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Volume XVIII

Number 1

Outline of the Fungi

by

G. W. MARTIN



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University of Iowa Studies in Natural History

G. W. MARTIN, Editor

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OUTLINE OF THE FUNGI

The first printing of this key, which appeared in June, 1936, under the title "A key to the families of fungi, exclusive of the lichens" (Univ. Iowa Stud. Nat. Hist. Vol. 17, No. 3) has been exhausted. Since demand for it continues, I venture to reissue it, taking the opportunity to make certain changes which experience has suggested may make it more useful. The general purpose and plan are sufficiently indicated in the following excerpts from the preface of the earlier publication:

In view of the existence of several comprehensive treatments of the fungi as a whole, a brief summary of the present sort may appear to be superfluous. Its justification must be on the basis of certain difference of opinion between the views expressed in other mycological treatments and those of the present writer. These differences have to do with the origin of the fungi and their relationship to other organisms, with the position of the Myxomycetes and with the subdivision of certain of the major subgroups, particularly the Heterobasidiomycetes.

The lichens are omitted because it has been our practice to consider them very briefly in our own laboratory, because historically they have been the concern, for the most part, of specialists not greatly interested in other fungi and because of the lack of critical knowledge of the group on my own part, which would make it presumptuous to attempt to do other than paraphrase the work of Zahlbrückner, in spite of the apparently unnecessary multiplication of orders and families in his treatment. Besides, the recent revision of Fink's monograph by Miss Hedrick places in the hands of interested students in the United States and Canada a usable and practical introduction to the study of these forms. With the viewpoint, gaining favor in recent years, that the lichens must eventually be distributed amongst the other fungi, I am in complete accord.

The viewpoint here adopted is that the fungi, including the Myxomycetes, constitute an independent phylum derived from the simple flagellate protozoa, and characterized by many divergent series. Relationship with algal groups, so often assumed, is regarded as unproved and based upon superficial analogies rather than upon true homologies, and as less probable and less logical than the relationship suggested. Fungi, according to this view, are not plants and their retention in the domain of botany is, and doubtless will continue to be, based upon historic association. For this reason, the term vegetative (as opposed to reproductive) phase is not employed, the term assimilative phase being used in its stead. Such a term has the further advantage of being the more suitable as applied to fungi, whatever view may be adopted concerning their

phylogeny. For the same reason, the terms saprophyte and saprophytic are replaced by the terms saprobe and saprobic. Under any circumstances, reference to the reproductive structure of a fungus as a "plant" is thoroughly objectionable.

Obligation to the various standard works listed in the bibliography, and to others, will be obvious. Particular acknowledgment should be made to Fitzpatrick's "Lower Fungi", to Gäumann's "Vergleichende Morphologie der Pilze", to Dodge's translation and revision of that work and to Bessey's excellent text.

In preparing for the present printing, many of the keys have been rewritten and an attempt has been made to make fuller use of secondary characters, which in many cases are more obvious than those which are regarded as fundamental. The keys to the orders have been distributed through the body of the text, to bring them into closer proximity to the keys to the families. The Myxomycetes have been rearranged so as to place them in what, if not a natural sequence, is at least less unnatural. The Archimycetes are restricted to the group of organisms more or less intermediate between the Myxomycetes and the Mycochytridiales, following what is essentially Gäumann's arrangement. There has been a considerable rearrangement of the Pyrenomycete orders, involving a somewhat doubtful enlargement of the Dothideales and a reversion to Lindau's treatment of the stromatic Sphaeriales, rejecting the attempt made in the earlier key to adopt the system suggested by von Höhnel and Wehmeyer. I regard this as a distinct retrogression, to be justified only on the ground that until more comprehensive treatments of these forms than have yet appeared are available, the newer and better classification serves to confuse students.

An attempt has been made to clarify the treatment of the Heterobasidiomycetes, particularly the wide range of forms included in the Tremellales. The subordination of the Daerymycetaceae to family rank is open to criticism, but if this group is to be recognized as an order, the claims of several of the other families to the same distinction are almost if not quite as good, and there are too many doubtful and intermediate forms which have not yet been critically studied to warrant such disposition of these families at the present time.

The glossary has been enlarged and corrected and an index has been added.

THE FAMILIES OF FUNGI

The Thallophyta, an artificial division of the plant kingdom, arbitrarily defined as including all plants and plant-like organisms below the level of the Bryophyta, may be further subdivided as follows:

- a. Chlorophyll present Algal groups¹
(Note, however, that a few undoubted algae lack chlorophyll).
- a. Chlorophyll lacking Fungal groups b
 - b. Organic unit a single cell, often united with other cells into filaments or masses; nuclei lacking or not clearly defined; reproduction by fission Bacteria¹
 - b. Organic unit usually multicellular or multinucleate, or both; nuclei always clearly defined; reproduction various, often involving karyogamy, very rarely by fission Phylum FUNGI

FUNGI

- a. Assimilative phase a plasmodium² Class MYXOMYCETES p. 6
- a. Assimilative phase not a plasmodium, usually filamentous
- b. Mycelium, if present, usually continuous throughout in active assimilative phase; if lacking, reproduction not by budding; perfect stage usually represented by oospores or zygosporcs; imperfect stage by sporangiospores or modified sporangia or sporangial parts serving as disseminules Class PHYCOMYCETES p. 8
- b. Mycelium septate, rarely lacking, and cell in such case reproducing by budding or (very rarely) by fission; perfect stage characterized by asci or basidia c
- c. Parasitic on algae, forming with them symbiotic subaerial structures of characteristic morphology Form Class LICHENES¹
- c. Rarely parasitic on algae and, when so, not forming a characteristic symbiotic thallus; mycelium immersed in humus, soil, dung or the tissues of higher plants or sometimes animals, occasionally subaerial d
- d. Perfect stage characterized by spores borne in asci Class ASCOMYCETES p. 11
- d. Perfect stage characterized by spores borne on basidia Class BASIDIOMYCETES p. 18
- d. Neither asci nor basidia known and relationships not otherwise inferable with reasonable assurance Form Class FUNGI IMPERFECTI p. 23

¹ Not included.

² Terms are used throughout in the sense indicated in the glossary.

IOWA STUDIES IN NATURAL HISTORY

MYXOMYCETES

- a. Hypothallus complex, erect; simple, branched or poroid; sporangia lacking, probably represented by the so-called spores, the latter stalked, 4-nucleate, giving rise on germination to a protoplasmic body which in turn forms a group of eight swarm-cells Subclass EXOSPOREAE p. 6
- a. Hypothallus simple, consisting of a thin pellicle or reticulum prostrate on the substratum, sometimes not evident; spores borne internally, giving rise on germination to one or two myxamoebae or swarm-cells, rarely more Subclass MYXOGASTRES p. 6

EXOSPOREAE

- Including only the family **Ceratiomyxaceae**,
Represented by the single genus *Ceratiomyxa*

