EFFECT OF DIFFERENT LEVELS OF NITROGEN ON THE GROWTH AND PRODUCTION OF CUCUMBER

BY

Agriculture Research Institute, Sariab, Quetta, Pakistan
Agriculture Extension Department, Balochistan, Pakistan

ABSTRACT
An experiment to see the effect of Nitrogen (N) levels (0 to 210 kg/ha) in combination with a basal dose of 120 kg DAP per hectare on the growth, yield and yield components of Cucumber (Cucumis Sativus), was conducted at student's farm SAU, Tandojam. The N rates were 0, 30, 60, 90, 120, 150, 180 and 210 kg/ha. The crop grown was regularly observed and data were recorded for fruits length, weight and plot yield. The results revealed that the application of N at levels 210 and 180 kg/ha produced significant longer cucumber vines than the remaining treatments. The mean length and weight of the fruits as well as the yield per experimental plot under these two treatments were comparatively higher than all the six remaining treatments but were not significantly different from those receiving 120 and 150 kg/ha N.

Keywords: Cucumber (cucumis sativus), salad, nitrogen, potassium, growth

INTRODUCTION
Cucumber (cucumis sativus) is a tender annual vegetable vine crop, grown for its fresh fruits. It is consumed in salads or taken as fresh fruit desserts. In addition to its lovely taste and taste and fairly good caloric value, cucumber is reported to be of high importance to the human beings on account of its medicinal benefits. It is the best known natural diuretic, and thus can serve an active drug for secreting and promoting the flow of urine. Due to high content of potassium (80 mg/100), cucumber can highly be useful for both, high and low blood pressure conditions. It is a good source of Vitamin-A (80 I.U./100 g) and contains “Erasing”, an enzyme that helps to digest proteins (Kadans, 1979).

In view of great importance of cucumber in terms of human health and food, it’s production in our country is not very much appreciable. As per latest information, an area of 139 hectares (ha) was brought under cultivation in province of Sindh during the year 1983-84 (Agri. Stat. 1984), the lower interest in this crop by local growers may be due to less net economic returns on account of poor Yield/unit area. This, again, may be due to the lack of scientific production technology of this crop. Among the various factors for having better quality and higher yield per unit area, the optimum application of fertilizers is the most important one. Among the major plant nutrients required by the plants, N is reported to be very essential for the proper growth and development of crop plants. Very little research work has been conducted on the N requirements of this crop under our local conditions of soil and climate. The present studies were therefore, conducted to determine the effect of various levels of N on the growth and yield of this crop, supplied with a uniform dose of 120 Kg Di-Ammonium Phosphate (DAP) per hectare.

MATERIAL AND METHODS
The experiment was conducted at the Garden of the Department of Horticulture, Sindh Agriculture University, Tandojam during the year 1987. The following eight levels of Nitrogen (N) were applied along
Ahmed, et al. (2007). Effect of nitrogen levels on cucumber

with a uniform basal dose of 120 Kg DAP per hectare to the cucumber crop in a Randomized Complete Block Design with three replications.

Following nitrogen application treatments were formed in this study

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Level of N Kg/ha</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>00 (control)</td>
</tr>
<tr>
<td>T2</td>
<td>30</td>
</tr>
<tr>
<td>T3</td>
<td>60</td>
</tr>
<tr>
<td>T4</td>
<td>90</td>
</tr>
<tr>
<td>T5</td>
<td>120</td>
</tr>
<tr>
<td>T6</td>
<td>150</td>
</tr>
<tr>
<td>T7</td>
<td>180</td>
</tr>
<tr>
<td>T8</td>
<td>210</td>
</tr>
</tbody>
</table>

*Plus a uniform basal dose of 120 Kg D.A.P./ha.

The field area selected for these studies was loamy type in texture. The experimental unit plot measured 10 x 1.8 m², and was connected with a 75cm wide water channel to supply the irrigation to each of the plot independently. The seed of the local variety of cucumber, purchased from Sindh Seed Store Hyderabad was sown on both the sides of raised beds on 7-1-1987 when the soil was in proper condition. The seed was dibbled at a distance of 60 cm and thus each experimental plot consisted 30 plants. The emergence of plants was recorded on 15-1-1987. The treatment doses of N were given in the form of urea fertilizer split in two equal installments, applied on 5-2-1987 and 16-4-1987 as side dressings. All the cultural operations like weeding, hoeing, supply of irrigation water and plant protection measures were conducted uniformly when ever necessary. The following observations were recorded:

1. **Length of vine at the time of first fruit formations.**

   The total length of the vine from ground level up to the tip of the main vine was recorded on five randomly selected plants under each treatment

2. **Length of fruit.**
3. **Weight of fruit.**

   These observations were recorded on five randomly labeled fruits under each treatment harvested after uniform period of 7 days of fruits setting.

4. **Yield per experimental plot**

   The weight of the fruits harvested from all the plants under each treatment (including 5 random plants), throughout the cropping season was summed up to have the yield/plot.

