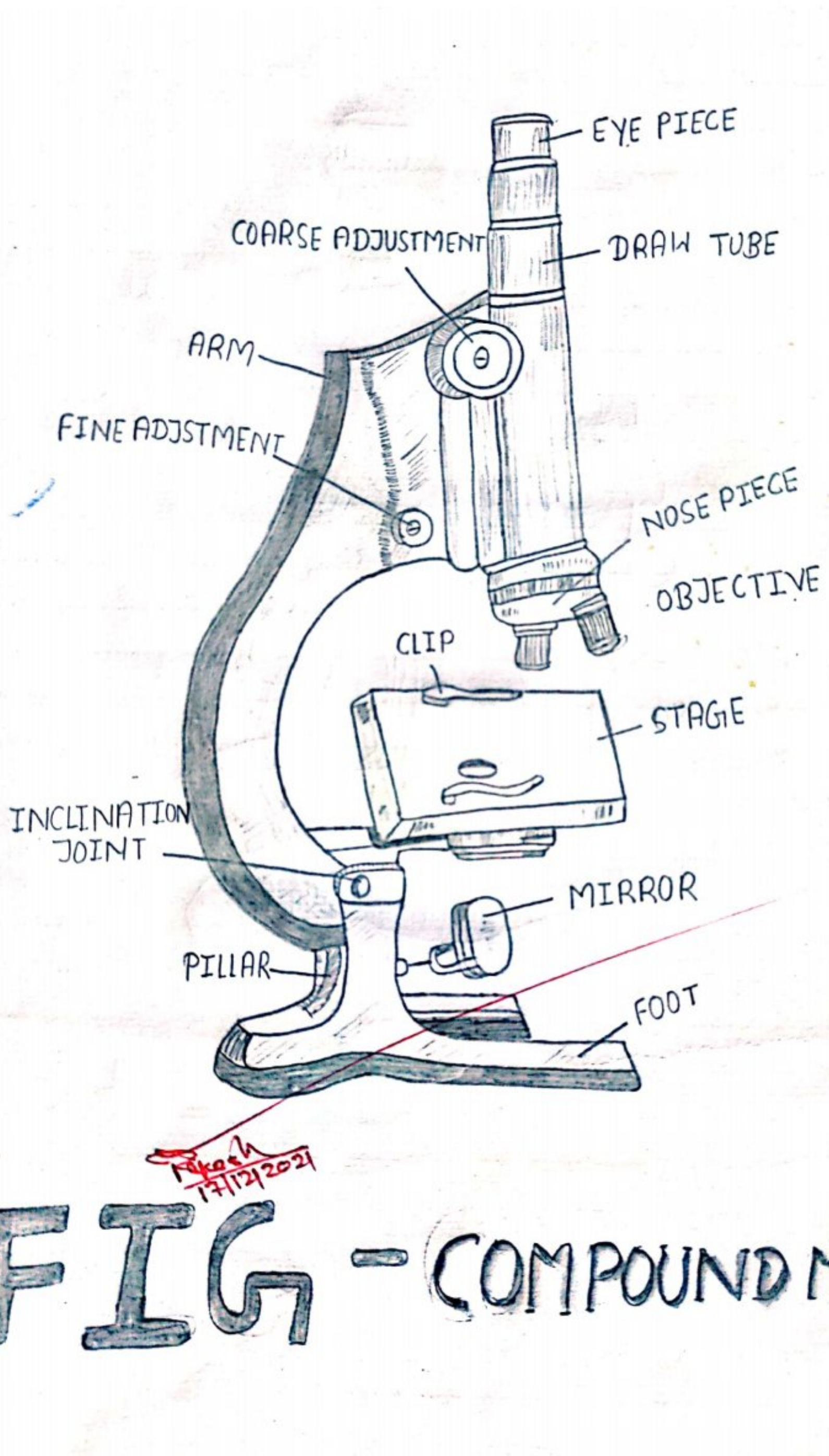
B.SC.-1ST SEMESTER PRACTICAL FILE

BOTANY



Rakesh 13/12/2021

FIG - COMPOUND MICROSCOPE

Expt. No..... Page No.....01..... Date...../...../.....

COMPOUND MICROSCOPE —

Compound microscope are used to view small samples that can not be indentified with the naked eye. These samples are typically placed on a slide under the microscope.

Part of Compound Microscope —

Eye piece Tube —

Eye piece tube holds the eyepieces in place above the objective lens. Binocular microscope heads typically incorporate a diopter adjustment ring that allows for the possible inconsistencies of our eyesight in one or both eyes.

Condenser —

Condenser is used to collect and focus the light from the illuminator on to the specimen.

Nose piece —

It carries low power objective and high power objective.

Stage —

Stage is where are used the specimen to be viewed is placed.

Stage clips —

Stage clips are used when there is no mechanical stage. It is holds the slide finnly on the stage.

Arm —

Arm connects to the base and supports the microscope head. It is also used to carry the microscope.

Teacher's Signature : .....

