kingdom:Fungi

phylum:Ascomycota

Ascomycota is a group of fungi named after a saclike structure called an ascus, which is used in reproduction. This group makes up 75% of all of the known fungi and consists of 65,000 species

Characteristics

1-Ascomycota are morphologically diverse. The group includes organisms from unicellular yeasts to complex cup fungi.

2-There are 2000 identified genera and 30,000 species of Ascomycota.

3-The unifying characteristic among these diverse groups is the presence of a reproductive structure known as the ascus, though in some cases it has a reduced role in the life cycle.

4-Almost half of all members of the phylum Ascomycota form symbiotic associations with algae to form lichens.

5-Others, such as morels (a highly prized edible fungi), form important mycorrhizal relationships with plants, thereby providing enhanced water and nutrient uptake and, in some cases, protection from insects.

6-The cell walls of the hyphae are variably composed of chitin and β-glucans, just as in Basidiomycota. However, these fibers are set in a matrix of glycoprotein containing the sugars galactose and mannose.

7-The mycelium of ascomycetes is usually made up of septate hyphae. However, there is not necessarily any fixed number of nuclei in each of the divisions.

8-The septal walls have septal pores which provide cytoplasmic continuity throughout the individual hyphae. Under appropriate conditions, nuclei may also migrate between septal compartments through the septal pores.

9-A unique character of the Ascomycota (but not present in all ascomycetes) is the presence of Woronin bodies on each side of the septa separating the hyphal segments which control the septal pores. If an adjoining hypha is ruptured, the Woronin bodies block the pores to prevent loss of cytoplasm into the ruptured compartment. The Woronin bodies are spherical, hexagonal, or rectangular membrane bound structures with a crystalline protein matrix.

Reproduction and Life Cycle

For Ascomycota species (filamentous species), the life cycle starts with the germination of the spores (haploid spores) to produce mycelia. Mycelia then grow vegetatively and mature to repeat the cycle. Once they are mature, the mycelia form conidia that produce spores. Once the spores are released, the life cycle begins.

Sexual reproduction takes place when gametes are produced. Essentially, these (gametes) are nuclei that are produced in the hyphae of the organism or within the spores and are capable of cross-fertilization with other gametes.

Here, the spores and hyphae of the filamentous Ascomycota acts as the gametangia that is responsible for the production of gametes for sexual reproduction.

For filamentous fungi, an organ referred to as a fruiting body is produced and develops on the mycelia of the organism. As soon as it is mature, it is fertilized by the male gametes (nucleus) that is produced from the conidium of another mycelia if they are compatible.

Following fertilization, the fruiting body develops further to produce a zygote (ascospores develop to zygote), which in turn develop into the mycelia of male/female nuclei. These nuclei can then divide and develop further for the cycle to start again.

asexual reproduction by different types of sporeslike

-conidia

-oidea

-chlamydospore

-Arthrospore

-Blastospore

Benefits of Ascomycota

1-Some species such as Penicilium chrysogenum are used to produce antibiotic.

2-Some species like Tolypocladium release substances that act as immunosuppressors. As such, it is used to help patients with poor immunity.

3-Many ascomycetes are of commercial importance. Some play a beneficial role, such as the yeasts used in baking, brewing, and wine fermentation, plus truffles and morels, which are held as gourmet delicacies.

4-Production of insulin and other

Disadvantages of Ascomycota Species

1 -cause plant diseases that damage crops and other plants like apple scab, rice blast, the ergot fungi, and the powdery mildews.

2-Penicilium italicum spoil food that can result in significant loses

3-Some species are capable of producing poisonous substances that can gravely affect humans and animals called mycotoxin like patulin ,aflatoxine and alkaloides

4-Candida albicans in phylum Ascomycota can cause opportunistic diseases in human beings. However, they are also capable of causing infections in healthy individuals.

Ascospres

Asci:the sexual spore-bearing structure , a single ascus will contain eight ascospores The eight spores are produced by meiosis followed by a mitotic division. This ascusMay be naked called **Naked asci** or inside sexual fruit bodies called **Ascocarp**, The formation of these Ascusis a major characteristic of Ascomycota .some asci be on Stalked and some asci Sessilewithout Stalked .

