

Lab-1-

Classification of fungi :

Classification : is the systematic arrangement of organisms into groups based on specific standards .

Standard Endings :

Phylum	.....	mycota
Sub phylum	.....	mycotina
Class	.....	mycetes
Subclass	.....	mycetidae
Order	.....	ales
Family	.....	aceae

The fungal characteristics that use in Classification :

- ❖ Cell wall
- ❖ The cell wall chemical component
- ❖ Somatic phase
- ❖ Reproduction
- ❖ Nutrition
- ❖ The structural that formed by fungi
- ❖ Fruiting bodies
- ❖ Spores

Fungal Webster , Weber and Hibbett Classification(2007):

1- Kingdom : protozoa (protista)

Phylum : myxomycota

Phylum : plasmodiophoromycota

2- Kingdom : Chromista (Stramenopila)

Phylum : Hyphochytriomycota

Phylum : Labrinthulomycota

Phylum : Oomycota

3- Kingdom : Fungi

Phylum : Chytridiomycota

Phylum : Zygomycota

Phylum : Ascomycota

Phylum : Basidiomycota

Phylum : Deutromycota

Kingdom : Fungi

Phylum : Chytridiomycota

General characteristics :

- ❖ Chytrids are the most primitive group of fungi and the only group that possess gametes with flagella.
- ❖ having zoospores (motile cells) with a single, posterior, whiplash structure (flagellum).
- ❖ Species are microscopic in size
- ❖ Most are found in freshwater or wet soils
- ❖ Most chytrids are unicellular; a few form multicellular organisms
- ❖ No septa between cells (coenocytic).
- ❖ Chytrids are important as degrader of cellulose, keratin.
- ❖ They reproduce both sexually and asexually
- ❖ Most are parasites of [algae](#) and animals or live on organic debris (as saprobes).
- ❖ Sometimes controlling algal blooms .
- ❖ A few species in the order Chytridiales cause [plant disease](#), and one species, [Batrachochytrium dendrobatidis](#), has been shown to cause disease in frogs and amphibians

Habitat :

Chytrids usually live in aquatic environments, although some species live on land. Some species thrive as parasites on plants, insects, or amphibians, while others are saprobes. Some chytrids cause diseases in many species of amphibians, resulting in species decline and extinction .

Class : Chytridiomycetes

Order: Rhizophydiales

Ex: [Batrachochytrium dendrobatidis](#)

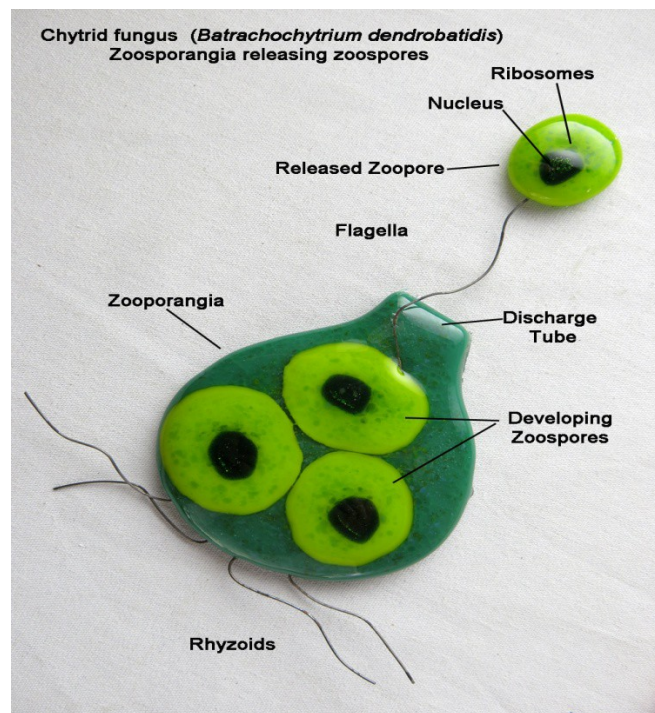
parasitic chytrid fungus that has been associated with population declines in endemic amphibian species in upland montane rain forests in Australia and Panama. It causes chytridiomycosis (fungal infection of the skin), or more specifically chytridiomycosis, in wild and captive amphibians. First described in 1998, the fungus is the only chytrid known to parasitise vertebrates. *B. dendrobatidis* can remain viable in the environment (especially aquatic

Practical fungi Classification

environments) for weeks on its own, and may persist in latent infections. Some amphibian species appear to have an innate capacity to withstand chytridiomycosis infection due to symbiosis with *Janthinobacterium lividum* .

B. dendrobatidis infects the **keratinized** skin of **amphibians**. The fungus in the epidermis has a **thallus** bearing a network of **rhizoids** and smooth-walled, roughly spherical, **sporangia**. Each sporangium produces a single tube to discharge spores.

Zoospores of *B. dendrobatidis*, which are typically 3-5 **µm** in size, have an elongate-ovoidal body with a single, posterior **flagellum** (19-20 µm long), and possess a core area of **ribosomes** often with membrane-bound spheres of ribosomes within the main ribosomal mass



B. dendrobatidis can grow within a wide temperature range (4-25 °C), with optimal temperatures being between 17-25 °C .

Lab-2-

Order :Chytridiales

General Characters of Chytridiales:

- 1- This order includes 65 genus and 300 species. They are the most primitive and simplest members of true fungi. They are often called the chytrids. The latter are restricted to the wet soil. A few species are marine. Many chytrids are parasitic and others saprophytic. The fresh water species parasitize algae
- 2- Members live within the host cell and in some of them reproductive structures are produced within the host cell.
- 3- The rhizomycelium is embedded in the host tissue. The endobiotic species are considered primitive. The thallus in all the chytrids is a single cell. The cell wall consists of fungal chitin or both fungal chitin and cellulose. In the eucarpic species, the thallus develops a system of rhizoid- like fine hyphal branches constituting rhizomycelium.
- 4- forming zoospores that escape through an opening formed by the separation of a minute, circular cap-like lid or operculum at the end of a discharge tube.

