Study of okra varieties against *Bemisia tabaci* (Genn.) under field condition of Gandhinagar, Gujarat

Madhavi Singh*, Bharat Maitreya

Department of Botany, Bioinformatics, Climate Change Impacts Management, University School of Sciences, Ahmedabad-380009, Gujarat, India

ABSTARCT

The Yellow Vein Mosaic Virus (YVMV) is a fatal virus that infects okra and is spread by the white fly (*Bemesia tabaci*). The disease has a negative impact on the quality and productivity of the fruit. As a result, attempts were made to screen 19 genotypes for *Bemesia tabaci* in okra, in this study. Nineteen genotypes of okra were cultivated in a field trial area of the Suraj crop science private Ltd, Gandhinagar, Gujarat during February-April 2019 to determine their responses to *Bemisia tabaci* (Genn.). The results showed that SCOH-1020 and SCOH-1021 was moderately attacked by whitefly, while SCOH-1019 was not affected. Kasturi, Divya, Nirogi, Vaishnav, Anjali, KFOL-157, KFOL- 158, KFOL- 523 and KFOL- 524 were susceptible while Priyanka was highly susceptible to *Bemisia tabaci* (Genn.)**.**

KEYWORDS

Okra, Screening, Varieties, *Bemisia tabaci* (Genn.)

INTRODUCTION

Okra or Bhindi [*Abelmoschus esculentus* (L.) Moench] is a Malvaceae family annual herbaceous plant with erect growth habit, with or without branches and bisexual bloom. It is one of the most widely grown vegetable crops in the world. Farmers grow a lot of okra during the rainy and summer seasons because there is a lot of consumer demand and hence a greater price. The Yellow Vein Mosaic Virus (YVMV) is a deadly virus spread by the white fly (*Bemesia tabaci*) in okra. The illness has a negative impact on fruit quality and productivity. Kulkarni (1924) was the first to report the sickness in India, in the Bombay province. Plants infected at 20, 35, and 50 days after germination have been observed to lose up to 98, 83, and 49% of their weight, respectively (Shastry and Singh, 1974). Chemical control of this disease is limited by frequent pickings, high operational costs, and pesticide residues entering the food chain. As a result, efforts were conducted in this work to screen 19 genotypes of okra for *Bemesia tabaci* in okra.

MATERIALS AND METHODS

The field experiments were conducted during February-April 2019 at the Suraj Crop Science Private Ltd research field (23.35° N latitudes, 72.69° E longitudes). Nineteen genotypes of okra were collected from gene bank of Suraj crop (Table 1) and sown in Randomized Block Design with two replications at spacing of 60 cm, Plant to plant distance was 30 cm. Observations on incidence of whitefly 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 9 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:

$$\text{Per cent disease incidence} = \frac{\text{No. of plants infected}}{\text{Total no. of plants}} \times 100$$

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.

RESULT AND DISCUSSION

To find the resistance against the *Bemesia tabaci*, 19 varieties were screened in the field during February-April cropping months of 2019. The percentage disease incidence of okra yellow vein mosaic disease was calculated during the pre-flowering and post-flowering phases of the crop.

Table 1 shows the morphological characteristics of several okra types in terms of bloom colour, stem, pod, and leaf shape. Between okra types, there was no change in bloom colour or leaf shape. On the basis of stem and pod characteristics, the varieties were divided into three groups. There were three shades of green: pale green, dark green, and reddish green. The flower colour and leaf form found in our research (Table 1) were identical to Alam and Hossain's findings (2008). The leaves were arranged in a unique way. In one part, there was only one leaf. The leaves had palmate lines. The leaf's tip was pointed, and the rim was serrated (Rashwan, 2011). Almost all of the variants (10 out of 19) were classified as light or dark green, with the other two varieties classified as reddish green (Table 1). Under field conditions, the reaction of nineteen okra varieties to OYVMV was observed.

