Assessment of different methods of sowing of vegetable cowpea to harness productivity and profitability potential


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Received : April 2015 ; Revised Accepted: September 2015

ABSTRACT

Cowpea is one of the important leguminous vegetables, an important source of nutrients and high quality protein to cereal based diets. The variety ‘Kashi Kanchan’ with high production potential developed from Indian Institute of Vegetable Research, Varanasi is preferred by farmers. Three methods of sowing with recommended package practices were assessed in order to achieve the productivity potential. Highest number of pods plant^{-1} (27.6 and 27.6), plant height (58.3 and 59.5 cm) and yield (135.5 and 125.4 q ha^{-1}) was recorded in raised bed method of sowing during 2012 and 2013, respectively. Similarly, highest net return `98300 ha^{-1} and `95740 ha^{-1} with highest B:C ratio 3.64 and 3.27 was also observed in raised bed method of sowing during 2012 and 2013, respectively.

Key words: Cowpea, growth, economics, sowing methods, yield.
(primarily salt affected soils) is not up to the mark. Therefore, the productivity of cowpea has yet to be reached at a desired level. In order to increase the area under cowpea, it was necessary to conduct the on farm trials with suitable method of sowing along with a promising cultivar to improve the quality production of cowpea.

**MATERIALS AND METHODS**

The experiments were conducted by Krishi Vigyan Kendra, Bhadohi during Zaid seasons of 2012 and 2013. The land is situated in between 25.12° & 25.32° north latitude and 82.12° & 82.42° east longitude. The temperature ranges between 5° to 46°C and annual rainfall of 1563 mm. The experiment was conducted in Randomized Complete Block Design (RCBD) with three treatments as method of sowing namely T1: Flat method, T2: Ridge method (top of ridge was 60 cm apart) and T3: Raised bed method (bed width was 90 cm and 30 cm width of drainage channel) and five replications. Individual plot size of the experiment was 250 m².

A promising cultivar ‘Kashi Kanchan’ evolved from Indian Institute of Vegetable Research; Varanasi was selected for the study. This variety is resistant to *Golden Yellow Mosaic* disease. Farm yard manure was applied @ 20 t ha⁻¹ prior to sowing. The crop was sown in the second fortnight of February during both the years. The seeds were placed 10 cm apart and 60 cm spacing was maintained in row to row. Irrigation was scheduled in an interval of 8-10 days as per requirement. N:P:K was applied @ 25:60:60 kg ha⁻¹. Full dose of phosphorus and potash and half dose of nitrogen were applied as basal at the time of field preparation and remaining half dose of nitrogen was applied after 30 days of sowing. The pods were picked as and when matured. Five spots were randomly selected to assess the no. of pods plant⁻¹, length of pods (cm), height of plant (cm). Total yield (q ha⁻¹) was calculated from individual plot and analyzed. The economic parameters were also studied in terms of total cost of production (₹ ha⁻¹), gross return (₹ ha⁻¹), net return (₹ ha⁻¹) and benefit cost ratio.

**RESULTS AND DISCUSSION**

It is evident from Table 1 that the highest number of pods plant⁻¹ (27.6) was observed in raised bed method of sowing followed by ridge method of sowing (26.2) and flat method (23.6) during 2012. Number of pods plant⁻¹ observed in raised bed method was statistically significant with flat method. However, number of pods plant⁻¹ was not statistically differed with flat method and ridge method and similar is the case with ridge method and raised bed method. Highest length of pods (27.1 cm) was observed in ridge method followed by raised bed method (25.8 cm) and flat method (22.7 cm) during 2012. The length of pods in ridge method was statistically different from flat method and raised bed method and statistically at par in ridge method and raised bed method. It is one of the major criteria to select better variety for its higher yield and preferable pod size. Longer pods are the preferred and higher marketability character of cowpea. It is also obvious that the longer pods produce more yield than shorter pods. In this way, the pods produced in ridge method and raised bed method proved to be of superior quality.

