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Issues of *ex situ* plant diversity conservation in Albania

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Summary

The objective of this study is to provide information about the current situation of the plant diversity preservation in Albania, focusing on the *ex situ* conservation of the wild and cultivated plants. Until 1990 about 1,600 wild species, 587 cultivated species with nearly 20,500 accessions were preserved. This study deals with the main reasons that make *ex situ* plant conservation in Albania a necessity for the future. It covers an analysis of the relevant current issues and also the future action plan which targets both, on the establishment of a national body of representatives from the concerned institutions of germplasm preservation and on the formulation of the Albanian *ex situ* plant preservation strategy as an alternative and supplement to the *in situ* conservation.

Key words: Albanian biodiversity, genetic resources *ex situ* and *in situ* conservation.

1. Introduction

Albania is a mountainous country with sharp-edged slopes, rivers that cross the country from east to west by wide canyons, a mostly rocky seashore, a small flat area (23.4 % of the territory is up to 200 m high) and a geographic and climatic crossroad; all these factors determine the flora distribution and rich vegetation of Albania. The same factors make the study, administration, protection and preservation of that wealth very difficult and they also, in particular for climate and soil variation, ask for the creation of diverse conditions for the protection and conservation of species. If we add the social and economic problems that Albanian people have faced through history, the situation gets complicated.

This paper has been carried out to inform about the existing situation on conservation of the wild and cultivated species; to argue over the necessity of the *ex situ* plant conservation in Albania, showing the ways of its functioning.

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2. The plant diversity conservation in Albania

With reference to the National Report on "Biodiversity Strategy and Action Plan", *in situ* conservation can be achieved in the Protected Areas (PA), which cover 5.8% of the national territory. As regards the *ex situ* conservation, the above report states: "Up to now there do not exist *ex situ* conservation practices of threatened wild plant and animal species. The Botanical Garden offers an opportunity that should be taken in the future".

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The Botanical Garden of University of Tirana has so far conducted the conservation of wild plants.

It was established by virtue of government decision in 1965, which stated: " Aiming at setting up an important resource center for the introduction of the Albanian and foreign plants that absolutely have economic and scientific values, willing to make the teaching of biology and agriculture concrete and conduct also research on the acclimatization and improvement of useful plants, the Council of Ministers decided to establish the Botanical Garden on an area of 15-20 ha".

The Botanical Garden was visioned to be established in two phases. The "first phase", which started in 1965 and ended in 1971, is known as the foundation period of the Botanical Garden. It was open for the public in the same year. Since it was the only Botanical Garden in the country, the botanists were of the opinion that mainly Albanian flora should be preserved there. The first project (in 1966) envisaged nearly 3,000 species to be planted in the concentrated parcels. From 1966 until 1970, there were about 1,200 herbaceous species and 210 tree and shrub species. The latter were taken from the natural habitats as living plants, whereas the herbaceous plants were mostly seeds.

In addition to the *in vivo* conservation, a seed conservation sector operates in the Botanical Garden. Not only are the seeds collected from the plants grown in the Botanical Garden's territory over the past years preserved there, but also many seeds collected from the natural habitats. Seeds are stored in laboratory conditions without any special treatment.

In 1980 the Botanical Garden issued "*Index Seminum*" giving information on 627 species. Over the period 1981-1990, nearly 4000 seed lots were

delivered to foreign botanical gardens which were never contested in terms of their scientific accuracy and quality.

Since there was no other Institution specialized in the introduction of ornamental plants in Albania, the Botanical Garden was unique even in that field. Until 1990 ornamental plants were represented by nearly 800 varieties of about 400 species.

As stated above, the Botanical Garden's capacity, as envisaged in 1966, was never reached. Moreover, after the year 1990 it suffered severe damages that endangered its existence. Therefore, in a 30-year period the Botanical Garden was founded, then risked to disappear and finally was re-established. Today, in an area of 14 ha, having various relieves, the Botanical Garden is a potential Institution for the *ex situ* conservation of the Albanian plant resources and the introduction and acclimatization of foreign flora species. The establishment of the seed bank and the application of *in vitro* propagation methods further enlarge its capacity.

The genetic resources of cultivated plants are preserved at the agricultural research Institutions. Those genetic resources have played a major role in the agricultural research and particularly in the growth of the agricultural production. It is the result of dedicated and masterful work of the Albanian farmers over generations. The archeological discoveries certify the early tradition of the Albanians in agriculture. Our country is well known for the "Zhulica" wheat, the corn of Sulova, Reci and Mati, the tobacco of Postriba, Dumrea, alfalfa of Dibra, Gjirokastra, etc. The first surveys for the germplasm collection of cultivated plants were conducted by Gaqo Tashko in 1962, who collected some landraces of wheat. The collection was enriched by further surveys of M. Permeti, L. Xhuveli, etc.

Over the 90's the genetic resources of the cultivated plants contained a high number of accessions: wheat (10,000), corn (2,000), barley (500), vegetables (500), forage crops (600), grapevine (350), fruit trees (450). Of the above accessions, 10-12 populations of wheat, 11 of barley, 600 of corn, 155 of fruit trees and 15 of citrus were native.

