INFLUENCE OF TIME OF SOWING ON YIELD AND YIELD ATTRIBUTES OF NIGER (GUIZOTIA ABYSSINICA L.) UNDER RAINFED SITUATION OF ASSAM

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ABSTRACT

A field experiment was conducted during rabi season of 2005-2006 at The Instructional-cum-Research Farm of Assam Agricultural University (AAU), Jorhat, Assam. Four different sowing times, viz. 15th November (D_1), 30th November (D_2), 15th December (D_3) and 30th December (D_4) were used to evaluate the influence of time of sowing on yield and yield attributes of rabi niger crop under rainfed situation. The growth and yield attributing character like plant height, number of branches/plant, number of capitula/plant, number of seeds/capitulum and 1000-seed weight decrease significantly due to delay in sowing time of the crop. Uptake of N, P and K were statistically significant with niger crop sown on 15th November (D_1). The seed and stover yield of niger decrease significantly for every 15 days delay in sowing of niger crop from 15th November (D_1) to 30th December (D_4).

Key words: Niger, Sowing date, Growth, Yield and yield attributes.

Niger (Guizotia abyssinica L.), a minor oilseed crop, is important under rainfed, less fertile soil. The oil from niger is valued for using different purposes like- culinary, anointing the body, manufacturing of paints and soft soaps, lighting and lubrication and as a base oil by the perfume industries. With the area of 9.7 thousand hectare under niger crop, Assam is one of the major niger producing sates of India. With the advantage of considerable area under rice-fallow system, niger crop fits into the system under rainfed condition of Assam (Gogoi et al. 2010), as the period from November to February in the state shows very low moisture availability. Farming community of Assam prefers to grow niger under less moisture available condition.

Optimum sowing time for kharif niger is from mid of June to early August, whereas rabi niger can be sown from September to December (Ahlawat, 2010). Thus, sowing period for niger in different states in India varies depending of the climatic and geographical location. In Assam, sali rice is harvested late and so, the sowing time of next rabi crop gets delayed. Valid information regarding the optimum sowing time of rabi niger for Assam is meager. Considering the importance of location specific information, the present study was undertaken with the aim to assess the influence of dates of sowing on the growth, yield and yield attributes of niger in an inceptisol under rainfed situation of Assam.

The investigation was carried out during rabi season of 2005-2006 at the Instructional-cum-Research Farm (located in latitude 26°48’N, longitude 95°50’E and altitude 86.6 m) of Assam Agricultural University (AAU), Jorhat, Assam. The important initial characteristics of the soil were of sandy loam in texture with bulk density 1.3 Mg/m³, water holding capacity 39.3%, pH 5.5, medium in organic carbon (0.65%), low in available nitrogen (225.00 kg/ha), medium in available phosphorus (25.00 kg/ha) and low in available potassium (80.64 kg/ha).

In the experiment, four dates of sowing i.e. 15th November (D_1), 30th November (D_2), 15th

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December (D₃) and 30th December (D₄), were replicated thrice in randomized block design. The seed rate of rabi niger (variety 'NG-1') used for line sowing was 8 kg/ha and shown manually by placing the seeds in the 4 to 5 cm deep furrow, opened 25 cm apart. The recommended levels of N, P₂O₅ and K₂O (20, 10 and 10 kg/ha for niger) were applied as basal at the time of sowing in the form of urea, single super phosphate (SSP) and muriate of potash (MOP), respectively. The other crop management practices were followed as per the standard recommendation of the region. The total rainfalls received were 96.5, 137.2, 229.2 and 276.0 mm by the 15th November (D₁), 30th November (D₂), 15th December (D₃) and 30th December (D₄) sown crops, respectively. However, total rainfall received by the crops in the early stage of growth (upto the month of February) was 5.5 mm and heavy rain occurs during later stage. During the crop season the mean weekly maximum and minimum temperature ranged from 20.6°C to 32.1°C and 7.7°C to 22.1°C, respectively. Plant height was taken at 90 days after sowing and other yield attributing characters (such as number of branches per plant, number of capitulla per plant, number of seeds per capitulla etc.) was recorded during harvesting of the crop. Plant samples collected at the time of harvesting were chopped, dried and ground, and digested in concentrated H₂SO₄ for determination of N content (modified kjeldahl’s method) and in tri acid mixture for determination of P (yellow colour development method) and K (flame photometric method) contents (Jackson 1973). All the data was subjected to statistical analysis.

