

Response of Groundnut variety M-13 to NPK during *Kharif* season under Konkan climatic conditions

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A field experiment to determine the optimum NPK requirement of groundnut (*Arachis hypogaea* L) (variety M-13) was conducted at the Agricultural College Farm, Dapoli for the three years i.e. 1977, 1978 and 1979 during *Kharif* season. The results revealed that the N, P and K combinations viz., 25:50:00, 25:50:25 and 25:50:50 kg/ha gave significantly more dry pod yield of groundnut over 0:0:0 (control) 4:4:18 and 12.5:25:12.5 kg NPK/ha. Former treatment combinations were at par with each other. Highest dry pod yield (23.45 q/ha) was obtained due to application of 25:50:0 followed by 25:50:50 (23.21 q/ha) and 25:50:25 (22.79 q/ha) NPK per hectare respectively. The per cent increase was in the range of 67.65 and 62 respectively in later three treatments over control.

Groundnut (*Arachis hypogaea* L) is one of the important oil seed crops grown in Maharashtra. Anonymous (1977) reported better performance of groundnut Variety M-13 under Dapoli conditions. Fertilization is one of the most important crucial input to increase crop production. Gopani (1963) reported good response of groundnut to combined application of nitrogen and phosphorus. Patil (1979) reported yields of pods as 2.37 t/ha without P, 2.82 t with 40 kg P₂O₅/ha and 2.69 t with 80 kg P₂O₅/ha. In Tamil Nadu the rainfed bunch groundnut responded only to potassium along with F.Y.M. The optimum dose was reported to be 40 and 46 kg K/ha with and without F.Y.M respectively (Natrajan *et al.* 1976). An information on response of groundnut to N, P and K under Konkan climatic condition is not available. With this view in mind the present investigation was taken up to find out nitrogen,

phosphorus and potassium requirements of groundnut during *Kharif* season.

MATERIAL AND METHODS

Field experiment was conducted at the Agricultural College farm, Dapoli in Randomised Block Design, replicated four times and repeated for three consecutive years during *Kharif* season of 1977, 1978 and 1979. Treatments consisted of the combination of nitrogen, phosphorus and potassium viz., 0:0:0 (control), 4:4:18, 12.5:25:12.5, 25:50:25, 25:50:50 and 25:50:0 kg per hectare. Gross and net plot sizes were 6.75x4.50 and 5.85x3.60 m respectively. The soil of the experimental plot was lateritic with medium in N, P and K contents. Basal manuring of six tonnes of well decomposed F.Y.M. was incorporated in the soil at the time of final harrowing. Fertilizers namely urea, single superphosphate and muriate of potash as per the treatments were applied at the time of sowing by line placement method.

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Dibbling of groundnut variety M-13 was done on 10.6.1977, 7.6.78 and 19.6.79 during first second and third season respectively by adopting spacing of 45x15 cm. On an average two hand-weedings and one small earthing up were given to the crop. Harvesting of the crop was done on 13.10.77, 16.10.78 and 26.10.79 respectively.

In rainy season Konkan region of Maharashtra receives high rainfall with usually no dry spell and warm-humid climate. The total rainfall received in the year 1977, 1978 & 1979 during crop growth period was 3684, 3835 and 2930 mm in 113, 124 and 83 rainy days respectively. Under Konkan climatic conditions variety M-13 is semi-spreading and matures in about 125-130 days during rainy seasons.

Yearwise statistical analysis as well as pooled analysis of the dry pod yield was carried out in order to arrive a proper conclusion. Statistical analysis of the growth and yield contributing characters was not done and the inferences were drawn on mean values. Economics of the various treatments was calculated by considering present ruling prices of dry pods and haulms of groundnut and different fertilizers.

RESULTS AND DISCUSSION

Effect of fertilizer levels on growth and yield attributes. Data on growth and yield attributes and percentage increase over control (no application) as affected by various fertilizer levels are presented in Table 1. The results indicate that the mean plant height, spread and number of branches per plant were incr-

ased with the increase in the fertilizer level. The percentage increase in these growth attributes in 25:50:50 kg NPK/ha treatment was 21.47, 23.23 and 11.93 respectively over control treatment. This might have resulted in increase in dry weight of haulm in 25:50:50 kg NPK/ha treatment. The maximum number of pod (18.2) and weight of pods per plant (203 g) was obtained by the application of 25:50:0 kg NPK/ha. The percentage increase in these two yield attributes was observed as 30.00 and 30.12 respectively in 25:50:0 kg NPK/ha over control treatment. This might have resulted in increase in the dry pod yield per hectare in 25:50:0 kg NPK/ha treatment. This was followed by application of 25:50:50 and 25:50:25 kg NPK/ha treatment.

