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Screening of okra varieties against yellow vein mosaic disease under natural conditions

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Abstract

In view to check the infectivity of yellow vein mosaic virus on okra plants under natural conditions there were 38 varieties used. From this cultivars sixteen varieties were free from/infected with YVMV disease incidence, but Twelve varieties were found to be resistant (VRO-6, HRB108-2, JNDOL-02-2, ARO-97-16, PB-236, JNDOL-03-1, Arka Anamika, Kashi pragati, JOL-02K-19, HRB-08-4, BO-13, Arka abhay), Eight varieties were moderately resistant (Parbhani kranti, VRO-22, HRB-107-4, Varsha uphar, Okra Local, PB-31-1, OKHYS-14-05, Phule Utkarsha) and only two varieties showed moderate susceptibility namely, Evergreen, Mahabeej-333.

Keywords: Screening, okra, yellow vein mosaic virus

Introduction

Okra (*Abelmoschus esculentus* (L.) Moench), originated from tropical Africa, is an important fruit vegetable grown throughout the tropical and subtropical regions of the world. It is one of important vegetable crops in India and popularly called as *bhendi*. It is widely cultivated as a summer season crop in North India and as a *Kharif* and summer season crop in Maharashtra, Gujarat, Andhra Pradesh, Karnataka and Tamil Nadu. It grows well in the areas where day temperatures remain between 25 to 40°C and that of night over 22°C.

A number of fungi, bacteria, viruses and phytoplasma are known to infect this crop. The total loss of vegetable on this account has been estimated up to 20-30%. This loss may increase up to 80-90% under favorable weather conditions for pathogens & its vectors (Hamer & Thompson, 1957) [1]. Amongst the various constraints in cultivation of okra, viral disease, particularly; yellow vein mosaic is a major one. The disease is reported before 86 years by Kulkarni (1924) [2] in Maharashtra. It had appeared in epidemic form for first the time in Maharashtra in 1950 [12] (Capoor and Varma, 1950) [3]. Subsequently, epidemic outbreak of the disease had been reported from different states where okra was cultivated (Tripathi and Joshi, 1967 and Chelliah *et al.* 1975) [4, 5]. Presently, the disease is occurring in all okra growing states of India some times in endemic and mostly in epidemic form threatening the cultivation of okra. The losses caused are both qualitative and quantitative. The losses ranged from 50 - 90 per cent (Jambhale and Nerkar, 1986 and Nath and Saikia, 1993) [6, 7].

In India, including Maharashtra attempts have been made to manage the disease by killing, immobilizing and repelling the vector whiteflies. The methods used to control the disease includes, use of insecticides (Debnath and Nath, 2003) [8] and use of mulching with polythene sheets (Khan and Mukhopadhyay, 1975 and Ali *et al.* 2001) [9, 10].

During summer 2015, okra crop from the field of Department of Horticulture, Dr. Balasaheb sawant Konkan Krishi Vidyapeeth, Dapoli (M.S.) was found heavily suffered from yellow vein mosaic disease. Also in nearby villages of Dapoli tahsil wherever okra was grown, the crop was found affected with this disease. In order to find out an effective integrated disease management practice, this investigation was under taken.

Materials and Methods

Screening of okra cultivars against yellow vein mosaic virus

Seeds of thirty eight varieties of okra were procured from Vegetable Improvement Scheme, Central Experimental Station, and Wakawali. A screening trial was conducted in summer, 2016 at Department of Agronomy, College of Agriculture Dapoli. Plants were selected from each variety for recording observations on yellow vein mosaic virus incidence.

Per cent yellow vein Mosaic virus incidence was recorded at an interval of 15 days from 45 days after sowing (DAS) till the last harvest.

Screening for resistance

The varieties were assessed for resistance against yellow vein mosaic disease. The varieties were ranked into different grades on the basis of per cent incidence of disease in the following scale (Bhalekar, 2008).

Table 1: Disease resistance

Per cent Disease Incidence	Grades
0.0	Immune/Disease Free (I)
0.0 - 5.0	Resistant (R)
5.1 – 15	Moderately Resistant (MR)
15.1 – 30	Moderately Susceptible (MS)
30.1 – 50	Susceptible (S)
Above 50	Highly Susceptible (HS)

Table 2: List of different genotypes of okra used for screening

Var. No.	Variety	Var. No.	Variety
V1	NOL-303	V20	JNDOL-03-1
V2	OKRAVRES-6	V21	Hariya-351
V3	VRO-6	V22	PB-266
V4	HRB-108-2	V23	OKRAVRES-1
V5	OKRAVRES-5	V24	Evergreen
V6	Parbhani Kranti	V25	Arka Anamika
V7	Vedhe local (Halva)	V26	GO-2
V8	OKHYS-14-04	V27	PB-226
V9	VRO-22	V28	OKRAVRES-2
V10	HRB-107-4	V29	Kashi pragati
V11	Okra local	V30	Mahabeej-333
V12	JNDOL-02-2	V31	JOL-02K-19
V13	Varsha Uphar	V32	HRB-108-4
V14	OKHYK-14-11	V33	BO-13
V15	DSN-1	V34	OKRAVRES-4
V16	PB-31-1	V35	OKHYS-14-02
V17	ARO-97-16	V36	Phule Utkarsh
V18	Bhendi No-10	V37	Arka abhay
V19	PB-236	V38	OKHYS-14-05

