

## Response Of French Bean (*Phaseolus Vulgaris* L.) To Organic Manures And Inorganic Fertilizer On Growth & Yield Parameters Under Irrigated Condition

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**ABSTRACT:** The investigation was conducted at field research centre of Department of Seed Science and Technology, H.N.B. Garhwal University, Srinagar (India) during Rabi season, 2007, on sandy loam soil, p<sup>H</sup> having 5.3 to 5.5 to study the effect of organic sources of nutrients viz., vermicompost, FYM and along with inorganic fertilizers in French bean under irrigated condition with an objective to study growth and yield without degrading soil quality by using various nutrient compositions. In this investigation, vermicompost treatment (T2) recorded the highest in all observations except biomass of whole plant (above and ground biomass) which was recorded highest in N:P:K (T1) treatment this may be due to high composition of Nitrogen in inorganic fertilizers which supplement to the plant's vegetative phase. Thus it may be concluded that vermicompost was found useful than any other type of treatments under irrigated condition of Srinagar valley. [Nature and Science. 2009;7(5):52-54]. (ISSN: 1545-0740).

**Key words:** Vermicompost, FYM, N:P:K, Production, Seedling Growth.

### Introduction

French bean (*Phaseolus vulgaris* L.) is one of the most important leguminous vegetables in India. It is a nutritious vegetable and can be grown in all types of soils ranging from light sandy loam to clay soils but it cannot withstand water-logging. The highest yield is obtained in soils with a P<sup>H</sup> between 5.3 and 6.0. The use of chemical fertilizers boosted the agricultural products and the farming communities are using the same indiscriminately in such areas where irrigation facility exists with an eye on two to three crops in a year. This has drained the soil and resulted in the loss of soil productivity. So to obtain maximum return farmers need to apply high quantity of fertilizers and due to this culture the rate of use of fertilizers are increasing day by day, which means unlimited draining of soil. In spite of the importance for urgent step-up, very little attention has been paid so far to nutrient management in various soil and climatic conditions. The preparation and use of organic manures as a nutrient management may provide a hygiene and useful way of disposal and utilization of waste which would otherwise have created a healthy environment. [Sankhyan et al. \(2001\)](#) reported the increase in soil moisture due to mulching and significant increase in productivity of maize due to application of FYM. [Kumaran \(2001\)](#), reported the application of FYM+ fertilizer produced higher number of matured pods per plant, pod weight per plant, number of kernels per pod, test weight, pod yield and haulm yield of groundnut. But use of fertilizer alone recorded lower pod yield. [Veerabhadraiah et al. \(2006\)](#) showed improved soil properties due to application of either FYM or compost or vermicompost. [Yadav and Vijayakumari \(2003\)](#) found better yield in vermicompost treatment. Same observation was also reported by [Rameshwar \(2006\)](#). [Guu et al. \(1995\)](#) reported pod yield with fertilizer and manure application.

Keeping the views of the above aspects the present research work was, therefore, undertaken to find out the response of French bean to vermicompost, farmyard manure, N:P:K (Chemical fertilizer) and their different combination treatments under irrigated condition of Srinagar valley of Uttarakhand, India.

### Materials and methods

The experiment was carried out at the field research centre of Department of Seed Science and Technology, H.N.B. Garhwal University, Srinagar, Uttarakhand (India) during Rabi season of the year 2007.

**Experimental Site:** Srinagar (Garhwal), 540 meter above of msl is situated between the latitude 36°12'24" to 30°13'24" North and longitude 78°41'22" to 78°49'42" east, it is a large valley about 6 Km long and 1.5 Km wide, spreading on both sides of the river Alaknanda. This valley exhibits subtropical extreme climate with dry summer and severe winter with occasional dense fog in early morning from December to mid March except

during rainy season. Rests of the months are usually dry with exceptions of occasional showers during winter or early spring. Minimum temperature ranges between 4<sup>0</sup>C and 12<sup>0</sup>C in the month of January. The soil of the site is sandy loam and clay soils with p<sup>H</sup> value 5.3 to 5.5.

