

Biology and Larval and Post-Larval Development of *Athalia proxima* Klug on Different Host Plants

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ABSTRACT

Biology of *Athalia proxima* klug was studied under the laboratory conditions during the year 1976. The egg period was on an average 6.21 days. There were six larval instars and duration of each instar was on an average 1.25, 2.83, 3.25, 3.83, 1.92 and 1.83 days respectively. The total larval period was on an average 14.66 days. The average duration of pupal stage was 12.79 days. The male and female adults survived for 6.40 and 5.20 days respectively and female adult laid on an average 22.60 eggs during its life span.

The larvae were also reared on different host plants to study the effects of different host plants on their development. The shortest larval and pupal period was observed on mustard and rats tail respectively. The adult longevity was more when the larvae were fed on rat's tail.

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INTRODUCTION

Mustard (*Brassica juncea* Coss.) is an important oilseed crop in India. The cultivation of mustard is mainly in the Northern and Eastern States extending from the Punjab to Bengal. During last few years there has been a rapid increase in the area and production of mustard in Gujarat State. Among the various insect pests infesting this crop, the larvae of *Athalia proxima* Klug is an important pest. A study was, therefore, undertaken during the year 1976 to know the biology of this pest at room temperature under Gujarat conditions and the effect of important host plants on its development. The results of this research has been presented in this paper.

MATERIALS AND METHODS

The larvae of *Athalia proxima* Klug were collected from the unsprayed field of mustard sown on the farm of Main Oilseeds Research Station, Junagadh. The larvae were reared in the glass jars (12 cm × 90 cm) filled with the soil for their pupation. The mustard leaves were provided as food for the larvae. As soon as the larvae pupated, they were collected and the pupae were kept in the petri dishes (90 cm in diameter). The newly emerged adults were paired in the glass jars and mustard leaves were provided for oviposition. Total 10 pairs were observed. The glass jars were closed with the muslin cloth kept in position by the rubber bands. The sugar solution

(5%) was provided as food for the adults. The mustard leaves were changed daily to count the number of eggs laid by a single female. The number of eggs laid by a single female were counted on the basis of the number of larvae emerged from the eggs laid by a single female during its life span. The larval instars were judged on the basis of exuviae casted off by the larvae. This study was carried out under the laboratory conditions at the temperature range of 21° to 26° C.

Similarly fresh leaves of different host plants viz., mustard, rats tail, radish and cauliflower were served as food to the larval stage at 19° to 24° C temperature.

RESULTS AND DISCUSSION

A. *Biology of Athalia proxima* Klug on mustard:

(1) Egg:

The eggs were laid singly in the leaf tissues around the periphery, within incisions made with the help of the ovipositor. The incubation period varied from 4 to 8 days with an average of 6.21 days (Table 1). According to Tripathi (1963), the egg period varied from 6-8 days.

TABLE 1

Biology of *Athalia proxima* Klug on mustard.

Stage	Numbers observed	Duration in days
Egg:	78	4-8(6.21)*
Larva:	12	12-20(14.66)
First instar	12	1-2(1.25)
Second instar	12	1-3(2.83)
Third instar	12	1-10(3.25)
Fourth instar	09	2-5(3.83)
Fifth instar	08	1-4(1.92)
Sixth instar	08	2-5(1.83)
Pupa:	29	10-15(12.79)
Adult:	—	—
Male	10	2-7(6.40)
Female	10	5-8(5.20)

*Figures in parenthesis are the average values.

(2) Larva:

(a) *First instar larva*: The newly hatched larva was greyish green in colour. The mesothorax was thicker than the other body segments. The head capsule was shiny black in colour. The larva possessed eight pairs of prolegs in addition to three pairs of true thoracic legs. It was less active and coiled its body on disturbance. It measured 1.80 to 3.00 mm with an average of 1.94 mm in length.

The duration of this instar larva lasted for 1 to 2 days with an average of 1.25 days (Table 1). Tripathi (1963) reported that this period varied from 2 to 3 days.

(b) *Second instar larva*: This instar larva was similar in morphological characters to the first instar larva. It measured 2.50 to 5.00 mm with an average of 3.52 mm in length.

The duration of this instar larva varied from 1 to 3 days with an average of 2.83 days (Table 1). According to Tripathi (1963), the duration of this instar larva varied from 3 to 5 days.

(c) *Third instar larva*: This instar larva was black in colour and coloured bands were visible on the dorsum. It measured 4.00 to 9.59 mm with an average of 6.04 mm in length.

The duration of this instar larva varied from 1 to 10 days with an average of 3.25 days (Table 1). The period recorded by Tripathi (1963) was 4 to 6 days.

