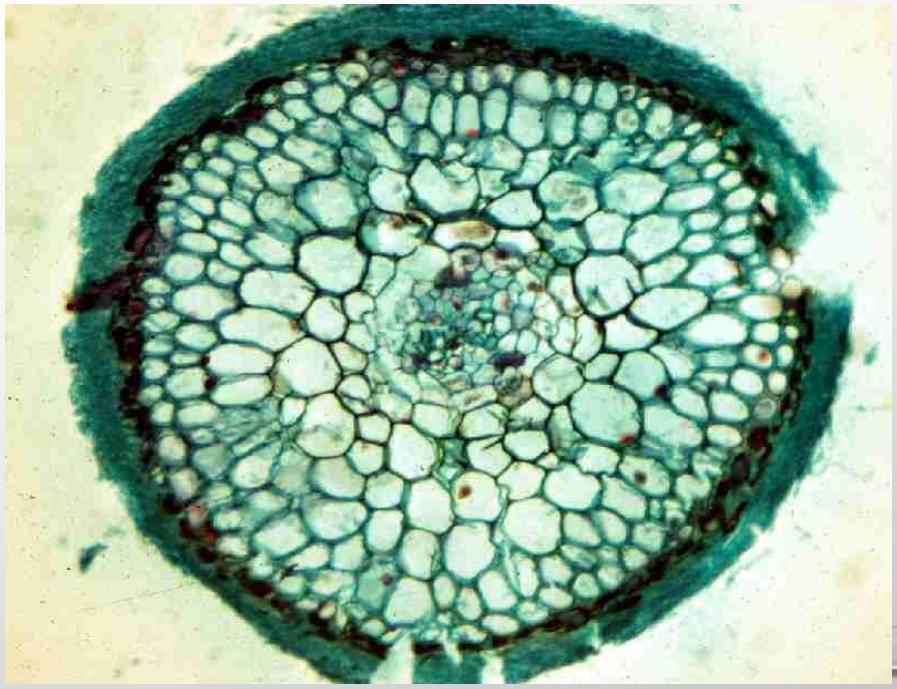
STRUCTURE OF FUNGI AND IT'S IMPORTANCE

By — kunal kumar

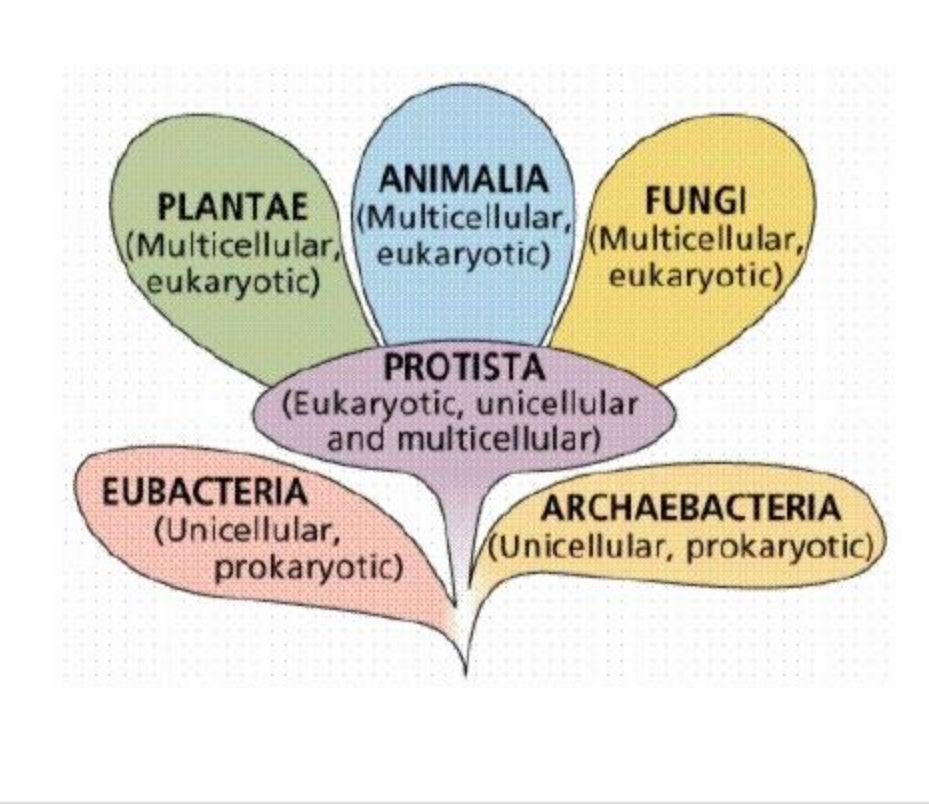
INTRODUCTION OF FUNGI

- Fungi are eukaryotic organisms; i.e. Their cells contain membrane-bound organelles and clearly defined nuclei.



THE SIX KINGDOM

Fungi are placed in a separate kingdom called kingdom FUNGI.

