



Effect of integrated nutrient management on yield and economics of groundnut-pea-summer groundnut

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Abstract : Growing oilseeds and legumes generally on impoverished soil without proper application of nutrient through external sources constrained production in this country. Researches with a yearly cropping sequence of groundnut (Rainy season)- peas-groundnut(summer) carried out at zonal Agriculture Research Station Mainpuri of C.S. Azad University of Agriculture and Technology, Kanpur on a sandy loam soil indicated that the recommended doses of 20-30-45 and 20-60-40 kg/ha of N, P_2O_5 and K_2O for respective groundnut and Pea crops together with 30q/ha of FYM to rainy season crop of groundnut only could bring about the maximum productivity and profitability in pooled results of two years.

Key Words : Sequence groundnut (summer), Productivity Profitability

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INTRODUCTION

The short fall in production of oilseeds and pulses necessitated the import of oilseeds and pulses without effectively encouraging the local growers for more and more production of these crops in earliest possible time. The availability of suitable short duration varieties of groundnut and peas has widened the scope of yearly sequential cropping of these crops with proper nutrient management. The present experiment is an effort in this direction for semi-arid condition of central Uttar Pradesh.

MATERIALS AND METHODS

The research was carried out consecutively for two years at Zonal Agricultural Research Station Mainpuri of C.S.A. University of Agriculture and Technology, Kanpur. The sandy loam soil of experimental field had a pH of 8.0 containing organic carbon 0.33 per cent, available phosphorus 40 kg/ha and available K-268.00 kg/ha. Randomized Complete Block Design with four replications was followed and the same layout plan was used insitu for all three crops raised in sequence on the same field in both the years. The treatments

for rainy season groundnut and also the other crops in succession included T_1 -Control, T_2 -Farmers' practices (60kgDAP) T_3 -recommended doses of fertilizer(RDF) T_4 -RDF+10q FYM/ha T_5 -RDF+ 20q FYM/ha, T_6 -RDF+30q FYM/ha, T_7 -PSB (Phosphate solubilising bacteria), T_8 -RDF+PSB, T_9 -RDF+10q/ha FYM+PSB, T_{10} -RDF+20q FYM/ha+PSB, T_{11} -RDF + 30/ha FYM+PSB, T_{12} -RDF+PSB+20Kg S/ha. DH-86 variety of groundnut being of early duration was used for both rainy season and summer season cropping. Sapna variety of Pea was grown after the rainy season groundnut. FYM was applied to rainy season groundnut but with holding it for successive crops for the residual effects of FYM containing treatments viz., R.D.F. @ 20-30-45 for groundnut and 20-60-40 for pea in kg/ha of N, P_2O_5 and K_2O , respectively. PSB culture @ 2kg/ha was used. The dose for sulphur was 20 kg/ha in elemental form. FYM was applied 20 days before sowing the rainy season groundnut and NPK doses were applied in furrow at sowing time of all crops. DH-86 genotype was used for the both seasons of groundnut crop. The planting dates for rainy season groundnut, pea summer groundnut were 18 July, 25 October and 15 march, respectively in both years of investigation.

RESULTS AND DISCUSSION

It is clear from the data (Table 1) that the performance of treatment pertaining to two years pooled yields of crops *viz.*, rainy season groundnut, field pea and summer groundnut in sequence, revealed that T₁₁ comprised of recommended doses of fertilizers @ 20N+30P₂O₅ and 45 K₂O in kg/ha plus FYM@ 30 q/ha in presence of phosphate solubilising bacteria brought about significantly the highest yields of all the crops even when there was only the residual effects of FYM applied to rainy season groundnut on the following crops of field pea and summer groundnut. However, the differences among T₁₁, T₁₀, and T₆ in both the groundnut crops and T₁₁ and T₆ in field- pea were not found significant. It is also note worthy that T₁₁ caused 26.6 per cent, 54.0 per cent and 24.1 per cent higher production of groundnut, field pea and summer groundnut, respectively than T₂ (Farmers' practices having

only 60 Kg DAP per hectare). Further the addition of sulphur (T₁₂) enhanced the yield of all the crops over no application of sulphur (T₈) in presence of phosphate solubilising bacteria (PSB) but with the addition of FYM such effect of sulphur was not observed. Kasturi Krishna and Ahlawat (2000) in field-pea and Hango and Salama (1987) in groundnut reported positive effect of sulphur.

