

Preface

Plants are the basis of life on earth as we know it and have not only shaped, to a large extent, diverse ecosystems but also provide food, feed, fibers, and fuel for human subsistence. Understanding how plants evolved and develop to fulfill their manifold functions is thus of great fundamental and applied interest.

It will soon be 10 years since the last volume of *Current Topics in Developmental Biology* focused on plant development. Since then, biology has seen a revolution in methods for the investigation of genes, transcripts, and proteins, allowing a wide variety of “omics” approaches. Also, the tools to investigate gene function using forward-genetic, reverse-genetic, and alternative methods, such as artificial microRNAs and RNA interference, have provided deep insights into the molecular processes that regulate plant development. The arsenal of the plant biologist has recently been extended by the CRISPR/Cas9 system, which allows functional studies also in non-model systems, providing new insights into developmental diversity and plasticity. Clearly, focusing efforts on a model system, in this case *Arabidopsis thaliana*, has greatly accelerated progress in understanding plant function. On the other hand, a tunnel vision focusing on a single species is bound to miss important aspects of development that are not found in this model system. Certainly, plant biology has profited a lot from the powerful genetics of *Zea mays* (maize), which started well over a hundred years ago, and the recent focus on *Oryza sativa* (rice) as one of the most important crop plants. Over the last years, the range of plant species used in fundamental research has greatly expanded, providing insights into diverse developmental processes.

Unraveling the molecular control of plant development has also provided the material to look at the evolution of gene regulatory networks, investigating how preexisting mechanisms were co-opted for new developmental programs or how novelties arose during land plant evolution. Such evo-devo studies have provided great insights into the evolution of the enormous diversity of plants that exists today. It is more than timely then to provide a broad overview of plant development and evolution, as it is only possible in a multichapter book bringing together experts in diverse field to share their views on specific plant developmental processes and their evolution. The chapters provide a wide diversity of perspectives on both vegetative and reproductive development, summarizing the deep functional and

mechanistic insights that have been gained in many fields of development. The chapters focusing on evolutionary aspects provide an excellent view on the directions the evo-devo field will take in the future by being able to do functional studies in nonmodel systems that promise to provide invaluable insights into the evolution of plant development.

I was delighted that so many of my colleagues enthusiastically accepted to contribute to this volume of *Current Topics in Developmental Biology* and I am thankful for their detailed reviews and insightful discussions on a wide range of topics in plant development and evolution. No doubt the next decade will see enormous progress and further deepen our understanding of plant function. Nevertheless, I am convinced that the readers will find this volume interesting and timely and hope they will enjoy reading it.

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