

Book Title (ID 2024_02)

Progress and Prospects in Cereal Crops Research

(Rice, Wheat, Maize, Barley, Oats, Rye and Sorghum)

About the Book

It offers a comprehensive examination of recent advancements and future directions in cereal crop science, emphasizing climate resilience, genomics, precision farming, RNA interference (RNAi), policy frameworks, soil and nutrient health, and biotic and abiotic stress management. The book highlights the integration of next generation sequencing and genome editing technologies, such as CRISPR, to accelerate breeding programs and develop stress-tolerant varieties. It explores precision farming techniques to optimize inputs and enhance productivity, as well as RNAi applications for pest and disease resistance. Additionally, the book addresses sustainable soil and nutrient management practices and the importance of supportive policy frameworks in promoting agricultural innovation. By bridging scientific research with practical applications, this volume serves as a vital resource for advancing cereal crop production and ensuring global food security.

Chapters outlines but not limited to

Part I: Agronomy and Crop Management

Chapter 1: Innovative Agronomic Practices for Cereal Crops

Chapter 2: Precision Agriculture in Cereal Crop Production

Chapter 3: Soil Health and Nutrient Management in Cereal Farming

Chapter 4: Water Management Strategies in Cereal Crop Production

Chapter 5: Crop Rotation and Intercropping Systems in Cereal Farming

Chapter 6: Mechanization and Automation in Cereal Crop Production

Part II: Advanced Breeding and Biotechnology

Chapter 7: Molecular Breeding for Stress Tolerance in Cereal Crops

Chapter 8: Transgenic Approaches for Disease Resistance in Cereal Crops

Chapter 9: Nanotechnology in Cereal Crop Improvement

Chapter 10: Genome-Wide Association Studies (GWAS) in Cereal Crops

Chapter 11: RNA Interference (RNAi) for Gene Silencing in Cereal Crops

Chapter 12: Proteomics and Metabolomics in Cereal Crop Research

Part III: Climate Resilience and Sustainable Practices

Chapter 13: Climate Resilient Cereal Crop Production Technology

Chapter 14: Sustainable Practices in Cereal Cultivation

Chapter 15: Biofortification of Cereal Crops: Enhancing Nutritional Quality

Chapter 16: Paddy Fish Culture: Integrating Aquaculture with Rice Farming

Chapter 17: Raised and Sunken Bed Farming: Techniques and Benefits

Chapter 18: Sensor-Based Phenotyping for Stress Tolerance in Cereal Crops

Part IV: Genomic Resources and Crop Improvement

Chapter 19: Progress and Challenges of Crop Genomes

Chapter 20: Genomic Resources for Crop Improvement

Chapter 21: Next-Generation Sequencing Technologies: Approaches and Applications for Crop Improvement

Chapter 22: CRISPR Editing Events in Transgenic Wheat: Analyzing with Next-Generation Sequencing

Chapter 23: Virus-Induced Gene Silencing: A Tool to Study Gene Function in Wheat

Chapter 24: Common Genomic Tools and Their Implementations in Genetic Improvement of Cereals

Chapter 25: Introduction to Marker-Assisted Selection in Wheat/Rice Breeding

Chapter 26: Chemical and Physical Mutagenesis Approaches for Herbicide and Drought Tolerance in Wheat/Rice

Chapter 27: A Modular Cloning Toolkit for Genome Editing in Cereals

Part V: Transcriptomics and Functional Genomics

Chapter 28: Reference-Based Transcriptomic Approach in Cereal Crops

Chapter 29: Transcriptome Data Analysis Using a De Novo Assembly Approach

Chapter 30: Functional Annotation of miRNAs in Rice Using ARMOUR

Chapter 31: QTL Interval Mapping for Agronomic and Quality Traits in Cereal Crops

Chapter 32: Tools and Techniques for Genomic Imprinting in Cereal Crops

Chapter 33: DNA Affinity Purification Sequencing (DAP-Seq) for Mapping Genome-Wide Transcription Factor Binding Sites in Plants

Chapter 34: Basics of Sensor-Based Phenotyping in Wheat

Chapter 35: Computational Methods for Receptor-Metabolite Interaction Studies in Cereal Crops

Part VI: Biotic and Abiotic Stresses

Chapter 36: Biotic Stresses in Cereal Crops: Pests and Diseases

Chapter 37: Abiotic Stresses in Cereal Crops: Salinity and Drought Tolerance

Chapter 38: Host Plant Resistance: Mechanisms and Applications

Chapter 39: Integrated Pest Management (IPM) in Wheat

****Note:** Chapter may be written on individual cereal crop, wherever applicable and chapter title may also be modified by the author

Chapter 40: Integrated Pest Management (IPM) in Rice

Chapter 41: Integrated Disease Management (IDM) in Wheat

Chapter 42: Integrated Disease Management (IDM) in Rice

Chapter 43: Weed Management in Cereal Crops: Current Practices and Future Directions

Part VII: Genomics and Bioinformatics

Chapter 44: Advances in Cereal Crop Genomics

Chapter 45: Bioinformatics Tools for Cereal Crop Research

Chapter 46: Genome Editing Technologies: Beyond CRISPR

Chapter 47: High-Throughput Phenotyping in Cereal Crops

Chapter 48: Comparative Genomics of Cereal Crops

Chapter 49: Epigenomics in Cereal Crops: Current Status and Future Prospects

Part VIII: Economics and Policy

Chapter 50: Economics of Cereal Crop Production: Case Studies

Chapter 51: Policy and Regulatory Frameworks for Cereal Crop Improvement

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