

GENETIC DIVERSITY OF SOME LOCAL VARIETIES OF FRUIT TREES IN SHKODRA REGION

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Abstract

Shkodra region is characterized by a great diversity of local species of fruit trees which are cultivated and used for centuries by the local population. Most wide preaded types of local fruit trees are apples, pears and plums which are used for fruits but also for other uses as preparation of jam, alcohol etc. These local varieties are characterized by an annual sustainable production as well as a great durability to weather conditions and diseases. In this region during 2013 a survey was conducted and a collecting mission for tree main species apple, pear and plum was carried out. During this collecting mission about 20 accessions of the abovementioned species were collected and described in detail for several bio-morphological indicators (features). For the data collected by the description of these accessions a database was built and a statistical processing was done too. From the analysis of the data it is shown that some trees of apple, pear and plum are very old (more than 100 years old) and have very large genetic values. Surveys have shown that some of trees of the local varieties are in danger to be extinct because of several factors. In these conditions is very emergent to collect and preserve these local varieties in ex-situ field collections in a specialized institution of the country.

Key words: *local variety, genetic diversity, accession, bio-morphological feature.*

Introduction

Shkodra region consists of three districts which are Shkodra, Malesia e Madhe and Puka which extend from the sea level up to 2500 m altitude. Because this geographical position, the region is characterized by different micro zones and microclimate and by a great diversity of plant species which are very important for food and agriculture. Among this plant diversity we found many native species of fruit trees such as apple, plum and pear which represent great values, especially in relation to their nutritional values, resistance to diseases and pests and tolerance to drought. These local varieties of fruit trees are cultivated for centuries by farmers of this region, but during the last 40-50 years due to the introduction into production of new cultivars, a part of these native species are threatened to be extinct.

During collecting missions organized in the year 2013, about 20 accessions of these local varieties were collected and described in detail. The material collected is located in private nursery for propagation and later will be transferred in field collections of Albanian gene bank. Annual collecting of these local varieties and their on farm cultivation or field collection maintaining, is very important.

Material & Methods

The realization of collecting missions was done according to the FAO guidelines. In this context the most appropriate methodologies are used when surveying and collecting fruit genetic resources for *Prunus*, *Malus*, and *Pyrus* species. The collecting team was provided with methodologies to map and mark the trees in the survey, to describe and photograph the accessions and their fruits, and to collect the propagation material. The use of GPS tools and the record of GPS coordinates, the use of a camera to take pictures of the trees and the fruits; the ways to mark the trees to be accessioned, the materials needed during the survey/collecting missions and the procedures to follow to collect the genetic materials, as well as the list of the evaluation/characterization descriptors of the local fruit tree germplasm to be recorded during the survey and after entering the Fruit Gene bank were detailed before starting the mission. Three information sheets were prepared, to be compiled per each accession during the missions:

A questionnaire, for interviewing the tree owners with questions related to the tree age and history, the harvesting time, fruit taste, traditional uses (fresh consumption or processing), as well as further traits such as tolerance/resistance to biotic stresses, if known (**Table 1**). The questionnaire was translated into Albanian by the interpreter to facilitate the task of the interview.

Table 1. Questionnaire completed during interviews

Nr	Data to be collected
1	Name of the variety, other names (synonyms)
2	History of the variety, if known, use of the fruit (fresh or processed)
3	History of the tree (age, grafted or not, source of the tree, who grafted etc)
4	If the tree is unique exemplar or there are others of the same in farm or in other farms
5	Information on: time of flowering & ripening, taste of the fruit, etc.
6	If the farms allows marking the tree with a spray and collection of propagation material
7	If the farmer intends to maintain the tree
8	If the farmer agrees in making cuts to stimulate vegetation in very weak trees
9	Status of the tree (health conditions)
10	Position of the tree
11	Pictures of the tree

A table with the minimum passport descriptors (Table 2), was drawn using as a reference the most updated version of the FAO/Biodiversity Multi-Crop Passport Descriptors. Each of the passport descriptors was passed in review, clarified when necessary and a subset of 16 MCPDs was selected to be used during the survey missions to provide a basic but adequate passport documentation of the accession candidate for inclusion in the National Fruit Collection of Tirana. Once the accessions enter the National Collection, their description will be enriched or completed with the remaining MCPDs listed in the FAO/Biodiversity document.

Table 2 passport descriptors

Descriptor Name	Examples
COLLNUMB	Initials of collectors + a number
COLLCODE	FAO WIEWS code of the Institute Collecting
COLLMISSID	
GENUS	
SPECIES	
CROPNAME	
ACCENAME	Name, second name, other names
COLLSITE	
LATITUDE	
LONGITUDE	
ELEVATION	
SAMPSTAT	300 for a landrace

A table listing a minimum set of crop-specific evaluation and characterization descriptors

The compilation of this table during the survey missions was meant to provide a first evaluation/description of the accessions. For each of the main fruit crops: apple, pear, plum, an excel sheet was prepared where the key descriptors (and a minimum number of ranking categories for each descriptor) to use in the survey missions were listed.

