

Original Research Article

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## Biology and Damage Pattern of Hairy Caterpillar *Selepa celtis* Moore (Lepidoptera: Nolidae) on *Terminalia arjuna*

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### ABSTRACT

#### Keywords

*Selepa celtis*,  
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The life history of *Selepa celtis* Moore was studied during Aug-Sept- 2019 under laboratory conditions at Central Tasar Research and Training Institute, Ranchi, Jharkhand. Gravid female was observed laying eggs with the fecundity of  $150.60 \pm 39.32$  eggs. Incubation period of eggs was 3-4 days. Total larval, pre pupal and pupal period were observed to be 16-22, 1-2 and 8- 12 days, respectively. Adult longevity was ranged from 2-6 days. During the study nature of damage was also observed in the field and it has been found that this pest is gregarious and causes the damage by defoliating the foliage. In early instars larvae feeds by scraping the chlorophyll content of the leaves and later instars known to cause skeletonization of the leaves by feeding the whole leaf except mid rib and veins of the leaves.

### Introduction

*Selepa celtis* is regularly occurring nocturnal, polyphagous, multivoltine lepidopterous pest. The larvae of *S. celtis* are polyphagous in nature, sometimes causing epidemic defoliation. of various forest tree species viz. *Albizia spp*, *Bischofia javanica*, *Careya arborea*, *Duabanga grandiflora*, *Elaeodendron glaucum*, *Ficus glomerata*, *Gme Jina arborea*, *Lagerst roemia spiciosa*, *Lannea coromafldelica*. *Mangifera indica*, *Schleichera trijuga*, *Shorea rohusta*, *Syzygium cuminii*, *Terminalia bellerica*, *T. catappa*, *T. chebula*, *T. myriocarpa*, *T.*

*tomentosa* *Xylia dalbriformia*, *Acacia nilotica* and *Embllica officinalis* in different parts of the country (Beeson, 1941; Browne, 1968; Khan *et al.*, 1985; Joshi and Meshram 1989, Rizvi 2010, Haldhar *et al.*, 2019 and Tripathy *et al.*, 2020). This pest is distributed throughout Peninsular India, Madhya Pradesh, Tamil Nadu, and West Bengal Nagaland (Sharma, 2014; Shubhalaxmi *et al.*, 2011).

Diagnostic characters of this pest are eggs are laid in masses and freshly laid eggs will be yellowish and translucent with round shape with reticulate markings on chorion. The

larvae of this defoliator are highly active, hairy, and yellowish with black dots on abdominal tergites. In adults vertex, frons and thorax are pale brown; forewings are long and narrow, pale brown with a purplish-grey tinge, traces of sub basal and medial wavy black lines, a double post medial line excurved round end of cell and enclosing a blackish circular path; hind wings are small and broad, whitish, suffused with fuscous towards outer margin (Sharma, 2014). Bharpoda *et al.*, 2009 studied seasonal occurrence of *S. celtis* and reported that this pest is known to be active between the months of May-January. Where as Khatua 1997 reported that peak incidence of *S. celtis* is during the month of April in Sal forest. Damaging symptoms includes larvae cause damage by defoliating the leaves. Early instar larvae causes damage by feeding the epidermal layer of the leaves by scraping. However late instars larvae causes the defoliation/skeletalisation of the leaves. This pest is known to complete 6-8 generations annually as reported by Jianfen and Zenghe, 1990; Si-ming, 2007.

In the recent years incidence of this pest is frequent on *Terminelia arjuna* which is a important host plant of tasar silkworm. However there is no record on biology of this pest on *T. arjuna*. With this background in present study on biology and nature of damage of *S. celtis* on important tasar silkworm host plant (*T. arjuna*) has been carried out.

## **Materials and Methods**

Larvae of *Selepa celtis* collected from *Terminelia arjuna* plantation of Central Tasar Research and Training Institute, Ranchi and which has served as nucleus culture. Further it has been reared under laboratory condition to obtain the egg masses to study the biology.

After getting the egg masses from nucleus culture one egg mass was placed into petri plates (9 cm diameter). Eggs were monitored daily till hatching. After hatching freshly hatched larvae (n=30) were separately reared under petri plates in 5 batches. Fresh tender leaves were provided for newly hatched larvae and observed daily till and adult emergence. Each batch of insects were observed daily for their development and survival. Observations on incubation, larval period, pre pupal erod, pupal period, fecundity and adult longevity were recorded.

### **Incubation period**

Egg incubation period was recorded as the duration of time taken from egg laying to hatching, which was recognized by hatching of the larva through the egg chorion.

### **Larval period**

The duration of larval period was recorded as the number of days taken from hatching of egg to the pupation of last instar larva. To determine the number of larval instars observation on number of molts (based on the molted skin of previous instar larva) were made on to know the different instars duration. The process was continued till pupal stage.

