Research Article

Identification of Okra Genotypes for Yellow Vein Mosaic Virus and Fruit Borer

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Abstract

The present investigation was carried out to identify the okra genotypes for yellow vein mosaic virus and fruit borer. Different genotypes of okra planted in plot size of 5.40 m^2 with the spacing of 60 X 30 cm. Observations were recorded on incidence of yellow vein mosaic virus (YVMV) on plot basis at 30, 45, 60, 75 and 90 days after seed sowing and pod borer infestation was recorded at different picking. Results reveled that genotypes namely, PB-520, PB-236, PB-57 and PB-266 were free from YVMV at 30, 45 and 60 days after seed sowing and genotypes, PB-236, Punjab-7, Vivek-1 and PB-174 were free from fruit borer at first picking. On the basis of overall performance, it may be concluded that there were significant variations observed for YVMV incidence and fruit borer infestation on okra genotypes.

Keywords: okra, YVMV, genotypes, picking

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Introduction

Okra (*Abelmoschus esculentus* L. Moench) commonly known as bhindi belongs to Family Malvaceae. It is a native of tropical and subtropical Africa is a popular vegetable grown throughout the country in different agro-climatic zones. Because of High nutritive value and prolonged shelf-life, okra has captured a prominent position among the export oriented vegetable crops and it is being exported in Middle Eastern countries, Western Europe and U.S.A. On the nutritional poin of view, consumption of 100 g of fresh okra fruit provides 20, 15 and 50 per cent of the daily requirement of calcium, iron and ascorbic acid, respectively [3, 8]. Its tender green fruits are used as a vegetable and are generally marketed in fresh state, but sometime in canned or dehydrated forms.

Okra is chiefly attacked by numbers of viruses, fungi, bacteria, phytoplasma, nematodes and insect pests [1, 5]. The occurrence of okra yellow vein mosaic virus and fruit borer causes yield losses to 50-80 per cent depending upon severity [4]. Crop pests reduced the yield up to 20- 30 per cent and in case of severe infestation loss may be up to 80-90 per cent [1]. Infection rate may reaches up to 100 per cent but in field yield loss ranges between 50% and 94% depending on the stage of crop growth [6]. If infection occurs in first 20 days after germination, the growth of plants become stop, few leaves and fruits are formed and yield loss reaches up to 94% [7]. As plant's age increases the rate of yield loss decreases due to pathogen [1]. Frequent pickings, high operational cost and residues of pesticides entering food chain are the limiting factors for chemical control of this disease. Therefore, it is important to search for resistant hybrids or varieties. Varietal resistance to YVMV has been reported by several researchers in okra genotypes. So efforts have been made to identify different okra cultivars against yellow vein mosaic virus and fruit borer under field condition.

Material and Methods

The present investigation was conducted at Vegetable Research Centre of Govind Ballabh Pant University of Agriculture and Technology, Pantnagar, Uttarakhand, during the rainy season of the year, 2008. Geographically this research center is situated at latitude of 29.50 N, longitude of 79.30 E and at an altitude of 243.84 meters above the mean sea level. The climate of Pantnagar is humid sub-tropical with maximum temperature ranging from 35.10^0 C to 45.40^0 C in summer and minimum temperature ranging from 4.8 to 8.3^0 C in winters. The experimental material comprised of 12 high yielding genotypes/cultivars of okra obtained from various research institute and seed companies of India. A brief description of genotypes/cultivars comprising their names and sources presented in **Table 1**. The experiment consisted of three replications under randomized block design (RBD) with plot size 5.40 m^2. Sowing was done in spacing of 60 X 30 cm with two seeds per hill on 04 July, 2008. After germination excess plants were thinned out to maintain one plant at desired distance. Agronomic practices were carried out during crop growth.

Observations were recorded on incidence of yellow vein mosaic virus (YVMV) on plot basis at 30, 45, 60, 75 and 90 days after seed sowing and pod borer infestation was recorded at different picking.

