

Response of cassava to irrigation

G.R.Baker, S. Fukai and G.L. Wilson

Department of Agriculture, University of Queensland St. Lucia, Queensland, 4067

Cassava production in the marginal areas of Northern Australia will experience seasonal or infrequent rainfall. In such areas, cassava with a growing season of 9 to 20 months is expected to encounter water stress during its growth.

In this work, the effects of different levels of available soil moisture on growth and tuber yield of cassava are studied.

Methods

Two irrigation experiments with the cultivar MAus 7 were conducted in South Queensland, one at Redland Bay and the other at Dalby, with annual average rainfall of 1500mm and 670 mm respectively. Both experiments were planted in September-October 1979 and harvested in June-July 1980.

Irrigation to field capacity occurred twice per week for the frequent irrigation treatment. An irrigation once per fortnight which aimed to maintain a minimum available soil water content at 60 percent of field capacity was the infrequent irrigation treatment. Treatments began 13 weeks after planting and continued to the harvest. A rainfed treatment was the control.

Results and Discussion

At Redland Bay, rainfed plants experienced several water stress periods. By the end of April, plants were showing signs of severe stress. Yield of the rainfed plants was 59 percent of the 21.9 tonnes per hectare obtained under frequent irrigation (Table 1).

Table 1. Effects of three soil moisture regimes on total plant dry matter, storage organ yield and harvest index for Redland Bay

	Total plant dry matter (t ha ⁻¹)	Storage Organ Yield		Harvest Index
		Dry wt. (t ha ⁻¹)	Fresh wt. (t ha ⁻¹)	
Frequent Irr.	31.2	21.9	49.3	0.70
Infreq. Irr.	21.6	15.3	36.3	0.71
Rainfed	17.7	12.9	31.4	0.73

The relation between storage organ and total plant dry matter was independent of irrigation treatments, as shown in the similar values of harvest index, suggesting that carbohydrate partitioning was not influenced by water stress. Therefore there was no adaptation to water stress in terms of efficiency of the use of carbohydrate.

The total dry matter yields for Dalby (not shown) were much less and hence storage organ yield was also much less than Redland Bay. However, the response to irrigation was similar to the Redland Bay experiment. Higher daily evaporative demand and a weed-infested site adversely affected the Dalby plants.

Physiological studies (results not shown) indicate stomatal control of water use in cassava is so effective and rapid that leaf water potential did not vary between treatments. With increased leaf shedding under

drought conditions, the crop has a good drought avoidance. However, this study clearly indicates a strong yield response to irrigation even in a high-rainfall coastal area.