Syllabus of Plant Families - A. Engler’s Syllabus der Pflanzenfamilien Part 1/2:

*Ascomycota*

Ed.: Walter Jaklitsch; Hans-Otto Baral; Robert Lücking; H. Thorsten Lumbsch; Wolfgang Frey

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Part 1/2 of Engler's Syllabus of Plant Families – Ascomycota provides a thorough treatise of the world-wide morphological and molecular diversity of the fungal phylum Ascomycota. The Ascomycota (including lichenized forms) are the most diverse group of fungi, with a fascinating range of morphological and biological variation, distributed from the arctic tundra and subantarctic vegetation formations, to tropical rainforests and semi-deserts, to freshwater and marine ecosystems. The present volume is an updated synthesis of classical anatomical-morphological characters with modern molecular data, incorporating numerous new discoveries made during the last ten years, providing a comprehensive modern survey covering all families and genera of the Ascomycota including detailed family descriptions.

While the Fungi are not part of the Plant Kingdom, they are formally included within the classic Engler's title "Syllabus der Pflanzenfamilien / Syllabus of Plant Families", which comprised families of blue-green algae, algae, fungi, lichens, ferns, gymnosperms and flowering plants. Engler’s Syllabus of Plant Families has since its first publication in 1887 aimed to provide both the researcher, and particularly the student with a concise survey of the plant kingdom as a whole, presenting all higher systematic units right down to families and genera of plants and fungi. In 1954, more than 60 years ago, the 12th edition of the well-known „Syllabus der Pflanzenfamilien“ ("Syllabus of Plant Families"), set a standard.

Now, the completely restructured and revised 13th edition of Engler’s Syllabus published in 5 parts and in English language for the first time also considers molecular data, which have only recently become available in order to provide an up-to-date evolutionary and systematic overview of the plant and fungal groups treated.

In our “molecular times” there is a vitally important and growing need to preserve the knowledge of the entire range of diversity and biology of organisms for coming generations, as there is a decline in "classical" morphological and taxonomical expertise, especially for less popular (showy) groups of organisms.

Accordingly, the 13th edition of Syllabus of Plant Families synthesizes both modern data and classical expertise, serving to educate future experts who will maintain our knowledge of the full range of Earth’s biodiversity.

Syllabus of Plant Families is a mandatory reference for students, experts and researchers from all fields of biological sciences, particularly botany.

**Book Review: IMA Fungus vol. 7 no. 1**

Engler’s Syllabus der Planzenfamilien is one of the classic botanical reference works, the first edition of which appeared in 1892 and the 12th in 1954. The first volumes of the 13th edition started to appear in 2009, and are in English unlike all earlier editions. If one can shake off the distaste of a major work on fungi appearing in such a series today, this volume on the Ascomycota has to be recognized as by far the most important overview of the phylum to have appeared this century, fleshing-out the latest “Outline of Ascomycota – 2009” (Lumbsch & Huhndorf 2010). This volume is essentially a systematic arrangement which includes descriptions of higher taxa now recognized down to and including that of family, with lists of accepted generic names (with selected synonyms) under each family name. Estimates of species numbers are given from genera upwards, explanatory notes are added where appropriate, and key references are cited. The descriptions at all ranks are much more detailed than the diagnostic ones in Kirk et al. (2008), and more conveniently placed in their systematic position rather than alphabetically, greatly facilitating comparisons.

The volume has been compiled at a time when, with the end of dual nomenclature in 2011, the process of incorporating generic names typified by assexually typified species into a single system is in progress and incomplete; this must be borne in mind when looking for particular genera.

