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Nota di contenuto	Part 1. Introductory Chapters -- Chapter 1. Recent Advances in the Photosynthesis of Cyanobacteria and Eukaryotic -- Chapter 2. The Algal Tree of Life from a Genomics Perspective -- Part 2. Molecular Genetics Of Algae -- Chapter 3. Chlorophyll-Xanthophyll Antenna Complexes: in between Light Harvesting and Energy Dissipation -- Chapter 4. The Dynamics of the Photosynthetic Apparatus in Algae -- Chapter 5. Biosynthesis of Chlorophyll and Bilins and Assembly of the Photosynthetic Apparatus -- Part 3. Biochemistry and Physiology of Algae -- Chapter 6. Chloroplast Ion and Metabolite Transport in Algae -- Chapter 7. Structural and Biochemical Features of Carbon Acquisition in Algae -- Chapter 8. Light-Driven Oxygen Consumption in the Water-Water Cycles and Photorespiration, and Light Stimulated Mitochondrial Respiration -- Chapter 9. The Algal Pyrenoid -- Part 4. Light-Harvesting Systems in Algae -- Chapter 10. Light-Harvesting in Cyanobacteria and Eukaryotic Algae; An Overview -- Chapter 11. Light Harvesting by Long-Wavelegth Chlorophyll Forms (Red Forms) in Algae: Focus on their Presence, Distribution and Formation -- Chapter 12. Diversity in Photoprotection and Energy Balancing in Terrestrial and

Aquatic Phototrophs -- Chapter 13. Photoinhibition in Algae -- Chapter 14. Modulating Energy Transfer from Phycobilisomes to Photosystems: State transitions and OCP-related Non-Photochemical Quenching -- Chapter 15. Coherent Processes in Photosynthetic Energy Transport and Transduction -- Chapter 16. Light Harvesting Complexes of Diatoms – Fucoxanthin Chlorophyll. Proteins -- Chapter 17. Symbiodinium, Corals and Coral Bleaching. .

Sommario/riassunto

Algae, including cyanobacteria, are in the spotlight today for a number of reasons; firstly it has become abundantly clear over recent years that algae have been neglected in terms of basic research and that knowledge gap is being rapidly closed with the establishment of some surprising discoveries, such as the presence of Near-Infra-Red-Absorbing cyanobacteria and a wealth of natural products; secondly molecular approaches have provided a wealth of approaches to genetically modify algae and produce value-added products; thirdly it has become clear just how important, marine phytoplankton is to global carbon capture and the production of food globally; and fourthly, it has also become clear that algae present unparalleled opportunities to generate biofuels in a sustainable and non-polluting way. This volume presents 15 chapters by world experts on their subjects, ranging from reviews of algal diversity and genetics to in-depth reviews of special algal groups such as diatoms (which account for over 30% of marine carbon capture). Other chapters chart the ways in which this carbon capture occurs or how there are a multiplicity of ways in which algae intercept sun light and deploy this energy for carbon capture. A fascinating aspect here is the way in which sun light is harvested. A special chapter is devoted to the very recent and exciting possibility that algae use coherent light energy transformation to enhance the efficiency of light capture, an aspect of quantum physics that has implications for future developments at several levels and a variety of industries. Just how and why algae use Chlorophyll a as the major light capture pigment is discussed in several chapters. However, attention is also given to those cyanobacteria, which have been found to use the special Near-Infra Red absorbing chlorophylls mentioned above. And attention is also given to those algae that employ phycobiliproteins to fill in the “green window”, i.e., the spectral region from 400 – 650 nm, which is not efficiently covered by chlorophyll and carotenoid pigments. Photoinhibition and photoprotection is the subject area of several chapters and one which it is essential to understand as we work towards greater efficiency of algal photosynthesis. A final chapter is devoted to understanding the molecular basis for coral bleaching, a much-neglected area that is essential in trying to come up with solutions to this very worrying phenomenon, caused by global warming and ocean acidification. This is a book for research scientists, environmentalists, planners in a range of areas including those of marine resources, nutrient control and pollution of water bodies and that growing body of concerned citizens interested in controlling carbon emissions and global warming. Special attention has been given to generating a set of articles that will be read by university students, informed laymen and all those whose wish to understand the rapid changes that have come about in our knowledge of algae over the past decade.