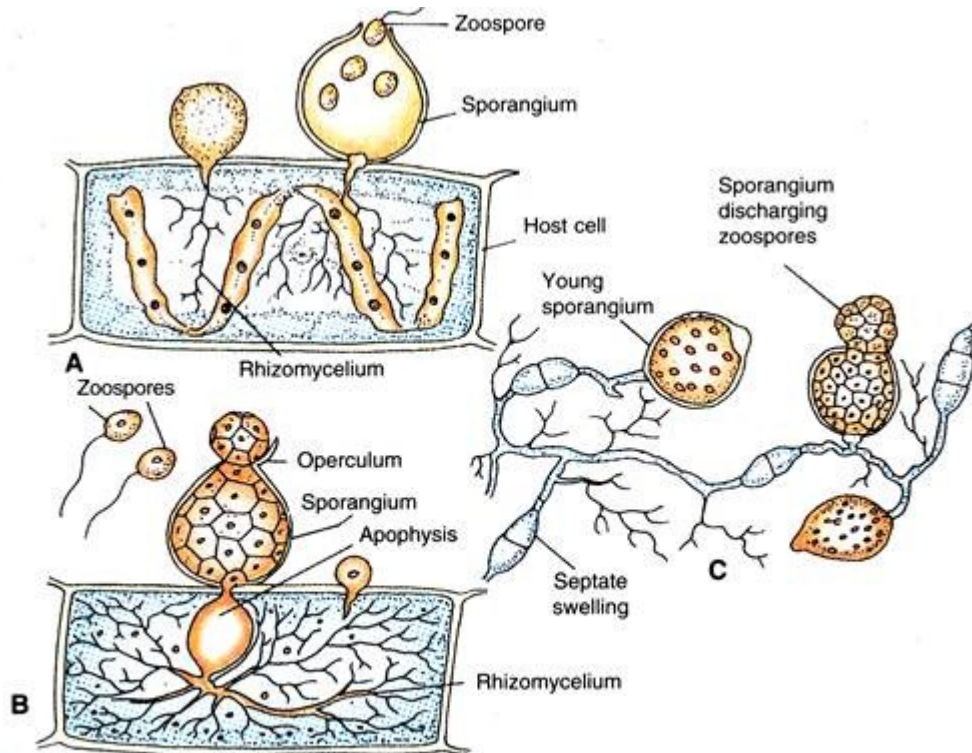


Fig. 4.2 (A-C). Epibiotic chytrids. A, *Rhizophidium* on algal host; B, *Chytridium lagenaria* on algal host (monocentric); C, *Cladochytrium tenue* (Polycentric).

Family :synchytriaceae

The family was described by German mycologist Joseph Schröter in 1892. The type genus, *Synchytrium*, contains about 200 species of fungi that are parasitic on flowering plants, ferns, and algae.

EX: *Synchytrium endobioticum* is a chytrid fungus that causes the **potato wart** disease or **black scab**. It also infects some other plants of the *Solanum* genus, an economically important disease of cultivated potato.

Order : Spizellomycetales

is an order of fungi in the Chytridiomycetes. chytrids are essentially ubiquitous zoospore-producing fungi found in soils where they decompose pollen. Recently they have also been found in dung and harsh alpine environments .

EX: *Spizellomyces punctatus*

Role in the environment:

Practical fungi Classification

chytrids have **beneficial** roles in the soil for nutrient recycling and as parasites of organisms that attack plants, such as nematodes and oospores of downy mildews. On the other hand, they also have **harmful** roles as parasites of mycorrhizae, symbiotic fungi that help plants gain essential nutrients .

Class 1: Taphrinomycetes

Inhabit :

Most of these fungi live Naked ascus , saprotrophic or parasitic nutrition linked to plants in one way or another, Some live on plant secretions while others live on plant nectar or live on sugary secretions on the surface of healthy or rotting fruits. also some species living symbiotic with some insects especially beetles are called the foods of the gods (Ambrosia fungi) , **the ambrosia symbiosis of wood-boring beetles and fungi** . figure (1)

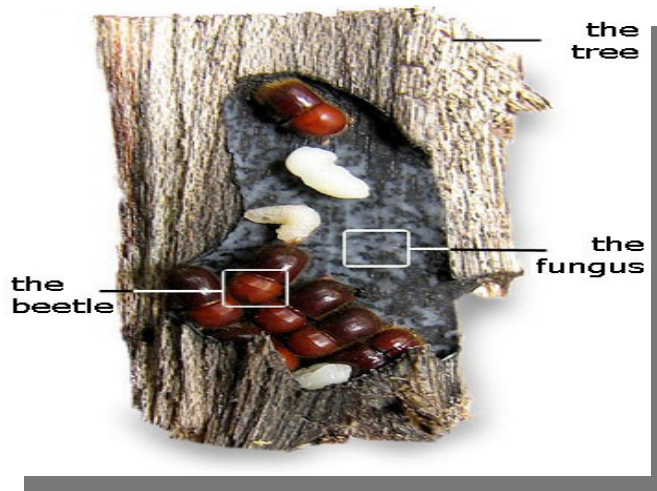


Figure (1) ambrosia symbiosis

Economic importance :

- 1- These fungi are responsible for most important fermentation processes in the food industry.
- 2- caused damage to stored food ..
- 3- used in the Vitamins industry
- 4- caused some plant diseases such as *Taphrina* sp. .
- 5- The saprotrophic fungus is responsible for the decomposition of plant and waste residues.
- 6- some species that parasitism on humans caused diseases such as *Pneumocystis* sp.

