

# Apple Snails

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## A Common Aquarium Product

Apple snails are well-known and popular aquarium snails throughout the world because of their aquarium cleaning feeding habitats and attractive appearance, shape and size. Apple snails are the biggest living freshwater snails on earth. When handled and maintained properly some apple snail species can attain six inches in diameter (*Pomacea maculata*).



*P. bridgesi* color variants

The most common apple snail in aquarium shops is *Pomacea bridgesi* (spike-topped apple snail). This species comes in different shell colors from brown to albino or yellow and even blue,



*P. canaliculata* yellow phase

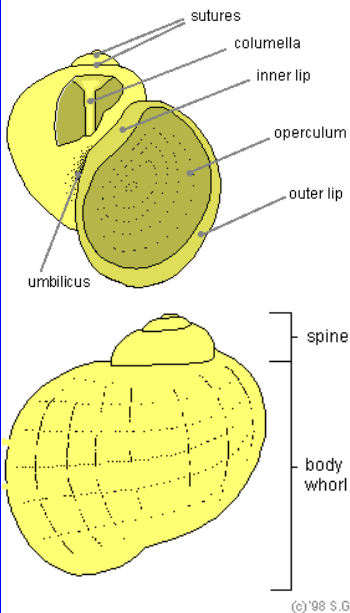
with or without banding (the yellow variant is known in the aquarium trade as the "golden mystery snail"). The living tissue also shows great color variation from black to yellow or gray. Another common apple snail is *Pomacea canaliculata*. This snail is bigger, rounder and consumes plants, which makes it less suitable for aquaria. These snails also come in different shell and body colors. The Florida apple snail (*Pomacea paludosa*) can also be found in the aquarium trade. This snail is less common than *P. bridgesi* and *P. canaliculata*.



Jacksonville Shell Club

*P. paludosa*

**Shell Morphology**



The giant amongst the apple snails, *P. maculata*, and other miscellaneous species occasionally make their way into the aquarium trade.

Apple snails are very often given incorrect names like *Ampul-larius* for the genus instead of *Pomacea* and the wrong species names, like *gigas*, instead of *maculata*.

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## *P. canaliculata*: Tropical and Subtropical Agricultural Pest

In the 1980's, *Pomacea canaliculata*, channeled apple snail, were introduced in Taiwan to start an escargot industry. Instead of becoming a useful human food resource, they escaped to



*P. canaliculata*

rice fields and became a serious rice eating pest and a pest to the environment in general. Through human introduction, this apple snail has rapidly spread to Indone-

sia, Thailand, Cambodia, Hong Kong, southern China, Japan, Philippines, Hawaii and there are indications that they are invading Australia. This snail is also recognized as a pest on crops of taro in many of these regions.

(continued on page two)

This publication is intended to educate farmers about apple snails, it is not meant to be a guide for definitive identification.

## Apple Snail Identification

Apple snails can be confused with snails from the Viviparidae family. The snails from this family look very similar in shape and color, but they do lack a lung, a siphon and labial tentacles (the small tentacles near the mouth). In contrast with the egg-laying Ampullariidae snails, the Viviparidae snails are live bearing.

Snails in the aquarium trade are most likely to be *Pomacea bridgesi* or *Pomacea canaliculata*. If the snail, however, grows over four inches, and has somewhat indented sutures like *P. canaliculata*, then you are probably dealing with a *P. maculata*. This creature pops-up



The extended siphon allows a submerged apple snail to breathe.

once in a while in the pet trade and is considered to be the largest freshwater snail on earth. More common, and also rather large, is *P. haustorium*.

When the snail has a flat shell and has a size over one

inch, with or without dark stripes, it probably is *Marisa cornuarietis*, giant ramshorn snail. This snail is not always recognized as an apple snail due to its different appearance.

Less common, but also occasionally available in the aquarium trade



*M. cornuarietis* - Giant ramshorn

(mainly in the United States), is *P. paludosa*, Florida apple snail.

