



ECOBREED: Increasing the Efficiency and Competitiveness of Organic Crop Breeding

Geographical location	Slovenia
Main geographical location (NUTS3)	Osrednjeslovenska
Keywords	Plant breeding, Field crops, Organic farming
Main funding source	Horizon 2020 (EU Research & Innovation programme)
Project Identification	Multi-actor
Project type	Research project
Starting date	2018
End date	2023
Project status	Ongoing
Total budget	€ 6 263 830,90
Website	www.ecobreed.eu
Social media	Facebook (@ecobreed) & Twitter (@ECobreedP)
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Objectives of the project:

- To increase the availability of seeds and varieties for the organic and low-input sector.
- To identify traits and combinations of traits suited to organic and low-input production environment including high nutrient use efficiency and weed competitiveness/allelopathy.
- To increase breeding activities for organic and low-input crop production.

ECOBREED will increase the competitiveness of the organic and low-input breeding and farming sectors by:

- Identifying genetic and phenotypic variation in morphological, abiotic/biotic tolerance/resistance and nutritional quality traits that can be used in organic breeding.
- Evaluation of the potential of genetic variation for enhanced nutrient acquisition
- Evaluation of the potential for increased weed competitiveness and control
- Optimisation of seed production/multiplication via improved agronomic and seed treatment protocols
- Developing efficient, ready-to-use farmer participatory breeding systems
- Pre-breeding of elite varieties for improved agronomic performance, biotic/abiotic stress resistance/tolerance and nutritional quality
- Development of training programmes in (a) genomic tools/techniques, (b) PPB and (c) use and application of improved phenotyping capabilities.
- Ensuring optimum and rapid utilisation and exploitation of project deliverables and innovations by relevant industry and other user/stakeholder groups.

The Importance of Genetic Resources for Breeding

Problems

Genetic resource, search for it and identification, is the first milestone in a year's long process towards new variety formation. The contribution of the genetic resources towards the improvement of new varieties is estimated at 5-15 % and the contribution of variety innovation to the growth of the crop yield is estimated at 30-60 %. Effective use of the genetic resources assumes the best possible knowledge of the existing genetic variability of species, the biological properties of a wide set of varieties and breeding materials.

Solutions

Genetic resources are a unique and irreplaceable source of genes and gene complexes for continuous improvement of organisms' biological and production potential. The main goal for using plant genetic resources is to prevent the narrowing of genetic variability of individual crop species and to prepare a source of genotypes for further research and breeding programmes. The evaluation of genetic resources allows the appropriate selection of the starting material with required traits and characteristics, which will lead to the better effectiveness of breeding new varieties. Access and availability of genetic resources for the final users and also sufficient knowledge and information about these resources are preconditions for their efficient application.

Applicability box

Theme

Breeding and diversification experience

Geographic coverage

Worldwide

Application time

Permanent

Period of impact

Strategy building phase

Equipment

Storage in gene banks

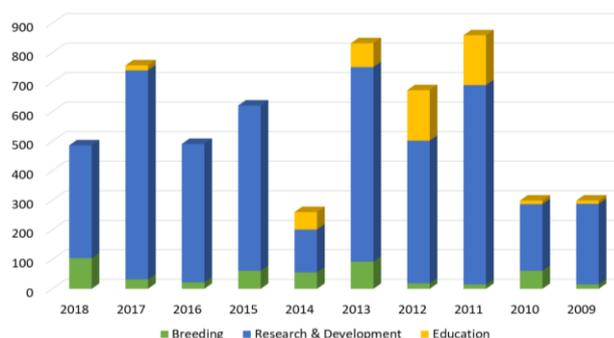
Best in

Planning of breeding initiatives

End users

Researchers and developers

Number of accessions provided by the Gene bank of Slovak Republic to different users from 2009 to 2018



Outcome

Every country preserves its plant genetic resources and uses them according to the international standards (FAO/IPGRI, 1994). Biological and genetic diversity in agriculture is important for the sustainable development of agricultural production and rural areas. Genetic resources are primarily used for:

- Diversification of agricultural production,
- Product quality enhancement,
- Optimal management and use of natural and agricultural resources,
- Improving the quality of the environment and nature,
- Identifying products for new ways of use and new markets.



Bean, Polana SVK (Foto Pavol Hauptvogel 2007).

Modern breeding methods reduce genetic diversity leading to the genetic erosion. Loss of genetic diversity can also be caused by other factors:

