Evaluation of Hazelnut Varieties under the Climatic Conditions of Kalam, Swat

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ABSTRACT

An experiment was conducted to evaluate the performance of different varieties of Hazelnut *Corylus avellana* at the Agricultural Research Station, Kalam, Swat during 2000. All the varieties showed significant variation in number of male and female flowers per branches, fruit size, fruit weight, kernel percentage and yield per plant. There was no significant difference in days to fruit set and days to nut maturity. Maximum number of male and female flowers per branch (57.3 and 35.0), days to fruit set (13.7), days to nut maturity (138.3), fruit size (4.19 cm³), fruit weight (2.3 g), kernel percentage (61.32) and yield per tree (3.78 kg) was noted in variety T-Giffoni, while minimum number of male and female flowers per branch (30.3 and 20.3), days to fruit set (10.0), days to nut maturity (125.0), fruit size (2.9 cm³), fruit weight (1.4 g), kernel percentage (33.95), and yield per tree (2.64 kg) was recorded for variety Kalam-B. Variety T-Giffoni is recommended for better performance.

Keywords: Hazelnut, Pakistan, Varieties

Introduction

Hazelnut (*Corylus avellana*) belongs to family *Betulaceae*. The cultivated hazelnut (filbert) has been classified as *Corylus maxima* Mill and *Corylus avellana* L. It is deciduous shrub and monoecious. Hazelnut are self-sterile, pollinizers such as Duchilly, Halls Giant and Butler are planted at a ration of one pollinizer to fourteen Barcelona or Ennis Trees (Lagerstedt and Thompson, 1980). The leaf buds of hazelnut requires as much chilling as apple buds, but the flower buds require only a fraction as much. Thus, the ideal winter climate is cool, to provide 1500 hours chilling with lows only a few degrees below freezing. The growing season should be about 180 days, as the nuts mature in autumn (Westwood, 1993). This shrub is an important in terms of nut production as well as for beautification of premises. In landscaping it is used for symmetrical and asymmetrical plantation to provide rhythm to the viewers.

Demirici and Rehber (1980) reported that 70 % of world hazelnut production comes from Turkey. Cobb-Douglas type is the best variety in the eastern region of black sea. Alberghina and Galvagno (1983) studied six cultivars, from two regions of mainland of Italy and Sicily. Their observations based on the mean yields, crown volume, yield and yield per unit infestation by bugs, dates of flowering (male and female) and maturity. Tonda Romana, Siciliana and Pesce Rosso were the highest yielding and Agghirara has the best shelling yield. It was noted that Tonda Romana, from central Italy, performed well in Sicily while Tonda Gentile delle Langhe, from Italy, did not well. Anonymous (1985) studied 63 varieties of hazelnut and recommended six varieties for commercial plantation in Italy for shelling yield ad an overall assessment including suitability for processing. Amongst six, only four cultivars were good for processing. Westwood (1993) reported that Turkey is the principal hazelnut producing country, accounting for about 60% of the world production. The main
variety of Turkey is Tombul. Italy produces 24% of the world crop, the main variety is Negretta. Jankovic et al. (1987) reported that cultivars Istarski Dugi, Nochione, Tonda Gentile del Piemonte and Roman were propagated by earthing-up (stooling) and form softwood and hardwood cuttings. Stooling gave 30.1-42.1 % rooting. Softwood cutting treated with IBA gave 52-60 % rooting (optimum concentration 5 g IBA per liter) and hardwood cuttings treated with IBA gave 8-28 % rooting (optimum concentration 4 g was IBA per liter).

Materials and methods

The present project under the title of "evaluation of hazelnut varieties under the climatic conditions of Kalam, swat" was carried out at the Agriculture Research Station Kalam. Two exotic varieties of Hazelnut i.e T-Giffoni and T-Romina introduced form Switzerland under KIDP in 1994 were studied along with two wild varieties i.e Kalam-A and Kalam-B. The plants were of five year old and planted at the distance of four meter apart. The experiment was laid out in Randomized Complete Block Design with four treatments and replicated three times. The data was analyzed according to Least Significant Difference (LSD) test.

Data on number of male and female flowers per branch, days to fruit set and maturity, fruit size, kernel percentage, fruit weight and yield per tree were recorded.

Results and discussions

Number of male flowers per branch

Mean values in Table-1 showed that maximum number of male flowers per branch (57.3) was recorded in variety T-Giffoni, Followed by T-Romina (47.0), while minimum number of male flowers per branch (30.3) was recorded in Kalam-B. The difference in number of male among different varieties may be due to genetic nature.

