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EFFECT OF N, P AND K ON THE GROWTH AND YIELD OF BHINDI (*Abelmoschus esculentus* L.) IN THE RECLAIMED ALLUVIAL SOILS OF KUTTANAD, KERALA

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ABSTRACT

A field experiment to study the effect of graded doses of nitrogen (25, 50 and 75kg N/ha), phosphorus (5, 10 and 15 kg P₂ O₅/ha) and potash (15, 30 and 45kg K₂O/ha) on the growth and yield of bhindi, *Abelmoschus esculentus* (variety Pusa savani) grown in the reclaimed alluvial soils of Kuttanad was conducted at the Regional Agricultural Research Station, Kumarakom. Nitrogen had a significant effect on the yield of bhindi fruits and 75 kg N/ha was found to be significantly superior to 25 and 50 kg N/ha. But the effect of P and K were statistically significant. The NK interaction effect was statically significant with the combination N₇₅K₁₅ producing the maximum yield. In general, the NPK combinations were significantly superior to the absolute control (N₀P₀K₀) in their effect on yield and yield components of bhindi.

Bhindi (*Abelmoschus esculentus* (L.), Moench) otherwise known as 'okra', is an important vegetable crop cultivated throughout Kerala for its immature fruits. It thrives on all types of soil and is tolerant to acidity. Among the important varieties grown, Pusa savani is the popular one on account of its high yield, better quality and tolerance to 'vein

clearing' disease. However, the fertilizer requirement of the crop has not so far been worked out particularly for the reclaimed alluvial soils of Kuttanad where the crop is now extensively grown under the partial shade of coconut. Therefore, the present study was undertaken to find out the response of bhindi cv, Pusa savani to N, P and K in the

reclaimed alluvial soils of Kuttanad, Kerala.

MATERIALS AND METHOD

The experiment was conducted at the Regional Agricultural Research Station, Kumarakom for three seasons. The soil was a reclaimed alluvium, acidic in reaction (pH 5.4), medium in total N (0.096%) and high in available P (64 kg P₂O₅/ha) and K (278 kg K₂O/ha).

The design of the experiment was 3³ + 1 partially confounded factorial in R.B.D. with two replications. Three levels each of Nitrogen (25, 50, and 75 kg N/ha), phosphorus (5, 10 and 15 kg P₂O₅/ha) and potassium (15, 30 and 45kg K₂O/ha) in all possible combinations plus one absolute control (N₀P₀K₀) in each sub block contributed the treatments. Nitrogen, phosphorous and potash were applied as urea, super phosphate and muriate of potash, respectively. Half the does of N and K and full dose of P were applied at seeding. The remaining quantities of N and K were applied in two equal splits at 30 and 60 days after seeding. The plot size was 3 x 4.05 m. The seeds were dabbled at the rate of two seeds per hill in lines at a spacing of 60 x 45 cm.

The tender fruits were harvested twice every week and observations on number of fruits per plant, fruit length, plant height, yield of haulm, harvest index and per cent of damage due to fruit borer attack were recorded. The data relating to various growth and yield

attributes were gathered from a sample of ten plants from each treatment.

RESULTS AND DISCUSSION

The data on fruit yield and yield contributing characters revealed that a applied nitrogen increased the fruit yield significantly over the control during all the three seasons. The nature of response was linear although the difference between the levels 25 and 50 kg N/ha did not touch the level of statistical significance. The yield response per unit dose of N was 81.3 kg at the 75 kg/ha level and 92.2 kg per kg of nitrogen at the 50 kg/ha level. The linear nature of response to added nitrogen in the alluvial soil having inherently low available N status, emphasises the need for further increasing the does of nitrogen for realising better yields. Similar linear response of the crop to added nitrogen has been reported by Sundaram *et al.* (1969) and Kamalanathan *et al.* (1970).

The number of fruits per plant was also significantly influenced by the level of nitrogen. As in the case of fruit yield, N at 75 kg/ha provided the maximum number of fruits per plant. This is obvious because in bhindi, the yield is a function of the number of fruits per plant.

In the case of yield of per unit also the effect of nitrogen was significant, with the highest level (75 kg N/ha) recording more yield over the other levels. However, the differences between the levels 25 and 50, and 50 and 75 kg N/ha were not significant. This increased

TABLE 1. Effect of n, p and k on the growth, yield and yield components of bhindi (mean of 3 seasons)

Treatments	Yield of fruits (t/ha)	No. of fruits per plant (transformed)	Length of fruit(cm)	Height of plants (cm)	Haulum yield (t/ha)	% of fruits affected by borer (transformed values)	No. of pickings
25 kg N/ha	5.70	3.00	16.20	109.28	3.36	22.55	3.92
50 Kg N/ha	6.86	3.23	15.03	124.14	4.07	22.63	3.92
75 kg N/ha	8.35	3.44	15.25	132.32	4.81	21.97	3.92
CD (0.05)	1.38	0.32	NS	5.143	0.86	NS	NS
SE (M) ±	0.48	0.11	1.05	14.92	0.30	0.29	0.02
5 kg P ₂ O ₅ /ha	6.40	3.13	14.77	120.09	4.07	22.63	3.91
10 kg P ₂ O ₅ /ha	7.13	3.23	16.72	119.31	4.04	22.06	3.92
15 kg P ₂ O ₅ /ha	7.39	3.31	14.99	126.34	4.53	22.46	3.94
CD (0.05)	NS	NS	NS	NS	NS	NS	NS
SE (M) ±	0.48	0.11	1.05	14.92	0.30	0.29	0.02
15 kg K ₂ O/ha	7.20	3.28	14.85	117.38	3.84	22.30	3.94
30 kg K ₂ O/ha	6.28	3.09	14.63	119.02	3.93	22.38	3.92
45 Kg K ₂ O/ha	7.44	3.30	16.99	129.33	4.48	22.46	3.91
CD (0.05)	NS	NS	NS	NS	NS	NS	NS
SE (M) ±	0.48	0.11	1.05	14.2	0.30	0.29	0.02

yield may probably be due to the influence of this nutrient on the vegetative growth of the crop. The growth characters like height of plant also showed a similar significant trend.

The direct effect of applied phosphorus and potash was not significant either on yield or on any of the characters studied. This might be due to the high

initial status of these nutrients in the soil. Lack of response to applied phosphorus and potash has been reported by Sundaram *et al.* (1969), Kamalanathan *et al.* (1970) and Chandrasekharan *et al.* (1970).

The data on number of pickings and percentage of damage due to fruit borer attack showed an erratic trend.

Among the nutrient interactions the N x K interaction alone was statistically significant, on fruit yield. Nitrogen and potash combination at 75 kg and 15 kg/ha, respectively, produced the highest fruit yield of 9.25 t/ha and it was significantly superior to N₂₅K₁₅, N₂₅K₃₀ but was on par with the others (Table 2)

The yield recorded by different NPK combinations and the absolute control (N₀P₀K₀) showed that, in general the NPK combinations were significantly superior to the absolute control in their effect on yield and yield components. The results indicate the need for increasing the dose of nitrogen to 75 kg/ha (or even more, since the response is liner)

and reducing the doses of P and K to the minimum levels of 5 and 15 kg, respectively, per hectare, in the reclaimed alluvial soils of Kuttanad. This NPK combination of 75:5:15 produced a fruit yield of 6.97 t/ha as against 2.25 t/ha by the absolute control (N₀P₀K₀). This combination also resulted in a net profit of Rs.11,526/- per hectare to the farmer at the prevailing prices of the inputs and the produce (Table 3)

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