

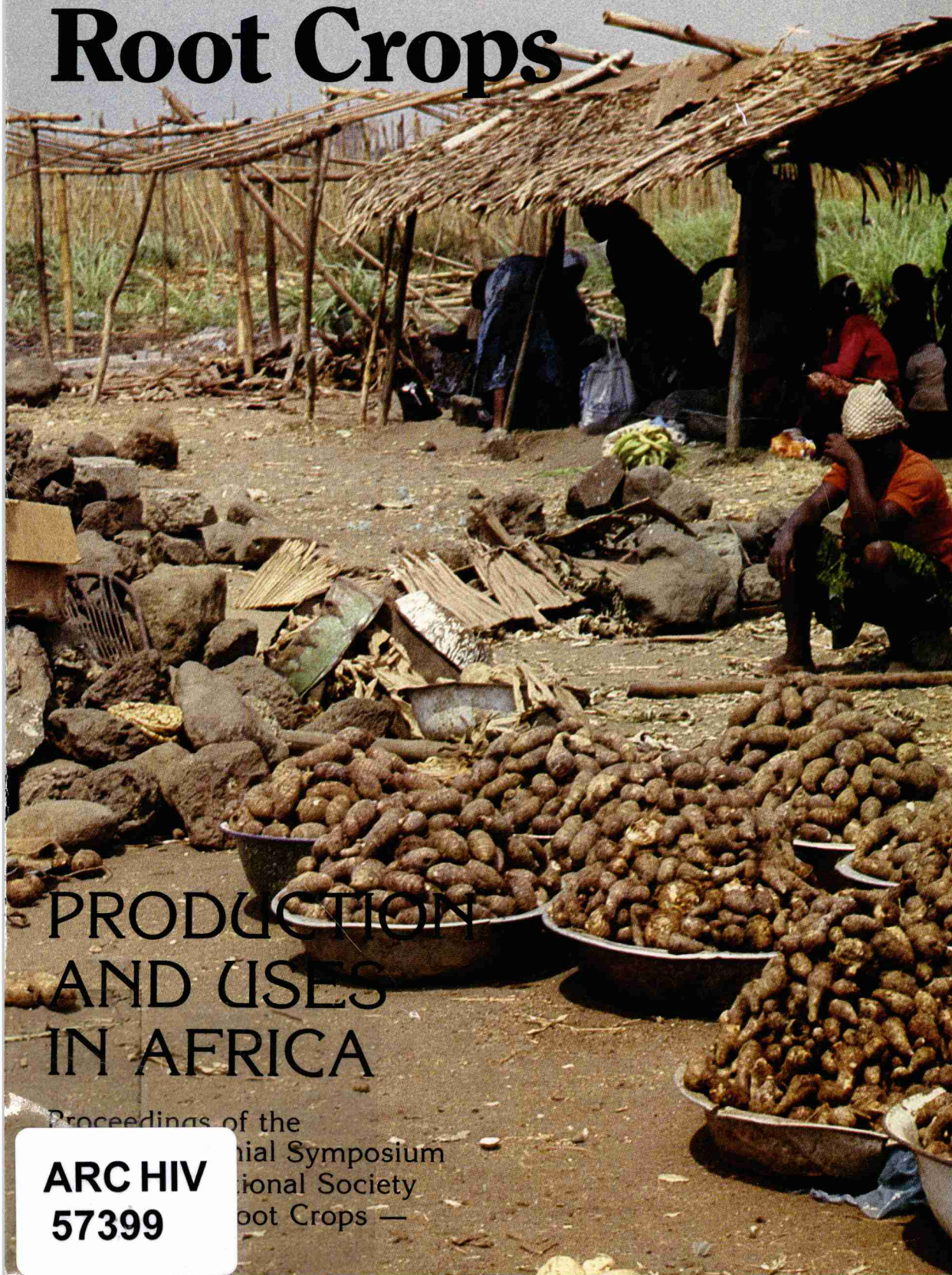
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Tropical Root Crops

PRODUCTION AND USES IN AFRICA

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The International Society for Tropical Root Crops — Africa Branch was created in 1978 to stimulate research, production, and utilization of root and tuber crops in Africa and the adjacent islands. The activities include encouragement of training and extension, organization of workshops and symposia, exchange of genetic materials, and facilitation of contacts between personnel working with root and tuber crops. The Society's headquarters are at the International Institute of Tropical Agriculture in Ibadan, Nigeria, but its executive council comprises eminent root and tuber researchers from national programs throughout the continent.

