

Book Reviews

Sung G.-H., Hywel-Jones N. L., Sung J.-M., Luangsa-ard J. J., Shrestha B. & Spatafora J. W. (2007). Phylogenetic classification of *Cordyceps* and the clavicipitaceous fungi. – *Studies in Mycology* 57: 63 pp.

In this issue of *Studies in Mycology* (SIM) a revised taxonomy of the ecologically and economically important genus *Cordyceps* and the clavicipitaceous ascomycetes is presented. The hitherto used systematic classification was completely revised based on a five- to seven-gene phylogeny of 162 species of clavicipitaceous fungi. The results of the DNA work reject a monophyly of the genus *Cordyceps* within the Hypocreales but give evidence of three monophyletic clades within the Clavicipitaceae. The authors describe one new family (Ophiocordycipitaceae), two new genera (*Elaphocordyceps*, *Metacordyceps*), and two new species (*Metacordyceps yongmunensis*, *Ophiocordyceps communis*). Besides these taxonomic novelties more than 160 species are newly combined. Three clavicipitaceous clades containing members of the genus *Cordyceps* are supported by the molecular findings. The authors present a detailed discussion about the morphological characters of the teleomorphic state supporting the molecular taxonomy, and consequently propose a revised taxonomy based on three families: Clavicipitaceae *sensu stricto*, Cordycipitaceae, and Ophiocordycipitaceae. To establish a new taxonomy, the results of the molecular work were compared not only to the morphological characteristics of the teleomorph, but also to the anamorphic stages. Based on this broad data set, the authors propose that texture, pigmentation, and morphology of the stromata, the anamorphic state, and ecological preferences are useful characters to support a realistic interpretation of molecular taxonomy's results. This exhaustive discussion is supplemented by a taxonomic overview of all species examined and a list of *Cordyceps* species which were not discussed in this work. To top off this extensive study on the taxonomy of *Cordyceps*, a dichotomous key for all discussed genera is provided at the end of the book.

As usual, this issue of SIM is illustrated by excellent figures, many of them in colour. The extensive molecular data in combination with the results of the comprehensive morphological observations result in an excellent description of the new taxonomic units. The combination of available genotypic, phenotypic and ecological data makes this issue of SIM a must for all mycologists working with this interesting group of the Hypocreales.

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Crous W. P. *et al.* (2007). The genus *Cladosporium* and similar dematiaceous hyphomycetes. – *Studies in Mycology* 58: 253 pp.

The reviewed volume 58 of *Studies in Mycology* (SIM) is dedicated to G. de Vries – and the involved authors did justice to this dedication. The aims of this SIM named in the preface where, to circumscribe the addressed genera, and to create a

tool for identification of similar looking organisms by morphological characters as well as by molecular data. Also the basis for a DNA-dependent online key should be laid. For that purpose the complicated nomenclatural history of *Cladosporium* and allied genera was reviewed in a clear manner. Again, this book gave an opportunity to discuss the handling of anamorph genera with the question “How natural should anamorph genera be?” (Gams W., 1995). The authors plead for the conservation of the artificial system of anamorph genera, even though they may be polyphyletic. In this concern they chose an accurate way, as the binomials of anamorphic fungi were inferred to describe a phenotype without necessarily referring to teleomorphs and their phylogenetic relatedness.

This volume consists of 9 articles, all of them revising several groups of *Cladosporium*-like fungi and related teleomorphs. Each article is backed up by phylogenetic analyses, mostly based upon ribosomal gene sequences (LSU), but also multilocus sequence typing (MLST) was inferred based on analyses of five loci. Thus, the phylogeny and anamorph-teleomorph relations for the treated groups were enlightened. The systematic entities were described in detail, keys are provided, and micrographs and drawings of very high quality underline the demanded comprehensive approach. The articles comprise tremendous numbers of taxonomic novelties and new combinations as well as systematic reorganisations. All of them focus not only on morphologic characters and phylogenetic analyses, but also on questions regarding applied research. Innovative approaches in mycology were set successfully with the calculation of populations and interactions for the *Cladosporium herbarum* and *Cladophialophora carrionii* complexes. The latter was combined with a trendsetting experimental-ecological work on the distribution of this human pathogen, which could be adopted for similar questions in future.

Altogether *Studies in Mycology* Vol. 58 enqueues in the series with the potential to become a standard work for taxonomic/systematic research and identification of *Cladosporium*-like fungi and their teleomorphs.

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Samson R. A., Varga J. (2007). *Aspergillus* systematics in the genomic era. – *Studies in Mycology* 59: 206 pp.

