

## Book Review

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### Black fungal extremes

Studies in Mycology 61, 2008, 198 p., CBS Fungal Biodiversity Centre, Utrecht, The Netherlands. – ISBN 978-90-70351-73-1, ISSN 0166-0616. Price 60 €.

The book comprises altogether 18 papers originating from workshops organized by the “Black Yeasts” and “Chromoblastomycosis” working groups in 2006 and 2007 under auspices of the International Society for Human and Animal Mycology (ISHAM). The author teams are mostly international, coming from The Netherlands, Spain, Germany, Austria, Slovenia, Switzerland, Italy, Russia, Iran, China, Thailand, Canada, USA, Mexico, and Brazil.

The book treats “dematiaceous fungi”, i.e. hyphomycetes producing melanin pigments. Melanins provide protection from environmental stress factors and they also play a role in virulence of human- and phytopathogenic fungi. The book therefore covers several aspects of the two main topics: extremotolerant black fungi in natural habitats and black fungi of medical importance. Both topics currently belong to prominent mycological subjects and are often closely linked.

Papers focusing on black fungi in a natural environment include e.g. a study on new extremophilic fungi found in the Antarctic (*Recurvomyces*, *Elasticomyces*, and *Acidomyces*). In another paper, *Aureobasidium pullulans* is redefined based on multilocus molecular analysis of a strain from the Arctic and strains originated globally. The authors describe two new varieties: *A. pullulans* var. *subglaciale* from subglacial ice in Spitsbergen, and *A. pullulans* var. *namibiae* from dolomitic marble in Namibia. A further paper presents a phylogenetic study of black fungi associated with lichens, mainly from arid habitats in Armenia. It was found that *Capnobotryella*, *Cladophialophora*, *Coniosporium*, *Mycosphaerella*, and *Rhinocladiella* are opportunistic colonisators of lichens (e.g. *Caloplaca*, *Protoparmeliopsis*, *Xanthoria*) without showing pathogenic symptoms.

Several papers are centred on the study of adaptations of black fungi to stress environmental factors. For example, Slovenian authors studied genes related with salt tolerance of *Aureobasidium pullulans*. They found three novel genes encoding fatty-acid modifying enzymes (desaturases, elongase). Another paper deals with halophilic fungi isolated from saltens, and the influence of environmental salinity on reductase, which acts in sterol biosynthesis. One paper presents the black yeast *Hortaea werneckii* and its adaptation from a molecular point of view. This fungus, dominant in hypersaline waters, appears to be a promising source of transgenes for osmotolerance improvement of industrially important organisms. Results of an investigation into melanin pigment biosynthesis are presented by Russian specialists. Another paper deals with the melanised rock-inhabiting fungus *Sarcinomyces petricola* and its cellular responses to desiccation and subsequent rehydration. Subsequent paper overlaps mycology by tending to astrobiology. It presents a study of the resistance of Antarctic black fungi and cryptoendolithic communities to simulated space and Martian conditions. A paper treating biotransformations presents results of a biochemical study dealing with the acidotolerant black yeast *Exophiala oligosperma* R1 and its ability to utilise various organic nitriles. To isolate chaetothyrialean black yeasts from the environment the oil flotation isolation technique is suitable. It was tested which mechanisms (oligotrophism, hydrophobicity or assimilation) play a role in this isolation methods.

Medical aspects of black fungi are presented in several papers. One of these papers is focused on *Hortaea werneckii*, a fungus causing superficial mycosis, tinea nigra, especially in the tropics. Chinese and European specialists studied the cell division cycle gene (CDC42) in members of *Chaetothyriales* and its putative role as a virulence factor involved in the invasive phase in chromoblastomycosis. Another study is focused on isolation of potential agents of chromoblastomycosis from the environment

## BOOK REVIEW

in Brazil. However, molecular analyses proved that most environmental strains differed from the clinical strains, although they showed similar morphology and belong to *Chaetothyriales*, too. Other authors studied the life cycle of *Exophiala dermatitidis*, an agent of neurotropic infections in humans, especially in Asia. They also searched for natural habitats of this human pathogen and found positive samples predominantly on railway ties contaminated by human faeces and oily debris, and in a minor extent faeces of frugivorous birds and bats.

Several papers comprise aspects of medical and environmental mycology. For example, an international team discovered the fungal ancestors of pathogen-rich lineages among melanised fungi (*Chaetothyriales*) inhabiting inhospitable rock surfaces. Chinese and European mycologists described a new black fungus from skin lesion, *Coniosporium epidermidis* (*Chaetothyriales*). Noteworthy, the species is in the lineage involving both rock inhabitants and human pathogens. Found on humans it can be either asymptomatic or symptomatic. The set of papers is crowned by a paper on the biodiversity of the genus *Cladophialophora*. It is a genus comprising clinically important species as well as environmental taxa. The authors combined morphological and multilocus phylogenetic analyses and described four new species originating from infected patients and environmental samples.

The book is completed with an index. The individual papers are abundantly documented by clades, superior photographs of fungi, schemes, tables, and diagrams. This publication is a successful follow-up of related publications in *Studies in Mycology*, e.g. books on *Cladosporium* and on fungi under extreme conditions. Just as the cited works, the present book is freely accessible on the internet.

The book provides a huge amount of data on black fungi from many points of view. Thus it is of great interest to all those who are seeking new information in mycology, human pathogens, ecology of extreme habitats, taxonomy a phylogeny, biochemistry, etc.

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