productivity level. The only problem—these are the same conditions that are ideal for fouling organisms to settle. When Williams checked his longlines in early summer for mussel seed, he noticed that the gear was covered with what he called “sea strawberries,” a hydroid species known as *Tubularia* sp. Although mussels were able to out compete *Tubularia* as the season progressed, the longlines were later inundated with other invasive tunicates such as *Styela* and *Botrylloides*. Williams claims that fouling shortens the window for harvesting the mussels.

“If sea squirts attach to the mussels, the product will either sink because of the extra weight or require extensive cleaning,” Williams said.



photo: Suzanne Ouellette: © The Day



photo: Tessa Getchis

Tiny blue mussels cover the surface of an oyster rack. Unless removed manually, the mussels will compete with the cultured oysters for space and resources.

Extension educator Tessa Getchis retrieves part of a mussel longline covered in sea strawberries (*Tubularia* sp.) This hydroid species is native to Long Island Sound.

Day to day operations have changed for Captain John Wadsworth of Niantic Bay Shellfish LLC as well. A normal day used to be “set it and forget it.” Well, that’s just not true anymore. Today the shellfish cages used by Wadsworth to grow oysters have to be scrubbed and rinsed multiple times throughout the growing season. Among the fouling organisms found on his gear are two non-native seaweeds, *Grateloupia* (a large red flat blade alga) and *Codium* (a green, forked, spongy-feeling alga).

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Wrack Lines

photo: Tessa Getchis



Shellfish bottom cages such as this one can be completely inundated with fouling organisms if the gear is not maintained regularly.



photo: Nancy Balcom

Two of the major invasive “culprits” of the Northeast aquaculture industry include the clubbed tunicate *Styela clava* (on the left) and the colonial tunicate *Botrylloides violaceus* (mass on the right).

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“For the most part, this used to be a one-man operation. Today it takes a lot of time and man power to maintain this gear.” said Captain Wadsworth.

Researchers at the University of Connecticut and elsewhere continue to investigate the control and economics of these aquatic nuisance species in marine aquaculture. While it may not be possible to eradicate these species entirely, reducing their spread and impact is imperative to growers.

Tessa Getchis is Connecticut Sea Grant's extension educator specializing in aquaculture.



Invasive Species of Long Island Sound

Free poster from Connecticut Sea Grant. Send \$2.50 for shipping and handling and your legible name and address to: Connecticut Sea Grant, 1080 Shennecossett Road, Groton CT 06340.

World Wide Web resources

For additional information on marine invasive species of Long Island Sound, visit:

<<http://www.seagrant.uconn.edu/LISinvasives.htm>>

To learn about research on the ecology of aquatic invasive species, visit:

<<http://www.marinesciences.uconn.edu/team/Pages/research/invasive%20species.htm>>

For the Sea Grant Nonindigenous Species Site (SGNIS), a national information center: <<http://www.sgnis.org>>