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Chapter 2

Use of biodiversity

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Issues related to the protection and use of fruit tree and grapevine genetic resources in Albania

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Summary

Albania is the ancient home of early domestication for many fruit tree and grapevine species. In the territories of the Western Balkans, where Illyria extended, many fruit-tree and vine species occupied wide territories of river valleys, as well as hilly and mountainous zones. The mild Mediterranean climate and the orographic character of the territory supported not only the protection of those plants during the Ice Age, but also the intense development of a variety of forms, types and kinds of fruit-trees out of species belonging to the genera *Malus, Pyrus, Cerasus, Prunus, Vitis, Olea, Ficus, Juglans, Cornus, Sorbus, Vaccinium*, etc. Up to date, due to the above circumstances, in a narrow territory we possess more than 70 species and sub-species with more than 1,200 forms of biotypes, varieties and primitive landraces of fruit, vine and olive trees. Urgent issues are certainly their "*in-situ*" tracing, inventory and protection and the "*ex situ*" study, evaluation and economic use of the majority of them for the purpose of the sustainable development of agriculture in general, and viticulture in particular, both in hilly and mountainous zones of Albania. Finally, the formulation of an effective legislation in the framework of the global strategy for biodiversity and the establishment of the Genetic Bank for Plant-Farming, as a separate scientific unit (given the importance and the concrete situation of our country), would constitute the concrete measures for the protection, evaluation and use of biodiversity in Albania.

Key words: biodiversity, populations, landraces, *in-situ* and *ex situ* conservation, genetic bank.

1. Introduction

The variety of orographic and climatic characteristics as well as the strategic position in the Mediterranean Basin make Albania one of the most concentrated and rich areas, with enormous opportunities to preserve a considerable number of species, sub-species, varieties, local and Balkan landraces for fruit, vine and olive trees. This genetic wealth made the ancient Illyria famous and also affected the economic and cultural development of that region.

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In a narrow territory, after the Ice Age (about 10.000 BC), in a spontaneous and isolating way, man passed from "hunt and harvest in nature" phase of the fruit food resources into "proto-domestication" phase which still continues in some mountainous zones (Tropojë, Pukë, Has, Skrapar, Përmet, Mallakastër, Librazhd, Mokërr, Gore).

In the context of the typical Mediterranean and continental ecosystems and because of isolation and protection from the mountainous territory, valleys and rivers, this richness still exists in association with many woody and shrub species. Thanks to these circumstances we today possess over 70 species and sub-species of more than 1,200 forms, varieties, populations and primitive landraces of endemic and sub-endemic grapevine and olive trees.

This great richness of national biodiversity, which once was typical of a wider territory of South and South-Eastern Europe, risks disappearing like in many other European regions. The emergency situation gets worse, considering the negative phenomena that occurred in Albania, and it seems to be irresistible and unpredictable in terms of its dynamics. Nowadays we risk to lose, in a very short time, the plant genetic resources which other countries have lost for two or three centuries and are making investments and great efforts to re-create and re-establish them.

We should state from the very beginning that the Albanian Government must take the primary legal and financial measures in order to preserve the values and justify the efforts of many scientists, researchers and passionate amateur farmers who for many generations have preserved that unique richness of the Albanian nature.

Progenitors of cultivated species are considered today as vital genetic resources for the future and the development of many crops in the Albanian hilly and mountainous zones where human, land and climatic resources exist but are not used or are used poorly and without criteria.

The breeders are multiplying their efforts to utilize the wild plants they meet, as the latter have valuable genes, not yet used, like the genes of resistance towards the difficult conditions of soil, drought, diseases and harmful agents, content of vitamins and ethereal oils, etc. Our efforts meet that objective.

