EVALUATION OF RAPESEED ADVANCE LINES UNDER RAINFED CONDITIONS OF KHYBER PAKHTUNKHWAA PROVINCE

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ABSTRACT
Growth and yield response of four different lines of rapeseed i.e. No-29-47, 99 CBN-027, SPS-1, AUP-03-11 and SPS-2 was studied on three different locations i.e. ARS Kohat, ARS Mingora and ARS Tarnab under rainfed conditions during the year 2012-13. There were significant differences in various entries of rapeseed regarding days to flowering. The maximum days to 50 % flowering (123 days) were recorded for entry 29-47 at ARS Mingora but the same entry took minimum days (94) to 50% flowering at ARS Kohat while days to maturity ranged between 182-189 days at both the locations. Grain yield kg ha\(^{-1}\) for various rapeseed entries had significant difference at different locations. The highest grain yield of 2499 kg ha\(^{-1}\) was noted for SPS-1 at ARS Kohat while minimum grain yield of 805 kg ha\(^{-1}\) was recorded for AUP-03-11 at BARS Kohat.

KEYWORDS: Canola; grain yield; agronomic characters; Pakistan.

INTRODUCTION
Canola is a genetically altered and improved version of rapeseed that was developed for its superior edible oil and high value meal. The term “canola” can only be applied to those varieties that produce less than 2 percent erucic acid. Canola oil is lower in saturated fats than any other vegetable oil, making it a popular choice among health-conscious consumers. Canola meal, the portion of the seed left after the oil is extracted, is of value as feed for livestock. Another potential use for canola is as annual forage. (University of Kentucky College of Agriculture)
Some major oilseed crops grown in Pakistan include cottonseed, rapeseed, mustard, canola, sunflower, safflower, groundnut and sesame. A significant amount of edible oil is extracted from cottonseed that is a fabric crop but not an oilseed. Edible crops like rapeseed, mustard and groundnut are indigenous and have been cultivated for centuries.
Per acre yield of traditional crops is significantly lower due to poor seed quality, inappropriate cultivation techniques and reduced potential yield of cultivars. On the other hand, sunflower, soybean and sesame are non-traditional crops and crop cultivars have higher potential yield.
Cultivation of oilseed crops is essential for steady supply of edible oil and to reduce imports. Edible oil is the fifth largest import item and its share in total imports is 3.6 per cent, which was 5.3 per cent a decade back. As a whole, Pakistan spends around Rs50 billion per annum on export of edible oil. The country imports palm oil from Malaysia, Norway, Singapore and South Korea and soybean oil from Malaysia, Argentina, Singapore and Switzerland.
In 2004-05, Pakistan imported palm oil worth $477.7 million against $464 million the previous year. Similarly, $49 million were incurred on the import of soybean oil in the same period. The demand for edible oil is increasing.
The total availability of edible oil in 2003-04 was 2.437 million tons with the share of local production at around 0.740 million tons which was 30.4 per cent of the total national requirements and 1.693 million tons was imported that constituted 69.6 per cent share. Edible oil is either imported or extracted from the imported seeds. Cultivation of edible oil is not popular among the farming community due to a number of reasons. Reported area under sunflower, rapeseed and mustard, sesame, cottonseed and canola in 2004-05 was 7,70,000 acres, 6,12,000 acres, 66,000 acres, 79,79,000 acres and 288,000 acres, respectively. Production of oilseed of sunflower, rapeseed and mustard, cottonseed and canola was 5, 07,000 tons, 215,000 tons, 4,470,000 tons and 1,73,000 tons, respectively during the same year.
Oil extraction from oilseeds produced during 2004-05 was 17,700 tons, 68,000 tons, 5,36,000 tons and 6,100 tons of sunflower, rapeseed and mustard, cottonseed and canola, respectively. Total oil production was 8,42,000 tons during 2004-05. To increase the area under oilseeds is difficult because increasing
demand of cereal grains for human. Small farmers prefer to grow cash crops instead of oilseeds. The situation calls for exploration of other means to increase the acreage of oilseed crops without sacrificing the area under cash and grain crops. Cultivation of non-traditional crops like sunflower, canola and soybean is imperative to enhance production of oilseed in order to deal with the situation effectively. The farmers are reluctant to grow oilseed crops because of the non-existent of definite procurement system for oilseeds. While an efficient system of procurement promotes production and efficient production attract buyers.