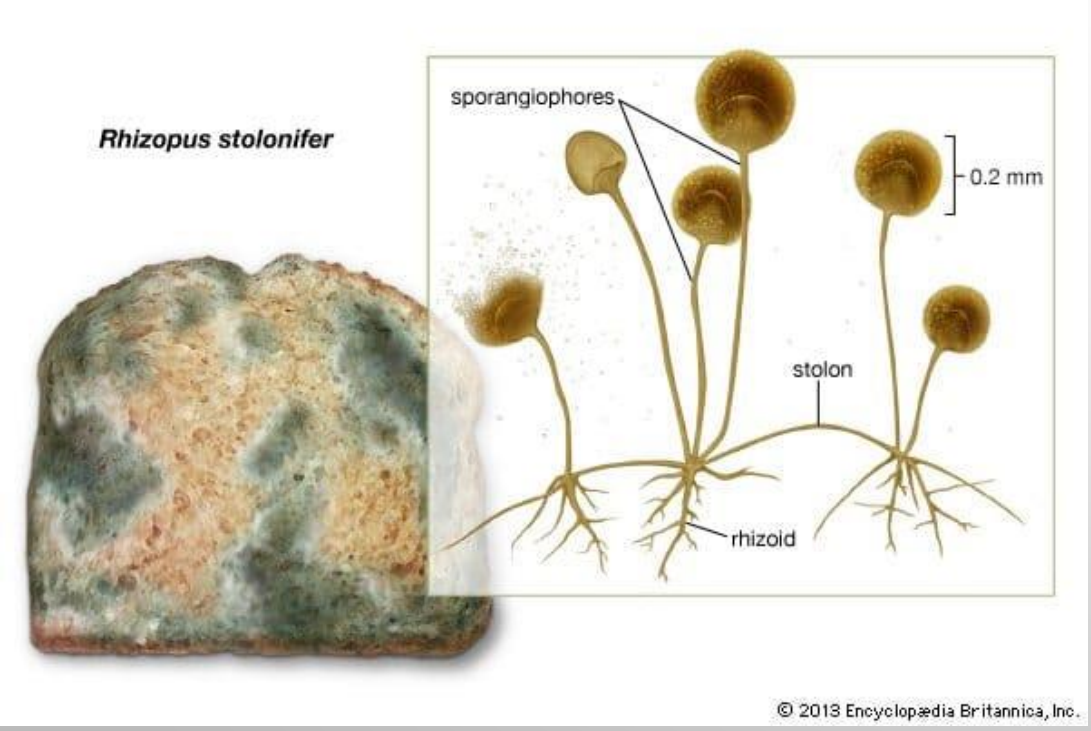


INTRODUCTION OF FUNGI

- FUNGI ARE NOT PLANTS
- NON-PHOTOSYNTHETIC
- EUKARYOTES
- NON-MOTILE
- MOST ARE SAPROBES (LIVE ON DEAD ORGANISMS)

THE INTRODUCTION OF FUNGI

- BREAD MOLD

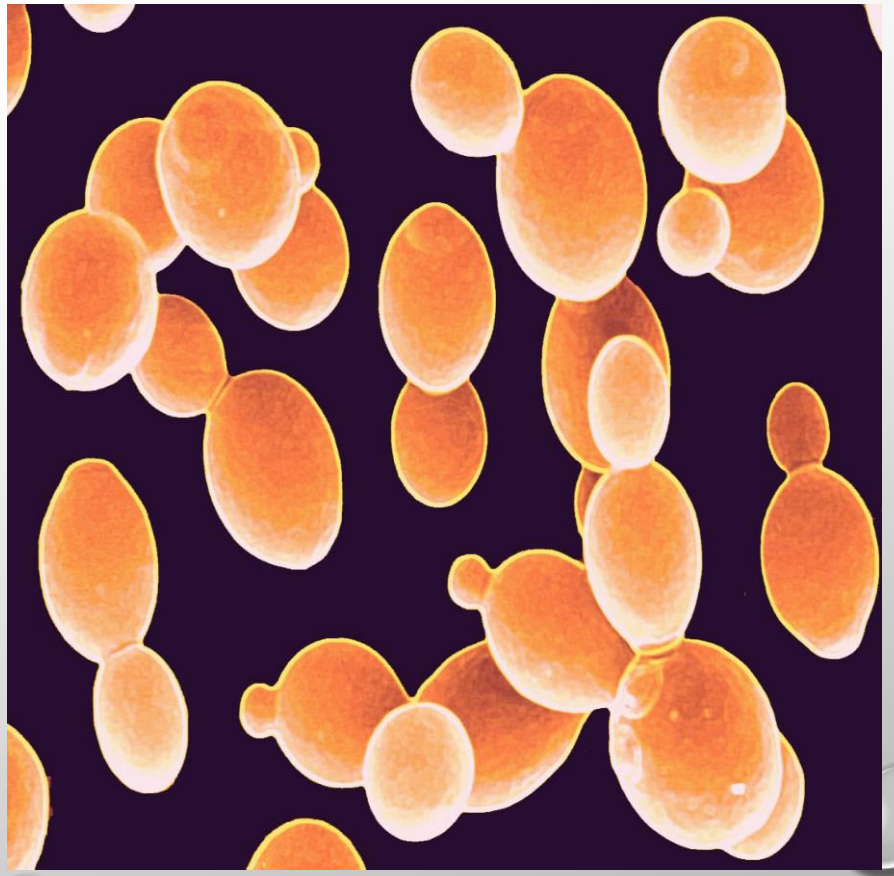


- ABSORPTIVE HETEROTROPHS (DIGEST FOOD FIRST & THEN ABSORB IT INTO THEIR BODIES

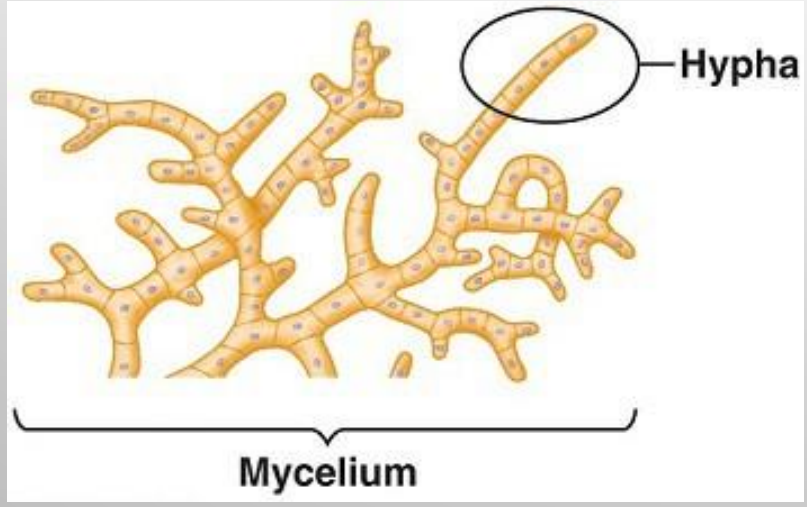
- RELEASE DIGESTIVE ENZYMES TO BREAK DOWN ORGANIC MATERIAL OR THEIR HOST STORE FOOD ENERGY AS GLYCOGEN

THE INTRODUCTION OF FUNGI

- IMPORTANT DECOMPOSERS & RECYCLERS OF NUTRIENTS IN THE ENVIRONMENT
- MOST ARE MULTICELLULAR, EXCEPT UNICELLULAR YEAST
- LACK TRUE ROOTS, STEMS OR LEAVES
- UNICELLULAR YEAST

