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Review article

RECORDING, PRESERVATION, IMPROVEMENT AND USE OF AUTOCHTHONOUS GENETIC RESOURCES OF PLANTS IN THE REGION OF KORÇA

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Abstract

Korça, although a small area on the surface, stands out for its climatic, land and orthographic diversity. This has made that the genetic diversity, both in spontaneous and cultivated plants per area unit, to be quite wide. After the industrial revolution, there has been an exploitation on a large scale which has led to the narrowing of this biodiversity and in some cases, to their disappearance
Collection is the first step in conservation of genetic resources. This includes a series of activities from germplasm exploration, collection of field materials, processing, documentation, to submission for storage
Plant exploration was carried out at the time of flowering. At this stage was also determined, the most suitable deadline
for the second visit during which the materials will be collected. Most germplasm collections were based on seed collection.
Through the study, we identified resources with important genetic values of cultivars and autochthonous populations of the Korça region, such as corn, beans, tomatoes, peppers, onions, cabbage, leeks, watermelons, melons, fodder peas, apples, pears, walnuts, chestnut etc.
The next important step is the introduction into the schemes of genetic improvement of seed production of plant forms, especially those that are of interest to farmers.
From an economic point of view, this project made a contribution to the reduction of genetic erosion.

Keywords: autochthonous genetic resources, cultivar, genetic diversity, genetic erosion, Korça region, plant population.

1. Introduction

Plant genetic resources play an important role in addressing the challenges of providing food for humanity in a sustainable manner. The diversity of plant species and varieties of a variety of crop types (cereals, legumes, fruits, vegetables) and intraspecific genetic diversity are essential for our food system (Ehsan Dulloo, 2019; Pathirana and Carimi, 2022; Sonnino, 2017). Sustainable food systems have a fundamental dependence on biological diversity. According to B.G. Murray 2017 plant biodiversity is not uniformly distributed.
The entirety of this heritable biodiversity constitutes what is called genetic resources. Plant genetic resources (PGR) comprise any material of actual or potential value, containing functional units of heredity.
An important role in biodiversity man plays by improving or worsening it depending on the actions that he performs. Breeders combined desired genetic traits from different varieties into one variety, in some cases even from different species, gradually adapting to the development of high-yielding genotypes that sustain modern societies.
Biodiversity is a living bank in which everyone should invest. Currently, the scientific knowledge and preservation of this heritage is one of the most essential problems. To this day it is biodiversity that has invested and continues to invest for us. At least 40% of the world

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economy and 80% of our needs are met by biological resources. Currently, 93% of the human diet is represented by plant foods.

Genetic diversity is a basic element for plant improvement. Without this, it is not possible to create lines, hybrids, improve populations, create synthetic cultivars with a high frequency of useful genes for production, quality, as well as for resistance to environmental stresses. The role of plant diversity and their genetic improvement will become increasingly important in the near future, in order to guarantee food security (Fazlia and Gixhari, 2017).

Due to genetic erosion, there is a loss of a good part of the traditional cultivars.

According to Ibraliu 2018, the main driving factors of genetic erosion included:

Replacement of local varieties with foreign varieties and hybrids;

Replacing the cultivation of agricultural plant ecotypes with modern varieties;

Frequent fires deliberately set on hills to combat plant diseases or accidental fires;

Habitat destruction through unplanned works, road construction or other social and stone buildings;

Socio-economic changes and demographic migration, the abandonment of the village areas, mainly hilly and mountainous areas, which are richer in plant genetic resources.

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Destruction of habitat through unplanned works, road construction or other social buildings and stone-quarries;

Social-economic changes and demographic migration, abandonment of rural areas, mainly hilly and mountain areas, which are richer in plant genetic resources.

Due to genetic erosion, there is a loss of a good part of traditional cultivars (Khoury K.C. et al., 2022).

Modern varieties have higher capacities than improved populations but are poorly suited to the requirements of small producers, who have low-input management agriculture on often poor soils. The so-called high-yielding varieties are highly reactive varieties, as their productive capacity depends on the main inputs (fertilizers, pesticides), which are sometimes harmful to the environment. Without these inputs, their high potential is not realized. Young systems are also more susceptible to disease and pests. Large genetically uniform fields favor the rapid spread of pests and pathogens. So plant breeders are dependent on the availability of genetically diverse material represented by landraces and wild relatives in their effort to keep agriculture one step away from tomorrow's sudden disaster. This is because modern varieties themselves possess a very limited gene pool for future breeding. Without a reserve of genetic resources to work on, further genetic improvement may be impossible.

