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Effect of different sources of nitrogen on growth and yield of okra (*Abelmoschus esculentus* L. Moench) var. ARKA ANAMIKA

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ABSTRACT

The vegetative growth parameters *viz*., plant height, plant spread, number of leaves per plant and leaf area have been significantly influenced by different sources of nitrogen. The plant height was maximum (117.63 cm) in application of 100% N through neem cake. Similarly the growth in terms of plant spread, number of leaves per plant and leaf area was significantly higher in the treatment T_6 (100% N through neem cake). As regards to the yield parameters, all yield contributing characters like weight and length of fruit, yield per plant and yield per hectare were significantly influenced due to different treatments tried. The treatment T_6 recorded significantly maximum weight and length (17.55 g and 17.68 cm, respectively) of okra fruit. The yield per plant was maximum (217.09 g) with treatment T_6. The highest yield (126.57 q/ha) was obtained in treatment100% N through neem cake.

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Key words : Growth, Yield, Vermicompost, Neem cake

INTRODUCTION

Okra or bhendi [*Abelmoschus esculentus* (L.) Monech] is mainly cultivated for its immature fruits which are used as vegetable. It is a good source of vitamin A, B and also contain C. It is rich in protein, iodine, calcium, potassium and other mineral matters. Okra is said to be very useful against genitourinary disorders, spermatorrhoea and chronic dysentery (Nadkarni, 1972). Besides its use as vegetable, okra has some industrial importance. Matured fruits and stems containing crude fibre are used in the paper industry. Okra produces fibre up to 2.2 to 7.2 per cent (Singh, 1998). Organic manures play an important role in quality production of vegetable crops. Shankaran (1996) and Kannaiyan (2002) reported that organically grown products are high in quality. (Venkataratham and Purushotham, 2002) found increased yield, shelf life, quality, etc. in organically grown vegetables. Continuous and unbalanced use of chemical fertilizers are leading to decrease in nutrient uptake efficiency of plants resulting in decrease in crop yield (Maurya and Beniwal, 2003). There are also problems of loss of applied fertilizers through leaching, volatilization and de-nitrification of nitrogen and fixation of phosphorus. Among the different organic manures used, farm yard manure is a commonly used manure, plays an additional role than its capacity to contribute N, P, K. Therefore, keeping in view of the above points, an experiment was conducted to decide proper combination of organic manure and inorganic fertilizers for better growth and yield of okra var. ARKA ANAMIKA.

MATERIALS AND METHODS

The field experiment was conducted at Department of Horticulture, Marathwada Agricultural University, Parbhani with variety Arka Anamika in monsoon 2008-09 to study effect of different sources of nitrogen on growth and yield of okra [*Abelmoschus esculentus* (L.) Moench]. The experiment was laid out in simple Randomized Block Design with three replications and seven treatments. In this investigation the crop was applied with following nutrient sources T_1 (100% N through RDF), T_2 (100% N through sheep manure), T_3 (100% N through FYM), T_4 (100% N through vermicompost), T_5 (100% N through poultry manure), T_6 (100% N through neem cake), T_7 (control- without any fertilizer). Observations were recorded and statistically analyzed as per method given by Panse and Sukhatme (1967).

RESULTS AND DISCUSSION

The findings of the present study as well as relevant discussion have been summarized under following heads:

Effect on vegetative growth:

The vegetative growth parameters *viz*., plant height, spread of plant, number of leaves per plant, leaf area have been significantly influenced by different nitrogen sources (Table 1).

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Height of plant (cm):

At 30 and 60 days after sowing, the treatment 100% N through neem cake (T_6) recorded statistically more plant height (67.34 cm and 97.13 cm, respectively) over the rest of the other treatments, except treatment T_1 (100% N through RDF) and the lowest height of the plant (38.50 cm and 59.86 cm, respectively) was observed in control. Similar at 90 days after sowing, the tallest plant height (117.63 cm) was recorded in treatment T_6 (100% N through neem cake) which was significantly superior over other treatments except treatment T_1 (100% N through RDF) which was at par. Significantly lowest plant height (95.12 cm) was recorded in control. This might be happened due to insufficient availability of nutrients. The findings are similar with the findings of Darley *et al.* (1988) and Kumaran *et al*. (1998).

