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Varietal Screening against Major insect Pests of Mustard (*Brassica juncea* L.)

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ABSTRACT: The experiment was conducted at research farm of Department of Agricultural Entomology, College of Agriculture, Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani, Maharashtra, India. during *Rabi* season 2020-21. Ten different varieties of mustard were screened for resistance/susceptibility against major insect pests of mustard under field conditions results unfolded that variety Giriraj could be an auspicious source of resistant against major insect pests of mustard, however, in specific, PM-26, PM-28 and Giriraj had better control over leaf webber *Crocidolomia binotalis* (Zeller), mustard sawfly *Athalia lugens proxima* (Klug) and aphids *Liphapis erysimi* (Kalt.), respectively. NRCHB-101, RH-74944 and ACN-09 were deemed to be susceptible cultivars against major insect pests of mustard. Mean population of mustard aphid, leaf webber and saw fly on different varieties were in the range of 6.32 to 14.08 aphids / 5 cm terminal shoot, 0.18 to 1.23 larvae / plant and 0.18 to 1.08 larvae / plant, accordingly.

Keywords: Major insect pests, *Liphapis erysimi, Crocidolomia binotalis, Athalia lugens proxima*, mustard, varieties, screening, mean population.

INTRODUCTION

Indian mustard, *Brassica juncea* Linn. commonly referred as sarson or rai (Hindi), mohari (Marathi) and Sasive (Kannada) is one among the important edible oilseed crops grown within the country. Mustard is an integral part of the human diet with oil content ranging from 32-40% and protein content ranging from 15-17% (Dash and Konarand 2019).

From germination to harvest, the mustard crop is plagued by insect pests and diseases. According to Sachan and Purwar (2007), the mustard aphid, *Lipaphis erysimi*; mustard sawfly, *Athalia proxima*; painted bug; *Bagrada cruciferum*; leaf minor, *Chromatomyia herticola*; and Bihar hairy caterpillar, *Spilarctia oblique* are among the insect species that assault mustard.

The mustard aphid is the most damaging insect, causing 24.5 to 68.00 percent yield loss (Parmar *et al*., 2007; Kular and Kumar 2011; Sharma *et al*., 2019; Kumar, 2017) and 3.38 to 8.14 percent oil loss (Sharma *et al*., 2019) with Patel *et al*. (2004) reporting a 97.40 percent yield loss. *Crocidolomia binonalis* is a serious pest that reduces yields by 13.2 to 81.3 percent (Pawar *et al*., 2009). The losses caused by the mustard sawfly have been measured to 15.50 percent (Divakaran and Babu 2016).

Several techniques have been modified to handle insect pests on mustard crop; among these pest control methods, chemical control has been widely used for insect pest control. Pesticides have certain drawbacks, such as adverse effects on natural enemies and pollution of the environment; as a result, the safest option for pest control should be the use of resistant varieties. Plants that are immune to insect pests have the distinct benefit of providing the crop with built-in insect control. Plant resistance is caused by a variety of factors like non-preference, antibiosis, and insect tolerance, which are all biochemical in nature (Kher and Rataul 1991). Varietal tolerance has been prioritised in the Integrated Pest Management program among the various control methods. In view of the above, the present investigation was designed.

MATERIALS AND METHODS

A field study was conducted at research farm of Department of Agricultural Entomology, College of Agriculture, Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani, Maharashtra during *Rabi* season 2020-21 to screen different varieties for resistance / susceptibility against major insect pests of mustard. Ten different varieties were procured from AICRP on mustard, Nagpur, Maharashtra and sown in Randomized Block Design with three replications and the spacing of 45 × 20 cm was followed. Subjected varieties were NRCHB-101, BIO-902, ACN-09, RH-74944, PM-21, Kranti, TAM-108-1, PM-26, PM-28, Giriraj. Sowing was done on 51st MW on a uniform medium black cotton soil with medium fertility and decent drainage.

While recording the observations, mustard aphid counted by number of aphids / 5 cm terminal shoot, whereas leaf webber and saw flies by number of larvae per plant. Five plants were randomly selected and tagged from each plot for recording at weekly interval started from the initiation of preferred pests' infestation.

