

## Effect of Spacing, Gibberellic Acid and N: P<sub>2</sub>O<sub>5</sub>: K<sub>2</sub>O Ratio on Growth, Yield and Tuber Shape of Potato Variety Royal

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Potato variety ROYAL is suitable for French fries which require long-oval shaped tubers to minimize wastages in processing. Tuber yield and quality depend on N:P<sub>2</sub>O<sub>5</sub>:K<sub>2</sub>O nutrient ratio and their amounts. Two field experiments were conducted in Nuwara-Eliya using variety ROYAL (a) to evaluate the possibility of changing tuber shape by manipulating spacing and gibberellic acid (GA3) application and (b) to identify the best N:P<sub>2</sub>O<sub>5</sub>:K<sub>2</sub>O ratio to optimize growth and tuber yield. The first experiment was conducted as a two-factor factorial randomized complete block design (RCBD): factor 1 was intra-row spacing (15, 20, 25, 30, and 35 cm) and factor 2 was GA3 concentration (0, 150, 200, and 250 ppm; foliar-applied at bulking stage). Inter-row spacing was constant as 45 cm. In the second experiment, Agriculture Research Station, Seetha-Eliya recommended N:P<sub>2</sub>O<sub>5</sub>:K<sub>2</sub>O ratio (8:3.5:8.5) with organic manure (T1; Control) and the same without organic manure (T2) were compared with three other N:P<sub>2</sub>O<sub>5</sub>:K<sub>2</sub>O ratios (T3 - 12.5:21:12, T4 - 9:19:12 and T5 - 9:10:16:1 with MgO) in a RCBD. Organic manure was applied at the rate of 25 t ha<sup>-1</sup>. In both experiments, 4 replicates were used. Spacing and GA3 interaction was not significant (P>0.05) for tuber yield and shape. The yield per plant increased as intra-row spacing increased but the yield per unit land area decreased with increasing spacing. GA3 effect on tuber yield was insignificant (P>0.05). GA3 at 200 ppm recorded the highest number of long-oval shaped tubers (62% increment). The ratios of N:P<sub>2</sub>O<sub>5</sub>:K<sub>2</sub>O considered had no (P>0.05) significant effect on growth, yield, and quality. Therefore, a fertilizer ratio with low nutrient input (T5) will be a better option as it is cost-effective and environmentally friendly. Moreover, closer intra-row spacing (15 cm) with 200 ppm GA3 can be recommended for higher yield per unit land area with more long-oval shaped tubers.

**Keywords:** Fertilizer, GA3, Growth Hormone, Long-oval Shape, Plant Density