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J Ramkumar
ICAR-Krishi Vigyan Kendra,
Aruppukottai, Virudhunagar,
Tamil Nadu, India

P Mareeswari
Regional Research Station,
Aruppukottai, Virudhunagar,
Tamil Nadu, India

M Jeeva
ICAR-Krishi Vigyan Kendra,
Aruppukottai, Virudhunagar,
Tamil Nadu, India

B Venudevan
ICAR-Krishi Vigyan Kendra,
Aruppukottai, Virudhunagar,
Tamil Nadu, India

Assessment of Co 4 Bhendi with special reference to yellow vein mosaic under on farm testing at coastal district of Ramanathapuram, Tamil Nadu

J Ramkumar, P Mareeswari, M Jeeva and B Venudevan

Abstract

The Bhendi Yellow Vein Mosaic Virus (BYVMV) is the most destructive disease causes heavy yield loss to the farmers. Hence, to create awareness about new improved bhendi varieties and to assess the performance of three Bhendi cultivars with special reference to Yellow Vein Mosaic the present study was carried out under On Farm Testing at coastal district of Ramanathapuram, Tamil Nadu. The lesser mean days to 50% flowering of 49.51, 49.71 and 50.89 was recorded with Kashi kranti, Co (Bh) 4 and traditional Bhendi cultivars respectively. The plant height (124.97 cm) was higher in Co (Bh) 4 cultivar, whereas it was 98.77 cm in traditional variety and 95.49 cm in Kashi kranti. The other growth parameters viz., no. of fruits per plant (16.8), fruit length (12.17 cm) and weight (15.31 g) also maximum in Co (Bh) 4 followed by Kashi kranti (11.66 fruits/plant, 9.01 cm and 8.8 g) and traditional cultivar (8.86 fruits/plant, 8.72 cm and 8.66 g). The Nil BYVMV was recorded with Co (Bh) 4 and it was 16% in Kashi Kranti and 12% in traditional cultivar. The highest average yield of 18.99 t/ha was recorded with Co (Bh) 4 followed by traditional variety (12.43t/ha) and Kashi Kranti (11.78 t/ha). Similarly, the highest net return and BCR of Rs. 1,06,420 and 3.33 was recorded with Co (Bh) 4 followed by traditional variety (Rs. 57,440 and 2.36) and Kashi Kranti (Rs. 49,240 and 2.09)

Keywords: Bhendi, BYVMV, Co (Bh) 4, kashi kranti, plant height, no. of fruits per plant

Introduction

Abelmoschus esculentus commonly called Bhendi, okra, lady's finger is a major vegetable crop grown in Tamil Nadu. Bhendi has a huge amount of nutritional value. One hundred gram of edible portion of Bhendi contains 1.9 g of protein, 0.2 g fat, 6.4 g carbohydrate, 0.7 g minerals and 1.2 g fibre (Tiwari *et al.*, 1998) ^[3]. India occupies first place globally in terms of total area of 0.53 million ha with the production and productivity of 6.36 million tons 11.9 t ha⁻¹ respectively (Anonymous, 2015) ^[7]. But its cultivation is seriously limited by most important disease called Bhendi Yellow Vein Mosaic Virus (BYVMV) (Fajinmi *et al.*, 2010 and Sanwal *et al.*, 2016) ^[8,9] which causes heavy yield loss to the Bhendi growers. The BYVMV was first reported in India during 1924 (Kulkarni, 1924) ^[1]. The BYVMV is neither sap transmissible nor seed transmissible. It is mainly transmitted through most important sucking pest, white fly *Bemisia tabaci* during feeding. The major symptom of disease is chlorosis, yellowing of veins and veinlets, smaller leaves and stunting. Fruit yield also drastically reduced by 96% if the crop is infected at an early stage (Pun and Doraiswamy, 1999) ^[2]. In Ramanathapuram district of Tamil Nadu, bhendi occupies 150 ha at Bogalur and Nainarkoil blocks. Most of the farmers used to grow traditional bhendi variety which is susceptible to BYVMV that causes severe economic losses to the farmers of Ramanathapuram district. Keeping these in mind, the present study was conducted at farmer's fields at Ramanathapuram district to assess the performance of Co (Bh) 4 bhendi with special reference to Yellow Veil Mosaic under On Farm Testing (OFT).

