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Alan L. Kriz • Brian A. Larkins
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Molecular Genetic Approaches to Maize Improvement

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Preface

During the past decade, we have seen tremendous progress in maize improvement through the application of molecular genetics and biotechnology. Today, more than half of the US corn acreage is genetically engineered, and further development of this technology will have far-reaching effects on corn production throughout the world. This volume provides an overview of our current knowledge of maize molecular genetics, how it is being used to improve the crop, and future possibilities for crop enhancement. First, we consider the technical approaches for introducing novel genes into the maize genome, regeneration of transformed cells into plants, and creation of transgenic lines for field production. We then consider a number of genetically engineered traits that are currently, or soon will be, in commercial production. Next, we consider how molecular genetic techniques are being used to identify genes and characterize their function, and how these procedures are utilized to accelerate the development of elite maize germplasm. Characterization of the maize genome at the DNA and chromosomal level is providing insight into its structure and evolution, and this information is creating technical approaches that help us to understand and control gene expression. Ultimately, these approaches may lead to the understanding of a fundamentally important feature of maize, hybrid vigor. Currently, more than 70% of corn production is used for food and feed; hence, knowledge of the biochemical genetics of starch, protein and lipid production is fundamental for improving the nutritional and food-making properties of corn. We also consider chloroplasts, as they provide energy for the cell and the precursors for starch, protein, and lipid synthesis. Finally, we consider a new and growing use for corn as biomass for energy production. Thus, this volume provides an in-depth review of the foundation for maize biotechnology.

Alan L. Kriz and Brian A. Larkins

Gales Ferry and Tucson
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Contents

Part I Introduction

1	Molecular Genetic Approaches to Maize Improvement – an Introduction	3
	Robert T. Fraley	
	References	6
2	Maize Tissue Culture and Transformation: The First 20 Years	7
	Todd J. Jones	
2.1	Introduction	7
2.2	Maize Plant Regeneration Systems	8
	2.2.1 Somatic Embryogenesis in Maize	8
	2.2.2 Organogenesis in Maize	11
2.3	Maize Transformation Systems	12
	2.3.1 Protoplast Transformation	13
	2.3.2 Particle Bombardment (Biolistics)	13
	2.3.3 <i>Agrobacterium</i> -Mediated Transformation	15
2.4	Selectable Marker Systems	16
	2.4.1 Herbicidal Selectable Markers	16
	2.4.2 Alternative Non-antibiotic, Non-herbicidal Selectable Markers	17
2.5	Marker-Free Transformation	18
	2.5.1 Co-transformation and Transgene Segregation	18
2.6	Future Prospects: Bigger and Better	20
	2.6.1 Homologous Recombination and Targeted Integration	20
	2.6.2 High Molecular Weight DNA Transformation	22
	References	23

Part II Transgenic Traits

3	Insect Resistance in Corn Through Biotechnology	31
	Graham Head and Dannette Ward	
3.1	Introduction	31
3.2	The Nature of Bt Corn Technologies	32
3.3	Adoption of Bt Corn Technologies and Their Impact on Insecticide Use	33
3.4	The Economic Impact of Bt Corn	35
3.5	The Impact of Bt Corn on Grain Quality	36
3.6	The Environmental Impact of Bt Corn	37
3.7	Conclusions	38
	References	39
4	Seed Total Phosphate and Phytic Acid	41
	Victor Raboy	
4.1	Introduction	41
4.2	Phytic Acid Synthesis, Breakdown and Storage	43
4.3	Seed Total P	47
4.4	Conclusion	50
	References	51
5	Traits and Genes for Plant Drought Tolerance	55
	John Mullet	
5.1	Introduction	55
5.2	Prospects for Improving Plant Stress Tolerance Through Genetics	56
5.3	Physiological/Developmental Framework for Assessing the Role and Potential Utility of Genes and Traits for Drought Tolerance ...	58
5.4	Identification and Testing Gene/Trait Leads for Drought Tolerance	59
5.5	Deployment of Drought Tolerance Genes and Genotype	62
	References	63
6	Biotechnology Approaches to Improving Maize Nitrogen Use Efficiency	65
	Stephen Moose and Fred E. Below	
6.1	The Importance of Improving Nitrogen Use Efficiency and a Biotechnology Approach	65
6.2	The Biology of Maize NUE	66
6.2.1	N Uptake and Assimilation	67
6.2.2	N Transport	68
6.2.3	N Utilization by Kernels	69
6.2.4	Regulation of N-Associated Processes	70

