Scientists look for ways to kill Sitka tunicate

By Ellen Chenoweth, KCAW, September 24, 2012 4:35 pm

Tammy Davis, invasive species coordinator for the Alaska Dept. of Fish & Game, points to an individual among a colony of D. vex coating a rock in Whiting Harbor. The tiny animal, called a tunicate, joins with other individuals, coating things its path and choking out life below. (Photo by Ed Ronco/KCAW)

Scientists have been monitoring an invasive species of sea squirt growing on the bottom of Whiting Harbor in Sitka. It's called *Didemnum vexillum*, or *D. vex* for short.

Part of the problem with *D. vex* is that it has a lot of unusual qualities. And now, research into its bizarre biology might help scientists figure out how to get rid of it.

Sarah Cohen has built her career studying invasive marine species. But even this San Francisco State University professor admits there are some unique hurdles when working with Sitka's most unwelcome visitor, *D. vex*.

"The first thing we faced after brainstorming about different things to try for killing them was, 'Gee, how do we assess if they're dead or not?'" she said. "If you are used to studying fish, that's just not something you get challenged by."

Still, Cohen has found some level of appreciation for the curious life form. But to the untrained eye, D. vex looks like something only a mother could love.

“It was described as ‘sea vomit’ by some people in Alaska after seeing the way it grows are these dripping mats kind of whitish to yellowish to tan or greyish and it just coats the surfaces of things on the bottom or nets pens or anything it grows on and as it gets heavy it forms these dripping, they look like stalactites coming down from the roof of a cave or something,” Cohen said.

D.vex looks like a single uniform blob but it’s actually a tightly knit group of thousands of tiny animals. Each individual is about the size of a pencil lead. They are called tunicates because they are nestled under a shared membrane, or tunic. These animals spend their entire adult lives in one place, latched on to a rock, net, or the hull of a ship. They feed by filtering microscopic food particles out of the water.

This particular invader has been known to science for only about the last 10 years. In that time, *D. vex* has astonished biologists with its ability to thrive in vastly different environments. Thought to have originated in Japan, *D. vex* has shown up in New Zealand, both coasts of the United States, British Columbia, and Northern Europe.

It was discovered in Sitka during a 2010 bioblitz, where citizens hunted for marine invasive species.

And like many marine invasives, it has probably been making its way from port to port by hitching a ride on shipping vessels. Once established, it has proven that it can carpet the sea floor, covering thousands and thousands of acres of underwater real estate.

Marnie Chapman is an associate professor of Marine Biology with the University of Alaska Southeast in Sitka. Chapman got to see how fast *D. vex* colonies can grow first hand. She had been using a mesh bag to transport samples when she noticed a few tiny fragments left behind. “It was amazing,” she said. “In two weeks it was much larger, and two weeks after that it was much larger. In about two and a half months it was huge it covered the whole laundry bag it was dripping down from the laundry bag and dripping down to the bottom below out there at Whiting.”

This dripping is the main reason why eradicating *D. vex* is so difficult. Once a fragment breaks off and lands on a new spot, it can actually seed an entire new colony.

In fact, the way *D. vex* grows and spreads reminded Chapman of a more notorious blight in the world of biology.

“I was taking a graduate course on cancer biology at the time and it just struck me some the similarities: The quickness with which it spreads, the way it doesn’t respect boundaries within the area that its growing, and its ability to morph into different shapes and take over its area,” she said.

Researchers have discovered a few *D. vex* weaknesses that may guide eradication efforts. The Smithsonian Environmental Research Center conducted some experiments in Sitka to see how well *D. vex* could survive under different challenging conditions.

A research center biologist, Linda McCann, subjected pieces of *D. vex* to low oxygen, freshwater, extra salty water, or bleach. According to McCann, plain old sea salt, but at much higher concentrations than you typically find in the ocean, was a surprisingly effective weapon against *D. vex*, at least on a small scale.

“This last summer we went back and tried to scale up and do this on the sea floor, and we found that even trying to do this in a very small area, that there were some issues with the salt dissipating very rapidly so that the salinity would go back down to the natural salinity very quickly,” McCann said. “So that’s something we would have to address.”

Humans are getting some help getting rid of *D.vex*. Chapman and other local Sitkans including Carrie Hisaoka, Paul Norwood and Jasmine Shaw documented a native snail species that feeds on living *D. vex*.

Scientists want to know a lot more about how D. vex grows, spreads and affects other species. An important question for the Sitka area is how it will affect the survival and development herring eggs that may settle on it during spawning.

Linda Shaw works for the National Marine Fisheries Service in Juneau. She says *D. vex* research is ongoing, but it’s not her top priority.

“And that’s a principle of invasive species management,” she said. “You want to control it first, then research it.”

Chapman agrees that her top priority is getting *D. vex* out of Sitka.
“Some of the more esoteric aspects of its biology might be fascinating, and I’d love to study it forever but I’d rather do it somewhere else rather than here in Sitka.”

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