Materials and Methods

The study was carried out by the ICAR-Krishi Vigyan Kendra, Ramanathapuram during two successive seasons (June-September and October-December) at Bogalur and Nainarkoil blocks to create awareness about improved cultivars of bhendi among the farmers. Hence, the KVK, Ramanathapuram introduced Co (Bh) 4, a resistant hybrid against BYVMV along with Kashi Kranti released by IIVR, Varanasi. The On Farm Trail was carried out in seven participant farmer's field with these Bhendi cultivars and traditional variety as check.

Corresponding Author:
J Ramkumar
ICAR-Krishi Vigyan Kendra,
Aruppukottai, Virudhunagar,
Tamil Nadu, India

Before sowing, seed treatment was done with Imidacloprid 70 WS @ 7 gm/kg of seed. The treated seeds were sown at 45 x 30 cm spacing @ 3 seeds per hole. Thinning was done two weeks after sowing by maintaining one plant per stand. Other intercultural operations *viz.*, irrigation, weeding and fertilizer

application was followed as per the TNAU Horticulture crop production guide. As a part of OFT, spraying of neem soap, IIHR vegetable special and installation of yellow sticky traps were also demonstrated at farmer's field (Table 1).

Table 1: Improved technology demonstrated

Sl. No.	Technology demonstrated	Quantity used	Purpose
1.	Neem Soap	10 gm/lt	To check the sucking pest population
2.	Installation of yellow sticky traps	5 nos / acre	To attract whitefly
3.	Arka Vegetable Special	5 gm/lt	Micronutrient mixture

The demonstrations of above bhendi cultivars was monitored regularly to assess the BYVMV incidence and other economically important traits *viz.*, days to 50% flowering, plant height (cm), No. of fruits/plant, fruit length (cm), average fruit weight (g), days to first harvest, fruit yield were collected, which was further analysed using RBD. The BCR also calculated.

To assess the per cent incidence of BYVMV, fifty plants from each field were randomly tagged at early stage of the crop. From the tagged plant no. of virus infected plants was counted and per cent disease incidence was calculated using the following formula:

$$\% \text{ YMV incidence} = \frac{\text{No. of YMV infested plants}}{\text{Total no. of plants}} \times 100$$

Results and Discussion

The results of OFT emphasized that, the TNAU Co (Bh) 4 Bhendi cultivar performed well in both seasons with respect to growth parameters and economic returns. The lesser mean days to 50% flowering of 49.51, 49.71 and 50.89 was recorded with Kashi kranti, Co (Bh) 4 and traditional Bhendi cultivars. The similar mean days to 50% flowering of 52.30 (Kashi kranti), 51.0 (Co (Bh) 4) days was observed by

Hemant Kumar Singh *et al.*, 2018, Dakahe *et al.*, 2007 and Sivakumar *et al.*, 2020 ^[5, 6, 4] respectively. The plant height (124.97 cm) was higher in Co (Bh) 4 cultivar, whereas it was 98.77 cm in traditional variety and 95.49 cm in Kashi kranti. The other growth parameters *viz.*, no. of fruits per plant (16.8), fruit length (12.17 cm) and weight (15.31 g) also maximum in Co (Bh) 4 followed by Kashi kranti (11.66 fruits/plant, 9.01 cm and 8.8 g) and traditional cultivar (8.86 fruits/plant, 8.72 cm and 8.66 g). The present observation has got support from other investigation also. Sivakumar *et al.*, 2020 ^[4] recorded no. of fruits/plant, fruit length, fruit weight as 20.4 nos., 13.7 cm and 15.6 g respectively, which is accordance with the present findings (Table 2).

The Nil BYVMV was recorded with Co (Bh) 4 and it was 16% in Kashi Kranti and 12% in traditional cultivar. Though other growth traits was superior in Kashi kranti, when compared to traditional cultivar the BYVMV was maximum in Kashi kranti.

