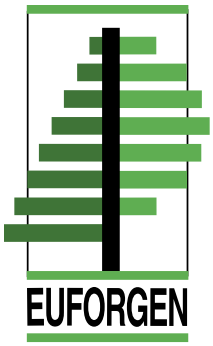
Conifers Network

Summary of the fifth meeting

Larnaca, Cyprus, 7-9 April 2005



European Forest Genetic Resources Programme (EUFORGEN)

FUTURE HARVEST
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IPGRI is a Future Harvest Centre supported by the Consultative Group on International Agricultural Research (CGIAR)

Fifth EUFORGEN Conifers Network meeting, Larnaca, Cyprus, 7-9 April 2005

Summary of the meeting

Opening of the meeting

X. Hadjikyriacou welcomed the participants to Cyprus on behalf of Mr. A.P. Ioannou, Director of Cyprus Forestry Department. He then briefly stressed the importance of forest genetic diversity as part of sustainable forest management and biodiversity conservation.

C. Mátyás, Chair of the Network, welcomed the participants from 25 countries and thanked the local organizers for the meeting arrangements. He then asked all participants to briefly introduce themselves before selection of new Chair and Vice-Chair. C. Mátyás provided a short review on the previous Chairs of the Network and proposed B. Fady as a new Chair and A. Pfeifer as new Vice-Chair. J. Fennessy, who represented Ireland in this meeting, accepted the offer on behalf of A. Pfeifer. The meeting participants supported this proposal unanimously. J. Koskela presented the tentative agenda of the meeting which was then adopted. J. Fennessy, C. Mátyás and B. Fady were nominated as rapporteurs for the meeting.

Introduction to EUFORGEN Phase III (2005-2009)

J. Koskela welcomed the participants on behalf of the EUFORGEN Secretariat and provided an introduction to the outputs of the fourth EUFORGEN Steering Committee meeting as well as Phase III of the Programme, which started in January 2005. He presented the objectives of Phase III and the new Network structure of the Programme.

EUFORGEN continues to promote conservation and sustainable use of forest genetic resources in Europe. The objectives for Phase III are as follows: 1) promote practical implementation of gene conservation and appropriate use of genetic resources as an integral part of sustainable forest management, 2) facilitate further development of methods to conserve genetic diversity of European forests, and 3) collate and disseminate reliable information on forest genetic resources in Europe. Now EUFORGEN has three species-oriented Networks, namely Conifers, Scattered Broadleaves and Stand-forming Broadleaves. Furthermore, a new thematic Forest Management Network has been established to promote integration of gene conservation into sustainable forest management. In addition to these Networks, an Information Working Group will facilitate inter-Network collaboration through task-oriented working groups on certain topics.

Progress made in various countries

Central and Eastern Europe (Czech Republic, Hungary, Poland, Romania, Slovakia and Slovenia)

During the last decade, all countries of the sub-region have adopted new Forest Acts and recently national legislations on the marketing of forest reproductive material have also been reviewed following the Council Directive 1999/105/EC. Based on the new regulations, control of forest reproductive material has been strengthened across the whole region.

Romania reported a revision of demarcation of provenance regions. Some national research institutes have taken over the responsibility for control of reproductive material.

Networks of gene reserves have been set up by all countries with the exception of Slovenia. Its low interest to establish gene reserves is explained by the general reliance on natural regeneration. In total, approximately 800 reserves have been selected by now in the region, covering nearly 100 000 hectares. The average size of reserves varies widely among countries. In some countries differences in policy interpretation between the Ministries of Agriculture and Environment hamper the proper management of gene reserves.

Much of the region has experienced unusually extensive damage by bark beetles, gypsy moth and certain fungi. Extreme weather conditions of the last years (e.g. droughts) are the primary causes. While industrial pollution decreased, Poland reported unidentified dieback damages of forests at the timberline in the Tatras Mountains.

Almost all countries reported that financial support for research has been curtailed, resulting in re-structuring of organizations. In some cases applied research activities in genetics has been disconnected.

