GAU Res. J. 1977, 2 (2) 92-96

Studies on Biology of Castor Hairy Caterpillar, *Porthesia scintillans* Walker *(Lymantriidae: Lepidoptera)*

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ABSTRACT

The biology and habits of the castor hairy caterpillar *Porthesia scintillans* Walker have been studied in detail. The incubation period was on an average 7·18 days, while the first, second, third, fourth, fifth and sixth larval instar were completed in 4·30, 2·80, 2·80, 4·70, 6·10 and 7·67 days respectively. The prepupal and pupal periods lasted for 1·0 and 7·71 days respectively. Longevity of male and female moth was on an average 6·95 and 6·63 days respectively. Brief morphological description of the different life stages is also given.

(Received on June 13, 1977)

INTRODUCTION

CASTOR, *Ricinus communis* L. is one of the major oilseed crops in India. In Gujarat State, it is grown in about 5,5000 hectares with an annual production of nearly 20,000 tonnes. The larvae of *Porthesia scintillans* Wlk. were found to damage this crop for the first time in Gujarat. Yuk Chau (1936) reported it as a serious pest of castor in Malaya. Sonan (1927) mentioned it infesting tea in Formosa and so also Sevastopulo (1936) in India at Pashoke. Very little information is published on the biology of this pest on castor and hence an attempt was made to study in detail the biology of this pest.

MATERIALS AND METHODS

The larvae of *Porthesia scintillans* Wlk. were collected from *castor plants* sown at the main Oilseeds Research Station, Junagadh to raise the culture in laboratory. They were reared in battery jars measuring 15 cm × 20 cm. Castor leaves were provided as food after washing with tap water. The pupae formed were *transferred* daily to other battery jars and the adults emerging from them were paired in new battery jars for studying the fecundity, longevity and oviposition period. Paper strips and castor leaves *were provided for oviposition.* The tops of the jars were closed with muslin cloth held in place by rubber bands. Cotton swabs soaked with 5% honey solution was provided as food to the adults. The *laboratory temperature varied* from 20° to 31° C during the period of study.

RESULTS AND DISCUSSION

1. *Oviposition and fecundity:*

The male and female moths copulated in tail to tail position. After mating *the eggs were* mostly deposited in clusters on the castor leaves, glass surface and paper strips. Under the field conditions, they were generally found *in clusters*

on the capsules and upper leaf surface. The pre-oviposition, oviposition and post-oviposition periods were observed to be 1 to 3 days with an average of 1·75 days, 1 to 6 days with an average of 3·63 days and 0 to 3 days with an average 1·25 days respectively. The number of eggs laid varied from 127 to 623 with an average of 274·19 (Table 1).

2. *Description and duration of various life-stages:*

Egg:

A freshly laid egg was small, smooth, round and creamy-white in colour. There was a small star-shaped circular depression at the top. The colour changed to dull-white, greyish and finally black at the time of hatching. They measured from 0·72 to 0·78 mm with an average of 0·75 mm in diameter. The hatching took place by cutting a hole in the chorion at the upper end. The incubation period varied from 6 to 9 days with an average of 7·18 days (Table 2).

Larval instars:

The larvae passed through five or six larval instars. The colour of the larva changed through successive instars and the mature larva was reddish brown in colour. The larval body had barbed

TABLE 1

The pre-oviposition, oviposition, post-oviposition periods and fecundity of *Porthesia scintillans* Wlk. at 20° to 31°C laboratory temperature.

Date of pairing	*Number of females under observation*	*Pre-oviposition period in days*	*Oviposition period in days*	*Post-oviposition period in days*	*Number of eggs per female*
Feb. 15, 1975	1	1	6	2	532
Feb. 16, 1975	1	2	4	2	623
Feb. 16, 1975	1	1	3	1	128
Feb. 17, 1975	1	3	4	1	282
Feb. 17, 1975	1	3	4	1	282
Feb. 17, 1975	1	2	6	0	333
Feb. 17, 1975	1	2	6	0	334
Feb. 17, 1975	1	3	1	1	277
Feb. 18, 1975	1	2	3	1	175
Feb. 18, 1975	1	2	3	1	321
Feb. 18, 1975	1	2	3	2	321
Feb. 18, 1975	1	1	5	1	128
Feb. 18, 1975	1	1	5	0	127
Feb. 19, 1975	1	1	2	2	130
Feb. 19, 1975	1	1	2	2	229
Feb. 19, 1975	1	1	1	3	165
	Total	28	58	20	4387
	Range	1-3	1-6	0-3	127-623
	Average	1·75	3·63	1·25	274·19

nettling hairs which caused irritation on contact with the skin.

The newly hatched larvae start nibbling the green tissues of the leaves. They were pale yellow in colour and measured on an average 2·25 mm in length. The head capsule was reddish black. Two black dots on either side of the head and another black dots of light tan hairs on each of the first four and sixth, seventh and eighth abdominal segments were present. The duration of first instar larva varied from 4 to 5 days with an average of 4·30 days (Table 2).

The colouration and feeding habits of second instar larva was almost like first instar. It measured on an average 5·10 mm in length. The duration of second instar larva ranged from 2 to 4 days with an average of 2·80 days (Table 2).

Third instar larva was reddish brown in colour and ate away the leaf tissues completely. The head capsule was red in colour and the body was ornamented by two tufts of long black hairs on either side of the head, another black tuft on the eighth abdominal segment, four brush-like tufts of black hairs on each of the first four abdominal segments and red dots on the sixth and seventh abdominal segments. It measured on an average 7·10 mm in length. The duration of third instar larva varied from 2 to 4 days with an average of 2·80 days (Table 2).