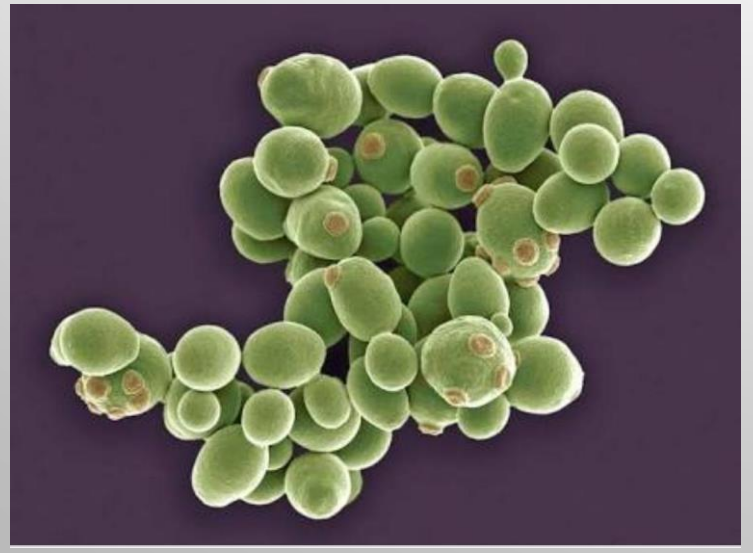


THE INTRODUCTION OF FUNGI



- CELL WALLS ARE MADE OF CHITIN(COMPLEX POLYSACCHARIDE)
- BODY IS CALLED THE THALLUS
- GROW AS MICROSCOPIC TUBES OR FILAMENTS CALLED HYPHAE

Fungi as decomposers



THE INTRODUCTION OF FUNGI

- SOME FUNGI ARE INTERNAL OR EXTERNAL PARASITES
- A FEW FUNGI ACT LIKE PREDATORS & CAPTURE PREY LIKE ROUNDWORMS
- PREDACEOUS FUNGI FEEDING ON A NEMATODE (ROUNDWORM)

SOME ARE EDIBLE, WHILE OTHERS ARE POISONOUS

POISONOUS

EDIBLE

THE INTRODUCTION OF FUNGI

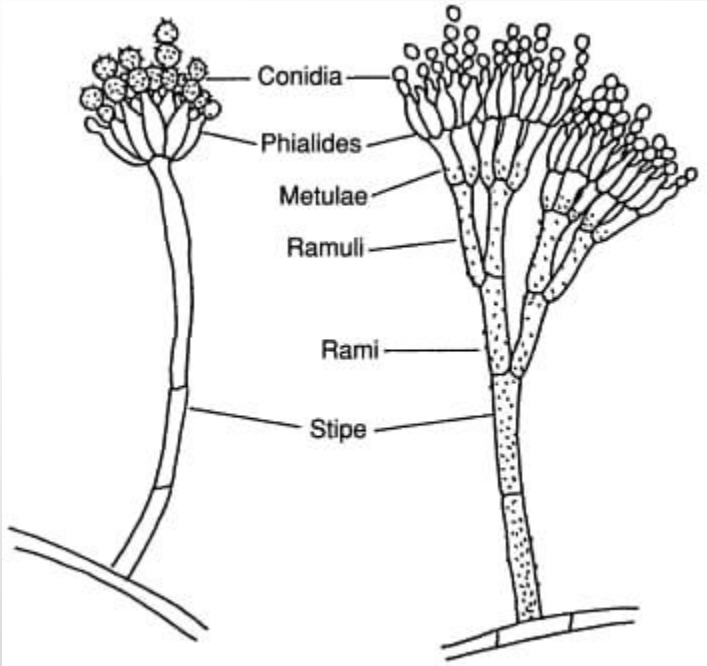
- PRODUCE BOTH SEXUAL AND ASEXUAL SPORES
- CLASSIFIED BY THEIR SEXUAL REPRODUCTIVE STRUCTURES

THE INTRODUCTION OF FUNGI

- GROW BEST IN WARM, MOIST ENVIRONMENTS
- MYCOLOGY IS THE STUDY OF FUNGI
- MYCOLOGISTS STUDY FUNGI
- A FUNGICIDE IS A CHEMICAL USED TO KILL FUNGI
- FUNGICIDE KILLS LEAF FUNGUS