Mediterranean region (Bulgaria, Croatia, Cyprus, France, Italy, Greece, Serbia and Montenegro, Spain, Portugal)

The Mediterranean sub-regional group was represented by nine countries. The species of interest for the group are the following: *Pinus halepensis, P. brutia, P. pinaster, P. nigra, P. pinea, P. sylvestris, P. peuce, P. leucodermis, Abies alba, A. cephalonica, A. pinsapo, A. nebrodensis, Cupressus sempervirens, Taxus baccata, Juniperus ssp., Tetraclinis articulata, Cedrus libani and C. brevifolia.*

Regarding research activities, projects aiming at monitoring genetic diversity, gene flow and genetic mapping were reported. Genetic markers (nuclear microsatellites) are now available for *Cupressus sempervirens* and are applicable to many members of the genus *Cupressus*. New genetic markers are also under development for *Juniperus* ssp., *Pinus pinea* and *Abies alba* (nuclear microsatellites). Spain is participating, together with France, UK, Italy, Sweden and Finland, in a EU-funded project (TREESNIPS) aiming to identify candidate genes associated with adaptive traits, such as drought tolerance (association studies). In the framework of this project, new common garden experiments (combined provenance-progeny tests) were developed for *Pinus pinaster* and *P. sylvestris*. A similar research using both neutral genetic markers and markers associated with adaptive traits was reported from Italy for *P. halepensis*. In Serbia and Montenegro, a comparative study based on genetic markers was carried out for *P. nigra* with an aim to detect differences among trees and populations growing on dry sites (cliffs and canyons) and more favourable sites for the species. Significant differences were detected and results could be applicable throughout Europe. The use of genetic markers for seed source certification was noted by several countries.

Two *ex situ* plantations – one for *Juniperus excelsa* and one for *Cedrus brevifolia* – will be established in Cyprus while an inventory of the natural distribution of *Juniperus excelsa* has already been completed. Networks for *ex situ* conservation of *Abies alba*, *Pinus pinaster* and *Picea abies* were reported from France. In Spain, current work on the elaboration of a national strategy for the use and conservation of forest genetic resources was reported. This strategy will provide the framework for further work on conservation (both *in situ* and *ex situ*) of forest genetic resources in Spain. Serbia and Montenegro reported the establishment of an

archive of diallel progeny obtained from crossing of 25 selected test trees from a Serbian spruce seed orchard located in Central Serbia.

Two training activities were reported from Italy and Spain; an international Ph.D. course on conservation of forest and crop genetic resources sponsored by the Italian Ministry of Education and an international course on conservation of forest genetic resources organized by Spain in collaboration with South American countries.

Regarding public awareness, it was noted that there is a lack of laws regulating the trade of reproductive material for ornamental purposes. The group also discussed how the origin of genetic material used for restoration can impact natural parks. It was also discussed that it is important to raise awareness on the number of seed trees left for reforestation after forest fire. Regarding legal issues, molecular markers may be very useful in verifying the identity of seed sources and also the number of mother trees in registered stands.

Northern Europe (Estonia, Finland, Iceland, Lithuania, Norway, Sweden)

In the Nordic countries, conservation of genetic resources has a high priority at the political level in the Nordic Council of Ministers. At the national level, however, the topic has a quite variable priority. The Nordic Network for Forest Tree Gene Conservation was established in 2003 and is used to improve cooperation among the Nordic countries, and also for better cooperation with the Nordic Gene Banks for agricultural plants and animals. More information can be found at www.nordgen.net.

In the area of Nordic forest genetics research and tree breeding, a virtual Centre of Advanced Research (GENECAR) was established in 2005 by the Nordic Forest Research Co-operation Committee and the Nordic forest research institutes to promote better collaboration among the scientists. A GENECAR Web page will be established soon.

Sweden was hit by a disaster this winter; a storm felled more than 75 million m^3 of wood and most of the damage was made in Norway spruce forests. This event has raised interest, both at the political and public level, on several silvicultural aspects, and, in particular, the proper use of forest reproductive materials. In Sweden, funding for forest genetics research and conservation of genetic resources has been reduced and subsequently there are also less human resources available for these activities. A new strategy for forest tree gene conservation is being discussed in Sweden to link gene conservation efforts with nature protection.

The winter storm also affected Lithuania but it caused less damage there than in Sweden. In Lithuania, Norway spruce in particular seems to move northwards and this is considered as a likely effect of climate change (warm winters, temperature fluctuations and dry summers). The need to develop special conservation strategies is being discussed to tackle this issue. There is also a need to provide more information for forest managers and general public about the importance of conservation of forest genetic resources. A new law on conservation of plant genetic resources is now in force in Lithuania and a new institution, i.e. Plant Gene Bank, has been established. The scope of the Plant Gene Bank includes forest tree species.

