

## Abstract

Potato is the world's fourth important food crop after wheat, rice and maize because of its great yield potential and high nutritive value. In Kenya, potato is constrained by low seed tuber production in the informal sector. This is partly due to improper fertilizer regimes and irregular rainfall patterns. Therefore, a study was conducted in a rain shelter at the Horticultural Research Farm of Egerton University in Kenya from 19<sup>th</sup> August to 19<sup>th</sup> December 2011 (Trial I) and 5<sup>th</sup> April to 6<sup>th</sup> August 2012 (Trial II) to determine the effects of integrated irrigation water, nitrogen (N) and phosphorus (P) supply on tuber yield and size distribution. The layout was a split split plot design with irrigation (40%, 65% and 100% field capacity) assigned to main plots, N (0, 75, 112.5 and 150 kg N/ha) to subplots and P (0, 115, 172.5 and 230 kg/ha P<sub>2</sub>O<sub>5</sub>, corresponding to 0, 50.6, 75.9, 101.2 kg P/ha) to sub-subplots. The treatments were replicated three times and repeated once. The irrigation water rates were applied in drip tube lines. Nitrogen was supplied as urea (46% N) in two equivalent splits, at planting time and at 5 weeks after planting. Phosphorus was supplied at planting time as triple superphosphate (46% P<sub>2</sub>O<sub>5</sub>). Data were collected on number, yield and size distribution of tubers at harvest and subjected to analysis of variance. Significantly different means were separated using Tukey's Studentized Range Test at P= 0.05. The 65% irrigation water and the high N and P rates resulted in relatively high number, yield and quantity of seed potato sizes I and II. The 100% irrigation water increased the ware -sized seed potato tubers and reduced the quantity of chats. Therefore, integration of moderate irrigation water and high rates of N and P is recommended for optimizing seed potato tuber grades.