



Research Article

RECORD OF PESTIFEROUS LAND SNAIL, *MACROCHLAMYS INDICA* GODWIN-AUSTIN 1883 (MOLLUSCA: GASTROPODA: ARIOPHANTIDAE) ON MULBERRY (*MORUS* SP.) IN DEHRADUN, UTTARAKHAND, INDIA

Sahadev Chouhan, *Sanjay Paunikar and Pallabi Priyadarshani

P2, Basic Seed Farm, NSSO, Central Silk Board, Sheeshambara, Dehradun (Uttarakhand).
Zoological Survey of India, Central Zone Regional Centre*, Vijay Nagar, Jabalpur - 482002, Madhya Pradesh, India

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ABSTRACT

The present paper reports the land Mollusca, *Macrochlamys indica* Godwin-Austin, 1883 as a pest on mulberry from the Basic Seed Farm, Sheeshambara Dehradun, Uttarakhand. The species commonly known air breathing land snail have been reported causing damage to mulberry garden and nursery samplings at P2, Basic Seed Farm, Sheeshambara, Dehradun, Uttarakhand, India. They feed on succulent, tender leaves and create irregular holes with smooth edges on leaves by scraping with their rasp-like tongues. Their peak activity period in Dehradun is rainy season. This is the first report of damaging sapling of mulberry of this snail in nursery of mulberry from Dehradun, Uttarakhand.

Keywords: *Morus alba*, Records, Molluscan pests, Snails, *Macrochlamys indica*.

INTRODUCTION

Mulberry (*Morus* sp.) one of the important plant species for sericulture industry throughout the year which is important for the rearing of the larvae of *Bombax mori* silkworm. Mulberry has been also used in herbal medicine as anti-phlogistic, liver protective, kidney protective, hypotensive, diuretic, anti-cough and analgesic agent (Singh *et al.*, 2013). Several states of India, where sericulture industry is being threatened by various insect pests and diseases which not only reduce the yield and its nutritional status but also making it unfit for its utilization by *Bombyx mori* L. It is an only food plant for the several insect and non-insect pests' species causes significant hampers leaf quality, silkworm rearing, and cocoon production. Like other plant species attacked by several insect pests and non-insect pests, mulberry, the food plant of silkworm is also prone to attack by number of pests comprising largely with insects and few non-insect species (Sengupta *et al.*, 1990). Several insect pests damage the mulberry plant from seedlings to plantation stages. They cause reduction in mulberry leaf yield besides deteriorating its nutritional value and make unfit for feeding silkworm. Feeding pest affected leaves to silkworm often results in adverse impact on its growth and

cocoon yield (Singh *et al.*, 2000; Singh and Saratchandra, 2001; Sakthivel *et al.*, 2019). Therefore proper management strategies need to be adopted to keep mulberry garden free from the pests for sustainable production of silk. In changing climatic scenario, emergences of new insect pests and non-insect pests complex are being observed in mulberry growing areas of the country. The comprehensive and intensive host plant surveillance and field collections of insect pests and non-insect pests associated with Mulberry (*Morus alba*) are required regularly.

MATERIAL AND METHODS

During the surveys to record the occurrence and the level of incidence of insect and other pests in nurseries of mulberry, some snail individuals were collected from mulberry leaves and seedlings in of P2, BSF, Sheeshambara, Dehradun, Uttarakhand during 2021 and 2022. The farm is situated geographical position at north latitude 30°20'12'' and east longitude 77°53'31'' with an average annual rainfall 1485 mm (last five year data). Then, the first author sends these Mollusca species for identification in Zoological Survey of

*Corresponding Author: Sanjay Paunikar, Zoological Survey of India, Central Zone Regional Centre, Vijay Nagar, Jabalpur -482002, Madhya Pradesh. Email: sanjaypaunikar@gmail.com.

India, Central Zone Regional Centre, Jabalpur, Madhya Pradesh. The species identified as snail, *Macrochlamys indica* Godwin-Austen, 1883 under class Gastropoda and family Ariophantidae. The present paper reports for the first time, pestiferous land mollusc *Macrochlamys indica* Godwin-Austen, as severe pests of mulberry trees and sapling in of P2, BSF, Sheeshambara, Dehradun, Uttarakhand along with new distributional records.

RESULT AND DISCUSSION

The phylum Mollusca is the most diverse and ubiquitous component of ecosystem; and the second largest group of invertebrate in terms of species diversity (Lydeard *et al.*, 2004). Molluscs are considered environmental indicators in terms of spatio-temporal changes in a particular ecosystem or landscape (Elder and Collins, 1991; Lewis and Magnuson, 2000; Chlyeh *et al.*, 2006; Thom *et al.*, 2017, Sajan *et al.*, 2021). Mollusca play a major role in ecology and freshwater molluscs are important constituent of food chain and also an important resource of protein to humans (Hotopp, 2002; Ramkrishna and Day, 2007; Tripathy and Mukhopadhyay, 2015). The percentage of endemism of Mollusca is high in India. Ramakrishna and Mitra (2002) mentioned that about 62.8 % of molluscs families known from the world are represented in India.

