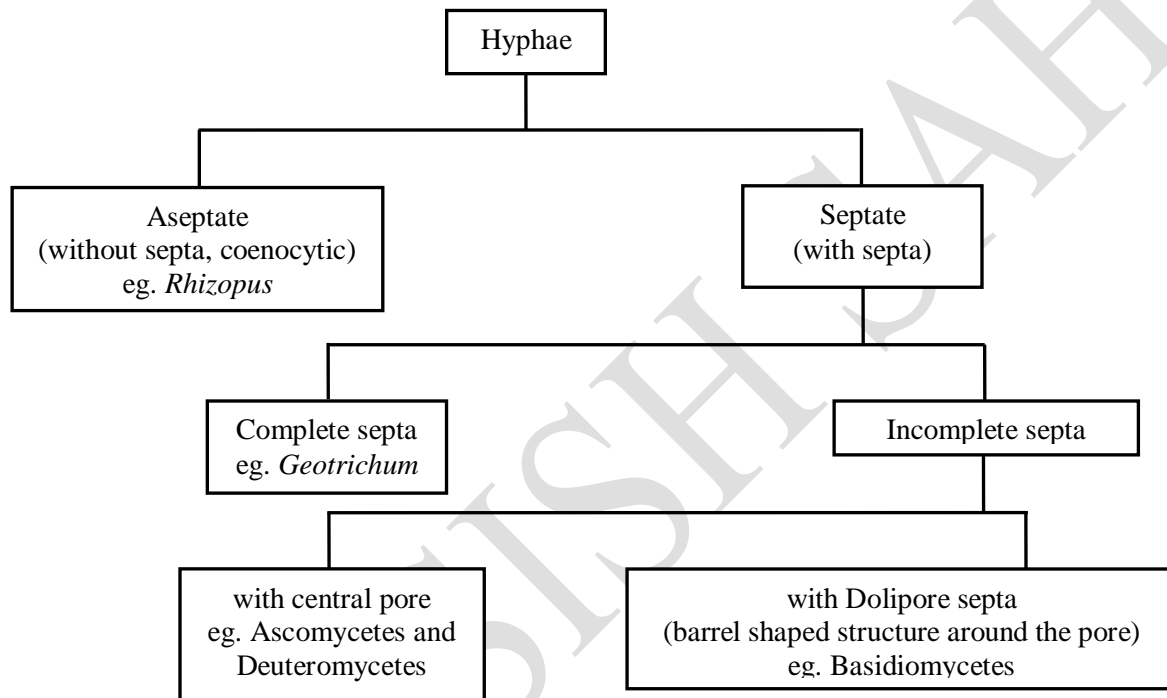


Mycology : The study of fungi.

Father of Mycology : Pier Antanio Micheli

Fungal Mycelium :

- **Mycelium** : The somatic body of a fungus composed of assemblage of hyphae. A few fungi are unicellular, e.g., *Synchytrium*, *Saccharomyces* (Yeast). *Saccharomyces* can form pseudo-mycelium by addition of immature buds.
- **Hyphae** : The branched or unbranched thread like unit of mycelium.
- **Types of Hyphae** :



Fungal Spores :

