Investigating the effect of date of sowing on growth and yield of chia (Salvia hispanica L.)

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Abstract
A field study was conducted to determine the effect of different date of sowing on the growth and yield of chia (Salvia hispanica L.) Randomized complete block design with three replication. The experiment was conducted at Experimental farm, Agriculture Research Station, Mandor-Jodhpur (Agricultural University, Jodhpur) in the year 2016-17. There is four date of sowing viz., 25th October (D1), 05th November (D2), 15th November (D3) and 25th November(D4) in the experiment. The study revealed that the crop sown on 25th October gave highest plant height (77.42 cm), number of influence per plant (49.47) and seed yield (685.44 kg per ha).

Keywords: chia, date of sowing, growth & yield parameters

Introduction
Chia (Salvia hispanica L.) is an annual plant belonging to the Lamiaaceae family native to Mexico and Guatemala (Ixtaina et al., 2008) [3]. Chia can grow up to 1 m tall and has opposite arranged leaves. Salvia hispanica produces white or purple flowers. It is reported that the chia seeds commercialized today were selected by Nahua botanists, but came into the twenty-first century as a mixed population. In pre-Columbian times, its seeds were one of the basic foods of Central American civilizations (Ayerza and Coates, 2005) [1]. It is cultivated in Argentina, Australia, Bolivia, Colombia, Guatemala, Mexico and Peru. Today, its cultivation is not only limited to America but is also extended to other areas such as Australia and Southeast Asia (Jamboonsri et al., 2012) [3]. In India and in the State of Rajasthan, chia is an emerging innovative crop. Inclusion of chia crop in diversified Indian agricultural system provided not only a wider choice in the production of a variety of crops but also higher net returns per hectare of land. The exploitation of new crops and their genotypes has opened up new horizons in crop production. Hence, it becomes essential to study the influence of date of sowing on productivity of chia crop. In light of the above facts, as chia is new to this State particularly so in western Rajasthan.

Materials and Methods
The experiment was carried out on chia (Salvia hispanica L.) at Agricultural Research Station, Mandor-Jodhpur (Rajasthan). Geographically, Jodhpur is situated between 26° 15’ N to 26° 45’ North latitude and 73° 00’ E to latitude 73° 29’ East longitude at an altitude of 231 meter above mean sea level. The soil of experimental site is loamy sand in texture, slightly alkaline in reaction, poor in organic carbon (0.13%), low in available nitrogen (174 kg ha⁻¹) and medium in phosphorus (22.2 kg ha⁻¹) but high in available potassium (325 kg ha⁻¹). The mean daily maximum and minimum temperature fluctuated between 21.8 to 39.8 °C and 8.8 to 22.8 °C, respectively during the crop growing season. The experiment was laid out in Randomized complete block design with three replications. There is four date of sowing viz., 25th October (D1), 05th November (D2), 15th November (D3) and 25th November (D4) in the experiment. The data on growth & Seed yield were recorded.

Results and Discussion
Data presented in the Table showed significant (at 1% level of probability) effect of date of sowing on growth and yield of Chia. The plant height differed significantly due to date of sowing when crop was sown on 25th October. It produced significantly higher plant height...
(77.42 cm) which was significantly superior to later sowing on 5th November, 15th November, and 25th November. The variation in plant height of Chia was observed in present study due to different sowing time indicated that plant height of Chia may be influenced by temperature or other environmental conditions. These results agree with the earlier finding of Karim et al. (2015) [4] and Sharma (2012) [5].

Table 1: Effect of date of sowing and plant geometry on plant height at 30, 60 and at harvest on chia

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Plant height (cm)</th>
<th>Number of inflorescence plant</th>
<th>Seed Yield per ha</th>
</tr>
</thead>
<tbody>
<tr>
<td>D1 (25th October)</td>
<td>77.42</td>
<td>49.47</td>
<td>685.44</td>
</tr>
<tr>
<td>D2 (05th November)</td>
<td>60.66</td>
<td>42.73</td>
<td>564.06</td>
</tr>
<tr>
<td>D3 (15th November)</td>
<td>55.99</td>
<td>30.73</td>
<td>546.27</td>
</tr>
<tr>
<td>D4 (25th November)</td>
<td>46.22</td>
<td>32.13</td>
<td>323.05</td>
</tr>
<tr>
<td>SEM ±</td>
<td>3.3641</td>
<td>2.7380</td>
<td>21.3579</td>
</tr>
<tr>
<td>CD (P = 0.05)</td>
<td>3.6645</td>
<td>3.3060</td>
<td>9.2335</td>
</tr>
</tbody>
</table>

Data presented in Table revealed that the differences in number of inflorescence per plant were significant. At harvest, both first date of sowing i.e. 25th October recorded significantly higher number of inflorescence per plant i.e. 49.47. Progressive delayed sowing resulted in significant reduction in number of inflorescence per plant at all stages of observation. This may be due to higher taller plants in earlier sowing. On the contrary lower number of inflorescence was found in case of sowing on 25th November may be due to decreased favorable environmental conditions. These results are in agreement with Karim et al. (2015) [4].

In term of seed yield per hectare differ significantly among the varying date of sowing. Higher seed yield and husk yield was found in 25th October (685.44 kg per ha) sowing. The yield was decreased as sowing was delayed. Ayerza and Coates (2005) [1], who reported effect of environmental condition causing variation in chia yield. Karim et al. (2015) [4] also reported similar decrease in delayed sowing in seed yield per hectare of chia.

Conclusion

Growth and yield was found maximum with D1 (25th October sowing) which was significantly higher over rest of dates of sowing.

References