Seasonal incidence of Diamond back moth in Broccoli (*Brassica oleracea* var. *italica*)

1. ABSTRACT

Field experiment was conducted at entomology research field, IANS, Deen Dayal Upadhyaya Gorakhpur University, Gorakhpur during *Rabi*, 2022, for studying the seasonal incidence of Diamond back moth in broccoli. First appearance of DBM in broccoli field was started in 49th SMW, the pest population reached at peak in 2nd SMW. The correlation studies showed that maximum temperature, minimum temperature is significantly negatively correlated to pest population whereas morning relative humidity showed negative non-significant correlation with the pest population, rainfall had non-significant and evening relative humidity had positively significant effect on the pest population.

Comment [mm1]: Add background, problems, aims, methods, result, conclusions

Keywords: *Broccoli; Pests; DBM; seasonal incidence; correlation and weather parameters.*

2. INTRODUCTION

The broccoli belongs to the "Cole Crop Group" of Brassica oleracea species and is planted in the cool seasons for its green blooming head. It is closely related to cabbage, cauliflower, kale, and mustard. It usually has a green colour and is grouped in a tree-like form on branches that emerge from a large, delicious stalk. Broccoli is one of the most widely consumed frozen vegetables and a high-quality vegetable for fresh consumption. It is a crop that is very nutrient-dense and contains significant amounts of vitamins A and C as well as minerals K, P, Ca, and Fe. Additionally, it includes thiamine, riboflavin, and niacin (McMurray 1999).

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After China, India produces the most broccoli, with the US coming in third. In many other nations, like Spain, Mexico, Italy, France, the United States, etc., it is also consumed as a vegetable. The Mediterranean region is the origin of broccoli. A cultivar of wild cabbage is broccoli. Wild cabbage was first domesticated thousands of years ago throughout the northern and western coasts of the Mediterranean (Schery, 1972; Heywood, 1978).

According to Bhoopathi and Pathak (2012), more than 25 insect pest species have a costly impact on broccoli. *Plutella xylostella* L., *Crocidolomia binotalis* Zeller, *Atalia ligens proxima* Klug, *Brevicoryne brassica* L., *Bagrada cruciferarum* Kirkaldy, and *Hellula undalis* Feb. are examples of cabbage webworms and diamond backmoths. Termite (*Microtermes obesi* Holemgren), cutworm (*Agrotis ipsilon* hufnagel), leaf eating weevil (*Tanymecus circumdatus* Wiedemann), cabbage semilooper (*Trichoplusia ni* Hubner), leaf minor (*Chromatomyia horticola* Goureau), whitefly (*Bemisia tabaci* Gennedius), red spider mite (*Tetranychus urticae* Koch), crucifer flea beetle (*Phyllotreta cruciferae* Goeze), thrips (*Frankliniella accidentalis* Pergande), etc. are the major insects of broccoli. The diamondback moth is the bug that causes the most damage to broccoli (Satyagopal *et al.* 2015). Crop output is impacted by the high incidence of DBM. Crop damage from insects includes gnawing on foliage, suckling on juice, spreading disease, and laying eggs.

3. MATERIAL AND METHODS

The field experiment was conducted at entomological research station, IANS, DDUGU to study the seasonal incidence of diamond back moth on broccoli during *Rabi*- 2022. Experiment was laid out in randomized block design (RBD) laid with three replications. Twenty-five-day old broccoli seedlings

were transplanted in the plot of 3x3 m with spacing of 60x45 cm during first week of November. Recommended management practices except insect pests' management practices were employed during the raising of crop. Weekly observation was taken after one week of transplanting till maturity of the crop. DBM larvae, counted from randomly selected five plants per replication. Weather parameters (maximum temperature, minimum temperature, relative humidity morning, relative humidity evening, rainfall) were correlated with the pests population.

4. RESULT AND DISCUSSION

Comment [mm3]: Add more discussion. Please explain all result on tables and figures

First appearance of DBM in broccoli field was started after two weeks of transplanting in 49th SMW in second week of December the pest population reached at peak in 2nd SMW second week of January when the maximum temperature (15.89), minimum temperature (7.57), Relative humidity morning (85.57), Relative humidity evening (67.14), the lowest recorded population of DBM was in the. 49th SMW when maximum temperature (25.73), minimum temperature (11.17), relative humidity morning (83.57), relative humidity evening (45.57) no rainfall was recorded during the course of investigation.

The corelation studies showed that maximum temperature (-0.81), minimum temperature (-0.825) is significantly negatively correlated to pest population whereas morning relative humidity (-0.224) showed negative non- significant correlation with the pest population, rainfall (0.135) had non-significant and eventing humidity (0.825) had positively significant effect on the pest population.

