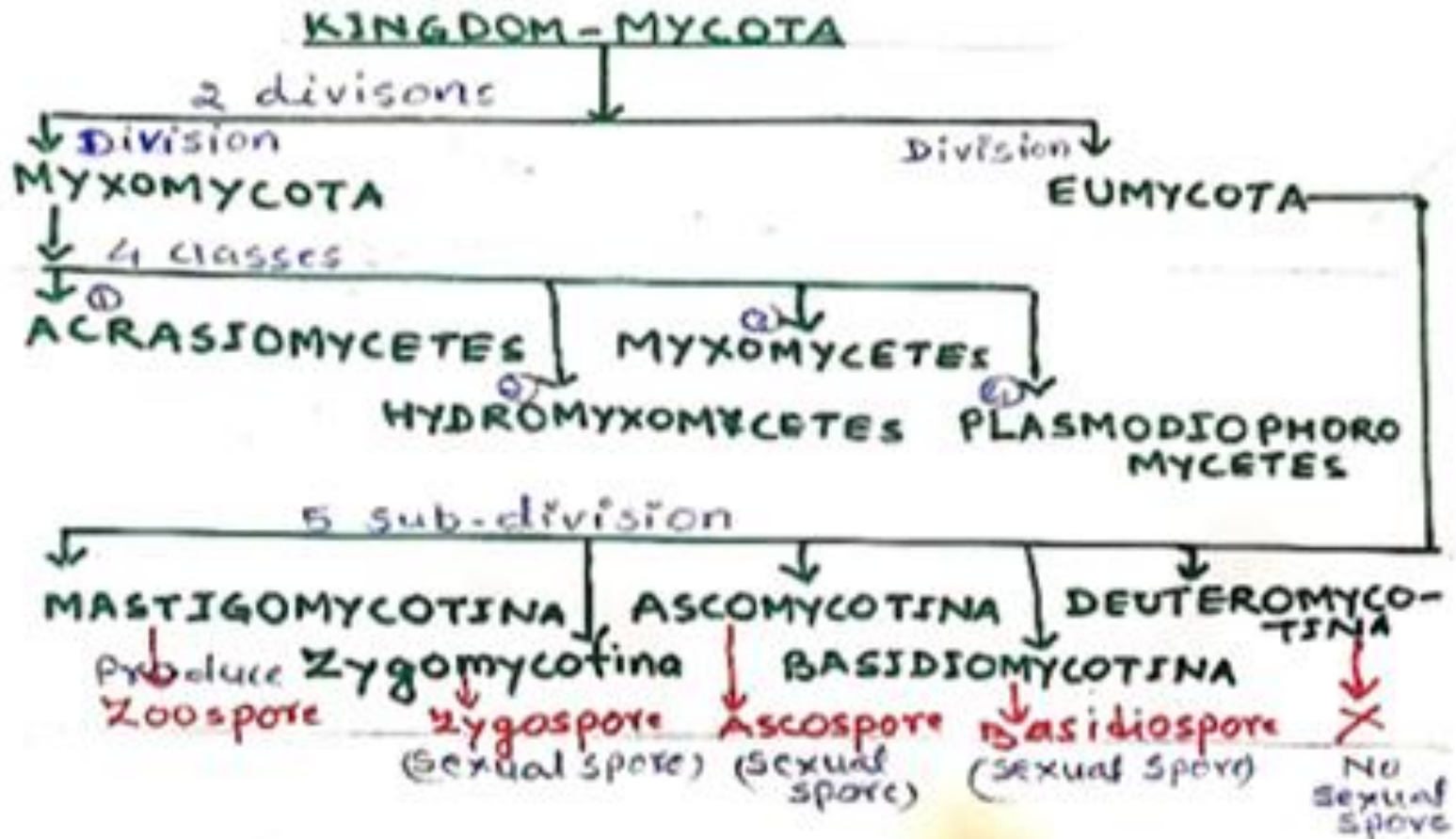


B.Sc. I Paper I
Unit III
Outlines of Classification of Fungi

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Classification of fungi

A more natural system of the classification of fungi was proposed by G.C. Ainsworth (1966, 1971, 1973). He included all fungi in the kingdom Mycota. An outline of his classification as follows :-