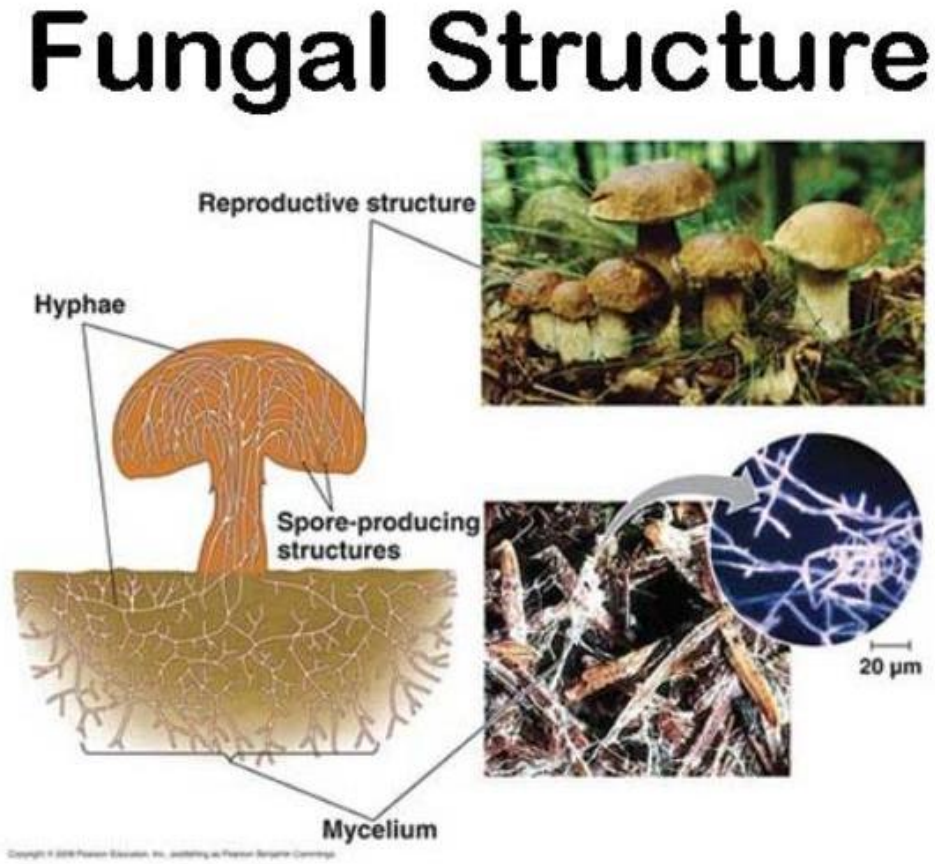
THE INTRODUCTION OF FUNGI

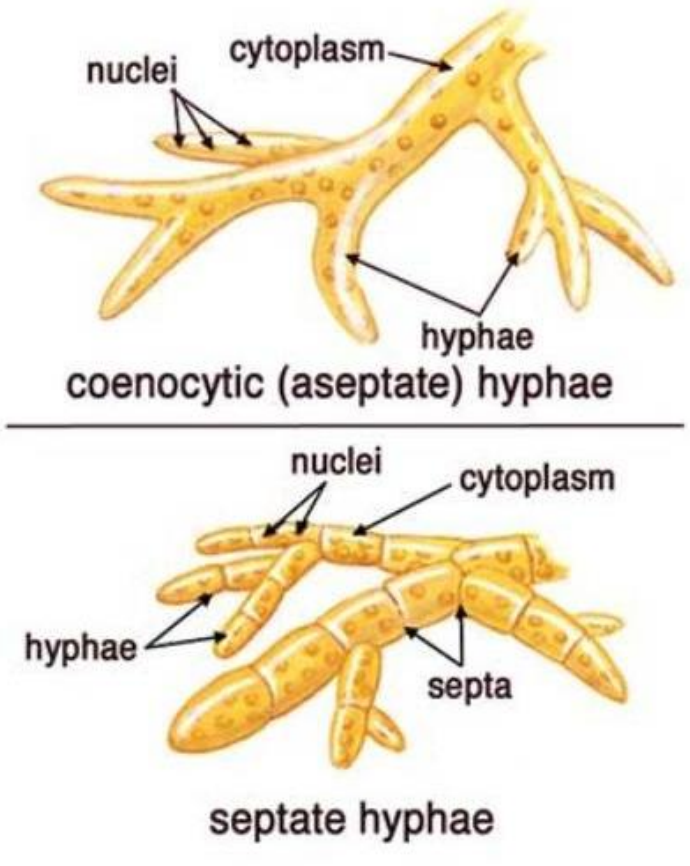
- FUNGI INCLUDE PUFFBALLS, YEASTS, MUSHROOMS, TOADSTOOLS, RUSTS, SMUTS, RINGWORM, AND MOLDS.
- THE ANTIBIOTIC PENICILLIN IS MADE BY THE PENICILLIUM MOLD



Digram of Penicillium

STRUCTURE OF FUNGI



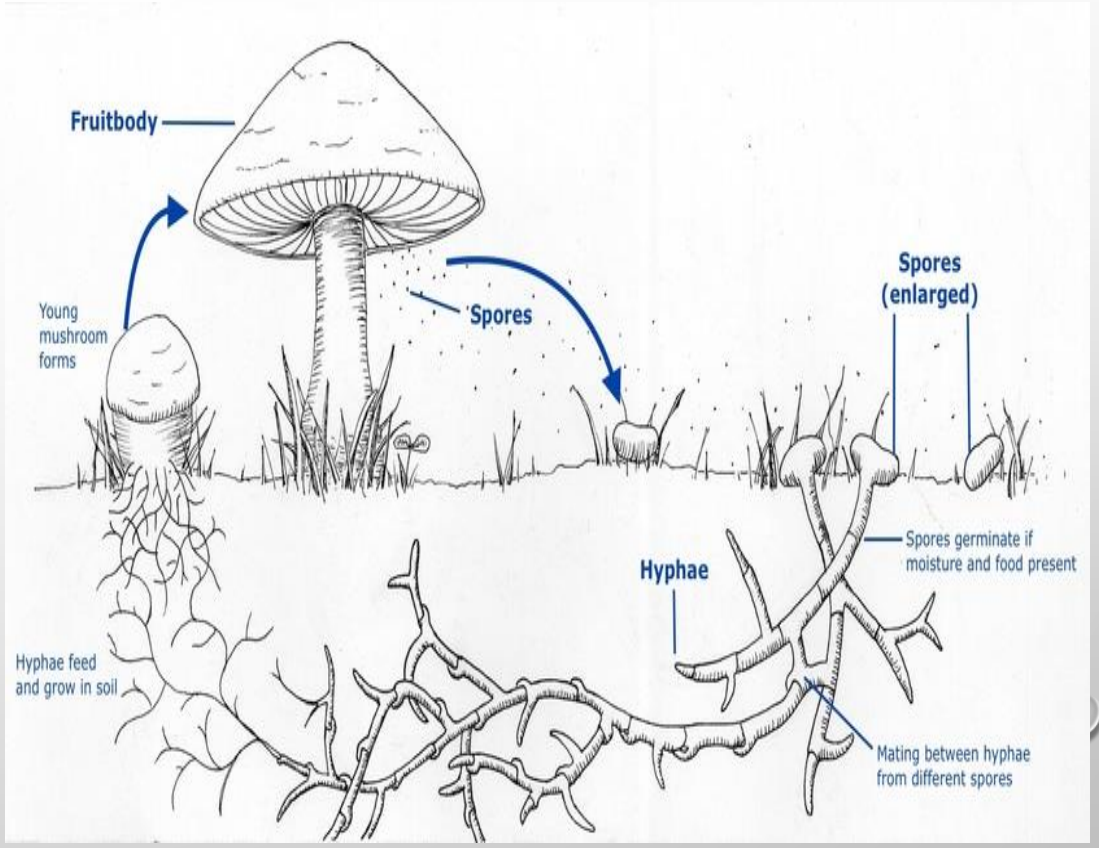


•MYCELIUM

- MYCELIUM IS THE VEGETATIVE PART OF A FUNGUS OR FUNGUS-LIKE BACTERIAL COLONY, CONSISTING OF A MASS OF BRANCHING, THREAD-LIKE HYPHAE. THE MASS OF HYPHAE IS SOMETIMES CALLED SHIRO, ESPECIALLY WITHIN THE FAIRY RING FUNGI. FUNGAL COLONIES COMPOSED OF MYCELIUM ARE FOUND IN AND ON SOIL AND MANY OTHER SUBSTRATES.