### **Pupal period**

Pupal period was recorded by considering the number of days took from pupation to adult emergence. Total development period from egg to adult was computed by counting the data obtained from observations and the data regarding the duration of various stages of the pest were presented.

### **Adult longevity**

The life span of adults was recorded by enclosing twenty male and twenty female

adults in separate cages with 10 per cent honey solution.

### **Fecundity**

Fecundity was recorded for five females (pre mated) by counting the number of eggs laid during the oviposition period for each female.

### **Nature of damage**

Visual observations were made under the field to know the nature of damage and documented through photography.

### **Results and Discussion**

The biology *S. celtis* was studied under laboratory conditions on *T. arjuna* at mean temperature ( $27\pm 2^{\circ}\text{C}$ ) and relative humidity ( $75\pm 5\%$ ). The results are presented in Table 1. The life cycle of *S. celtis* consists of five developmental stages viz., egg, larva, pre-pupa, pupa and adult stage (Fig. 1). Eggs are laid in groups on the upper and lower surfaces of the leaves. A brief description of each development stage is illustrated hereunder.

### **Incubation period**

Eggs were small, oval or oblong, microscopic, creamy white in colour when laid and later turned to yellow and finally to black before hatching (Fig. 1). Incubation period ranged from 3 to 4 days with a mean of  $3.25 \pm 0.71$  days (Table 1). The present results are comparable with the findings of Shah (1996) who reported the egg period of *S. celtis* as  $4.08 \pm 0.73$ . Marginal difference might be due to the difference the host plants used in the studies.

### **Larva**

During the present study, larva undergone four moults and five larval instars were

observed. Based on exuviae in each moulting the instars were recognised.

### **First instar larva**

First instar larva was cream or light yellow colour with prominent black head. Larvae was having fine hairs which are laterally arranged and length of hairs arising from terminal segments were comparatively longer (Fig. 2). They were very sensitive and immediately after hatching started feeding the epidermis and chlorophyll content of the leaves by scraping. The duration of first instar larva was 3-5 days with a mean of  $3.60 \pm 0.71$  days (Table 1).

### **Second instar larva**

Second instar larva was light yellow color with black head and laterally arranged hairs (Fig. 2). The duration of second instar larva ranged from 2 to 5 days with a mean of  $2.95 \pm 0.82$  days (Table 1). They are comparatively bigger in size and they also feed on the chlorophyll content of the leaves by scraping the leaf epidermis (Fig. 2).

### **Third instar larva**

Third instar larva were mustard yellow in colour with dark brown head and also exhibits 3 black spots on 1<sup>st</sup>, 6<sup>th</sup> and 8<sup>th</sup> abdominal tergites and these were observed on fourth and fifth instars also (Fig. 2). At this instar the larvae were more active, fed more and size increased gradually than the first and second instars. Third instar larvae feeds by skeletonising the leaves. The duration of third instar larva ranged from 3 to 5 days with a mean of  $4.15 \pm 0.67$  days (Table 1).

### **Fourth instar larva**

Fourth instar larva was orange in colour with dark brown head. Body segmentation was

more prominent and Hairs were oriented laterally at each segment (Fig. 2). Fourth instar larvae were voracious feeders. The duration of fourth instar larva ranged from 4 to 6 days with a mean of  $4.35 \pm 0.74$  days (Table 1).

### Fifth instar larva

Fifth instar larva was almost similar to the fourth instar larvae without any major morphological difference. However size of the larvae was bigger than the fourth instar

larvae and larval skin was very thin and transparent to see the thin lining of the alimentary canal in the form of short median greenish strip on the dorsal side (Fig. 2). Larval duration of fifth instar was  $3.20 \pm 1.05$  and it was ranged between 2-4 days (Table 1). The total larval period of *S. celtis* ranged from 16 to 22 days with a mean of  $18.25 \pm 2.12$  (Table 1). These results are close in agreement with the findings of Shah (1996) who reported that, the larval period of *S. celtis* was  $17.33 \pm 0.99$ .

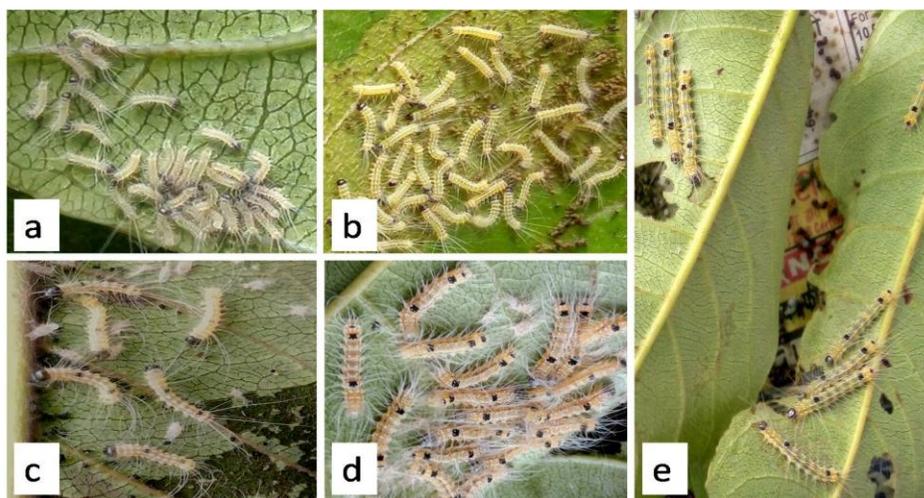
**Table.1** Biology of *Selepa celtis* reared on *Terminelia arjuna*

