Fundación Hondureña de Investigación Agrícola (FHIA)

Fundación Hondureña de Investigación Agrícola is the Spanish name of the Honduran Agricultural Research Foundation, better known by its acronym FHIA. Its banana and plantain programme is known for being the first breeding programme to have delivered disease-resistant hybrids to farmers.

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History of the breeding programme

FHIA was founded in 1984, but the banana genetic improvement programme had actually started much earlier, in the 1920s. Following the arrival in Latin America of Fusarium wilt, the United Fruit Company set up a breeding programme in Panama to produce a disease-resistant Gros Michel-like export banana, using materials collected in southeast Asia and the western Pacific. The programme was shut down in 1930 with the onset of the depression. Breeding resumed in 1958, but this time in Honduras, where the collection had been transferred and supplemented with accessions collected between 1959 and 1961 by the American botanist Paul H. Allen and his team[1].

Progress to produce a disease-resistant Gros Michel was slow because the cultivar is largely sterile, and early attempts resulted in inferior progenies. In the mean time, the banana companies had solved their Fusarium wilt problem by switching to cultivars that were resistant to the disease: the Cavendish bananas that currently dominate the export trade. Breeders had produced hybrids that out-yielded some of the Cavendish cultivars, but poor post-harvest characteristics made them unsuitable for commercialization.

By the beginning of the 1980s, with still no new commercial cultivars in sight, the main breeding programmes were facing closure. In 1984, the United Fruit Company (then called United Brands Company before becoming Chiquita Brands International that year) donated its genetic improvement programme and field collection to the Honduran government, which had just created FHIA. Phil Rowe oversaw the transition from a private enterprise to a governmental research
institute. Capitalizing on more than 25 years of working with bananas, FHIA was soon able to deliver disease-resistant hybrids.

**Banana breeding**

FHIA has a field collection of more than 400 *Musa* accessions from many countries, which are the source of genetic variability for the breeding programme.

The initial goal of the programme was to develop a Gros Michel-type banana with resistance to Fusarium wilt. First, hybrids were created by using Gros Michel and its dwarf mutants Cocos, Highgate and Lowgate as female parents and the diploid Lidi, resistant to race 1 of *Fusarium oxysporum f. sp. cubense*, as male parent. Although Gros Michel is largely sterile, it can be induced to set seeds using pollen from wild bananas. The number of seeds produced, however, is small and the process full of uncertainties.

Tetraploid hybrids obtained from these crosses were resistant to race 1 of Fusarium wilt but not as productive as the Cavendish clones that had replaced Gros Michel in commercial banana plantations since 1960. Breeders attributed this to the poor agronomic performance of the wild species used as male parents, which led them to concentrate on breeding ‘improved’ male parents that possessed both disease resistance and good agronomic characters.

The improved diploid SH-3142 was developed which served as the male parent for the development of FHIA-01, FHIA-18, FHIA-21 and FHIA-25. The hybrids released so far have good bunch and agronomic characteristics and are resistant or tolerant to black leaf streak and Fusarium wilt. They are being grown in a wide range of agro-ecological conditions in Africa, Latin America and Australia.

**References**


**External links**

- Official website of FHIA's banana and plantain programme
- Information on the FHIA field collection on the MusaNet website

**Also on this website**

- Lessons from introducing FHIA-21 in July 2011 issue of InfoMus@
- Tribute to Phil Rowe in the ProMusa blog (29 July 2013)
- Musapedia pages on FHIA hybrids:
  - FHIA-01, FHIA-02, FHIA-03, FHIA-17, FHIA-18, FHIA-20, FHIA-21, FHIA-23, FHIA-25
- Musapedia pages on research organizations:
  - Bioversity International
  - Centre de coopération internationale en recherche agronomique pour le développement - CIRAD
  - Centro Agronómico Tropical de Investigación y Enseñanza - CATIE
  - Empresa Brasileira de Pesquisa Agropecuária - Embrapa
  - Fundación Hondureña de Investigación Agrícola - FHIA
  - International Institute of Tropical Agriculture - IITA
  - Taiwan Banana Research Institute - TBRI