Order : Taphrinales :

This order includes a variety of fungus, all parasitic fungi on vascular plants, causing an increase in the growth of infected tissues. The disease symptoms appear on infected plants such as wrap leaves, which affects leaves of trees peach and almond , This order includes two families

Family 1: Taphrinaceae

This family includes about 118 species of Genus *Taphrina* sp. which grow as yeasts by budding during one phase of their life cycles, then infect plant tissues in which typical hyphae are formed this condition called **Dimorphic** .

Taphrina deformans is one of the most important fungi of this family, which causes Peach Leaf Curl disease. Figure (2)

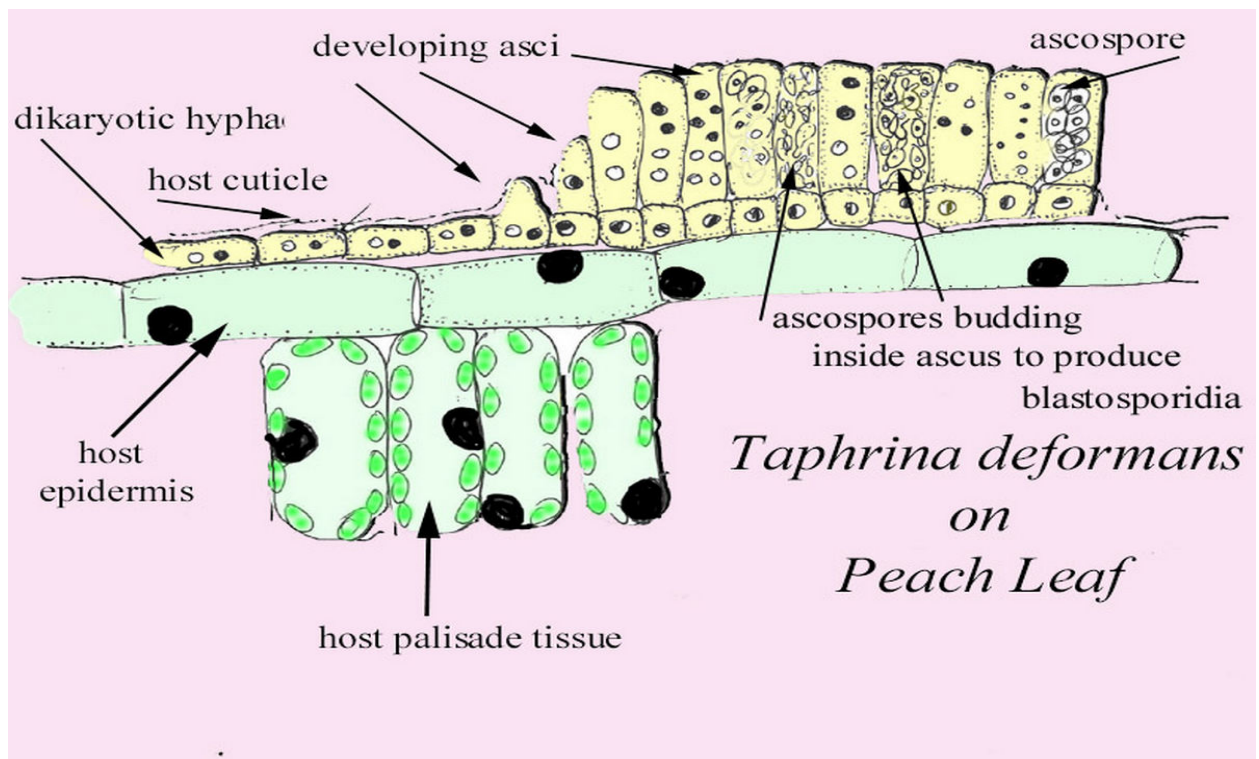


Figure (2) *Taphrina deformans*

Family 2: Protomyctaceae

The most important species of this family is the fungus *Protomyces macrospores*, which causes **Life gall disease** of a group of plants belonging to the Umbelliferae family such as metal, celery, carrots and coriander.

Class 2: Schizosaccharomycetes

Order : Schizosaccharomycetales

Family : Schizosaccharomycetaceae

Ex : *Schizosaccharomyces* sp.

Is a genus of fission yeasts. The most well-studied species is *S. pombe*, At present four *Schizosaccharomyces* species have been described (*S. pombe*, *S. japonicus*, *S. octosporus* and *S. cryophilus*). is a significant model organism in the study of eukaryotic cell biology. This yeast has contributed to the knowledge of many genetic information that has been reported in reaching a cure for many diseases, especially cancer , Yeasts reproduce by budding or forming spores called **Blastospores**. Sometimes the bud is not separated from the mother forming **pseudohypha** which is a chain of linked buds. Figure (3)

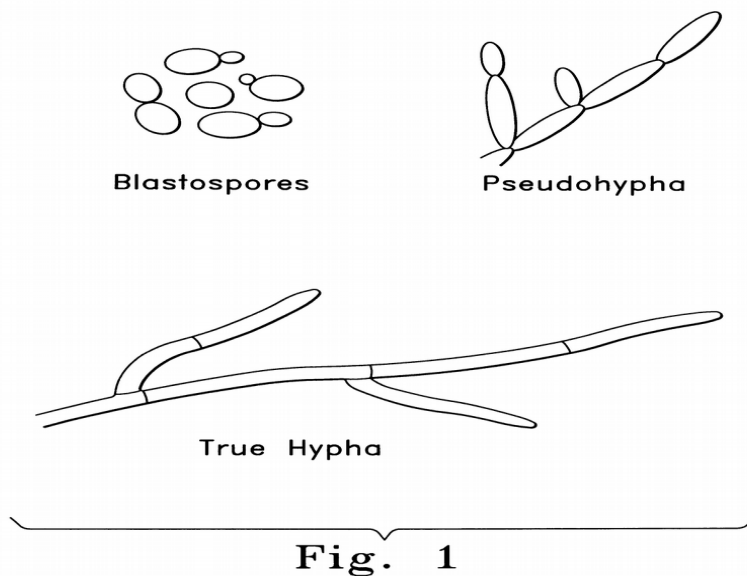


Figure (3) Blastospores

Ex : *Pneumocystis* sp.