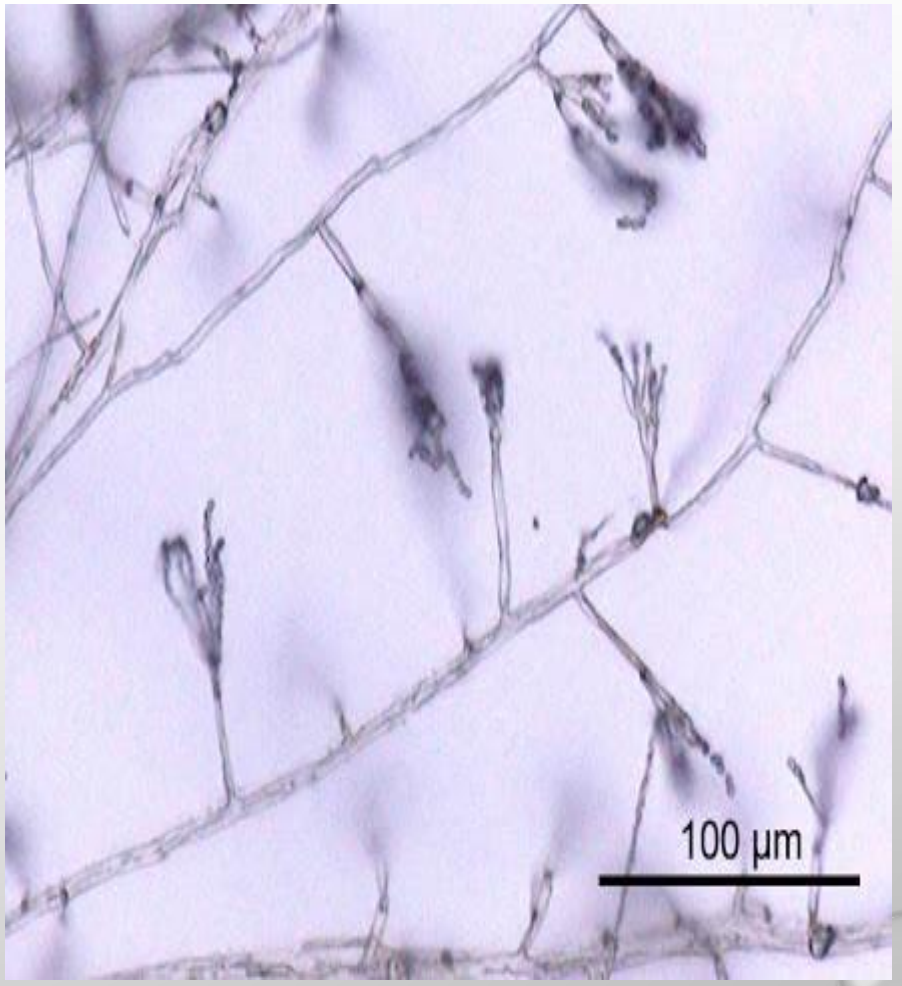
•FUNGAL SPORES

- FUNGAL SPORES ARE MICROSCOPIC BIOLOGICAL PARTICLES THAT ALLOW FUNGI TO BE REPRODUCED, SERVING A SIMILAR PURPOSE TO THAT OF SEEDS IN THE PLANT WORLD. ... THERE ARE THOUSANDS OF DIFFERENT FUNGI IN THE WORLD WHICH ARE ESSENTIAL FOR THE SURVIVAL OF OTHER ORGANISMS.



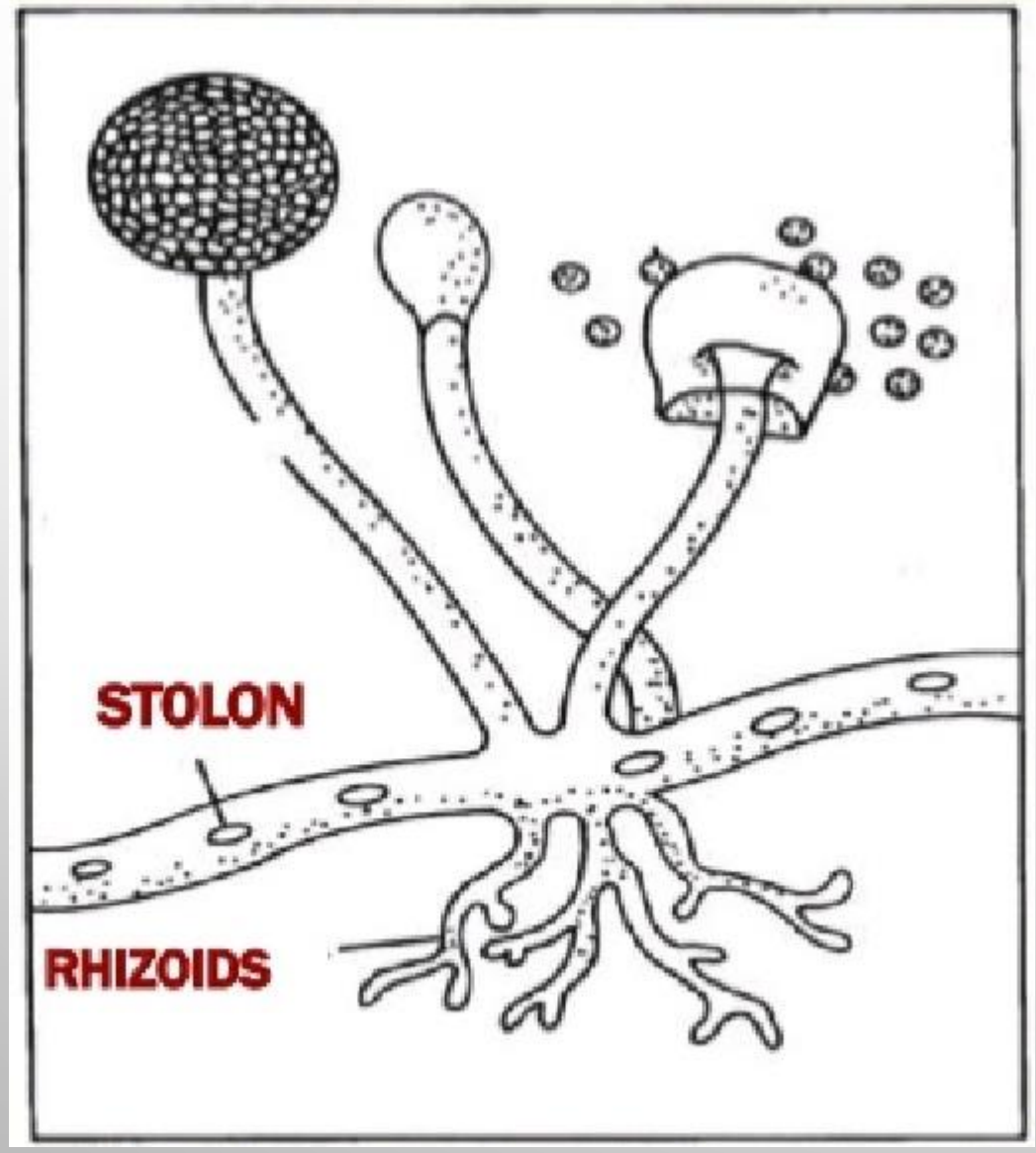
•SEPTA

- A HYPHA CONSISTS OF ONE OR MORE CELLS SURROUNDED BY A TUBULAR CELL WALL. IN MOST FUNGI, HYPHAE ARE DIVIDED INTO CELLS BY INTERNAL CROSS-WALLS CALLED "SEPTA" (SINGULAR SEPTUM). SEPTA ARE USUALLY PERFORATED BY PORES LARGE ENOUGH FOR RIBOSOMES, MITOCHONDRIA AND SOMETIMES NUCLEI TO FLOW BETWEEN CELLS



