



FACT SHEET

Freshwater Aquatic Invasive Species in Rhode Island November 2017

Mystery Snails



Species Description and General Information

There are three mystery snails considered to be invasive in Rhode Island. Chinese or Japanese mystery snails are referred to by a variety of scientific names, but North American literature most commonly uses *Cipangopaludina chinensis*, or *C. japonica*, respectively*. These are large freshwater snails that are uniformly brown or olive green on the outside and white to pale blue on the inside. The Japanese variety of this species is black and usually a dark green, moss-like algae covers the shell. The third invasive snail species is the banded mystery snail (*Viviparus georgianus*), which has a more spherical shell which is yellowish to greenish in hue and has a distinct reddish-brown banding pattern. Generally, adults of this species reach lengths greater than 1.5 inches, and can grow up to 2.5 inches from the tip of the whirl to the bottom of the shell opening. The banded mystery snail differs from Chinese/Japanese mystery snails in that it is native to North America, but is considered an invasive north of the Carolinas. Shells of mystery snails form in 6-7 convex whorls that wrap to the right (dextral), away from the shell opening, with deep indentations where whorls meet. Mystery snails are commonly known as trapdoor snails (or black snails) because of the dark, solid, door-like operculum that covers the opening of the shell when the snail is fully retracted. Most native snails do not possess this “trap door” operculum. Mystery snails prefer lakes and slow-moving streams between 0.2-7 meters in depth with soft mud, silt, or sandy substrate. In infested waterbodies during summer months, live mystery snails can be seen along the shoreline in shallow water and empty shells of deceased snails can be found washed up on beaches, particularly on the downwind side of a lake. They are thought to be called “mystery” snails based on their unique lifecycle; in the spring they give birth to young, and then suddenly, fully developed snails mysteriously appear from deeper parts of the lake.

Related Non-Invasive Species

Don't be tricked, there is a brown mystery snail (*Campeloma decisum*) native to the northeastern United States that is typically olive green in color and can easily be confused with its invasive counterparts. It is smaller and narrower than the invasive snails, rarely reaching 1.5 inches and is more elongated than the other two snails. The most obvious difference is the shape of its shell opening and operculum—instead of a completely rounded shell opening (as the invasives have), the shell opening of the native brown mystery snail has an apex opposite from the tip of the shell.

*Taxonomic confusion exists as to whether Chinese and Japanese mystery snails are entirely different species, or if morphological differences are due to variances in individuals. Again, Japanese mystery snails appear to have more elongated whorls than Chinese mystery snails.

What Makes These Snails Invasive Species?

Once an adult, one female mystery snail can produce over 100 live, crawling young each brood. This is an important factor in their dispersal, as it only takes one impregnated female to start a new population, since one female usually produces more than 170 young in one lifetime. Their ability to close up also protects them against drying out if taken out of water. When snails attach to plants and are inadvertently tangled on boat trailers, the snails can stay moist and alive for at least 4 weeks, allowing for long-range transport to other, potentially uninfected waterbodies. Mystery snails are a problem because they feed on any organic and inorganic bottom material, diatoms, and algae, thus competing with native snails and fish for food and habitat. Mystery snails can also clog the screens on water intake pumps for irrigation. Banded mystery snails are especially problematic because they can prey on the eggs of largemouth bass. Mystery snails may also be a human health concern, as swimmers are at a risk of injury from mystery snails by cutting a foot or hand on sharp, broken shells along the shore. Further, in some countries, mystery snails have been known to host human intestinal flukes (*Echinostoma cinetorchis*) and transmit other diseases and parasites. In China they are eaten as part of the human diet because the meat is high in protein, low in fat, and considered delicious.

How Did Mystery Snails Become Established in the United States?

The earliest record of invasive mystery snails in the United States dates back to the late 1800s when they were imported from Southeast Asia to San Francisco for the live food market. They were discovered in Boston as early as 1914 and may have been accidentally introduced in Massachusetts in the early 1900s either with goldfish released to control mosquito populations or when byproduct was released into waters by Asian food markets. By 1965, they had also been discovered in Connecticut, Maryland, New Hampshire, New Jersey, New York, Pennsylvania, Maine, Virginia, Idaho, Indiana, Michigan, Ohio, Wisconsin, Lake Michigan, Lake Erie, Lake Ontario, and the Niagara River. Since then, dispersal has become widespread in ponds, lakes, rivers, and drainage ditches across the country, likely due to the dumping of contaminated live bait or aquariums, or from transport on recreational watercraft, boat trailers and gear.

Please Help Stop the Spread of the Invasive Mystery Snail!

The most manageable threat to spreading mystery snails is recreational boaters and anglers transporting them from lake to lake. Care should be given to thoroughly check, drain and dry a boat being transported from waters known to have invasive mystery snails. Cleaning boots, waders and other fishing gear, and allowing them time to thoroughly dry is especially important. Never release a plant or animal into a water body unless it came from that water body. Discard unused bait in the trash and do not dump aquarium contents into any waterbody. The flushing of engines and bilge water should be done out of and away from the water. Once introduced into a waterbody, it is unlikely that invasive mystery snails will be eradicated. No effective large-scale control options currently exist. Aquatic pesticides are ineffective at controlling mystery snails, and instead may often kill native snails. The trap-door-like structures near the opening of the shell give mystery snails the ability to close-up when water conditions become inhospitable, and when water quality is restored, they can re-open and continue to thrive. Since mystery snails do not feed on plant material, removing plants from the water body will not control the introduced population. Winter lake draw-downs are also ineffective because the snails migrate to the depths of the waterbody and hibernate in temperatures lower than 15°C. Preventative actions are the best defense in the fight against mystery snails. Learn to identify invasive species and be on the lookout for mystery snails in your lake. Examine sand and muck along the shore, where they are most likely to be seen. Report any suspected sightings of this species to RI DEM, and spread the word to fellow boaters and fishermen!

For more information also see:

- Protect Your Waters
<http://www.protectyourwaters.net/>
- 100th Meridian Initiative
<http://www.100thmeridian.org/>
- Aquatic Invasive Species in Rhode Island
<http://www.dem.ri.gov/programs/water/quality/surface-water/aquatic-invasive-species.php>