2. Materials and methods

The plant material, object of the study, consists in fruit, olive tree and grapevine species, concentrated in the growing areas of origin (Figs. 1,2,3), not yet damaged in mountainous zones and high valleys (of the upper river

channel of Vjosë, Shkumbin, Mat and Drin). The surveys allowed to explore and identify the permanent zones as reference points for the definition and registration of our genetic resources, which are the bases for the work on the completion of descriptors in conformity with the methodology determined by I.B.P.G.R.

In the meantime the creation of the repository for the temporary preservation and the establishment of the primary collection of the fruit tree and grapevine germplasm were decided as well.

3. Results and discussion

Starting from the grapevine, we notice some primitive forms that contain a high coefficient of reproduction, intensity, color and aroma which are of particular interest to the wine industry in order to meet the current demands of competition with well-known wines like Cabernet sauvignon, Chianti, Tokai, Pinot, etc. (Tab. 1).

Tab. 1. Grapevine genetic resources in Albania (Short-list)

Species	Genetic resources	"*in situ*" sites
Vitis spp.	*V.vinifera-silvestris: pubescens* *V.vinifera-silvestris: glabra* *V. vinifera-sativa* *Proles pontica, Negr.* Subproles.balcanica	Elbasan, Gramsh, Gore, Burrel, Tepelenë, Berat, Skrapar Lezhë, Divjakë, Vlorë
	Populations	
	Kallmetet	Shkodër, Lezhë, Mirditë
	Sheshet (Black, white)	Tiranë, Durrës, Kavajë
	Vloshet	Vlore, Mallakaster, Fier
	Debinat (Black, white)	Përmet, Leskovik
	Serinat (Black, white)	Korçë, Gramsh, Skrapar, Berat
	Pulsat	Berat, Skrapar, Mallakastër
	Dimrakët	Tiranë, Mat, Kavajë, Berat
	Tajkat	Burrel, Tiranë, Skrapar, Dibër
	Landraces	
	Kallmet kokërvogel (small)	Shkodër, Lezhë, Malësia e Madhe
	Kallmet kokermadh (large)	Shkodër, Lezhë, Malësia e Madhe
	Kallmet i bardhë (white)	Lezhë
	Papqore	Pukë
	Cerruje	Burrel
	Dimraku	Tiranë, Kavajë, Skrapar, Berat
	Serinat(Black, white)	Korçë, Bilisht, Mallakastër
	Debinat(Black, white)	Leskovik, Përmet

The DNA analysis of some Albanian populations showed that Sheshi i Zi, Debina, Pulësi and Serina might be the forecomers of celebrated cultivars such as Cabernet sauvignon, Tokai, Malvasia, Riesling, as supported by the old literature (Pliny, Columella), and by the latest research conducted in France and in Italy on the origin of cv. Cabernet sauvignon and of some

Albanian cultivars such as Kallmet, Debina, Serina, Kotejka, Pules, Vloshi, etc.

As for olive (Tab. 2), the populations of Kalinjoti, Boçi, Ulliri i bardhë, Ulliri i zi of Priska, Frengut etc, are of high interest for selection works aimed to increase production, oil content and quality, controlling alternate bearing and resistance to water stress.

Tab. 2. Olive genetic resources in Albania (Short-list)

Species	Genetic resources	"*in-situ*" sites
Olea spp.	*O.oleaster*	Himarë, Vlorë, Mallakastër
	O.sativa	Coastal plain
	O.olivaster	Coastal plain
	O.sativa,var.*macrocarpa*	Berat, Mallakastër
	Populations	
	Berati	Berat, Lushnjë
	Elbasan	Elbasan, Peqin
	Vlora	Vlorë, Fier
	Kalinjot	Vlorë, Fier, Mallakastër, Tepelenë, Himarë, Sarandë
	Kallmet	Lezhë, Kurbin, Shkoder
	Kokermadhi	Berat, Lushnjë, Elbasan
	Landraces	
	i holli i Himarës	Himarë
	i bardhi i Durresit	Durrës, Kavajë
	i bardhi i Tiranës	Tiranë
	i bardhi i Krujës	Krujë
	Krypësi	Krujë
	Pulazeqin	Vlorë
	Nisiot	Himarë
	Maks	Berat, Fier, Mallakastër
	Kotruves	Berat, Fier
	Mixan	Elbasan, Tiran, Durrës
	Ulliri i kuq	Tiranë, Durres, Kavajë
	Vajsi i Peqinit	Peqin, Elbasan
	Managjel	Krujë, Kurbin, Durrës
	Boç	Tiranë