MYXOGASTRES

- a. Spores in mass pallid, yellow, purplish, rosy or rarely olivaceous or dingy; lime never present b
- a. Spores in mass typically black or deep violaceous, sometimes ferruginous, rarely pallid; lime present or absent c
 - b. True capillitium lacking or scantily developed; pseudo-capillitium often present, of tubules or perforated plates, sometimes fraying out into threads; spores pallid, often with purplish or rosy tints, or dingy Order LICEALES p. 6
 - b. Capillitium present, threadlike, parietal or free, sculptured, the markings usually distinct; spores pallid, yellow or rosy Order TRICHLIALES p. 7
 - c. Neither peridium nor capillitium calcareous; lime rarely present and then restricted to hypothallus, stipe and columella Order STEMONTIALES p. 7
 - c. Peridium or capillitium, or both, calcareous Order PHYSARALES p. 7

LICEALES

- a. Fructification of separate sporangia or small plasmodio-carp, rarely a pseudoaethalium, and plasmodic (dictydine) granules then present b
- a. Fructification a pseudoaethalium or an aethalium; plasmodic granules never present c
 - b. Plasmodic granules lacking; peridium not covered with a net Family Liceaceae
Representative genera: *Licea*, *Hymenobolina*
 - b. Plasmodic granules present; peridium typically covered by a net which remains after spores are shed Family Cibrariaceae
Representative genera: *Cibraria*, *Dictyidium*

- c. Pseudoaethalium formed of closely appressed sporangia, with walls entire; individual sporangia dehiscent at apex Family Tubiferaceae
Representative genus: *Tubifera*

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- c. Fructification a true aethalium, or a pseudoaethalium in which walls disappear at maturity; dehiscence irregular d
- d. Pseudocapillitium perforated, frayed or fragmentary; spores ochraceous or umber in mass Family **Reticulariaceae**
 Representative genera: *Reticularia*, *Enteridium*, *Dictydiaethalium*
- d. Pseudocapillitium of colorless, branched and often flattened tubes; spores pinkish or pallid Family **Lycogalaceae**
 With the single genus *Lycogala*

TRICHIALES

- a. Capillitrial threads slender, warded or spinulose, usually minutely so, sometimes smooth b
- a. Capillitrial threads rather coarse, usually characterized by distinct sculptured markings c
- b. Peridium usually single; capillitrial threads perpendicular to the peridium, attached at base and usually at tip, often anastomosing to form a net, in *Listerella* jointed Family **Dianemaceae**
 Representative genera: *Dianema*, *Margarita*
- b. Peridium usually double; capillitrial threads irregularly disposed, free or attached at one end Family **Perichaenaceae**
 Representative genera: *Perichaena*, *Ophiotheca*
- c. Capillitium a net, usually elastic, arising from base of sporangium; markings in the form of spines, cogs, warts or rings Family **Arcyriaceae**
 Representative genera: *Arcyria*, *Lachnobolus*
- c. Capillitium a network, usually not strongly elastic, or composed of short, free elaters, marked by distinct spiral bands, rarely nearly smooth Family **Trichiaceae**
 Representative genera: *Trichia*, *Hemitrichia*, *Oligonema*

STEMONITALES

- a. Outer wall of peridium gelatinous, persistent; columella lacking Family **Collodermataceae**
 With the single genus *Colloderma*
- a. Peridium membranous, fugaceous or persistent; columella usually well-developed b
- b. Fructification aethaliod or sporangioid; capillitium developed from entire length of columella Family **Stemonitaceae**
 Representative genera: *Stemonitis*, *Comatricha*, *Diachea*
- b. Always sporangioid; capillitium arising from tip of columella Family **Lamprodermataceae**
 Representative genus: *Lamproderma*

PHYSARALES

- a. Capillitium and usually peridium calcareous Family **Physaraceae**
 Representative genera: *Physarum*, *Fuligo*, *Badhamia*
- a. Capillitium non-calcareous; peridium, and sometimes stipe, limy Family **Didymiaceae**
 Representative genera: *Didymium*, *Diderma*

PHYCOMYCETES

- a. Holocarpic parasitic thallus wholly immersed in living host,
naked at least until shortly before reproductive phase be-
gins Subclass ARCHIMYCETES p. 8

a. Eucarpic or rarely holocarpic; parasitic or saprobic;
thallus with membrane from first b

b. Gametangia unlike; perfect stage represented by
oospores; imperfect stage by zoospores or by zoospor-
angia functioning as conidia and germinating by the
production of zoospores or, less commonly, directly
..... Subclass OOMYCETES p. 8

b. Gametangia morphologically alike (frequently differ-
ing in size); perfect stage represented by zygospor-
es; imperfect stage by sporangiospores, modified sporangia
or part-sporangia functioning as conidia, or by true
conidia Subclass ZYGOMYCETES p. 10

ARCHIMYCETES

- a. Thallus naked at maturity; spore-mass naked or with a membrane; spores on germination producing each a swarm-cell with single anterior flagellum. Parasites on vascular plants, often causing hypertrophy ... Order PLASMODIOPHORALES p. 8

a. Thallus surrounded by a distinct membrane at maturity, preceding formation of reproductive phase; zoospores various, but never with single anterior flagellum. Microscopic fungi parasitic on water and land plants
Order MYXOCHYTRIDIALES p. 8

PLASMODIOPHORALES

With the single family **Plasmodiophoraceae**
Representative genus: *Plasmodiophora*

MYXOCHYTRIDIALES

OMYCETES

- a. Sterile portion of thallus represented by a basal haustorium or by slender and usually scanty mycelium, sometimes connecting vesicular enlargements. Mostly eucarpic parasites on water and land plants Order MYCOCHYTRIDIALES p. 9

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- a. Mycelium coarse or abundantly developed, or both b
- b. Mycelium scanty, often confined to a single host cell,
 and at maturity sometimes wholly transformed into
 reproductive structures Order LAGENIDIALES p. 9
- b. Mycelium usually abundantly developed, never wholly
 transformed into reproductive structures c
- c. Gametes differentiated into eggs and sperms
 Order BLASTOCLADIALES p. 9
- c. Gametangia not producing distinct gametes d
- d. Oospores usually several to many, sometimes single, but
 always free from oogonial wall; zoospores produced in
 attached zoosporangia. Mostly saprobic in water or
 soil Order SAPROLEGNIALES p. 9
- d. Oospore single, united with oogonial wall; zoosporangia
 usually functioning as aerial conidia, germinating after
 detachment by the production of zoospores or less com-
 monly by a hyphal tube; mostly parasitic on vascular
 plants Order PERONOSPORALES p. 10

MYCOCHYTRIDIALES

- a. Sterile portion varying from a button-like basal haustorium
 to a cluster of rhizoidal outgrowths, or slender mycelial
 threads, without swellings Family Rhizidiaceae
 Representative genera: *Rhizophidium*, *Polyphagus*
- a. Sterile portion mycelioid, sometimes profuse, usually with
 terminal or intercalary swellings Family Cladochytriaceae
 Representative genera: *Cladochytrium*, *Physoderma*, *Urophlyctis*

LAGENIDIALES

- With the single Family Lagenidiaceae
 Representative genera: *Achlyogeton*, *Myzocytium*

BLASTOCLADIALES

- a. Gametes motile, 2-ciliate, morphologically similar, but dif-
 ferring in size; resting spores often conspicuous Family Blastocladiaceae
 Representative genera: *Blastocladia*, *Allomyces*
- a. Sperms motile, 1-ciliate; eggs solitary, non-motile Family Monoblepharidaceae
 With the single genus *Monoblepharis*

