



Universidad Central "Marta Abreu" de
Las Villas

Instituto de Biotecnología de las
Plantas.



MISSION

To develop in the Plant Biotechnology a relevant activity:

Scientific
Technological
Productive
Post grade



Nationals and
Foreign

High technological, productive and working efficiency and
effectiveness



Knowledge generation,
spreading and transfer



Technologies, products and
services of a high aggregated
value and market competitive.

1. Genetic transformation of plants

1.1 Genetic transformation in banana for the resistance to the disease Black Sigatoka (*Mycosphaerella fijiensis* Morelet).

1.2 Obtainment of Papaya transgenic plants resistant to the Ring Spot Virus.

1.3 New methodologies of transformation in bean, sorghum and soy bean for the resistance to fungal soil disease and biofortification.



Transgenic line selected from 'Navolean' (AAB) cultivar with bunch to the left, Non transgenic controls to the right.



**Transgenic line selected from 'Grande naine' (AAA) cultivar to the left,
Non transgenic controls to the right.**

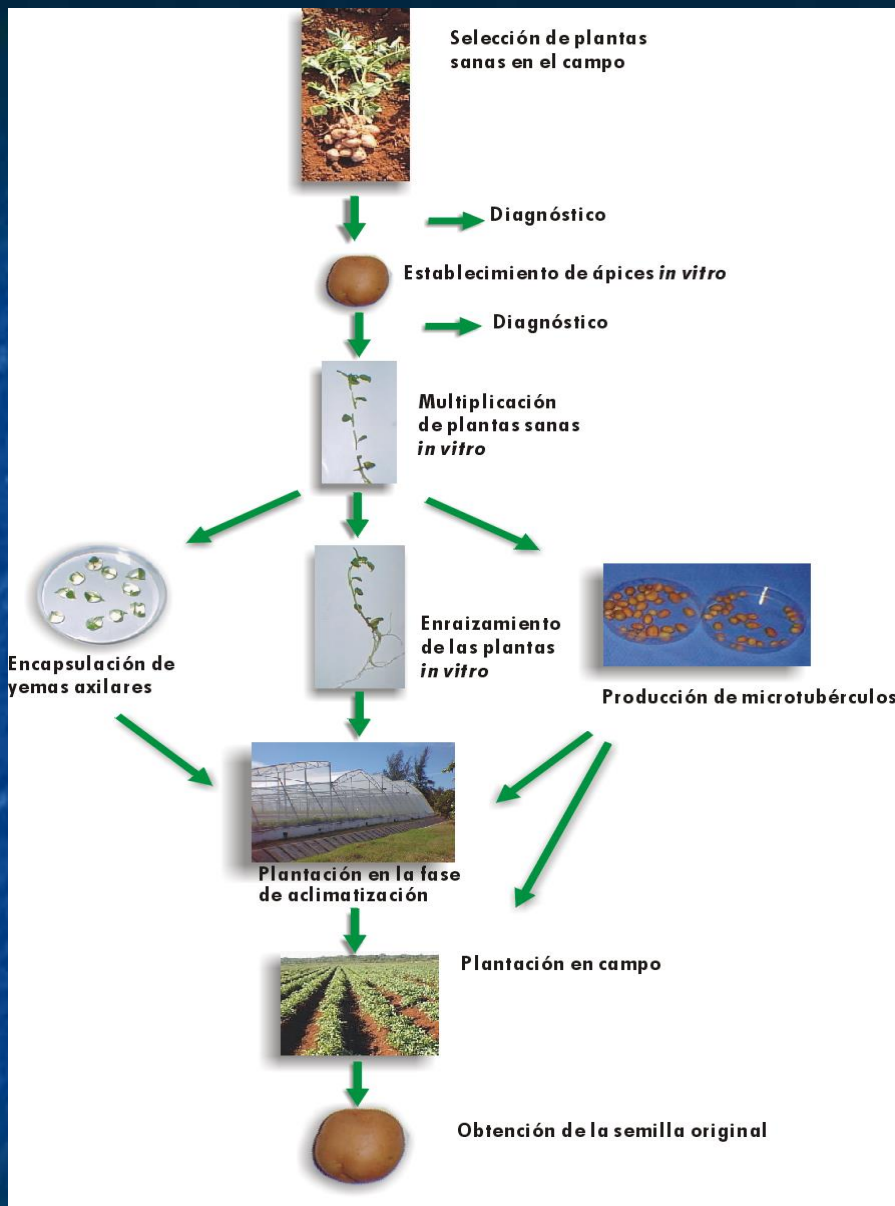
2. New technologies of plants propagation

2.1 Improvement of the technology for the production of potato seeds and evaluation of new somaclones in *Solanum tuberosum* L

2.2 Development of the Temporal Immersion Systems in Biofactories of V Generation

2.3 *In vitro* propagation of forest woody and fruit species

2.4 Plants propagation by somatic embryogenesis and its scaling in semi-automatic systems.



Production scheme of original potato seed.