According to the shape The Ascusare divided into several sections:

- ❖ Globular Ascus
- ❖ Ovate Broadly Ascus
- ❖ SeptateAscus
- ❖ ClavateAscus
- ❖ CylindricAscus

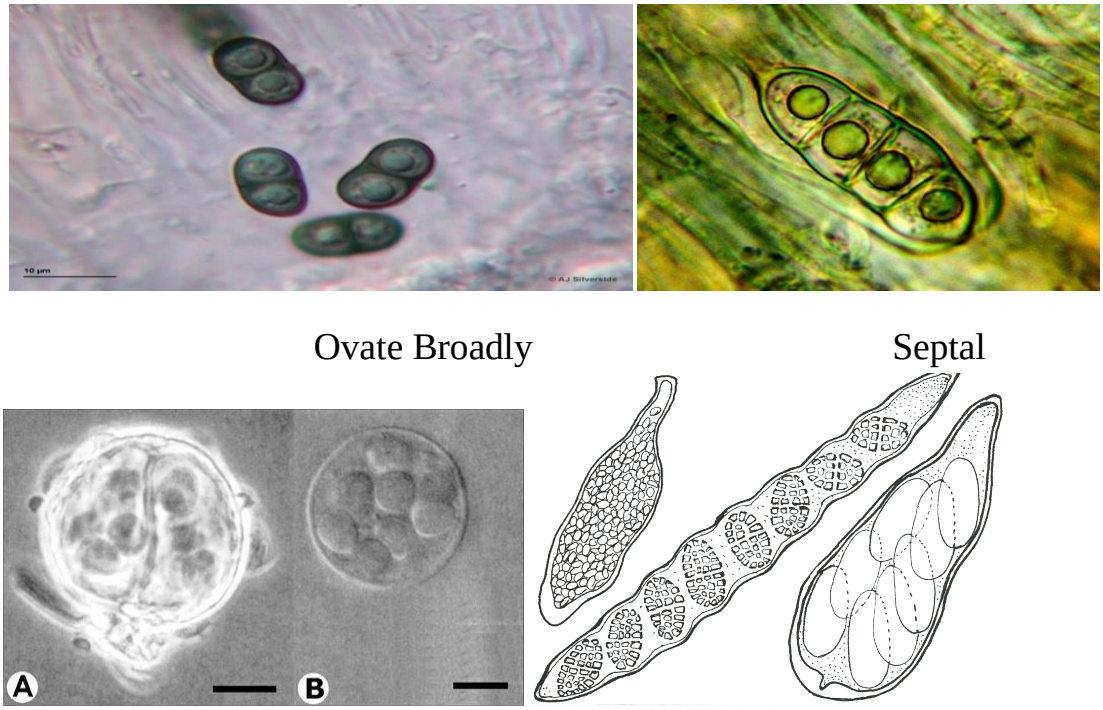


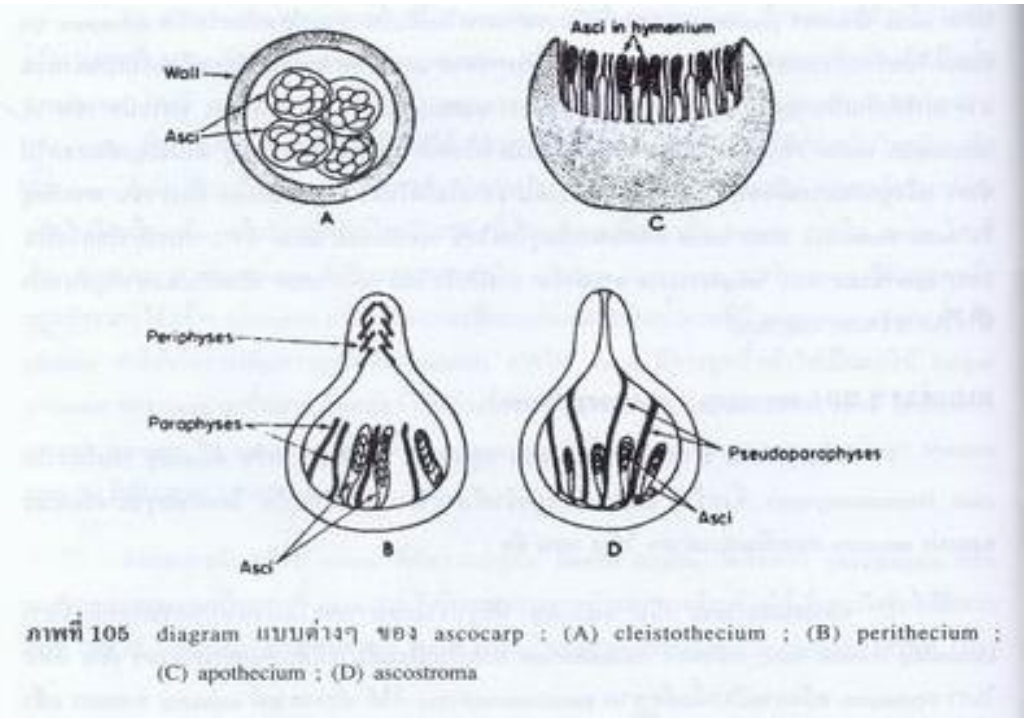
Figure (1) Shape of ascus

Ascocarp :

