AGRICULTURAL UNIVERSITETY OF TIRANA

CENTER FOR GENETIC RESOURCES

Tiranë,2015

Introduction

Center for Gene Resources (CGR) is the national center for coordination of all the activities in the field of conservation and management of plant genetic resources (PGR). CGR is relatively a new institution based on a contemporary legal framework, adequate infrastructure and it realizes the implementation of international standards for plant genetic resources.

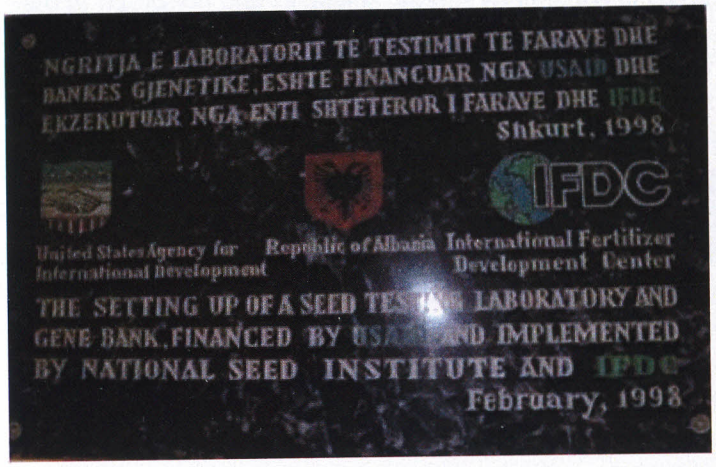
In the law "On propagating plant material" and other acts and directives, the Gene Bank is clearly defined as a scientific research institution of a national importance.

The Gentic Resources Centre (GRC) is represented by a professional staff with high scientific qualifications, which are trained in well-known European institutions for the plant genetic resources. It is focused on creating collections through *ex-situ* conservation and appropriate management for the preservation of the genetic resources *in-situ* and in field collections.

It aims to promote the conservation and sustainable use of the plant genetic resources for agriculture and food. For such a reason, joint programs are coordinated between the Agricultural University of Tirana and the Ministry of Agriculture and Food.

1. The historical development of Genetic Resources Center

The Center for Gene Resource (Gene Bank) was established in 1998, as part of the National Agency for Seeds and Seedlings (NASS). It was set up with the financial support of USAID, USA



and with the technical assistance of Mississippi State University. They provided the equipment, installation and testing of the infrastructure according to the Gene Banks standards. At the same time they trained the technical staff to qualify their skills for meeting the criteria on seed treatment protocols, storage and evaluation of the genetic material. The Gene Bank assured the functioning of the laboratories in compliance with the working operations and the implementation of the Standard Manual *(Genebank handbook IBPGRI 1994)* unified for all the institutions which have the status "Gene Bank".

The Gene Bank came into contacts with important organizations such as the International Plant Genetic Resources Institute (IPGRI), as well as different other institutions and various experts for implementation of working programs in

accordance with the priorities which included short-term, medium and long-term goals.

At the beginning, it was evaluated and identified the state of plant collections and was ensured the support for the repatriation of the Albanian plant genetic resources, which were previously collected in Albania by foreign scientists and preserved in their gene banks. A significant contribution for the establishment of the Gene Bank is given by Mrs.Merita Spahillari.

The Albanian Gene Bank (GB) had a huge support and assistance of the international experts, as Prof. Karl Hammer.

In the period 1999 – 2006, the GB has functioned as part of NASS and was represented by Dr.Adriatik Çakalli. In 2006, Gene Bank passed under the authority of the Agricultural University of Tirana and in 2008; it was established as Scientific Research Centre for Genetic Resources, including the former Orchard Station.

For the period 2008-2014, Director of the Centre was Prof. Dr. Halit Sulovari, who has contributed to the organization and its optimal functioning.

A valuable contribution to the collecting, vonservation and use of the plant genetic material in Albania is given by the Academic Prof.Mentor Përmeti. He worked over 40 years on breeding wheat cultivars and in 2001, he donated to the Gene bank his wheat collection which actually is at the disposal of the breeders.

