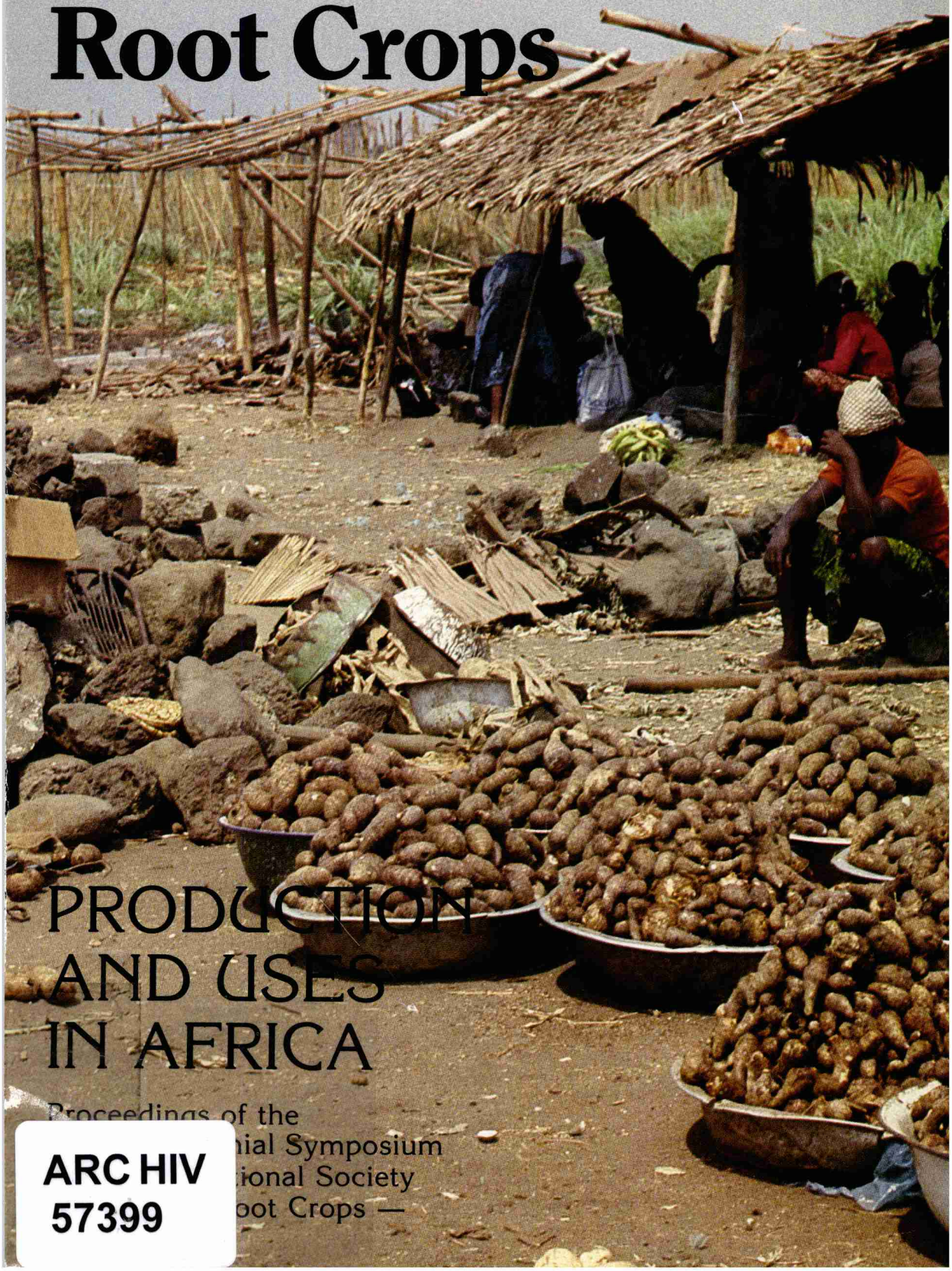
Tropical Root Crops



PRODUCTION AND USES IN AFRICA

Proceedings of the
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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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TROPICAL ROOT CROPS: PRODUCTION AND USES IN AFRICA

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.

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TROPICAL ROOT CROPS:
PRODUCTION AND USES IN AFRICA

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PROCEEDINGS OF THE SECOND TRIENNIAL SYMPOSIUM OF THE INTERNATIONAL SOCIETY FOR TROPICAL ROOT CROPS — AFRICA BRANCH HELD IN DOUALA, CAMEROON, 14 – 19 AUGUST 1983

CONTENTS

CONTROL OF THE CASSAVA GREEN MITE IN UGANDA

B. ODONGO AND G.W. OTIM-NAPE[1]

Investigations were conducted at Serere Agricultural Research Station (eastern Uganda) to identify and promote resistance of cassava to *Mononychellus tanajoa*, the most destructive arthropod pest of cassava in the country. Six cassava families that were imported from the International Institute of Tropical Agriculture, Nigeria, as seeds and included in the breeding program exhibited different degrees of hairiness of leaf surface. When they were subjected to severe mite attack during the dry season, their resistance correlated with the number of hairs on the leaves. This information helped in selecting cassava varieties with high mite resistance.

