



Research Paper

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Screening for yellow vein mosaic virus resistance of okra under Hyderabad conditions

■ M. VIJAYA¹ AND VEENA JOSHI

Members of the Research Forum

Associated Authors:

¹Vegetable Research Station, Dr. Y.S.R. Horticultural University, Rajendranagar, HYDERABAD (A.P.) INDIA

Author for correspondence :

VEENA JOSHI

Grape Research Station, Rajendranagar, HYDERABAD (A.P.) INDIA
Email : veenahorti@rediffmail.com

ABSTRACT : A field experiment was carried out to screen for yellow vein mosaic virus resistance on okra involving eleven entries which include two susceptible and two resistant checks. The per cent plant infection and the reaction of the genotypes were assessed based on the disease incidence. It was observed that in both the years, the entry VRO-6 has recorded mild incidence of YVMV (2.6 %) and the entry Akola Bahar has shown severe intensity of disease (63.9 %) more than the incidence of resistant and susceptible checks. With respect to the fruit yield, it was observed that the entry JOL-2K-19 and VRO-6 have recorded maximum yield. Hence, among the entries screened for YVMV, it can be concluded that the entry VRO-6 and JOL-2K-19 were found to be promising in terms of mild YVMV incidence and maximum fruit yield.

KEY WORDS : Okra, Yellow vien mosaic virus, Mild, Severe, Yield

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Okra [*Abelmoschus esculentus* (L.) Moench] belongs to the family Malvaceae. Okra is an important vegetable crop in the tropical and subtropical regions of the World (Akinyelo and Osekita, 2006; Alam and Hossain, 2008; Kumar *et al.*, 2010). Okra has been in use for several purposes. Its tender fruits are used for cooking (Qhureshi, 2007) and its stem is used for making paper in paper mills (Lamont, 1999). Okra green fruits are good source of carbohydrates, proteins, fats, vitamins and minerals (Fajinmi and Fajinmi, 2010). Moreover, okra mucilage is suitable for medicinal and industrial applications (Akinyele and Temikotan, 2007). It has been used as a medicine to replace plasma and to expand blood volume (Lengsfeld *et al.*, 2004).

However, the growers will come across with many problems that include number of viruses, fungi, bacteria, phytoplasma, nematodes and insect pests that attack this crop (Petlamul *et al.*, 2009). The yield loss in okra due to the disease mentioned has been estimated up to 20-30 % and may increase up to 80-90 % in case of severe infestation (Ali *et al.*, 2005). YVMV in okra is the most serious disease which is transmitted by white fly (*Bemisia tabaci* Gen.) (Ali *et al.*, 2000; Ghanem, 2003 ; Fajinmi and Fajinmi, 2010). In field conditions, infection of 100 per cent plants is not an

unusual sight. Therefore, the yield loss ranges between 50 to 94 per cent depending up on the stage of the crop growth. Plants if infected in the early stage *i.e.* within 20 days age the loss may be up to 94 %. If the infection is between 50 and 65 days the loss may be up to 64 % and 49 %, respectively (Ali *et al.*, 2005).

Hence, cultivation of disease resistant variety as a control measure of plant disease is more economical and environmentally safer than that of chemical control. Varietal resistance in okra to YVMV has been reported by several researchers (Sastri and Singh, 1974; Sharma and Sharma, 1984; Prakasha *et al.*, 2010). In this context, the above experiment was conducted to screen the resistant variety of okra YVMV under Hyderabad conditions.

RESEARCH METHODS

The experiment was carried out in the experimental farm of Vegetable Research Station, Agricultural Research Institute, Rajendranagar, Hyderabad during the *Kharif* seasons of 2007 and 2008. The experiment was carried out in Randomized Block Design with a plot size of 3 x 3 m in three replications. The crop was maintained following the recommended agronomic practices except the spraying schedule. Pesticides were not sprayed on the crop in order

