

# CLASSIFICATION OUTLINE

\* These organisms may not be discussed in some semesters

## Domain: BACTERIA

(cocci, bacilli, spirilli; prokaryotic)

**Cyanobacteria** (blue-green bacteria, blue-green algae)

*Anabema* (has heterocysts)

*Oscillatoria*

*Spirulina*

\**Stigonema*

\**Scytonema*

\**Nostoc*

## Domain: ARCHAEA (prokaryotic)

Thermophilic, halophilic, and methanogenic forms

## Domain: EUKARYA

**KINGDOM: FUNGI** (chitin cell walls, no motile cells (except Chytrids); filamentous hyphae; mycelia; haploid; nutrition by absorption)

Division: **Zygomycota** (coenocytic hyphae, bread molds; zygosporangia)

*Rhizopus* (common bread mold)

*Pilobolus* (dung fungus; cap-thrower)

*Entomophthora* (parasitic on house flies)

*Phycomyces* (spiny zygosporangia)

Division: **Ascomycota** (sac fungi, lichen-forming fungi, imperfect fungi; asci and ascospores; septate hyphae)

**Class: Hemiascomycetes** (most yeasts) NO ASCOCARPS

*Saccharomyces* (baking and brewing yeast; budding)

*Schizosaccharomyces octosporus* (fission yeast)

**Class: Euascomycetes** WITH ASCOCARPS

*Peziza* (cup fungus; apothecium)

\**Microsphaera* (powdery mildew, cleistothecium)

*Morchella* (edible morel; modified apothecium)

*Claviceps purpurea* (ergot of rye; perithecium; sclerotium, stroma; St. Anthony's Fire)

*Sordaria* (perithecium; used in genetics lab)

*Tuber* (truffles, edible hypogeous fungi; pigs)

\**Physcia* (a foliose lichen)

other lichens (foliose, crustose, and fruticose forms)

**“Fungi Imperfecti” or “Deuteromycota”** (asexual only, conidia)

*Penicillium* (original source of penicillin, blue cheese)

*Aspergillus*

*Fusarium*

Division: **Basidiomycota** (club fungi; basidia and basidiospores)

CLASS: **Teliomycetes** (rusts) NO BASIDIOCARPS

*Puccinia graminis* (wheat rust; aecia, telia, uredinia,  
spermagonia; barberry)

cedar apple rust (junipers and apple trees)

CLASS: **Ustomycetes** (smuts) (formerly combined with the  
above Class)

*Ustilago maydis* (corn smut)

CLASS: **Basidiomycetes**

Series: **Hymenomycetes** (mushrooms;

BASIDIA ON THE BASIDIOCARP)

*Coprinus* (inky cap mushroom)

*Agaricus* (common edible mushroom)

bracket fungi, polypores, coral fungi

Series: **Gasteromycetes** BASIDIA IN THE  
BASIDIOCARP (puffballs, earth stars,

stinkhorns, bird’s nest fungi)

**KINGDOM: PROTISTA** (Protoctista) (grouped on the basis of  
food reserve, cell wall chemistry, flagella, and pigments, etc.)

**Heterotrophic Protists**

**“Fungal-Like Protists”**

Division: **Oomycota** (water molds; diploid, coenocytic hyphae;  
cellulose cell walls; tinsel and whiplash flagella)

*Saprolegnia* (“ich” on aquarium fish)

*Plasmopara viticola* (downy mildew of grape; fungicide)

*Phytophthora infestans* (late blight of potato)

Division: **Myxomycota** (plasmodial slime molds)

*Physarum* (plasmodial stage; myxamoebae; sporangia)

various other sporangial stages (National Geographic pictures)

Division: **Dictyosteliomycota** (Acrasiomycota) cellular slime  
molds; pseudoplasmodia)

*Dictyostelium* (sorocarps, amoeba; stalk cells, spore cells)

## “Animal-Like Protists - Protozoa”

Phylum: **Rhizopoda** (amoebas, heliozoans, radiolarians, foraminiferans)

*Amoeba*

Phylum: **Zoomastigina** (flagellates)

*Giardia*

*Trypanosoma gambiense* (African Sleeping Sickness)

*T. cruzi* (*Chagas' Disease*)

Phylum: **Ciliophora** (ciliates)

*Paramecium*

*Stentor*

*Vorticella*

Phylum: **Apicomplexa** (sporozoans)

*Plasmodium vivax* (malaria)

## Autotrophic “Algal” Protists

Division: **Bacillariophyta** (diatoms - centric and pennate types; valves, raphe, diatomaceous earth)

Division: **Dinophyta** (Pyrrhophyta)(dinoflagellates; red tides)

*Gymnodinium* (unarmored)

*Peridinium* (armored)

*Noctiluca* (bioluminescent)

Division: **Euglenophyta** (euglenoid flagellates, pellicle, paramylon)