Highest plant height was also observed in raised bed (58.3 cm) followed by ridge method

<table>
<thead>
<tr>
<th>Parameters</th>
<th>No. of pods/plant</th>
<th>Length of pods (cm)</th>
<th>Plant height (cm)</th>
<th>Yield (q/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flat method</td>
<td>23.6b</td>
<td>22.7b</td>
<td>48.2b</td>
<td>112.6b</td>
</tr>
<tr>
<td>Ridge method</td>
<td>26.2b</td>
<td>27.1a</td>
<td>52.7b</td>
<td>126.9a</td>
</tr>
<tr>
<td>Raised bed method</td>
<td>27.6a</td>
<td>25.8a</td>
<td>58.3a</td>
<td>135.5a</td>
</tr>
<tr>
<td>SEm ±</td>
<td>1.25</td>
<td>1.08</td>
<td>2.14</td>
<td>4.56</td>
</tr>
<tr>
<td>CD (P=0.05)</td>
<td>2.89</td>
<td>2.49</td>
<td>4.94</td>
<td>10.52</td>
</tr>
</tbody>
</table>
(52.7 cm) and flat method (48.2 cm) during 2012. Plant height in flat method and ridge method was statistically at par and differed in flat method and raised bed method and in between ridge method and raised bed method. Similarly, the highest yield was observed in raised bed (135.5 q ha\(^{-1}\)) followed by ridge method (126.9 q ha\(^{-1}\)) and flat method (112.6 q ha\(^{-1}\)) during 2012. Yield in flat method was statistically different from ridge method and raised bed method, however, yield in ridge method and raised bed method were statistically at par. The results indicate that the uptake of nutrients, space etc. might be utilized efficiently in raised bed method of sowing followed by ridge method of sowing. Besides, poor weed competition might be one of the reasons for higher yield in raised bed.

Table 2 also depicts that the highest number of pods plant\(^{-1}\) (27.6) was observed in raised bed method of sowing followed by ridge method of sowing (26.0) and flat method (24.4) during 2013. Number of pods plant\(^{-1}\) observed in raised bed method was statistically significant with flat method. However, number of pods plant\(^{-1}\) was not statistically differed with flat method and ridge method; ridge method and raised bed method. Highest length of pods (24.7 cm) was observed in ridge method followed by raised bed method (24.0 cm) and flat method (19.6 cm) during 2013. The length of pods in ridge method was statistically different from flat method and ridge method; flat and raised bed method and statistically at par in ridge method and raised bed method. Highest plant height was also observed in raised bed (59.5 cm) followed by ridge method (53.2 cm) and flat method (51.0 cm) during 2013. Plant height in flat method and ridge method was statistically at par and differed in flat method and raised bed method and in between ridge method and raised bed method. Similarly, the highest yield was observed in raised bed (125.4 q ha\(^{-1}\)) followed by ridge method (115.7 q ha\(^{-1}\)) and flat method (105.2 q ha\(^{-1}\)) during 2013. Yield in flat method was statistically different from ridge method and raised bed method and flat method. The results indicate that the higher yield in raised bed might be due to highest water use efficiency in addition to above mentioned speculations. The roots absorb water and nutrients from either sides or aeration takes place from other sides. Besides, salt accumulation may not take place in ridge method and raised bed method of sowing in comparison to flat method.

As far as economic parameters are concerned, highest gross cost incurred in ridge method (\(\text{₹} 38600\) ha\(^{-1}\)) followed by raised bed (\(\text{₹} 37200\) ha\(^{-1}\)) and flat method (\(\text{₹} 35450\) ha\(^{-1}\)) during 2012 (Table 3). However, gross return hectare\(^{-1}\) was highest in raised bed method (\(\text{₹} 135500\)) followed by ridge method (\(\text{₹} 126900\)) and flat method.


