

Book review

Chemical Ecology and Phytochemistry of Forest Ecosystems, in: John T. Romeo (Ed.), Recent Advances in Phytochemistry, vol. 39, Elsevier, 2005, pp. 318. ISBN: 0-08-044712-0; cost: £130

This book is the product of the 44th annual meeting of the Phytochemical Society of North America held in Ottawa, Canada, in July 2004. The title of the book is too broad and does not fully reflect its content: the focus is clearly on tree chemistry and chemical ecology of insect herbivores whereas other aspects of forest chemical ecology (e.g. allelopathy or plant-pathogen interactions) are barely mentioned. Yet, for those researchers who, like me, are interested in tree biochemistry and plant defences against insect herbivores, the volume provides fascinating reading and a valuable source of up-to-date information.

The book consists of 10 chapters written by leading phytochemists and chemical ecologists from North America, Europe and Asia. The first two chapters (by Schmidt et al. and by Martin and Bohlmann) review current progress in studies of chemical defences in conifers, particularly Norway and Sitka spruce, achieved by integrated biochemical, molecular and genomics approaches. Anyone who believes that breakthroughs in molecular biology of plant defences happen only in studies of *Arabidopsis* should read these two chapters. My only criticism is that chapter 2 would provide a better introduction to the topic because it discusses both constitutive and induced defences and gives more background information on conifer defences whereas chapter 1 covers only induced defences. Chapters 3 and 4 explore the effects of conifer chemical defences on bark beetle physiology and population dynamics. In addition to their usual role in food digestion, midguts of some species of pine bark beetles can also produce pheromone components, which are often monoterpenes and may act synergistically with host tree volatiles. By applying functional genomics tools, Tittiger et al. explore digestive and pheromone-biosynthetic processes in bark beetle midgut. By taking more ecological perspective, Raffa et al. examine interactions between conifer terpenoids and bark beetles at wounding site, individual tree, population and landscape scales.

Chapter 5 by Constabel and Major shifts the focus from conifers to angiosperms and reviews recent advances in molecular biology and chemical defences of poplars, which, since sequencing of the *Populus trichocarpa* genome in 2004, are quickly becoming the model

trees for molecular studies of plant-insect interactions. Chapter 6 by Isman reviews recent studies of insecticidal properties of phytochemicals from tropical trees. The range of natural insecticides discovered in tropical trees and their biological activities is impressive, but the lack of commercial applications of these compounds (with the exception of those from neem) is somewhat disappointing. Chapter 7 by Yoshida et al. covers structural diversity and functional properties of tannins. The authors present evidence from recent studies demonstrating that tannins might have stronger antioxidant, antibiotic and antitumorogenic effects than more explored lower molecular weight polyphenols such as flavonoids.

The last three chapters in the book deal with insect perception of plant odors. Chapter 8 by Wright and Thomson describes an unusual and interesting statistical approach to quantification of odor structure by drawing an analogy with statistical analyses of visual scenes. Chapter 9 (Honson et al.) reviews structure and function of insect odorant, pheromone-binding and chemosensory-specific proteins. I found the language of this chapter to be far too technical and doubt that anyone apart from a specialist in this field will be able to appreciate it. This chapter is also somewhat out of place because it is not related to forest ecosystems and, thus, the subject of the book. The last chapter by Mustaparta and Strandén is more rewarding and provides an interesting comparison of olfaction in insect species living on gymno- and angiosperm hosts. A fairly comprehensive subject index concludes the volume.

In summary, the book provides a very readable overview of research at the forefront of tree phytochemistry and forest chemical ecology and a first glimpse into how this field might be revolutionised by introduction of new molecular, biochemical and statistical approaches. I very much enjoyed reading this book and recommend it to all researchers and students interested in tree phytochemistry, plant defences and chemical ecology of forest pests.

Julia Koricheva

*School of Biological Sciences,
Royal Holloway, University of London,
Egham, Surrey TW20 0EX, UK
Tel.: +44 1784 443414; fax: +44 1784 434326
E-mail address: julia.koricheva@rhul.ac.uk*

Available online 24 January 2006