For the significant contribution on increasing of genetic resources collections, it is worth mentioning of Prof. Lufter Xhuveli, especially for his engagement on joint expeditions with foreign experts carried out in our country. Also, valuable contribution regarding the identification, collection and preservation of plant genetic resources in the country is given by well-known experts as: Niko Qafëzezi, Hysen Laçej, Hysen Çobani, Adem Salillari, Eqerem Meçollari, Milto Hyso, etc.

2. The mission, structure and functions of GRC

The mission of the GRC is collecting, preservation and sustainable use of the plant genetic resources.

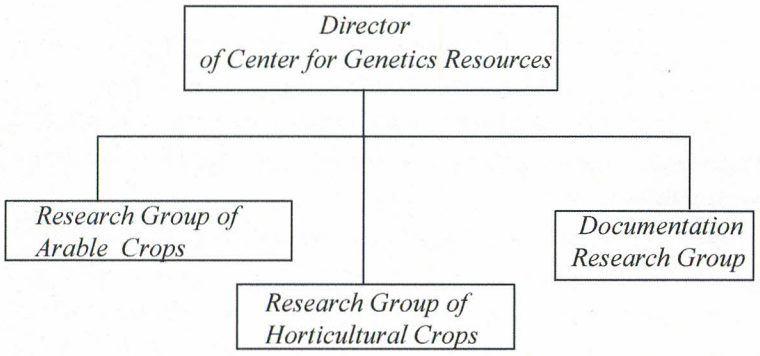
It is responsible to accomplish the following tasks:

- Exploring, collecting, regeneration, multiplication, characterization, evaluation, study and conservation of the autochthonous and created genetic resources of the country.
- Inventory of the agricultural plant species originating local at risk of disappearance and evaluation of their state.
- Establishment of a national database for all the species of plant genetic resources originating local or authochthonous.
- Preservation of the genetic resources in their original locations and away, ex-situ, in-situ, in-vivo and in-vitro.
- Identification and evaluation of plant genetic resources at bio-morphologic, biochemical and molecular level.
- Establishment of field collections to preserve the authochthonous plant genetic resources.
- Coordination of the activities with the national programs for the research and development, the central institutions and regional projects in the field of genetic resources.
- Organization of the inventory, documentation, computerization and publication of plant genetic resources.
- Scientific research in the field of the genetic resources and their genetic improvement.
- Cooperation and exchange of materials and information with the scientific institutions within the country and abroad in the field of plant genetic resources.

2.1 Organizational structure and infrastructure

The Genetic Resource Center has in its composition a group of experts with experience in various disciplines in the field of agriculture, especially for plant production. Experts and academics are engaged in scientific research as well as teaching.

The structure of GRC is given below.



2.2 Infrastructura of GRC

a) *Laboratories*

· **Laboratory for acceptance and processing of seed**, for acceptance, cleaning and control of plant material, control of accompanying documentation, measure of moisture and germination capacity, packaging and preparation for conservation/storage.

· **Laboratory for characterization and evaluation of germplasm** included the laboratory of electrophoresis for evaluation/assessment and identification of the collected material.

· **Laboratory for germplasm conservation,** for long-term storage in the store room provided with a cooling system securing conservation of the base collection (seed) at -20°C for over 50 years.

· **Laboratory "in vitro",** for short-term storage (or alternative) through the slow growth of plant crops (manipulation of the artificial nourishing terrain) aims to achieve the preservation of the cultures which can not be stored at temperatures below 0°C

· **Laboratory for active collection** consists of refrigerated rooms for conservation of active collection (seed material) at the temperatures from 0 - 5°C and storage period up to 10 years.

b) Ex-situ Collection of Center for Genetic Resources Center

GRC applies modern international standards for the management of genetic resources. Valuable genetic resources stored in GRC are treated, processed and evaluated according to the standards recommended by the International Board

for Plant Genetic Resources (*Gene bank Handbook, IBPGRI 1994).*

Base collection. Once the genetic material (seed) enter in genebank it is checked over, processed, tested for the level of its quality indicators. (germination capacity), when moisture content in seed is decreased to 3 - 7% (according to species) then it is approved to deposit it in storage, determining at the same time the type of storage. The storage conditions for the material (seed) are provided in a dark room with a cooling system (deep freezers) at the temperature -20°C being stored in double envelopes (paper cardboard material), anti-humidity and aluminum ones.

GRC host a plant collection which is obtained and collected over the years in cooperation and with the contribution of various former research institutes within the country and other donors.

