

RESEARCH ARTICLE

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Exploration and collecting local genetic resources of vegetable crops and pulses**SOKRAT JANI^{1*}, LIRI MIHO²**¹ Plant Genetic Resources Centre, Agricultural University of Tirana (AUT), Albania.² Department of Agro-Environment and Ecology, Faculty of Agriculture and Environment, AUT, Albania.**Abstract**

The growth of urban areas that absorb agricultural land, the change in agricultural techniques, the low profitability of farms and their small size, the advanced age of farmers, the conversion of vegetable gardens to other crops, have been and continue to be the major factors affecting genetic erosion in exploration areas. Exploration and collection of local plant genetic resources of vegetable crops and pulses was carried out by implementing the bilateral research project between Albania and FAO (TCP/ALB/3401/Conservation and management of endangered locally adapted crop varieties), with the focus on their preservation and use. During the years 2013 and 2014 several expeditions in rural areas of northern and southeastern Albania were conducted. The exploration, inventorying and collecting local genetic resources in these areas was performed using a GPS system. The National collection was enriched with 192 local vegetable and pulses accessions. Collected materials are listed in the National Register ALB026, according to international descriptors of FAO, ECP/GR and International Biodiversity. The accessions are stored and included in the survey for characterization and evaluation in the National Genebank.

Key words: *collection, conservation, documentation, evaluation, local vegetable and pulses*

1. Introduction

Albania has attracted the attention of botanists and geographers for many years because of the diversity of plant genetic resources regarding its territory and climate.

Albania has a total area of 28,748 square kilometers. It lies between latitudes 39° and 43° N, and mostly between longitudes 19° and 21° E (a small area lies east of 21°). The 70% of the country is mountainous rugged. The highest mountain is Korab situated in the district of Dibër, reaching up to 2,764 meters. They stretch in the axis from the south and southwest to the north. Albania's coastline length on the Adriatic Sea and the Ionian Sea is 476 km.

With its coastline facing the Adriatic and Ionian seas, its highlands backed upon the elevated Balkan landmass and the entire country lying at latitude subject to a variety of weather patterns during the winter and summer seasons, Albania has a high number of climatic regions relative to its landmass. The coastal lowlands have typically Mediterranean climate; the highlands have a Mediterranean continental climate. In both the lowlands and the interior, the weather varies markedly from north to south.

Although a small country, Albania is distinguished for its rich biological diversity. The variation of geomorphology, climate and terrain

create favorable conditions for a number of endemic and sub-endemic species with 27 endemic and 160 sub-endemic plants present in the country. The total number of plants is over 3250 species, approximately 30% of the entire flora species found in Europe.

The growth of urban areas that absorb agricultural land, the change in agricultural techniques, the low profitability of farms and their small size, the advanced age of farmers, the conversion of vegetable gardens to other crops, have been and continue to be the major factors affecting genetic erosion in exploration areas[2]. From August 2013 to October 2014, in the framework of FAO project (TCP/ALB/3401/Conservation and management of endangered locally adapted crop varieties), a series of collecting missions were carried out in rural areas of northern and southeastern Albania. These missions were a continuation of those carried out earlier, which started in 1994 and ended in 2011, thanks to the collaboration between the Albanian Research Institutes, Plant Genetic Resources Centre and some foreign projects in Albania.

Through implementation of the latest project, it is conducting a research program for inventorying and collecting local genetic resources of vegetable crops, with the focus on their preservation and targeted use.

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The aim of the study was collection and preservation of valuable local vegetable accessions of the above mentioned areas of

2. Materials and methods

The subject of this research is local plant genetic diversity of vegetable crops.

During the period 2013-2014 in several expeditions conducted in north and south-eastern regions of Albania, vegetable crops collections in Plant Genetic Resources Centre were enriched and seed accessions were deposited in the National Gene bank.

All the information available regarding regions' agriculture and results from previous collecting missions were consulted with the specific aim of better planning this exploration.

The main sources of the collected seed samples were farmers' fields. In a few cases samples were also collected from seed sellers, which made it possible to find out and collect old traditional material. At each collecting site a passport data sheet was filled in, using data from a hand-held GPS system that included latitude, longitude and altitude of the place of origin.

In addition to the data recorded directly by the collecting team, further information was registered from local specialists and through several interviews with the growers. Seed collecting was conducted in accordance with methods for collection and storage of germplasm [3,6] and developed by FAO [1]. Further details on the sampling methods and exploration strategy used are reported in other experiences [4, 5].

The accessions have been listed in the National Register ALB026. Available passport information has been introduced in accordance with international descriptors of FAO, ECP/GR and Biodiversity International for documentation of plant genetic resources.

3. Results and discussion

The missions were carried out in four counties, 9 districts and 36 villages. During the eleven missions conducted for exploration and collection of indigenous cultivars a considerable diminution of agricultural

Albania, as well as their sustainable preservation in the National Genebank.

activities was detected; this phenomenon has become more marked in the last 25 years. Today the main crops cultivated in these areas are fodder crops, corn, beans, fruit trees, grapes and a few vegetables. The region of southeastern Albania turned out to be more interesting and richer, from an agricultural point of view, than north region (Figure 1). Agriculture is more developed here and its main products are: wheat, tomatoes, peppers, cabbages, onions, melons, beans, potatoes, apples and grapes.

