

Giant African land snail, *Achatina fulica* in Udaipur, Rajasthan: a threat to biodiversity and ecosystem

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Submitted : 19.08.2013

Accepted : 09.10.2013

Published : 31.12.2013

Abstract

During survey of terrestrial and aquatic snail fauna in southern Rajasthan, a number of giant African snails *Achatina fulica* Bowdich, were recovered from Din Dayal Upadhyay garden in Udaipur. This garden is situated in close proximity with Lake Pichhola that provides a humid environment which is preferred by this land snail species. It was seen in huge numbers feeding on *Hibiscus* plants that are abundant in this place. Even the rock crevices were inhabited by *Achatina*. This exotic giant land snail is becoming a threat to the existing ecosystem by destroying the crops, plants and disturbing food chain which are discussed.

INTRODUCTION

Giant African snail, *Achatina fulica* is an exotic terrestrial gastropod belonging to phylum Mollusca and family achatinidae. *A. fulica* is one of the largest land snails in the world reaching up to 19 cm in length^[1] and has originated from coastal East Africa particularly Kenya and Tanzania. Due to its high reproductive efficiency, polyphagous diet and perfect adaptability to extreme cold and hot environments, this species has now become cosmopolitan in distribution^[2-5]. This snail was introduced in India in 1847 and was first reported in Bengal^[6]. Now *A. fulica* is abundant in many states of India, including Andaman & Nicobar Islands, Assam, Bihar, Mumbai, Kolkata, Kerala, Manipur, Jharkhand, Orissa, Gujarat and Tamil Nadu^[6].

In Rajasthan, few specimens of this snail species were first seen in a canal region of Udaipur city in 1996^[7]. Recently, this giant African snail (Figure 1) was seen in Din Dayal Upadhyay city garden, located near Pichhola lake. Although in Udaipur there are a number of parks, farms and gardens but this snail preferred Din Dayal Upadhyay garden for living and multiplication. Actually this garden has abundance of *Hibiscus* plants (China rose) on which these snails feed (Figure 2). Infact this snail species prefers the leaves of this plant^[8]. Secondly, *Achatina* thrives well in moist and humid environments, and in this case it was found inhabiting in the rock crevices of the garden (Figure 3). It has been reported that it is most abundant in sites with high human density^[9] and one of the most important factors for its establishment and dispersion is human presence^[10]. Day by day these snails are increasing their population due to high reproductive rate and lack of predators feeding upon them. They are infact prolific breeders (Figure 4) and can breed twice a year and produce around >1000 eggs in a year. The snails' ability to store sperm is a distinct advantage and could enable a founding population from just one individual^[5]. *Achatina* can cause great peril to farmers due to their propensity in consuming large amounts of crops and plants, as this snail species can eat more than 500 plant species^[11]. If by mistake this snail is introduced in agriculture fields then it can become a threat for farmers as it can ruin any type of crop. Also in the forest it can disturb the ecosystem by consuming voraciously on various trees and medicinal plants^[4], and alter the nutrient cycle due to large

volumes of plant material that would pass through its gut. Besides this, their decaying bodies release bad odour and the calcium carbonate in their shells neutralizes acid soils, altering soil properties and the type of plants that can grow in the soil^[2]. Above all it poses a serious threat to the indigenous land snail species sharing its habitat due to competition for food and habitat. It has been reported that these snails preyed upon veronicellid slugs^[12] thus, it can implicate in the extirpation of native taxa of terrestrial gastropods. Not only do these snails have herbivorous and carnivorous habit but they also have a saprophytic habit and were found feeding on horse and bull faeces^[8].

Although freshwater snails are vectors for many dreaded trematodes diseases in domestic animals and man^[13, 14] but this giant land snail also serves as a vector of at least two human disease causing agents: the rat lung-worm, *Parastrongylus* /*Angiostrongylus cantonensis*^[15] and a gram negative bacterium, *Aeromonas hydrophila*^[16, 17]. In addition to this, *Achatina* can transmit diseases in economically important plants as cacao, black pepper, coconut, papaya, taro, aubergine, tangerine etc. through its faeces that carry spores of *Phytophthora* species^[2, 18, 19]. *Annona glabra* softwood cutting fence has been reported to be a feasible and practical alternative to protect nursery beds from *Achatina fulica*^[20].

Although giant African land snail *A. fulica* is a threat for farmers, horticulturists, biodiversity as well as human health but interestingly people are unaware about this highly invasive pest and are more attracted towards its shell and so carry it along with them thus helping its introduction or dispersion to new sites where it spreads as a plague. Bearing in mind that this snail could represent a threat to the ecosystem, biodiversity and above all human health it is therefore, necessary that its population must be biologically or chemically controlled or eradicated. This would not only help in maintaining the native medicinal and economically important plant and terrestrial snail population but also minimize the financial loss that this snail does to the crops.

CONCLUSION

It can therefore, be concluded that *Achatina* is a threat to the sustainability of local crops, medicinal plants and ecosystems because of its macrophytophagous habit. It has a negative impact



Fig 1. Specimens of giant African land snail *Achatina fulica*.



Fig 2. *Achatina* feeding on leaves of *Hibiscus* plant. Note the barren twigs of the plant.



Fig 3. *Achatina* inhabiting the rock crevices and exhibiting gregarious nature



Fig 4. Giant African hermaphrodite land snail (*Achatina fulica*) breeding in the lawn of first author (S L Choubisa)

on the native flora and fauna due to its prolific breeding capacity. It is also a major threat to the existing snails and affects the ecosystem by altering food chain by providing alternative food sources for predators. This exotic, pestiferous land snail population needs to be controlled in order to prevent its destructive habit. People should be made aware about its pest properties and avoid its introduction to new sites. Its population can be restricted by preventing its introduction, strict quarantine and surveillance activities.

ACKNOWLEDGEMENTS

We are thankful to the University Grants Commission, New Delhi, India for financial assistance (39-658/2010 SR).

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