

# Preface

This two-volume book collects 48 manuscripts that present a timely state-of-the-art view on how genomics of plant genetic resources contributes to improve our capacity to characterize and harness natural and artificially induced variation in order to select better cultivars while providing consumers with high-quality and nutritious food. In the past decade, the appreciation of the value of biodiversity has grown steadily, mainly due to the increased awareness of the pivotal role of plant genetic resources for securing the future supply of plant-derived products in the quantity required to meet the burgeoning needs of mankind. The remarkable progress made possible with the deployment of genomics and sequencing platforms has considerably accelerated the pace of gene discovery, the identification of novel, valuable alleles at target loci and their exploitation in breeding programs via marker-assisted selection or other molecular means. Clearly, a better understanding of the genetic make-up and functional variability underpinning the productivity of crops and their adaptation to abiotic and biotic constraints offers unprecedented opportunities for highly targeted approaches while shedding light on the molecular functions that govern such variability.

Meeting the challenges posed by climate change and the future needs of mankind for plant-derived products will require a quantum leap in productivity of the handful of species that provide the staple for our diet and existence. This quantum leap will only be possible through a more effective integration of genomics research with extant breeding programs. As we anticipate a further reduction in the cost of genotyping/sequencing, the exploitation of still largely untapped samples of wild germplasm stored in gene banks will become instrumental for the success of breeding programs. Importantly, the new selection paradigm ushered in by genomics greatly facilitates mining the genetic richness present in orphan crops and underutilized species, previously less readily accessible via conventional approaches.

The unifying picture that emerges from this book unequivocally shows the pivotal role played by genomics to characterize germplasm collections, mine genebanks, elucidate gene function, identify agronomically superior alleles and, ultimately, release improved cultivars. For each of these objectives, the book presents compelling case studies and examples; additional case studies are provided by the references of each chapter.

We hope that this book will provide a helpful reference to students, young researchers, crop specialists and breeders interested in a more effective characterization and utilization of plant genetic resources. In particular, we hope that reading of this book will encourage students and young scientists to pursue a career focused on the study of plant genetic resources and join forces with those already engaged in this challenging and equally fascinating field of science.

We wish to thank all the authors for their timely contributions that have made this book possible. We also thank all those who have contributed to the editing of this book. Last but not least, we wish to thank the policy makers and funding agencies that provide the funds required to collect, conserve, characterize and harness the allelic richness of plant genetic resources.

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Genomics of Plant Genetic Resources

Volume 1. Managing, sequencing and mining genetic resources

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