

**Scientific Name:** *Cipangopaludina chinensis malleata* Reeve, 1862

**Common Name:** Chinese/Oriental mystery snail, Asian apple snail, Chinese apple snail

**Taxonomy:** Available through ITIS

**Identification:** Species of the genus *Cipangopaludina* can be identified by their relatively large globose shells and concentrically marked opercula (Burch 1980). *C. chinensis* has a width to height ratio of 0.74–0.82, the shell has 6.0–7.0 whorls, and the inner coloration is white to pale blue (Clarke 1981; Jokinen 1992). This species has a small and round umbilicus and the spire is produced at an angle of 65–80° (Jokinen 1992). *C. chinensis* exhibits light coloration as a juvenile and olive green, greenish brown, brown or reddish brown pigmentation as an adult (Clarke 1981; Jokinen 1992). In juveniles, the last shell whorl displays a distinct carina, and the shell contains grooves with 20 striae/mm between each groove (Clarke 1981; Smith 2000). Juveniles also have a detailed pattern on their periostracum consisting of 2 apical and 3 body whorl rows of hairs with long hooks on the ends, distinct ridges and many other hairs with short hooks (Jokinen 1984).

The shell of *C. chinensis* grows allometrically (the height increasing faster than the width) and does so at a decreased rate in comparison with *C. japonica*, such that the adult shell is less elongate than that of its congener (Jokinen 1982). The radula also may differ between *C. japonica* and *C. chinensis*, but there is so much variation even within one species that it is not a good diagnostic characteristic (Smith 2000). However, as a general guide, in one North American population, the radula of *C. chinensis* had seven small cusps on the marginal tooth and a large central cusp with four small cusps on either side (Jokinen 1982).

**Size:** *C. chinensis malleata* may grow to 60–63 mm in height (Jokinen 1992; Martin 1999).

**Native Range:** *C. chinensis* is native to various parts of Asia (Jokinen 1992).

**Nonindigenous Occurrences:** The first record of *C. chinensis malleata* in the Great Lakes dates from some time between 1931 and 1942 from the Niagara River, which flows into Lake Ontario (Mills et al. 1993). *C. chinensis malleata* occurs in Lake Erie, where it was introduced some time prior to 1968 (Wolfert and Hiltunen 1968). *C. chinensis* was found for the first time in Oneida Lake, which flows to Lake Ontario, in 1977–1978 (Clarke 1978; Jokinen 1992). Jokinen (1982) records occurrences of populations of *C. chinensis* in the drainages of Lake Erie, Lake Ontario and Lake Michigan, from the states of Michigan, Indiana, Ohio, Wisconsin and New York.

**Means of Introduction:** The species *C. chinensis malleata* was probably released from an aquarium into the Niagara River between 1931 and 1942 (Mills et al. 1993).

**Status:** *C. chinensis malleata* is established in Lake Erie and its drainage as well as the Lake Ontario and Lake Michigan drainages.

**Ecology:** *C. chinensis* feeds non-selectively on organic and inorganic bottom material as well as benthic and epiphytic algae, mostly by scraping, but diatoms are probably the most nutritious food it ingests at sites in eastern North America (Jokinen 1982). It prefers lentic water bodies with silt, sand, and mud substrate in eastern North America, although it can survive in slower regions of streams as well (Jokinen 1982; Stanczykowska et al. 1971). This species has been found in waters in eastern North America with pH 6.5–8.4, calcium concentration of 5–97 ppm, magnesium concentration of 13–31 ppm, oxygen concentration of 7–11 ppm, depths of 0.2–3 m, conductivity of 63–400  $\mu\text{mhos/cm}$ , and sodium concentration of 2–49 ppm (Jokinen 1982; Jokinen 1992; Stanczykowska et al. 1971). It can tolerate conditions in stagnant waters near septic tanks (Perron and Probert 1973).

This species is ovoviviparous (Jokinen 1992). Females live up to 5 years, while males live up to 3, occasionally 4 years (Jokinen 1982; Jokinen 1992). Female fecundity is usually greater than 169 young in a life time, and may reach up to 102 for any given brood (Jokinen 1982). All females generally contain embryos from May to August and young are born from June through October in eastern North America in shallow water, then females begin migrating to deeper water for the winter in the fall (Jokinen 1982; Jokinen 1992; Stanczykowska et al. 1971). Females bear more young in their 4<sup>th</sup> and 5<sup>th</sup> years than in other years (Jokinen 1992).

In Korea, this species is known to be a host to the metacercariae *Echinostoma cinetorchis*, an intestinal trematode parasitic in humans (Chung and Jung 1999). It is also a common host to larvae of echinostomes in the Kinmen islands (Chao et al. 1993).

### **Impact of Introduction**

**A) Realized:** To date, this species has exerted no recorded impacts in the Great Lakes and is considered relatively “benign” with respect to its potential to greatly change or influence ecosystems and native species (Mackie 1996).

**B) Potential:** In the Boston area, this species is a regular host to the common native parasite *Aspidogaster conchicola*, which is a first time record in North America for a gastropod acting as host to this species (Michelson 1970). Negative interactions with native gastropods are also possible.

**Remarks:** Taxonomy of the introduced populations of Oriental mystery snails is confusing and there are many scientific names in use. There has also been debate regarding whether or not *C. chinensis malleata* and *C. japonica* in North America are synonymous and simply different phenotypes of the same species. This database considers the two as separate species. Smith (2000) argues that *Cipangopaludina* is a subgenus of *Bellamya*; however, because most North American literature does not use the genus *Bellamya* to refer to these introduced snails, oriental mystery snails discussed here are referred to by the name *Cipangopaludina*. Literature cited in this database regarding the Chinese mystery snail may employ the following names: *C. chinensis*, *C. chinensis malleatus*, *C. chinensis malleata*, *Viviparus malleatus*, *V. chinensis malleatus*, *B. chinensis* and *B. chinensis malleatus*.

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**Other Resources:**

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**Group:** Mollusks – Gastropods (Snails)

**Lake(s):** Lake Erie Drainage, Lake Michigan Drainage, Lake Ontario Drainage

**Genus:** *Cipangopaludina* (also synonymous with *Bellamya* and *Viviparus*)

**Species:** *chinensis malleata* (also synonymous with *chinensis malleatus*, *chinensis*, and *malleatus*)

**Common Name:** Chinese/Oriental mystery snail, Asian apple snail, Chinese apple snail

**Status:** Established

**Freshwater/Marine:** Freshwater

**Pathway:** Aquarium Release

**Exotic/Transplant:** Exotic