Title

PERFORMANCE OF OKRA [Abelmoschus esculentus (L.) Moench] HYBRIDS UNDER REDUCED LEVEL OF CHEMICAL FERTILIZERS SUPPLEMENTED WITH ORGANIC MANURES

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INTRODUCTION

The present productivity of vegetables in India is much lower than the potential productivity because of imbalance use of inorganic fertilizers with resulting deterioration of soil health. Thus, on one hand, quantum jump in production is the need by use of hybrids and at the same time to produce quality vegetables after maintaining soil fertility and environmental safety by adoption of Integrated Nutrient Management, is highly essential. Keeping this in view, field experiments were conducted to study the performance of okra hybrids under reduced level of chemical fertilizers supplemented with organic manures.

MATERIALS AND METHODS

The experiment was carried out at District Seed Farm of Bidhan Chandra Krishi Viswavidyalaya, West Bengal, India during kharif seasons of 2004 and 2005 following proper statistical methods. Fifteen F_1 hybrids of okra were evaluated under reduced level of chemical fertilizers (50% of Recommended Dose of Fertilizers @ 150:100:80 kg NPK/ha as 100 % RDF) with two sources of organic manure [cow dung manure (CDM) @ 25 t/ha and neem cake (NC) @ 2.5 t/ha] in a sandy loam soil with pH 6.4. The seeds were sown at 50 cm x 30 cm spacing in 4.5 m x 3.0 m plot area as per the treatment schedule during first week of July in both the years. Other recommended cultural practices except manuring were followed in time for all the treatments. Observations taken on different growth and yield attributes and yields as well were analyzed following the methods as suggested by Gomez and Gomez (1984).

RESULTS AND DISCUSSION

Significantly maximum plant height was recorded in hybrid Mahyco Bhendi No. 12 (138.53 cm), primary branches/plant in NOH 147 (2.07) and nodes/plant in Mahyco Bhendi No. 02 (29.67) However, statistical *parity* were recorded in hybrids like Mahyco Bhendi No. 01, Mahyco Bhendi No. 10, NOH 15, Sun 40 and Makhamalli for plant height; Indo 7215, NOH 15, Prova, Sun 08, Makhamalli and Bejo hybrids for branches/plant as well as in hybrid Vijaya, Mahyco Bhendi No. 10, Mahyco Bhendi No.12, NOH 15, Prova, Sun 08, Sun 40 and Makhamalli for nodes/plant with their corresponding higher values. Significantly earliness was recorded in Mahyco Bhendi No.12 (45.33 DAS) which was statistical *at par* with Vijaya, Indo 7215, Mahyco Bhendi No. 10, Sun 08, Sun 40, Makhamalli and Panchalli. However, the hybrid Mahyco Bhendi No. 02 took significantly maximum days to attained 50 % flowering (50.17 DAS).

Significantly better results in neem cake treated plots for different vegetative growth parameters than the corresponding cow dung manure treated plots might be due to better availability of NPK nutrients by neem cake than cow dung manure. Neem cake enhanced the mineralization of organic N, liberation of more P to the soil and higher K content. As a whole, neem cake brought about an increased nutrient availability and preponderance of different groups of microorganisms in soil, which create a favourable condition for vegetative growth of okra plants. In relation to earliness in flowering, it is considered as a genetically controlled trait in okra; however, other factors like environmental, cultural practices and nutrition of the plants also influence it to a considerable extent.

Regarding fruit parameters, hybrid Sun 40 produced significantly maximum number of fruits/plant (21.02) and fruit girth (1.69 cm), than rest of the hybrids, irrespective of sources of organic manures. However, maximum fruit length was observed in hybrid Mahyco Bhendi No.10 followed by Vijaya, and Sun 40.Higher fruit weights were obtained in hybrids like

Mahyco Bhendi No.01, NOH 15, Makhamalli and Bejo hybrids whereas lower fruit weights in Indo 7215.

