Molecular Plant Breeding
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Yunbi Xu, who works as a molecular maize breeder and head of the Applied Biotechnology Center at the International Maize and Wheat Improvement Center (CIMMYT), El Batan, Mexico, provides a comprehensive overview of molecular plant breeding in this timely book. The late Norman E. Borlaug, and Regents and McKnight Professor Ronald L. Phillips (Univ. of Minnesota) wrote two independent forewords for welcoming this single-authored book. Its 15 well-written chapters include topics such as DNA marker technology, “omics” science, gene mapping, quantitative genetics, plant genetic resources, marker-aided breeding methodology (both theory and practices), genotype-by-environment interaction, genetic transformation, breeding informatics, decision support tools, and intellectual property rights (emphasizing plant variety protection). Each chapter, which underwent a comprehensive peer-review process, includes a wealth of up-to-date information with supporting tables, figures, and cited references, whose list is included at the end of the book.

The introductory chapter sets the scene for reading the book. It gives an appropriate overview on various issues, from domestication of crop plants through major developments in the history of plant breeding—including the Green Revolution—to modern genetic enhancement methods (albeit selectively). This frame sets the foundation. The fourth chapter on population useful for those searching for offspring further research in plant genetics and genetic resources management, evaluation are the subject of Chapter 5, while available wealth of information for each sub-sections. Table 5.1 on core collections and a couple of root and tuber crops, and others known for legumes, fruits, and vegetables.

Chapters 6 to 10 are the core of this book. They are devoted to molecular dissection of complex traits and marker-assisted selection (MAS). The various approaches and statistical methods for mapping quantitative trait loci (QTL) receives significant attention in Chapter 6, whereas Chapter 7 answers questions on number and location of QTL in segregating populations, separating closely linked QTL into single units, comparing QTL across different genetic backgrounds and developmental stages, epistasis, or handling multiple traits and expression QTL. The components of MAS, marker-aided introgression and pyramiding, selection for quantitative traits and long-term selection are included in Chapter 9. The practice of MAS could have benefitted by including examples for each of the above topics, thereby illustrating how to apply the theory of MAS into their genetic research or plant breeding program. The practice of MAS is discussed in Chapter 9, which highlights the versatile schemes available to plant breeders, they may limit its application in plant breeding and in situations involving complex traits. The final chapter comprehensive peer-review process, includes a wealth of up-to-date information with supporting tables, figures, and cited references, whose list is included at the end of the book.