

Contents

1	Introduction: Biotechnological Interventions for Crop Improvement: Answers to Global Challenges	1
	William D. Dar	
Part I The Tools for Engineering Plants		
2	The Evolution of Agriculture and Tools for Plant Innovation	13
	Agnès Ricroch	
3	Techniques and Tools of Modern Plant Breeding: Field Crops	25
	Surinder Chopra	
4	Genomic Methods for Improving Abiotic Stress Tolerance in Crops	35
	Dea-Wook Kim, Ganesh Kumar Agrawal, Randeep Rakwal, Shahid Ahmed, and Jai Singh Rohila	
Part II Contributions to the Society		
5	Transgenic Crops and Food Security	45
	Calestous Juma and Katherine Gordon	
6	Intellectual Property Protection of Plant Innovation	59
	Bernard Le Buanec and Agnès Ricroch	
7	Prospects for Agricultural Biotechnology to 2030	75
	David B. Sawaya	
8	Genetically Engineered Crops and Rural Society	93
	Leland Glenna and Kristal Jones	
9	Is It Possible to Overcome the GMO Controversy? Some Elements for a Philosophical Perspective	107
	Marcel Kuntz	

Part III Sustainable Management

- 10 Sustainable Management of Insect-Resistant Crops**..... 115
Shelby J. Fleischer, William D. Hutchison,
and Steven E. Naranjo
- 11 Effects of GM Crops on Non-target Organisms**..... 129
Steven E. Naranjo
- 12 Herbicide-Resistant Crop Biotechnology: Potential and Pitfalls**..... 143
J. Franklin Egan
- 13 Virus-Resistant Crops and Trees**..... 155
Cristina Rosa and Bryce W. Falk
- 14 Role of Biotechnology to Produce Plants Resistant
to Fungal Pathogens**..... 169
Iffa Gaffoor and Surinder Chopra

Part IV Sustainable Environment

- 15 Root Traits for Improving Nitrogen Acquisition Efficiency** 181
Joseph G. Chimungu and Jonathan P. Lynch
- 16 Biotech Approaches for Crop Improvement in the
Semi-arid Tropics**..... 193
Kiran K. Sharma, Srinivas Reddy Dumbala,
and Pooja Bhatnagar-Mathur
- 17 Sustainable Soil Health** 209
Mary Ann Bruns

Part V Contributions to Food, Feed, and Health

- 18 Approaches for Vegetable and Fruit Quality Trait Improvement**..... 227
Li Li, Yaakov Tadmor, and Qiang Xu
- 19 Biofortification: Vitamin A Deficiency and the Case
for Golden Rice** 245
Robert S. Zeigler
- 20 Production of Medicines from Engineered Proteins
in Plants: Proteins for a New Century** 263
Mary E. Mangan
- Author Bios** 277
- Index**..... 285