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| Descrizione fisica | 1 online resource (450 p.) |
| Collana | Advances in Photosynthesis and Respiration, Including Bioenergy and Related Processes, , 2215-0102 ; ; 42 |
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| Soggetti | Plant physiology Plant Physiology |
| Lingua di pubblicazione | Inglese |
| Formato | Materiale a stampa |
| Livello bibliografico | Monografia |
| Note generali | Description based upon print version of record. |
| Nota di bibliografia | Includes bibliographical references at the end of each chapters and indexes. |
| Nota di contenuto | Physical Processes in Leaf Canopies -- 1. Light Distribution -- 2. Leaf Energy Balance: Basics, and Modeling from Leaves to Canopies -- Physiological Processes from Leaves to Canopies -- 3. Modeling Leaf Gas Exchange -- 4. Within-canopy Variations in Functional Leaf Traits: Structural, Chemical and Ecological Controls and Diversity of Responses -- 5. Regulation of Leaf Traits in Canopy Gradients -- Whole-plant Processes in Leaf Canopies -- 6. Photomorphogenesis and Photoreceptors -- 7. Forest Canopy Hydraulics -- 8. Simulating Crop Growth and Development using Functional-Structural Plant Modeling -- Assessments of Vegetation Functioning -- 9. Modeling Canopy Photosynthesis -- 10. Observation and Modeling of Net Ecosystem Carbon Exchange over Canopy -- 11. Remote Sensing of Vegetation: Potentials, Limitations, Developments and Applications -- 12. Biometric-based Estimations of Net Primary Production (NPP) in Forest Ecosystems -- Application to Ecological and Evolutionary Processes -- 13. Optimization and Game Theory in Canopy Models -- 14. The Use of Canopy Models to Analyze Light Competition among Plants -- 15. Axiomatic Plant Ecology— Reflections toward a Unified Theory for Plant Productivity. |
| Sommario/riassunto | A plant canopy, a collection of leaves, is an ecosystem-level unit of photosynthesis that assimilates carbon dioxide and exchanges other |

gases and energy with the atmosphere in a manner highly sensitive to ambient conditions including atmospheric carbon dioxide and water vapor concentrations, light and temperature, and soil resource availability. In addition to providing carbon skeletons and chemical energy for most of the living organisms, these key canopy functions affect global climate through modification of atmospheric carbon dioxide concentration and through altering surface albedo. This interaction, the climate-carbon cycle feedback, is one of the most uncertain processes for projection of future global climate. This book describes our current knowledge of canopy photosynthesis that has accumulated over the last hundred years since the pioneering study of P. Boysen Jensen. The book provides a comprehensive analysis of plant canopy physiology, ecology and physics with emphasis on predictive modeling techniques. The book is divided into five parts covering hierarchy of canopy processes in time and space. Two chapters in Part 1 discuss the basic physical processes on light attenuation and energy transfer in plant canopies, while three chapters in Part 2 deal with the principle mechanisms of leaf gas-exchange regulation and the patterns and mechanisms of variations in leaf traits. Three chapters in Part 3 focus on whole-plant processes in plant canopies. Part 4 (in four chapters) describes how vegetation functions are assessed by modeling, eddy-covariance techniques, and remote sensing and forest inventory. Finally, three chapters in Part 5 discuss the relationships between canopy photosynthesis and other vegetation processes in plant stands.
