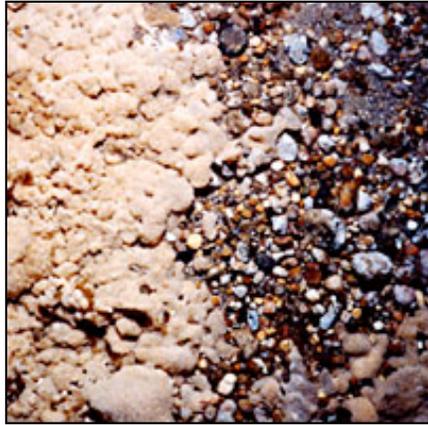


Squirt invasion

Spreading colonies of tiny vertebrates threaten Georges Bank fishing

By **DOUG FRASER**
STAFF WRITER

WOODS HOLE - They're slimy, little creatures that reproduce rapidly, and they appear to be flourishing on Georges Bank.



■ Sea-squirt colonies advance from left to right over gravel bottom in the northern Georges Bank at a depth of 135 feet.

Last year, a team of scientists found a thick mat of tunicates, small vertebrate animals that colonized the sea bottom, on a 6-square-mile section of Georges Bank. This year, scientists from Woods Hole and Rhode Island looked at a much larger area than before and found that the animals covered at least 40 square miles of bottom.

Known as sea squirts, these animals are just a little more than a half-inch long, but congregate in colonies that form thick mats, smothering sea life on the ocean floor, including scallops, the second most valuable

commercial species in New England, and sea vegetation that provides shelter and food for fish.

The recent discovery of the squirts' spread is bad news for one of the world's prime fishing grounds that is also struggling to recover from hundreds of years of overfishing.

"Anything looking to settle on the bottom won't find a favorable habitat," said Page Valentine, a research geologist at the United States Geological Service Woods Hole Science Center. The squirts attach to gravel and hard-sand sea bottom and cannot tolerate the shifting sand that makes up most of the top of Georges Bank. Unfortunately, many commercially important juvenile fish species like cod also prefer gravelly bottom.

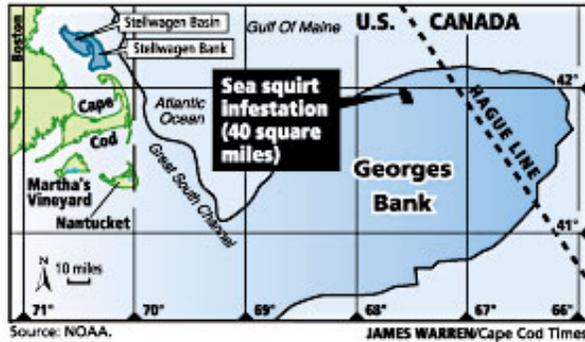
Valentine returned from Georges Bank on the National Oceanic and Atmospheric Administration's research ship Delaware II last Friday after attempting to map the boundaries of the sea-squirt colony discovered last fall, approximately 160 miles due east of the Cape, in waters between 138 and 213 feet deep.

"That's probably a record for this species," said Valentine of the depth.

What worries one researcher is that sea squirts thrive on microscopic nutrient molecules, viruses, bacteria and fungi.

Partial to sewage

"They really love sewage," said Gretchen Lambert, the marine biologist who identified the species in Washington state's Puget Sound when it was first found last spring on a sunken tugboat. Lambert believes poor water quality in coastal waters, and maybe even as far out as Georges Bank, could be giving these animals the food they need to thrive.



"We're talking about an awful lot of biomass out there. It wouldn't be there without its preferred food," she said.

No one yet knows how the squirts arrived here, but it is considered an alien species since scientists believe the

only native colonies are off the Netherlands and France. It has been found growing on ships' hulls and may have dropped off on a trans-Atlantic passage. Sea squirts were first found in New England off the Coast of Maine in 1993 and since then have been reported in coastal waters from Connecticut to northern Maine. They have also been found along the California coast, and this October in Puget Sound in Washington.

"We have never seen this kind (of growth) in our lifetime. It's not in our literature," Lambert said.

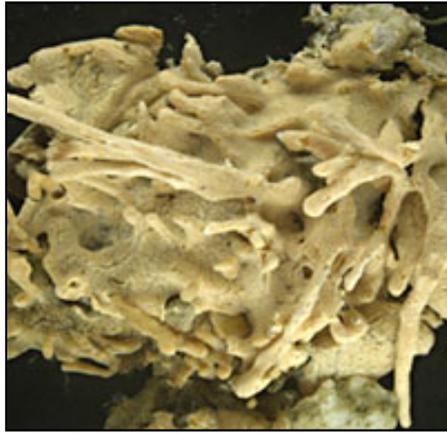
Lambert said sea-squirt colonies are capable of rapid growth. The 3-foot-diameter colony on the tugboat grew to 10 feet in six months. They are also extremely hardy, with survival mechanisms that rival the alien species found in science fiction.

Unfortunately, squirts can tolerate even the extreme cold of a New England winter, a limiting factor for most invasive species. Valentine monitored sea squirts in tidal pools in Woods Hole last winter, one of the coldest and most protracted in recent memory. While the colonies appeared to die off, they came back strong with the spring warmup.

Lambert said the sea squirt survives by retreating to a simple stem cell phase of dormancy and then is ready to grow back come spring. It can also reproduce two ways: asexually by budding, with each tiny organism replicating itself; and by creating little "tadpoles" that live for just a few hours and swim a short distance before settling to the bottom and attaching to a hard surface.

"Clean machine"

What impressed Valentine was that colonies of squirts always looked clean and newly formed in his underwater videos. That's quite a feat in an environment where even constantly moving fish have something growing on them. Lambert said the squirt produces noxious byproducts that are anticellular, anti-bacterial, antifungal and taste bad.



■ A colony of the tiny vertebrates encrusts a mussel shell in the northern Georges Bank at a depth of 148 feet.
(File photo: U.S. GEOLOGICAL SURVEY)

There are no known predators once the squirt is past its tadpole stage, although there have been some reports of it being eaten by fish.

"Right now, nothing anybody has tried to do (to eradicate sea squirts) has been successful," said NOAA Fisheries spokesperson Teri Frady.

Valentine and Lambert believe the only thing that can be done with sea squirts right now is to somehow keep them from taking over too much territory.

Valentine's experiments this past winter showed that breaking up sea-squirt colonies actually helps spread them faster as the animals resort to asexual budding to rebuild themselves. He is concerned that scallopers or fish draggers could increase the territorial growth of sea squirts by towing through an infested area.

"One option would be (fishing area) closures," said Valentine.

Frady said too little is still known about the sea squirts on Georges Bank to talk about fishing area closures. NOAA scientists will examine samples brought back on the Delaware II to see whether they have any nutritional value for fish and to learn more about the animals. In the meantime, NOAA and the Woods Hole Oceanographic Institution have scheduled an International Invasive Sea Squirt Conference at WHOI in Woods Hole this April.

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