The authors have, however, endeavoured to cover the literature up to the end of 2014, with some works from 2015 weaseled in. As I know from personal experience in preparing editions of the "Outline" and the Dictionary of the Fungi, it is necessary to be practical and use a system termed here as a “pragmatic compromise, in this case between a conventional, morphology-based system and a phylogenetic system based on molecular data” (p. 8). In many cases, molecular data are lacking, and decisions on placements have still to be based on morphology. Molecular data do not, however, always result in neat pigeonholing, and phylogenetic trees can change as more taxa are included, but at least the Ascomycota backbone appears to be increasingly stable, with only one new class added in recent years (Archeoarthizomycetes). Specialists will have their own views on the detailed arrangements adopted, and it would be trite to be critical of particular decisions here. The key point is that here we have an updated overall system for the phylum, backed by descriptions, that can be commended for general use.

Three subphyla are accepted (Pezizomycotina, Saccharomycotina, and Taphrinomycotina), 17 classes, 97 orders, 406 families, and about 6 100 genera; together totaling about 57 000 species). The largest class is Lecanoromycetes (ca 14 900 species, followed by Sordariomycetes) ca
In 2009, Wolfgang Frey started with the edition of the 13th edition of Adolf Engler’s famous survey of the plant kingdom „Sylabus der Pflanzenfamilien/Syllabus of Plant Families“, for the first time in English. Although fungi are no longer part of the Plant Kingdom, they are included traditionally and formally with the classic Engler’s title. The first volume of the new edition published was Part 3 “Bryophytes and seedless Vascular Plants” (ferns and fern allies), followed in 2012 by Part 1/1 “Blue-green Algae, Myxomycetes and Myxomycetelike organisms, Phytoparasitic protists, Heterotrophic Heterokontobionta and Fungi p.p.” in 2015 by Part 2/1 “Eucaryotic Algae (Glaucobionta, Heterokontobionta p.p. (Cryptophyta, Dinophyta, Haptophyta, Heterokontphyta), Chlorarachniophyta, Euglenophyta, Chlorophyta, Streptophyta p.p. (except Rhodophyta)" and Part 4 “Pinopsida (Gymnosperms), Magnoliopsida (Angiosperms) p.p., Subclass Magnoliidae [Acorales to Asparagales]”. Now, 2016, part 1/2 “Ascomycota” is published, the most diverse group of fungi, distributed from the arctic and subarctic vegetation formations to tropical rainforests and semi-deserts, to freshwater and marine ecosystems. This volume indicates that it is possible to bring the new edition soon to an end. Missing parts include Part 1/3 “Basidiomycota”, Part 2/2 “Rhodobionta” and Part 5 “Seed Plants, Sporophytes, Angiosperms p.p., Rosidae”.


Most obvious on a first look for non-fungal specialists: the systematics of the Ascomycota has changed dramatically when compared to former textbook classification a decade ago. The phylum now contains three subphyla, the Taphrinomycotina, the Saccharomycotina, and the Pezizomycotina with a total of 18 formally recognized classes.

Responsible are phylogenetic revisions based on DNA sequence data which have become available recently and which have revolutionized the systematic classification at higher level dramatically, leading to a new understanding of fungal evolution and species delimitation. The systematic arrangement followed, therefore reflects the current state of understanding of the Ascomycota and provides an updated synthesis of classical anatomical-morphological characters and modern molecular data.

The text consist of six chapters: 1 Introduction, 2 Ascomycota (including introduction, characterization and systematic arrangement), 3 Synopsis of classification of the Ascomycota, 4 Systematic arrangement of the Ascomycota, 5 Taxonomic novelties, 6 Appendix. It is completed by 17 coloured plates with 149 photos (habit, details) of almost high quality. They give a first impression of the various taxa treated. Chapter 2 presents an excellent summary of the characters of the taxa of the phylum (sexual reproduction, asexual reproduction, ecology and distribution, evolution, importance and uses) and give valuable hints for a further reading (references).

The classes and all further taxa of Chapter 4 (main part) are arranged in alphabetical order. The total number of families is 406 (plus an additional 10 lineages at present not formally named), with approx. 6100 genera. Detailed descriptions for all families with estimates of species numbers at the family and genus level are given additionally (when possible).