SAPROLEGNIALES

- a. Oospores usually several to many, sometimes one, without
 periplasm; hyphae not constricted Family Saprolegniaceae
 Representative genera: *Saprolegnia*, *Achlya*, *Dictyuchus*
- a. Oospore single, with periplasm; hyphae constricted at reg-
 ular intervals Family Leptomitaceae
 Representative genus: *Leptomitus*

PERONOSPORALES

- a. Conidiophores differing little, if at all, from assimilative hyphae; mycelium saprobic or parasitic, but, if latter, intracellular, without haustoria Family Pythiaceae
Representative genera: *Pythium*, *Phytophthora*
- a. Conidiophores specialized; mycelium intercellular, with haustoria; parasites on vascular plants b
- b. Conidia (sporangia) catenate on club-shaped conidiophores borne in dense sori beneath epidermis of host; haustoria globose Family Albuginaceae
With the single genus *Albugo*
- b. Conidia borne singly or in clusters at the tips of usually branched, rarely clavate conidiophores which emerge through stomata; haustoria various Family Peronosporaceae
Representative genera: *Peronospora*, *Plasmopara*, *Bremia*

ZYGOMYCETES

- a. Outer wall of zygospore developed from gametangia; imperfect spores typically sporangiospores (sometimes borne in merosporangia) or conidia. Mostly saprobic Order MUCORALES p. 10
- a. Zygospore free within gametangial vesicle; imperfect spores modified sporangia functioning as conidia, or true conidia, the latter sometimes catenate. Frequently parasitic on insects or other animals Order ENTOMOPHTHORALES p. 11

MUCORALES

- a. Sporocarp present, containing sporangia, zygospores or azygospores Family Endogonaceae
Representative genus: *Endogone*
- a. Sporocarp lacking b
- b. Sporangia all columellate and alike c
- b. Columellate sporangia present or absent; non-columellate sporangia, sporangioles or conidia always present d
- c. Sporangial membrane thin, fugaceous; sporangiospores liberated by breaking up of sporangial wall Family Mucoraceae
Representative genera: *Mucor*, *Rhizopus*, *Absidia*, *Phycomyces*
- c. Sporangial wall densely cutinized above, entire sporangium violently discharged or detached as a whole from sporangio-phore Family Pilobolaceae
Representative genera: *Pilobolus*, *Pilaira*
- d. Terminal sporangium columellate, multispored, or sometimes replaced by a sterile spine; sporangioles (few or 1-spored) borne on whorled branches of same sporangio-phore Family Thamnidiaeae
Representative genera: *Thamnidium*, *Helicostylum*, *Chaetocladium*
- d. Columellate sporangia lacking (except in Choanephora-ceae); imperfect stage represented by non-columellate

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- sporangia, sporangioles, merosporangia or conidia, or some combination of these structures e
- e. Merosporangia borne on swollen tips of sporangiophores, at first cylindrical, then forming a single row of sporangiospores, simulating a chain of conidia Family **Piptocephalidaceae**
Representative genera: *Piptocephalus*, *Syncephalastrum*
- e. Merosporangia lacking f
- f. Sporangioles or conidia born on swollen tips (columellate sporangia also present in some genera); zygospores naked Family **Choanephoraceae**
Representative genera: *Choanephora*, *Cunninghamella*, *Rhopalomyces*
- f. Sporangia, if present, without columellae; sporangioles and conidia, when present, borne singly, not on swollen tips of sporophores; zygospores imbedded in a thick hyphal matrix Family **Mortierellaceae**
Representative genera: *Mortierella*, *Haplosporangium*

ENTOMOPHTHORALES

- a. Conidia borne singly or in chains, not forcibly discharged; parasitic on amoebae and nematodes Family **Zoopagaceae**
Representative genus: *Zoopage*
- a. Sporangium functioning as a single conidium, forcibly discharged at maturity b
- b. Mycelium persistent, of uninucleate cells, giving cellulose reaction; gametangia unequal; not parasitic on insects Family **Basidiobolaceae**
With the single genus: *Basidiobolus*
- b. Mycelium usually breaking up into multinucleate segments, not giving cellulose reaction, gametangia equal; often parasitic on insects Family **Entomophthoraceae**
Representative genera: *Entomophthora*, *Empusa*, *Conidiobolus*, *Delacroixia*

ASCOMYCETES

- a. Asci formed singly, typically as direct result of karyogamy although this is frequently lacking, sometimes closely aggregated, but no ascocarp developed Subclass **HEMIASCOMYCETES** p. 11
- a. Asci borne in ascocarps Subclass **EUASCOMYCETES** p. 12

HEMIASCOMYCETES

- a. Zygote transformed directly into an ascus; mycelium sometimes lacking; mostly saprobic Order **ENDOMYCETALES** p. 12
- a. Hyphal cells becoming chlamydospores, each of which germinates to become a single ascus; parasitic on vascular plants Order **TAPHRINALES** p. 12

ENDOMYCETALES

- a. Spore-sacs (asci?) many-spored; gametangia, when present, sometimes multinucleate Family Ascoideaceae
 Representative genera: *Ascoidea*, *Dipodascus*
- a. Ascii with 8 ascospores, or fewer; gametangia, when present, always uninucleate b
- b. Ascii borne on a well-developed mycelium Family Endomycetaceae
 Representative genera: *Endomyces*, *Eremascus*
- b. Mycelium lacking, reproduction by budding; ascii formed by transformation of a single cell, or as the result of fusion of two cells Family Saccharomycetaceae
 Representative genera: *Saccharomyces*, *Zygosaccharomyces*

TAPHRINALES

- a. Chlamydospores thick-walled, germinating after a rest period, the exospore splitting and the endospore emerging to form a large, many-spored spore-sac Family Protomycetaceae
 Representative genus: *Protomyces*
- a. Chlamydospores thin-walled; endospore, on germination (less commonly a hyphal tip) protruding from host and cut off by a septum to form an 8-spored ascus, which may become many-spored by the budding of the ascospores Family Taphrinaceae
 Representative genus: *Taphrina*

EUASCOMYCETES

- a. Ascii borne singly or in tufts at various levels in interior of ascocarp b
- a. Ascii borne in tufts or hymenial layers (rarely solitary) in specific portions of ascocarps c
- b. Extensive stroma lacking (stalk or stalk-like base may be present); ascii and ascogenous hyphae filling interior of ascocarp Order EUROTIALES p. 13
- b. Stroma well developed, often gelatinous; ascii borne singly in locules Order MYRIANGIALES p. 14
- c. Ascii borne in globose, ellipsoidal or elongated cavities with a small opening or none (Pyrenomycetes) d
- c. Ascii borne in hymenial layers, typically in cup-shaped or saucer-like ascocarps, or in subterranean tuberous modifications of these (Discomycetes) j
- d. Stroma always present; ascii borne in one to many cavities (locules) without differentiated perithecial walls but frequently resembling perithecia; true paraphyses and periphyses lacking e
- d. Stroma present or absent; ascii borne in cavities with true walls (perithecia), paraphyses and periphyses usually present f
- e. Locules more or less spherical, resembling perithecial cavities Order DOTHIDEALES p. 14

