Cassava propagation by small scale farmers using a low cost *in vitro* system

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Background

Lack of quality planting material of farmers' varieties, produced locally and at a low cost, is a major constraint contributing to the limited expansion of cassava production in small farm settings in Colombia. This work presents our experience in adapting conventional cassava propagation into a low-input, rural tissue culture multiplication scheme, developed and run by resource-poor small farmers. The project was developed in a farmers' community in the hillsides of southern Colombia. Alternative, economical, and readily available sources of tissue culture material and equipment were developed through a two-phase participatory process by a group of women farmers, a nongovernmental organization, and CIAT scientists (Escobar et al., 2001)

This system allows us to certify the quality of material each cycle, and support seed releases or renewing materials in the Department of Cauca (Colombia).

At CIAT, research will continue to incorporate other crops, with minimum investment, taking advantage of the low-cost facilities already in place. Other CBN-funded pilot sites, in Ecuador, Cuba, and Brazil, are scheduled to implement similar cassava propagation schemes with farmers.

Methodology

The methodology was tested in the field with six commercial clones (6000 *in vitro* plants). The plants were harvested and certified as frog skin disease (FSD)-free by the Colombian Institute of Agriculture (ICA). Certified cuttings were then used as initial explants in a two-node, rapid propagation system. The purpose was to increase the number of plants for distribution among farmers.

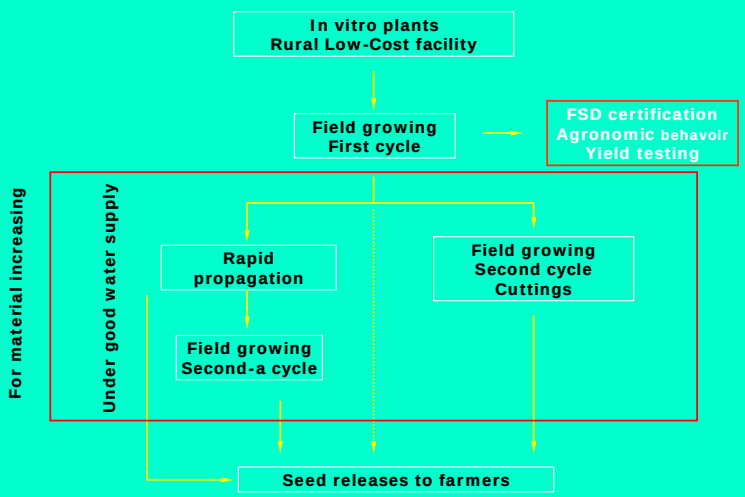

Diagram 1: Seed production scheme implemented in Cauca, Colombia with small-farmers

Results

- A laboratory was set up and constructed with locally sourced materials at a cost estimated as being 20-30 times less than that for a conventional laboratory (Fig 1).
- A tissue-culture medium was improvised from domestically available ingredients at costs that were five times less than those for traditional tissue-culture media. The propagules' multiplication rate (1:3-4) was comparable to those obtained by a conventional laboratory.

Table 1. Average production of 6 commertial clones produce by farmaer using in vitro system

Clone	% Commercial roots	Average (kg / plant)	Standard deviation	Anova grouping
CM 523-7	52.2	3.67	0.20	a
CM 6740-7	54.6	4.15	0.07	a
HMC-1	67.4	4.57	0.93	a
MBra383	60.4	3.42	0.27	a
MCol 1522	25.2	1.25	0.65	b
MPer 183	65.7	4.4	0.049	a

Pr > F (<0.0001); R2 = 09256; CV = 12.07; Averageamong clones = 3578 kg plant

- ICA functionaries certified San Rafael's plot as free of FSD; these materials were planted last year as part of CBN- Systemwide Program on Participatory Research and Gender Analysis for Technology Development and Institutional Innovation (PRGA)-supported activities (Escobar et al., 2002). Some materials (HMC-1, CM6740-7, MBra 383, and CM 523-7) showed the highest potential (Figure 1a-b; Table 1).

Figure 1: Rural low-cost *in-vitro* facilities. Rapid propagation and increment field for basic seeds

Conclusions

- This experience incorporates *in vitro* propagation into farmers' routine agricultural practices. We believe that the system could be implemented in other cassava-growing regions where there is need to renew planting material.
- Low-cost propagation methods could support decentralized seed systems. At present, this project will allow distributed clean material for 7-10 ha (certified free FSD material) for small farmers to use in the next planting cycle (2004-B). Our material could be used for re-establishing cassava plantations in the Cauca area.
- Rates of multiplication achieved with the rural tissue culture system were as high as with the conventional tissue culture procedures.

Bibliography

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