Scientific Name: *Valvata piscinalis* Müller, 1774

Common Name: European valve snail, European stream valvata

Taxonomy: Available through ITIS

Identification: *V. piscinalis* has a somewhat pinched aperture and an attenuate spire (Grigorovich et al. 2005). Spire height tends to increases in more eutrophic conditions (Fretter and Graham 1978; Grigorovich et al. 2005). Shells of this species often exhibit 4–5 whorls (Grigorovich et al. 2005) and are white to beige with more orange to red pigmentation apically (Fretter and Graham 1978). The operculum shows spiral markings of around 10 turns, originating almost centrally (Fretter and Graham 1978). The animals are yellow colored, spotted grey and white, with blue eyes and darker pigmentation on the snout, mantle and base of the penis (Fretter and Graham 1978). Valvatids all exhibit a bipectinate ctenidium (respiratory organ) that is visible as the animal moves (Fretter and Graham 1978). The European valve snail can be confused with *V. sincera*, a native species in the Great Lakes; however, the native species has a more spherical aperture, a wider umbilicus, a conical spire and more widely spaced and rough growth lines on the shell in comparison with the introduced species (Grigorovich et al. 2005).

Size: In the Great Lakes, mature adult European valve snails are 5 mm high and 3–5 mm wide (Grigorovich et al. 2005). In Europe, this snail has been found up to 7 mm high and 6.5 mm wide, but is usually smaller (Fretter and Graham 1978).

Native Range: The European valve snail is native to Europe, the Caucasus, western Siberia and Central Asia and is common in many freshwater environments therein (Grigorovich et al. 2005). It is entirely absent from Iceland (Fretter and Graham 1978).

Nonindigenous Occurrences: The European valve snail was originally introduced to Lake Ontario at the mouth of the Genesee River in 1897. In forty years it dispersed to Lake Erie and subsequently it expanded its range to the St. Lawrence River, the Hudson River, Champlain Lake and Cayuga Lake. *V. piscinalis* was recorded in the 1990s and the first decade of the 21st century in Superior Bay in Lake Superior (Minnesota), Lake Michigan (Wisconsin) and Oneida Lake in the Lake Ontario watershed (New York State) (Grigorovich et al. 2005).

Means of Introduction: The European valve snail was most likely first introduced to Lake Ontario in packing material made of straw and marsh grasses used to protect breakable items arriving from Europe (Mills et al. 1993). Subsequent range expansion may have occurred via natural dispersal, while more recent records of the 1990s and the first decade of the 21st century may have been aided by human-mediated dispersal in ships and via canals (Grigorovich et al. 2005).

Status: The European valve snail is established in all the Great Lakes except for the St. Clair River and Lake Huron (Grigorovich et al. 2005). Populations are much more sparsely distributed and often disjunct in the more recently colonized areas.

Ecology: *V. piscinalis* is known for its rapid growth and high fecundity. It reproduces as a hermaphrodite, one individual acting as the male and the other as the female, and has no free larval stage (Fretter and Graham 1978; Grigorovich et al. 2005). It may spawn 2 or 3 times in a year, laying up to 150 eggs at a time (Grigorovich et al. 2005). Hatching normally occurs in 15–30 days (Fretter and Graham 1978). Individuals breed around the age of 1 and usually die at 13–21 months (Grigorovich et al. 2005). In Europe, breeding occurs from April to September, occurring later at more northerly latitudes (Fretter and Graham 1978).

The species is an efficient feeder, grazing on epiphytic algae and detritus, and in more eutrophic environments is capable of filter feeding on suspended organic matter and algae (Grigorovich et al. 2005). *V. piscinalis* can also rasp off pieces of aquatic vegetation (Fretter and Graham 1978).

V. piscinalis tolerates varying calcium concentrations and generally does not require very high temperatures to survive (Fretter and Graham 1978; Grigorovich et al. 2005). Individuals can overwinter in mud, often experiencing growth during this cold period (Chernogorenko 1980; Fretter and Graham 1978), although some populations may experience mortality in frozen littoral zones (Olsson 1984). This species can tolerate salinities up to 0.2% (Fretter and Graham 1978) and is distributed in northern parts of the Curonian Lagoon, where it experiences periodic intrusions of saline water for a few hours or days at a time (Bubinas and Vaitonis 2005; Olenin and Daunys 2005). In its native range, this species' presence has been associated with oligotrophic nearshore zones (Grigorovich et al. 2005), clear-water habitats more than turbid water, sparsely vegetated lakes or sites dominated by *Chara* spp. and *Potamogeton* spp. (Van den Berg et al. 1995; Van den Berg et al. 1997), littoral habitats with high siltation rates (Smith et al. 1994). lentic and stagnant waters or slow streams (Frank 1987), fine substrates (mud, silt and sand) – especially during hibernation, and aquatic macrophytes – for laying its egg masses (Grigorovich et al. 2005). The snail appears to be somewhat resistant to declines in macrophyte cover, because populations have been recorded to survive in ponds after vegetation cover almost completely disappeared (Lodge and Kelly 1985). This species is found anywhere from 0.5–23 m in the Great Lakes (Grigorovich et al. 2005). In Europe, it usually is found up to 10 m (Fretter and Graham 1978).

V. piscinalis is a common first intermediate host for the parasitic trematode *Echinoparyphium recurvatum* and has also been shown to act as the first and second intermediate hosts to *E. mordwilokoi* in native environments in Europe (Evans et al. 1981; Grabda-Kazubska and Kiseliene 1991; McCarthy 1990). The snail also has chemosensory perception that allows it to detect nearby leeches and distinguish molluscivores from non-molluscivores, and thus close its operculum to avoid predation (Kelly and Cory 1987).

Impact of Introduction

A) Realized: When *V. piscinalis* was introduced to Oneida Lake, native gastropods (in particular, hydrobiid snails) decreased in abundance (Grigorovich et al. 2005), possibly due to competition.

B) Potential: This species has the potential to compete with native gastropods for food and space (Grigorovich et al. 2005). Unlike native gastropods, it is capable of filter feeding on suspended food items in eutrophic conditions, which could conceivably allow it to become competitively dominant in such conditions.

Remarks:

Voucher Specimens:

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Other Resources:

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Group: Mollusks – Gastropods (Snails)

Lake(s): All Great Lakes, except the St. Clair River and Lake Huron; recent introductions are disjunct populations

Genus: *Valvata*

Species: *piscinalis*

Common Name: European valve snail, European stream valvata

Status: Established

Freshwater/Marine: All

Pathway: Not on list – Originally arrived in packing material made of straw and marsh grasses

Exotic/Transplant: Exotic