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Assessment of performance of Bhendi Hybrid CO₄ and Arka Nikita

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Abstract

Bhendi is an important vegetable which is grown throughout the India. Gujarat, West Bengal, Bihar, Maharashtra, Orissa, Uttarpradesh, Andrapradesh and Tamil Nadu are important states involving in bhendi production. In Salem district, 2993 ha under bhendi cultivation with average productivity of 4.7 tons /ha and its cultivated throughout the year with irrigated condition. Most of the farmers depending on the private bhendi hybrids seeds for cultivation, which they have to spend much more towards seed cost. An investigation is needed to assess the performance of high yielding public sector bhendi hybrids in Salem district. Hence, this study had been carried out and assessed the performance of high yielding bhendi hybrids released by public sector in Salem district in the year 2019. During Kharif 2019 an on farm trial (OFT) has conducted in five different locations of Salem district by using bhendi hybrids like Arka Nikita released by IIHR, Bengaluru and Bhendi Hybrid CO 4 released by Tamil Nadu Agricultural University, Coimbatore with the check hybrid of Sakthi released by Nunhemp. Based on the yield performance bhendi hybrid CO 4 recorded highest yield per hectare (16.6 t/ha) followed by Arka Nikita (16.4 t/ha). Farmers preference is more for bhendi hybrid CO 4 & Sakthi in Salem District due to less incidence of Yellow Vain Mosaic virus (YMV). The IIHR variety Arka Nikita and bhendi hybrid CO 4 gave good yield but its susceptible to YMV disease during summer. Regarding BC ratio, Arka Nikita and Sakthi recorded 2.71 and 1.49, respectively as against highest BC ratio of 2.74 in bhendi hybrid CO₄.

Keywords: Bhendi, Arka Nikitha, bhendi hybrid CO 4, yield, Onfarm trial

Introduction

Bhendi [*Abelmoschus esculentus* (L.) Moench] is an important vegetable commonly known as lady's finger in India with chromosome number $2n=130$, native of tropical and subtropical Africa (Siva Ranjani *et al.* 2019) [1]. It is a most important kharif and summer season vegetable crop belongs to the family Malvaceae and valued for its tender fruits. Tender green fruits are consumed as fried vegetable or in curry, sambar and soups and sun dried fruits are used for year round consumption in Africa and India. Bhendi is rich source of minerals and vitamin like iodine, calcium (66 mg/100 g fresh) phosphorus (56 mg/100g fresh) and Vitamin A (88 IU), Thiamine (0.7 mg), Riboflavin (0.10 mg) and Vitamin C (13 mg) per 100 g fresh edible portion. Tender fruits contain protein (1.9%), carbohydrate (6.4%) and fibre (1.2%). Dry bhendi seeds contain 20-24% protein (Samadia & Haldhar *et al.* 2019) [3]. Afghanistan, India, Iran, Nigeria, Turkey, Ghana, Egypt, Brazil and Mexico are important bhendi growing countries. Globally, India ranks first in bhendi production with annual production of 6094.9

thousand tons from an area of 509 thousand hectares and productivity of 12 million tonnes/ha. Maharashtra, Gujarat, Karnataka, Tamil Nadu, Haryana, Punjab, Uttar Pradesh, Bihar, West Bengal and Orissa are major bhendi growing state in India. Gujarat is the leading bhendi producing state with the production of around 921.72 thousand tons from an area of 75.27 thousand ha (productivity of 12.25 tonnes/ha) and West Bengal is ranked second (914.86 thousand tonnes from 77.5 thousand ha with 11.5 tonnes/ha productivity (NHB 2018-19). The farmers prefer high yielding varieties resistant against yellow vein mosaic virus and pests due to better quality produce with lower cost of crop protection. Farmer's reluctance to accept new varieties and hybrids, until and unless their performance under the given climatic conditions is proved. The yield of bhendi is primarily determined by genetic constitution of the plant by number of flowers, pod per plant and length and thickness of the pods. The bhendi pods are generally harvested at 2 to 4 days' intervals due to the stage of pod harvesting also contribute equally to the yield and quality (Meena & Bhati 2016) [16].

The use of low yielding varieties, plant population, weed infestation, insect-pest and diseases are seriously affected the production and productivity of bhendi. High yielding varieties and hybrids plays a major role in higher production, high net returns, compared to local cultivars used in same climatic conditions and inputs applied.

Salem district is known for mangoes, silver ornament, textiles, sago industries, and steel production. Salem has divided into 20 blocks; maximum temperature is 32^o C and 19.6^o C minimum, with humidity ranging from 39 to 85%. Rainfall of 545 mm and 564.2 mm was recorded during south west and north east monsoon respectively. Net sown area is 22,33,70 ha and area under horticultural crops is 39,765 ha, out of which 2,993 ha under bhendi cultivation during 2019-20 with average productivity of 4.7 tons /ha. At present the farmers are facing problem of lower productivity of existing private hybrids yield loss due to Yellow Vein Mosaic Virus (Upto 30%) and higher seed cost of private hybrid seeds. it is leads to increase the cost cultivation. So, an investigation is needed to assess the performance of high yielding Bhendi hybrids released by public sector like Arka Nikitha released by IIHR, Bengaluru and bhendi hybrid CO 4 released by Tamil Nadu Agriculture University, Coimbatore with lesser seed cost in the farmers' fields of Salem district.