Is not commonly found in the lungs of healthy people, but, being a source of opportunistic infection, it can cause a lung infection in people with a weak immune system. *Pneumocystis pneumonia* is especially seen in people with cancer undergoing chemotherapy .

Class 3: Saccharomycetes

Order : Saccharomycetales

Ex : *Saccharomyces cerevisiae*

It is species of yeast , the microorganism behind the most common type of fermentation. *S. cerevisiae* cells are round to ovoid, 5–10 µm in diameter. It reproduces by a division process known as budding or forming spores called Blastospores .

Class 4: Pezizomycetes

Order : Pezizales

This order consists of a group of fungi whose fruit bodies are Disc shape or Apothecium, which are open from the beginning or closed from the beginning and then open later. The fruiting body is relatively large, sometimes up to 10-15 cm in size, bright colors and fruiti Is a large genus of saprophytic cup fungi that grow on the ground, rotting wood, or dung. Most members of this genus are of unknown edibility and are difficult to identify as separate species without use of microscopy. The genus has been estimated to contain over 100 species .

Class 5 : Eurotiomycetes

Order : Eurotiales

This order consists of fungus characterized by the formation of closed fruit bodies Cleistothecium composed of pseudo- histological tissue fungal and asxual reproduction by the formation of conidates, containing seven families, including the most important Eurotiaceae, which includes several species, most notably *Aspergillus* sp, *Penicillium* sp.

Ex 1 : *Penicillium* sp.

The researcher(link) is the first who diagnosis *Penicillium* in 1809, *Penicillium* includes a list of 227 species worldwide, isolated from environments such as air,

soil, food waste, fruits, vegetables, fodder, and enclosed environments. and have ability to attack food products, fruits and fodder because of their ability to grow in severe conditions, including growth in oxygen Low levels and high levels carbon dioxide, even at low temperatures .

Penicillium digitatum (Green Mold) is an important and common species that causes green fruit rot, The most common post-harvest diseases, causes major Economic losses, usually affecting most types of fruits, especially citrus.

Penicillium expansum (Blue Mold) is one of the most important causes of blue rot of post-harvest fruits and causes major economic losses annually. This type is known to cause the production of carcinogenic Mycotoxins. Patulin has been found in many samples of apple fruit Infected with this species.

Ex 2 : *Aspergillus* sp.

Aspergillus is an opportunistic pathogenic fungi that cause of the aspergillosis disease, This genus has about 200 species that grow in different environments. This fungus is common and all species of *Aspergillus* generally produce spores Conidia, which is best germinated at a temperature close to 35 ° C, has some species of *Aspergillus* that High ability to resist Inappropriate environmental conditions through the production of sexual phases or stone objects.

Aspergillus niger is one of the most important fungal species which is characterized by spores of black color and is called black mold (Black Mold).

Aspergillus flavus is a widespread fungal species in tropical and subtropical regions that causes damage to poorly stored crops. *A.flavus* produces aflatoxins, the most Mycotoxins dangerous, either lethal or carcinogenic to the liver.

Lab-7-

Class : Pyrenomycetes :

General characteristics :

- 1- monophyletic group
- 2- fruiting body generally Perithecium or Cleistothecium and sometimes inside Ascostroma .
- 3- Hymenium layer clear.
- 4- Ascospore Oval shape monocular wall .

Order : Chaetomiales :

General characteristics :

- 1- Ascospores not clear , fruiting body Perithecium can Identified clearly by forming threads in the base.
- 2- The most members of this order live on cellulose, so most of them live on the leaves and cotton fiber , saprophytism nutrition . for example *Chaetomium sp.* Follow a family Chaetomiaceae and cause **Cloth mildew**

: Order : Clavicipitales

: Family : Clavicipitaceae

: Includes two important Genes

- 1- *Cordyceps sp.* parasitize on spiders

Cordyceps fungus attacks a host, the mycelium invades and eventually replaces the host tissue, while the elongated fruit body (ascocarp) may be cylindrical, branched, or of complex shape

Some *Cordyceps* species *C. subsessilis* are sources of biochemicals with interesting biological and pharmacological properties like cordycepin .

- 2- *Claviceps purpurea*

An important fungus that parasitic on plants, especially wheat, barley and oats, causes a disease known as Ergotism, which produces some toxic alkaloids that cause health problems for humans and animals when consumed. Some of these alkaloids are useful and are used to make medicines to prevent bleeding that accompanies birth. The most important alkaloids are Ergot novin, Ergot metrin, Ergot amine, which is used as a medical drug to treat severe migraines.

Order :Sphaeriales or Xylariales

: This order includes many families

- 1- **Sordariaceae** : Some species are common and known. These fungi are important to humans, where most of them are used as a model in biological laboratories such as *Neurospora sp.* , *Podospora sp.* and *Sordaria sp.*
- 2- **Xylariaceae** : The fruiting body of this family is inside Ascostroma consisting of true fungal tissue and contains an cavity , this fungus characterized with ascus carrying a crown at the top, which can be distinguished under the microscope , *Xylaria sp.* is One of the most important types of this family, which lives saprophytism and sometimes living a weak parasite on tree trees .