Developmental stages	Development period (Days)	Range
Incubation	$3.25 \pm 0.71$	3-4
I <sup>st</sup> Instar	$3.60 \pm 0.75$	3-5
II <sup>nd</sup> instar	$2.95 \pm 0.82$	2-5
III <sup>rd</sup> Instar	$4.15 \pm 0.67$	3-5
IV <sup>th</sup> instar	$4.35 \pm 0.74$	4-6
V <sup>th</sup> Instar	$3.20 \pm 1.05$	2-4
Total larval period	$18.25 \pm 2.12$	16-22
Pre Pupal period	$1.30 \pm 0.47$	1-2
Pupal period	$9.85 \pm 1.22$	8-12
Adult Longevity	$4.10 \pm 1.11$	2-6
Male	$3.00 \pm 0.79$	2-4
Female	$5.25 \pm 0.71$	4-6
Total life cycle (Egg-Adult)	$33.5 \pm 2.52$	29-36
Fecundity	$150.60 \pm 39.32$	110-200

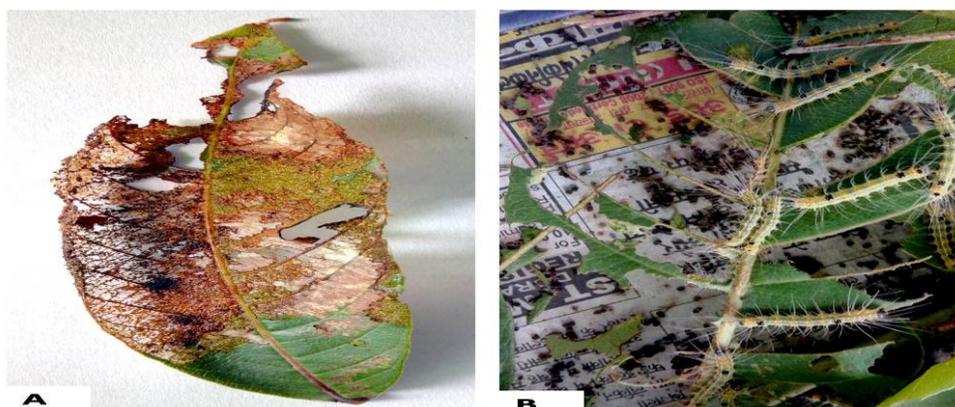
**Fig.1** Life cycle of *Selepa celtis* depicting different developmental stages



**Fig.2** Larval instars of *Selepa celtis* a) First instar b) Second instar c) Third instar d) fourth instar e) Fifth instar



**Fig.3** Damage caused by *Selepa celtis* A) Damage due to early instar larvae (1<sup>st</sup> and 2<sup>nd</sup> instars); B) Damage due to late instar larvae (3<sup>rd</sup>, 4<sup>th</sup> and 5<sup>th</sup> instars)



### Pre pupa and pupa

During pre pupal stage late instar larvae (5<sup>th</sup> instar) stops feeding and larval body length gets shrunken. Mature larvae did not pupate immediately it was quiescent for  $1.30 \pm 0.47$  days with the range of 1-2 days (Table 1). During this period larvae construct protective silken case and pupate inside it. Pupa is small in size with dark brown colour and flattened ventrally (Fig. 1). Recorded mean pupal duration was  $9.85 \pm 1.22$  days and it ranged between 8 to 12 days during the study (Table 1).

**Adult moth:** adults are medium in size with head and thorax are dark brown in colour (Fig. 1). Abdomen is slender with tapering end in males and blunt in females. Adult longevity was ranged 2 to 6 days with the mean of  $4.10 \pm 1.11$  days. Between males and females males were short lived for 2-4 days where as females lived for days 4-6 days (Table 1).

**Damage pattern:** field observations on nature of damage revealed that *S. celtis* is a gregarious defoliating pest. In early instars

larvae feeds by scraping the chlorophyll content of the leaves and later instars are voracious feeders and known to cause the skeletonising the leaves by feeding the whole leaf except mid rib and veins of the leaves (Fig. 3).

Results obtained during the present study are in agreement with the findings of Shah (1996) with certain marginal difference in the biological parameters. This variation might be due to the difference in the host plant used during both the studies. Results cannot be discussed further since the literature related to the *S. celtis* is very scanty and this is the first systematic report of this pest on *Terminelia arjuna*.

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