**Growth and yield attributing character:** All the growth and yield attributing parameters of niger were significantly influenced by the variation in time of sowing (Table 1). Plant height of niger with D₁ treatment i.e. sowing time on 15th November was significantly higher to that obtained with other sowing times. Delay in sowing times up to 30th December significantly reduces the number of branches per plant of niger. Highest number of branches per plant was recorded from early sown (D₁ treatment i.e. sown on 15th November) crop of niger, followed by D₂ treatment (sown on 30th November) and least was recorded from D₄ treatment (sown on 30th December). Number of capitula per plant and number of seeds per capitulum decreases significantly due to delay in sowing time of niger crop. Sowing of niger crop on 15th November showed highest number of capitula per plant and highest number of seeds per capitulum, which were statistically significant than that of other sowing times. The magnitude of increase was 19.54% in number of capitula per plant and 24.93 % in seeds per capitulum than that of 30th December sown crop (D₄ treatment). The perusal of data (Table 1) also revealed a significant variation in test weight of niger seeds due to changes in time of sowings. 2.74% increase in test weight of seeds was recorded with D₁ treatment as compared to D₄ treatment. Such significant decrease in growth and yield attributing characteristics of niger due to delay in sowing times were also reported by Nayak and Paikray (1991).

**Nutrient uptake by niger crop:** The effect of time of sowings was significant on the nutrient uptake of niger crop. The total uptake of nutrients (N, P, K) was highest in the early sown (D₁) treatment and lowest in the late sown (D₄) treatment. The yield of niger (seeds and stover) was also significantly affected by the time of sowing. The perusal of data (Table 1) also revealed a significant variation in test weight of niger seeds due to changes in time of sowings.

<table>
<thead>
<tr>
<th>Dates of sowing</th>
<th>Plant height at 90 DAS</th>
<th>Number of branches per plant</th>
<th>Number of capitulla per plant</th>
<th>Number of seeds per capitulum</th>
<th>1000-seed weight (gm)</th>
<th>Total uptake nutrients (kg/ha)</th>
<th>Yield of niger (q/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>D₁: 15th November</td>
<td>65.55</td>
<td>12.00</td>
<td>23.00</td>
<td>23.00</td>
<td>3.75</td>
<td>44.60 8.176 17.56 4.63</td>
<td>34.00</td>
</tr>
<tr>
<td>D₂: 30th November</td>
<td>64.10</td>
<td>11.00</td>
<td>21.66</td>
<td>20.50</td>
<td>3.71</td>
<td>39.64 7.349 16.13 4.12</td>
<td>32.02</td>
</tr>
<tr>
<td>D₄: 30th December</td>
<td>61.77</td>
<td>10.00</td>
<td>19.24</td>
<td>18.41</td>
<td>3.65</td>
<td>34.72 6.327 14.11 3.47</td>
<td>30.20</td>
</tr>
<tr>
<td>S. Ed (±)</td>
<td>0.207</td>
<td>0.368</td>
<td>0.515</td>
<td>0.414</td>
<td>0.005</td>
<td>0.115 0.076 0.252 0.043</td>
<td>0.439</td>
</tr>
<tr>
<td>CD(5%)</td>
<td>0.51</td>
<td>0.01</td>
<td>1.26</td>
<td>1.13</td>
<td>0.001</td>
<td>0.28 0.184 0.617 0.10</td>
<td>1.07</td>
</tr>
</tbody>
</table>
uptake by niger crop (Table 1). The niger crop sown on 15th November (D1) showed highest uptake of N, P and K (44.60, 8.18 and 17.57 Kg/ha, respectively). This marked improvement of N, P and K content in niger crop might be attributed to better growth and yield attributing parameters with better root proliferation and there by ensured higher nutrient uptake. Such result corroborate the earlier findings of Gogoi et al. (2010) and Mandal et al. (1991). Lowest uptake of NPK was recorded from D4 treatment i.e. the niger crop sown on 30th December. 

**Yield of niger**: The seed and stover yield of niger decreased significantly for every 15 days delay in sowing of the niger crop from 15th November (D1) to 30th December (D4). It is explicit from the Table 1 that the seed yield of niger varies in between 3.47 and 4.63 q/ha and stover yield ranged in between 30.20 and 34.00 q/ha. The extend of decrease in seed and stover yield was 11.02 to 25.05% and 5.82 to 11.18% respectively for the delay of 15 to 45 day from 15th November. The crop sown at later dates suffered due to low temperature at initial growth stages and heavy rainfall at later stage, which affected the niger yield. Thus, confirming the findings reported earlier by Thakuria and Gogoi (1992) and Gogoi et al. (2010). Such significant reduction in seed and stover yield of niger due to delay in sowing time has also been reported earlier by Singh et al. (1990) and Mandal et al. (1991). It is thus concluded that delay in sowing time has deleterious effect on performances of rabi niger. Sowing of niger on 15th November was found to be optimum so far as growth, nutrient uptake, yield and yield attributing parameters were concerned under rainfed rice fallow situation of Assam.

**REFERENCES**