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### **Invasive Species Impacts Marine Life, Alters Feeding Habits of Bottom-Dwelling Fish on Georges Bank**

The invasive species *Didemnum vexillum* found on northern Georges Bank off the New England coast is affecting bottom-dwelling communities and the feeding habits of at least one commercially valuable fish species found there, according to a study by researchers at NOAA's Northeast Fisheries Science Center and the University of Rhode Island.

Commonly called a sea squirt, *Didemnum vexillum* is a soft-bodied colonial animal known as a tunicate that spreads across the ocean bottom in rope-like chains or mats, which are often described as looking like scrambled eggs or macaroni. *Didemnum* is considered a marine nuisance species because it reproduces rapidly and grows on almost any hard surface, including gravel and rock ocean bottom and the animals that live there. Primarily found in inshore coastal areas worldwide, its presence on Georges Bank was a rare offshore discovery.

This invasive species has colonized more than 230 square kilometers (roughly 90 square miles) of gravel bottom on northern Georges Bank since it was first documented there in 2002. Concern has arisen in the past few years as to how *Didemnum* could directly affect bottom-dwelling communities and indirectly affect mobile predators, such as commercially-important groundfish species.

"It's both good and bad news, depending on how you look at it," said Brian Smith, a food web ecologist at the Woods Hole Laboratory of NOAA's Northeast Fisheries Science Center and lead author of the study to quantify the dietary impacts of *Didemnum vexillum* on groundfish species. "*Didemnum vexillum* can cover almost all non-mobile animals living on the bottom, smothering some but providing a favorable habitat for others. This study found it has a very positive effect on two species of polychaetes, or marine worms, and to a lesser degree on a species of *Cancer* crab. That is also good news for winter flounder, which love to eat the worms and other bottom-dwelling animals. Since winter flounder feed extensively on polychaetes, the presence of this invasive species, usually considered a negative, appears to be a positive."

In one of the first studies to address these direct and indirect effects, Smith and colleagues Jeremy Collie and Nicole Lengyel of the University of Rhode Island's Graduate School of Oceanography will present their findings in early December at the 12<sup>th</sup> Flatfish Biology Conference in Westbrook, Conn.

"Winter flounder have small mouths and slurp their food like people sometimes do when they eat spaghetti," said Smith, who has been studying fish feeding habits and benthic habitat

ecology on Georges Bank for nearly a decade. “They are generalist feeders, and even though they prefer certain prey, they will eat whatever is available.”

Researchers compared areas with varying levels of *Didemnum* coverage as well as variability in the benthic animal community due to bottom surface type, depth, and disturbance from commercial fishing. Four sites on Georges Bank, two in areas open to fishing and two in areas closed to fishing, were sampled annually from 2005 through 2008 during the months of July through September.

Winter flounder stomachs were examined to determine if the presence or absence of *Didemnum* at the sampling sites altered the abundance or biomass of prey, indirectly affecting this commercially-important fish.

Smith and colleagues found that bottom-dwelling species like polychaetes and crabs were more abundant, and the benthic community was more diverse, when *Didemnum* was present. The increased abundance of polychaetes and crabs was also reflected in an increased presence of these animals in the diet of winter flounder. Although winter flounder prefer to eat the worms, they sometimes ate *Didemnum*, an occurrence attributed to the incidental consumption of polychaetes and other prey associated with the presence of the invasive species.

What will happen in another five or ten years if *Didemnum vexillum* spreads and covers a larger area of Georges Bank?

“This is one of the first studies addressing the indirect or second-order effects of *Didemnum vexillum* on groundfish species in this region. As the benthic community changes with the presence of this invasive species, the immediate impact on the feeding habits of one particular fish species appears to be positive,” said Smith. “However, the chronic effects on the ecosystem have yet to be determined.”

“The food web interactions among many of the groundfish species are extensive, but loosely connected,” Smith said. “There is much more to be done to understand how the presence of *Didemnum vexillum* affects the feeding habits of other economically and ecologically important fishes in this region.”

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Related links:

12<sup>th</sup> Flatfish Biology Conference: <http://mi.nefsc.noaa.gov/flatfishbiologyworkshop>

Invasive Marine Species Found on Georges Bank (2003 news release):

[http://www.nefsc.noaa.gov/press\\_release/2003/news03.17.html](http://www.nefsc.noaa.gov/press_release/2003/news03.17.html)

Marine Nuisance Species: <http://woodshole.er.usgs.gov/project-pages/stellwagen/didemnum/>