

Preface

Microbial ecology is an exciting and growing discipline with broad interest and potential impacts. Our understanding of the many beautiful and detailed processes that are controlled all, or in part, by microorganisms is expanding daily. With that understanding has come an appreciation for things microbial. For many years, microbes got, at best, second billing to higher organisms when they were even mentioned and they had incredibly bad press. To most people all microbes, especially viruses and bacteria, were germs and as such something to eradicate. Through the dedicated efforts of numerous scientists a microbially dominated world has come into view. This new view shows a world where life as we know it could not exist without the processes and functions of these tiny organisms.

Over the years there have been a few microbial ecology textbooks that have been produced and used to greater or lesser extents. Writing a textbook on a subject that is growing rapidly is dangerous business. New material that is important will probably be published while the textbook is being readied for printing. Therefore, to be of value to the student, a textbook in microbial ecology must capture general concepts that can be used to understand what we have already discovered and all or most future microbial discoveries. To this end, in this textbook I have sought to present microbial ecology through the lens of evolutionary ecology. The principles of evolution and ecology have been, with varied success, applied to higher organisms but few if any attempts have been made to apply these concepts to microorganisms. However, these basic biological principles should help us understand various microbial strategies and predict others that may not be fully appreciated yet. In addition, microbes provide a unique tool for understanding basic evolutionary and ecological principles because of their relatively short generation times that allow thousands of generations to be reared and observed—a luxury not available to scientists who study higher organisms. The power of evolutionary and ecological theories also can be tested using the organisms that began all ecology and evolution. There is much to learn from these oldest of all creatures.

Microbial ecology from a taxonomic perspective is an incredibly broad topic. It includes most of the living diversity of the planet. While the textbook title suggests a very broad sweep through all of the microbes, including eukaryotes and prokaryotes, the actual presentation spends a greater proportion of time discussing bacterial evolutionary ecology. This bias is recognized and greater emphasis to other microbial

groups could be added in future additions if professors choose to use this approach (textbook) in their teaching microbial ecology.

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