

FOREST GENETICS AND SUSTAINABILITY

Forest Genetics and Sustainability. Cs. Mátyás, editor. Edition Forestry Sciences 63, Kluwer Academic Publishers, 1999. 287 pages. ISBN 0-7923-6011-7, price 132.50 USD, or 113.50 Euro.

During the 4th International Consultation on Forest Genetics and Tree Breeding, held by IUFRO in 1998, in Beijing, China, leading scientists were invited to review past achievements, to redefine the role of forest genetics and tree breeding in contemporary forestry and to set priorities for future research and development. On the basis of the invited presentations, the book summarizes the state-of-knowledge in various fields of research.

In the first, introductory contribution, Cs. Mátyás editor of the book and chair of the Conference Scientific Committee, suggests five "lessons to be learnt" for forest genetics and tree breeding. He maintains that "postwar economic expansion triggered an unforeseen boom in tree breeding in the developed world. The high expectations were only partially fulfilled with the advent of new ideas on nature conservation / biodiversity three decades later. At the same time, the appearance of new molecular methods in forest genetics brought an unparalleled expansion in knowledge. This offered excellent conditions for the support of tree breeding programmes. Instead, an increasing shift of research emphasis occurred in the developed world from classical tree breeding support toward molecular genetics and conservation." The five main lessons according to Cs. Mátyás are: the need for public acceptance and long-term thinking; practical links with the forestry sector; synthesis of the wealth of results; field experimentation; and the need for an ethical approach.

The last chapter of the book is very useful because it offers a summary of statements and research priorities proposed by participants during the Conference. The integration of classical breeding and modern biotechnology, which is considered critical to the success of forest tree improvement, was one of the main recommendations made. "While classical quantitative genetics (and provenance research) appear to be relatively underrepresented in current research, genomic science offers new opportunities to link it with molecular genetics in tree improvement programmes". It is perhaps characteristic that two "biotechnology" contributions – on the perspectives of tree genomics research (by R. Sederoff) and on genetic markers (A. Szmidi and X.-R. Wang) – make up the second chapter of the book entitled "Situation and challenges for forest genetics and breeding". The third contribution in this chapter is a very useful analysis of the results of an enquiry sent to forest geneticists around the world on the perspectives of forest genetics and tree breeding (E. Teissier du Cros).

Knowledge of the adaptive potentials of forest tree populations is very important, especially for tree improvement work. The third chapter includes several contributions that examine the role of genetic markers for evaluation of adaptive potentials. Theoretical background of this complex research task is provided, as well as results of several studies based on experimental data, prevalingly obtained at isoenzyme loci. Another contribution (T. Skrøppa and Ø. Johnsen) demonstrates experimental data from provenance experiments in *Picea abies* in Norway, which confirmed the effects of reproductive environment on the phenotypic variability of progenies. These research results of course suggest important implications for the evolutionary adaptation of the species.

The fourth chapter focuses on the genetic consequences of global environmental changes. D. Karnosky *et al.* provide an overview of the technology and results of numerous studies that have been conducted on the impact of increasing levels of greenhouse gases and UV-B radiation on genetic structures. The biological aspects of sexual reproduction in a changing environment are discussed by V. Koski.

In the fifth chapter, several contributions address the impact of forest management practices on genetic diversity and genetic processes. Experimental data from different parts of the world were used in the studies. T. Boyle reviews the existing criteria and indicators as a practical and effective tool for measurement and monitoring of diversity. Risks and stability in using "bred, cloned or biotech products" are discussed by G. Namkoong. Following to the presentations made in this chapter, the crucial links between productivity, stability and diversity are addressed in the recommendations adopted by the Conference.

The contribution of S. Midgley and D. Boland is an overview of major issues related to the international exchange of forest genetic resources, an area of growing importance, not only from "an Australian perspective" as the title of this paper could suggest.

The next chapter, "Conservation of forest genetic resources" is composed of two contributions. G. Namkoong emphasizes the importance of well-targeted and well-communicated genetic research data, if they are to prove useful for conservation decisions. An update of the international framework for the conservation and sustainable use of forest genetic resources is provided by P. Sigaud, FAO. The recommendations of the Conference (last chapter of the book) include a detailed, comprehensive set of needs and priorities regarding new tools, networking, priority setting and access to exchange of genetic resources at a global level.

The seventh chapter offers an interesting set of contributions on forest genetic and tree breeding research in the different continents. Despite considerable heterogeneity in the scope and focus of the contributions, they provide a very useful insight into the – very different – current problems and prospects. The contribution from China (J. Hong) describes the accomplishments that have been made in the country to meet the increasing needs of rural population for timber through investment into genetic research, tree breeding and afforestations. The chapter certainly helps to understand why most of the experimental data used in the research studies throughout the book are limited to boreal and temperate tree species.

In conclusion, the book is a valuable overview of contemporary situation in forest genetics and shows the potential of this research field to contribute to sustainability in forestry. It may be useful for scientists, university lecturers and advanced students, for decision-makers in forestry and conservation agencies. Although it resulted from an international consultation with focus on forest genetics and tree breeding, the book is rather true to its title suggesting broader coverage – "Forest Genetics and Sustainability".

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