

Population dynamics of diamond backmoth, *Plutella xylostella* (Linnaeus) on cabbage

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ABSTRACT

Studies on population dynamics of diamond backmoth, *Plutella xylostella* (Linnaeus) on cabbage revealed that the pest population of *Plutella xylostella* (Linnaeus) appeared from third week December which gradually increased and attained a peak of 8.9 larvae per plant during fourth week January. It indicated that the pest was more active during the month of January. Later on, the pest population declined gradually towards the maturity of the crop. Among the different weather parameters, evening relative humidity exhibited highly significant negative correlation ($r=-0.6852$) with *P. xylostella*. Whereas, remaining all the weather parameters showed non significant correlation with *P. xylostella*.

Key words : Cabbage, *P. xylostella* and population dynamics

INTRODUCTION

Cabbage is a high yielding and remunerative *Rabi* vegetable crop. Total cultivated area of cabbage in Gujarat is about 19,046 hectares with the total production of 3, 29,236 MT with an average productivity of 17,286 kg per hectare (Anonymous, 2006). This crop is attacked by 375 species of insect pests (Oatman and Planter, 1969). Among the insect pests of cabbage, *P. xylostella* is the most destructive pest of cruciferous plants through out the world (Talekar and Shelton, 1993). Different control measures, especially insecticides are applied indiscriminately to control this pest in the country. Excessive use of chemicals not only causes the economical restrain on farmers but also produce the harmful side effects on the environment as well as human being. The best way to over come this situation is to destroy the pest at its initial stage of the life cycle. This is possible if timely prediction of the occurrence of the pest can be made. Hence, an attempt has been made to investigate the sensitivity of the incidence of the diamond backmoth, *P. xylostella* on cabbage to the different meteorological parameters.

MATERIALS AND METHODS

The cabbage cv. GOLDEN ACRE was transplanted at Instructional Farm, Department of Agronomy, College of Agriculture, Junagadh Agricultural University, Junagadh during *Rabi* season of 2008-09 in a block size of 10.0 m x 18.0 m (180 m²) keeping the spacing of 45 cm x 30 cm. The crop area was divided into 10 quadrates (5.0 m x 2.25 m). Five plants were selected randomly and tagged from each quadrate. The absolute larval population of *P.*

xylostella was counted from seedling to maturity stage of crop at weekly interval. The data thus obtained were correlated with various meteorological weather parameters to ascertain the effects of abiotic factors on population fluctuation of the pest on cabbage.

RESULTS AND DISCUSSION

The data (Table 1) revealed that the pest commenced after 3rd week of transplanting *i.e.* 4th week of December with 0.86 larvae per plant, which gradually increased and attained a peak of 8.90 larvae per plant in 4th week of January (7th week after transplanting). The population of *P. xylostella* was ranged from 0.86 to 8.90 larvae per

Table 1 : Population of *P. xylostella* on cabbage in relation with different weather parameters during *Rabi* 2008-09

Sr. No.	Standard week	Date of observation	Week after transplanting	Mean larval population <i>P. xylostella</i> / plant
1.	50	15/12/08	1	0.00
2.	51	22/12/08	2	0.00
3.	52	29/12/08	3	0.86
4.	1	05/01/09	4	1.88
5.	2	12/01/09	5	3.00
6.	3	19/01/09	6	4.80
7.	4	26/01/09	7	8.90
8.	5	02/02/09	8	7.80
9.	6	09/02/09	9	6.20
10.	7	16/02/09	10	6.00
11.	8	23/02/09	11	6.80
12.	9	2/03/09	12	2.65
13.	10	9/03/09	13	0.00

Table 2 : Correlation co-efficient between weather parameter and population of *P. xylostella* infesting cabbage

Temperature (⁰ C)			Relative humidity			Mean bright sunshine hours	Wind velocity Km/hr
Max.	Min.	Mean	Morning	Evening	Mean		
0.5415	0.0446	0.2288	-0.2717	-0.6852	-0.5467	0.3225	-0.1148

* and ** indicate of significance of values at P = 0.05 and 0.01 is (r= ± 0.553) and (r= ± 0.641), respectively,

plant during *Rabi* season. Further, the pest population declined gradually with maturity of the crop and it reached upto 2.65 larvae per plant during 12th week after transplanting (1st week of March). Roy *et al.* (2005) reported that the pest population of *P. xylostella* peaked during end of January on mustard.

The correlation studies of *P. xylostella* with various weather parameters indicated that only evening relative humidity exhibited highly significant negative correlation (r=-0.6852), whereas maximum temperature (r=0.5415), minimum temperature (r= 0.0446), mean temperature (r=0.2288) and mean bright sunshine hours (r=-0.3225) showed non significant positive correlation with population of *P. xylostella* on cabbage during *Rabi* season. While, the pest population showed non significant negative correlation with morning relative humidity (r = -0.2717), mean relative humidity (r = -0.5467) and wind speed (r = - 0.1148). Raju *et al.* (1993) reported the positive correlation of the pest population with minimum temperature, maximum temperature and morning relative humidity (Table 2).

REFERENCES

- Anonymous (2006).** Directorate of Horticulture, Gandhinagar, Gujarat.
- Oatman, E. R. and Planter, G. R. (1969).** An ecological study of insect population on cabbage in southern California. *Hilgardia*, **40** (1): 1– 40.
- Raju, J. V., Sivaprakasam, K. and Marimuthu, T. (1993).** Influence of weather factors on the incidences of pests and diseases on cabbage. *Madras agric. J.*, **80** (6): 301 – 306.
- Roy, M., Konar, A., Roy, P. S. and Paul, S. (2005).** Aptitude of rapeseed and mustard genotypes to diamondback moth, *Plutella xylostella* (L.). *Environ. & Ecol.*, **23** (3): 705 – 706.
- Talekar, N.S. and Shelton, A.M. (1993).** Biology, ecology and management of the diamondback moth. *Annu. Rev. Ento.*, **38**: 275 - 301.

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