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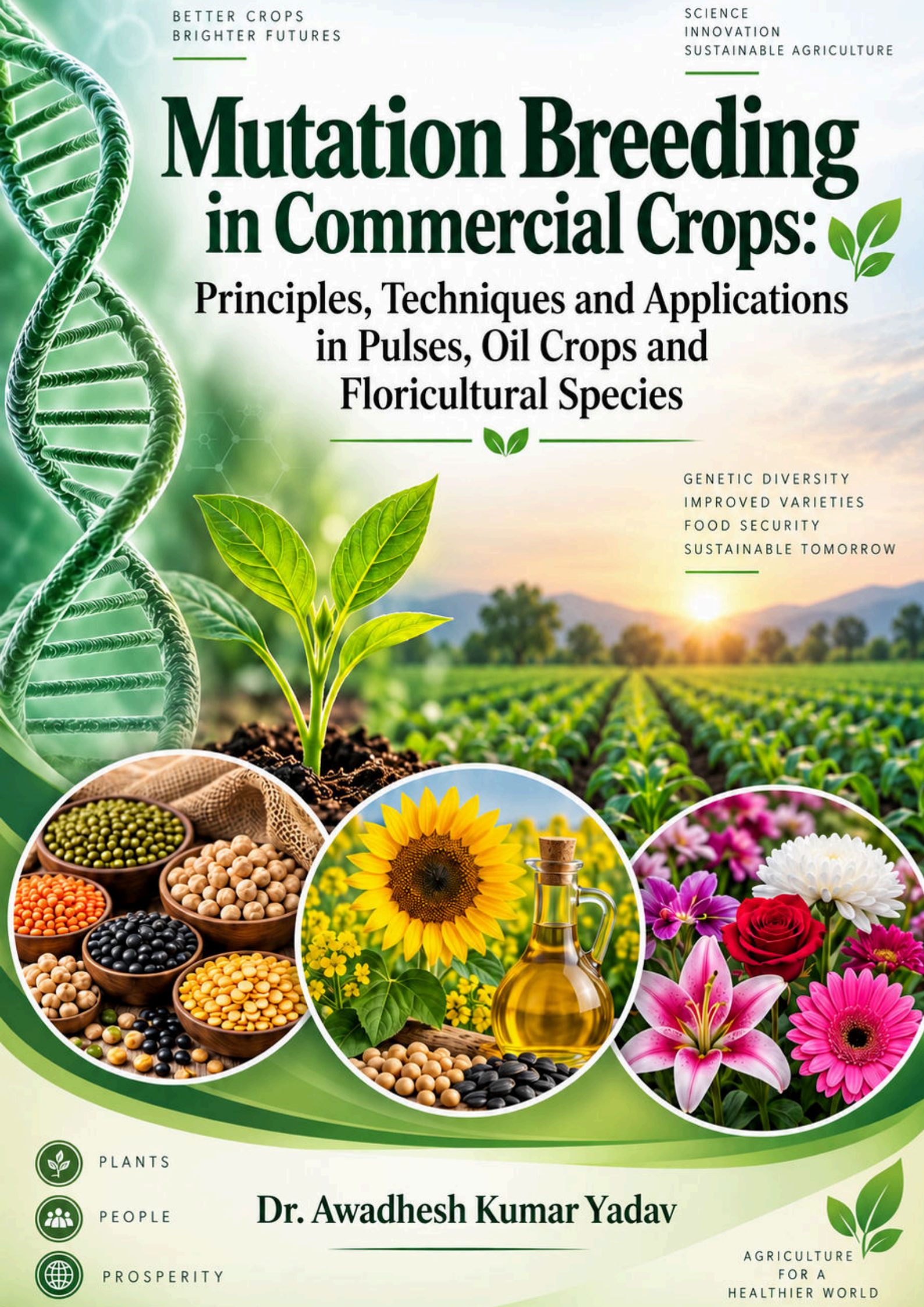
SCIENCE
INNOVATION
SUSTAINABLE AGRICULTURE

Mutation Breeding in Commercial Crops:

Principles, Techniques and Applications
in Pulses, Oil Crops and
Floricultural Species



GENETIC DIVERSITY
IMPROVED VARIETIES
FOOD SECURITY
SUSTAINABLE TOMORROW



PLANTS



PEOPLE



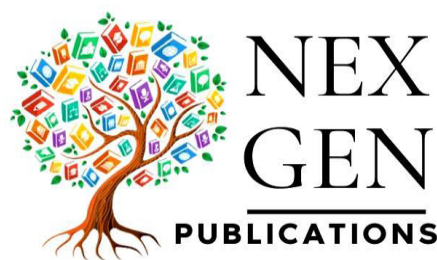
PROSPERITY

Dr. Awadhesh Kumar Yadav



AGRICULTURE
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Mutation Breeding in Commercial Crops: Principles, Techniques and Applications in Pulses, Oil Crops and Floricultural Species



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Mutation Breeding in Commercial Crops: Principles, Techniques and Applications in Pulses, Oil Crops and Floricultural Species

Authored By:

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Preface

Agriculture faces increasing challenges from population growth, climate change, emerging pests and diseases, environmental stresses, and the growing demand for nutritious food and high-value agricultural products. These challenges have increased the need for innovative and effective crop improvement strategies. Mutation breeding is an important approach for creating useful genetic variability and developing improved crop varieties with desirable agronomic, quality, and commercial characteristics.

