Effect of soil application of potassium and DAP spray in blackgram (Vigna mungo L.)

response of blackgram to potash was up to 25 kg ha\(^{-1}\) in combination with two sprays of DAP at pre flowering and pod initiation stage. This can be ascribed to the medium status of the available potash in the experimental site. Blackgram responded to DAP at pre flowering and pod initiation rather than pre flowering. This clearly indicates the constant requirement of nitrogen and phosphorous even by a legume crop like blackgram. Ramasamy and Ramaiah, (1990), Barik and Rout (1990), also found the beneficial effects of spraying DAP on blackgram. Nitrogen fixation bacteria may not supply the adequate nitrogen through out the plant growth period as senescence of bacteria occurs especially at the time of seed maturity and seed maturity especially during the winter season as the supply of phosphorous to plant from soil is restricted due to low temperatures.

Foliar spray of DAP has served the purpose of supplying nitrogen and phosphorous at the flag end stages of the crop and potash might have helped in effective translocation or mobilizing of the nutrients from one part of the plant to other parts. Therefore, it can be recommended that blackgram should be applied K\(_2\)O @ 25 kg ha\(^{-1}\) along with DAP spray under Southern Telangana region of Andhra Pradesh for achieving the remunerative yield during winter season as this treatment shown maximum benefit cost ratio.

References


(Received: December 2000; Revised: November 2001)

Madras Agric. J. 89 (1-3) : 149-150 January-March 2002

Research Notes

**Integrated phosphorus management in greengram**

R. DURAI SINGH, K. VAIRAVAN AND M. RAMASAMY

*National Pulses Research Centre, Vamban - 622 303, Tamil Nadu.*

Green gram (*Phaseolus radiatus* L.) is one of the most important pulse crop with poor average yield. It is well known that the P is one of the major nutrients which is required in large quantities for its nodulation, N fixation and optimal growth, but it is a major constraint as nearly 98% of soils in India have inadequate supply of P. (Kanwar and Grewal, 1990). Further very little information is available about the effect of P solubilizing bacteria (PSB) on greengram. Hence the present investigation was carried out with objectives to find out the suitable source and levels of inorganic phosphate fertilizer and its combination with organic sources of phosphorus on the yield of greengram.