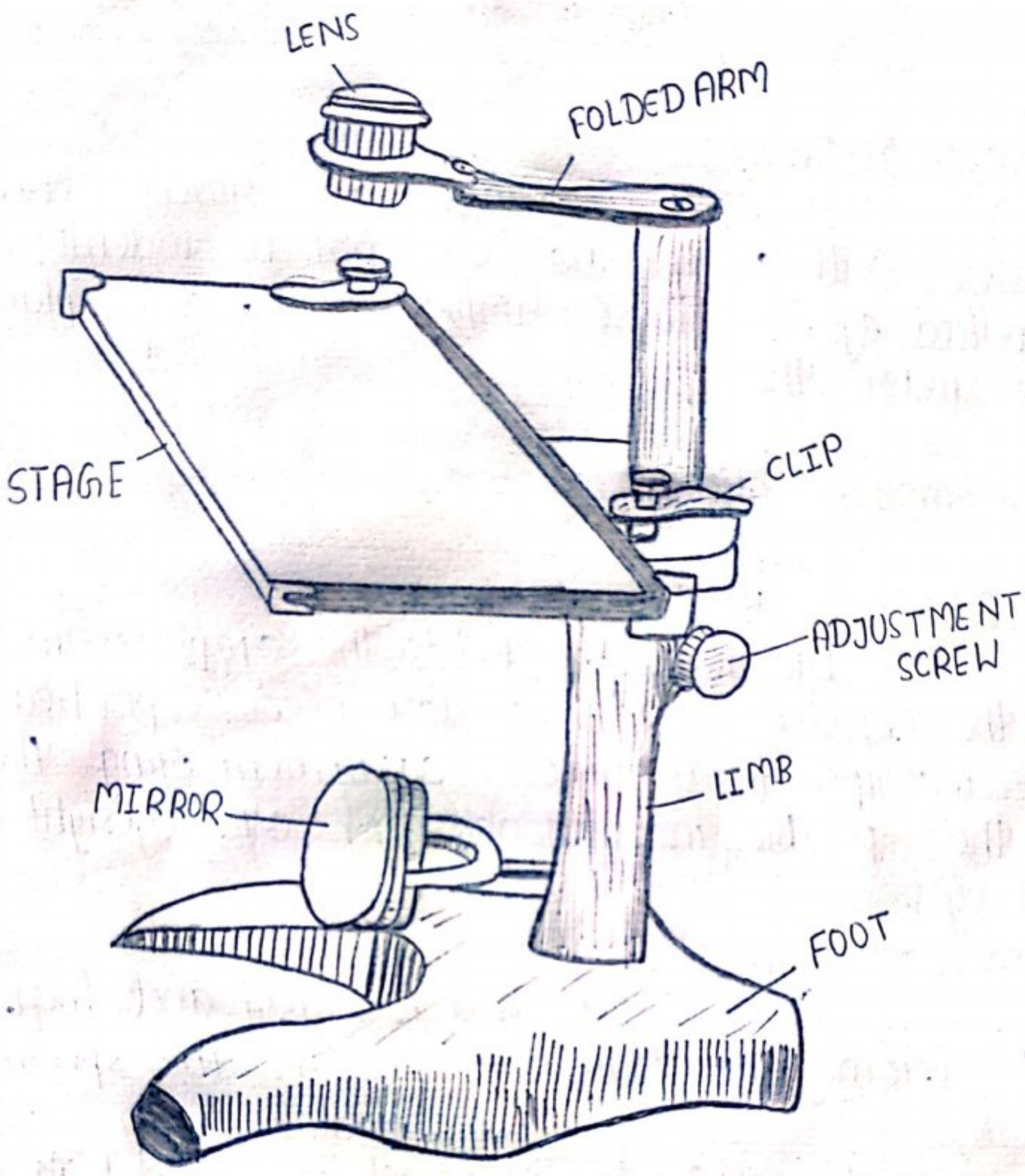


FIG- A DISSECTING MICROSCOPE

17/12/2021

DISSECTING MICROSCOPE —

A dissecting microscope is used to view three - dimensional objects and larger speciments, with a maximum magnification of 100x.

Part of Dissecting Microscope —

Lense —

It is simple convex lens of either 2x, 3x, 5x, 10x, or 20x magnification.

Stage —

It is rectangular glass plate attached to the upper end of the stand or limbs.

Clips —

Two clips are fitted on the stage. They are used to hold the slide in the desired position.

Mirror —

It is concave reflecting mirror attached to the lower inner side of the stand. Light rays are reflected of focussed on the stage by the mirror.

Foot or Base —

It is the bassal, horse-shoe shaped or circular part of dissecting microscope. It is made of heavy material.

