

References: Reece, J. B., & Campbell, N. A. (2011). *Campbell biology*. Boston: Benjamin Cummings / Pearson. Webster, J., & Weber, R. (2007). *Introduction to fungi*. Cambridge, UK: Cambridge University Press.

TAXONOMY OF FUNGI

Taxonomy is the science of classification, the “assigning of objects to defined categories”

Classification has three main functions: it provides a framework of recognizable features by which an organism under examination can be identified; it is an attempt to group together organisms that are related to each other; and it assists in the retrieval of information about the identified organism in the form of a list or catalogue (Webster& Weber, 2007).

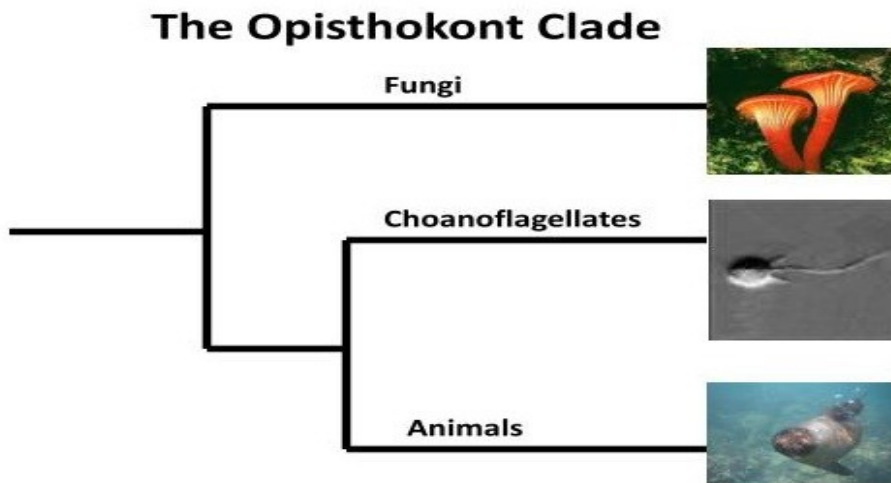
All taxonomic concepts are man-made and therefore to a certain extent arbitrary. This is especially true of classical approaches relying on macroscopic or microscopic observations because it is a matter of opinion whether the difference in a particular character _ say, a spore or the way in which it is formed _ is significant to distinguish two fungi and, if so, at which taxonomic level. The great fungal taxonomist R. W. G. Dennis (1960) described taxonomy as ‘the art of classifying organisms: not a science but an art, for its triumphs result not from experiment but from disciplined imagination guided by intuition’(Webster& Weber, 2007).

Recently, great efforts have been made at introducing a seemingly more objective set of criteria based directly on comparisons of selected DNA sequences encoding genes with a conserved biological function, instead of or in addition to phenotypic characters. The results of such comparisons are usually displayed as phylogenetic trees which imply a common ancestry to all organisms situated above a given branch. Such a grouping is ideally ‘monophyletic’. However, as we shall see later, quite different phylogenies may result if different genes are chosen for comparison. Further, a decision on the degree of sequence divergence required for a taxonomic distinction is based mainly on numerical parameters generated by elaborate computerized statistical treatments, occasionally at the expense of sound judgement. An excessive emphasis on such purely descriptive studies in the recent

literature has led an eminent mycologist to characterize phylogenetic trees as ‘the most noxious of all weeds’. Despite their limitations, these methods have led to a revolution in the taxonomy of fungi. At present, a new, more ‘natural’ classification is beginning to take shape, in which DNA sequence data are integrated with microscopic, ultrastructural and biochemical characters. However, many groups of fungi are still poorly defined, and many more trees will grow and fall before a comprehensive taxonomic framework can be expected to be in place. One of the core problems in fungal taxonomy is the seemingly seamless transition between the features of two taxa, and the question as to where to apply the cut-off point. To quote Dennis (1960) again, ‘a taxonomic species cannot exist independently of the human race; for its constituent individuals can neither taxonomise themselves into a species, nor be taxonomised into a species by science in the abstract; they can only be grouped into species by individual taxonomisers’ (Webster & Weber, 2007).

THE ANCESTOR OF FUNGI

Fungi and animals are more closely related to each other than they are to plants or other eukaryotes. Fungi, animals, and their protistan relatives form the **opisthokonts** clade (Reece & Campbell, 2011).

