

Response of Frenchbean (*Phaseolus vulgaris*) varieties to phosphorus and farmyard manure application

PURUSHOTTAM KUMAR¹ AND U.K. PURI

Research Sub-station, Himachal Pradesh Krishi Vishvavidyalaya, Salooni 176 320

Received : March 2001

ABSTRACT

A field experiment was conducted during the rainy (*kharif*) seasons of 1996 and 1997 at Salooni, to study the response of 2 varieties of Frenchbean or *rajmash* (*Phaseolus sadiatus* L.) to phosphorus and FYM application under rainfed condition. Among the varieties, 'Jawala' recorded the highest number of pods/plant, seeds/pod, 1,000-seed weight and harvest index, which in turn reflected in higher grain and straw yields. Application of 50 kg P₂O₅ with 10 tonnes of FYM/ha resulted in the maximum plant height, pods/plant, seeds/pod and 1,000-seed weight and thereby higher yields.

Key words : Frenchbean or *rajmash*, Phosphorus, FYM, Rainfed

Frenchbean or *rajmash* (*Phaseolus vulgaris* L.) is one of the important pulse crops of higher hills of Himachal Pradesh. This crop responds well to phosphorus application (Ahlawat and Sharma, 1989). The productivity of this crop at the farmer's field is poor due to growing of local cultivars and poor fertility management. Since the information on various aspects of improved agronomic practices is scanty for the area, the present investigation was undertaken to study the effect of phosphorus and FYM application on *rajmash* varieties.

MATERIALS AND METHODS

The field experiment was conducted during rainy (*kharif*) seasons of 1996 and

1997 at Research Sub-station of Himachal Pradesh Krishi Vishvavidyalaya, Salooni. The soil was clay loam in texture, medium in organic carbon (0.9%) and available potassium (212.6 kg/ha) and low in available nitrogen (266.5 kg/ha) and phosphorus (9.2 kg/ha), with pH 6.1. Twelve treatments consisted of 2 varieties ('Jawala' and 'Local'), 3 levels of phosphorus (0, 25 and 50 kg P₂O₅/ha) and 2 levels of FYM (0 and 10 tonnes FYM/ha) were evaluated in randomized block design with 3 replications. Full dose of P as per treatment and a uniform dose of 20 kg N/ha were applied as basal. The crop was sown in the first week of June in rows 30 cm apart. The total rainfall received during the crop season of

Present address : ¹Regional Research Station, HPKV, Dhaulakuan (Sirmour), Himachal Pradesh 173 001

1996 and 1997 was 762.5 and 1,063.7 mm respectively.

RESULTS AND DISCUSSION

Variety

Varieties influenced almost all the growth, yield attributes and yield significantly. The mean data of 2 years showed that 'Jawala' gave grain and straw yields than 'Local' (Table 1). The higher yield of this variety was observed owing to significantly higher values for all the growth and yield attributes except plant height. Higher plant height with low seed yield gave lower harvest index for 'Local' variety. 'Jawala' recorded 24.1% and 5.1% higher seed and straw yields, respectively, over the 'Local'. Similar results were also reported by

Badiyala *et al.* (1992) and Saini and Negi (1998). Net returns were also higher with 'Jawala' compared with to Local.

Phosphorus

Phosphorus application increased all the growth, yield attributes and yield of *rajmash* significantly except harvest index. Seed and straw yields increased significantly with increasing phosphorus levels (Table 1). Crop fertilized with 50 kg P_2O_5 /ha resulted in 108.3 and 38.9% more seed and 88.0 and 31.1% more straw yields, respectively, over 0 and 25 kg P_2O_5 /ha. Higher yield with increasing dose of P was mainly owing its beneficial effect on growth and yield-attributing characters (Table 1). Ahlawat and Sharma (1989) also reported a

Table 1. Growth, yield attributes, yield and economics of Frenchbean as affected by variety, phosphorus and farmyard manure (mean data of 2 years)

Treatment	Plant height (cm)	Pods/plant	Seeds/pod	1,000-seed weight (gm)	Seed yield (q/ha)	Straw yield (q/ha)	Harvest index (%)	Net returns (Rs/ha)
Variety								
'Jawala'	51.7	10.3	4.9	546.0	10.0	12.3	45.0	13,501
'Local'	64.3	7.0	3.6	371.3	8.3	11.7	41.5	10,571
CD (P = 0.05)	2.1	0.4	0.2	15.8	0.4	0.5	1.9	
P_2O_5 (kg/ha)								
0	52.9	7.1	3.5	427.6	6.0	8.3	42.0	5,801
25	58.6	8.3	3.8	445.9	9.0	11.9	43.1	11,731
50	62.4	10.4	4.6	493.5	12.5	15.6	44.5	18,525
CD (P = 0.05)	3.7	0.5	0.3	24.3	0.5	0.7	NS	
FYM (tonnes/ha)								
0	55.8	8.0	3.6	445.4	8.1	10.9	42.6	10,626
10	60.2	9.2	4.4	471.9	10.2	12.9	44.2	13,431
CD (P=0.05)	2.1	0.4	0.2	15.8	0.4	0.5	NS	
CV (%)					9.1	9.3		

favourable response of French bean to P application. The crop fertilized with 50 kg P_2O_5 /ha gave the maximum net returns.

Farmyard manure

Farmyard manure had a significant effect on the growth, yield attributes, seed and straw yields of French bean (Table 1). FYM application recorded 25.9 and 19.6% more seed and straw yields, respectively, over no FYM application. The increase in yields due to FYM application is due to its favourable effect on growth and yield attributes of the plant. In term of economics, FYM application also recorded higher net returns than no FYM application.

Interaction

Based on mean of 2 years data, the interaction effect between FYM and phosphorus levels was significant (Table 2).

Table 2. Interaction effect of FYM and phosphorus on mean seed yield (q/ha) of rajmash

FYM (tonnes/ha)	P_2O_5 (kg/ha)		
	0	25	50
0	5.6	7.5	11.0
10	6.5	10.4	13.8
CD (P = 0.05)		0.7	
CV (%)		9.1	

Seed yield of French bean significantly higher with the application of 50 kg P_2O_5 /ha in combination with 10 tonnes of FYM/ha, followed by 50 kg P_2O_5 /ha alone. However, the yield obtained with 50 kg P_2O_5 /ha alone was statistically at par with of 25 kg P_2O_5 /ha in combination with 10 tonnes of FYM/ha. This proves the significance of the integration of chemical fertilizer with organic manures.

It was concluded that application of phosphorus @ 50 kg P_2O_5 /ha in combination with 10 tonnes FYM/ha recorded the maximum seed yield. However, 25 kg P_2O_5 /ha in combination with 10 tonnes FYM/ha proved as good as 50 kg P_2O_5 /ha.

REFERENCES

- Ahlawat, I.P.S. and Sharma, R.P. 1989. Response of frenchbean genotypes to soil moisture regimes and phosphate fertilization. *Indian Journal of Agronomy* 34 (1) : 70-74.
- Badiyala, D., Singh, Bhopal and Singh, C.M. 1992. Performance of rajmash (*Phaseolus vulgaris* L.) varieties at varying levels of nitrogen under dry temperate condition of Himachal Pradesh. *Indian Journal of Pulse Research* 5 (2) : 149-152.
- Saini, J.P. and Negi, S.C. 1998. Effect of cultivars and date of sowing on growth and yield of French bean (*Phaseolus vulgaris*) under dry temperate condition. *Indian Journal of Agronomy* 43 (1) : 110-113.