

EVALUATION OF OKRA VARIETIES FOR YIELD AND QUALITY TRAITS CULTIVATED UNDER HILL ZONE OF KARNATAKA, INDIA

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KEYWORDS

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ABSTRACT

Vegetable crop okra is well known for its Indian vegetable export and household consumption contribution (Anonymous. 2014), and thus should be explored for cultivation under various agro climatic zones. Higher production of this crop is possible by the cultivation of varieties or genotypes which shows remarkable enhanced returns, compared to other cultivars grown at same climatic conditions and inputs applied. Regions of Western Ghats of India, can serve to okra production in better way if the productive varieties can be screened for this region, which is lacking till date. Hence an attempt is made to recommend a variety, which perform better under Western Ghats climatic conditions of India. Five okra cultivars (VRO 6, Parbhani Kranti, Arka Anamika, JNDO 5 and Varsha Uphar) were evaluated in randomized complete block design, replicated four times. Analysis of variance revealed that all varieties differed significantly for all the traits except for node at first flower appear, number of branches per plant, fruit girth and number of ridges fruit per fruit. There was wide range of variation for earliness, growth, yield and quality parameters as well. These results showed presence of significant varietal effect. However, the present study demonstrated the superiority of Parbhani Kranti over other varieties in terms of days to first flowering (35.67 days), total yield per plant (170.54g), marketable yield per plant (133.97g) and having better growth and quality potentials under Indian western Ghats soil and climatic condition.

INTRODUCTION

Okra [*Abelmoschus esculentus* (L.)] is one of the important annual vegetable crop grown extensively in tropics, sub-tropics and warmer seasons of the temperate areas in the world. India ranks first in the production (73% of world's production) with productivity of 12 Metric tons per ha (Anon, 2014). It is native of Ethiopia (Vavilov, 1951). The immature tender pods are the edible part of this plant (known as capsule), which are consumed mostly fresh as cooked vegetable, but sometimes as sun-dried. Okra is rich source of essential micro and macro-nutrients so play an important role in nutritional, medicinal, and industrial value. Okra contains carbohydrate, proteins and vitamin C in large quantities (Adeboye and Oputa, 1996). Fresh okra pods are the most important vegetable source of viscous fibre, an important dietary component to lower cholesterol (Kendall and Jenkins, 2004). Mucilage is appropriate for medicinal and industrial uses. Medically it is useful for plasma replacement or blood volume expander. Industrially, okra mucilage is usually used in paper industry and also useful in sugarcane industry among other uses (Markose and Peter, 1990).

Apart from nutritional and health importance, okra is an imperative cradle in income generation and sustenance among rural farmers in developing countries like India. It has a vast potential as one of the foreign exchange earner crops and

accounts for 30% of the export of fresh vegetables excluding potato, onion and garlic, the destinations being the Middle East, Western Europe and USA. Although India is the leading country in okra production of 45.28 lakh tones with an area of 4.32 lakh hectares, productivity of 10.5 Mt/ha and the yield potential is very low. Thus, it is important to explore cultivation of his crop under various agro climatic zones. Higher production of this crop is possible by the cultivation of varieties or genotypes which shows remarkable enhanced returns, compared to other cultivars grown at same climatic conditions and inputs applied. Regions of Western Ghats of India, can serve to okra production in better way, if the productive varieties can be screened for this region, which is lacking till date. However, productivity could be improved through careful evaluation and selection of proper okra varieties based on location (Deepak *et al.*, 2015). Therefore, the study was undertaken with the objective of evaluation and identification of suitable okra variety for cultivation in hill zone of Karnataka.

MATERIALS AND METHODS

Field study was conducted at the College of Horticulture, Mudigere, during summer season of 2014 to evaluate the potentials of five okra cultivars popularly cultivated in Karnataka. Mudigere comes in hill zone of Karnataka with typical climate scenario. It is located at 13.13°N 75.63°E. It

has an average elevation of 915 meter. The annual rainfall is typically very high ranging from 3000 mm to 3500 mm per year. Five improved varieties VRO 6, Parbhani Kranti, Arka Anamika, JNDO 5 and Varsha Uphar comprised the experimental materials. The experimental design used for the study was a randomized complete block design, replicated four times. Standard cultural practices were followed throughout the experimental period to give the cultivars a favorable environment to fully express their genetic potentials. Five plants were randomly chosen and tagged for data collection as per the method suggested by Kadwey *et al.* (2015). Observations were taken as per the method of Adeoluwa and Kehinde (2011) with respect to, days to first flowering, days to first harvest, node at first flower appear, plant height, internodal length, number of branches per plant, average fruit weight, number of fruits per plant, total yield per plant, marketable yield per plant, fruit length, fruit girth and number of ridges for fruit. Data collected were subjected to analysis of variance to partition the variance into the various causes by using analysis of variance given by IARI, New Delhi official website software, along with H.A.U. Hisar, analysis software. Significant means were separated using the Critical Difference.

RESULTS AND DISCUSSION

The results on analysis of 5 varieties for 13 yield and quality traits under study are summarised in Table-1. All varieties differed significantly for all the traits except for node at first flower appear, number of branches per plant, fruit girth and number of ridges fruit per fruit. The result suggests the presence of tremendous variation among the five cultivars studied except for those characters that were not significant. The presence of wide genetic variability provides an indication of a better scope for genetic improvement. Similar results were reported by Akortkar *et al.* (2010), Adeoluwa and Kehinde.

(2011) Simon *et al.* (2013) and Sanganamoni Mallesh *et al.* (2015) for cultivar effect in all the studied traits.