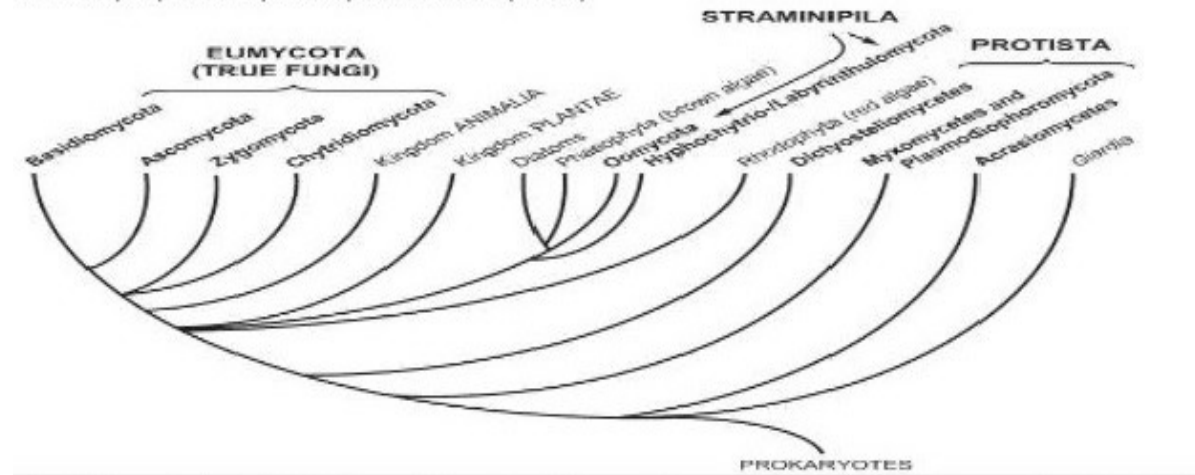


HOW OLD ARE FUNGI?

Several lines of evidence indicate that fungi are a very ancient group of organisms. Berbee and Taylor(2001) estimated that fungi may have separated from animals some 900 million years ago, i.e. long before the evolution of terrestrial organisms. This estimate is consistent with the discovery of fossilized anastomosing hypha-like structures in sediments about 1 billion years old. Fungi recognizable as Chytridiomycota, Zygomycota and Ascomycota have been discovered among fossils of early terrestrial plants from the Lower Devonian Rhynie chert, formed some 400 million years ago. It is apparent that these early terrestrial plants already entertained mycorrhizal symbiotic associations with glomalean members of the Zygomycota(Webster& Weber, 2007).

GENERAL CLASSIFICATION OF KINGDOM FUNGI

This classification scheme is based on the classification proposed by McLaughlin et al (2001). Mainly this scheme also is based on molecular phylogeny and is broadly the same as proposed by Alexopoulos et al. (1996).



(Webster & Weber, 2007)

KINGDOM: FUNGI (EUMYCOTA)

Division: Chytridiomycota

Class: Blastocladiomycetes

Order: Blastocladales

Class: Chytridiomycetes

Order: Chytridiales

Class: Monoblepharidomycetes

Order: Monoblepharidales

Class: Olpidiomycetes

Order: Olpidiales

Class: Rhizophyidiomycetes

Order: Rhizophydiales

Class: Synchytriomycetes

Order: Synchytriales

Division: Zygomycota

Class: Zygomycetes

Order: Endogonales

Order: Entomophthorales

Order: Kickxellales

Order: Mucorales

Order: Zoopagales

Class: Trichomycetes

Order: Harpellales

Division: Ascomycota

Subdivision: Pezizomycotina

Group: Discomycetes

Class: Orbiliomycetes

Order: Orbiliales

Class: Pezizomycetes

Order: Pezizales

Classis: Lecanoromycetes

Classis: Lichinomycetes

Classis: Leotiomyces

Order: Helotiales

Order: Erysiphales

Group: Plectomycetes

Class: Eurotiomycetes

Order: Onygenales

Order: Eurotiales

Group: Perithecial Ascomycete Fungi

Class: Sordariomycetes

Class: Laboulbeniomyces

Group: Pseudothecial Ascomycete Fungi

Class: Dothideomycetes

Group: Lichenized Ascomycete Fungi

Class: Arthoniomycetes

Subdivision: Saccharomycotina

Subdivision: Taphrinomycotina

Class: Schizosaccharomycetes

Class: Pneumocystidiomycetes

Class: Neoelectomycetes .

Class: Taphrinomycetes

Group: Deuteromycetes (Fungi imperfecti)

Division: Basidiomycota

Subdivision: *Agaricomycotina*

Class: *Agaricomycetes*

Order: *Agaricales*

Order: *Russulales*

Order: *Boletales*

Order: *Cantharellales*

Order: *Polyporales*

Order: *Auriculariales*

Order: *Geastrales*

Order: *Phallales*

Class: *Dacrymycetes*

Order: *Dacrymycetales*

Class: *Tremellomycetes*

Subdivision: *Pucciniomycotina*

Subdivision: *Ustilaginomycotina*

Class: *Ustilaginomycetes*

Order: *Ustilaginales*

Class: *Exobasidiomycetes*

Order: *Exobasidiales*

REFERENCES

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