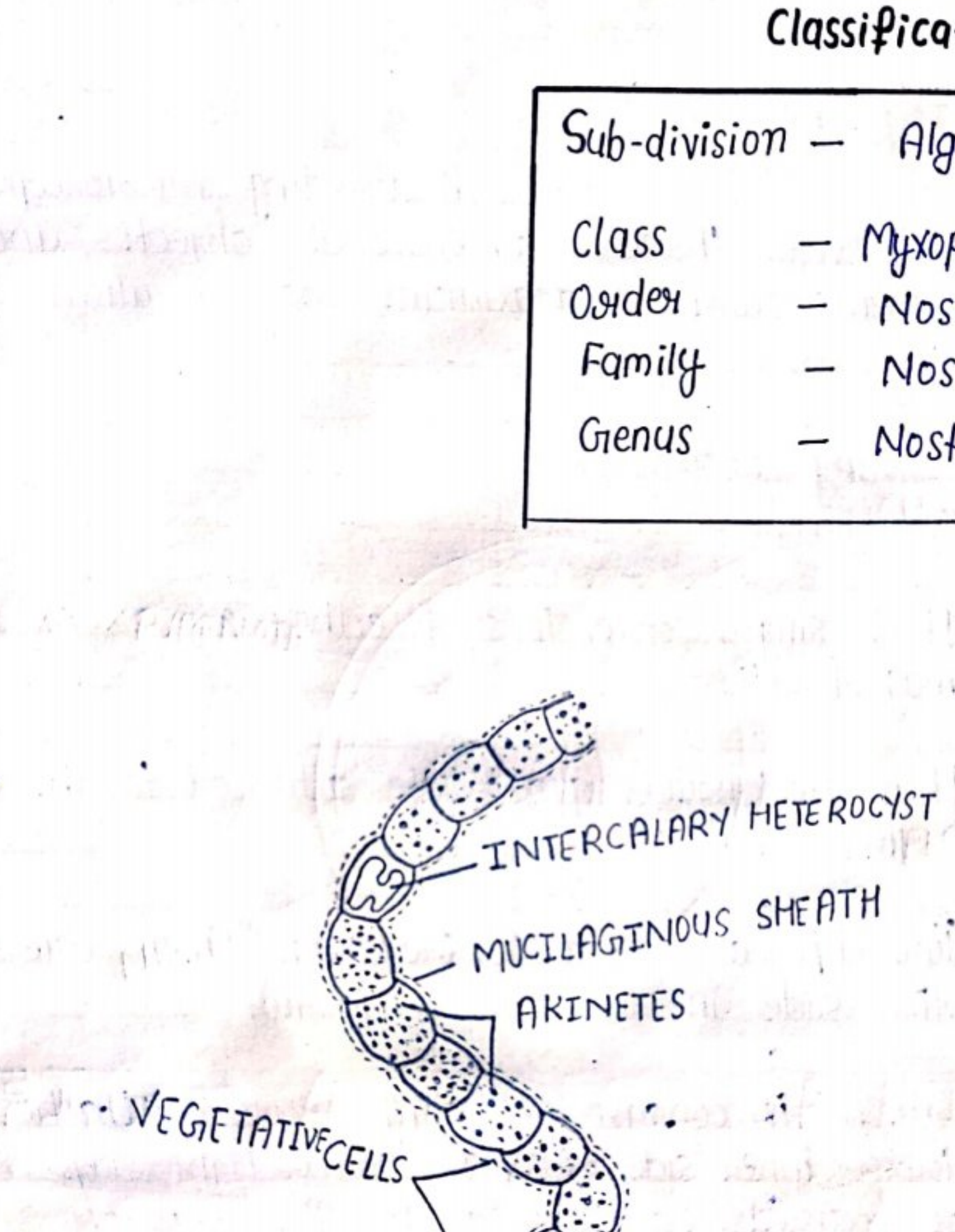
Stand —

It is short but strong, hollow, cylindrical rod. Its one end is fixed at the foot or base.

Teacher's Signature : .....

Classification

Sub-division	—	Algae
Class	—	Myxophyceae or Cyanobacte
Order	—	Nostocales
Family	—	Nostocaceae
Genus	—	Nostoc



NOSTOC

FIG – A SINGLE FILAMENT

Expt. No..... Page No. 03 Date...../...../.....

SECTION-A

ALGAE AND FUNGI

PHYCOLOGY AND MYCOLOGY

PHYCOLOGY (ALGAE) -

-: NOSTOC :-

Comments —

1. Thallus is colonial young colonies are microscopic, spherical and solid.
2. Mature colonies become irregular are hollow.
3. Colonial envelope encloses many filaments, these are much twisted, curved and entangled with each other.
4. A filament has diffluent gelatinous sheath.
5. The trichomes are unbranched, Each trichome is made of cells of uniform size and shape except those called heterocyst which occur throughout.
6. Structure of a cell is typically cyanophycean, It has a centrally located centroplasm, nucleus being altogether absent.
   Peripheral cytoplasm shows diffused pigments, A few shining cyanophycean granules are also present in the region.
7. They few cells mostly in chains between to Consicutive become modifi into Akinetes.

Teacher's Signature : .....