Order: Hypocreales

:This order includes three families

- 1- **Hypocreaceae**: the type of body fruit is Perithecium inside Ascostroma , *Cordyceps capitata* is the most important species of this family.
- 2- **Nectriaceae** : the type of body fruit is Perithecium and without Ascostroma a. *Necteria* sp. is one of the most important members of this family, which contains 27 genus which causes Cancer disease of shade plants.
- 3- **Hypomycetaceae** :the type of body fruit is Perithecium inside Ascostroma , *Hypomyce* sp. is the most important species of this family.

Order : Erysiphales

Family : Erysiphaceae

Is divided into species according to appendage type and the number of ascus on the surface of the fruiting body , members causes **Powdery mildew** diseases included : figure (1)

- 1- More than one asci and appendage like the **Mycelium**. **Ex:** *Erysiphae* sp.
- 2- One asci and appendage like the **Mycelium**. **Ex:** *Sphaerotheca* sp.
- 3- More than asci and appendage Branch **Ex** : *Microsphaera* sp.
- 4- One asci and appendage Branch **Ex** : *Podosphaera* sp.
- 5- Appendage that globular base **Ex** : *Phyllactinia* sp.
- 6- Appendage shape is Hockey **Ex** : *Uncinula* sp.

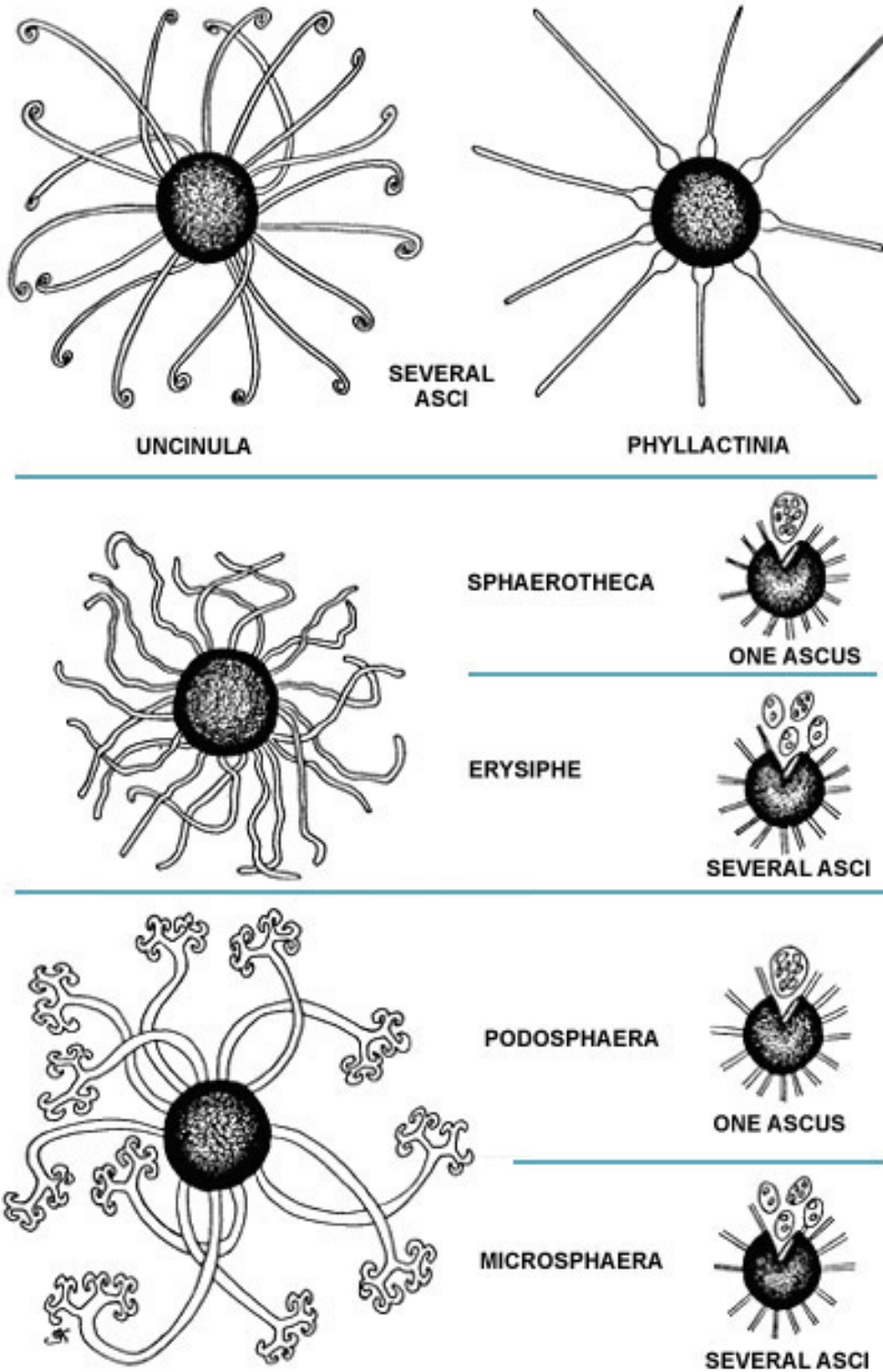


figure (1) ascus and appendage Erysiaceae species

Class : Discomycetes

General characteristics :

- 1- The type of fruiting body is Apothecium .
- 2- Hymenium layer open and sometimes closed .
- 3- fruiting body maybe Above or under the soil .
- 4- classification property of this class Is a presence Operculate on ascus or Inoperculate .

Order 1: Helotiales

General characteristics :

- 1- fruiting body Disc shape or Apothecium above the soil .
- 2- Inoperculate ascus .
- 3- Ascospore cup shape .
- 4- The most members of this order living saprophytic on wood plants .

