

## Report of the Second EVOLTREE Stakeholder Group meeting Eisenstadt, Austria, 16-17 September 2009



### Opening of the meeting

Jarkko Koskela, of Bioversity International, opened the meeting and welcomed the participants. He explained the purpose of the meeting and presented the agenda. Martin. Höbarth then welcomed the participants to Austria on behalf of the Federal Ministry of Agriculture, Forestry, Environment and Water. He also stressed the importance of forest genetic resources for forestry in the face of climate change.

Antoine Kremer, the coordinator of EVOLTREE, provided an overview of the objectives and structure of the Network of Excellence and illustrated the scientific challenges and questions that EVOLTREE is addressing. He also introduced a new initiative, FoResTTraC, which is a collaborative project between Europe and North America (Canada and the USA). It will develop a roadmap on how to address major challenges in the area of ecosystem genomics over the next 10 years. FoResTTraC is funded by the EC and it will start in January 2010.

Jarkko Koskela then invited all participants to introduce themselves. He continued by presenting the European Forest Genetic Resources Programme (EUFORGEN) and its recent activities. He also briefed the participants on the new phase of EUFORGEN (2010-2014) during which the Programme will continue promoting conservation and use of forest genetic resources at pan-European level as part of the MCPFE process (Ministerial Conference on the Protection of Forests in Europe).

### Ongoing projects on forest genetic resources in Europe

Gerry Douglas provided an overview of the TREEBREEDDEX project and its objectives and activities. ([www.treebreedex.eu](http://www.treebreedex.eu)). He described also the different outputs produced so far (e.g. various databases, inventory of field trials and collections, expert groups, state of the art reports, workshops, website and e-mail discussion group). He then provided figures on the size and content of the databases. He also described publications generated by the project activities and examined the expected achievements of the project.

- Understanding of genetic variation / geography.
- Delineation of European breeding zones (instead of national).
- Strategies for climate change.
- Relevant info on size and organization of breeding populations.
- Scientific basis for joint breeding programmes.
- Pools of common methodologies / protocols for experiments.
- Better appreciation on value of mass propagated stock, economic/ecological and deployment roles.

The potential synergies with EVOLTREE and other European research activities emerged clearly from the presentation.

Catherine Bastien, the coordinator of NovelTree ([www.noveltree.eu](http://www.noveltree.eu)) provided an overview of this European research initiative. She showed how the project is developing new improved and novel tree breeding strategies, to meet changing societal and environmental needs, thus achieving the multiple objectives of continuous genetic gains for wood production and stability of performances in changing environments, obtaining specific added values (eg. bio-energy), contributing to sustainable management of natural resources. She showed how advanced knowledge and new technologies are critical for increasing efficiency in tree breeding programmes and how the project is based on efforts started by other projects; such as, for example, the large collaborative re-sequencing efforts for SNP discovery undertaken within the EU project EVOLTREE and Energy-poplar, and the USA(NFS) and Canadian funded initiatives Arborea and Treenomix. Great efforts are directed towards the development of tools to investigate efficiency, expected genetic gains and evolution of genetic diversity from various breeding and deployment scenarios, using a modelling approach (eg. simulator of genetic gain, web-based support to disseminate optimal seed transfer rules for Scots pine in both Sweden and Finland).

Jarkko Koskela presented an update to the recent activities of the EUFGIS project (Establishment of a European Information System on Forest Genetic Resources), which is being implemented in close collaboration with the EUFORGEN member countries ([www.eufgis.org](http://www.eufgis.org)). The project is co-funded by the EC (DG Agriculture, 50% of the total budget) under Council Regulation No 870/2004 on genetic resources in agriculture.

It focuses on improving documentation and management of dynamic gene conservation units of forest trees. More specifically, the project aims at 1) creating an online information system to serve as the European documentation platform for national FGR inventories, 2) establishing a network of national focal points in 40 countries to provide data for the information system, 3) developing minimum requirements and data standards for dynamic gene conservation units of forest trees at pan-European level, 4) making available harmonized data on the dynamic gene conservation units in Europe, and 5) providing training on FGR documentation to the national focal points in participating countries. The EUFGIS Portal will be launched at the final meeting in Vienna, scheduled for September 2010.

