

Welcome students to this module of e-learning. I am Dr. Maria A. D'Souza, Assistant Professor, St. Xavier's College will present to you this module today to the students of First year, Botany Semester 1. Course code BOC 101 Course title - Biodiversity 1 Microbes, Algae, Fungi and Bryophytes.

Unit 3 Fungi, module name Agaricus, classification and morphology. The outline of the module the systematic position, morphological characteristics and structure of Agaricus. The learning outcomes. Once the student completes this module, the student will be able to give the systematic position of Agaricus. Describe the morphological features and structure of Agaricus.

So students today you'll be studying about Agaricus. It's classification and morphology. So students it's commonly called as mushrooms and it will come up mostly during the rainy seasons or where there is sufficient moisture. So students let us begin today.

Today's class on Agaricus it's classification and morphology. This is a picture of Agaricus commonly called as mushrooms. The systematic position of Agaricus belongs to Kingdom Fungi, Division Eumycota because these are the true fungi, Subdivision – Basidiomycotina because the sexual spore which is produced in basidiomycete is called as a basidiospore. Class - Hymenomycetes because there's basidia and the basidiospores are initially covered. The hymenial layer is initially covered with a membrane, but on maturity it exposes the spores. It belongs to Subclass Holobasidiomycetes because the basidiospore which is formed on the hymenial layer is aseptate, Order agaricales which include all the gilled mushrooms, Family Agaricaceae. These are the mushrooms which are found on dead and decaying organic matter and the genus Agaricus.

Students, you can see the picture of Agaricus. Now, Agaricus is commonly called as mushrooms. Most of the species of Agaricus are saprophytic in nature they are called as Meadow mushrooms because they grow on open well manure, grassy areas on damp, dead, and decaying substances such as dung humors rotten wood, twigs, trunks, some of the edible species of mushrooms like Agaricus campestris, Agaricus bisporus.

The body of the Agaricus can be studied under two heads, one is the vegetative mycelium, which is found living within the soil or the humus where the Agaricus or the mushroom grows. The second part is the basidiocarp or the fruiting body or the proper mushroom as we call it its aerial above the soil it comes up and it is formed as a result of sexual reproduction.

The vegetative mycelium students, the first part can be differentiated into primary mycelium, secondary mycelium, and tertiary mycelium. The primary mycelium is monokaryotic in nature that means it has a single nucleus, short lived and it arises from the germination of basidiospores. Now, if the basidiospore is of a plus strain, you will have a primary mycelium of a plus strain and if it is the basidiospores of a negative strain, then the mycelium arising from the negative strain basidiospore will be a negative strain.

Primary mycelium is haploid in nature which consist of hyphae, which are uni nucleate, septate hyaline

with short cells having oil globules, vacuoles and protoplasm. The secondary mycelium arises from the fusion of the plus strain primary mycelium and the negative strain primary mycelium and it forms a dikaryon. Now Dikaryon is formed because of the process of dikaryotization wherein it undergoes successive division and forms the dikaryotic mycelium. The dikaryotic mycelium is binucleate, there is no fusion of the nuclei and this mycelium have hyphae which are long perennial branched septate hyaline with short cells and forms an extensive branching network. This mycelium also has a typical septum called as the Dolipore septum which is found mostly in the basidiomycetes in which its opening is guarded on both sides with parenthosome. This mycelium the secondary mycelium is most abundant perennial and will form the tertiary mycelium and this tertiary mycelium will give rise to mushrooms year after year.

This is how the Dolipore septum looks like. This is the hyphal wall students. This is the septum which has a Dolipore and it is surrounded by the parenthosome. The tertiary mycelium is the mycelium, which is formed from the secondary mycelium and this mycelium produces the basidiocarp or the proper mushroom. The hyphae, interlace or twist to form microscopic thick white tangled wooly hyphal cords called as rhizomorphs which will be producing the fruiting bodies or the basidia which will be producing the spores. The dikaryotic mycelium shows centrifugal growth. The fructification's developed at the hyphal tip of a circular colony forming a fairy ring.

