

Tiny invasive snail impacts Great Lakes, alters ecology

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Long a problem in the western U.S., the New Zealand mud snail currently inhabits four of the five Great Lakes and is spreading into rivers and tributaries, according to a Penn State team of researchers. These tiny creatures out-compete native snails and insects, but are not good fish food replacements for the native species.

"These snails have an operculum, a door that closes the shell," says Edward P. Levri, associate professor of biology at Penn State's Altoona Campus. "They can be out of the water for longer than other snails and when fed to fish, they are not digested and sometimes come out alive. This has a potential to alter the salmon and trout fisheries because they alter the food chain."

The New Zealand mud snail grows to a maximum of a quarter of an inch and is more normally a sixteenth to an eighth of an inch in length. The hard shell is capable of sealing off the soft animal from outside influences. In New Zealand, the snails reproduce asexually, resulting in identical clones, or sexually. However, in invaded areas, asexual cloning is the only mode of reproduction.

This mud snail spread to England as early as 1850 and Europe in the late 1800s. It is found in Japan, but when the snail arrived there is unknown. The first mud snail found in the U.S. was in 1987 in the Snake River, Idaho, but the species did not appear in the east until 1991 in Lake Ontario. The western and eastern U.S. populations are separate episodes of introduction, because they represent different clones; in each case,

only one snail needed to be introduced to begin the invasion. The snails in the Great Lakes region appear to be the same as one clone found in Europe.

"In the western U.S., this species is of special concern largely because of their ability to modify ecosystems," Levri told attendees today (Aug. 8) at the Ecological Society of America's annual meeting in Milwaukee.

The snails in western streams alter the nitrogen and carbon cycling. They are primarily grazers and detritus eaters with very wide food preferences. In some places in streams in Yellowstone National Park, they reach population densities of 323 individuals per square inch. Levri, working with undergraduates Warren J. Jacoby, Shane J. Lunen, Ashley A. Kelly and Thomas A. Ladson, found that densities in the Great Lakes are not anywhere near that in the West.

"In our most recent survey, we were lucky if we found a few hundred per square meter," says Levri. "In Lake Erie they are not very abundant, but it is unclear what they are doing 100 feet below the surface."

In New Zealand, the mud snails are not a problem because of native trematodes -- flukes -- that infect the snails and controls their population and reproduction. Some people have suggested that those who want to control the snail introduce this trematode to the U.S. to control the snails.

"There are two problems with introducing these trematodes," says Levri. "The first is that any introduction of a nonnative species can cause worse problems than they were expected to cure. The second is that these flukes have a multiple-host life cycle, infecting ducks that are apparently not affected before infecting the snails. This might work in the west where the snails are in shallow water, but no duck is going to dive 100 feet to get snails."

Levri and his team found that in Lake Ontario, the densities of the snails peak between 50 and 82 feet and they were rarely found in water less than 16 feet.

"What we can do is limit their expansion," says Levri. "That means that recreational water users must be very careful moving from one place to another. We advise anglers to freeze waders and fishing gear, or use Formula 409 or something like that to kill the snails."

He notes that signs are beginning to mark areas in New York where the snail is found to warn people to clean their gear.

The Penn State researcher warns that the snails are difficult to control, noting "I have frozen them for 12 hours at a time and about 50 percent of them survive."

Source: Penn State

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