- e. Stroma flattened, dimidiate, opening by a pore or tear, the whole simulating the upper part of a perithecium Order HEMISPHAERIALES p. 14
- f. Ostiole lacking, sometimes simulated by an apical lysigenous region Order ERYSIPHALES p. 15
- f. Ostiole present g
- g. Perithecia and stromata, if present, bright colored, soft and fleshy Order HYPOCREALES p. 15
- g. Perithecia or stromatic wall, when present, or both, dull colored, leathery or carbonaceous h
- h. Minute parasites on insects or arachnids; mycelium represented by a small number of basal cells functioning as haustorium and stalk Order LABOULBENIALES p. 15
- h. Saprobie, or, if parasitic, rarely on insects; mycelium well developed i
- i. Ostiole typically circular in section; if elongated, on a more or less globose perithecium Order SPHAERIALES p. 16
- i. Ostiole an elongated slit on a usually flattened, elongate perithecium, bearing the ascii in a flat basal layer Order HYSTERIALES p. 17
- j. Hymenium covered with a membrane until ascospores are mature, the membrane then splitting in stellate or irregular fashion Order PHACIDIALES p. 17
- j. Hymenium not provided with a membrane splitting in stellate fashion k
- k. Ascii inoperculate, provided with a definite pore Order HELOTIALES p. 18
- k. Ascii operculate, or, in the Tuberiales, not discharging spores l
- l. Ascocarp epigeic, at least at maturity; hymenium usually exposed before maturity of spores Order PEZIZALES p. 18
- l. Ascocarp typically hypogaeic, remaining closed Order TUBERALES p. 18

EUROTIALES

- a. Peridium composed of loosely interwoven hyphae Family Gymnoascaceae
Representative genus: *Ctenomyces*
- a. Peridium pseudoparenchymatous b
- b. Ascocarp sessile, minute; peridium weak, tardily and irregularly dehiscent Family Eurotiaceae
Representative genera: *Monascus*, *Eurotium*, *Carpenteles*; (for conidial stages: *Aspergillus*, *Penicillium*)
- b. Ascocarp stalked and capitate, subaerial, small to medium; peridium tough, opening above Family Onygenaceae
Representative genera: *Onygena*, *Trichocoma*
- b. Ascocarp sessile, hypogaeous, indehiscent; medium to large Family Elaphomycetaceae
Representative genus: *Elaphomyces*

MYRIANGIALES

- a. Asci arising at various levels b
- a. Asci arising in a single layer d
- b. Thallus gelatinous, superficial on leaves, typically of yeast-like cells; tropical fungi growing on insect secretions Family Atichiaceae
Representative genus: *Atichia*
- b. Thallus not superficial nor composed of yeast-like cells c
- c. Stroma massive, homogeneous, naked Family Myriangiaceae
Representative genus: *Myriangium*
- c. Stroma effused, with gelatinous interior and crustose rind. Family Elsinoaceae
With the single genus: *Elsinoe*
- d. Stroma naked Family Saccardiaceae
Representative genus: *Saccardia*
- d. Stroma with rind; locules immersed, the intervening stromatic tissue compressed to form pseudoparaphyses Family Dothioraceae
Representative genus: *Botryosphaeria*

DOTHIDEALES

- a. Stroma massive, carbonaceous, often extensively branched; conceptacles borne singly at tips of branches, perithecia-like; often on living plants, associated with insect secretions Family Capnodiaceae
Representative genera: *Capnodium*, *Scorias*
- a. Stroma pulvinate or flattened, not extensively branched; often simulating a perithecium or a group of perithecia; saprobic on vegetable debris, or parasitic b
- b. Stroma pulvinate, usually with a single locule; dehiscence by an ostiole-like pore Family Pseudosphaeriaceae
Representative genus: *Pleospora*
- b. Stroma pluriloculate c
- c. Stroma lobed, each lobe containing a single locule which is finally widely open Family Coryneliaceae
Representative genus: *Caliciopsis*
- c. Stroma not markedly lobed; locules immersed in groups d
- d. Stroma, at maturity, erumpent and superficial Family Dothideaceae
Representative genus: *Dibotryon*
- d. Stroma, at maturity, covered by host tissues Family Phyllachoraceae
Representative genus: *Phyllachora*

HEMISPHAERIALES

- a. Stromata subcuticular; mycelium scanty or lacking Family Stigmateaceae
Representative genus: *Stigmatea*
- a. Stromata superficial b

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- b. Mycelium largely internal, forming a hypostroma Family **Polystomellaceae**
Representative genera: *Parmulina*, *Polystomella*
- b. Internal mycelium scanty c
- c. Stomatic cover not of radially arranged hyphae Family [**Hemisphaeriaceae**] **Micropeltaceae**
Representative genus: *Micropeltis*
- c. Stromatic cover radial d
- d. Superficial mycelium reticulate or lacking Family **Microthyriaceae**
Representative genera: *Asterina*, *Microthyrium*, *Microthyriella*
- d. Superficial mycelium radial or parallel, forming a flat thallus, one cell thick Family **Trichopeltaceae**
Representative genus: *Trichopeltis*
- d. Superficial mycelium irregular or lacking; ascomata with basal tissue; parasitic on other fungi Family **Trichothyriaceae**
Representative genus: *Trichothyrium*

ERYSIPHALES

- a. Mycelium white Family **Erysiphaceae**
Representative genera: *Erysiphe*, *Microsphaera*, *Uncinula*, *Podosphaera*
- a. Mycelium dark b
- b. Neither mycelium nor upper part of perithecium becoming gelatinous Family **Meliolaceae**
Representative genus: *Meliola*
- b. Upper portion of perithecium becoming gelatinous at maturity, exposing asci Family **Englerulaceae**
Representative genus: *Englerula*

HYPOCREALES

- a. Perithecia superficial; stroma present or absent Family **Nectriaceae** b
- a. Perithecia partially to entirely immersed in a stroma or stromatic base Family **Hypocreaceae** c
- b. Stroma lacking Tribe **Nectrieae**
Representative genus: *Nectria*
- b. Stroma present Tribe **Creonectrieae**
Representative genus: *Creonectria*
- c. Stroma seated directly on substratum, usually patellate or effused, rarely clavate and erect Tribe **Hypocreeae**
Representative genera: *Hypocrea*, *Hypomyces*
- c. Stroma arising from a sclerotium, usually clavate and erect, rarely depressed Tribe **Cordycipiteae**
Representative genera: *Cordyceps*, *Claviceps*

LABOULBENIALES

- a. Antheridia lacking; spermatia borne exogenously on specialized branches of appendages Family **Ceratomycetaceae**
Representative genus: *Ceratomyces*

- a. Antheridia present b
- b. Antheridia unicellular, flask-shaped Family *Laboulbeniaceae*
 Representative genera: *Laboulbenia*, *Stigmatomyces*
- b. Antheridia compound, the several cells discharging
 spermatia into a common cavity, whence they are later
 freed Family *Peyritschellaceae*
 Representative genus: *Rickia*

