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To screen the popular hybrids of cabbage under field conditions against *Plutella xylostella* L.

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Abstract
To undertake the present study the field experiment was conducted at research farm of entomology section at college of agriculture, Badnapur during *Rabi* season of 2023-2024. Under present investigation the reaction of eight varieties of cabbage were recorded against *Plutella xylostella* L. pest. The experiment was conducted in three replications under natural condition without application of Insecticide and weedicide. The reaction was recorded from 15 days after sowing to till harvesting, none of the varieties found immune to *Plutella xylostella* L. attack however the present study revealed that the inception of *Plutella xylostella* observed during standard meteorological weeks and the population *Plutella xylostella* L. larvae ranged between 2.00 to 3.33larvae/plant. The lowest population of *Plutella xylostella* was recorded on Saint (2.00 larvae/plant) followed BC-79 (2.50 larvae/plant), Doller (2.70 larvae/plant), and referred as tolerant Varieties. Moderately infested entries were Atulya (2.83 larvae/plant) followed by Varun (3.00 larvae/plant). Green rock (3.17 larvae/plant) The maximum population observed varieties were, Elite (3.27larvae/plant), Videshi (3.33larvae/plant)

Keywords: Cabbage, *Plutella xylostella* L. screening

Introduction
The majority of people on the planet are turning vegetarian, and this is especially true in India. Vegetables are vital to agriculture because they can give people access to food, nourishment, and financial security. Vegetable demand is therefore always growing. In the horticultural sector, vegetables are a major crop, accounting for 11.2 million hectares of land (Anonymous, 2021) [1] and yielding 204.6 million tons of product overall, with an average productivity of 18.2 tonnes ha-1. Actually, with about 59% of all horticultural production, vegetables are the main product. India is still the world's top producer of vegetables, with only China (11.4%) producing more than all other nations combined. In India, the vast majority of people follow a vegetarian diet, and vegetables form an important part of their regular diet. India eats 62.79 kg of vegetables per person annually, while Korea, China, and Japan consume 115.92 kg, 114.89 kg, and 105.2 kg of vegetables per person, respectively.
India is one of the largest producers of cabbage with production 9.72 mt of cabbage are grown on 0.398 million hectares. With an output of 2.341 mt, or 24.38% of India's total, West Bengal is the biggest producer of cabbage. Orissa (1.130 mt) and Gujarat (0.796 mt) came next. With an average production of 0.178 mt and a share of 1.86%, Maharashtra comes in at number thirteen (PIB, 1st Adv. Estimate 2021-22). In Maharashtra, the districts of Chhatrapati Sambhajinagar, Akola, Sindhudurg, Nashik, and Pune are the main locations for the cultivation of cabbage. Insect pests that attack the crop at different stages are a key barrier to expanding the output of crucifers. The Cruciferae family includes the cabbage (*Brassica oleracea* var. *capitata*), which is grown for its edible head. A major crop that is grown in over 90 countries worldwide in temperate to tropical climates, it is one of the most important crops (Singh *et al.*, 2010) [6].
The word "cabbage" is derived from the French word "Cobache," which refers to a single, enormous terminal bud consisting of numerous thick leaves that cling to the majority of the short, unbranched stem in a tightly overlapping manner. Cabbage (*Brassica oleracea* var. *capitata*) belonging to family Cruciferae is important Vegetable crop among all vegetables. As it is good source of glucosinolate's, which protect against cancer disease (Dias, 2012) [2] So it is grown on vast area in India.

The Cabbage is attacked by different insect pest major insect among them are Diamondback moth (*Plutella xylostella* L.), Cabbage Aphids (*Brevicoryon brassicae*), Tobacco leaf eating caterpillar (*Spodoptera litura*), Cabbage head borer (*Hellula undalis*), Leaf eating caterpillar (*Helicoverpa armigera*), Flea beetle (*Phyllotreta crucifera*), Painted bug (*Bagrada hilaris*). (Kumar *et al.*, 2021). Among all this pest Diamondback moth have national importance as it causes 50-80% annual loss in marketable yield. (Gautam *et al.*, 2020).

Materials and Methods

The investigation on screening of the popular hybrids of cabbage under field conditions against *Plutella xylostella* L. were carried out during winter 2023. In which cabbage was planted in RBD design in three replications and eight treatments in which two lines of 3.15 m were planted in row-to-row distance and 45 x 45 cm plant to plant distance planted at College of Agriculture, Badnapur during October *Rabi* 2023. Using cabbage varieties Doller, BC-79, Green Rock Super, Varun, Atulya, Elite-103, Saint, Videshi were grown using following practices. The seedings were grown and raised at college nursery in September 2023 and transplanted during October 2023.

