GROWTH AND YIELD OF POTATO (*SOLANUM TUBEROSUM*) UNDER VARYING WATER SUPPLY REGIMES

BY

Dionisia Warue M'eruaki

A thesis submitted to the Department of Agriculture and Natural Resources, Faculty of Science and Technology in partial fulfillment of the requirements for the award of the degree of

MASTER OF SCIENCE IN AGRICULTURAL AND RURAL DEVELOPMENT

of

KENYA METHODIST UNIVERSITY

JUNE 2010

Abstract

The Irish potato (*Solanum tuberosum*) is the second most important food crop in Kenya after maize. The crop is cultivated mainly in the high altitude areas between 1500 and 2700 metres above sea level. In the mid-altitude areas of Kenya, it is grown mainly under rain-fed conditions in two seasons per year. However, low water supply during the short rainy season leads to poor crop growth and low yields. A study was carried out at KARI Embu to assess the influence of varied moisture supply regimes on growth, development and yield of three potato cultivars. A field experiment was set up with the use of a line-source sprinkler irrigation system, which provided a declining water supply gradient from the main line. Rain gauges were fixed in each experimental plot to record the amount of water received by the crop. The trial was set up in a factorial randomized complete block experimental design and comprised two major factors as treatments, namely, three water regimes and three potato cultivars. It was observed that the rate of potato plant emergence after planting is dependent on the cultivar and soil moisture availability. The stem elongation rate for the three cultivars was higher during the early stages of plant growth and tended to decline towards physiological maturity. The above ground dry matter accumulation increased at different rates from one growth stage to the next for all cultivars under different moisture regimes. Potato tuber dry matter for the three cultivars was not significantly different in growth stages I to III but differed significantly at physiological maturity under varying water supply regimes. The yield was also significantly influenced by moisture availability. Findings from this study led to the conclusion that potato crop production is most suited to areas that receive seasonal rainfall of at least 600 mm. To attain high yields, supplemental irrigation would be necessary when potatoes are grown in areas with less than 600 mm of rainfall.