Impact of Varying Nitrogen Levels on Growth and Yield of Fennel (*Foeniculum vulgare*)

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An experiment was performed to see the impact of varying nitrogen levels on the growth and yield of Fennel at farmer field District Kharan during the year 2003-2004. Nitrogen Levels tested were: 0, 40, 80 and 120 kg per hectare. The results revealed that nitrogen levels significantly affected plant height at maturity, Number of Umbels per plant, Number of seeds per umbel, 100-seed weight and seed yield per unit area. The highest Nitrogen levels (120 kg ha\(^{-1}\)) attained taller plants (133.40 cm), however 80 kg N ha\(^{-1}\) produced maximum Umbels (31.10), number of seeds (792.84), seed index (19.21) and seed yield of (1145.66 kg ha\(^{-1}\)). It was observed that there was gradual improvement in growth and yield characters of Fennel with each increased level of nitrogen fertilizer up to 80 kg ha\(^{-1}\) and highest nitrogen level produced significantly low values for all the growth and yield components.

Introduction

Fennel (*foeniculum vulgare*) belongs to family apiaceae locally called saunfowing to its many ous pharmaceutical uses, is the most important medicinal crop that finds use in the indigenous ‘Unani’ and allopathic system of medicines. It is an important spice and used in food and flavor industry for addition to meats, vegetable products. Fish sauces, soups, salad dressing, breads, pastries and alcoholic beverages. As a medicinal plants fennel seed has been used as an antispsmodic, curminative, diuretic, laxative and stomachic. It has also been used to stimulate lactation in animals. It is a remedy against colic, cough and asthma and is a safeguard against blindness (Simons et al, 1984). It was recommended in the past as an antidote for those who had eaten poisionous herbs or mushrooms. Fennel seed contains 3-4% oil that is composed of anethole, fenchone, pinene, comphene, sabine and camphor is used in pharmaceutical industry (Bentley and Trimen 1999).

Although the cultivation of fennel on a commercial scale is practically non-exist in Pakistan, yet on account of its medicinal value the farmers almost all over the country grow it on small scale. The produce obtained from a small scale cultivation in the country is not sufficient to meet the national demand, and consequently it is imported from other countries in the world. In view of its importance an multipurpose crop, it is imperative to bring some area under its cultivation and determine asute agronomic requirements for its successful cultivation. Saadul et al. (2002) reported that yield and oil contents of fennel can be enhanced with use of fertilizer especially the nitrogenous one. The present study was therefore conducted to determine impact of varying nitrogen levels on growth and yield of fennel under agro-ecology of kharan.

Materials and Methods

The investigations pertaining to the impact of varying levels of nitrogen on growth and yield of fennel locally called saunf was conducted at the farmer field, district kharan during the year 2003_2004. The experiment was laid out in ransomed complete block design and replicated thrice. The net plot size was 2.5 m x 3.8m. the levels of nitrogen (kg ha\(^{-1}\)) tried were 0, 40, 80 and 120. A basal dose of P and K was applied @ 60, and 30 kg ha\(^{-1}\). The crop was sown on November, 15, 2003 in 45 cm apart rows with the help of a single row hand drill. All the P, K and half nitrogen was applied at the time of sowing and the remaining nitrogen was applied with 1st irrigation. The crop received four irrigation V12. first at the completion of germination, second after twenty days of 1st irrigation, third at flowering and the last irrigation was applied at seed formation crop was harvested on May 15,2004. The yield and yield components data were recorded after harvesting of the crop and analysed statistically according to (steel and torrie, 1984).
Results and Discussion

Plant height at maturity (cm)

The height of the crop is a function of combined effect of both the genetic and environmental factors. The data regarding the plant height as affected by different nitrogen levels, significantly affected plant height at maturity. Increase in N levels caused a significant increase in plant height and all the levels differed significantly from one another. Maximum plant height 133.40 cm was obtained by applying 120 kg N ha\(^{-1}\) and the minimum of 105.17 cm was recorded in control.

1000- seed weight (gm)

To determine weight per 1000- seed is another parameter to judge the ultimate growth and yield response of a crop. It is a measure of vigor of seeds. The data given in Table 1. Indicate that 1000- seed weight was significantly affected by different nitrogen levels. Maximum 1000- seed weight (19.21g) was obtained by applying 80 kg N ha\(^{-1}\) and it was minimum (11.50g) was obtained from control treatment. These result agree with those of Bentley et al. (1999).

(Seed yield kg ha\(^{-1}\))

The data regarding seed yield kg ha\(^{-1}\) as affected by different nitrogen levels are given in Table 1. The increase in N levels caused a significant increase in seed yield. Maximum seed yield of (1145.66 kg ha\(^{-1}\)) was obtained by applying 80 kg ha\(^{-1}\) while the minimum was obtained in case of T1 that is control. The increase in seed yield with 80 kg N ha\(^{-1}\) may be due to increase in number of umbel plant\(^{-1}\), seeds umbel\(^{-1}\) and 1000-seed weight. These results are in consonance with those reported by Csernii and p.sass.(1994).

Number of umbels per plant

Number of umbels per plant is a key factor for determining yield performance. It is directly related to the yield of fennel crop.

The data in Table 1 indicate that the number of umbels plant\(^{-1}\) was significantly influenced by different nitrogen levels. Among the treatment mean, treatment T3 (80 kg N ha\(^{-1}\)) resulted (31.10) umbels plant\(^{-1}\) as compared to the rest of treatments. Number of umbels plant\(^{-1}\) in control treatments were the lowest (15.40) of all the treatments. These results are in consonance with those reported by Patel et al (2000).

Number of seeds per umbel:

The number of seeds per umbel is an important component that directly helps in exploring the yield potential of crops. The more number of seeds per umbel; the more will be the yield.

The data regarding the number of seeds umbel\(^{-1}\) as affected by different nitrogen levels are shown in Table 1. It is clear from the date that treatment T3 produced maximum (792.84) seed umbel\(^{-1}\). Minimum of number of seeds umbel recorded in control treatment. The results are in conformity with those reported by Khan et al (1999).

Table 1. Impact of varying levels of nitrogen on growth yield components of Fennel.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Ph (cm)</th>
<th>No of Umbel</th>
<th>No. of Seeds</th>
<th>1000 seed</th>
<th>Seed Yield</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Plant(^{-1})</td>
<td>umbel(^{-1})</td>
<td>(g)</td>
<td>kgh(^{-1})</td>
</tr>
<tr>
<td>T1=0</td>
<td>105.17</td>
<td>d</td>
<td>15.40</td>
<td>442.61</td>
<td>11.50</td>
</tr>
<tr>
<td>T2=40</td>
<td>117.24</td>
<td>c</td>
<td>26.28</td>
<td>684.50</td>
<td>13.18</td>
</tr>
<tr>
<td>T3=80</td>
<td>122.08</td>
<td>b</td>
<td>31.10</td>
<td>792.84</td>
<td>19.21</td>
</tr>
<tr>
<td>T4=120</td>
<td>133.40</td>
<td>a</td>
<td>27.13</td>
<td>712.00</td>
<td>16.75</td>
</tr>
</tbody>
</table>

* Any two means not sharing the same letter differ significantly from each other at 0.05 probabilities

References

- Bhati, D.S. and S.P. Raychaudhuri 1992. Effect of stage of umbel picking and nitrogen fertilization on fennel. Recent advances in medicinal, aromatic and spice


