PEST MANAGEMENT STRATEGIES IN PULSES AND CEREAL CROPS

Dr. Arun Kumar

Dr. Wajid Hasan

Dr. Bhavna Verma

Dr. C. P. Singh

Kripa Drishti Publications, Pune.

PEST MANAGEMENT STRATEGIES IN PULSES AND CEREAL CROPS

Editors

Dr. Arun Kumar
Vice-Chancellor,
Swami Keshwanand Rajasthan Agricultural University,
Bikaner, Rajasthan, India.

Dr. Wajid Hasan
Subject Matter Specialist in Entomology,
Krishi Vigyan Kendra,
Jahanabad, BAU, Sabour, Bihar, India.

Dr. Bhavna Verma
Technical Officer,
Directorate of Plant Protection Quarantine and Storage,
CIPMC Indore, MP, India.

Dr. C. P. Singh
Former Professor- Entomology,
G. B. Pant University of Agriculture and Technology,
Pantnagar, Uttarakhand, India.

Kripa-Drishti Publications, Pune.

Book Title: **Pest Management Strategies in Pulses and Cereal Crops**

Editors By: **Dr. Arun Kumar, Dr. Wajid Hasan, Dr. Bhavna Verma, Dr. C. P. Singh**

1st Edition

ISBN: **978-81-19149-06-3**

Published: **March 2023**

Publisher:

Kripa-Drishti Publications

A/ 503, Poorva Height, SNO 148/1A/1/1A,

Sus Road, Pashan- 411021, Pune, Maharashtra, India.

Mob: +91-8007068686

Email: editor@kdpublications.in

Web: https://www.kdpublications.in

PREFACE

Introduction of high yielding varieties, expansion in irrigation facilities and indiscriminate use of increased rates of agrochemicals such as fertilizers and pesticides in recent years with a view to increase productivity has resulted in heavy crop losses due to insect pests in certain crops. This situation has risen mainly due to elimination of natural enemies, resurgence of pests, development of insecticide resistance and out-break of secondary pests. With a view to provide the farmers the best planting material available in the world for maximizing productivity per unit area and to encourage the seed industry. Environmental factors are also directly associated with the production, therefore several researchers in the past had made efforts to develop statistical models based on time series data on crop-yield and weather variables for the pre-harvest grain yield forecast. Work-related to survey and surveillance of insect pests and disease across the country should be regularly conducted for getting proper information on changing trends of insect pests and associated losses in different crops including cereals and pulses. To manage the insect pests, it is essential that experts have a thorough knowledge of insect-pathogen behavior, life cycle, bioecology, phenology, economic injury level and other factors of insect pests. Management strategies include cultural, mechanical and biological methods that minimize the pest incidence naturally. Insecticides should apply in harmonious, judicious, timely and selective or broad manner. Hence, manage the insect pest and disease by integrating all available techniques which can reduce the pest infestation and cost of cultivation.

The intricacy of the interaction between a pest and its host, influenced by biotic and abiotic factors of the environment, make the control of these disease and insect pest. Both the pest and diseases accounts for decrease in grain density, germination percent, affected seed viability or weight resulting in overall reduction in crop quality and quantity. Therefore, the management practices are still challenging with different aspects. The combination of pest management and safety measure during post-harvest storage will be led towards the better sustainability of these crops. Control measures and management practices consists of use of synthetic pesticides, cultural methods and other mechanical methods. Host plant resistance studies and the biological control are gaining much attention in recent years either to control the diseases or to produce a resistance variety along with new crop cultivation technologies.