•HYPHAE

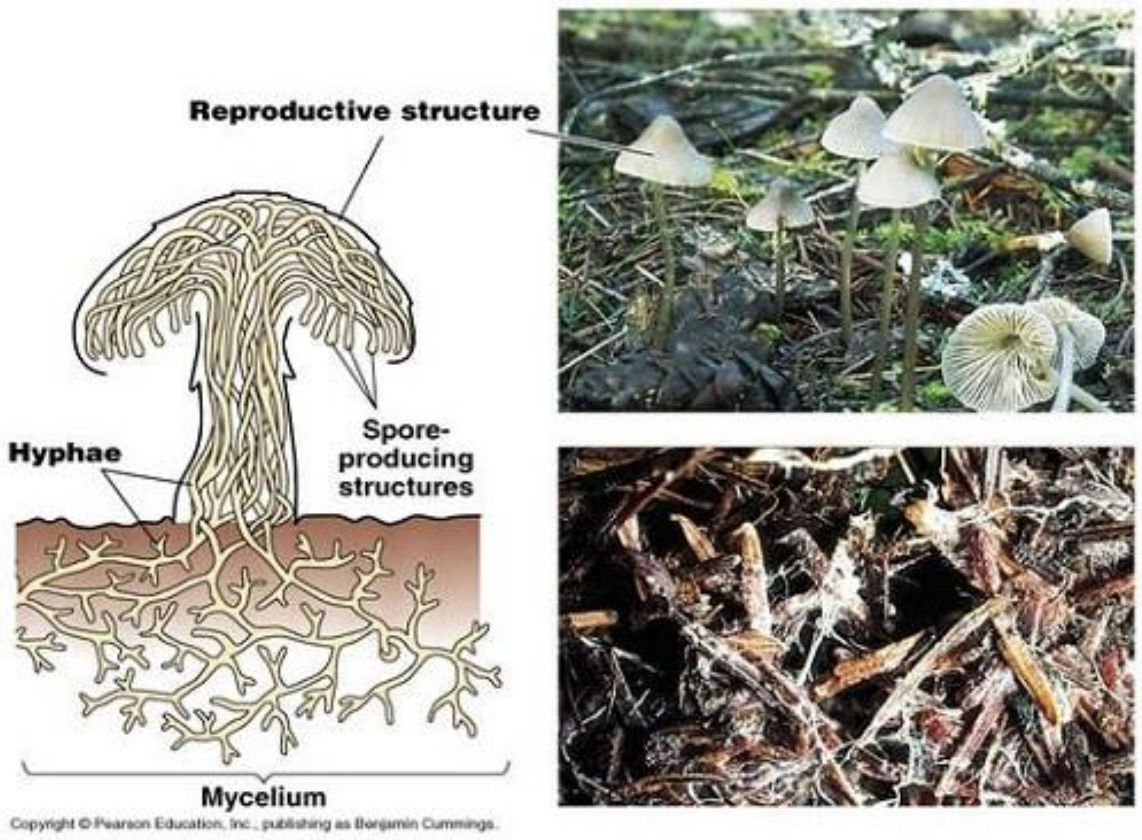
- TUBULAR SHAPE
- ONE CONTINUOUS CELL
- FILLED WITH CYTOPLASM & NUCLEI
- MULTINUCLEATE
- HARD CELL WALL OF CHITIN ALSO IN INSECT EXOSKELETONS



•HYPHAE

- STOLONS HORIZONTAL HYPHAE THAT CONNECT GROUPS OF HYPHAE TO EACH OTHER.
- RHIZOIDS - ROOTLIKE PARTS OF HYPHAE THAT ANCHOR THE FUNGUS