This is how students you have the basidiospore one will be of a strain and one will be offered a negative strain. Now this mycelium is primary mycelium is short lived. You can see and the cell wall dissolves and formation of a dikaryon. OK now this dikaryon multiplies, successive divisions takes place by means of clamp connections and it results into the secondary mycelium. The secondary mycelium is very very long lived. Now this mycelium will give rise to the tertiary and tertiary will give rise to the mushrooms.

Basidiocarp or the fructification is the aerial portion of the fungus and it is commonly called as mushrooms. It's an umbrella shaped conspicuous, well defined structure consisting of the pileus. This stipe is a stalk like portion and it is broader, swollen at the base and is centrally attached to the pileus 6 to 9 centimeters in height, whereas the pileus is the expanded portion of the mushroom and in young condition when it is in a button shape, a covering or a thin membrane surrounds that button mushroom and it is called as a velum. Now as the button mushroom increases in size or grows into a proper mushroom, the velum breaks open and the remnants of the velum surround the stipe and that is called as the annulus. So this student is the annulus. This is the pileus, and the stipe. OK this is the button mushroom stage.

On the lower surface on the undersurface of the pileus you have several thin vertical plate like structures. Lamellae and these are initially pink in color students and on maturity when this spores are formed they will change its color to brown or dark brown and this place students is responsible for the formation of these spores or the fruiting or the reproductive structures called as the basidiospores.

Now the negative geotropism of the stipe, the Diageotropism of the pileus and the positive geotropic nature of the gills helps the basidiocarp to stand erect. Now, if you see the structure of a lamellae or the

gill, it has three parts. Hymenium, trama and sub hymenium. The hymenium is the fertile region and it's with club shaped binucleate cells and it's lying on either side of the lamella. All the cells of the hymenial layer are not fertile. There are some shorter cells which are sterile they are called as paraphyses whereas there are some cells which are much elongated. They protrude out and they are called as basidia they are fertile and they will produce the basidiospores. The trama is the central sterile region and it consists of loosely arranged interwoven mass of plectenchymatous tissue of long, slender hyphae. of long, slender hyphae. Hyphae run more or less, longitudinally with multinucleated elongated cells that extend from hyphae of the pileus with the long axis of hyphae lie parallel to hymenium.

The sub hymenium students is situated on both sides of the trama region and is composed of hyphae at right angles to those of trama. Hyphal cells are isodiametric, binucleate formed by the lateral branches of hyphae coming out of trama region.

So if you see students, this is the lamellae or the gills which are found on the undersurface of the basidiocarp. If you take a vertical section of the lamellae you will see three regions, first one is Trama region which is made up of plectenchymatous tissue. Longitudinal to it lies the hymenial layer of isodiametric cells and the hymenial layer this one which is made up of fertile cells. OK now this layer hymenium has fertile cells called as a basidium and the shorter sterile cells called as paraphyses. Now on the basidium which will bear base short peg like structures. Short pointed structures which are called as sterigma and on top of this you will have the Basidiospores, the basidiospore will be or having only one nucleus. Now there are four basidiospore arising on one basidium, two will be of a strain and two will be of a negative strain.

Students we have studied today the systematic position of Agaricus, we have also learned what is the structure of Agaricus. How it looks like. It has two portions, the Basidiocarp and stipe is a stalk like portion and the basidiocarp is the expanded portion which will be having gills on its undersurface or lamellae. If we take the section of the gills we have seen three regions. The trama, sub-hymenium, hymenial layer the hymenial layer which will bear the basidium with sterigma on which we will have the basidiospores coming out and the basidiospore when the favorable conditions arise will be liberated. And they have the capability of forming the primary, secondary, and tertiary mycelium.

These are the references students, the offline references, the online references.

Thank you students for a patient hearing.