Vitroplants on field



Production of Tubers beginning with Vitroplants

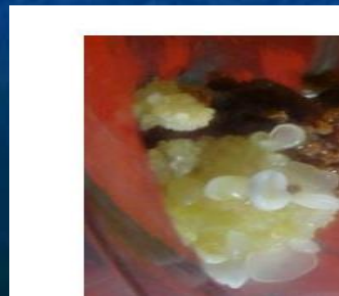
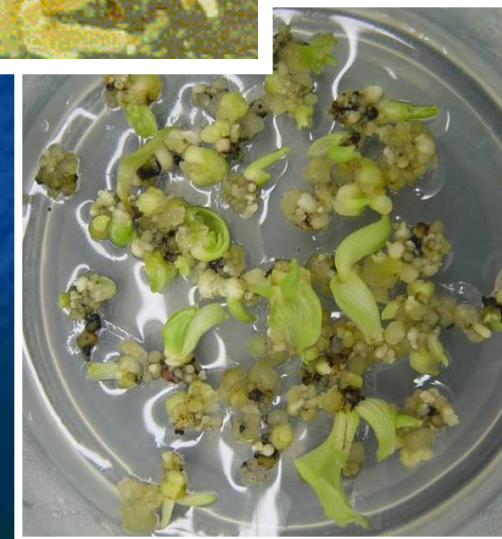
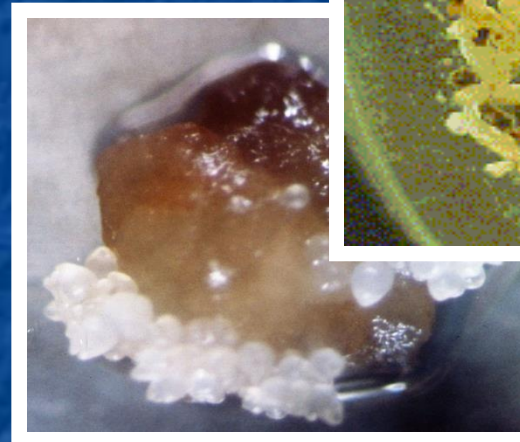
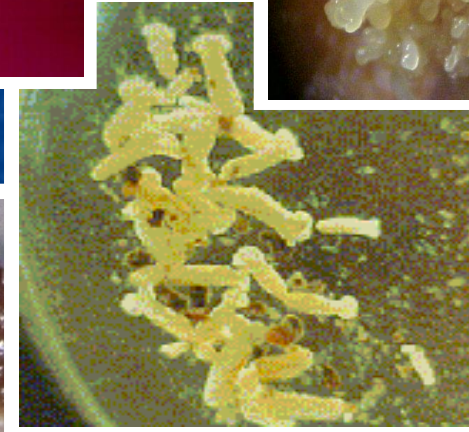
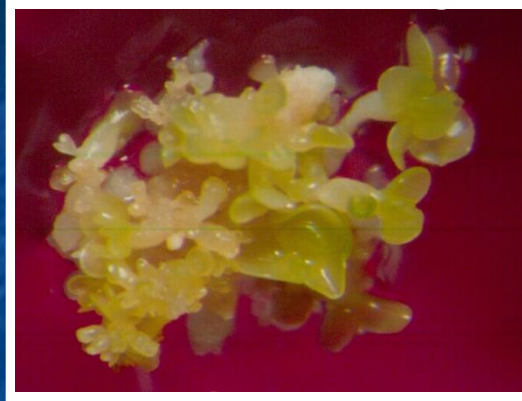
Methodologies of *in vitro* propagation using Temporal Immersion Systems.

- ❑ Potato
- ❑ Bananas y plantains
- ❑ Sugar cane
- ❑ Pineapple



Somatic embryogenesis

- Sugar cane
(*Saccharum spp.* Hybrid)
- Papaya (*Carica papaya* L.)
- Banana y plantain (*Musa spp.*)
- Guava (*Psidium guajaba* L.)
- Coffee (*Coffea arabica* L.)
- Mahogany (*Swietenia macrophylla* King)
- *Anthurium sp.*
- Bean (*Phaseolus vulgaris* L.)



Evaluation in the field of plants obtained from somatic embryos. “*La Cuba*” enterprise, Ciego de Avila province



FHIA-18 cultivar

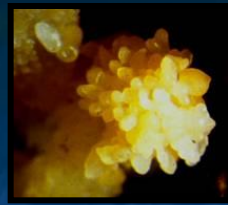
PHENOTYPIC VARIABILITY FOUND IN PLANTS OBTAINED VIA SOMATIC EMBRYOGENESIS IN BANANA AND PLANTAIN CULTIVARS.

