Evaluation of Cassava for Leaf and Root Production in Sierra Leone

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ABSTRACT

Cassava is the second most important food crop in Sierra Leone after rice. Both the tuberous roots and leaves are eaten.

Studies over a 2-year period show that variety Nucass 3 significantly outyielded the other varieties while the local cultivar, Cocoa, had the lowest production.

Cassava varieties reacted differently to leaf harvest in terms of tuberous root yields. Compared with plants whose leaves were not harvested, there was a total fresh tuberous root yield reduction ranging from 22% to 42% when leaves were harvested monthly.

Cassava (Manihot esculenta Crantz) is the second most important food crop after rice in Sierra Leone. Tuberous roots and leaves are both important in diets of the people.

Average root yield is 4.4 t/ha (Central Statistics Office, 1972), which compares unfavourably with the African average of 9 t/ha. Cassava improvement work started in the country some years ago with seeds obtained from the International Institute of Tropical Agriculture (IITA), Nigeria. The main objectives were to develop cultivars with high yield, disease and pest resistance, good consumer acceptability and wide adaptability.

The work resulted in the release of several improved varieties. This paper reports on performance of five of these varieties together with a local check over two growing seasons.

Several authors (Ahmad, 1973; Singh and Chaudhury, 1975; Dahniya et al., 1981) have reported adverse effects of leaf harvests on yield of tubers so another study was to determine response of varieties to leaf harvests.

Materials and Methods

Five improved cassava varieties, Nucass 1, Nucass 2, Nucass 3, Rocass 1, Rocass 3 and a local cultivar, Cocoa, were planted on 23 May 1980 on upland gravelly soil described by Odell et al., (1974) as Orthoxic palehumult at Njala University College Experimental farm.

The experiment was a RCB with four replications. Each plot consisted of four ridges, 1 m apart with 12 stakes planted 1 m apart on each ridge.

The plants were harvested for tubers a year after planting with the two central ridges excluding the end plants as sampling unit. Data on number of tubers per plant, individual tuber size and yield (t/ha) of fresh and dry tubers were recorded. The study was repeated during the 1981/82 planting season.

In determing response of the cassavas to leaf harvest, the varieties were planted on 21 May, 1981 on upland gravelly soils. The cassava varieties made up the main plots which consisted of four ridges, 1 m apart with 10 plants 1 m apart per ridge. The subplots were made up of two ridges and the 16 centre plants per subplot served as sampling units.

Leaves from the top 30 cm of each branch were plucked starting 5 months after planting. This continued monthly until 13 months after planting but no leaf harvests were made on the 9th and 10th months because of low leaf numbers due to the severe dry season.

The plants were harvested for tubers 2 weeks after the final leaf harvest and data on tuber yield, size and numbers were taken. The experiments were entirely rainfed and no fertilizers were applied.

Results and Discussion

Tuber Yield and Yield Components

Nucass 3 produced significantly more (25.5 t/ha) fresh tuberous root than the other varieties while the local cultivar, Cocoa, had the lowest fresh yield of 5.9 t/ha (Table 1). This significantly higher yield is mainly attributable to greater number of tubers produced by Nucass 3 rather than individual tuber size.

Table 1. Tuber yield and yield components of cassava varieties.

Variety	Fresh tuber yield (t/ha)	Dry tuber yield (t/ha)	Tubers plant	Fresh Wt./tuber (g)
Nucass 1	15.5	5.2	4.7	351
Nucass 2	14.3	4.2	3.6	403
Nucass 3	25.5	7.0	7.6	341
Rocass 1	12.4	4.4	4.0	326
Rocass 3	9.7	3.7	2.7	370
Cocoa (Local)	5.9	2.2	2.2	285

Dry tuber yield shows that Nucass 3 has lower dry matter content (27.5%) than the other varieties. This has great implication for processing the variety into the two most important local food forms, foofoo and gari.

Root yield per se of a variety is not a reliable indicator of the quantity of gari it produces (Ibe and Ezedima, 1981). The best and simplest criterion for predicting garification rate of roots prior to processing into gari is the tuber dry matter content (IITA, 1981). Sanneh et al., (1982) after evaluating varieties Nucass 1, 2 and 3 for suitability to produce gari and foofoo concluded that Nucass 3 was unsuitable while the other two were acceptable.

Varietal Response to Leaf Harvest

Total fresh leaf yield of Nucass 3 (7.9 t/ha) was significantly higher than those of the other varieties. The local cultivar, Cocoa, had the lowest leaf yield of 3.3 t/ha (Table 2).

Varieties reacted differently to leaf harvest in terms of tuberous root yields confirming an earlier report by Dahniya et al., (1981). The fresh tuberous root yield of Cocoa was reduced by 22% as a result of leaf harvest while decreases of 33%, 40%, 27%, 42% and 36% were recorded for varieties Nucass 1, 2, 3, Rocass 1 and 3, respectively.

Number of tubers per plant was unaffected by leaf harvest (Table 2). Since the first leaf harvest was taken 5 months after planting, it appears that the number of storage roots was determined early in the growth of the plants as reported by Wholey and Cock (1974) and Hunt et al., (1977). Individual tuber size of the control plants significantly exceeded those of plants with harvested leaves in all the varieties except Cocoa.

Table 2: Effects of monthly leaf harvested on various yield attributes of cassava.

Variety	Leaf harvest	Fresh leaf yield (t/ha)	Fresh tuber yield (t/ha)	Dry tuber yield (t/ha)	Tubers plant	Fresh Wt./tuber (g)
Nucass 1	None	0.0	20.1	6.7	5.8	351
	Monthly	5.2	13.5	4.5	6.8	200
Nucass 2	None	0.0	18.9	5.6	4.6	418
	Monthly	4.1	11.4	3.4	4.5	278
Nucass 3	None	0.0	26.9	7.4	7.5	419
	Monthly	7.9	19.6	5.4	8.5	231
Rocass 1	None	0.0	16.8	5.9	4.4	375
	Monthly	4.2	9.8	3.5	4.6	219
Rocass 3	None	0.0	14.7	5.6	3.7	397
	Monthly	3.9	9.4	3.6	3.4	278
Cocoa (local)	None	0.0	5.0	1.9	2.6	195
	Monthly	3.3	3.9	1.5	2.2	183

Results show that the local cultivar is better adapted to leaf harvest since tuber yield, individual tuber size and numbers were not significantly affected by leaf harvest as was the case with the improved varieties. However, leaf and root yields of the variety are low. Although improved varieties were more severely affected by leaf harvest, their total leaf and root yields are far superior to that of Cocoa.

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