

Book Title (ID 2024\_10)

# Cereal Diseases: Advanced Approaches for Diagnosis and Management

(Wheat, Rice, Maize, Rye, Oats, Barley, Millets)

## About the Book

It offers a comprehensive exploration of contemporary strategies to tackle viral, bacterial and fungal diseases affecting major cereal crops. The book delves into the latest advancements in diagnostics, including genomic technologies and nanotechnology applications, providing precise and rapid identification of pathogens. It emphasizes breeding approaches and potential strategies for developing disease-resistant varieties through genomic insights and molecular techniques. Integrated Disease Management (IDM) principles are thoroughly examined, highlighting the synergy of cultural, biological, chemical and genetic methods for sustainable disease control. This book serves as an essential resource for researchers and students, aiming to enhance cereal crop health and productivity through innovative and integrated management practices.

## Chapters outlines but not limited to:

### Theme A: Bacterial Diseases

1. Revolutionizing Bacterial Disease Detection in Cereals with Genomics
2. Microbial Antagonists: Nature's Answer to Bacterial Diseases in Cereals
3. Harnessing Plant Immunity Against Bacterial Invaders in Cereals
4. Biotechnological Innovations in Bacterial Disease Resistance for Cereal Crops
5. Microbiome Engineering for Bacterial Disease Suppression in Cereals

### Theme B: Viral Diseases

6. Next-Gen Sequencing for Viral Pathogen Identification in Cereals
7. Virus-Resistant Cereals: Genetic Breakthroughs and Future Directions
8. Host-Virus Interactions: Decoding the Molecular Mechanisms in Cereals
9. Viral Disease Management in Cereals Through Gene Silencing Techniques
10. Advanced Virus Epidemiology and Disease Management in Cereal Crops

### Theme C: Fungal Diseases

11. Fungal Pathogenomics: Deciphering Fungal Disease Mechanisms in Cereals
12. Eco-Friendly Fungicides for Sustainable Cereal Disease Management
13. Molecular Approaches to Combat Fungal Diseases in Cereal Crops

14. Innovations in Fungal Disease Resistance Breeding for Cereals
15. Integrated Management of Fusarium caused diseases

### Theme D: Etiology, Epidemiology and Management

16. Novel Insights into the Etiology of Emerging Cereal Diseases
17. Integrated Epidemiological Strategies for Sustainable Disease Control in Cereals
18. Molecular Epidemiology: Tracking Cereal Pathogens in Real-Time
19. Advanced Data Analytics for Cereal Disease Prediction and Management
20. Pathogen Surveillance Networks: A New Frontier in Cereal Disease Management

### Theme E: Plant Breeding and Diseases Management

21. Accelerated Breeding Techniques for Disease-Resistant Cereals
22. Integrative Genomic Approaches in Cereal Disease Breeding Programs
23. CRISPR/Cas9: A Paradigm Shift in Cereal Disease Resistance Breeding
24. Omics-Based Strategies for Breeding Disease-Resistant Cereal Varieties
25. Genomic Tools for Enhancing Disease Resistance in Cereal Crops

### **Theme F: Identification of a New Susceptibility Gene**

26. Genome Editing to Eliminate Susceptibility Genes in Cereals
27. Functional Genomics Approaches to Identify Susceptibility Genes in Cereals
28. Deciphering the Role of Susceptibility Genes in Cereal Pathogenesis
29. Susceptibility Gene Knockout for Enhanced Disease Resistance in Cereals
30. Novel Susceptibility Genes and Their Implications in Cereal Breeding

### **Theme G: Breeding Strategies for Developing Disease-Resistant Varieties**

31. Cutting-Edge Techniques for Developing Disease-Resistant Cereals
32. Exploring Genetic Diversity for Disease Resistance in Cereal Crops
33. Biotechnological Innovations in Cereal Disease Resistance Breeding
34. Advanced Marker-Assisted Breeding for Disease Resistance in Cereals
35. Innovative Cross-Breeding Techniques for Cereal Disease Resistance

