Department
for Environment
Food & Rural Affairs

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Giant African Land Snail

LISSACHATINA FULICA

UKOT PLANT PEST FACT SHEET

Figure 1. Giant African land snails *Lissachatina fulica* coming out at dusk to feed, Mauritius
© Chris Malumphy

Background

The Giant African Land Snail *Lissachatina fulica* (Bowdich) (Gastropoda: Stylommatophora: Achatinidae) is a major plant pest, native to East Africa, that has been introduced accidentally to many parts of the world with trade and/or intentionally as a commercial food source, for scientific research and education, and as a novelty pet. It has the ability to go into a state of aestivation in cooler conditions and so is readily transportable over considerable distances. It has established in many tropical regions where it has had a major negative impact economically, environmentally and socially due to its broad polyphagy and prodigious reproductive capacity. As a result, *L. fulica* has been classified as one of the world's top 100 invasive species by The World Conservation Union, IUCN (ISSG, 2003). The snail can be found in agricultural areas, coastland, natural forest, planted forests, riparian zones, shrublands, urban areas, and wetlands.

Lissachatina fulica presents a potentially serious plant health threat to all the UK Overseas Territories with tropical climates, particularly to those located in the Caribbean where the snail is currently expanding its geographical range.

Figure 2. *Lissachatina fulica* fully extended and searching for food, Brazil © Chris Malumphy

Figure 3. *Lissachatina fulica*, ribbon-like excrement is indicated by the arrow, Singapore © Chris Malumphy

Figure 4. *Lissachatina fulica* eggs that were hidden under a stone, Saint Lucia © Chris Malumphy

Figure 5. Group of *Lissachatina fulica* snails in a small park in an urban area, Saint Lucia © Chris Malumphy

Figure 6. Plastic laundry baskets containing several hundred live Giant African Land Snails imported from Africa into the UK as food © Fera

Figure 7. Giant African Land Snails are commonly kept as pets © Chris Malumphy

Geographical Distribution

Lissachatina fulica is native to the coastal regions of East Africa but has become widely distributed by the activities of man in humid tropical areas of sub-Saharan Africa, the India Ocean, Asia, Pacific, South America and parts of the Caribbean. Incursions in Florida, USA, are under eradication.

Host Plants

Lissachatina fulica is broadly polyphagous feeding on hundreds of plant species (Raut & Ghose, 1984). In its native range its preferred food is decayed vegetation and animal matter, lichens, algae and fungi. It was only recognised as a major plant pest after having been introduced into new environments and has since been recorded feeding on a large number of plants including many ornamentals, vegetable and fruit crops. It shows a preference for brassicas, breadfruit, cassava, cocoa, papaya, peanut, rubber and most species of legumes and cucurbits. It can also feed on the bark of relatively large trees such as citrus, papaya, rubber and cacao.

The snail needs a source of calcium to build its shell and is recorded eating sand, very small stones, bones from carcasses and even concrete. In captivity, it is often given cuttlefish bone to feed on.

Description

Mature *L. fulica* are distinctive in appearance and are readily identified by their large size and relatively long, narrow, conical shell (Figs 1-3, 5 and 8). The shell is usually in the size range 5 to 10 cm but may reach a length of 20 cm or more. The colour is variable but is most commonly light brown, with alternating brown and cream bands on young snails and the upper whorls of larger specimens. The coloration becomes lighter towards the tip of the shell, which is almost white. There are from six to nine spirally striate whorls with moderately impressed sutures. The shell aperture is ovate-lunate to round-lunate with a sharp, un-reflected outer lip (Fig. 8). The mantle is dark brown with rubbery skin. There are two pairs of tentacles on the head: a short lower pair and a large upper pair with round eyes situated at the apex. The mouth has a horned mandible containing some 80,000 teeth. Eggs (Fig. 4) are spherical to ellipsoidal in shape (4.5-5.5 mm diameter) and are cream to yellow in colour.

Figure 8. Giant African Land Snail shell © Fera

There are several species of large land snail distributed across sub-Saharan Africa, though three are most frequently encountered: *L. fulica* from East Africa is somewhat smaller than its similar counterpart in West Africa, *Achatina marginata*, and has a more pointed apex to its shell (see Fig. 8). Another similar species, *Achatina achatina*, also from West Africa, is the world's largest snail with a maximum recorded shell length of 27 cm and a weight of almost 1 kg.