With respect to economics, the highest average yield of 18.99 t/ha was recorded with Co (Bh) 4 followed by traditional variety (12.43t/ha) and Kashi Kranti (11.78 t/ha). Similarly, the highest net return and BCR of Rs. 1,06,420 and 3.33 was recorded with Co (Bh) 4 followed by traditional variety (Rs. 57,440 and 2.36) and Kashi Kranti (Rs. 49,240 and 2.09) (Table 3).

Table 2: Growth attributes of Bhendi cultivars

Cultivars	Days to 50% flowering	Days to first harvest	Plant height (cm)	No. of fruits/plant	Fruit length (cm)	Fruit weight (g)	BYVMV (%)
Kashi kranti	49.51	42.8	95.49	11.66	9.01	8.8	16
CO (Bh)4	49.71	42.54	124.97	16.8	12.17	15.31	No incidence
Traditional variety	50.89	44.20	98.77	8.86	8.72	8.66	12
Mean	50.03	43.18	106.40	12.43	9.96	10.92	-
SD	1.46	0.53	2.94	0.39	0.23	0.30	-
CD	3.06	2.17	6.4	0.86	0.52	0.66	-

Table 3: Economics of Bhendi cultivars

Cultivar	Yield (t/ha)			Gross cost (Rs./ha)	Gross return (Rs./ha)	Net return (Rs./ha)	BCR
	Max.	Min.	Avg.				
Kashi kranti	13.52	10.62	11.78	45000	94,240	49,240	2.09
CO (Bh)4	20.50	17.23	18.99	45500	1,51,920	1,06,420	3.33
Traditional variety	13.45	11.45	12.43	42000	99,440	57,440	2.36

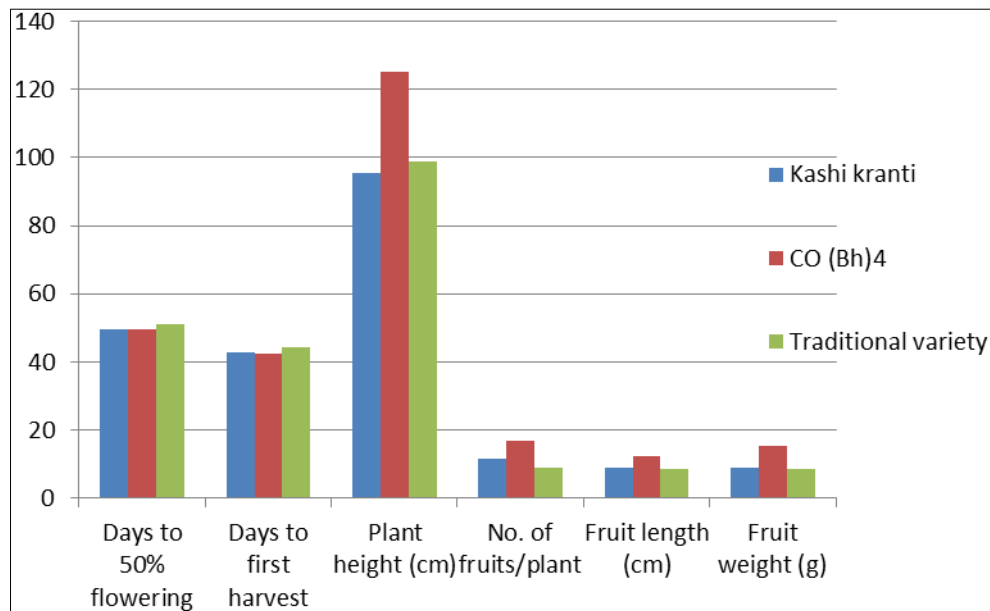


Fig 1: Graphical representation of Growth attributes of Bhendi cultivars

Conclusion

Based on the above findings, the Bhendi cultivar Co (Bh) 4 is superior in growth habits and yield attributes than other two cultivars assessed. Hence, Co (Bh) 4 is most suitable for coastal district of Ramanathapuram for getting higher yield and net returns.

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