Mutation Breeding in Commercial Crops: Principles, Techniques and Applications in Pulses, Oil Crops and Floricultural Species provides a comprehensive overview of the principles, techniques, applications, and emerging prospects of mutation breeding. The book covers the fundamentals of induced mutations, physical and chemical mutagens, mutation induction, mutant identification, selection, evaluation, and stabilization of desirable traits.

Special emphasis is given to commercially important pulse and oilseed crops, where mutation breeding has contributed to improvements in yield, maturity duration, plant architecture, disease resistance, abiotic stress tolerance, and nutritional and processing quality. The book also highlights the application of induced mutagenesis in floricultural species for developing novel flower colours, forms, sizes, flowering characteristics, plant architecture, and other commercially valuable traits.

In addition to conventional approaches, the book discusses the integration of mutation breeding with tissue culture, molecular markers, genomics, and emerging biotechnological tools. It also addresses variety testing, registration, release, commercialization, and future opportunities and challenges.

This book is intended for students, teachers, researchers, plant breeders, geneticists, biotechnologists, and agricultural professionals. It aims to serve as a useful academic and practical reference for understanding and applying mutation breeding in commercial crop improvement and to encourage further research and innovation in this rapidly developing field.

The content of the textbook is designed to combine theoretical knowledge with practical relevance. The material is arranged in a logical sequence so that the reader can first understand the basic concepts of information security

Acknowledgement

The successful completion of Mutation Breeding in Commercial Crops: Principles, Techniques and Applications in Pulses, Oil Crops and Floricultural Species has been made possible through the knowledge, guidance, and support of many individuals and institutions.

We sincerely express our gratitude to all researchers, scientists, plant breeders, academicians, and agricultural professionals whose valuable contributions to the fields of mutation breeding, plant genetics, crop improvement, biotechnology, and agricultural science have provided the scientific foundation for this book. Their pioneering research and continued efforts have greatly advanced the understanding and application of induced mutations in crop improvement.

We are especially thankful to the authors and contributors for their valuable time, expertise, and commitment in preparing the chapters and presenting the subject matter in a clear and comprehensive manner. Their contributions have enriched the academic and practical value of this work.

We also acknowledge the support and encouragement received from our colleagues, institutions, research organizations, and academic communities throughout the preparation of this book. Their constructive suggestions and assistance have been valuable in bringing this work to completion.

We extend our sincere appreciation to the publishers, editors, and production team for their cooperation, guidance, and efforts in preparing and presenting the book in its final form.

Finally, we are grateful to our family members, friends, and well-wishers for their patience, encouragement, and continued support during the preparation of this work.

We hope that this book will serve as a useful resource for students, researchers, educators, plant breeders, and professionals and will contribute to the continued advancement of mutation breeding and commercial crop improvement.

Dr. Awadhesh Kumar Yadav

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Dr. Awadhesh Kumar Yadav is a senior academician and researcher in Botany, specializing in plant genetics, cytogenetics, and mutation breeding. He has extensive experience in undergraduate and postgraduate teaching, research supervision, and curriculum development. His scholarly contributions include publications in national and international journals and active participation in international research collaborations. His research emphasizes genetic variability, mutagenesis, and cytological analysis of crop plants, with relevance to sustainable agriculture. As an author, he aims to integrate classical botanical foundations with modern experimental approaches, presenting clear, rigorous, and globally relevant content for students, researchers, and professionals across academia and applied plant sciences. Presently associated with Sri Krishna University, Chatterpur, Madhya Pradesh as Professor & Head of Department of biological Sciences. In this modern era of AI technology, Machine Learning for Sustainable Agriculture is must to learn and read for Wider Approaches in Mutation Breeding.

ABOUT THE BOOK:

Mutation Breeding in Commercial Crops presents the principles, techniques, and applications of induced mutation for crop improvement. It focuses on pulses, oil crops, and floricultural species, covering mutation induction, mutant selection, evaluation, and development of improved varieties.

The book highlights the role of mutation breeding in enhancing yield, quality, disease resistance, stress tolerance, maturity, and desirable floral traits. It also introduces modern approaches integrating mutation breeding with molecular and biotechnological tools.

Designed for students, researchers, plant breeders, and agricultural professionals, this book provides both fundamental knowledge and practical insights into the development and commercialization of improved crop varieties for sustainable agriculture and food security.

