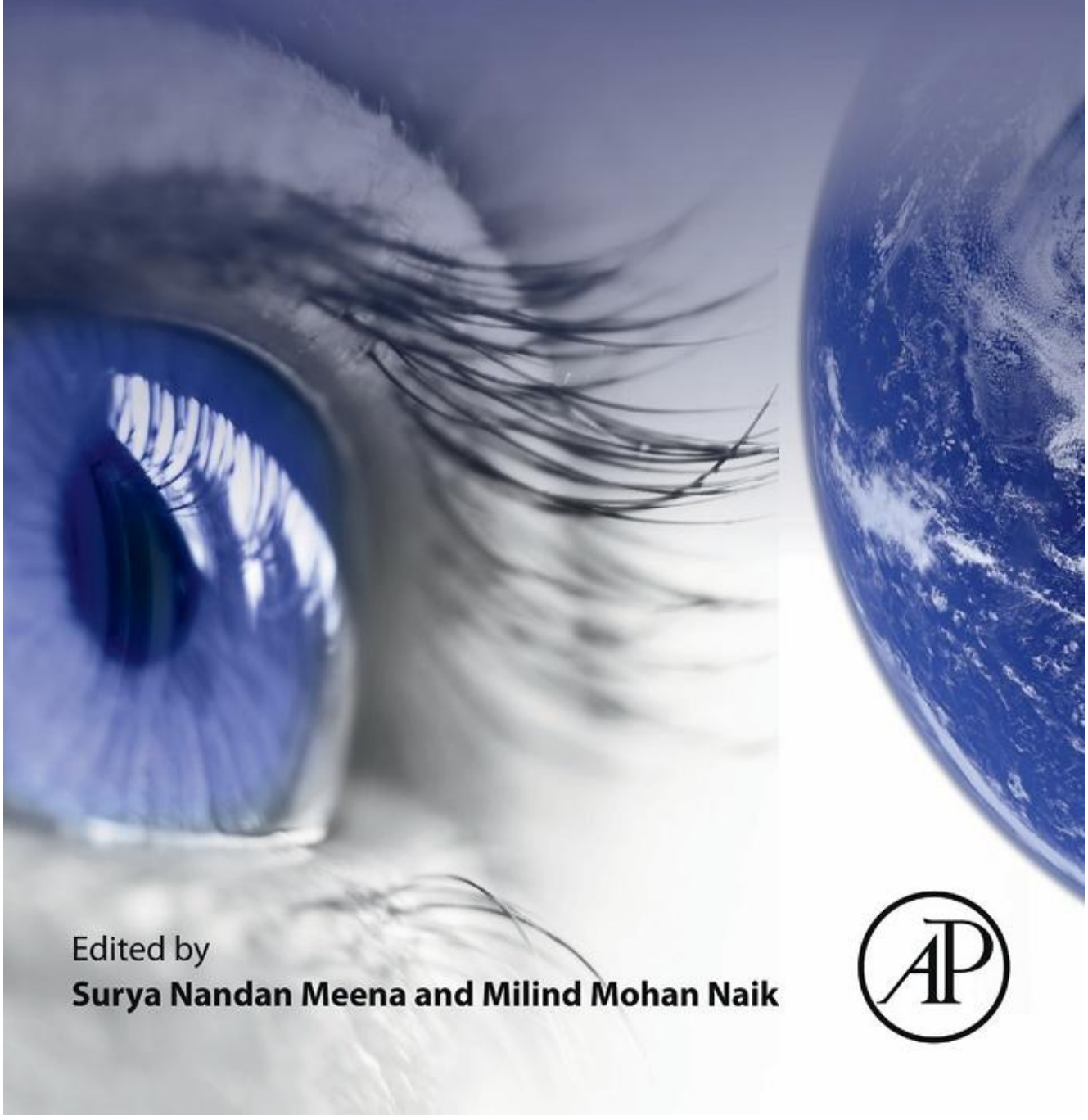
Advances in Biological Science Research

A Practical Approach



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Chapter 19

Advances in methods and practices of ectomycorrhizal research

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19.1 Introduction

Ectomycorrhizae (ECM), also termed as ectotrophic mycorrhizae, are the second most predominant type of mycorrhiza found in nature. A typical ectomycorrhizal root shows formation of characteristic features such as "mantle" and "hartig net." The fungal mantle, also known as the "sheath," is the clustering of fungal mycelia on the surface of the host root and the hartig net is the network of fungal hyphae formed between the epidermal or cortical cells of the host root without penetrating the root cells. From the mantle surface arise "rhizomorphs" that are hyphal strands interwoven to form bundles and these structures spread in the surrounding soil. In tropical forests, rhizomorph development can be prolific, sometimes traveling several meters away from the host root [1,2].

The ECM occur on about 6000 plant species that mainly include woody plants such as gymnosperms, angiosperms, and certain lower land plants such as hornworts and liverworts [3]. ECM association is found in most of the coniferous trees, including the Pinaceae family, in which all the species essentially form ECM. Other plant families commonly associating with ECM fungi include Betulaceae, Dipterocarpaceae, Fagaceae, Juglandaceae, Myrtaceae, and Salicaceae [2,4–6]. Over 20,000 fungal species are known to form ectomycorrhizae. The majority of ECM synthesizing fungi belong to classes Basidiomycetes and Ascomycetes that form fruiting bodies, like mushrooms, puffballs, coral fungi, toadstools, truffles, etc. [2,3]. The ECM fungi are classified based on their host range and the stage of the plant on which they appear. Some fungi have a narrow plant host range, such as *Boletus betulicola* forms mycorrhizae only with *Betula* species. Some fungi have a broad range, such as *Pisolithus tinctorius* that forms mycorrhiza with

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