

Biology of Diamond back moth, *Plutella xylostella* Linn.

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SUMMARY

The pre-oviposition, oviposition, post-oviposition periods and fecundity of *Plutella xylostella* were found 2 to 4, 6 to 7, 5 to 7 days and 152 to 221, respectively. The larvae passed through four instars. The incubation, larval and pupal periods were 3 to 4, 7 to 11 and 3 to 5 days, respectively. The pupation took place on the glass jars, muslin cloth and undersurfaces of the leaves of the plants. The longevity of male moth was 5 to 7 days while female lived for 12 to 16 days. The mean time taken from egg to adult stage was 14 to 22 days.

Key words :

Plutella xylostella,
Biology, Diamond
back moth

Diamond back moth, *Plutella xylostella* Linn. is the most noxious pest of cabbage crop which occurs almost all over the world and causes severe damage to the crop. The pest was first recorded from South America in 1890 and then from Venezuela in 1939 (Saravaiya and Patel, 2005). The larvae mine the cabbage leaves on their undersurfaces in the earlier stages while in the later stages they feed on leaves. The larvae feed on the leaves to the extent of 62 to 78 per cent, causing irregular patches on the leaves (Harcourt, 1957). All the leaf tissues are consumed by the larvae except the veins. The last stage larvae are voracious feeders which cause more injury than the first three larval instars creating a 'windows' to the leaves. Thus, the larvae skeletonise the plants and growth of plants remains stunted in cases of severe attack. The pest causes the damage right from seedling stage to till harvest. As a result there is a reduction in quality and yield of the produce. Abraham and Padmanaban (1968) reported 31 per cent yield loss to cabbage crop due to *P. xylostella* attack while Krishnakumar *et al.* (1986) estimated 52 per cent losses in the marketable yield due to the attack of this pest.

MATERIALS AND METHODS

Laboratory studies on biology of diamond back moth, *P. xylostella* Linn. were undertaken in the insectary of the Department of

Agricultural Entomology, College of Agriculture, Dapoli at room temperature and relative humidity during *Rabi* season of 2005. The initial culture of the pest was obtained by collecting the infested cabbage leaves. The larval stages of the pest were reared in the laboratory in 41 cm high and 30 cm diameter cylindrical glass jars. The tops of which were covered with muslin cloth, secured firmly with rubber bands. The adults obtained from this rearing were used for maintaining mass culture of the pest. Thus, the mass culture of the pest was maintained in the laboratory and the various aspects of biology such as pre-oviposition period, oviposition period, post-oviposition period, fecundity, larval instars, prepupal period, pupal period and adult longevity were studied by using this culture.

RESULTS AND DISCUSSION

The pre-oviposition, oviposition, post-oviposition period and fecundity were found 2 to 4, 6 to 7, 5-7 days and 152-221, respectively (Table 1). The present findings were in confirmity with those of Kandaria *et al.* (1994) who reported that the pre-oviposition and oviposition periods lasted for 0.7 to 3.5 days and 2.4 to 21.4 days, respectively. The present investigation also confirmed those by Sharma *et al.* (1999) who reported that the pre-oviposition and oviposition periods and fecundity were 3.17 ± 0.199 , 6.42 ± 0.142 days and 72-

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Table 1 : Pre-oviposition, oviposition and post-oviposition periods and fecundity of *P. xylostella*

Female No.	Pre-oviposition period (days)	Oviposition period (days)	Post-oviposition period (days)	Fecundity
1.	3	6	7	179
2.	2	7	5	159
3.	2	7	5	172
4.	2	6	6	210
5.	4	6	7	192
6.	3	6	5	204
7.	3	6	6	159
8.	2	7	6	221
9.	4	6	5	182
10.	4	6	7	152
Mean	2.9	6.3	5.9	183
Range	2 to 4	6 to 7	5 to 7	152 to 221

241, respectively.

Life cycle:

The data recorded on the periods required for the completion of different stages of the pest and total period required for the completion of life cycle are given in Table 2. Results revealed that an egg, larval, pre-pupal, pupal and adult stages varied from 3 to 4 days (mean : 3.23 days), 7 to 11 days (mean : 8.5 days), 1 to 2 days (mean : 1.10 days), 3 to 5 days (mean : 4.10 days) and 5 to 16 days (mean : 10.5 days), respectively. The larva completed its development in 8.5 days by passing through four instars, the duration of which lasted for 2.5, 2.2, 1.5 and 2.3 days, respectively. The life cycle from egg to adult varied from

Table 2 : Life cycle of *P. xylostella*

Stage	Duration in days		
	Minimum	Maximum	Mean
Egg	3	4	3.23
Larval instars			
First instar	2	3	2.50
Second instar	2	3	2.20
Third instar	1	2	1.50
Fourth instar	2	3	2.30
Total larval development	7	11	8.50
Prepupa	1	2	1.10
Pupa	3	5	4.10
Adult	5	16	10.5
Life cycle period	14	22	16.93
Generation period	19	38	27.43

14 to 22 days with an average of 16.93 days. The period required for completion of a generation varied from 19 to 38 days with an average of 27.43 days. The present findings were more or less similar to those of Vaghasia (1989) who reported that the total life cycle from egg to adult stage lasted for 33.58 ± 2.65 , 32.41 ± 2.16 and 32.67 ± 2.64 days for male and 35.46 ± 2.91 , 34.05 ± 2.32 and 34.61 ± 2.65 days for female, respectively on cabbage, cauliflower and mustard crops. The present findings also confirmed those of Nirmala Devi and Desh Raj (1995) and Sharma *et al.* (1999) who reported that the total life cycle from egg to adult took 22 to 28 days and 16.5 to 38 days, respectively.

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REFERENCES

- Abraham, E.V. and Padmanaban, M.D.** (1968). Bionomics and control of diamond back moth, *Plutella xylostella* Curtis. *Indian J. agric. Sci.*, **38**(3): 513-519.
- Harcourt, D.G.** (1957). Biology, life history, behaviour and host relationships of diamond back moth, *Plutella maculipennis* Curt. in Eastern Ontario. *Canadian Entomol.*, **89**: 554-564.
- Kandaria, J.L., Lal, A. and Singh, L.** (1994). Biology of diamond back moth, *Plutella xylostella* Linn. on cauliflower. *J. Insect Sci.*, **7**: 76-80.
- Krishnakumar, N.K., Srinivasan, K., Suman, C.L. and Ramchander, P.R.** (1986). Optimum control strategy of cabbage pests from a chemical control trial. *Prog. Hort.*, **18**: 104-110.
- Nirmala Devi and Desh, Raj** (1995). Biology and parasitization of diamond back moth, *Plutella xylostella* Linn. infesting cauliflower in mid-hill region of Himachal Pradesh (India). *J. Ent. Res.*, **19**(1): 83-86.
- Saravaiya, S. and Patel, M.** (2005). DBM (Diamond Back Moth) : the most notorious pest of cauliflower and its management strategies. *Agrobios Newsletter*, **3**(9): 23-24.
- Sharma, S.K., Nirmala Devi and Desh Raj** (1999). Bionomics and parasitization of diamond back moth, *Plutella xylostella* Linn. (Lepidoptera : Plutellidae). *J. Ent. Res.*, **23**(4): 309-314.
- Vaghasia, J.M.** (1989). Comparative bionomics of diamond back moth, *Plutella xylostella* Linn. on different host plants and its chemical control. M.Sc. (Ag.) Thesis G.A.U., Sardar Krushinagar, Anand, Gujarat, India.