Number of female flowers per branch

Mean values in Table-1 showed that maximum number of female flowers per branch (35.0) was recorded in T-Giffoni, followed by T-Romina (27.7). Minimum number of female flowers per branch (20.3) was recorded in Kalam-B. The difference in female flowers among various varieties is due to genetic make up of varieties.

Number of days from flowering to fruit set

Mean values in Table-1 showed that maximum number of days to fruit set (13.7) were recorded in variety Kalam-B, followed by T-Romina (10.7). The minimum number of days from flowering to fruit set (10.0) was recorded in variety T-Giffoni. The difference in days to fruit set among varieties T-Giffoni, T-Romina and Kalam-A are statistically alike. The difference in number of days to fruit set is the varietal character as some varieties gave early flowering and some late.

Number of days to nut maturity

The maximum number of days to nut maturity (138.3) was recorded in variety Kalam-B, followed by Kalam-A (135.7), while minimum days to nut maturity (125.0) was recorded in variety t-Giffoni (Table-1). Early or late nut maturity might be due to genetic nature of the varieties.

Fruit size

The data in Table-2 showed that maximum fruit size (42 cm²) was recorded in variety T-Giffoni, followed by T-Romina (4.1 cm²), while minimum fruit size (2.2 cm²) was recorded in variety Kalam-B. The difference in fruit size may also be due to genetic make up of varieties.

Kernel percentage

Maximum kernel (61.3 %) was recorded in variety T-Giffoni, followed by T-Romina (59.3 %) and minimum kernel percentage (33.9) was recorded in variety Kalam-B (Table-2). The difference in kernel percentage is due to shell thickness, the varieties will thin shelled gave more kernel and vice versa.
Table 1: Flowering, fruit set and nut maturity of various Hazelnut varieties at Kalam, Swat.

<table>
<thead>
<tr>
<th>Varieties</th>
<th>Male flower per branch</th>
<th>Female flowers per branch</th>
<th>Days to fruit set</th>
<th>Days to nut maturity</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-Giffoni</td>
<td>57.3 a</td>
<td>35.0 a</td>
<td>10.0 b</td>
<td>125.0 b</td>
</tr>
<tr>
<td>T-Romina</td>
<td>47.0 b</td>
<td>27.7 ab</td>
<td>10.7 ab</td>
<td>133.3 ab</td>
</tr>
<tr>
<td>Kalam-A</td>
<td>35.7 c</td>
<td>22.7 b</td>
<td>10.3 b</td>
<td>135.7 ab</td>
</tr>
<tr>
<td>Kalam-B</td>
<td>30.3 d</td>
<td>20.3 b</td>
<td>13.7 a</td>
<td>138.3 a</td>
</tr>
</tbody>
</table>

LSD value at 5% 4.7 7.6 3.2 12.3

Means followed by different letters are significantly different from each other at 5% level of probability.

Table 2: Fruit characteristics of various Hazelnut varieties at Kalam, Swat.

<table>
<thead>
<tr>
<th>Varieties</th>
<th>Fruit size (cm²)</th>
<th>Kernel percentage</th>
<th>Fruit (nut) weight (g)</th>
<th>Yield per plant (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-Giffoni</td>
<td>4.2 a</td>
<td>61.3 a</td>
<td>2.3 a</td>
<td>3.78 a</td>
</tr>
<tr>
<td>T-Romina</td>
<td>4.1 a</td>
<td>59.3 a</td>
<td>1.9 ab</td>
<td>3.48 a</td>
</tr>
<tr>
<td>Kalam-A</td>
<td>2.4 b</td>
<td>37.9 b</td>
<td>1.4 b</td>
<td>2.94 b</td>
</tr>
<tr>
<td>Kalam-B</td>
<td>2.2 c</td>
<td>33.9 c</td>
<td>1.4 b</td>
<td>2.64 b</td>
</tr>
</tbody>
</table>

LSD value at 5% 0.078 3.4 0.5 1.3

Means followed by different letters are significantly different from each other at 5% level of probability.

Nut weight (g)

The maximum nut weight of 2.3 g was recorded in variety T-Giffoni, followed by 1.8 g in T-Romina and minimum nut weight of 1.4 g was in variety Kalam-B (Table-2).

Yield per plant (kg)

It is obvious from Table-2, that maximum yield per plant (3.78 kg) was recorded for variety T-Giffoni, followed by 3.48 kg per tree in T-Romina and minimum yield per plant (2.64 kg) was recorded in variety Kalam-B. The difference in yield among various cultivars is due to fruit set and nut size and weight. The maximum yield in T-Giffoni is due to maximum nut size and nut weight while the minimum yield in Kalam-B is due to small size of nut.

References