ARIZONA GAME AND FISH DEPARTMENT
HERITAGE DATA MANAGEMENT SYSTEM

Invertebrate Abstract **Element Code:** IMGASE7010
Data Sensitivity: No

CLASSIFICATION, NOMENCLATURE, DESCRIPTION, RANGE

NAME: *Cipangopaludina chinensis*
COMMON NAME: Chinese Mystery Snail, Japanese Trapdoor Snail, Miracle Snail, Golden Snail, Chinese Vivipara, Tanisha, Rice Snail, Chinese apple snail, Asian Apple Snail
SYNONYMS: *Paludina malleata, Viviparus malleatus, Viviparus chinensis malleatus, Viviparus japonicus, Viviparus stelmaphora Paludina japonicus, Cipangopaludina malleata*, *Bellamya chinensis*
FAMILY: Viviparidae

AUTHOR, PLACE OF PUBLICATION: Gulf States Marine Fisheries Commission. 1998. and Kohl 2000 cites the author as L. Reeve, 1863, Conch. Icon.14 *Paludina:* Pl.5, figs. 5a-b, with letterpress, as *Paludina malleata.* NatureServe 2005 cites the author as Gray 1834. And Perez et al. 2004 cites the author as Gray 1817.

TYPE LOCALITY:

TYPE SPECIMEN: Unknown

TAXONOMIC UNIQUENESS: Most references cite this species in the genus *Cipangopaludina*; however, the most recent review (Smith 2000) has assigned them to the genus *Bellamya* (Perez et al., 2004). Smith showed that there are 2 species present in North America and questions the recognition of subspecies in the North American populations due to probably mixed origins. There are 2 subspecies in this species, *Cipangopaludina chinensis malleata* is the subspecies found in Arizona.

DESCRIPTION: Chinese mystery snails have a shell, which is smooth, globose in outline, and thin in structure, but strong. Color is uniform, light to dark olive-green, without any color bands. The small, round umbilicus is covered in part by the reflected, slightly thickened parietal lip. The outer lip is only slightly reflected and forms a round-to-oval aperture. Black pigmentation rims the entire lip and somewhat within the aperture. The columnella is narrow and arched. Whorls are strongly convex, with a very slight shoulder, and the suture is deeply indented. Shell sculpture consists of fine growth lines, spiral lines and fine to moderate malleations over the entire surface. In some individuals, older lip reflections will appear as fairly strong axial ridges. In others there may be one or more spiral threads forming slight carinae (prominent, sharp-edged ridges). The operculum is corneous, thin, with concentric

growth lines, and a submarginal (located nearer the outer lip) nucleus. Large specimens reach 65mm in length; their shells have 6 or 7 whorls (Gulf States Marine Fisheries Commission, 1998).

AIDS TO IDENTIFICATION: *Cipangopaludina chinensis* can be mistaken with *Viviparus intertextus* when they are small, or depressed in size, and darker in color (Bataran, 1999). *Cipangopaludina chinensis* differs from *B. japonica* in its wider shape and loss of carination at about 35 mm lengths. Shells over about 45 mm are very similar. Form of the juvenile shell, periostracum sculpture, and anatomical details also differ. Both species differ from native viviparids in their large size (over 35 mm), relatively thin shells, and lack of a well-developed shoulder on the whorls. (Perez et. al 2004).

ILLUSTRATIONS:
Color photo (Kohl *in* http://nis.gsmfc.org/nis_factsheet.php?toc_id=125#biology)

TOTAL RANGE: Viviparidae, commonly referred to as "mystery snails", have a worldwide distribution. *Cipangopaludina chinensis* is native to Burma, Thailand, South Vietnam, China, Korea, and Asiatic Russia in the Amur region, Japan, the Philippines, and Java. This species inhabits Canada as well as the Eastern and Western United States (Gulf States Marine Fisheries Commission, 1998, NatureServe, 2000).

RANGE WITHIN ARIZONA: Pima County and possibly in Santa Cruz and Cochise Counties as well.

SPECIES BIOLOGY AND POPULATION TRENDS

BIOLOGY: Mystery snails have a feature called a “trap door” which allows them to close up the opening in their shell when water conditions are unfavorable. The gills of *Viviparus* are characterized by unusually large triangular lamellae whose tips hang over a ciliated gutter or "food groove" running across the floor of the mantle cavity. Cilia direct mucus and entrapped particles into the food groove. Particles collected on the gill filaments are carried to the tip, where they also fall into the grove. A food/mucus string forms, which is carried forward and collected into a ball, or "sausage". Periodically the snail will turn its head and eat the collected food (Kohl, 2000).

This species as well as viviparids in general have been the subject of several spermatogenesis studies because it has polymorphic spermatozoa (Gulf States Marine Fisheries Commission, 1998).

REPRODUCTION: Viviparid offspring hatch inside a specialized marsupium in the female’s mantle cavity, and the right antenna (tentacle) of the male snail is modified to serve as a penis. Juvenile snails feed and grow inside the mantle for several weeks before they leave the

marsupium. *C. chinensis* will usually bear young twice per year (Perez et al., 2004, Foster & Smith, 1997).

FOOD HABITS: *C. chinensis* is an omnivore whose diet consists of algae, plant matter, vegetables, zooplankton, and phytoplankton. In a captive setting they will eat fish food, frozen foods, and live foods (Foster and Smith, 1997).

