

Screening for disease in incidence of yellow vein mosaic virus in okra [*Abelmoschus esculentum* (L.) Moench]

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ABSTRACT

Fifty five genotypes of okra were screened for yellow vein mosaic virus (YVMV) disease under field conditions. The per cent disease incidence and coefficient of infection ranges from 7.20 to 100.00 and 1.8 to 75.00, respectively. Out of 55 genotypes, five were highly resistant, thirteen were resistant, seventeen were moderately resistant, thirteen were moderately susceptible, five were susceptible and two were highly susceptible based on the coefficient of infection. The yield per plant ranged from 65.85 to 273.63 g/plant. The maximum yield per plant was recorded in Parbhani Kranti (273.63 g) followed by IC 90210 (255.35 g) JNDO-5 (240.25 g), Arka Anamika (238.00g), OLR02 (235.47 g) and IC 90170 (235.40 g).

Key words : Okra, Screening, YVMV incidence.

Yellow Vein Mosaic Virus (YVMV) is a devastating viral disease transmitted through white fly (*Bemisia tabaci*) in okra. The disease affects the quality of fruit and yield adversely. In India, the occurrence of this disease was first reported by Kulkarni (1924) in Bombay province. It has been reported that when plants infected at 20, 35 and 50 days after germination the losses are upto an extent of 98, 83 and 49 per cent, respectively (Shastry and Singh, 1974). Frequent pickings, high operational cost and residues of pesticides entering food chain are the limiting factors for chemical control of this disease. Varietal resistance to YVMV has been reported by several researchers in okra [*Abelmoschus esculentum* (L.) Monech] genotypes. Therefore, in this study efforts have been made to screen 55 genotypes for YVMV in okra.

MATERIALS AND METHODS

Fifty five genotypes of okra were collected from different sources (Table 1) and sown in randomized block design with three replications at spacing of 60 x 30 cm apart in 5 meters rows. Seeds of most susceptible variety, Pusa Sawani were also sown along the borders of entire plots to provide adequate virus source to the vector. Observations on disease severity and intensity were recorded at 30 days interval on ten randomly selected plants of each genotype and the cumulative data were obtained. To assess the resistance of a given strain, symptom severity grades, designated with numerical values of 0 to 4 were given on the basis of visual observations. To quantify the disease severity, calculations were made (Singh and Singh, 2000). The per cent disease incidence (PDI) was calculated by the following formula:

$$\text{PDI} = \frac{\text{Number of diseased plants}}{\text{Total number of plants observed}} \times 100$$

The coefficient of infection (CI) was calculated by multiplying the per cent disease incidence to the response value assigned for each severity grade. Thus, the coefficient values combine the amount of infection and its severity.

RESULTS AND DISCUSSION

The data presented in Table 1 indicate that the yield per plant ranged from 65.85 to 273.63 grams per plant in 55 genotypes of okra (Sharma *et al.*, 1993). The maximum yield was recorded in Parbhani Kranti (273.63g) followed by IC90210 (255.35g), JNDO-5 (240.25g), Arka Anamika (238.00g) and IC90170 and OLR02 (235.47g). The per cent disease incidence ranged from 7.20 to 100.00. The genotypes (IC111479, EC 30-5615 and IC90194) were having high incidence (100%) of YVMV. Further, the genotypes (EC305647, EC 305649, IC 90077 and IC90165) having lesser per cent incidence of YVMV were classified into highly resistant, resistant, moderately resistant and moderately susceptible, respectively. This ruled out the possibility of relationship between the per cent disease incidence and their reaction to YVMV. Hence, the per cent disease incidence coupled with disease severity (response value) *i.e.*, coefficient of infection will be more useful in selecting suitable genotype resistant to YVMV and higher yield. Coefficient of infection ranged from 1.80 to 75.00 % (Dhankar *et al.*, 1996). The minimum coefficient of infection was noticed in EC 305647 (1.80) followed by EC305633 (2.83), EC329424 (3.32), IC90273 (3.50) and IC90269 (3.68).