The number of different species on which we rely for food, fiber, building materials, medicines and other natural products is very limited. Only a very small proportion of plant and animal species have been tested for their usefulness. Out of 265 thousand plant species, only about 7 thousand have been cultivated or collected for food. Of these, 20 species currently provide 91% of the world's food and precisely three of them - wheat, corn and rice - provide more than half of the world's food.

The wide variation of genetic resources can be used or kept in reserve for later use when needed by the science of plant genetic improvement, etc.

Plant genetic resources play an important role in the sustainability of food in the conditions of environmental changes (Singh et al., 2022; FAO, 2024; Maho and Mero., 2018).

Korça, even though it is a small area on the surface, stands out for its climatic, land and orthographic diversity. This has made the genetic diversity, both in spontaneous plants and in those cultivated for the surface unit, to be quite wide. Climatic and terrestrial variability constitutes one of the basic factors of genetic variability and has left deep traces in the formation of genetic variability in vegetation.
The selection made by the artistic hands farmers of the Korça region over the centuries has become a source of variability, which is present in almost every area, or even village. For this, it is enough to refer to the denominations where many of them preserve the names of the places where they were selected and preserved, such as cultivars of beans Eçmeniku, Trenare, corn of Floqi, fodder pea of Voskopoja, etc.
Diversity is life, Uniformity is death. However, many human activities are leading to depletion of biodiversity.
Our study, based on the very positive work carried out by the Institute of Plant Genetic Resources, Agricultural University of Tirana, 2018 aimed at the identification, conservation, improvement and use of autochthonous genetic resources of plants in the Korça region.

2. Methodology

2.1. Planning, collection methods and procedures: Collection is the first step in the conservation of genetic resources, the role of which is growing, which is related to the risk of genetic erosion. This includes a series of activities from germplasm exploration, collection of field materials, processing, and documentation, to submission for storage.
The species programmed for collection were correctly identified. The decision of which part to collect for preservation and use is related to the reproductive biology of the species being collected, as well as the equipment available for preservation. In this regard, the best form for storage is the seed.
There are many reasons for collecting germplasm, but two of the most important are its preservation and use.
The general criterion for germplasm collection is to ensure that in the collected sample there is at least one copy of 95% of alleles with a frequency higher than 0.05%
Collecting with multiple visits is better as the potential variation of the species being collected can be better captured.
The variation related to the time of fruiting in the Korça region, which is caused by latitude, altitude above sea level, and climatic changes, was taken into consideration.
In the first phase of the collection, the exploration, or knowledge of the condition of the plants, was carried out. This is known as the reconnaissance phase and was carried out at the time of flowering by determining the location of certain populations, as well as the identification of the material. In this phase, the points where the samples (or individual plants) will be taken were also marked. At this stage, the most suitable deadline for the second visit during which the materials will be collected was determined. It is usually carried out between 35 and 60 days after flowering.

2.2. Sampling methodology in the collection process: Technical and practical aspects of the collection of plant genetic resources.
Matters related to the planning of the collection mission, the composition of the collection team, routes, equipment, and tools, sampling (sampling sites, number of plants per sample, number of samples, etc.), cleaning of seeds, delivery of samples, and documentation).
Planning the collection mission. This includes the technical and logistical plan of the collection. But these in themselves are not separate but intermingle with each other, or rather complement each other.

The planning was carried out by accurately predicting the plants to be collected, the places where the collection missions will be carried out, the time when it will be carried out, the teams that will deal with the collection of materials, the material base, and the necessary budget. All these are included in the logistics plan.

1. Determination of priority plants.
2. During the planning I started from the principle that it is easier to collect one plant, or similar mixed plants, at the same time in the field.
3. In the logistic plan, it was foreseen how they would be collected; ecogeographic data were organized and analyzed.