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ABSTRACT

A mixture of original research, updates on procedures, literature reviews, and survey reports, this document resulted from the second symposium of the International Society for Tropical Root Crops — Africa Branch, with 77 participants from 16 countries. The focus was cassava, yams, cocoyams, and sweet potatoes, from the perspectives of breeders, agronomists, soil specialists, plant pathologists, entomologists, nutritionists, food technologists, etc. Learning from past successes and failures, many of the researchers directed their efforts toward problems obstructing progress in reaching improved production and use of root crops and attempted to view, realistically, the context in which their results would be applied.

RÉSUMÉ

Résultats de recherches récentes, mises à jour sur les méthodes de recherche, revues de publications et rapports de sondages sont contenus dans ce document issu du Deuxième symposium de la Société internationale pour les plantes-racines tropicales — Direction Afrique, qui a réuni 77 participants de 16 pays. Des communications sur le manioc, le taro, le yam et la patate douce ont été présentées par des phytosélectionneurs, des agronomes, des pédologues, des phytopathologistes, des entomologistes et des spécialistes de la nutrition et des aliments, entre autres. Tirant leçon de leurs succès et de leurs échecs, beaucoup de ces chercheurs ont dirigé leurs efforts vers la solution des problèmes qui entravent l'augmentation de la production et de la consommation des plantes-racines et ont tenté de considérer d'un œil réaliste le contexte qui sera celui de l'application de leurs recherches.

RESUMEN

Una mezcla de investigaciones originales, actualizaciones de procedimientos, reseñas de literatura e informes de encuestas, este documento es el resultado del segundo simposio de la Sociedad Internacional de Raíces Tropicales, Filial Africana, que contó con 77 participantes de 16 países. El simposio se centró en la yuca, el ñame, el cocoñame y las batatas, desde la perspectiva de los fitomejoradores, los agrónomos, los especialistas en suelos, los patólogos vegetales, los entomólogos, los nutricionistas, los tecnólogos alimenticios, etc. A partir de los éxitos y fracasos anteriores, muchos de los investigadores encaminaron sus esfuerzos hacia los problemas que obstaculizan el avance para lograr una producción y un uso mejorados de las raíces y trataron de obtener una visión realista del contexto en que los resultados pueden ser aplicados.

TROPICAL ROOT CROPS: **PRODUCTION AND USES IN AFRICA**

EDITORS: E.R. TERRY, E.V. DOKU, O.B. ARENE, AND N.M. MAHUNGU

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EFFECTS OF STAKING ON TUBER YIELD OF THREE CULTIVARS OF TRIFOLIATE YAM

S.N. LYONGA AND J.T. AMBE¹

At Ekona, South West Province, Cameroon, in 1979–81, three cultivars of trifoliate yam (Jakiri, Muyuka, and local) were compared for their tuber yields on ridges of staked and unstaked plots. Blocking was done according to treatments and oriented in an east–west direction so that staked plants would not shade unstaked ones. The tuber yields differed significantly among cultivars (main plots). Although staked and unstaked treatments did not differ markedly in yield, the staked plots were easier and cheaper to maintain, had a lower prevalence of fungal disease, and produced more male and female flowers than did the unstaked plots.

Traditionally, farmers in Cameroon do not stake sweet yams (*Dioscorea dumetorum*). This is particularly true in the savanna areas of the northern parts of the country where stakes are scarce. The vines either cluster to form a natural stake or climb on cereal stakes left in the field after harvest. The tuberization of the sweet yam has been negatively geotropic. Hence, there is constant mulching with soil so that the tubers do not become exposed and hardened. To mulch in an unstaked field of sweet yam is difficult and expensive, and at least some of the vines that are creeping will be cut, with reductions in yield.

