

# Use of tissue culture techniques to produce disease-free cassava cultivars for small-scale farmers in the department of Cauca, Colombia, affected by frog skin diseases and whiteflies pest

R. H. Escobar<sup>1,2</sup>, L. Muñoz<sup>1</sup>, E. Caicedo<sup>1,3</sup>, G. Jaramillo<sup>4</sup>, D. Zapata<sup>5</sup>, A. Mina<sup>5</sup> and J. Tohme<sup>1</sup>

<sup>1</sup>Agrobiodiversity and Biotechnology Project. International Center for Tropical Agriculture. AA 6713 Cali-Colombia. (R.ESCOBAR@CGIAR.ORG).

<sup>2</sup>National University of Colombia, Palmira. Scholarship Award Gines-Mera, 2003

<sup>3</sup>Cassava Biotechnology Network (E.CAICEDO@CGIAR.ORG)

<sup>4</sup>Cassava Breeding Program, CIAT.

<sup>5</sup>Local Farmers Association (AMUC) (ASOCAMP@ANDINET.COM)

## Background

The Agrobiodiversity and Biotechnology Project (SB-2 Project) promote the efficient conservation and use of agrobiodiversity. Farmers in the Cauca department of Colombia have traditionally cultivated cassava as a food and cash crop. This staple, however, has been increasingly affected in the past decade by a major pest, the whitefly (*Aleurotrachelus socialis* Bondar) and a chronic phytosanitary problem frog skin disease (FSD). These production constraints have negatively affected the income derived from cassava and, thus the well being of many resources-poor farming communities in the department of Cauca.

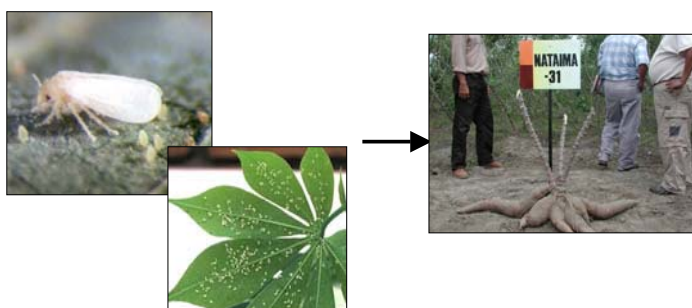
The SB-2 Project initiated a series of activities in three localities: Alegrias, Pescador, and Santa Ana of the Cauca Department, with a view to reactivating cassava production and improving the wellbeing of farmers in this regions.

## A. Production of planting material of the whitefly-resistant cassava cultivar Nataima-31:

The Tropical Whitefly IPM Project, with the financing of the New Zealand Agency for International Development identified resistance to the whitefly (*A. Socialis*) in cassava clones from Ecuador and Peru. This resistance was used to breed a high-yield cassava cultivar possessing high levels of resistance to whitefly damage: The cultivar "Natiama-31".

In June 2002, the Colombian Corporation for Agricultural Research (Corpoica), the Colombian Ministry of Agriculture and Rural Development (MADR), and CIAT released the new cultivar in Colombia "Nataima-31" being a good option because it yields well average 33 tons of fresh roots/Hectare and does not need pesticide application for whitefly control, which maximizes household income for cassava farmers. However, there is not enough planting material of "Natiama-31" to satisfy its demand.

This project aims to produce two seed lots of "Nataima-31", consisted of 5000 plants for a cassava development project (Polo de Desarrollo) managed by CIAT-MADR, and 500 plants for small farmers' associations (AMUC) to produce good quality planting material, free of diseases such as FSD.



## B. Production of cassava planting material possessing tolerance to Frog Skin disease (FSD)

Frog Skin Disease (FSD) is a serious phytosanitary problem that affects cassava production in Colombia, and particularly in the department of Cauca. The causes of FSD are still uncertain and diseased cassava plants do not produce marketable roots.

Research conducted by the Virology Research Unit of CIAT has shown that some cassava clones are tolerant to FSD, resulting in acceptable yields despite being infected.

The SB-2 project using tissue culture techniques aims to produce a seed plot with 500 plants of the FSD-tolerant genotypes: HMC-1, MPer 183, CM 7951-15, and SM 653-14 and Nataima-31.



## C. Use of leaves and root flour for human consumption.

Among other characteristics, Nataima-31 has a low cyanide content, good culinary quality, and low physiological root deterioration. As this clone tolerates whitefly attack and does not need pesticide applications it could be considered a good source of cassava flour for human consumption. In addition, research about carotene content in varieties maintained at CIAT found that clone CM 2772-3 has the highest content. Five hundred plants will be planted to establish a small plot for flour production from Nataima-31 as a dietary supplement.



## C. Production of small-scale horticultural crops for food security and income generation

Discussion with different communities allowed identification of crops of interest for management in a small plot of 200 m2. Farmers from Alegrias, Cauca, were not interested in working with these kinds of crops because they considered they required a lot of management. Four groups from Pescador and five from Santa Ana decided to participate in this part of the project.

We chose materials produced by the Horticultural Research Group of the National University of Colombia, Palmira, because they were developed with a low input-technology. The implementation of this activity has different purposes: (a) opening a space for women to discuss their expectations and interactions with men in agriculture activities-gender and participatory thematic were developed with a sociologist's support, (b) production activity as home food supply, (c) income generation possibility, and (d) open discussion about CBN.

Crops considered by participating farmers were: common beans, maize, summer squash, carrot, tomato, pepper, and coriander.



## Acknowledgment

We thank José Restrepo (Foundation for Rural Agro-industrial Research and Development-FIDAR), German Manrique, Arcadio Guaza, the Horticultural Group from the National University of Colombia, Palmira, for their collaboration during the project.