Spread of plant and Leaf area (cm^2):

Data depicted in Table 1 regarding plant spread clearly indicated that, at 30 and 60 days after sowing, the treatment 100% N through neem cake (T_6) recorded maximum plant spread (2343.12 cm^2 and 3736.91 cm^2, respectively) and leaf area (148.69 cm^2 and 449.12 cm^{2-}, respectively) which was significantly superior over rest of the other treatments. The lowest plant spread (1729.60 cm^2 and 2768.42 cm^2, respectively) and leaf area (138.23 cm^2 and 380.75 cm^2, respectively) was recorded in control. It was clear from the observation taken at the end of crop duration at 90 days after sowing that the treatment T_6 (100% N through neem cake) was significantly superior regarding plant spread and leaf area (4846.32 cm^2 and 505.50 cm^{2-}, respectively) and lowest (3662.70 $cm^2$and 412.89 cm^2) was observed in control. These findings are supported by results reported by Shelke *et al*. (1999) and Yadav *et al.* (2002).

Number of leaves per plant:

The treatment 100% N through neem cake produced significantly more number of leaves per plant (8.93 and 18.60) and in control recorded minimum number of leaves (6.92 and 15.86) at 30 and 60 days after sowing, respectively. Similar trends in number of leaves was observed at 90 days after sowing revealed that among the treatments, 100% N through neem cake recorded maximum number of leaves (22.00). Significantly minimum number of leaves (17.53) per plant was recorded in treatment control. The reason for increased number of leaves per plant could be attributed due to the solubilization effect of plant nutrients by addition of neem cake and vermicompost leading to increased uptake NPK as has been reported by Subba Rao and Ravishankar (2002). Similar results were also obtained by Shelke *et al.* (1999) in brinjal.

Effect on Yield parameters:

The various attributes on yield *viz*., weight and length of fruit, yield per plant and yield per hectare were significantly influenced due to different treatments (Table 2).

Weight and length of fruit:

The treatment 100% N through neem cake has recorded maximum weight (17.55 g) and length (17.68 cm) of fruit which were at par with other treatments while minimum weight of fruit and length of fruit were recorded in control (14.39 g and 12.39 cm, respectively). This might due to accelerated mobility of photosynthates from the source to the sink as influenced by growth hormone

Table 1: Effect of different sources of nitrogen on growth okra [*Abelmoschus esculentus* (L.) Monech]

Sr. No.	Treatments	Plant height (cm)			Plant spread (cm^2)			No. of leaves per plant			Leaf area (cm^2)		
		30 DAS	60 DAS	90 DAS	30 DAS	60 DAS	90 DAS	30 DAS	60 DAS	90 DAS	30 DAS	60 DAS	90 DAS
T_1	100% N through RDF	63.43	88.18	114.18	2212.48	3483.10	4680.12	8.42	17.80	20.80	148.03	448.08	500.08
T_2	100 % N through sheep manure	49.53	74.64	103.13	2012.59	3223.48	4220.18	7.83	17.20	20.60	146.64	444.50	492.67
T_3	100 % N through FYM	45.42	72.06	96.10	1861.13	2878.72	3812.47	7.46	16.80	18.00	141.72	408.33	484.44
T_4	100% N through vermicompost	46.86	73.12	98.12	1872.45	2929.38	3879.17	7.49	16.96	18.53	143.28	412.78	488.72
T_5	100% N through poultry manure	58.12	82.34	04.40	2138.56	3273.12	4223.48	8.20	17.62	20.63	147.75	446.12	496.07
T_6	100% N through neem cake	67.34	97.13	117.63	2343.12	3736.91	48.46.32	8.93	18.60	22.00	148.65	449.12	505.50
T_7	Control	38.50	59.86	95.12	1729.60	2768.42	3662.70	6.92	15.86	17.53	138.23	380.75	412.89
	S.E. ±	1.35	1.12	1.31	29.67	22.79	14.14	0.015	0.024	0.50	0.70	0.90	3.50
	C.D. (P=0.05)	4.17	3.47	4.40	91.30	70.12	43.53	0.046	0.075	1.54	2.18	2.76	10.79

Table 2 : Effect of different sources of nitrogen on yield of okra [*Abelmoschus esculentus* (L.) Monech]

Sr. No.	Treatments	Length of fruit (cm)	Weight of fruit (g)	Yield per plant (g)	Yield per hectare (q)
T_1	100% N through RDF	16.00	16.62	207.41	120.96
T_2	100 % N through sheep manure	13.66	15.13	184.43	107.49
T_3	100 % N through FYM	13.16	14.72	176.64	102.99
T_4	100% N through vermicompost	15.28	16.20	202.91	118.29
T_5	100% N through poultry manure	14.42	15.28	198.12	115.45
T_6	100% N through neem cake	17.68	17.55	217.09	126.57
T_7	Control	12.39	14.39	158.86	92.56
	S.E. $\pm$	0.033	0.058	1.80	1.05
	C.D. (P=0.05)	0.10	0.17	5.55	3.24

released or synthesized due to the organic source of manures. This is in accordance with the findings of Abusaleha and Shanmugavelu (1988).