In all cases, application of neem cake had significantly better fruit parameters as compared to cow dung manures, irrespective of hybrids. The better efficacy of neem cake might be due to better availability and uptake of nutrients.

Table 1. Performances of F_1 hybrids of okra under organic manures.

Variety	Plant height (cm)	No. of primary branches /plant	Nodes /plant	Days to 50% flowering	Fruits /plant	Fruit length (cm)	Fruit girth (cm)	Fruit weight (g)	Yield (q/ha)
Vijaya	107.55	1.78	28.92	46.00	19.35	15.31	1.54	16.83	99.36
Indo 321	103.01	1.77	25.49	47.17	14.39	13.53	1.51	17.00	74.75
Indo 7215	105.74	1.83	26.17	46.33	14.12	12.74	1.61	15.33	68.94
Mahyco 01	137.43	1.19	26.32	48.17	19.10	13.75	1.55	18.00	102.72
Mahyco 02	108.95	1.53	29.67	50.17	16.97	13.80	1.38	15.33	79.68
Mahyco 10	136.61	1.75	29.32	46.00	19.31	15.46	1.66	17.00	101.31
Mahyco 12	138.53	1.80	29.53	45.33	20.50	14.87	1.66	17.17	103.38
NOH 15	137.66	1.83	29.18	46.50	20.94	14.97	1.64	17.33	107.98
NOH 147	101.83	2.07	26.72	47.67	14.93	13.30	1.39	16.17	74.75
Prova	111.50	2.05	28.70	47.33	14.80	14.58	1.57	17.17	79.68
Sun 08	125.28	2.02	29.35	46.00	18.77	14.89	1.63	17.00	99.36
Sun 40	137.05	1.65	29.45	46.17	21.02	15.01	1.69	17.17	105.68
Makhamalli	136.70	1.98	29.09	46.17	20.38	14.97	1.69	17.33	107.43
Panchalli	101.31	1.80	26.55	45.50	15.36	13.23	1.62	16.17	74.30
Bejo hybrids	115.56	2.03	27.22	47.83	14.33	14.37	1.61	17.33	76.99
CDM	118.90	1.75	27.55	47.38	17.01	13.89	1.55	16.57	86.91
NC	121.72	1.86	28.67	46.27	18.22	14.74	1.61	17.08	93.93
	CD (5%)	CD (5%)	CD (5%)	CD (5%)	CD (5%)	CD (5%)	CD (5%)	CD (5%)	CD (5%)
Variety (V)	5.21	0.25	1.32	1.16	1.82	0.76	0.08	1.05	9.38
Org. manure (OM)	1.90	0.09	0.48	0.42	0.67	0.28	0.03	0.38	3.43
V x OM	NS	NS	NS	NS	NS	NS	NS	NS	NS

A perusal of data on total yield revealed significant variations among the hybrids and organic manures, except their interactions. The hybrid NOH 15 recorded maximum total fruit yield (107.98 q/ha) and was closely followed by Makhamalli, Sun 40 , Sun 08, Mahyco Bhendi No. 12,Mahyco Bhendi No. 10. The relatively high yield in the above mentioned varieties, irrespective of organic manures used, might be due to significantly higher effective node/plant and different yield attributes. Further, both fruits/plant and fruit weight are the direct and positive contributory characters to fruit yield due to their direct effects in okra (Balakrishnan and Balakrishnan, 1990). The better performance of NOH 15 has been reported by and Neeraja *et al.* (2002).

Superiority of neem cake for total fruit yield was evident over cow dung manure application. The interaction effects of hybrids and organic manures were non-significant but invariably all the hybrids performed better under neem cake than cow dung manure application.This might be due to significant influence in terms of vegetative growth parameters, reproductive behaviour, fruit parameters and finally the green fruit yield.

Based on these results, it may be concluded that under the agro climatic conditions of West Bengal, India hybrids like NOH-15, Makhamalli, Sun 40, Mahyco Bhendi No.12 can be recommended for commercial cultivation under reduced level of fertilizers (50% RDF) with neem cake@ 2.5 t/ha during kharif season.

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