Taxonomic novelties include the Thelocarpales Lücking & Lumbsch ord. nov. and Vezdaeales Lumbsch & Lücking ord. nov. Volume 1/2 of the new ‘Engler’s Syllabus of Plant Families’ – as the previous published volumes – is a well done, well based and solid book. It represents an outstanding and modern, up-to-date synopsis of the Ascomycota and include an informative and well based summary on the different fungal lineages and the phylogenetic reconstruction that will serve as a prime reference for a long time. It is an important step towards a solid familiar and generic re-arrangement of the taxa for even less popular groups of organisms. This volume quickly will become an essential work in any library. It is an extremely handy source and a basic treatment for finding the most up-to-date classification, number of families, genera and further references, and most valuable for students, botanists, ecologists and researchers, interested in fungi (incl. lichens) diversity.

Harald Küsterschneider (Berlin)
Herzogia 29 (1), 2016


The authors are well aware of the difficulty in producing such a comprehensive work when the classification of fungi, as well as that of other organisms, is undergoing such a rapid and widespread change as a result of the accumulation of data from molecular sequencing. Thus, they view this as nothing like the final word, rather as a snapshot of a work in progress. In the Preface, the editor of the series (Frey) describes the new edition of the Syllabus as “Following the tradition of Engler, and incorporating the latest results from molecular phylogenetics and phylogenomics, this completely restructured and revised 13th edition provides an up-to-date evolutionary and systematic overview of the fungal and plant groups.” The authors of this part further state that “phylogenetic revisions have revolutionized the systematic classification of taxa from phylum to species level and a new understanding of fungal evolution and species delimitation has emerged. These new insights are here treated in an integrated context of morphological and molecular data, providing an up-to-date synopsis of this phylum while acknowledging that the systematic classification of this group of Fungi is not yet fully settled.”

Be forewarned, this is not an enthralling page-turner. It is a reference work that will sit on your shelf until you need to learn something about an ascomycete whose name you have encountered for the first time or find out who is thought to be close cousin of whom. Following a one-page introduction, Chapter 2 provides a succinct summary of the phylum, Ascomycota, its modes of reproduction, ecology and distribution, evolution, and importance to humans. Chapter 3 consists of a 14-page synopsis of the classification of the Ascomycota. Chapter 4 makes up the bulk of the book (more below), Chapter 5 gives us two new order names, and Chapter 6 slips in some late additions and updates. An index to taxa completes the book.

Following the outline provided in Chapter 3, Chapter 4 cycles through the subphyla, classes, orders, and families, providing brief descriptions of each taxon, numbers of genera in each family, often numbers of species in each genus, and reference citations (there is a huge number of them). Other than for the three subphyla (Taphrinomycotina, Saccharomycotina, and Pezizomycotina), the entries are arranged alphabetically. Scattered throughout the book are 8 line drawings, mostly of life cycles, and 16 color plates. Fifteen of the plates consist of multiple images (8–12) of macroscopic or microscopic features. They are mostly of high quality and my only reservation is that, in some cases, providing a close-up of a small feature prevents one from getting a picture of the whole organism or fruiting body. This book will be a necessity for anyone making a serious study of the ascomycetes and will no doubt find a place in most university mycology labs and libraries. Although it could well come in handy for many folks, the price is likely to prevent it from finding its way into the personal libraries of most amateur mycologists.

