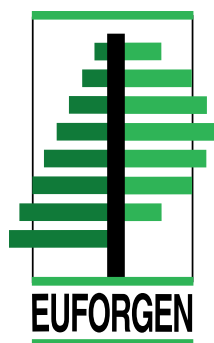




Conifers Network

Summary of the third meeting

Kostrzyca, Poland, 17-19 October 2003



European Forest Genetic Resources Programme (EUFORGEN)

Third EUFORGEN Conifers Network Meeting

Introduction

Jan Matras welcomed the participants on behalf of the local organizers. He introduced his colleagues from the Forestry Research Institute, and representatives from the State Forest Service and other institutions who attended the meeting as observers.

Csaba Mátyás, Chair of the Network, welcomed the participants from 25 countries and thanked the local organizers for the arrangements. The Chair reiterated the importance of producing visible and useful output, which not only supports conservation activities in the participating countries, but at the same time serves as awareness-raising material for wider professional circles, for decision-makers and for the public in general.

Jozef Turok, EUFORGEN Coordinator, presented the agenda and summarized the progress made in implementing the joint tasks of the Network since the last meeting. He introduced Michele Bozzano, Temporary Scientific Assistant working with the EUFORGEN Secretariat. He also announced the arrival of the new EUFORGEN Coordinator, Jarkko Koskela, who will take up his responsibilities as of 1 January 2003.

The agenda of the meeting was adopted. All participants then briefly introduced themselves. Jan Matras, Giovanni Vendramin, Bruno Fady and Csaba Mátyás agreed to chair sessions during the meeting. Tore Skrøppa, Giovanni Vendramin, Armin König and Jan Matras agreed to act as discussion leaders for the four ecogeographic working groups. The following rapporteurs were nominated: Tore Skrøppa, Giovanni Vendramin, Sam Samuel, John Fennessy and Michele Bozzano.

Country reports: status and progress made in gene conservation of conifers

Network members were divided into four working groups to discuss progress made in the four ecogeographic subregions of Europe. A representative of each working group gave a presentation summarizing the status and progress in the following plenary session (see working group summaries below). Updates from each country concerning conservation and use, inventories, relevant policies and legislation, research, tree improvement, public awareness and perspectives will be posted on the IPGRI Information Platform (www.ipgri.cgiar.org/networks/euforgen/default.asp) (see the section on 'Documentation, information and public awareness', page 16).

The importance of the participation and involvement of all European countries in the EUFORGEN Network was stressed by all working groups. This is particularly important as the Network moves towards common systems for sharing information and making it available to researchers, scientists and policy-makers.

The working groups strongly supported the concept of combining information on ecological importance and genetic diversity of target species with all available conservation strategies (e.g. habitat-oriented) at a European level.

All participants will provide the Secretariat with an electronic version of their country report or country update, in the agreed format, by 31 October 2002. Each update should carry a date of completion.

Northern Europe working group

Participants: Estonia, Finland, Lithuania, Norway, Sweden

The group regrets that Latvia is missing from EUFORGEN and encourages Latvia to actively participate in the activities of this Network.

Politicians in the Nordic countries have recently focused on genetic resources in agriculture and forestry. The Nordic Council of Ministers has developed a Nordic gene resource strategy. A proposal for a strategy on genetic resources of forest trees has been completed and will be discussed in the near future. Public awareness about the value of genetic resources and their management has been given high priority in the Nordic

countries, and an annual publication combining three sectors (animal husbandry, agricultural plant production and forestry) has been launched.

The percentage of seeds used from seed orchards is increasing in several countries. In Finland, 70% of Norway spruce seeds and 60% of Scots pine seeds are produced in seed orchards, and in Lithuania and Estonia the proportion is about 50% for both species.

In Lithuania, fragmentation of formerly continuous conifer forests is a major problem. Electronic maps (GIS system) of all forests and genetic reserves are available. Three new laws have been passed by the government; one on protected landscapes, one on plant genetic resources, and one amending the forest act. Common definitions are used in all laws, and the regulations for forest trees are according to the EC Directive on forest reproductive material. The number of gene reserves for Norway spruce has been reduced, resulting in larger-sized areas.

In Estonia, 1.5-generation seed orchards have been established for both Norway spruce and Scots pine. A working group has been established to develop a strategy for the seed requirements for the next 30 years. Provenance trials with Scots pine show that the local provenances generally have the best performance.

In Norway, combined seedling seed orchards and gene conservation stands of Norway spruce have been established for the northern areas, based on large numbers (200–400 per zone) of half-sib families from natural stands. The family identity of individual seedlings has been kept, and thinning can be done on the basis of information from progeny tests planted at the same time.

Mediterranean working group

Participants: Bulgaria, Cyprus, France, Italy, Spain, Turkey

The discussion focused on the five target species: *Abies alba*, *Picea abies*, *Pinus pinaster*, *Taxus baccata* and the *Pinus halepensis/brutia* species complex. The importance of these species is very different in each country: for example, *Picea abies* is economically important in Bulgaria, France and Italy but *Pinus brutia* is the most relevant species for Turkey and is the only conifer of importance in Cyprus.