SPHAERIALES

- a. Perithecia wholly or partly superficial. (Note comment un-
der m.) b
- a. Perithecia immersed in substratum or stroma, with mouth
 or neck only projecting h
- b. Subiculum lacking, or at most arachnoid c
- b. Stroma present f
- c. Perithecial walls membranous d
- c. Perithecial walls carbonaceous e
- d. Perithecia hairy, especially above; asci deliquescent
 Family *Chaetomiaceae*
 Representative genus: *Chaetomium*
- d. Perithecia naked or sparsely setose; asci discharging
 spores forcibly Family *Sordariaceae*
 Representative genera: *Sordaria*, *Sporormia*
- e. Mouths of perithecia papillate Family *Sphaeriaceae*
 Representative genera: *Lasiosphaeria*, *Neurospora*
- e. Perithecia with long, often hair-like beaks Family *Ceratostomataceae*
 Representative genus: *Ceratostomella*, *Ceratosphaeria*
- f. Perithecia caespitose, completely emergent from stroma,
 at least at maturity Family *Cucurbitariaceae*
 Representative genus: *Cucurbitaria*
- f. Bases of perithecia persistently immersed g
- g. Mouths of perithecia circular Family *Amphisphaeriaceae*
 Representative genus: *Amphisphaeria*
- g. Mouths of perithecia compressed, elongate Family *Lophiostomataceae*
 Representative genus: *Lophiostoma*
- h. Perithecia immersed in substratum; stroma lacking or
 poorly developed i
- h. Perithecia typically immersed in stroma or under a
 stromatic crust (stroma rarely present in conidial stage
 only, and disappearing at maturity of perithecia) j
- i. Asci not notably thickened at tips; mouths of perithecia
 mostly papillate Family *Mycosphaerellaceae*
 Representative genera: *Mycosphaerella*, *Venturia*, *Physalospora*
- i. Asci thickened at tips; perithecia usually beaked Family *Gnomoniaceae*
 Representative genera: *Gnomonia*, *Glomerella*
- j. Stroma a shield-like crust over perithecia, through which
 the necks protrude (a clypeus) Family *Clypeosphaeriaceae*
 Representative genus: *Anthostomella*

- j. Stroma not a clypeus k
- k. Stroma composed of mixed host and fungous elements l
- k. Stroma composed wholly of fungous elements m
 - l. Conidia borne in cavities in stroma Family **Valsaceae**
Representative genera: *Valsa*, *Eutypella*, *Diaporthe*
 - l. Conidia borne superficially on surface of stroma Family **Melanconidaceae**
Representative genus: *Cryptosporrella*
- m. Ascospores small, cylindrical, usually allantoid, hyaline to yellow-brown. In several genera, of which *Calosphaeria* is the best known, the stroma is present only in the conidial stage, the perithecia developing under bark and often appearing superficial on wood when the bark is shed Family **Diatrypaceae**
Representative genera: *Diatrysce*, *Calosphaeria*
- m. Ascospores various, but not as above n
- n. Conidia typically borne in hollow chambers in stroma; ascospores rather large, 1-∞-celled, hyaline or brown Family **Melogrammataceae**
Representative genus: *Endothia*
- n. Conidia borne in superficial layer on surface of young stroma; ascospores 1-(rarely 2-) celled, blackish brown Family **Xylariaceae**
Representative genera: *Rosellinia*, *Nummularia*, *Ustulina*, *Hypoxyylon*, *Daldinia*, *Xylaria*

HYSTERIALES

- a. Ascocarps at first immersed in host tissue, then erumpent b
- a. Ascocarps superficial from the first c
 - b. Walls black, tough-leathery Family **Dichaenaceae**
With the single genus: *Dichaena*
 - b. Walls gray or black, thick, corky Family **Ostropaceae**
Representative genus: *Ostropa*
- c. Ascocarps black, carbonaceous; round or elongated Family **Hysteriaceae**
Representative genera: *Glonium*, *Hysterographium*
- c. Ascocarps brown, tough-membranous, clavate, erect Family **Acrospermaceae**
Representative genus: *Acrospermum*

PHACIDIALES

- a. Ascocarp soft, fleshy; bright colored, never black Family **Stictidaceae**
Representative genera: *Stictis*, *Propolis*
- a. Ascocarp leathery or carbonaceous, black b
 - b. Ascocarp immersed, finally erumpent; hypothecium thick Family **Tryblidiaceae**
Representative genus: *Tryblidium*
 - b. Ascocarp remaining imbedded in host tissue or in stroma; hypothecium thin Family **Phacidiaceae**
Representative genera: *Clithris*, *Rhytisma*, *Lophodermium*

HELOTIALES

- a. Ascocarps clavate or pileate, the hymenium covering the convex upper portion Family **Geoglossaceae**
Representative genera: *Geoglossum*, *Leotia*
- a. Ascocarps discoid, typically cupulate or saucer-shaped b
b. Apothecia leathery, horny, cartilaginous or gelatinous; paraphyses united at tips to form an epithecium; asci thick-walled Family **Patellariaceae**
Representative genera: *Patellaria*, *Cenangium*, *Phaeobulgaria*
- b. Apothecia usually fleshy or waxy, rarely gelatinous; tips of paraphyses not forming an epithecium; asci thin-walled c
- c. Peridium of rounded or angular, mostly thick-walled and dark cells forming a pseudoparenchyma Family **Mollisiaceae**
Representative genera: *Mollisia*, *Pseudopeziza*
- c. Peridium of elongate, thin-walled and bright colored hyphae, arranged in parallel strands Family **Helotiaceae**
Representative genera: *Helotium*, *Sclerotinia*, *Chlorosplenium*

PEZIZALES

- a. Fructification a pear-shaped stroma with numerous apothecial pits; parasitic on *Nothofagus* in southern hemisphere Family **Cyttariaceae**
With the single genus: *Cyttaria*
- a. Saprobie; widely distributed b
b. Apothecia cup-shaped or discoid; sessile or stipitate Family **Pezizaceae**
Representative genera: *Lamprospora*, *Ascobolus*, *Pyronema*, *Humaria*,
Patella, *Bulgaria*, *Urnula*, *Peziza*
- b. Ascocarps pileate and stipitate, or columnar Family **Helvellaceae**
Representative genera: *Helvella*, *Morchella*

TUBERALES

- With the single Family **Tuberaceae**
Representative genera: *Tuber*, *Genea*

BASIDIOMYCETES

- a. Basidia septate or deeply divided, or arising from a teliospore or probasidium; basidiospores often germinating by repetition, or by the production of conidia Subclass HETEROBASIDIOMYCETES p. 18
- a. Basidia always simple, cylindrical to broadly clavate; probasidium not differentiated; basidiospores, on germination, usually producing a mycelium directly Subclass HOMOBASIDIOMYCETES p. 20

HETEROBASIDIOMYCETES

- a. Basidiocarp usually well developed, often gelatinous, but

varying to waxy or coriaceous; mostly saprobes, sometimes parasitic on plants, insects or other fungi

..... Order TREMELLALES p. 19

- a. Basidiocarp lacking; perfect fructification a mass of probasidia, often compound (teliospores), with or without a peridium; accessory spore forms present or absent; parasites on vascular plants b
- b. Epibasidium, or less commonly contents of teliospore, divided transversely into (usually) four cells, each producing a single basidiospore on a sterigma; basidiospores sometimes germinating by repetition but not budding. Spore-masses often yellow or orange. The rusts.
- Order UREDINALES p. 20
- b. Epibasidia septate or not, bearing sessile basidiospores ("sporidia") usually capable of germinating in yeast-like fashion, occasionally by repetition; teliospores rarely germinating to produce a mycelium directly. Spore-masses usually black. The smuts Order USTILAGINALES p. 20

