

Effect of different sources of nitrogen on growth and yield of French bean (*Phaseolus vulgaris* L.) cv. Arka Komal

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Abstract: *The present investigation entitled “Effect of different sources of nitrogen on growth and yield of French Bean (*Phaseolus vulgaris* L.) cv. Arka Komal” was conducted at Department of Horticulture, College of Agriculture, Latur during 2007-2008. The experiment was laid out in RBD with 10 treatment combinations replicated twice. The growth attributes like height of plant (55.96 cm) and number of branches (12.66) was maximum with the treatment of 50 per cent N through urea along with 50 per cent N through poultry manure (T₄) and maximum number of compound leaves (13.00) was recorded with 50% N through poultry manure. The yield attributes like maximum yield (0.140 kg) per plant and yield (119.70 qtl) per hectare was most effective in combination of 50 per cent N through urea along with 50 per cent N through poultry manure.*

Key words: *growth, height, yield, urea, poultry manure, hectare.*

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I. Introduction

The French bean (Syn. kidney bean haricot bean, snap bean and heavy bean) is most important leguminous vegetable. It is the world's most important food legume. In Africa, women and small farmers are the primary bean growers. The French bean growing leading states in India are Maharashtra, Andhra Pradesh and Punjab. In Maharashtra the mostly French bean producing districts are Pune, Ahmednagar, Solapur and Nasik. In India it is mostly grown in two season i.e. kharif and rabi. In India area under French bean for the vegetable category particularly “Arka komal” variety is 100.00 hectare and production is 800.00 quintals. The average yield of French bean for the vegetable category is 1.795 tones in the Maharashtra state (Anon. 2007). To meet the dietary need for common man, to eliminate malnutrition, deficiency disease and to relive over stress on cereals, there is a greater need to enhance vegetable production like Rjama (Kallo and Pandey, 2002). Organic manure in the soil is as store house for nitrogen supply to plant. There is very little inorganic nitrogen in soil and much of it obtained by the conversion of organic forms. Organic manure not only increases the yield but also improve physical, chemical and biological properties of soil that improve the productivity of crop (Blane et al., 1989). An investigation was therefore conducted to find out the Effect of different sources of nitrogen on growth and yield of French Bean (*Phaseolus vulgaris* L.) cv. Arka Komal.

II. Materials And Methods

The field experiment was carried out at Instructional-cum Research farm, Department of Horticulture, College of Agriculture Latur, during kharif season 2007-08. There are ten different treatments comparing T₁-control 100 % urea , T₂- 50 % N through urea combine with 50% N through FYM, T₃-50% N through urea combine 50% N through Vermicompost, T₄- 50% N through urea combine with 50% N through poultry manure, T₅-100 N through FYM, T₆-100% N through poultry manure, T₇-100% N through Vermicompost, T₈- 75% N through urea combine with 25% N through FYM, T₉- 75% N through urea combine with 25% poultry manure, T₁₀-75% N through urea combine with 25% N through Vermicompost. All above the treatments tested against the control in randomized block design. The nitrogen applied in the form of poultry manure, FYM and Vermicompost as source of N, P, and K respectively. The crop was raised at a spacing 45 cm x 15 cm with normal dose of N, P and K viz; 120: 60: 60 Kg/ha, respectively.

III. Result And Discussion

Plant height

At 30 days after sowing. The maximum height of plant (27.66 cm) was recorded in treatment (T₄) 50 per cent N through poultry manure combined with 50 per cent N through urea, this treatment was significantly Superior over rest of all the treatments. The minimum height of plant (22.53 cm) was recorded in treatment (T₅) where 100 per cent N through FYM.

The data on height of plant 50 days after sowing, showed the treatment T₂, T₃, T₄, T₉ and T₁₀ these treatment are statically superior over the treatment T₁ receiving 100 per cent N through urea. The maximum

height (46.90 cm) was recorded in treatment T₄ receiving 50 per cent N through urea combined with 50 per cent N through poultry manure. This treatment was significantly superior over the rest of all treatments. The lowest height of plant (38.66 cm) was recorded in the treatment T₅ receiving 100 per cent N through FYM.

At 70 days after maximum height was (55.96 cm) in treatment receiving 50 per cent N through urea combined with 50 per cent N through poultry manure (T₄) which was followed by the treatment T₃ where 50 per cent N through urea combined with 50 per cent N through Vermicompost was supplied. These results confirm findings by Browed et al. (1992) reported maximum height of French bean. The similar results are findings by Srinivas and Naik (1990).

