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Book Review for Plant Biotechnology and Genetics. C. Neal Stewart Jr. (ed.)

WILEY, 2008, 374 pp. 9.21 × 6.14 ×. 81 in.; 1.50 lbs.; $ 126.00. ISBN 978-0-470-04381-3 (hardcover)

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Over the last 50 years, plant biotechnology and genetics have emerged as a rapidly evolving research domain within plant sciences. Plant biotechnology has significantly influenced almost every field of the plant sciences to overcome and answer several long enduring challenges and has achieved new heights. However, the most important problem of feeding a hungry world is still persisting and will pose a significant challenge with projected increase in global population to 9.5 billion in 2050.

The current volume attempts to raise this problem among the scientists, researchers, and more importantly among the students. This edited volume highlights on different currently available technologies and also emphasizes on strategies to overcome the challenging problems in the near future. The editor is a well-renowned scientist in the field of plant biotechnology and molecular biology and has done an excellent job of bringing together different researchers and experts from divergent disciplines (including genetics, plant breeding, tissue culture, molecular breeding, and others) across the globe under one roof. Majority of the contributors are highly respected and seasoned researchers in their individual research domains. This comprehensive volume covers in details the use of plant biotechnology and genetics in modern era of agriculture and crop sciences.

The present volume comprises of 16 chapters. The introductory chapter covers the importance of biotechnology in agriculture with a strong emphasis on GM crop production and cumulative increase in the acreage of land under GM crop cultivation over the last few decades. The chapter also does a good job in highlighting how GM crops help to improve the crop production with development of new varieties that are resistant to different biotic and abiotic stresses. Chapter 2 mainly deals with the history of genetics and briefs an overall idea regarding the plant reproduction system. The chapter on plant breeding (Chapter 3) covers the basics of plant breeding and its use in the modern agriculture. A nice illustrative coverage of all the plant breeding techniques is highly appreciated. The next section (Chapter 4) focuses on basic aspects of plant development and physiology. This chapter coherently describes plant anatomy, morphology, seed germination, plant organ

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development, and photomorphogenesis. It also has an interesting section on different plant hormones and signal transduction process.

Why the tissue culture is important to improve the plant production? The next article (Chapter 5) of this book deals with this question. It provides all the primary information about tissue culture and its use in regeneration of plants. However, it misses out on some recent advances such as increasingly popular approach of isolated microspore culture for double haploid production. Next three chapters (6–9) deals extensively with molecular biology and its application in plant biotechnology; molecular genetics of gene expression (Chapter 6); recombinant DNA, aspects of vector designs, and constructions for gene delivery (Chapter 7); genes and important agronomic traits for transgenic plants (Chapter 8); and application of marker genes, reporters, and promoters (Chapter 9) with specific examples like GUS and GFP to simplify the techniques.

The next few chapter of this book gives an excellent idea about the transgenic plants production and analysis (Chapters 10 and 11). A single chapter has been dedicated towards understanding the regulations and safety issues related to transgenic plants (Chapter 12). Another two chapters extensively covers on the much neglected aspect of field testing of transgenic plants (Chapter 13) and involvement of intellectual property in agricultural biotechnology (Chapter 14). The penultimate chapter (15) is an outstanding resource on the controversies pertaining to transgenic plants. With some excellent examples the author tried to emphasize on the broad message how the modern day transgenic technology can help to overcome several challenges and problems related to food and food production. The editor did an excellent job in summarizing the overall triumphs and technological sophistication achieved by plant biotechnologists and realistically highlighted the future progress of plant biotechnology.

One of the novel and awe inspiring aspect of the book has been the inclusion of short and concise biographies of several leading researchers and contributors working in agriculture and biotechnology in the form of life boxes at the end of every chapter. This is quite an uncommon trend in other competing titles available in the market. This certainly adds the attraction of the volume and more appealing to new generation learners and enthusiastic students. The accompanying education CD and Powerpoint® slide presentations are additional jewels to the volume for simple basic concepts both helpful for students and teachers alike. In one hand it has quick presentation material for the teacher and on the other hand it has reviewing opportunity of the students before taking an exam and also refreshing basic thematic concepts delivered in the lecture. The colored images and very simple description of complex genetic phenomena from a wide diversity of living organisms from virus, microbes, and fungal members to higher plants and important crop species are extremely helpful in getting a broad idea of the application of this powerful technology in various perspectives.

In summary, the current volume is an excellent collection of important topics on plant biotechnology and genetics. This book will certainly cater to the need of both undergraduate and graduate level students, doctoral candidates in the areas of Plant Biotechnology, Genetic Engineering, Molecular Biology, Molecular Genetics, Plant Physiology and Biochemistry, GM Technologies, Transgenics; and also appeal to teachers, researchers, scientists, and policy-makers involved in the relevant fields for an easy, hand on, communicable approach and excellent information and illustrations. It is a delight reading for enthusiastic readers just starting in the field and also to researchers from related or allied disciplines for its very simplistic approach in explaining complex biological processes operating in plant.