6.3	Candidate Genes for Enhancing Maize NUE.....	71
6.3.1	Quantitative Trait Loci	71
6.3.2	RNA Expression Profiling	72
6.3.3	Transgenes for Improving Maize NUE	72
6.4	Commercialization of Maize Hybrids with Improved NUE	73
	References	76
7	Enhancement of Amino Acid Availability in Corn Grain	79
	Alan L. Kriz	
7.1	Introduction	79
7.2	Increased Lysine Accumulation Through Deregulation of Metabolic Pathways	80
7.3	Modification of Corn Grain Protein Profiles	81
7.3.1	Distribution of Proteins in the Corn Grain	81
7.3.2	Zein Reduction	81
7.4	Expression of Lysine-rich Proteins in Corn Grain.....	86
	References	87
8	Over-expression of Novel Proteins in Maize	91
	Elizabeth E. Hood and John A. Howard	
8.1	Introduction	91
8.1.1	Why Over-produce Proteins?.....	91
8.1.2	What Do We Want in a Host for Over-production?	91
8.2	Expression Technology	92
8.2.1	What Is the Protein Being Expressed and How Much is Accumulated?	92
8.2.2	Protein Characteristics	92
8.2.3	Molecular and Cellular Characteristics	93
8.2.4	General Tools to Effect Accumulation	96
8.3	Production	97
8.3.1	Confinement.....	99
8.4	Examples of Products.....	100
8.5	Future Prospects	101
	References	101
9	Global Regulation of Transgenic Crops	107
	Bruce M. Chassy	
9.1	Regulatory Oversight of Transgenic Maize	107
9.1.1	Development of a Regulatory Paradigm and Rationale ...	108
9.1.2	Divergent Regulatory Approaches Around the World ...	109
9.2	Scientific Assessment of Risks Associated with Transgenic Maize	110
9.2.1	Description of the Event and Organisms.....	113
9.2.2	Evaluation of Agricultural Hazards.....	113

9.2.3	Evaluation of Environmental Hazards	113
9.2.4	Evaluation of Food Safety Hazards	115
9.3	Discussion and Conclusions	120
	References	122

Part III Breeding and Genetics

10	Doubled Haploids	127
	Ming-Tang Chang and Edward H. Coe, Jr	
10.1	Introduction	127
10.2	History	128
10.3	Methods	130
10.3.1	Spontaneous Haploids	130
10.3.2	Genetic Induction	130
10.3.3	Modifications in Handling	131
10.3.4	Artificial Induction	131
10.3.5	Anther Culture, Embryo Culture and Microspore Culture	132
10.3.6	Wide Crosses and Chromosome Elimination	132
10.3.7	Apomixis (Parthenogenesis and/or Androgenesis)	132
10.4	Chromosome Doubling	133
10.4.1	Spontaneous Doubling	133
10.4.2	Selection for Spontaneous Doubling	134
10.4.3	Artificial Doubling	134
10.5	Advantages	134
10.5.1	Genetic Homozygosity	134
10.5.2	Genetic Enrichment	135
10.5.3	Gamete Selection	135
10.5.4	Gene Mutation	136
10.5.5	Molecular Mapping Applications	136
10.6	Future Perspectives	137
	References	138
11	Transposon Tagging and Reverse Genetics	143
	A. Mark Settles	
11.1	Introduction	143
11.2	General Strategies for Transposon Tagging	144
11.3	Directed Tagging	146
11.4	Non-directed Tagging	149
11.5	Reverse Genetics Resources	151
11.5.1	Single-Gene Screening Resources	151
11.5.2	Flanking Sequence Tags and Reverse Genetics	152
11.5.3	An Optimal Reverse Genetics Strategy?	154
11.6	Future Perspectives	155
	References	155

- 12 EMS Mutagenesis and Point Mutation Discovery** 161
Clifford F. Weil and Rita-Ann Monde
 - 12.1 Introduction 161
 - 12.2 EMS Mutagenesis 161
 - 12.3 TILLING 164
 - 12.3.1 TILLING Mutagenized Lines 164
 - 12.3.2 EcoTILLING 166
 - 12.4 Targeted Resequencing Using Massively Parallel Strategies:
TRUMPing TILLING 168
 - 12.5 Conclusion 170
 - References 170