Methods of observations

Five plants will be selected and tagged randomly from each hybrid to record the observations on Diamondback moth. The number of larvae/pupae will be recorded from whole plant since from transplanting at weekly interval up to harvest. Percent damage (no. of holes) by diamondback moth larvae will also be recorded and grading of marketable heads and non-marketable heads will be made following the scales recommended by Dreyer *et al.*, (1987) [3] as below. The data generated will be transformed and subjected to appropriate statistical analysis suggested by Gomez and Gomez (1984) [5].

Table 1: Dreyer scale used to record damage score on cabbage varieties

Score	Description
1.	No damage or few isolated small holes in the outer or lower leaves
2.	Many holes but damage limited to outer or lower leaves
3.	Considerable damage of the outer or lower leaves slight damage on cabbage head, head leaf marketable with minor removal of outer
4.	Outer or lower leaves completely destroyed moderate attack of head marketable after considerable removal of outer head
5.	Severe attack on the head (head unmarketable)

Results and Discussion

Under present investigation the reaction of 8 varieties of cabbage were recorded against major insect pest *Plutella xylostella* L. The experiment was conducted in three replications under natural condition without application of Insecticide and weedicide. The reaction was recorded from 15 days after sowing to till harvesting. The different Eight cabbage varieties were screened for major insect pests the results obtained are discussed herewith. The data dispensed in table revealed that the entries Saint (Ch) and BC-79(Ch) were exhibited tolerant reaction to *Plutella xylostella* throughout the season i.e. 46st to 51th SMW followed by Doller and Atulya, Varun was also registered tolerant reaction toward *Plutella xylostella* during six SMW. Whereases Elite was the most infested varieties during all six SMW (46th to 51th) and a secondly Videshi was identified as a more affected entry with *Plutella xylostella* population. The ascending order of susceptibility *against Plutella xylostella* L. infestation was Saint> Bc-79>Doller>Atulya>Varun>Green Rock>Elite>Videshi.

Table 2: Mean number of *Plutella xylostella* larvae per plant observed on different cabbage varieties across standard meteorological weeks (SMW 46-51).

Sr. No.	Varieties	Av. *Plutella xylostella* larvae/plant						
		46 SMW	47 SMW	48 SMW	49 SMW	50 SMW	51 SMW	Mean
1.	Doller	2.70 (1.78)	2.33 (1.68)	3.33 (1.96)	1.67 (1.47)	1.33 (1.35)	0.67 (1.08)	2.03 (1.56)
2.	BC-79	2.50 (1.73)	2.83 (1.83)	3.17 (1.91)	1.33 (1.35)	1.00 (1.22)	0.33 (0.91)	1.86 (1.49)
3.	Green rock	3.17 (1.91)	3.83 (2.08)	4.17 (2.16)	2.50 (1.73)	2.17 (1.63)	2.00 (1.58)	2.97 (1.84)
4.	Varun	3.00 (1.87)	3.67 (2.04)	4.00 (2.12)	2.33 (1.68)	1.83 (1.53)	1.83 (1.53)	2.77 (1.79)
5.	Atulya	2.83 (1.83)	3.33 (1.96)	3.67 (2.04)	2.00 (1.58)	1.50 (1.41)	1.33 (1.35)	2.44 (1.69)
6.	Elite	3.27 (1.94)	4.00 (2.12)	4.33 (2.20)	2.67 (1.78)	2.33 (1.68)	2.17 (1.63)	3.12 (1.80)
7.	Saint	2.00 (1.50)	1.67 (1.47)	2.00 (1.58)	1.00 (1.22)	0.67 (1.08)	0.17 (0.82)	1.89 (1.27)
8.	Videshi	3.33 (1.96)	4.17 (2.16)	4.50 (2.24)	2.83 (1.83)	2.50 (1.73)	2.33 (1.68)	3.27 (1.93)
SE(m)		0.10	0.10	0.12	0.09	0.07	0.09	0.10
CD at 5%		0.33	0.30	0.39	0.30	0.24	0.29	0.31
Cv %		9.64	9.23	11.10	10.89	9.52	12.88	10.54

Conclusion

The lowest pest population of insect pest was observed on Varieties Saint (1.50 larvae per plant) and BC-79 (1.50 larvae per plant) which showed at par with each other. While, the highest larval population observed on Varieties Videshi and Elite (4.50 larvae per plant). In respect of *Plutella xylostella* L. The significantly highest head yield was recorded on Varieties Saint, BC-79(2187 kg/ha) and followed by Doller (2166 kg/ha) and lowest head yield was recorded on Varieties, Elite, Videshi (492 kg/ha).

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