Other conifer species that are not represented on this list are also of economic and ecological interest in this subregion: various *Abies* species, *Cupressus* species, *Pinus sylvestris*, the *Pinus nigra* species complex, *Pinus leucodermis/heldreichii* and *Pinus pinea*. The Mediterranean is well known to have a high overall level of biological diversity, which deserves conservation efforts. In some countries, the genetic resources of some of these species are already conserved or some conservation plans are being developed.

The discussion focused on two main points: new research knowledge and new activities in sustainable management of conifer genetic resources.

For species of major ecological and/or forestry importance, the amount of scientific knowledge relevant for gene conservation is quite impressive. Recently, knowledge of the genetics of the less economically important species of the Mediterranean has increased, but this knowledge may not be exploitable for practical conservation. Neutral and adaptive diversity must be used together for a truly integrated approach to conservation. Recent projects have concentrated on the characterization of genetic resources using combined approaches involving neutral and adaptive molecular markers (e.g. *Pinus pinaster* and *P. halepensis*). Although each country has some level of conservation activity, conservation of widely distributed species needs to be addressed on an international scale as well.

Genetic information based on molecular markers is now available for *Picea abies* and *Pinus pinaster*, and soon will be for *Pinus halepensis*. Other important scientific results have recently been obtained on colonization dynamics, gene flow and hybridization processes for these species as well as *Abies alba*. Methods for provenances and seed lot identification were developed for *Pinus pinaster* and can be applied to other species.

New provenance trials and progeny tests for *Pinus brutia*, *Pinus halepensis* and *Pinus pinea* have been established jointly during the past few years in several Mediterranean countries.

Results from research activities were used to design or expand already existing conservation networks.

- *In situ* conservation:
 - In Spain, conservation areas were identified for *Pinus pinaster*, *Pinus halepensis* and *Abies alba*.
 - In France, additional units were chosen for the *Abies alba* conservation network.
 - In Cyprus, a new inventory of the distribution of *Pinus brutia* populations was carried out.
 - In Turkey, 50 *Pinus brutia* gene conservation units were identified and the number of *Pinus brutia* selected seed stands was increased.
 - In Bulgaria, the number and size of *Picea abies* and *Abies alba* selected seed stands was increased.

Ex situ conservation :

- Clone banks: In Spain, 50 *Taxus baccata* clones were selected and in Turkey there are now approximately 2500 *Pinus brutia* clones in four different clone banks.
- Seed banks: In Spain and Italy, the number of populations stored increased for *Pinus pinaster* and *Pinus halepensis*.
- DNA banks: In France, Italy and Spain, DNA fragments isolated from populations of *Abies alba*, *Pinus halepensis*, *Pinus pinaster*, *Pinus brutia* and *Picea abies*, stored at -80°C , are available.
- Additional initiatives:
 - Several databases including molecular genetic and ecological data were created at national and international levels for target species.
 - Spain organized a course dealing with conservation of forest genetic resources for forestry practice managers.
 - In Cyprus, legislative measures were taken to prevent the introduction of insects and pathogens from other countries.
 - The new EC Directive 1999/105/EC enters into force on 1 January 2003. France and Spain have already transposed it into national legislation with some enhancements (*Taxus baccata* was included in Spain).

Western Europe working group

Participants: Austria, Belgium, Germany, Ireland, Switzerland, United Kingdom

In terms of forests and forestry, there is a big contrast between the north-west European countries and those in the south-west of the subregion. The forest area in Ireland and the UK amounts to 9% and 11% respectively, whereas it is 30% in Switzerland and 47% in Austria. In Ireland and the UK the main coniferous species, *Picea sitchensis* and *Pseudotsuga menziesii*, originate from Pacific North America. In Belgium the main coniferous species is *Picea abies*, far ahead of *Pinus sylvestris*, *Pseudotsuga menziesii* and *Larix* sp.; all of these are exotics. In these western European countries only *Juniperus* sp. and *Taxus baccata* occur naturally. Additionally *Pinus sylvestris* is native in northern parts of Scotland, and by some is also considered to be so in Ireland. Seed collection sources are approved in the UK as a basis for extension of existing areas and creation of new woodland of this type. Ireland, the UK and Belgium aim to increase their forest areas. This increasingly favours native species.

In Austria, Germany and Switzerland several conifers have a high economic importance, especially *Picea abies*, *Pinus sylvestris* and *Larix decidua*. *Abies alba*, which has suffered heavily from air pollution, seems to be recovering slightly. In past years there has been a trend to transform non-natural pure conifer stands into stands closer to nature, in which broadleaved species are favoured. Where natural regeneration is practised, the consequence is a reduced collection in seed stands and a reduced artificial plant production.

The member states of the EU are completing the harmonization of their national legislation on forest reproductive material with EC Directive 1999/105/EC. The regulations have an impact on forest genetic resources.