Base Collection consists of different species such as cereals, vegetables, fodder, industrial plants, medical and aromatic plants, etc.

This collection represents 45 genus and 69 different species and constitutes the base collection of the Gene Bank. The main part of this collection consists of cereals, medicinal and industrial plants, vegetables and fodder. 70% of the total number of the accessions in the Gene Bank is represented mainly by authochthonous genetic material.

Active collection consists of a refrigerating room for storage of seed material at a temperature of 0-5 °C. This collection serves as source material for breeder's needs and research institutes, also to exchange with the other homologous gene banks.

Field collections of fruit trees is located on the plot of GRC in Valias consist of cultivated species in our country, which are subject to a continuous monitoring process.

3. The conservation on ex-situ and in-situ collections

3.1 The collection of the genetic material from the research institutes

In 1998, it was organized several meetings with the specialists of genetic improvement and the research institutes of the country. Among the short-term objectives, there was to collect and put in emergency storage in the bank the greatest amount of the country germplasm in danger of disappearing. For this purpose, it was secured the support for the multiplication of the genetic material in these institutes and its deposition in the Gene Bank. The main contributors were Lushnja Research Institute and the Institute of Maize and Rice in Shkodra. Contribution was also given by the Researche Institute of Fushe Kruja and the Experimental Station in Korca.

3.2 Repatriation of genetic material

In the cooperation with international organizations such as IPGRI and the Gene Bank of Gatersleben, Germany, it was assured the repatriation of the genetic material (seed), which was put at the disposal of the research institutes for its replication/multiplication and fulfillment of their needs as well as its depositing in the Genetic Bank.

This contingent consisted of 468 accessions of different plant species.

Out of the repatriated contingent, it was available for regeneration:

- The Institute of Vegetable and Potato, 166 accessions representing 44 species of vegetables;
- The Agricultural Research Institute Lushnje, 197 accessions (wheat and leguminous).

- The Forage Institute, Fushe Kruje 105 accessions.
- The Genetic Bank put in long-term storage 105 accessions.

3.3 Improvement of the legal framework

The main commitment has been the strengthening of the State System of plant genetic resources conservation through consolidation of the Genetic Bank role as a structure of national importance.

- Improvements were realised in the law "On the herbal plant material" and the law "On the protection of biodiversity".
- It was approved the regulations for the functioning of the Gene Bank, the Coordination Council, the collections, etc.

3.4 Improvement of the infrastructure

For the achievement of the contemporary standards for the collection and conservation of the genetic material, the Gene Bank has expanded its premises and new forms of plant conservation are being applied. Some of the achievements are:

- The establishment of the laboratory "in vitro"
- The expansion of laboratory for base collection
- The creation of the active collection
- The establishment of fruit-trees field collection
- The establishment of the conservation network of the genetic resources *"on farm"*.

3.5 Cooperation with other institutions

CGR has expanded its activity for the conservation of the genetic resources by increasing inter-institutional cooperation.

· In 2003, it was held the national conference "For an improvement of institutional cooperation in the conservation of plant genetic resources", with the participation of stakeholders

nationwide concerned in the field of genetic resources.

· In 2008, it was reached a Cooperation Agreement between the Ministry of Agriculture and the Agricultural University of Tirana "For the management of plant genetic resources".

· In 2008, a joint commission of the Ministry of Agriculture and AUT carried out the inventory and the documentation of the National Inventory of the genetic resources in ex-situ conservation in the Genetic Bank and the ATTC-s.

· In 2009, a training course was conducted by the genetic resources experts of NordGen, with the participation of the curators of the Genetic Bank and the ATTC-s.

· A significant number of specialists from the Genetic Bank and ATTC-s were trained in different Gene Banks in Europe.

· There has been a good cooperation between the Gene Bank and ATTC-s for the organization of joint activities, the coordination of the work dealing with the genetic resources and avoiding of duplication of parallel activities in explorations and collections.

3.6 Participation in projects

To achieve its objectives, the Genetic Bank has played an important role in the implementation of some projects which had a significant impact in its activity.

Biodiversity Project "Collection, study, categorization of the plant genetic resources and the conservation of germplasm in cereals, vegetables, fodder and fruit trees", realised in 1999 and financed by the Ministry of Education and Science (MES).

