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Invasion of the mud snail

Minuscule creature is threat to fishing

By **Ray Grass**

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GREEN RIVER — It may not have been particularly appetizing, sifting through the half-digested meals taken from the stomachs of trout, which included everything from bugs to other fish and large mice.

But Mark Vinson sought what was not being digested: tiny snails only slightly larger than the tip of a pen.

Of particular concern on the Green River, and now other waters along the Wasatch Front, including the Provo, Ogden, Weber and Logan rivers, is the infestation of the New Zealand mud snail.

The New Zealand mud snail, proper name *Potamopyrgus antipodarum*, is an exotic aquatic snail that is spreading into waters in the Western United States like a prairie fire and is pushing out native invertebrates. And, as Vinson's newest findings show, the tiny snail is providing a convenient meal but delivering little or no nutritional value to fish.

In sections of the Madison River in Yellowstone National Park, the observed density of the tiny invertebrates is greater than 100,000 per square meter and makes up more than 95 percent of the available invertebrate biomass in some sections.

Fears are that the introduction of the snail could have a negative impact on fishing.

"There's no reason to be alarmed at this point," said Vinson. "but the snail is a definite concern. It is not good for the fishery."

The snail was first noticed in the Green River in September 2001.

Since that time, through May 2004, Vinson noted, 477 locations were sampled in Utah and the snails were found in 28 locations within 16 stream basins. In 2001, the snails were found in only three basins and in 2002 eight.

Among those rivers found to hold snails are the Green, Bear, Weber, Ogden, Provo and Logan.

In one experiment, trout that were fed an exclusive diet of New Zealand snails lost 2 percent of their body weight per day and eventually died.



Mark Vinson, left, of Utah State University's Department of Aquatic, and graduate student Anree Walker check long tubes placed in the Green River below the Flaming Gorge Dam to catch possible food sources for the river's trout populations.

Tom Smart, Deseret Morning News

"The snails offer very little nutritional value for fish. There is a little nutrition, but not enough for a fish to survive," said Vinson. "Typically, these fish should gain between 1 and 2 percent of their body weight per day when they feed on native invertebrates."



Snails placed on a penny show the relative size of the small invertebrates.

Vinson, leader and research assistant professor, Utah State University Department of Aquatic, tagged along on a night fish survey by the Utah Division of Wildlife Resources on the Green River below the Flaming Gorge Dam.

What he found was a big increase in the number of fish that are eating snails. Prior to 2001, no snails were found in the stomachs of fish. In 2002, less than 5 percent of the fish had eaten snails. In 2004, 35 percent of the fish had eaten snails.

"What this tells us is the snail population is increasing and that the snails are now more available to fish," he added.

"We don't yet know what this is doing to the fish. We've seen no decrease in growth from 2003 to 2004. The health of the fish did not go down, but the occurrence of snails is a concern. Fish simply don't get enough nutrition from eating the snails.

"We looked at 914 snails that we collected after passing through trout gastrointestinal tracts. Of those we checked, 43 percent were alive, 42 percent were dead and 15 percent were empty. My thinking is that only 15 percent of the snails that were ingested were digested and could be assimilated into muscle tissue. Equally important, 43 percent of the snails ingested pass through alive. These snails can be easily moved to new locations by fish that like to wander."

In the worst case, the snails will take over Utah rivers like they have in Yellowstone and fishing will simply not be as good.

"If they maintain a moderate level of abundance, then they may not have much effect because there is so much other food available," he added.

In Colorado, a two and a half-mile section of the Boulder River was closed to all fishing because of the infestation of the mud snail. A section of river in California was recently closed for the same reason. Officials in the two states fear fishermen will inadvertently pick up the tiny snails on their boots, shoes or on fishing tackle and transport them to other waters. They can also be transported, as can whirling disease, by animals and birds.

It is believed that the infestation of rivers along the Wasatch Front was a result of fishermen.

"We believe this because the snails have been found in popular access points. If birds had moved the snails, then the sites would be more random," said Vinson.

The snails have one particular morphological trait that makes them especially prone to explosive growth. All of the snails are female, which means the eggs produced do not need to be fertilized, but are simply clones of the parent.

A single snail can therefore start a new population. The New Zealand



snail can also produce up to six generations per year.

What is needed, said Vinson, is to continue to monitor the snail population and to aggressively learn how to manage waters to reduce their population.

"First, we could try experimenting with high flows. Snails live in live vegetation. Removing some of the vegetation during high flow can temporarily reduce the population. The high flow will also wash some of the snails downstream. We haven't found the snails in the river through Dinosaur National Monument, so it seems there's something there they don't like."

As with whirling disease, people need to be aware of the snails and be prepared to take steps not to spread them to other locations. One thing fishermen can do is wash their waders when they move between waters and put them in the sun to dry thoroughly. If the snails are kept moist, they can live for several weeks out of water.

The New Zealand mud snail can be found on both gravel and cobble substrates and aquatic vegetation. They look like tiny, black pebbles.

If anyone believes they have located colonies of the New Zealand mud snail, Vinson asked that they store them in a small container with a preservative (either isoprophyl or ethyl alcohol) and mail the container to Mark Vinson, BLM Western Bioassessment Center, Department of Aquatic, Watershed and Earth Resources, Utah State University, Logan, UT 84322-5210.



These fishermen try their luck and skill on the Green River below Flaming Gorge Dam where mud snails threaten the fish.

Tom Smart, Deseret Morning News

"Again, this is nothing to be alarmed about, but people need to be aware that the snails are in Utah waters and they need to do everything possible to stop them from spreading," concluded Vinson.

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