① Sub-division MASTIGOMYCOTINA

is divided into 3 classes

- ① CHYTRIDIOMYCETES
- ② HYPHOCHYTRIDIOMYCETES
- ③ OOMYCETES

② Sub-division ZYGOMYCOTINA

is divided into 2 classes

- ① ZYGOMYCETES
- ② TRICHOMYCETES

③ Sub-division ASCOMYCOTINA

is divided into 6 classes

- ① HEMIASCOMYCETES
- ② PLECTOMYCETES
- ③ PYRENOMYCETES
- ④ DISCOMYCETES
- ⑤ LABDOLOBENIOMYCETES
- ⑥ LOCULOASCOMYCETES

④ sub-division-BASIDIOMYCOTINA

is divided into 3 classes

- ① TELIOMYCETES
- ② HYMENOMYCETES
- ③ GASTEROMYCETES

⑤ Sub-divi. DEUTEROMYCOTINA

- ① BLASTOMYCETES
- ② HYPHOMYCETES
- ③ COELOMYCETES

Distiguishig charecters of taxa

Kingdom – Mycota

1. Chlorophyll absent
2. Reserve food glycogen
3. Cell wall of fungal cellulose

I. Divison Myxomycota

1. Thallus without cell wall
2. thallus is nacked mass of protoplasm

II Divison- Eumycota

1. Presence of definite cell wall
2. Assimilatory phase is filamentous

Divison Eumycota is divided in five sub-divisions

1. Sub-division Mastigomycotina :

One large group of the Mastigomycotina is aquatic. While another group of the Mastigomycotina are primarily terrestrial, although the organisms still form motile zoospores when open water is available

The members of Mastigomycotina produce flagellated zoospores in their life cycle.

Most of them are filamentous and have coenocytic mycelium. However, unicellular form is present, and some genera show the pseudosepta (false cross wall) formation.

Live either as saprophytes or parasites.

The sexual spores are Oospores common in almost all Mastigomycotina.

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Three classes are included in this sub-division, on the basis of zoospore and oospore

a) Class -Chytridiomycetes –

- Thallus unicellular.
- Zoospore uniflagellate,
- Flagella - posterior, whiplash type

Order 1 –Chytridiales, Family – Synchytriaceae, Ex –
Synchytrium

b) Class -Hyphochytridiomycetes,

- Thallus unicellular.
- Zoospore- uniflagellate
- Flagella - anterior, tinsel type

Order 1–Hyphochytriales, Family-Hyphochytriaceae
ex*Hyphochytrium*

c) Class –Oomycetes

- Thallus mycelial
- Zoospore - biflagellate , posterior flagella whiplash type and anterior flagella - posterior flagella whiplash type and anterior tinsel type.

Order 1 – Saprolegniales, Family – Saprolegniaceae Ex –*Saprolegnia*

Order 2 – Peronosporales

1. Family – Pythiaceae, ex - *Pythium*
2. Family - Peronosporaceae, ex- *Peronospora*
3. Family – Albuginaceae , ex- *Albugo*

2. Sub-division -Zygomycotina

Most of the Zygomycotina are present in soil and dung, occurring mostly as saprophytes; few are parasitic on plants and animals.

- Vegetative (somatic) body is Haploid .
- Thallus is usually mycelial, hyphae coenocytic.
- Cell wall is made up of chitin and chitosan.
- Asexual reproduction occurs most commonly by the formation of nonmotile, unicelledsporangiospores.
- Flagellated spores and gametes are absent in this division.
- Sexual reproduction occurs with the fusion of two multi-nucleate gametangia to produce a zygospre.

Two classes are recognized in this sub -division .

a) Class –Trichomycetes

- Mycelium not immersed in host tissue
- Parasite on arthropods

b) Class - Zygomycetes.

- Mycelium immersed in host tissue
- Usually saprophytic or parasitic

Order 1– Mucorales,

1. Family – Mucoraceae ex- *Mucor*
2. Family – Pilobolaceae , ex- *Pilobolus*

3. Sub-division-Ascomycotina(sac fungi)

Members of the Ascomycotina are known as the Sac Fungi.

- These fungi possess well-developed, profusely branched mycelium except the unicellular yeasts.
- Hyphae with regular cross-walls called septa and haploid which are centrally perforated to allow movement of cytoplasm, and sometimes nuclei between compartments.
- The hyphal cells of the vegetative mycelium may be either uninucleate or multinucleate.
- Cell walls are composed mostly of chitin.
- All produce an ascus (sac-like structure) that contains haploid (n) ascospores after meiosis .
- A dikaryotic phase is produced – the ascogenous hyphae represent the dikaryotic hyphae.
- Six classes are recognized in this sub -division

Order1 - Sphaeriales

1. Family – Sordariaceae, ex - *Neurospora*
2. Family-Xylariaceae,ex -*Xylaria*
3. Family – Clavicipitaceae, ex - *Claviceps*

a) Class - Hemiascomycetes

- Asci naked.
- No ascocarp and ascogenous hyphae.