is a fruiting body consists of very tightly tangle hyphae and may contain millions of asci, each of which typically contains eight ascospores.In addition to some other components such as **Hymenium Layer**Which is the tissue layer on a fungal fruiting body where the cells develop into asci, which produce spores. In some species all of the cells of the hymenium develop into asci .This layer is permeated by threads called **Sterile threads .**

Ascocarpstypes :

A. Cleistothecium.
B. Perithecium
C. Apothecium
D. Ascostroma



Figure(2) types of ascocarps

Sterile threads :

Is an extended filament between the ascus in the Hymeniumlayer inside the fruit bodies, not know function so called sterileBut there are some theories explain the role of these filament expected that its function is to spreadascosporewhen Release , These filament are important taxonomic characteristics .

Types of Sterile threads :

1- **Paraphyses:**are filaments cylindrical shaped sometimes branches undifferentiatedarise from the base of the Ascocarp and are free between the ascus in the Hymeniumlayer have a protective function for ascospore**Figure(3)**

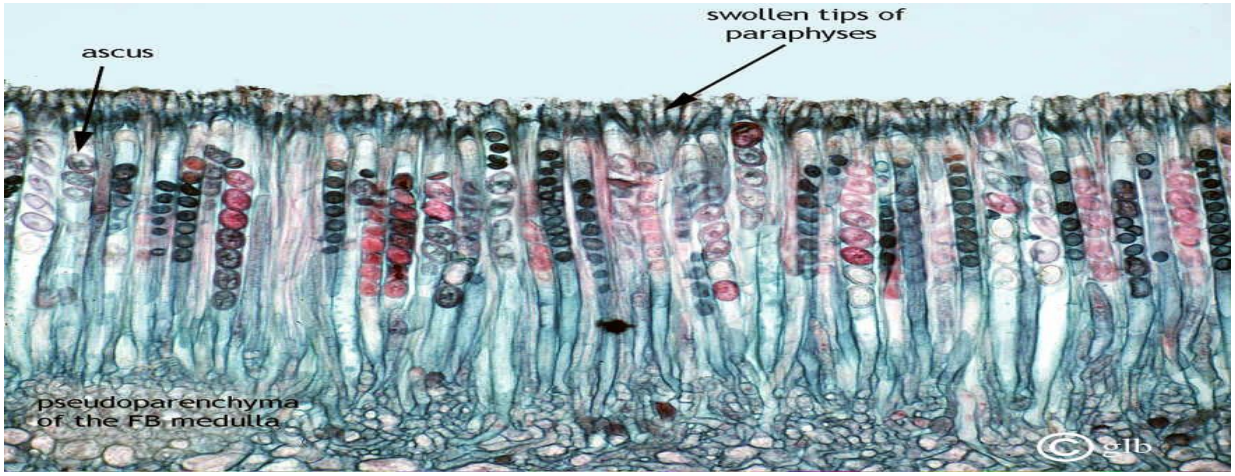


Figure (3) Paraphyses

2- **Periphysis:** Short filaments structures or in the form of cilia around the opening of thefruitingbody,functionon directing the ascosporeinto the exit slot.**Figure(4)**

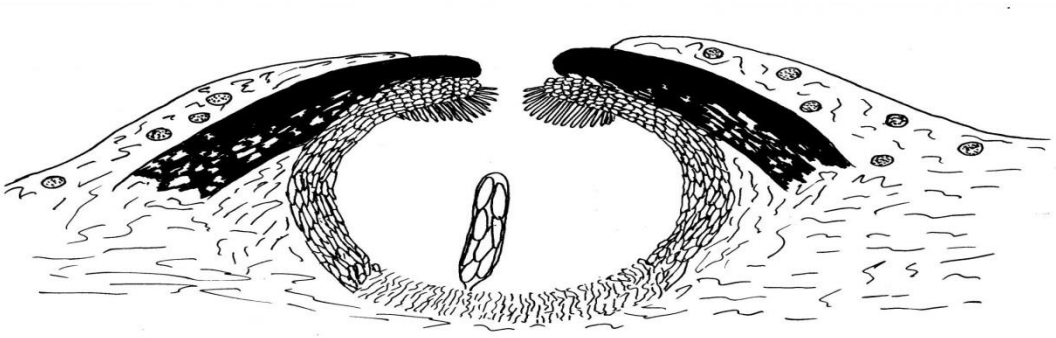


Figure (4) Periphysis

3- **Periphysoidsparaphyses :**are paraphysesfilaments in the side along theInternal wall to the fruiting body towards the top .**Figure(5)**

