

ASSESSMENT OF VEGETABLE RESOURCES CONSERVATION WORK AT VEGETABLE RESEARCH STATION BACAU ROMANIA

EVALUAREA ACTIVITATII DE CONSERVARE A RESURSELOR GENETICE LEGUMICOLE LA STATIUNEA DE CERCETARE DEZVOLTARE PENTRU LEGUMICULTURA BACAU

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***Abstract** The aim of this study is to present our research activity for: identification, collection, evaluation and conservation of germplasm resources useful in breeding works; creation and patenting of new cultivars, with high production capacity and quality, suitable for organic and conventional system and diversification of vegetables assortment by introducing of species, varieties and local populations. More than forty-nine plant varieties developed in Vegetable Research and Development Station Bacau have been patented by State Office for Inventions and Trademarks (OSIM). Part of our cultivars can be successfully cultivated in ecological culture system. The paper presents information about our accessions and some new genotypes created by our researchers.*

Key words: biodiversity, preservation, breeding

***Abstract** Scopul acestei lucrări este de a prezenta activitatea de cercetare bazată pe identificarea, colectarea, evaluarea și conservarea resurselor de germoplasmă utile în ameliorare, în vederea creării și patentării de noi cultivare și hibrizi cu capacitate productivă ridicată, cu indici de calitate superiori care să se preteze la condițiile agriculturii convenționale și biologice, (diversificării sortimentului de legume cultivate prin introducerea de specii noi, mai puțin cunoscute și răspândite și a unor populații locale cu potențial cantitativ și calitativ. Mai mult de 49 de varietăți de plante au fost create la Stațiunea de Cercetare Dezvoltare pentru Legumicultură Bacău și patentate de către Oficiul de Stat pentru Invenții și Mărci (OSIM). O parte dintre aceste cultivare sunt cultivate cu succes în sistemul de agricultură biologică. Lucrarea prezintă informații cu privire la accesii colectate și la genotipurile obținute prin ameliorare de către cercetătorii stațiunii.*

Cuvinte cheie: biodiversitate, prezervare, ameliorare

INTRODUCTION

Conservation work starts from the most urgent environmental problem all over recognized in our society: continuing loss of biodiversity (Wood, 2000). In Romania alarming losses were recorded in all plant species including vegetable. The researchers from VRDS Bacau are involved in international projects regarding management of genetic resources. Our priority is to ensure efficient

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management of vegetable genetic resources in order to preserve and use in breeding of proper biological material, valuable from the view point of resistance to biotic and abiotic stress, with high qualitative and quantitative potential. The mini gene bank from VRDS Bacau started its activities in 1995.

MATERIAL AND METHOD

We organized special expedition at small farms in Moldova, in order to collect seeds of old varieties, local population and cultivars under erosion risk. We also collected accessions for abroad. The purpose of the collection of plant genetic resources is to capture the maximum amount of useful genetic variation in the smallest number of samples (Marshall and Brown, 1975). Our interest is on genotypes with high level of resistance to pathogen attack and drought.

Seeds were cleaned to remove debris, inert material, damaged and infected seeds or seeds of other species in order to improve the quality of samples. Storage facilities are represented by fields for "in vivo" conservation and seed chambers for vegetable and other herbaceous crops. All accessions are stored at +4° C, after previous desiccations process. Cold chambers at -18 ° C for long term preservation are not available.

RESULTS AND DISCUSSIONS

Number of accessions: Table 1 provides an overview of the most important accessions stored in our mini gene bank.

Table 1

The most important accessions stored in our mini gene bank

Botanical family	Species	Number of accessions	Number of traits
Solanaceae	<i>Capsicum annuum</i> L.	350	12
	<i>Lycopersicon esculentum</i> Mill.	391	12
	<i>Solanum melongena</i> L.	40	6
Cucurbitaceae	<i>Cucumis melo</i> L.	10	15
	<i>Cucumis sativus</i> L.	15	13
	<i>Citrulus lanatus</i> L.	6	10
Leguminosae	<i>Phaseolus vulgaris</i> L.	212	9
	<i>Phaseolus coccineus</i> L.	26	9
	<i>Phaseolus aureus</i> Roxb.	22	9
Cruciferae	<i>Brassica campestris</i> L.	2	6
	<i>Brassica rapa</i> L.	2	6
	<i>Brassica oleracea</i> L.	34	6
	<i>Raphanus sativus</i> L.	44	8
Umbeliferae	<i>Daucus carota</i> L.	9	8
	<i>Pastinaca sativa</i> L.	9	6
	<i>Petroselinum hortense</i> L.	9	6
Alliaceae	<i>Allium cepa</i> L.	164	8
	<i>Allium porrum</i> L.	24	8
	<i>Allium sativum</i> L.	5	8
	<i>Allium ampeloprasum</i> L.	2	8
	<i>Allium schoenoprasum</i> L.	4	

