
Preface

Cereals are the major source of calories in human diets and remain central to food security as demand for food increases as human populations grow and food consumption per person increases due to economic development. Cereals are the seeds of grasses (Poaceae family) that were domesticated by humans at the beginnings of agriculture. The main species of cereals cultivated today are wheat, rice, maize, barley, sorghum, and millet. These are species of great social and economic importance. Genomics tools may allow others to be domesticated in the future. The genomes of the cereals hold the genetic information that determines their productivity and nutritional and functional attributes.

The continuous genetic improvement of cereals is essential to global food security. Analysis of cereal genomes has application in wild and domesticated germplasm screening to find new sources of desirable traits. Advances in DNA sequencing technologies are revealing the diversity available. Functional genomics links gene sequences to utility in cereals. Genes for disease resistance, productivity, nutritional value, and food functionality are all important targets in the cereals. Molecular selection tools allow recombination of these genes to develop superior genotypes and accelerate genetic gain. Genome modification using transgenic approaches allows novel traits to be developed in the cereals.

This volume of *Methods in Molecular Biology* provides modern protocols for the analysis and manipulation of cereal genomes. Techniques for isolation and analysis of DNA and RNA from both the vegetative tissues and from the more challenging seeds of cereals are described. Tools for the isolation, characterization and functional analysis of cereal genes and their transcripts are detailed. Methods for molecular screening of cereals and for their genetic transformation are also covered. The volume provides a comprehensive resource for those studying cereal genomes.

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