

Preface

To me, mycology is not only a branch of biological science but also an acquired interest and passion. It has led me to cross the Pacific Ocean from China to Canada 27 years ago and later to the USA to pursue my professional dream. It was a long trip, full of challenges and sometimes doubts. When I was teaching plant pathology at Olds College in Alberta, I was very grateful to Olds College for offering me my first job in North America after my graduate studies and postdoctoral work. At the same time, I missed mycological research and assumed that mycology might have parted from me. During the pinnacle of public health concerns to indoor molds along with a mounting number of indoor mold-related litigations in the USA in the early 2000s, an industry job provided me an opportunity to return to mycology by working on indoor molds, most of which are microfungi. I have been working on microfungi and aeromycology ever since. This is one of the major reasons why the book was titled “Biology of Microfungi.”

The focus of this book is principally on covering the latest development of research on microfungi from both systematic and practical aspects. In a broad sense, Mesofungi were also covered. It is not an overstatement that microfungi are in our daily life, but we normally do not realize the presence of these microfungi. It is almost impossible and impractical for us to live a microfungi-free environment, whether we recognize it or not. Fungi are ubiquitous. Spores of microfungi are present in the air. We breathe them in and out all the time. Microfungi are both our friends and foes. Without microfungi, we would not be able to enjoy our bread, mantou (steamed bun), other baked food, fermented food, preserved food, alcoholic beverages (beer, wine, liquor, tequila, rice wine, etc.), and access to some modern medication, such as penicillin and cyclosporin, etc., which are secondary metabolites of microfungi. Microfungi have been directly used as medicinal herbs in Chinese medicine to treat various diseases for over 1000 years. A number of microfungi have been used as biocontrol agents to manage plant insects and diseases, such as *Trichoderma* spp., *Clonostachys rosea* (Link) Schroers et al. (\equiv *Gliocladium rosea* Bainier) for plant disease control, *Beauveria bassiana* (Bals.-Criv.) Vuill., and *Metarhizium anisopliae* (Metchnikoff) Sorokin for controlling insects. Without microfungi as decomposers, our planet would be buried by numerous mountains of

plant litter and nutrient flow/recycle in our ecosystem would be interrupted or even stopped. Without the microfungi of Glomeromycota to form arbuscular mycorrhizae, the host plants' adaptability to adverse environments would be significantly reduced and some may not even be able to survive. For these aspects, microfungi are our friends. On the negative aspects, some microfungi are pathogenic to humans, animals, or plants. Some microfungi, such as *Stachybotrys chartarum*, *Fusarium* spp., *Aspergillus flavus*, are able to produce mycotoxins, which are detrimental to the health of humans and animals. Microfungi, especially airborne fungal spores, can be allergens to some individuals. Thus, these microfungi are our foes. Some microfungi can be both beneficial and detrimental to human beings. For example, *Tilletia hordei*, *Ustilago crameri*, *Ustilago maydis* (DC.) Corda, and *Ustilago nuda* (C.N. Jensen) Rostrup cause smuts on a number of cereal crops and grasses, but they are used as medicinal remedies in Chinese medicine.

Have we fully explored the resources of microfungi? The answer is definitely NO.

This book is a collective effort of a team of mycologists who either contributed chapter(s) to this book or reviewed manuscripts to make this book possible. I am so fortunate that such a wonderful group of mycologists accepted my invitation and committed themselves and their time to contribute to this book. At the time of completing this book, I am very grateful to have had this opportunity to edit it. I have learnt so much from what the chapter authors have covered. However, any errors in the book are mine.

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Windsor, CT
Nanjing, Jiangsu, China

De-Wei Li
李德伟

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Li, D.-W. (Ed.)

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