Georg von Wuehlich, of the COST action E52 on the Evaluation of Beech Genetic Resources for Sustainable Forestry, gave a presentation of this initiative which is coming to a conclusion in March 2010. The objective of the COST actions are a) to evaluate pan European beech provenance trials, b) to analyse patterns of populations of European beech, c) to attempt a prediction of the future range of distribution of European beech based on reaction patterns found. He described the patterns observed in the variation of some selected traits of beech across the European provenance trials. The preliminary conclusions resulting from the analysis of the observations are that a) there are no clear regional patterns in most variables observed and the dispersal of the species from refugia does not explain the variation observed; b) local adaptation (adaptedness) definitely exists (e.g. spring phenology); c) the high amount of adaptability to differing sites can be expected, (e.g. distant

provenances perform unexpectedly well); d) and that there is a strong genotype by site interactions, which makes general provenance recommendations rather difficult.

### Visit to the repository center

In the afternoon the participants visited the Austrian Institute of Technology GmbH in Seibersdorf, where the common DNA repository center established within EVOLTREE is located and maintained.

Silvia Fluch, AIT staff and EVOLTREE partner, welcomed the visitors and gave a presentation on the hosting research center and on the common DNA repository. This was followed by an illustration by Dieter Kopecky of the e-Lab, another joint effort and permanent common infrastructure set up within the framework of EVOLTREE.

The e-Lab (<http://www.evoltree.org/index.php/elab>) is a virtual laboratory through which a series of distributed databases, maintained by EVOLTREE partners, are accessible and can be queried. In this way, the e-Lab allows to perform a simultaneous search inside all the databases currently shared by partner institutions within the EVOLTREE project. Access to the E-Lab is currently restricted to EVOLTREE partners, but should be soon opened to the larger scientific community.

Another example of research conducted at AIT was illustrated by Mrs. Seesitsch, who gave a presentation on research activities she is undertaking on the forest soil microbial communities.

Finally, Silvia Fluch showed results from the research undertaken on tree species (Norway spruce and oaks) at AIT.

The visitors then had a chance to see the repository center and the AIT staff Mr. Stierschneider gave a demonstration of its functioning and an illustration of its considerable storing capacity and impressive automated functions.

### Presentation of research findings from EVOLTREE and previous research projects

On the second day, invited scientists from EVOLTREE presented a series of overviews of their specific areas of work. The objective was to illustrate the current level of knowledge acquired in different scientific areas related to forest tree genetics and genomics, highlighting the practical applications of possible interest to the Stakeholders. The topics covered were the following:

- Movement of forest reproductive material: a strategy to cope with climate change? (Speaker: Reiner Finkeldey).
- Examples of practical applications of tree genetic and genomic research: Incorporating genomic insight into forest management, screening for drought resistance (Speaker: Bruno Fady).
- Molecular tools for certification of plant material (Speaker: Giovanni Giuseppe Vendramin).
- Application of modelling approaches to anticipate future scenarios with regard to European forests (Speaker: Koen Kramer).

Reiner Finkeldey, from the University of Göttingen, presented an overview of the challenges posed by climate change in Europe and discussed some crucial steps in forest management that have a considerable role in determining future responses to climate change, such as forest regeneration practices and the choice of forest reproductive material. He presented the results coming from different experiments, including past results of provenance trials and preliminary results of very recent seedling translocation experiments conducted within the framework of EVOLTREE.

Bruno Fady then illustrated different examples of (practical) applications of tree genetic and genomic research. He showed how human intervention can affect forests and their genetic makeup through different actions. In particular, the genetic diversity and adaptive potential of forests will be differently affected by choosing between the option of either moving / introducing populations and species to fit their current ecological niche with climate predictions or relying on (and improving) locally available diversity for increasing plasticity and adaptation. He provided an insight on the scientific background demographic processes affecting forest population genetics (e.g., reproduction and dispersal ecology and their effects on the spatial genetic structure of natural populations, the genetic diversity of marginal populations, the possibility to use DNA barcoding to identify species and hybrids). He also reviewed aspects related to genomic research and the new avenues it opens for adaptation. Finally he provided an insight on biodiversity spatial organization at the macro-scale, across the Mediterranean biome, linking species and genetic diversity conservation into a single process of biodiversity conservation.

