

Productivity and economics of groundnut (*Arachis hypogaea*) in rice (*Oryza sativa*) fallows as influenced by gypsum and sulphur

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ABSTRACT

A field experiment was conducted during 1989 and 1990 to study the effect of gypsum and sulphur application on productivity and returns of groundnut (*Arachis hypogaea* L.) in rice (*Oryza sativa* L.) fallows under tankfed irrigation condition. All gypsum and sulphur treatments performed equally better in raising the groundnut yields over the control. Half the quantity of gypsum with seed-pelleting was found beneficial. Both gypsum and S-pelleting treatments provided higher monetary net returns.

Groundnut (*Arachis hypogaea* L.) is generally raised in summer in rice (*Oryza sativa* L.) fallows as an irrigated or semi-irrigated crop to augment the total production as well as its productivity. The fertility of tankfed rice lands is generally low. In order to improve the fertility, green-manuring practice still could be revived, and the role of gypsum or sulphur in enhancing the production of groundnut has been reported by Sagare *et al.* (1986). In order to minimize the quantity of gypsum and sulphur, gypsum and S pelleting need to be tested under field condition. Hence an experiment was conducted to study the effect of gypsum and sulphur on productivity of groundnut in rice fallows.

MATERIALS AND METHODS

The field experiment was conducted

during 1989 and 1990 at Narasapur in Kolar district. During the first year, the trial was conducted at site I and during the second year at site II. The soils of both the sites were low in organic matter (0.123 and 0.45% respectively). The soil was low and medium in available nitrogen at site I and II respectively (169.4 and 331.4 kg/ha) and low in available phosphorus (13.6 and 14.6 kg/ha). The available potassium was also low at both the sites (74.0 and 143.3 kg/ha). A common crop of *Sesbania rostrata* was sown on 12 May 1989 and 19 May 1990. At flowering it was beaten down to soil and an equal quantity of green manure was applied (10 kg/plot). Seedlings of 25-day-old 'Jaya' rice were transplanted in the last week of July as common crop. After taking these crops, 'TMV 2' groundnut was raised from January to June with 6 treatments, viz.

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Table 1. Yield, yield attributes and economics of groundnut as influenced by gypsum and sulphur application (mean data of 1989 and 1990)

Treatment	Pod yield (q/ha)	Shelling (%)	100-kernel weight (g)	Gross returns (Rs/ha)	Net returns (Rs/ha)	Benefit : cost ratio
T ₁	27.43	62.1	24.17	16,719	10,682	2.77
T ₂	31.62	66.2	26.99	19,586	12,119	3.03
T ₃	32.59	64.2	26.21	20,230	13,492	3.00
T ₄	32.86	68.2	25.48	20,344	13,336	2.91
T ₅	32.24	66.1	27.72	19,994	13,426	3.05
T ₆	32.08	67.1	26.28	19,830	13,162	2.98
	NS	NS	NS			

CD (P = 0.05)

T₁, Control; T₂, NPK; T₃, seed-pelleting with S (2g/kg) + 45 kg S/ha at flowering; T₄, sulphur at 90 kg/ha (1/2 at sowing + 1/2 at flowering); T₅, seed-pelleting with gypsum (12 g/kg) + 250 kg gypsum/ha at flowering; T₆, gypsum at 500 kg/ha (1/2 at sowing + 1/2 at flowering)

control, NPK alone, seed-pelleting of S @ 2 g/kg + 45 kg S/ha at flowering, S @ 90 kg/ha (half at sowing + half at flowering), seed-pelleting of gypsum @ 12 g/kg + 250 kg gypsum/ha at flowering and gypsum @ 500 kg/ha half at sowing and half at flowering). The experiment was conducted in randomized block design with 4 replications.

RESULTS AND DISCUSSION

Groundnut yield

Pod was significantly influenced by S and gypsum treatments in 1989 (Table 1). The increase in pod yield over the control was 4.87–7.24 q/ha due to all other treatments. During 1990 there was similar trend, though the treatments did not show statistical differences among themselves (30.42 q/ha in the control, 33.94 q/ha with NPK, 32.8–34.53 q/ha with other treatments). The improvement observed in the yield of groundnut could be attributed to improvement in shelling % and 100-kernel weight with gypsum @ 500 kg/ha and seed-pelleting with S @ 2 g/kg + 45 kg S/ha and NPK alone. Sistani (1984) also reported such improvement in yield attributes due to gypsum and sulphur application.

Economics of groundnut

Higher gross returns were obtained with gypsum and S treatments (Rs 18,602–19,513) compared with the control in 1989 (Table 2). In addition to gypsum and S treatments, NPK alone also recorded higher returns (Rs 21,058–21,571) than the control (Rs 18,292) in 1990. Seed-pelleting with S @ 2 g/kg + 45 kg/ha at flowering, S @ 90 kg/ha and gypsum pelleting @ 12 g/kg + 250 kg gypsum/ha at flowering gave the maximum net returns compared with the control and in other treatments during the

first year. However, during the second year except pelleting with gypsum all other treatments gave higher net returns compared with the control. The mean net returns averaged over the 2 years indicated that gypsum and sulphur treatments provided higher net returns compared with the control (Table 1). In the first year, the treatments of gypsum, sulphur and NPK gave higher benefit : cost ratio (2.74–2.97) than the control (2.51). No such wide differences were observed during the second year. These data suggest that normal recommended dose of NPK could bring fairly higher returns and additional benefits over NPK and could be obtained from either gypsum or S application.

The present study, therefore, lends

support the hypothesis that the groundnut can be taken up in summer rice fallows in tankfed areas in Kolar district and its productivity and returns could be enhanced by gypsum and S application, partly through seed-pelleting and partly through soil application, thus saving the cost involved in sulphur and gypsum.

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