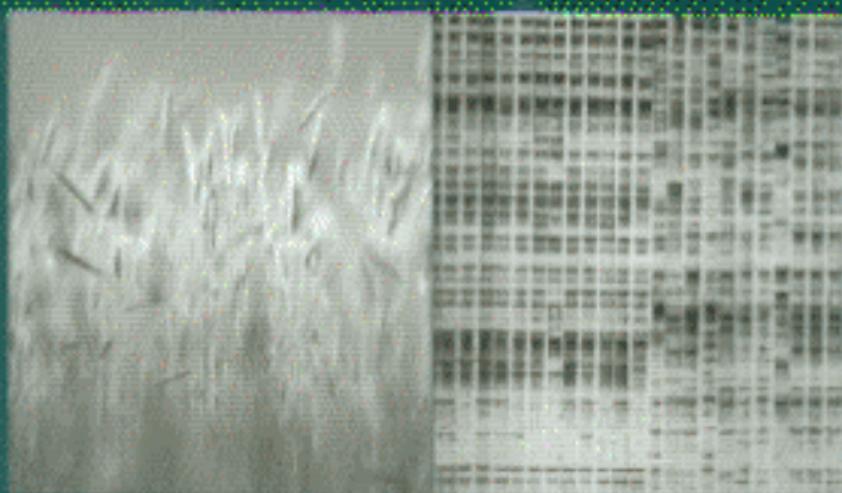


Physiology and Biotechnology Integration for Plant Breeding



edited by

**Henry T. Nguyen
Abraham Blum**

Contents

Preface

iii

Part I Physiological Basis of Yield and Environmental Adaptation

1. Physiology of Yield and Adaptation in Wheat and Barley Breeding
José L. Araus, Gustavo A. Slafer, Matthew P. Reynolds, and Conxita Royo 1
2. Genetic Yield Improvement and Stress Tolerance in Maize
Matthijs Tollenaar and Elizabeth A. Lee 51
3. Physiological Basis of Yield and Environmental Adaptation in Rice
Shaobing Peng and Abdelbagi M. Ismail 83
4. Sorghum Physiology
Abraham Blum 141
5. Pearl Millet
Francis R. Bidinger and C. Thomas Hash 225

6. Comparative Ecophysiology of Cowpea, Common Bean, and Peanut 271
Anthony E. Hall
7. The Physiological Basis of Soybean Yield Potential and Environmental Adaptation 327
Tara T. VanToai and James E. Specht
8. The Physiological Basis of Yield and Environmental Adaptation in Cotton 363
Derrick M. Oosterhuis and James McD. Stewart

Part II Application of Biotechnology to Improve Crop Yield and Adaptation

9. Genome Mapping and Genomic Strategies for Crop Improvement 403
Prasanta K. Subudhi and Henry T. Nguyen
10. Marker-Assisted Utilization of Exotic Germ Plasm 453
Ilan Paran
11. Heterosis of Yield: Molecular and Biochemical Perspectives 469
Charles W. Stuber
12. Genetic Engineering for Enhancing Plant Productivity and Stress Tolerance 489
Tuan-hua David Ho and Ray Wu
13. Genome Mapping and Marker-Assisted Selection for Improving Cotton (*Gossypium* spp.) Productivity and Quality in Arid Regions 503
Yehoshua Saranga and Andrew H. Paterson
14. Molecular Dissection of Abiotic Stress Tolerance in Sorghum and Rice 525
M. S. Pathan, Prasanta K. Subudhi, Brigitte Courtois, and Henry T. Nguyen

Contents**ix**

15. Genetic Dissection of Drought Resistance in Maize:
A Case Study 571
*Jean-Marcel Ribaut, Marianne Bänziger, Tim L. Setter,
Gregory O. Edmeades, and David Hoisington*
16. Physiology and Biotechnology Integration for Plant
Breeding: Epilogue 611
Abraham Blum and Henry T. Nguyen
- Index* 619