(d) *Fourth instar larva*: This instar larva resembled to the third instar larva. The body length of this instar larva varied from 5.50 to 12.50 mm with an average of 9.24 mm.

The duration of this instar larva varied from 2 to 5 days with an average of 3.83 days (Table 1). Tripathi (1963) reported that this period varied from 4 to 5 days.

(e) *Fifth instar larva*: This instar larva was similar in shape and colour to the fourth instar larva. It measured 8.00 to 15.50 mm with an average of 12.33 mm in length.

The duration of this instar larva varied from 1 to 4 days with an average of 1.92 days (Table 1). Tripathi (1963) reported 5 to 6 days as this period.

(f) *Sixth instar larva*: This instar larva was sluggish and thicker in size. It was smooth and black in colour. The dorsum was marked with five long stripes on the body. With a touch, it has a tendency to curl up and drop on the ground showing the feign death. It measured 10.80 to 16.00 mm with an average of 13.33 mm in length.

The duration of this instar larva varied from 2 to 5 days with an average of 1.83 days (Table 1). According to Tripathi (1963), this period varied from 3 to 6 days. He further reported that the total larval period varied from 21 to 30 days, while according to Narayanan (1953), the total larval period varied from 10 to 15 days. In our case, this period varied from 12 to 20 days with an average of 14.66 days (Table 1).

(3) Pupa:

Full-fledged larva descended and pupated in the soil in earthen cocoon. The cocoon was made of a parchment like material secreted from the larval mouth and was cemented over by the thin layer of the earth. The larva casted off its last skin and there-

after went to the pupation. The cocoon measured 6.00 to 8.00 mm with an average of 6.90 mm in length and 3.00 to 4.00 mm with an average of 3.40 mm in breadth.

The pupal period varied from 10 to 15 days with an average of 12.79 days (Table 1). According to Tripathi (1963) and Narayanan (1953) this period varied from 7 to 10 days and 10 to 12 days respectively.

(4) Adults:

Adult flies were short and thick bodied and were marked with black and orange-colours. Their wings were smoky with black veins and though called flies, they had two pairs of wings. The tip of female abdomen on ventral side was black in colour which was lacking in case of the male adult. The male was smaller in size than the female adult. The male and female measured 4.40 to 4.50 mm with an average of 4.46 mm and 5.0 to 5.20 mm with an average of 5.1 mm in length respectively. The breadth with expanded wings of male and female varied from 10.50 to 11.00 mm with an average of 10.78 mm and 12.00 to 12.40 mm with an average of 12.20 mm respectively.

The male survived longer than the female. The longevity of male and female varied from 2 to 7 days with an average 6.40 days and 5 to 8 days with an average of 5.20 days respectively (Table 1). Tripathi (1963) reported 10 days as the longevity of the adult. The female adult laid 7 to 35 eggs with an average of 22.60 eggs during its life period (Table 1). According to Tripathi (1963) and Narayanan (1953), the average number of eggs laid by a single female were

40.20 and 35.00 respectively. The sex ratio of female to male from the field collected larvae was observed to be 1:3.83.

*B. Effect of different host plants on the larval and post-larval development of *Athalia proxima* Klug.*

TABLE 2

Effect of different host plants on the larval and post-larval development of *Athalia proxima* Klug.

Sr. No.	Host Plant	Duration in days			Numbers observed in each case
		Larva	Pupa	Adult	
1	Mustard (<i>Brassica juncea</i> Coss)	13-16(14.29)*	16-20(19.00)	3-8(4.57)	7
2	Rats tail (<i>Raphanus sativum</i> L.)	15-20(17.40)	14-16(15.37)	4-10(6.25)	8
3	Radish (<i>Raphanus sativum</i> L.)	15-19(16.25)	15-18(17.00)	4-7(6.00)	6
4	Cauliflower (<i>Brassica Oleracea</i> (<i>botrytis</i> L.)	15-17(16.60)	16-19(18.11)	1-3(2.11)	9

*Figures in parenthesis are the average values.

It can be seen from Table 2 that though there was not much difference in larval period, it was shortest (14.29 days) when reared on mustard. Therefore, it can be said that the mustard might be the favourable host plant for the development of larvae. Similarly the difference in pupal period was about 3 days and was less (15.37 days) on rat's tail. The longest longevity (6.25 days) of the adult was observed when the larvae were reared from rat's tail. The longevity was minimum (2.11 days) when larval food was cauliflower, which might be due to its low nutritional value to this insect. Bagawat (1967) reported that the larval period was significantly lengthened on china cabbage, cabbage,

knolkhol and cauliflower. The longest and shortest pupal period was reported on radish and cauliflower respectively. He also reported that the longevity of adult was longer on mustard, turnip, rye and radish as compared to other host plants tested.

REFERENCES

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