Materials and Methods

Most of the farmers unaware about public sector hybrid and depend upon only the private bhendi hybrids, for which they have to spend more money towards the seed cost. Also the farmers facing problem of lower productivity due to Yellow Vein Mosaic Virus (Upto 30%) of existing private hybrids in the market. Farmers need hybrids with high yield and resistant to YMV with low seed cost. The Krishi Vigyan Kendra, Salem conducted on farm trails to study the production and financial viability in bhendi hybrids through the scientific farming methods. During the kharif season in 2019, the "On Farm Testing on performance of bhendi hybrid Arka Nikita and TNAU Bhendi Hybrid CO 4 with Sakthi Hybrid of Nunhempas as check hybrid " was done at five farmers field in A.Thalaiyur Village, Magudanchavadi block of Salem district, Tamilnadu. Initially KVK, Salem has given technical knowledge on bhendi cultivation and few important inputs like, hybrid seeds of bhendi hybrid CO 4, Arka Nikitha and IIHR vegetable special which having micronutrient and growth promoting substances. The farmers were demonstrated bhendi cultivation with improved hybrid seeds, seed treatment, maintenance of

optimum plant population, application of recommended dose of fertilizer by adopting plant spacing of 45 cm x 30 cm with the seeds rate of 2.5 kg/ha. 5 active farmers were selected for front line demonstration from 50 respondent farmers through proportionate sampling method to study the viability and economic feasibility of new demonstration. All 5 farmers were educated on all aspects of bhendi production techniques and the following observation like growth, yield characters and economics on FLDs were recorded. Each farmer provided statistics on crop output and profitability for the OFT and control plots, which were then averaged across all locations. Using the appropriate statistical methods, the gathered data were pooled and tabular analysis was completed to determine the technical gap. The response also received the various improved production technologies such as the choice of improved varieties, Integrated Nutrient Management (INM), foliar spray of crop boosters (Arka vegetable special), and Integrated Pest and Disease Management (IPDM).

Results and Discussion

The results (Table 1.) showed that highest individual fruit weight of 25.6g was recorded by TNAU bhendi hybrid CO 4 followed by Arka Nikita (24.7 g) and among the three hybrids lower fruit weight of 24.4 g was observed by Sakthi. The more plants height (162 cm), fruits length (13.6 cm) were observed by TNAU bhendi hybrid CO 4 with medium spreading habit. The tender fruits of TNAU bhendi hybrid CO 4 were elongated with narrow tip, light green in colour and recorded low incidence of Yellow Vein Mosaic disease (2.8%) when compare to arka nikitha. But less yellow vein mosaic disease was noticed in sakthi hybrid.

Arka Nikitha was a high yielding bhendi hybrid, medium spreading type with plant height of 159 cm and fruits length of 12.01 cm. The fruits were green in colour, surface was rough with hairiness and less tolerant to yellow vein mosaic virus. Concerning to yield attribute, highest yield per hectare (16.6t/ha) was observed in TNAU bhendi hybrid CO4 and Arka Nikitha was second best in terms of yield (16.2t/ha), which may be due to the higher number of harvest (22), fruits per plant (28/plant) in TNAU bhendi hybrid CO4. Farmers as well as market preference are higher for TNAU bhendi Hybrid than Arka Nikitha in Salem District, because of its bigger size fruits with more number of fruits per plant. The highest BC ratio of 2.74 in was registered in TNAU bhendi hybrid CO 4 followed by Arka Nikitha and Sakthi recorded 2.71 and 2.49 respectively.

Table 1: Performance of different bhendi hybrids in Salem Districts

Technology options	Plant height (cm)	Fruit length (cm)	Fruit weight (g)	YMV incident percent (%)	Number of harvest	Number of fruits per plant	Green fruit yield (t/ha)	Net Returns (Rs. in lakh./ha)	B:C ratio
Technology 1 Arka Nikita	159	12.01	24.7	4.6	21	25	16.2	0.86	2.71
Technology 2 TNAU Bhendi Hybrid CO 4	162	13.6	25.6	2.8	22	28	16.6	0.95	2.74
Farmers Practice Sakthi hybrid	156	11.2	24.4	0.6	18	22.	15.9	0.93	2.49
Mean	159	12.27	24.9	2.66	20	25	16.2	0.91	2.64
CD5%	3.23	0.45	1.81	2.01	0.15	3.16	0.64		
S.Ed	1.27	0.21	0.79	0.89	0.09	1.25	0.28		
CV(%)	2.82	2.42	4.66	5.32	1.12	1.19	2.13		

Based on the assessment, the TNAU Bhendi Hybrid CO 4 having profuse flowering, more number of fruit and continuous fruit setting characters with moderately resistance to Yellow Vein Mosaic Virus. Arka Nikitha performance was medium yield with less tolerance to Yellow Vein Mosaic Virus in Salem District. The number of fruits and fruit yield variation amongst the hybrids of bhendi might be due to their genetic makeup and sink-source relationships. The current findings are agreed with Sivakumar *et al.*, (2020) ^[5], Meena *et al.*, (2021) ^[6], Kumar *et al.* (2017) ^[7].

Conclusion

In Salem District of Tamil Nadu, bhendi hybrid CO 4 and Arka Nikitha were registered the higher green fruit yield of 25.6 t/ha and 24.7 t/ha, respectively. The highest number of fresh fruits (28) per plant as well as highest individual fruit weight (25.6 g) were observed in bhendi hybrid CO 4, whereas the private hybrid logged in number of fruits (18), lowest individual fruit weight (24.4g) as well as fruit yield (15.9 t/ha) with less incidence of Yellow Vein Mosaic Virus. In Salem district, TNAU bhendi hybrid CO 4 was suitable among the bhendi growing farmers to get higher yield and net income as well benefit cost ratio.

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Competing Interests

No competing interests declared by the authors.

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