Per se performance worked out on growth, flowering, earliness, yield and quality parameters are presented in Table 2. Days to first flowering varied significantly among the varieties. There was wide range of variation for earliness, growth, yield and quality parameters. Mean performance for days to first flowering ranged from 35.67 (Parbhani Kranti) to 39.33 (VRO-6), for days to first harvest ranging from 42.67 (JNDO-5) to 48.33 (VRO-6), and for node at first flower appear from 2.78 (Varsha Uphar) to 3.24 (Parbhani Kranti). For growth parameters varieties shown variation from 96.19 (Varsha Uphar) to 125.82 (Arka Anamika) for plant height, 3.93 (JNDO-5) to 6.05 (Arka Anamika) for internodal length and 3.07 (JNDO-5) to 3.47 (VRO-6, Varsha Uphar) for number of branches per plant and similar results were reported by Khan *et al.* (2002) and Rahman *et al.* (2012). Mean of performance for fruit quality and yield traits ranged from 15.72 (Arka Anamika) to 21.78 (JNDO-5) for average fruit weight, 12.67 (JNDO-5) to 20.67 (Arka Anamika) number of fruits per plant, 142.25 (Varsha Uphar) to 170.54 (Parbhani Kranti), for total yield per plant 11.79 (JNDO-5) to 16.08 cm (Arka Anamika), for fruit length, 1.63 (JNDO-5) to 2.53 (Parbhani Kranti) for fruit girth and 5 (VRO-6, Arka Anamika, JNDO-5 and Varsha Uphar) to 5.60 (Parbhani Kranti) for number of ridges for fruit. Similar results were reported by Khan *et al.* (2002), Rahman *et al.* (2012), Weerasekara, (2006) and Jindal *et al.* (2009).

Earliness is one of the important criteria for farmers, as early yield fetches higher price in the market. However, none of the variety was consistent across all the earliness parameters. Parbhani Kranti (35.67) was early flowering while JNDO 5 (42.67) gave first harvest earlier than other varieties. Varsha Uphar (2.78) was able to form first flower at lowest node. Plant height, lesser internodal length and more number of branches are desirable higher yield in okra. All the 5 varieties varied

Table 1: Analysis of variance (mean sum of squares) of okra varieties for various characters

Source	df	CH-1	CH-2	CH-3	CH-4	CH-5	CH-6	CH-7	CH-8	CH-9	CH-10	CH-11	CH-12	CH-13
Replications	3	1.79	25.73**	0.68	57.03**	0.99	0.37	4.14 *	0.81	2935.00 **	2623.02 **	2.53	0.02	0.32
Varieties	4	12.90**	24.65**	0.74	556.31**	2.53**	2.01	22.35**	37.54**	4289.69**	4128.61**	8.99**	0.22	0.21
Error	12	10.2	7.89	0.22	34.38	0.24	0.11	3.23	1.9	675.17	700.6	2.38	0.06	0.16

*and** indicate significance of values at $p=0.05$ and $p=0.01$, respectively.

Table 2: Per se performance of okra varieties for earliness, growth, yield and quality traits

Testers	CH-1	CH-2	CH-3	CH-4	CH-5	CH-6	CH-7	CH-8	CH-9	CH-10	CH-11	CH-12	CH-13
VRO 6	39.33	48.33	3.16	97.77	4.4	3.47	19.91	13.5	151.88	119.52	14.42	1.77	5
Parbhani Kranti	35.67	43	3.24	119.48	4.96	3.27	20.33	16.1	170.54	133.97	13.83	2.53	5.6
Arka Anamika	37	44.33	3.18	125.83	6.05	3.4	15.72	20.67	157.94	133.24	16.08	1.9	5
JNDO 5	38	42.67	3.02	111.31	3.93	3.07	21.78	12.67	151.84	127.47	11.79	1.63	5
Varsha Uphar	38.33	44.33	2.78	96.19	4.57	3.47	20.58	15.7	142.25	114.38	14	2	5
Mean	37.67	44.53	3.076	110.11	4.79	3.34	19.66	15.72	154.89	125.71	14.02	1.97	5.12
CD (P = 0.05)	5.13	10.53	0.76	19.42	0.79	0.53	4.91	4.24	41.96	42.51	2.45	0.33	0.65
CV (%)	7.76	5.75	13.51	6.04	10.54	10.12	9.66	7.53	14.35	17.45	11.37	10.41	7.78

CH-1	Days to first flowering	CH-6	No. of branches per plant	CH-10	Marketable yield per plant (g)
CH-2	Days to first harvest	CH-7	Average fruit weight (g)	CH-11	Fruit length (cm)
CH-3	Node at first flower appear	CH-8	No. of fruits per plant	CH-12	Fruit girth (cm)
CH-4	Plant height (cm)	CH-9	Total yield per plant (g)	CH-13	No. of ridges per fruit
CH-5	Internodal length (cm)				

significantly for these traits. Arka Anamika (125.83), JNDO 5 (3.93), Varsha Uphar (3.47) and Arka Anamika (20.67) showed highest plant height, lowest internodal length, more number of branches and more number of fruits per plant respectively over other varieties. JNDO 5 (21.78) and Arka Anamika (16.08) were able yield fruits with high average weight and length respectively. However, Parbhani Kranti gave higher total yield per plant (170.54) and higher marketable yield per plant (133.97). Parbhani Kranti gave early flowering, relatively early yield with good plant frame and appealing fruit quality. Our results collaborates with the work of Simon et al. (2013) and Weerasekara, D. (2006). The extent of variation and nature of performance of okra cultivars under hill zone of Karnataka provided useful information for selecting appropriate variety for cultivation. Present study demonstrated the superiority of Parbhani Kranti over other varieties in terms of days to first flowering (35.67), total yield per plant (170.54), marketable yield per plant (133.97) and having better growth and quality potentials under Western Ghats of India climatic and soil condition.

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