In Estonia, currently only three persons are working with topics related to the conservation of forest genetic resources. In January 2005, the structure of Estonian Agricultural University was re-organized and the Faculty of Forestry, the Institute of Rural Engineering and the Forest Research Institute were merged. The name of this new unit is the Institute of Forestry and Rural Engineering. There has been some research collaboration with Belarus on isozyme

characterisation of Norway spruce gene reserves. Research on gene reserves and genetic diversity of Scots pine have also been initiated using microsatellites.

In Finland, there has been a change from using seed stands towards using seed orchard seed of Norway spruce during the recent years. However, very little flowering has taken place in the seed orchards in the last years and now there is a lack of Norway spruce seed in the country. A new Norway spruce gene reserve has been established in the western part of Finland. It has been suggested that gene reserves should be established using a mixture of tree species, e.g. Norway spruce and birch. Finland has also prepared a publication on the management of its forest gene reserves in English. Databases on the gene reserves will be made accessible on the Internet in the near future.

Siberian larch has been suffering from the mild winters in Iceland. The species' growth processes have started early but then the trees have been "knocked back" into dormancy by cold spells late in the spring and they have not resumed active growth until the next year. Larch seeds are now being produced in a green house. Hybrid families between European and Siberian larch have shown the best growth in Iceland.

Gene resource conservation still has a high priority in Norway and there is good cooperation on gene conservation activities for agricultural plants, animals and forest trees. As part of a PhD study in Norway, there are new results about the post-glacial immigration of Norway spruce combining information from molecular markers and micro and macro fossils. Due to a very high frequency of selfed seeds (90 %) from a hybrid larch seed orchard in Denmark, a total of 200,000 seedlings had to be destroyed in a nursery in Norway. Disagreement about the economic responsibilities will be most likely settled at court.

Western Europe (Austria, Germany, Ireland, United Kingdom)

In general, few major new developments were reported among the group. Austria reported the launch of a new conservation programme. In the past the main emphasis has been on *Picea abies* but now this species is considered adequately protected. Under the new programme the emphasis is on species that are considered endangered such as *Taxus baccata* and *Abies alba*. There are also plans to work with *Larix* ssp. in the future, although it is not considered an endangered species in Austria.

In Germany the Federal and State Working Group on Conservation of Gene Resources is compiling its report for the period 2001 to 2004. The Federal Ministry supports the integration of genetic monitoring into other ongoing national and international monitoring programmes on forest ecosystems, e.g. the International Co-operation Programme on Assessment and Monitoring of Air Pollution Effects on Forests (=IPC Forests). Conifers will be included to the monitoring efforts. For the conservation of forest genetic resources in the future, the priority conifer species will be *Abies alba* and *Taxus baccata.* However, work is also continuing with *Picea abies*. The German 'Concept for the Conservation and Sustainable Utilization of Forest Genetic Resources' is available at www.genres.de/fgr/blag/ (both in German and English).

In Ireland work is continuing with *Picea sitchensis* while the United Kingdom reported on the establishment of a new marker-aided selection experiment in *P. sitchensis* on three sites.

Progress made in the Network activities

Technical Guidelines

J. Koskela provided an update to the state of the Technical Guidelines on conifers. Now a total of eight Technical Guidelines have been published for conifers (*Abies alba*, *Picea abies*, *Pinus pinaster* and *P. brutia/halepensis*, *P. peuce*, *P. nigra*, *P. pinea* and *P. sylvestris*). Furthermore, draft text and distribution maps are ready for *Larix decidua*, *Pinus cembra* and *P. leucodermis*. The finalization and printing of these three remaining guidelines will take place in 2005.

Common Action Plan

J. Koskela presented the current state of the common action plan for *Picea abies*. Data on the gene conservation units of *P. abies* is available from seven countries and more data from additional countries is needed to obtain a better understanding on how the gene conservation units are located within the distribution area of the species. It was discussed that there is a need to develop common criteria or requirements for the gene conservation units in collaboration with other EUFORGEN Networks and agree what a gene conservation unit is at pan-European level.

List of priority species

J. Koskela distributed a list of priority conifers species which were identified at the beginning of Phase II in 2000. After the previous meeting in Scotland, it was agreed that the scoring of priority species should be changed from 10 classes to four. He then asked participants to fill in the scoring for those countries where it was missing. It was also discussed whether the Network should select 'target species' for Phase III instead of trying to work with all priority species.