Table 3: Screening of okra varieties for yellow vein mosaic disease intensity in summer season

Sr. No.	Varieties	PDI	Reaction
1	NOL-303	0	I
2	OKRAVRES-6	0	I
3	VRO-6	10	R
4	HRB-108-2	10	R
5	OKRAVRES-5	0	I
6	Parbhani Kranti	20	MR
7	Vedhe Local (Halva)	0	I
8	OKHYS-14-04	0	I
9	VRO-22	20	MR
10	HRB-107-4	20	MR
11	Okra Local	20	MR
12	JNDOL-02-2	10	R
13	Varsha uphar	10	MR
14	OKHYK-14-11	0	I
15	DSN-1	0	I
16	PB-31-1	20	MR
17	ARO-97-16	10	R
18	Bhendi No-10	0	I
19	PB-236	10	R
20	JNDOL-03-1	10	R
21	Hariya-351	0	I
22	PB-266	0	I
23	OKRAVRES-1	0	I
24	Evergreen	40	MS
25	Arka Anamika	40	MS
26	GO-2	0	I
27	PB-226	0	I
28	OKRAVRES-2	0	I
29	Kashi Pragati	10	R
30	Mahabeej-333	40	MS
31	JOL-02K-19	10	R
32	HRB-108-4	10	R
33	BO-13	10	R

34	OKRAVRES-4	0	I
35	OKHYS-14-02	0	I
36	Phule Utkarsha	20	MR
37	Arka Abhay	10	R
38	OKHYS-14-05	20	MR

Results and Discussion

About 38 okra varieties were screened to study the incidence of YVMV at Department of Agronomy, College of Agriculture, and Dapoli. The incidence of YVMV was recorded at 15 days interval starting from 45 days after sowing (DAS) which revealed the table 3. Out of 38 okra varieties screened for YVMV incidence, 16 varieties were free from disease (NOL-303, OKRAVRES-6, OKRAVRES-5, Vedhe Local (Halva), OKHYS-14-04, OKHYK-14-11, DSN-1, Bhendi No-10, Hariya-351, PB-266, OKRAVRES-1, GO-2, PB-226, OKRAVRES-2, OKRAVRES-4, OKHYS-14-02), 12 varieties were found to be resistant (VRO-6, HRB-108-2, JNDOL-02-2, ARO-97-16, PB-236, JNDOL-03-1, Arka Anamika, Kashi pragati, JOL-02K-19, HRB-08-4, BO-13, Arka abhay), 8 varieties were moderately resistant (Parbhani Kranti, VRO-22, HRB-107-4, Okra Local, Varsha uphar, PB-31-1, OKHYS-14-05, Phule Utkarsha), 2 varieties showed moderate susceptibility (Evergreen and Mahabeej-333) whereas no any variety was found to be Susceptible and Highly Susceptible.

At 45 DAS to 75 DAS no YVMV disease incidences was observed in okra varieties. After 90 DAS, the disease incidence was observed in varieties Evergreen (10%), Arka Anamika (10%) and Mahabeej-333(10%). At 105 DAS, YVMV incidence was noticed in varieties Parbhani Kranti (10%), VRO-22 (10%), HRB-107-4 (10%), Okra local (10%), Varsha uphar (10%), PB-31-1(10%), Evergreen (10%), Mahabeej-333 (10%), Phule Utkarsha (10%), OKHYS-14-05 (10%). However, there was no YVMV incidence in other varieties. Sangar (1997) ^[11] screened 8 varieties of okra for resistance to OYVMV and found that Arka Anamika and Arka Abhey was resistant, Parbhani Kranti and V-6 were moderately resistant to disease. Prabu *et al.*, (2007) ^[12] reported that the varieties Varsha Uphar, Phule Utkarsha and HRB 107- 4 were found moderately resistant to the virus.

At 120 DAS, YVMV incidence increased in all okra varieties except NOL-303, OKRAVRES-6, Vedhe local, OKHYS-107-4, OKHYK-14-11, DSN-1, Bhendi No.10, Hariya-351, pb-266, OKRAVRES-1, GO-2, PB-266, OKRAVRES-2, OKRAVRES-4 and OKHYS-14-02 (zero per cent incidence, respectively) was found completely free from disease. Incidence of YVMV was noticed in VRO-6 (10%), HRB-108-2 (10%), Parbhani Kranti (10%), VRO-22 (10%), HRB-107-4 (10%), Okra local (10%), JNDOL-02-2 (10%), Varsha uphar (10%), PB-31-1 (10%), ARO-97-16 (10%), PB-236 (10%), JNDOL-03-1(10%), Evergreen (20%), Arka Anamika (10%), Kashi Pragati (10%), Mahabeej-333 (20%), JOL-02K-19 (10%), HRB-108-4 (10%), BO-13 (10%), Phule Utkarsha (10%), Arka Abhay (10%), OKHYS-14-05 (10%). Tiwari *et al.* (2012) ^[13] reported that the entry VRO -6 was resistant to okra YVMV.

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