Another reason to be cited here is poor cultivation techniques. Normally, oilseed crops are cultivated in areas where it is not feasible to grow cash or grain crops due to deficiency of inputs such as irrigation water. Oilseed don’t require high amount of inputs. Little dose of fertilizers, minimum tillage, a few irrigations, and less plant protection measures are inputs required for successful cultivation of oil seeds due to which cost of production of these crops is much lower compared to grain or cash crops. Nevertheless, to get higher per acre yield, appropriate cultivation techniques are required. It is possible to increase area of cultivation under oilseed crops in different agro-ecological regions where there is shortage of water.

Similarly, another option available is cultivation of oilseed crops on marginal lands, intercropping and replacement of some traditional crops like rapeseed and mustard. About 6.17 million hectares are salt affected soils, which comprises of 60 per cent of cultivable canal command area. Raymer et al. (1991) conducted cultivar performance trials with canola (low eric acid) quality rape cultivars in 1990-91 at 5 locations in Georgia. Improved management practices are needed to raise production. Per acre yield can be increased by introducing higher yielding hybrids, early maturing hybrids, hybrids resistant to insects, pests and diseases, availability of other inputs such as fertilizers, irrigation etc. and adoption of modern technology. Quality seed is essential to get higher yield of oilseed crops. Quality seed makes it possible to enhance production by 10-20 per cent. Planting techniques play important role in enhancing crop yield significantly (Bilal Hassan, Dawn.com).

MATERIAL AND METHODS
Five entries selected from rapeseed advance yield trial were tested under Barani conditions for their yield and other agronomic characteristics. The selected materials were tested at BARS Kohat, ARS Mingora and ARI Tarnab during Rabi 2012-2013 for better performance against drought and other traits. Experiment was laid out in RCB design with three replications having plot size of 5 x 1.2 m² at three different locations. Fertilizer was applied @ 80:58 N: P2O5 kg ha⁻¹ before sowing. Data was collected on various parameters and analyzed statistically using LSD at 0.05 %P.

Entries: 05
Locations: 03
Reps: 03
Plot Size: 5 x 1.2 m²
Design: RCB

RESULTS AND DISCUSSION

Days to 50% flowering
Data presented in Table-1 showed that there were significant differences in various entries of rapeseed regarding days to flowering. The maximum days to 50 % flowering (123 days) were recorded for entry 29-47 at ARS Mingora but the same entry took minimum days (94) to 50% flowering at ARS Kohat.

Grain yield
Data on grain yield kg ha⁻¹ (Table-1) indicated that various rapeseed entries had significant difference from one another at different locations. The highest grain yield of 2499 kg ha⁻¹ was noted for SPS-1 at ARS Kohat while minimum grain yield of 805 kg ha⁻¹ was recorded for AUP-03-11 at BARS Kohat. Barni (1985) studied 17 cultivars of B. napus during 1981-84 at 5 locations while Ghaffari (1987) studied 10 Brassica napus cultivars. Similarly Zaman et al (1991) carried out field experiment in which five swede rape lines were evaluated and compared with B. juncea and B. campestris. The results obtained through this study coincide the results of above mentioned researchers.

Days to maturity
Data on days to maturity ranged between 182-189 days at both the locations (Table-1).
Table 1: Performance of rapeseed entries at two locations

<table>
<thead>
<tr>
<th>S. No</th>
<th>Entries</th>
<th>Days to 50 % flowering</th>
<th>Days to maturity</th>
<th>Grain yield (kg ha^-1)</th>
<th>Means</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>ARS Kohat</td>
<td>ARS Mingora</td>
<td>ARS Kohat</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>No-29-47</td>
<td>94 E</td>
<td>123 A</td>
<td>182</td>
<td>1527 BE</td>
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<td></td>
<td></td>
<td>ARS Mingora</td>
<td></td>
<td>ARS Kohat</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>99 CBN-027</td>
<td>95 E</td>
<td>121 AB</td>
<td>184</td>
<td>2000 AC</td>
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<td></td>
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<td>ARS Mingora</td>
<td>1393 DE</td>
</tr>
<tr>
<td>3</td>
<td>SPS-1</td>
<td>94 E</td>
<td>121 AB</td>
<td>185</td>
<td>2499 A</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>ARS Kohat</td>
<td>1622 B-E</td>
</tr>
<tr>
<td>4</td>
<td>AUP-O3-11</td>
<td>103 D</td>
<td>121 AB</td>
<td>181</td>
<td>805 F</td>
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<tr>
<td></td>
<td></td>
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<td></td>
<td>ARS Mingora</td>
<td>1866 B-D</td>
</tr>
<tr>
<td>5</td>
<td>SPS-2</td>
<td>111 C</td>
<td>120 B</td>
<td>184</td>
<td>1722 BE</td>
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<td>LSD at 0.05%</td>
<td>2.397</td>
<td>N.S</td>
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REFERENCES


