Preface

Plant species grown in tropical countries—on small-scale family farms or commercial farms, to provide food for humans or livestock, in dry or humid regions—are highly abundant and taxonomically diversified.

A broad spectrum of biological and genetic knowledge—acquired and synthesized by geneticists and agronomists and essential for the progress of genetic improvement programmes—had to be reviewed for the purposes of this book. *Tropical Plant Breeding* thus covers many topics, including: methods for assessing genetic diversity and spatiotemporal variations; natural reproductive mechanisms and possible deviations that could give rise to novel varietal structures and potential genetic exchanges with neighbouring species; vegetative and reproductive cycles, while sometimes accurately specifying details like leaf and inflorescence emission rates; genetic origins of traits such as tolerance to biotic and abiotic constraints, along with the underlying physiological and genetic mechanisms.

Readers perusing the different chapters of this reference book will undoubtedly be impressed by how quickly information is accrued and effectively utilized, thanks to the interdisciplinary approach, and how readily new breeding techniques are adopted and implemented. Are not oil palm, coffee and rice essential model species for plant biotechnology development?

Tropical plants—grown in fragile environments or those weakened by poor cultivation practices, recently domesticated or subjected to controlled breeding, sometimes transplanted in limited numbers remote from their natural areas, intercropped with traditional crops or monocropped over vast areas—are often faced with extreme situations with respect to population genetics, genetic drift, climatic adaptation and pest and disease constraints.

A comparison of tropical and temperate plant breeding highlights that similar techniques are implemented and the specific biological constraints are comparable. What characterizes tropical species is the need to reconcile a high genetic potential with a capacity for adaptation to a wide range of agricultural conditions and environments. However, there

is a less clear difference for these species with respect to genetic resources, elite material and improved varieties, which could be explained by the fact that the seed subsector is less industrialized in tropical countries. It also meets the need for adaptive flexibility, which is crucial in the tropics because of the high environmental and pest and disease risks.

The format adopted for all the chapters also highlights the importance allocated to the evolutionary organization of species, species complexes and varietal choices based on the prevailing agroeconomic context.

Note that this book is the result of considerable collaboration with different authors throughout the writing and editing process. It has benefitted from the skills and experience of researchers from CIRAD, INRA and IRD and others based in many different tropical countries. This type of collaboration reflects the team spirit that motivates international networks, while promoting the sustainability of genetic improvement programmes.

This updated reader-friendly book will meet the needs of plant breeders, pathologists and agronomists seeking a more in-depth understanding of genetic variability organisation and breeding of tropical plant species. The reader will readily understand their richness and find key elements necessary for a detailed study in the extensive bibliography.

Finally, in concluding I wish to convey to all authors with whom I have had the pleasure of working, that it was an enjoyable task to read this book and jointly ponder the potential of these knowledge-intensive genetic improvement programmes.

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