In this project, as result of the cooperation of all the research institutes in the country, it was made possible the

collection of a great amount of genetic material and its hosting in the Gene Bank collection for long-term preservation period.

It was put in storage the genetic material of various species from 1766 accessions (seed samples) of cereals, vegetables, fodder, industrial plants, etc.

Agricultural Services Project (ASP) was financed by the World Bank and enabled for:

a) The establishment of the laboratory "in-vitro" by the Genetic Bank.

b) The establishment of several cold storage facilities in the research institutes in Shkodra, Lushnje and Fushe-Kruje.

c) The exploration of the most important areas of high diversity of medicinal and aromatic plants.

In these missions were collected a contingent of 361 accessions and their deposition for long-term preservation.

. **Regional Project (SEEDNeT 2005-2011)** funded by SIDA (Swedish International Cooperation Agency). The project involved a wide number of specialists and it realised some very important objectives related to the collection and conservation of plant genetic resources.

SEEDNET Project was part of European Program for the Balkan region "Network for the Development of the Genetic Resources in South East Europe", led by the coordinator Dr. Eva Thorn.

Some of the activities realised by the project SEEDNet.

- Improvment of the legal framework in relation to the conservation of plant genetic resources;
- Realisation of efficient national programs for the treatment of genetic resources.
- Identification of the national inventory for the conservation of plant genetic resources;
- Exploration and collection of autochthonous genetic

resources of specific value.

- Conservation of the genetic resources in ex-situ, in-situ and in-vitro formats and preservation by the farmer.
- Characterization of the genetic material collected.
- Establishment of a documentation and computerization system at national level.
- Short- and long-term trainings of the specialists dealing with resource conservation activities.
- Provision of the laboratory processing the seed with equipments.
- Meetings and public awareness (meetings, seminars, publications, publishings, etc.).
- Establishment and functioning of the working groups according to the crop group.
- Participation of the Albanian researchers in regional meetings of the working groups and in the Steering Committee meetings.

Some aspects of meetings in the framework of SEEDNet project.

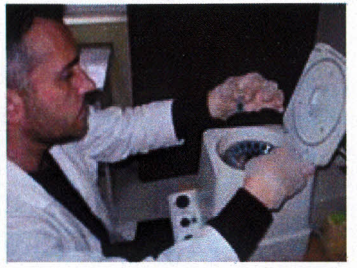
· **FAO Project TCP 34/01 (2013-2014)** for the collection of the genetic resources was the only financial support in this period. In the working groups have participated researchers of the CGR and of ATTC to the project implementatuion.

The objects of the collection have been: vegetable plant species, medicinal and aromatic plants and fruit trees species. For this purpose recently, three collection groups were

organized. They collected a total of 507 samples of the species mentioned above, among them 166 old cultivars, the forms and biotypes in fruit trees and vine, which belong to 10 important fruit trees species.

- **Project HIGHERKOS, Austria (2013-2014).** "Analysis of *Fusariumne ear rot"* on different maize genotypes in Kosovo and Albania". (2013-2014), supported by University of Natural Resources and Life Sciences, Vienna.

- **Project (RESFAN), (2013-2014).** " "Screening the viral health status of the local Vitis germplasm of Kosovo and Albania" HigherKos – Research Cooperation and Networking between Austria, Kosovo and the Western Balkan Region".



3.7 Documentation and computerization

Documentation of plant genetic resources is an instrument which creates optimal conditions for their effective use and management, increasing the value of this valuable asset.

Before using the plant genetic resources, it is necessary to know their characteristics and the value of usage. Their can be achieved through passport descriptors (indicators), characterization and evaluation data.

Our agricultural research institutions previously didn't have a unique system for registration of plant genetic resources data. Even in those cases, the passport descriptors were not properly used.

With the implementation of the passport descriptors list for many plants (Multi-crop passport descriptors MCPD), it is unified the standard facilitating the information exchange of plant passport data.

The information on genetic resources in CGR is mainly provided on the basis of documentation of collecting data, which also includes collection data management.

Passport data are reflected on-line in the European Catalogue EURISCO. While a part of the passport data, with collection data (inventory) are inserted in SESTO system.

The database of CGR is storing the National Inventory (which includes the GeneBank data and also other data