Evaluation Planting Date on Agronomical Traits of Canola (Brassica napus L.)

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ABSTRACT: The production of oil seed in Iran is not high, about 80% of Iran's necessary oil is imported from foreign countries planting dates obviously affect canola yield and yield components. Experiments were conducted at the Agricultural Farm Station of Karaj, Iran in years (2009-2010) during autumn seasons to find out optimum planting time for the rapeseed Opera cultivar in the Karaj of Iran. There were five planting dates in September 15, September 25, October 10, October 20 and October 30. Dates of sowing significantly influenced the plant height, seed yield, and oil yield the rapeseed in two years. The maximum seed yields (2.19 t.ha⁻¹) were obtained from the 25 September planting and it was significantly different from all other planting dates in 2009-2010 year. The lowest seed yields were found from 25 Oct (2009-2010).

Keywords: Planting date, Canola, Agronomical traits

INTRODUCTION

Rapeseed (Brassica napus L. and Brassica campestris L.) are the important oilseed crops throughout the world which rank third among the oilseed crops after soybean and oil palm in production of vegetable oils, while fifth in the production of oilseed proteins. Rapeseed is also important oilseed crops of Iran. Winter oilseed rape (Brassica napus L.), the most important species of oilseeds, must compete economically with cereal crops and to meet this challenge, the yield of rapeseed crops must increase significantly. In this regard, it has been reported that at the early planting date, seed yield and straw yields were greater than late planting (Daly et al., 1988). Planting time is one of the most important factors for maximizing canola yield especially in those areas where temperature, day length, rainfall and humidity vary throughout the year. Taylor & Smith (1992) reported that yields of seed and oil declined when sowing was delayed beyond May (the optimum period of canola sowing in Australia) (Taylor, 1992). A number of studies have shown yield decline in canola with delay in sowing (Hocking et al., 2001). Sowing time is an important factor that determines the length of growing season and hence yields. If planted in spring, they can be grown as summer crop but the seed yield would be decreased due to short growing season and lack of enough water at the end of growing season, thus, winter cropping is preferred. Early spring sowing of oil canola delayed flowering and reduced reflection of radiation during flowering which were important factors leading to the highest yields achieved by late sowing (Jenkins et al., 1986). Degenhardt and Kondra (1981) also suggested that delayed seeding resulted in a significant decrease in seed yield, harvest index, racemes per plant and racemes per unit area. To date, management practices required for optimal yield of oilseed rape have been described for neither Karaj in Iran. The objective of this study was to determine the appropriate management practices for production rapeseed under Karaj conditions by evaluating the effects of planting date on grain yield of rapeseed.

MATERIALS AND METHODS

Experiments were conducted at the Agricultural Farm Station of Karaj, Iran, during two consecutive autumn seasons of 2009-2010, respectively. The experimental field was a piece of well drained high land with moderately even topography. The soil is acidic in nature with pH 6.2. There were five dates of planting viz. September 15,
September 25, October 10, October 20 and October 30. The treatments were arranged in a Randomized Complete Block Design (RCBD) with three replications having plot size 4m x 6m. All other fertilizers and ½ amount of the urea were applied during final land preparation; and the rest ½ of urea were applied at 15 days after seedling emergence. Weeding cum thinning, irrigation, and insect and disease control measures were done as per requirement. At maturity, 15 randomly selected plants were uprooted for data collection. Data were collected on plant height, 1000- seed weight, seed yield per hectare, and oil yield per hectare.

RESULTS AND DISCUSSION

Different dates of sowing had significant effect on plant height, 1000- seed weight, seed yield, oil yield (Table 1). Plants of early sowing flowered normally due to prevalence of favorable environment especially low temperature during vegetative growth phase which enhanced flower initiation in the genotype. Saran and Giri, (1987) also reported that October 11 sowing date gave earlier flower. This variation might have occurred due to temperature and moisture stress. Above and below of this range, it reduced the growth rate by reducing plant height accumulation. The average of three years results revealed that the maximum plant height was found in 15 Oct. planting and the shortest plant was found in delayed planting on October 25. The highest 1000-seed weight, seed yield were obtained from the September 25 planting, which was different from the other dates of planting. The highest seed yield (2.19 t.ha⁻¹) were obtained from the plants of 25 September planting and it was significantly different from all other dates of plantings in the year. This year results revealed that the highest seed yield was obtained from 25 September planting. Yield potential of a crop is a theoretical assessment of the maximum yield that can be generated when high yielding biological material is grown in an optimum physicochemical environment. Yield is classified as biological yield (total biomass) and economic yield. The seed yield was reduced with the advancement of sowing date from 5th October to 25 October. Chakraborty et al. (1991) stated that early sowing produced 24% higher seed yield than that of later sowing. Tuteja et al., (1996) also reported the highest seed yield from October 2 sowing but it was decreased by delayed sowing to October 22. Delayed planting reduced the seed yield drastically, which might be occurred due to rapid initiation of inflorescence, flowering, fruiting and maturity. Brar et al. (1998) also reported increased seed and oil yield from early planting.

Table 1. Growth traits of rapeseed Opera as influenced by different planting dates in (2009-2010), Karaj of Iran.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Plant height (cm)</th>
<th>1000-seed weight (g)</th>
<th>Seed yield (t.ha⁻¹)</th>
<th>Oil yield (t.ha⁻¹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009-2010</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15 Sep.</td>
<td>154.7d</td>
<td>3.85c</td>
<td>2.02c</td>
<td>0.96d</td>
</tr>
<tr>
<td>25 Sep.</td>
<td>131.3ab</td>
<td>3.74c</td>
<td>2.19cd</td>
<td>0.89c</td>
</tr>
<tr>
<td>5 Oct.</td>
<td>127.4a</td>
<td>3.3b</td>
<td>1.80a</td>
<td>0.76b</td>
</tr>
<tr>
<td>15 Oct.</td>
<td>145.6c</td>
<td>3.08ab</td>
<td>1.85ab</td>
<td>0.79b</td>
</tr>
<tr>
<td>25 Oct.</td>
<td>143c</td>
<td>2.64a</td>
<td>1.79a</td>
<td>0.71a</td>
</tr>
<tr>
<td>CV (%)</td>
<td>12.32</td>
<td>12.31</td>
<td>12.31</td>
<td>9.34</td>
</tr>
<tr>
<td>LSD (0.05)</td>
<td>1.55</td>
<td>0.16</td>
<td>0.17</td>
<td>0.025</td>
</tr>
</tbody>
</table>

CONCLUSION

From the results of the experiment it may be concluded that September 25 planting is the best time for higher seed yield of canola, Opera for the Karaj region of Iran.

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