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# A Report on Incidence of a New Vanya Silkworm Species *Actias selene* Hubneron Primary Post Plant Species *Machilus bombycina* King of Muga Silkworm *Antheraea assama* Ww. in District Bageshwar, Uttrakhand

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### ABSTRACT

The present study deals with incidence of a new vanya silkworm *Actias selene* Hubner on one of the primary host plant species *Machilus bombycina*, King of muga silkworm species *Antheraea assama* Ww. which is exclusively cultivated in Assam for production of precious muga silk fibre in India only in the world. The detailed biology of insect *A. selene* Hubner was carried out on nature grown host plant under natural weather as prevails during summer in Distt Bageshwar of State Uttarakhand. The incidence of the wild silk moth is recorded during onset of summer at an altitude of 4000 ft. The larval period was recorded 28 days. Eggs size was recorded 1.5 mm and colour white with extensive black and brown. Newly hatched larvae are red with a black abdominal limp thereafter in second instar larvae become all red with black heads till the third instar and in last instar larvae take on a green colour. Larva on maturation becomes apple-green with paired dorsal and lateral yellow spinous tubercles on each segment except the last. The length and weight of mature larva of the silkworm were observed 12-13.5 cm and 16-18.5 gm respectively. Cocoons shape was long oval and colour observed was tan-brown. The average cocoon weight (g) and SR % for male and female was recorded at 5.4, 9.4 and 12.80, 11.30, respectively.

### 1. Introduction

A large number of wild silkworm species belong to the family Saturniidae. This family has great economic importance as it consist a large number of wild silk producing species. Presently, around eighty wild silk producing species feed on various host plants have been reported (Jolly et al. 1975). Among them three species *i.e.* *Antheraea mylitta* (Tasar moth), *A. Assama* Ww. (Muga moth) and *Samia cynthia* Drury (Eri moth) are being exploited for producing commercially valued silk production. In the Western Ghats of Maharashtra the worms of *A. selene* are widely scattered (Kavane and Sathé 2011).

*Actias selene* Hubner of Saturniidae is also found on nature grown plant species *Machilus bombycina* in the forest of District Bageshwar in Kumaon region of state Uttarakhand, where its caterpillars feed on the primary host plant of muga silkworm *Antheraea assamensis*. Cotes (1891-93) and Barlow (1982) studied the host plants of *A. selene* from northern part of India. They reported that, *A. selene* was found feeding on *Zanthoxylum acanthopodium* D. & C., *Z. alatum* Roxb (Rutaceae), *Cedrela paniculata* (Meliaceae), *Coriana nepalensis* Wall. (Coriariaceae), wild cherry prunus, wild pear pyrus (both Rosaceae), walnut (Jugandaceae) and other fruit trees in northern India. According to Nassig and Peigler (1984) some members of Anacardiaceae were good host plants for *A. selene*.

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In Kumaon region the District Bageshwar is located at 29°51'N latitude and 79°46'E longitude with an elevation of at 800 AMSL and consists varied topography with high mountain peaks, ridges and river valleys with an altitude ranging from 800 to 6000 m. The area covers all weather conditions like tropical, sub-tropical, sub-temperate and temperate. Because of this the district has affluent flora and fauna and several wild silkworm species are found abundant. In this study the host plant species *Machilus bombycina* King. Syn. *Persaea bombycina*, host of muga silkworm *A. assama* Ww. is recorded as new host plant for *Actias selene* Hubner and biology of this vanya silkworm *Actias selene* Hubner on host plant species *Machilus bombycina* King has been carried out.

### 1.1 Earlier work

There are number of studies have been reported on seri-biodiversity and their wide potential as a source of natural silk in Indian subcontinent (Arora and Gupta 1979; Thangavelu 1991; Nassig et al. 1996; Chinnaswamy 2001; Thangavelu et al. 2002; Srivastava and Thangavelu 2005). Jolly et al. (1975) recorded approximately 80 species in Asia and Africa producing silk of commercial importance. Arora and Gupta (1979) enlisted nearly 40 species in India alone. Neog et al. (2011) studied the feeding habits of muga silkworm,

*A. assamensis* Helfer larvae towards the leaves of its four different host plants and the chemical basis of feeding preference. Biswas et al. (2011) studied impact of food plant on rearing performance of muga silkworm *A. assama* Ww. in Tarai region of West Bengal, India. Bhuiya and Mukherjee (2011) assessed the role of four species on other primary host plant of muga silkworm genus *Litsaea* in sericulture industry under cultivation of precious golden glittering muga silk.

