

A COMPARATIVE STUDY OF THE ANATOMICAL CHANGES ASSOCIATED WITH TUBERIZATION IN THE ROOTS OF CASSAVA AND SWEET POTATO

P. Indira and T. Kurian*

SUMMARY

In cassava, starch deposits are largely confined to the secondary xylem tissue. In sweet potato, starch is mainly stored in the cortex. Cassava and sweet potato differ in the pattern of anatomical differentiation preceding tuberization. In cassava, rapid proliferation of secondary xylem begins three weeks after planting and this is followed by starch deposition. In sweet potato starch is already occurring in the cortical region by one week after planting, and discrete cambia arise round individual vessels.

RESUME

Dans le manioc, les dépôts d'amidon sont largement confinés au tissu secondaire du xylème. Dans la patate douce l'amidon est essentiellement concentré dans le cortex. Le modèle de différenciation anatomique précédant la tubérisation diffère chez le manioc et la patate douce. Dans le manioc la prolifération rapide du xylème secondaire commence trois semaines après le semis suivi par le dépôt d'amidon. Dans la patate douce l'amidon se produit déjà dans la région corticale une semaine environ après le semis, et des cambiums discrets se forment autour des vaisseaux individuels.

RESUMEN

En yuca, los depósitos de almidón están mayormente confinados en los tejidos del xilema secundario. En el camote, el almidón se almacena principalmente en el cortex. La yuca y el camote se distinguen en cuanto al patrón de diferenciación anatómica precedente a la formación de tubérculos. En yuca, una rápida proliferación del xilema secundario se inicia tres semanas después de la siembra con una subsecuente deposición de almidón. En camote el almidón ya se encuentra presente en la región cortical alrededor de una semana después de la siembra, observándose aparición de cambios en forma discreta alrededor de vasos individuales.

MATERIAL AND METHODS

Stem cuttings of cassava having 6–8 buds and sweet potato vines were planted in pots containing sawdust, since uprooting of plants from sawdust was easy and cause least damage to roots. Watering was done as and when required. Three days after planting plants were carefully uprooted daily and observations were made on the formation of roots. Microscopic studies were carried out on thin transverse sections of roots stained with iodine. The occurrence of starch was defined as the criterion for differentiation of roots to tuber initials.

RESULTS

Root initiation

In cassava, callus formation occurred before the formation of roots at the distal end of the cutting within a week from planting. Roots originated from the callus within two to three days. In sweet potato rooting usually took place within three to five days from planting the vine cuttings.

Anatomy of normal roots

In cassava, the outer epidermal layer of the root is uniseriate. There is a cortex comprising ten to thirteen layers of parenchymatous cells. The cortical cells are closely packed. Within the cortex is an endodermis with casparian strips on its anticlinal walls. Within the endodermis is a pericycle which later may give

*Central Tuber Crops Research Institute, Trivandrum, Kerala, India.