RESULTS AND DISCUSSION

A. Screening of promising cultivars against mustard aphid Lipaphis erysimi

Data on mean population presented in (Table. 1 and fig.1) of insect pests revealed that average number of aphid infestation was ranged from 6.32 to 14.08 aphids / 5 cm terminal shoot. The minimum number of aphids was recorded on variety Giriraj (6.15 aphids / 5 cm terminal shoot), followed by PM-28 and TAM-108-1 whereas maximum number of aphids was reported in NRCHB-101 (14.19 aphids / 5 cm terminal shoot) followed by RH-74944 and BIO-902.

Ghadage (2012) reported that the genotype SKM-0518 was the least vulnerable, and it was on par with genotypes Bio-902 and Kranti, respectively. Singh (2013) found that T-6342 variety was found to be immune to *Lipaphis erysimi*, while RH-819, PusaBahar, Bio-902, Sanjucta Asech were found to be extremely susceptible to mustard aphid. The present studies are more or less in line with the above research workers. Sharma *et al.*, (2019), Indicated that three varieties viz., RGN-145, RGN-303 and RGN-73 were found less susceptible, whereas, three varieties NRCBH-101, Vasundhra and Laxmi were found highly susceptible to aphids and pinted bug.

B. Screening of promising cultivars against leaf webber Crocidolomia binotalis

The data in (Table 1 and Fig. 2) mean number of leaf webber was ranged from 0.18 to 1.23 larvae / plant. The minimum number of larvae was recorded in PM-26 variety (0.18 larvae/plant), which was on par with Giriraj, Kranti, BIO-902 and PM-21. The maximum number of leaf webber was observed in NRCHB-101 (1.23 larvae / plant), which was significantly higher than all other entries.

Kakade (2007) reported that the varieties Varuna and Bio-902 were found to be the least susceptible, while GM-1 and GM-2 were found to be the most susceptible. Pawar *et al*. (2009) revealed that SKM-0301 was appeared to be the least susceptible to the pest (0.99 larva/five plants), followed by genotypes SKM-0445, SKM-0513, SKM-0401, SKM-0533, and SKM-0518, which had 1.02, 1.05, 1.32, 1.41, and 1.52 leaf webber larvae/five plants, accordingly. Sarkate (2014) documented that the minimum number of leaf webber larvae was observed on the variety Jaikisan (BIO-902) during leaf webber screening, indicating resistance to leaf webber, followed by MAUL-2, Pusa bold, RH-8812. The current investigation results are on par with the earlier research workers.

Table 1: Mean population of major insect pests of mustard on 10 different varieties during *Rabi* season 2020-21.

Varieties	*Lipaphis erysimi* (No. of Aphids/5 cm terminal shoot)	*Crocidolomia binotalis* (No. of larvae/plant)	*Athalia lugens proxima* (No. of larvae/plant)
NRCHB-101	14.19 (3.83*)	1.23 (1.32)	0.87 (1.17)
BIO-902	11.04 (3.40)	0.30 (0.89)	0.28 (0.89)
ACN-09	10.58 (3.33)	0.46 (0.98)	0.55 (1.02)
RH-74944	13.85 (3.79)	0.66 (1.07)	1.08 (1.26)
PM-21	9.76 (3.20)	0.34 (0.92)	0.92 (1.19)
Kranti	10.30 (3.29)	0.22 (0.85)	0.37 (0.93)
TAM-108-1	8.92 (3.07)	0.43 (0.97)	0.70 (1.10)
PM-26	9.23 (3.12)	0.18 (0.82)	0.37 (0.93)
PM-28	8.21 (2.95)	0.40 (0.95)	0.18 (0.83)
Giriraj	6.15 (2.58)	0.21 (0.84)	0.22 (0.85)
SE ±	0.09	0.06	0.06
CD at 5%	0.27	0.18	0.16
CV	8.79	16.46	11.04