Family : Sclerotinaceae Includes

- ❖ *Monilina sp.* cause Brown rot on trees have stony endocarp.
- ❖ *Sclerotina sp.* cause White rot on herbaceous, flowers and vegetables .

Order 2: Tuberales

General characteristics :

- 1- Include all types of Truffles Which is a fruiting body cup shape live above the soil .
- 2- Some of the truffle species are highly prized as food.
- 3- Truffles are ectomycorrhizal fungi and are therefore usually found in close association with tree roots. Spore dispersal is accomplished through fungi, animals that eat fungi .
- 4- The most important family Terfeziaceae include many species of Iraqi truffles ex: *Terfezia sp.* ‘ *Phaeangium sp.* ‘ *Trimania sp.*

Class : Ioculoascomycetes

Order : Pleosporales

General characteristics :

- 1- fruiting body Perithecium and It is called Pleospora type .
- 2- Sterile threads be kind Pseudoparaphysis .
- 3- The most important family pleosporaceae include:
 - ❖ *Sporomia sp.* living on Dung animals Herbivorous.
 - ❖ *Pleospora sp.* It is a plant pathogen infecting several hosts including alfalfa, apples, tomatoes, citrus and chickpea. It has a cosmopolitan distribution, and is common in temperate and subtropical regions.
- 4- The second family is Venturiaceae :

Ex: *Venturia inaequalis* causes the Apple scab disease Lead to deformation of fruits .

Class: Laboulbeniomycetes

Order : Laboulbeniales

Family : Laboulbeniaceae

All kinds of fungi live on insects such as spiders, ants and cockroaches , Each one specializes on one insect . fruit body have Small-necked with one ascus , The important species *Laboulbenia sp.*

Phylum : Basidiomycota

General characteristics :

- 1- Is one of two large Phylum that, together with the Ascomycota .
- 2- filamentous fungi composed of hyphae (except for basidiomycota-yeast) .
- 3- reproduce sexually By the formation of specialized club-shaped end cells called **basidia** that normally bear external spores (usually four).
- 4- Specialized spores in this phylum called **basidiospores** .
- 5- The basidiospores on the basidium is naked in nature or inside a vegetable composition called **basidiocarp**.
- 6- The Threaded fungal(hyphae) in Basidiomycota forming a **Clamp connection** between adjacent cells, which are characteristic of this Phylum .
- 7- the Basidiomycota include these groups: mushrooms, puffballs, stinkhorns, bracket fungi, other polypores, jelly fungi, boletes, chanterelles, earth stars, smuts, bunts, rusts, mirror yeasts, and the human pathogenic yeast Cryptococcus.

Basidiospores :

Is the unit of sexual reproduction in Basidiomycota which is formed after passing through the stages of sexual reproduction Plasmogamy and Karyogamy and then the Meiosis ' the last two stages occur in the basidium and eventually consists of four **basidiospores** on each basidium . **figure (1)**

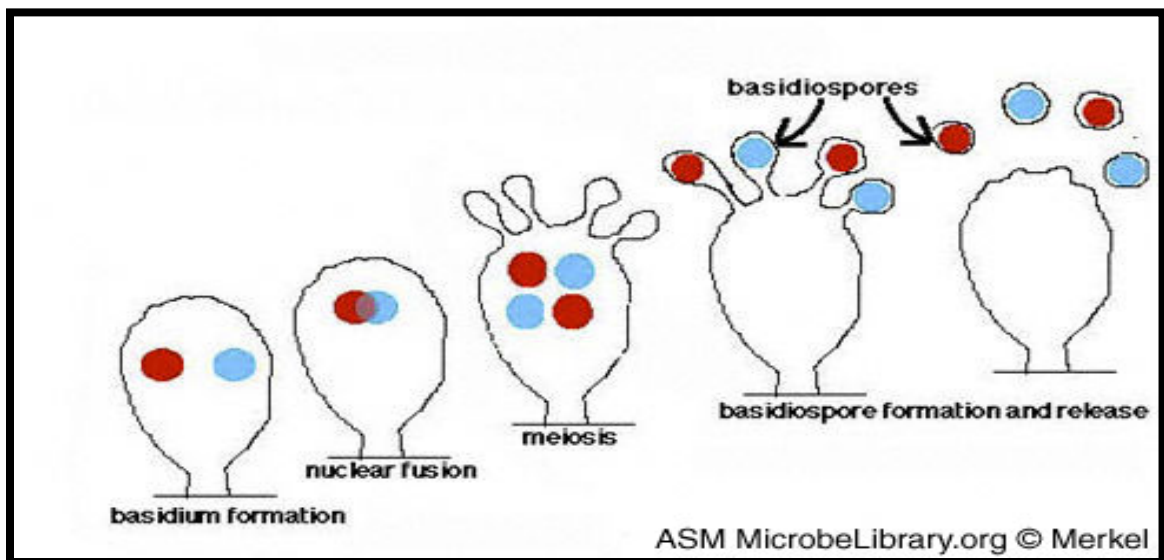


figure (1) Phases of formation the basidiospores

Asexual reproduction:

Asexual reproduction of Basidiomycota fungi by budding or Fragmentation the mycelium or by the formation of conidides or by Urediospores.

Presence :

Basidiomycota are found on land and in different parts of the world. Most of them live on a variety of organic materials, which have the ability to decompose organic matter and rot wood.

Economic importance:

- 1- Live parasitic on plants caused by plant diseases such as rust rust diseases and smut diseases .
- 2- some species are used as food for humans around the world, such as fungus Mushroom .
- 3- some species are toxic and deadly to humans called Toadstool, such as *Amanita sp.* Which is called the Death Angel.