to keep the vector population. Eleven entries were evaluated which include two susceptible and two resistant checks and all were received from the Indian Institute of Vegetable Research under All India Coordinated Research Project on Vegetable Crops, Varanasi collected from the different agro climatic zones of the country. The entries were sown along with the resistant and susceptible checks with 60 x 30 cm spacing. The entries included are VRO – 21, VRO-22, KS-442, PB-31-1, JOL-2K-19, Akola Bahar, VRO-6, resistant checks viz., Arka Anamika and Arka Abhay, susceptible checks viz., Parbhani Kranti and Pusa Sawani. The crop was grown under natural / field conditions for two successive *Kharif* seasons of 2007 and 2008. Observations on disease incidence were taken from 15 days after sowing up to 90 days after sowing. Observations were made based on the visual symptoms like vein and veinlet chlorosis, chlorotic spots appearing regularly in the interveinal region. The per cent plant infection was calculated. Reaction of the genotypes was assessed based on the scale 0: absent, 1-15: Mild; 16-30: Moderate; 31-45: Severe and > 45: Highly severe. The fruit yield was also recorded in both the years.

RESEARCH FINDINGS AND DISCUSSION

The per cent plant infection and the reaction of the genotypes were assessed based on the disease incidence. The data of both the years after statistical analysis are furnished in Table 1.

During 2007 among the entries screened, VRO-6 has recorded mild incidence of YVMV disease (2.9%) while Akola Bahar has shown highest severity of YVMV disease

(92.2 %). The other entries which recorded mild disease incidence were KS-442 and PB-31-1. The entry JOL-2K-19 has shown moderate disease intensity while severe incidence was noticed in both susceptible and resistant checks. With respect to the fruit yield, among the entries, Akola Bahar has recorded highest fruit yield (69.9 q/ha) and lowest was recorded in check Pusa Sawani (39.9 q/ha).

During 2008 it was observed that the intensity of YVMV incidence was less than the previous year and among the entries, VRO-6 has recorded mild intensity of YVMV (2.3%) while check Pusa Sawani has shown the severe disease incidence (67.8 %). The other entries which have shown the mild incidence of YVMV were VRO-21, VRO-22, KS-442, PB-31-1 and JOL-2K-19. With respect to the fruit yield, unlike the previous year JOL-2K-19 recorded maximum yield (95.6 q/ha) followed by VRO-21 (85.6 q/ha) and minimum yield was recorded in Check Parbhani Kranthi (65.6 q/ha).

The pooled data of disease incidence are presented in Table 2. It implies that the entry VRO-6 recorded mild incidence of YVMV (2.6%) and Akola Bahar showed severe incidence of YVMV disease (63.9%). Further the results signify that the entries viz., KS-442, PB-31-1, JOL-2K-19, VRO-21 and VRO-22 were observed to be moderate showing disease incidence range from 4.9 % to 11.1 %. The incidence in resistant checks Arka Anamika (26.5 %), Arka Abhay (26.7 %) and in the susceptible checks, incidence was 39.6 % in Parbhani Kranti and 58.6 % in Pusa Sawani. Regarding the fruit yield JOL-2K-19 recorded maximum fruit yield of 78.4 q/ha whereas the susceptible check Pusa Sawani recorded

Table 1 : Performance of different genotypes of okra against yellow vein mosaic virus under field conditions

| Sr. No. | Genotype | 2007 | | | 2008 | | |
|---------|----------------------|-------------|----------------------|--------------------|--------------|----------------------|--------------------|
| | | Disease (%) | Reaction of genotype | Fruit yield (q/ha) | Disease (%) | Reaction of genotype | Fruit yield (q/ha) |
| 1. | VRO-21 | 17.1 (24.3) | Moderate | 43.3 | 5.0 (12.01) | Mild | 85.6 |
| 2. | VRO – 22 | 12.3 (20.5) | Moderate | 51.1 | 3.0 (9.79) | Mild | 74.8 |
| 3. | KS – 442 | 6.7 (14.9) | Mild | 45.9 | 3.0 (9.88) | Mild | 74.9 |
| 4. | PB – 31 – 1 | 7.1 (13.3) | Mild | 44.4 | 3.7 (13.32) | Mild | 77.4 |
| 5. | JOL - 2K – 19 | 8.6 (17.0) | Moderate | 61.1 | 3.4 (8.39) | Mild | 95.6 |
| 6. | Akola Bahar | 92.2 (78.4) | Highly severe | 69.9 | 35.5 (41.57) | Severe | 60.0 |
| 7. | VRO - 6 | 2.9 (9.8) | Mild | 47.7 | 2.3 (8.65) | Mild | 83.7 |
| 8. | Arka Anamika (RC) | 42.5 (40.7) | Severe | 43.3 | 10.4 (18.4) | Moderate | 77.4 |
| 9. | Arka Abhay (RC) | 44.1 (41.6) | Severe | 44.8 | 9.2 (17.53) | Moderate | 80.4 |
| 10. | Parbhani kranti (SC) | 64.8 (53.6) | Highly severe | 48.9 | 14.3 (21.94) | Moderate | 65.6 |
| 11. | Pusa Sawani (SC) | 49.4 (44.7) | Highly severe | 39.9 | 67.8 (55.71) | Highly severe | 72.6 |
| | S.E. ± | 2.738 | - | 2.896 | 9.88 | - | 2.808 |
| | C.D. (P=0.05) | 8.075 | - | 8.543 | 8.54 | - | 8.284 |
| | CV % | 14.5 | - | 10.6 | 25.4 | - | 6.3 |

