

Preface

Reaction wood is wood produced by trees in order to orientate stems and branches in response to displacement and the requirements for light. The accompanying changes in the physical and chemical properties of the wood result in its having different mechanical and physical properties compared to normal wood including differences in colour, fibre properties, workability, distortion and strength. These have important consequences for wood-based industries in the processing and serviceability of products containing reaction wood. This has resulted in increased interest among wood scientists in the factors controlling reaction wood formation, the physical and chemical properties of reaction wood cells, and the way such changes are able to generate the stresses required to reposition stems and branches.

The European COST Action program COST E50 “Cell wall macromolecules and reaction wood (CEMARE)”, which ran from July 2005 to June 2009, brought together wood scientists from 19 countries. The Action covered the whole range of issues related to reaction wood from cell wall biosynthesis to forest management and wood processing. In this way it attempted to link the environmental influences on reaction wood formation to cell wall formation and cell wall structure and subsequently to the consequences for wood and fibre properties and processing. It very deliberately brought together studies on compression wood and tension wood, the normal types of reaction wood in gymnosperms and angiosperms, respectively.

The genesis of the idea for this book was the realisation amongst the scientists involved in CEMARE that there was no synthesis in one place of all the different aspects of reaction wood. In addition, the definitive work on compression wood by Tore Timell is now almost 30 years old, and no such comprehensive work on tension wood has ever been written. Therefore, it was decided to pull together in one volume the latest understanding of reaction wood and to ensure that we discussed compression wood and tension wood together in order to highlight the similarities and differences in their formation and properties. The book covers everything from reaction wood morphology, anatomy, ultrastructure and cell wall polymers to the molecular mechanisms of reaction wood induction, and the bio-mechanical action and biological functions of reaction wood. In addition the physical and mechanical properties of reaction wood at all levels are discussed,

focussing in particular on the impact of these properties on the utilisation of wood for different end products. Finally, there are chapters on detection techniques, the commercial implications of reaction wood and the influence of forest management.

The book will provide a valuable and important reference source on reaction wood for wood scientists and technologists, plant biologists and chemists, plant breeders, silviculturists, forest ecologists and anyone involved and interested in the growing of trees and the processing of wood. It is hoped that it will also provide a useful introduction to the subject for people new to this scientific area.

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