As far as the wild forms of fruit trees (Tab. 3) are concerned, great interest is shown in the creation of rootstocks with a high level of adaptation and graft compatibility with varieties like plum, pear, cherry, apple, peach, etc.

We have not singled out yet the distinguished forms of walnut, chestnut, pear, quince, mulberry, apple, cornel, strawberry tree, prickly pear, etc. that are widely used by the local people as food, medicinal plants, preparation of juices, drinks and jams as well as for traditional rootstocks for the production of fruit and olive trees.

Tab. 3. Main genetic resources of fruit tree (short list)

Species	Genetic resources	"*in situ*" sites
Prunus spp.	*P. cocomilla, P.institia*	Wild pluns, Kukës, Dibër, Mat, Gorre, Opar, Gramoz
	P. prostrata, Labill.	Martanesh, Burrel, Librazhd
	P. spinosa, L.	Martanesh, Skrapar, Tepelene, Gore, Mirditë, Lenie
	P. padus L	Central mountain areas
	P. cerasifera EH	Mountain plun, Devoll, Gore, Kukës, Dibër, Pukë, Ostrovicë, Librazhd, Mokër
	P. domestica L.	Whole country
	P. divaricata L.	Devoll, Pogradec, Librazhd
Malus spp.	*M. fiorentina*, Shne ider	Mokër, Pogradec
	M. silvestris, Mill.	Tiranë, Librazhd, Berat, Mallakastër, Burrel, Dibër, Skrapar, Mokër
	M. dasyphylla, Bark	Dibër, Mat, Puke, Lezhë, Malësi e Madhe
	M. pumila, Mill.	Berat, Skrapar, Elbasan
Pyrus spp.	*P. comunis* L.	Përmet, Leskovik, Gorre, Opar, Librazhd, Mokër
	P. pyraster, Burg.	Tiranë, Librazhd, Korçë, Pogradec, Elbasan, Kukës, Berat, Skrapar, Malësi e Madhe
	P. amygdaliformus Will.	Kolonjë, Mokër, Librazhd, Mat, Himarë
	P. eleagrifolie Poll	Tepelenë, Berat, Korçë

4. Conclusions

Judging from the current situation and the peculiarities of socio-economic developments in Albania, the scientific research activity in the domain of fruit trees, vine and olive will focus on the following directions: botanically, we notice an obvious absence since we haven't studied deeply and systematically the taxonomy of very important genera like*: Malus, Pyrus, Prunus, Cerasus, Vitis, Olea, Cornus, Sorbus*, whose diversity needs to be really known and used in selection and agricultural practices. In addition, many accessions result to be new endemic sub-species, varieties and forms which will enrich the biological diversity of our ancient plots that constitute the origin of landraces of pear, vine, cherry, plum, fig, walnut, olive, etc.

Economically, the development of agri-tourism cannot be considered without the local use of organic products being produced through the industrial and home-made processing of species like Juglans spp., *Corryllus* spp., *Castanea* spp., *Juniperus* spp., *Pyrus* spp., *Amygdalus* spp., *Rubus* spp., *Crataegus* spp., *Cornus* spp., *Arbutus* spp., *Vaccinium* spp., *Sorbus* spp., *Malus* spp., *Prunus* spp. etc.

