



The Asia-Pacific Forest Invasive Species Network (APFISN) has been established as a response to the immense costs and dangers posed by invasive species to the sustainable management of forests in the Asia-Pacific region. APFISN is a cooperative alliance of the 32 member countries in the Asia-Pacific Forestry Commission (APFC) - a statutory body of the Food and Agriculture Organization of the United Nations (FAO). The network focuses on inter-country cooperation that helps to detect, prevent, monitor, eradicate and/or control forest invasive species in the Asia-Pacific region. Specific objectives of the network are: 1) raise awareness of invasive species throughout the Asia-Pacific region; 2) define and develop organizational structures; 3) build capacity within member countries and 4) develop and share databases and information.

Giant African Snail



Scientific name: *Achatina fulica* Bowditch

Common names: Giant African Snail, Giant African Land Snail

Classification: **Phylum:** Mollusca; **Class:** Gastropoda

Order: Eupulmonata

Family: Achatinidae

Introduction: Giant African Snail (GAS) is one of the world's largest and most damaging land snail pests. The Global Invasive Species Database has included this snail among the "100 World's Worst" invaders. It is non-host specific and can consume at least 500 different types of plants, including breadfruit, cassava, cocoa, papaya, peanut and most varieties of beans, peas, cucumber and melon. The snail is native to coastal East Africa (Kenya and Tanzania), but is now widespread on all continents except Antarctica. It is highly adaptive to a wide range of environmental conditions and is capable of modifying its life cycle to suit local conditions. GAS is a threat to the sustainability of crop systems and native ecosystems, has a negative impact on native fauna, and acts as a vector of human diseases.

Distribution: The introduction of GAS outside its native range dates back to the early 1800s, when it spread to Ethiopia, Somalia, Mozambique and Madagascar. The first occurrence outside Africa was in West Bengal (India) through Mauritius in 1847. In the Asia-Pacific region, the snail is recorded from Bangladesh, China, Fiji, India, Indonesia, Japan, Kiribati, Malaysia, New Zealand, Palau, Papua New Guinea, Philippines, Samoa, Solomon Islands, Sri Lanka, Vanuatu and Vietnam and its range is still expanding.

Description: The fully grown GAS consists of 7 to 9 (very exceptionally 10) whorls, with a moderately swollen body-whorl and a sharply conical spire, which is distinctly narrowed but scarcely drawn out at the apex. The snail can reach up to 20 cm in length and up to 12 cm in diameter. The outlines vary from very slender to moderately obese, the broader specimens tending to be shorter for the same number of whorls. All whorls are decidedly convex due to the broadly impressed sutures. The aperture is relatively short, even in the broadest specimens, being always shorter than the spire. The outer lip is usually sharp and thin, rarely somewhat thickened or even slightly expanded in very old specimens; it is convex, evenly curved into a regular semi-ellipse, and inserted on the body-whorl at a sharp, open angle, the upper part of the body-whorl being scarcely or not flattened behind the lip. The columella is more or less concave, sometimes rather weakly so, in which case it may be slightly or even much twisted; it tends to be more concave in broader shells. It should be noted that in GAS all stages, from the nepionic shell onwards, have the umbilical slit completely closed and the columella truncate. Both the columella and parietal callus are white or bluish-white. The normal life span of the GAS is 3-5 years, but some may live as long as 9 years. The snail reaches sexual maturity in less than a year. It is a simultaneous hermaphrodite, which means that each individual is capable of producing both sperm and ova. Instances of self-fertilization are rare and may occur in low populations. Reciprocal copulation, typically lasting 6-8 hours, produces viable eggs. It can lay eggs within 8-20 days after copulation, usually in nests excavated in the soil or among leaves and stones on the ground surface. The snails lay up to 100 eggs in their first year and up to 500 in their second year; the fecundity declines after the second year, but the snails may live up to five years with a total egg clutch of up to 1,000. In tropical humid conditions, eggs can hatch after 11 days. Adult size is reached in about 6 months; after that the growth slows, but does not ever cease. GAS is capable of aestivating for up to 3 years in times of extreme drought.