In Ireland and the UK, no formal policy of gene conservation has been formulated but the process has started in both countries. Sitka spruce and Douglas fir are the subjects of breeding programmes but not of any real active genetic conservation programme.

In Belgium, no active long-term management of forest genetic resources has been initiated so far, but conservation of these resources is indirectly made through the breeding programme (seed stands, field tests, seed orchards).

Germany has established a concept for the 'conservation and sustainable use of forest genetic resources'; this concept has been revised in recent years and a new version (in German and in English) was published in 2000 (available at www.genres.de/fgrdeu/). A working group comprising members from each state as well as from federal organizations is responsible for implementing the programme. The latest working plan was established for the period 2001–2004.

Ireland and the UK do not have gene conservation units other than for Scots pine in the UK, which remains to be collated.

Belgium does not have any either, but there is an intention to make two of the *Picea abies* selected seed stands representative for the 'Ardenne' landrace.

In Germany, gene conservation stands have been delineated mainly in regions where the respective species is endangered. In regions where a species occurs frequently, such as *Abies alba* in southern Germany, integration of conservation into forest management is considered to be the best concept. Seed stands are also conservation stands. Protection is secured by self-regulation of the forest administration.

Switzerland is creating a network of *in situ* gene conservation units for the main coniferous species.

Austria has established a network of gene conservation units since 1986, considering stands in all ecoregions. In total 7000 ha (net coniferous area) has been declared explicitly for conservation purposes.

Central and Eastern Europe working group

Participants: Azerbaijan, Czech Republic, Georgia, Hungary, Poland, Slovakia, Slovenia, Yugoslavia F.R.¹

The discussion concentrated on five main topics: species priorities, progress made in *in situ* and *ex situ* conservation measures, changes in legal background and new research activities in each country. The newly participating countries—in particular Azerbaijan and Georgia—proposed to incorporate additional species to be considered within the priorities of the Conifers Network (especially *Abies nordmanniana*, *Picea orientalis*, *Pinus eldarica*, *Pinus kochiana* and various *Juniperus* species).

There were great differences among countries in the progress reported for *in situ* and *ex situ* gene conservation during last two years. New gene reserves specifically selected for gene conservation purposes were created in Hungary, Poland, Slovakia, Slovenia and Yugoslavia. In Azerbaijan and Georgia, new nature reserves were designated, which also fulfil *in situ* gene conservation objectives. Considerable progress with regard to *ex situ* conservation was reported by Poland, Slovakia, Slovenia and Yugoslavia.

Nearly all the countries of this subregion mentioned the ongoing process of adapting national regulations on forest reproductive material to harmonize with the new EC Directive. Additional legal documents with relevance to the subject were highlighted: for gene reserves in Slovakia, biodiversity in Slovenia, the forest act in Georgia and biodiversity protection in Azerbaijan.

Relevant inventory and research activities were mentioned: a recently completed inventory of *Taxus baccata* in the Czech Republic; an ongoing forest management project in Georgia; an inventory of lowland occurrences of *Taxus baccata* in Hungary; DNA analyses of spruce and pine variability in Poland; a mountain forest project in Slovakia; molecular and

¹ Since February 2003 the Former Republic of Yugoslavia has been known as Serbia and Montenegro.

biochemical databases in forestry in Slovenia; and identification of genetic bases for forest seed and seedling production in Yugoslavia.

Visit to the Kostrzyca Forest Gene Bank

The Kostrzyca Forest Gene Bank is one of the most recently built, state-of-the-art facilities for long-term storage of forest tree seeds in Europe. It is located in one of the forest areas that has been most damaged by industrial air pollution. This emphasizes the importance of the role and activities of the gene bank.

The laboratories of the gene bank are fitted with equipment from suppliers around Europe for the entire seed preparation process and long-term storage. The gene bank is authorized to issue seed quality certificates, according to both national and international standards (more information is available at www.lbg.jgora.pl). Facilities include a nursery for the production of container plants and nursery stock, as well as a 4.32-ha arboretum. New laboratories are planned for molecular research, including isoenzyme and DNA analyses.

This Network meeting, some of the sessions of which took place at the gene bank, was an excellent opportunity for discussing the collaborative work on conifers in Europe, including the particular role and challenges of gene conservation in forest tree gene banks. The participants visited the facilities and had the opportunity to discuss the work of the gene bank on the first day of the meeting.

Implementation of genetic conservation strategies and guidelines

Jozef Turok introduced the policy context for discussion about future steps in implementing the common conservation strategies and guidelines for selected conifers in Europe. He presented the structure, history, current developments and perspectives of the process of Ministerial Conferences on the Protection of Forests in Europe (MCPFE). The next Ministerial Conference will be held in April 2003, in Vienna. A draft 'Vienna Declaration', four 'Special Items' and a number of annexes are currently being developed for the Conference.