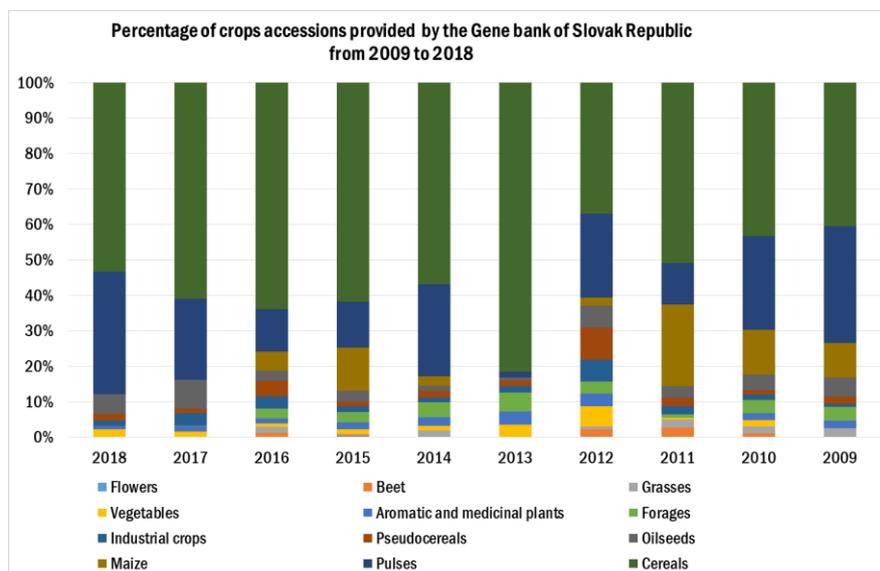
- Changes of the agricultural systems where traditional growing systems and cultivation of diverse regional populations are replaced by new growing systems and modern varieties with market importance,
- socio-economic changes affecting rural life,
- the overexploitation of pastures where uncontrolled cultivation of wild-growing species can lead to the destruction of native plant communities,
- loss or destruction of indigenous habitats caused by the increase of urban agglomerations, dams constructions, highways, etc.,
- the impact of better competitors, predators and pests, the introduction of foreign organisms (e.g. plants, pests and micro-organisms),
- natural disasters and pollution (drought, floods, disease epidemics, industrial pollution, etc.).



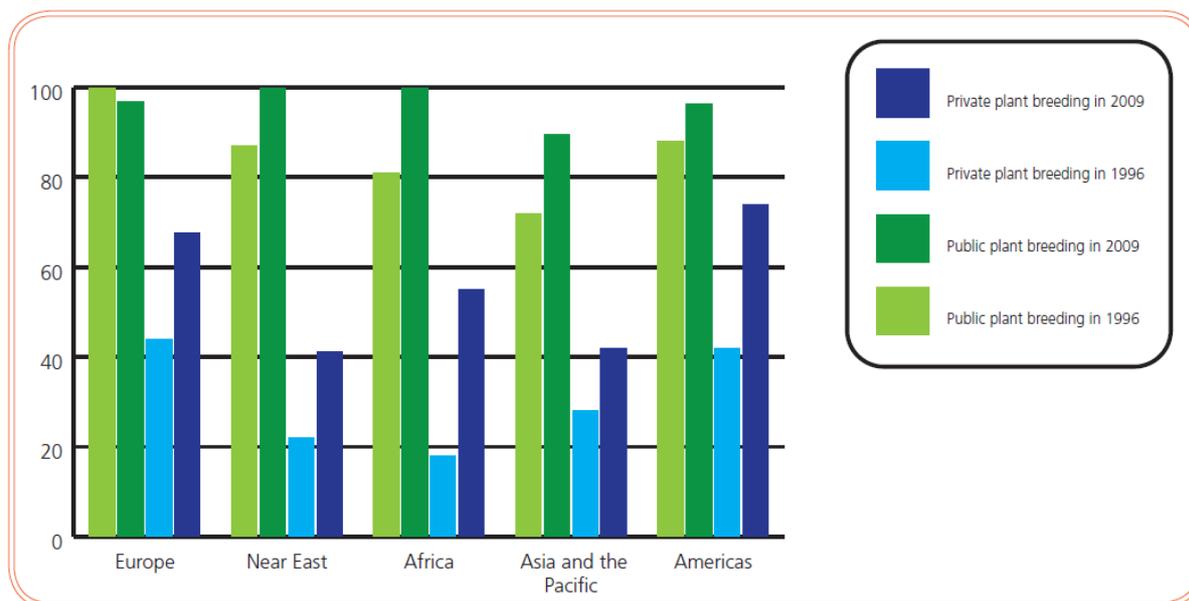
Harvest of barley on farm near Radošina SVK
(Foto Pavol Hauptvogel, 2008).

Practical recommendations

- Freely to develop and market new varieties, regardless of any patent claims extending to plant materials
- Strengthening breeding capacities and breeding programs for the development of value-added varieties
- Raising awareness about the importance of the plant genetic resources diversity and its contribution to the food security.
- Improve information technology and molecular biology progress
- Introduction of new techniques for the protection and use of plant genetic resources.
- Improve communication between breeders and seed companies and establish partnerships.
- Rationalize genebank collections.
- Improve documentation, characterization and evaluation of the genebank material.
- Adopt new tools such as geographic information systems and molecular analyses by national plant genetic resources programs.



Percentage of countries that reported the existence of public and private breeding programmes in the first and second SoW reports



Source: Data from a set of similar countries that presented country reports for both the first and second SoW reports, complemented with information from the GIPB-PBBC database (available at: <http://km.fao.org/gipb/pbbc/>).

Further information

- <https://griss.vurv.sk/>
- <https://grinczech.vurv.cz/gringlobal/search.aspx>
- <https://www.gzr.cz/>

Consortium

