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VIRUS INDEXING THE *IN VITRO* SWEET POTATO GERM PLASM COLLECTION AT CENARGEN-EMBRAPA, BRAZIL

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Introduction

Sweet potato (*Ipomoea batatas* (L.) Lam.), a vegetatively propagated root crop, feeds millions of people throughout the tropics and subtropics. A collection of 371 accessions of this species is maintained under *in vitro* conditions at the Centro Nacional de Recursos Genéticos e Biotecnologia (CENARGEN) of the Empresa Brasileira de Pesquisa Agropecuária (EMBRAPA), Brazil.

The nutrient medium used is semi-solid MS (Murashige and Skoog 1962), with additions of 2 mg/L calcium panthotenate and 2% (w/v) sucrose; temperature is held at 20 ± 2 ^{o}C; and photoperiod is 12-h light. The intervals of subculturing vary from 6 to 12 mo.

The germ plasm collection was built up through exchange and field collection, and includes not only landraces but also exotic materials such as genotypes used by various Indian tribes of Brazil. Because the main purpose of a germ plasm collection is to supply genetic material for research and breeding, it must be pathogen free.

Viruses have been presumed, for many years, to cause several diseases of sweet potato, but the first extensive characterization of these viruses was published only in 1985. Although virus etiology is currently an area of extensive research, several sweet potato viruses have yet to be isolated and described (Clark and Moyer 1988). The known viruses that attack the sweet potato are sweet potato feathery mottle (SPFMV), found nearly everywhere the plant is grown; sweet potato vein mosaic (SPVMV), reported in Argentina; sweet potato latent (SPLV) and sweet potato yellow dwarf (SPYDV), both reported in Taiwan; sweet potato mild mottle (SPMMV), isolated in East Africa; sweet potato caulimo-like (SPCV), reported in Puerto Rico; cucumber mosaic (CMV); and sweet potato chlorotic fleck (SPCFV) (IBPGR 1988).

Virus diseases therefore limit the cultivation of sweet potatoes, and the use of healthy stocks is the best way to reduce yield losses. Techniques such as ELISA have proven reliable diagnostic tests for many viral diseases. The purpose of this study was to detect, for eradication, viruses in the sweet potato *in vitro* germ plasm collection.

Methods

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The sweet potato *in vitro* germ plasm collection was tested for four viruses: SPLV, SPFMV, SPMMV, and SPCFV. Indexing was based on Dot-ELISA tests (Lizarrage and Fernández-Northcote 1989). The kits (CIP NCM-ELISA kit) were supplied by the International Potato Center (CIP, its Spanish acronym). The samples were initially composed of three accessions; if the results were positive for any virus, the tests were then repeated for single samples to identify infected accessions.

Results

Of the 371 accessions, 27 were infected by SPFMV (Table 1); the presence of the other three viruses was not detected.

Discussion

Keeping vegetatively propagated plants virus free in field cultures is very difficult. Because infection with viral diseases leads to the degeneration of clonal stocks (Ford-Lloyd and Jackson 1986), *in vitro* cultures initiated from meristems are also kept. These should be free of viruses and the probability of contamination should therefore be extremely low.

The indexing we did showed that 27 sweet potato accessions from the CENARGEN *in vitro* germ plasm collection were infected by SPFMV, the commonest of the sweet potato viral pathogens (Clark and Moyer 1988). As Table 1 shows, most of these accessions originated from field collections, where SPFMV is frequent. Nevertheless, such infections should not be expected in an *in vitro* collection that was initiated from meristem culture. Our findings corroborate Schilde-Rentschler and Roca's (1986) suggestion that meristem culture alone does not guarantee pathogen-free status.

The infected accessions are being recommended for the additional treatment of thermotherapy. Combined, these two measures should help contribute to the safe movement of sweet potato germ plasm.

References

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Table 1. List of sweet potato accessions infected by the sweet potato feathery mottle virus (SPFMV) at the Centro Nacional de Recursos Genéticos e Biotecnologia (CENARGEN), Brazil.

Laboratory control no. (CCG)	Brazilian system code (BRA)	Name of accession	Origin[a]
13	6076	PPW 2813	Vilhena, RO
16	1392	Goldrush	
33	1783	BGIB 103	
46	6530	PPW 2867	Pôrto Velho, RO
50	3476	Leite	
61	1431	Heartogold	
102	2348	BGIB 126	
104	2003	BGIB 130	São Mateus, ES
114	6521	PPW 2865	Pôrto Velho, RO
116	1724	Enrica Homem	
121	1422	Early Gold	
131	6131	DPW 2585	N. Colorado, RO
142	7277	PPW 2852	Ouro P. Oeste, RO
163	6009	PPW 2802	Comodoro, MT
200	9466	Balao	CPAA/Manaus, AM[b]
217	9296	CNPH 98	CNPH/Brasília, DF[c]
234	7854	CCMS 100	Rio Fortuna, SC
283	8320	CCMS 132	Herval Oeste, SC
318	9831	SCS 232	Itapaje, CE
338	8869	CCMS 193	Mariópolis, PR
345	8761	CCMS 183	São José Cedro, SC
346	8532	CCMS 156	Xanxeré, SC
364	9687	SCS 234	Forquilha, CE
368	9580	SCS 230	S. G. Amarante, CE
380	9938	SCS 280	Joazeironorte, CE
381	9695	SCS 237	Forquilha, CE
391	10031	SCS 264	Floriano, PI

States of Brazil are AM = Amazônas; CE = Ceará; DF = Distrito Federal; ES = Espírito Santo; MT = Mato Grosso; PI = Piauí; PR = Paraná; RO = Rondônia; SC = Santa Catarina.

a. *CPAA = Centro de Pesquisa Agroforestal da Amazônia. CNPH = Centro Nacional de Pesquisa de Hortaliças.*