

Jose Kallarackal
Fernando Ramírez

Wood Density

Functional Trait in Plants

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*The first author (JK) dedicates this book
to his mentors in Plant Physiology
and Ecophysiology:*

*(Late) Prof. Dr. John A. Milburn (University
of New England, Australia), Prof. Dr. Ewald
Komor and Prof. Dr. John Tenhunen (both
University of Bayreuth, Germany).*

*The second author (FR) dedicates this book
to his parents Natalia and Fernando de Jesús.*

Preface

Wood density is a fundamental plant trait that influences a wide range of ecophysiological and evolutionary processes, including plant growth, water and mineral transport, mortality, and community composition. It is also an important economic trait, as it affects the value of wood for timber and other products. During the last three decades, much research has gone into wood density research, which gives us the idea that it is not a mere physical parameter or property of the wood or timber, but an important functional trait in plants. Despite its importance, wood density is often overlooked in plant ecology and physiology textbooks. This book aims to fill this gap by providing a comprehensive overview of wood density, from its physiological and anatomical basis to its ecological and evolutionary significance. We have discussed the wood density as a physical parameter including different methods of measurement and also its correlation with other functional traits. The variation seen in wood density between species, genera, and families is dealt with in detail. Phyto-geographical aspects of wood density are discussed in a chapter. The application of wood density in climate change research and estimations is discussed at length. The book also points out the challenges and opportunities of research on wood density.

This book is intended for a broad audience, including students, researchers, and professionals in plant ecology, physiology, forestry, and wood science. It is assumed that readers have some basic knowledge of plant biology and ecology, but no prior knowledge of wood density is required. We hope that this book will promote more research on the topic of wood density, especially its functional relations.

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Bogotá, Colombia
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Fernando Ramírez

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About the Authors

Jose Kallarackal an accomplished Consulting Scientist and independent researcher holds a Ph.D. in Botany from the University of Delhi. With extensive post-doctoral research experience at esteemed institutions such as the University of New England in Australia, the University of Bayreuth in Germany, and Manaaki Whenua—Landcare Research in New Zealand, Dr. Kallarackal has established himself as a prominent figure in the field of ecophysiology and tree physiology. Since 1986, he has been an Alexander von Humboldt Fellow, actively engaging in collaborative ecophysiological research with German universities. In his role as a senior research scientist at the Kerala Forest Research Institute in India, he spearheaded numerous national and international projects focused on ecophysiology and tree physiology. Notably, he led initiatives related to tree water use in the tropical region of Western Ghats, India. Dr. Kallarackal's primary research interests revolve around tropical ecophysiology and tree physiology, with a specific emphasis on understanding the water usage patterns of both exotic and indigenous tree species. His collaborative efforts extend globally, including partnerships with CSIRO (Australia) and AusAID, where he contributed to studies on the water use of eucalypts. Furthermore, his involvement in Joint Forest Management (JFM) initiatives in the Western Ghats of India showcases his commitment to sustainable forestry practices.

His prolific academic career is reflected in the publication of over 50 papers in various journals, including two comprehensive books on climate change aspects as they relate to forest and horticultural trees and shrubs. Dr. Kallarackal's dedication to advancing the understanding of ecophysiology and tree physiology, coupled with his extensive collaborative work, underscores his significant contributions to the scientific community.

Fernando Ramírez currently serving as an Independent Researcher, has dedicated his research efforts to the study of phenology and reproductive physiology in tropical crops, with a particular focus on mango, tree tomato, lulo, and uchuva. Through his extensive work in this domain, he has emerged as a notable figure contributing to the understanding of the intricate processes governing the reproductive aspects of these crops. Mr. Ramírez has played a crucial role as a co-author, actively contributing to