On the technical level, they were analyzed in detail:

- The method of sampling (sampling) with the aim of being suitable for the defined region, species and plant parts (seeds, vegetative parts, pollen, etc.);
- The most optimal time for collection;
- Collection equipment and techniques required to be used;
- Documentation that will be needed to take it to the field, etc.

Most germplasm collections were based on seed collection.
This is generally done by hand, either by cutting the flower or shaking it over some type of container (a plastic tray or raincoat).
For vegetables, the seeds were obtained according to scientific methods specific to each type. Then the seeds are stored in cotton or paper bags.
During the collection, were taken into account some advice that have resulted from experience in this direction specifically:
For all seeds:

- A more or less equal number of seeds was collected from each sampled plant, and with the same ripening, the best when the seed storage potential and coherence to drying is higher;
- Damaged seeds (mechanical damage, pest infestation) were removed;
- For seeds that were cleaned in the field during the collection mission, cleaning was done manually to minimize possible mechanical damage;
- At the end of each day, the seeds were delivered to the laboratory.

2.3. Documentation of field information of the germplasm being collected: All genetic materials collected were well documented to give users (especially breeders) better opportunities to use them in subsequent programs. In addition, there is a minimum of data that was recorded to have an effective information between the collectors, the breeders and the genetic bank.
For the species to be collected, a label model was prepared to be placed on each sample, one label outside and one inside the bag, as well as a card containing the basic descriptors used during germplasm collection. The card was completed in the field by the collection missions team.

3. Results

Through the scientific expedition, more than 140 cultivars and autochthonous populations were identified for the plants of corn, beans, tomatoes, onions, cabbage, leeks, fodder peas, cowpeas, bitter vetch (vicia ervelia), apples, pears, etc.
It was done the collection of cultivars and autochthonous populations for corn, bean, tomato, onion, cabbage, leek, fodder pea, cowpea, bitter vetch (vicia ervelia), apple, pear, etc.
The recent climate changes in the Korce region were highlighted, which significantly influence the autochthonous genetic resources.
Cultivar selection is one of the best ways to adapt to negative climate changes.

Were defined the methods of conservation of plant genetic resources:

1. In-situ storage.
   On-farm storage. On-farm conservation can be defined as the sustainable management of the genetic diversity of locally developed varieties with wild species or forms by farmers within the traditional system of agriculture, horticulture or agro-silviculture.
2. Ex-situ storage.
   Storage in genetic banks in seed form.

The activities of the project were made known, using the media, to various interest groups such as farmers, agricultural specialists, researchers, producers and traders of seeds and seedlings, etc.

4. Conclusions

On the basis of the data collected in the whole district of Korça, regarding the genetic resources, we encounter two different situations:

1. Competitive genetic resources for which farmers show interest in cultivation. Most of them need a genetic scheme of varietal purification and elite seed production.
   On-farm storage can be applied to them.
   In this group includes: Eçmenik Bean, Trenare Bean, Trenare Bean with support system, Leshnica Bean, Hoçisht Bean (phaseolis vulgaris multiflorus coccineus), Voskopi Bean (phaseolis vulgaris multiflorus coccineus), Sërrëke Tomato, Gogozhare Pepper, Miras Onion, Dishnica Red Onion, Lini Onion, Bilishti Cabbage, Voskopi Cabbage, Belorta Leek, Farashuk Melon of Korça, Korovec Melon of Korça, various autochthonous grape and apple cultivars.
2. Non-competitive genetic resources, for which farmers show little interest in cultivation. Most of them need a genetic scheme of hanging purification and production of elite seed. They present maximum risk of extinction. We have been able to find only a small number of farmers who cultivate them.
   On-farm storage and genetic bank storage should be applied to them.
   In this group includes: Kabashi Bean of Kolonja, Kosorkë Bean, Green Bean of Kolonja, Bitincka Short Bean (phaseolis vulgaris multiflorus coccineus), "Korça" Corn, "Floqi" Corn, "Devolli" Corn, "Liqenasi" Corn, Tomato of Sanjollas, Korça Yellow Tomato, Tomato "Pistilka" of Korça, Pepper "Poçe red", Pepper "Poçe yellow", Pepper "Vethka", Pepper "Hundashka", Onion of Tushemishti, Cabbage "Mishe" of Korça, Lettuce salad of Korça, Conical turnip of Korça, Fodder pea "Voskopoja".

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