Cassava Research at CIAT

Centro Internacional de Agricultura Tropical
International Center for Tropical Agriculture

Sustaining biodiversity for current and future generations.

- CIAT maintains the worldwide cassava germplasm collection, including wild Manihot accessions
- The discovery of cassava clones with higher protein content in their roots within the collection highlights the importance of conservation of landraces of cultivated crops.
- The discovery of longer shelf live of roots of an inter-specific hybrid with *M. walkerae* (three weeks instead of only 1-2 days) highlights the importance of wild relatives as well (Figure 1)

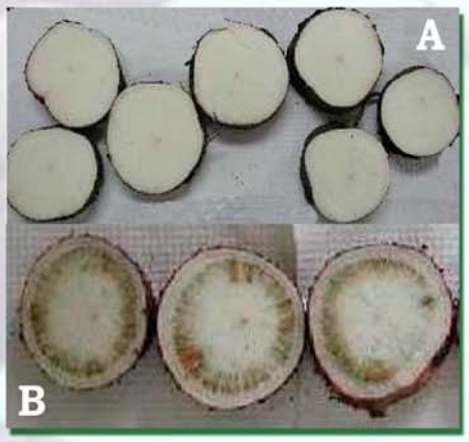

Figure 1. Ten days after harvest, roots from an interspecific hybrid with M.walkerae (A) do not show the typical symptoms of post-harvest physiological deterioration of normal cassava (B).

Reducing rural poverty through agricultural diversification and emerging opportunities for high-value commodities and products:

- Promotion of foliage exploitation and silage utilization for on-farm animal feeding (i.e. swine production) offers new opportunities to reduce poverty and diversity farm production
- Cassava, usually seen as a low-value crop can be transformed in a high-value commodity through the recent discovery of commercially useful mutations (i.e. waxy starch cassava)

Figure 2. Clone SM 1433-4 yielded more Than 80 t/ha of fresh roots (about 25 t/ha of dry matter) in commercial fields

Producing more and better food at lower cost through genetic improvement:

- Over a million hectares of high-yielding, highly-stable, improved varieties grown in Asia. High-yielding clones also developed and released in Latin America (Figure 2)
- Yield stability based on resistance to the most important biotic stresses. The discovery of resistance to white flies is the first among crops susceptible to this pest (Figure 3)
- Yield stability based on tolerance to the most important abiotic stresses, with special emphasis to drought, acid soils and low fertility (Figure 4)
- Enhanced nutritional quality, specifically for increased levels of pro-vitamin A carotenoids and protein content in cassava roots (Figure 5)
- Enhanced value of cassava roots, including high-value traits such as waxy starch (Figure 6), small granule size for bioethanol industry (Figure 7) and resistant starches (for food industry)

Figure 3. Resistance to white flies in a landrace from Germplasm Collection

Promoting poverty alleviation and sustainable management of water, land and forest resources:

- Introduction and promotion of different hedgerows and live-barriers in Asia drastically reduces soil erosion (Figure 8)

Improving policies and facilitating institutional innnovation to support sustainable reduction of poverty and hunger:

- Development of high-value clones make cassava processing more competitive, strengthening local and international markets.
- Cassava needs to be processed near the fields where it is harvested. Processing cassava promotes rural development
- CLAYUCA's role in exploring new ways to organize farmers around cassava production, processing and marketing facilities are innovative approaches for empowering rural communities and helping them to establish sustainable links with markets.

Figure 4. Cassava grown in semi-arid conditions in the north-east of Brazil.

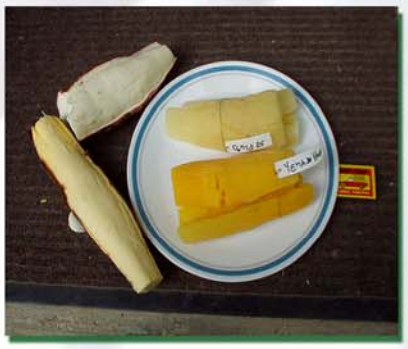

Figure 5. Enhanced nutritional value clones with higher concentration of pro-vitamin A carotenoids

Figure 6. Amylose stains normal cassava roots blue. An amylose-free or waxy starch mutation (staining brown) has recently been identified

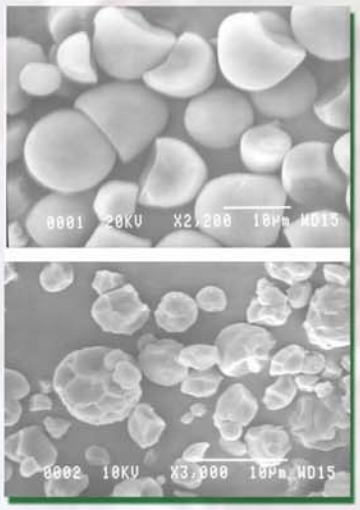

Figure 7. Electron mycroscope phtographs of normal starch granules (A) and from a mutation with small granules that should offer advantages for bioethanol production (B).

Figure 8. Terrace formation as result of the utilization of Vetiver grass in hedgerows plantings in Hainan Province, China