Table 1 List of Genotype/cultivars and their sources

Sl. No	Name Of Variety	Source
1	PB-27-1	Pantnagar
2	PB 31-1	Pantnagar
3	PB-174	Pantnagar
4	PB-195	Pantnagar
5	PB-236	Pantnagar
6	PB-266	Pantnagar
7	PB-520	Pantnagar
8	PB-2018	Pantnagar
9	Punjab-7	P.A.U, Ludhiana
10	PB-57 (Parbhani Kranti)	P.K.V.U, Parbhani, M.S
11	Pusa Sawani (C)	IARI, New Delhi
12.	Vivek (C)	V.P.K.A.S. Almora

Result and Discussion

Yellow vein mosaic virus and fruit borer are the two most serious problems in okra cultivation which cause great losses in yield as well as in quality of pods and hence listing of genotypes for resistance to these biotic stresses assumes special significance.

Incidence of Yellow Vein Mosaic Virus disease (%)

There was significant variation among the genotypes for occurrence of percent yellow vein mosaic infected plants. Significant variation among the genotypes for Yellow Vein Mosaic Virus disease was observed at 30, 45, 60, 75 and 90 days after seed sowing, the mean values of yellow vein mosaic virus of different genotypes presented in **Figure 1**.

The 11 genotypes namely Parbhani Kranti, PB-266, PB-236, PB 31-1, PB-27-1, PB-2018, Pusa Sawani, PB-520, Vivek-1, PB-174 and PB-195 were observed to be free from YVMV till 30 days after seed sowing. One entry i.e. Punjab-7 (10.71%) showed significantly higher incidence of YVMV at 30 days after seed sowing accepts other genotypes.

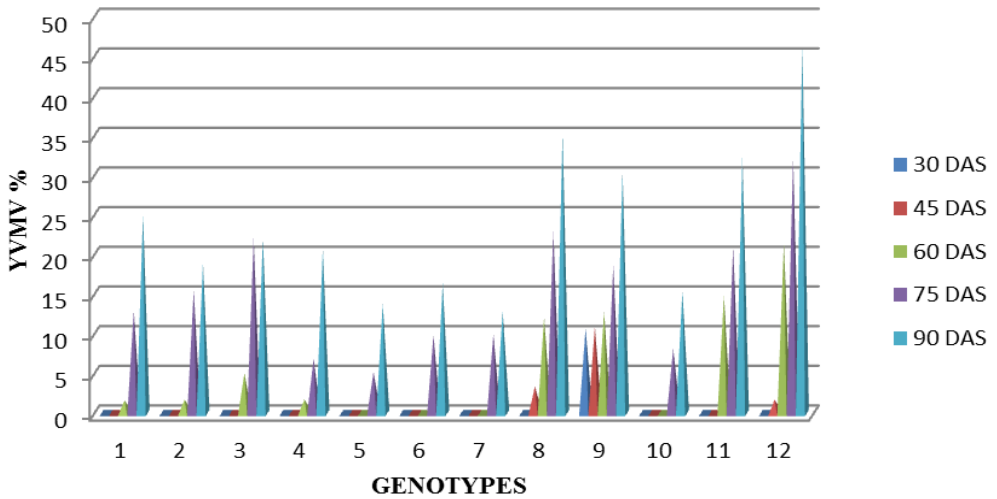

Figure 1 Incidence of yellow vein mosaic virus at 30, 45, 60, 75 and 90 days after seed sowing of okra genotypes

At 45 days after seed sowing all the genotypes were found free from YVMV accept Punjab-7 (10.91%), PB-2018 (3.38%) and Vivek-1 (1.69%). The highest being shown by Punjab-7, at the same moment PB-2018 and Vivek-1 showed significantly lesser incidence of YVMV. Except these three, other nine cultivars may be treated as resistant genotypes against YVMV up to 45 days after sowing.

At 60 days after seed sowing, the genotypes PB-266, PB-236, PB-520 and PB-57 were found free from YVMV. The lowest incidence of virus was recorded in PB-27-1 (1.61%), PB-31-1 (1.72%), PB-195 (1.72%), PB-174 (5.08%) and Pusa Sawani (14.83%). The genotypes PB-27-1, PB-31-1 and PB-195 were significantly superior to Pusa Sawani and rest of the other genotypes. The highest incidence of YVMV was observed in Vivek-1 (21.42%), while Punjab-7 and PB-2018 showed less incidence of virus than Vivek-1, these two genotypes showed 12.86 % and 12.08 % incidence, respectively. The genotypes namely, PB-266, PB-236, PB-520 and PB-57 may be treated as resistant genotypes against YVMV up to 60 days after seed sowing.