In the forest zone of the country, yams are grown in mounds, whereas ridging is the practice in the savanna and also at experimental stations. In both zones, sometimes holes are dug, especially for *D. alata* and *D. rotundata*, but this approach is very expensive.

Various authors have reported beneficial effects of staking yams, with substantial yield increases being associated with increasing heights of staking. Waitt (1963) reported that the response of yams was species dependent, with *D. dumetorum* and some others not needing stakes. In Guadeloupe, Rouanet (1967) showed no differences between staked and unstaked *D. alata*. Doku (1967) reported that the effects of staking differ according to cultivar and location but that higher yields are realized from staked plots. We investigated the effects of staking on the fresh tuber yields of three cultivars of *D. dumetorum* at two locations in Cameroon.

MATERIALS AND METHODS

A series of trials from 1979 to 1981 was set up at Mile 17 and Yoke. Staked and unstaked plots were compared for three cultivars — Jakiri, Muyuka, and local. The plots were plowed and harrowed. The setts, 300–400 g, were planted on ridges at a spacing of 1 m × 1 m, and blocking was done from east to west so that staked plants would not shade unstaked plots. A split-plot, randomized design was used, with cultivars being main plots (with four replications) and staking as subplots. Subplots were 4 m × 10 m, with the experimental plots being 2 m × 8 m (16 stands). The data collected were stand count 90 days after planting and at harvest; fresh tuber clusters at harvest; fresh weight of tubers; and disease incidence.

Planting was done in March, and tubers were harvested in November. Statistical analysis was carried out, and the data on yields were extrapolated to a per-hectare basis.

RESULTS

In all the years, Jakiri significantly ($P < 0.05$) outyielded the Muyuka and local cultivars (Table 1). In 1979, at Mile 17, staked plots outyielded unstaked plots in all three cultivars, but only Jakiri showed a significant yield difference in staked (34 t/ha) over unstaked (26 t/ha) treatments.

Leaf-spot (fungal) diseases were prevalent in all the cultivars, but plant counts 90 days after

¹ Cameroon National Root Crop Improvement Programme (CNRICIP), Njombe, Cameroon.

Table 1. Fresh yield of three cultivars of *D. dumetorum* (kg/m²).^a

Treatment	Mile 17 ^b			Yoke ^c	
	1979	1980	1981	1980	1981
Jakiri					
Staked	3.4*	2.6**	2.5	2.0*	2.0*
Unstaked	2.6	2.4	2.7**	1.5	1.6
Muyuka					
Staked	1.5**	1.8**	1.5**	1.1	1.4**
Unstaked	1.3	1.6	1.3	1.0	1.2
Local					
Staked	2.4**	1.8	2.1	1.4**	1.2**
Unstaked	2.2	1.8	2.5**	1.2	1.0

^aSignificance levels: * = 5%; ** = 1%.^bCoefficient of variation = 19%; standard deviation = 0.5 kg.^cCoefficient of variation = 20%; standard deviation = 0.3 kg.

planting and at harvest showed 93% survival. The 7% difference in plant population on experimental plots was not serious enough to cause border effect, as yields/plant were not significantly different from yields/m².

Dioscorea dumetorum produces clusters rather than individual tubers. An average 1.5 clusters/plant were recorded at harvest.

DISCUSSION AND CONCLUSION

Compared with Muyuka and local, Jakiri cultivar was consistently the highest yielder, but it has a distinct disadvantage in that its tuber hardens quickly when exposed to air at ambient temperature. The tuber of Muyuka cultivar

takes a long time to harden. Efforts should be intensified to delay Jakiri's hardening. Although the yields from staked plots were not significantly larger than those from unstaked plots, the staked treatments of all three cultivars produced more male and female flowers than did unstaked treatments, and this characteristic could be exploited in breeding programs. Other agronomic advantages were derived from the staked plots. Operations such as weeding, mulching, and harvesting were facilitated. For commercial cultivation of this yam, where additional inputs like inorganic fertilizers will be used, staking is advisable so that during fertilizer application and mulching with soil the yam vines will not be destroyed. Fungal diseases were more prominent on the unstaked plots, and the creeping vines on the ground were particularly vulnerable to pests such as crickets and beetles.