

# Sal Defoliator; *Dendrophleps semihyalina* Hampson (Lymantriidae : Lepidoptera) : a Destructive Pest Newly Recorded on Sal Forest in Bangladesh.

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## Abstract

Sal forest covers 32% of the total forest land of Bangladesh. Though there is no record of severe infestation of sal forest by any defoliator insect in Bangladesh. Recently, Altadighi sal forest of Naogaon district is completely defoliated by an unknown lepidopteran insect affecting the growth of the plant seriously. The insect has been identified as *Dendrophleps semihyalina* Hampson (Lymantriidae: Lepidoptera). It is a new record of sal defoliator in Bangladesh. More than 95% trees were infested by the pest. The peak infestation period occurred during March and April. Two insecticides namely Malathion 57 EC (malathion) and Ripcord 10 EC (cypermethrin) were applied on infested trees @ 2- 4 ml/l and 1-2 ml/l of water respectively after every seven days for 2 to 3 times. The pest was controlled within two weeks.

## সারসংক্ষেপ

শালবন বাংলাদেশের মোট বনাঞ্চলের ৩২% এলাকা জুড়ে বিস্তৃত। যদিও পূর্বে এদেশের শালবনে খুবই ক্ষতিকর কোন পাতাভোজী পোকায় মারাত্মক আক্রমণ দেখা যায়নি কিন্তু সম্প্রতি নওগাঁ জেলার আলতাদিঘী শালবনের পাতা এক প্রকার ক্ষতিকর পোকায় শুককীটের আক্রমণে সম্পূর্ণ ক্ষতিগ্রস্ত হয়েছে। পোকাটিকে *Dendrophleps semihyalina* Hampson (Lymantriidae : Lepidoptera) নামে সনাক্তকরণ করা হয়েছে। এটি বাংলাদেশের শালবনে পাতাভোজী পোকাক্রমণের নতুন তথ্য। বনের ৯৫% এর অধিক গাছ পোকায় আক্রান্ত হয়েছে। এতে গাছের বৃদ্ধি ও বিকাশ মারাত্মকভাবে ব্যাহত হয়েছে। মার্চ-এপ্রিল মাসে পোকায় আক্রমণ সবচেয়ে বেশি দেখা যায়। দু'ধরনের কীটনাশক ম্যালাথিয়ন ৫৭ ইসি ও রিপকর্ড ১০ ইসি @ ২-৪ মিলি/লি এবং ১-২মিলি/লি হারে পানিতে মিশিয়ে পর্যায়ক্রমে প্রতি সপ্তাহে পরপর ২/৩ বার আক্রান্ত গাছে প্রয়োগ করা হয়। দু'সপ্তাহের মধ্যে পোকা নিয়ন্ত্রণে চলে আসে।

**Keywords:** Altadighi; defoliator; *Dendrophleps semihyalina*; pest; sal

## Introduction

Sal tree (*Shorea robusta* Roxb.exgaertn.f) is the dominating plant species of sal forest. It belongs to the category 'Tropical Moist Deciduous Forest'. Sal occurs exclusively in India along with the Sub-Himalayan tract of Nepal, Pakistan and Bangladesh (Hossain 2015). In Bangladesh, sal tree naturally occurs in Gazipur, Mymensingh, Tangail and Sherpur districts. Some isolated and smaller patches also occur in Comilla, Rangpur, Dinajpur, Thakurgaon and Naogaon districts. It has also been experimentally planted in Chittagong and Cox's Bazar districts (Baksha 2000). In our country, sal forests cover an area of about 1,21,000 ha this is about 32% of the total forest land (Banglapedia 2003). Sal is a deciduous large tree attaining a height of 20-40 meter, and a diameter of 50-135 cm at breast height with a spreading crown at maturity (Hossain 2015). The quality timber of sal is used for

general construction purpose, especially for house building, electrical and telephone poles, boat and sleeper construction and also for furniture and many other uses (Banglapedia 2003).

All sal growing areas in Bangladesh have been found infested by sal heartwood borer, *Hoplocerambyx spinicornis* Newman (Cerambycidae : Coleoptera). It has been reported as one of the major pests of the sal forests (Baksha 1990). The infestation is not epidemic but sporadic (Baksha 2000). In Bangladesh, 47 insect pests of sal have been recorded, of which 20 species wood borer, 20 defoliators, 2 leaf miners, 3 sap suckers and 2 leaf rollers. All defoliator insects are minor pests (Baksha 2008). In India, 346 insects are recorded on sal, of which about 155 species of insects belonging to the order Lepidoptera, 105 Coleoptera, 31 Thysanoptera, 9 Hemiptera, 4 Orthoptera, 1 Ephemeroptera and 1 Isoptera are



associated with living tree. In India, major insect pests of sal are seed and seedling borer, *Pammene theristis* Meyrick (Eucosmidae : Lepidoptera), feeding on seeds while they are on tree and *Sitophilus ruggicollis* Casey (Curculionidae : Coleoptera) damaging seeds either in the forest floor or during storage (Roychoudhury 2015).

