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Screening of okra (*Abelmoschus Esculentus* (L) Moench) genotypes for resistance to yellow vein mosaic under agro-climatic conditions of Jammu

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ABSTRACT

The study was undertaken to screen okra genotypes for resistance against yellow vein mosaic virus (YVMV) at research farm of SKUAST Jammu. The experiment was laid out in RBD with three replications by accommodating 60 genotypes at a spacing of 60 x 45 cm in 3 x 3 meter size plot. The observations were recorded from 10 selected plants from each genotype in each replication. The results reveal that based on severity index, 20 genotypes were found to be highly resistant, one resistant and ten were moderately resistant to YVMV. On the other hand, 19 genotypes were highly susceptible and nine were susceptible to YVMV under agro-climatic conditions of Jammu.

1. Introduction

Vegetables contribute essential nutrients, vitamins as well as phytochemicals and hence considered as 'protective food'. The low fruit and vegetable intake is estimated to cause about 31 % of ischaemic heart disease and 11 % of stroke worldwide (WHO, 2002) necessitating the need to make more vegetable available at household level (Panwar *et al.,* 2019). Among them, okra is one of the important vegetable grown round the year. Okra (*Abelmoschus esculentus* (L) Moench) is a herbaceous annual plant belongs to the family Malvaceae. It is most popular crop grown throughout the world for its tender pods as vegetable and other industrial and medicinal uses. It has wide climatic adaptability and hence grown during summer and rainy season and available throughout the year. It is a good source of vitamins A and B, minerals, protein and also a good source of iodine. Its production can tailored according the market demand and hence okra fetches better prices for the farmers. Okra green fruits are the excellent sources of carbohydrates, proteins, fats, vitamins and minerals

India rank first in the world with a production of 6.18 mt and amongst fresh vegetables, it has major share in revenue generation after onion export. However, it production is constrained by a number of biotic and abiotic stress and losses due to biotic factor is quite substantial (Jellis, 2009). Among the biotic stress, Yellow vein mosaic virus (YVMV) is the most serious disease transmitted through whilte fly (*Bemesia tabaci*). The disease in India was first reported by Kulkarni (1924) in Bombay. The disease is characterized by homogenous interwoven network of yellow vein enclosing islands of green tissues within leaf. This disease not only reduces the yield but quality of the produce also. The yield loss range from 50-94 % depending upon the stage of crop growth as if the plant is infected at 20, 35 and 50 days after germination, the losses up to the extent of 98, 83 and 49 per cent, respectively (Ali *et al.,* 2005). A number of pesticides are being applied to control vector of this disease and hence pesticide residues entering into food chain necessitating the need to explore YVMV resistant varieties. Therefore, adoption of disease resistant variety as a control measure of YVMV is more economical and environmental safer than that of chemical control. In this context, the present investigation was conducted to screen YVMV resistant genotypes in agro-climatic conditions of Jammu, J&K.

2. Material and Methods

The present experiment was carried out at the experimental farm of Department of Vegetable Sciences and Floriculture, SKUAST, Jammu, during *kharif* season of 2018-20. Genotypes (60 Nos.) collected from different part of the

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country were arranged in Randomized Block Design with three replications with a plot size of 3 x 3 meter size. The genotypes were sown during 3rd week of June every year at a distance of 60 x 45 cm. All recommended agronomic practices except plant protection were followed for healthy crop. Pusa Sawani was sown along the borders of entire plots to provide adequate virus sources to the vector. The observations were recorded on ten randomly selected plants of each genotype in each replication. The number of plants showing visual symptoms like vein and veinlet chlorosis, chlorotic spots appearing regularly in the interveinal region was counted. The Per cent disease incidence (PDI) was calculated by the formula :

$$PDI = \frac{\text{No. of infected plants}}{\text{Total no. of observed plants}} \times 100$$

The disease on each genotype was put in rating scale by Ali *et al.* (2005) and presented in Table 1.

Table 1. Disease rating scale for YVMV.

Severity grade	Per cent incidence	Disease reaction
0	0 to 1 %	Highly Resistant
1	1.1 to 5 %	Resistant
2	5.1 to 10 %	Moderately Resistant
3	10.1 to 25 %	Moderately Susceptible
4	25.1 to 50 %	Susceptible
5	50.1 % and above	Highly Susceptible

3. Results and Discussions

The per cent infection and reaction of the genotypes were assessed based on disease incidence under agro-climatic conditions of Jammu. The data of both the years was pooled, analysed and presented in Table 2. It was observed that among the 60 genotypes, 20 had recorded 1.1 – 5.0 per cent severity and were categorised into highly resistant group. However, only one genotype i.e. DOV-88 had sown resistant in reaction to the disease incidence with a severity ranges of 1.1 – 5.0 per cent. Ten genotypes registered 5.1 – 10.0 per cent disease incidence and were grouped into moderately resistant genotypes. The results provide an idea for identification of stable source of YVMV resistance which can be utilized for development of disease resistant cultivars. Kolakar *et al.* (2018) evaluated 16 genotypes of okra and reported that none of the genotypes was completely immune to YVMV incidence. There are also reports that indicated that the resistance to YVMV was not stable and frequent breakdown of resistance have been reported in developed varieties. Hence resistance source can be effectively used any crop improvement programme (Noopur, *et al.,* 2019)

It was also observed that out of 60 genotypes under study, none of the genotypes were highly susceptible to YVMV. While 19 genotypes showed 10.1 – 25 per cent severity and were grouped under moderately susceptible. The severity level of 25.1 – 50 % was recorded with 9 genotypes *viz*, VRO-5, BCO-1, DOV-91-4, Pusa Sawani, EMS-81, D-1-87-5, Vindivaphy, Pusa A-4 and Varsha Uphar consequently, these genotypes must be avoided because the yield would be very low at this level of severity. Tiwari *et al.* (2012) studied YVMV in okra and reported that Pusa Sawani had shown disease severity between 50 to 60 per cent (in 0-100 point scale). Kumar and Raju (2017) and Vijaya (2004) reported that VRO-6 and IVR-11 were resistant and Pusa Sawani was highly susceptible to YVMV

Table 2. Disease reactions against YVMV in okra

Highly Resistant	Resistant	Moderately Resistant	Moderately Susceptible	Susceptible	Highly Susceptible
Superlady	DOV-88	DOV-37	Arka Anamika	VRO-5	NIL
Bhindi Green		Kashi Vardan	Arka Lush Green	BCO-1	
IC-685583		Kashi Kranti	Punjab Suhavini	DOV-91-4	
Hissar Naveen		Kashi Pragati	Azad Bhini-2	Pusa Sawani	
Arka Abhay		DOV-92	DOV-17	EMS-81	
Hissar Unnat		Lam-1	DO-26	D-1-87-5	
DPO-11		Punjab Padmini	DOV-33	Vindivaphy	
DPO-12		VRO-109	P-20	Pusa-A-4	
Pusa Makhmali		IC-1610753	Azad Bhini-1	Varsha Uphar	
DOV-25		Parbhani Bhindi-1	HRB-55		
Parbhani Kranti			Pusa Bhindi-5		
DOV-40			SB-6		
DOV-41			BO-13		

DOV-43			DOV-44		
DOV-45			HRB-9-2		
VRO-3			JBS-02		
Punjab-8			GS-43		
DOV-86			DOV-42		
Sakataa Bhindi			DOV-77		
Punjab-7					

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