https://doi.org/10.29321/MAJ.10.A02193

Madras Agric. J 74 (8 & 9) 377—380; August & September, 1987

EFFECT OF FOOD, LIGHT AND DARKNESS ON THE NUMBER OF INSTARS AND STADIAL PERIODS IN A MANTID *EUANTISSA PULCHRA* (FABRICIUS) (DICTYOPTERA : MANTIDAE)

U. KARUPPANAN

Nymphs of *Euantissa pulchra* were grouped into 5 categories as starvation for different periods; with different types of preys ; continuous illumination; complete darkness and normal conditions, in-order to observe the number of moults (or instars) as well as the total nymphal periods. It is recorded that the food or illumination did not influence the number of moults but may extend the nymphal period.

It is generally recorded that the number of instars in insects is fairly related to the amount and type of food provided (Gaines and Campbell, 1935; Vanderwerker and Kulman, 1974; Daly, 1985) and the availability of temperature (Guppy. 1969; Daly, 1985). The duration of the stadium or the total larval periods from hatching to adult emergence is significantly related to the interval between the meals whereas the prolongation of the larval period increases the number of moults in insects (Roeder, 1953; Jacobson and Blakeley, 1960). It is observed that the larvae with additional moults have a longer first stadium as well as total larval period (Schmidt and Lauer, 1977). There is little information available concerning the effect of food, light and darkness on the stadial periods and number of instars in mantids and hence the present study was undertaken.

MATERIALS AND METHODS

Totally 80 first instar freshly hatched nymphs of *E. pulchra* were collected from oothecae of the stock culture in the laboratory. Alive Drosophila flies were provided to all the nymphs of the categories (except III category) throughout their nymphal periods. Each of the nymph was separately reared in a transparent plastic container with some minute openings on the top of the cap. The nymphs of *E. pulchra* were grouped into 5 (I-V) categories, each with 10 nymphs, as mentioned below.

I - Control group - Fed by Drosophila flies daily.

II - Experimental group - Fed by Drosophila flies.
  a) After Starvation for one day
  b) After starvation of two days

Department of Zoology, Government Arts College, Coimbatore-641 018.

c) After starvation of three days
d) After starvotion of four days

III - Experimental group - Fed by Drosophila flies, Mosquitoes, Termites, Psychodids and house flies (Mixed diet).

IV - Experimental group Nymphs were provided Drosophila flies daily under continuous illumination (A 60 w electric bulb was continuously burning throughout the life of the experimental nymphs. The temperature was kept constant (30 - 33°C).

V - Experimental group - Nymphs were given Drosophila flies daily and maintained under complete darkness throughout their nymphal periods.

RESULTS AND DISCUSSION

Relationship between the food and number of instars :

Under normally fed condition (control), the male nymph makes 5 moults to emerge into adult whereas the female makes 6 moults (Table 1) There is no change in the number of moults (male 5 and female 6) when the nymphs are reared on different preys or at different photoperiods, though such report is available in fruit moth (Roeder, 1953) and *Pseudaletia unipuncta* (Lepidoptera) (Guppy, 1969). It is evident from the present observations (Table 1) that the number of moults or instars in the nymphal stage is genetically fixed, and it can not be altered by mere change in food, photoperiod as well as starvation during the nymphal periods.

Prolongation of the stadial period in relation to food

Among the various environmental factors, food and temperature are the most valuable traits for the development of the insects. The control nymphs with regular feeding with excess of food material make *E. Pulchra* to grow more rapidly and relatively the total nymphal period is significantly shorter (Table 1). The period is gradually prolonged, according to the duration of intervals between the meals, under experimental conditions. The investigation recalls the observations of the interruption of feeding by starvation in *A. orthogonia* (Jacobson and Blakeley, 1960) and reduction of nutritive materials in cloth moth larvae (Roeder, 1953). Similarly the first stadial period in the present investigations, is longer in the female nymphs than in the males. The present observations further elucidate that the regular feeding is indispensable for the normal growth of an insect. The growth rate of the nymphs of *E. pulchra*, under different experimental conditions is virtually related not only by the amount of food provided but by the duration of intervals between the meals (Table 1). The daily and sufficient food provided to

Table 1 Showing the number of instars and average number of days for each stadial period of the nymphs of E. *pulchra*

FEMALE	STADIAL PERIODS (days)						
	I	II	I.I	IV	V	VI	Total No. of days
I Control	7.75	5.00	5 50	8 25	9.50	11.50	47.50
II starved for One day	10 25	7.25	6.75	11.50	12.75	13.25	61.75
,, Two days	13.70	20 00	10.25	12.50	10.25	13.25	79 25
,, Three days	11.25	14.25	10.75	19.25	20.25	19.25	94.75
,, Four daya	11.75	12.75	10.75	15 00	24.25	21.50	96.00
III Different types of preys	13.75	5.00	7.75	9.00	22.00	15.00	69.50
IV Continuous illumination	11.33	5 67	7.33	7.00	11.67	15.33	57.33
V Complete darknees	8 25	15.25	15.25	23.00	20.00	16.00	97.75

MALE	STADIAL PERIODS (Days)					
	I	II	III	IV	V	Total No. of days
I Control	7.25	5.50	5.75	7.53	10.25	36.25
II starved ror One day	7.75	6.75	7.00	10.75	13.00	44 75
,, Two days	13.50	8.50	14.25	11.75	15.75	63 75
,, Three days	11.00	11.25	11.25	18.75	22.00	74.25
,, Four days	10.50	11.25	12.50	16.00	32.00	74.25
III Different types of preys	12.00	8.00	9.75	16 75	16.50	63.00
IV Continuous illumination	11 00	6.25	7 00	8.50	13.00	45.45
V Complete darkness	8 00	12.25	16.00	22.75	12.50	71.50

the nymphs of *E. pulchra* quicken the growth of the nymphs whereas the starvation, according to the length of interval between two successive meals, rather retards the normal growth of the nymphs. The period is positively related to the intervals between the meals. It is longer in the female nymphs than in the males of *E. pulchra*. During the prolongation of the nymphal period, there is no additional moults formed. It is clear that the regular feeding expedites the rapid growth whereas the prolonged starvation impedes the growth of the nymphs of *E. pulchra*.

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