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In-Field Screening of Okra Hybrids for Yellow Vein Mosaic Virus (YVMV) Tolerance

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ABSTRACT

Current experiment was undertaken to screen out twenty-five okra hybrid for yellow vein mosaic virus (YVMV) disease. Okra is one of the most important malvaceous vegetable grown across the sub-tropical, tropical and warmer temperate regions of the world for it tender pods. YVMV is basically transmitted through whitefly (*Bemisia tabaci*) which cause about 70-100% of loss of marketable yield. The results revealed that out of twenty-five okra hybrids seven hybrids *i.e.,* A5, A8, A9, A10, A13, A14 and C9 were resistant to YVMV. The obtained resistant hybrids can be screened under closed condition in order to apply conservative viral pressure.

INTRODUCTION

Okra is one of the important tropical and subtropical vegetable belongs to family malvaceae. Okra is commercially cultivated for its tender, fresh, dark green fruits botanically which is pod. Okra holds major market in dry and humid region of India. Okra pods are rich in dietary carbs, proteins, useful fibers and anti-oxidants. Moreover, okra is known to have beneficial effect on human health like, lowering cardiac diseases, blood sugars, cancer and stroke.

Though India is major producer of okra but productivity is lower than countries like Saudi Arabia & Egypt. The chief cause for reduction in okra productivity is due to abiotic stress that too especially viral infection. Mainly there are two virus are known to effect on okra growth and development *i.e.*, yellow vein mosaic virus (YVMV) and Okra enation leaf curl viruses (OELCV) known to cause moderate to severe

loss in crop yield. YVMV caused by mono-partite and bi-partite begomovirus belongs to family Geminiviridae which typically transmitted through tobacco whitefly (*Bemisia tabaci*) in a persisted manner. Even though the most important YVMV resistant cultivars in India, such as Parbhani Kranti, P-7, Arka Anamika, and Arka Abhay (Sanwal et al. 2014), have previously documented are becoming susceptible now a days due to continuous evolution of virus and it vector. In view of this many seed companies are researching on development of resistant okra hybrid for YVMV.

Basically YVMV infected plant's leaves have bleached veins and veinlets, but the interveinal portions will be green (Jatav *et. al.*, 2018). As the disease progresses, the entire plant turns white and Infected plants produce bleached, unmarketable fruits, which keep them stunted. Based on symptom indices scoring technique was implemented as described by Borah et al., 1992. In the month of December, around twenty-five hybrids were screened for YVMV under open field condition of dry and humid region of Telangana by releasing YVMV carrier whiteflies at seven-day intervals. Scoring for YVMV was done for three time at interval of 3 picking (PDI-I to PDI-III) starting from 18th picking or harvesting.

The results revealed that YVMV incidence ranged from 1.28 % (C9) to 11.54 % (A3) with the overall mean value of 5.04 %. The investigation has shown seven YVMV tolerant hybrids out of twenty-five okra hybrids i.e., A5, A8, A9, A10, A13, A14 and C9 (Table 1). The hybrid selection pressure was applied at 2.5 % of disease incidence in order to select prominent hybrid tolerant to YVMV. Furthermore, experiment revealed the hybrids like A1, A5, A7, A8, A9, A10, C3, C7, C8, C9 and C11 had consistency mode of viral transmission which shows the resistance capacity of hybrids against YVMV (Figure 1).

YVMV symptoms on okra leaves

YVMV symptoms on okra flower buds

YVMV symptoms on okra fruits

Plate 1. yellow vein mosaic virus symptoms on bhendi leaves, floral buds and pods.

Table 1. Percentage of Disease Incidence observed for different hybrids

Sl. No.	Hybrid Code	PDI-I	PDI-II	PDI-III	Sum	Inference
1	A1	7.04	7.04	7.04	7.04	Susceptible
2	A2	2.11	3.16	5.26	3.51	Susceptible
3	A3	7.69	13.46	13.46	11.54	Susceptible
4	A4	5.43	6.52	7.61	6.52	Susceptible
5	A5	2.04	2.04	2.04	2.04	Resistant
6	A6	7.69	9.62	11.54	9.62	Susceptible

7	A7	3.23	3.23	3.23	3.23	Susceptible
8	A8	0.00	2.30	2.30	1.53	Resistant
9	A9	2.13	2.13	2.13	2.13	Resistant
10	A10	1.30	1.30	1.30	1.30	Resistant
11	A11	6.90	8.05	10.34	8.43	Susceptible
12	A12	6.10	8.54	8.54	7.72	Susceptible
13	A13	0.00	1.27	3.80	1.69	Resistant
14	A14	1.25	2.50	2.50	2.08	Resistant
15	C1	7.41	11.11	11.11	9.88	Susceptible
16	C2	2.33	2.33	4.65	3.10	Susceptible
17	C3	8.33	8.33	8.33	8.33	Susceptible
18	C4	3.85	3.85	5.13	4.27	Susceptible
19	C5	2.56	5.13	7.69	5.13	Susceptible
20	C6	3.70	8.64	9.88	7.41	Susceptible
21	C7	4.94	4.94	4.94	4.94	Susceptible
22	C8	3.75	3.75	3.75	3.75	Susceptible
23	C9	1.28	1.28	1.28	1.28	Resistant
24	C10	6.45	6.45	8.06	6.99	Susceptible
25	C11	2.63	2.63	2.63	2.63	Susceptible
Mean		4.01	5.18	5.94	5.04	-

Where, PDI- Percentage of Disease Incidence.

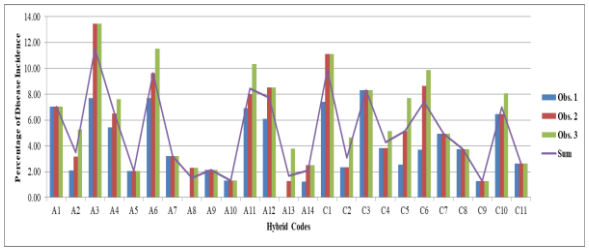

Figure 1. Frequency of yellow vein mosaic virus disease incidence observed for different okra hybrids.

YVMV incidence is chiefly proportional to whitefly population (Sheikh *et. al.,* 2013) and favorable environmental factor in which virus perpetuate and exhibits its presence in a proper fashion. In order to increase accuracy of scoring, experiment has to organize in closed condition and proper care should be taken against other miscellaneous effect.

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