

# Growth, Yield and Phosphorus Use Efficiency of Potato Varieties under Variable Phosphorus Rates

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The use of poor quality potato seeds as well as low soil fertility majorly limit potato production in Kenya. The objective of the study was to determine effect of phosphorus rates on growth, yield and phosphorus use efficiency of potato (*Solanum tuberosum* L.) varieties propagated from rooted apical cuttings. Field experiments were conducted at the research fields of Egerton University, Njoro and the Kenya Agricultural and Livestock Research organization (KALRO), Molo. A split plot arrangement in randomized complete block design with three replicates was used. Main plot factors were four potato varieties (Shangi, Dutch Robyn, Unica and Wanjiku) and sub plot factors were four P levels (0, 30, 60, 90 kg P ha<sup>-1</sup>). Data on growth, yield and phosphorus use efficiency of potato were collected. Phosphorus rates had significant effect (P<0.05) on plant survival, number of stems and marketable tuber yield. The interaction effects of phosphorus rates and varieties on plant survival, plant height, shoot biomass, number of eyes and tuber size was significant (P< 0.05). The rates of 60, 90, and 30 kg P ha<sup>-1</sup> recorded 16, 15 and 14 tubers per hill, respectively, which were not significantly different but higher than control that recorded 11 tubers. The interaction of Wanjiku and 30 kg P ha<sup>-1</sup> gave the highest shoot biomass of 0.42g and the highest number of large sized tubers (<60mm diameter). The main effects of variety (P<0.01) and phosphorus rates (P<0.05) significantly affected days to physiological maturity and marketable tuber yield. Main effect of phosphorus application rate on P uptake and PUE was significant (P<0.001). Unica variety showed high PUE at both study sites. Rooted apical cuttings of Wanjiku, Shangi and Unica varieties with application of 30 kg P ha<sup>-1</sup> is recommended in the study areas and other areas with similar agro ecological zones.

**Keywords:** Phosphorus, potato, rooted apical cuttings, nutrient use efficiency