Beppe Vendramin gave a presentation on the molecular tools for certification of plant material. He clarified the concepts of traceability (ability to trace the history, application or location of an entity by means of recorded identification (ISO, 1994)) and timber identification (of tree species or of geographical origin), which is a technical prerequisite for monitoring and controlling wood trade or to control the chain of custody in the context of certification. He reminded that there are different techniques for the wood identification (wood anatomical methods, chemical methods, genetic methods). He then focused particularly on the use of molecular markers (alone or as complement to other methods) to identify the geographic origin of wood. He reminded that the DNA markers to be used must have enough discriminating capacity and show enough geographical structure. The use of markers has to be combined with a careful mapping of the spatial distribution of genetic diversity of the species examined.

The technique described has numerous potential applications: identification of populations, discrimination between exotic versus native species/provenances, identification of species, identification of individual clones, detection of (trans)genes, molecular labelling.

Koen Kramer concluded the series of seminars with a presentation on the application of modelling approaches to anticipate future scenarios with regard to European forests.

He explained the fundamental difference between two types of models, classical population-genetic models and individual-based genetic modelling (which takes into account ecology, physiology, genetics, coupled with forest management). He explained how species area modelling projects the species into a new range based on

the expected shifts of optimum climatic conditions for a given species but they neglect to account for evolutionary processes that induce adaptation. He then presented an attempt to include individual based genetic modelling in process based species area models. He highlighted the specific role played by forest management in determining the rate of adaptation to climate changes. The most crucial impact is played through an influence on the interval of regeneration and the number of parent trees contributing to that. Particularly in the case of beech, half of the adaptive capacity resides in the difference in bud burst between NW and SE Europe. Bud burst- and water use- related traits are good candidates to be used for predictions on adaptive capacity of a species.

In case of artificial regeneration the number of trees from which seed is collected is also a crucial element that determines overall genetic diversity in the material planted and ultimately resilience of the system.

### Comments and recommendations by the Stakeholders

Two points were presented to the attention of the Stakeholders to seek their feedback.

- Preparation of policy briefs or information notes on scientific findings of relevance to the Stakeholders, derived from EVOLTREE and associated initiatives
- Organization of the last Stakeholder Group meeting in occasion of the final EVOLTREE scientific conference, to be held in San Lorenzo del Escorial, near Madrid, in June 2010, from 9 to 11.

During the First Stakeholder Group meeting another series of seminars covering scientific issues with applied elements, was presented to the Stakeholders and, based on the themes illustrated, the following list of possible topics for the policy briefs was proposed:

1. What is genomics and how does it contribute to discussion on how forest trees respond to climate change?
2. How to incorporate climate change concerns into forest management – insight from ecological, genetic and genomic studies.
3. Benefits from sharing common infrastructures; creating a common DNA repository center.
4. Genomic insights in relation to trees and energy.
5. Moving forest reproductive materials in the face of climate change: what do we know about genes involved in tree adaptation to climate change?
6. Using molecular tools to trace timber illegally traded.

The second point presented to the Stakeholders attention was the organization of a Stakeholders event during the EVOLTREE scientific conference. The purposes of such event were reminded, before seeking a feedback on how to structure the event drawing from the experience of previous interactions with Stakeholders. The side event would thus constitute an opportunity for:

- Policy makers to learn about scientific findings of relevance.

- Policy makers to contribute to shape the development of future research collaborations in the area of forest genomics.
- Scientists to increase visibility of their research activities and translate results for non-experts.
- Scientists to ensure their research work is linked to the demands.

The webpage of the conference is already developed and partly under construction. The address is: [www.ecosystemgenomics2010.fgua.es](http://www.ecosystemgenomics2010.fgua.es)

Vladimir Čamba introduced the discussion providing an overview of the expectations from the Austrian stakeholders. The topics proposed as subjects for the preparation of policy briefs were then examined and suggestions were expressed on how to organize the Stakeholders event planned during the final EVOLTREE scientific conference.

#### Users of the policy briefs

It was reminded that the purpose and final users of the policy briefs should be carefully identified. The two main target groups so far selected (policy makers and forest practitioners) are very distinct and this should be taken into consideration when proposing recommendations for action based on scientific findings. It was observed that if the main objective of the policy briefs is to raise awareness on the importance of forest genetic resources, the priority target would be policy makers as they are in a position to influence other stakeholders.

#### Types of contents of the policy briefs

The list of topics proposed was reviewed and a merging of subjects was suggested. The stakeholders agreed that the effort should be limited to 1 or 2 policy briefs, very well focused on strategic topics. Just a few powerful and clear messages should be transmitted and they should mainly cover the relationships between genetic diversity and climate change. They should emphasize the fact that genetic diversity is crucial in adaptation and mitigation, illustrating the potential consequences of not adapted forest management practices (eg., in terms of job losses, economic value lost, etc.), insisting on the least controversial issues, avoiding an ideological approach and maintaining a neutral, scientific tone. Furthermore, it was suggested that the use of forest genetic resources as part of a risk management strategy to cope with environmental changes be further disseminated.

