Workshop COST E52 "Evaluation of beech genetic resources for sustainable forestry"

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The main objective of the COST Action E52 "Evaluation of Beech Genetic Resources for Sustainable Forestry" is to make predictions of the future distribution range of beech forest ecosystems under the assumption of certain scenarios of climate change, based on the analysis of the reaction pattern of European beech populations of defined origin (progenies of natural beech stands) under changed climate situations in sets of pan European field trials. The results obtained will facilitate the joint evaluation of the genetic resources of beech for better economic utilization under observation of the requirements for a sustainable forest management. The MC5 and WGs meeting of the COST Action E52 has been held from the 17th to the 19th of April, 2008, in Florence (Italy). During this workshop oral presentations on beech have been given, and a selection of them is reported in the current issue of this journal.

Keywords: ***Fagus sylvatica*, Climate change, Provenance trials, Genetic variability**

Human influences on earth's climate are becoming more and more obvious. Several climate observations have proven the existence of global warming trends that are in accordance with variations in phenology and range boundaries of different biota. Forest ecosystems are particularly sensitive to climate change, because the long life-span of trees does not allow for rapid adaptation to environmental changes. But at the same time several sources indicate that trees have efficient strategies and mechanisms at different levels (single trees, populations, ecosystems) that act to support evolutionary adaptation as result of their different levels of genetic diversity.

European Beech (*Fagus sylvatica* L.) is a major and wide-spread forest tree species with a natural occurrence from Scandinavian to Mediterranean countries and ranging from the marine influenced climate in West-Europe to the more continentally influenced countries in Central and South-Central Europe, covering an area of roughly 14 million ha of forest land. Beech is not only of interest for economic reasons. It is also of high ecological and silvicultural value and acts to stabilize forest ecosystems. Beech forests are beneficial for the production of ground water and the regeneration of depleted soils.

Beech is a dominating species in many forest ecosystems. Other species of these ecosystems depend on co-existence with beech. Beech is thus viewed as a flagship species of many ecosystems because they would not exist in this form if beech were not present.

Due to its wide range of distribution, dominating position in ecosystems, and its functional flexibility and large genetic plasticity, beech could be utilized to study wide reaching influences affecting plant growth, *e.g.*, climate factors in different parts of Europe.

The genetic variability in many ecophysiological and life history traits introduces a substantial source of uncertainty into models that are conceived to simulate shifts in species composition under climate change conditions. If left alone, these shifts will appear as mass mortalities instead of gradual successional changes. Therefore, the variability in these traits and the speed with which specific alleles can increase in frequency in a given population need to be studied.

The COST Action E52 "Evaluation of Beech Genetic Resources for Sustainable Forestry" (http://www.bfafh.de/inst2/cost_e52/index.htm) has been approved on 14/06/2005 and twenty-two European countries have agreed to participate.

The main objective of this COST Action is to make predictions of the future distribution range of beech forest ecosystems under the assumption of certain scenarios of climate change, based on the analysis of the reaction pattern of European Beech populations of defined origin (progenies of natural beech stands) under changed climate situations in sets of pan European field trials.

This objective can be fulfilled by evaluation of data from provenance trials located in most of the regions of beech occurrence. The trial data will show how well populations have adapted to certain site-inherent environmental features, *e.g.*, limited water availability, late frost occurrence, acidic or calcareous soil, etc., how non-adapted populations react to such situations, and how successfully they might cope with them. This is of great significance for formulating evaluation criteria to be able to assess the value of a given population with respect to the conservation of the genetic resources of beech.

The results obtained will facilitate the joint evaluation of the genetic resources of beech for better economic utilization under observation of the requirements for a sustainable forest management.

The workshop of COST E52 has been held from the 17th to the 19th of April, 2008, in Florence (Italy). During this workshop oral presentations on beech have been given, and a selection of them is reported in a special collection of the current issue of the journal iForest - Biogeosciences and Forestry.