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## Book Review

SUMMERBELL R. C., CURRAH R. S. and SIGLER L. (eds.)

**The Missing Lineages. Phylogeny and ecology of endophytic and other enigmatic root-associated fungi.**

In: Studies in Mycology, vol. 53. Centraalbureau voor Schimmelcultures, Utrecht, The Netherlands, 2005, vi + 262 pp. – ISBN-10: 9070351-58-7, ISBN-13: 987-90-798979870351-58-8, Price € 65. The book is available in library of the Czech Scientific Society for Mycology.

This volume of Studies in Mycology is composed of a preface and eleven papers written by world specialists and their collaborators. It focuses on problematic fungi associated with roots (mycorrhizal, endophytic or rhizospheric fungi). The articles provide new and interesting information concerning the mentioned fungal groups and are of high quality, for which this journal is well-known. The first six articles solve taxonomic problems, the seventh to ninth papers are concerned with ecological questions and the last contribution is a review.

The authors of the first paper describe the new anamorphic genus *Meliniomyces* and three species belonging to this genus from roots of ericoid plant and trees. These newly recognised species create white to grey colonies, lack conidia and chlamydospores, and their teleomorphs are unknown. The genus belongs to the *Hymenoscyphus ericae* aggregate.

The new anamorphic genus *Leohumicola* producing lateral and terminal aleurioconidia and isolated especially from soil exposed to high temperatures is described in the second paper. It is similar in morphology to the genera *Humicola*, *Trichocladium* and *Thermomyces*. A molecular-genetic study however shows that the genus *Leohumicola* is a monophyletic group and a SSU ribosomal sequences analysis revealed that *Leohumicola* (Leotiomycetes) is not related to *Humicola*, *Trichocladium* (Sordariomycetes) or *Thermomyces* (Eurotiomycetes). A dichotomous key enables the identification of species of the described genus based on morphological and physiological (growth rate) features.

Two new *Cryptosporiopsis* species (*C. ericae* and *C. brunnea*) from ericaceous plants from North America are described in the third paper. In comparison with *C. radicicola* and *C. rhizophila*, which occur very frequently in roots of host plants in Europe, the new species have been recorded very rarely. According to molecular-genetic data one of them, *C. brunnea*, is more related to *C. radicicola* living in oak roots than to *C. rhizophila* living in roots of ericaceous plants in Europe.

Three articles are devoted to the problems of the anamorphic genus *Oidiodendron*. In the first of them, cultivation on cereal agar covered by a cellophane membrane was found to be useful to distinguish *O. maius* from selected other *Oidiodendron* species. The results of this cultivation method was compared with and supported by results obtained from analyses of the ITS region. The species *O. maius* and *O. citrinum*, *O. griseum* and *O. flavum*, and *O. truncatum* were recognised as different groups.

A new species from the genus *Oidiodendron* named *O. fimicola*, close to the species *O. flavum*, is described in the fifth article. The new taxon was recognised in a study of morphological and physiological features. The physiological features were obtained by using the Biolog FF system and compared with features of 40 strains of 18 related species.

A survey of *Oidiodendron* species based on morphological and physiological features is given in the next paper. Molecular-genetic methods were not used in this study. Two species (*O. robustum* and *O. terrestre*) were excluded from this genus on the basis of their morphology. Synoptic and dichotomous keys to the identification of the 23 *Oidiodendron* species are presented.

The distribution of root endophytes and mycorrhizosphere fungi living in the environment of *Picea mariana* roots from four boreal forest sites (undisturbed forest, recently regenerated forest, clear-cut site and open peat bog with spruce roots) were investigated by the author of the seventh paper. Differ-

ences in composition of the investigated mycobiota between the investigated sites were recorded. *Phialocephala fortinii* and *Meliniomyces variabilis* were the most frequently occurring taxa.

The eighth article deals with the diversity of root endophytes in *Deschampsia flexuosa* (grass) and ericaceous plants. The phylogenetic relatedness of the isolated helotialean fungi and their effect on nitrogen uptake was investigated. Arbuscular mycorrhizal fungi were recorded much more frequently than *Phialocephala fortinii*-like fungi in *Deschampsia flexuosa*. The *Phialocephala fortinii*-like fungi, *Cryptosporiopsis* spp., were dominant taxa of the roots of the investigated ericaceous plants. Nitrogen uptake increased in roots colonised by *Helotiales*.

The following paper replies to the question whether the same mycorrhizal fungi are utilised as a carbon source by young seedlings of orchids and by adult orchids. This association was investigated on the rare American orchid *Platanthera leucophaea* and its fungal symbiont *Ceratorhiza goodyeraerepentis*. It was found that this fungal species is associated with both stages of the orchid. The result is important for the conservation of this rare plant species.

The tenth article reviews the recent knowledge on dark septate endophytes (DSE), which live in roots and are badly known in comparison to arbuscular mycorrhizal fungi and ectomycorrhizal fungi. The paper evaluates the abundance of DSE in various ecosystems and functions of DSE in natural ecosystems.

The last paper does not provide original new data, but summarises the research into endophytic, rhizospheric and other saprophytic fungi associated with ectomycorrhizal roots before 1985, when science started to be more international. It shows the main topics of microbiological and mycological studies of the mycorrhizosphere carried out before 1985.

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