



Research Article

SCREENING OF MUSTARD GENOTYPES AGAINST MUSTARD SAWFLY (*Athelia proxima*) AND LEAF WEBBER (*Crocidolomia binotalis*)

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Abstract: The field experiment was conducted to evaluate different genotypes of mustard against mustard sawfly (*Athelia proxima*) and Leaf webber (*Crocidolomia binotalis*) during Rabi season of 2015-2016 at College of Agriculture, Nagpur (Dr. PDKV, Akola). The Trial was laid out in randomized block design with fifteen treatments and three replications. The results were found to be statistically significant. The significantly lowest larval population of mustard sawfly was recorded in Geeta (2.32 per plant) and it was at par with Seeta, Laxmi, Varuna, Ashirvad and GM-2. Whereas maximum population of mustard sawfly was recorded on the genotype ACN-9 (11.32 per plant) which was at par with Sej-2, Pusa bold, Urvashi, Bio-902, Pusabhar, Kranti and Rohini, respectively. The mean larval population of leaf webber (at 30, 60 and 90 DAS) in all genotypes of mustard was observed in the range of 2.73 to 11.60 per plant. However, the minimum population of leaf webber larvae was recorded in ACN-9 (2.73 per plant) and found statistically at par with GM-2, Seeta, Kranti, Bio 902, Ashirvad, Rohini and Vardan, Whereas, maximum leaf webber larvae were recorded on the genotype Varuna (11.60 per plant) which was at par with Pusa bold, Laxmi, Geeta, Sej-2 and Urvashi.

Keywords: Mustard, Genotypes, *Athelia proxima*, *Crocidolomia binotalis*

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Introduction

Mustard commonly referred as Mohari (Marathi), Rai or Sarson is an important edible oilseeds crop. It contributes more than 13 per cent to the global production of edible oil. Seed contains 33 to 40 per cent oil and 15-17% protein [1]. The crop commodity provides vegetable oils, which not only form an essential part of human diet but also serve as an important raw material for industrial products like soap, paints, lubricants [2]. Amongst the cruciferous crops the rapeseed and mustard are grown on 81% of the total area under oil seed crops [3].

Among the various constraints in the productivity of mustard, the infestation of insect pest is one of the most important limiting factors for its low yield. The mustard crop is highly vulnerable to attack of insect pests by more than 43 insect species. Out of which, mustard aphid *Lipaphis erysimi* (Katenbach); mustard sawfly, *Athelia proxima* (Klug); Painted bug, *Bagrada hilaris* (Cruciferarum); pea leaf miner, *Chromatomyia horticola* (Goureau); Bihar hairy caterpillar, *Spilarctia obliqua* (Walker) and Leaf Webber (*Crocidolomia binotalis*) (Zeller) are a serious pest causing yield loss of 13.2 to 81.3 per cent.

The present studies were initiated to avoid chemical control and to select resistant varieties to record the relative abundance of pest. Use of resistant varieties to the insect pests is an important strategy of integrated pest management [4-10]. The objective of the present investigation is to evaluate the different genotypes of mustard against pest of mustard.

Material and Methods

The study was conducted at experimental field of department of botany, Shankar Nagar, College of Agriculture, Nagpur, Dr PDKV, and Akola during Rabi season 2015-2016 to screening different genotypes of mustard for resistance or susceptibility against major insect pest of mustard. The Trial was laid out in randomized block design with fifteen treatments and three replications. The mustard genotype was planted at 45 X 10 cm spacing.

The Net plot size was kept 33.75 X 12 m. All recommended packages and agronomic practices were followed to raise the crop [11-19].

Method of recording observations

The larval population of mustard sawfly was recorded on five randomly selected plants from each genotype per plot and counted total larval population per plant for computation of mean larval population per plot. The number of leaf Webber larvae per plant was recorded on five randomly selected plants from each genotype per plot and counted the total larval population per plant for computation. The data recorded on population of insect pest in different genotypes were subjected to statistical analysis after appropriate transformation [20].

Result and Discussion

Screening of different genotypes against Mustard sawfly, *Athelia proxima*.

The data of larval population of mustard sawfly are recorded and presented in [Table-1]. The result was found to be statistically significant. The larval population per plant on 30th DAS was observed in range from 1.02 to 8.40 per plant. Significantly lowest population of larvae was recorded on the genotype Geeta (1.02 per plant), which was at par with Laxmi and Seeta. Significantly highest larval population of mustard sawfly was recorded on the genotypes Vardan (8.40 per plant), which was at par with Sej-2, ACN-9, Pusa bold, Rohini, Bio-902 and Pusabhar.

