Department for Environment Food & Rural Affairs

Plant Pest Factsheet

Apple snails

Pomacea species

Figure 1. *Pomacea* sp. pink eggs laid in batches above the water © Departament d'Agricultura, Ramaderia, Pesca, Alimentació i Medi Natural de la Generalitat de Catalunya

Background

The water snail genus *Pomacea* (Family Ampullariidae) is native to America, but a number of species of *Pomacea* are invasive, and are now found in other regions of the world. Adults can be the largest freshwater snails in the world, and may even reach the size of an apple (hence the common name of apple snails), and are frequently sold as aquarium species. However, if released, some species have proved capable of establishing in new areas, and at least two species (*P. canaliculata* and *P. maculata*) have become serious pests of rice in Asia. In August 2009, apple snails were found in the wild for the first time in Europe, in a river in Spain. As a result, emergency measures are being taken in Spain, and measures against the entire genus *Pomacea* are being added to the EU plant health legislation.

Figure 2. *Pomacea* sp. eggs masses in Spain © Departament d'Agricultura, Ramaderia, Pesca, Alimentació i Medi Natural de la Generalitat de Catalunya

Figure 3. *Pomacea* sp. snail in shallow water © Departament d'Agricultura, Ramaderia, Pesca, Alimentació i Medi Natural de la Generalitat de Catalunya

Figure 4. *Pomacea* sp. sold in the pet trade showing the globose shell and yellow colouration © Fera

Figure 5. *Pomacea* sp. removed from water, showing the operculum partially closing the shell © Fera

Figure 6. *Pomacea canaliculata/maculata* eggs laid on a coconut in Singapore © Dr Chris Malumphy

Figure 7. *Pomacea canaliculata/maculata* in Singapore showing the size of an adult snail compared to an adult hand © Dr Chris Malumphy

Geographical Distribution

The genus *Pomacea* is native to the New World. One species is native to Florida, USA, and all the rest are native to South and Central America, including the Caribbean. At least one invasive species has become established in the USA (selected southern states and Hawaii), and large parts of South East Asia, including Cambodia, some provinces of China, Indonesia, Japan, Laos, Malaysia, Myanmar, Philippines, Singapore, South Korea, Taiwan, Thailand and Vietnam.

Host Plants

Species in the genus *Pomacea* are polyphagous on plants and algae growing in water (eating both entirely submerged plants and those partly above water). Some species feed mostly on detritus and algae, while others preferentially feed on rooted plants and can be economic pests of rice (*Oryza sativa*) and taro (*Colocasia esculenta*) in the introduced range.

Description

Pomacea eggs are laid in a mass just above the water on living plants (Fig. 1), plant material (Fig. 6) and other structures such as concrete (Fig. 2). Individual eggs are 2.2–3.5 mm in diameter. The eggs form an opaque mass, which is usually brightly coloured and highly visible. A few days after being laid, the egg mass becomes quite dry in comparison with many snails. The colouration of the eggs varies with the species of snail, and takes a few days to develop; if the egg mass dehydrates, the colour may lighten. Many species have bright pink or reddish coloured egg masses, but the eggs of several species are light green. All species of *Pomacea* lay their eggs above water, while many other freshwater snails lay eggs exclusively underwater in a transparent gelatinous mass.

Newly hatched snails are tiny, with shells that can be less than 2 mm in diameter, but grow rapidly. Adults can have shell diameters of up to 15 cm (depending on the species and conditions it had as a juvenile, such as food availability and temperature). They may be dull brown (Figs. 3 and 7), or brightly coloured (including yellow and white) (Fig. 4), and can be with or without coloured banding. *Pomacea* species have an operculum – a discrete oval structure that can seal the shell closed and prevents desiccation (Fig 5); four tentacles (in Fig. 3, both long and one of the shorter tentacles are visible); and a very long collapsible siphon that allows them to breathe at the surface when extended. The shell is globose, with a spiral that increases in diameter very rapidly. Many other freshwater snails, both native and moving in trade, do not have a siphon, and many have only two triangular tentacles and no operculum.

Identifying *Pomacea* to species is often difficult, even with adult snails, and definitive identification usually requires molecular (DNA) techniques. There is frequently confusion in the literature as to which species is being studied (e.g. between *P. canaliculata* and *P. maculata* in Asia), and, indeed, there is no consensus on just how many species are in the genus *Pomacea*. The traditional concept of a species does not fit well with the differences in morphology, life history, and other variation exhibited by these snails.