The field experiment was conducted during Kharif season of 1998-99 and 1999-2000 at National Pulses Research Centre, Vamban, Pudukkottai district. The soil was sandy loam (alfisols) with a pH of 6.3, available N, P\(_2\)O\(_5\), and K\(_2\)O were 193, 8.5 and 260 kg ha\(^{-1}\) respectively. The variety used for this study was Vamban 1. The crop was sown in an individual plot size of 5.4 m x 4 m with a spacing of 30 cm x 10cm. Before sowing, the seeds were treated
Table 1. Effect of integrated P management in growth and yield of greengram (Mean of two years)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Plant height (cm)</th>
<th>No. of branches/plant</th>
<th>No. of pods/plant</th>
<th>Pod length (cm)</th>
<th>No. of seeds/pod</th>
<th>100 grain weight (g)</th>
<th>Grain yield (kg ha⁻¹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>T₁</td>
<td>31.89</td>
<td>2.32</td>
<td>22.26</td>
<td>5.83</td>
<td>7.8</td>
<td>3.04</td>
<td>496</td>
</tr>
<tr>
<td>T₂</td>
<td>34.75</td>
<td>2.75</td>
<td>23.51</td>
<td>5.94</td>
<td>8.4</td>
<td>3.19</td>
<td>539</td>
</tr>
<tr>
<td>T₃</td>
<td>34.47</td>
<td>2.91</td>
<td>25.72</td>
<td>6.20</td>
<td>8.2</td>
<td>3.16</td>
<td>530</td>
</tr>
<tr>
<td>T₄</td>
<td>36.90</td>
<td>2.75</td>
<td>25.53</td>
<td>6.08</td>
<td>7.9</td>
<td>3.12</td>
<td>512</td>
</tr>
<tr>
<td>T₅</td>
<td>38.04</td>
<td>2.58</td>
<td>27.24</td>
<td>6.10</td>
<td>8.5</td>
<td>3.35</td>
<td>594</td>
</tr>
<tr>
<td>T₆</td>
<td>38.30</td>
<td>2.85</td>
<td>26.09</td>
<td>6.13</td>
<td>8.8</td>
<td>3.33</td>
<td>605</td>
</tr>
<tr>
<td>T₇</td>
<td>38.92</td>
<td>3.05</td>
<td>30.65</td>
<td>6.22</td>
<td>9.3</td>
<td>3.40</td>
<td>671</td>
</tr>
<tr>
<td>T₈</td>
<td>38.58</td>
<td>3.04</td>
<td>29.79</td>
<td>6.20</td>
<td>9.0</td>
<td>3.40</td>
<td>659</td>
</tr>
<tr>
<td>T₉</td>
<td>39.87</td>
<td>3.86</td>
<td>32.15</td>
<td>6.46</td>
<td>9.8</td>
<td>3.43</td>
<td>690</td>
</tr>
<tr>
<td>T₁₀</td>
<td>42.72</td>
<td>3.98</td>
<td>33.14</td>
<td>6.62</td>
<td>10.7</td>
<td>3.51</td>
<td>723</td>
</tr>
<tr>
<td>CD (P=0.05)</td>
<td>3.37</td>
<td>0.38</td>
<td>4.53</td>
<td>0.44</td>
<td>1.2</td>
<td>NS</td>
<td>25.0</td>
</tr>
</tbody>
</table>

with PSB as per the treatment at the rate of 3 packets / 20 kg of seeds. N and K were applied as per treatment schedule. The experiment was laid out in a randomized block design with three replications and the following treatments were imposed.

- **T₁** - Control
- **T₂** - 20 kg P₂O₅ through DAP
- **T₃** - 20 kg P₂O₅ through Rockphosphate (RP)
- **T₄** - Phosphorus solubilizing bacteria (PSB)
- **T₅** - 20 kg P₂O₅ through DAP + PSB
- **T₆** - 20 kg P₂O₅ through RP + PSB
- **T₇** - 40 kg P₂O₅ through DAP
- **T₈** - 40 kg P₂O₅ through RP
- **T₉** - 40 kg P₂O₅ through DAP + PSB
- **T₁₀** - 40 kg P₂O₅ through RP + PSB

The plant height at harvest and number of branches per plant was significantly influenced by the phosphorus application in combination with PSB. The highest plant height of 42.72cm was recorded by the application of 40 kg P₂O₅ ha⁻¹ through rockphosphate with phosphorus solubilizing bacteria (Table 1). Increasing the doses of P caused considerable increase in number of pods / plant (33.14) was noticed at 40 kg P₂O₅ ha⁻¹ through rockphosphate with PSB which was significantly higher over control (No phosphorus) and lower doses of both sources of P. Similar trend was noticed for pod length and number of seeds per pod. Application of 40 kg P₂O₅

ha through rockphosphate with PSB produced grain yield of 723 kg ha⁻¹ which was 45.8 per cent and 36.5 per cent higher than those at 20 kg P₂O₅ ha⁻¹ through rockphosphate and control respectively. Application of phosphorus in combination with PSB enhance the availability of P and favour better root growth which in turn enables plant to assimilate more atmospheric nitrogen resulting in to higher grain yield. Similar effect of phosphorus on greengram yield have been reported by Mishra and Masood Ali (1998) and Bagavathiammal and Mahimairaja (1999).

It is concluded that application of 40 kg P₂O₅ ha⁻¹ through rockphosphate and PSB can be recommended for higher grain yield in greengram.

**References**


(Received: December 2000; Revised: April 2001)