

Contents

Part I Natural History and Genetic Diversity

- 1 Phylogenetic Relationships of Saccharinae and Sorghinae.....** 3
Elizabeth A. Kellogg
- 2 The Gene Pool of *Sorghum bicolor* and Its Improvement** 23
Clarissa T. Kimber, Jeff A. Dahlberg, and Stephen Kresovich
- 3 The Gene Pool of *Saccharum* Species
and Their Improvement** 43
Andrew H. Paterson, Paul H. Moore, and Tom L. Tew
- 4 The Gene Pool of *Miscanthus* Species
and Its Improvement** 73
Erik J. Sacks, John A. Juvik, Qi Lin, J. Ryan Stewart,
and Toshihiko Yamada

Part II Genomic Tools, Resources and Approaches

- 5 The Sorghum Genome Sequence: A Core Resource
for Saccharinae Genomics.....** 105
Andrew H. Paterson
- 6 Transcriptome Analysis in the Saccharinae** 121
Milton Yutaka Nishiyama-Jr, Fabio Vicente,
Paloma Mieke Sato, Savio Siqueira Ferreira,
Frank Alex Feltus, and Glaucia Mendes Souza
- 7 Sorghum and Sugarcane Proteomics** 141
Bongani Kaiser Ndimba and Rudo Ngara

8 Gene Mutagenesis Systems and Resources for the Saccharinae	169
Zhanguo Xin, Ming-Li Wang, Surinder Chopra, and Pohao Wang	
9 Association Genetics Strategies and Resources	187
Jianming Yu, Martha T. Hamblin, and Mitchell R. Tuinstra	
10 Sorghum Transformation: Overview and Utility	205
Tejinder Kumar, Arlene Howe, Shirley Sato, Ismail Dweikat, and Tom Clemente	
11 Genetic Engineering of <i>Saccharum</i>	223
Getu Beyene, Ian S. Curtis, Mona B. Damaj, Marco T. Buenrostro-Nava, and T. Erik Mirkov	
12 Genetic Engineering of <i>Miscanthus</i>	255
Dean Engler and Katrin Jakob	
13 <i>Saccharinae</i> Bioinformatics Resources	303
Alan R. Gingle and F. Alex Feltus	
Part III Bridging Classical and Genomic Investigations of Sorghum Biology	
14 Bridging Classical and Molecular Genetics of Sorghum Plant Stature and Maturity	333
Patrick J. Brown and Andrew H. Paterson	
15 Bridging Classical and Molecular Genetics of Sorghum Disease Resistance	347
Clint W. Magill	
16 Bridging Conventional and Molecular Genetics of Sorghum Insect Resistance	367
Yinghua Huang, Hari C. Sharma, and Mukesh K. Dhillon	
17 Genetic Enhancement of Sorghum for Biomass Utilization	391
Wilfred Vermerris and Ana Saballos	
Part IV Early Messages pertinent to Other Crops, from Saccharinae Research	
18 Comparative Genomics of Grasses: A Saccharinae-Centric View	429
Andrew H. Paterson, Xiyin Wang, Haibao Tang, and Changsoo Kim	

19 Comparative Genomic Analysis of C4 Photosynthesis Pathway Evolution in Grasses 447
Xiyin Wang and Andrew H. Paterson

20 Differentiation of Seed, Sugar, and Biomass-Producing Genotypes in *Saccharinae* Species 479
Seth C. Murray

21 Perennialism and Weediness in the *Saccharinae*..... 503
Russell W. Jessup

Part V Synthetic and Futuristic Perspectives

22 Bringing the Benefits of Sorghum Genomics to Africa 519
Segenet Kelemu, Brhane Gebrekidan, and Jagger Harvey

23 Synthesis: Fundamental Insights and Practical Applications from the *Saccharinae* Clade 541
Andrew H. Paterson

Index..... 551