Next steps in developing Technical Guidelines, common action plans and priority/target species were discussed as part of the three working groups (see below).

Meetings, projects and other initiatives

EVOLTREE II proposal

G.G. Vendramin provided a short overview to the second EVOLTREE (EVOlution of TREEs as drivers of terrestrial biodiversity) proposal which was submitted to the European Commission under the last call of the 6th framework programme in March 2005. EVOLTREE is a consortium of 24 partner institutes located in 15 European countries. The main aim of the project is to support integration of work on forest genomics in Europe by developing common infrastructures and exchanging human resources. The project also includes jointly executed research activities and dissemination of research results and other relevant information. In addition to forest trees, the scope of the project includes associated species (insects and micro-organisms). The EUFORGEN Networks will be used to disseminate the project outputs, if EVOLTREE receives funding. The EC is expected to make funding decisions by the end of May 2005.

EUFGIS proposal

J. Koskela delivered an update on the Council Regulation No 870/2004 on genetic resources in agriculture. The first call for proposals is expected to be opened May or June 2005 and the second one in 2006. In May 2004, the EUFORGEN Steering Committee discussed the Regulation and requested the EUFORGEN Secretariat to coordinate the development of an inter-Network proposal for the first call under the Regulation. Subsequently, in collaboration with focal points in six countries (Austria, Denmark, France, Slovakia, Slovenia and the United Kingdom), the Secretariat has developed a concept note for a project proposal to establish a European Information System on Forest Genetic Resources (EUFGIS).

The EUFGIS project aims at developing minimum requirements for dynamic gene conservation units of FGR and common information standards at pan-European level, and creating a web-based, permanent information system on national FGR inventories in Europe. The role of the EUFORGEN Networks is to provide technical backstopping through the Information Working Group and in particular, contribute to the harmonization of various minimum requirements for *in situ* gene conservation units and other relevant information standards. If established, the Network can benefit from EUFGIS in their further efforts to develop common action plans for various tree species.

In addition to EUFGIS, three other proposals are being developed by EUFORGEN Networks. These proposals focus on *in situ* and *ex situ* conservation of elms, inventories of natural poplar populations and fruit trees.

IPGRI-IUFRO workshop on forest genetic diversity and climate change

J. Koskela informed the meeting on the development of this workshop which is included in the new MCPFE Work Programme as an implementation action for Vienna Resolution 5 (Climate change and sustainable forest management in Europe). The purpose of the workshop is to analyze the role of forest genetic diversity in mitigating the effects of climate change and maintaining sustainable forestry in Europe. It will also review the current scientific understanding and 'translate' the information for policy-makers (i.e. the MCPFE process).

IPGRI and IUFRO are currently developing the programme of the three-day workshop which will be held in France in March or April 2006 in collaboration with the French Ministry of Agriculture. The EUFORGEN Networks will have an opportunity to provide ideas for the agenda and participate in the workshop.

Development of a new work plan

J. Koskela introduced the purpose of the working group discussions and then presented the assignment of the participants into three working groups to discuss the three new objectives of Phase III (see Appendix 1). The three working groups held their discussions during the morning of the second meeting day. The following list shows the topics that were highlighted during the discussions and the recommendations that the working groups made. During the wrap-up session on the last meeting day, the outputs of the working groups were discussed by all participants.

The underlined and bold text indicates those topics or issues which were identified as priority ones to be included into the new work plan of the Network. It was agreed that the

working groups will continue their discussions after the meeting and formulate specific milestones or actions related to these priority topics with a proposed timeframe. C. Mátyás, B. Fady and J. Fennessy were identified as focal points for Group 1, 2 and 3, respectively. The focal points should facilitate the finalization of the specific milestones and send them to the Secretariat by **15 June 2005**. The Secretariat will then compile the inputs into the new work plan and circulate it to all Network members by **15 July 2005** for further inputs.

Group 1 and Objective 1: promote practical implementation of gene conservation and appropriate use of genetic resources as an integral part of sustainable forest management

(X. Hadjikyriacou, J. Frýdl, A. König, C. Mátyás, J. Matras, G. Parnuta, R. Bruchánik, L. Ackzell and C. Edwards)

When compared to other EUFORGEN Networks, the Conifers Network may rely on the most extensive genetic information resources, which is a good starting point to develop further the integration of genetic thinking on sustainable forest management.