Yield per plant:

The maximum yield per plant (217.09 g) in treatment T_6 (100% N through neem cake) which was significantly superior over rest of the treatments while the lowest yield per plant (158.86 g) was observed in control. Similar results were obtained by Hilman and Suwandi (1989) and Patel *et al.* (1999).

Yield per hectare:

Among different treatments T_6 (100% N through neem cake) produced highest yield (126.57 q/ha), while lowest yield (92.59 q/ha) was noted in control. Kurup *et al.* (1997) indicated that the application of 100 kg N/ha as neem cake blended with urea produced highest yield in okra.

REFERENCES

Abusaleha and Shanmugavelu, K.G. (1988). Studies on the effect of organic v/s inorganic source of nitrogen on growth, yield and quality of okra [*Abelmoschus esculentus* (L) Moench]. *Indian J. Hort.*, **45**(3-4):312-318.

Hilman, Y. and Suwandi (1989). Effect of different kinds and rates of FYM on the tomato cultivar, Gondol. *Bulletin penelition Hort.*, **18**(2):33-43.

Jose, Darley, Shanmugavalu, K.G. and S. Thamburaj (1988). Studies on the efficiency of organic v/s inorganic form of nitrogen in brinjal. *Indian J. Hort.*, **45**(1-2):100-103.

Kumaran, S., Natarajan, S. and S. Thamburaj (1998). Effect of organic and inorganic fertilizers on growth yield and quality of tomato. *South Indian J. Hort.*, **46**(3-4):203-205.

Kurup, B.S., Pushpakumari, R. and Isaac, S.R. (1997). Enhancing nitrogen use efficiency in okra with nitrification inhibitors. *Veg. Sci.*, **24**:1, 10-12.

Kannaiyan, S. (2002). Biological input supply and quality control for vegetable production. International Conference on Vegetable held at Bangalore on 11-14 Nov., 2002.

Panse, V.G. and Sukhatme, P.V. (1967). *Statistical methods for agricultural workers*, ICAR, New Delhi, Publication.

Maurya, R.P. and Beniwal, V.S. (2003). Use of biofertilizers in horticultural crops. *Agrobios Newsletter*, **1**(11):12-13.

Nadkarni, K.M. (1972). *Indian meteria medica*, Nadkarni and Co., Bombay.

Patel, H.R., Patel, B.A. Vyas, R.V., Patel, D.J. and Dhawan, S.C. (1999). Organic amendments in management of root-knot nemetodes in bottle gourd proceeding of national symposium rational approaches in nematode management for sustainable agriculture. Anand, India. 23-25 November, 1998, 7-9.

Shankaran, S. (1996). Soil fertility management for reconciling sustainability with productivity. *J. Indian Soc. Soil Sci.*, **44** (4):593-600.

Shelke, S.R., Adsule, R.N. and Amrutsagar, V.M. (1999). Nitrogen management through organics and inorganics in brinjal. *J. Maharashtra Agric. Univ.*, **24**(3):297-298.

Singh, S.P. (1998). *Production technology of vegetable crops*. Agricultural Research Communication, Centre, Karnal, 71pp.

Subba Rao, T.S. and Ravishankar (2002). Effect of organic manures on growth and yield of brinjal. *South Indian J. Hort.*, **49**(Special) : 288-292.

Venkataratham, L. and Purushotham, G. (2002). Organic farming some observations and vegetable production by a few farmers. International Conference on Vegetable held at Bangalore on 11-14Nov., 2002.

Yadav, V.S., Yadav, B.P. and Sharma, Y.K. (2002). Effect of NICAST (organic manure) in comparison to recommended doses of manure and fertilizer in cabbage. *South Indian J. Hort.*, **49**(Special):157-159.

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