

Biology of *Marucavitrata* on Pigeonpea

The legume pod borer, *Maruca vitrata* (Geyer) (Lepidoptera Pyralidae) is a serious pest of grain legumes in tropics and sub tropics which attacks the crop from pre-flowering stage to pod maturing stage, causing yield losses estimated between 20 to 60 per cent.

The studies on biology of *M. vitrata* on pigeonpea revealed that the moth lays eggs singly or in groups with a mean egg period of 3.6 days, passes through 5 instars in a period of 10.9 days. The I and II instars are creamy white and in III instar the colour changes to brownish green with a pair of conspicuous dark spots on each segment. The duration of pupal period was 6 days. The adult of *M. vitrata* was medium sized with brown fore wings dotted with a single black eyed white spot while hind wings were semi hyaline white with a basal brownish area. Adult longevity was 4.1 days and total life cycle was 24.6 days.

The larvae were collected initially from the fields of RARS Lam farm Guntur and were reared in the rearing vials till pupation on fresh flowers of redgram. After pupation, the pupae were transferred into rearing jars for adult emergence. The newly emerged moths were collected and released in glass chimneys for mating and cotton swab soaked in 10 per cent honey was provided to serve as food for adult. After 24 hours, moths were released into the cages prepared with acrylic sheets and muslin cloth, which were tied to the redgram plant branches with inflorescence for oviposition. The eggs laid on plant parts were removed daily and kept separately for hatching. The newly hatched larvae were transferred into rearing vials with fresh redgram flowers. Rearing was continued till the adult emergence. The number of eggs laid were recorded. Egg laying was observed in 10 pairs of adults and the mean number of egg laid by a single female was calculated.

The larvae were reared in rearing vials with redgram flowers. The number of larval instars, duration of each instar and total larval period were recorded. The data was recorded on 10 larvae.

Cessation of feeding and reduction in size and disappearance of larval markings were regarded as the characteristics of pre-pupa. The pre-pupa with a silken gauze like cocoon around the body was regarded as pupa. The period between the time of pupation and adult emergence was recorded for 10 pupae and mean was calculated.

Ten moths were introduced separately into cages and were provided with 10 per cent honey swab as food and maintained till they died. The adult longevity period was recorded.

Eggs were laid singly and in small groups. The eggs are tiny, globular and scaly. The total egg period range between 3.00 to 4.50 days with an average of 3.60 days (Table-1). Bindu *et al.* (2006) reported the egg period as 3.47 days on pigeon pea. The larva passed through 5 instars which tally with the findings of Veeranna *et al.* (1997), Rao (2001), Bindu *et al.* (2006) and Ghorpade *et al.* (2006).

The I instar larvae were minute, white in colour without any brownish black spots on dorsal side. I instar larva measured on an average of 2.79 mm in length and 0.32 mm in breadth (Table-2) Rao (2001) reported that larva measures 2.37 mm in length and 0.49 mm in breadth on blackgram. Bindu *et al.* (2007) recorded 3.02 mm length and 0.69 mm breadth of larva in redgram. The larval period of I instar was 2.15 days which concur with studies of Bindu *et al.* (2007) who reported 2.93 days of larval period on redgram. Ghorpade *et al.* (2006) reported larval period of 3.43 days in redgram.

The II instar larva was similar to I instar but with large size. It measures on an average 4.87 mm in length and 0.85 mm in breadth. Bindu *et al.* (2007) reported the larval size as 4.55 mm in length and 0.84 mm breadth. The developmental period of II instar was 1.95 days. Bindu *et al.* (2007) reported 3.20 days and Ghorpade *et al.* (2007) 2.5 days development period of II instar in redgram respectively.

