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Book Title (ID 2024_07)

Integrated Pest Management: Advancement, Adoption and Ecological Challenges

About the Book

This book offers a comprehensive assessment of the strategies utilized in ecologically-based pest management, delivering a well-rounded examination of methods that prioritize environmental safety and ecological integrity. It delves into various subjects, including the employment of biological control mechanisms involving fungi and viruses, the preservation of natural predator populations, the application of botanical solutions and the correlation between efficient pest management and the advancement of food security. Positioned within the broader realms of agriculture, sustainability and environmental preservation, this publication presents a diverse and globally-informed viewpoint on integrated pest management. Its insights are valuable not only to researchers specializing in entomology, crop protection, environmental sciences and pest management, but also to those with multidisciplinary interests.

Chapters outlines but not limited to:

Part I: Introduction and Overview

Chapter 1: Introduction to Integrated Pest Management (IPM), Historical Perspective and Current Trends
Chapter 2: Principles and Components of IPM
Chapter 3: Integrated Pest Management for Sustainable Agriculture
Chapter 4: Emerging issues in Integrated Pest Management Implementation and Adoption

Part II: Molecular Approaches in IPM

Chapter 5: Genomics and Pest Resistance: Applications of CRISPR-Cas9
Chapter 6: RNA Interference (RNAi) Technology in Pest Management
Chapter 7: Proteomics and Metabolomics in Insect Pest Management
Chapter 8: Molecular Diagnostics for Early Detection of Pest Infestations
Chapter 9: Transcriptomics for Understanding Pest-Host Interactions

Part III: Information and Communication Technology (ICT)

Chapter 10: Precision Agriculture: ICT Tools in Pest Monitoring
Chapter 11: Big Data Analytics for Predictive Pest Modelling
Chapter 12: Mobile Applications and Decision Support Systems for Farmers
Chapter 13: Remote Sensing and GIS in Pest Management
Chapter 14: IoT-Based Smart Traps and Sensors for Pest Surveillance

Part IV: Nanotechnology in IPM

Chapter 15: Nanopesticides: Formulation and Delivery Mechanisms
Chapter 16: Nanotechnology for Targeted Pest Control
Chapter 17: Environmental and Safety Aspects of Nanomaterials in Agriculture
Chapter 18: Nano-encapsulation of Biological Control Agents

Part V: Genome Editing and Genetic Control

Chapter 19: Gene Drive Technologies for Pest Population Management
Chapter 20: Synthetic Biology and Insect Pest Management
Chapter 21: Transgenic Crops: Current Status and Future Prospects
Chapter 22: Epigenetics and Pest Resistance Management

Part VI: Host Plant Resistance

Chapter 23: Breeding for Pest Resistance in Crops
Chapter 24: Biotechnological Approaches to Enhance Plant Defense Mechanisms
Chapter 25: Plant-Insect Interaction and Resistance Mechanisms
Chapter 26: Marker-Assisted Selection for Pest Resistance

Part VII: Biological and Microbial Control

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Chapter 28: Endophytes and Their Role in Pest Management
Chapter 29: Parasitoids in Integrated Pest Management

Chapter 30: Augmentation and conservation of natural enemies
Chapter 31: Microbial Interactions and Synergistic Effects in Pest Control
Chapter 32: Virus- and bacteria-transmitting arthropod vectors and their management

Part VIII: Botanicals and Non-Pesticidal Management

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Chapter 34: Applications of Plant Extracts in Pest Control
Chapter 35: Biopesticides: Botanical Extracts and Their Applications
Chapter 36: Non-Pesticidal Management Techniques in Agriculture

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Chapter 38: Entomopathogenic Fungi and Bacteria in Pest Management

Part X: Chemical Control and Safety

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Chapter 40: Pesticide Resistance Management Strategies
Chapter 41: Safe Use of Chemical Controls in IPM
Chapter 42: Economic and Ecological Externalities of Pesticide Use
Chapter 43: Effect of pesticides on non-target sites with reference to soil ecosystems

Part XI: Ecological and Social Challenges

Chapter 44: Ecological Impact of IPM Practices
Chapter 45: Socioeconomic Factors Affecting IPM Adoption
Chapter 46: Policy and Regulatory Frameworks in Pest Management
Chapter 47: Sustainable IPM: Balancing Productivity and Environmental Health
Chapter 48: Advances in Crop Protection Practices for the Environmental Sustainability of Cropping Systems

Part XII: Case Studies and Future Directions

Chapter 49: Case Studies: Successful IPM Programs Worldwide
Chapter 50: Future Directions in Integrated Pest Management Research
Chapter 51: Interdisciplinary Approaches and Collaboration in IPM

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