

Effect of Organic Manures, PSB and Phosphorus Fertilization on Yield and Economics of Mungbean *Vigna radiata* (L.) Wilczek.

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Abstract

A field experiment was conducted during *kharif* season of 2005 and 2006 sandy loam soil to find out the effect of organic manures, PSB and phosphorus fertilization on yield and economics of mungbean *Vigna radiata* (L.) Wilczek. Results indicated that response of organic manures, PSB and phosphorus, have markedly influenced the yield and monetary return of *kharif* mungbean. Effect was found to be significant and higher seed, straw and biological yield could be obtained with application of vermicompost at 2 t/ha (8.09, 16.24 and 24.33 q/ha), seed inoculation with PSB (7.39, 15.56 and 22.95 q/ha) and 40 kg P₂O₅/ha (8.03, 16.29 and 24.33 q/ha) independently. However, based on economics, treatments FYM at 4 t/ha, 40 kg P₂O₅/ha and seed inoculation with PSB were found to be equally effective.

Key words : Organic manures, PSB, Phosphorus, Yield, Mungbean.

Mungbean *Vigna radiata* (L.) Wilczek. is one of the important pulse crops grown in the arid and semi-arid regions of India. The total area under pulses is 22.47 million hectares with an annual production of 13.38 million tonnes in the country. In India, mungbean occupies 3.0 million hectares and contributes to 1.3 million tonnes in pulse production (1). The important mungbean growing states are Orissa, Maharashtra, Andhra Pradesh, Tamil Nadu, Uttar Pradesh, Madhya Pradesh, Rajasthan and Bihar. In Rajasthan, the total area under mungbean was 754,598 hectares with the annual production of 205,068 tonnes and productivity of 272 kg/ha (2). It is a short duration *kharif* pulse crop which can be grown as catch crop between *rabi* and *kharif* seasons. During summer, it can also be used as a green manure crop. Being a leguminous crop, it has the capacity to fix atmospheric nitrogen. Its green plants are used as fodder after removing the mature pods. Mungbean is an excellent source of protein (25%) with high quantity of lysine (4,600 mg/N) and tryptophan (60 mg/N) and consumed as whole grain and *dal* in variety of ways for table purposes. Considering these in a view an experiment was conducted to find out the effect of organic manures, PSB and phosphorus fertilization on yield and economics of *kharif* mungbean.

Methods

Field experiment were conducted during *kharif* season of 2005 and 2006 at research farm of S. K. N. College of Agriculture, Jobner, RAU, Bikaner on sandy loam soil with pH 8.2. The soil of the experiment plot was low in the organic carbon (0.16%), available nitrogen (130 kg/ha), phosphorus (17.9 kg/ha), medium in available potassium (150 kg/ha). The field experiments were laid out in randomized block design with three levels of organic manures (control, vermicompost at 2 t/ha and FYM at 4 t/ha), two levels of PSB (no inoculation and with inoculation) and three levels of phosphorus (0, 20 and 40 kg/ha). Net return (Rs/ha) were computed by subtracting the cost of cultivation in gross return.

Results and Discussion

Grain Yield, Straw Yield and Biological Yield

Application of vermicompost significantly increased the number of pods per plant, seeds per pod, test weight, seed yield, straw yield and biological yield of mungbean over control and FYM. It might

Table 1. Yield and economics of mungbean as affected by organic manures, PSB and phosphorus fertilization (pooled data of two years).

Treatments	Grain yield (q/ha)	Straw yield (q/ha)	Biological yield (q/ha)	Net return (Rs/ha)
Organic Manures (t/ha)				
Control	5.97	13.64	19.61	10616
FYM 4 t/ha	7.41	15.02	22.42	13210
Vermicompost 2	8.09	16.24	24.33	13179
SE ±	0.19	0.40	0.59	334
CD (P = 0.05)	0.56	1.15	1.71	960
PSB				
No inoculation	6.92	14.37	21.29	11660
Inoculation	7.39	15.56	22.95	13010
SE ±	0.16	0.33	0.49	273
CD (P = 0.05)	0.45	0.94	1.40	784
Phosphorus (P₂O₅ kg/ha)				
0	6.24	13.50	19.73	10185
20	7.19	15.11	22.31	12439
40	8.03	16.29	24.33	14381
SE ±	0.19	0.40	0.59	334
CD (P = 0.05)	0.56	1.15	1.71	960

be due to enhanced vegetative growth in terms of dry matter and number of branches per plant provided more sites for the translocation of photosynthates and ultimately resulted in increased number of yield attributes. The beneficial effect of organic manures on yield attributes was probably due to enhanced supply of macro and micronutrients during entire growing season. It might have attributed to higher manufacture of food and its subsequent partitioning in sink. The availability and optimum supply of nutrients to plants favorably influenced the flowering and grain formation, which ultimately increased the pods per plant, seeds per pod and test weight. Similar results were also reported by Reddy and Swamy (3) and Mathur (4) in mungbean. It is well established that seed yield of a crop is a function of yield attributes such as number of pods per plant and seeds

per pod. Increase in these yield attributes due to fertilization might have increased grain yield of mungbean. The existence of significant and positive correlation between yield attributes and grain yield in the present study also supported these results (Table 1). The significant increase in straw yield due to application of vermicompost could be attributed to the increased vegetative growth possibly as a result of effective utilization of nutrients absorbed through extensive root system and prolific shoot development on account of improved nourishment through organic fertilization. Vermicompost improved the physical and biological properties of soil including supply of almost all the essential plant nutrients for growth and development of plant, thus balanced nutrition under favorable environment might have helped in production of new tissues and development of new shoots. Rajkhowa (5) was also of the opinion that application of 2.5 t/ha vermicompost recorded the maximum straw yield of mungbean which was significantly higher than the same dose of FYM. Findings of Mathur (4) in green gram, Yadav (6) and Netwal (7) in cowpea and Kumar et al. (8) in mungbean also lend support to the findings of the present investigation.

Economics of Evaluations

The net returns were significantly influenced by sources of organic manures (Table 1). Application of FYM (Rs 13,210/ha) being at par with vermicompost (Rs 13,179/ha) proved significantly superior to control (Rs 10,616/ha) enhancing net returns to the extent of Rs 2,594/ha. Inoculation of seed with PSB significantly increased the net returns (Rs 13,010/ha) over control (Rs 11,660/ha) and difference between the two treatments was Rs 1,350/ha. Application of 40 kg P₂O₅/ha fetched the maximum net returns of Rs 14,381/ha which was significantly higher than control and 20 kg P₂O₅/ha by Rs 4,196 and Rs 1,932, respectively. It was mainly due to increase in yield attributes due to fertilization that might have increased grain yield of mungbean. The existence of significant and positive correlation between yield attributes and grain yield in the present study also supported the above results. The significant increase in straw yield due to application of vermicompost could be attributed to the increased vegetative growth possibly as a result of effective utilization of nutrients ab-

sorbed through extensive root system and prolific shoot development on account of improved nourishment through organic fertilization.

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