

Contents

Foreword	vii
Rice drought-prone environments and coping strategies 1	
Drought: economic costs and research implications	3
<i>Sushil Pandey and Humnath Bhandari</i>	
Modeling spatial and temporal variation of drought in rice production	19
<i>Robert J. Hijmans and Rachid Serraj</i>	
Recent progress in breeding and genetics of drought resistance 33	
Rice germplasm development for drought-prone environments: progress made in breeding and genetic analysis at the International Rice Research Institute	35
<i>G.N. Atlin, R. Venuprasad, J. Bernier, D. Zhao, P. Virk, and A. Kumar</i>	
Drought research at WARDA: current situation and prospects	61
<i>M. Sié, K. Futakuchi, H. Gridley, S. Mande, B. Manne, M.N. Ndjiondjop, A. Efisue, S.A. Ogunbayo, M. Moussa, H. Tsunematsu, and H. Samejima</i>	
Drought resistance characters and variety development for rainfed lowland rice in Southeast Asia	75
<i>Shu Fukai, Jaya Basnayake, and Ouk Makara</i>	
Molecular breeding for drought-tolerant rice (<i>Oryza sativa</i> L.): progress and perspectives	91
<i>Zhi-Kang Li and Yong-Ming Gao</i>	
Recent efforts to improve drought resistance of rice in Brazil	113
<i>Flávio Breseghezzo, Cleber Moraes Guimarães, and Beatriz da Silveira Pinheiro</i>	
Harnessing quantitative genetics and genomics for understanding and improving complex traits in crops	123
<i>James B. Holland and Andrea J. Cardinal</i>	
Physiological and molecular mechanisms of drought resistance 137	
Drought-resistant rice: physiological framework for an integrated research strategy	139
<i>R. Serraj, G. Dimayuga, V. Gowda, Y. Guan, Hong He, S. Impa, D.C. Liu, R.C. Mabesa, R. Sellamuthu, and R. Torres</i>	

The rice root system: from QTLs to genes to alleles	171
<i>Brigitte Courtois, Nourollah Ahmadi, Christophe Perin, Delphine Luquet, and Emmanuel Guiderdoni</i>	
An integrated systems approach to crop improvement	189
<i>Graeme L. Hammer and David Jordan</i>	
Management of rainfed rice systems	209
Drought-prone rainfed lowland rice in Asia: limitations and management options	211
<i>S.M. Hafele and B.A.M. Bouman</i>	
Enhancing rice productivity in water-stressed environments: perspectives for genetic improvement and management	233
<i>Anil Kumar Singh and Viswanathan Chinnusamy</i>	
Effects of irrigation treatment on rice growth and development: comparing a study of rice farming between nonflooding and flooding cultivation	259
<i>Longxing Tao, Xi Wang, Huijuan Tan, and Shihua Cheng</i>	
Genes and genomics for drought-resistant rice	273
Gene expression analysis and data mining from microarray analysis applied to drought stress in rice	275
<i>Kouji Satoh, Koji Doi, Toshifumi Nagata, Aeni Hosaka, Kohji Suzuki, Xumei Ji, Muturajan Raveendran, Hei Leung, John Bennett, and Shoshi Kikuchi</i>	
Gene discovery for improving drought resistance of irrigated rice by systematic genetic and functional genomics approaches	299
<i>Lizhong Xiong</i>	
SNP discovery at candidate genes for drought responsiveness in rice	311
<i>Kenneth L. McNally, Ma. Elizabeth Naredo, and Jill Cairns</i>	
Research activities on drought tolerance of rice at JIRCAS	325
<i>Takashi Kumashiro and Kazuko Yamaguchi-Shinozaki</i>	
GM technology for drought resistance	333
<i>Philippe Hervé and Rachid Serraj</i>	
Biotechnology and transposon-tagging for improving drought resistance in rice for Indonesia	351
<i>I.H. Slamet-Loedin, S. Purwantomo, PB.F. Ouwerkerk, S. Nugroho, and R. Serraj</i>	
Bioinformatics for drought resistance	365
<i>Victor Jun Ulat, Samart Wanchana, Ramil Mauleon, and Richard Bruskiewich</i>	
Conclusions and recommendations	383
Drought-resistant rice for increased rainfed production and poverty alleviation: a concept note	385
<i>R. Serraj and G. Atlin</i>	