
Preface

Photorespiration renders oxygenic photosynthesis possible by acting as a metabolic repair mechanism by which the toxic by-product 2-phosphoglycolate is scavenged and recycled. However, it also leads to high losses of newly assimilated CO₂ from most land plants. The latter fact historically led to photorespiration being classified as wasteful; however, cumulative evidence has suggested that it is rather an important ancillary component of both photosynthesis and the global carbon cycle. Indeed photorespiration is one of the major flux bearing pathways in the terrestrial biosphere, which is multiply linked to other major pathways of central metabolism in land plants. While the study of photorespiratory mutants was initiated some 40 years ago, recent technological advances have been made in the full spectrum of approaches which have been used to analyze photorespiration including multi-parallel approaches to quantify transcripts, enzymes, proteins, and their modifications, photorespiratory metabolites that have followed the adoption of systems biology approaches as well as the exploitation of t-DNA knockout mutants, development of ever sophisticated gas exchange measurements, and cell biological analysis of the evolution of photorespiration. While these methods are becoming commonly adopted there are a number of hurdles which need to be met in their establishment. This volume is therefore intended to present a comprehensive overview of contemporary methods to analyze photorespiration in higher plants.

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Photorespiration

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