The current state and documentation of plant genetic resources in Albania

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Albania lies in the south-eastern part of Europe, in the western part of the Balkan Peninsula, along the Eastern coast of the Adriatic and Ionian seas, between latitude 42°39'N and 39°38'N and longitude 21°40'E and 19°16'E. It has a surface area of 28,748 km^2, of which 27,400 km^2 are lands categorized as 25% plains, 47% hills and 28% mountains. Albania is mainly a mountainous country where mountains and hills occupy 76.6% of its territory. The average altitude of Albania is 708m above sea level. Albania is included in the Mediterranean climate zone with a relatively short and mild winter in the lower seacoast area, large amounts of rain in the northern part and long, hot, very dry summers. The eastern part of the territory is under the influence of continental air streams.

Amantia Oil mill (in Vlora, Albania). It is about 650 years BC. Photo ©Hairi Ismaili.

Albanian biodiversity: Albania, owing to its Mediterranean geographic position, its mountainous lands and its very changeable climate, is characterized by a rich ecosystem of diversified flora. It has a considerable number of primitive cultivars, native populations and wild species. Primitive cultivars and native populations are mainly cultivated in farmers' gardens in the most remote mountain villages in the country. Albania is a country with extremely rich plant biodiversity, including wild relatives of cultivated crops. Studies carried out into Albanian flora have identified about 3,250 species of plants in the country, representing 29.5% of the 11,000 types of plants identified in Europe, with a density of 113 kinds per 1,000 km^2 of land area.

Genetic erosion: As a result of long-term anthropogenic influence and the uncontrolled movement of populations from rural zones to major urban centres in Albania, some large territories of natural ecosystems have been degraded with considerable tracts of agricultural land remaining uncultivated and the loss of old, local forms of genetic resources. During nearly half a century of centralized economy, a great number of cultivated plant populations were lost through cultivating new varieties created in Albania or introduced from new ones from abroad, Agriculture is dominated by small, fragmented farms (0.25 to 1.13 ha). The fragmentation of agricultural land brings with it a number of difficulties for the management and coordination of genetic resources.

Bylis Oil mill in Hekal of Mallakstra (Albania). It is about 150 years B.C. Photo ©Hairi Ismaili.

Since 1995, there has been a noticeable trend in Albania for cultivating foreign cultivars and hybrids. This trend, coupled with the movement of the human population from rural to urban areas, has led to reduced cultivation of old

populations and cultivars, thus seriously threatening their existence, or in other words, being subject to genetic erosion. This phenomenon is principally assessed as the primary cause for the loss of a great number of landraces. Today, genetic erosion is critical in Albania. This genetic erosion has affected almost all cultivated plants, in particular wheat, maize, forages, legumes, fruit trees and especially medicinal and aromatic plants and their wild relatives.

Roost-hutch used for conservation on farm. Photo ©B. Gixhari.

In this regard, the need to preserve the major genetic resources of plants was the incentive for the creation in 1998 of the first seed collection bank of plant genetic resources (PGR) which is the Albanian Genebank (AGB). The Albanian Genebank's main activity is the collection and *ex situ* conservation of wild growing relatives of domesticated plants. At present the AGB maintains more than 2,700 accessions of cultivated, landrace and wild plants. The majority of the accessions stored are represented by landraces and improved cultivars.

The status of *ex situ* collections: *Ex situ* collections are created with genetic materials represented by native cultivars, populations and ecotypes that have been created, preserved and used through generations of Albanian people; introduced genetic materials; lines and cultivars created within the country; and spontaneous flora of the country that has been identified, researched, collected and conserved by research institutions. *Ex situ* conservation of PGR is carried out through three forms of collection: the *ex situ* base collection, the *ex situ* field collection, and the active, working collection. Base collections, for all plants reproducing by seeds, are maintained in the AGB. Two *ex situ* field collections (Tirana and Vlora) include more than 300 autochthonous forms, which serve as duplicates of the most important fruit trees, grapevine, olives, citrus, and some of the underutilized vegetative and wild species. Active and working collections are presently stored in institutional genebanks, which are located in the Agricultural Technology Transfer Centres (ATTC). The institutional genebanks are serving as potential storage centres of genetic materials.

Collecting mission: Sorghum bicolor, local form. Snosan, Gramsh, Albania. Photo ©B. Gixhari.