Spores, unit of asexual reproduction are of two types,

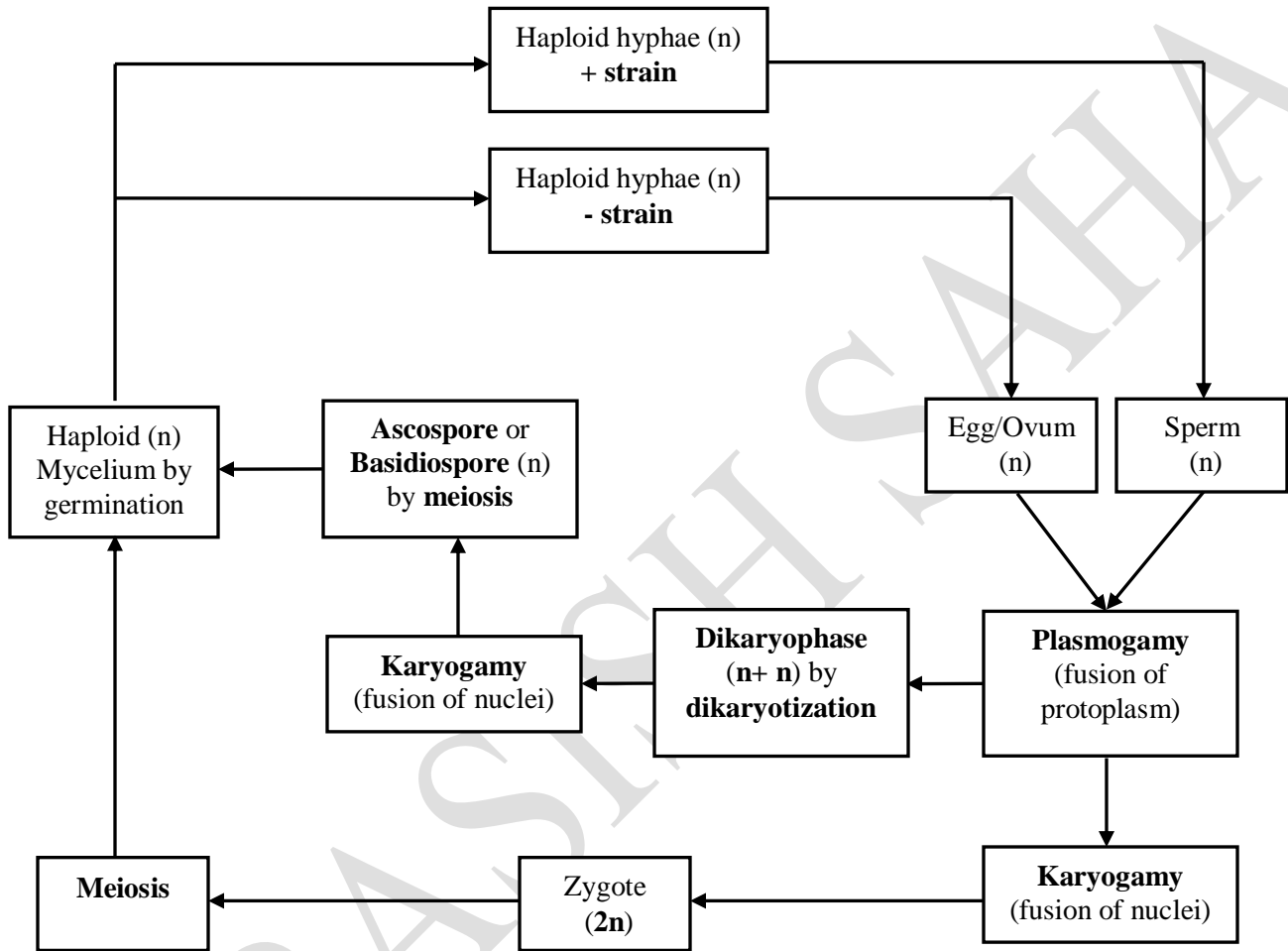
Mitospores (formed after mitosis), eg. Zoospores, Sporangiospores, Conidia, Aplanospores.

Meiospores (formed after meiosis), eg. Ascospores, Basidiospores.

- **Zoospores** : **Endogenous** flagellate spores occurring in aquatic fungi, without true cell wall. eg. *Saprolegnia*, *Allomyces*. The spores are formed in **zoosporangia**.
- **Aplanospores** : Endogenous nonmotile thick walled resting spores formed under of unfavourable conditions. eg. *Mucor*.
- **Sporangiospores** : Nonmotile spores which developed endogenously inside sporangia, dispersed by wind.
- **Conidia** : Nonmotile spores developed in chains **exogenously** at the tip of special hyphae called **conidophores**, dispersed by wind.

- **Ascospores** : Nonmotile sexual endogenous meiospores formed in special reproductive structure called **ascus** in Ascomycetes.
- **Basidiospores** : Nonmotile sexual exogenous meiospores developed on club-shaped **basidium** in Basidiomycetes.

