Preservation strategies of local varieties of crop plants in Europe and worldwide

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Abstract Since 1992 the rising interest concerning the agrobiodiversity preservation is felt. On European and worldwide level a series of events took place within were signed treaties and created directives and laws in order to support the preservation of plant genetic resources, which of course involves preserving local varieties of plants. Preservation of these traditional varieties can be achieved in two ways: in situ and ex situ.

Preservation in situ (on farm) is made in natural habitat and involves the varieties of interest, managing and monitoring them in their place of origin. Ex situ preservation means maintaining the entire studied biological community outside of the natural habitat. It involves sampling, transfer and storage of certain species of population far from the original place. This type of preservation can be achieved in gene banks, individuals being kept in conditions controlled by humans.

A special importance for preservation of local varieties has Suceava Gene Bank which preserves 386 species of crop plants.

Currently, in Romania, there are landraces which disappeared – at flax and hemp, or which are threatened with the extinction – at corn, potato and bean. Cause traditional varieties are threaten by extinction, Europe creates strategies of genetic erosion combat.

A landrace is “a set of populations or clones of a plant species that have naturally adapted to the environmental conditions of their region” (Directive 2008/62/CE). A landrace is also synonyme with: traditional, peasanty or conservation variety. The importance of a landrace goes side by side with its traits. Thus, a landrace is highly heterogeneous, characteristic that provide genetic diversity. Another important trait of a landrace is given by the ability to adapt to stressors as: frost, draught, diseases, pests or low nutrient resources. Speaking about crop plant landraces they have excellent taste qualities.

The evolution of global and European policies concerning the landraces

The issue of preserving local varieties is found in laws, directives and international treaties. The first step in terms of biodiversity is made at Rio de Janeiro by Convention on Biodiversity (CBD) in 1992. The principles of this Convention are found in many European directives and international treaties.

At European level, Directive 98/95 CEE is the first document of major importance for agrobiodiversity preservation. The above mentioned Directive, highlights the importance of biodiversity preservation and mentions the need to create a legal basis (for each country) to support in situ preservation of traditional varieties.

Since 1942 DUS conditions (Distinctness, Uniformity and Stability) are imposed for European varieties and since 1966 when the European Community creates the Common Catalogue, the marketing becomes illegal for the varieties which are not part of International and European catalogs. Thus, Directive 98/95 CEE improves the existing situation through provisions that offers the possibility of registering local varieties in the Common Catalog but also by creating a favorable legal framework for marketing seeds for in situ preservation. The same directive is intended to introduce a new catalog that includes preservation varieties threatened by genetic erosion. Farmers of the ecological system together with the great farmers’ associations and confederations of occidental countries suggest the adoption or remove some of the provisions considered too restrictive. This reaction is based on the grounds that are incorrect the applications of DUS criteria (especially those of
uniformity and stability) on local varieties. The argument was based on the idea that local varieties are for organic crops and consumers are not interested that the products to be classified in several parameters.

The year 2001 is marked by the signing of International Treaty on Plant Genetic Resources for Food and Agriculture and in 2005 was adopted a new directive through which the list of local varieties is separated from the list of approved varieties.

In June 2008 the European Commission issued a directive (2008/62/CE) that is supporting: primitive agricultural breeds, varieties naturally adapted to regional environmental conditions and threatened by genetic erosion and marketing of their seeds. These provisions refer to the following agricultural species: *Pisum sativum*, *Triticum spp*, *Hordeum vulgare*, *Zea mays*, *Solanum tuberosum*, *Brassica napus* and *Helianthus annuus*. The directive retains the DUS criteria, restricting the growth of traditional varieties and limiting the number of species and quantity of seeds for sale.

Directive 2008/62/CE adjusts aspects of the "home region" (region where the local variety is traditionally cultivated and natural adapted to environmental conditions).

Article 2 defines a number of terms closely related to the biodiversity preservation:

- "in situ preservation" means preservation of genetic material in its natural environment and in the case of cultivated plant species in the agricultural environment in which they have developed their distinctive properties;
- "genetic erosion" means loss of genetic diversity between and within populations or varieties of the same species or reduce the genetic basis of a species due to human intervention and climate change;
- "local variety" means a set of populations or clones of a plant species that have naturally adapted to the environmental conditions of their region;
- "seeds" means seeds and seed potatoes, except where seed potatoes are expressly excluded.

Article 8 of Directive establishes the quantities of seeds that can be used according to: species, vegetation period and cultivated area.

The European directives underline legal framework of different countries. Thus, in Finland:

- a variety of preservation may be registered in the national catalog of varieties only if the applicant has cultivated it for decades; to register the applicant needs the original owner's consent;
- is considered eligible for registration a local variety, an old trade variety or an European variety; an old commercial modified variety is that commercial variety that changed so much because of cross-pollination or environmental selection, that is different from the original variety;
- the local variety can be grown only in or near the geographical area of origin; during a vegetation cycle it will be submitted to DUS test;
- requirements for differentiation, uniformity and stability are not as stringent as for the modern varieties, but variety must be identifiable. When a variety of preservation is registered, it receives a name that should be acceptable and which is the sole identifier of the landrace. It will be used whenever the variety is used for seeds marketing. After harvesting is established the germination capacity and if the established standards are accomplished, the seeds will be approved for marketing.