*Figures in parenthesis are square root transformed values

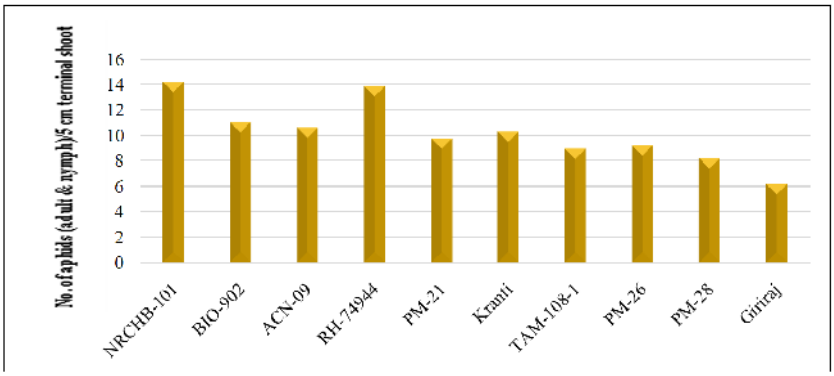

Fig. 1. Mean population of aphid *Lipaphis erysimi* on different mustard varieties.

C. Screening of promising cultivars against mustard sawfly Athalia lugens proxima

In case of saw fly, the average number of data (Table 1 and Fig. 2) was ranged from 0.18 to 1.08 larvae / plant. The lowest number of sawflies was noticed in PM-28 (0.18 larvae / plant), which was on par with Giriraj and BIO-902, whereas the highest number of sawflies was observed in RH-74944 (1.08 larvae / plant), which was on par with PM-21, followed by NRCHB-101. Remaining all varieties were moderately resistant to the mustard sawfly.

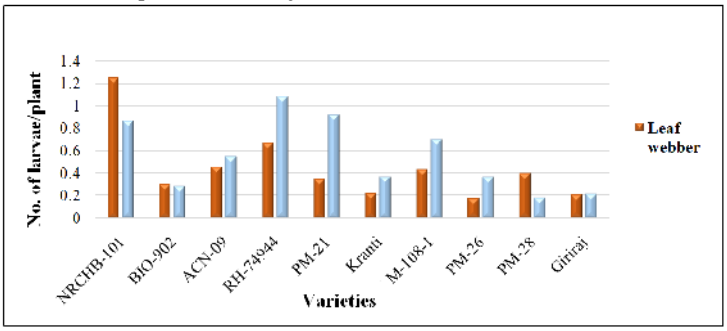

Fig. 2. Mean population of leaf webber *Crocidolomia binotalis* and sawfly *Athalia lugens proxima* on different mustard varieties.

Ansari and Naqshbandi (2004) reported that varieties like KM-9798, PusaJaikisan (BIO-902), Gaurav, Godawari, B5-2 were moderately susceptible to sawfly infestation, Kranti, Pusa Agrani, Lakshmi, Naveen, T-50, Pusa Bold, Rohini, 1001, Swarna, Kesari were susceptible, and highly susceptible varieties were KM-2, 4001, RH-30, R5-30, Kundan, PBM-16, Chapka-111, 9611, Nathsona. The present study results are in accordance with the above research scientists' findings.

Mustard aphids

CONCLUSIONS

The outcomes of the current study exhibited that having Giriraj variety in mustard cultivation could be a greater advantage against major insect pests' infestation among the subjected cultivars. When it comes to the individual pest suppressing, varieties Giriraj, PM-26 and PM-28 displayed relatively high resistance against aphid, leaf webber and saw flies, respectively. NRCHB-101, RH-74944 and ACN-09 were appeared to be vulnerable to pest attacks. All other remaining varieties fell in intermediate positions. Employing varietal resistance in crop production aids in higher production of mustard along with reducing the use of hazardous chemical pesticides and intern environmentally friendly.

FUTURE SCOPE

1 Studies may provide information on varietal screening against major insect pests of mustard (*brassica juncea* L.)

2. More studies should be conducted at different region to find out the suitable variety or genotype of mustard in Marathwada region.

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Conflict of Interest. None.

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