Shortly before passing this issue of *Sydowia* to press the new “*Studies in Mycology* 59” arrived at the editorial office. Skimming over the table of contents made clear that we should not delay the review of this book to the next issue of *Sydowia*. There is no doubt that *Aspergillus* is among the most important fungal genera in medicine, biotechnology and agriculture. Every step towards a consensus in species recognition will be welcome in the mycological community. “*Aspergillus* systematics in the genomic era” was the title of an international workshop at the CBS Fungal Biodiversity Centre in Utrecht, The Netherlands in 2007. This issue of *Studies in Mycology* (SIM) is a summary of the presentations and discussions of the workshop. In several articles species concepts and problems in species recognition, as well as species delimitation are discussed. Most welcome, the discussions result in concrete recommendations for a contemporary species concept in *Aspergillus* and for describing new taxa and their teleomorphs. The polyphasic approach in *Aspergillus* taxonomy preached in the first articles is excellently realised in monographs of the sections *Candidi*, *Clavati*, *Usti*, *Nigri*, and *Fumigati* and *Neosartorya*. The comprehensive descriptions of the species are completed by excellent

illustrations of morphological characters. This issue of SIM is a must for mycologists, biotechnologists, and medical scientists coming in touch with *Aspergillus*.

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Gröger F. (2006) Bestimmungsschlüssel für Blätterpilze und Röhrlinge in Europa. Teil I. Regensburger Mykologische Schriften Band 13. Bresinsky E. & Besl H. (Eds.) Verlag der Regensburgische Botanische Gesellschaft von 1790 e.v. Regensburg. ISSN 0944-2820. 638 pp.

This paperback is a very valuable and useful dichotomous key to the European agarics and boletes with white to pale (cream, yellow, red) spore print. As indicated by "Teil I" on the title, this is the first volume of a series of keys. The forthcoming volume will focus on fungi with darker spore print and Russulales. (The key to the genera in the present volume also includes *Russula* and *Lactarius*, but they are not further treated in it) A main key leads to 10 genus keys and three additional keys ("Hilfsschlüssel"). Keys first use macroscopical characters (including colour of spore print), and then continue based on microscopical characters. Thus, it is not possible to identify fungi on genus level without using a microscope. The key is quite straight forward, and provides good rates of success also to beginners in mycology. The numerous explanatory notes and references to closely related taxa are very useful.

The "classical" mycologist needs to get used to the organization of the key, as alternatives of one question (e.g. 11A and 11B) are not consecutive, but can even be on different pages. Genus names are usually provided in Latin and in German. Each genus has a consecutive number, which can be found throughout the book as header. I personally would have loved to also find a page number referring to the respective genus.

Eighty-three genera of Boletaceae, Paxillaceae, Gomphidiaceae, Hygrophoraceae, Pleurotaceae, Tricholomataceae and Entolomataceae are critically treated. As far as available, genus concepts follow recent monographic treatments, e.g. including *Gymnopus*, or treating *Camarophyllus* as part of *Hygrocybe*. The keys to the species of a genus are based on the current state of the art. After the genus name and synonyms, brief annotations introduce the mycologist to the genus, to nomenclatural/systematical problems, and provide the modern literature the genus key is based on.

All genus keys are based on the most recent literature; therefore the keys include a number of new taxa, and also provide names of taxa which were synonymised recently. Keys to the species are usually easy to understand, formulations are clear, and questioning is usually symmetrical and user-friendly. Latin species names are provided with correct authorities. Species descriptions are usually short, but the annotations provide good additional information concerning pictures, descriptions, synonyms, and closely related species. In these sections, the high number of abbreviations used often provides a challenge for the user.

An abbreviation list is provided at the beginning; mostly self-explanatory abbreviations were used. Six pages of references cite the literature used for this key, however, literature (including recent monographs) specifically used for keying out a genus is provided after the diagnosis of the respective genus. In the glossary

the most important terms for mycologically relevant structures and chemical reactions are explained. Seven, sometimes overloaded pages of not very nicely drawn figures explain the terms used in the glossary, keys and descriptions. The alphabetical index includes Latin genus and species epithets; however no index for the German names is given.

All together, this is a very valuable contribution to mycology: it is easy to use, and thus an important tool enabling passionate beginning mycologists to identify mushrooms (with white to red spore print) based on one book only. Experienced mycologists benefit from the inclusion of new species/synonymies and new genus concepts. Maybe, based on this book, a number of mycologists will learn German. The enormous amount of new knowledge in the field of mycology during the last 20 years is also reflected in the amount of pages of this book. Earlier keys to Agarics and Boletes (Moser 1985, Horak 2005) treated Agaricales, Boletales and Russulales on about the same number of pages. If Gröger carries on with this concept, at least four volumes will be necessary to key out the four above-mentioned groups.

‘Nobody is perfect’, also this key is not. But it is a very valuable contribution to mycology, and a very impressive output for a single author.

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