

Nittaya Wanikorn 2007: Effects of Varieties, Harvesting Dates and Planting Seasons on Starch Biosynthesis of Cassava. Doctor of Philosophy (Agronomy), Major Field: Agronomy, Department of Agronomy. Thesis Advisor: Associate Professor Vichan Vichukit, Dr.sc.agr. 86 pages.

This research focused on relationship between biochemical activity, physiological characteristic and environmental condition on yield and starch content as affected by varieties, harvesting dates and planting seasons. A 3X7 factorial in Randomized Complete Block Design (RCBD) was used with 4 replications having varieties and harvesting dates as treatment combinations within two planting seasons. Three varieties were Huaybong 60 (HB 60), Kasetsart 50 (KU 50) and Rayong 1 (R1) and 7 times of bimonthly harvested starting from 2 to 14 months after planting were combined. Cassava was planted at Thai Tapioca Development Institute, Dan Khun Thod district, Nakhon Ratchasima province in the rainy season (March 2003) and in the dry season (October 2003). Results of this research indicated fresh root yield, root dry weight and starch content in fresh root were affected by varieties and environmental condition especially rainfall and soil moisture. In the rainy season, three varieties grew during drought that soil matric potential was low but fresh root yield, root dry weight and starch content in fresh root did not change significantly because they induced small heat shock proteins (HSPs) activity in root peel. Root dry weight and starch content in fresh root were reduced by high soil matric potential after drought but leaf dry weight was increased because regrowth of new leaves. In the dry season, fresh root yield, root dry weight and starch content in fresh root increased ontogenetically in all varieties because soil matric potential was high during growth cycle.

Fresh root yield, root dry weight and starch content in fresh root of HB 60 and KU 50 were greater than R1 at all harvesting dates in both the rainy and dry seasons. HB 60 and KU 50 acclimated to drought better than R1. Almost immediately after soil matric potential dropped (more negative), HB 60 and KU 50 induced small HSPs faster and better than R1. Dry matter partition in storage root of HB 60 and KU 50 were higher than R 1 and dry matter partition in stem of R 1 was higher than HB60 and KU 50. HB 60 produced the greatest fresh root yield and starch content in fresh root at 10 months after planting but KU 50 and R 1 produced them at 8 months after planting in the rainy season while in the dry season the three varieties should be harvested at 14 months after planting. Protein in leaves, peels and pulps have been identified as rubisco, starch phosphorylase and small HSPs, respectively. The expression of those proteins depended on period of development, varieties, planting seasons and soil matric potential.

---

Student's signature

---

Thesis Advisor's signature