A quick method for differentiating apple snails can be based on shell shape. When attempting to identify snails ignore the animal and shell colors when comparing them with pictures. Many color variations (shell and body) exist within a single species (please note the variety of colors for each species pictured in this technical bulletin). An excellent source for color pictures and an interactive, three-dimensional representative of

(continued on page three)

## *P. canaliculata*: Agricultural Pest

(continued from page one)

Nevertheless, *P. canaliculata* and other apple snails are considered a delicacy and are often sold in Oriental markets for consumption.

In the United States, the State of Mississippi has prohibited all members of the apple snail family Ampullariidae calling them “destructive



Yellow phase

plant eating apple snails.” Texas, Hawaii, California and Louisiana have identified *P. canaliculata* as an agricultural pest that can negatively impact rice, taro and the production of other aquatic plants. The U.S. Department of Animal and Plant Health Inspection Service will begin enforcing existing regulations for any snail plant pest species. This will

include *P. canaliculata*.

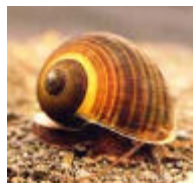
The channeled apple snail has been distributed and used in the United States to control nuisance aquatic plants, for research or educational purposes and as a water gardening or aquarium item.



Newly laid *P. canaliculata* egg mass.

## Apple Snail Taxonomy

Apple snails belong to the phylum Mollusca, class Gastropoda (snails), subclass Prosobranchia, order Mesogastropoda, family Ampullariidae (apple snails). The Ampullariidae family is divided into several genera with about 120 different species. The genera



*P. f. flagellata*

*Asolene*, *Felipponea*, *Marisa*, and *Pomacea* are the New World genera (South America, Central America, the West Indies and the Southern United States), while the genera *Afropomus*, *Lanistes* and *Saulea* are found in Africa. The genus *Pila* is native in

both Africa and Asia.

However, the number of genera is open to debate and much work needs to be done to identify all species, to rule out the misidentified species and to remove synonymous species.

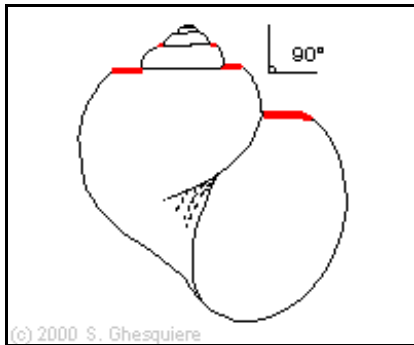


*P. haustorium*

# Apple Snail Identification (continued from page two)

each species, please visit <http://www.applesnail.net>.

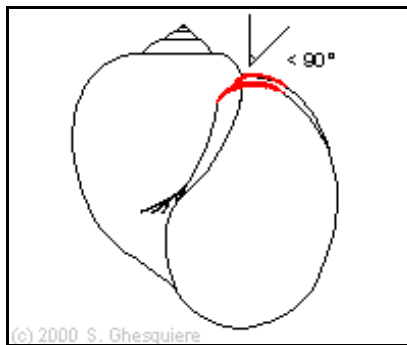
The three common aquarium species have distinct shell characteristics. The shell of *P. bridgesi*, has about 5 to 6 whorls. The most obvious characteristic of the shell are the square shoulders (flat at the top of the whorls) with almost 90° su-



tures. The shell opening is large and oval, the umbilicus (the deep pit in the center of the shell) is large and deep. The size of the shell varies from 40-50 mm wide and 45-65

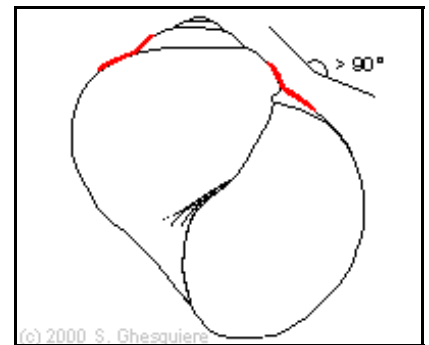
mm high. The spire is high and sharp, hence the common name: spike-topped apple snail.

