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EFFECT OF FYM AND PHOSPHORUS ON GROWTH AND YIELD OF OKRA (*ABELMOSCHUS ESCULENTUS L.*)

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Abstarct

A field experiment was conducted during *rabi* season of 2015-16 at the Bundelkhand University Farm, Jhansi (U.P.) to study the effect of FYM and P on growth and yield of okra. Application of FYM up to 30t/ha resulted in significantly higher plant growth, yield and yield attributes as compared to 20 t FYM/ha. The maximum fruit yield was 65.3 q/ha under 30 t/ha as against only 61.5 q/ha from 20 t FYM/ha. The applied phosphorus up to 100 kg/ha resulted in maximum growth, yield- attributes and yield up to 81.2 q/ha just double than the yield from without phosphorus.

Key words: Effect of FYM and Phosphorus, growth, yield and quality of okra

Introduction

Okra (*Abelmoschus esculentus L.)* is an economically important vegetable crop grown in tropical and subtropical parts of India. Under the heavy pressure of cropping and imbalanced nutrient management in present days, the productivity of this crop can only be maintained at the sustainable extent by using organic manures along with inorganic fertilizers. The use of FYM is the tool to improve the physical, chemical and biological properties of the soil. FYM being the source of all essential elements, improves soil organic matter and humus part of soil. Phosphorus is an indispensable nutrient for okra. It is a constituent of protein, nucleic acid, phospholipids and enzymes. It also regulates the transfer of energy and metabolic activities in plants phosphorus deficiency is the key factor for poor yield of okra in most of the soils. The formation of insoluble-P due to P-fixation in soil is also a problem. Looking to all these facts, the present research was taken up to enhance the productivity of okra under the existing agro-climatic conditions.

Materials and methods

A field experiment was conducted during *kharif* season of 2014 at the Bundelkhand University farm, Jhansi (U.P.). The soil of the experimental field was sandy loam having pH 7.4, organic carbon 0.48%, available $N_1P_2O_5$ and K_2O 212, 14 and 185 kg/ha, respectively. The treatments comprised three of FYM (20, 25 and 30 t/ha) and four levels of phosphorus (0, 40, 80 and 100 kg/ha). The experiment was laid out in randomized block design (factorial) with three replications. The okra variety Arka Anamika was sown on January 2014 with the actual seed rate @ 30 kg/ha. The crop was grown as per recommended package of practices.

Results and discussion

Growth Parameters

The scrutiny of data in table 1 indicate that the application of FYM up to 30 t/ha increased the growth parameters significantly over 20 t FYM/ha. The maximum plant height was 33.5 cm, plant girth 5.4 cm, plant spread 43.6 cm, number of leaves 22.8/plant, fresh and dry weight 154 and 84 g/plant, respectively. The boosted vegetative growth due to FYM may be as a result of its usefulness as a store-house of plant nutrients, reduction in volatilization losses of urea-N, leaching and run off, reduced fixation of applied-P, improved soil aeration and root development, reduced evaporation and augmentation of biological activities in the rhizosphere. The results commemorated with the findings of Rakshifond Sen (2008), Chattoo *et al.* (2009), Jadhav *et al.* (2009), Bairwa *et al.* (2009) and Rakshit (2009).

Application of phosphorus up to 100 kg/ha resulted in almost significantly increases in plant height (3h, 5cm), plant girth (5.6cm) plant spread (45.8cm) leaves (24.3/plant), fresh and dry weight (160 and 92 g/plant, respectively) against the preceding levels. This might be due to increased availability phosphorus leading to better

Table 1: Growth, yield and yield-attributes of okra as influenced by FYM and Phosphorus levels.

Treatments	Plant Height (cm)	Plant girth (cm)	Plant spread (cm)	Leaves / Plant	Fruits / Plant	Fruits girth (cm)	Fruit length (cm)	Fresh weight / Plant (cm)	Dry weight / Plant(g)	Fruit Yield (q/ha)
FYM Levels (t/ha)										
20	29.1	3.8	41.5	21.2	7.5	7.2	8.5	146	68	61.5
25	32.4	4.9	42.8	22.4	8.4	8.1	8.7	152	75	63.4
30	33.5	5.4	43.6	22.8	9.0	9.2	9.2	154	84	65.3
CD (P=0.05)	1.5	0.9	1.6	0.9	1.0	1.0	0.9	5.5	9.6	3.6
Phosphorus levels (kg/ha)										
0	28.8	3.2	36.6	18.1	5.0	5.1	6.8	140	56	40.5
40	30.4	4.6	42.8	22.0	8.3	8.1	8.4	150	71	69.4
80	32.6	5.0	44.3	24.1	9.8	9.4	8.4	152	83	74.4
100	34.5	5.6	45.8	24.3	10.1	10.2	10.4	160	92	81.2
CD (P=0.05)	1.5	0.9	1.6	0.9	1.0	1.0	0.9	5.5	9.6	3.6

nutritional environment in the root zone for growth are development. Similarly increased supply of available phosphorus plays an important role in the conversion and transfer of energy in the metabolic reactions of living cells including biological energy transformation. These providing conductive conditions for the better utilization of photosynthesis which ultimately coursed better vegetative growth, flowing and fruiting. The present findings are in accordance with those of Tangjang *et al.* (2007), Rajpaul *et al.* (2007), Chattoo *et al.* (2009), Jadhav *et al.* (2009), El-Shaikh are Mohammed (2009).

Yield-attributes and yield

Application of the highest level of 30 t/FYM/ha brought about significantly higher yield-attributes and consequently fruit consequently yield of okra as compared to 20 t FYM/ha only. That means 25 and 30 t FYM/ha were found equally effective where fruits were 8.4 to 9.0/plants, fruit girth 8.1 to 9.2 cm, fruit length 8.7 to 9.2 cm and therefore fruit yield 63.4 to 65.3 q/ha. However, all these parameters were found maximum with 30t FYM/ha. This may be due to stimulated growth which produced photosynthetic surface and assimilation for over all development of reproductive structure which ultimately enhanced the yield-attributing characters under higher levels of FYM. Thus the fruit yield obtained from 25 to 30t FYM/ha was exactly in accordance with the yield-attributing characters from such FYM levels. Similar observations by the application of FYM have been reported by Rakshit and Sem (2008), Bairwa *et al.* (2009), Jadhav *et al.* (2009) and Rakshit (2009).

Addition of phosphorus up to 100kg/ha enhanced the yield-attributes and fruit yield significantly in comparison to the previous levels. The maximum fruits were 10.1/plant, fruit girth 10.2cm and fruit length 10.4 cm, therefore the maximum fruit yield was 81.2 q/ha.

The increase in yield-attributes due to P application may be utilization of large quantities of nutrients through their well developed root system which might have resulted in better plant development and ultimately yield-attributes. The increase in okra yield may be attributed to the effective metabolic activities coupled with increased rate of photosynthesis leading to better translocation of nutrients in sink. These findings are in confirmation with those of Rajpaul *et al.* (2007), Chattoo *et al.* (2009), Jadhav *et al.* (2009) and El-Shaikh and Mohammed (2009).

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