The highest yields all three crops with T₁₁ tended to maximize their net returns and benefit cost ratio (Table 2). The benefit cost ratio for the cropping sequence as a whole on pooled result of two years was 2.21 in T₁₁ which was the maximum among all treatments followed by T₁₀ (2.16) and T₆ (2.14), where as this ratio in T₂ (farmer's practice) was only 1.62

It is thus clear that the recommended crop doses of fertilizers and 20 or 30 q/ha of FYM applied only to rainy

Table 1 : Pooled mean yield of groundnut- field pea – summer groundnut (q/ha) in sequence as affected by nutrient management

Treatments	Groundnut	Field pea	Summer groundnut
T ₁ -Control	18.49	20.16	20.57
T ₂ -Farmers' practice	20.57	23.10	22.66
T ₃ -R.D.F	21.35	29.90	23.44
T ₄ -RDF+10q FYM	22.14	30.55	24.22
T ₅ -RDF+20q FYM	23.18	32.19	25.26
T ₆ -RDF+30q FYM	25.00	34.58	27.08
T ₇ -PSB	20.97	25.00	22.84
T ₈ -RDF+PSB	22.92	31.15	25.00
T ₉ -T ₄ +PSB	24.22	33.15	26.50
T ₁₀ -T ₅ +PSB	25.79	34.32	27.86
T ₁₁ -T ₆ +PSB	26.04	35.60	28.12
T ₁₂ -RDF+PSB+S	24.78	33.70	26.86
S.E.±	0.54	0.54	0.86
C.D. (P=0.05)	1.14	1.07	1.11

Table 2 : Economic feasibility of groundnut – field pea- summer groundnut (Rs./ha) in sequence as affected by nutrient management

Treatments	Groundnut net return (Rs./ha) (B:C ratio)	Field pea net return (Rs./ha) (B:C ratio)	Summer groundnut net return (Rs./ha)(B:C ratio)	B:C ratio for the cropping sequence
T ₁ -Control	18031(1:1.18)	29482(1:2.73)	13354(1:0.76)	1:1.40
T ₂ -Farmers' practice	22221(1:1.34)	36548(1:3.21)	15935(1:0.88)	1:1.62
T ₃ -R.D.F	21829(1:1.32)	47028(1:3.68)	16309(1:0.86)	1:1.76
T ₄ -RDF+10q FYM	22861(1:1.35)	48328(1:3.78)	17480(1:0.93)	1:1.82
T ₅ -RDF+20q FYM	24433(1:1.41)	51608(1:4.04)	19046(1:1.01)	1:1.94
T ₆ -RDF+30q FYM	27333(1:1.55)	56388(1:4.41)	21770(1:1.15)	1:2.14
T ₇ -PSB	22360(1:1.45)	39048(1:3.57)	16625(1:0.94)	1:1.77
T ₈ -RDF+PSB	24521(1:1.47)	49394(1:3.83)	18515(1:0.98)	1:1.90
T ₉ -T ₄ +PSB	26486(1:1.55)	53394(1:4.14)	20465(1:1.08)	1:2.04
T ₁₀ -T ₅ +PSB	28824(1:1.64)	55734(1:4.32)	22955(1:1.21)	1:2.16
T ₁₁ -T ₆ +PSB	28830(1:1.61)	58294(1:4.52)	23195(1:1.22)	1:2.21
T ₁₂ -RDF+PSB+S	25953(1:1.43)	52058(1:3.65)	19389(1:0.95)	1:1.84

season groundnut in the cropping sequence with or without phosphate solubilising bacteria (PSB) may safely be used for higher productivity and profitability.

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