Little clams play big part in keeping seagrass ecosystems healthy, new study finds

June 14 2012, by Donna Hesterman

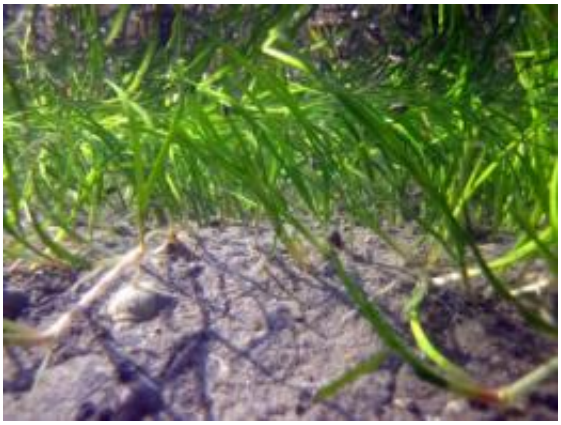
Here is a typical seagrass meadow denizen. Photo courtesy of Marjolijn J.A. Christianen

Sometimes it's the little things that matter most. That's definitely the case for endangered and threatened seagrass ecosystems according to a new study. Little clams living in the soil of seagrass beds consume toxic sulfides that accumulate in the silty sediments and turn what should be a toxic soup into a healthy aquatic environment where communities of fish, clams and shrimp thrive.

The study, a collaboration between a University of Florida researcher and a team of Netherland scientists, appears in the June 15 edition of the journal *Science*.

“Seagrass meadows are buffers against pollution and erosion that can damage the coast,” said Brian Silliman, the UF associate professor of biology who co-authored the study. “They also serve as nurseries for a variety of important fishery species and support healthy coral reef communities by absorbing nutrients and reducing turbidity.”

In short, seagrass meadows do a lot of the ecological heavy lifting along the coastal shelves where they exist. But the same speed bump action that buffers the shoreline from incoming waves also causes free floating organic debris and dead leaves of seagrass to settle in the underwater meadows. As the debris settles and decomposes, it blankets the soil with a sulfide offgassing layer of marine humus. Left to fester, the sulfides build up in the sediments and become toxic to the grass. But in most seagrass meadows throughout the world, they don’t – and for decades scientists have wondered why.



Lucinid clams live in the silty soil of a seagrass meadow. Photo courtesy of Laura L. Govers

Silliman and his team suspected that clams belonging to the Lucinidae lineage might be playing a role. Lucinid clams are known to host bacteria

in their gills that oxidize sulfides in the water and convert it to energy that sustains the mollusk.

The team tested their theory in laboratories at the University of Groningen in the Netherlands. They grew containers of seagrass in aquariums and monitored the rise in sulfide levels as leaves of grass died and accumulated in the tank. The researchers then introduced clams into half of the containers and noted that sulfide levels began to drop relative to tanks without clams.

Satisfied with the results of their experiment, the team began to look for hard evidence that what they saw in the lab was representative of what happens in nature. They analyzed data from 84 studies describing fauna of seagrass beds in 83 sites around the world and found Lucinid clams in 97 percent of the tropical systems.

“Finding the clams in 97 percent of the tropical sites shows that this is a globally important interaction that supports the foundation of seagrasses,” Silliman said.

The researchers calculated that at least 40 percent of the variation in grass growth across expansive meadows of seagrasses could be directly attributed to the abundance of Lucinid clams.

The more clams, the higher the grasses grow.

The study is an important one because it clearly shows that preserving natural interactions between species is vital to success when seagrass beds or other habitats are being restored, said Tjisse van der Heide, the study’s lead author from the University of Groningen in the Netherlands.

Making sure the little clams are present when new seagrass is planted could give a new meadow a big advantage, he said.

Provided by University of Florida