EVALUATION OF DIFFERENT DOSES OF NPK FOR CUT FLOWER PRODUCTION

Sajida Parveen1, Nazir Ahmed Alizai2, Raza Shah3, Muhammad Ali4, and Habibullah Kakar5,

1Directorate of Agriculture Research (Potato Seed Production), Pishin, Balochistan, Pakistan.
2Directorate of Agriculture Research (Fruits) ARI, Sariab, Quetta Balochistan
3Directorate of Agriculture Research, (Transfer of Technology), Mustung, Balochistan, Pakistan.
4Directorate of Agriculture Research, (Sugar crop) At Bolan Kachhi, Balochistan, Pakistan.
5Horticulturist Directorate of Agriculture Research, (Loralai), Balochistan, Pakistan.

Email of Corresponding Author: razaquesoomro@hotmail.com

ABSTRACT
Demand of cut flowers has been increased due to the fact that these are used for religious ceremonies, wedding functions, etc. Commercial production and marketing of cut flower can generate good income to the farmer. A study was conducted to explore the effect of different doses of Nitrogen, Phosphorus and Potassium (NPK) in the ratio of 1N:2P:1K on the performance of cut flower cultivar, Pride of Holland Yellow. Results revealed that on an average, tallest plants of 61.40cm height were produced by T1 treatment where 2.5N, 5.0P and 2.5K g/m² fertilizer was applied. Size of flower and fresh weight of flower was significantly affected by the NPK treatments, maximum flower size of 34.93cm and flower fresh weight of 8.002gm was produced by the fertilizer treatment (T1) where 2.5N, 5.0P and 2.5K g/m² fertilizer was applied. It was concluded that cut flowers better performed under T1 where 2.5N, 5.0P and 2.5K g/m² fertilizer was applied, whereas, lowest performance of cut flower was noticed under control treatment (T0) where no any fertilizer application was made.

KEYWORDS: Iris (Iris hollandica), cut flower, rhizomatous, NPK, fresh flower weight

INTRODUCTION
The Iris (Iris hollandica) belongs to Iridaceae family and is grown as commercial cut flower crop. The Dutch Iris is a prince among the fall bulbs having perfect three large petals. They are commercially exploited for their showy-flowers; hence the Greek name has been applied for the sparkling hues of the flower colors. These are hardy evergreen rhizomatous and cormous rooted perennials, comprising of more than 300 known species. These species are found naturally distributed throughout the temperate and subtropical zones of the Northern Hemisphere (De and Bhattacharjee, 2003). Production of cut flowers in Pakistan is estimated at about 10-12 thousand tons per annum and floriculture is fast emerging as a profitable venture for small farmers in this country (Rehman, 2004). Worldwide export of cut flowers is about US $ 50 billion while Pakistan is presently exporting flowers worth more than US$ 126 million per year (Akhter, 2005 and Awan, 2005).

To maintain quality characters, good management practices and judicious application of fertilizer is required. Iris, like other cut flowers, requires well balanced fertilizer application for quality production on commercial basis. Fertilizers help to increase the production of cut flowers by maintaining the growth and health. The interaction between nutrients may influence the growth and quality of bulbs. Attention should therefore be paid to the relative proportion of macronutrients (nitrogen, phosphorus and potassium) in the plant. Iris bulbs show good response to N and K fertilization. Iris bulbs showed higher values for plant height, fresh and dry weight of leaves, and number of bulblets as well as length of inflorescence (Mahgoub et al., 2006). NPK application enhanced vegetative growth characteristics of gladiolus while moderate of NPK exhibited more pronounced effect on floral characteristics and corm development (Khan and Ahmed, 2004 and Mukesh et al., 2001). Significant increase in the height of plant, number of leaves, leaf area, and number of flowers per spike and fresh weight of corm of gladiolus (Gladiolus grandiflorus) cultivar white prosperity was recorded in the plot treated with the combination of vermin compost at 10 tones/ha + 80% recommended NPK rate compared to other combinations (Gangadharan and Gopinath, 2000). Therefore, it is necessary to supply a proper combination of nitrogen, phosphorus, and potash in a judicious manner to achieve the optimum vegetative and reproductive growth.

Combined application of N and K on gladiolus gives highest values of plant height, leaves/plant, leaf area, spike length, no. of flowers/spike and both fresh and dry weight of corms (Paradhan et al., 2004). N and P application give significant results on growth, flowering and yield in gladiolus (Rajiv et al., 2003 and Pant, 2005). Increasing rates of N, P and K increased the number of leaves per plant and plant height.
significantly of *Polianthes tuberosa* L. (Pant, 2005). Lower doses of fertilizer produced poor quality plants and yield of flower.

Keeping in view the previous research studies, the present investigation was made to explore the optimum dosage of NPK fertilizer on the performance of Iris cut flower genotype Pride of Holland Yellow.