The EUFORGEN Steering Committee prepared a brief statement for the attention of the Conference. The statement refers to the follow-up work made at international level with regard to Strasbourg Resolution S2 and outlines the perspectives for future collaboration in Europe, with the overall objective "... to tie the island of gene conservation to the continent of sustainable forest management. . ." This statement was brought to the attention of the last MCPFE expert level (preparatory) meeting held in October 2002. It was noted, however, that the MCPFE Liaison Unit did not incorporate the statement into new draft commitments. The Network meeting therefore proposed that this statement should be brought to the attention of national representatives in the MCPFE process, especially those of the lead countries (Poland, Austria, Norway and Portugal).

The meeting also expressed the need to inform the environment process, the Pan-European Biological and Landscape Diversity Strategy (PEBLDS), about the importance of genetic diversity in forest conservation in Europe. Network members were encouraged to contact the country representatives in this process.

Jozef Turok also presented the main outcomes of the last EUFORGEN Steering Committee meeting, held in Jönköping on 30 June–1 July 2002. The Steering Committee evaluated the progress made during the first part of Phase II and provided recommendations for the remaining period, as well as an outlook for future collaboration. The Steering Committee highlighted the need to focus current activity in the Networks on finalizing species-specific technical guidelines.

Technical guidelines for selected conifer species

Four species modules were developed following the purpose, target audience, structure and format, which were agreed at the previous Network meeting in Spain. These draft modules were introduced during the meeting:

- *Picea abies* (Norway)
- *Pinus pinaster* (Spain)
- *Pinus brutia/halepensis* (France and Italy)
- *Taxus baccata* (Slovakia).

The authors were commended for the excellent work done on the four modules since the last meeting.

Michele Bozzano presented the edited technical guidelines on *Fraxinus excelsior* produced by the Noble Hardwoods Network for illustration and reference.

It was agreed that the authors will incorporate the comments and suggestions received during the meeting or shortly after (comments can be sent to authors until 31 October 2002), and will circulate advanced versions, through the Secretariat, no later than 30 November 2002. The Secretariat will ensure that introductions, distribution maps and terminology are harmonized throughout the modules developed by the different Networks (it was agreed that authors need not include an introduction in their modules). The authors were encouraged to use figures and images to illustrate text. They were reminded about the text limit of 1200 words (excluding introduction and references). The bibliography should consist of no more than five important references that are widely available. The first set of technical guidelines in the form of species modules will be produced before the MCPFE in April 2003.

The module on *Abies alba* will be added to the first set of species, according to the original agreement. The module on *Taxus baccata* will incorporate relevant outcomes of the research work done recently on the species (see pages 26–35).

It was proposed that five new species modules will be developed and presented at the next Network meeting:

- *Pinus sylvestris* (Hungary, UK and Sweden)
- *Pinus nigra* (Yugoslavia, France and Turkey)
- *Pinus cembra* (Switzerland and Slovenia)
- *Larix decidua* (Poland)
- *Juniperus communis* (UK, Caucasus countries)

Interest was expressed in developing additional species modules, which was appreciated by the Network members. Network members will confirm the availability of their countries to contribute to additional modules before 31 December 2002.

Sharing of conservation responsibilities—case study on *Picea abies*

Following the workplan made during the last Network meeting in Spain, the Secretariat has devoted resources to compiling distribution maps with georeferenced *in situ* gene conservation units² for *Picea abies* as the selected pilot species. Five countries provided information on their *in situ* gene conservation units.³ The results of this work were presented by Michele Bozzano. He explained the compilation of distribution maps using different sources of data and introduced the different software packages and information available to date. An additional source of good maps (<http://dendrome.ucdavis.edu/Image/Rangemap/index.html>) was mentioned.

² **Gene conservation unit:** A common term for all units in which genetic resources are maintained, including gene reserves, *in situ* and *ex situ* gene conservation stands or populations, seed lots stored in genebanks, clone collections, seed orchards and arboreta.

³ ***In situ* conservation:** conservation of genetic resources ‘on site’, in the natural and original population, on the site formerly occupied by that population, or on the site where genetic resources of a particular population developed their distinctive properties. Although usually applied to stands regenerated naturally, *in situ* conservation may include artificial regeneration whenever planting or sowing is done without conscious selection and in the same area where the reproductive material was collected.

The discussion highlighted the importance of this work for coordinating, harmonizing and sharing conservation responsibilities in Europe. The minimum common information standards were discussed.

All countries were requested to provide feedback on the distribution map and to send information on designated gene conservation units for the pilot species. In consultation with the Chair, the Secretariat will circulate a note specifying criteria and format, and requesting input from all countries before 31 October 2002. The input will be provided by all countries before 30 November 2002. Representatives from countries not present at the meeting will also be contacted by the Secretariat.

It was emphasized that the identification of *in situ* gene conservation units for inclusion in a pan-European network will be jointly discussed by the Network on the basis of the information supplied by each country. The public-awareness value of updated distribution maps with cross-border networks of gene conservation units was stressed.

