

Biology of Blue Butterfly, *Euchrysops cneajus* Fab. as a Pest of Tur, *Cajanus Caja* Millsp*.

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ABSTRACT

The species of *Euchrysops cneajus* Fab. was recorded for the first time in Gujarat State. Biology of this pest was studied in detail under the laboratory conditions during the year 1974-75. The egg period was on an average 3.85 days. There were four distinct instars and duration of each instar was on an average 3.10, 3.02, 1.94 and 2.13 days respectively. The total larval period was 10.33 days with a range of 8.03 to 13.06 days. The prepupal and pupal periods were 2.12 and 5.98 days respectively. The Pre-oviposition, oviposition and post-oviposition periods varied from 1 to 10., 1 to 7 and 1 to 5 days respectively. The female adult laid on an average 32.22 eggs during its life span. The male and female adults survived for 5.69 and 9.55 days on an average respectively. Damage on host has been described. *D.lablab* was observed to be the best host for the pest. The field parasites of the same collected were identified.

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INTRODUCTION

Among the various insect pests infesting Tur (*Cajanus Cajan*), the blue butterfly, *Euchrysops cneajus* Fab. is an important pest and causes appreciable damage to the crop. This pest also has been recorded on Sunnhemp (Shri Ram, 1971). Excepting for preliminary studies on the bionomics of this species done by Shree Ramulu (1968) and Pramanik & Basu (1973), very little study has been made on its biology. Hence a detailed study was, undertaken on biology of this pest under laboratory and in field conditions, the results of which are presented in this paper.

MATERIALS AND METHODS

Initial laboratory culture was the larvae of *Euchrysops cneajus* Fab. collected from the unsprayed field of tur sown on the college farm, college of agriculture, Junagadh. The larvae were reared in petri dishes (10 x 2.5 cm). The fresh buds, flowers and pods of tur were provided daily as food for larvae till they pupated. The pupae were kept in the glass jar (15 x 11 cms) for adult emergence. The newly emerged adults were paired in the glass jars. Cotton plug dipped in 5 per cent fresh sugar solution was provided as food for adults. The twigs with buds were provided for ovi-

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position as well as for the adults to alight. The number of eggs laid by a single female was counted and recorded. The larval instars were determined by the presence of the head capsules casted off by the larvae.

RESULTS AND DISCUSSION

Eggs :

The eggs are laid singly on calyx of unopened fresh buds, flowers and often on the petioles under field conditions. A typical egg is round, disc shaped, flattened and sculptured with numerous raised points on the surface. The freshly laid egg is greenish in colour with bluish tinge. The colour changes from pale yellow to whitish. The egg measured 0.75 mm in diameter on an average. The incubation period from 2 to 7 days with an average of 3.85 days; while Pramanik *et al.* (1973) reported incubation period to be 4 to 6 days.

Larva:

First instar : The newly hatched larva is pale yellow in colour. It possesses a comparatively large shiny black

coloured head, three pairs of true legs and five pairs of prolegs. Each segment of the body carries five conspicuous setae arranged in a row. Length ranges from 1.6 to 6.5 mm, breadth 0.40 to 1.52 mm. The average respectively were 4.46 and 0.81 mm. The head capsule width measured 0.37 mm on an average (Table 1).

The duration of this instar larva varied from 1 to 5 days with an average of 3.10 days.

Second instar : Morphologically, this instar larva resembles the first instar larva except in size and colour. The body colour changes to brown. A single dot on the prothorax is conspicuous. A pale yellowish hazy stripe can be noticed on the dorsum of the entire body. The abdominal end segments are flattened. The larvae measured 6.81 mm in length and 2.24 mm in breadth on an average. The head capsule width measured 0.60 mm on an average (Table 1).

TABLE 1

Studies regarding larval development of *E. cneajus* Fab.

Instar	Numbers observed	Head capsule width mm	Larval		Duration in days
			Length mm	Breadth mm	
I	40	0.30-0.42 (0.37)*	1.60-6.50 (4.46)	0.40-1.52 (0.81)	3.10
II	35	0.38-1.16 (0.60)	2.25-11.50 (6.81)	1.00-4.50 (2.24)	3.02
III	35	0.42-1.18 (0.77)	5.00-12.00 (7.24)	1.10-5.00 (3.40)	1.94
IV	35	0.54-1.20 (1.00)	6.00-12.50 (9.99)	2.00-5.00 (3.68)	2.13

*Figures in parenthesis are the average values.

The duration of this instar larva varied from 1 to 6 days with an average of 3.02 days.

Third instar : The larval body of this instar is covered by dark brown hairs. The lateral brown stripes become wider.

The colour is deep brown on the two end segments. The head is concealed under prothorax. The larva measured 7.24 mm in length and 3.40 mm in breadth on an average. The head capsule width measured 0.77 mm on an average (Table

1). The duration of this instar larva varied from 1 to 4 days with an average of 1.94 days.

Fourth instar : The 9th and 10th abdominal segments of this instar larva has a deep brown colour. The setae pattern of the first instar totally disappears. Each segment possesses small brownish hairs. The central region of larval body is thickest. The larval body colour gradually changes to greenish. The larva become flattened dorso-ventrally and minute cylindrical retractile process are observed along the pleural margin of either sides. On the dorsum of the 7th abdominal segment, a crescent shaped apperature is located from which some liquid is secreted. This instar larva measured 6.00 to 12.50 mm with an average of 9.99 mm in length and 2.0 to 5.0 mm with an average of

3.68 mm in breadth. The head capsule width measured 0.54 to 1.20 mm with an average of 1.00 mm (Table 1). The duration of this instar varied from 1 to 6 days with an average of 2.13 days.

