Scientific Name: Elimia virginica Say, 1817

Common Name: piedmont elimia, Virginia river snail

Taxonomy: Available through ITIS

Identification: *Elimia virginica* belongs to the family Pleuroceridae, a group of snails with thick, elongated shells. The opercula are withdrawn, proteinaceous, corneous, and paucispiral. The shells are dextral and have a very high and narrow spire, with little space in the incisions between the whorls. This species has two distinct shell morphologies, one smooth and one lirate (i.e. finely lined or grooved) (Smith 1980). Specimens of this species often vary in coloration; in general, the *E. virginica* is yellow to chestnut in hue, but it may or may not exhibit 2 darker brown spiral bands (Peckarsky et al. 1993). Juveniles (snails with an aperture height of no more than 7 mm) display the banding more frequently than adults (Smith 1980). It is straightforward to distinguish the female of this species by way of the external genital sinus (Jones and Branley 1964).

Size: *Elimia virginica* from New York State and the Connecticut River range from 27–33 mm high, with an aperture height of 9–12 mm (Smith 1980).

Native Range: *Elimia virginica* is native to large Atlantic coast rivers in eastern North America, found east of the continental divide (Pennak 1989; Smith 1980). The northeastern limit of the native range of the species is the lower Connecticut River (Smith 1980).

Nonindigenous Occurrences: The first record of this species in the Great Lakes drainage dates from around 1856–1860 when it was found in the Erie Canal around Mohawk, New York State. Populations later increased throughout the canal in the late 1800s and reached Buffalo, at the mouth of Lake Erie. In the 1960s, this species was recorded from Oneida Lake, New York State (Mills et al. 1993).

Means of Introduction: *Elimia virginica* was introduced via the Erie Canal to the Lake Ontario drainage.

Status: The species is considered established in the Lake Ontario drainage.

Ecology: Pleurocerids are usually found in lotic erosional environments, in riffles or shoals with rock or sand substrate, and especially frequently on rocks in slower areas of medium size reaches. *Elimia virginica* usually inhabits slow to medium velocity rivers and streams with firm and clean gravel, cobble and rock substrate (Smith 1980). Pleurocerids in general are sensitive to abiotic stresses, and the *E. virginica* is not tolerant to siltation (Smith 1980). In Connecticut, the *E. virginica* is at the edge of its range and is most likely limited to hard water habitats only (Jokinen and Pondick 1981). During collections made in the Connecticut River, the snail was found to inhabit regions with water temperatures up to 27.5°C, dissolved oxygen between 7 and 14 ppm, CaCO₃ concentration from 42–160 ppm, pH from 7.6–9.0 and CO₂ concentration from 0–10 ppm

(Smith 1980). However, it should be noted that at some of these sites, population abundance was very low and/or decreasing, especially in conditions of high water temperature and alkilinity (Smith 1980).

A short study in the Potomac River, Virginia, found that the snail has a very strong shell that is adapted to withstand predation by such predators as crayfish and ducks. However, there is an evolutionary trade-off between predator defense and rapid growth and reproduction amongst snail populations found in this river. *Elimia virginica*, unlike softer shelled physid snails, grows very slowly and has the lowest intrinsic rate of increase, along with *Mudalia carinata*, in this environment (Hamilton 1980).

E. virginica lays is dioecious (Jones and Barclay 1964) and lays its eggs from spring to summer, in particular in June and July (Smith 1980). In the Connecticut River, shells of *E. virginica* is often used as substrate by epizootic algae and the Entoproct *Urnatella gracilis* (Smith 1980). Trematodes are often parasitic in reproductive organs of this species (Smith 1980).

Impact of Introduction

A) **Realized:** There is recent evidence for hybridization and introgression between *E. virginica* and *E. livescens* amongst populations brought into contact due to the opening of the Erie Canal (Bianchi et al. 1994). These two species were formerly completely geographically isolated during glaciation by the Alleghenian Divide, and the former was only found in Atlantic Slope drainages, while the latter was only found in Interior Basin drainages (Bianchi et al. 1994). Hybridization and introgression have the potential to jeopardize the genetic integrity of a species, especially when the population is already small.

B) Potential: There are currently no known impacts caused by introduction of this species to other water bodies.

Remarks: *E. virginica* is synonymous with *Goniobasis virginica* and *Oxytrema virginica*. It is considered rare in Connecticut (Jokinen and Pondick 1981). This species, although introduced to the Lake Ontario drainage, has been largely out-competed by the introduced snail *Bithynia tentaculata*, and is thus virtually absent now from the Oswego drainage and possibly very reduced in abundance in other localities where it was introduced, due to such competition (Mills et al. 1993).

Voucher Specimens:

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Other Resources:

Author: Rebekah M. Kipp

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Group: Mollusks – Gastropods (Snails)

Lake(s): Lake Ontario Drainage

Genus: Elimia (also synonymous with Goniobasis and Oxytrema)

Species: *virginica*

Common Name: piedmont elimia, Virginia river snail

Status: Established

Freshwater/Marine: Freshwater

Pathway: Canals

Exotic/Transplant: Native Transplant