Severe occurrence of the giant African snail, *Achatina fulica* (Bowdich) (Stylommatophora: Achatinidae) in Kolar District, Karnataka

V. SRIDHAR, M. JAYASHANKAR, L. S. VINESH and ABRAHAM VERGHESE

Division of Entomology and Nematology, Indian Institute of Horticultural Research, Hessaraghatta Lake Post, Bangalore– 560089, Karnataka, India
Email: vsridhar@iihr.ernet.in

The International Union for Conservation of Nature and Natural resources (IUCN) has listed the giant African snail, *Achatina fulica* (Bowdich, 1822) (Stylommatophora: Achatinidae) as one of the world’s 100 most invasive species (Lowe et al., 2000). *A. fulica* has been spreading globally since 1800’s primarily due to several factors viz., high reproductive capacity, voracious feeding habit, and inadequate quarantine arrangements and human aided dispersal (Mead, 1979; Raut and Barker, 2002; Silvana, 2007). The snail has been reported for the first time causing damage to ornamental plants and vegetables in Bangalore during kharif (Veeresh et al., 1979). It is known to cause serious damage on different crops viz., mulberry (Shree and Kumar, 2002), betelvine, capsicum, areca, banana, tomato (Javaregowda, 2004), vanilla (Vanitha et al., 2008) in India. The present communication is a first report of *A. fulica* in Kolar district (13° 60’ N and 77° 90’) of Karnataka state. The period coincides with the favorable season for the snail incidence.

**Methodology and Crop damage observations**

In order to to investigate the level of snail infestation and assess the snail damage, a survey was undertaken in Melthayaluru village in Mulbagal taluk of Kolar district by a team from Indian Institute of Horticultural Research, Bangalore. The survey and field observations were undertaken during November 2012. Farmers were interviewed to obtain feeds back on the problem and snail specimens were collected to ascertain the species. Based on the data collected from the farmers, the snail population is spreading from field to field throughout the village ever since its introduction four years ago *i.e.*, during 2008. As per the farmers own statement, the snails which they refer as gavigalu locally were perceived as mere harmless creatures. But currently there has been a paradigm shift in that perception with farmers facing immense loss in their fields. This delayed realization has cost severe loss to agriculture, horticulture, moriculture and ornamental crops in the village.

The findings of the preliminary survey showed that majority of the farmers could not grow seedlings in nurseries and nursery-raised vegetables by transplanting them into the fields because they were immediately devoured by huge nocturnal congregations of *A. fulica*. Vegetable crops such as potato, spinach, radish and tomato were seriously damaged. Recently transplanted plants were completely destroyed within one night as per the univocal observations of the respondents contacted. On an average up to 60 per cent of the vegetable nurseries and 40 per cent of the yield was lost in various vegetable crops grown in this village because of the snail damage. High population densities with characteristic symptoms of damage were observed in the fields surveyed as enumerated below.

Snail infested papaya (*Carica papaya*) (Fig.1) plantations showed stunted growth and retarded floral development resulting in reduced yield (up to 40 % loss). Scrapings on stem and fruits were also noticed in the papaya field.

Epicarp of succulent vegetables like tomato (*Solanum esculentum*) and cucumber (*Cucumis sativus*) were scrapped by the snails (Fig. 2 & 3). Tomatoes with notched appearance due to snail feeding were common symptoms observed. Up to 25 percent yield loss was recorded in tomato, whereas in cucumber the damage was up to 20 percent.

Leaves of Mulberry plants (*Morus sp.*) were fed by snails. Instances of 100 percent devouring of the foliage is noticed which has hindered sericulture practice in the village. This is mainly due the reason that silk worms get discouraged to feed the slime smeared leaves by the crawling snails. The snails surge in large numbers at dusk, and take refuge into...
their hideouts to escape desiccation in day in the adjacent quarry stones piled with soil. Aggregations of adult snails were located at the base of mulberry plants (Fig. 4).

