

Preface

Every single plant in nature is closely associated with mutualistic microbes, particularly fungi and bacteria. In addition, plants are repeatedly attacked by a multitude of pathogens and pests, including bacteria, fungi, oomycetes, nematodes, and insects. Deciphering how plants interact with both mutualistic and parasitic microbes is central to understanding their biology. One could almost argue that plant biology should be viewed as a subdiscipline of plant-microbe interactions. Identifying the plant-microbe cross talks is also crucial for a better understanding of the processes regulating the complex interactions between entangled plant and microbial communities in ecosystems.

The field of plant-microbe interactions has significantly matured in recent years. All major classes of molecular players both from plants (surface and intracellular immune receptors) and microbes (microbial pattern molecules and effectors) have now been revealed. This book focuses on effectors, secreted microbial molecules that alter plant processes and facilitate colonization. Effectors are central to our newly integrated view of plant-microbe interactions. Effectors have evolved to facilitate parasitism, for example, by suppressing host immunity in a variety of ways. However, they can also "trip on the wire" and activate plant immune receptors, a response known as effector-triggered immunity. These are complex interactions and the coevolutionary dynamics between plants and microbes have left striking marks in their genomes. Our goal was to take stock of current knowledge on effectors of plant-associated organisms and illustrate the diverse and complex ways in which effectors interact with their host plants.

The book opens with general reviews on plant immunity and how it is targeted by microbial effectors (Chapters 1 and 2). The field of effector biology has greatly benefited from genome-wide analyses, which result in complete catalogs of effector genes. Chapters 3–5 report on genome-wide analyses and evolution of effector genes. These chapters nicely illustrate how comparative genomics greatly contributed to our understanding of effector evolution. Chapters 6–8 describe how effectors function in suppressing host immunity and how they are perceived by plant immune receptors. How effectors traffic inside plant cells is covered by Chapters 9 and 10. Finally, the closing Chapters 11–15 cover emerging topics. Effectors have been reported in a number

of plant-microbe systems, including bacterial and fungal symbioses, as well as nematode and insect pests.

Effector biology is a new and fast-paced field of research. As with all emerging fields of science, consensus among researchers has not always been reached and some topics remain controversial. Readers will surely notice more than one example throughout the book. We elected to keep such "inconsistencies" rather than enforce an arbitrarily sanitized version. We hope that such differences between authors will be informative of the current dynamic state of our science.

Books may have become less fashionable in the age of tweeting and microblogging. However, we hope that there is value in a document that summarizes the current state of the field of effector biology and provides a handy complement to the literature for both novice and experienced scientists.

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