The III instar larva had brownish black spots on the mid dorsal line. The head and prothoracic shield were darker. The larva measured 8.59 mm in length and 1.74 mm in breadth. Dilli Rao (2001) reported 7.09 mm length and 1.29 mm breadth in III instar. Bindu *et al.* (2007) reported 8.97 mm length and 1.59 mm breadth. The developmental period of III instar larva was 1.85 days. Bindu *et al.* (2007) 3.40 days and Ghorpade *et al.* (2006) 2.42 days development period of III instar in redgram respectively.

The IV instar larva was dull white in colour with dark spots on dorsal side similar to III instar except in size. The head and prothoracic shield became dark brown. The larva measured 11.09 mm in length and 2.6 mm in breadth. Dilli Rao (2001) reported length and breadth as 10.49 mm and 1.90 mm in IV instar

Table 1. Biology of *Maruca vitrata* on Pigeonpea

Stage	Number Studied	No.of Days	Average Days
Egg	10	3.0 – 4.5	3.6
Larva			
I instar	10	1.5 – 2.5	2.15
II instar	10	1.5 – 2.5	1.95
III instar	10	1.5 – 2.5	1.85
IV instar	10	1.5 – 2.0	1.85
V instar	10	2.5 – 4.0	3.10
Total larval Period	10	8.5 – 13.5	10.90
Pupal Period	10	5.0– 7.0	6.00
Adult longevity	10	3.5 – 5.0	4.10
Total development period	10	20 - 30	24.60

Table 2. Biometrics of larval instars of *M.vitrata* on Pigeonpea

Instar	Number studied	Length range (mm)	Average (mm)	Breadth Range (mm)	Average (mm)	Head capsule width range (µm)	Average (µm)
1 st	10	3.1 – 2.4	2.79	0.1-0.6	0.32	17 – 28	24
2 nd	10	4.6 – 5.2	4.87	0.7 – 1.1	0.85	60 - 72	64.9
3 rd	10	8.0 – 9.0	8.59	1.2 – 2.0	1.74	80 - 89	85.2
4 th	10	10.0 – 12.0	11.09	2.2 – 3.1	2.6	117 - 132	122.3
5 th	10	12.3 – 18.1	16.54	2.3 – 3.4	2.88	119 - 150	134.5

larva. Bindu *et al.* (2007) stated length as 11.55 mm and breadth as 2.71 mm. The development period was 1.85 days. Bindu *et al.* (2007) recorded 3.47 days and Ghorpade *et al.* (2006) reported 2.33 days development period of IV instar in redgram.

The V instar larva was creamy white to brownish grey with dark brown sclerites. The larva measure 16.54mm in length and 2.88 mm in breadth. Dilli Rao (2001) reported the size of V instar larva as 16.10 mm in length and 2.43 mm in breadth. Bindu *et al.* (2007) reported length and breadth as 15.30 mm and 3.28 mm. The larva completes its development in 3.10 days. Bindu *et al.* (2007) 3.27 days and Ghorpade *et al.* (2006) 4.25 days development period of V instar in redgram respectively.

The total larval period under laboratory conditions lasted for 10.90 days on red gram. Rao (2001) reported 11.36 days larval period on blackgram and Ghorpade *et al.* (2006) as 13 to 17 days

on redgram. The difference in the period may be due to the change in the environmental conditions and also may be due to difference in host plants.

Pupa were light brown in colour. The total pupal period was 6 days. Rao (2001) reported 9.07 days of pupal period on blackgram. Ghorpade *et al.* (2006) as 7.6 days in redgram. Bindu *et al.* (2007) stated as 7.13 days on redgram.

Adult moths were medium sized with brown forewings dotted with single black-eyed white spot. Hind wings were semi-hyaline, white with a basal brownish area. The adult longevity on an average was 4.1 days. Bindu *et al.* reported adult longevity as 4.70 days.

The total developmental period was 24.60 days. Rao (2001) recorded developmental period as 25.98 days on blackgram. Ghorpade *et al.* (2007) as 30.00 days on redgram and Bindu *et al.* (2007) as 30.00 days on redgram.

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