Scientific Name: *Bithynia tentaculata* Linnaeus, 1758

Common Name: faucet snail, bithynia

Taxonomy: Available through ITIS

Identification: The faucet snail has a shiny pale brown shell, oval in shape, with a relatively large and rounded spire consisting of 5–6 somewhat flattened whorls, no umbilicus, and a very thick lip (Clarke 1981; Jokinen 1992; Mackie et al. 1980). The aperture is less than half the height of the shell (Clarke 1981). Adult *B. tentaculata* possess a white, calcareous, tear-drop to oval-shaped operculum with distinct concentric rings (Clarke 1981; Jokinen 1992; Pennak 1989). The operculum of juveniles, however, is spirally marked (Jokinen 1992). The operculum is always located very close to the aperture of the shell (Jokinen 1992). The animal itself has pointed, long tentacles and a simple foot with the right cervical lobe acting as a channel for water (Jokinen 1992).

Size: The shell is usually no larger than 12–15 mm; the snail is sexually mature by the time it reaches 8 mm in size (Jokinen 1992; Mackie et al. 1980; Peckarsky et al. 1993; Pennak 1989).

Native Range: The species is native to Europe.

Nonindigenous Occurrences: *B. tentaculata* was first recorded in Lake Michigan in 1871, but was probably introduced in 1870 (Mills et al. 1993). It spread to Lake Ontario by 1879, the Hudson River by 1892, and other tributaries and water bodies in the Finger Lakes region during the 20th century (Jokinen 1992; Mills et al. 1993). It was introduced to Lake Erie sometime before 1930 (Carr and Hiltunen 1965; Krieger 1985). This snail's range now extends from Quebec and Wisconsin to Pennsylvania and New York (Jokinen 1992). It has been recorded from Lake Huron, but only a few individuals were found in benthic samples from Saginaw Bay in the 1980s and 1990s (Nalepa et al. 2002).

Means of Introduction: *B. tentaculata* could have been introduced to the Great Lakes basin in packaging material for crockery, through solid ballast in timber ships arriving to Lake Michigan, or by deliberate release by amateur naturalists into the Erie Canal, Mohawk River and Schuyler's Lake (Mills et al. 1993). The most likely and most accepted explanation for its original introduction is the solid ballast vector (Jokinen 1992).

Status: The species is established in the drainages of Lake Ontario (Mills et al. 1993; Peckarsky et al. 1993), Lake Michigan (Mills et al. 1993), and Lake Erie (Krieger 1985; Mackie et al. 1980; Peckarsky et al. 1993), but not Lake Superior (Jokinen 1992). Occurrences in Lake Huron do not warrant classification as established.

Ecology: This species is found on the substrate in fall and winter (including gravel, sand, clay, mud or undersides of rocks) and on aquatic macrophytes (including milfoil, *Myriophyllum spicatum* and muskgrass, *Chara* spp.) in warmer months (Jokinen 1992;

Pennak 1989; Vincent et al. 1981). It lives mostly in shoals, but is found at depths up to 5 m (Jokinen 1992). *B. tentaculata* can inhabit intertidal zones in the Hudson River (Jokinen 1992). In general, the faucet snail inhabits waters with pH of 6.6–8.4, conductivity of 87–2320 µmhos/cm, Ca^{++} of 5–89 ppm, and Na^{+} of 4–291 ppm (Jokinen 1992). It can potentially survive well in water bodies with high concentrations of K^{+} and low concentrations of NO_3^{-} (Jokinen 1992). In the St. Lawrence River, it tends to occur in relatively unpolluted, nearshore areas (Vaillancourt and Laferriere 1983) and amongst dreissenid mussel beds (Ricciardi et al. 1997).

This species functions as both a scraper and a collector-filterer, grazing on algae on the substrate, as well as using its gills to filter suspended algae from the water column. When filter feeding, algae is sucked in, condensed, and then passed out between the right tentacle and exhalant siphon in pellet-like packages which are then eaten (Jokinen 1992). The ability to filter feed may play a role in allowing populations of the faucet snail to survive at high densities in relatively eutrophic, anthropogenically influenced water bodies (Jokinen 1992). *B. tentaculata* feeds selectively on food items (Brendelberger 1997). The faucet snail is known in Eurasia to feed on black fly larvae (Pavlichenko 1977).

