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Research Note

Effect of different fertility and bio-fertilizer levels on yield and economics of summer green gram

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ABSTRACT : An investigation was carried out on sandy loam soil at Pulse Research Station, Model Farm, Anand Agricultural University, Vadodara, Gujarat during summer season of the year 2009-10. The variety V_2 (Meha) produced significantly higher seed and stover yield by 8.60 and 11.59 per cent, respectively as compared to the variety V_1 (GM-4). Application of F_3 (100 % RDF) recorded significantly higher seed and stover yield ha^{-1} over F_0 (control). The magnitude of increase in seed and stover yield with *Rhizobium* + PSB was to the tune of 8.12 and 7.69 per cent, respectively over no inoculation. Maximum net realization of Rs. 26327 ha^{-1}, Rs. 30262 ha^{-1} and Rs. 26181 ha^{-1} was also registered under Meha variety, application of 100 per cent RDF and treatment B_1 *(Rhizobium* + PSB), respectively.

KEY WORDS : Fertility levels, Bio-fertilizers, Yield, Economics, Green gram

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Green gram commonly known as "mung" or "mung bean" is the most important crop of the south-east Asia and particularly the Indian subcontinent. This popular and ancient crop is specially recognized as an excellent source of protein. The calorific value of green gram is 334 calories per 100g and its chemical composition is as follows: crude protein 24.0 per cent, fat 1.3 per cent, carbohydrate 56.6 per cent, minerals 3.5 per cent, lysine 0.43 per cent, methionine 0.10 per cent, calcium 124 mg, phosphorus 3.26 mg and iron 7.3 mg (Kachroo, 1970). It also plays an important role in maintaining and improving the fertility of soil through its ability to fix atmospheric nitrogen in the soil by root nodules. Nodules on the root of green gram having *Rhizobium* bacteria, fix about 35 kg ha^{-1} atmospheric nitrogen (Gupta *et al.,* 2006). Pulse as well as mung bean production has been steadily decreasing due to reduced acreage. Therefore, to meet the situation, it is necessary to boost up the production through varietal development and proper management practices. The present study was, therefore, undertaken to find out the effect of levels of fertility and bio-fertilizer on of green gram genotypes.

The field experiment was conducted at Pulse Research Station, Anand Agricultural University, Model Farm, Vadodara, Gujarat during the summer season of the year 2009-10. The soil of the experimental field was sandy loam in texture with pH of 7.6. The soil was medium in available N (270 kg^{ha-1}), available P (42.5 kg^{ha-1}) and high in available K (285 kg^{ha-1}) and the organic

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carbon content was 0.71 per cent. The field experiment was laid out in Factorial Randomized Block Design (FRBD) replicated three times with net plot size of 9.6 m^2 (2.4 m x 4 m) consisted of combinations of 2 varieties *viz.*, GM-4 and Meha; 2 levels fertility *viz.*, control, 50 per cent RDF, 75 per cent RDF and 100 per cent RDF and 2 levels of seed treatment *viz.*, no seed treatment and seed treatment with *Rhizobium* + PSB. Nitrogen and phosphorous as per the treatments were drilled manually through urea and DAP, respectively prior to sowing in the furrows at 30 cm apart. The *Rhizobium* + PSB seed inoculatrion was given to the half the quantity of seeds and dried under shade. In order to evaluate the effect of different treatments on yield and qualities of green gram, the observations were recorded from five plants taken at random from each plot.

The results obtained from the present study have been discussed in detail under following heads :

Yield:

The varieties showed significant difference seed and stover yield. Variety V_2 (Meha) gave significantly higher seed and stover yield than variety V_1 (GM-4). The increase in seed and stover yield of variety V_2 (Meha) by 8.60 and 11.58 per cent, respectively over variety V_1 (GM-4). Higher seed and stover yield of this variety may be attributed to better contribution of yield attributing characters. Kumar *et al*. (2002) and Rajkhowa *et al.* (1992) also reported such variation in green gram varieties. The magnitude of increase in seed and stover yields with F_3 (100% RDF) was to the tune of 38.31 and 36.39 per cent, respectively over control (no fertilization). It might be that balanced fertilizer application provided better nourishment to plant for better partitioning dry matter and in turn it results in increased seeds yield per plant (g). The present findings lend support from results of Kumar *et al.* (2002) and Chovatia *et al*. (1993). The magnitude of increase in seed and stover yield with *Rhizobium* + PSB was to the tune of 8.12 and 7.69 per cent, respectively over no inoculation. Increase in seed and stover yield under inoculation might have been due to the cumulative effect of increased growth and yield attributes as well as increased nitrogen and phosphorous uptake by crop. Similar observations were also made by Meena *et al*. (2001), Sarkar *et al.* (1993) and Raut and Kohire (1991).

Economics:

Between the two varieties variety Meha accrued maximum net returns of Rs. 26327 per ha along with C.B.R. (2.10). Among different fertility levels F_3 accrued maximum net return with the highest value of Rs. 30262 ha^{-1}, it was closely followed by F_2. Among the bio-fertilizer treatments, application of treatment B_1 (*Rhizobium* + PSB) recorded maximum net returns (Rs. 26181 ha^{-1}) along with B.C.R. (2.09).

It was concluded that for securing maximum seed yield with better quality and net profit, summer green gram variety

Table 1 : Effect of varieties, fertility levels and bio-fertilizers on the grain yield and economics of summer green gram

Treatments	Yields (kg ha^{-1})		Gross realization (Rs.ha^{-1})	Cost of cultivation (Rs. ha^{-1})	Net realization (Rs. ha^{-1})	BCR
	Grain	Stover				
Variety (V)						
V_1 : GM-4	860.03	947.48	43475	22436	22572	1.93
V_2 : Meha	934.03	1057.29	47230	22436	26327	2.10
Fertility levels (F)						
F_0: Control	738.46	832.47	37339	21695	17127	1.72
F_1: 50% RDF	843.49	953.99	42651	22425	21759	1.90
F_2: 75% RDF	984.81	1087.67	49784	22683	28651	2.19
F_3:100% RDF	1021.35	1135.42	51635	22940	30262	2.25
Bio-fertilizer (B)						
B_0 :Control	862.02	965.28	43584	22395	22718	1.94
B_1:*Rhizobium* + PSB	932.03	1039.50	47121	22476	26181	2.09

Note: Selling price: Seed: Rs. 50 kg^{-1}, Stover: Rs. 0.50 kg^{-1}

V_2 (Meha) should be fertilized with F_2 (75 % RDF) in conjugation with bio-fertilizer treatment B_1 (*Rhizobium* + PSB) in sandy loam soil under middle Gujarat Agro-climatic conditions.

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