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YIELD AND YIELD ATTRIBUTING CHARACTERS AND ECONOMICS OF *(ABELMOSCHUS ESCULENTUS* MILL) AS INFLUENCED BY NUTRIENTS

Among the vegetables, bhindi occupies an important place on account of its tender green fruits. The development of larger number of improved varieties with wider acceptability and standardisation of their production techniques for agroclimatic conditions has made great popularity for mis crop all over India. In order to cater the demand, production potential of vegetable bhindi needs further agronomic studies. With this background, the study was undertaken to determine the optimum quantity of fertilizers and their application in splits to maximise the production of quality bhindi fruits. The experiment was conducted at the College of Agriculture, Vellayani, Trivandrum during 1990. The soil of the experimental site was sandy clay loam, low in available nitrogen (232.5 kg ha^{-1}), medium in available phosphorus (40 kg ha^{-1}) and low in available potassium (117 kg ha^{-1}) and the pH of the soil was 5.0. The treatments were four different combinations of nitrogen, phosphorus and potassium viz., F_1 - 330:110:220 kg ha^{-1}, F_2 - 220:73:146 kg ha^{-1}, F_3 - 110:37:73 kg ha^{-1}, F_4 - 50:8:30 kg ha^{-1} of N, P_2O_5, K_2O and three methods of split application of nutrients viz., S_1 - two equal splits, 1/2 each as basal and 30 days after sowing, S_2 - four equal splits, 1/4 each as basal, 20 days after sowing (DAS), 40 DAS and 60 DAS and S_3 - six equal splits each as basal, 15 days after sowing (DAS), 25 DAS, 35 DAS, 45 DAS and 55 DAS.

Table 1. Yield attributing characters of bhindi as affected by nutrient levels and its split application

Treatments	Days to 50% flowering	No. of flowers / plant	No. of fruits / plant	Length of fruit cm	Grith of fruit cm
Nutrient levels					
F1	42.00	36.69	20.98	16.91	5.98
F2	40.08	36.49	17.93	16.73	6.11
F3	39.67	35.56	18.24	16.92	6.01
F4	38.08	30.49	16.55	17.09	5.90
CD (0.05)	0.51	5.54	3.62	NS	NS
Split application of nutrients					
S1	40.25	35.04	18.10	16.91	6.05
S2	39.94	33.90	18.16	16.90	5.96
S3	39.69	37.73	18.50	16.93	5.99
CD (0.05)	0.44	NS	NS	NS	NS

Table 2. Fruit yield per plant and total fruit yield as affected by nutrient levels and its split application

Treatments	Fruit yield / plant, kg	Total fruit yield, t ha^{-1}
Nutrient levels		
F1	2.66	9.317
F2	2.53	8.843
F3	2.51	8.802
F4	1.93	6.773
CD (0.05)	0.31	1.06
Split application of nutrients		
S1	2.44	8.533
S2	2.40	8.415
S3	2.39	8.353
CD (0.05)	NS	NS

The experiment was laid out as a factorial experiment in randomised block design with four replications. All together 25 harvests were taken during the entire cropping period. The yield and yield attributing characters were analysed statistically and presented in Table 1. Days to 50 per cent flowering was significantly delayed with increasing levels of

Table 3. Economics of cultivation

Treatments	Total cost of production (y), Rs	Fruit yield, kg	Value (x), Rs	Net profit (x-y), Rs	: Benefit cost ratio (x/y)
Nutrient					
F1	23587.06	9317.40	37269.60	13682.54	1.58
F2	22275.99	8843.00	35372.00	13096.01	1.59
F3	21411.42	8801.60	35206.40	13794.98	1.64
F4	20184.64	6772.50	27090.00	6905.36	1.34
Split application of nutrients					
S1	19422.40	8533.30	34133.20	14710,80	1.76
S2	22083.00	84147.00	33658.80	11575.80	1.52
S3	24089.07	8352.80	33411.20	9322.13	1.37

1 kg N - Rs 7.61 ; 1 kg P_2O_5 - Rs 7.81 1 kg K_2O - Rs 2.50; 1 kg bhindi - Rs 4

nutrients. Higher levels of nutrients significantly increased the number of flowers formed by plant. The higher availability of nutrients might have enabled the plant to produce more number of flower buds. Higher nutrient levels significantly increased the number of fruits formed per plant and this may be due to the increased production of flowers at higher levels of fertiliser application. Majanbu *et al.* (1985) reported that nitrogen and potassium application increased the number of fruits formed per plant and Mishra and Pandey (1987) reported similar results with phosphorus and potassium applications. Split application of nutrients also significantly influenced the days to 50 per cent flowering. Application of nutrients in two splits significantly delayed days to 50 per cent flowering compared to application of nutrients in six splits. By applying nutrients in two splits, higher quantities of nutrients are made available to the plant at the early growth stage and this might have resulted in prolonging the vegetative phase. Split application of nutrients did not significantly influence the number of flowers formed per plant, number of fruits formed per plant and length and girth of fruits, It is a well established fact that length and girth of fruits are mostly varietal traits. So levels of nutrients could not influence this character.

The per plant yield and total yield of bhindi fruits (Table 2) were significantly influenced by increasing levels of nutrients. Among the higher levels of nutrients namely, F_1, F_2 and F_3 there was no appreciable difference between per plant yield and total yield. The lowest nutrient levels (F_4), recorded significantly inferior per plant yield and total yield compared to the other higher nutrient levels. The yield of a crop is a very complex competitive character resulting from different factors, the more important being the yield per plant and number of plants per unit area (Tanaka *et al.*, 1964). Application of nutrients in splits did not exert significant influence on per plant yield and total yield produced. The nonsignificant effect of split application of nutrients on number of flowers formed per

plant, number of fruits per plant, length and girth of fruits etc may be the reason behind this. The net profit increased with increase in levels of nutrients (Table 3). F_3 level of nutrient recorded highest net profit of Rs 13,794 ha^{-1} compared to Rs 6,905 ha^{-1} in F_4 level. The differences of net profit with F_1, F_2 and F_3 level of nutrient compared to F_4 level of nutrient were Rs 6,777, Rs 6,190 and Rs 6,889 respectively. The benefit cost ratio was maximum with F_3 level of nutrient (1.64) compared to 1.34 in F_4. Among the split application of nutrients, the highest net profit of Rs 14,710.80 ha^{-1} was recorded by S_1 and it was Rs 5,388 and Rs 3,135 higher than S_3 and S, respectively. The highest benefit cost ratio was recorded by S_1 (1.76).

Based on the results of the experiment, it is concluded that, for getting maximum profit from bhindi, a nutrient doze of 110 kg N, 37 kg P_2O_5, 73 kg K_2O ha^{-1} is to be supplied in two equal split dozes, half as basal and half at 30 days after sowing.

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