There is a small patch of natural sal forest (427.69 acres) at Altadighi, Dhamoirhat, Naogaon district. In March-April 2014 a serious insect infestation occurred in that forest. The population was so huge that the whole forest became completely defoliated. We know that a number of sal defoliator infestations occur in sal. But there is no record of severe infestation of sal by any defoliator insect in Bangladesh. Due to the demand of Divisional Forest Officer (DFO) of Rajshahi Social Forestry Division, the present study was undertaken to identify the insect and to know the biology and management of the pest.

## Materials and Methods

Divisional Forest Officer (DFO) of Rajshahi Social Forestry Division reported Forest Protection Division (FPD) of Bangladesh Forest Research Institute (BFRI) about the incidence over the phone and sent some photographs of infested plants and insect larvae by E-mail to FPD. Due to some unavailable circumstances prevailing in the country it was not possible for us to visit that infested forest area at that time. DFO Rajshahi sent some infested samples to BFRI. The insects reared at Entomology laboratory of FPD at room conditions ( $26.0 \pm 4.7^\circ \text{C}$  and  $81.0 \pm 4.2\%$  r. h.). The larvae were kept in glass jars covered by muslin cloth. Fresh leaves of sal trees were provided as food to larvae, and debris was cleaned regularly. After each molt the larvae were transferred to bigger petri-dishes with new leaves. Observations on the larval development, measurement, color, molting and feeding habit were recorded. Field and laboratory notes on the biology and ecology of the pest were also taken. Within 20 days several adult moths emerged from the samples. The adult moth was new to us. The insect has been identified. Two insecticides namely

Malathion 57 EC (malathion) and Ripcord 10EC (cypermethrin) were sprayed on infested trees @ 2-4 ml/l and 1-2 ml/l of water respectively to control the pest.

## Results and Discussion

### Identification of the pest

On request of BFRI Dr. Shafique Haider Chowdhury, Ex-Professor, Department of Zoology, University of Chittagong identified the pest as *Dendrophleps semihyalina* Hampson (Lymantriidae: Lepidoptera) (Chawdhury 2015). The pest is newly recorded as sal defoliator in Bangladesh. The insect is identified following the Fauna of British India including Ceylon and Burma (Hampson 1976).

### Nature of damage

The larvae feed on leaves; consume the entire leaf leaving only the mid-ribs and the main veins. Terminal buds and green epidermis are also attacked in certain cases. All parts of the attacked leaf are uniformly skeletonized (figure 1b). After skeletonizing the leaf turned into pale brown. According to the local Beat Officer of Rajshahi Social Forestry Division, more than 95% trees were infested by the pest. Severe infestation started in March-April. Huge population of insect consumed the leaves voraciously. Due to heavy infestation, the forest was completely defoliated (figure 1a). As a result growth and development are affected. Repeated infestation may seriously hamper the forest productivity.

### Biology of the pest

**Egg:** Eggs are laid on food plants in masses (figure 2). They are oval in shape being  $0.6 \pm 0.08$  mm long. The eggs are yellow in colour. Incubation period  $6.6 \pm 0.5$  days (table 1).

**Larva:** The larvae of the insect are  $37 \pm 2.73$  mm in length. They are yellowish brown in color with rows of brushes of very long white hairs at both side of the body (figure 2). Two long plumes of hair project on either side of the head. There are five larval instars that lasted  $24 \pm 1$  days (table 1)



## Pupa

Pupation occurs in a cocoon of silk mixed with larval hair ( figure 2). Pupa is  $13.8 \pm 1.1$  mm long. Pupation period is  $6.8 \pm 0.45$  days (table 1).

## Adult

A full-grown moth is white in color and  $19.6 \pm 1.67$  mm long. Antennae feathery with the branches of moderate length and black in color. Ocelli absent; leading edge of wings rounded (figure 2).

Hindtibia with one pair of spurs. Vertex of thorax with three black spots; abdomen with dorsal black bands. Fore wing hyaline; a white patch on basal inner area. Fore wing with veins 3 from before angle of cell; 4 and 5 stalked; 6 from upper angle; 7, 8 or 9 stalked. Hind wing with vein 3 from close to angle of cell. Hind wing with the costal half hyaline; the inner half white. The life cycle of the defoliator is completed in 40.4 days (table 1). Thus 5-6 generation is possible in a year with an extended period required for the winter months.

## Pest management

For immediate pest management a primary recommendation was sent to the concerned DFO. Initially two types of chemical pesticides were suggested; a synthetic pyrethroid (Ripcord 10 EC) and a contact/stomach poison (Malathion 57 EC). The recommended doses were 1-2 ml/l of water and

2-4 ml/l of water respectively to spray after every 7 days alternatively for 2 to 3 times. In addition to that, also suggested to allow insectivorous birds in the forest. Weeding and cleaning of the forest floor were also recommended. Bio-insecticide such as *Bacillus thuringiensis* was currently suggested for gypsy moth control (Robert 1985). As per feedback of the DFO Rajshahi, the pest was controlled within two weeks.