At 75 days after seed sowing, the minimum incidence of YVMV was recorded in PB-236 (5.17%) followed by PB-195 (6.89%), PB-57 (8.15%), PB-266 (9.83%), PB-520 (10.0%), PB-27-1 (12.9%), and PB-31-1 (15.51%). All these entries were significantly better and superior as compare to Pusa Sawani (20.96%). The highest incidence of YVMV was recorded in Vivek-1 (32.14%). Rest of the genotypes namely Punjab-7, PB-174 and PB-2018 were statistically similar among each other and also with check Pusa Sawani. The less infection of YVMV in these genotypes may be because of genetic constituent of the genotypes with environmental as well as due to the less population of white fly which is responsible to cause the infection, these findings are in accordance with the result of [9, 11].

At 90 days after seed sowing the incidence of YVMV ranged 12.9 to 46.42 %. The genotypes PB-520 (12.9%), PB-236 (13.79%) and PB-57 (15.38%) were statistically similar to each other and showed lesser incidence of YVMV than the check Pusa Sawani (32.25%). The genotypes Vivek-1 (46.42%) and PB-2018 (35.41%) showed significantly more infestation of YVMV than the check Pusa Sawani. Rest of the genotypes showed intermediate results for this character. Variation for yellow vein mosaic viruses among the okra genotypes were reported by previous researchers' viz., [2, 10] and similar findings were also observed by [11] during rainy season.

Incidence of fruit borer (%)

Considerable variations for percent fruit borer infestation revealed inherent genetic differences among the 12 genotypes. Significant variation was observed among the genotypes for pod borer infestation at the 1st, 7th and 15th picking stage (**Figure 2**).

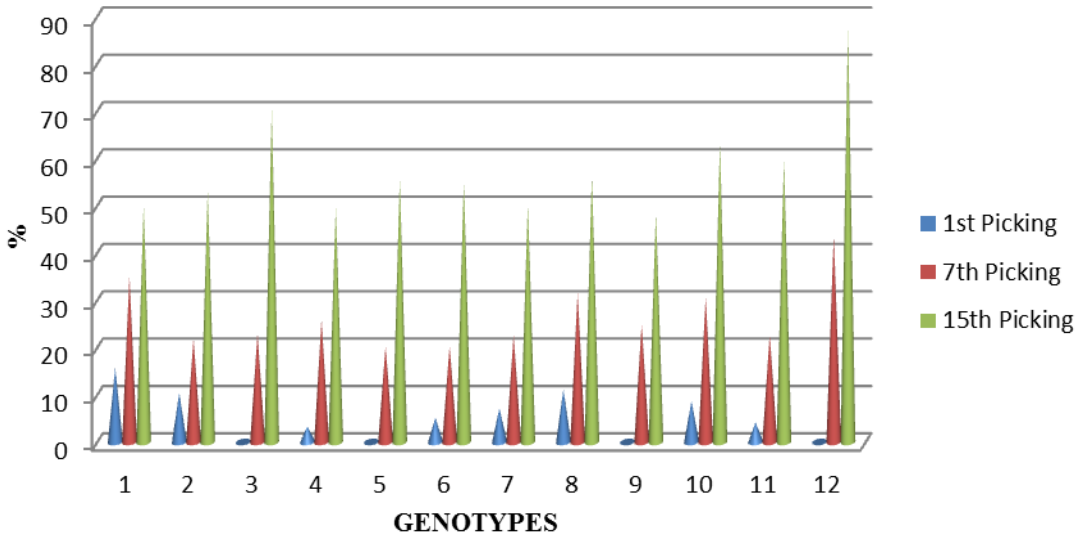

Figure 2 Incidence of fruit borer at 1st, 7th and 15th picking after seed sowing of okra genotypes

In 1st picking borer infection varied from 0.00 to 15.74. At 1st picking the genotypes PB-236, Punjab-7, PB-174 and Vivek-1 were found free from incidence of fruit borer. The highest borer infection was observed in PB-27-1. The genotypes PB-195 followed by Pusa Sawani, PB-266, and PB-520 showed less (< 8.0 %) infection of fruit borer. The genotypes PB-236, Punjab-7, Vivek-1 and PB-174 were observed to be completely free from fruit borer attack at first picking, may be because of high temperature with low humidity in the environment which may reduce the population of the insect.