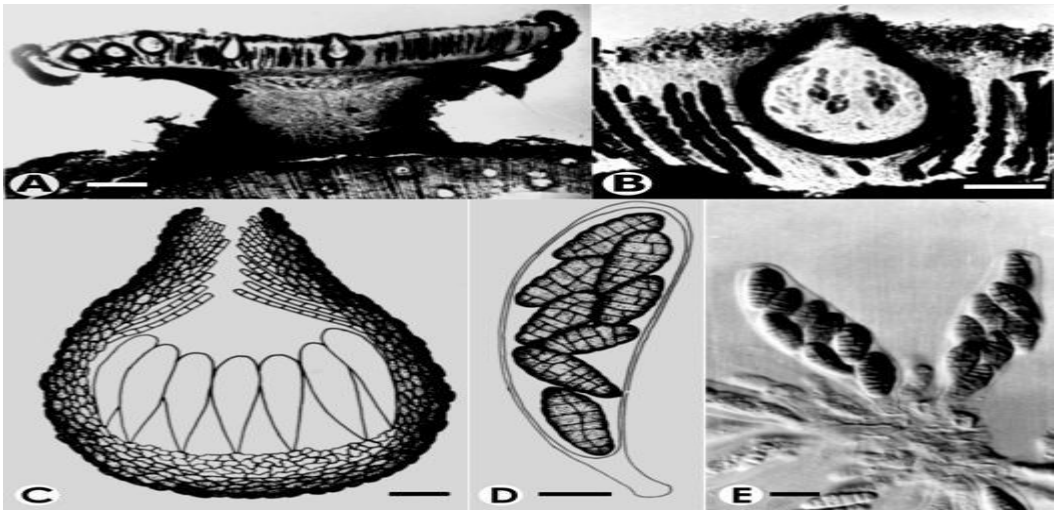
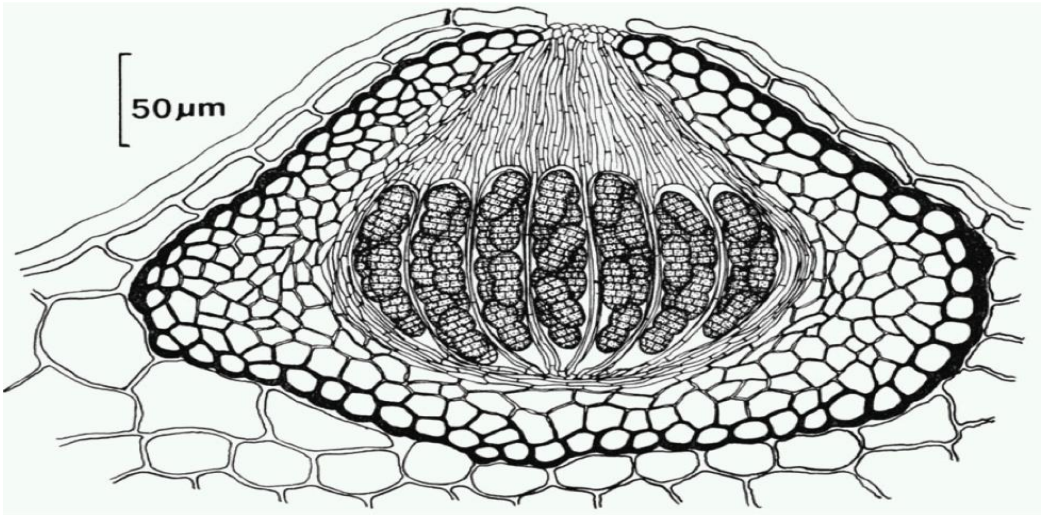


Figure (5)Periphysoidsparaphyses (C)

4- **Apical paraphyses** : are paraphyses filaments but consist of the top and then grow down between the ascus, Keep the top free movement

5- Pseudoparaphysis:filaments similar to Apical paraphyses, but not remain free movement, but grow down to reach the base and then unite and form a curtain between the ascus.**Figure (6)**



Figure(6) Pseudoparaphysis