



Foreword, Acknowledgements

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FOREWORD

The REGEFOR Workshops set out to improve the dialogue between research and forest management. They are organized every two years by INRA, Gip ECOFOR, AgroParisTech and Lorraine University.

The fourth REGEFOR Workshop took place in June 2013 at the INRA Nancy-Lorraine Centre, Champenoux, on the theme “*Is the management of forest soil fertility at a turning point?*”.

This theme was especially topical given the anticipated rapid increase in the use of forest biomass, particularly for fuel (theme of the 2009 REGEFOR Workshop), the change in forestry harvesting and production practices and the progressive effects of climate change. It focused on the question of how the chemical, physical and biological components of soil will behave in the long term to deal with these changes and the new stressors.

Forest ecosystems are able to make particularly efficient use of nutrients, which ensures the sustainability of all soil functions. Forest soils generally have limited fertility, and trees are particularly well suited to these conditions, producing significant quantities of biomass through efficient recycling of mineral resources and microbiological associations that are highly effective at mobilizing nutrients in organic and inorganic forms. This ability is remarkable, but it depends on maintaining the ecosystem's recycling ability, rendering the system vulnerable to anthropogenic disruption.

It is, therefore, reasonable to consider the sustainability of forest soils. Over the past decades there has been a succession of different phases. There was a long period of intensive coppicing which significantly impoverished the soils, as seen in the long established forests in the Ardennes, the Massif Central and Morvan regions. This was followed by a respite that allowed the soil to recover. There was then concern about the effects of acid rain and the physical degradation of the soil, particularly after the destruction caused by the storm in 1999 and, more generally, by the continued increase in mechanization of forest management and, finally, about the possible effects of more intensive harvesting, at least in certain situations, resulting from the increasing use of wood for fuel.

This raises the question: *Have we reached a turning point?* Can the performance of ecosystems be maintained, especially in case of more severe water stress in poor environments?

How can these changes be managed by striking a balance between sustainable production, ability of forest ecosystems to provide services and preservation of biodiversity (theme of the 2011 REGEFOR Workshop)? What precautions should be taken? What remedial actions should be taken if necessary?

The 2013 REGEFOR Workshop set out to assess current knowledge in the field of forest soil fertility and the impact of stressors, encourage discussion between forest management and research, discuss the applied aspects of soil fertility by considering different forest management scenarios in a strategic approach that took social and economic aspects into account.

The main issues covered in this special edition of the *Revue forestière française* are:

- analysis of the key stressors for forest ecosystems: increase in the use of biomass, changes in harvesting practices (especially for the final crop), global climate change and past land use;
- knowledge of key processes: bioavailability of nutrients (including the effect of stressors and environments), interactions between tree species, role of the biological community, water availability and its interaction with mineral nutrition;

- tools for monitoring (networks), experiments (reference ecosystems), modeling (on different temporal and spatial scales), and decision-making;
- soil responses to stress and their resilience: acidification, soil compaction, soil erosion;
- soil management, in particular the various forms of remediation: amendments, fertilization, restitution (ash), recycling (sludge), mechanical or biological restoration;
- the functions and services provided by soils depending on changes in forest management.

These issues were discussed from different, complementary points of view. The workshop began with plenary sessions with overviews presented by experts, who described current standard practices for key aspects, followed by workshops that provided the opportunity for discussion on current management issues. For the first time, the 2013 REGEFOR Workshops included a forum for PhD students to present examples of current research projects to participants less familiar with research. There were also presentations of software for soil management (analysis, modeling and remediation) and information on forest soils (books and other media) by various institutions, publishing houses, associations and private companies.

A field trip was organized to an experimental site in Azerailles (Meurthe-et-Moselle), where the effects of soil compaction are being studied. This site is widely used for academic and practical training.

We hope that this special edition of the *Revue forestière française* has provided useful information on forest soil fertility and has helped to understand the factors that drive its changes.

On behalf of the organizers of the 2013 REGEFOR Workshop

The guest editorial board:

Céline RANGER
 coordinator of the Editorial Committee (INRA)
 Jacques RANGER (INRA) and Guy LANDMANN (ECOFOR)
 guest editors

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The success of the 2013 REGEFOR Workshop was due to all those who took part – speakers, workshop leaders, presenters of tools and documents, not to mention the highly responsive audience.

The technical and administrative teams comprises Céline Ranger (INRA – *project leader – logistics and financial manager*) assisted by Yves Bernardi (INRA, *graphics design and logistics*), Marie Bruto (INRA student) and Véronique Monnier (INRA, *short-term employee*).

The organizing committee comprised representatives of the participating organizations: Erwin Dreyer (INRA), Guy Landmann (Gip ECOFOR), Mathieu Petrisans (Lorraine University), Christophe Voreux (AgroParisTech), Jacques Ranger (INRA, *representative of the Scientific Committee*) and Céline Ranger (INRA – *project leader*).

The Scientific Committee comprised Dominique Arrouays (INRA, president of AFES), Laurent Augusto (INRA), Alain Bailly (FCBA), Antonio Bispo (ADEME), Erwin Dreyer (INRA), Bruno Ferry (AgroParisTech), Pascale Frey-Klett (INRA), Jean-Paul Laclau (Cirad), Guy Landmann (Gip ECOFOR), Sophie Leguëdois (INRA – Lorraine University), Anne Poszwa (Lorraine University), Olivier Picard (IDF), Jacques Ranger (INRA, president), Claudine Richter (ONF), Christophe Schwartz (INRA – Lorraine University), Stéphane Uroz (INRA), Michel Venetier (IRSTEA).

The activities of the committee were coordinated by Céline Ranger.

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