Prevention of genetic erosion: In order to meet increasing needs of agricultural research with the objective of genetic improvement of cultivars, some collecting missions have been organized over the last ten years. During these collections, very abundant diversity within species has been identified and interesting plant populations have been selected. More than 500 various local populations were found within arable crops and wild species, which have never been collected before or are being recollected because they have been lost. To prevent genetic erosion, the AGB has launched a national initiative to inventory and evaluate the genetic variability of underutilized plants and wild species. In Albania, there has never yet been a wide institutional inventory and survey of underutilized and wild plants for food production. And yet, through these collecting missions, carried out in selected areas in the country,

valuable authentic materials can be obtained and collected. These materials can be used directly by introducing them to production for cultivation or as initial materials in the work programmes for genetic improvement of variety cultivars.

Documentation of Plant Genetic Resources

Passport data: The AGB, established in 1998, is responsible for storing and updating the National Inventory (NI), which is a register of PGR. Documentation of PGR in AGB includes data on: exploring and collecting missions; registration and acquisition; conservation and regeneration; characterization and evaluation; duplication and distribution; and genebank rules and methodologies, etc. All accessions accepted and stored in the genebank (more than 2,700 accessions) are described by principal passport descriptors. Passport data are recorded in the electronic database in *Excel* and *Access* format according to the international standards developed jointly by International Plant Genetic Resources Institute (IPGRI)[1] and the UN Food and Agriculture Organization (FAO), including additional descriptors added for the specific purposes of EURISCO. The Albanian NI database of PGR includes 2,111 accessions and it is present in the EURISCO catalogue (http://eurisco.ecpgr.org). A part of the accession database (nearly 1,800 accessions) is present in SESTO system (http://seednet.geminova.net/). The Albanian genepool data will be available on the website of the Albanian genebank (http://www.bgj.ubt.edu.al) still under development. In the future, the Albanian genebank is planning to implement GRIN-Global (genebank management system) (http://www.grin-global.org/index.php/Main_Page#The_GRIN-Global_Project) and, through EURISCO, link to Genesys (www.genesys-pgr.org) as a global platform for PGR.

Regeneration is the main goal for AGB, in collaboration with ATTC, at this time, since several accessions need regeneration and characterization. During the regeneration process, international standards of regeneration are followed and the biological requirements of individual species are taken into account. Regeneration data are documented manually and computerized entering information in the *Excel* and *Access* databases.

Characterization and evaluation: Today, AGB and agricultural institutions that collect, maintain, store, research, use and distribute germplasm of PGR with which they are working, have carried out

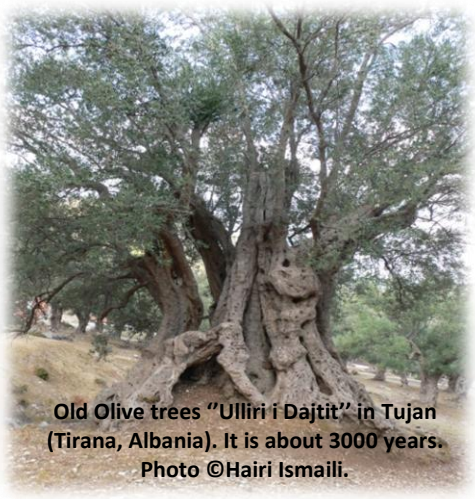
Field regeneration of the Albanian genebank. Photo ©B. Gixhari.

[1] Since 2006, Bioversity International is the operating name of the International Plant Genetic Resources Institute (IPGRI) and the International Network for Improvement of Banana and Plantain (INIBAP).

characterization and evaluation of respective germplasm. Characterization and evaluation of plant genetic resources is made using IPGRI descriptors and protocols and the data are documented manually and computerized entering information in the *Excel* and *Access* databases.

Diversity of Albanian National Inventory in EURISCO: The Albanian NI in EURISCO includes passport data of the 2,111 accessions. Passport data for the remaining accessions is ongoing and will be uploaded very soon. The Albanian NI of PGR in EURISCO presents a large range of diversity: 33 genus, 62 species, 2,111 accessions and 25 descriptors. More than 54% of the NI is collected materials, 61% of genetic materials collected in the last decade have geographic data. Most accessions (65%) collected on farms and in cultivated habitats have the biological status 'landraces'. The rest (35%) have 'wild or semi-wild' biological status and were collected all in wild habitats.

Use of germplasm in crop improvement: Plant genetic resources stored in AGB are used in two main ways: as populations of initial material in plant breeding programmes, and directly as cultivars cultivating them in wide production for fulfilling food needs. Movement of germplasm from its conservation and management units to its users is limited because users of germplasm (farmers) are also its possessors and consequently movement is not recorded. Lately in the AGB procedures have been developed for documenting movements of germplasm. There are not considerable movements of germplasm from this genebank. This is because most of the plant germplasm conserved in the AGB is stored under ''base collection'' conditions.



Old Olive trees ''Ulliri i Dajtit'' in Tujan (Tirana, Albania). It is about 3000 years. Photo ©Hairi Ismaili.