- preservation varieties seeds may be sold only in Finland as opposed to modern seeds that can be marketed throughout the EU.

Since 2000 the Finnish farmer receives subsidies for *on farm* preservation of landraces. For this, he must go through the following conditions:

- he must cultivate the registered variety for a minimum of a year;
- he has to produce seeds for a sowing area of two hectares;
- he must guarantee that the variety is not mixed with modern varieties and is protected by cross-pollination [Paavilainen K., 2009].

Another example is Italy, where:

- preservation varieties can be registered only if they were grown in agro-ecosystems for at least 50 years;
- DUS tests are not necessary but it must be assured the variety distinction with its history;
- it has to be proved the cultural link between the cultural diversity and human local community;
- there are no demands on seed purity;
- it is allowed to sell small quantity of seeds to farmers of the area [Lorenzetti et al., 2009].

The European Commission, on November 26, 2009, complements the legislation with the Directive 2009/145/EC which sets certain derogations for acceptance of varieties of vegetables with no intrinsic value for commercial crop production, but designed to be grown in special conditions and for marketing of landrace and varieties.

Exemptions refer to the basic requirements concerning the acceptance of a variety and procedural requirements (Directive 2003/91/EC) of establishing a minimum number of features to be examined and the minimum conditions for examining certain varieties of vegetables (Directive 2002/55/EC, Article 7).

Directive 2009/145/EC brings a number of facilities for *in situ* preservation of vegetables varieties and mention the quantitative restrictions regarding the marketing of preservation seeds varieties in Member States.

The agricultural situation in Romania and the danger of genetic erosion to agrobiodiversity

In Romania the agricultural area is 61.8% of the country. 64.1% of the agricultural area is arable, pasture and hay 33% and 2.9% is occupied by
vineyards, orchards and nurseries. Since 1990 Romania's agricultural area decreased gradually due to the inclusion of land surfaces in the built cities and then, because the restitution.

Traditional agro-ecosystems are the most important deposits for in situ preservation of agricultural diversity intra-and inter-specific.

Suceava Gene Bank (BGS) is the most important institution in Romania which is interested in ex situ preservation of local varieties. The Gene Bank investigations prove the involvement of many farmers in the on farm preservation of agricultural species by growing local populations of grains, vegetables, industrial and technical plants and medicinal herbs [Ibănescu et al., 2002].

Within the Bank there are preserved 386 species of culture plants, with 17,704 samples. Through studies, Gene Bank has identified three areas of interest in Romania. Most landraces are concentrated in Apuseni Mountains, Bucovina and Maramures, mainly in villages that remained under communism non-cooperation and where modern technologies are not possible due to the relief.

The activity of Suceava Gene Bank requires both ex situ preservation of plant genetic resources and on farm preservation of old varieties and landraces. Regions of Maramures, Suceava and Apuseni Mountains are areas of interest for on farm preservation of local varieties. The richest genetic diversity preserved on farm is found in canned beans, corn and potatoes, vegetables, medicinal herbs and they include numerous local varieties, but are grown on very small surfaces. The traditional varieties are threatened by genetic erosion due to their replacement with modern varieties. The genetic erosion effects include destruction of habitats and ecosystems and labor migration abroad. The most critical situation is found in flax and hemp crops, where local varieties have disappeared almost entirely. The disappearance of local varieties is rising even on maize (three varieties in Suceava county, in 2008 and a landrace in Maramures and Apuseni Mountains), potato (five landraces in Bucovina and three in the Apuseni Mountains) and grain (grown only in Dorna Depression).

At the other extreme is the bean (Phaseolus vulgaris L.), in which case, in Maramures county are about 10 local varieties per household / farm.

For the on farm maintenance of agricultural genetic heritage, in Romania are imposed governmental measures and special politics, and development of a national preservation plan which involves farmers and small producers [Watchman et al., 2009].

Priorities of landraces conservation strategy in Europe

Landraces conservation strategy in Europe includes the biological material and also political, economical and social factors [ Veteläinen et al., 2009].

The Biodiversity International Organization supported by the Consultative Group on International Agricultural Research, establishes the following priorities:

- inventory methodology development of landraces;
- complete inventory of landraces by crop groups and regions;
- extinction and genetic erosion assement of landraces;
- on farm (in situ) preservation of landraces diversity;
  - farmer/grower studies on their prerequisites for continued management of landraces on farm;
  - allied to the maintenance of agricultural landraces on farm is the maintanance of garden landraces in home gardens;
- landraces and on farm information dissemination;
  - exploration of the links between landraces and on farm conservation in organic production systems;
- collection and ex situ conservation of landraces diversity;
- establishment of local seed depositories/community seed banks;
  - reinforecment of local cultural identity and linking local crops and different dishes with local culture;
  - the adoption of European legislation to boost maintenance and enrichment of genetic diversity in crop plants;
- public awareness and education.

References

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