

Contents

Handbook of Maize	v
Jeff Bennetzen and Sarah Hake	
Preface	vii
Part I Maize and the Origins of Plant Genetics	
1 East, Emerson, and the Birth of Maize Genetics	3
Ed Coe	
2 Barbara McClintock	17
Lee B. Kass and Paul Chomet	
3 The Birth of Maize Molecular Genetics	53
L. Curtis Hannah and Drew Schwartz	
4 Mutagenesis – the Key to Genetic Analysis	63
M.G. Neuffer, Guri Johal, M.T. Chang, and Sarah Hake	
Part II Maize Improvement	
5 Development of Hybrid Corn and the Seed Corn Industry	87
A. Forrest Troyer	
6 Maize and the Biotech Industry	115
G. Richard Johnson and Zoe P. McCuddin	
7 Modern Maize Breeding	141
Elizabeth Lee and William F. Tracy	

Part III The Maize Genome

8	Cytogenetics and Chromosomal Structural Diversity	163
	James A. Birchler and Hank W. Bass	
9	Maize Genome Structure and Evolution	179
	Jeffrey L. Bennetzen	
10	Genetic Diversity, Linkage Disequilibrium and Association Mapping	201
	Antoni Rafalski and Evgueni Ananiev	
11	The Polyploid Origin of Maize	221
	Joachim Messing	
12	Maize Centromeres and Knobs (neocentromeres)	239
	R. Kelly Dawe	
13	Transposons <i>Ac/Ds</i>, <i>En/Spm</i> and their Relatives in Maize	251
	Jianbo Zhang, Thomas Peterson, and Peter A. Peterson	
14	<i>Mutator</i> and MULE transposons	277
	Damon Lisch and Ning Jiang	
15	The LTR-Retrotransposons of Maize	307
	Phillip SanMiguel and Clémentine Vitte	
16	<i>Helitrons</i>: Their Impact on Maize Genome Evolution and Diversity	329
	Shailesh K. Lal, Nikolaos Georgelis, and L. Curtis Hannah	
17	Maize GEvo: A Comparative DNA Sequence Alignment Visualization and Research Tool	341
	Eric Lyons, Sara Castelletti, Brent Pedersen, Damon Lisch, and Michael Freeling	
18	Meiotic Genes and Meiosis in Maize	353
	W. Zacheus Cande, Inna Golubovskaya, C.J. Rachel Wang, and Lisa Harper	
19	Homologous Recombination in Maize	377
	Hugo K. Dooner, An-Ping Hsia, and Patrick S. Schnable	
20	Paramutation: Heritable in <i>Trans</i> Effects	405
	Maike Stam and Marieke Louwers	

Contents	xi
21 Imprinting in Maize	429
Nathan M Springer and Jose F Gutierrez-Marcos	
22 Chromatin, DNA Methylation, RNAi and Epigenetic Regulation	441
Shawn Kaepler	
23 The B Chromosome of Maize	459
Wayne Carlson	
24 Mitochondria and Chloroplasts	481
Kathleen J. Newton, David B. Stern, and Susan Gabay-Laughnan	
 Part IV Maize Genetic and Genomic Technologies	
25 Genetic Mapping and Maps	507
Karen C. Cone and Edward H. Coe	
26 Genetic Analyses with Oat-Maize Addition and Radiation Hybrid Lines	523
Ronald L. Phillips and Howard W. Rines	
27 Maize Chromosome Tools: Quantitative Changes in Chromatin	539
David Weber	
28 Transposon Resources for Forward and Reverse Genetics in Maize	561
Donald R. McCarty and Robert B. Meeley	
29 TILLING and Point Mutation Detection	585
Clifford Weil and Rita Monde	
30 Gene Expression Analysis	597
David S. Skibbe and Virginia Walbot	
31 Maize Transformation	609
Kan Wang, Bronwyn Frame, Yuji Ishida, and Toshihiko Komari	
32 Doubled Haploids	641
Hartwig H. Geiger	

33 Databases and Data Mining	659
Carolyn J. Lawrence and Doreen Ware	
34 Sequencing Genes and Gene Islands by Gene Enrichment	673
Pablo Rabinowicz and W. Brad Barbazuk	
Part V Genes and Gene Families	
35 Maize Transcription Factors	693
Erich Grotewold and John Gray	
36 The Genetics and Biochemistry of Maize Zein Storage Proteins	715
Rebecca S. Boston and Brian A. Larkins	
37 The Cytochrome P450 Superfamily of Monooxygenases	731
Alfons Gierl	
38 Cell wall Biosynthetic Genes of Maize and their Potential for Bioenergy Production	741
Wilfred Vermerris	
Part VI Future Prospects	
39 The Future of Maize	771
Jeffrey L. Bennetzen	
Index	781