The cassava green mite (CGM) was introduced into Africa through Uganda where it was reported near Kampala in 1972 (Nyiira 1975). It has now spread to Tanzania, Kenya, Sudan, Zaire, Rwanda, Burundi, Nigeria, Benin, and Togo (Leuschner 1982). The mite has been recorded feeding and breeding on *Manihot esculenta*, *M. glaziovii*, *M. dichotoma*, *M. piauhensis*, *M. heterophylla*, and *M. cartholgenensis* (Nyiira 1978).

The ecological distribution and biology of CGM have been intensively studied, with the most severe outbreaks being linked to drought and poor soil conditions (Nyiira 1982). The pest attacks the shoots and causes a reduction in young leaf development and eventually affecting root size, root quality, and time for root formation (Nyiira 1982).

Because of the socioeconomic conditions in Africa, use of acaricides has not been recommended as a control measure; emphasis has been on biological and integrated control.

At the Serere Agricultural Research Station in Uganda, we have been screening seedlings of six families in an attempt to confirm resistance to CGM and to determine the relationship between mite resistance and the hairiness of cassava leaves.

METHODS

Open-pollinated seeds of six cassava families imported from the International Institute of Tropical Agriculture, Nigeria — IYT (1979) bulk; 30395 (1979) bulk; 30572 (1980) bulk; 30555 (1979) bulk; PYT (1980) bulk; AYT (1979) bulk — were planted in a seedling nursery, at a spacing of 50 cm × 50 cm. The seedlings were infested naturally by CGM, and, at 6 months, when mite infestation was greatest, the symptoms were scored on a scale of 0–5, where 0 was no mite damage and 5, serious damage including defoliation at the top of the shoot. Each plant was scored for resistance or susceptibility. Using hand-held lenses, staff at the station also scored hairiness of leaves and shoot tops on a scale of 0–5, where 0 was no hair and 5, profuse and dense forked trichomes.

RESULTS AND DISCUSSION

Of the cassava families tested, 30395 and 30572 performed best. From family 30395, 2.63% of the seedlings had a score of 0 for mite damage and 3.29%, a score of 2. In leaf and shoot hairiness, 0.66% and 1.97% of the seedlings scored 4 and 5, respectively. For 30572, the percentages of seedlings scoring 0 and 2 for mite damage were 1.80 and 6.31. Seedlings from family 30555 were the most liable to mite damage and were the least hairy (Table 1). A majority of the seedlings scored 3–5 for mite damage and 0–1 for hairiness. Those scoring 4 or 5 were considered susceptible; 3, tolerant; 0–2, resistant.

The investigation revealed that some "resistant" individuals harboured a number of mites

[1] National Root Crops Improvement Programme, Serere Agricultural Research Station, Soroti, Uganda.

Table 1. Mite score and pubescence of seedlings of six selected families, Uganda.

	Seedlings tested	% seedlings in mite damage score						% hairiness score					
		0	1	2	3	4	5	0	1	2	3	4	5
IYT (OP) 1979	241	0	0.83	1.24	21.49	30.58	46.69	87.60	9.92	2.07	0.41	0	0
30395 (OP) 1979	132	2.63	0	3.29	28.95	25.00	40.13	81.58	15.79	0	0	0.66	1.97
30572 (OP) 1980	95	1.80	0	6.31	39.64	31.52	20.72	96.40	0	0	3.60	0	0
30555 (OP) 1979	183	0	0	0	14.83	22.88	62.29	99.58	0.42	0	0	0	0
PYT (OP) 1980	181	0	0.46	1.83	22.83	36.53	38.36	89.04	10.96	0	0	0	0
AYT (OP) 1979	180	0	0	1.90	21.52	32.91	43.67	86.61	11.39	0	0	0	0

without showing symptom development, that is, showed less sensitivity to mite attack.

The resistance of 30395 and 30572 has been reported elsewhere (IITA 1980), and its confirmation in Uganda implies that this characteristic is genetically stable and is likely to remain so across different environments and for a long time (CIAT 1979).

Dense trichomes have been observed to affect mite behaviour by making it difficult for the pests to rest along the leaf midrib. When the trichomes are closer than 0.2 mm, the mite finds it difficult to feed and rest because the average length and width of the female mite are 0.3 mm and 0.2 mm (IITA 1980). Cassava also has other defence mechanisms: HCN concentrations and unknown factors affecting development, length of adult lives, and nymph mortality (CIAT 1979) — factors that may explain why family PYT 1980 is quite resistant despite its having few trichomes.