CULTIVAR	TOTAL NUMBER OF PLANTS	CYCLE EVALUATED	PERCENTAGE OF VARIABILITY
Grande naine (AAA)	500	1	0 %
FHIA~18 (AAAB)	4500	2*	0.2 %
FHIA~21 (AAAB)	8000	1	0.03 %

* Plants group tested in CORBANA, Costa Rica



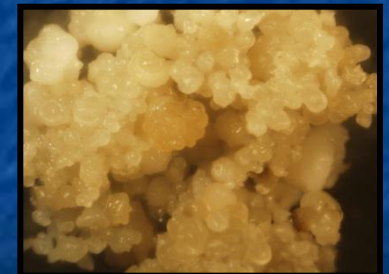
Inflorescencia masculina inmadura.



Embriones somáticos globulares.



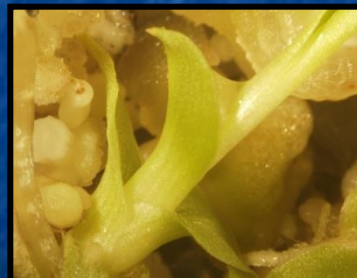
Establecimiento de suspensiones celulares embriogénicas. 45 días.



Formación de embriones somáticos globulares. 30 días.



Maduración de los embriones somáticos , 30 días.



Germinación de embriones, 30 días



Plantas obtenidas a los 30 días

SOMATIC EMBRYOGENESIS PROTOCOL FOR BANANA *Musa spp.* (AAA) IN COMMERCIAL LAB. (Kosky *et al.*, 2000)

Distribution of bananas and plantain (FHIA-21) plants obtained via somatic embryogenesis into the country



Total number of plant produced via somatic embryogenesis in IBP and *Biofactory network*, **475 344** (years 2008, 2009 and 2010)

3. Genomic and Bioinformatics

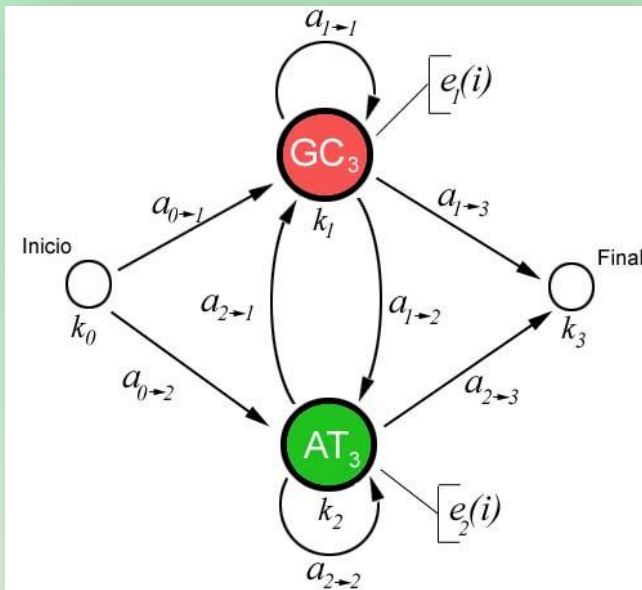
3.1 Isolation and identification of genes related to the interaction plant-pathogen in *Musa* in front of the Black Sigatoka disease.

3.2 Genome map of the fungus *M. fijiensis*, causal agent of the Black Sigatoka disease.

3.3 Localization of genes of interest in the sugar cane genome related to the resistance to the rust disease (*Puccinia melanocephala* Syd).

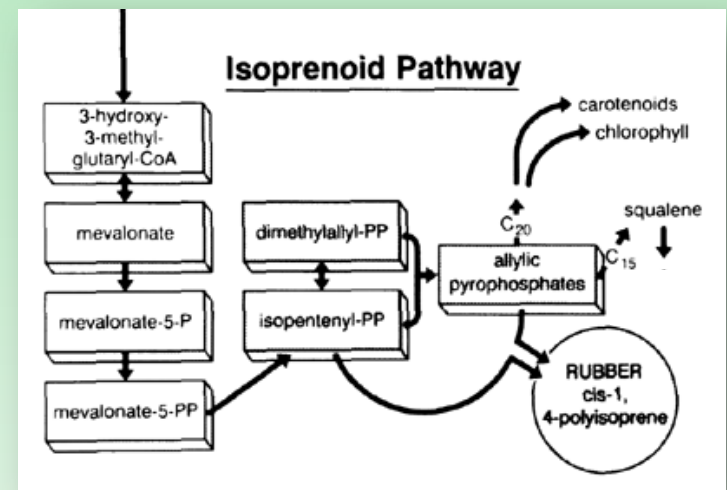
Plant Genetic Transformation

- Genome annotation of *Mycosphaerella fijiensis*.
- Motif detection in filamentous fungi.