Risto Paivinen remarked during the first day that it would be very useful to provide, through the policy briefs, an historical perspective on what role genetic research has played in determining the increment observed in European forests. This would be a rather challenging task but would achieve the objective of demonstrating the importance of research in this area. In addition, he remarked that a subject of common concerns is GMOs and a position paper on this topic would be needed.

Additional aspects were discussed: the importance of properly packaging the information and to make it readily available in the form of short sentences, focused on non-controversial aspects of the subject, to be included in official documents within the framework of relevant policy making processes. Besides, some stakeholders expressed the view that the policy briefs should convey a sense of perspectives: ie, what are the chances to succeed in fostering forest adaptation by looking at tree genetics and genomics, what kind of research should be undertaken and what infrastructures are needed. This would inform policy-makers on what

would be the expected impact of supporting technology developments in the area of forest genomic resources.

It was also observed that the policy briefs could be aimed at highlighting some gaps in current regulations. For example, the EU regulation on the movement of forest reproductive material cover only issues of traceability of the material moved and does not includes recommendations on what material should be used.

The policy briefs could also touch upon practical management issues (eg., how to harvest seeds to ensure the reproductive material is sufficiently diverse in the face of climate change pressures, how to manage provenance regions, to what extent the introduction of foreign forest reproductive material would be recommended to better cope with climate change). However, understanding the responses of forest ecosystems to environmental changes is a challenging effort that takes long time and some scientific results are inevitably too unclear to be immediately adopted as guidance to practical management issues.

Finally, it was observed that policy makers should be involved in the science-policy dialogue initiated within EVOLTREE, but also implemented in the framework of other projects and MCPFE participation in the dialogue would be crucial. In addition, the EUFORGEN programme could play a role in the dissemination of scientific findings that have practical implications in the management of forest genetic resources.

#### Final Stakeholders event

The Stakeholders recommended that the agenda of the event be structured, and the participants selected, keeping well in mind the specific objectives of the event that are multiple, eg, influence policy making processes, secure future funding to the sector, include stakeholders perspective into the development of future research proposals.

The messages delivered during this event should be aligned with the contents of the policy briefs.

The event should not overlap with other technical sessions in order to ensure a large participation of the scientific community attending the conference, allowing a broader exchange of views between scientists and stakeholders.

#### Conclusions

The meeting provided a good opportunity to get an overview of the ongoing research efforts in Europe in the area of forest tree genetics and genomics and the three main groups of participants (scientists from EVOLTREE, scientists representing other European research initiatives, Stakeholders) expressed satisfaction for the useful exchange of information. The illustration of the different research projects, which address slightly different scientific questions from EVOLTREE, although related, showed the importance of EVOLTREE as a useful platform to which other initiatives can link, allowing access to the genomic resources assembled in common databases, and making available shared infrastructures at European level.

A broader participation of stakeholders and scientists compared to the First Stakeholder Group meeting was positively noted, however it was recognized that in order to make stakeholders meetings more effective, the attempt to include a broader representation of relevant organizations should be continued. In addition, it was reminded that EUFORGEN could continue to play an important role in maintaining a flow of information from the scientific communities to the policy-makers and forest practitioners, translating relevant scientific findings that have practical implications in the management of forest genetic resources.

The proposal to disseminate research findings in the form of policy briefs was appreciated and the topics suggested were re-examined. The discussion led to the agreement that a smaller set of policy briefs, but very strategically focused, would serve the purpose of transferring key information to the stakeholders.

The policy briefs should clearly relay the message that genetic diversity is crucial in climate change adaptation and mitigation, should illustrate the potential consequences of non-adapted forest management practices (eg., in terms of job losses, economic value lost, etc.), and cover the least controversial scientific aspects.

Suggestions were expressed with regard to the organization of the last Stakeholders event that will take place in the framework of the EVOLTREE final scientific conference. The event has the purposes of influencing policy making processes, securing future funding to the sector, including stakeholders perspective into the development of future research proposals. In order to achieve these objectives, the agenda and the participants should be defined very strategically.

**Second Stakeholder Group meeting of EVOLTREE  
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