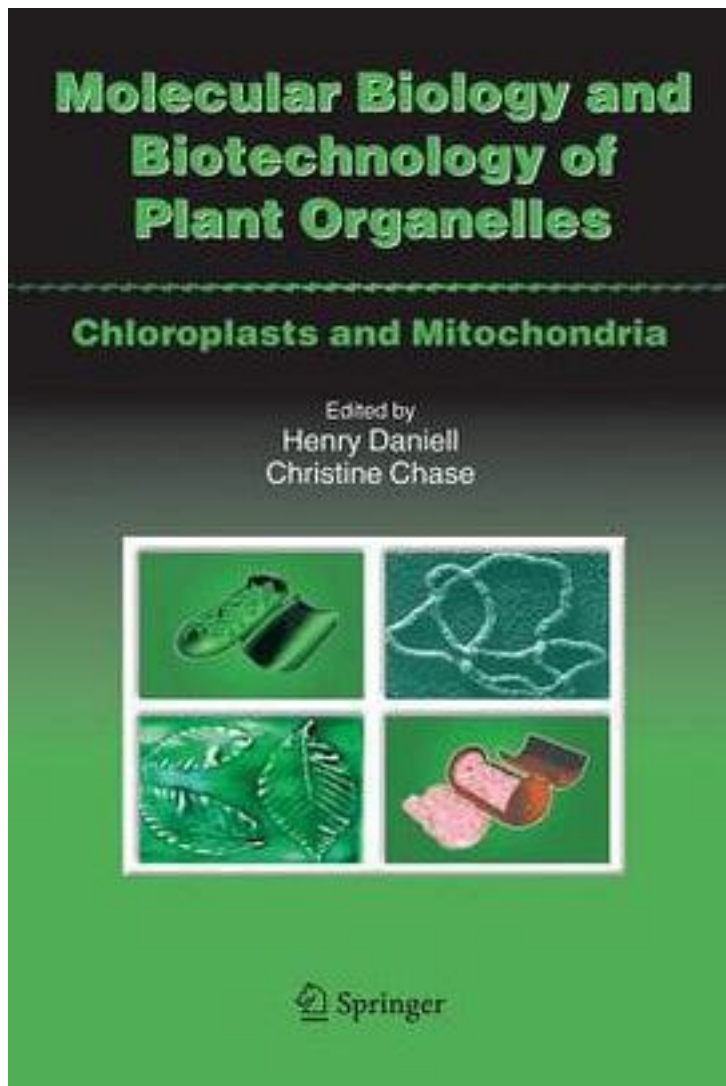


# Molecular Biology and Biotechnology of Plant Organelles



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出版者:Springer-Verlag New York Inc.

出版时间:2005-1

装帧:HRD

isbn:9781402027130

Plant organelles have intrigued biologists since the discovery of their endosymbiotic origin and maternal inheritance. The first application of organelle biotechnology was the role of cytoplasmic male sterility in hybrid seed production and "Green Revolution". In modern times, plant organelles are again leading the way for the creation of genetically modified crops. On a global scale, 75 percent of GM crops are engineered for herbicide resistance and most of these herbicides target pathways that reside within plastids. Several thousand proteins are imported into chloroplasts that participate in biosynthesis of fatty acids, amino acids, pigments, nucleotides and numerous metabolic pathways including photosynthesis. Thus, from green revolution to golden rice, plant organelles have played a critical role in revolutionizing agriculture. This book details not only basic concepts and current understanding of plant organelle genetics and molecular biology but also focuses on the synergy between basic biology and biotechnology. Forty four authors from nine countries have contributed twenty four chapters containing many figures and tables. Section 1 on organelle genomes and proteomes discusses molecular features of plastid and mitochondrial genomes, evolutionary origins, somatic and sexual inheritance, proteomics, bioinformatics and functional genomics. Section 2 on organelle gene expression and signalling discusses transcription, translation, RNA processing/editing, introns and splicing, protein synthesis, proteolysis, import of proteins into chloroplast and mitochondria and their regulation. Section 3 on organelle biotechnology discusses chloroplast and nuclear genetic engineering for biotic/abiotic stress tolerance, improved fatty acid/amino acid biosynthesis, biopharmaceuticals, biopolymers and biomaterials, cytoplasmic male sterility for hybrid seed production, plant improvement and restoration of fertility. This book is designed to serve as a comprehensive volume and reference guide for teachers, advanced undergraduates and graduate students and researchers in plant molecular biology and biotechnology.

作者介绍:

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