The average number of larvae of mustard sawfly at 60 days after sowing ranged from 2.80 to 15.90 per plant. The lowest number of larval populations was recorded on Geeta (2.80 per plant) which was at par with Seeta (3.80), Varuna (4.70), Vardan (5.00), GM-2 (5.60), Ashirvad (6.80) and Laxmi (7.10) larvae per plant. Likewise, significantly higher population was recorded on ACN-9 (15.90 per plant).

Table-1 Screening of different genotypes against mustard sawfly, *Athelia proxima*

Tr. No.	Name of Genotype	No. of larvae/plant			Average
		30 DAS	60 DAS	90 DAS	
1	ACN-9	6.40 (2.52)	15.90 (3.98)	11.67 (3.41)	11.32 (3.36)
2	Pusa bold	6.00 (2.44)	11.90 (3.44)	10.37 (3.22)	9.42 (3.06)
3	Varuna	3.90 (1.97)	4.70 (2.16)	4.27 (2.06)	4.29 (2.07)
4	Rohini	5.80 (2.40)	11.30 (3.36)	5.30 (2.30)	7.46 (2.73)
5	Sej-2	8.00 (2.82)	14.10 (3.75)	10.20 (3.19)	10.29 (3.20)
6	Seeta	1.40 (1.18)	3.80 (1.94)	4.32 (2.07)	3.17 (1.78)
7	Laxmi	1.55 (1.24)	7.10 (2.66)	3.23 (1.79)	3.96 (1.98)
8	Ashirvad	4.00 (2.00)	6.80 (2.60)	2.32 (1.52)	4.37 (2.09)
9	Kranti	2.20 (1.48)	10.70 (3.27)	10.60 (3.25)	7.83 (2.79)
10	Vardan	8.40 (2.89)	5.00 (2.23)	3.50 (1.87)	5.56 (2.35)
11	Pusabahal	4.90 (2.21)	8.90 (2.98)	10.00 (3.16)	7.93 (2.81)
12	Geeta	1.02 (1.00)	2.80 (1.67)	3.14 (1.77)	2.32 (1.52)
13	Gm-2	3.10 (1.76)	5.60 (2.36)	5.85 (2.41)	4.85 (2.20)
14	Urvashi	2.56 (1.6)	13.40 (3.66)	10.32 (3.21)	8.76 (2.95)
15	Bio-902	5.10 (2.25)	10.80 (3.28)	10.10 (3.17)	8.67 (2.94)
SE (m) ±		0.27	0.41	0.37	0.26
CD at 5%		0.80	1.25	1.12	0.78

The larval population of *Athelia proxima* at 90th days after sowing ranged from 2.32 to 11.67 per plant. The significantly lowest population was observed on Ashirvad (2.32 per plant) and it was at par with Geeta, Laxmi and Vardan, which exhibited 3.14 to 3.50 larvae per plant. Maximum population was recorded on the genotype ACN-9 (11.67 per plant) which was at par with Kranti (10.60) larvae per plant. The average larval population of mustard sawfly ranged between 2.32 to 11.32 per plant, the lowest average larval population of mustard sawfly was recorded on Geeta (2.32 per plant) which was at par with Seeta (3.17), Laxmi (3.96), Varuna (4.29), Ashirvad (4.37) and GM-2 (4.85) Whereas, maximum larval population of mustard sawfly was recorded on the genotype ACN-9 (11.32 per plant) which was at par with Sej-2 (10.29), Pusa bold (9.42), Urvashi (8.76), Bio-902 (8.67), Kranti (7.83) and Rohini (7.46).

Screening of different genotypes against Leaf webber, *Crocidolomia binotalis*

The data of larval population of leaf webber are recorded and presented in [Table-2]. The result revealed that the average number of leaf webber larvae at 30th days after sowing ranged from 0.70 to 8.30 per plant. Significantly lower population of leaf webber was recorded on the genotype ACN-9 (0.70 larvae / plant) and it was at par with GM-2 (1.00 larvae per plant) and Bio-902 (1.50 larvae per plant). The maximum larval population of leaf webber was recorded on the genotype Geeta (8.30 larvae per plant). However, the remaining genotypes occupied intermediate positions.

The average number of leaf webber larvae at 60th days after sowing ranged from 2.10 to 15.99 per plant. Significantly lowest population of leaf webber larvae was recorded on the Bio-902 (2.10 per plant) and it was at par with Gm-2, Kranti, Seeta, Vardan and ACN- 9. Significantly highest larvae were recorded on Varuna and found at par with Pusabahal, Laxmi, Rohini, Urvashi, Geeta, Pusa bold, Ashirwad and Sej-2.

The average number of leaf webber larvae on the 90th days after sowing ranged from 0.50 to 16.10 larvae per plant.