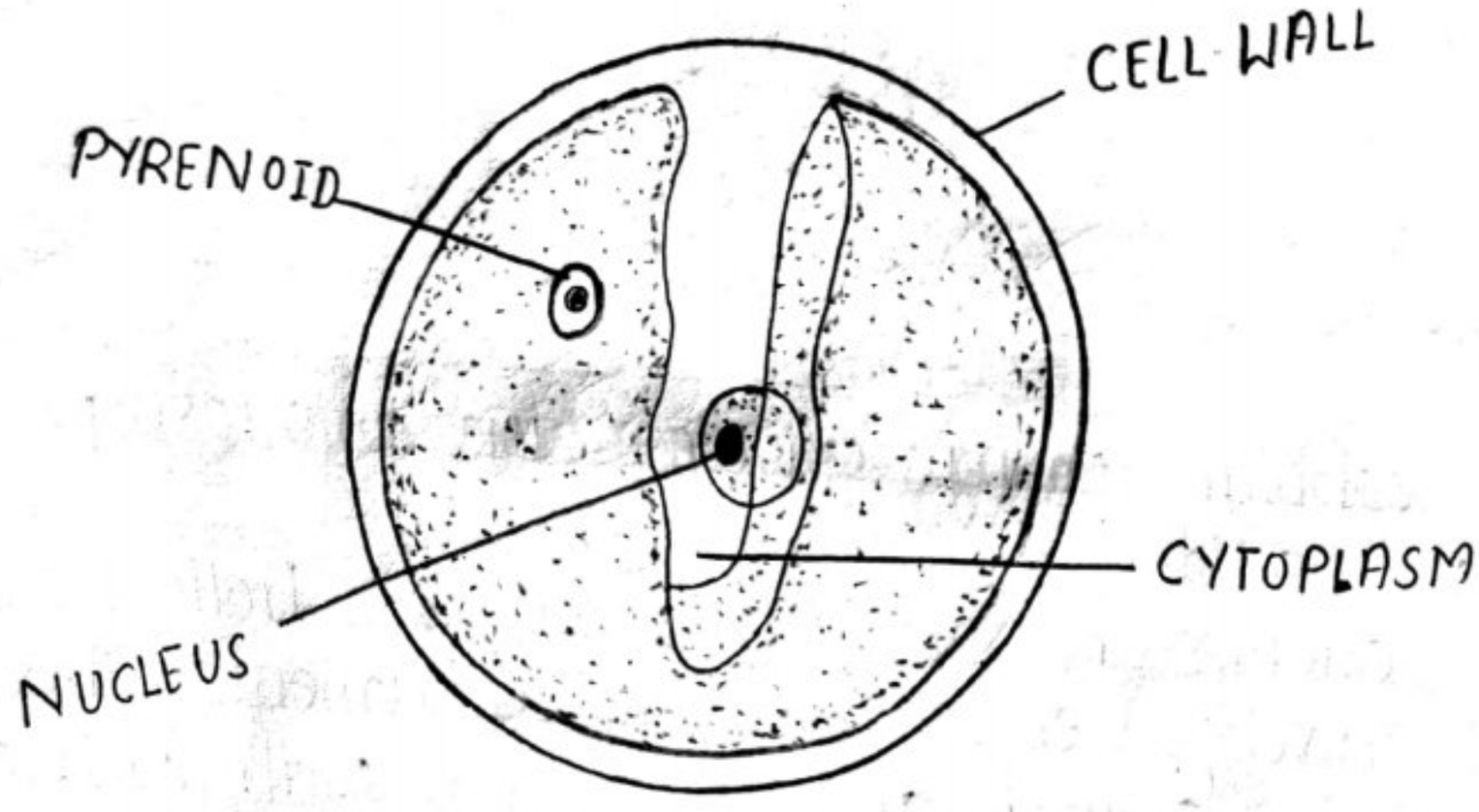


FIG - A SINGLE CELL REPRESNTING A TALLUS
(CHLORELLA. THLLUS)

Expt. No..... Page No. 04 Date...../...../.....

CHLORELLA

Classification —

Sub-division — Algae
Class — Chlorophyceae
Order — Chlorococcales
Family — Chlorellaceae
Genus — Chlorella

Comments —

1- Single cell represents the thallus. The cell non-motile.
2- The cell are found singly or sometimes in groups.
3- A cell is very small. It is spherical to ellipsoidal in shape.
4- A cell has single cup-shaped or curved band of chloroplast parietal in position.
5- A single pyrenoid is generally found (lacking at times).
6- Nucleus lies surrounded by the cytoplasm, which fills up most of the cell.
7- The only method of reproduction is by autospores. Two to sixteen autospores are formed by the cell as a result of division.
8- A cell is surrounded by a cellulose cell wall.
9- The cells are solitary and very small.
10- Only asexual method of reproduction is present.

Teacher's Signature : .....