TREMELLALES

- a. Epibasidia inflated, spore-like, finally cut off by septa from hypobasidium Family Tulasnellaceae
Representative genera: *Tulasnella*, *Gloeotulasnella*
- a. Epibasidia not spore-like nor notably inflated b
- b. Probasidia cylindrical to narrowly clavate; basidia not septate but becoming furcate by the development of two thick epibasidia at either side of tip of hypobasidium Family Dacrymycetaceae
Representative genera: *Dacrymyces*, *Calocera*, *Guepinia*
- b. Basidia at length septate, not furcate c
- c. Probasidia subglobose, ovate or pyriform, or rarely broadly fusiform; primary septum longitudinal or somewhat oblique; secondary septa at right angles to primary d
- c. Probasidia cylindrical, narrowly fusiform or globose, they, or the epibasidia arising from them, becoming transversely septate f
- d. Basidia catenulate, epibasidia lacking Family Sirobasidiaceae
With the single genus: *Sirobasidium*
- d. Basidia not catenulate; epibasidia usually present e
- e. Gymnocarpous; widely distributed Family Tremellaceae
Representative genera: *Tremella*, *Exidia*, *Sebacina*, *Tremelloidendron*
- e. Semiangiocarpous; spores retained within a gelatinous sheath; known only from the tropics Family Hyaloriaceae
With the single genus: *Hyaloria*
- f. Angiocarpous; basidiospores sessile Family Phleogenaceae
Representative genus: *Phleogena* (*Pilacre*)
- f. Gymnocarpous; basidiospores borne on sterigmata g

- g. Basidiocarp tough or membranous, not putrescent; reviving when moistened Tribe **Marasmieae**
Representative genera: *Marasmius*, *Panus*, *Heliomyces*
- g. Basidiocarp subfleshy to fleshy, putrescent h
 - h. Gills waxy, broad, sharp, more or less separable Tribe **Hygrophoreae**
Representative genera: *Hygrophorus*, *Gomphidius*
 - h. Gills thin, fleshy i
- i. Trama vesiculose, texture usually brittle Tribe **Lactarieae**
Representative genera: *Lactarius*, *Russula*
- i. Trama not vesiculose j
 - j. Gills not autodeliquescent; spores variously colored, rarely black Tribe **Agariceae**
Representative genera: *Agaricus*, *Hypholoma*, *Panaeolus*,
Clitopilus, *Cortinarius*, *Pholiota*, *Pleurotus*, *Amanita*,
Lepiota, *Armillaria*, *Tricholoma*, *Collybia*
 - j. Gills autodeliquescent; spores black Tribe **Coprineae**
Representative genus: *Coprinus*

HYMENOGASTRALES

- a. Basidiocarp minute, with a single glebal cavity Family **Protogasteraceae**
Representative genus: *Gasterella*
- a. Gleba compound b
 - b. Stem prolonged into a distinct columella reaching apex;
dehiscence by separation of base of peridium from stem Family **Secotiaceae**
Representative genera: *Endopychum*, *Podaxis*
 - b. Columella lacking or rudimentary; indehiscent c
- c. Tramal plates radiating from base, not closely connected with peridium Family **Hysterangiaceae**
Representative genera: *Hysterangium*, *Phallogaster*
- c. Tramal plates arising from peridium Family **Hymenogastraceae**
Representative genera: *Hymenogaster*, *Rhizopogon*

PHALLALES

- a. Gleba borne on inner portion of receptacle or between the arms Family **Clathraceae**
Representative genera: *Clathrus*, *Simblum*
- a. Gleba borne on outer portion of simple receptacle Family **Phallaceae**
Representative genera: *Phallus*, *Mutinus*

LYCOPERDALES

- a. Peridium crumbling away after maturity; glebal chambers remaining intact and falling apart as fine sandlike particles Family **Arachniaceae**
With the single genus: *Arachnion*
- a. Inner part of peridium persistent; glebal chambers disintegrating into a powdery mass b

- b. Peridial layers coalesced; falling away in flakes, or opening in stellate fashion exposing gleba, or outer portion only flaking away Family **Lycoperdaceae**
Representative genera: *Lycoperdon*, *Calvatia*, *Bovista*
- b. Outer peridium thick, externally fibrous, dehiscent in stellate lobes, leaving thin inner peridium intact Family **Gastraceae**
Representative genera: *Gastrum*, *Myriostoma*

SCLERODERMATALES

- a. Sessile, or with a stalk-like base b
- a. With a distinct, firm or gelatinous stalk c
 - b. Peridium without a distinct, separable outer layer Family **Sclerodermataceae**
Representative genera: *Scleroderma*, *Pisolithus*
 - b. Peridium with a distinct outer layer which at maturity splits in stellate fashion, exposing the persistent inner peridium Family **Astraeaceae**
With the single genus: *Astraeus*
- c. Stalk firm, fibrous; peridium membranous Family **Tulostomataceae**
Representative genus: *Tulostoma*
- c. Stalk and outer portion of peridium gelatinous Family **Calostomataceae**
With the single genus: *Calostoma*

NIDULARIALES

- a. Glebal chambers (peridioles) remaining attached or free within outer peridium Family **Nidulariaceae**
Representative genera: *Cyathus*, *Crucibulum*
- a. Single glebal chamber violently discharged at maturity Family **Sphaerobolaceae**
Representative genus: *Sphaerobolus*

FUNGI IMPERFECTI

- a. Fructification determinate, at first closed (Coelomycetes) b
- a. Fructification indeterminate, superficial or lacking c
 - b. Conidia borne in pycnidia or chambered cavities Form order **PHYLLOSTICTALES** p. 23
 - b. Conidia borne in acervuli, definitely circumscribed and finally free on substratum Form order **MELANCONIALES** p. 24
 - c. Conidiophores superficial, entirely free or bound in tufts or clusters Form order **MONILIALES** p. 24
 - c. No spores known; mycelium or masses of fungous cells MYCELIA STERILA p. 24

PHYLLOSTICTALES

- a. Pycnidia more or less globose, ostiolate or closed b
- a. Pycnidia not globose when mature c

- b. Walls dark, tough, leathery or carbonaceous
 Form family [Sphaeriodaceae] **Phyllostictaceae**
 Representative genera: *Phyllosticta*, *Phoma*,
Sphaeropsis, *Diplodia*, *Septoria*
- b. Walls or stroma bright-colored, fleshy or waxy
 Form family **Nectrioidaceae**
 Representative genus: *Zythia*
- c. Pycnidia dimidiate, usually radiate or hysteroid
 Form family **Leptostromataceae**
 Representative genus: *Leptothyrium*
- c. Pycnidia at length cupulate or discoid Form family **Excipulaceae**
 Representative genera: *Sporonema*, *Discella*

MELANCONIALES

- With the single Form family **Melanconiaceae**
 Representative genera: *Colletotrichum*,
Gloeosporium, *Pestalotia*, *Coryneum*