The question of choosing and using appropriate seed sources for (artificial) regeneration has the largest impact on the genetic value of future forests.

Users of forest reproductive material must be made aware of the consequences of their decisions, especially in the absence of binding regulations at national and EU levels. The group of private forest land owners are likely to be the most challenging to deal with (representing a large afforestation potential, especially in Eastern Europe).

The selection of appropriate sources should be supported by further national and international analysis of provenance tests.

Regarding general silvicultural practices, a discussion paper should be compiled as a starting point for further refinement. The paper on "**best practice**" should emphasize that sustainable forest management (or close-to-nature forestry) has to rely on and include conservation of forest genetic resources. During refinement of the paper:

- a survey of presently applied management methods should be carried out;
- the issue of conserving genetic resources should be put into an economic context and advantages for forest management should be pointed out.

Gene conservation units should not be separated from the practice of sustainable forest management. They should rather be regarded as "demonstration areas" for genetically proper silvicultural treatment. Conservation of forest genetic resources may be connected with nature conservation if active conservation measures are genetically acceptable.

Practical applications of forest genetic research results have continued to be put into operation (e.g. certification, minimum number of trees left in regeneration felling, etc.). However, the process has to be strengthened. It is recommended that:

- silvicultural and yield research apply genetic knowledge;
- genetic approaches should be included in ecological research as well;
- provenance research should be continued and international cooperation broadened in data analysis;
- the use of forest reproductive material and mitigating effects of climate change are thematic areas, where the input of forest genetics is indispensable and may strengthen links to both forestry practice and related fields in basic and applied sciences.

Group 2 and Objective 2: Facilitate further development of methods to conserve genetic diversity in European forests

(A. Alexandrov, T. Maaten, B. Fady, G.G. Vendramin, T. Skrøppa, M. C. Varela, V. Isajev, S. C. González-Martínez, A. Christou)

There is a need for a clear definition of "common action plans" at European level and identifying gaps and overlaps in gene conservation schemes. This calls for agreeing on **minimum requirements**: what are gene conservation units (CUs) and how many are needed for the network to adequately sample and conserve the genetic diversity of the target species. The minimum requirements should be based on:

- scientific knowledge (ecology, genetic diversity at intraspecific level) to choose CUs
- scientific knowledge (effective population size, genetic structure, demography) to design the size and shape of CUs
- practical and operational considerations (management practice, economic constraints) to choose and design CUs.

NB: in conifers, stands are often managed. This should not necessarily be considered as a reason not to select the stands as CUs.

Target species in three categories for further development of the common action plans:

- stand forming / widespread (e.g. Picea abies, Pinus halepensis / brutia, P. nigra complex)
- scattered / widespread (e.g. Taxus baccata)
- rare / threatened (e.g. endemics as a group)

Experimental and tentative: promote the collection of southern European and North African populations and their transplantation and hybridization with local populations situated further north, to provide new material to tolerate climate change.

The goal of *in situ* genetic biodiversity conservation is to maintain evolutionary processes. We have to be sure that the future forests originate from an adequate number of seed trees. The target of monitoring, once a network is established, is thus regeneration, whether natural or through plantation.

Fine scale genetic studies are needed to develop criteria and indicators related to the genetic diversity of the next generation. Tentative indicators are based phenological and demographic data.

The Secretariat should push National Coordinators to advertise for Technical Guidelines (TGs), either through a book review section in national forestry journals or in general public journals. TGs should be translated into national languages, adapting them to local problems. **A specific TG for endemic conifers should be written**.

There is a high priority to the highlight negative consequences of the use of inappropriate forest reproductive material (FRM) because of the EU Directive on FRM (1999/105/EC). On a personal level, raise awareness of FRM people in each country by participating in their meetings.

EUFORGEN should produce a document / electronic material indicating the negative consequences to forests when inappropriate seeds / material are used. EUFORGEN should also produce a TG "How to properly use our forest resources / biodiversity".

Development of methods to promote genetically sustainable regeneration: sustainable regeneration in conifers, whether natural or through plantation, is achieved if seeds are collected from a large number of seed trees.

Recommendations associated with financial incentives are needed.

It is highly desirable to improve collaboration between **nature conservation and gene conservation** efforts in Europe. The feasibility of this task will depend on individual countries.