Table-2 Screening of different genotypes against leaf webber (*Crocidolomia binotalis*)

Tr. No.	Name of Genotype	No. of larvae / plant			Average
		30 DAS	60 DAS	90 DAS	
1	ACN-9	0.70 (0.83)	6.89 (2.62)	0.60 (0.77)	2.73 (1.65)
2	Pusa bold	2.80 (1.67)	13.10 (3.10)	16.10 (4.01)	10.67 (3.26)
3	Varuna	6.40 (2.52)	15.99 (3.99)	12.49 (3.53)	11.60 (3.40)
4	Rohini	6.10 (2.46)	8.50 (3.31)	2.90 (1.70)	5.83 (2.41)
5	Sej-2	5.90 (2.42)	9.49 (3.08)	14.62 (3.82)	10.00 (3.16)
6	Seeta	4.90 (2.21)	5.10 (2.25)	0.50 (0.70)	3.50 (1.87)
7	Laxmi	6.10 (2.46)	12.40 (3.52)	13.50 (3.67)	10.69 (3.26)
8	Ashirvad	4.00 (2.00)	9.49 (3.08)	2.49 (1.57)	5.33 (2.30)
9	Kranti	3.85 (1.96)	4.50 (2.12)	4.14 (2.03)	4.16 (2.03)
10	Vardan	2.90 (1.70)	5.59 (2.36)	8.99 (2.99)	5.83 (2.41)
11	Pusabahal	7.00 (2.64)	15.08 (3.88)	9.49 (3.08)	10.52 (3.24)
12	Geeta	8.30 (2.88)	10.12 (3.18)	11.06 (3.32)	10.50 (3.24)
13	Gm-2	1.00 (1.00)	2.49 (1.57)	6.00 (2.44)	3.16 (1.77)
14	Urvashi	6.00 (2.44)	10.50 (3.24)	10.99 (3.31)	9.16 (3.02)
15	Bio-902	1.50 (1.22)	2.10 (1.44)	9.39 (3.06)	4.31 (2.07)
SE (m) ±		0.28	0.46	0.56	0.29
CD at 5%		0.81	1.35	1.62	0.93

The significantly lowest leaf webber larvae was recorded on Seeta (0.50 per plant) which was at par with ACN-9, Ashirvad, Rohini and Kranti with larval population 0.60, 2.49, 2.90, 4.14 per plant.

Maximum leaf webber larvae were recorded on the genotype Pusa bold (16.10 per plant) which was at par with Sej-2, Laxmi, Varuna, Geeta, Urvashi and Bio-902 larval population ranged from 14.62 to 9.39 per plant respectively. The remaining genotypes occupied intermediate positions.

The average number of leaf webber larvae ranged from 2.73 to 11.60 per plant. Significantly lowest leaf webber larvae recorded on ACN-9 (2.73 per plant) which was at par with GM-2, Kranti, Seeta, Bio-902, Ashirvad, Rohini and Vardan having larval population in the range of 3.16 to 5.83 per plant respectively. Further Maximum leaf webber larvae were recorded on the genotype Varuna (11.60 per plant) which was at par with Pusa bold, Laxmi, Geeta, Pusabahal, Sej-2 and Urvashi having larval populations from 10.67 to 9.16 per plant respectively.

Pawar et al. (2009) [21] investigated the relative resistance of twenty genotypes of mustard against leaf webber, *Crocidolomia binotalis* and revealed that the genotype SKM-0301 was least susceptible to the pest (0.99 larva per five plants) followed by the genotypes Varuna, SKM-0513, and SKM-0518 with 1.02, 1.05, and 1.14 leaf Webber larvae per three plants, respectively.

Conclusion

The present study is concluded that, the significantly lowest larval population of mustard sawfly was recorded on genotypes Geeta (2.32 per plant) and it was at par with Seeta, Laxmi, Varuna, Ashirvad and Gm-2 which recorded larval population in the range of (3.17 to 4.85), respectively. However, the minimum population of leaf webber larvae was recorded on ACN-9 (2.73 per plant) and found statistically at par with Gm-2, Seeta, Kranti, Bio 902, Ashirvad, Rohini and Vardan.

Application of research: Study the different genotypes of mustard against pest of mustard. The present studies are initiated to avoid chemical control and to select resistant varieties to record the relative abundance of pest.

Research Category: Entomology

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Study area / Sample Collection: College of Agriculture, Nagpur, 440001

Cultivar / Variety / Breed name: Mustard - *Brassica juncea* (Zern.), ACN-9, Pusa bold, Varuna, Rohini, Sej-2, Seeta, Laxmi, Ashirvad, Kranti, Vardan, Pusabahar, Geeta, GM-2, Urvashi, and Bio-902

Conflict of Interest: None declared

Ethical approval: This article does not contain any studies with human participants or animals performed by any of the authors.

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