

POPULATION GENETICS AND GENETIC CONSERVATION

Population Genetics and Genetic Conservation of Forest Trees (Ph. Baradat, W. T. Adams & G. Müller-Starck, eds.). SPB Academic Publishing bv, Amsterdam, The Netherlands, 1995, 479 pages, ISBN 90-5103-109-2, price 147 USD.

This book is derived from the International Symposium on Population Genetics and Gene Conservation in Carcans-Maubuisson, France, August 24–28, 1992. Problems of conservation are a hot issue in forest tree biology since biodiversity in forests is undergoing an accelerated erosion due to the effects of human activities.

The introductory chapter by W. J. Libby shows how knowledge of the structure of genetic diversity and the mating pattern provides a guide to the wise management of the genetic resources of the species. The first chapter describes different kinds of genetic markers and their use in characterizing different levels of genetic variability. Examples are given to show the utility of various markers. In particular, the use of terpenes that are controlled by a major gene is, according to Baradat, well adapted to study population structure and mating patterns in coniferous species. Lebreton shows how flavonic markers allow one to study diversity at several taxonomic levels (populations, subspecies, specific complex, subgenus) thus providing a good overall picture of the level of diversity. Busov and Culot *et al.* describe electrophoretic methods for finding specific differences and making taxonomic identification when discrimination is not possible by morphological traits. RFLPs and RAPDs have been used to study biodiversity at the population level because they reveal high polymorphism with population specific fragments as discussed by Seguin *et al.* and Russell *et al.*

The second chapter describes the structure of forest tree populations using the above described markers. Baradat's results show a large variation in terpene composition between seed sources at the country level in *Pinus halepensis*. Fady finds the same results with terpenes and isozymes in species of *Abies*. Müller-Starck describes an interesting study on the

impact of extreme environmental conditions on genetic variation in *Picea abies* and *Fagus sylvatica*. In *Pinus* species, with isozyme markers, only a small amount of the genetic variation appears to be interpopulational; the remainder is due to differences between individuals within populations (Kim & Lee). This seems to be general for forest tree species, while with chloroplast DNA markers, most of the diversity between populations is maintained (Byrne & Moran).

The third chapter discusses the impact of the mating system of the tree species on gene dispersal and consequently on population structure.

The fourth chapter deals with a fundamental problem: the relationships between patterns of genetic diversity and gene conservation procedures. Practical questions about which traits have to be taken into account to provide good strategies for gene conservation are discussed. In particular, the question is asked whether the use of neutral markers to characterize the genetic structure of the population is sufficient, or whether the sampling for gene resource populations must encompass the variation in adaptive traits. An example is given by Eriksson with *Picea abies* and *Pinus sylvestris*. The last chapter examines practical examples of genetic diversity conservation of forest trees and ends with a description of European projects in conservation of genetic forest resources.

In conclusion, the book is a valuable review of the recent research in conservation of genetic forest resources in the world. It is thus able to give insights to anyone beginning a program in population genetics or conservation of forest tree species.

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