Basidiocarp :

sexual vegetable structures contain sexual spores consisting of False fungus tissue and vary depending on the fungi such as:

- ❖ Jelly fungi
- ❖ Birds nest
- ❖ Bracket fungi
- ❖ Toadstool
- ❖ Mushroom

Basidiocarp is different in size from a small microscope that is not seen by the naked eye to several feet in diameter and several kilograms in weight. For example, the size of Polypores is 147 cm in diameter, and the mushroom weight sometimes reaches 5 pounds. Basidocarp is also different in composition, whether it is skinning, gelatin, wood, sponge or paper .

A perfect Basidiocarp of mushroom consisting of the following structures :

- | | | |
|------------------|----------|--------------------|
| a- Cap or Pileus | b- Gills | c- Ring or Annulus |
| d- Stape or Stem | e- Volva | figure (2) |

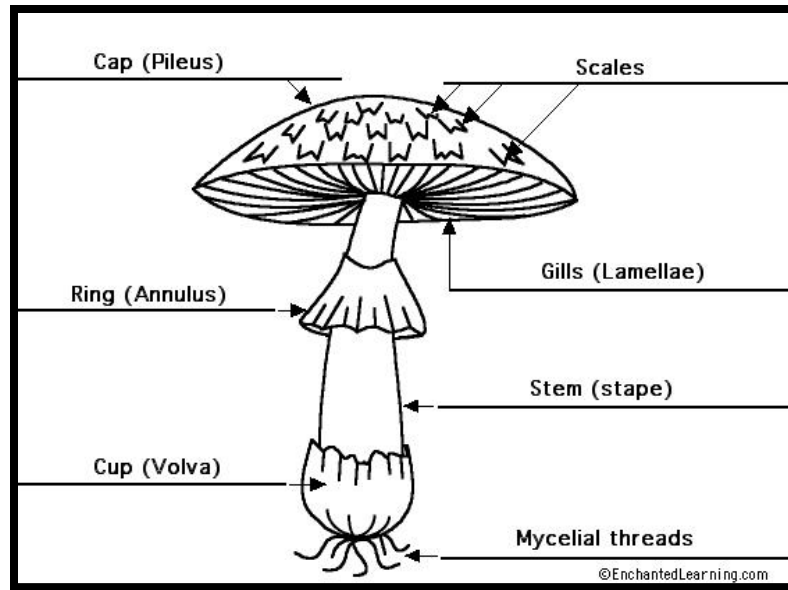


figure (2) Basidiocarp Structures

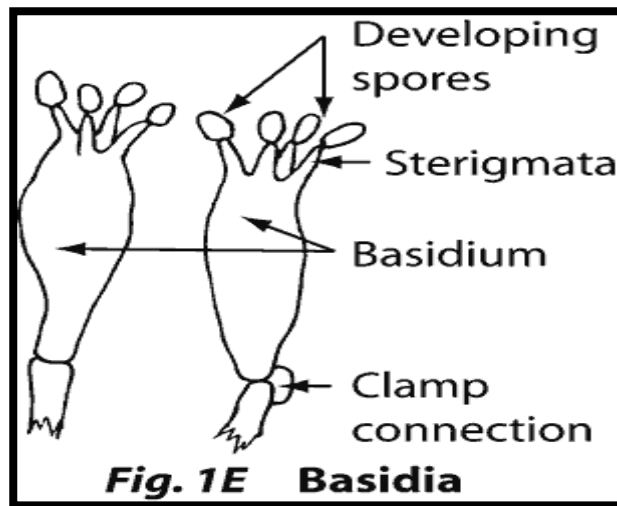
Basidium :

A reproductive structure in Basidiomycota fungi carried four Strigma (perfect number) each Strigma carry one Basidiospores .

Types of Basidium :

- 1- **Holobasidium** : consists of one cell different sizes undivided
- 2- **Phragmobasidium** : divided by septa Longitudinal or transverse
- 3- **Teiliobasidium** : Represent Teliospore **figure (3)**

figure (3)



Class : Homobasidiomycetes

Order : Agaricales

General characteristics :

- 1- Called Gill Fungi .
- 2- This order includes about 7,000 species distributed in about 200 genus .
- 3- Members live in the soil rich in organic matter and the remains of dead trees, many of which enter into the relationship of Takaful Mycorrhizae with trees
- 4- Includes Mushrooms (Edible) and Toadstool (poisonous) .
- 5- Sporophore have Stipe Solid and strong compared with other fungi .

This order includes a groups of families :

❖ **Family : *Agaricaceae***

Ex: *Agaricus sp.*

is a genus of mushrooms containing both edible and poisonous species, with possibly over 300 members worldwide .

❖ **Family : *Amanitaceae***

Ex: *Amanita sp.*

the most important genus of mushrooms. It is believed contains a poisonous substance called **Muscarine**. and In one Basidiocarp it is poisonous enough to kill 12 or more people .

❖ **Family : *Boletaceae*** .

Ex: *Boletus sp.*

The genus *Boletus* contains many members which are edible and tasty such as *Boletus edulis* and *B. aereus* .