Woodward (1856) published the first ever review of Indian land molluscs. Later, several renowned workers who contributed to the taxonomy of Indian land molluscs. Mitra *et al.* (2004) gave detailed account on Indian Land Snails on some selected species. More than 1500 species of land mollusc are recorded from India. Out of these, several species viz., *Achatina fulica* Bowdich, *Ariophanta bajadera* (Pfeiffer), *Ariophanta ligulata* Ferrussac, *Ariophanta solata*

(Benson), *Ariophanta laevipes* Muller, *Bensonia monticola* Hutton, *Cryptozona belongiri* Deshayes, *Cryptozona (Nilgiria) semiru~ata* Seck., *Cryptozona (Xestina) bistrialis* Beck., *Macrochlamys indica* (Godwin-Austen), *Opeas gracile* (Hutton), *Zootecus insularis* Ehrenberg and *Mariaella dussumieri* Gray are known to cause damage to forestry, agricultural, horticultural and plantation crops in India (Subba Rao, 1975; Raut and Ghosh, 1984; Srivastava, 1992; Kumar and Ahmed, 2000; Jadhav, *et al.*, 2016; Zala *et al.*, 2018; Sakthivel, *et al.*, 2019; Singh *et al.*, 2020).

Systematic Position

Macrochlamys indica Godwin - Austen, 1883

Order: Stylommatophora

Family: Ariophantidae

Subfamily: Macrochlamyinae

Genus: *Macrochlamys* Gray, 1847

Macrochlamys indica Godwin-Austen, 1883

The horntail snail belongs to the genus *Macrochlamys* (Family: Ariophantidae), (Figure 1) which has over a hundred described species distributed from South to Southeast Asia and southern China (Pholyotha *et al.*, 2018). It occurs in India, Sri Lanka, Bangladesh, Nepal, Pakistan and Brazil (Lal, 1977; Raut and Ghose, 1984; Biswas *et al.*, 2015; Jayashankar *et al.*, 2015). Jayashankar *et al.* (2015) report the occurrence of this snail in Europe; however, the location is not specified, and we were unable to find additional information to substantiate this report. In India, it is known as the common garden snail, and populations are higher in urban settings than in agricultural areas and forest nurseries (Kumar and Ahmed, 2000; Jayashankar *et al.*, 2015).



Figure 1. Mulberry saplings, P2, Basic Seed Farm, Sheeshambara, Dehradun.



Figure 2. *Macrochlamys indica* Godwin-Austen, 1883

Diagnostic Features: Shell perforate, pale brown with smooth and polished surface, with five and half whorls and low spire. Last whorl much wider than the rest, rounded at the periphery. Aperture is oblique, columellar margin curved and oblique, peristome thin. **Distribution:** India: Andaman Islands, Assam, Bihar, Chhattisgarh, Delhi, Himachal Pradesh, Jammu and Kashmir, Karnataka, Kerala, Maharashtra, Punjab, Rajasthan, Odisha, Tamil Nadu, West Bengal and Uttarakhand. **Host Plants:** It has been reported as a pest of *Lujja* sp., Beans, Lettuce, Cole crops, *Moringa oleifera*, *Amaranthus bitum*, *Abelmoschus esculentus*, *Tagetes* spp. and *Chrysanthemum* sp. (Raut and Ghosh, 1984), Money plant (Subba Rao, 1975) *Azadirachta indica* (Kumar and Ahmed, 2000), and Citrus and Gauva (Singh *et al.*, 2020). **Remarks:** It is being reported for the first time as a pest on mulberry sapling. It is a voracious plant feeder and found devouring young mulberry garden and nursery at P2, Basic Seed Farm, Sheeshambara, Dehradun, Uttarakhand. **Habit and Habitat:** Land molluscs are restricted to moist habitats. They hide during the day in holes grass dumps etc. and become active at night. The snails and slugs aestivate or hibernate during adverse conditions. The aestivating/hibernating mollusc population is of great significance as this population becomes responsible for "restocking an infested area" With the onset of monsoon the snails and slugs which have survived the stress and strain of adverse climatic conditions during aestivation/hibernation becomes active again and resume their biological activities. Molluscs prefer slightly alkaline sandy soils (pH 7.0-8.0). The fallen leaves, debris, animal dung and dead snails serve as food for mollusc. The eggs are laid in moist places. The cluster contains 15-100 eggs, depending on the age of the mollusk attack (Raut and Ghose 1983). Mollusc rehabilitates itself by rebuilding its population, spread all over again and becomes a menace.

CONCLUSION

Nature of Damage: *Macrochlamys indica* are voracious plant feeders and devour all parts of the saplings. The young molluscs prefer tender leaves and stem and avoid harder portions, while older ones attack young as well as

grown up saplings. They feed voraciously on the main tender stem above the collar region by licking the bark which results in the girdling of the stem and subsequently the saplings die due to the damage to the cambium. The debarked stem becomes very fragile and weak and easily breaks off with the slightest movement of wind. It has been observed that damage is beyond survival, in saplings ranging from 10 cm - 15 cm, as the saplings are eaten up completely, older saplings are defoliated and stem is debarked and the plant is able to revive when prevented from further attack (Raut and Ghose 1983).

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