The polyphagous snails damaged ornamental rose (*Rosa sp.*) and marigold (*Tagetes sp.*) plants as well. Severe damage to young rose plants and marigold had cost not only economic yield loss but had their scars imprinted on plants thus affecting the floral quality also. Lots of gaps were observed in the rose fields because of complete devouring of the young plants by the snail. The farmer suffered huge yield loss up to 35 percent in rose. Young seedlings of marigold particularly up to 30 days after germination are very vulnerable to the snail attack.

About to 40 to 50 percent damage was observed in groundnut (*Arachis hypogea*) and French beans (*Phaseolus vulgaris*). Other horticultural crops on which feeding of *A. fulica* observed include flat beans and banana.

Preliminary study indicates two prominent possibilities of the introduction of the snail into the village. It could have first entered the village along with mulberry plant cuttings transported from Kaggalipura near Bannerghatta, Bangalore and the other was probably through poultry waste got from neighboring Chittoor district of Andhra Pradesh to be used as fertilizer, coinciding with the time of snail introduction into the village. Both the introductions being unaware of the future consequences were accidental and unintentional. However, to the best of our knowledge the former seems to be more probable because of the reference to Kaggalipura and surrounding areas of Bangalore South Taluk, with numerous commercial nurseries experiencing the menace caused by malacofauna including *A. fulica* (Jayashankar et al., 2010).

**Farmer’s practices for snail management**

Desperate to eradicate the growing menace of the pestiferous snail, farmers in the village had resorted to different strategies including hand collection and burying the collected snails in soil. Such operations would favor snail escape and thereby facilitate its spread, hence farmers were asked to refrain from such practices. After a series of trial and error combinations to devise an effective management measure, the farmers claim

---

**Fig. 1-5.** *A. fulica* damage on different crops

Fig. 1. Papaya  
Fig. 2. Tomato  
Fig. 3. Cucumber  
Fig. 4. Mulberry  
Fig. 5. Marigold  
Fig. 6. Heaps of dead *A. fulica*
success with the bran bait (Rice bran + Jaggery + Lannate) in the ratio 60:6:1 which was applied in a 5-acre field area. This has been fairly effective, evident by the manifestation of mortal mini-heaps of *A. fulica*, mainly juveniles around the marigold fields fenced with the killer bait (Fig.5 & 6). According to the information gathered from the respondents during the survey, the black slug, *Laevicaulis alte* (Ferrusac) also inflicted damage to various crops.

A blend of abiotic and biotic factors is known to influence the distribution of land snails in complex ways (Coney et al., 1982). Such a blend of factors facilitating accidental dispersal of snails were noticed within the village aided by human activities viz., through fodder collection, along with water pipes, along irrigation canals etc. Also, indisposed waste generated due to cultural practices used as barriers and boundaries in the fields served as “hide and breed” sites. Therefore, the farmers were enlightened about such dispersal aides so as to monitor such activities and contain further dispersal of the snail.

In addition to impacting crops, the snails’ are a nuisance in walking paths in fields due to their slime trails and broken shell pieces that can cause injury. The farming community has sensed the emergence of *A. fulica* as a prominent pest and its potential for incurring more damage to crops propelling immediate attention. Of the potential reasons observed facilitating establishment of the introduced species include, lack of native predators or parasites coupled with human-aided spread. Information from this survey, while important in laying a foundation for future research, has also brought to limelight a growing problem which needs to be curtailed in its infancy to avoid further repercussions. Innovative control methodologies and collaborative models are increasing the capacity to solve such invasive species problem. However, early detection, rapid assessment and rapid response would increase the likelihood of containing and eradicating the pest in the introduced area. A final management measure is increased public education about the value of native invertebrates and the dangers of introduced forms because these pestiferous “invaders” didn’t really invade rather they were brought in by human activity.

ACKNOWLEDGEMENTS

The authors are thankful to the Director, Indian Institute of Horticultural Research, Bangalore and Department of Horticulture, Government of Karnataka for facilitating the survey.

REFERENCES


**MS Received : 17 Nov 2012**

**MS Accepted : 10 Dec 2012**