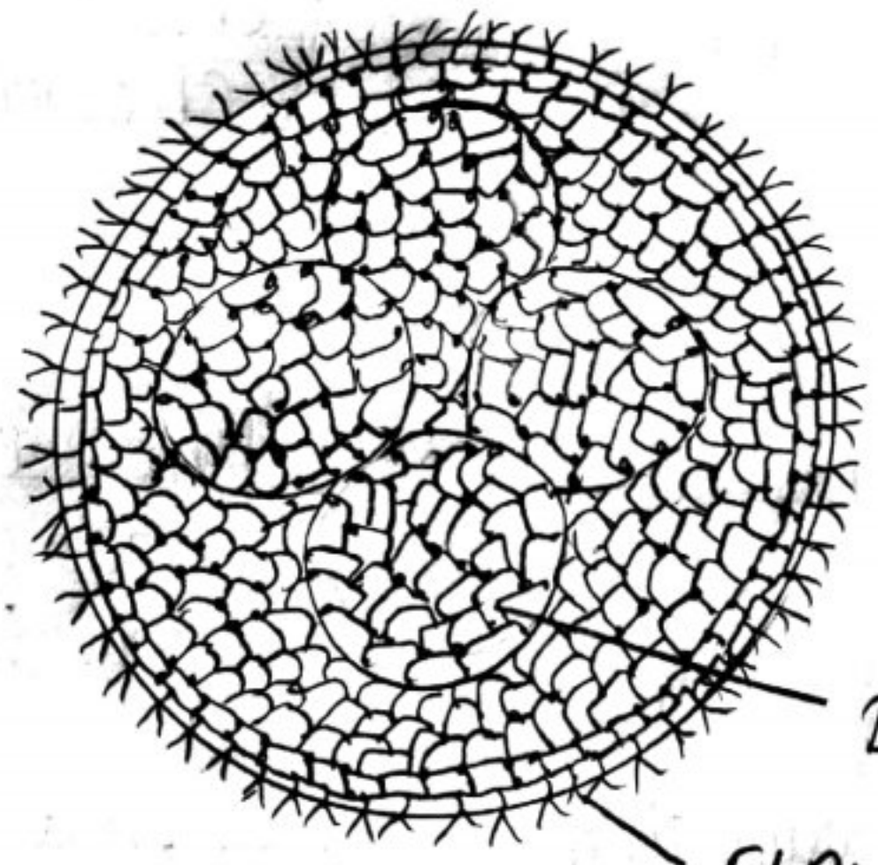


FIG - VOLVOX

Rakesh
18/12/2021

Expt. No..... Page No. 05 Date...../...../.....

! VOLVOX !

CLASSIFICATION—

Sub-Division — Algae
Class — chlorophyceae
Order — Volvocales
Family — Volvocaceae
Genus — Volvox

Comments —

1- All the cells are arranged in the periphery of mucilaginuous sphere in a single layer.
2- Asexual reproduction is with the help of daughter colonies, which develop in parent colony.
3- Daughter colonies move for a time with in parent colony.
4- Daughter colonies come out by rupturing the parent colony and behave as individual colonies.
5- The number of daughter colonies in a parent colony varies from a few to as many as twenty.
6- Daughter colonies come out by rupturing the parent colony and behave as individual colony.
7- Sex organs are present in the posterior half of the Coenobium.
8- Sexual reproduction is Oogamous and Coenobia may be homothallic or heterothallic.
9- Homothallic species are always protandrous, i.e. antheridia develop first and Oogonia later on.

Teacher's Signature : .....

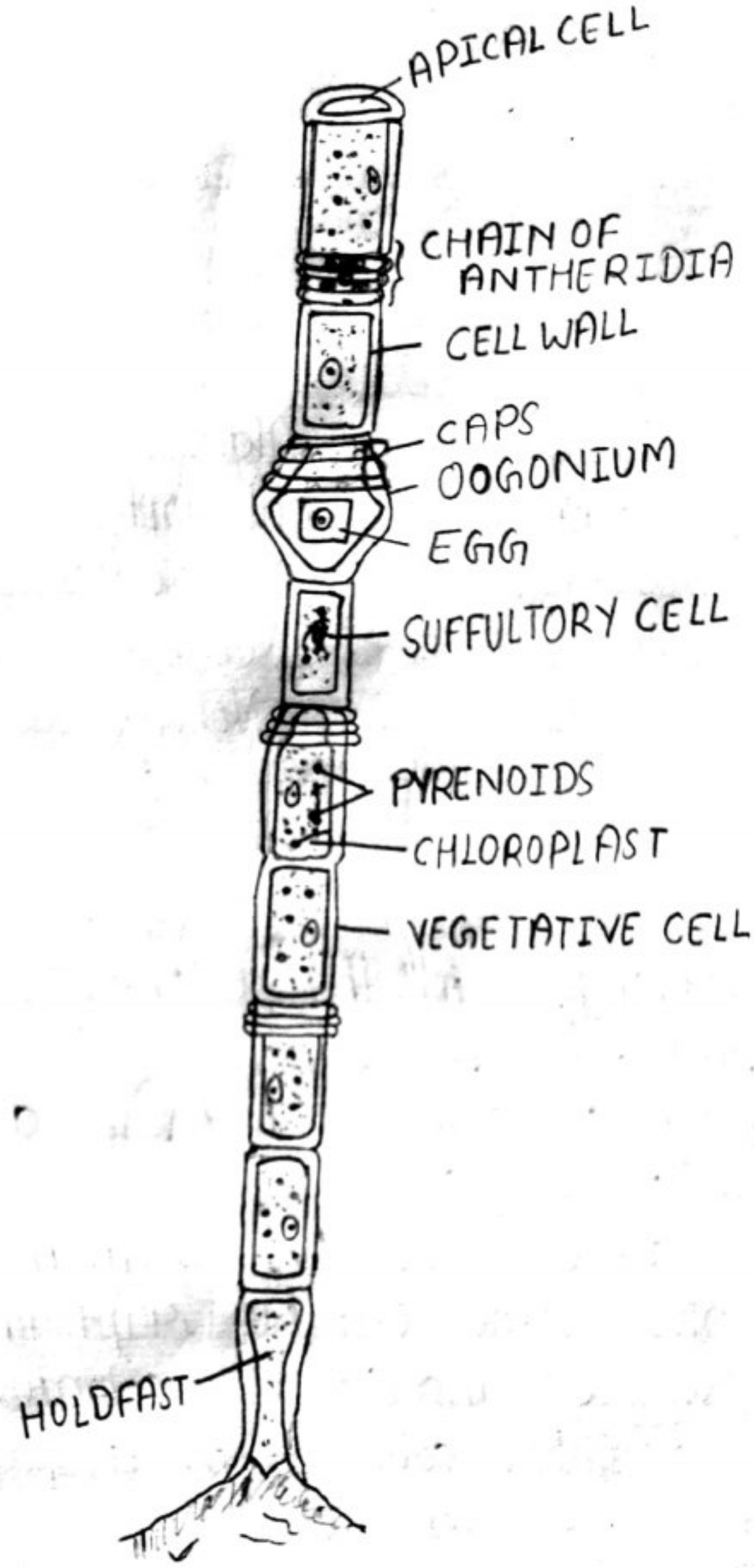


FIG – OEDOGONIUM A FILAMENT

Rakesh
19/12/2021

Expt. No..... Page No. 06 Date...../...../.....