*Euglena*

Division: **Phaeophyta** (brown algae; kelps, rockweeds; alginates; cold marine waters)

*Laminaria* (kelp; heteromorphic alternation of generations)

*Macrocystis* (kelps; each blade with a float)

*Nereocystis* (another large kelp with a single float)

*Fucus* (rockweed; diploid life cycle; receptacles, conceptacles)

*Sargassum* (Sargasso Sea; free-floating)

Division: **Rhodophyta** (red algae; no motile cells, phycobilins;  
warm marine waters; agar, carrageenan)

*Polysiphonia* (tetrasporophytes; carpospores; antheridia;  
carpogonia; carposporophytes)

*Corallina* (coralline red alga)

Division: **Chlorophyta** (green algae; ancestors of plants)

*Chlamydomonas* (a motile unicellular form)

*Volvox* (a huge motile colonial form)

*Hydrodictyon* (water net; non-motile-colonial)

*Acetabularia* (mermaid's wine glass; coenocytic, marine; used in  
development experiments)

*Ulva* (sea lettuce; isomorphic alternation of generations;  
marine)

*Micrasterias* (a desmid; non-motile unicell; semicells)

*Spirogyra* (filamentous; conjugation)

**KINGDOM: PLANTAE** (plants; all with heteromorphic  
alternation of generations cycle)

*GAMETOPHYTE GENERATION GREEN AND DOMINANT* ----- the  
"bryophytes"

**DIVISION: Hepatophyta** (liverworts, hepatics)

*Marchantia* (thallose liverwort; antheridiophores,  
archegoniophores, gemmae cups; calyptra)

*Conocephalum* (thallose liverwort)

*Porella* (leafy liverwort)

*Frullania* (leafy form with underleaves modified as pitchers)

**DIVISION: Anthoceroophyta** (hornworts)

*Anthoceros* (yellow spores; indeterminate growth of sporophyte)

**DIVISION: Bryophyta** (mosses; peristomes, seta, capsule,  
gametophore, protonema)

*Mnium* (typical moss; antheridia, archegonia; acrocarpous)

*Polytrichum* (salt-shaker dispersal, epiphragm; acrocarpous)

*Sphagnum* (peat mosses; pseudopodium, hyaline and  
chlorophyllose cells; bogs)

*SPHOROPHYTE GENERATION GREEN AND DOMINANT* -----

**VASCULAR PLANTS** (those with xylem and phloem)-----

NON-SEED VASCULAR PLANTS (vascular cryptogams)

Division: **Rhyniophyta** (extinct)

*Rhynia*

Division: **Lycopodiophyta** (club mosses, lycophytes;  
microphyllous leaves)

*Lycopodium* (sporangia in strobili; homosporous)

*Huperzia* (sporangia in axils of the leaves)

*Selaginella* (heterosporous; megasporangia, microsporangia)

*Isoetes* (quillworts; heterosporous)

*Lepidodendron* (fossil scale tree)

Division: **Pteridophyta**

(ferns; megaphyllous leaves or megaphyllous-like leaves)

**“Typical Ferns”** (leptosporangiate and eusporangiate types;

Ophioglossales, Filicales, Marattiales, Salviniiales,  
Marsileales)

*Polypodium* (no indusium)

*Cyrtomium* (with an indusium)

*Marsilea* (water fern; heterosporous)

*Salvinia* (water fern)

*Azolla* (water fern)

**Wisk Ferns** (Psilotales; psilophytes)

*Psilotum* (whisk fern; no leaves, roots; protosetle)

**Hortsetails and Scouring Rushes** (Equisetales)

*Equisetum* (whorls of branches; homosporous,  
sporangiophores)

*Calamites* (fossil member)

SEED PLANTS=====

GYMNOSPERMS GROUPS

Division: **Coniferophyta** (conifers; lab key)

*Pinus* (pine)

*Tsuga* (hemlock)

*Picea* (spruce)

*Juniperus* (junipers, red cedar)

*Pseudotsuga* (douglas fir)

*Abies* (fir)

*Larix* (larch)

*Taxus* (yew)

Division: **Cycadophyta** (cycads; motile sperm; fern-like leaves;

large cones; male and female plants)  
*Cycas* (sago palm; common ornamental)  
*Zamia* (only cycad native to the U.S.)

Division: **Ginkgophyta** (ginkgo; extinct in the wild)  
*Ginkgo biloba* (ginkgo, maidenhair tree; male and female trees)

Division: **Gnetophyta** (vessels in xylem; no archegonia)  
*Gnetum* (tropical vines)  
*Ephedra* (Mormon tea; SW desert areas)  
*Welwitschia* (wierd plant of SW Africa)

ANGIOSPERMS-----

Division: **Anthophyta** (flowering plants; flowers, fruits, double  
fertilization)  
**CLASS: Monocotyledones** (monocots)  
**CLASS: Eudicotyledones** (eudicots)