International Transit Centre (ITC)

The International Transit Centre (ITC) holds the world’s largest collection of bananas, the International Musa Germplasm Collection, which is managed by Bioversity International. Hosted by the Katholieke Universiteit Leuven in Belgium, the genebank has more than 1,500 accessions. Most of them are cultivars. The others are breeding material, including improved hybrids, and wild relatives, including DH Pahang, the accession that was used for sequencing the Musa acuminata genome.

Most accessions in the genebank are held in trust for the benefit of future generations. They are conserved under the conditions of an agreement signed between Bioversity and the Governing Body of the International Treaty on Plant Genetic Resources for Food and Agriculture (PGRFA), thereby placing these materials in the Multilateral System of Access and Benefit Sharing.

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History

The ITC was established in 1985 by INIBAP. At the time, the acronym stood for the INIBAP Transit Centre. INIBAP was replaced by International when INIBAP and IPGRI changed their name to Bioversity at the end of 2006.

At the time of the genebank’s establishment, quarantine regulations to prevent the introduction of viruses in areas where they were absent were putting a constraint on movement of plant material. By the late 1980s, however, the ITC had become the hub for the safe movement of Musa germplasm anywhere in the world thanks to the implementation of a system for indexing its accessions for the presence of viruses. Only accessions that have been indexed as free of viruses are distributed.
The ITC was initially set up with material from several banana collections such as the ones maintained by CIRAD in Guadeloupe, FHIA in Honduras; IITA in Nigeria; IRAZ in Burundi and CATIE in Costa Rica. A number of INIBAP-sponsored collecting missions, such as a series of collecting missions in Papua New Guinea in 1989 and 1990, also contributed to its holdings.

In 1993, however, the coming into force of the Convention on Biological Diversity (CBD), which affirmed the sovereign rights of nations over their genetic resources, led several countries to withhold the export of plant genetic resources for food and agriculture. To ensure that the accessions contained in collections assembled before 1993 remained freely available to all, the Centres of the Consultative Group on International Agricultural Research (CGIAR) signed an agreement with the Food and Agriculture Organization of the United Nations (FAO). Under this agreement, the Centres of the CGIAR hold the designated germplasm in trust for the benefit of the international community and cannot claim legal ownership nor can they seek intellectual property rights over it or related information. In 1994, the ITC became part of the International Network of ex-situ genebanks following the signature of an agreement between Bioversity (then IPGRI) and FAO.

Storage conditions

In vitro
Each accession is represented by 20 shoot cultures (tissue-culture plantlets) kept on nutrient medium in continuous light conditions at 16°C. Even though the temperature and lighting are kept at a minimum to slow down the growth process, the plantlets eventually outgrow their test tube. As a consequence, each accession is re-cultured once a year on average. After a number of years, new plantlets are cultured using material grown out in the field to control for the risks of somaclonal variation (altered characteristics in plant tissues that have been kept in test tubes for an extended period of time).

Cryopreservation
To ensure the long-term conservation of the collection, the accessions are also cryopreserved, that is frozen to the temperature of liquid nitrogen (-196°C). Cryopreservation arrests both the growth of plant cells and all processes of biological deterioration, so that the material can be preserved indefinitely and resuscitated into fully viable banana plants should the need arise. As yet further insurance, a duplicate set is being deposited for safe-keeping at the French research institute for development (IRD) in Montpellier, France.

Accessing or depositing material
The accessions that have been indexed virus negative are available upon request and can be ordered online. The material is distributed under the terms and conditions of a Standard Material Transfer Agreement (SMTA) of the Multilateral System of Access and Benefit Sharing of the International Treaty on Plant Genetic Resources for Food and Agriculture.

The material (usually five samples per accession) is sent as proliferating tissue cultures (multiple shoot clusters suitable for further multiplication and/or regeneration into plants) or in vitro rooted plantlets ready for soil planting. For a wide range of accessions, 50 mg of freeze-dried leaf tissue harvested from a greenhouse plant are also available. The average delivery time, from the time the necessary documents have been approved, varies from 2 months for proliferating tissues, to 4 months for rooted plants and 2 weeks for lyophilized leaves. The material is accompanied by a
It is also possible to send germplasm to the ITC for safety duplication and sharing with the research community or other interested parties.

**Impact assessment study**

A 2010 study evaluated the impact of the ITC over its first 25 years of operation[12]. The study analysed the genebank's operation costs and evaluated its performance in terms of service provided to the users and standards maintained in the genebank operations. The purpose was to provide baseline information for developing a strategy for rationalization of its operations.

An impact assessment brief presents the main findings and recommendations made by respondents to improve the ITC and its services[13].

**References**

1. At the ITC, an accession is a set of tissue-culture plantlets derived from the same plant. Each accession has a unique identification number.
2. First glimpse at the banana genome in the July 2012 issue of InfoMus@
3. Website of the International Treaty on Plant Genetic Resources for Food and Agriculture
8. InfoMus@ news on the ITC's black box, Svalbard by the Mediterranean
9. Contact details of ITC curator
10. InfoMus@ news on Ordering bananas online
11. Section on the SMTA on the International Treaty website

**See also on this website**

Related news and blogs
- Svalbard by the Mediterranean
- The workings and impact of a world-class collection
- Ordering bananas online

External links

Contact details of the ITC
How to order ITC accessions from MGIS

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