Inorganic fertilizers (N:P:K) which are widely used in agriculture and organic manures [farmyard manure (FYM) and vermicompost (Vc)] were used as materials. Method of cultural operation was adopted as per recommended practices. And observations were recorded mainly on growth (germination count, plant height, number of leaves, length of leaves, width of leaves, no. of pods per plant, root length, no. of nodulation) and yield (no. of seed per pod, yield per plot and biomass of shoot and root)

The experiment comprised of the following treatments:

Treatments	Material(s) used	Quantity (Kg/bed)
T1	N:P:K	0.10
T2	Vc	4.00
T3	FYM	6.00
T4	N:P:K + FYM	0.50+ 3.00
T5	Vc + FYM	2.00 + 3.00
T6	N:P:K + Vc + FYM	0.50 + 2.00 + 3.00
T7	Control	Nil
T8	N:P:K + Vc	0.50 + 2.00

## Result

In all the observation aspects of growth the maximum value was recorded under vermicompost treatment (T2) (Table 1). But minimum value was found variably in different treatments and different observation aspects. The average production per plot was found highest (2.6 Kg/bed) and lowest (1.30 Kg/bed) in vermicompost treatment (T2) and mixed treatment of N:P:K+Vc+FYM (T6) respectively. The number of seed per pod was recorded maximum with same seed number (9.4/pod) in four treatments viz., vermicompost (T2), N:P:K+FYM (T4), Vc+FYM (T5), N:P:K+Vc+FYM (T6) treatments and minimum (8.4/pod) in control treatment (T7). The above and below ground dry biomass recorded the maximum average weight of above (55.74gm) and below (6.93gm) under T1 treatment (N:P:K).

**Table 1.** Mean effect of various levels of treatment on germination (Gm), height of plant (Ht), number of leaves per plant (NL), length of leaves (LL), width of leaves (WL), number of pods per plant (NPP), length of root (LR), number of Nodules (NN), above ground Dry biomass of plant (ADB), below ground dry biomass of plant (BDB), yield per plot (YP) and number of seeds per pod.

Treatments	Gm (%)	Ht (cm)	NL	LL (cm)	WL (cm)	NPP	LR (cm)	NN	ADB (g)	BDB (g)	YP (kg)	NSP
N:P:K (T <sub>1</sub> )	80.0	22.73	20	17.93	10.84	20.6	29.24	57.2	55.74	6.93	1.990	9.0
Vc (T <sub>2</sub> )	97.5	30.13	30	28.17	12.02	25.2	30.34	67.2	15.02	2.275	2.600	9.4
FYM (T <sub>3</sub> )	85.0	23.67	24	25.60	9.50	21.6	27.44	64.6	20.52	2.095	2.000	8.6
N:P:K + FYM (T <sub>4</sub> )	87.5	26.09	25	23.91	9.75	18.8	22.14	58.6	20.80	1.160	1.800	9.4
Vc + FYM (T <sub>5</sub> )	87.5	23.02	24	24.63	9.95	20.4	21.28	56.0	18.99	0.549	2.100	9.4
N:P:K + Vc + FYM (T <sub>6</sub> )	82.5	21.09	25	24.44	9.73	18.4	24.01	60.0	19.97	0.749	1.300	9.4
Control (T <sub>7</sub> )	77.5	22.35	27	24.13	9.78	13.6	18.56	60.6	11.82	1.319	1.750	8.4
N:P:K + Vc (T <sub>8</sub> )	75.0	21.31	24	21.46	9.06	15.0	17.30	54.0	14.79	0.757	1.900	9.2

