Curso AT0607 Grupo AT05J-CARDONA
2025-11-12 Practical field activity
Activities to be carried out at the *Musa* spp germplasm bank in Zabaletas-rio Dagua

Context. *In vivo in situ* germplasm banks focus on conserving genetic diversity directly within living plants and their natural ecosystems. These banks are especially valuable for preserving traditional crop varieties, wild relatives, and culturally significant species in collaboration with local communities.

Title.

Collection and establishment of an in vivo in situ germplasm bank of sections of the genus Musa spp. present in the Valle del Cauca Pacific region. Undergraduate Thesis, Universidad del Pacífico, June 17, 2024.

Author(s): Livis Gicela Grueso Díaz/Carlos Emiro Arboleda Riascos/ José Omar Cardona Montoya

Livis Gicela Grueso Díaz's work focuses on the collection and establishment of an in vivo in situ germplasm bank of Musa spp. in the Pacific region of Valle del Cauca, aiming to conserve genetic diversity and support agroecological resilience. This initiative, documented in her 2024 monograph for the Universidad del Pacífico, integrates biotechnological tools and participatory methods to safeguard banana biodiversity in one of Colombia's most ecologically and culturally rich regions.

In vivo in situ germplasm banks focus on conserving genetic diversity directly within living plants and their natural ecosystems. These banks are especially valuable for preserving traditional crop varieties, wild relatives, and culturally significant species in collaboration with local communities.

Activity to be carried out on the date (2025-11-12). Based on the planting map created by Livis Gicela Grueso, each accession (collected material) will be marked. Activities:

1. Marking and labeling each of the accessions present (to date) in the germplasm bank.

2. Delimiting the area of the germplasm bank.

3. Eliminating the temporary bank; that is, eliminating the plants initially collected if they have developed suckers.

Objectives of the Germplasm Bank

- Conserve genetic diversity of Musa spp. through live collections and habitat-based strategies.
- Establish a DNA bank to complement morphological characterization with molecular data.
- Facilitate rapid phenotypic discrimination using highly heritable descriptors visible across environments.
- Support agroecological innovation and food sovereignty in local communities.

Collection and Establishment Activities

1. Field Collection. Completed.

- Targeted sampling of wild and cultivated *Musa* spp. across diverse agroecosystems.
- Use of morpho-taxonomic descriptors for initial classification.
- Documentation of local names, uses, and cultivation practices.

2. In Vivo Conservation. In progress.

- Establishment of living plots in controlled and community-managed settings.
- Maintenance of agronomic and phytosanitary conditions to ensure viability.
- Monitoring of growth, flowering, and fruiting cycles.

3. In Situ Conservation

- Collaboration with local farmers and indigenous communities to protect varieties in their natural or traditional habitats.
- Promotion of on-farm conservation and seed exchange networks.
- Integration with territorial planning and biocultural conservation strategies.

4. Genetic Characterization. In progress

- Collection of leaf samples for DNA extraction and molecular analysis.
- Use of markers to assess genetic variability and relationships among accessions.
- Creation of a DNA repository for future research and breeding.

5. Data Management and Accessibility

- Development of descriptor sheets and digital records for each accession.
- Alignment with platforms like the Musa Germplasm Information System (MGIS).
- Facilitation of educational and research access to the germplasm bank.

Core Activities in In Vivo In Situ Germplasm Banks

1. Participatory Inventory and Documentation (Completed)

- Identification of local landraces, wild relatives, and culturally important species.
- Recording traditional knowledge, uses, and management practices.
- Mapping populations and habitats using GPS and community input.

2. Ecological Monitoring and Adaptive Management (Completed)

- Tracking phenology, population dynamics, and ecological interactions.
- Assessing threats (e.g., habitat loss, climate change, invasive species).
- Developing adaptive protocols for conservation and sustainable use.

3. On-Farm Conservation and Agroecological Support (In progress)

- Strengthening traditional farming systems that maintain genetic diversity.
- Promoting polycultures, seed saving, and agroforestry practices.
- Supporting farmer-led innovation and varietal selection.

4. Genetic and Morphological Characterization (In progress)

- Conducting field-based assessments of traits (e.g., drought tolerance, yield).
- Collecting samples for molecular analysis when appropriate.
- Comparing diversity across sites and management systems.

5. Community Agreements and Governance

- Establishing local norms for access, benefit-sharing, and stewardship.
- Facilitating intergenerational transmission of knowledge.
- Supporting community seed banks and exchange networks.

6. Education, Outreach, and Capacity Building (In progress)

- Organizing workshops, field schools, and intercultural exchanges.
- Creating educational materials in local languages.
- Training youth and farmers in conservation techniques.

7. Integration with Protected Areas and Policy Frameworks (In progress)

- Aligning with biosphere reserves, indigenous territories, and conservation corridors.
- Advocating for recognition of biocultural heritage in legal frameworks.
- Linking local efforts to national and international conservation strategies.

Core Activities in In Vivo In Situ Germplasm Banks

1. Participatory Inventory and Documentation

- **Identification of local landraces, wild relatives, and culturally important species.** Labeling and marking of accessions: **Activity to be carried out.**
- Recording traditional knowledge, uses, and management practices.
- Mapping populations and habitats using GPS and community input.

2. Ecological Monitoring and Adaptive Management

- Tracking phenology, population dynamics, and ecological interactions.
- Assessing threats (e.g., habitat loss, climate change, invasive species).
- Developing adaptive protocols for conservation and sustainable use.

3. On-Farm Conservation and Agroecological Support

- Strengthening traditional farming systems that maintain genetic diversity.
- Promoting polycultures, seed saving, and agroforestry practices.
- Supporting farmer-led innovation and varietal selection.

4. Genetic and Morphological Characterization

- Conducting field-based assessments of traits (e.g., drought tolerance, yield).
- Collecting samples for molecular analysis when appropriate.
- Comparing diversity across sites and management systems.

5. Community Agreements and Governance

- Establishing local norms for access, benefit-sharing, and stewardship.
- Facilitating intergenerational transmission of knowledge.
- Supporting community seed banks and exchange networks.

6. Education, Outreach, and Capacity Building

- Organizing workshops, field schools, and intercultural exchanges.
- Creating educational materials in local languages.
- Training youth and farmers in conservation techniques.

7. Integration with Protected Areas and Policy Frameworks

- Aligning with biosphere reserves, indigenous territories, and conservation corridors.

- Advocating for recognition of biocultural heritage in legal frameworks.
- Linking local efforts to national and international conservation strategies.