Number of leaves

At 30 days after sowing the treatments T₂, T₃, T₄, T₇, T₉ and T₁₀ these treatments are statically superior over the control. The maximum numbers of leaves (6.66) were recorded in treatment T₄ receiving 50 per cent N through urea combined with 50 per cent N through poultry manure. This treatment was significantly superior over the rest of all treatments. The lowest numbers of leaves (3.00) were observed in the treatment T₅.

At 50 days after sowing the treatments T₂, T₃, T₄, T₉ and T₁₀ these treatments are statically superior over the control treatment T₁ receiving 100 per cent N through urea. The highest number of leaves (12.66) recorded in treatment T₄ receiving 50 per cent N through urea combined with 50 per cent N through poultry manure at 50 DAS. This treatment was significantly superior over rest of all treatments. The lowest number of leaves (7.66) observed in the treatment T₅ receiving 100 per cent N through FYM.

The data on number of leaves per plant at 60 days after sowing showed that the treatment T₄ continued to record maximum number of leaves (13.00) receiving 50 per cent N through poultry manure. This treatment was significantly superior over the rest of all the treatments. The minimum number of leaves per plant (8.00) were recorded in treatment T₅ receiving 100 per cent N through FYM. These results are similar to the findings of Jana et al. (1984).

Number of branches per plant

At 30 days after sowing the treatments, T₃, and T₄ these treatments are statically superior over the control treatment T₁ receiving 100 per cent N through urea. The treatment T₄ receiving 50 per cent N through urea combined with 50 per cent N through poultry manure recorded the maximum number of branches per plant (2.06). This treatment was statically superior over the rest of all treatments. The lowest number of branches per plant (1.06) recorded in treatment T₅ receiving 100 per cent N through FYM.

At 70 days after sowing the maximum numbers of branches (12.66) were recorded in treatment (T₄) receiving 50 per cent N through urea combined with 50 per cent N through poultry manure. The lowest number of branches (9.70) were recorded in treatment (T₅) receiving 100 per cent N through FYM. Similar results were reported by Jasrotia and Sharma, (1998) in French bean.

Yield attributes

Yield per plant

Maximum yield per plant 0.140 kg obtained with application of 50 per cent N through poultry manure combined with 50 per cent N through urea (T₄). The increased yield per plant in treatment T₄ was due to large size of green pods, more number of green pods and weight of green pods. Chaudhari et al. (2001) reported that highest green pod yield per plant in French bean was due to the combined application of organic and inorganic manure and fertilizer. The above findings are similar to the present findings.

Yield per hectare

The combination of 50 per cent Nitrogen through urea along with 50 per cent Nitrogen through poultry manure was most effective in number of green pods (44.57) per plant and recorded maximum yield (119.70 quintal) per hectare. The lower number of green pods (34.99) per plant and recorded lower yield (73.20 quintal) per hectare found the treatment receiving 100 per cent N through FYM. This result was confirmed by findings with Srinivas and Naik (1988).

The maximum yield in treatment T₄ was due to more number of pods and large sized green pods as well as increased vegetative growth and balanced C/N ration, which might have increased the synthesis of carbohydrates which ultimately promoted greater growth and yield. It has been also reported that, the secret of hormones like IAA, Cytokinin, auxin and GA which might have been another factor for increasing the yield. The above results corroborate with Brown et al. (1993).

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Table: 1 Effect of different sources of nitrogen on green pod length, Number of green pods per plant and yield of French bean (Phaseolus vulgaris L.)

Treatments	Treatment details	Length of green pods/ plant	Number of green pods /plant	Yield per plant (kg)	Yield per hectare (Q)
T1	Control	18.21	39.05	0.107	91.56
T2	50 % N through urea + 50 % N through FYM	18.60	43.80	0.133	114.38
T3	50 % N through urea + 50 % N through Vermicompost	19.16	43.79	0.137	117.09
T4	50 % N through urea + 50 % N through Poultry manure	19.50	44.57	0.140	119.70
T5	100 % N through FYM	17.33	34.99	0.085	73.20
T6	100 % N through poultry manure	18.13	37.46	0.095	81.26
T7	100 % N through Vermicompost	19.08	35.78	0.090	77.18
T8	75 % N through urea + 25 % N through FYM	18.70	40.99	0.099	87.12
T9	75 % N through urea +25 % N through poultry manure	19.37	42.99	0.124	106.16
T10	75 % N through + 25 % N through Vermicompost	19.19	41.87	0.109	93.58
	S.E. +	0.151	0.315	0.0004	7.271
	C. D. at 5%	0.449	0.934	0.001	21.57