At 7th picking, the genotypes namely PB-266, PB-236 and PB-31-1 were showed minimum infection of the fruit borer as compare to Pusa Sawani. It may be due to the interaction of genotypes with the environment. At 7th picking the incidence of fruit borer infection ranged from 20.25 to 43.67. It was highest in Vivek-1 (43.67) and lowest in PB-236 and PB-266, both the entries showed equal % of fruit borer infection i.e. 20.25. The genotypes namely, PB-266,

PB-236 and PB-31-1 were showed minimum incidence of fruit borer and significantly superior than Pusa Sawani. Rest of the genotypes showed intermediate performance better than Vivek-1. At 7th picking, the genotypes namely, PB-266, PB-236 and PB-31-1 were showed minimum infection of the fruit borer as compare to Pusa Sawani. It may be due to the interaction of genotypes with the environment.

At 15th picking the infection of fruit borer was ranged from 48.46 to 87.18. The minimum infection was observed in Punjab-7, PB-195 and PB-27-1 which was significantly lesser as compare to Pusa Sawani (59.77 %). The maximum fruit borer infection was noted in Vivek-1 (87.18). The higher infection of fruit borer may be due to the high temperature and high humidity which provide better and favorable conditions for the growth of the insect population. Therefore, it may cause the more infection of fruit borer in the genotypes which showed susceptibility to the fruit borer.

Conclusion

The genotypes PB-520, PB-236, PB-57 and PB-266 were free from YVMV at 30, 45 and 60 days after seed sowing. The genotypes PB-236, Punjab-7, Vivek-1 and PB-174 were free from fruit borer at first picking. On the basis of overall performance of okra genotypes, PB-236 were found free from YVMV infection upto 60 days after sowing and also comperatively less infected by fruit borer. So this genotype can be used for field sowing under tarai areas of uttarakhand.

Reference

[1] Ali S., M. Khan, A. H. S. Rasheed and Y. Iftikhar, "Correlation of Environmental Conditions with Okra Yellow Vein Mosaic Virus and Bemisia tabaci Population Density," International Journal of Agriculture and Biology, Vol. 7, No. 1, 2005, pp. 142-144.

[2] Arora, S.K.; Dhanju, K.C. and Sharma, B.R. 1992. Resistant in okra genotypes to Yellow Vein Mosaic Virus. Plant disease research. 7.2:221-225

[3] Hamon S (1988). Evolutionary organization of its kind Abelmoschus (okra). Co-adaptation and evolution of two species grown in West Africa, A. esculentus and A. caillei. Paris, Orstom, DTP Works and Documents. 46:191.

[4] Phad, G.N., Suryawanshi, A.B., Agale, D.A. and Chavan, S.R. Performance of New Hybrids of Okra [Abelmoschus esculentus (L.) Moench] For Yield, Yellow Vein Mosaic Virus and Fruit Borer. International Journal of Plant Protection. 2009. (2)1 : 140-141.

[5] Prakasha T., P. MS and B. VI, "Survey for Bhendi Yellow Vein Mosaic Disease in Parts of Karnataka," Karnataka Journal of Agricultural Sciences, Vol. 23, 2010, pp. 658-659.

[6] Sastry K. and S. Singh, "Effect of Yellow Vein Mosaic Virus Infection on Growth and Yield of Okra Crop (India)," Indian Phytopathology, Vol. 27, No. 3, 1975, pp. 294-297.

[7] Sastry K. S. M. and S. J. Singh, "Effect of Yellow Vein Mosaic Virus Infection on Growth and Yield of Okra Crop," Indian Phytopathology, Vol. 27, No. 3, 1974, pp. 294-297.

[8] Schippers R (2002). African indigenous vegetables. An overview of the cultivated species. Natural Resources Institute/ACP-EU, Technical Centre for Agricultural and Rural Cooperation, CD ROM 214, Chatham, UK.

[9] Singh, D.K. and Jain, S.K. 2006. Evaluation of okra genotypes during rainy season. Annual Res. Report of State Varietals Trail of Okra. Submitted to V.P.K.A.S, Almora. 2.

[10] Singh, S.P. and Singh, H.N. 1978. Study of genetic variability and inheritance of certain characters in okra. Haryana Journal of Horticulture Research. 7.1: 66-70.

[11] Tiwari, B. 2001. Performance of okra [Abelmoschus esculentus (L).Moench] hybrid in Tarai conditions of U.P during rainy season. M.Sc Ag. Thesis submitted to G.B.P.U.A & T, Pantnagar, P: 77.

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