Table 1 : Disease incidence, yield/plant and reaction of YVMV in okra

Sr. No.	Name / Accession number	Source of collection	Yield/plant (g)	Percent disease incidence	Response value	Coefficient of infection	Reaction
1.	Arka Anamika	IIHR, Bangalore	238.00	26.50	0.5	13.25	MR
2.	Arka Abhay	IIHR, Bangalore	188.00	32.50	0.5	16.25	MR
3.	EC 305625	NBPGR, RRS, Akola	137.25	18.00	0.5	9.00	R
4.	EC305646	NBPGR, RRS, Akola	181.00	12.20	0.5	6.10	R
5.	EC 305615	NBPGR, RRS, Akola	80.35	100.00	0.5	50.00	S
6.	EC 305650	NBPGR, RRS, Akola	146.50	17.50	0.5	8.75	R
7.	EC 305647	NBPGR, RRS, Akola	160.30	7.20	0.25	1.80	HR
8.	EC 305649	NBPGR, RRS, Akola	134.35	9.50	0.50	4.75	R
9.	EC 305633	NBPGR, RRS, Akola	143.35	11.35	0.25	2.83	HR
10.	EC 316046	NBPGR, RRS, Akola	160.65	17.50	0.25	4.37	R
11.	EC 329369	NBPGR, RRS, Akola	135.35	14.50	0.50	7.25	R
12.	EC 329375	NBPGR, RRS, Akola	155.30	27.35	0.25	6.83	R
13.	EC 329370	NBPGR, RRS, Akola	110.00	85.00	0.50	42.50	S
14.	EC 329411	NBPGR, RRS, Akola	145.00	11.30	0.50	5.65	R
15.	EC 329424	NBPGR, RRS, Akola	175.00	13.30	0.25	3.32	HR
16.	IC 111479	NBPGR, RRS, Akola	120.35	100.00	0.25	25.00	MS
17.	IC 90203	NBPGR, RRS, Akola	80.25	35.00	1.00	35.00	MS
18.	IC 111478	NBPGR, RRS, Akola	110.35	29.50	0.75	22.12	MS
19.	IC 90077	NBPGR, RRS, Akola	135.25	18.95	0.50	9.47	MR
20.	IC 90194	NBPGR, RRS, Akola	75.32	100.00	0.75	75.00	HS
21.	IC 90075	NBPGR, RRS, Akola	127.35	23.00	0.50	11.50	MR
22.	IC 90230	NBPGR, RRS, Akola	185.35	26.00	0.50	13.00	MR
23.	IC90044	NBPGR, RRS, Akola	88.35	36.00	0.75	27.00	MS
24.	IC 90176	NBPGR, RRS, Akola	135.50	100.00	0.25	25.00	MS
25.	IC 90273	NBPGR, RRS, Akola	165.35	14.50	0.25	3.50	HR
26.	IC 90178	NBPGR, RRS, Akola	180.17	25.40	0.50	12.70	R
27.	IC 90253	NBPGR, RRS, Akola	90.35	30.30	0.75	22.72	MS
28.	IC 111483	NBPGR, RRS, Akola	165.35	90.50	0.50	45.25	S
29.	IC 90170	NBPGR, RRS, Akola	235.40	25.50	0.50	12.75	MR
30.	IC 90098	NBPGR, RRS, Akola	165.35	34.50	0.75	25.87	MS
31.	IC 90165	NBPGR, RRS, Akola	180.85	26.50	1.00	26.50	MS
32.	IC 90096	NBPGR, RRS, Akola	183.65	26.00	1.00	26.00	MS
33.	IC 90269	NBPGR, RRS, Akola	180.35	14.75	0.25	3.68	HR
34.	IC 90210	NBPGR, RRS, Akola	255.35	24.30	0.50	12.15	MR
35.	IC 90263	NBPGR, RRS, Akola	195.25	17.50	0.25	4.37	R
36.	IC 90049	NBPGR, RRS, Akola	165.35	29.00	0.75	21.75	MS
37.	IC90037	NBPGR, RRS, Akola	85.35	89.00	0.75	66.75	S
38.	IC 128156	NBPGR, RRS, Akola	65.85	100.00	0.75	75.00	HS
39.	IC128146	NBPGR, RRS, Akola	135.4	14.60	0.50	7.30	R
40.	IC117204	NBPGR, RRS, Akola	180.10	18.30	0.50	9.15	R
41.	IC117308	NBPGR, RRS, Akola	125.55	90.00	0.75	67.5	S
42.	IC128071	NBPGR, RRS, Akola	210.35	24.50	0.75	18.37	MR
43.	IC128080	NBPGR, RRS, Akola	165.00	38.00	0.75	28.50	MS
44.	IC117224	NBPGR, RRS, Akola	90.00	28.00	0.75	21.00	MS
45.	IC117385	NBPGR, RRS, Akola	125.35	26.50	0.50	13.25	MR
46.	VRO-3	IIHR, Bangalore	195.55	22.50	0.50	11.25	MR
47.	VRO-4	IIHR, Bangalore	210.37	29.00	0.75	21.75	MS
48.	DVR-3	IIHR, Bangalore	210.65	14.30	0.50	7.15	R
49.	NDO-10	IIHR, Bangalore	225.35	27.60	0.50	13.80	MR
50.	JNDO-5	IIHR, Bangalore	240.25	25.40	0.50	12.70	MR
51.	Parbhani Kranti	IIHR, Bangalore	273.63	26.00	0.50	13.00	MR
52.	VRO-6	AICPIP, Dharwad	205.21	36.30	0.50	18.15	MR
53.	Varsha Uphar	AICPIP, Dharwad	220.54	32.50	0.50	16.25	MR
54.	OLR01	AICPIP, Dharwad	225.36	22.50	0.50	11.25	MR
55.	OLR02	AICPIP, Dharwad	235.47	23.50	0.50	11.75	MR