### 2. Materials and Methods

The larvae of the insect species were brushed on the host plant and reared under net cover in open weather till maturation and further cocooning of the worms. The spun cocoons were collected and kept indoor weather conditions for emergence, coupling and oviposition. The observations in respect of biology of the insect were recorded and or analysing SR% of cocoons the formula mentioned hereunder was used:

$$\text{Shell ratio} = \text{Wt. of shell} / \text{Wt. of cocoon} \times 100$$

### 3. Results and Discussion

The wild silkmoth *A. selene* Hubner, a member of Saturniidae family (Subfamily: Saturniinae) belonging to order Lepidoptera is commonly known as Moon moth or Lunar moth, the caterpillar of the insect species is polyphagus in nature. The morphometrics of different stages of the insects is presented in Figure 1.a-g.





**Figure 1.** Biology of insect *Actias selene* Hubner

- (a) Silkworm host plant species *Machilus bombycina* King.
- (b) Eggs
- (c) I<sup>st</sup> stage larva
- (d) III<sup>rd</sup> stage larva
- (e) Mature larva
- (f) Cocoon
- (g) Moth

**Eggs:** Eggs are white creamish in colour, laid eggs in a cluster of 2 to 5 on leaves and measures around 1 x 1 mm in size. Hatching takes 8–10 days. Mean single egg weight 0.009 g - 0.010 g was observed. The variation in the single egg weight was found negligible.

**Larvae:** Generally, the hatching of silkworm larvae take place in the early morning, The newly-hatched, 4mm long larvae consume part of their egg shells soon after this followed by leaves ( tender to mature) of their host plant

species till maturation. The larvae during 1<sup>st</sup> and 2<sup>nd</sup> instars usually remained in groups on the ventral surface of tender leaves of the tree branch and chewed the cell-sap/chlorophyll content. The subsequent 3<sup>rd</sup>, 4<sup>th</sup> and 5<sup>th</sup> instars larvae fed on the medium and mature leaves. During the course of larval development, the larva undergoes four moults and passes through five instars. The larva in each instar could be easily identified by the colour of tubercles which changes at every instar. In the final instar some of the body ridges become bluish and the head greenish. The observations revealed that larva takes a total 29 days to become mature in summer. On the maturation larval body colour turned as light green at dorsal and dark green with light brick coloured tubercles on the body. During this instar larva consumed large quantity of mature leaves and its body grows fastest among all instars. Larval body attained length and weight 12-13.5 cm and 16-18.5 g, respectively.

**Cocoons:** On maturation, the larvae cease feeding and remain motionless till sunset. A mature worm shrinks marginally and its body colour also changes to light green. The formation of cocoon is completed within 3 to 4 days. The female larva spins a larger cocoon than the male. Cocoon weight (g) and SR% for male 5.4 and 12.80 while female 9.4 and 11.30, respectively. Cocoon is spun on the leaves and its false peduncle is attached to the main petiole of a leaf of the host. Its colour is dark brown to tan brown without peduncle at anterior end.

**Emergence:** The emergence of the moth starts in early night hours and continues till late night. Newly emerged moth from cocoon crawls in search of a support and where it is settled for a while and spreads its wings and remains motionless till stretch and harden.

**Moth:** The male and female moth exhibit distinct sexual dimorphism. The male bears forewings with sharp curve at the tips, broader antennae and narrow abdomen while female bears blunt curve, light green body, narrow antennae broad abdomen. The mean male and female moth length, width with wing and weight was recorded as  $3.08 \pm 0.27$ ,  $10.60 \pm 0.44$  cm,  $2.30 \pm 0.50$  g, respectively.

**Adults**

Females prepare to mate in the evening or night after emerging in late morning. Adult flight is during May and June, as one generation.

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