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ORIGINAL ARTICLE

WATERLILY LEAF CUTTER MOTH, *ELOPHILA OBLITERALIS* (WALKER) (INSECTA: LEPIDOPTERA: CRAMBIDAE: ACENTROPINAE): AN ECONOMIC THREAT TO INDIAN AQUATIC GARDENS

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Abstract*: Both commercially and among hobbyists, waterlilies and lotus cultivation is a very new and blooming sector in aquatic gardens in India. These plants can be easily grown indoor sometimes and within plastic containers even. The different colours and shapes of these hybrid lotus and waterlily varieties are getting popular day by day and the aquatic garden is a flourishing business specially in southern and western parts of India because of the climatic condition. A study on aquatic garden plants was conducted* for two years, 2021-22 and 2022-23 *in Diamond Harbour, West Bengal. Many insect pests are found to cause damage the different parts of the plants. Among them, the larvae of leaf cutter moth, Elophila obliteralis were very common and tough to eradicate from the aquascapes and the nursery pools of the aquatic farms which causes heavy economic losses. From the economic point of view, further studies are required to control this leaf cutter moth in aquatic gardens.*

Key words: Indian aquatic plant market, waterlily pests, economic losses, *Elophila obliteralis* (Walker).

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1. INTRODUCTION

Lotus and waterlilies in Indian aquatic gardens are nurtured from the very ancient period but the invention of the hybrid varieties from South East Asian countries during last fifteen years, especially the Thai varieties of these aquatic plants has led this branch of gardening to a new dimension. The new hybrid varieties are genetically better and with different coloured and shaped pads and flowers. In an over populated country like India, the growers and hobbyists are increasing every day because these varieties need a very little space to grow even in the balcony and the terrace garden pool or within plastic tubs. According to Indian mythology, the waterlilies symbolize fertility, peace, purity, and spiritual enlightenment. Indian growers are now actively participating in hybridizing the waterlilies and lotus [4]. People are showing interest in this field as it need very basic components and rewarding at last.

Waterlilies are both day and night blooming. Tropical waterlilies could be either day bloomers or night bloomers. Hardy species are always day bloomer. Depending upon the behaviour of the plant, there are various types of pests of these plants. Sometimes they invade into the other aquatic weeds and ornamental

plants too. Among them the larvae of Leaf cutter moth, *Elophila obliteralis* are very common and hard to eliminate from the aquascapes and the nursery pools of the aquatic farms which causes ultimately heavy economic losses. The present study was carried out to observe the effect and nature of the action of leaf cutter moth in the aquatic plants in a farm of West Bengal.

2. METHODOLOGY

An aquatic farm located at Diamond Harbour (latitude 22.127322°N and longitude 88.213111°E) of South 24 Parganas, West Bengal, India was selected for the study for two years, 2021-22 and 2022-23 from the months of January to April.

It was observed that during the end of February and March, the leaf cutter moth attack begins and if not controlled it can cause even more than 40 percent crop destruction. As these moths are nocturnal in habit, examine ponds in early spring for leaf sections attached to stems during nights by using torch or head lamp. The first evidence of larval feeding are tiny shot holes in the foliage. As larvae increase in size they cut larger leaf pieces from the edges, which they use as their boats. The early instar larvae skeletonize the foliage, causing extensive damage. Larva unite several leaves together. These may kill the whole leaves. They also cut tissue from leaves of land- scape trees and join with lily pads that have fallen into the pond. Close observation under each leaf as much as one can will be helpful. Hand picking and cutting the infected leaves and observation of the larvae within the cases with the help of forceps were done for proper identification.

3. RESULT AND DISCUSSION

In the present investigation, if was observed that along with maturity attainment, through the developmental stages, the larvae of leaf cutter moth start cutting the new leaves and then the larger sized leaf cases in a progressive manner. It is evident that, when the leaves are affected by the herbivorous activity of the larvae, and it affects the plants distinctly [3]. The pest is a frequent type in the study area and has a broad range of aquatic host plants in the nurseries with different ornamental aquatic plants, including water lilies and *Nymphaea*. In the organized set up of a nursery, remarkable financial loss may be an outcome, as the vigorous level of larval feeding can make the aquatic garden plants unattractive for the customers. Due to damage of the leaves, the photosynthetic activity and health of the plants is retarded, which often cause even the death of the plants [2].

During the study, it was found that as the larvae develop, they cut new, progressively larger leaf cases. This action can provide quite significant damage to the infested plant [3]. This pest has a broad host range, and frequently is a pest in aquatic plant nurseries, especially on waterlilies, *Nymphaea* spp. In the nursery setting, this insect can cause economic losses as the larval feeding makes the plants unattractive to customers. Extensive feeding may even lead to reduced plant health and death [2].
After the insect visit, the white-coloured eggs become visible at the margins of the leaves of the waterlilies.
Larvae of these moths lack gills and they live inside a leaf cage built, which is by two pieces of leaves.
The body of the larva is whitish in colour, with minute papillae.
The yellowish pupa is found inside silk cocoon within the leaf cases formed by the larvae.
The adult moths show sexual dimorphism. They are greyish brown in colour with darker patches on the wings.

In the present investigation, the identified insect, *Elophila obliteralis* is reported to have a broad spectrum of host plants. It feeds on the leaves of ornamental pond plants, water lilies and even the invasive weeds of aquatic system, such as *Hydrilla*, *Hygrophila*, Salvinia [5], and water lettuce [1]. For this, the larvae of the leaf cutter moth are potent candidates for the biological control of invasive aquatic plants [6].

Figure 1. Waterlilies with Leaf cutter attack

Figure 2. Ventral side of leaf showing larva and case

Figure 3. Early stage of larva cut the leaf and made the case.

Figure 4. Later stage of larva inside the leaf case

The larvae aggressively feed on the soft tissue of the leaves. While feeding upon the leaves, the larvae cut the leaves to prepare and make a leaf case for the shelter for themselves. The overall activity of these larva is detrimental for the affected plants, which needs special care.

In the present study, 17 genera under 12 families of the plants which were observed to be attacked by the leaf cutter moths.

Table 1. Plant genera attacked by the leaf cutter moths

Family	**Plant Genera**
Flowering Plant (Angiosperms)	
Acanthaceae	*Hygrophila*
Apiaceae	*Hydrocotyle*
Araceae	*Pistia*
Brassicaceae	*Cardamine, Nasturtium*
Gentianaceae	*Nymphoides*
Hydrocharitaceae	*Hydrilla*
Lythraceae	*Rotala*
Nymphaeaceae	*Brasenia, Nelumbo, Nuphar, Nymphaea*
Pontederiaceae	*Eichhornia*
Potamogetonaceae	*Potamogeton*
Non-flowering Plants (Pteridophyte)	
Marsileaceae	*Marsilea*
Salviniaceae	*Azolla, Salvinia*

4. CONCLUSION

Elophila obliteralis is a major pest of waterlilies so a threat to aquatic nurseries. In India, very few works have been done so far on this species. So, there is a scope for further study on this species. The infected leaves with larvae should be picked up by hands. UV black lights should be used to trap adult moths. In extreme cases it was observed that copper sulphate treatment mixed with water was helpful.

This pest should be kept under control otherwise it will be a serious threat in aquatic gardens and nurseries in our country.

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