MONILIALES

- a. Hyphae nearly or quite lacking; propagation by budding
 (false yeasts) b
- a. Hyphae present; reproduction not usually by budding c
- b. Never germinating by repetition
 Form family **Pseudosaccharomycetaceae**
 Representative genus: *Pseudosaccharomyces*
- b. Cells in old cultures germinating by repetition, as do
 the basidiospores of many of the Tremellales, of which
 these forms may be regarded as imperfect species
 Form family **Sporobolomycetaceae**
 Representative genus: *Sporobolomyces*
- c. Neither conidiophores nor hyphae bound together d
- c. Conidiophores and often hyphae united into characteristic
 fructifications e
- d. Hyphae, conidiophores and conidia hyaline or bright col-
 ored Form family **Moniliaceae**
 Representative genera: *Verticillium*, *Botrytis*, *Cephalothecium*
- d. Hyphae or conidia, or both, dull colored, brownish to
 black Form family **Dematiaceae**
 Representative genera: *Torula*, *Streptothrix*,
Cladosporium, *Alternaria*
- e. Conidiophores united into a coremium
 Form family [Stilbaceae] **Stilbellaceae**
 Representative genera: *Coremium*, *Stilbella*, *Isaria*, *Graphium*
- e. Hyphae and conidiophores combined in a sporodochium
 Form family **Tubulariaceae**
 Representative genera: *Volutella*, *Tubularia*, *Exosporium*

MYCELIA STERILA

- Not divided into form families
 Representative genera: *Rhizoctonia*, *Sclerotium*

SPORE SECTIONS OF IMPERFECT FUNGI

Used within the families, in any case, however, carrying the divisions only to the point demanded by convenience.

Conidia 1-celled, globose, oval or short-cylindrical	I. AMEROSPORAE
Conidia hyaline or bright	1. <i>Hyalosporae</i>
Distinction between hyphae and conidia slight, or hyphae lacking	a. <i>Micronemeeae</i>
Hyphae elongate, distinct from conidia	b. <i>Macronemeeae</i>
Conidia dark or swarthy	2. <i>Phaeosporae</i>
Distinction between hyphae and conidia slight, or hyphae lacking	a. <i>Micronemeeae</i>
Hyphae elongate, distinct from conidia	b. <i>Macronemeeae</i>
Conidia 2-celled, ovate or elongate	II. DIMEROSPORAE
Hyaline or bright	1. <i>Hyalodidymae</i>
Dark or swarthy	2. <i>Phaeodidymae</i>
Conidia oblong to fusoid, transversely septate into 3 or more cells	III. PHRAGMOSPORAE
Hyaline or bright	1. <i>Hyalophragmiae</i>
Dark or swarthy	2. <i>Phaeophragmiae</i>
Conidia ovate to elongate, muriform	IV. DICTYOSPORAE
Hyaline or bright	1. <i>Hyalodictyae</i>
Dark or swarthy	2. <i>Phaeodictyae</i>
Conidia acicular to filiform, 1-∞-celled, hyaline or dark	V. SCOLOCOSPORAE
Conidia cylindric, spirally coiled, 1-∞-celled, hyaline or dark	VI. HELICOSPORAE
Conidia stellate or irregular, 1-∞-celled, hyaline or dark	VII. STAUROSPORAE

GLOSSARY

Certain terms of wider meaning are defined with reference to their mycological usage only.

Acervulus—a disk-like or saucer-like determinate group of conidiophores, sometimes with accessory structures, characteristic of the Melanconiales.

Aethalium—A Myxomycete fructification in which the plasmodium becomes aggregated into a continuous mass and fruits as a whole, hence usually comparatively large.

Allantoid—Sausage-shaped; of spores.

Amoeboid—Destitute of permanent cell wall and exhibiting changes of shape as in *Amoeba*; of plasmodium of Myxomycetes, and of the swarm-cells of these and the zoospores of certain Phycomycetes.

Amphigenous—of hymenium, when borne on all sides of hymenophore.

Angiocarpous—remaining closed at least until the maturity of the spores; of a fruiting structure.

Antheridium—the male gametangium.

Apothecium—a cup-shaped or saucer-shaped, sometimes irregular ascocarp, in which the asci are borne in a usually clearly defined hymenium.

Arachnoid—like a cobweb.

Ascocarp—a specialized fruiting body in which asci are borne.

Ascogenous—ascus-producing (of certain hyphae); ascus-bearing (of fructifications or their parts).

Ascospore—a spore borne in an ascus, typically as the result of free cell formation, following karyogamy and three subsequent mitoses.

Ascus—a sac-like structure producing ascospores, typically following nuclear fusion.

Basidiocarp—a specialized fruiting body on or in which basidia are produced.

Basidiospore—a spore borne exogenously on a basidium, typically following karyogamy and subsequent divisions.

Basidium—a cell in which nuclear fusion is followed by meiosis, after which the haploid nuclei pass into extensions of the wall which are separated as exogenous spores; or a morphologically similar structure in which fusion and meiosis do not occur.

Budding—a process of multiplication in unicellular fungi or spores in which a small outgrowth develops into a new cell; opposed to fission.

Capillitium—sterile, thread-like tubes or fibers occurring amongst the spores of various fungi, particularly Myxomycetes and Gasteromycetes.

Catenulate—occurring in chains or linear series.

Chlamydospore—a spore formed by direct transformation of a portion of the mycelium; usually thick-walled and often undergoing a resting period.

Clypeus—a shield-like stromatic growth covering the perithecia in certain Sphaeriales.

Coenocyte—a cell or larger unit with numerous nuclei enclosed within a common membrane.

Columella—a persistent sterile central axis in a fructification.

Conceptacle—ascus-bearing chamber in certain myriangiaceous fungi.

Conidiophore—a more or less specialized hymenial branch bearing conidia.

Conidium—a spore, produced neither as a direct result of karyogamy nor in a sporangium; typically pinched off from the tip of a hyphal branch; 1-to-many-celled; sometimes a modified sporangium.

Coremium—a tuft of conidiophores united in columnar fashion.

Determinate—with sharply limited boundaries (of fructification)

Dichotomous—forking, usually repeatedly.

Endospore—(1) the inner layer of the wall of a spore having two or more layers; (2) spores formed internally and parthenogenetically, often resembling ascospores.

Epibasidium—a filament or outgrowth arising from the probasidium of a heterobasidiomycete upon which one or more usually sterigmate basidiospores are borne.

Epigeic—developing above the ground or substratum.

Epitheciun—a distinct layer above the asci formed by the tips of paraphyses in many discomycetes.

Erumpent—bursting through; of fructifications formed beneath bark or other substratum, and then emerging.

Eucarpic—of fungi, when entire thallus is not transformed into a fructification; cp. holocarpic.

Exogenous—developing on the outside, e.g. a basidiospore.

Exospore—the outer layer of the spore wall in spores with two or more wall layers.

Fission—splitting into two; of bacteria and certain unicellular fungi; cp. budding.

Flagellum—the whip-like organ of a motile spore or gamete.

Fugaceous—evanescent; not persisting.

Gametangium—a structure in which gametes are produced, or the contents of which function in place of gametes.

Gamete—a reproductive cell which must fuse with another, like or unlike, in order to function.

Gleba—the spore-bearing tissue in any angiocarpous fungous fructification, particularly in the gasteromycetes.

Gymnocarpus—said of a sporocarp in which the spore-bearing region is exposed from the beginning or from an early stage.

Haustorium—a root-like or knob-like extension of an intercellular hypha of a parasitic fungus, which enters the host cell.