A task force should be developed to provide a document that shows the minimum requirements for CUs. This document can then be presented to people responsible for the Natura 2000 initiative, scientific coordinators in national parks, etc. In countries where administrative problems prevent easy contacts, the representative of the EUFORGEN Conifers Network should make contact with individual nature conservation managers (the one step at a time approach).

The Secretariat should continue its efforts to push all European countries to become full EUFORGEN members. Non-European Mediterranean countries (North Africa, Near East) should be invited to the meetings as observers. Forest genetic resources in these countries are likely to be useful for European forests considering the predicted climate change.

Climate change and gene conservation: it is important to analyze the impacts of climate change on gene conservation and whether the current gene conservation strategies are appropriate ones under the predicted changes.

Group 3 and Objective 3: Collate and disseminate reliable information on forest genetic resources in Europe.

(M. Mengl, M.Idzojtic, T. Nikkanen, A. Sigurgeirsson, J. Fennessy, D. Danusevicius, G. Bozic and P. Alizoti)

It is important to **increase awareness among policy makers, forestry professionals and the general public on the importance of forest genetic resources:**

- Incorporate the term biodiversity into information describing the task of gene conservation and then promote the message.
- 'Conservation of forest genetic resources' is a term not fully understood. We have to identify how we can promote the conservation of FGR.
- A need to produce papers (Technical Guidelines format) on general introduction to conservation of forest genetic resources (e.g. papers on: What forest genetic resources are? What conservation of forests is? Why genetic diversity is so important?) to inform forest administrators and the public. The translation of these documents and the Technical Guidelines into national languages is essential in educate forest administrators and others on the importance of the conservation of forest genetic resources.
- Provide specific species examples where genetic resources are lacking now because of a catastrophic event or major epidemic. This would get the message across in each country and to different target groups.

- Distribution of explanatory leaflets to target groups such as forestry students and other similar groups.
- Production by the EUFORGEN Secretariat of a Power-Point presentation (translated in different languages) concerning forest genetic resources and their conservation in simple words for demonstration purposes.

In order to compile and make available geo-referenced data on gene conservation units in Europe, it is necessary to define what **gene conservation units** are and to have agreed criteria on the requirements of gene conservation reserves. This could be achieved by establishing a task force within the Conifers Network. However, since this issue is common to all Networks, ultimately a task force among all Networks is needed to define the essential requirements of the proposed gene conservation units.

Develop, in collaboration with the other EUFORGEN Networks, a EUFORGEN position paper on "**Forest genetic diversity in biodiversity conservation"** [this is linked to the outputs of Group 1].

It is difficult to produce reports on the state of forest genetic resources in Europe and other relevant issues before we define what gene conservation units are (see above).

The group considers the development of electronic information – education package, an important task to be completed during Phase III. Another consideration is the creation of a forest gene conservation education package (possibly in cartoon format) for the general public and especially for the younger people to promote the idea of conservation of forest genetic resources.

Consider the development of an electronic newsletter within the EUFORGEN Website (e.g. suggested title: **EUFORGEN News** and Views): Events, current activities and ideas from colleagues on conservation of forest genetic resources, photo gallery, information on relevant projects and meetings etc.

In order to facilitate exchange of information among countries, a full list of national coordinators with a short information note and a possible photo could be inserted on the EUFORGEN Website. A list of representatives for of each Network and their contact information could also be added.

Many of the above proposals have strong linkages and represent a best use of resources.

Seminar on forest conservation and management in Cyprus

Conservation of forest genetic resources (A. Christou)

A. Christou presented an overview to conservation of forest genetic resources in Cyprus. Cyprus is geographically situated in the southeastern part of Mediterranean basin and is subjected to extreme drought conditions. Its forests have been exploited for more than 8000 years. Fires, overgrazing, clearance for agriculture and overexploitation were the main factors damaging the forest genetic resources in the past. Nowadays, fires, air pollution and climate change seem to be the main threats while grazing, insect attack and other pathogens are of less importance.

For the conservation of the forest genetic resources, a number of measures have been taken. These measures include both *in situ* and *ex situ* activities such as establishment of *ex situ* plantations for endangered forest species, declaration of protected areas, protection against fires and insects, monitoring of forest ecosystems, promotion of public awareness, participation in international programmes, research activities, etc. The measures undertaken for the conservation of forest genetic resources seem to be sufficient, however, additional research is recommended.