'Best practice' in genetically sustainable silvicultural management

Csaba Mátyás, Chair of the Network, outlined the concept of a publication that would describe genetic aspects of sustainable silviculture. The document should cover genetic considerations relevant for the use of reproductive material, silvicultural treatment and regeneration of forest stands. It should include principles of monitoring genetic sustainability and a chapter on balancing forest management, nature and specific gene conservation. Such a document has recently been published in Hungary. Csaba Mátyás offered to produce an English version, which will be circulated for comments to the Network. The document, approximately 10 pages long, could be proposed for adoption either as a Conifer Network publication or as a more general EUFORGEN publication.

Technical support for policies on use of forest genetic resources

It was felt that in order to keep genetic considerations in focus, linking gene conservation to sustainable forest management is essential. Csaba Mátyás proposed that EUFORGEN Networks could offer advice and technical support to European forest policy in the area of use of forest genetic resources. First steps in this direction have already been taken by producing technical guidelines. The expertise and the available information (at both national and common level) would enable EUFORGEN to play an advisory role in facilitating the appropriate use and maintenance of forest genetic resources. It was felt that further elaboration of this idea would be needed and Csaba Mátyás agreed to produce a proposal that will be discussed at the next meeting.

Research

Tore Skrøppa gave a brief report on the EU-supported Adaptability project, which studied the effects of the female reproductive environment on the phenotypes of Norway spruce offspring. DNA methylation may be the epigenetic regulatory mechanism that explains why identical genotypes produced under different environmental conditions have different phenotypes under the same environmental conditions.

Giovanni Vendramin reviewed recent studies of genetic variability based on neutral molecular markers and discussed their implications for gene conservation. He presented as an example some results from the EU-funded CYTOFOR project, in which 22 forest tree and shrub species were studied using molecular markers and fossil pollen. This project demonstrated the usefulness of phylogeographic studies in understanding the importance of migration patterns in shaping current genetic and geographic diversity. This is a relevant approach to designing conservation strategies but is of little value in understanding adaptability patterns. This is why new types of molecular markers are being developed for Norway spruce as well as *Pinus pinaster* and *Pinus halepensis* (for example, single nucleotide polymorphisms [SNPs] in the expressed region of the genome). They have a great potential in the study of adaptive traits.

Csaba Mátyás questioned the use of neutral genetic markers for the conservation of genetic resources. These markers have been useful for characterizing common origins of populations and their postglacial migration routes, and for studies of mating systems. They have less potential for characterizing genetic diversity in adaptive traits and the adaptive potential of populations. He stressed the need to bring the two approaches together so that genetic markers can also be used to study the adaptability of populations and effects of selection. The new type of markers may be a first step in this direction.

Bruno Fady highlighted the necessity to use both neutral and adaptive approaches. In the face of environmental changes, populations will migrate or adapt, or both. Knowledge of both mechanisms is necessary for gene conservation.

Jozef Turok mentioned the Conference on the Dynamics and Conservation of Genetic Diversity in Forest Ecosystems (DYGEN) (see www.pierroton.inra.fr/genetics/Dygen/), which will be held in Strasbourg, France on 2–5 December 2002. It will bring together approximately 300 scientists in the field of population genetics and conservation of forest genetic resources. Introductory review presentations will be given by leading scientists and major achievements of the different projects dealing with forest genetic resources financed by the EU will be presented. EUFORGEN has been involved in the preparation of the conference, and the coordinator and Network chairs are members of the scientific committee. Network activities and strategies will be presented at poster sessions.

Csaba Mátyás presented the outline of a poster to be produced by the Conifers Network. It would focus on the target species of the Conifers Network. Ideas, pictures or maps should be sent to him before 31 October 2002. It was suggested that a EUFORGEN poster could be made to present the common goals of all Networks.

Jozef Turok gave a short presentation on the EU Sixth Framework Programme for research 2002–2006 (www.cordis.lu/rtd2002). It contains seven thematic priorities. The research on forest genetic diversity fits into the priority ‘Sustainable development, global change and ecosystems’. The most relevant activity for the Network is ‘global change and ecosystems’, in which genetic resources are specifically mentioned.

Two instruments are available to implement these priorities:

- Integrated projects (IP), which are large in scale and scope. Only highly integrated projects will be funded and multidisciplinary approaches are needed. Their goal is to produce new scientific knowledge.
- Networks of excellence (NoE); large networks of research centres. Their goal is to structure the European research community more efficiently.

Expressions of interest were submitted in the summer of 2002, and EUFORGEN was involved in the preparation of two of them: Diversity of European Forest Trees (EVOLTREE), a NoE led by A. Kremer, INRA, France; and Genetic Resources and Changing Ecosystems (GRACE), an IP led by N. Maxted, University of Birmingham, UK.

The programme will be launched in November 2002, and first calls will most likely be published in early 2003. Participation will be from a larger number of countries than in earlier programmes. EUFORGEN Networks were invited to act as a catalyst to bring together scientists and end-users to prepare projects in the field of forest genetic resources.

