

COURSE CODE: BOT 325

COURSE TITLE: *Plant Mycology*

NUMBER OF UNITS: 2 Units

COURSE DURATION: 2 Hours per week

COURSE DETAILS:

Course Coordinator: Dr. (Mrs.) I.A. Kehinde, *B.Sc., M.Sc., Ph.D.*

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Office Location: COLNAS

Other Lecturer: None

COURSE CONTENT:

Structure, life cycles, physiology and classification of fungi. The presence and role of fungi in agriculture, food and industry. Mycotic infections, epidemiology and importance of fungi.

COURSE REQUIREMENTS:

This is a compulsory course for all Botany students in the University. Students are expected to participate in all course activities and have a minimum of 70% attendance to be able to write the final examination.

READING LIST:

1. Campbell, N.A. *Biology* 4th Ed. New York, Benjamin/cummings Publishing Co, Inc. 1996.
2. Uno, G., Storey, R and Moore, R, *Principle of Botany* McGraw Hill, New York.
3. Stevenson, G.B. *The Biology of Fungi, Bacteria and Viruses*. Edward Arnold Publishers Ltd. Great Britain.

LECTURE NOTES

The branch of botany that studies fungi and fungus-caused diseases - their genetic and biochemical properties, their taxonomy and their use to humans as sources for medicinals and food, as well as their dangers, such as poisoning or infection.

Mycology is closely related to phytopathology: the study of plant diseases.

Fungi are a diverse group that have a whole kingdom all to themselves--Kingdom Fungi. Classification of mushrooms, molds and yeasts is based on reproductive structures.

Fungi play a vital role in the environment, and are economically important as a food source, as destructive pests, and as agents of disease. The study of fungi continues to produce important advancements in science.

A Fungus

It is an organism that is (1) Eukaryotic (2) possess cell walls (3) grow by extending filamentous cells called hyphae, or by budding (4) obtain nutrients by releasing digestive enzymes into the environment to break down organic molecules, which are then absorbed and (5) have no chlorophyll.

Fungi do not ingest their food (by eating). They have a filamentous or budding growth habit, along with the presence of cell walls

Most fungi reproduce through the generation of spores. Fungal spores are non-motile (meaning they cannot move of their own accord).

Fungi are mostly saprophytes, meaning they obtain their nutrients from dead organic matter. They play an important role in the environment by decomposing and recycling organic matter. A few are parasitic on plants causing major losses of crops while others cause various infections on humans or other animals.

The Structure of Fungi

The basic cell type of the majority of fungi is the hypha (pl hyphae), which is thin and tubular in shape. A network arrangement of hyphae is referred to as mycelium

Not all fungi have hyphae. Yeasts are essentially unicellular, producing round or oblong cells that bud from a mother cell to produce daughter cells.

Spores are specialized for dispersal and survival. Though produced in large numbers only few find their way to plants to cause infection.

Spores can be produced asexually via mitosis, in which case they are called *conidia*. Spores may also be produced sexually.

Fungal Classification

The fungi can be divided into four or five major divisions. There is little disagreement about the "big four" Basidiomycota, Ascomycota, Zygomycota and Dueteromycota. However, the

Oomycota (water molds) are considered by some to be “fungal protists” because they have a motile phase. Fungal classification is based on the morphology of sexually produced spores.

The Zygomycota can produce numerous conidia or reproduce sexually to form microscopic zygospores. Black bread mold is a zygomycete.

Members of Ascomycota may form conidia as well as larger fruit bodies that contain sexually derived ascospores inside a cell type called the ascus.

Basidiomycota are characterized by sexually produced basidiospores that form at the ends of cells called basidia. Examples *Agaricus bisporus*, *Pleurotus subnudus*, *Termitomyces* sp.

Some fungi have no known sexual phase and these are put in the Deuteromycota. These kinds of fungi are commonly called molds.

IMPORTANCE OF FUNGI

Fungi are of great economic importance

Recycling

Fungi, together with bacteria, are responsible for most of the recycling which returns dead material to the soil in a form in which it can be reused. Without fungi, earth would have been covered under piles of dead plant and animal remains.

Mycorrhizae and plant growth

Fungi are vitally important for the good growth of most plants, including crops, through the development of the mycorrhizal association. This association enables continued supply of food to all life since plants exist at the base of most food chains.

Food

Fungi are also important directly as food for humans. Many mushrooms are edible and different species are cultivated for sale worldwide. Fungi are also widely used in the production of many foods and drinks. These include cheeses, beer, wine and bread

Medicines

The antibiotic drug, penicillin is derived from a common fungus called *Penicillium*. Many other fungi also produce antibiotic substances, which are now widely used to control diseases in human and animal populations.

A fungus which parasitizes Rye crops causes a disease known as Ergot. It produces small hard structures, known as sclerotia. These sclerotia can cause poisoning in humans and animals which have eaten infected material but are the source of a powerful and important drug is used during childbirth.

Biocontrol

The spores of the fungi are sprayed on the crop pests such as insects (entomophagous) and nematodes (Nematophagous). This method is generally cheaper and less damaging to the environment than using chemical pesticides.

Crop Diseases

Fungi cause various diseases on crop resulting to reduced yield. Some fungi are parasites of plants. Most of our common crop plants are susceptible to fungal attack of one kind or another. An entire field can be lost to fungal attack if not treated with anti fungal agents (fungicides)

Animal Disease

Fungi can also parasitize domestic animals causing diseases. Fungi also live on and in humans. Athletes foot and candida infections are frequently occurring diseases of human caused by fungi

Food Spoilage

Fungi play a major role in food spoilage. Large losses of stored food with high moisture content are lost to fungi. This occurs more in the tropics. Moulds render infected stored foods inedible.