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.

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 Maharashtr, 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 tonnes 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 (T3) 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
The height (46.90 cm) was recorded in treatment $T_4$ 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 $T_4$ 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 combine with 50 per cent N through poultry manure ($T_5$) which was followed by the treatment $T_3$ where 50 per cent N through urea combined with 50 per cent N through Vermicompost was supplied. These result are confirm finding by, Browed et al, (1992) reported maximum height of French bean. The similar result are finding by Srinivas and Naik (1990).

**Number of leaves**

At 30 days after sowing the treatments $T_2$, $T_3$, $T_4$, $T_5$, $T_6$ and $T_{10}$ these treatments are statically superior over the control. The maximum numbers of leaves (6.66) were recorded in treatment $T_5$ 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 $T_6$.

At 50 days after sowing the treatments $T_2$, $T_3$, $T_4$, $T_5$ and $T_{10}$ these treatments are statically superior over the control treatment $T_1$ receiving 100 per cent N through urea. The highest number of leaves (12.66) recorded in treatment $T_5$ 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 $T_1$ receiving 100 per cent N through FYM.

The data on number of leaves per plant at 60 days after sowing showed that the treatment $T_4$ continued to recorded 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 $T_3$ 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, $T_3$, and $T_4$ these treatments are statically superior over the control treatment $T_1$ receiving 100 per cent N through urea. The treatment $T_4$ 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 $T_5$ receiving 100 per cent N through FYM.

At 70 days after sowing the maximum numbers of branches (12.66) were recorded in treatment ($T_4$) receiving 50 per cent N through urea combine with 50 per cent N through poultry manure. The lowest number of branches (9.70) were recorded in treatment ($T_3$) 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 combine with 50 per cent N through urea ($T_4$). The increased yield per plant in treatment $T_4$ 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 combine application of organic and in organic manure and fertilizer. The above finding are on similar confirms 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 confirmly finding with Srinivas and Naik (1988).

The maximum yield in treatment $T_4$ 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 corporate with Brown et al. (1993).
Effect of different sources of nitrogen on growth and yield of French bean (Phaseolus vulgaris L.)

Literature Cited:


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.)

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Treatment details</th>
<th>Length of green pods/ plant</th>
<th>Number of green pods /plant</th>
<th>Yield per plant (kg)</th>
<th>Yield per hectare (Q)</th>
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<tbody>
<tr>
<td>T1</td>
<td>Control</td>
<td>18.21</td>
<td>39.05</td>
<td>0.107</td>
<td>91.56</td>
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<td>T2</td>
<td>50 % N through urea + 50 % N through FYM</td>
<td>18.60</td>
<td>43.80</td>
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<td>T3</td>
<td>50 % N through urea + 50 % N through Vermicompost</td>
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<td>43.79</td>
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<td>T4</td>
<td>50 % N through urea + 50 % N through Poultry manure</td>
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<td>44.57</td>
<td>0.140</td>
<td>119.70</td>
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<tr>
<td>T5</td>
<td>100 % N through FYM</td>
<td>17.33</td>
<td>34.99</td>
<td>0.085</td>
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<td>T6</td>
<td>100 % N through poultry manure</td>
<td>18.13</td>
<td>37.46</td>
<td>0.095</td>
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<td>T7</td>
<td>100 % N through Vermicompost</td>
<td>19.08</td>
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<td>T8</td>
<td>75 % N through urea + 25 % N through FYM</td>
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<td>40.99</td>
<td>0.099</td>
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<td>T9</td>
<td>75 % N through urea +25 % N through poultry manure</td>
<td>19.37</td>
<td>42.99</td>
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<td>T10</td>
<td>75 % N through + 25 % N through Vermicompost</td>
<td>19.19</td>
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