Pre-pupa and pupa :

The pre-pupa is greenish in colour. The freshly formed pupa is of obtect type and greenish in colour. The colour changes to blackish after 4 days of pupation. The pupa is supported by silken thread around the middle portion. The pupa measured 9.66 mm in length and 3.92 mm in breadth on an average. The pre-pupal and pupal periods varied from 1 to 4 days with an average of 2.12 days and 3 to 9 days with an average of 5.98 days respectively (Table 2). Pramanik *et al.* (1973) reported the pupal period to be 7 to 12 days.

TABLE 2

Studies regarding pre-pupal, pupal, pre-oviposition, oviposition and post-oviposition period of *E. cneajus* Fab. at different periods of study.

Sr. No.	Period of study	Numbers observed	Durations in days		Period of study	No. of pairs observed	Duration in days		
			Pre-pupal period	Pupal period			Pre-oviposition period	Oviposition period	Post-oviposition period
1.	1-9-74 to 1-10-74	40	1-4 (2.23)*	3-7 (5.56)	27-9-74 to 5-10-74	12	1-2 (1.75)	2-5 (4.23)	1-3 (1.92)
2.	16-9-74 to 19-10-74	40	1-2 (1.65)	4-7 (5.32)	17-10-74 to 2-11-74	20	1-10 (6.55)	1-7 (4.70)	1-5 (1.20)
3.	28-10-74 to 10-1-75	41	1-3 (2.47)	5-9 (7.05)	—	—	—	—	—
Ave.			2.12	5.98			4.15	4.47	1.56

*Figures in parenthesis are the average values.

Adult :

Male : The male is dorsally pale violet in colour with a bluish shade.

The fore wings possess a slender dark line along the apical margin. The hind wings bear the two dark spots encircled with fainty whitish border at apex.

A black tail tipped with white is located between these two spots. The underside of wings is pale silvery in colour. It is more active than the female. It possesses tuft of hairs and scale on the last abdominal segment. The body of the male measured 11.50 mm in length and 27 mm in breadth with the expanded wings on an average.

Female : The underside of the female wings is greenish. The fore wings flash especially with metallic blue. The hind wings bear three fuscous spots encircled with white and two dark spots marginized with white and orange on the apical margin. The underside of wings and a tail are as in the male, but the black spots touched with metallic scalling. The last abdominal segment of female is pointed dorsally and forms a hole like circular depression ventrally. The female measured 11.50 mm in length and 29.60 mm in breadth with the expanded wings on an average.

Fecundity : The pre-oviposition, oviposition and post-oviposition periods varies from 1 to 10 days, 1 to 7 days and 1 to 5 days with an average of 4.15, 4.47 and 1.56 days respectively (Table 2). The number of eggs laid by a female varies from 7 to 87 with an average of 32.22. Shree Ramulu (1968) reported the pre-oviposition period of 1 to 2 days and up to 37 eggs laying capacity of a single female. Pramanik *et al.* (1973) recorded eggs laid by a single female varied from 60 to 90.

Longevity :

The longevity of female and male varies from 7 to 15 days with an average of 9.55 days and 1 to 9 days with an average of 5.69 days respectively, which tallies with the observation of Shree Ramulu (1968) where he reported survival of adults for 16 days.

Sex ratio :

The sex ratio of male and female from the field collected larvae was found to be 1: 1.78.

Nature of damage :

The newly hatched larva enter either the flowers carrola or developed buds. The larva feed on the internal contents of flowers and buds; moult inside to second instar and then come out from them. The damaged buds and flowers drop down. The full grown larva feed on the developing grains insides the pods preferably near the base by pushing its body halfway inside the pod. The larva reach other seeds of the same pod by separate holes. The infested pods will be easily recognised as they have one or more holes. One or two larvae will be found on a single pod. The presence of larva could be noticed by presence of brownish ants on pods which are attracted by the secretion from anal segment of larva.

Host-Preference :

To find out the most suitable host for laboratory rearing, larvae were reared on tur flowers up to second instar and then forty larve were reared on various hosts from third instar until pupation. The suitability of the host was judged on the basis of growth idex calculated by dividing the percentage of pupation with an average larval duration in days. The data are presented in Table 3. Results indicated that *Dolichas lablab* L. is the most suitable host for laboratory rearing, followed by tur, green gram and black gram.

Natural enemies :

A hymenopterous insect, *Telenomus* sp. was collected from the field as an egg parasite of blue butterfly. The field

TABLE 3
Growth index of *E. cneajus* Fab. larvae on various hosts.

Sr. No.	Host plant	Larvae observed	Ave. larval period (days)	Pupae obtained		Growth index
				Nos.	%	
1.	Black gram <i>Phaseolus aconitifolines</i> J.	40	2.87	19	47.50	16.80
2.	Green gram. <i>Phaseolus aureus</i> R.	40	3.50	39	97.50	20.47
3.	Val. <i>Dolichas lablab</i> L.	40	3.02	39	97.50	32.50
4.	Tur, <i>Cajanus cajan</i> Mills.	40	3.12	29	87.87	28.16

incidence ranged from 26.13 to 12.35% during October to December, 1974. On an average 10 days were required for complete development of eggs upon the host in laboratory conditions.

Two larval parasites observed to be parasiting the blue butterfly larvae, were identified as *Aplomya metallica* W. and *Drino* spp. The *Drino* spp. occurred during January to February. The incidence recorded in January was as high as 61.90%. The larvae of *Drino* spp. were endoparasitic on the host larvae. The infection of *Aplomya metallica* W. was almost negligible.

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