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of

CASSAVA GERM PLASM

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held at CIAT, Palmira, Colombia
4-6 February 1975

Editors: Barry Nestel and Reginald MacIntyre

Cosponsored by the
International Development Research Centre
and the
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Contents

Cassava Germ Plasm Resources, Disease Incidence, and Phytosanitary Constraints at IITA, Nigeria

E. Terry

Germ Plasm Collection

The IITA cassava germ plasm collection includes cultivars assembled from Africa, Latin America, and Asia. The variation within the germ plasm of *Manihot esculenta* and the few related species assembled is only a fraction of the total natural global variation within the genus.

The collection is being evaluated for desirable agronomic and botanical characteristics on the basis of both phenotypic and genotypic variation. The evaluation is being carried out under wide-ranging environmental conditions to test for genotype/environment interactions.

The following points should be considered: 1) Global germ plasm collection should be made only in true seed form; 2) Germ plasm in vegetative form should be assembled on a regional basis to overcome regional phytosanitary constraints; 3) A methodology for evaluation of germ plasm should be developed; 4) Germ plasm should be indexed after evaluation, and the information should be made available to cassava researchers; 5) Vegetative and seed material from germ plasm collections should be distributed as planting or breeding material; and 6) A machinery should be set up for the registration of germ plasm and breeding materials.

Cassava Diseases in Africa

A summary of the global distribution of the virus and virus-like diseases of cassava is presented in Table 1. Only two of these (CMD and CBSV) have been reported in Africa but not in America. Four of these diseases, however, have been reported only in America. All six have a high risk potential for in-

TABLE 1. Virus and virus-like diseases of *Manihot esculenta*.

Disease	Causal agent	Distribution in Africa	Distribution in other continents	Risk potential for introduction	Control
CMD	?	All cassava-growing areas	Asia	High	Resistant DFPM
CCMV	Virus	N.R.	America	High	"
CBSV	Virus	East Africa	N.R.	High	"
CVMV	Virus	N.R.	America	High	"
CLV	Virus	N.R.	America	High	"
CSD	Mycoplasma-like	N.R.	America	High	"

CMD – Cassava Mosaic Disease
CBSV – Cassava Brown Streak Virus
CLV – Cassava Latent Virus
N.R. — Not Reported
CCMV – Cassava Common Mosaic Virus
CVMV – Cassava View-Mosaic Virus
CSD – Cassava "Superbrotamento" Disease
DFPM – Disease-Free Planting Material

Root and Tuber Improvement Program, International Institute for Tropical Agriculture, Ibadan, Nigeria.

troduction into areas in which they are presumed presently absent. As indicated in Table 2, the only economically important bacterial disease of cassava with a high risk potential for introduction is cassava bacterial blight. The disease is presently of limited distribution in Africa. Two fungus diseases, cassava ash and cassava rust are likely to have a high risk potential for introduction into West Africa (Table 3).

TABLE 2. Bacterial diseases of *Manihot esculenta*.

Disease	Causal agent	Distribution in Africa	Distribution in other continents	Risk potential for introduction	Control
CBB (LS, LW)	***Xanthomonas manihotis***	Nigeria Zaire Cameroun	America Indonesia	High	Resistance
Bacteriosis (LS)	*Bacterium cassavae*	Uganda Congo Rwanda	N.R.	?	?
Bacteriosis (LS)	*Xanthomonas cassavae*	Malawi	N.R.	?	?
Bacteriosis	*Bacterium robici*	Madagascar	N.R.	?	?
CBW (LW)	*Pseudomonas solanacearum*	N.R.	Brazil	?	?

CBB Cassava Bacterial Blight
CBW Cassava Bacterial Wilt
LS – Leaf Spotting
LW – Leaf Wilt
N.R. – Not Reported

TABLE 3. Fungus diseases of *Manihot esculenta*.

Disease	Causal agent	Distribution in Africa	Distribution in other continents	Risk potential for introduction	Control
Cercospora leaf spots	*C. henningsii* *C. caribaea*	All cassava-growing areas	Asia America	None	Resistance
Phyllosticta leaf spots	*Phyllosticta* spp.	All cassava-growing areas	Asia America	None	Resistance
Cassava ash	*Oidium manihotis*	East Africa(?)	Asia America	?	Resistance
Anthracnose	*Glomerella manihotis*	All cassava-growing areas	America	None	?
Rust	*Uromyces* spp.	East Africa(?)	America	?	?
Stem rots	*Glomerella cingulata* *Botryodiplodia theobaomae*	All cassava-growing areas	America	None	?
Root rots	*Phytophthora* spp.	Congo	America	None	?
	Rossellina necatrix	Congo	America	None	?
	Sclerotium rolfsii	?	America	None	
	Fomes lignosus	All cassava-growing areas	America	None	

Phytosanitary Constraints

The Inter-African Phytosanitary regulations regarding cassava are as follows: Quarantine in a station approved by the IAPSC is essential for cassava cuttings. A permit is required specifying the need for a general phytosanitary certificate, with special certificate for active growth inspection at the place of cultivation in quarantine. There are, however, no restrictions on importing seeds.

A further set of regulations (The Plant Protection [Importation] Order) governs importation of *Manihot* species into East Africa. The regulation states that importation of all parts, including cut flowers and foliage, but excepting vegetative propagating material, roots for consumption, and true seeds is prohibited from all countries.

Due to the widespread incidence of cassava bacterial blight disease in Zaïre, Nigeria, and Cameroun, and the recent report of an outbreak of the green mite *Mononychellus tanajoa* in Uganda, importation permits for cassava cuttings are no longer routinely issued by the East and West African Regional Quarantine Stations at Muguga (Kenya) and Ibadan (Nigeria) respectively.

Cassava International Testing Program

The acquisition, evaluation, and utilization of superior material is of vital importance in cassava improvement. The idea, therefore, of an International Cassava Testing Program is most welcome. The following points should be considered in the establishment of such a program: 1) The objectives must be clearly defined; 2) The advantages to be derived from the proposed program by National Cassava Programs be clearly stated; 3) Uniform sets of materials must be tested to determine response to different environments; 4) Testing programs with vegetative material should be organized on a regional basis; 5) National Cassava Programs should cooperate with international institutes for the selection of families and clones of cassava for their particular needs; and 6) The strong evidence of genotype/environment interaction already documented must be seriously considered in setting up testing programs.