

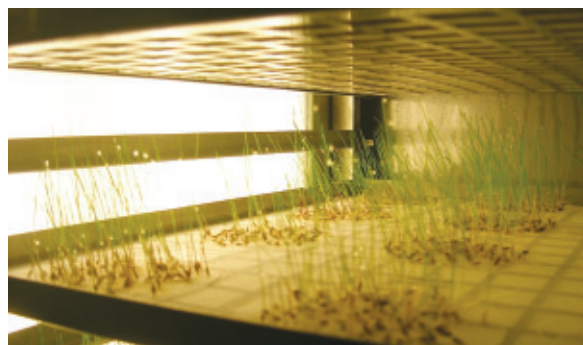
The age of AEGIS

Bioversity International's Lorenzo Maggioni and Jan Engels profile the system designed to conserve plant genetic resources across Europe...

The value of plant genetic resources in sustaining world food security and peoples' livelihoods has been recognised since the early 1900s. From this period onwards, collecting expeditions were carried out worldwide to find, conserve and use these resources for research purposes and in breeding programmes. In the 1970s, ex situ collections were promoted by international institutions, in particular by the Food and Agriculture Organization of the United Nations and the International Board for Plant Genetic Resources, as well as the International Plant Genetic Resources Institute. Furthermore, since the first half of the 20th Century, a number of countries in the Americas and Europe continued to collect threatened germplasm and/or material that were needed by plant breeders in these countries.

The genetic diversity that is conserved in germplasm collections maintained by gene banks is the base material that provides breeders with the possibility to face current and future challenges. Traditional targets of plant breeding are yield increase, resistance to pest and diseases, and tolerance to abiotic factors (drought, salinity, heat, cold, etc.). Emerging challenges and opportunities include the use of plant genetic resources for sustainable agriculture (ie. agriculture that does not compromise the ability of future generations to meet their needs) and for ecosystem services (ie. carbon sequestration, pest control, pollination, etc.). The widespread availability of genetic diversity is also the main asset in addressing the challenge of climate change and the consequent need for adaptation of cultivated crops.

In 1996, a Global Plan of Action (GPA) for the Conservation and Sustainable Utilization of Plant Genetic Resources for Food and Agriculture was launched. The GPA calls for a more rational conservation system based on better planning and more collaboration and coordination, while allowing individual countries to maintain their sovereign rights over Plant Genetic Resources for Food and Agriculture (PGRFA) that existed in their territories. The GPA does permit reductions in costs and places conservation work on a scientifically sound and financially sustainable foundation. More recently, the International Treaty on Plant Genetic Resources for Food and Agriculture, which entered into force in June 2004, has created a Multilateral System (MLS) for access and benefit sharing of plant genetic resources. It should be noted that this treaty regulates the exchange of germplasm that only



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belongs to a limited list of crops (so-called Annex I list), largely consisting of 35 major food crops and temperate grasses and forages. Germplasm included in the MLS have to be exchanged on the basis of an internationally agreed Standard Material Transfer Agreement (SMTA), thus providing for an equitable sharing of the benefits arising out of the use of PGRFA. Crops that are not included on the list (including such crops as soybean, peanut, tomato, Prunus and all of the several thousands of the so-called neglected and underutilised species) should be exchanged according to bilateral arrangements as indicated by the Convention on Biodiversity.

At the present time, PGRFA in Europe are conserved in some 600 institutions or collections scattered over more than 40 European countries. Considering that genetic diversity for most crop species crosses national borders, and that conservation and effective use in plant breeding programmes is facilitated when the entire gene pool is considered, the aim for a closer collaboration has always been a logical goal that is being shared and acknowledged by national programmes across Europe. However, there is still a rather low level of coordination and actual collaboration on conservation activities. There seem to be ample opportunities for improving this situation, particularly in terms of a more rational, regionally integrated approach, as well as with regard to the actual availability of germplasm.

The aims of AEGIS

Within the European region, the European Cooperative Programme for Plant Genetic Resources (ECPGR), involving 43 countries, aims at facilitating the long-term conservation on a cooperative basis and the increased utilisation of plant genetic resources in Europe. Within this framework, it was decided in 2004 to work towards

the establishment of an effective, efficient and rational European conservation system – with an initial focus on existing ex situ gene bank collections in European countries. The goal of AEGIS¹ is to create ‘a European gene bank integrated system’ for PGRFA, aimed at conserving the genetically unique and important accessions for Europe and making them available for breeding and research.² Such material will be safely conserved under conditions that ensure genetic integrity and viability in the long term. At the same time, efforts are ongoing to improve the quality of the information that has been generated with respect to individual accessions through so-called characterisation and evaluation efforts, as well as to improve the access to these data through the European Genetic Resources Catalogue EURISCO.³ The perceived benefits of this initiative consist of:

- Improved security of germplasm through long-term commitment and systematic safety-duplication;
- Facilitated access to and availability of germplasm;
- Improved quality standards of conserved material;
- Cost-efficient conservation activities;
- Reduced duplication of germplasm material;
- Improved sharing of knowledge and information.

European countries become members of AEGIS by subscribing to a Memorandum of Understanding, which is deposited at Bioversity International, as the organisation responsible for providing secretariat services for the ECPGR. As of May 2010, 20 countries were members of AEGIS (Albania, Azerbaijan, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, Georgia, Germany, Ireland, The Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Switzerland and Ukraine) and more are undergoing the necessary procedures to obtain the governmental signature.

The future of the project

In the next steps towards the implementation of AEGIS, its member countries will propose individual accessions as European Accessions, for which they are prepared to:

- Assume long-term conservation responsibilities according to agreed minimum standards;
- Ensure the safety duplication;
- To make the European Accessions available along with the pertinent information, in accordance with the principles defined in the SMTA of the International Treaty.

The SMTA will not only be used for the distribution of Annex I crops but the same terms and conditions will also be applied to the transfer of non-Annex I crops, thereby extending the multilateral system in Europe to cover all the crops.

The genetically unique and important germplasm accessions that will collectively form the to-be-established decentralised European Collection will be readily available for use, since it will be composed of material under the management and control of the member countries and in the public domain. The establishment of AEGIS is



AEGIS aims to create an integrated European system to conserve germplasm

currently coordinated by the ECPGR Secretariat and is expected to be implemented within the next few years, at a variable speed that will depend on the level of funding that suitable donors (prominently and ideally the European Union) will decide to invest in the process.

Within the framework of ECPGR, the AEGIS initiative has recently become the top priority, thereby focusing the efforts of the 43 European member countries of ECPGR towards the issue of efficient conservation of the plant genetic resources for the present and future generations.

Overall, breeders, as well as other researchers and users of the conserved germplasm, should in the end be the major beneficiaries of the AEGIS system, since it is expected that a more rational and efficient conservation system will be able to offer well documented and characterised accessions from all crops, adequately conserved for the long term according to high quality standards and permanently available under uniform, clear, equitable and standard conditions for transfer and subsequent use.

¹ www.aegis.cgiar.org

² ECPGR. 2009. A Strategic Framework for the implementation of a European Genebank Integrated System (AEGIS). A Policy Guide. European Cooperative Programme for Plant Genetic Resources (ECPGR). Bioversity International, Rome, Italy – www.bioversityinternational.org/publications/publications/publication/publication/-0a7ad9ed4e.html

³ <http://eurisco.ecpgr.org>

The images within refer to the Institute IPK, Malchow/Poel, Germany



Lorenzo Maggioni
ECPGR Coordinator



Jan Engels
AEGIS Coordinator
Bioversity International
Tel: +39 06 6118 222
www.ecpgr.cgiar.org

