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Title: The Effect of Photoperiod on Cassava Storage Root Growth in Washington State.

Abstract:

Cassava, *Manihot esculenta* Crantz is a perennial shrub of the family Euphorbiaceae which is mainly cultivated for its starchy storage roots. It is a major food staple in the tropics and is ranked 6th most important source of calories worldwide. In 2005, the Bill and Melinda Gates foundation funded the BioCassava Plus program, where the principal objective is to improve nutrition among sub-Saharan Africans by creating a full range of optimal bioavailable nutrients in cassava. Additional objectives include delivering cultivars without cyanogens and reduced post-harvest physiological deterioration (PPD) which occurs within 24-72 hours after root harvest. The BioCassava effort at WSU is centered around investigations of PPD. In order to have a source of fresh storage roots for research purposes, cassava growth must be optimized for rapid and consistent yields of usable plant material. Due to the difference between the Washington State temperate climate zone and that of the tropics, a controlled environment growth study is underway. Variety in day length is the outstanding difference in the temperate zone and past research has indicated that a short days and high light levels favor increased storage root growth by limiting shoot growth. The current research study will examine the rate at which storage roots form under short, long, and changing seasonal photoperiods while keeping all other parameters as constant as possible.

A growth room study as well as a greenhouse applied study is proposed. Growth rooms offer control of environmental variables such as light, temperature, and humidity more precisely compared to greenhouse conditions. As such, one study will take place in growth rooms where four treatments will be applied: long day, short day, long changing to short days, and short changing to long days. The first two treatments will establish yield differences between short and long day plants, while the latter two treatments will mimic the seasonal photoperiod changes occurring in Washington State. With an end goal of growing cassava in the greenhouse, another study will take place in the greenhouse where 4 different plant dates will occur on each solstice running for 6 months. Long days will be March to September, short days will be September to March, long changing to short days will be June to December and short changing to long days will be December to June. Roots will be harvested on 4 dates for each treatment. Root to shoot ratios of height and weight will be established to highlight differences in storage root initiation and rate of starch accumulation and dry matter partitioning.