OEDOGONIUM

CLASSIFICATION —

Class — Chlorophyceae
Order — Oedogoniales
Family — Oedogoniaceae
Genus — Oedogonium

Comments —

1. Thallus is multicellular, filamentous and Unbranched.
2. A filament is differentiated into three types of cells according to their position.
   (i) basal (ii) intercalary (iii) apical.
3. The basal cell of a filament functions as a holdfast.
   The lower part of the holdfast is either disk-like or finger-shaped. The upper part is mostly broad and rounded. The basal part of the cell generally lackes green pigments and, there fore, is non-green unlike other cells of the filament.
4. A cell at the tip of the filament is known as apical cell. It is rounded at its free surface.
5. The cells present between basal and the apical cells are intercalary cells. These show typical cell structure.
6. The typical cell is cylindrical.
7. Cell wall is thick and three layered.
8. Inner to cell wall is a reticulate chloroplast, that runs parallel to the long axis of the cell.
9. Mature and old cells show 'Cap cells' at their upperend.
10. These are characteristic of the members of Oedogoniales.

Teacher's Signature : .....

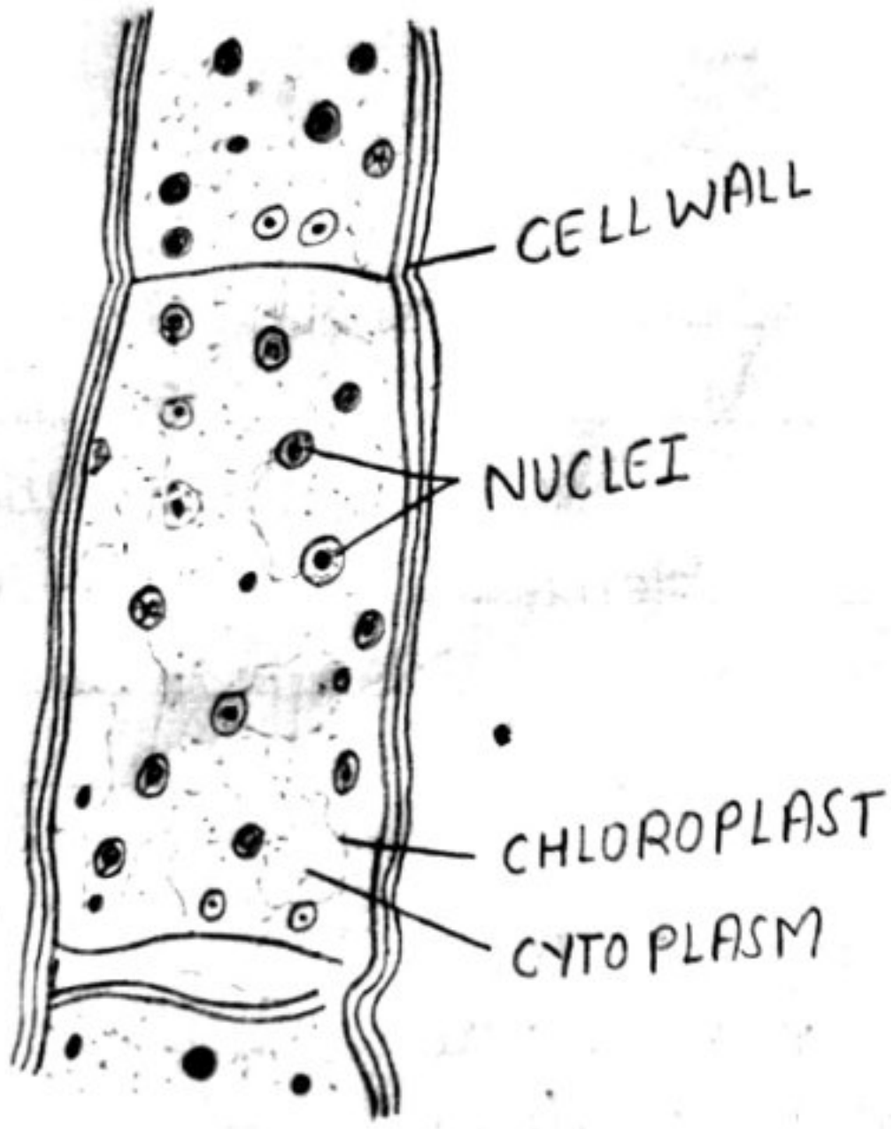


FIG - CLADOPHORA

Expt. No..... Page No. 07 Date...../...../.....