Holocarpic—of fungi, when entire thallus is transformed into a fructification; cp. eucarpic.

Hyaline—colorless and translucent.

Hymenium—a continuous layer of ascii or basidia borne on a specialized area.

Hymenophore—that part of an ascocarp or basidiocarp upon which the hymenium is produced.

Hypha—a single fungous thread or filament.

Hypobasidium—the lower portion of the basidium of a heterobasidiomycete, after it has produced epibasidia.

Hypogeic—developing and attaining maturity beneath the surface of the earth.

Hypothallus—a horny base beneath the fructification of Myxomycetes.

Indehiscent—remaining unopened, as, e.g., of certain hypogeic fungi.

Indeterminate—lacking a definite margin, esp. of fructification.

Intercellular—between cells; esp. of the mycelium of a parasitic fungus with reference to the cells of the host.

Intracellular—within cells; esp. of the mycelium of a parasite with reference to the cells of the host.

Karyogamy—nuclear fusion, usually as preceding the formation of specialized reproductive organs or spores.

Lamella—the gill of a mushroom, on which the hymenium is borne.

Locule—a cavity in a stroma, without perithecial wall, in which ascii are produced.

Lysigenous—of a cavity or opening formed by the dissolving of cells.

Merosporangium—a cylindrical outgrowth from the swollen tip of the sporangiophore in certain of the Mucorales, the contents usually becoming divided into a chain-like series of sporangiospores.

Monopodial—a type of branching in which a single continuous axis gives off single branches, often in an alternate or spiral series.

Mycelium—the aggregation of threadlike hyphae forming the assimilative portion of most fungi.

Oidia—catenulate conidia, formed by direct transformation of a hypha.

Oogonium—a female reproductive structure, commonly a more or less spherical sac, containing, at maturity, one or more oospores.

Oospore—a resting spore produced in an oogonium as a result of the fusion of its contents with those of an antheridium; a similar structure produced parthenogenetically.

Ostiole—the morphologically differentiated opening in a peritheclum through which spores are discharged; to be distinguished from a tear or a pore of lysigenous origin.

Paraphyses—sterile elements in the hymenium of Ascomycetes and Basidiomycetes, usually hairlike in the former, often clavate in the latter.

Parasite—a fungus living at the expense of another living organism. Cp. saprophyte, saprobe.

Perfect stage—that stage in the life cycle of a fungus characterized by spores formed as a result of nuclear fusion, or by morphologically similar spores produced parthenogenetically.

Peridiole—a chamber of a gleba with a more or less independent wall of its own, often serving as the unit of dissemination.

Peridium—the wall layers of a spore-bearing structure in which the spores are developed in the interior; particularly in the Gasteromycetes and cup fungi, and the Myxomycetes.

Periplasm—protoplasm in the oogonium which has not entered into oospore formation and is consequently left as a thin layer surrounding the oospore(s).

Peritheclum—an enclosed structure in which asci are borne, usually subglobose or flask shaped, surrounded by a definite wall and usually opening by an ostiole.

Plasmodic granules—microscopic, dark colored granules, scattered, clustered or in lines on the outside of the peridium or net and often on the spores of the Cribriariaceae. Also called dictyidine granules.

Plasmodiocarp—a type of Myxomycete fructification in which the sporangia are sessile and veinlike, as though developed directly from the larger veins of the plasmodium.

Plasmodium—the semi-naked, multinucleate, motile and usually reticulate assimilative phase of a Myxomycete.

Probasidium—the young stage of a basidium up to the time protuberances begin to develop; especially used of the Heterobasidiomycetes; sometimes thick-walled, as in the rusts.

Pseudoaethalium—a dense cluster of myxomycete sporangia, simulating an aethalium, but in which the sporangia are distinct and separate.

Pseudocapillitium—in Myxomycetes: plates, tubes, or thread-like bodies in the fructification apparently not developed in direct connection with the sporogenous protoplasm, but representing the outer region of the plasmodial veins, or the walls of the constituent sporangia in a pseudoaethalium.

Pseudoparenchyma—a pseudotissue resembling parenchyma but formed by the modification and fusion of hyphal elements.

Pycnidium—a more or less globose or flask-like cavity or fructification in which conidia are borne; characteristic of the imperfect fungi belonging to the Phyllostictales.

Repetition—a type of spore germination in which a spore is formed morphologically similar to the first spore, the secondary spore often germinating in the same way.

Rhizoidal—used of a fungus in which the sterile portion of the thallus is composed of fine, usually branching, hair-like filaments.

Saprobe—an organism securing nourishment by absorption from dead organic matter.

Saprophyte—a plant securing nourishment by absorption from dead organic matter. Inadvisedly used of fungi.

Septum—a transverse wall in a hypha.

Sorus—a cluster of sporangia or of resting spores.

Spermatia—non-motile male gametes, as in Laboulbeniales.

Sporangiole—a small sporangium, without columella, usually relatively few-spored, characteristic of certain Mucorales.

Sporangiophore—a more or less specialized mycelial branch bearing a sporangium.

Sporangiospore—a spore borne in a sporangium.

Sporangium—a sac in which spores are formed as result of cleavage.

Spore—a general term for a reproductive structure in Cryptogams, commonly unicellular, but in the Fungi frequently multicellular.

Sporidia—term used for the spores borne upon the “promycelium” of the rusts and smuts, here regarded as basidiospores borne upon an epibasidium.

Sporodochium—a determinate, cushion-like cluster of conidiophores, typically stromatic, characteristic of the Tuberculariaceae.

Sporophore—a more or less specialized branch of mycelium which bears spores; especially a conidiophore.

Sterigma—a stalk on a basidium upon which a basidiospore is borne, and from which it is as a rule forcibly discharged. Inadvisedly used for somewhat analogous structures in groups other than the Basidiomycetes.

Stroma—a cushion-like mass of fungous cells, or mixed fungous cells and host tissue, in or on which fructifications are developed.

Subiculum—an arachnoid or floccose mycelial weft upon which fructifications are formed.

Swarm-cell—a motile cell issuing from the spore of a Myxomycete and functioning, with or without further division, as an isogamete.

Teliospore—the terminal stage in the life-cycle of a rust, composed of one or more, usually thick-walled probasidia; in a compound teliospore the constituent probasidia are arranged in a characteristic fashion, varying with different genera.

Thallus—a general term used for the vegetative portion of a non-vascular plant; as extended to fungi, the entire assimilative phase of the individual organism.

Trama—internal part of hymenium-bearing tissue.

Verticillate—a type of branching in which a continuous main axis gives rise at intervals to whorls of subordinate axes.

Volva—an external envelope covering the young fructifications of certain hymenomycetes and gasteromycetes, and rupturing in course of development, remaining as a cup-like base.

Zoosporangium—a sporangium producing zoospores.

Zoospore—a motile sporangiospore.

Zygospore—a thick-walled spore produced as a result of the fusion of equal or morphologically similar gametangia.

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Not intended to be complete. The list includes the most important general works on the classification of the fungi, and many of the better known and more readily available treatments of special groups, with particular reference to those based on the fungi of the eastern United States and Canada. For a more extensive bibliography see Chapter XV of the Bessey text, pp. 393-468: "Guide to the literature for the determination of fungi."

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