EFFECT OF GROWTH REGULATORS ON YIELD OF SUMMER GREENGRAM

V. K. Parmar, M.G. Dudhatra and N.M. Thesiya,
Department of Agronomy, College of Agriculture, Junagadh Agricultural University, Junagadh – 362 001, India.

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ABSTRACT

The results of the experiment on effect of various plant growth regulators on yield of summer greengram revealed that the spray of significantly highest number of pods per plant and number of grains per pod of 22.15 and 7.45 respectively, were recorded under NAA 40 ppm at 20 and 40 DAS application. This treatment also recorded significantly the highest grain weight per plant (6.02 g). Spray of NAA 40 ppm at 20 and 40 DAS recorded maximum grain yield of 1228 kg/ha and stover yield (1890 kg/ha).

Key words : Growth regulators, Greengram, Yield

At present, India is passing through a shortage of protein where the people are mostly vegetarian. Pulses form the main source of protein and are of vital importance in daily diet. Greengram contains about 25 per cent protein of high digestibility and quality. It is used for various purposes either as a whole or in a variety of ways. Sprouted seeds of greengram synthesize ascorbic acid (Vitamin C). Greengram is also a good source of riboflavin and thiamine. It can be successfully raised in summer where adequate irrigation facilities are available. Regulation of plant growth by using chemicals has opened new vista and have become rescuer for agricultural scientists to mitigate certain problems.

The experiment was laid out at Instructional Farm, College of Agriculture, Junagadh Agricultural University, Junagadh during summer season of 2004 with 14 treatments and three replications in randomized block design. The details of treatments are given as under:

- \( T_1 = \text{Control (without any spray)} \)
- \( T_2 = \text{Control (distilled water spray)} \)
- \( T_3 = \text{GA}_3 \text{ (20 ppm) at 20 days after sowing (DAS)} \)
- \( T_4 = \text{GA}_3 \text{ (40 ppm) at 40 DAS} \)
- \( T_5 = \text{NAA (20 ppm) at 20DAS} \)
- \( T_6 = \text{NAA (40 ppm) at 40DAS} \)
- \( T_7 = \text{Kinetin (25 ppm) at 20DAS} \)
- \( T_8 = \text{Kinetin (50 ppm) at 40DAS} \)
- \( T_9 = \text{GA}_3 \text{ (20 ppm) at 20 and 40 DAS} \)
- \( T_{10} = \text{GA}_3 \text{ (40 ppm) at 20 and 40 DAS} \)
- \( T_{11} = \text{NAA (20 ppm) at 20 and 40 DAS} \)
- \( T_{12} = \text{NAA (40 ppm) at 20 and 40 DAS} \)
- \( T_{13} = \text{Kinetin (25 ppm) at 20 and 40 DAS} \)
- \( T_{14} = \text{Kinetin (50 ppm) at 20 and 40 DAS} \)

The greengram Cv. Gujarat greengram-4 was sown with the spacing of 45 X 10cm. The gross and net plot sizes kept were 5 m x 3.6 m and 4 m x 2.7 m, respectively. The required quantity of each of chemical was weighted separately and NAA and \( \text{GA}_3 \) were dissolved in 95 per cent ethyl alcohol, while kinetin was dissolved in diluted HCl. These materials were kept at low temperature in refrigerator. All the agronomic operations were
followed to raise a good crop. The observations were recorded from five randomly selected plants on number of pods per plant, number of grains per pod, grain weight per plant and grain and stover yield per hectare.

**Number of pods plant** : The data on number of pods per plant (Table-1) revealed that the application of NAA @ 40 ppm at 20 and 40 days produced significantly highest number of pods per plant (22.15), followed by T9 (GA3 20 ppm at 20 and 40 DAS), T11 (NAA 20 ppm at 20 and 40 DAS) and T10 (GA3 40 ppm at 20 and 40 DAS).

**Number of grains per pod** : A significant effect of treatment T12 (NAA 40 ppm at 20 and 40 DAS) in respect of maximum number of grains per pod (Table-1) was recorded, followed by T11 (NAA 20 ppm at 20 and 40 DAS), T9 (GA3 20 ppm at 20 and 40 DAS) and T10 (GA3 40 ppm at 20 and 40 DAS). The treatments T6 (NAA 40 ppm at 40 DAS), T5 (NAA 20 ppm at 20 DAS), T4 (GA3 40 ppm at 40 DAS) and T3 (GA3 20 ppm at 20 DAS).

**Grain weight per plant (g)** : The data (Table-1) indicated that significantly the highest green gram grain weight per plant (6.02 g) was recorded under treatment T12 (NAA 40 ppm at 20 and 40 DAS) followed by T11 (NAA 20 ppm at 20 and 40 DAS), T10 (GA3 40 ppm at 20 and 40 DAS) and T9 (GA3 20 ppm at 20 and 40 DAS) at harvest. The treatments T6 (NAA 40 ppm at 40 DAS), T5 (NAA 20 ppm at 20 DAS), T4 (GA3 40 ppm at 40 DAS) and T3 (GA3 20 ppm at 20 DAS) recorded significantly higher grains weight per plant over control and also found at par with each other.