**MATERIALS AND METHODS**

The present research was conducted at the experimental area of Department of Horticulture Department, Sindh Agriculture University, Tandojam. Randomized Complete Block Design (RCBD) replicated four times was adopted in this research study where cut flower cultivar Pride of Holland Yellow was used. Three nutritional levels of NPK fertilizers i.e. T1 (2.5N, 5.0P and 2.5K g/m²), T2 (5.0N, 10.0P and 5.0K g/m²) and T3 (10.0N, 20.0P and 10.0K g/m²) as compared to T0 (control; where no fertilizer was applied) were studied to evaluate the performance of the cut flower variety. The seeds or bulbs were taken from well reputed seed supplier. Bulbs were sown in November and harvested in May. The duration of the crop was 5-6 months. Before plantation of bulbs, area under Iris crop was 2750 sq ft. The size of each plot was 40.5 sq ft with 3 rows accommodating 24 plants per plot. The planting was done at distance of 30 × 45 cm during November 2013. Fertilizers in the form of urea, triple super phosphate and potash mixed thoroughly with soil were applied in each plot. Farmyards manure at the rate of 20 ton/ha were incorporated in the soil at the time of field preparation. Half dose of nitrogen and full doses of phosphorus and potash were applied at the final stage of land preparation. Remaining half dose of nitrogen was applied (top-dressed) at fourth leaf stage. Cultural operations carried out during the experiment were hoeing, weeding and irrigation. The data on plant height, flower size and flower fresh weight was recorded on 10 plants randomly selected from each entry of the experiment. The data thus collected were analyzed statistically as suggested by Gomez and Gomez, 1984 by using MSTAT-C computer software program to compare the means for their significance.

**RESULTS AND DISCUSSION**

Cut flower cultivar, Pride of Holland Yellow plants grown in field condition were applied with different doses of NPK fertilizer and then observed for differences in three parameters under study. Results revealed highly significant differences among the fertilizer treatments. The tallest plants of 61.40 cm height were produced under T1 treatment where NPK was applied at the rate of 2.5, 5.0 and 2.5 g/m² respectively and the lowest plant height (50.43 cm) was observed in control treatment (T0) where no fertilizer was applied. The height of plant is dependent on genetic makeup of the variety, the environmental effects and nutritional status in the soil. It is also evident from the data that increase in plant height is inversely proportional to the higher concentration of chemical fertilizers as compared to lower ones. It was observed that T1 had maximum plant height because chemical fertilizer provide sufficient nutrition to support development process while in T0 (control) the lowest plant height was due to less supply of nutrients for vegetative growth and flower formation. There is usually a dramatic improvement in both quantity and quality of plant growth when appropriate fertilizers are added. Nitrogen is needed for vegetative growth and is part of proteins, enzymes, vitamins, chlorophyll and plant regulators. Usually, high nitrogen and low potassium levels favour vegetative growth and low nitrogen and high potassium levels promote flowering (Havlin et al., 1999). Iris bulbs showed good response to N and K fertilization thus gave higher values for plant height (Mahgoub et al., 2006).

Nutrients treated plants showed maximum flower size (34.93 cm) under treatment T1 (2.5N, 5.0P and 2.5K g/m²), whereas the minimum flower size (21.46 cm) was observed under control treatment T0. Normally nitrogen is used to enhance the vegetative growth but in this case it also increased the size of flowers in combination with phosphorus and potassium. Chemical fertilizers are involved in several plant development processes and promote a number of desirable features including uniform flowering, reduced time to flowering, and increased flower number and size. Foliar nutrition with NPK in addition to soil application significantly affects vegetative growth and floral characters (Roy et al., 1995). N application rate combined with moderate P and K rates enhanced vegetative growth and exhibited more pronounced effects on floral characteristics and corm development. Therefore, it is necessary to supply a proper combination of nitrogen, phosphorus, and potash in a judicious manner to achieve the optimum vegetative and reproductive growth (Khan and Ahmed, 2004).

On an average, maximum fresh weight of flowers (8.002 gm) was obtained with the application of NPK at the rate of 2.5, 5 and 2.5 g/m² respectively (T₁), whereas the minimum fresh weight of flowers (5.90 gm) was observed under control treatment T₀. These results are in accordance with the results reported by Barzegar et al. (2006) who found that nitrogen fertilizer and planting dates increased the flower fresh weight, total soluble solid content and floret vase life of cut gladiolus cultivar Oscar. The effect of P₂O₅ on Oriental hybrid lily “Casa Blanca” was determined by (Lee and Choi, 2005) which increase the dry and fresh weights of cut flowers. These results indicated that tissues with P₂O₅ contents should be maintained at levels greater than 2% to produce high quality cut flowers.
**Table 1:** Effect of different doses of NPK fertilizer on three parameters of cut flower cultivar, Pride of Holland Yellow.

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Plant height</th>
<th>Flower Size</th>
<th>Flower Fresh weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>T₀ (control) No Fertilizer</td>
<td>50.43 d</td>
<td>21.46 c</td>
<td>6.033 f</td>
</tr>
<tr>
<td>T₁ (2.5N, 5.0P and 2.5K g/m²)</td>
<td>61.40 a</td>
<td>34.93 a</td>
<td>8.002 a</td>
</tr>
<tr>
<td>T₂ (5.0N, 10.0P and 5.0K g/m²)</td>
<td>57.13 b</td>
<td>30.85 ab</td>
<td>7.614 bc</td>
</tr>
<tr>
<td>T₃ (10.0N, 20.0P and 10.0K g/m²)</td>
<td>53.38 c</td>
<td>28.18 b</td>
<td>7.146 de</td>
</tr>
<tr>
<td>Mean</td>
<td>55.58</td>
<td>28.85</td>
<td>7.199</td>
</tr>
</tbody>
</table>
REFERENCES


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