Documentation, information and public awareness

Michele Bozzano presented the recently updated EUFORGEN Information Platform (www.ipgri.cgiar.org/networks/euforgen/default.asp), through which the documentation produced by EUFORGEN Networks is now accessible. Country reports and updates are maintained in a database-driven system that facilitates searching through the information.

Information on the current status and progress made in the conservation of genetic resources (*in situ* and *ex situ*), which has been available as tables, will be stored in the database in order to provide a complete picture of forest gene conservation in Europe.

Michele Bozzano briefly presented the EUFORGEN bibliographic database on grey literature. The database has been frequently used online from the web page. An improved

Access form will be circulated to Network members to avoid the problem of duplicate references. It was noted that contact information for the author (or contributor of the reference when author not available) should be provided for all references.

Bruno Fady updated Network members on the progress made on the image collection database and stressed the importance of providing more slides, particularly on the items listed in Table 1.

Table 1. Slides required

Code topic	Number of slides needed
100 General data on the species	30–35
110 Natural range map	
Mixed forests	
Stands of different countries	
120 Morphological aspects	
Leaf	
Flower	
Seed	
Bud	
Bark	
Seedlings	
Plant	
Flushing	
130 Taxonomy	
140 Pests	
200 Conservation aspects	30–35
210 <i>In situ</i> conservation	
220 <i>Ex situ</i> conservation	
240 Outstanding trees or stands	
250 Public awareness activities	
300 Genetics and breeding	10–15
310 Within-species variability	
320 Material selected	
400 Silviculture	10–15
410 Regeneration	
420 Thinning	
430 Stand growth	
500 Utilization	10

The importance of producing a regular publication after every meeting was highlighted. It was agreed to change the scope and style of published reports. The new Network reports will be devoted to a specific theme, which will be addressed during the preparatory phase leading to the meeting and during the meeting itself. The theme will be associated with the location or country in which the meeting takes place.

It was agreed that the Report of the Third Conifers Network Meeting should focus on the role of gene conservation in areas affected by industrial air pollution. The Report will contain contributions from the meeting as well as any relevant contributions from the previous meeting. Karel Vančura and Bruno Fady agreed to be the guest editors for this Report. They will be responsible for the contents of the Report. The Secretariat will support their work by facilitating communication with Network members and by providing publication services.

It was agreed that country reports and updates will only be published on the website (Information Platform). The thematic reports may, however, include summary information

on the current status of conservation of genetic resources for selected species in Europe, for example in a tabular form (with details for all countries).

Seminar: 'Genetic conservation and restoration programmes in areas affected by industrial air pollution'

Opening the programme, Mr Wojciech Fonder, Chief of the Silviculture Department of the General State Forest Service, welcomed EUFORGEN participants to the Forest Gene Bank and gave an overview of Polish forestry and the programme to preserve Poland's forest genetic resources.

Forests cover more than 28% of Poland and it is planned to increase this to 30% by 2025. Approximately 78% of the forests are managed by the State Forest Service. The most abundant species is Scots pine (70.5%) followed by oak (6.7%), Norway spruce (5.6%), birch (5.6%), beech (4.6%), alder (4.3%), Douglas fir and other firs (2.0%) and other broadleaves (0.7%).

Mr Fonder then went on to outline the programme to preserve Poland's forest genetic resources in this region. The present programme (1990–2010) is a continuation of a programme originally started in 1975. The objectives of the programme are:

- to preserve forest genetic resources
- to create a seed base to preserve this forest genetic resource
- to select seed trees to maintain a parent base for this programme.

In the Wrocław region approximately 4000 ha are planted annually, which is close to 10% of the total planting for Poland. To satisfy the demand for forest reproductive material, seed is obtained from a number of sources. These include material from:

- permanent seed stands
- temporary seed stands
- selected plus trees for the establishment of seed orchards.

The programme will run for a further 8 years, but many of the objectives have already been achieved, including over 1000 ha of seed orchards. In this region state forests predominate and conifers represent 77% of forest cover. The next phase of the programme is now well advanced. An important aim is to increase the level of natural regeneration from the current 3–5% to a level of 10–15%.

Genetic conservation and reforestation of the areas destroyed by air pollution in the Polish Sudetes

Mr Kazimierz Harcich, Regional Director of the State Forest Service in Wrocław, presented a paper giving information on the forests of Lower Silesia. He presented a range of statistics showing changes in the period 1988–99 in the Sudetes mountain areas affected by air pollution. The region has 33 forest districts, one fishery and two forest service units—roads and wood transportation—under its control. In 1988, 27.8% of the land in this region was under forest cover. By 1999 this had increased to 28.2% and it is envisaged that by 2030 the forest area will have increased to 33%.

Details for all main species by age structure, distribution by forest habitat type, production and standing volume were given. Annual planting stock requirements are supplied from local nurseries in each forest district, which produce 6.5 million plants.

