



Giant African snail

The giant African snail (*Achatina fulica* Bowdich) is native to East Africa. Since the eighteenth century it has spread eastwards, largely assisted by man. It was first introduced into the Pacific region in 1938 when a few specimens were taken to Palau. In 1999, it is now established in American Samoa, Federated States of Micronesia, French Polynesia, Guam, Marshall Islands, New Caledonia, Northern Mariana Islands, Palau, Papua New Guinea, Samoa, Vanuatu and Wallis and Futuna.

BIOLOGY

The snail typically lives for five to six years, if environmental conditions are favourable. The shell is distinctive as it is relatively long, narrow and conical in shape. Although it may reach a length of 20 cm, it is more common to see snails with a shell 5–10 cm long. The shell is usually a light brown colour, with darker brown and cream banding (Fig. 1).

The activity, growth and reproduction of the snail are highest in rainy weather, and stop or considerably slow down when it is dry.

The snail is nocturnal, searching for food at night and hiding away before sunrise, although in cloudy or rainy weather it may remain active during the day. Adult snails can travel up to 50 metres in a single night. When conditions are unfavourable the snail aestivates. That is it burrows into the ground or crawls under shelter, seals off the opening of the shell with a calcified membrane and waits, up to several years, for environmental conditions to improve.



Fig. 1. Giant African snail

The giant African snail is a hermaphrodite. Each individual has both male and female sex organs, but reproduction requires cross-fertilisation. Young snails become sexually mature after 3–5 months. The shell is about 55 mm long when the snails mate, and 60 mm when they lay eggs. Egg-laying begins 8–20 days after mating and then occurs at about monthly intervals during active periods. The eggs, which are a yellow or cream colour and 4.5 to 5.5 mm in diameter, are laid just beneath the soil surface in batches of up to 400 (Fig. 2). The eggs hatch in 3–15 days. The number of eggs laid increases with the age of the snail and may reach 1200 eggs per snail in one year.

Snail invasions start with a 'population explosion' when densities may reach several hundred snails per square metre. These high

densities often persist for several years. During this period, the infested area will expand by only a few hundred metres a year unless the snail is accidentally or deliberately spread by man.



Fig. 2. Giant African snail eggs in soil

DAMAGE

The snails feed mainly on dead plant matter, excreta and all sorts of organic refuse. However, they also cause severe damage to vegetables and other crops, including young fruit trees, particularly when snail populations are high. In fact the snail has been recorded attacking more than 500 types of plants, with a preference for breadfruit, cassava, cocoa, papaya, peanut, rubber and most species of legumes and cucurbits. Food crop and flower gardens provide ideal breeding grounds for *Achatina*. The snails are also found in nurseries, roadside weed growth, thickets of shrubs, and even in forests.

Damage caused by the giant African snail is always greatest when the snails have moved (or been introduced) into a new area, during the initial population explosion.

CONTROL

Once the snail becomes established it is very difficult to eradicate. If the snail is observed in an area previously free of the pest it is essential to act quickly to control it. It is appropriate to activate an emergency response plan.

1. Physical methods

Achatina rarely moves onto bare ground. Consequently, a strip of bare earth about 1.5 m wide around cultivated areas will give some protection. In the same way, spreading bands of sand around cultivated areas will also prevent the snail from moving. Burning is not always recommended, but if it can be done it will provide the bare ground and also destroy some giant African snails and eggs, if they are not too deeply buried.

These physical control measures are more effective if combined with chemical control and the regular collection of snails.

2. Collection

Regular collection of snails from fields and gardens, particularly in rainy weather, should be carried out. Community cooperation by village, school or other groups can help to reduce snail numbers significantly, particularly in newly infested areas.

3. Chemical control

The giant African snail can be baited with metaldehyde. This chemical is marketed in the form of pellets under such brand names as Blitzem (New Zealand, 1.5% and 1.8% metaldehyde), Durham Metaldehyde (USA, 7.5% metaldehyde), Slug Out (Australia, 1.8% metaldehyde) and Trails End (USA, 7.5% metaldehyde). The chemical is poisonous to the snail if it eats the bait but also if it comes into contact with the snail's foot, causing the snail to dehydrate. If conditions are wet, the snail may recover from sub-lethal doses of metaldehyde. The higher

concentration formulations give better control as they are more likely to be lethal to the snail quickly. The pellets should be spread evenly on the ground around crops in doses of 2.0–20 grams per square metre, depending on the metaldehyde concentration of the product. Scattering on non-crop areas is not very effective. Baits should be checked every few days and renewed as necessary.