- 13 Applications of Linkage Disequilibrium and Association Mapping in Maize** 173
Elhan S. Ersoz, Jianming Yu, and Edward S. Buckler
 - 13.1 Introduction 173
 - 13.2 What is Linkage Disequilibrium and How is it Related to Association Mapping Studies 174
 - 13.2.1 How to Estimate LD 175
 - 13.2.2 Interpretation of LD Data 176
 - 13.2.3 LD in Maize 177
 - 13.3 Association Populations and Statistics 177
 - 13.3.1 Population Structure 179
 - 13.3.2 Classic Association Populations 180
 - 13.3.3 Family-Based Association Populations 181
 - 13.3.4 Special Association Populations 182
 - 13.4 False Positives and Power of Association 183
 - 13.5 Phenotyping and Genotyping Strategies for Association Testing 185
 - 13.6 Association Mapping in Crop Plants 187
 - 13.7 Conclusions 189
 - References 190

- 14 Maize Genetic Resources** 197
Martin M. Sachs
 - 14.1 Introduction 197
 - 14.2 Genetic Stocks 198
 - 14.2.1 Maize Genetics Cooperation Stock Center (MGCSC; GSZE) 198
 - 14.2.2 The Genetic Stock Collection 199
 - 14.2.3 The Services Provided 201
 - 14.2.4 The Value of the Stocks 202
 - 14.3 Other Maize Germplasm 203
 - 14.3.1 The North Central Regional Plant Introduction Station (NCRPIS; NC7) 203

14.3.2	Centro Internacional de Mejoramiento de Maiz y Trigo (CIMMYT)	204
14.3.3	The National Center for Genetic Resources Preservation (NCGRP)	205
14.4	Conclusions	205
	References	206

Part IV The Corn Genome

15	The Structure of the Maize Genome	213
	Joachim Messing	
15.1	Introduction	213
15.2	The Gold Standard of Genome Sequence	214
15.3	Fractionation Methods of the Maize Genome	215
15.4	Distribution of Methylated and Repetitive DNA in the Maize Genome	216
15.5	One Hundred Random Regions of the Maize Genome	217
15.6	Physical Map of the Maize Genome	218
15.7	Evolution of Maize Chromosome Numbers	220
15.8	Diploidization of the Maize Genome	220
15.9	Retrotransposition	221
15.10	Chromosome Expansion and Contraction	222
15.11	Orthologous and Paralogous Gene Copies	224
15.12	Haplotype Variation	225
	References	227
16	Molecular Markers	231
	Patrick S. Schnable, An-Ping Hsia, Ling Guo, and W. Brad Barbazuk	
16.1	Utility of Molecular Markers	231
16.2	Molecular Markers	232
16.2.1	Detection of Polymorphisms	232
16.2.2	SSRs (Simple Sequence Repeats)	232
16.2.3	IDPs (InDel Polymorphisms)	233
16.2.4	SNPs (Single Nucleotide Polymorphisms)	233
16.3	Maize Mapping Populations	235
16.4	Genetic Maps of Maize	236
16.5	Future Perspectives	237
	References	237
17	Applied Cytogenetics	241
	R. Kelly Dawe	
17.1	Chromosome Analysis on Mitotic Chromosome by FISH	241
17.2	Histones, ChIP, Genes and Histones	242
17.3	Centromere Cytogenetics	243
17.4	Minichromosomes – Using Cytogenetics to Produce a Better Vector	244

17.4.1	Background	244
17.4.2	Efforts in Plants	244
17.4.3	Limitations and Outlook for Engineered Chromosomes	245
	References	246
18	The Wonderland of Global Expression Profiling	251
	David W. Galbraith	
18.1	Introduction	251
18.1.1	Some Definitions	251
18.1.2	Available Platforms for Global Expression Profiling	252
18.1.3	Fractionation and Prepurification Procedures for Complex Systems	255
18.1.4	The Information Content of the Maize Genome	256
18.2	Global Transcript Analysis	257
18.2.1	Affymetrix GeneChips	257
18.2.2	Microarrays Employing PCR Amplicons as Probes	258
18.2.3	Microarrays Employing Long Oligonucleotides as Probes	259
18.2.4	Non-Microarray-Based Profiling	260
18.3	MicroRNA Profiling	261
18.4	Conclusions and Future Prospects	262
	References	262
Part V Molecular Biology and Physiological Studies		
19	Zein Storage Proteins	269
	David R. Holding and Brian A. Larkins	
19.1	Introduction	269
19.2	Storage Proteins in the Maize Kernel	270
19.2.1	Embryo Proteins	270
19.2.2	Endosperm Proteins	271
19.3	High Lysine Corn and the Development of Quality Protein Maize	279
19.4	Future Perspectives	281
	References	282
20	The Complexities of Starch Biosynthesis in Cereal Endosperms	287
	L. Curtis Hannah and Thomas Greene	
20.1	Introduction	287
20.2	The Starch Biosynthetic Pathway	288
20.3	Adenosine Diphosphate Glucose Pyrophosphorylase (AGPase)	289
20.3.1	Subunits of AGPase	289
20.3.2	Subcellular localization of AGPase	290