**Grain yield (kg/ha)** : Treatment T12 (NAA 40 ppm at 20 and 40 DAS) significantly out yielded (Table-1) rest of the treatment, with the highest green gram grain yield (1228 kg/ha), but it was statistically at par with treatments T11 (NAA 20 ppm at 20 and 40 DAS), T10 (GA3 40 ppm at 20 and 40 DAS) and T9 (GA3 20 ppm at 20 and 40 DAS).

### Table 1: Effect of plant growth regulators on yield attributes of greengram.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Treatment</th>
<th>Number of pods per plant</th>
<th>Number of grains per pod</th>
<th>Grain weight (g)</th>
<th>Grain yield (kg/ha)</th>
<th>Stover yield (kg/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>Control (without spray)</td>
<td>18.50</td>
<td>5.78</td>
<td>3.30</td>
<td>712</td>
<td>1228</td>
</tr>
<tr>
<td>T2</td>
<td>Control (distilled water spray)</td>
<td>18.50</td>
<td>5.89</td>
<td>3.38</td>
<td>727</td>
<td>1330</td>
</tr>
<tr>
<td>T3</td>
<td>GA3 (20 ppm) at 20 DAS</td>
<td>20.00</td>
<td>6.88</td>
<td>4.54</td>
<td>970</td>
<td>1575</td>
</tr>
<tr>
<td>T4</td>
<td>GA3 (40 ppm) at 40 DAS</td>
<td>19.50</td>
<td>6.83</td>
<td>4.68</td>
<td>997</td>
<td>1610</td>
</tr>
<tr>
<td>T5</td>
<td>NAA (20 ppm) at 20 DAS</td>
<td>20.50</td>
<td>6.97</td>
<td>4.71</td>
<td>1005</td>
<td>1615</td>
</tr>
<tr>
<td>T6</td>
<td>NAA (40 ppm) at 40 DAS</td>
<td>20.50</td>
<td>7.05</td>
<td>4.98</td>
<td>1063</td>
<td>1625</td>
</tr>
<tr>
<td>T7</td>
<td>Kinetin (25 ppm) at 20 DAS</td>
<td>19.80</td>
<td>6.60</td>
<td>4.35</td>
<td>930</td>
<td>1493</td>
</tr>
<tr>
<td>T8</td>
<td>Kinetin (50 ppm) at 40 DAS</td>
<td>19.60</td>
<td>6.58</td>
<td>4.29</td>
<td>923</td>
<td>1470</td>
</tr>
<tr>
<td>T9</td>
<td>GA3 (20 ppm) at 20 and 40 DAS</td>
<td>22.00</td>
<td>7.28</td>
<td>5.50</td>
<td>1168</td>
<td>1784</td>
</tr>
<tr>
<td>T10</td>
<td>GA3 (40 ppm) at 20 and 40 DAS</td>
<td>21.40</td>
<td>7.15</td>
<td>5.50</td>
<td>1185</td>
<td>1820</td>
</tr>
<tr>
<td>T11</td>
<td>NAA (20 ppm) at 20 and 40 DAS</td>
<td>21.40</td>
<td>7.22</td>
<td>5.61</td>
<td>1210</td>
<td>1836</td>
</tr>
<tr>
<td>T12</td>
<td>NAA (40 ppm) at 20 and 40 DAS</td>
<td>22.15</td>
<td>7.45</td>
<td>6.02</td>
<td>1228</td>
<td>1890</td>
</tr>
<tr>
<td>T13</td>
<td>Kinetin (25 ppm) at 20 and 40 DAS</td>
<td>20.00</td>
<td>6.66</td>
<td>4.19</td>
<td>900</td>
<td>1440</td>
</tr>
<tr>
<td>T14</td>
<td>Kinetin (50 ppm) at 20 and 40 DAS</td>
<td>20.00</td>
<td>6.53</td>
<td>4.17</td>
<td>895</td>
<td>1432</td>
</tr>
</tbody>
</table>

DAS: Days after sowing.

S. Em ± 0.26 0.13 0.21 21 41  
C. D. at 5% 0.77 0.37 0.62 61 118  
C. V. % 10.17 8.47 17.04 11.52 17.75
**Stover yield (kg/ha)**: Significantly the maximum stover yield (Table-1) was observed in treatment T12 (NAA 40 ppm at 20 and 40 DAS), which remained statistically at par with treatments T11 (NAA 20 ppm at 20 and 40 DAS), T10 (GA3 40 ppm at 20 and 40 DAS) and T9 (GA3 20 ppm at 20 and 40 DAS). The next best treatments were T6 (NAA 40 ppm at 40 DAS), T5 (NAA 20 ppm at 20 DAS), T4 (GA3 40 ppm at 40 DAS) and T3 (GA3 20 ppm at 20 DAS) but they were statistically at par with each other.

The present findings are in confirmation with the earlier work of Pandey (1975), Gowda (1977), Jayaram and Ramiah (1980), Nisha et al. (1996), Reena et al. (1998) and Upadhyay (2002).

**REFERENCES**