Sexual Cycle :



Classes of Fungi :

Class	Mycelium	Veg./Asexual Reproduction	Sexual Reproduction	Examples
Phycomycetes	Aseptate, Coenocytic	by biflagellate heterokont Zoospores (motile), Aplanospores or Sporangiospores	by Zygospor (in Zygomycetes) or Oospore (in Oomycetes) formed by anisogamous to oogamous fertilization (gametangial conjugation or gametangial contact respectively)	<i>Mucor</i> , <i>Rhizopus</i> (Zygomycetes), <i>Phytophthora</i> , <i>Albugo</i> (Oomycetes) (MRP A)
Ascomycetes (Sac fungi)	Unicellular (yeast) or incompletely septate hyphal	by conidia on conidiophore	by Ascospore produced in sac like Ascus of Ascocarp after dikaryotisation	<i>Saccharomyces</i> , <i>Claviceps</i> , <i>Penicillium</i> , <i>Aspergillus</i> ,

	mycelium			<i>Neurospora</i> (SC PAN)
Basidiomycetes (Club fungi)	Septate mycelium with Dolipore septum	by Fragmentation	by Basidiospore produced on club like Basidia of Basidiocarp after dikaryotisation	<i>Agaricus</i> , <i>Puccinia</i> , <i>Ustilago</i> (APU)
Deuteromycetes (Fungi imperfecti)	Unicellular or septate mycelium	by conidia	not known	<i>Alternaria</i> <i>Colletotrichum</i> <i>Trichoderma</i> (ACT)

Useful Effects :

Name	Importance
<i>Penicillium</i>	Penicillin antibiotic
<i>Trichoderma polysporum</i>	Cyclosporin-A (immuno-suppressent), Biopesticides
<i>Monascus purpureus</i>	Statin (anti-cholesterol)
<i>Candida lipolyica</i>	Lipase
<i>Aspergillus niger</i>	Citric acid, Pectinase, Amylase
<i>Aspergillus oryzae</i>	Soya sauce, Protease
<i>Morchella</i> (Ascomycetes), <i>Volvariella</i> , <i>Pleurotus</i> (Basidiomycetes)	Mushroom
<i>Saccharomyces</i> (yeast)	Alcohol, Baking
<i>Fusarium</i>	SCP
<i>Penicillium roquefortii</i>	Roquefort cheese

Harmful Effects :

Name	Importance
<i>Phytophthora infestans</i>	Late blight of potato
<i>Aspergillus</i>	Aspergillosis (resperiatory system disease) in animals, Aflatoxin
<i>Puccinia graminis tritici</i>	Rust of wheat
<i>Claviceps</i>	Ergot of rye
<i>Amanita verna</i> , <i>Agaricus</i>	Poisonous fungi
<i>Alternaria solani</i>	Early blight of potato
<i>Colletotrichum fulcatum</i>	Red rot of sugarcane

Symbiotic relationships :

(I) **Lichens** : Symbiotic association between fungus and algae.

- **Types -**

- (i) **Leprose** - *Lepraria incana*.
- (ii) **Crustose** - *Rhizocarpon*, *Lecanora*.
- (iii) **Foliose** - *Parmelia*, *Physica*.
- (iv) **Fruticose** - *Ramalina*, *Cladonia*, *Usnea*.

- **Lichen Partners** : Fungus partner or **mycobiont** (generally **Ascomycetes**) and algal partner or **phycobiont** (**Cyanophyceae** or **Chlorophyceae**).

Phycobiont performs (i) Photosynthesis, (ii) Nitrogen fixation, if cyanophycean, (iii) Secretes vitamins &

hormones.

Mycobiont takes part in (i) Protection from desiccation and harmful radiations, (ii) Attachment, (iii) Absorption and retention of moisture from dew, rain and wet air and (iv) Absorption of minerals

- **Reproductive structures :** (i) **Isidia** and (ii) **Soredia**
- **Importance :**
 - (i) **Biological Succession :** Act as **pioneer species in ecological succession.**
 - (ii) **Pollution indicators :** Fruticose and foliose lichens are **indicator of SO₂ pollution** (air pollution).

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(II) **Mycorrhiza** : Symbiotic association between a fungus and the root of a higher plant (Angiosperms or Gymnosperms).

- Differences between **Ectomycorrhiza** & **Endomycorrhiza (VAM)**

Ectomycorrhiza	Endomycorrhiza (VAM)
i) Fungus mantle over the external root surface ii) Fungal hyphae do not enter inside cortical cells.	i) Mantle is absent. ii) Fungal hyphae enter inside cortical cells forming vesicles and arbuscules (so Vesicular Arbuscular Mycorrhiza/VAM)

- **Advantages of Mycorrhizal Association :**

- i) Increased absorption of Minerals like nitrogen, **phosphorus** and potassium.
- ii) Enhanced Absorption of Water.

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