According to a report submitted by L. Xhuveli in 1992, the number of species and related accessions preserved *ex situ* in the research Institutions are reported in Tab. 1.

The current plant genetic resources of cultivated species have suffered damages resulting from the recent changes in Albania. The most numerous losses were noted in 1997. The collections of some Institutions were severely damaged like the case of the Forage Research Institute in Fushe-Kruja and the Institute of Plant Farming in Vlora where the collections of

olive, vine and citrus, etc, were damaged. The collections of plants that are no longer cultivated in Albania like cotton, cauliflower, bean, rice, etc., have been damaged or have reached the critical point. The existing situation of the agricultural research Institutions is hard due to inadequate conditions of germplasm conservation; consequently, they risk losing their germinating power, thus bringing about increase of the genetic erosion which keeps the rates high in our country.

Tab. 1. Number of species and accessions conserved *ex situ* by scientific Institutions.

Institution	Number of species	Number of accessions
Agricultural University, Tirana	54	4276
Institute of Agricultural Research, Lushnja	17	10049
Institute of Corn and Rice, Shkodra	2	1567
Forage Research Institute, Fushe Kruja	22	518
Institute of Vegetables and Potato, Tirana	32	1200
Institute of Tobacco, Cerrik	1	480
Forest and Pasture Research Institute, Tirana	12	157
University of Korça	1	220
Institute of Fruit Trees and Grapevine, Tirana	25	1052
Institute of Olive and Citrus, Vlora	11	110
T O T A L	187	19629

The surveys made in Albania by the natives and foreigners show that a great part of the above accessions were saved also for being preserved in the genetic banks of the other countries. The surveys made by Mr. Hans Shtibe in 1941 are considered very important. The most active collection period was between 1993-1996, when the Agricultural University of Tirana cooperated with IPGRI, the Germplasm Institute of Bari and the Genetic Bank of Gatersleben, guided by K. Hammer, L. Xhuveli, G. Laghetti, P. Perrino, and D. Pignone.

3. *Ex situ* conservation: an alternative method to preserve the plant diversity

It would be ideal to conserve biodiversity by means of natural habitats undisturbed by human beings. Since it is ideal, ex situ conservation is impossible, moreover utopian. That's why it is believed that the alternative strategies based upon both *in situ* and *ex situ* methods, offer more effective solutions for germplasm preservation. Given the advantages of *in situ* conservation we'll give below the main reasons that make *ex situ* conservation a necessity in Albania:

the broken orography of the mountainous relief makes the current management of endangered habitats and species difficult;

the presence of small populations of endemic, endangered plants, etc.;

absence of complete and updated documentation on the status of endemic, endangered plants, etc.;

many communities that lived very close to nature in the past (their needs depended on natural products) suffer deep economic, social and cultural changes. They live a poor economic life and consider those nature products as their only living means;

privatization of land, forests and pastures leads to an unsound use of natural and scientific property;

the experience of the last ten years in natural property protection is pessimistic for *in situ* conservation;

the community is not sensitive to natural property protection because of the poor level of environmental education;

absence of effective structures for the implementation of legislation on biodiversity conservation;

the possibility of knowing these species and habitats increases, by creating an easily accessible model.

The main mechanism to preserve biodiversity and ecological functions as mentioned in "The Biodiversity Strategy and Action Plan" is the establishment and management of the protected areas. To this purpose we suggest that the protected areas should occupy 14% of the national territory by emphasizing their good administration. For *ex situ* conservation, it lays down the need to preserve the plants and animals in botanical gardens and zoos as well as to set up the genetic banks.

The Institutions in charge of *ex situ* conservation of plants depend on the Ministry of Agriculture and Food, the Ministry of Education and Science and the Academy of Science.

As clearly seen, the Institutions are not a few and they make up a network which has worked in a closed circuit so far. Our suggestions for its functioning are as follows:

setting up of a national board with representatives of the above Institutions

development of *ex situ* conservation strategies for plants in Albania including:

short and long-term objectives;

coordinated preservation of genetic resources;

training of technicians on the germplasm preservation;

establishment of a national data bank for the preservation of germplasm resources;

development of techniques for the re-introduction of wild plantsinto their ecosystems;

introduction of topics concerning the genetic resources in schoolnd university curricula and raising the awareness of the public onthe consequences of damages and losses of plant resources native to the country;

establishment of other botanical gardens in different phyto-climatic areas that have a great diversity.

4. Conclusions

Ex situ conservation of plants in Albania is a necessity in addition to *in situ* conservation.

The creation of a national board is imperative to work out the policies and strategies for *ex situ* conservation. The establishment of an institutional network for *ex situ* conservation in order to avoid the unnecessary overlapping should be a priority for the work of the national board.

The information and education of the community should be included in the working programmes of the Institutions being involved in the conservation of plant diversity in Albania.

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