CLADOPHORA

CLASSIFICATION —

Sub-Division — Algae
Class — Chlorophyceae
Order — Cladophorales
Family — Cladophoraceae
Genus — Cladophora

Comments —

1- The thallus is multicellular, filamentous and branched.
2- In some cases large number of filaments are held together by weaving of the branches.
3- Such plants form dense masses and appear as compact cushions attached to some substratum or sometimes as loose hollow balls (frequently as big as human head).
4- These species are known as aegagropilous are found at the bottom of shallow lakes or in marine habitats.
5- Alga remains attached to the substratum by rhizoids. Rhizoidal outgrowths come out from the basal part of the thallus.
6- The filaments are profusely branched.
7- Branching is lateral but appears dichotomous because of evection (process of pushing the main axis on (one) one side during the development of lateral branches).
8- Branches arise just beneath the septum, from the upper end of the cell.

Teacher's Signature : .....

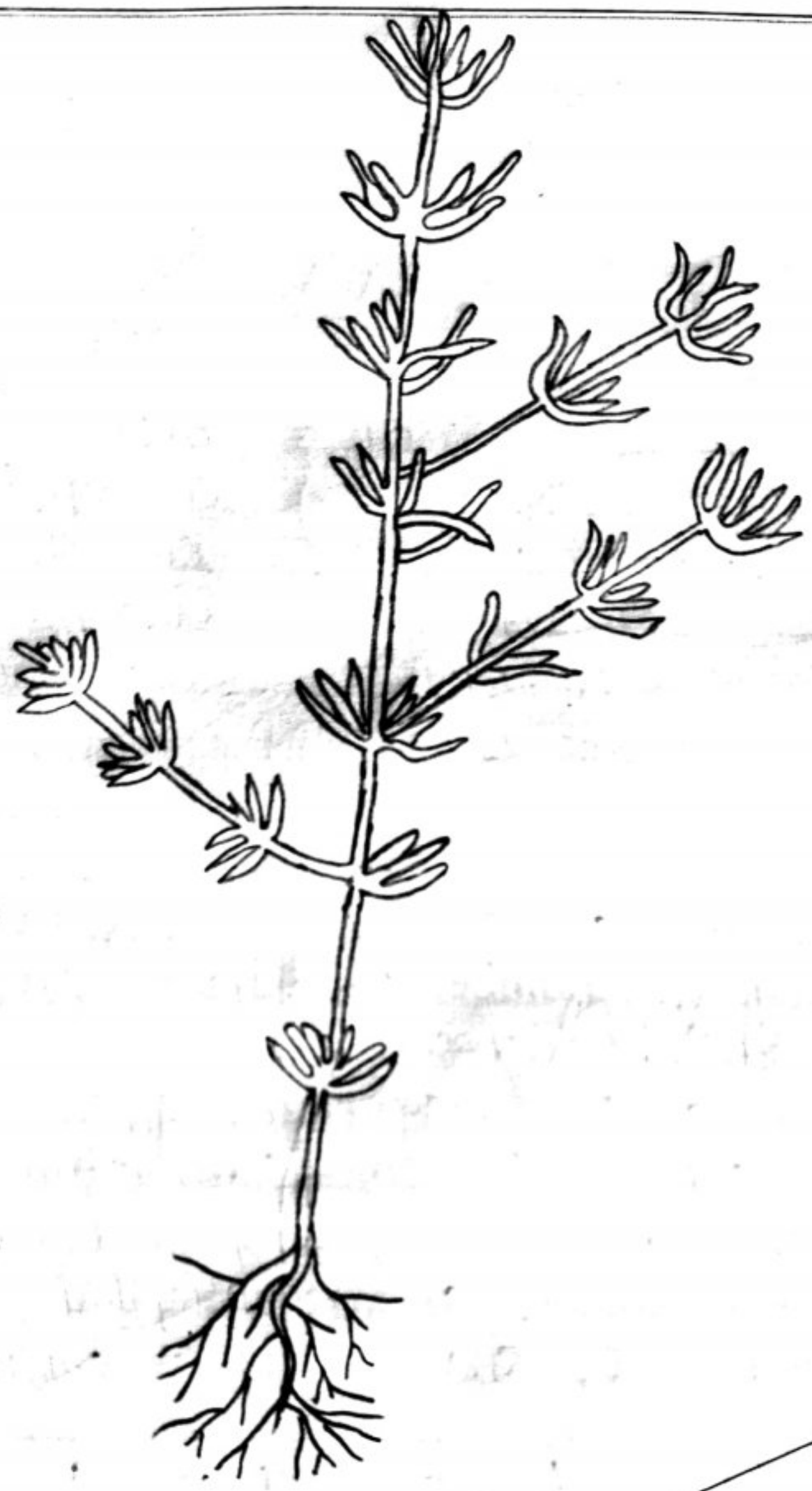


FIG- CHARA A THALLUS TO SHOW HABIT

Rakesh
18/12/2021

Expt. No..... Page No. 08 Date...../...../.....