Production of Plant Secondary Metabolites

- Genome wide gene expression analysis.
- *In silico* metabolic pathway construction.



National Collaboration

- ❑ **INIVIT**
- ❑ **AGROFAR**
- ❑ **CIGB**
- ❑ **ETICA Villa Clara-Cienfuegos**
- ❑ **INCA**
- ❑ **CIAP**
- ❑ **INISAV**
- ❑ **INICA**
- ❑ **BIOPLANTA**
- ❑ **EMPRESA NACIONAL DE SEMILLAS. MINAGRI**
- ❑ **CBQ**
- ❑ **FAC. DE CIENCIAS AGROPECUARIAS. UCLV**

Collaboration international

- ❑ Germany
- ❑ Belgium
- ❑ France
- ❑ Mexico
- ❑ Israel
- ❑ Colombia
- ❑ Venezuela
- ❑ Ecuador
- ❑ Costa Rica
- ❑ Honduras
- ❑ Bolivia
- ❑ Brazil
- ❑ Australia
- ❑ Argentina
- ❑ Dominican Rep.
- ❑ Spain

**5 INTERNATIONAL
INVESTIGATION
PROJECTS**

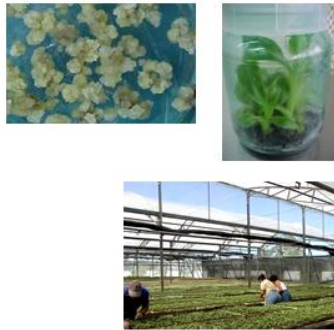
Postgraduate studies

The Institute of Plant Biotechnology offers:

- Master of Science Program in Plant Biotechnology.
(Postgraduate Program of Excellence, as accredited by the Ministry of Higher Education, Cuba).
(International Postgraduate Price of the Iberoamerican Universities Association)
- PhD Program in Plant Biotechnology.



Biotecnología Vegetal



Editada por: Instituto de Biotecnología de las Plantas
Universidad Central "Marta Abreu" de Las Villas

Biotecnología Vegetal is a journal edited three times a year by the **Instituto de Biotecnología de las Plantas (IBP)**, Central University "Marta Abreu" of Las Villas (UCLV). It publishes unedited scientific articles, short communications and reports about new techniques on the thematic: Cells and tissues culture, Mass propagation of plants, Genetic improvement by mutagenesis and *in vitro* selection, *In vitro* germplasma conservation and genetic engineering.

Indexed in the Databases:

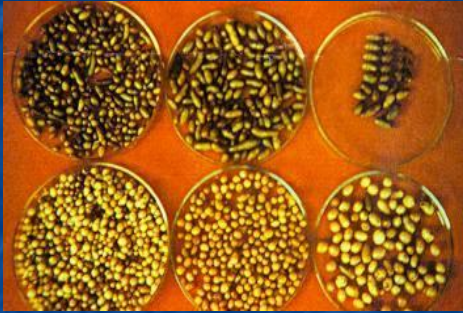
CAB ABSTRACT, PERIÓDICA, LATINDEX, CUBACIENCIA, BIOSIS, ULRICH, PLANT BREEDING ABSTRACT, PLANT GENETIC RESOURCES, ABSTRACT, FORESTRY ABSTRACT, AGBIOTECH NET, HORTICULTURAL ABSTRACT, POTATO ABSTRACT



Biofactory

- ❑ Installation of multiple cultures (potato, plantains and bananas, woody, sugar cane, pine apple, guava, ornamentals, among others
- ❑ Annual capacity produced : 4 millions *in vitro* plants
- ❑ Employs 20 workers
- ❑ It has produced more than 15 millions of *in vitro* plants.

Offers *in vitro* plants



Potato



Plantain



Cocoyan



Linden



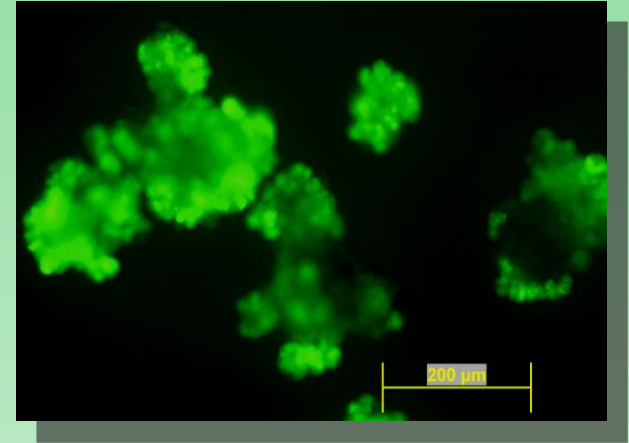
Eucalyptus



Guava

Applied research, from the laboratory ...

...to the field.



Contact

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