All the 192 accessions collected belong to 19 species of vegetables and pulses (Table 1-2). The original samples consist of morphologically different landraces.

Seventy-one accessions of vegetable crops were collected in the southern regions of the country and twenty-three in the northern regions.

Larger collections also include 23 tomato accessions (*Solanum lycopersicum* L.) and 22 pepper genotypes (*Capsicum annuum* L.) with different areas of use, these also being the most significant vegetables in traditional Albanian kitchen. The accessions showed very good taste and tolerance to biotic and abiotic stress factors, combined with other excellent organoleptic value of the fruits. Findings of interest for breeding programs were also for melon, cucumber and onion, for which respectively 8, 12 and 8 accessions were collected.

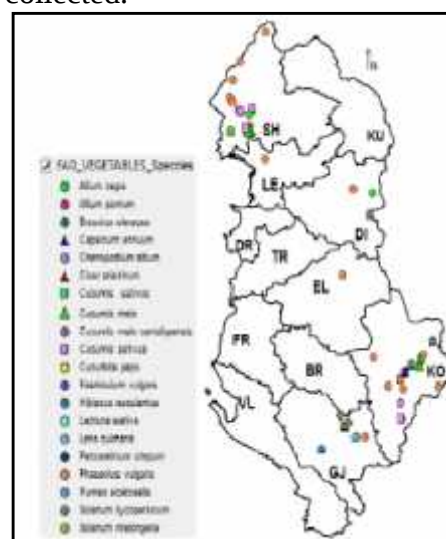


Figure 1. Albanian regions inventoried, local vegetable and pulses collected

From a total of 98 accessions of pulses, 91 belong to the common bean (*Phaseolus vulgaris* L.), which shows that the areas explored are rich in genetic resources and tradition in the cultivation and use of this specie (Table 2). It is the main grain legume for direct human consumption, and it represents a rich source of protein, vitamins, minerals, and fiber, especially for the poorer populations of mountainous areas. A valuable collection of 73 local bean accessions from high areas was created. This type of beans typically develops successfully and gives fruit only in the collecting region, and these accessions represent unique germplasm for

the breeding programs. Considering the above, this is very valuable information for specific agro-climatic characteristics of the growing region for further tests and use of resources. The studied areas and farms are suitable for on farm conservation.

The collected materials have been listed by passport data: collecting area, place, geographical coordinates and altitude, the scientific name of the sample (taxonomy), characteristics of the genotype. The accessions are listed with catalogue numbers in the National Collection. Seed storage started in the National Genebank for sustainable preservation.

Table 1. List of accessions collected for each vegetable crops

Species	Years		
	2013	2014	∑
<i>Solanum lycopersicum</i> Mill.	10	13	23
<i>Capsicum annuum</i> L.	11	11	22
<i>Cucumis sativus</i> L.	3	5	8
<i>Cucumis melo</i> L.	2	10	12
<i>Allium cepa</i> L.	5	3	8
<i>Allium porrum</i> L.	0	3	3
<i>Chenopodium album</i> L.	1	3	4
<i>Rumex acetosella</i> L.	0	1	1
<i>Solanum melongena</i> L.	1	3	4
<i>Abelmoschus esculentus</i> (L.) Moench	1	2	3
<i>Cucurbita pepo</i> L.	0	1	1
<i>Brassica oleracea</i> L.	0	1	1
<i>Anethum graveolens</i> L.	0	1	1
<i>Lactuca sativa</i> L.	0	2	2
<i>Petroselinum crispum</i> Mill.	0	1	1
Total	34	60	94

Table 2. List of pulse accessions collected

Species	Years		
	2013	2014	∑
<i>Phaseolus vulgaris</i> L.	36	55	91
<i>Phaseolus coccineus</i> L.	3	1	4
<i>Cicer arietinum</i> L.	1	1	2
<i>Lens culinaris</i> Medikus	1	0	1
Total	41	57	98

4. Conclusion

Several months of the exploration and collecting missions have shown that the country's riches in genetic biodiversity of vegetable crops and pulses, requires community support initiatives to preserve them *in situ* (on farm), through the distribution of knowledge, publicity and cooperation with scientific researchers and governmental structures.

The collections of National Gene bank have been enriched with 192 valuable local vegetable accessions of Albanian flora.

Areas and farms have been inventoried throughout active expeditionary activities for collecting of local germplasm.

The results indicate the presence of valuable local plant diversity, which emphasizes the need for continued collecting in other areas of the country as well.

Enrichment of the collections ensures the conservation of valuable germplasm in relation to global challenges.

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Exploration and collection of local plant genetic resources of vegetable crops and pulses was carried out by implementing the bilateral research project between Albania and FAO (TCP/ALB/3401/ Conservation and management of endangered locally adapted crop varieties), with the focus on their preservation and use. We would like to thank FAO office for this contribution. Finally the collecting team is grateful to the local farmers, who shared their knowledge and seeds.

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