GAU Res. J. 1993. 19 (1) : 136-137

# Effect of Nitrogen, Phosphorus and Potash on Growth and Yield of Onion

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An experiment was conducted in a split plot design during the *rabi* season of 1987-88 at the Instructional Farm, Gujarat Agricultural University, Navsari to study the effect of NPK fertilizers on the growth and yield of onion. Nine treatment combinations of nitrogen (50, 100, 150 kg N/ha) and phosphorus (25, 50, 75 kg $P_2O_5$/ha) were kept in main plots and three levels of potash (50, 100, 150 kg $K_2O$/ha) in sub plots. Each treatment was repeated three times.

The soil of the experimental plot was clayey in texture, deficient in nitrogen (0.055% total N), moderate in phosphorus (30.9 kg $P_2O_5$/ha) and sufficient in potash (348 kg $K_2O$/ha) with pH 7.9. Full dose of phosphorus and potash and half dose of nitrogen was applied at the time of transplanting and the remaining quantity of nitrogen was topdressed 45 days after transplanting. Onion cultivar Pusa Red was transplanted in the first week of January and was harvested at the end of April.

The data presented in Table-1 revealed that application of nitrogen significantly influenced the growth and yield of onion.

*TABLE 1*

**Effect of nitrogen, phosphorus and potash on growth and yield attributes and bulb yield of onion.**

| *Treatments* | *Plant height (m)* | *Number of leaves* | *Weight of bulb (g)* | *Diameter of bulb (cm)* | *Bulb yield (q/ha)* |
|---|---|---|---|---|---|
| **Nitorgen (kg/ha)** | | | | | |
| 50 | 52.90 | 10.4 | 44.6 | 4.5 | 208.5 |
| 100 | 59.20 | 11.5 | 51.3 | 5.0 | 225.8 |
| 150 | 62.30 | 12.7 | 54.2 | 5.2 | 239.5 |
| S. Em ± | 0.83 | 0.13 | 1.19 | 0.06 | 5.00 |
| C.D. at 5% | 2.49 | 0.40 | 3.58 | 0.19 | 14.83 |
| C.V. % | 7.41 | 6.02 | 12.39 | 6.64 | 11.42 |

| 1. | 2. | 3. | 4. | 5. | 6. |
|---|---|---|---|---|---|
| **Phosphorus (kg $P_2O_5$/ha)** | | | | | |
| 25 | 57.80 | 10.8 | 47.2 | 4.6 | 210.7 |
| 50 | 57.90 | 11.4 | 50.2 | 4.9 | 220.5 |
| 75 | 58.60 | 12.4 | 52.7 | 5.1 | 242.5 |
| S. Em ± | 0.83 | 0.13 | 1.19 | 0.06 | 5.00 |
| C.D. at 5% | NS | 0.40 | 3.58 | 0.19 | 14.83 |
| C.V. % | 7.41 | 6.02 | 12.39 | 6.64 | 11.42 |
| **Potash (kg $K_2O$/ha)** | | | | | |
| 50 | 57.80 | 11.3 | 47.8 | 4.8 | 219.5 |
| 100 | 58.10 | 11.6 | 50.4 | 4.9 | 227.7 |
| 150 | 58.50 | 11.7 | 51.8 | 4.9 | 226.7 |
| S. Em ± | 0.59 | 0.09 | 1.22 | 0.07 | 4.83 |
| C.D. at 5% | NS | 0,25 | NS | NS | NS |
| C.V.% | 5.25 | 3.89 | 12.65 | 7.33 | 11.26 |

Significanlty the highest plant height (62.3 cm), number of leaves per plant (12.7), weight of bulb (54 g), diameter of bulb (5.2 cm) and bulb yield (239.5 q/ha) were recorded with the highest level of nitrogen (150 kg N/ha), but it remained statistically at par with 100 kg N/ha in respect of bulb weight. This might be due to nitrogen which improved the vegetative growth, accelerated the photosynthesis and translocation of photosynthates to the storage organ of bulb resulting in an increased diameter and weight of bulb. Similar results were also reported by Verma *et al.* (1972), Pande *et al.* (1969) and Randhawa and Singh (1974).

The results further indicated that significanlty the highest number of leaves per plant (12.4), weight of bulb (52.7 g), diameter of bulb (5.1 cm) and bulb weight (242.5 q/ha) were recorded with the highest level of phosphorus (75 kg $P_2O_5$/ha), but it remained at par with 50 kg $P_2O_5$/ha with respect to weight of bulb and diameter of bulb. However, the plant height remained unaffected due to phosphorus application. Similar results were also reported by Pande and Mundra (1971) and Randhawa and Singh (1974).

Application of potash did not manifest any significant effect on growth and yield of onion, except number of leaves per plant were increased by higher level of potash application (150 kg $K_2O$/ha).

*(Received on 28th April, 1992)*

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