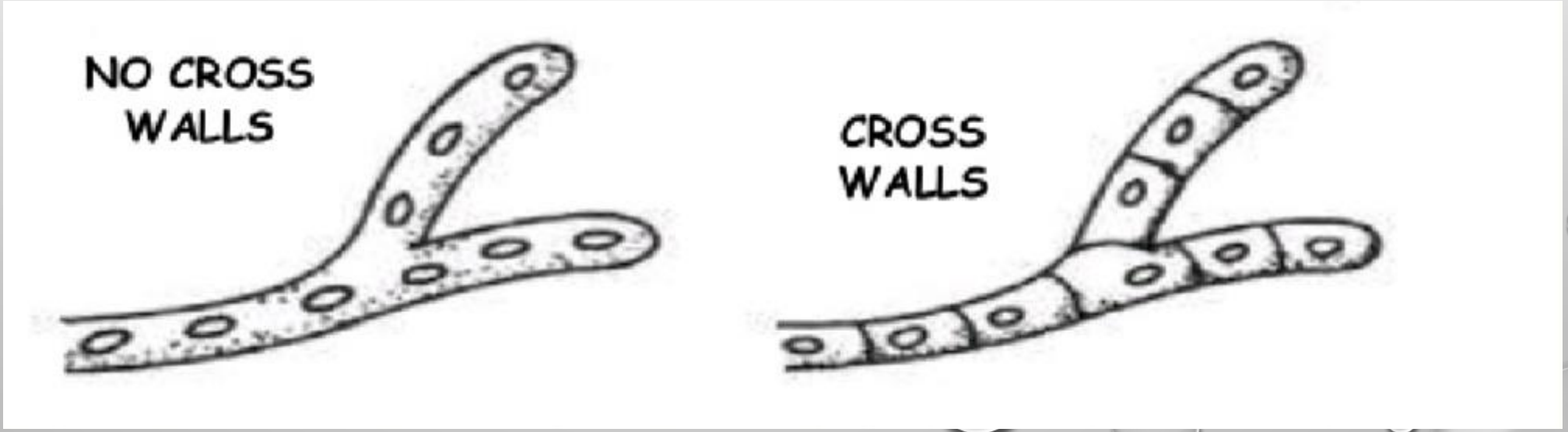
•HYPHAE



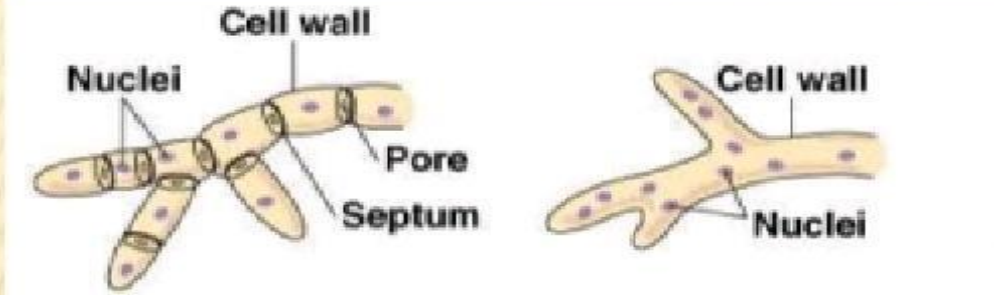
- CROSS-WALLS CALLED SEPTA MAY FORM COMPARTMENTS
- SEPTA HAVE PORES FOR MOVEMENT OF CYTOPLASM
- FORM NETWORK CALLED MYCELIA THAT RUN THROUGH THE THALLUS (BODY

MODIFICATIONS OF HYPHAE

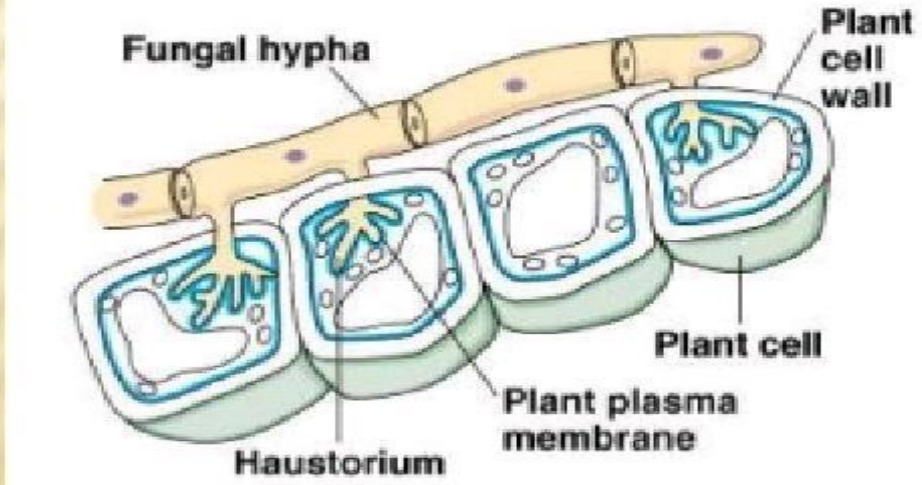
- FUNGI MAY BE CLASSIFIED BASED ON CELL DIVISION (WITH OR WITHOUT CYTOKINESIS)
- ASEPTATE OR COENOCYTIC (WITHOUT SEPTA)
- SEPTATE (WITH SEPTA)



MODIFICATIONS OF HYPHAE

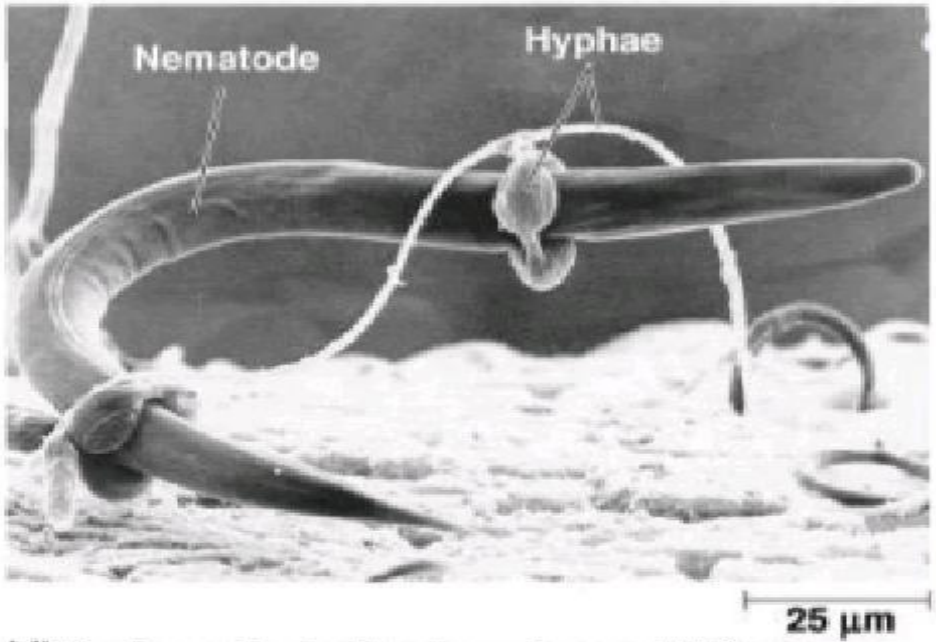


Septate Hyphae Coenocytic Hyphae



(c) Haustoria

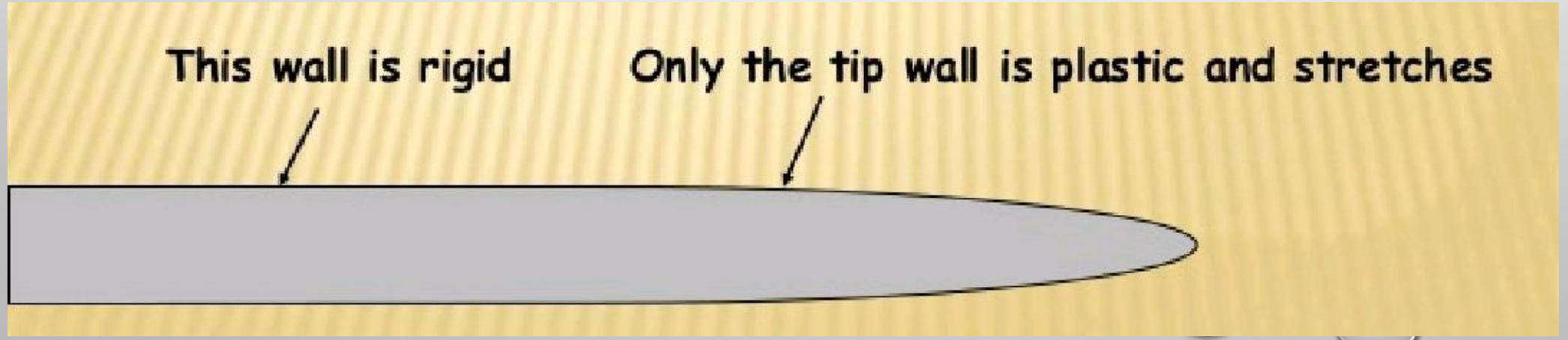
HAUSTORIA – parasitic hyphae on plants & animals



