

Abstract.

Dry matter production and distribution, quantitative shoot and leaf ontogeny and tuber yield and yield components in single and multi-shoot plants of six cassava cultivars were evaluated. High and low economic yielding cultivars were identified, with high tuber yields being due to either high biological yields or high harvest indices.

High yield variability was associated with low economic yields. Variability in mean tuber weight, rather than tuber number, was the more important immediate contributant to high yield variations. Dry matter production was a more important source of tuber yield variability than dry matter distribution.

Cultivar differences were identified in leaf production and retention as well as individual leaf growth, at four stages of plant ontogeny. Differences in leaf production were due to variations in branch number, as rates of leaf production per branch and percentage leaf fall were similar in all cultivars.

There were similar patterns of growth in single and multi-shoot plants of the six cultivars. Yield differences between cultivars in both crops were explained by variations in the leaf surface and net assimilation rates.

High nitrogen concentrations increased leaf production and individual leaf areas, in later stages of plant ontogeny. Reductions in lamina nitrate reductase activities (*in vivo*), during leaf and plant ontogeny, were described. These were related to changes in the pattern of dry matter distribution, after the onset of tuber bulking.

Times to leaf fall and the proportion of dry matter in the tuber were significantly increased by stem apex removal.

These results were discussed in relation to the performance of

elite cultivars and the yield potential of the cassava species.

A cultivar suitable for further field trials was identified and morphological and physiological characteristics for a cassava ideotype suggested.

To

Germaine Juliet,

with love.