Forest biodiversity (K. Kyriakou)

K. Kyriakou's presentation focused on biodiversity in the country. Cyprus is an island of oceanic origin which has never been connected to the mainland. This long geographic isolation together with the presence of a great variety of geological formations, the prevalence of extreme climatic conditions, the characteristic diversity of terrain and landscapes and the human impact contribute a lot to the rich biodiversity present in Cyprus.

A wide range of habitats is represented here, varying from forests, maquis, garigue, agricultural landscapes and wetlands. There are more than 1900 plant species recorded of which 140 are endemic.

Fires, ecosystem destruction, ecosystem fragmentation, invasive plants and organisms, poisoning and illegal hunting, overgrazing, water development projects, intensive agricultural practices and tourist development are considered the most important threats to biodiversity in Cyprus.

The biodiversity within the forests of Cyprus is preserved through the demarcation of Nature Reserves. So far seven sites have been declared as Nature Reserves. Furthermore nine sites have been declared as National Forest Parks mainly for recreation purposes but also among others for biodiversity conservation, environmental education and scientific research. In addition, the development of the Natura 2000 network, under the Directives 92/43/ C and 79/49/EEC, is one of the most promising actions for the conservation of biodiversity. The national list of proposed sites includes, among others, large areas of forests (76% of the total area of Natura 2000 sites).

Forest fire management (C. Papageorgiou)

C. Papageorgiou delivered a presentation on forest fire management. In Cyprus, as in many other countries of the Mediterranean basin, fire is considered as one of the principle destructive agents of forests and wooded areas. The prolonged hot, dry and windy summers, the flammable vegetation and various human activities favour the outbreak and quick spread of fires. Furthermore the increased urbanization, together with the abandonment of rural areas and the increased number of visitors in the forest for recreation, raise fire hazard levels. Normally the fire season starts in May and ends in October, but depending on the season, can occasionally start in April and sometimes extended to November.

The Department of Forests is responsible for the prevention and control of fires in or near the state forests and is fully aware of the high fire danger. It implements a series of measures to eliminate outbreaks through quick fire detection, rapid intervention and effective control of forest fires and fast restoration of the burned areas.

Drought resistance of Pinus nigra *in Serbia and Montenegro*

V. Isajev presented some results of a project on drought resistance in *Pinus nigra*. Early growth of open-pollinated progenies originating from trees growing in favourable environments and dry sites (cliffs and canyons) of Serbia and Montenegro were tested in nursery experiments. The same progenies were also analyzed using molecular markers to find out whether there are any differences between the progenies originating from different environments. V. Isajev stressed the potential of using genetic material adapted to dry sites throughout Europe.

Conifers in Greece

P. Alizoti gave a short presentation on the distribution of forests in Greece and the main coniferous species growing in the country. She provided information on protected forest areas (e.g. virgin forest, national parks, aesthetic forests and natural monuments) in Greece. She then highlighted some results of current research activities on forest genetics and tree improvement of conifers (e.g. *Abies* ssp., *Cupressus sempervirens, Pinus halepensis*, *P. brutia*, *P. nigra*,) carried out in Greece (by the Laboratory of Forest Genetics and Tree Breeding at the Aristotle University of Thessaloniki and NAGREF).

Biodiversity of conifers: is there a Mediterranean specificity? (B. Fady)

B. Fady gave a presentation on the biodiversity of the Mediterranean conifers. Covering 1.5 per cent of Earth dry land, the Mediterranean region hosts a total of 30 000 higher plant species, 10 per cent of all known plant species. It is also a "hot spot" of biodiversity for forest tree species. While 290 indigenous forest tree species (including 201 endemics) are found in the Mediterranean, only 30 are found in Europe on 3-4 times more land.

This amazing biodiversity at species level is also found at gene level. A compilation of isozyme data shows that gene biodiversity is 20 and 45% higher in Mediterranean conifers than in conifers worldwide. Explanations for this high and unexpected gene biodiversity considering the strong and long lasting human impact on this region are found in the legacy of the last Ice Age. More refugia were probably present around the Mediterranean than was assumed based on data from temperate European species. Also, refugia in the Eastern Mediterranean were probably sheltered from drastic climatic conditions and suffered little genetic drift.

Mediterranean populations harbor considerable variation, possibly of interest to temperate conifer species. This should be taken into consideration for gene biodiversity (resource) conservation. Mediterranean conifers and Mediterranean populations of temperate conifers need to be well represented in the form of conservation units in conservation networks.

