

PREFACE

Recent advances in the development of transgenic plants revolutionized our concepts of sustainable food production, cost-effective alternative energy strategies, microbial biofertilizers and biopesticides, disease diagnostics, etc. through plant biotechnology. As a result, a number of transgenic plants have been developed with improved traits. With the advancement of plant biotechnology many of the customary approaches are out of date, and understandings on new updated approaches are needed. To this end, this book has been written to share the information related to recent methods of genetic transformation, gene silencing, development of transgenic crops, biosafety issues, microbial biotechnology, oxidative stress, and plant disease diagnostics and management. This book comprises 13 chapters dealing with various aspect of plant biotechnology. Chapters 1–3 provide an in-depth knowledge of various techniques of genetic transformation of plants, chloroplast, and fungus. Chapter 4 describes advances in gene silencing in plant. Recently, gene silencing has rapidly become the method of choice for functional genomics analysis in plants. Importantly, Chapter 4 discusses specifically on recent advances in virus-induced gene silencing (VIGS) in plants. VIGS technique has been extensively used in plant reverse genetics studies.

Over the last three decades, a large number of transgenic plants have been developed across different classes of plants with various traits of interest. In order to give the comprehensive discussion on transgenic plants, five chapters (Chapters 6–10) are incorporated in the book which elaborately discuss the transgenic plants for various traits. Chapter 6 describes on transgenic plants and their application in crop improvement. Chapter 7 discusses intensively on genetically modified foods and biodiesel production. Chapters 8 and 9 describe biotechnological approaches in horticultural and ornamental plants, respectively. Chapter 10 has extensively described about the recent advances in the development of transgenic crop plants. Transgenic plants have unprecedented potential in crop improvement; however, several cancers are still associated with release of transgenic crops. In Chapter 10 also discusses on biosafety aspect associated with transgenic crops. Chapter 11 deals with microbial biotechnology in which role of microbes in sustainable agriculture has been discussed in depth. Chapter 12 describes about the

oxidative stress in plants. Finally, Chapter 13 discusses about biotechnological approaches for plant disease diagnosis and management.

This book is a blend of basics, new advances and their application so that students don't feel either it's very basic or too advanced. The aim of this book will be to nurture the graduate and postgraduate students in the field of biotechnology. Each chapter has been written by one or more leading experts in their field and then carefully edited to ensure thoroughness and consistency.

In the end, we would like to emphasize that though every possible care has been exercised in writing and proofreading the book, still we don't claim to be infallible. Thus, suggestions for further improvement from teachers, researchers, and students (our real strength) would be gratefully acknowledged.

—Sangita Sahni

—Bishun Deo Prasad

—Prashant Kumar