

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, are major constraints contributing to the limited expansion of cassava production in small farming settings in Colombia. This work presents our experience in adapting conventional cassava propagation into a low-input rural tissue culture multiplication scheme, developed and runned 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 women farmers group, an NGO and CIAT scientists (Escobar et al 2001)

This system allow 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) following the diagrama 1. The plants were harvested and certified as Frog Skin Disease-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.

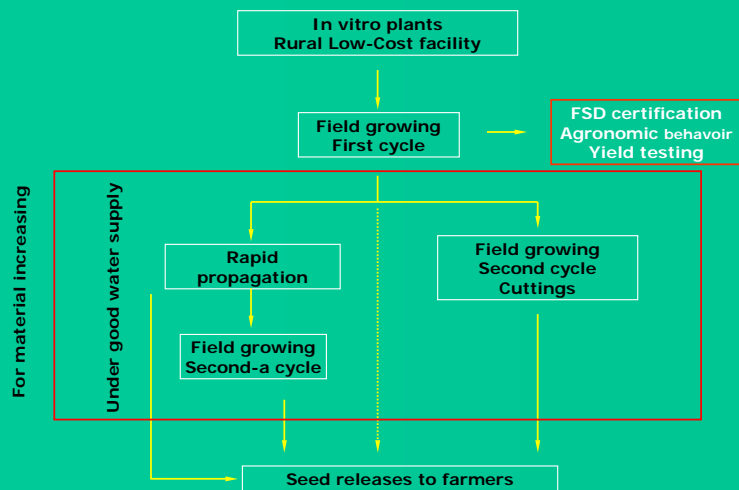


Diagram 1: Seed production scheme implemented in Cauca, Colombia with small-farmers

Results

- A laboratory was set up, and constructed with locally sourced materials at a cost estimated as being 20 times less than that for a conventional laboratory (Figure 1).
- A tissue-culture medium was improvised from domestically available ingredients at costs that were 5 times less than those for traditional tissue-culture media. The propagules' multiplication rate (1:3-4) was comparable as conventional laboratory obtained.

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

C 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; Average among clones = 3578 kg/plant

ICA functionaries certified San Rafael's plot as free frog-skin diseases plants; those materials were planted last years as part of CBN-PRGA supported activities (Escobar et al 2002). Some materials (HMC-1, CM6740-7, MBra 383 CM 523-7) showed 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 leads the incorporation of *in vitro* propagation into farmer's 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 be support decentralized seed systems. Nowadays this project will allow distributed clean material for 7-10 Ha (certified free frog-skin material) for small farmers to be use in the next planting cycle (2004-B). Our material could be use for re-establish cassava plantation in the Cauca's area.
- Rates of multiplication achieved with the rural tissue culture system were as high as with the conventional tissue culture procedures.

Bibliography

Escobar R., C. Hernandez, J. Restrepo, G. Ospina, J. Tohme and W. Roca. Involvement of Farmers in the Development of Cassava Low-Cost Input, *in vitro* Propagation Methods. In: Fauquet, CVM. & Taylor NJ, eds. Cassava : An ancient crop for modern times (Compact Disc No. 2) Proceedings 5th. International Scientific Meeting of the Cassava Biotechnology Network. 2001 November 4-9, St Louis, Mo. USA

