

Scientific Summary 2 Related to IUFRO News 10, 2007



Norway Spruce in the Conservation of Forest Ecosystems in Europe

By Janusz Sabor, Coordinator of [IUFRO 2.02.11](#)

International conference on "Norway spruce provenances and breeding" by IUFRO Working Party 2.02.11 from 3 to 5 September 2007 in Warszawa, Malinówka and the area of the Warszawa and Białystok Regional Directorates of State Forests (Wyszków, Knyszyn, and Goldap Forest Divisions), Poland. At the conference the following proposals were formulated:

Norway spruce, one of the most important European forest tree species, is threatened by climate and other environmental changes. The danger, which is especially grave in Central Europe, calls for effective action to protect the valuable populations of spruce: Multidisciplinary teams are necessary to help solving the problem of spruce eradication, and to halt the negative trend in Europe. Optimum economic programs for spruce need to be elaborated considering the new ecological circumstances. New breeding programs must be developed, primarily with the aim of increasing the production of spruce, as well as developing a greater hardiness to the new climatic conditions. The IUFRO Working Party 2.02.11 in collaboration with EUFORGEN will set up an action program for the coming years, which will involve the conservation of forest genetic resources.

In the light of the climate changes and predicted moving of provenances, the results of the IUFRO 1964/68 and IUFRO 1972 series of provenance experiments are extremely important. Both series should be taken special care of by the IUFRO WP on "Norway spruce provenances and breeding". All the measurement data from different sites and countries should be centralized, and jointly evaluated and published. It is necessary to collect current data from IUFRO 1964/68 and IUFRO 1972 experimental plots to determine the breeding value of the provenances under study, and define the possibility of using or restituting them in the changing environmental (climatic) conditions. The provenance experiments spread all over Europe and North America are real *ex situ* gene banks preserving the genetic diversity of Norway spruce. They need special care as a possible source of material for the restitution of some declining populations.

There is an urgent need to undertake studies aimed at predicting the response of spruce populations to the changing climatic conditions on both new and existing



Photo provided by Janusz Sabor

experimental sites. Consideration should be given to establishing test plantations under the conditions atypical of existing populations (e.g. in Scandinavia for Polish populations) or at a different altitude. In view of the declining health condition of spruce stands, it is also necessary to consider lowering the cutting age of spruce.

Genetic research is a fast-expanding area in population genetics and phylogeographic-genetic investigations, making it possible to reconstruct some re-immigration routes of spruce after the last glaciation. We should continue with the tests on spruce provenances, but within a new IUFRO cycle we need to pay attention to southern and marginal provenances of spruce from southern and southeastern Europe that for many years now have been exposed to higher temperatures than those from the North, and that perhaps have proved to be more resistant and resilient than those coming from the central and northern parts of Europe. New approaches, based on clone testing and reproduction, should be adopted to evaluate the breeding populations of spruce.

DNA polymorphism-based studies in the field of forest tree genetics should consider the genes coding specific breeding and resistance traits. Understanding the regulation mechanisms of gene expression in the presence of external factors (climate changes, fungal pathogens, insect pests) will enable the implementation of a rational strategy on the preservation of the spruce genetic resources.

Conference co-organizers: General Directorate of State Forests, Department of Genetics and Tree Physiology of the Forest Research Institute (IBL), Department of Forest Trees Breeding, Faculty of Forestry, Agricultural University of Kraków. The meeting was held in parallel with the IUFRO 2007 European Congress Forests.

The conference was attended by 95 participants from 10 European countries: Austria, Bosnia and Herzegovina, Czech Republic, Germany, Finland, Lithuania, Poland, Slovakia, Sweden and Ukraine. Altogether, 20 papers were presented in 3 topic areas: 1. Variability and genetic breeding value of spruce provenances in provenance trials; 2. Role of spruce in forest ecosystems. Current state of species protection. Programmes for selection and gene pool conservation; 3. Genetic polymorphism of spruce. Genetic markers.

The conference materials will be published in the next issue of *Dendrobiology*. [Meeting report.](#)