*P. canaliculata* has a globose (round) shell and the shell can be relatively heavy (especially in older snails). The 5 to 6 whorls are separated by deep, indented sutures (hence the name 'canaliculata' or 'channeled') that are less than a 90° angle. The shell opening is large and oval to round. Males are known to have a rounder aperture than fe-



males. The umbilicus is large and deep. The size of this snail varies from 40 to 60 mm wide and 45 to 75 mm high.

*P. paludosa*, Florida apple snail, is globose with a shell opening that is large and oval. The umbilicus is large and deep. The overall size can vary from 40 to 55 mm wide and 45 to 65 mm high. This apple snail has almost flat sutures with greater a than 90° angle, which gives the snail a cone shaped shell top (spine).



## Apple Snail Biology

Apple snails inhabit a wide range of ecosystems from swamps, ditches and ponds to lakes and rivers. Most apple snail species prefer still rather than moving water.

The respiratory system of the apple snail is highly adapted to tropical

climates that consist of wet and dry seasons. The seasonal abundance of water is reflected in the apple snails respiration system: a combination of both a gill and a lung.

Apple snails can remain active throughout the year or enter periods

of aestivation depending on environmental conditions. The main factors that determine apple snail activity are temperature, rainfall and food availability. Temperature and rainfall are the prime determinants. During aestivation apple snails bury in mud and their metabolism slows down. Apple (continued on page four)

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## Prohibited Snails

The following terrestrial snails are considered injurious to Florida agriculture. Introduction or distribution of these snails to Florida is prohibited under Chapter 5B-43, Phytophagous Snails, Florida Administrative Code. This prohibition includes snails in all live stages of development. Dead, canned or non-living, processed snails are exempt:

- *Achatina spp.* (Example: giant African snail).
- *Helix spp.* (Example: brown garden snail).
- *Theba pisana* Muller (white garden snail).
- *Megalobulimus oblongus* Muller (giant South American snail).
- Any other plant-feeding snail which may be determined by Florida Department of Agriculture and Consumer Services order or rule to be injurious to Florida agriculture.

In addition, certain states and regions of the world are known to be infested with these snails. Materials shipped from those areas that can harbor the snails must include a certificate issued by and bearing the signature of an authorized inspector of the government of origin, certifying that materials contained in the shipment were inspected and found to be free of the plant-feeding snails listed above. For additional information, contact the Division of Plant Industry, Bureau of Plant and Apiary Inspection, at 352-372-3505.

## Apple Snail Biology (continued from page 3)

snails that inhabit areas without a distinctive dry-wet season will have a temperature-based life cycle and occasionally hibernate if food availability decreases in the cold season. All apple snails require subtropical or tropical temperatures and do not inhabit regions where the temperature drops below 50°F in the winter months.

Apple snails are herbivorous, generally preferring soft vegetation. They will consume tougher plants and algae as long as they are able to grasp pieces with their radula (rasping organ). Although the radular system is almost identical



*P. canaliculata* surface feeding

throughout the apple snail species, some species have stronger and larger teeth than others.

Another strategy used to attain food is surface film feeding when food is floating. The snail crawls to the

surface and forms a foot-funnel in which particles from the surface are trapped and eaten.

Many apple snail species are known to eat other snail eggs. Egg consumption is quite common, while snail predation occurs during periods of starvation, but can happen when food is in excess. In extreme

cases (prolonged starvation) apple snails are known to be cannibalistic. Apple snails also consume all kinds of dead animals including fish, frogs, crustaceans, insects and the eggs of fish, frogs, snails and insects. The high nutritional value of these food sources fits well in their survival strategies.

The reproductive cycle of apple snails is determined by food availability and water temperature. During periods of high temperature and abundant food, some apple snail species have a very short life cycle from egg to adult of less than three months (60 days in the case of *P. canaliculata*) and can reproduce throughout the year. The total number of eggs laid is species dependent and can vary from 100 to 1,000.