

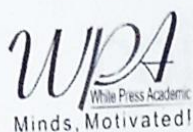
MOLECULAR PLANT BREEDING

Jasen Bernier



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MOLECULAR PLANT BREEDING

Molecular Plant Breeding (MPB) utilizes latest genetic technologies to develop better varieties of crop plants. Two molecular technologies, viz. molecular marker technology and transformation technology are used in molecular plant breeding. Molecular Plant Breeding attempts to present the complete picture of plant breeding ranging from the classical to the molecular approaches applied to crop improvement. The progress made in DNA marker technology has been remarkable and exciting in recent years. DNA markers have proved valuable tools in various analyses in plant breeding. Plant breeding describes methods for the creation, selection and fixation of superior plant phenotypes in the development of improved cultivars suited to needs of farmers and consumers. Primary goals of plant breeding with agricultural and horticultural crops have typically aimed at improved yields, nutritional qualities, and other traits of commercial value. Molecular breeding is an important branch of plant breeding which is gaining increasing significance these days. Molecular breeding is of very recent origin. It developed in the 1980s with the evolution of DNA marker technologies. Molecular breeding is defined as a branch of plant breeding which utilizes molecular genetic tools and approaches for genetic improvement of crop plants. In other words, genetic improvement of crop plants for various economic traits using molecular marker and transformation technologies is referred to as molecular plant breeding. This book is designed primarily for graduate students, viz., B.Sc. agriculture and B.Sc. science students with botany as one of the subjects, who would get their first exposure to plant breeding. It would also be useful for the post-graduate students, especially in botany, and to teachers of the subject. The book is written in simple and easy to understand language.

Contents: 1. Introduction, 2. Marker Assisted Plant Breeding, 3. The Replication of DNA and DNA Synthesis, 4. Homologous Recombination at the Molecular Level in Plant Breeding, 5. Site-Specific Recombination and Transposition of RNA, 6. Mechanism of Transcription.

Jasen Bernier is a research professor, Institute of Crop Science, Lesotho Academy of Agricultural Sciences, and barley molecular breeder/senior scientist at Maseru. He obtained his Bachelor degree from Maseru Agricultural College and Master and Ph.D. Degrees from Cambridge Agricultural University. He was a post doctoral scientist and research associate at Cornell University, Assistant and Associate Professor at Cambridge Agricultural University, rice molecular breeder at Rice Tec, Inc., Germany and the head of Applied Biotechnology Center, International Maize and Wheat Improvement Center, Mexico. He spends a few hundred days of a year lecturing at colleges and to environmental groups. His career and research has contributed to the development of methods, tools and products for molecular breeding. He serves as editorial board member for several international journals. He has published number of articles in top academic journals including Science, Nature Genetics and plant science breeding. He is now leading a group with researches focusing on the development of techniques, tools and methodologies for molecular breeding and their applications in maize genetics and breeding. He is a Fellow of the French Academy of Agricultural Sciences.