Order : Lycoperdales

The members of this order have characterized by the formation of Basidiocarp over the soil and contains the peridium, Basidiocarp called puff ball , all are edible , contains many families :

Family : *Lycoperdaaceae*

EX: *Lycoperdron sp.*

The genus has a widespread distribution and contains about 50 species. it .contains the smaller species such as the pear-shaped puffball

Order :Nidulariales

The Basidiocarp of the members of this order called the **Birds nest** include : one family

Family: Nidulariaceae

.EX: Cyathus sp

bird's nest fungi **figure (1)** , include 45 species are widely distributed throughout the world and some are found in most countries .



figure (1) bird's nest fungi

Order : Polyporales or phylloporales

It called pores Fungal to the presence of **pores** ,and the absence of **lamella** and most of the fungus belonging to this order are the Basidiocarp large size ,the form of colonies or coral form of dishes or shelves, mostly fungal parasites or rather an analyst as they attack the trees alive or dead and analyzed and therefore Reduce their economic value. This order includes several families, the most important :

Family : polyporaceae

Ex: Polypores sp.

this

genus known from Japan to grow on the ground on the living or dead

. roots

Class : Tremellomycetes

Order : Tremellales

Known as the Jelly fungi because the Basidiocarp is often Gelatin take yellow color, Basidium type Phragmobasidium divided into longitudinal to four cells of each cell carrying a Basidiospores on one Strigma , This order includes one family :

Family: Tremellaceae

Ex: *Tremella* sp .

All *Tremella* species are parasites of other fungi and most produce anamorphic yeast states. Basidiocarps (fruit bodies), when produced, are gelatinous . Over 100 species of *Tremella* are currently recognized worldwide. Two species, *Tremella fuciformis* and *Tremella aurantialba*, are commercially cultivated for food .

Order : Auricularales

Basidium type Phragmobasidium divided into longitudinal to four cells of each cell carrying a Basidiospores on one Strigma . This order includes one family:

Family : Auriculaceae

.Ex: *Auricularia* sp

Called (Ear Jelly fungi) because shape Basidiocarps is being ear-to shell-shaped or forming narrow, imbricate brackets ,Most *Auricularia* sp. are edible

Order : Septobasidiales

Different from the previous order that the Basidiocarps are skinning and not gelatinous, This order includes one family:

Family : Septobasidaceae

EX: *Septobasidium* sp.

Septobasidium species are known as **Entomopathogens** is a fungus that can a parasite and [pathogenic](#) to [insects](#) .

Class : Teliobasidiomycetes

Most Members of this class live as specialized plant parasites on leaves, fruits and stalks of important agricultural crops, especially grains such as wheat and barley, causing major economic losses such as Rust and Smut, Also called **probasidiomycetes** due non formation Basidiocarps ever, the bazidium in this fungus is Teliospore

Teliospore : Is a sexual spore , thick-walled that represents a sexual phase resistant to environmental conditions unsuitable for these fungi, mostly two-celled, sometimes one-celled. **figure (2)**

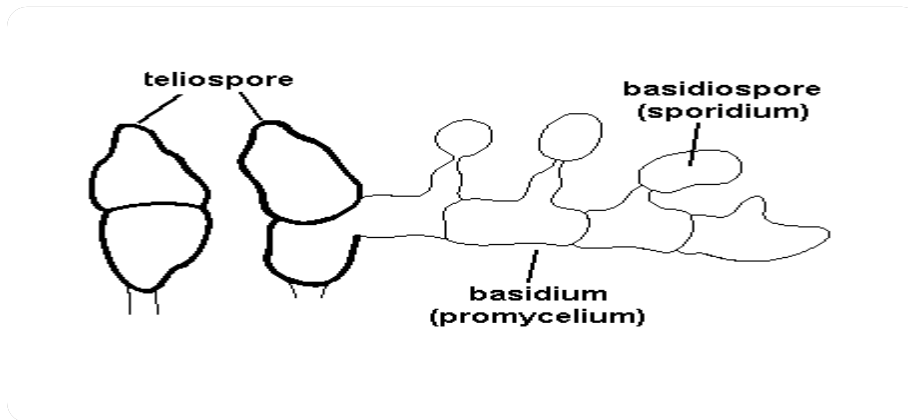


Figure (2) Teliospore

Order: Ustilaginales :

called Smut Fungi includes 1100 Different species all are obligate parasitism and these are the most common types of Basidiomycota : Primitive fungus. This order includes several families

Family : Ustilaginaceae

Ustilago sp. smut fungi parasitic on grasses

Family : Tilletiaceae

Tilletia sp. Species in this genus are plant pathogens that affect various grasses. *Tilletia indica*, which causes smut wheat, and *Tilletia horrida*, responsible for rice smut

Order :Uredinales

Also called **Rust fungus** an estimated 168 rust genus and approximately 7000 species, more than half of which belong to the genus *Puccinia* , Rust fungi are highly specialized parasites , the infection is limited to plant parts such as leaves, petioles, tender shoots, stem, fruits may cause deformities such as growth retardation, witch's broom, stem canker, hypertrophy of the affected tissues or formation of galls. Include many families :

Family : Pucciniaceae

EX: *Puccinia graminis*

Causing black stem rust in wheat

Life cycle

The members of this group pass either a long or short cycle :

- 1- **Micro-cyclic life cycle:** in this life cycle the **Teliospore** is The only spore.
- 2- **Macro-cyclic life cycle:** in this life cycle there is more than one single spore .

Phylum : Deuteromycota

also known as **imperfect fungi**, are fungi which do not fit into the commonly established taxonomic classifications of fungi that are based on biological species concepts or morphological characteristics of sexual structures because their sexual form of reproduction has never been observed; hence the name "imperfect fungi." The phylogenetic line can be traced back to the point where these species hoard some of the rudimentary characteristics that could imply information sufficient to redirect them into the known and confirmed taxon. Only their asexual form of reproduction is known, meaning that this group of fungi produce their spores asexually, in the process called sporogenesis .

There are about 25,000 species that have been classified in the deuteromycota and many are basidiomycota or ascomycota anamorphs. Fungi producing the antibiotic penicillin and those that cause athlete's foot and yeast infections are imperfect fungi. In addition, there are a number of edible imperfect fungi, including the ones that provide the distinctive characteristics of Roquefort and Camembert cheese.

Good luck

Practical fungi Classification