## Conclusion

There is no record of *Dendrophleps semihyalina* as a sal defoliator in India, Malaysia, Nepal and other neighboring countries. As a new pest it needs detailed and elaborate research.

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**Table 1.** Measurement of different life stages and life periods of *Dendrophleps semihyalina*

Sl no	Life stages	Measurement			Periods		
		Length (mm)			Days		
		Min.	Max.	Avg. $\pm$ SD	Min.	Max.	Avg. $\pm$ SD
1	Egg	0.5	0.7	$0.6 \pm 0.08$	6	7	$6.6 \pm 0.5$
2	Full grown Larva	35	40	$37 \pm 2.73$	23	25	$24 \pm 1$
3	Pupae	13	15	$13.8 \pm 1.1$	6	7	$6.8 \pm 0.45$
4	Adult	18	22	$19.6 \pm 1.67$	2	5	$3 \pm 1.41$





a) Insect Infested sal forest



b) Infested leaf of sal

Figure 1: Symptoms of defoliation by the pest

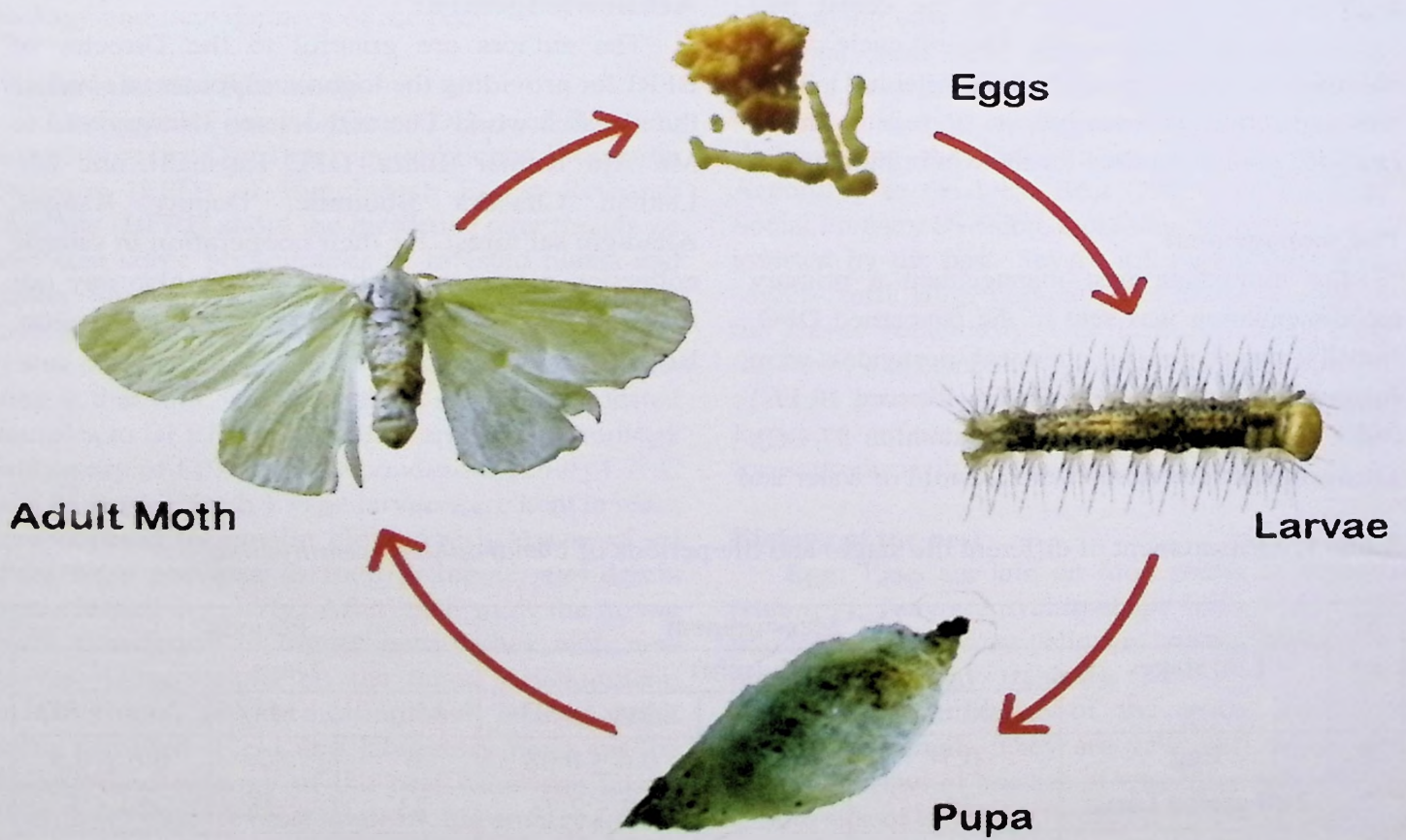


Figure 2 : Life cycle of *dendrophleps semihyalina*



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