Any other business

J. Koskela informed the participants that the European Environment Agency (EEA) started a new initiative called 'Streamlining European 2010 Biodiversity Indicators (SEBI2010)' with a kick-off meeting in January 2005. EEA has requested nominations to six expert groups which will carry out the work. One of the six expert groups will address genetic diversity (domesticated animals, cultivated plants and fish species of major socio-economic importance) and another one will focus on forests, agricultural areas, fishery and aquaculture under sustainable management. SEBI2010 is linked to the Convention on

Biological Diversity (CBD) and the Pan-European Biological and Landscape Diversity Strategy (UNEP/PEBLDS). The purpose of SEBI2010 is to deliver an improved and effective biodiversity indicator system for Europe.

J. Koskela also informed the participants that IPGRI is organizing, in collaboration with the Department of Genetics of the Austrian Office and Research Centre for Forests (BFW), a two-week training workshop on forest biodiversity near Moscow on 13-24 June 2005. This training workshop aims to give a common background to graduate students and young scientists already working on forest biodiversity and will address the urgent needs and challenges of biodiversity management in forest production systems. The workshop is open to participants from Albania, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Bulgaria, Georgia, Macedonia FYR, Moldova, Romania, Russian Federation, Serbia and Montenegro, and Ukraine. The workshop announcement was circulated to the EUFORGEN National Coordinators and Focal Points in January 2005 to reach the target group.

L. Ackzell pointed out that it is very useful to have a specific theme for a Network meeting and proposed that this practice should continue in the future.

Date and place of next meeting

Following the Steering Committee decisions, the species-oriented Networks can organize two other meetings during Phase III. The timing of the future meetings was discussed and it was agreed to organize them in autumn 2006 and in spring 2008.

Both Iceland and Lithuania offered to host the next meeting in autumn 2006. B. Fady thanked A. Sigurgeirsson and D. Danusevicius for their offer on behalf of the Network. After discussion, it was decided to organize the next meeting in Iceland in autumn 2006. The exact meeting dates and the venue will be informed at a later date. The idea of a special topic for the next meeting was agreed upon. Tentative topics are climate change and legal ownership of forest reproductive material.

Adoption of the meeting decisions

The meeting decisions were adopted and B. Fady closed the meeting.

Appendix 1. EUFORGEN objectives and Programme activities during Phase III[1].

Objectives	Activities
Promote practical implementation of gene conservation and appropriate use of genetic resources as an integral part of sustainable forest management. **Group 1**	1. Promote implementation of recommendations presented in the Technical Guidelines at national level, as needed or requested; 2. Support integration of gene conservation and appropriate use of genetic resources into national forest programmes and policies; 3. Collaborate with the MCPFE process and other relevant international, regional and national initiatives and processes; 4. Provide advice to countries on issues related to forest genetic resources, if requested; 5. Facilitate implementation of common action plans and use of best management practices; 6. Develop protocols to evaluate genetic consequences of different management practices and identify genetically appropriate management practices in collaboration with forest managers and policy makers.
Facilitate further development of methods to conserve genetic diversity of European forests. **Group 2**	1. Develop common action plans as part of pan-European gene conservation strategies; 2. Develop common methods for genetic monitoring; 3. Revise Technical Guidelines and develop new ones, as needed; 4. Highlight negative consequences of the use of inappropriate forest reproductive material; 5. Develop methods to promote genetically sustainable regeneration; 6. Improve collaboration between nature conservation and gene conservation efforts in Europe; 7. Facilitate the expansion of the Programme to recruit non-participating countries to cover the entire distribution ranges of European tree species.
Collate and disseminate reliable information on forest genetic resources in Europe. **Group 3**	1. Increase awareness among policy makers, forestry professionals and the general public on the importance of forest genetic resources; 2. Compile and make available geo-referenced data on gene conservation units in Europe; 3. Develop EUFORGEN position papers (*e.g.* for the MCPFE process); 4. Publish reports on the state of forest genetic resources in Europe and other relevant issues; 5. Maintain the existing Web site and develop a new online information infrastructure, as needed; 6. Facilitate exchange of information among countries.

[1] The full Fourth EUFORGEN Steering Committee Meeting report is available at: http://www.ipgri.cgiar.org/networks/euforgen/SteeringCommittee/SCIII_Docs/SC4_Report.pdf

Fifth meeting of the EUFORGEN Conifers Network
Larnaca, Cyprus, 7-9 April 2005

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