The fourth instar larva was brown in colour with two brush like tufts of pale yellow haris on each of the first two abdominal segments. The third hair brush was completely white while the fourth one was reduced. Other

TABLE 2

Measurements and duration of different stages of *Porthesia scintillans* Wlk. at 20° to 31°C laboratory temperature.

Stage of the insect	Measurements in mm		Duration in days	
	Length	Width	Average	Range
Egg:	0·75	(Diameter)	7·18	6—9
Larva:				
First instar	2·25	0·75	4·30	4—5
Second instar	5·10	1·00	2·80	2—4
Third instar	7·10	2·00	2·80	2—4
Fourth instar	18·30	3·75	4·70	4—6
Fifth instar	21·75	4·50	6·10	5—9
Sixth instar	27·50	6·50	7·67	7—9
Prepupa:	—	—	1·00	1—1
Pupa:	13·40	6·30	7·71	5—10
Adult:				
Male	14·20	31·60*	6·95	5—8
Female	16·80	35·00*	6·63	5—9

— Not recorded.
* Wing expanded.

morphological characters were almost like third instar larva. It was voracious feeder and caused enormous damage to the plant. It measured on an average 18·30 mm in length. The duration of this instar larva varied from 4 to 6 days with an average of 4·70 days (Table 2).

The body colour of the fifth instar larva was reddish brown. The head capsule was red in colour and the body was ornamented by two tufts of long black hairs on red prominent tubercles present on either side of the head, another black tuft on the eighth abdominal segment, four brush-like tufts of white hairs on each of the first four abdominal segments and red dots on the sixth and seventh abdominal segments. There was a red coloured mid-dorsal line running from third to last abdominal segment. They feed vocaciously causing enormous damage. It measured on an average 21·75 mm in length. The duration of fifth instar larva ranged from 5 to 9 days with an average of 6·10 days (Table 2).

The colouration and feeding habits of sixth instar larva were almost like fifth instar larva. It measured on an average 27·50 mm in length. The duration of sixth instar larva ranged from 7 to 9 days with an average of 7·67 days (Table 2).

The totaf farval period for five instar cycle varied from 19 to 24 days with an average of 20·70 days and for the six instar cycle varied from 26 to 30 days with an average of 28·37 days respectively. According to Yuk Chau (1936), the larva matured in about 15 to 20 days.

Prepupa:

The matured larva passed through a prepupal stage, when it stopped feeding and movement in the breeding jar. The colour of the larva gradually changed to deep black, all the hairs were sheds and the length was reduced. It then woven a cocoon by producing silken threads. The cocoon was semi-transparent and dirty white in colour. Finally it moulted into a pupa. The average prepupal period was one day (Table 2).

Pupa:

Freshly formed pupa was green and changed to brown, except for the thoracic segments which turned black. The pupa measured from 10 to 17 mm with an average of 13·40 mm in length and 5 to 8 mm with an average of 6·30 mm in width. The pupal period varied from 5 to 10 days with an average of 7·71 days (Table 2). According to Yuk Chau (1936), the pupal stage was completed in 5 days in May, 6 to 10 days in October and November and about 12 days in December and January.

Adult:

The female moth was yellow in colour with black and white markings on the fore-wings while hind-wings were dirty white. It measured from 31 to 37 mm with an average of 35 mm in wing expanse and from 15 to 19 mm with an average of 16·80 mm in length. The tip of abdomen was blunt and antennae

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The colouration and feeding habits of sixth instar larva were almost like fifth instar larva. It measured on an average 27-50 mm in length. The duration of sixth instar larva ranged from 7 to 9 days with an average of 7-67 days (Table 2).

The total larval period for five instar cycle varied from 19 to 24 days with an average of 20-70 days and for the six instar cycle varied from 26 to 30 days with an average of 28-37 days respectively. According to Yuk Chau (1936), the larva matured in about [illegible] 20 days.

Prepupa:

The matured larva passed through a prepupal stage, when it stopped feeding and movement in the [illegible]. The colour of the larva gradually changed to deep black, all the hairs were shed and the length was reduced. It then [illegible] a cocoon by producing silken threads. The cocoon was semi-transparent and dirty white in colour. Finally it moulted into a pupa. The average prepupal period was one day (Table 2).

Pupa:

Freshly formed pupa was green and changed to brown, except for the [illegible] segments which turned black. The pupa measured from 10 to 17 mm with an average of 13-40 mm in length and 5 to 8 mm with an average of [illegible] mm in width. The pupal period varied from 5 to 10 days with an average of 7-70 days (Table 2). According to Yuk Chau (1936), the pupal stage was completed in 5 days in May, 6 to 10 days in October and November and about 12 days in December and January.

Adult:

The female moth [illegible] with black and white markings on the fore-wings while hind-wings were dirty white. It measured from [illegible] mm with an average of [illegible] mm in wing expanse and from 15 to [illegible] mm with an average of 16-80 mm in length. The tip of abdomen was [illegible]

were bipectinate with very small hairs.

The male moth was black in colour and hind-wings were dirty white. It measured from 30 to 34 mm with an average of 31·60 mm in wing expanse and from 13 to 15 mm with an average of 14·20 mm in length. The tip of abdomen was pointed and antennae were bipectinate with long hairs.

The longevity of male and female moths varied from 5 to 8 days with an average of 6·95 days and 5 to 9 days with an average of 6·63 days respectively (Table 2).

ACKNOWLEDGEMENT

The authors wish to express their sincere thanks to Shri P. K. P... Oilseeds Specialist, Gujarat Agricult... University, Junagadh for providing nec... sary facilities and showing keen inter... and encouragement in developing th... research work on this pest.

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