

PRODUCTIVITY ENHANCEMENT OF SOYBEAN (*GLYSINE MAX.*) THROUGH INTEGRATED NUTRIENT MANAGEMENT IN HADOTI REGION OF RAJASTHAN

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Abstract: Among the factors responsible for low productivity of soybean, inadequate fertilizer use and emergence of nutrient deficiencies due to poor recycling of organic sources are important. To enhance the productivity of soybean integrated nutrient management package incorporating vermicompost was evaluated at farmers' field. Results of study revealed that application of 50% N by vermicompost +rest N, P and K of RDF by inorganic fertilizer gave significantly higher seed yield (15.85 q/ha) and net return (Rs 20,196 / ha) which was 17.41% and 26.08% higher, respectively over farmer practice and were at par with RDF owing to the integration of vermicompost.

Keywords: Soybean, Productivity, integrated nutrient management, vermicompost

INTRODUCTION

Soybean (*Glycine max.* L.) Merrill) is a crop of multiple qualities as it is considered as a pulse and an oilseed crop. The productivity of soybean in India is only 857 kg/ha against a world average of 2293 kg/ha but in Rajasthan its productivity (1050 kg/ha) is also very low. Among the factors responsible for low productivity, inadequate fertilizer use and emergence of nutrient deficiencies due to poor recycling of organic sources are important. Soybean generally grown with inadequate quantity of organic and inorganic sources of plant nutrients has not only deteriorated soil health but also resulted in poor productivity of the crop. Due to continuous growing of soybean, irregular application of P and N fertilizers, the native micro-nutrient content in soils often becomes inadequate for crop (Singh *et al.*, 2007). Integration of inorganic fertilizers, organic manures and biological sources and their efficient management has not only helped in sustaining the productivity and soil health but also in supplementing of crop nutrient requirement. However, meagre information is available on the combined use of vermicompost with recommended fertilizers in soybean. Therefore, the present experiment was carried out.

METHODOLOGY

The experiment was carried out during kharif 2010 and 2011 in adopted village Garmodi of Kota district of Rajasthan. The soils of the experimental fields were clay loam heavy textured with pH ranging from 7.85 to 8.30, medium in available nitrogen (282 kg/ha), phosphorus (15.60 kg/ha) and high in available potassium (340 kg/ha). The average annual rainfall received during crop season was about 865 mm. Three treatments viz., (T₁): Farmers' practice i.e. imbalanced use of fertilizer (25-35 kg N-

P₂O₅/ha); (T₂): Recommended dose of fertilizer (RDF) i.e. 20-40-40 kg N-P₂O K₂O/ha and (T₃): 50% N through vermicompost + rest N, P and K of RDF by inorganic sources were tested with 5 replications. Each farmer's field was considered as one replication accommodating all the three treatments. Soybean 'JS 335' was shown on 4 July in 2010 and 02 July in 2011 using seed rate of 80 kg/ha at a row spacing of 30 cm, during both the years in a plot size of 600 m² for each treatment. The required amount of vermicompost containing 1.6%N,0.6% P and 1.4% K were incorporated into the soil one week before sowing. NPK fertilizers were applied just before the sowing according to the treatments using urea, single super phosphate and muriate of potash. All the recommended cultural operations to raise the crop were followed as and when required. Crop was harvested manually in last week of September to first week of October in each year. A net plot area of 25 m² was harvested for seed yield and economics were worked out.

RESULT AND DISCUSSION

Results of two consecutive years trial revealed that nutrient management had significant influence on seed yield and net returns (Table 1). Application of 50% N by vermicompost +rest N, P and K of RDF by inorganic fertilizer gave significantly higher seed yield (15.85 q/ha) and net return (Rs 20,196 / ha) which was 17.41% and 26.08% higher, respectively over farmer practice and were at par with RDF owing to the integration of vermicompost. However, non-significant increase was observed in straw yield. Benefit: cost ratio increased with supplementation of vermicompost with RDF. The highest B: C ratio (2.45) was obtained with application of 50% N by vermicompost +rest N, P and K by inorganic

fertilizer which was significantly higher over farmer practice (2.23). It was because additional cost of vermicompost was compensated by the additional yield of soybean and relatively low cost on applied

chemical fertilizer due to substrate quantity of NPK nutrient added by vermicompost. Chaturvedi *et al.*(2010) also reported the similar findings.

Table 1: Seed yield and economics of soybean on farmers' field (Mean of 2 year)

Treatment	Seed yield (q/ha)	Straw yield (q/ha)	Net return (Rs/ha)	B: C ratio	Grain yield over FP (%)
T ₁ - Farmers' practice (25-35 kg N-P ₂ O ₅ /ha)	13.50	15.20	16019	2.23	-
T ₂ - RDF (20-40-40 kg N-P ₂ O ₅ -K ₂ O/ha)	14.65	15.95	17996	2.33	8.52
T ₃ - 50% N by vermicompost + rest N,P & K of RDF by chemical fertilizer	15.85	16.70	20196	2.45	17.41
CD(P=0.05)	1.65	NS	2275	0.20	

CONCLUSION

On the basis of two years result it can be concluded that integrated use of vermicompost along with rest quantity of N, P and K of RDF by chemical fertilizer is essential for exploiting the production potential of soybean as well as for maintaining soil health.

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