MS-Moderately susceptible, S-Susceptible, HS-Highly susceptible
HR-Highly resistant, R-Resistant, MR-Moderately resistant.

All these genotypes were classified under highly resistant. Further, the genotypes classified under highly resistant group were poor yielders ranging from 143.35 (EC305633) to 180.35 (IC90269) grams per plant.

The thirteen genotypes (EC305625, EC305646, EC305650, EC305649, EC 316046, EC329369, EC329375, EC329411, IC90178, IC90263, IC128146, IC117204 and DVR-3) were grouped under in the category of and their yield ranged from 134.35 to 210.00 gram per plant. The genotypes grouped under highly resistant and resistant were poor, medium and average yielder. Hence, these genotypes can be further utilized in YVMV disease resistance breeding programme. Seventeen genotypes were graded as moderately resistant and their yielding ability ranged form 125.35 to 273.00 grams per plant. The top five high yielding genotypes viz., Pharbani Kranti (273.00), IC 90210 (255.33), JNDO-5 (240.25), Arka Anamika (238.00), IC 90170 and OLR02 (235.4) were grouped under moderately resistant ones. Hence, these genotypes can be utilized for commercial cultivation to obtain higher yields with little care and lesser use of chemicals to control YVMV incidence. Thirteen (IC11479, IC90209, IC111478, IC90044, IC90176, IC90253, IC90098, IC90165, IC90096, IC90049, IC128080, IC117224, VRO-4), five (EC305615, EC329370, IC111483, IC90037 and IC117308) and two (IC90194 and IC128156) genotypes were categorized as under moderately susceptible, susceptible and highly susceptible, respectively. The genotypes grouped under moderately susceptible, susceptible and highly susceptible were poor to medium yielder and hence can be eliminated for future breeding programme. Similar type of screening

for diseases incidence of YVMV in okra has been reported (Sharma and Sharma, 1984).

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