During rainy weather, when snails are most active and protection is urgently needed, normal pellets are rapidly broken down and the metaldehyde is washed away. Pellets may be protected from rain by using simple bait containers made from tin cans or plant material. Also Blitzem is now available in a more rain-resistant formulation.

Care must be taken to ensure that livestock and pets do not eat the bait or poisoned snails.

4. Cultural control

Good field sanitation, the removal of mulches and other organic matter, will provide some control by reducing the number of breeding sites.

5. Biological control

There are reports of the giant African snail being controlled by 'cannibal snails' (i.e. snail species that feed on other snails), such as *Euglandina rosea*, *Gonaxis quadrilateralis* and *Edentulina ovoidea* and others. However, great care must be taken before introducing such snails as the endemic mollusc flora is easier prey for the cannibal snails than the giant African snail. Introduction of the cannibal snails could lead to the extinction of native snails.

The carnivorous tubellarian flatworm (*Platydemus manokwari*) has also been recommended for biological control of the snail, and good control has been achieved in Guam, the Northern Mariana Islands and the Maldives.

Before introducing any predators, a risk assessment and environmental impact study should be carried out.

Pigs and poultry, with the exception of ducks, will hardly ever eat living giant African snails, but will eat them cooked. Under no circumstances should snails that have been poisoned with metaldehyde be used to feed pigs or poultry. It has been estimated that three to five ducks can control snails in a 0.1 ha garden.

The giant African snail can be used for human consumption. However, it is a vector of the rat lungworm, which causes eosinophilic meningitis in man, and should only be eaten if properly prepared, that is thoroughly cleaned after a fast of several days, and cooked for at least one hour. Snails that have been in contact with metaldehyde bait should never be eaten. It is advisable to wash one's hands after handling uncooked snails.

QUARANTINE PROCEDURES

As the giant African snail is so difficult to eradicate once it establishes, effective quarantine to prevent its spread in the region is extremely important. The snails are easily carried from one place to another, especially when young and small, attached to plants, vehicles, machinery and packages of all kinds. Shipping containers and empty pallets which have been stacked on the ground in infested areas are a particular risk. Large specimens are sometimes taken home by tourists as a souvenir of their travels. Eggs and juveniles may be present in the soil imported with plant material. Quarantine inspection of all imports (plants, crates, containers, vehicles) should therefore be carried out with the utmost care in islands where the snail does not yet occur.

SUMMARY OF CONTROL MEASURES

1. To prevent the introduction of the giant African snail into countries free of the pest, the following quarantine measures are recommended:

- Advise importers/exporters to clean all containers, especially the underneath, and fumigate all containers and other materials in countries of origin before shipping, especially in countries which have the giant African snail;
- Containers should be certified as clean before loading onto ships; the certificates should be issued by the shipping company and certified by quarantine personnel;
- If during this process any snails are found on containers, these should be particularly carefully fumigated;
- Steam clean all new and secondhand vehicles and machinery arriving from, or via, countries with the snail immediately upon arrival at ports of entry;
- Thoroughly inspect all shipments of new and secondhand goods imported from countries with giant African snail, upon arrival at ports of entry;
- Any live snails intercepted must be destroyed immediately, either by burning or immersing in sea water.

2. For countries where the giant African snail is established, the following control measures are recommended:

- Encourage local groups to collect snails and kill them by burning or immersing in sea water;
- Clear all rubbish and weeds within and around infested areas to reduce breeding places for the snail;
- Clear areas of bare ground around infested areas, or spread bands of sand, to prevent the snail moving from the area;
- Prevent movement of planting materials and soil from infested areas to other places where the snail is not present;
- Apply chemical baits containing metaldehyde, within and around infested areas – caution must be taken to apply these baits in areas where children and domestic animals cannot reach them;
- Ensure that all seaports and airports, particularly where cargo and vehicles are stored, including transshipments, are kept free of the snail.

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