Biology

Lissachatina fulica is hermaphroditic and after a single mating can produce five or six batches of fertile eggs a year. Each batch contains 100 to 400 eggs (average around 200), with up to 1200 being laid in a year. They are laid on the ground, often at the base of plants. These hatch after about 8-21 days under tropical conditions. The reproductive rate of *L. fulica* is remarkable. For example, 20 tonnes of snails were collected on one day in Fiji just 4 years after its introduction. Adults have an average life span of 5-6 years but may live up to 9 years. Although *L. fulica* is a tropical snail, it can survive cold conditions, even snow, by aestivating for up to three years. It is normally nocturnal and crepuscular in its habits, though it will become active in the daytime during rainy or overcast periods.

Dispersal and Detection

The snails can move over short distances between host plants (Fig. 2) but long-distance dispersal is due to anthropogenic activities. They have been moved internationally accidentally with trade and intentionally as a commercial food source (Fig. 6), for scientific research, educational purposes, and as a novelty pet (Fig. 7). All developmental stages may become attached to plant and non-plant materials, such as agricultural machinery and vehicles. Eggs and juvenile snails are also readily transported in garden waste.

Mature snails are large and conspicuous, and hide during the day, coming out at dusk to feed (Fig. 1). Surveys are therefore best carried out at night using a flashlight. Mature snails are easily detected, and attacked plants exhibit extensive rasping and defoliation. The sheer weight of numbers can break the stems of some host plant. Its presence can also be detected by signs of ribbon-like excrement (Fig. 3), and large slime trails on plants and buildings.

The eggs and juvenile snails can be difficult to detect during phytosanitary inspections of imported plants and other cargo.

Economic and other Impacts

Economic Impact – The snail has a voracious appetite and has been recorded attacking a wide range of crops. It is considered by most authorities to be the most damaging land snail in the

world. Indirectly, *L. fulica* may damage plants by vectoring plant diseases, for example, it has been implicated in the transmission of the fungus *Phytophthora palmivora*.

Environmental Impact – The snail populations can reach very high densities and invade native ecosystems. Therefore they have the potential to pose a serious environmental and conservation threat by eating native plants, modifying habitats, and out-competing native species of snail.

Social Impact – The very high densities of snails in urban areas can be a major nuisance. Not only are they unsightly but cadavers smell and make a mess, especially where they are run over by traffic, which invariably happens during population explosions. *Lissachatina fulica* can act as a vector of the human disease, eosinophilic meningitis, which is caused by the rat lungworm parasite, *Angiostrongylus cantonensis*. The parasite is passed to humans through eating raw or improperly cooked snails.

In sub-Saharan Africa, *L. fulica* is an important source of protein and large numbers of snails are regularly imported into the UK for human consumption (Fig. 6). They can also be used to make fertilizer, chicken feed and fish feed. The snails are used for scientific research and educational purposes, and in Europe and parts of North America (where it is lawful), they are kept as a novelty pet (Fig. 7).

Advisory Information

A vast body of literature has accrued on the various methods of management available for *L. fulica*.

Phytosanitary/Preventative Measures – International quarantine and surveillance activities are fundamental in preventing the spread of this pest. Thorough pre-export quarantine inspections in countries where *L. fulica* is known to occur should be undertaken, in addition to plant quarantine inspections of imported cargo at international points of entry.

Physical Control – Physical control can often be as effective as any other means especially where the snails are found to congregate in large numbers (Figs 1 and 5). They are most easily collected during aestivation when they hide under hedges and debris and killed by sprinkling them with salt or by exposure to the sun. The public and stakeholders can be involved in collecting snails by using organised campaigns. In some countries they are gathered for food in large quantities. Effective physical control can also be achieved by making a strip of 1.5 m wide bare soil around the area that requires protection. Barriers or screens can be constructed using corrugated tin, security wire mesh and ditches dug around fields. Any potential hiding places should be removed from crop fields.

Biological Control – The introduction of alien predatory molluscs (mainly the Rosy Wolf Snail *Euglandina rosea* (Férussac)) on the islands of the Indian and Pacific Oceans for the biological control of *L. fulica* has frequently been disastrous, resulting in extinctions of endemic snail species without any evidence that the introductions were effective against the target species. Good control was reported from some islands in the South Pacific with the use of a non-specific

planarian worm *Platydemus manokwari* De Beauchamp. Another flatworm, *Geoplana* sp., was reported to have made an impact on populations of *L. fulica* in Guam but it should have no future use as a biological control agent because it is a vector of human disease.

Chemical Control – The most common treatment against *L. fulica* involved metaldehyde, although chemical molluscicides are no longer favoured as they have proved largely ineffective. Metaldehyde poison baits may be most effective when used on small scale cultivation, but are not practicable elsewhere.

Integrated Pest Management – Effective control against *L. fulica* will have to involve some form of integration of all the above methods, and is likely to vary according to local conditions.

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