Currently our mini gene bank holds more than 2500 accessions of horticultural crops (vegetables and plants with multiple purposes: aromatics, spices, medicinal, ornamentals), mainly those belonging to the *Solanaceae*, *Cucurbitaceae*, *Leguminosae*, *Cruciferae*, *Umbeliferae*. Large part of accessions is collected from: Romania, Spain, China, and Republic of Moldova. Portugal, India.

Regeneration and characterization: Seeds lose viability even under good storage conditions and it is necessary to regenerate accessions from time to time; the frequency of regeneration depends on the initial viability, the rate of loss of viability and the regeneration standard decided to regenerate the accession (Roberts 1984). The aim of regeneration is to increase the quantity of seed of any accession where the number of seeds available has been depleted, or to restore maximum viability to a seed lot. Regeneration of germplasm is one of the most crucial processes in gene bank management. It is costly in terms of resources and time, and it involves the risk to genetic integrity.

A big part of accessions has been characterized following the descriptors. Germplasm characterization is the recording of distinctly identifiable characteristics, which are heritable. This needs to be distinguished from preliminary evaluation, which is the recording of a limited number of agronomic traits considered to be important in crop improvement. (Upadhyaya, 2008) Germplasm characterization is carried out in precision fields by spaced planting under adequate agronomic conditions and plant protection. Our purpose in characterization process of accessions is:

- to describe accessions, establish their diagnostic characteristics;
- to classify groups of accessions;
- to identify accessions with desired agronomic traits and select entries for more precise evaluation;
- to estimate the extent of variation in the collection.

Evaluation and utilization: most part of accessions stored in our institution is used in different breeding programs carried out, mainly in *Solanaceae*, *Leguminosae* and *Compositae*. Drought, pathogen resistance and breeding for quality are the most important areas of our research interest.

Organoleptic and nutritional traits of (tomatoes, pepper, eggplant and melon) are performed by determination of titratable acidity, carotenes and lycopene, sugars, proteins, ascorbic acids content.

More than forty-nine plant varieties created in VRDS Bacau have been patented by state office for inventions and trademarks (OSIM). Most cultivars are suitable for ecological culture system, omitting synthetic herbicides and mineral nitrogen fertilizers, along with more diverse crop rotations, reduces detrimental impacts on biodiversity (Bengtsson et al., 2005). Positive effects of organic farming are found especially in biodiversity and also in health problems associated with nutrition. (Biao X, 2003).

The most important vegetable cultivars developed at Vegetable Research and Development Station, Bacau are: endive: Bacău 3, Magura; sweet pepper: Ceres, Dariana Bac, Dariochea; long pepper: Siret, Ionel; round pepper: Lider, Creola; hot pepper: Iute Delicios; faba bean: Productiv 31; Onion: Orizont;

cucumber: Mapamond, Cornibac F1; cauliflower: Timpurie de Bacău and Dumbrava; savory: De Moldova, Daria; climbing bean: Auria Bacăului, Verba, Verdana; garden bean: Cristina, Mileniu, Marinică, Perlata; lettuce: Silvia, Marilena, Serata; lovage: Rarău; gill: De Brad 3; carrot: Ceahlău; melon: Brilliant; sweet corn: Dulce de Bacau; moon radish: Roșioară; summer radish: Bianca, Țepușă de Bacău; spinach: Premier; Red beet: Rubiniu; Early cabbage: Flavius F₁, Rolis F₁; summer cabage: Rovana; tomato: Moldoveanca; celery: Bistrita. The main breeding objectives proposed were: productivity, quality, earliness, genetic resistance to the pathogen agents attack, ecological plasticity etc.

CONCLUSIONS

In the context of climate change in Romania, it is increasingly obvious that it is extremely important that national genetic resources have to be protected through the implementation of national programs for conservation feasible. Despite of current economical situation, Vegetable Research Station Bacau continue the researches on breeding, in order to develop new genotypes suitable to climatic condition and to market request.

Improving the economic importance of species must take into account the heritage of genetic resources held at this time for the success of the experiments to be integrated specific climatic conditions of our country.

In addition it is essential for species threatened by climate change to have real chances of survival through the implementation of national programs for “ex situ” conservation.

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