
Preface

Protective effects on eukaryotic hosts stemming from microbial colonization are relatively common in nature (Janzen, 1977) but their study escalated after Keith Clay (1988) proposed the defensive mutualism hypothesis to explain the widespread distribution of endophytic fungi in grasses. Since then there has been a deluge of research evaluating defensive mutualisms in several kingdoms of organisms; and much has been learned about the phenomenon of microbial-based defensive mutualisms. We believe that the time is right for a work that unifies microbial-based defensive mutualisms in diverse systems into a single text for students, teachers, and investigators. We have not attempted to produce the definitive treatment of defensive mutualisms and fully expect that more comprehensive treatments will follow this book. We have also not tried to guide the authors to write chapters that fit any central theses or hypotheses. Instead, we requested only that they cover well the biological systems that are the topics of their chapters with respect to the defensive mutualism theme.

To organize this book, we initially intended to classify mutualisms based on defensive properties, including anti-herbivory disease protection, abiotic stress tolerance, etc.; however, it soon became clear that it is difficult to find simple defensive mutualisms with single defensive effects. The majority of the defensive mutualisms that have been studied closely have multiple defensive effects on hosts. For example, clavicipitaceous grass endophytes may show protection from herbivory, diseases, and abiotic stresses. We also evaluated the idea of classifying mutualisms based on the habitat of the host species, a system that was particularly artificial. Finally, we organized this book by having an introductory chapter and a set of chapters providing an overview of the subject, followed by chapters that group the defensive mutualisms based simply on whether the microbial partner is prokaryotic or eukaryotic. A final part contains chapters on plant endophytes from the perspective of their use as a model for the study of microbial-based defensive mutualisms.

This book is an attempt to unify writings of diverse defensive mutualistic systems into a single work in order to permit the reader to assimilate and acquire a perspective on defensive mutualisms, particularly those involving microbial partners. It is our hope that this book will make a contribution by facilitating discussions of defensive mutualisms on a higher level or across disciplines, and will provide the information necessary to resolve some of the questions and uncertainties surrounding the concept of defensive mutualism.

**James F. White, Jr.
Mónica S. Torres**

REFERENCES

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- Janzen, D.H. 1977. Why fruits rots, seeds mold, and meat spoils. *The American Naturalist* 111:691–713.