Table 1: Morphological characteristics of various varieties of okra plants

Genotypes/varieties	Flower color	Stem color	Pod color	Leaf shape
Priyanka	Light yellow	Light green	Light green	Palmate
Hanshika	Light yellow	Radish green	Radish green	Palmate
Kasturi	Light yellow	Light green	Light green	Palmate
Divya	Light yellow	Light green	Light green	Palmate
Nirogi	Light yellow	Light green	Light green	Palmate
Vaishnav	Light yellow	Dark green	Dark green	Palmate
Anjali	Light yellow	Light green	Light green	Palmate
KFOL-157	Light yellow	Light green	Light green	Palmate
KFOL-158	Light yellow	Light green	Light green	Palmate
KFOL-523	Light yellow	Light green	Light green	Palmate
KFOL-524	Light yellow	Radish green	Radish green	Palmate
SCOH-1011	Light yellow	Light green	Light green	Palmate
SCOH-1014	Light yellow	Dark green	Dark green	Palmate
SCOH-1016	Light yellow	Dark green	Dark green	Palmate
SCOH-1017	Light yellow	Dark green	Dark green	Palmate
SCOH-1018	Light yellow	Dark green	Dark green	Palmate
SCOH-1019	Light yellow	Dark green	Dark green	Palmate
SCOH-1020	Light yellow	Light green	Light green	Palmate
SCOH-1021	Light yellow	Dark green	Dark green	Palmate

Table 3 is showing the data of screening. SCOH-1021 had the highest fruit yield (225.41 q/ha), followed by SCOH-1019 (221.09 q/ha). The variety Priyanka produced the lowest fruit yield (80.71q/ha).

Table 3: Screening of okra varieties/genotypes against whitefly incidence (summer 2019)

Sl. No.	Genotypes/varieties	Summer Pre-flowering incidence (%)	Mean incidence (%)	Reaction	Yield (q/ha)
1	Priyanka	94.05	74.69	Highly susceptible	80.71
2	Hanshika	73.23	52.17	Highly susceptible	125.44
3	Kasturi	72.64	47.62	Susceptible	155.56
4	Divya	71.81	46.76	Susceptible	162.21
5	Nirogi	76.64	48.46	Susceptible	166.64
6	Vaishnav	72.91	46.89	Susceptible	175.46
7	Anjali	73.64	48.53	Susceptible	129.07
8	KFOL-157	70.92	46.26	Susceptible	145.97
9	KFOL-158	77.73	49.31	Susceptible	120.41
10	KFOL-523	72.92	47.32	Susceptible	145.92
11	KFOL-524	75.07	49.42	Susceptible	140.34
12	SCOH-1011	77.92	50.27	Susceptible	135.42
13	SCOH-1014	76.69	49.03	Susceptible	139.49
14	SCOH-1016	57.05	36.70	Susceptible	185.63
15	SCOH-1017	57.26	36.87	Susceptible	186.74
16	SCOH-1018	5.57	2.98	Susceptible	215.56
17	SCOH-1019	1.78	0.99	Resistance	221.09
18	SCOH-1020	5.94	3.23	Moderately Resistance	205.92
19	SCOH-1021	1.85	1.03	Moderately Resistance	225.41

SCOH-1019 was the only cultivar that was shown to be resistant in summer season. Yellow vein mosaic virus was found in okra, according to Chaudhury et al. (1992). Disease incidence on hybrids ranged from 19.26 to 69.13 percent, while it ranged from 19.95 to 51.16 percent on parent plants. When Batra and Singh (2000) tested eight okra cultivars for OYVMV, they discovered that Okra No.6, LORM-1, VRO-3, and P-7 were disease-free, whereas VRO-4 had a minor sensitivity. In a field testing, Ali et al. (2005) found that Safal, Subz Pari, and Surkh Bhindi cultivars were resistant to OYVMV (3.36-24.40 percent). Other studies, such as Arora et al. (1992) and Gavkare et al. (2013), assessed 157 advanced germplasm and 7 cultivars/ hybrids of okra for two years and found that Punjab, Padmini, and EMS-8 remained free of OYVMV. Okra cultivars Punjab, Padmini, and Punjab-7 were discovered to be high yielding and resistant to OYVMV by Sharma et al. (1993).

It can be concluded that out of nineteen varieties of okra, SCOH-1020 and SCOH-1021 was moderately attacked by whitefly, while SCOH-1019 was not affected. Kasturi, Divya, Nirogi, Vaishnav, Anjali, KFOL-157, KFOL- 158, KFOL- 523 and KFOL- 524 were susceptible while Priyanka was highly susceptible to *Bemisia tabaci* (Genn.)**.**

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