Steve Trudell
FUNGI Volume 9:3 Fall 2016

Besp.: Lauterbornia 83 (2017)


Herausgeber
Lauterbornia 83 (2017)
Some lichenologists may be surprised by a work which includes a volume on lichenized and non-lichenized Ascomycota in its 13th edition that they may not have heard much about before. However, so-called cryptograms have been included in this work for more than 100 years due to the famous botanist, Adolf Engler, Director of the Berlin Botanical Garden and Museum, who wrote a single volume himself which included all fungi (with lichens) on only 21 pages. It started in 1892 with a slightly different title and soon became a standard text with new editions every few years, the 6th edition appearing with minor alterations in 1909. The 7th edition in 1912 saw the inclusion of illustrations and therefore an extension of the fungal chapter to nearly 40 pages. Engler was supported by E. Gilg hereafter until the 11th edition in 1936 which was issued by Ludwig Diels as a single volume. Only the 12th edition, edited by H. Melchior & E. Werdermann in two volumes in 1954 and 1964, contained a special chapter (15 pages) on lichens by F. Mattick.

After a break of about 60 years a completely new edition of several volumes written in English by well-known international specialists and edited by W. Frey has appeared. From the former editions in German it follows the general concept, title and tradition of including the fungi as well as blue-green algae, myxomycetes etc.

The short introduction of 12 pages is followed by a synopsis of classification of the phylum Ascomycota on 14 pages. This continues with the systematic arrangement of taxa – the main corpus of the book. Here all accepted taxonomic entities to family level are described using morphological as well as molecular data. Taxonomic uncertainties are discussed and extended lists of references are separately given for every class. Accepted genera in every family are listed with an estimation of the number of species in brackets. This part is illustrated by 7 plates of line drawing taken from the 12th edition and 17 plates of c. 150 new colour photographs of high quality. The orders Thelocarpales Lumbsch & Vezdales Lumbsch & Lücking are proposed as taxonomic novelties.

This is a standard reference work mandatory for every honest botanical library. For lichenologists the parts including lichen photo-symbionts may also be of interest. Photoautotrophic eukaryotic Algae have been published as volume 2/1 in 2015, blue-green Algae are included in volume 1/1 published in 2012, and Basidiomycota are still in preparation.

Peter Scholz, Schkeuditz

International Lichenological Newsletter vol. 49, no. 1, July 2016

The ascomycota comprise the numerically most important phylum of the fungal kingdom. They constitute well over 60% of the nearly 100,000 species of fungi known, and likely represent an even greater proportion of the estimated million(s) yet to be described. They are saprotrophs, parasites, lichen-formers, mycorrhizal symbionts, endophytes, and predators of invertebrates. A few are human pathogens, whereas others are sources of antibiotics used in combatting human pathogens. The ascomycota also include the fungus of greatest cultural and economic impact on humankind, the bread and beverage yeast Saccharomyces cerevisiae. The present volume offers an updated systematic scheme for this phylum extending below the level of order, with detailed descriptions of families and lists of included genera for each. With the infusion of molecular sequence data over the last couple of decades, the classification of fungi has undergone major rearrangements. That process is certainly not finished, but the broad scheme of higher taxa in ascomycota has reached sufficient stability to make a detailed treatment of this kind timely and useful.

The authors of this volume are major figures in the phylogenetic and systematic study of the organisms in question and have collaborated with a great many mycologists worldwide. They are therefore well positioned to provide a consensus snapshot of the current state of the science.

The authors recognize 18 classes of ascomycota, subdivided into about a hundred orders containing a total of 406 families, within which about 4000 genera are listed. Somewhat surprisingly, there is no cladogram or similar diagram to summarize the systematic framework employed. Nor is there a unified reference list. Instead, a separate bibliography follows each of the 18 fungal classes treated, a format that can make the search for a particular reference somewhat frustrating. Since the book consists mainly of descriptions of families and orders, it will serve the user primarily as a reference tool.

The short introduction of 12 pages is followed by a synopsis of classification of the phylum Ascomycota on 14 pages. This continues with the systematic arrangement of taxa – the main corpus of the book. Here all accepted taxonomic entities to family level are described using morphological as well as molecular data. Taxonomic uncertainties are discussed and extended lists of references are separately given for every class. Accepted genera in every family are listed with an estimation of the number of species in brackets. This part is illustrated by 7 plates of line drawing taken from the 12th edition and 17 plates of c. 150 new colour photographs of high quality. The orders Thelocarpales Lumbsch & Vezdales Lumbsch & Lücking are proposed as taxonomic novelties.