Order 1 – Endomycetales, Family – Saccharomycetaceae
ex –*Saccharomyces*

b) Class Plectomycetes

- Asci unitunicate
- Fruiting body cleisthecium

Order 1 - .Erysiphales, Family – Erysiphaceae ,Ex - *Erysiphe*

Order 2- Eurotiales, Family – Eurotiaceae,ex – *Eurotium*

c) Class - Pyrenomycetes

- Asci unitunicate
- Fruiting body perithecium

Order 1 - Sphaeriales

1. Family – Sordariaceae, ex - *Neurospora*
2. Family-Xylariaceae, ex -*Xylaria*
3. Family – Clavicipitaceae, ex – *Claviceps*

d) Class-Discomycetes

- Asci unitunicate
- Fruiting body apothecium

Order 1– Pezizales

1. Family – Pezizaceae, ex – *Peziza*
2. Family – Helvellaceae, ex - *Morchella*

e) Class Laboulbeniomycetes

- Fruiting body perithecium
- Asci unitunicate
- Exoparasite on arthropode

e) Class Laboulbeniomycetes

- Fruiting body perithecium
- Asci unitunicate
- Exoparasite on arthropode

f) Class Loculoascomycetes

- Asci bitunicate
- Ascocarp an ascstroma

4. Sub-division -Basidiomycotina (Club fungi)

Basidiomycotina are mostly terrestrial and saprophytic or parasitic and also contains important obligate parasites, two important plant pathogens the rusts and smuts.

- The mycelium is septate, Dolipore septa is present. The mycelium of the Basidiomycotina in most species have three distinct phases during the life cycle of the fungus:-
- Primary mycelium -When it germinates, a basidiospore produces haploid septate primary mycelium .
- Secondary mycelium -Commonly a secondary mycelium forms upon conjugation of two sexually compatible hyphae. Thus dikaryotic mycelium is formed.

- Tertiary mycelium is simply a mass of secondary mycelium.
- The dominant phase of the life cycle is dikaryotic mycelium. As the dikaryotic mycelium grows, the cells divide and more septa are formed between the new cells.
- Each of the new cells in the secondary mycelium has one haploid nucleus from each parent. This is due to clamp connections, specialized structures unique to the Basidiomycotina.

Three classes are recognized in this sub -division

a) Class-Teliomycetes

- Basidiocarp lacking,
- Teliospore grouped in sori or scattered within the host tissue.

Order 1–Ustilaginales, Family – Ustilaginaceae, ex – *Ustilago*

Order 2- Uridinales, Family – Pucciniaceae , ex - *Puccinia*

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Order 2- Uridinales, Family – Pucciniaceae , ex – *Puccinia*

b) Class -Hymenomycetes

- Basidiocarp present, basidia arranged in hymenium
- Completely or partly exposed on maturity

Order 1– Exobasidiales , Family – Exobasidiaceae,ex-. *Exobasidium*

Order 2–Agaricales ,Family – Agaricaceae , ex - *Agaricus*

Order 3–Aphyllorphorales, Family – Polyporaceae ex –*Polyporus*

c) Class -Gasteromycetes

- Basidiocarp present, basidia arranged in hymenium,
- Enclosed within the basidiocarp , basidia aseptate

Order 1- Lycoperdales ,Family - Lycoperdaceae , ex - *Lycoperdon*

5. Sub-division -Deuteromycotina (Fungi Imperfecti)

The Deuteromycotina are characterized by a well-developed, septate mycelium, Cell walls- Usually chitin and glucan.

- Asexual reproduction is by means of conidia (sing.=conidium) or may be lacking.
- Sexual reproduction is not known; thus these are the "imperfect Fungi."

Three classes are recognized in this sub -division

a) Class –Blastomycetes

- True mycelium lacking, budding cells with or without promycelium.

a) Class-Teliomycetes

- Basidiocarp lacking,
- Teliospore grouped in sori or scattered within the host tissue.

Order 1–Ustilaginales, Family – Ustilaginaceae, ex – *Ustilago*

Order 2- Uridinales, Family – Pucciniaceae , ex – *Puccinia*

b) Class -Hymenomycetes

- Basidiocarp present, basidia arranged in hymenium
- Completely or partly exposed on maturity

Order 1– Exobasidiales , Family – Exobasidiaceae,ex-. *Exobasidium*

Order 2–Agaricales ,Family – Agaricaceae , ex - *Agaricus*

Order 3–Aphyllorphorales, Family – Polyporaceae ex –*Polyporus*

c) Class -Gasteromycetes

- Basidiocarp present, basidia arranged in hymenium,
- Enclosed within the basidiocarp , basidia aseptate

Order 1- Lycoperdales ,Family - Lycoperdaceae , ex - *Lycoperdon*

b) Class-Hyphomycetes

- Mycelium sterile or bearing spores directly or on special branches.
- Not aggregated in pycnidia or acervuli

Order 1- Moniliales

1. Family –Dematiaceae ,ex- *Alternaria*
2. Family - Moniliceae ex - *Piricularia*
3. Family -Tuberculariaceae ex – *Fusarium*

c) Class -Coelomycetes:

- Conidia borne in pycnidia or acervuli

Order1-Melanconiales

1. Family,Melanconiaceae,ex- *Colletotrichum*