Increasing numbers of deer and wild boar necessitate increased levels of culling and fencing. Of the 4000–6000 ha planted annually, one quarter is fenced. Although a high level of industrial pollution remains, the immediate threat has declined. Today only 9% of the area is no longer under industrial pollution threat; 56% is in zone 1, 33% is in zone 2 and 2% is in zone 3.

Forest restoration in the Western Sudetes

The third paper, presented by Mr Andrzej Potyralski, Director of the Forest Gene Bank, focused on the restoration of destroyed forests in the Western Sudetes.

This area remained in a natural state until the 14th or 15th century. There followed a period of transformation of forests into spruce stands, lasting from the 16th to the 20th century. From 1880 until 1914, regeneration by sowing was gradually superseded by planting. After that, clear cutting became the only method of forest management in the Sudetes mountains. This was followed by a transformation into mixed forests, which began in the second half of the last century and has continued to date. This period is characterized by natural disasters which have led to large-scale forest dieback. More recently, damage from air pollution emitted by power plants in Poland, Germany and the Czech Republic led to the identification of this region as the 'black triangle'. This pollution resulted in a great ecological disaster which led to the removal of over 4.6 million m³ of timber in an area of 14 000 ha. Between 1978 and 1998 reforestation of the area has resulted in a major change in species because of forest decline due to the effects of industrial air pollution.

There is concern over the decline in area of *Abies alba* during this period, and efforts are being made to redress this balance. The soils in the Sudetes mountains are seriously chemically and biologically damaged as a result of long-term emissions of harmful substances in the form of dust and acid rain.

The Forest Gene Bank in Kostrzyca

Mr Zbigniew Sobierajski, deputy director of the Forest Gene Bank, explained that construction works started in 1994 and the gene bank began its activities in 1996. He outlined the goals set for the gene bank as follows:

- maintenance of all forest genetic resources through storage, for a maximum period of time based on current knowledge, of representative seed samples collected from the selected seed stands and plus trees from the territory of Poland
- control of seed collection and identification of seed origin in organizational units of state forests
- inventory of forest ecosystems for the conservation of their resources
- development of activities aimed at the conservation of endangered populations and the implementation of a programme for the conservation of species of trees, shrubs and forest floor vegetation.

The Gene Bank carries out its activities in accordance with the 'Programme for the conservation of forest genetic resources of forest tree species in Poland 1991–2010' within the framework of binding legal regulations and international agreements. An extensive tour of the facilities was made on the previous evening.

Rehabilitation of silver fir populations (*Abies alba* Mill.) in the Sudetes

Władysław Barzdajn, Agricultural Academy, Forest Faculty Poznan, presented a programme aimed at the preservation of one of the most endangered tree species in the region—silver fir. Inventories have shown a decline from a high of 8% in the middle of the 18th century to 4% in 1988, with a further decline to only 2% today. The age structure of stands with silver fir is poor, with most of the stands being in the 81–140 years age category. The silver fir in this area is very homogeneous, and quite different from that species in other regions. Mr Barzdajn outlined a strategy for gene resource conservation of silver fir in the region with the aim of preserving local populations. The programme aims to eventually increase the share of silver fir in the Sudeten forests to 18%.

Conservation of common yew (*Taxus baccata* L.) in Poland

The presentation by Małgorzata Falenca-Jablonska of the Ecology and Environmental Protection Department, Forest Research Institute, Warsaw, focused on the conservation programme for common yew. This is a rare species in Poland, and one of the earliest protected species in the country. An inventory carried out in the forest districts of the state forests in 1999–2000 has shown that naturally occurring or artificially regenerated yew is recorded in 129 forest districts. Yew most frequently occurs in broadleaved and mixed forest habitats, and rarely in riparian habitats, and it usually represents the shrub layer or

understorey. Even if conditions are favourable, it does not form pure stands. One of the limiting factors for yew occurrence is the type of parent rock material and the slope of the terrain. It grows best on calcareous, deep, moist soils.

Seed source for reforestation and gene conservation in the Sudetes

Jan Matras' paper dealt with the requirements of a permanent and reliable seed sources and the difficulties in developing this under the conditions prevailing in the Sudetes. The paper outlined the impact of industrial emissions and the resulting destruction of the forests and its effect on an increased demand for planting stock and a subsequent increase in quantities of seed required.

Common yew (*Taxus baccata* L.) and its genetic diversity in the Czech Republic

Karel Vančura presented an overview of a survey of the common yew and its genetic diversity in protected areas of the Czech Republic. This survey was undertaken by Vladimír Zatloukal and his colleagues at the Sumava National Park in the Czech Republic.