The images are all of superb quality and contribute substantially to the book’s overall appeal. Future editions might usefully expand on this feature, particularly by including more images of the microscopic characters that gure so prominently in the family descriptions. Following the format of many classic works in the German scientific textbook tradition, digressive text is set off as short paragraphs in smaller type. Here, however, these paragraphs provide the real commentary amidst the lists of characters, and so might preferably be highlighted rather than relegated to a format of lesser prominence.

This volume forms part of a series with a long and venerable history in botanical science reaching back to the 19th century, revived recently in a new edition brought out by Gebrüder Borntraeger, an equally long-standing institution in German scientific publishing. The series was initiated by the botanist Adolf Engler, whose Syllabus der Pflanzenfamilien encompassed all groups of organisms considered plants at that time, including the fungi, cyanobacteria, algae, and myxogastria. Nowadays, of course, the bacteria are classified in a separate prokaryotic domain, while among the eukaryotes, the plantae, fungi, myxogastria, euglenoid algae, chlorarachniophyte algae, alveolate algae and stramenopiles are all placed in different superfamilies (with a broad relationship among the latter three lately recognized). Obviously, Engler’s original concept of “plant” cannot be sustained in any conceivable sense, and especially not in a work dealing with biosystematics grounded firmly in contemporary phylogenetic principles. Well aware of this, the publisher and authors repeatedly acknowledge that fungi are clearly not plants under present concepts. But they do not say explicitly why they have chosen to retain the original series title in unaltered form. A less problematic option would have been to recast the new edition as simply PSB 63 (3) 2017 118 Engler’s Syllabus, or Syllabus of Biodiversity, or even Engler’s Syllabus of Plants, Eukaryotic Algae, Cyanobacteria, Fungi, and Slime Molds [etc.].


Im Kleindruck stehen, wo sinnvoll, jeweils ergänzende Erläuterungen. Diese kleingedruckten Hinweise werden nicht direkt der Sprache des Buches entsprechen. Somit sind die fotografierten Abbildungen eine gute Ergänzung zur Textüberlieferung.


Those who work intensively with fungi early meet with the multitude of Ascomycota, which are extremely diverse both in morphological, ecological and physiological aspects. They are present in all habitats of the arctic tundra over the rainforest to deserts.

The recently published synopsis is a completely revised and updated overview considering both classical anatomical-morphological features as well as new molecular insights. The aim is an accurate characterization of all families of Ascomycota including all genera of each family. The contents include abbreviations, a brief preface, a consistent introduction, focused on the essential, to the Ascomycota with explaining the main features and terms of ecology and distribution, evolution, importance and use, as well as the systematic classification. Each chapter ends with an extensive bibliography. Then, a synopsis of the Ascomycota is given, according to the subphyla, namely Taphrinomycotina (with the classes Archaeorhizomycetes, Neolectomycetes, Pneumocystidomycetes, Schizosaccharomycetes, Taphrinomycetes), Saccharomycotina (class Saccharomycetes) und Pezizomycotina (classes Arthonio-, Coniocybo-, Dothideo-, Eurotio-, Laboulbenio-, Leotio-, Lichino-, Orbilio-, Pezizo-, Sordario-, and Xylonomycetes).