Biology

Pomacea species are freshwater snails, although adults can leave the water for significant periods, and a few species can tolerate slightly brackish water, at least for a time. Females lay egg batches above the water, on any suitable surface, and they usually lay one egg batch about every fortnight if conditions are favourable. Virtually all egg batches are laid within 1 m of the water edge, with the height at which they are laid varying from less than 20 cm to over 1 m above the water in *P. maculata*. Egg batches can contain more than 1000 eggs in some species, and hatch rates in excess of 80% have been recorded in laboratory trials. The eggs require a good supply of air, and if subsequently submerged, few successfully hatch. Newly hatched snails descend and live underwater, feeding and growing rapidly. *Pomacea canaliculata* are first able to lay eggs when they reach a shell diameter of about 2.5 cm. Species of *Pomacea* where research has been done appear to require temperatures of over 20^{o}C to breed successfully. However, at least one *Pomacea* species, *P. canaliculata,* is found in Patagonia in South America, where winter temperatures are around 6–8^{o}C (the snails overwintering in soil or mud in a dormant state), though freezing temperatures cause high mortality.

Dispersal and Detection

Several introductions of *Pomacea* are thought to be due to the movement and subsequent release of aquarium snails into the wider environment. *Pomacea* are a source of food in South America, and have occasionally been imported for aquaculture in South Asia. Anglers may also introduce snails into new areas as an extra source of food for fish. Natural dispersal rates are relatively low, as the snails are restricted to damp habitats and are not capable of rapid movement. *Pomacea* adults are not wholly restricted to water, and

can move overland for short distances between sources of water. They are capable of dispersing downstream at a faster rate than upstream, as they can be carried along with floating vegetation, such as coconuts (Fig. 6), in water currents.

Eggs are the stage that is most likely to be detected in the wild. As they are laid above the water surface, and are brightly coloured, it seems probable that these will be the stage that is first observed. Adult snails are more cryptic, but if found, the sheer size of mature specimens will rule out native UK species of water snail.

Economic Impact

Invasive species of *Pomacea* are a serious pest of rice in southern Asia and taro in Hawaii, and have been damaging rice in Spain. Due to the highly polyphagous nature of the most invasive species of *Pomacea*, they are a threat to native wetland ecosystems, especially as these are often very sensitive to disturbance. *Pomacea* can also have impacts on the native snail fauna. Molluscs, including *Pomacea* species, are intermediate hosts for nematode parasites that can cause severe health problems in humans.

Advisory Information

Following EU emergency measures (Commission Decision 2012/697/EU) introduced on the 8 November 2012, there is now a prohibition on the introduction into, and the spread within, of *Pomacea* in the whole of the EU. There were existing stocks of *Pomacea* snails in the UK when this legislation was introduced in 2012 and the UK Plant Health Service allowed the sale of those snails on the condition that the snails would not be allowed to multiply. As the life expectancy of these snails is between 6 and 18 months, all the stock from 2012 should now have died and any current sales or breeding of *Pomacea* would be in breach of the legislation. If eggs are seen in captive stock, they should be removed, and frozen before disposal. Under **no circumstances** should *Pomacea* be released into the wild.

Suspected outbreaks of *Pomacea* or any other non-native plant pest should be reported to the relevant authority:

For **England and Wales**, contact your local **APHA Plant Health and Seeds Inspector** or the **PHSI Headquarters**, Sand Hutton, York. Tel: 01904 405138
Email: planthealth.info@apha.gsi.gov.uk

For **Scotland**, contact the **Scottish Government's Horticulture and Marketing Unit:**
Email: hort.marketing@gov.scot

For **Northern Ireland**, contact the **DAERA Plant Health Inspection Branch:**
Tel: 0300 200 7847 Email: planthealth@daera-ni.gov.uk

For additional information on UK Plant Health please see:
https://secure.fera.defra.gov.uk/phiw/riskRegister/

https://www.gov.uk/plant-health-controls
http://www.gov.scot/Topics/farmingrural/Agriculture/plant/PlantHealth/PlantDiseases
https://www.daera-ni.gov.uk

Authors

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