

Preface

Despite the recent advances made in the improvement of crucifer crops using conventional breeding techniques, the yield levels and the oil and meal quality that were expected could not be achieved. The understanding of genetic material (DNA/RNA) and its manipulation by scientists have provided the opportunity to improve crucifers by increasing their diversity beyond conventional genetic limitations. The application of biotechnological techniques will have two major benefits: first, it allows to choose from a number of techniques/methods for appropriate selection of favorable variants, and second, it gives an opportunity to utilize alien variation available in the crucifers to develop high-yielding varieties with good nutritional quality and resistance to insects, pests, and diseases.

Realizing the importance of biotechnology, there is an urgent need to update current techniques for enhancing crucifer crop production at the global level. The editor approached the leading scientists of the world for write-ups on the advances made in the area of crucifer biotechnology to be packaged into one volume for the benefit of students, nutritionists, and biotechnologists as well as researchers engaged in the improvement of Brassicas. The book consists of 12 chapters. Chapter 1 deals with the importance, origin, and evolution of Brassicas, while Chaps. 2 and 3 describe the major advances made in cytogenetics at the molecular level and the introgression of genes from wild species. Chapter 4 deals with microspore culture and double haploid technology, while Chap. 5 describes phytoremediation in crucifers. These are followed by chapters on genome analysis (Chap. 6) and genetic engineering of lipid biosynthesis in seeds (Chap. 7). Metabolism and detoxification of crucifer phytoalexins, the molecular basis of cytoplasmic male sterility, and self-incompatibility have been discussed in detail in Chaps. 8, 9, and 10. Chapters 11 and 12 provide brief accounts of the molecular basis of hybrid technology and genetic modifications for pest resistance.

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