The arrangement within the respective ranks (classes, orders, families) is alphabetically. Taxa with unclear position (incertae sedis) follow at the end, respectively. The main part of the work is the comprehensive description of the systematic classification of taxa with characteristic diagnosis of the group, associated references and literature for further reading. In small font there are, where appropriate, supplementary explanations. These small printed hints with explanation of some concepts and classifications are very revealing. The authors recognize 406 families (and an additional 10 lineages that are not named), the total number of genera is approximately 6100 (4000 of which are actually cited in the syllabus). Where possible, the estimated respective numbers of species are listed for the genera. At present this is not possible for a number of genera due to the rapidly changing assignments and thus remained undone in these cases. The total number of species of Ascomycota now holds approximately 57,000. Non-listed genera mainly concern unclear taxa. Only reliable taxonomic concepts are considered. In the appendix recently published additions and updates are listed. The taxa index concludes the volume. This synopsis is not a textbook, but a comprehensive overview; therefore, and probably also because of the otherwise easily escalating number of pages rather few illustrations are presented. The text illustrations are mostly taken from the previous edition. The colour plates on the other hand are newly incorporated with excellent photos. From these partly spectacular colour photos the enthusiasm of the authors for their research objects can be imagined.

Unlike so many other publications that follow the recent trend of using the termini asexual and sexual morphs, the well-known termini anamorph and teleomorph are still in use in the Syllabus, of course taking into account the Melbourne code. Through careful proofreading there are almost no misprints (such as a superfluous comma or a singular / plural error). Just a little something on the side: In the introduction Uncinula necator is used for powdery mildew in grapevine, who has long been called so, but now again should be named Erysiphe necator. In Figure 4-21 Tuber is erroneously associated with Pezizaceae, whereas in the synopsis it is classified as a separate family Tuberaeae. In comparison with the 12th edition of 1954, the present 13th edition stands out, due to the complexity of the matter and the massive new scientific findings, with an enormously increased number of pages and modern layout with colour photographs instead of black and white line drawings of the habits. Compared with part 1/1 of the syllabus, published 2013, about blue-green algae, slime moulds, oomycete, Zygomyces, Glomeromycota et al, the photo plates are now in colour instead of only in black and white.

It is an enormous task to succeed in today’s pace of scientific development, to follow the steady and ever-growing number of publications, to keep a good overview of these, to survey the changes, evaluate, and incorporate them – the result is a global update and invaluable summary of the sac fungi. Due to the exploding knowledge of the phylogenetic relationships on the basis of molecular biological research, in an extensive group of organisms such as fungi, this task is no longer manageable alone, therefore four authors are involved in this work each responsible for individual chapters. Only those who have themselves already worked taxonomically know how much stamina, consistency, time and effort are required for the conscientious compilation of such a survey. Although changes in the systematic classification of the Ascomycota are still going on, it is yet invaluable to have a current synopsis available. I can for sure highly recommend this superb 13th edition of the Syllabus Ascomycota to all mycologically interested, both students as well as scientists. Despite all the sources in the world-wide-web, as e.g. outline of the Ascomyota, MycoBank and Index Fungorum, printed general surveys continue to have their place. A must for every academic library! Congratulations to the authors!

Irmgard Krisai-Greilhuber, Wien, Austria
Sydowia 68 (2016)

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Syllabus der Pflanzenfamilien (1892–) by Adolf Engler (1844–1930) is a complete revision of plant families down to generic level and often even further. As such it forms part of the Engler system of plant taxonomy. Engler’s starting point was that of Eichler who had been the first to use phylogenetic principles, and reflected the new post-Darwinian perspective, although Engler himself did not think that his was. His modified Eichler schema first appeared in 1886 in his Guide to Breslau Botanic Garden Eine Übersicht über das Gesamte Pflanzensystem mit Besonderer Berucksichtigung der Medizinal- und Nutzpflanzen Nebst einer Übersicht über die Florenreiche und Florengebiete der Erde zum Gebrauch bei Vorlesungen und Studien über Spezielle und Medizinisch-pharmazeutische Botanik. Elfte Ergänzte Auflage. Ludwig Diels, "Botanical Gazette 98, no. 1 (Sep., 1936): 207. https://doi.org/10.1086/334633. MOST READ. Of all published articles, the following were the most read within the past 12 months. A Flower in Fruit’s Clothing: Pollination of Jackfruit (Artocarpus heterophyllus, Moraceae) by a Ne...