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## Environmental call to action In Puget Sound, an alien invasion

Scientists try to weed out invasive sea squirts

**SUSAN GORDON;** [susan.gordon@thenewstribune.com](mailto:susan.gordon@thenewstribune.com)

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Could a salad dressing ingredient help stewards of Puget Sound control aquatic aliens?

In theory, yes.

In practice, the answer could depend on the outcome of an experiment that began in February at Maury Island's Dockton Park. That's where the aliens, sponge look-alikes with a record of smothering marine life, established a foothold in Quartermaster Harbor.

The culprit is called *Didemnum*, a tunicate, or sea squirt, that hails from Japan. Tunicates – named for their cloaks or tunic-like exteriors – are filter feeders that grow in places where anemones, sea cucumbers and other bottom-feeding organisms live.

Like terrestrial invaders – think Scotch broom and Himalayan blackberries – non- native tunicates can crowd out the competition for nutrients and space.

The problem varieties are native to Asia. People first noticed them in the Sound in 1998, but no one knows exactly how or when they arrived.

“People tend to ignore tunicates until they are so abundant they can't be ignored any longer,” said Gretchen Lambert, a Seattle marine biologist who has studied invasive tunicates all over the world.

Tunicates might have come to the Sound by way of international trade or the long-abandoned practice of importing shellfish seed from overseas. It's also possible that some varieties came from British Columbia, Lambert said.

Several years ago, biologists and scuba divers began to worry about how disruptive the foreign species might become.

Beginning in February 2006, state officials targeted non-native tunicates as an enemy of the Sound. Since then, they've allocated \$750,000 to stop the spread.

Some of that money pays the salary of Larry LeClair, a state Department of Fish and Wildlife biologist. It was his idea to experiment with the salad dressing ingredient – acetic acid, which gives vinegar its taste and smell – at King County's Dockton Park.

King County officials closed the docks on Quartermaster Harbor for nearly two weeks in mid-February so state Fish and Wildlife officials could eradicate the tunicates there.

LeClair turned Dockton Park's 20 finger docks into a field laboratory with the backing of his boss, biologist Allen Pleus, aquatic nuisance species unit coordinator.

“It's been a great testing ground for different methods of removal,” said Pleus, who is putting together the state's tunicate management plan.

### **'THEY WERE EVERYWHERE'**

*Didemnum*, sometimes called colonial tunicate, is one of three alien sea squirts that pose a serious threat to the Sound, state officials said. The other two are *Styela clava*, or club tunicate, and *Ciona savigni*, or transparent tunicate.

Karlista Rickerson, a scuba diver who lives on Maury Island, first noticed *Didemnum* at the docks last October. By December, she said, “they were everywhere.”

“They look like a yellow sponge, draped and growing over everything. If anything is hanging down, they just grow all over it,” she said.

*Didemnum* is likely the most widespread of the non-native sea squirts in the Sound. In 2003, a scuba diver who was also a marine biologist first noticed the species at the Edmonds Underwater Park, a diving hotspot, where it had carpeted a sunken boat. Later, volunteer divers removed it.

Since then, hundreds of recreational divers have been trained to look for invasive tunicates.

“There isn’t a week that goes by that I don’t get an e-mail from somebody who thinks they saw something,” said Janna Nichols, a Vancouver, Wash., diver and conservationist who coordinated the program for the Reef Environmental Education Foundation.

In March 2007, Nichols and other divers peeled off a mat of *Didemnum* that had encrusted the breakwater at Seattle’s Shilshole Bay.

Winter is the best time to remove tunicates because they appear dormant and don’t sexually reproduce, experts said. However, tunicates also spread by cloning. So divers bag up tunicates and remove them from the water.

“If you let chunks go, they go off and form new colonies,” Nichols said.

*Didemnum*, in particular, has proved particularly difficult elsewhere. In 2003, scientists discovered it had colonized a 6.5-square-mile area of the Georges Bank, historically New England’s primary fishing grounds.

That announcement made an impression on Lambert. “You’re not going to find bottom-feeding fish if the whole place is a monoculture desert of *Didemnum*,” she said.

In 2006, Lambert looked for tunicates at 45 sites around the Sound and found evidence that *Ciona savigni* and *Didemnum* infestations were growing. *Didemnum*, she said, “is potentially the worst one.”

At Dockton, it hung beneath the floating piers that King County provides as temporary moorage.

## **ACID TREATMENT SEEMS TO WORK**

In the eradication experiment, LeClair tested five treatments, including conventional removal by volunteer divers. Five divers devoted two days to removing tunicates from two 12-foot-long sections, said Rickerson, who hauled the squirt-filled bags out of the water. Before they were trucked to the dump, the bags weighed 900 pounds, she said.

LeClair borrowed the idea of using acetic acid from New Zealand, where non-native tunicates are affecting mussel growers.

In the Dockton experiment, LeClair tested two kinds of acetic acid applications. On some floats, he sprayed the acid. On others, he soaked the tunicates in a weak acid bath. To do the soaking, he first wrapped each float in thick sheets of plastic, then pumped in the solution.

The rest of the trial included wrapping floats in sheeting and pumping in fresh water and simply wrapping floats in sheeting and waiting two weeks.

When the wrapping was removed after two weeks, everything that had hung from the float had died, LeClair said.

Acetic acid treatments also seemed to work, LeClair said, but he hasn’t completely evaluated the project.

If spraying proves effective, it may be the least labor-intensive approach to cleaning up marinas where infestations occur, he said.

“We’re looking at what roads to go down and which ones to avoid,” he said.

At the same time, state officials are about to launch an educational outreach program aimed at marine boat owners. Non-native tunicates

sometimes attach themselves to hulls. Particularly vulnerable are so-called “slip queens,” or recreational vessels that rarely leave their moorage.

Meanwhile, Lambert and others would like state officials to conduct a more comprehensive survey of alien species in the Sound. Without one, it’s uncertain how much of a problem non-native tunicates pose and whether it’s even possible to contain or control them, said Gordon King, who works for Taylor Shellfish Farms.

“Couldn’t two divers cover a lot of ground in a month?” King suggested at recent meeting of a committee that advises Fish and Wildlife Department officials about tunicates.

King, who manages Taylor’s mussels, later said the Dockton trial is a good idea, but he believes *Didemnum* is now so widespread in the Sound that it cannot be eradicated.

It hasn’t affected the Sound’s shellfish production, he said. “I don’t see it as a problem at this stage,” he said. “That doesn’t mean it won’t be one.”

Susan Gordon: 253-597-8756 **MORE online**

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