Effect on dry pod yield : Data pertaining to mean dry pod and haulm yield are presented in Table 2. Differences in the dry pod yield of groundnut (M-13) due to various fertilizer treatments were found to be significant. The NPK combinations of 25:50:25, 25:50:50 and 25:50:0 kg per hectare produced significantly higher dry pod yield of groundnut than 0:0:0, 4:4:18 and 12.5:25:12.5 kg NPK per hectare in all the three years as well as in pooled data. However, the former treatment combinations of NPK remained at par with each other. Similarly, treatments viz., 0:0:0, 4:4:18 and 12.5:25:12.5 kg NPK per hectare were also found to be at par except in the year 1979, the treatments 4:4:18 and 12.5:25:12.5 kg NPK/ha gave significantly more dry pod yield than control. These results are in confirmative to reported by Pawar and Khuspe (1978).

Birajdar and Ingle (1979) also reported the economic dose of groundnut as 27 kg N + 54 kg P₂O₅ /ha. Application of NPK to groundnut crop was also resulted in increase in the dry haulm yield over control. The highest dry pod yield (23.45q/ha) and 66.90 per cent increase was obtained due to the application of 25:50:0 kg NPK/ha over control (14.05 q/ha). This was followed by application of 25:50:50 and 25:50:25 NPK/ha.

Economics of different fertilizer levels : Economics of different fertilizer treatments (Table 2) revealed that application of 25:50:0 kg NPK/ha recorded maximum net return (Rs.2458/ha) over control followed by 25:50:50 and 25:50:25 kg NPK/ha treatments (Rs.2436 and 2327/ha) respectively. Thus in order to obtain maximum yield and economics return, application of 25 kg N+50kg P₂O₅/ha can be recommended to groundnut crop under Konkan condition during *Kharif* season.

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Table 1: Growth and yield attributes of groundnut (M-13) as influenced by different fertilizer treatments (Average of three seasons)

Treatment N : P : K [kg/ha]	Mean plant height [cm]	Mean spread per plant [m]	No. of branches per plant	No. of pods per plant	Weight of pods Plant [g]
0 : 0 : 18	28.4	34.0	9.3	14.0	15.6
4 : 4 : 18	29.4 [3.1]	38.4 [12.9]	10.8 [13.9]	18.5 [17.8]	17.7 [12.4]
12.5 : 25 : 12.5	31.3 [10.2]	39.8 [17.0]	12.2 [31.1]	17.0 [21.4]	18.3 [17.9]
22 : 30 : 25	31.8 [11.9]	41.1 [20.8]	12.4 [33.3]	17.2 [22.0]	19.7 [29.2]
25 : 25 : 30	34.5 [23.2]	41.0 [23.2]	13.8 [41.9]	17.5 [25.0]	20.1 [28.8]
25 : 30 : 00	31. [112]	40.5 [19.11]	12.6 [35.4]	18.2 [30.0]	20.3 [30.1]

Figures in parenthesis indicate the percentage increase over control

Table 2: Mean dry Pod and haulms yield of groundnut [M-13] as affected by various treatments

Treatment N : P : K [kg/ha]	Dry pod yield [q/ha]		Increase over control	Dry haulms yield [q/ha] [Average of three years]	Income from additional yield over control	Cost of fertilizer [Rs.]	Net return [[Rs.]
	1977	1978					
0 : 0 : 0	10.0	21.7	—	23.3	—	—	—
4 : 4 : 18 control	10.4	22.0	15.5	25.9	588	83	505
12.5 : 25 : 12.5	11.8	25.6	23.8	27.7	1098	212	887
25 : 25 : 30	17.4	21.5	52.2	28.3	2742	414	2328
25 : 25 : 50	17.8	31.7	65.1	30.7	2886	480	2436
25 : 30 : 00	17.5	32.7	66.9	28.8	2826	568	2458
S. S. ±	0.9	1.8	—	—	—	—	—
C. D. at 5%	1.8	4.8	—	—	—	—	—
General Mean	13.8	27.8	—	—	—	—	—