Giant African Snail- Habit

Habitat: GAS is commonly found in countries with a tropical warm, humid climate. The species occurs in agricultural areas, coastal areas and wetlands, disturbed areas, natural and planted forests, riparian zones, scrublands, shrub lands and urban areas. The snail also thrives in forest edges, modified forest, and plantation habitats. The snail prefers hot lowlands and the warm temperate lower slopes of the mountains. It needs temperatures well above freezing year-round, and high humidity at least during part of the year; the drier months are spent in dormant aestivation. It is killed by sunshine. GAS remains active at a temperature range of 9 to 29°C, and survives temperatures of 2°C by hibernation and 30°C by aestivation. It is active at night and in most cases spends the day buried underground. GAS is highly adaptable to dry and cooler climates and hibernates 10 to 15 cm deep in soft soil during less favorable conditions for up to one year.



Snail infestation

Threat and damage: GAS is a macrophytophagous herbivore and it also eats sand, very small stones, bones from carcasses and concrete as sources of calcium. It is a threat to native snails and affects native ecosystems by altering the food chain by providing alternative food sources for predators. This voracious snail feeds on a variety of vegetables and is considered to be a major agricultural pest; it also attacks plantations of teak, rubber, coffee and tea. It causes severe damage to horticultural and medicinal plants. In most parts of the world, the damage is greatest when the species is first established. GAS also acts as an intermediate vector of the Rat Lungworm *Angiostrongylus cantonensis*, causing eosinophilic meningoencephalitis in humans, as well as a gram negative bacterium, *Aeromonas hydrophila*, causing a wide variety of symptoms, especially in persons with compromised immune systems. The parasites carried by the snail are usually passed to humans through the consumption of raw or improperly cooked snails. It also enhances the spread of plant diseases like black pod disease of cacao caused by *Phytophthora palmivora*, which it spreads through its faeces. It is a general nuisance in human habitations since their decaying bodies release a bad stench and the calcium carbonate in the shell neutralizes the acid soils, altering soil properties and also the types of plants that can grow in the soil. In Florida, the cost of eradicating GAS after five years of its establishment was over US \$1 million. It also affects international tourism because the snail thrives in warm, tropical conditions which are tourist destinations.

Spread: The natural spread is slower than intentional spread. The main pathways of spread are through trade, transport and tourism and smuggling the snail for ornamental purposes. The snail is also imported as a food source. Other pathways of spread include moving snail infested soil, plants and agricultural products.

Uses: The snail is consumed as food and also used for medicinal and research purposes. It contributes to the degradation of animal matter.

Management

Prevention: Poor quarantine regulations and the animal's high reproductive capacity are the main reasons for the rapid dispersal of this snail. Preventing its introduction is the most cost effective option. Because of the huge risk that GAS poses and also its multiple methods of dispersal, strict quarantine and surveillance activities are necessary to control its spread. Creating awareness about the various negative impacts of the snail can help stop the illegal import of GAS for trade and its international spread.

Control: Control methods like collecting the snails by hand or incinerating them with flame throwers have been used to control infestations of GAS, but neither of these methods are very effective. In China, the snail is used as a food item, which controls the population to a large extent, but may encourage further deliberate spread. Chemical control involves using Metaldehyde, Methiocarb or a combination of these chemicals with other molluscicides as bait formulations or foliar sprays. But these chemicals can also harm non-target snails and endemic forms. Other methods like creating frigid temperatures or saturating the snail in ethanol are also used. In India, cuttings of *Anona glabra* are used as a snail repellent to protect nursery beds. Kerosene and common salt are used in some countries to control the snail. The predatory rosy wolf snail, *Euglandina rosea*, which is native to the southeastern United States, has been introduced to islands in the Caribbean, Pacific and Indian Oceans as a biological control agent for the GAS. However, in Hawaii and French Polynesia, this predatory snail has caused the extinction of numerous endemic tree snails. *Platydemus manokwari*, a turbellarian flat worm, has been reported to be successful in controlling GAS in Guam, Philippines and Maldives. However, this worm has also been implicated in the decline of native snails.

References

Global Invasive Species Database

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