- 20.3.3 Allosteric Properties of AGPase 291
- 20.3.4 Allosteric Properties of AGPase Are Pivotal
in Controlling Starch Levels 292
- 20.4 Starch Synthases (SS) 293
 - 20.4.1 Starch Synthase Isoforms 294
- 20.5 Starch Branching Enzymes (SBE) 295
- 20.6 Starch Debranching Enzymes (DBE) 296
 - 20.6.1 Physiological Role of DBEs 297
- References 298

- 21 Development of a High Oil Trait for Maize 303**
 Dale L. Val, Steven H. Schwartz, Michael R. Kerns, and Jill Deikman
 - 21.1 Introduction 303
 - 21.2 Background 304
 - 21.2.1 Kernel Morphology and Lipid Content 304
 - 21.2.2 Effects of Environment and Agricultural Practices on
Kernel Oil Content 305
 - 21.2.3 Inheritance of Oil Phenotype 305
 - 21.3 Breeding for High Oil 306
 - 21.3.1 High Oil Sources 306
 - 21.3.2 Oil QTL Analysis 306
 - 21.3.3 TopCross™ Strategy for High Oil Hybrids 308
 - 21.3.4 Contemporary Strategies for High Oil Breeding 308
 - 21.4 Synthesis of Oil in the Kernel 308
 - 21.4.1 Synthesis and Plastid Import of the Carbon
Precursor(s) of Acetyl-CoA 310
 - 21.4.2 Synthesis of Acetyl-CoA in the Plastid 312
 - 21.4.3 Plastidial de novo Fatty Acid Synthesis 312
 - 21.4.4 Fatty Acid Termination, Export and Transfer
to the ER 313
 - 21.4.5 ER Membrane Glycerolipid Synthesis and Fatty
Acid Desaturation 314
 - 21.4.6 Synthesis of TAG from ER Membrane Lipids 314
 - 21.5 Regulation of Oil Biosynthesis 316
 - 21.6 Conclusions 316
 - References 318

- 22 Chloroplasts 325**
 Delene J. Oldenburg and Arnold J. Bendich
 - 22.1 Introduction 325
 - 22.2 Size, Form, and Genomic Map of cpDNA 326
 - 22.2.1 Highlights of the Genome Sequence 326
 - 22.2.2 The Traditional Model: The Circular Form of
Maize cpDNA 327
 - 22.2.3 The Revised Model: Linear and Complex Forms of
Maize cpDNA 328

22.3	Replication of cpDNA	331
22.3.1	The Traditional Model: D-Loop-to-Theta-to-Rolling Circle Replication	331
22.3.2	The Revised Model: OPaLI-RDR	331
22.4	Plastid Development in Maize	333
22.4.1	Progressive Leaf and Plastid Development	333
22.4.2	Changes in Genome Copy Number and cpDNA Molecular Form	334
22.4.3	Effects of Light on cpDNA	335
22.4.4	Genes that Influence Plastid Development and cpDNA Levels	336
22.4.5	Mesophyll and Bundle Sheath Cell-Specific Processes	337
22.5	Strategies for Engineering the Chloroplast	338
22.5.1	Nuclear-Encoded Plastid-Targeted Transgenes	338
22.5.2	Plastid-Encoded Transgenes	338
	References	340

Part VI Biomass and Energy

23	Ethanol Production from Maize	347
	Stefan Schwietzke, Youngmi Kim, Eduardo Ximenes, Nathan Mosier, and Michael Ladisch	
23.1	Introduction	348
23.2	Maize as a Feedstock for Ethanol Production	348
23.3	Ethanol Production from Corn Grain	350
23.3.1	Wet Milling	351
23.3.2	Dry Milling	353
23.3.3	Enzymes	354
23.3.4	DDGS	354
23.4	Ethanol Production from Corn Cob and Corn Stover	355
23.4.1	Cellulolytic Microorganisms	357
23.4.2	Cellulolytic Enzymes	357
23.5	Comparison of Ethanol Yields for Conversion of Starch, By-products, and Corn Stover	359
23.6	Conclusion	362
	References	362
	Index	365

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