## Discussion

As per the findings of this investigation the result of the vermicompost treatment was found best than the farmyard manure, inorganic fertilizers and mixed treatments. Higher production per plot, germination percent, height of plant, number of leaves, length of leaves, number of pods per plant, length of root and number of nodules by farmyard manure (FYM) treatment than the N:P:K treatment support the findings of [Rameshwar \(2006\)](#) but contradicts the result of [Pradhan and Mondal \(1997\)](#). The high growth and yield recorded from FYM and FYM + Vc treatment in the experiment support the findings of [Sankhyan et al. \(2001\)](#) and [Kumaran, \(2001\)](#). The maximum overall growth and yield record from the vermicompost treatment and admixed with FYM were found consistent with the findings of [Yadav and Vijayakumari \(2003\)](#). The biomass of whole plant (above and ground biomass) was recorded highest in N:P:K (T1) treatment. The maximum biomass obtained may be due to high composition of Nitrogen in inorganic fertilizers which supplement to the plant's vegetative phase. The result was in accordance with the findings of [Sharma et al. \(2001\)](#). The experiment results revealed that the highest productivity by vermicompost, farmyard manure (FYM) and vermicompost + FYM treatments may be due to the improvement of physico-chemical properties of the soil and can be used as a resource for maximum crop productivity with more financial output in comparison to those chemical fertilisers. This observation was found consistent and accordance with the report of [Veerabhadraiah et al. \(2006\)](#).

From the above discussion, it may be concluded that Frenchbean was most responsive to vermicompost treatment (T2) on growth and yield in comparison to farmyard manure, chemical fertilizer and mixed treatments under irrigated condition of Srinagar valley. It also concluded that vermicompost is particularly good for farmers, consumers and ultimately for soil as it can be used as a resource for maximum crop productivity with more financial output in comparison to those chemical fertilisers. The highest productivity by vermicompost treatment may be due to the improvement of physico-chemical properties of the soil.

## References

- Guo J. W., Yang, T. C. and Fong, T. Y. Effects of organic manure on the growth and yield of common bean at fall season bulletin of Taichung. District Agricultural Improvement Station. 49: 41-48, 1995. (Cited from Horticultural Abstracts, CBA.1997. 67:4).
- Kumaran, S. Response of groundnut to organic manure, fertilizer levels, split application of phosphorus and gypsum application under irrigated condition. Res. on Crops 2, 2001 (2) : 156-158.
- Pradhan, B. K. & Mondal, S. S. Integrated nutrient management for sustaining productivity and fertility building of soil under rice based cropping system. Indian J. Agric. Sci., 1997, 67: 307-310.
- Rameshwar, Dogra, V., Sharma, G. D. and Rana, S. Effect of FYM and sand application on Barley (*Hordeum vulgare*) under Barley – fallow cropping system in the cold desert region of Himachal Pradesh. Himachal J. of Agric. Res. 2006, 32 (2):22-24.
- Sankhyan, N. K., Bharat Bhushan and Sharma, P. K. Effect of phosphorus, mulch and farm yard manure on soil moisture and productivity of maize in mid hills of Himachal Pradesh. Res. on Crops 2, 2001, (2) : 116-119.
- Sharma, S., Daramwal, N. S., Sharma, C. R. and Upadhyay, R. G. Influence of various doses of nitrogen and phosphorus on protein content, yield and its attributes of mungbean [*Vigna radiata* (L.) Wilczek]. Res. on Crops 2 2001, (2) : 108-111.
- Veerabhadraiah, T.N., Chamegowda and Badrinath, T.C. Effect of organic and inorganic sources of nutrients on availability and uptake of major and secondary nutrients by French bean in eastern dry zone of Karnataka, India (*Phaseolus vulgaris* L.). [The 18th World Congress of Soil Science \(July 9-15, 2006\)](#), 115-49.
- Veerabhadraiah, T.N., Chamegowda, and Badrinath, T. C. Consequences of organic and inorganic sources of nutrients on physico-chemical properties of soil under French bean land use cover. [The 18th World Congress of Soil Science \(July 9-15, 2006\)](#), 163-20.
- Yadav, H. and Vijayakumari, B. Influence of vermicompost with organic and inorganic manures on biometric and yield parameters of chilli [*Capsicum annum* (L.) var. Plri]. Crop Res. 25 (2) : 236-243 (2003).

3/25/2009