In the Czech Republic, yew is declared to be a highly endangered species. It is no longer seen as a forest timber species, and over the centuries it has practically disappeared from the forests where it was once found. The aim of this project was to obtain important missing information about common yew in the Czech Republic. Information sought included key elements such as frequency of occurrence, current state, ecological requirements and genetic characteristics of individual populations. In the course of the project, 532 individual yews from 21 populations have been subjected to isoenzyme analysis. The survey found that the entire gene pool of yews in the Czech Republic probably comes from a single glacial refugium from which one large primal superpopulation emerged. The differences in the genetic structure of the individual populations are probably the result of long-term isolated development of the remains of this population. Recommendations for preservation and strengthening of the yew population in the Czech Republic are in three key areas:

- theoretical: continuing research into the yew gene pool
- administrative and legislative: increasing the effectiveness of legal protection in areas where yews occur and improve the method of management while controlling the number of browsing animals
- implementation policy: support for natural regeneration and planting of yews where necessary using suitable reproductive material.

Miscellaneous

Alexander Alexandrov outlined his proposal for the role and potential collaborative activities on Mediterranean conifers, and called for more attention to be devoted to the numerous conifer species of the Mediterranean. The Network recognized the need for strengthening its focus on Mediterranean species. It was agreed that the gene conservation in these species could be addressed specifically during one of the future Network meetings. It was also emphasized that setting priorities within EUFORGEN is a continuous process under the oversight of the Steering Committee. Alexander Alexandrov offered to prepare a document for Steering Committee discussion.

Date, venue and theme of next meeting

The next Network meeting will be held in United Kingdom, in Scotland, in September 2003. Further details will be provided in due course. It was proposed that the theme of the meeting should focus on the issues associated with gene conservation of introduced/exotic conifer species.

Conclusion

Csaba Mátyás concluded by thanking the local host and organizers for their excellent work and hospitality during the meeting. He also expressed his thanks to Jozef Turok and the EUFORGEN Secretariat for their contribution.

Third EUFORGEN Conifers Network meeting

Kostrzyca, Poland, 17–19 October 2002

Wednesday 16 October—Arrival of participants

Thursday 17 October

08.30 Opening of the meeting

Welcome by host (Jan Matras)

Welcome by Chair of the Network (Csaba Mátyás)

Introduction and organizational arrangements (Jozef Turok)

Adoption of the agenda and nomination of rapporteurs

09.00 Status and progress of genetic conservation in conifers: discussion on the progress made in countries (All participants)

10.00 Break

10.30 Status and progress of genetic conservation in conifers (continued—discussion and synthesis)

11.30 Common Action Plans for the practical implementation of genetic conservation strategies and guidelines for selected conifers in Europe:

Outcomes of the EUFORGEN Steering Committee meeting and the MCPFE process (Jozef Turok)

Draft technical guidelines for selected species (introduced by Bruno Fady, R.

Bruchanik, S. Martin, Tore Skrøppa, A. König)

Maps of distribution areas and information available on existing gene reserves (introduced by Michele Bozzano)

Discussion

12.00 Lunch

13.30 Common Action Plans (continued)

15.30 Break

16.00 Forest Gene Bank Kostrzyca: aims and tasks, process and equipment, container nursery arboretum (Dr Bogdan Szumowski)

19.30 Dinner

Friday 18 October

08.30 Research:

Overview of ongoing research projects (All participants)

Outcomes of the IUFRO Symposium on Population and Evolutionary Genetics of Forest Trees (Csaba Mátyás)

Conference on the Dynamics and Conservation of Genetic Diversity in Forest Ecosystems (DYGEN); arrangements for presentation of the Conifers Network (introduced by Csaba Mátyás)

EU Sixth Framework Programme for research (introduced by Jozef Turok)

Discussion on research needs and priorities, new proposals

10.30 Break

- 11.00 Documentation, information and public awareness:
Database/ information platform (introduced by Michele Bozzano)
Bibliographic database (introduced by Michele Bozzano)
Collection of images (introduced by Bruno Fady)
Discussion of communication and public awareness issues, publications

12.00 *Lunch*

- 13.30 Seminar: Genetic conservation and restoration programmes in areas affected by industrial air pollution (introductory presentations):
Genetic conservation and reforestation of the areas destroyed by air pollution in Sudety mountains in Poland
Ecological disaster: factors and results, studies and practical action in reforestation of destroyed forests (A. Potyralski, Head of Forest Department of Regional Directorate, State Forest Wrocław)
Rehabilitation of silver of fir populations (*Abies alba* Mill.) in the Sudetes (W. Barzdajn, Agricultural Academy, Forest Faculty Poznań)
Programme of yew (*Taxus baccata* L.) protection in Poland (M. Falecka-Jablonska, Department of Ecology, Forest Research Institute)
Seed source for reforestation and gene reserves in Sudety region (Jan Matras, Department of Genetics and Physiology of Woody Plants, Forest Research Institute)
Status of *ex situ* stands: experience with the evacuation of threatened populations in the Czech Republic

15.00 *Break*

- 15.30 Seminar (continued—discussion)
16.30 Miscellaneous: Role and activities on Mediterranean conifers within the Network (introduced by A. Alexandrov)

Any other business

19.30 *Dinner*

Saturday 19 October

Field trip (half day)
15.00 Draft report

Conclusions
Closure of the meeting

19.30 *Farewell dinner*

Sunday 20 October 2002—Departure of participants

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