Results and Discussions

During the collecting mission the team has surveyed about 50 old varieties of apple, pear and plum and 20 accessions were collected and described for many data. These accessions belong to fruit trees: pear (*Pyrus* sp.) called: ‘Rakatele’, ‘Shinjëz’, ‘Koshe,’ ‘Faëkuqe,’ ‘Mace’, ‘Kungullore’, ‘Bardhje’, plum (*Prunus* sp.) called ‘Stambollie’, ‘Ugere, e Zeza Okolit’, ‘E Verdha Boges’, ‘E vonta e Boges’, ‘Dimerore e Boges,’ ‘E zeza Vermoshit’ and ‘Kujja e Vermoshit’ and only one apple (*Malus* sp.) called ‘Mollçinke e verdhe’.

The pear accessions of ‘Korrikje’, ‘Raketale’, ‘Shinjez’ are very old (over 100-150 years). Also their fruit ripe very early (‘Korrikje’) and are very delicious and aromatic (‘Faëkuqe’, ‘Koshe’ and ‘Bardhje’).

The fruit team surveyed the Bog village, located in a mountainous area at an altitude of 850 m above sea level. Most interesting was to explore 4 specimens of plum. All of the samples were very old trees (100-150 years old).

Below are presented the passport data and the evaluation descriptors for the 20 accessions in Shkodra region.

Apple: COLLNUMB IC; RS;LS;027

UPOV nr	Descriptor Name	Descriptor Ranking			
1	Tree vigour		3(weak)	5 (medium)	7(strong)
3	Tree habit	1(upright)	2(spread)	3(dropping)	4(Weeping)
24	Fruit size	1	3(small)	5(medium)	7(large)
28	Fruit shape	1-7	6		
35	Fruit ground color	1-6	4		
46	Fruit length of stalk	3 (short)	5 (med)	7 (long)	
47	Fruit thickness of stalk	3(thin)	5 (med)	7 (thick)	
48	Fruit depth of stalk cavity	3(shallow)	5 (med)	7 (deep)	
49	Fruit width of stalk cavity	3 (narrow)	5 (med)	7(broad)	
50	Fruit depth of eye basin	3(shallow)	5 (med)	7(deep)	
51	Fruit width of eye basin	3(narrow)	5(med)	7(broad)	
53	Fruit color of flesh	1-6	2		
55	Time of beginning flowering	end of Ap.			
56	Time for harvest	end of Oct			
57	Time for eating	6 months	after	harvest	

Plum: COLLNUMB; IC; RS; LS; BG;032

UPOV nr	Descriptor Name	Descriptor Ranking			
1	Tree vigour	3(weak)	5 (med)	7(strong)	
3	One year old shoot attitude	1(erect)	3(1/2 erect)	5(horizontal)	7(dropping)
43	Fruit size	3(small)	5(med)	7(large)	
49	Fruit depth of stalk cavity	3(shallow)	5(med)	7 (deep)	
50	Fruit ground color	1-9	8		
51	Fruit color of flesh	1-6	3		
52	Fruit firmness of flesh	3(soft)	5 (med)	7 (firm)	
54	Fruit adherence of stone	1(free sto)	2 (semi f)	3(cling st)	
55	Stone general shape	1 (round)	2 (ovate)	3(elliptic)	
56	Stone shape	1(narrow)	2 (elipt)	3(broad eli)	
61	Time of beginning flowering	end of Ap.			
62	Time for harvest	end of Sep			
57	Time for eating	5 months	after	harvest	

Pear; COLLNUMB; IC; RS; LS; 014

UPOV nr	Descriptor Name	Descriptor Ranking			
1	Tree vigour		3(weak)	5 (medium)	7(strong)
3	Tree habitat	1(upright)	2(spread)	3(droop)	4(weeping)
39	Fruit ratio length/diameter	1(v. small)	3(small)	5(medium)	7(large)
41	Fruit size		3(small)	5(medium)	7(large)
43	Fruit profile of sides	1(concave	29straigh	3(convex)	
44	Fruit skin ground color	1(not visib	2(green)	3 yellowgr	4 yellow
50	Fruit length of stalk	3(short)	5(med)	7(long)	
51	Fruit thickness of stalk	3(thin)	5(med)	7(long)	
54	Fruit depth of stalk cavity	3(shallow)	5(med)	7(deep)	
57	Fruit depth of eye basin	3(shallow)	5(med)	7(broad)	
58	Fruit width of eye basin	3(narrow)	5(med)	7(deep)	
60	Fruit flesh texture	3(fine)	5(med)	7(coarse)	
64	Time of beginning flowering	April			
65	Time of maturity	July			

Conclusions

- Shkodra region is characterized by a great genetic diversity of fruit trees, which has a high interest for food and agriculture.
- These local varieties of fruit trees are preserved and cultivated for hundreds of years by farmers of the region and have very high quality regarding taste, earliness, resistance to diseases and pests and tolerance to drought.
- Due to introduction of new varieties of fruit trees in recent years there has been a reduction and erosion of diversity of local varieties of pear, apple and plum. For this reason it is necessary to take care for preservation of these species on-farm or in field collections in specialized institutions.

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