

1. Record Nr.	UNINA9910782269203321
Titolo	Charting new pathways to C4rice [[electronic resource] /] / edited by J. E. Sheehy, P.L. Mitchell, B. Hardy
Pubbl/distr/stampa	New Jersey, : World Scientific, c2008
ISBN	1-281-91883-0 9786611918835 981-270-952-5
Descrizione fisica	1 online resource (436 p.)
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Disciplina	633.182
Soggetti	Rice - Genetic engineering Rice - Yields Crop yields Photosynthesis
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	"IRRI."
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Contents; Untitled; Untitled; FOREWORD; PREFACE; SECTION 1: SETTING THE SCENE; How the rice crop works and why it needs a new engine J.E. Sheehy, A.B. Ferrer, P.L. Mitchell, A. Elmido-Mabilangan, P. Pablico, and M.J.A. Dionora; Growth phases of rice; The grain yield equation; Plasticity: properties of individuals and community members; Solar radiation and canopy architecture as drivers of canopy photosynthesis; Relationship between leaf photosynthesis, canopy photosynthesis, and yield; Leaf and canopy temperature; Radiation-use efficiency: two strategies for C4 rice Is the sink in rice big enough for C4 productivity? Searching for C4-ness in wild rice; Conclusions; References; Notes; The case for C4 rice P.L. Mitchell and J.E. Sheehy; The chain of argument; Progress in techniques; The top-down approach; Envoi; References; Notes; Agricultural research, poverty alleviation, and key trends in Asia's rice economy D. Dawe; Pathways from agricultural research to poverty alleviation: theory1; Agricultural research and poverty alleviation:

evidence; Key trends in the Asian rice economy Rice; Water scarcity; Conclusions; References; Notes
Catching up with the literature for C4 rice: what we know now and didn't then P.L. Mitchell
Current understanding of C4 photosynthesis; Molecular biology and genetic engineering of C4 photosynthesis; Use of Cleome; Rice transgenic for C4 photosynthetic enzymes; Better Rubisco for improved photosynthesis; Reflections on constructing C4 rice; References; Notes; SECTION 2: C4 RICE FROM THEORY TO PRACTICE; C4 photosynthesis: minor or major adjustments to a C3 theme? R.C. Leegood; Intercellular metabolite transport in C4 plants; Intracellular metabolite transport in C4 plants
Altered properties of enzymes of carbohydrate synthesis Mitochondrial specialization; Regulation of C4 photosynthesis; C4 mutants; References; Notes; C4 photosynthesis and CO2 diffusion S. von Caemmerer, J.R. Evans, A.B. Cousins, M.R. Badger, and R.T. Furbank; Carbon isotope discrimination and CO2 diffusion; CO2 diffusion from intercellular air space to chloroplast stroma in C3 species; CO2 diffusion from intercellular air space to mesophyll cytosol in C4; CO2 diffusion across bundle sheath/mesophyll interface
Relationship between bundle sheath resistance to CO2 diffusion and leakiness of the bundle sheath Estimates of bundle sheath leakiness from measurements of carbon isotope discrimination; What are the possibilities for C4 rice?; Conclusions; References; Notes; Nuclear regulation of chloroplast development in C4 and C3 plants J.A. Langdale, M. Waters, E.C. Moylan, and A. Bravo-Garcia; Chloroplast development in the C4 plant maize; GLK genes in C4 and C3 plants; GLK gene function; C4 rice-wishful thinking or potential reality?; References; Notes
Balancing light capture with distributed metabolic demand during C4 photosynthesis J.R. Evans, T.C. Vogelmann, and S. von Caemmerer

Sommario/riassunto

Feeding Asia in the 21st century will require a second Green Revolution. However, unlike in the first generation, future yield increases will have to be grown using less water and nitrogen in a world of unfavorable climate change - this can only be done by increasing the efficiency of the photosynthetic system, i.e. developing a C4 rice plant. If and when achieved, it would be the first nonevolutionary example of reconstructing the primary metabolism of a plant. The impact of such a scientific achievement would be undeniable, but it requires either a superb feat of genetic engineering or forc