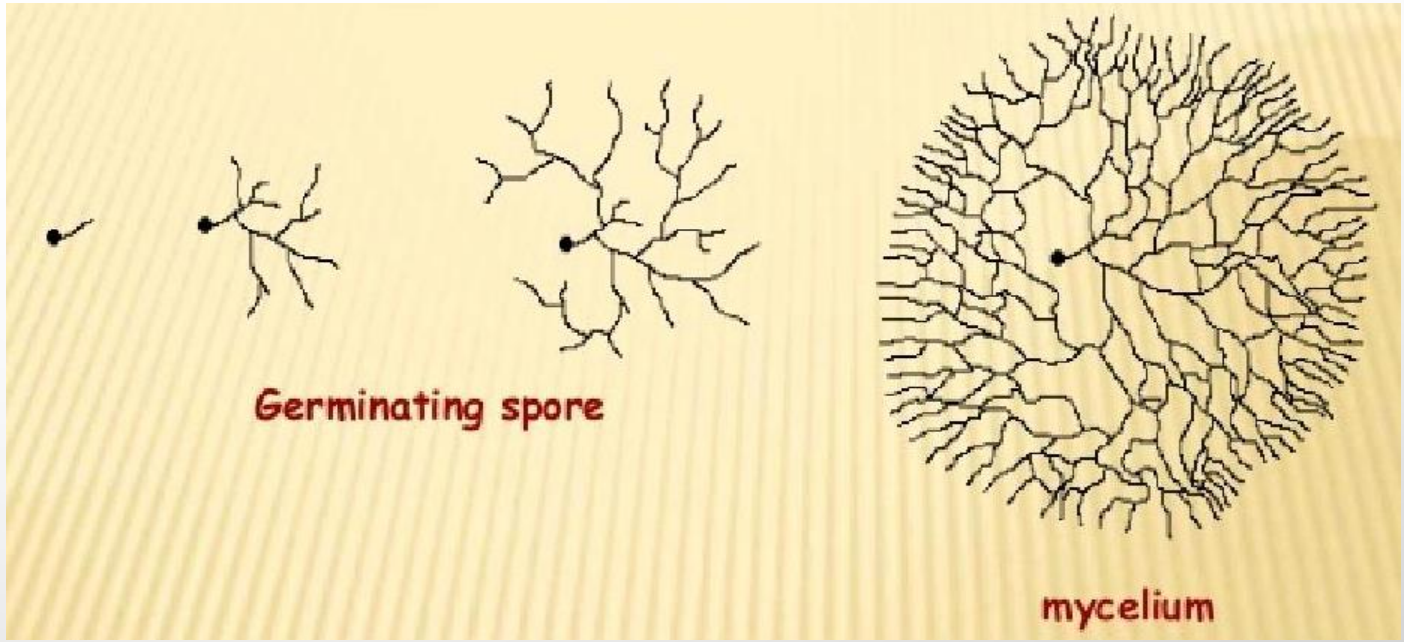
(d) Hyphae adapted for trapping and killing prey

•HYPHAL GROWTH

- HYPHAE GROW FROM THEIR TIPS
- MYCELIUM IS AN EXTENSIVE, FEEDING WEB OF HYPHAE
- MYCELIA ARE THE ECOLOGICALLY ACTIVE BODIES OF FUNGI



•REPRODUCTION



- MOST FUNGI REPRODUCE ASEXUALLY AND SEXUALLY BY SPORES.
- ASEXUAL REPRODUCTION IS MOST COMMON METHOD & PRODUCES GENETICALLY IDENTICAL ORGANISMS.
- FUNGI REPRODUCE SEXUALLY WHEN CONDITIONS ARE POOR & NUTRIENTS

HUMAN-FUNGUS INTERACTIONS

- **BENEFICIAL EFFECTS OF FUNGI**
- DECOMPOSITION - NUTRIENT AND CARBON RECYCLING.
- BIOSYNTHETIC FACTORIES, CAN BE USED TO PRODUCE DRUGS, ANTIBIOTICS, ALCOHOL, ACIDS, FOOD (E.G., FERMENTED PRODUCTS, MUSHROOMS).
- MODEL ORGANISMS FOR BIOCHEMICAL AND GENETIC STUDIES.
- PRODUCTION OF VITAMIN.
- HORMONE PRODUCTION.
- EDIBLE FUNGI.
- PRODUCTION OF INSECTICIDES.

HUMAN-FUNGUS INTERACTIONS

- **HARMFUL EFFECTS OF FUNGI**
- DESTRUCTION OF FOOD, LUMBER, PAPER, AND CLOTH.
- PLANT DISEASES.
- ANIMAL DISEASES
- HUMAN DISEASES, INCLUDING ALLERGIES.
- TOXINS PRODUCED BY POISONOUS MUSHROOMS AND WITHIN FOOD (E.G., GRAIN, CHEESE, ETC.).

•ECONOMIC IMPORTANCE

- **PUCCINIA GRAMINIS TRITICI** CAUSES BLACK OR STEM RUST.
- **P. RECONDITA** CAUSES BROWN OR ORANGE LEAF RUST
- **P. CORONATA** BROWN RUST OF WHEAT.
- **P. SORGHI** CAUSES LEAF RUST OF CORN

ECONOMIC IMPORTANCE

1. LOOSE SMUT OF WHEAT IS CAUSED BY USTILAGO TRITICI AND IS A COMMON DISEASE.
2. IT CAUSES ABOUT 1% DAMAGE IN THE PLANES AND AROUND 10-20% IN FOOT HILLS AND HUMID PLACES OF PAKISTAN.
3. COVERED SMUT OF BARLEY IS CAUSED BYU.HORDEI AND U.NUDA.
4. LOOSE SMUT OF MAIZE IS CAUSED BYU.MAYDIS OR U.ZEAE.
5. SUGAR CANE IS ATTACKED BY U.SCITAMINEA OR U.SACCHARI AND U.AVENAE CAUSE LOOSE SMUT OF OAT.

THANK YOU