B. tentaculata is dioecious and lays its eggs on rocks, wood and shells in organized aggregates arranged in double rows, in clumps of 1–77. Egg-laying occurs from May to July when water temperature is 20ºC or higher, and sometimes a second time in October and November by females born early in the year. The density of eggs on the substrate can sometimes reach 155 clumps/m^2. Fecundity may reach up to 347 eggs and is greatest for the 2nd year class. Eggs hatch in three weeks to three months, depending on water temperature. Oocytes develop poorly at temperatures of 30 - 34ºC (). Growth usually does not occur from September to May. The lifespan varies regionally and can be anywhere from 17 – 39 months (Jokinen 1992; Korotneva and Dregol'skaya 1992).

In its native Eurasian habitat, the faucet snail is host to many different species of digeneans, cercariae, metacercariae, cysticercoids, and other parasites (Mattison et al. 1995; Morley et al. 2004; Toledo et al. 1998). Natural dispersal of this snail is known to occur by passive transport in birds (von Proschwitz 1997). *B. tentaculata* is capable of detecting the presence of molluscivorous leeches through chemoreception and of closing its operculum to avoid predation (Kelly and Cory 1987).

The faucet snail has the potential to be a good biomonitor for contaminants such as Cd, Zn, and MeHg because there are good correlations between environmental concentrations and snail tissue concentrations with respect to these toxic compounds (Desy et al. 2000; Flessas et al. 2000).

Impact of Introduction

A) Realized: After its introduction into the Erie Canal, the faucet snail began replacing two pleurocerid species, *Elimia virginica* and *E. livescens* (Jokinen 1992). Between 1917 and 1968, the species richness of mollusks in Oneida Lake decreased by 15% as the faucet snail increased in abundance (Harman 2000). It is very probable that impacts on pleurocerids, especially *Elimia* spp. in Oneida Lake, have occurred because the faucet snail has higher growth rates per unit respiration than most pleurocerids due to its ability to filter feed (Shiro Tashiro and Colman 1982).

However, after colonization by invasive zebra mussels, *Dreissena polymorpha*, in Oneida Lake, the density of the faucet snail decreased and overall mollusk abundance decreased even further (Harman 2000). Similar effects occurred in Lake Ontario between 1983 and 2000 due to competition with invasive dreissenid mussels (Haynes et al. 2005).

B) Potential: *B. tentaculata* can serve as a food item for introduced common carp *Cyprinus carpio* (Ricciardi 2001). It is also frequently found on introduced milfoil *Myriophyllum spicatum* (Vincent et al. 1981) and amongst introduced mussels (Ricciardi et al. 1997). Where the faucet snail has been observed in Lake Champlain, it generally dominates gastropod assemblages (Vermont and New York State Departments of Environmental Conservation 2000). The snail also has the potential to be a bio-fouling organism for underwater intakes and in swimming areas (Vermont and New York State Departments of Environmental Conservation 2000).

Remarks: *Bythinia* was found in fossils from the Pleistocene in Glacial Lake Chicago (Jokinen 1992), but the only representative of the genus currently found in the Freat Lakes is Eurasian. *B. tentaculata* is synonymous with *Bulimus tentaculatus* (Jokinen 1992).

Voucher Specimens:

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Other Resources:

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Group: Mollusks – Gastropods (Snails)

Lake(s): All Great Lakes Drainages except Lake Superior

Genus: *Bithynia* (also synonymous with *Bulimus*)

Species: *tentaculata* (also synonymous with *tentaculatus*)

Common Name: faucet snail, bithynia

Status: Established in Lake Ontario Drainage, Lake Erie Drainage and Lake Michigan Drainage; Reported from and possibly established in Lake Huron.

Freshwater/Marine: All

Pathway: Shipping (the most likely original vector)

Exotic/Transplant: Exotic