
Preface

Life Sciences research has made a considerable amount of progress over the last fifty years due major changes in concepts and methodology. Recently, there have been numerous successes in providing the complete sequence of the genome of various eukaryotic multicellular organisms, and plant biology has participated in this enterprise. However, total genome sequencing should be seen as a start rather than an end! The openings offered by functional genomics reconciles organism biology and molecular biology, in order to define an integrative biology that should allow new insights about how a phenotype is built up from a genotype in interaction with its environment.

It was during our years spent at the head of the INRA Plant Biology Department that the idea for this book emerged. It was from this privileged position for observing the major changes occurring in Plant Biology that we decided to assemble in the same book, various topics related to genomics. These topics have had a major impact and changed the way research is carried out in Plant Biology and beyond. Thanks to the expertise of our colleagues from INRA, CNRS, CIRAD, IRD, and the Universities, we have been able to cover a wide area of concepts and methods in genomics. These have ranged from international genome sequencing projects, to invaluable bioinformatics tools, and analytical methods of gene expression, including final metabolic products and their specific tissue and cellular compartmentalization. This new knowledge enables us to understand the integration of basic physiological functions, and developmental programs. Also, the establishment of tight relationships between genomics, and genetic and plant breeding reveals synergies for exploiting molecular markers, for analysing genetic variation, or for studying quantitative traits. The integration that is now feasible by these new approaches also effects ecophysiology, and opens up new perspectives for the use of modelling for the study of plant populations.

We are, therefore, looking at the birth of a new Plant Biology, and we hope that this book will contribute to the dissemination of these new practices.

This book is intended for advanced students in biology and agronomy, their lecturers, and for all scientists who wish to understand plant genomics rapidly, in a relatively exhaustive and synthetic form.

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