Resistant cultivars are the most cost-effective and environment-friendly method of plant protection and are a requirement for any sustainable crop production system. To decrease yield losses caused by biotic stresses, an efficient collaboration between phyto-pathologists, geneticists, breeders and specialists on cereals and pulse crop production is needed. In the forthcoming, breeding for resistance may take place at the allele level and therefore the process may become more effective. Cultivars with a high level of resistance to the most dominant insect and pathogens in their growing

area will confirm yield and facilitate the development of sustainable crop production systems by allowing soil-conserving production systems with negligible input of pesticides, thereby decreasing site effects on non-target organisms, environment and consumers. Lastly, for evolving IPM strategies that would be appropriate and suitable in different agro-ecological zones for different crops expanded research and adequate investment are necessary. Success in crop production sustainability is largely dependent on availability of dedicated plant protection personnel, a pragmatic public policy and a determined political will in the coming years.

The book is structured into 22 chapters and is primarily for the degree, post-graduate students, and field researchers. The chapters will clearly define the Pest Management Strategies in Pulses and Cereal Crops and their impacts on agricultural productivity. We wish to express a deep sense of gratitude to those who helped us directly or indirectly during the preparation of the manuscript of this text. The Publication Pest Management Strategies in Pulses and Cereal Crops is expected to benefit researchers, scientists, teachers, academicians, policy planners, progressive farmers, and students and shall act as a good reference base for future advancement in the field. We express our sincere thanks to all contributors for their cooperation and sharing their valuable experiences and great thoughts in making this book informative.

Dr. Arun Kumar
Dr. Wajid Hasan
Dr. Bhavna Verma
Dr. C. P. Singh

About the Editors

Dr. Arun Kumar is a proficient researcher and author in the field of Agronomy. In his 23 years of academic experience, Dr. Arun Kumar has served in various capacities as Assistant Professor, Junior Agronomist (1998-2005) and Associate Professor (2005 – 2011). Dr. Arun Kumar has also served as the Director Planning at Bihar Agricultural University, Sabour during which he developed the Road Map of the university and headed the PME Cell and Institutional Quality Assurance Cell (IQAC) of the university. He has also served as the Dean (Agriculture), DRI cum Dean (PGS), Comptroller and Director Research at Bihar Agricultural University, Sabour. During 2021-22, Dr. Arun Kumar has also served as the Vice Chancellor of Bihar Agricultural University. During his tenure as Vice Chancellor, the Bihar Agricultural University and all its constituent colleges were accredited by ICAR and three new colleges were established under the BAU, Sabour. Dr. Kumar has also guided number of Master's and Ph.D. students and have number of publications to his credit including 37 Research Papers, 30 Edited/Authored Books, 19 Popular Articles and many more. Dr. Arun Kumar has handled various projects including nine consultancy projects of BAMETI, Patna. He has also chaired/co-chaired technical sessions of various national and international seminars, symposia and conferences. He has also led the state level committee for preparation of agricultural road map of the Bihar State. Considering his outstanding contributions to the field of agriculture, Dr. Arun Kumar has been awarded with award for excellent contribution in agriculture sector by his Excellency, the Governor of Bihar. He has done justice to all positions which were previously held by him with such admirable grace and calmness that he is an inspiration to all and Swami Keshwanand Rajasthan Agricultural University, Bikaner is strongly committed to steady development under his able leadership.

Dr. Wajid Hasan, PhD PDF, is devoted to research and extension activities in Agriculture Entomology. Dr Hasan is a Subject Matter Specialist in Entomology at KVK Jehanabad, Bihar Agricultural University in Bihar. He was awarded Dr DS Kothari UGC-Post Doctoral Fellow (PDF) in 2010, offered by the University Grant Commission of India. He holds a doctorate in Agricultural Entomology from GB Pant University of Agri & Tech, Pantnagar. He has good terms with farmers, and he serves them as an adviser for plant protection measures. Dr Hasan has received eleven awards from several societies for his outstanding contribution to the relevant discipline. He has fifty-eight research papers, twenty-five books, twenty-nine book chapters, thirty-nine popular articles, six success stories, two Practical Manuals, six success stories and forty-seven delivered lectures in different seminars/symposia/conferences/workshops and seven radio talks. Dr Hasan stayed as the chief organizer for eleven international conferences with more than three thousand participants each and managed a team of about three hundred co-organizers each. He has also organized 458 training programs for farmers, rural youth and agricultural professionals with 19975 participants. In addition, he has conducted three skill development training programs of 200 hours each and thirty-eight On-Farm Trials (OFT). Dr Hasan has a lifetime membership in five scientific societies. He is the Editor-in-Chief of the International Journal of Agricultural and Applied Sciences (IJAAS) and an Editorial board member for five scientific International Journals.

