Principles of Plant Genetics and Breeding. 

Plant breeding has been unintentionally and intentionally practiced by humans for thousands of years. However, in much of the developed world, only a small number of individuals are directly involved in crop production. Due to this removal from crop production, few individuals think about and even fewer understand the principles involved in plant improvement. Principles of Plant Genetics and Breeding is intended as and is appropriate as a textbook for upper-level undergraduate and lower-level graduate students with an interest in plant breeding.

The book is divided into two major parts. Part I, “Underlying science and methods of plant breeding,” is divided into eight major sections and contains 26 chapters. The eight sections are (i) historical perspectives and importance of plant breeding, (ii) general biological concepts, (iii) germplasm issues, (iv) genetic analysis in plant breeding, (v) tools in plant breeding, (vi) classic methods of plant breeding, (vii) selected breeding objectives, and (viii) cultivar release and commercial production. Each chapter within a section provides an excellent overview of a broad range of topics.

Part II, “Breeding selected crops,” contains eight chapters, with each chapter covering the history, general biology, breeding methods, and breeding objectives for a single crop. The crops covered are wheat, corn, rice, sorghum, soybean, peanut, potato, and cotton. It was refreshing to obtain information about crops other than the major cereal crops. By including four chapters about dicots, the author (perhaps unintentionally) provides a forum for discussing the similarities and differences involved in breeding monocots and dicots.

According to the author, “Plant breeding is an art and a science.” However, he also emphasizes that it is very applied and business oriented. To highlight the applied and business aspects of plant breeding, almost every chapter contains a box with “Industry Highlights.” The essays in each box are written by a broad range of individuals involved in the plant breeding industry, including professionals from academic, government, and commercial enterprises.

Although the book provides an excellent overview of most aspects of plant breeding, the book is most appropriate for students who have already taken courses in plant genetics and statistics. At the end of each chapter is a section for assessment; however, the questions focus more on basic knowledge than application of that knowledge. Practice problems are particularly needed for the chapters about statistical and genetic methods, in which many formulas used in plant breeding are presented in the chapter.

Instructors who wish to adopt this textbook for a class should be prepared to spend time developing questions and problems to emphasize the important points covered in each chapter.

In addition to being an academic resource, Principles of Plant Genetics and Breeding is also a valuable general resource for anyone interested in plant breeding as it provides a balanced discussion of both classic and modern techniques used in plant breeding. For example, the section on biotechnology and its uses is as interesting and informative as the section on classic breeding strategies for self-pollinated crops. This book is also a valuable resource in understanding the many controversial and practical issues associated with plant breeding, from intellectual property rights and regulation of biotechnology to the steps involved in cultivar release and seed certification. Overall, the book is well written, easy to read, and a valuable addition to plant breeding literature.

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