

B4EST International Conference

Managing Forest Genetic Resources (FGR) for an uncertain future

Instituto
Superior de
Agronomia

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THEMATIC
SESSIONS

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Adaptive Breeding for resilient Forests under climate change

<https://b4est.eu/>

Session A

Accelerating breeding to cope with new challenges and uncertain future



Laurence Moreau (GQE-Le Moulon, INRAE; France)



Chairs

- Leopoldo Sánchez-Rodríguez (INRAE, France)
- Chedly Kastally (University of Helsinki, Finland)

Brief description

Genomic innovations in the last decade have led to **promising improvements** in the way **tree breeding** is conducted. Considerable benefits are expected from this new source of information: the shortening of breeding cycles, the rationalising of phenotyping in terms of costs, and the improved predictive and explanatory analyses decrypting phenomes, to name a few. At the same time, genomic data open up new possibilities for a better monitoring and **long-term management of genetic diversity in breeding** and conservation programs, which is essential for a challenging future. To leverage these new data to their full potential, **methodological developments and proof-of-concept initiatives** are required, not only for genome-wide predictions for which substantial advancements already exists in most domesticated species including some forest trees, but also by accounting for new ways of evaluating tree performance that are sensible to underlying interactions at genomic, environmental and conspecific levels. Last but no least, insights are needed on the impacts that these new developments could bring at the organisation level of the breeding programs. The aim of **this session** is to showcase methods harnessing new genomic technologies developed for forest tree breeding and illustrate using case studies the possibilities offered by these approaches, including their impacts to the breeding sector.



Session B

Forest genetic resources (FGR) and adaptation to climate change



Tongli Wang (University of British Columbia, Canada)



Chairs

- Stephen Cavers (UKCEH, UK)
- Juliette Archambeau (INRAE, France)

Brief description

Climate change is already impacting forests through gradual climatic shifts and more frequent extreme climatic events, triggering changes in biotic (e.g. insects, diseases) and abiotic (e.g. floods, fires) disturbance. **Natural populations of forest trees can respond to these changes** by migrating to new sites or persisting in their current locations and relying on their dispersal ability, phenotypic plasticity and **ultimately genetic adaptation**, the only mechanism likely to ensure long-term persistence. In production forests, the use of the genetic variation within species (**forest genetic resources, FGR**) to adapt to new conditions may play a fundamental role in providing resilience and maintaining wood and non-wood product provision. **Assessing the vulnerability of forests to climate change** involves understanding the mechanisms that underlie responses to change and predicting how populations will respond over time. Such predictions will have to incorporate the uncertainty associated with the timing and magnitude of climate change, the interaction with other threats (e.g. land-use change) and the inherent stochasticity of population responses (e.g. stochastic demographic or evolutionary processes). **In this session**, we welcome population and quantitative genetic and modelling studies related to past and future forest tree adaptation to climate change and how to make use of FGR and their evolutionary potential to maintain forests (managed or unmanaged) in the face of the changes ahead.



Session C

The forests we want: deployment of forest reproductive material (FRM) for forest-based solutions



Conceição Silva (UNAC, Forest Owner Association; Portugal)



Chairs

- Sven Mutke (CSIC, Spain)
- Marina de Miguel (INRAE, France)

Brief description

Forest and landscape restoration goals has significantly evolved from the first tree plantations for land reclamation, aiming to regulate and provide ecosystem services (erosion control, flood prevention, timber and biomass production), to the current prominence for **transition pathways to bioeconomy** and **multipurpose forest management** (including non-wood forest products and cultural ecosystem services). Recently, these issues are gaining increased relevance with the UN Decade on Ecosystem Restoration, aiming at preventing, halting and reversing the degradation of ecosystems worldwide, and new European policy (e.g. the EU Biodiversity Strategy for 2030). One key question is whether to rely on **forest reproductive material (FRM) from local seed sources**, often seen as reservoirs of adaptive genetic diversity, or rather on **genetic improved FRM** (or exotic seed sources) **that are the result of breeding programs** and allow for the use of the best available plant resources for a given site, climate conditions and forest management goals – already accounting for expected major changes in local climates over this century (i.e. assisted migration). The ambition of **this session** is to support foresters with scientific evidence and decision support tools. Thus, we aim to learn about the role and the potential of FRM deployment in different European countries and forest types in a context of climatic and societal change.



Session D

Science policy interface for mitigation, adaptation and risk management in forestry



Michele Bozzano (EUFORGEN, EFI; Barcelona, Spain)

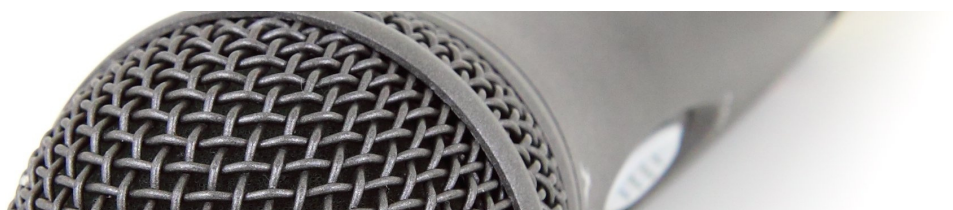


Chairs

- Richard Whittet (Forest Research, UK)
- Simone Bianchi (LUKE, Finland)

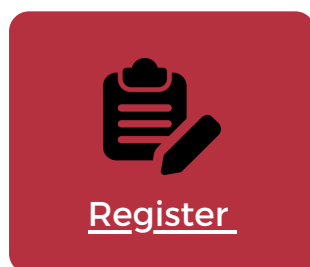
Brief description

Investment in forest genetic resources (FGR) tends to pay off very substantially in genetic gains delivered through breeding and better outcomes in ecological restoration. However the **rate of return on investment in research and development** is relatively long and priorities shift due to environmental and political change. Due to the generally necessary use of technical language, it often falls to scientists to **communicate benefits and risks of developing FGR** although for most purposes, no more than an intuitive understanding of genetics is truly required and many foresters are expert stewards of FGR without realising it. What role **do** and **should scientists, end-users and policy-makers play** in governance and coordination of FGR and over which timescales and within which geographical or administrative boundaries? For example, how do scientists retain and manage a blend of long- and short-term research infrastructure? How do end-users feed into policy and research agendas and where is the line between public good and private gain? How do policy makers handle uncertainty and how do their attitudes risk influence progress? The aim of **this session** is to demonstrate examples of regional or national/subnational systems of governance and coordination of FGR with a special focus on the role scientists play in them. Positive and negative examples are equally welcome in this session. Our intention is to learn from each other what works and why.



REGISTRATION & ABSTRACT SUBMISSION

If you want to **attend the conference**, please confirm your participation by filling out the following form:



Call for abstracts:

You can submit your abstract for one of the four thematic sessions.



Abstract submission will close on **23rd May 2022**