



Notes, outline and divergence times of Basidiomycota

Mao-Qiang He^{1,2,3} · Rui-Lin Zhao^{1,4} · Kevin D. Hyde³ · Dominik Begerow⁵ · Martin Kemler⁵ · Andrey Yurkov⁶ · Eric H. C. McKenzie⁷ · Olivier Raspé^{8,9} · Makoto Kakishima¹⁰ · Santiago Sánchez-Ramírez¹¹ · Else C. Vellinga¹² · Roy Halling¹³ · Viktor Papp¹⁴ · Ivan V. Zmitrovich¹⁵ · Bart Buyck¹⁶ · Damien Ertz^{8,9} · Nalin N. Wijayawardene³ · Bao-Kai Cui¹⁷ · Nathan Schouteten¹⁸ · Xin-Zhan Liu¹ · Tai-Hui Li¹⁹ · Yi-Jian Yao¹ · Xin-Yu Zhu^{1,3} · An-Qi Liu¹ · Guo-Jie Li¹ · Ming-Zhe Zhang¹ · Zhi-Lin Ling¹ · Bin Cao¹ · Vladimír Antonín²⁰ · Teun Boekhout^{21,22} · Bianca Denise Barbosa da Silva²³ · Eske De Crop¹⁸ · Cony Decock²⁴ · Bálint Dima²⁵ · Arun Kumar Dutta²⁶ · Jack W. Fell²⁷ · József Geml²⁸ · Masoomeh Ghobad-Nejjad²⁹ · Admir J. Giachini³⁰ · Tatiana B. Gibertoni³¹ · Sergio P. Gorjón³² · Danny Haelewaters^{33,34} · Shuang-Hui He¹⁷ · Brendan P. Hodkinson³⁵ · Egon Horak³⁶ · Tamotsu Hoshino³⁷ · Alfredo Justo³⁸ · Young Woon Lim³⁹ · Nelson Menolli Jr.^{40,41} · Armin Mešić⁴² · Jean-Marc Moncalvo^{43,44} · Gregory M. Mueller⁴⁵ · László G. Nagy⁴⁶ · R. Henrik Nilsson⁴⁷ · Machiel Noordeloos⁴⁸ · Jorinde Nuytinck⁴⁸ · Takamichi Orihara⁴⁹ · Cheewangkoon Ratchadawan² · Mario Rajchenberg^{50,51} · Alexandre G. S. Silva-Filho⁵² · Marcelo Aloisio Sulzbacher⁵³ · Zdenko Tkalčec⁴² · Ricardo Valenzuela⁵⁴ · Annemieke Verbeken¹⁸ · Alfredo Vizzini⁵⁵ · Felipe Wartchow⁵⁶ · Tie-Zheng Wei¹ · Michael Weiß^{57,58} · Chang-Lin Zhao⁵⁹ · Paul M. Kirk⁶⁰

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Abstract

The Basidiomycota constitutes a major phylum of the kingdom Fungi and is second in species numbers to the Ascomycota. The present work provides an overview of all validly published, currently used basidiomycete genera to date in a single document. An outline of all genera of Basidiomycota is provided, which includes 1928 currently used genera names, with 1263 synonyms, which are distributed in 241 families, 68 orders, 18 classes and four subphyla. We provide brief notes for each accepted genus including information on classification, number of accepted species, type species, life mode, habitat, distribution, and sequence information. Furthermore, three phylogenetic analyses with combined LSU, SSU, 5.8s, rpb1, rpb2, and ef1 datasets for the subphyla Agaricomycotina, Pucciniomycotina and Ustilaginomycotina are conducted, respectively. Divergence time estimates are provided to the family level with 632 species from 62 orders, 168 families and 605 genera. Our study indicates that the divergence times of the subphyla in Basidiomycota are 406–430 Mya, classes are 211–383 Mya, and orders are 99–323 Mya, which are largely consistent with previous studies. In this study, all phylogenetically supported families were dated, with the families of Agaricomycotina diverging from 27–178 Mya, Pucciniomycotina from 85–222 Mya, and Ustilaginomycotina from 79–177 Mya. Divergence times as additional criterion in ranking provide additional evidence to resolve taxonomic problems in the Basidiomycota taxonomic system, and also provide a better understanding of their phylogeny and evolution.

Keywords Classification · Molecular clock · Fungi · Systematics · Taxonomy

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✉ Rui-Lin Zhao
zhaorl@im.ac.cn

Extended author information available on the last page of the article

Introduction

The *Outlines of the Fungi* provide essential taxonomic information which are easy to use by workers in various disciplines incorporating mycological fields (Wijayawardene et al. 2017, 2018a, b). In the Kingdom Fungi, the phyla Ascomycota and Basidiomycota cover around 97% of all fungal species (Willis 2018). Wijayawardene et al.