RC- Resistant check

SC- Susceptible check

Reaction of the genotypes was assessed based on the scale

0: Absent, 1-15 : Mild 16-30 : Moderate 31-45 : Severe > 45 : Highly severe.

Table 2 : Pooled analysis of the data of 2007 and 2008 years

| Sr. No. | Genotype | Disease incidence (%) | | | Fruit yield (q/ha) | | |
|---------|----------------------|-----------------------|--------------|-------------|--------------------|-------|-------------|
| | | 2007 | 2008 | Pooled mean | 2007 | 2008 | Pooled mean |
| 1. | VRO – 21 | 17.1 (24.3) | 5.0 (12.01) | 11.1 | 43.3 | 85.6 | 64.5 |
| 2. | VRO – 22 | 12.3 (20.5) | 3.0 (9.79) | 7.7 | 51.1 | 74.8 | 63.0 |
| 3. | KS – 442 | 6.7 (14.9) | 3.0 (9.88) | 4.9 | 45.9 | 74.9 | 60.4 |
| 4. | PB – 31 – 1 | 7.1 (13.3) | 3.7 (13.32) | 5.4 | 44.4 | 77.4 | 60.9 |
| 5. | JOL - 2K – 19 | 8.6 (17.0) | 3.4 (8.39) | 6.0 | 61.1 | 95.6 | 78.4 |
| 6. | Akola Bahar | 92.2 (78.4) | 35.5 (41.57) | 63.9 | 69.9 | 60.0 | 65.0 |
| 7. | VRO - 6 | 2.9 (9.8) | 2.3 (8.65) | 2.6 | 47.7 | 83.7 | 65.7 |
| 8. | Arka Anamika (RC) | 42.5 (40.7) | 10.4 (18.4) | 26.5 | 43.3 | 77.4 | 60.4 |
| 9. | Arka Abhay (RC) | 44.1 (41.6) | 9.2 (17.53) | 26.7 | 44.8 | 80.4 | 62.6 |
| 10. | Parbhani kranti (SC) | 64.8 (53.6) | 14.3 (21.94) | 39.6 | 48.9 | 65.6 | 57.3 |
| 11. | Pusa Sawani (SC) | 49.4 (44.7) | 67.8 (55.71) | 58.6 | 39.9 | 72.6 | 56.3 |
| | S.E. ± | 2.738 | 9.88 | - | 2.896 | 2.808 | - |
| | C.D. (P=0.05) | 8.075 | 8.54 | - | 8.543 | 8.284 | - |
| | CV % | 14.5 | 25.4 | - | 10.6 | 6.3 | - |

RC- Resistant check SC- Susceptible check

minimum fruit yield (56.3 q/ha). Hence, it can be summarized that among the entries screened for YVMV resistance, entry VRO-6 and JOL-2K-19 were found to be promising in terms of mild disease incidence and highest fruit yield.

The similar line of work was also carried out by Tiwari *et al.* (2012) who reported that the entry VRO -6 was resistant to okra YVMV. According to Rashid *et al.* (2002), OK-292 and OK- 285 were found to be resistant to YVMV disease. Screening for yellow vein mosaic virus resistance and yield loss of okra under field conditions was also carried out by Benchasri (2011) who observed that KN-OYV-03 was moderately resistant and nine other entries were moderately tolerant to OYVMV.

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