

Marisa cornuarietis (Giant Ramshorn Snail)

Superfamily: Ampullarioidea (Operculate Snails)

Class: Gastropoda (Snails and Slugs)

Phylum: Mollusca (Molluscs)



Fig. 1. Giant ramshorn snail, *Marisa cornuarietis*.

[<https://sites.google.com/site/freesnails/marisa.jpg>, downloaded 7 March 2015]

TRAITS. The giant ramshorn snail or Colombian ramshorn snail is found as either yellow/brown striped or solid yellow colours (Figs 1, 2). The adult snail has a length of 48-56mm with a diameter of 35-50mm whereas the juveniles are smaller in size with a reddish/brown colour. The adults have a circular shaped shell with 3-4 whorls and 3-6 spiral brown bands whereas the juveniles have an elevated spiral with a globose shape. The shell's surface is smooth and is defined with transverse striations. The eyes are black and pigmented (Arias et al., 2014). Both male and female sexes exist with this species of snail and evidence of sexual dimorphism is seen as males have a more rounded aperture and thicker shell while females have an oval shaped aperture with thinner shells.

DISTRIBUTION. Widespread over South and Central America and the Caribbean and native to Bolivia, Brazil, Colombia, Costa Rica, Cuba, French Guiana, Guyana, Panama, Suriname, Trinidad and Tobago and Venezuela.

HABITAT AND ACTIVITY. Found in freshwater habitats and any ecosystem with live vegetation including lakes, rivers, ponds, irrigation systems and swamps; depths less than 1m close to vegetation. They are a diurnal species and spending most of its time foraging.

FOOD AND FEEDING. The giant ramshorn has an avid omnivorous feeding habit and consumes live or decaying plants or fish, eggs and other juvenile snails. This has a detrimental effect on aquatic vegetation contributing to direct competition, predation of eggs and juveniles and accidental egg mass disruption. They feed on plants by frequently clipping the petiole of stems then move on to the cuttings. When feeding on other snails, they attack the prey by introducing the proboscis, i.e., mouth or head, into the aperture of the victim and devouring the flesh by gnawing holes into the victim's shell. One study on *Marisa cornuarietis* found that 150 adult snails ranging from 30-60mm took less than a week to completely consume masses of 1360g wet weight of several species of aquatic macrophytes (plants). The radular morphology of these snails includes long canine lateral teeth which pierce and tear plant stem tissues and plant leaves. In addition, their jaws are powerful and can clip and grasp leaves and stems while the radula shreds them. They are voracious herbivores.

POPULATION ECOLOGY. The life cycle of the snails is dependent on the availability of food and the water temperature. At high temperatures and high abundance of food the life cycle is short (less than three months) and reproduces throughout the year. When there are drought and food shortages, the life cycle is longer and reproduction occurs once during the spring and early summer. They are present in a large abundance of areas where there is slow moving water and sufficient vegetation. In North America, where it is introduced, due to its large abundance this snail is of concern because of its ability to completely decimate the vegetation in its habitat. They also are capable of outcompeting native species through direct competition and predation on their eggs and young and as a result have been placed on a list of potentially harmful exotic shellfish by Texas Parks and Wildlife Department in 1990. Although little is known on ecological significance to river systems in the USA, densities of *Marisa cornuarietis* in areas of San Marcos and Comal Rivers are high as 100m² and a population of approximately two to twelve million in the 14 acre Comal Springs lake area (Arsuffi and Horne, 1998). Also, herbivorous snails were uncommon in freshwater ecosystems in North America and they mostly fed by scraping the algae attached to the surface of leaves instead of consumption of an entire plant. Introducing *Marisa cornuarietis* where macrophyte herbivory did not previously exist provided a completely new component to the trophic structure of these ecosystems.

REPRODUCTION. They are an egg laying species where 20-80 eggs are laid on objects such as plants, trunks or stones, in a gelatinous mass under the surface of the water (Fig. 3). The gelatinous mass is transparent and the eggs are visible as small white spots inside. When the eggs are deposited they are between 2-3mm. The eggs develop over a two week period and during the development they reach to a size of about 4mm, with the gelatinous mass becoming more transparent and snails inside being more visible inside the wall of each of the eggs (Fig. 4). After

development, the snails emerge from the gelatinous mass and are identical to their parents (male and female). They are soft, transparent and relatively small but as they intake water, they increase in size. Their shells grow due to high calcium contents of the water which offers enough nutrients for them to build their shells. When the water is too acidic or lacks nutrients, their shells begin to erode. After hatching, they feed on the remains of the egg-mass for the first few days. There is no seasonality of reproduction since a female is able to store active sperm in the genital tract for months after copulation, enabling her to reproduce even if she does not mate for months thereafter.

APPLIED ECOLOGY. *Marisa cornuarietis* is used as a biological control agent in the aquarium trade. They are effective for this reason because they are easily adaptable to captivity and since it is omnivorous, they act as an aquarium scavenger when plant growth is not being encouraged. Some countries deliberately use this species to control the invasive aquatic plant, *Hydrilla*. They retard growth of water hyacinths when they feed on the roots. It also serves as a weed control agent in the canals of South Florida, and it reduces the abundance of *Biomphalaria* snails which are hosts of Schistosomiasis disease found in some tropical countries.

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Fig. 2. Different forms of shell pattern in *Marisa cornuarietis*.

[<http://people.southwestern.edu/~burksr/test/poster/Chap1.pdf>, downloaded 16 March 2015]



Fig. 3. Female giant ramshorn snail depositing eggs on the surface of a stable object.

[www.iucnredlist.org, downloaded 17 March 2015].



Fig. 4. Egg development at 10 days in giant ramshorn snail.

[<http://www.fmmh.org/MarisaCornuartetis/species.asp?ID=314>, downloaded 7 March 2015]