**RESULTS**

The data for yield and its quantitative characteristics are given in Table-1. The analyses of variance for the effect of different levels of Nitrogen on the growth and yield of cucumber, recorded in terms of five selected variables was conducted as suggested by LeClerg et al. (1962). Further analyses to locate the signification differences among the treatment means, were conducted through applying the Duncan’s new multiple range test.

**Length of vine**

The effect of different doses of N on the total length of cucumber vine was significant at 1% level of probability. The results (Table-1) indicate that the vines receiving 210 and 180 kg/ha Nitrogen were significantly longer vines.

**Length of fruit**

The effect of different levels of N on the length of cucumber fruit was significant at 1% level of probability. The results (Table-1) indicated that the mean length of fruit harvested from the plants under treatments T8, T7, T6, T5, T4, and T3 were statistically not different from each other, but all of these treatments produced longer fruits than the plants under treatments T2 and T1.
Weight of fruit
The data regarding effect of different doses of N on the weight of cucumber fruit are given in Table-1. The analysis of the result revealed that the cucumber plants supplied with 210, 180 and 150 Kg N/ha produced the heaviest fruits and were significantly higher in their mean weight than the plants receiving 90, 60, 30, or 0 N/ha (T4,T3,T2, and T1). The fruits of the plants under T5 (120 Kg N/ha) were not significantly heavier than those under T4 but were so when compared with the fruits harvested from T3, T2, and T1. The cucumber fruits under T3 and T2 (60 and 30 Kg N/ha.) were not significantly different from each other in terms of their mean weight, but both of them were significantly (1%) heavier than the mean weight of fruits harvested from T1.

Yield per Plot
The data on the yield per plot of cucumber under the response of different doses of N are presented in Table-1. The analysis of variance of the data was significant at 1% level probability. Further analysis of the results showed that cucumber receiving the highest doses of N gave highest fruit yield per plot. The plants supplied with 210 and 180 Kg N/ha (T8 and T7), with a mean value of 14.867 and 13.65 Kg gave significantly more yield than those receiving 90, 60, and 100 Kg N/ha (T4,T3,T2, and T1). T6, T5, T4, T3, T2 and T1 were statistically not different from each other in terms of the cucumber fruit yield per plot.

DISCUSSION
The results indicate that the highest doses of N at 210 and 180 Kg/ha produced significantly longer cucumber vines, bearing comparatively longer and heavier fruits than the remaining doses of N ranging from 0-150 Kg/ha. Similarly, results suggest that the fruit yield per plot of cucumber increased with the increase in the application dose of the N. The plants receiving the highest doses of 210 and 180 Kg N/ha were comparatively better than those receiving 150 and 120 Kg N/ha and were significantly higher in yield /plot than the plants under the remaining treatments (90,60,30, and 0 Kg N/ha). Keeping in view the above stated important role of N in the plant growth, our results are in accordance with the expectations. The significant higher growth, measured in term of the length of the vines under the effect of higher doses of N, may have probably resulted in higher yield/ plot from those plants on account of the observed increase in the yield components such as length and weight of the fruit.

Table 1. Effect of Nitrogen on the growth, yield and yield components of cucumber

<table>
<thead>
<tr>
<th>Treatments Code</th>
<th>N. dose Kg/Ha</th>
<th>Length of vine (cm) 1*</th>
<th>Length of fruit (cm) 1**</th>
<th>Weight of fruit (gram) 1**</th>
<th>Yield per plot (Kg) 1***</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>00</td>
<td>93.93 d*</td>
<td>24.24 b*</td>
<td>113.67 d*</td>
<td>7.807 b*</td>
</tr>
<tr>
<td>T2</td>
<td>30</td>
<td>99.73 cd</td>
<td>25.27 b</td>
<td>140.47 c</td>
<td>9.640 b</td>
</tr>
<tr>
<td>T3</td>
<td>60</td>
<td>101.95 cd</td>
<td>29.60 a</td>
<td>148.00 c</td>
<td>9.257 b</td>
</tr>
<tr>
<td>T4</td>
<td>90</td>
<td>110.38 bc</td>
<td>30.53 a</td>
<td>198.00 b</td>
<td>9.717 b</td>
</tr>
<tr>
<td>T5</td>
<td>120</td>
<td>116.15 b</td>
<td>30.87 a</td>
<td>204.53 ab</td>
<td>11.140 b</td>
</tr>
<tr>
<td>T6</td>
<td>150</td>
<td>120.10 b</td>
<td>31.23 a</td>
<td>212.67 a</td>
<td>11.708 ab</td>
</tr>
<tr>
<td>T7</td>
<td>180</td>
<td>133.20 a</td>
<td>31.27 a</td>
<td>213.53 a</td>
<td>13.650 a</td>
</tr>
<tr>
<td>T8</td>
<td>210</td>
<td>136.42 a</td>
<td>31.33 a</td>
<td>215.63 a</td>
<td>14.867 a</td>
</tr>
</tbody>
</table>

*Mean marked with same letters are not significantly different from each other at 1% level of probability according to Duncan’s new multiple range test.

1*Mean of 15 vines, 1**Mean of 15 fruits, 1*** Mean of 3 plots
REFERENCES