Taken the situation in Albania, these resources are important for the future of the country. Given the current difficulty of "in situ" preservation, it is desirable to establish a genetic bank for progenitors and landraces of fruit trees, grapevine and olive. We suggest that considering the scope,

peculiarities, and importance of this issue, the fruit genetic bank should constitute a separate institution under the umbrella of the Academy of Sciences, recruiting scientists and researchers from the Institute of Biological Research and from the Agricultural University of Tirana.

Taking into account the fact that the natural sites of origin suffer dynamic changes, it is urgent to define, recognize and preserve the centers with a richer biodiversity in Albania. These areas can be rescued by setting up economic units of agro-forestry managed and used by groups of licensed farmers and under mutual state-community obligations. This will turn the system of germplasm preservation sustainable and lifelong. The above organization will bring about in the meantime economic revenues by the communities and the preservation of biodiversity itself, as a national genetic property.

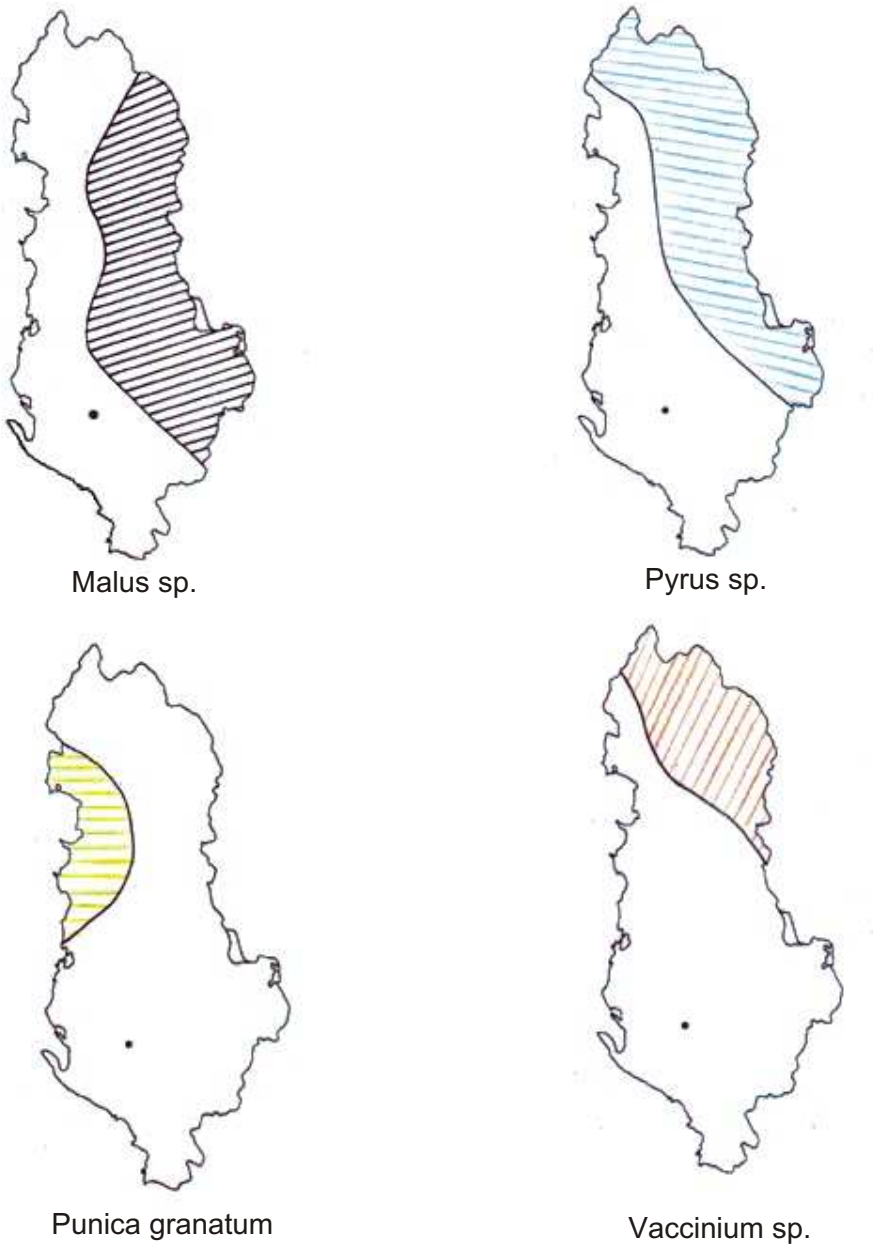

Fig. 1. Origin of the fruit-tree growing areas in Albania

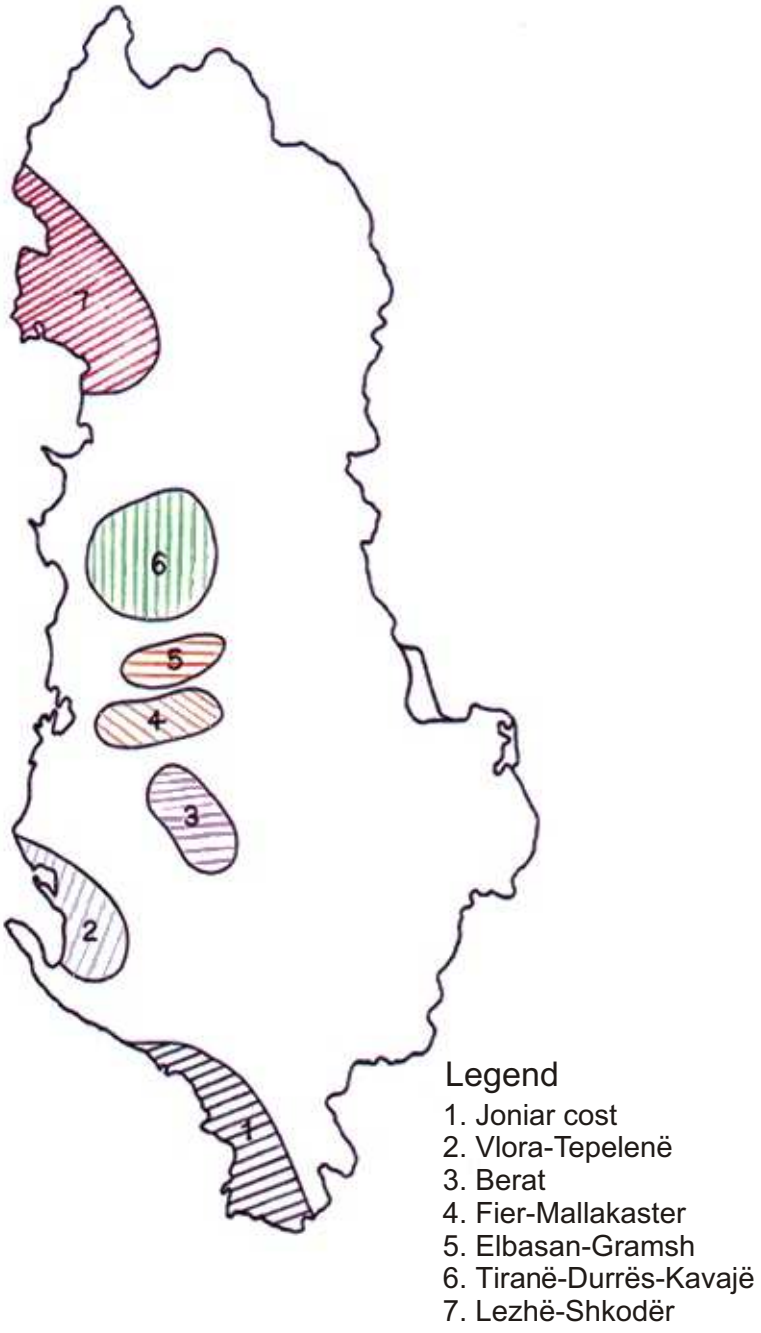

Fig. 2. Origin of the olive growing areas in Albania

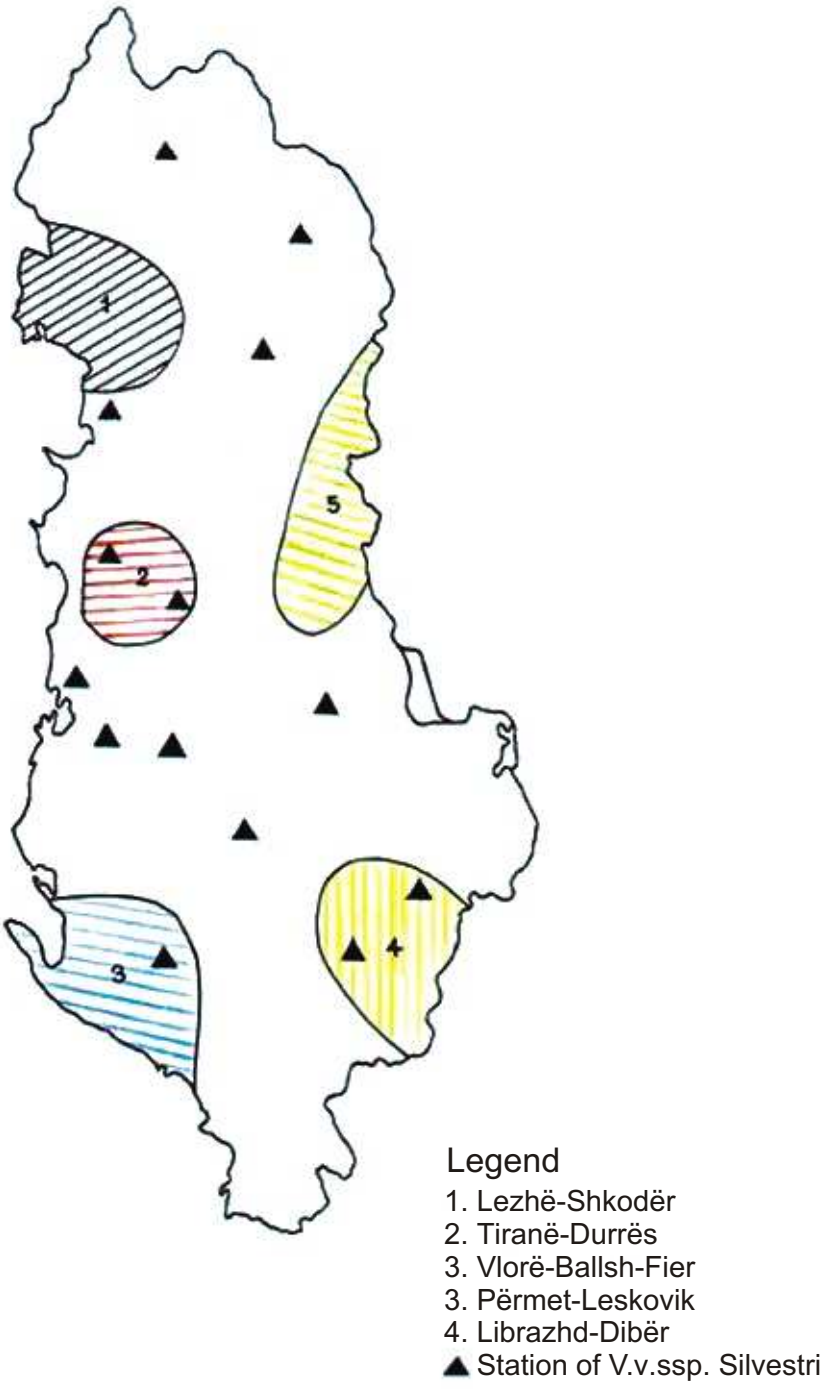

Fig. 3. Origin of the grapevine growing areas in Albania

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