Dr. Bhavna Verma, PhD, has devoted his academic career to Agriculture, particularly in Agriculture Entomology. She is presently working as a Technical Officer (Entomology) in the Directorate of Plant Protection Quarantine & Storage, CIPMC Indore MP. She did his B.Sc. (Ag) from the college of agriculture Indore, RVSKVV University Gwalior. Thereafter she did her M.Sc. (Ag) from the same university and did her PhD from Dr B. R. Ambedkar University of Social Sciences Dr Ambedkar Nagar Mhow, Indore MP. She has a wide experience in research and teaching several courses of Entomology like Integrated pest management, Plant quarantine, biological control, Bio agent, Crop pest, Taxonomy, Sericulture, Apiculture etc. She has received 5 awards from several societies for her outstanding contribution to the relevant discipline published 12 research papers, 14 articles, 4 pamphlets, 3 book chapters and 2 lead lectures. Dr Bhavna has participated in many national and international conferences she has organized 2 internationals conferences as a Co-Organizing Secretary.

Professor C. P. Singh is working for 39 years in the Department of Entomology, College of Agriculture, G.B. Pant University of Agriculture & Technology Pantnagar, UK. Dr. Singh has establishment of ETL, EIL, and yield – infestation relation, avoidable yield loses for *Lipaphis erysimi* (Kalt.), Nazara bug infesting sunflower and other major pests. Biochemical analysis of rapeseed mustard plant for resistance against *Lipaphis erysimi*. Forecasting modules for *Lipaphis erysimi* has been worked out. Formulated IPM module for key pests of oilseed, vegetable and cereal crops. Developed ICM (Integrated Crop Management) module for main oilseed, cereal, vegetable and fruit crops, Aromatic and Medicinal Crops. Rendered Plant Clinic Services: approach-plant stresses diagnosis & management, establishment-new one and run. He has undertaken 31 research projects, guided 7 Ph.D. and many MSc and UG students, published 142 research papers, 7 books, 9 book chapters, 65 popular articles, 15 success stories, 45 delivered lecture in different seminar/symposia/conference/ workshop and 8 radio talks. Dr. Singh organized 160 Trainings for Practicing Farmers, Rural Youths and Extension Functionaries.

CONTENT

About the Book

This book discusses the Pest Management Strategies in Pulses and Cereal Crops: This book focuses on the distribution, nature of damage and management of key pests of important cereals and pulses crops like, rice (paddy), wheat, maize, sorghum and pearl millet, lentil, black gram, red gram etc. In each case, we study the environmental distribution, damage, effect, pest and disease management. Then this book focuses on some farming methods which are being used and has a future for the better development of agriculture/ pest management. The chapters will clearly define the Pest Management Strategies and their impacts on agricultural productivity. We wish to express a deep sense of gratitude to those who helped us directly or indirectly during the preparation of the manuscript of this text. We hope that the book is valuable and exciting to readers, teachers, and students and would urge them to know more about recent research related to Smart Agriculture. We are highly thankful to all authors who contribute their research/ideas to enhance the book's utility.

KRIPA DRISHTI PUBLICATIONS

Price: ₹650

Kripa-Drishti Publications
A-503 Poorva Heights, Pashan-Sus Road, Near Sai Chowk,
Pune – 411021, Maharashtra, India.
Mob: +91 8007068686
Email: editor@kdpublications.in
Web: https://www.kdpublications.in

ISBN: 978-81-19149-06-3