### **Theme H: Potential Breeding Strategies for Developing Disease-Resistant Varieties**

36. Exploring Epigenetic Modifications for Cereal Disease Resistance
37. Integrating Multi-Omics for Robust Disease Resistance in Cereals
38. Precision Breeding: The Future of Disease Resistance in Cereals
39. Leveraging Synthetic Biology for Enhanced Disease Resistance in Cereals
40. Harnessing Plant-Pathogen Coevolution for Cereal Disease Resistance

### **Theme I: Economic and Eco-Friendly Alternatives for Efficient and Safe Management**

41. Economic Analysis of Integrated Disease Management in Cereals
42. Biological Control Agents: Cost-Effective Solutions for Cereal Diseases
43. Green Chemistry in Cereal Disease Management: Innovations and Impact
44. Sustainable Disease Management Practices for High-Yield Cereal Production
45. Economic Benefits of Eco-Friendly Disease Management in Cereal Crops

### **Theme J: Resistance Gene Identification, Cloning and Characterization**

46. Novel Approaches for the Identification of Resistance Genes in Cereals
47. Cloning and Functional Characterization of Novel Resistance Genes
48. Genomic Insights into Resistance Gene Evolution in Cereal Crops
49. Leveraging Biotechnology for Resistance Gene Characterization in Cereals
50. High-Throughput Screening of Resistance Genes in Cereal Genomes

### **Theme K: Utilization of Biosensors in the Identification of Bacterial Diseases**

51. Nanotechnology-Enhanced Biosensors for Cereal Pathogen Detection
52. Smart Biosensors: Revolutionizing Disease Diagnostics in Cereal Agriculture
53. Real-Time Monitoring of Cereal Diseases Using Advanced Biosensors
54. Field-Ready Biosensors for On-Site Cereal Disease Detection
55. Integrative Biosensing Technologies for Precision Disease Management in Cereals

### **Theme L: Nanomaterials for Integrated Crop Disease Management**

56. Nanoparticle-Based Solutions for Cereal Disease Control
57. Harnessing Nano-Fungicides for Sustainable Cereal Disease Management
58. Nanotechnology Applications in the Reduction of Mycotoxins in Cereals
59. Nano-Biotechnological Approaches for Cereal Disease Diagnosis
60. Eco-Friendly Nanomaterials for Cereal Disease Management

### **Theme M: Metallic Nanoparticles and Nano-Based Bioactive Formulations as Nano-Fungicides**

61. Innovative Nano-Fungicides for Fungal Disease Control in Cereals
62. Metallic Nanoparticles: A New Frontier in Cereal Disease Management
63. Synthesis and Application of Nano-Based Bioactive Formulations in Cereal Protection
64. Environmental Impact and Safety of Nano-Fungicides in Cereal Farming
65. Integration of Nano-Fungicides in Cereal Disease Management Practices

### **Theme N: Applications of Nano-Biotechnological Approaches in Diagnosis and Protection of Diseases**

66. Advanced Nano-Biotechnological Techniques for Cereal Disease Diagnostics
67. Nanotechnology-Enhanced Disease Resistance in Cereal Crops
68. Innovative Nano-Biosensors for Pathogen Detection in Cereals
69. Nano-Biotechnological Solutions for Sustainable Cereal Farming
70. Future Prospects of Nanotechnology in Cereal Disease Management

### **Theme O: Integrated Disease Management**

71. Comprehensive Strategies for Integrated Disease Management in Cereals
72. Synergistic Approaches in IDM for Sustainable Cereal Protection

73. Role of Biological Control in Integrated Disease Management of Cereals
74. Implementing IDM for Improved Cereal Yield and Quality
75. Innovative Technologies for Integrated Management of Cereal Diseases

### **Theme P: Eco-Friendly Management**

76. Sustainable Approaches to Cereal Disease Management
77. Eco-Friendly Fungicides for Long-Term Cereal Protection
78. Environmental Benefits of Sustainable Cereal Disease Management
79. Organic Farming Practices for Cereal Disease Control
80. Eco-Friendly Technologies for Integrated Pest and Disease Management in Cereals

**\*\*Note:** Chapter title may be modified or new chapter may also be proposed by the author.

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