HABITAT: *C. chinensis* prefers slow-moving freshwater habitat with muddy or silty bottoms. They can be found in lakes, ponds, rice paddies, irrigation ditches, roadside ditches, and the slower portions of streams where there is some sort of mud substrate. They will stay partially buried in the mud where the water is quiet.

ELEVATION:

PLANT COMMUNITY:

POPULATION TRENDS:

SPECIES PROTECTION AND CONSERVATION

ENDANGERED SPECIES ACT STATUS: None
STATE STATUS: None
OTHER STATUS: None

MANAGEMENT FACTORS: This is an exotic, nuisance species. This species can serve as a vector for various parasites and diseases. Over its native range, the Chinese mystersnail may serve as an intermediate host for Echinocasmus elongatus and many other species in this genus, which can infect human beings.

The best type of control is prevention. Preventing any further spread of the Chinese mystery snail will help keep our native ecosystems healthy. To help stop the spread of the Chinese mystery snail a few simple steps should be followed.

1. Learn to identify the Chinese mystery snail and other exotics species.
2. If you have snails or other animals in an aquarium and you no longer wish to care for them, you should euthanize the animals before disposing of them in the trash. DO NOT RELEASE THEM IN THE WILD!
3. Remove mud, plants, fish, and animals from all of your equipment and drain all water from the bilge and livewells before leaving a launch area.
4. Clean your equipment with hot water or a pressure washer and allow it to dry for 5 days before transporting it into a new body of water.
5. Never release plants or animals into a different body of water from which they came.

PROTECTIVE MEASURES TAKEN:

SUGGESTED PROJECTS:

LAND MANAGEMENT/OWNERSHIP:

SOURCES OF FURTHER INFORMATION

REFERENCES:

Barker, G.M. 2001. The Biology of Terrestrial Molluscs. CABI Publishing UK. Pp: 25.

Bataran, Stacy A. 1999. Exotic aquatics on the Move: Chinese (Oriental) Mystery Snail (Viviparous malleatus). Available online: http://www.iisgcp.org/exoticsp/Oriental_Mystery_Snail.htm.

Foster & Smith. 1997. Drs. Foster & Smith's Live Aquaria.com: Japanese Trapdoor Snail (Pond) (*Viviparus malleatus*). Available online: http://www.liveaquaria.com.

Gulf States Marine Fisheries Commission. 1998. Cipangopaludina chinensis (Reeve, 1863). Available online: http://nis.gsmfc.org/nis_factsheet.php?toc_id=125.

Gulf States Marine Fisheries Commission. 1998. Color photo by Martin Kohl. Cipangopaludina chinensis (Reeve, 1863). Available online: http://nis.gsmfc.org/nis_factsheet.php?toc_id=125.

Indiana Division of Fish and Wildlife. 2005. Indiana Department of Natural Resources: Division of Fish and Wildlife. Aquatic Invasive Species: Chinese Mystery Snail. Available online: http://www.in.gov/dnr/fishwild/fish/ais/snail.htm

Kohl, Martin. 2000. Freshwater Molluscan Shells/Viviparidae. Available online: http://members.aol.com/Mkohl1/Viviparidae.html

NatureServe Explorer: An online encyclopedia of life [web application]. 2001. Version 1.6. Arlington, Virginia, USA: NatureServe. Available: http://www.natureserve.org/explorer (Accessed : August 8, 2005)

Perez, Kathryn E., et al. 2004. Freshwater Mollusk Conservation Society: Freshwater Gastropod Identification Workshop: "Showing your Shells". University of Alabama, Tuscaloosa, AL. Available online: http://bama.ua.edu/~perez005/FMCSGastropodID.pdf.

Reeve, L.1863. Conch. Icon.14 *Paludina:* Pl.5, figs. 5a-b, with letterpress, as *Paludina malleata.*

USGS. 2005. NAS-Nonindigeneous Aquatic Species: *Cipangopaludina chinensis malleata* (Chinese Mystery Snail). Available online: http://nas.er.usgs.gov/queries/.

MAJOR KNOWLEDGEABLE INDIVIDUALS:

ADDITIONAL INFORMATION:

PATHWAYS/HISTORY: In 1892, Chinese mystery snails were imported into live markets in San Francisco. In 1911, a thriving population was found in the San Francisco Bay. They were found in Boston, Massachusetts in 1915 and in 1950 Florida reported finding a population. By 1965, Chinese mystery snails were established both on the west coast and on the east coast as well as some of the Gulf States like Texas. The great Lakes have been affected also; Lake

Michigan and Lake Erie populations were reported in 1965 (Indiana Division of Fish and Wildlife, 2005).

DISPERSAL/SPREAD: Chinese mystery snails were probably introduced into the United States through releases from the aquarium industry. This snail is readily imported for Asian food markets. Therefore, some releases may have been intentional in an effort to create a local food source. Once in a body of water the Chinese mystery snail could be transported via bait buckets and water holding areas on boats (Indiana Division of Fish and Wildlife, 2005).

RISKS/IMPACTS: Specific control methods for the Chinese mystery snail have yet to be developed but there are some general snail management techniques that could be applied. Biological control is always a method that most people support because it usually causes the least amount of damage to other aquatic organisms. By introducing fish or turtles that eat snails you may be able to lower the population. There is also the option to use a chemical control method. There are copper compounds that are sold as snailicides but they are usually not selective in the snails they kill. With Chinese mystery snails possessing the ability to "close up", more damage would probably occur to native snails in the treatment area than to the target pest (Indiana Division of Fish and Wildlife, 2005).

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