Present work of investigation is partially in line with previous worker Neha (2021) reported that maximum and minimum temperature were significantly negatively correlated with the larval population and negatively non-significant correlation with the relative humidity. However, they reported negative nonsignificant correlation with relative humidity morning. Sharma et al. (2017), Aishwarya et al., (2018) reported that the maximum and minimum temperature showed significant negative correlation with larval population of diamond back moth whereas non-significant correlation with relative humidity.

Table1. The incidence of diamond back moth in relation with abiotic factor on broccoli, During the cropping period (*Rabi*-2022-23)

S.N.	SMW	Temperature (°C)		Relative humidity (%)		Rainfall (mm)	DBM
		Max Temp.	Min Temp.	Morn.	Even.		
1	46	27.86	13.47	84.86	35.00	0.00	0.00
2	47	29.33	12.39	83.43	38.86	0.00	0.00
3	48	27.39	11.91	88.14	40.00	0.00	0.00
4	49	25.73	11.17	83.57	45.57	0.00	0.27
5	50	24.50	10.34	83.29	52.14	0.00	1.47
6	51	23.84	11.43	87.14	49.00	0.02	1.53
7	52	20.11	9.04	82.43	53.00	0.00	1.93
8	1	12.44	9.14	83.86	74.29	0.00	2.27
9	2	15.89	7.57	85.57	67.14	0.00	2.47

10	3	21.80	7.36	83.71	46.14	0.00	1.80
11	4	23.96	12.70	85.14	54.86	0.00	1.07
12	5	22.91	11.97	86.14	55.00	0.00	0.87

Table 2. Correlation of DBM population with weather parameters.

Weather parameters	Correlation (r)
Maximum Temperature	-0.890
Minimum Temperature	-0.825
Relative humidity Morning	-0.224
Relative humidity evening	0.825
Rainfall	0.135

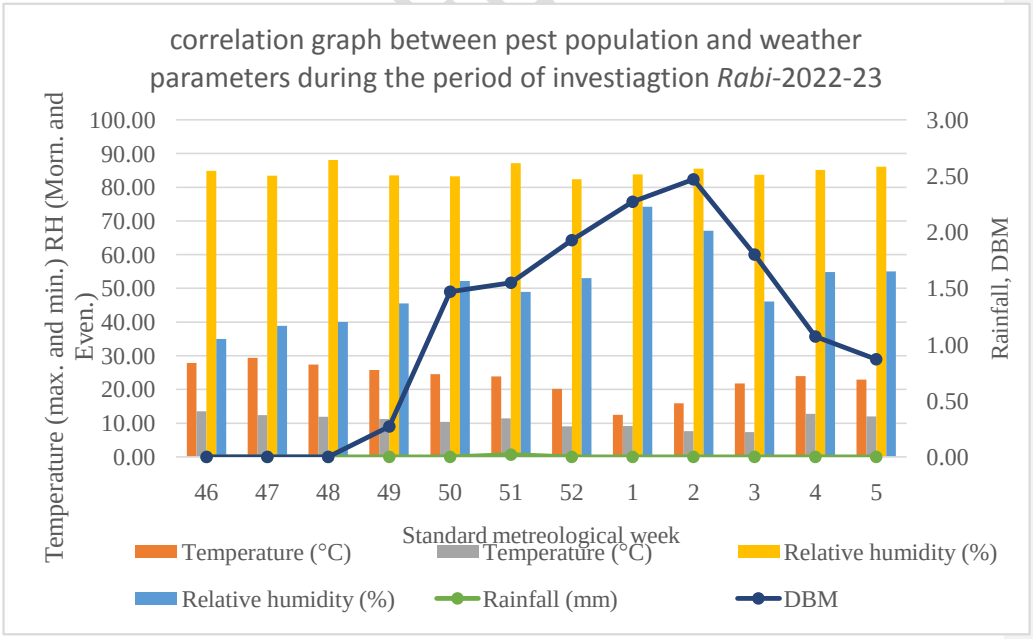

Fig.1 Correlation of DBM with weather parameters during the period of investigation *Rabi*-2022-23

5. CONCLUSION

The initialof DBM in broccoli field was started after two weeks of transplanting in 49th SMW in second week of December the pest population reached at peak in 2nd SMW second week of January.The correlation studies showed that maximum temperature (-0.81), minimum temperature (-0.825) is significantly negatively correlated to pest population whereas morning relative humidity (-0.224) showed negative non- significant correlation with the pest population, rainfall (0.135) had non-significant and eventing humidity (0.825) had positively significant effect on the pest population.

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