CHARA

CLASSIFICATION —

Sub-division — Algae
Class — Chlorophyceae
Order — Charales
Family — Characeae
Genus — Chara

Comments —

1- Thallus is macroscopic, branched and multicellular Calcium carbonate is deposited all over.
2- It remains attached to the substratum by multicellular rhizoids which bear an erect and branched main axis above.
3- Multicellular rhizoids are branched.
4- These are borne by the lower nodes of the main axis.
5- Rhizoids passess oblique septa. The rhizoids are not differentiated into nods and internods.
6- The Cytoplasm of a rhizoidal cell has a nucleus situated towards of a upper side of the cell.
7- At the septum of a rhizoidal cell, the ends are protracted in opposite direction to form knooted part.
8- Main axis is composed of long internodes alternating with small nodes.
9- Long internode is composed of a single cell, enveloped by many corticating threads.

Teacher's Signature : .....

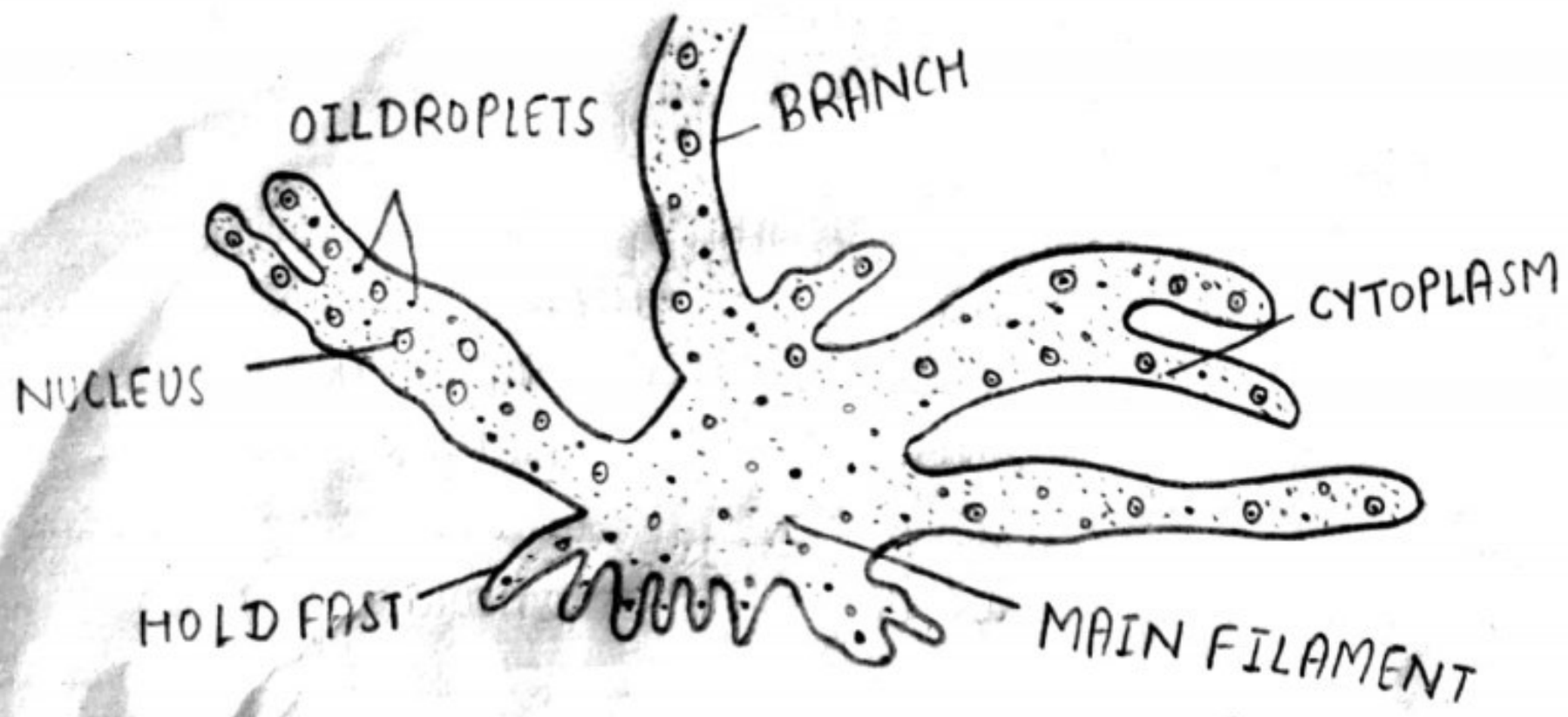


FIG-VAUCHERIA

20/12/2024

Expt. No..... Page No.. ७ Date...../...../.....

VAUCHERIA

CLASSIFICATION –

Sub-division – Algae
Class – Xanthophyceae
Order – Heterosiphonales
Family – Vaucheriaceae
Genus – Vaucheria

Comments –

1. Thallus is unicellular multinucleate filamentous and branched.
2. Filaments are profusely branched. The branching is lateral but appears dichotomous.
3. Filaments are without any septation (aseptate filaments).
4. If terrestrial in habitat, a few colourless, rhizoidal branches are given out which penetrate soil.
5. Cell wall is two layered. Outer layer is composed of pectose while inner is that cellulose.
6. In the centre lies a big vacuole, continuous through out the lenght of the filament.
7. The cytoplasm lies between vacuole and the cell wall.
8. Many small nuclear are scattered in the cytoplasm near the vacuole.
9. Small chromatophores are also scattered in the cytoplasm. They are circular or elliptical in shape. pyrenoids are absent.
10. The reserve food material in the from of small oil droplets.

Teacher's Signature : .....

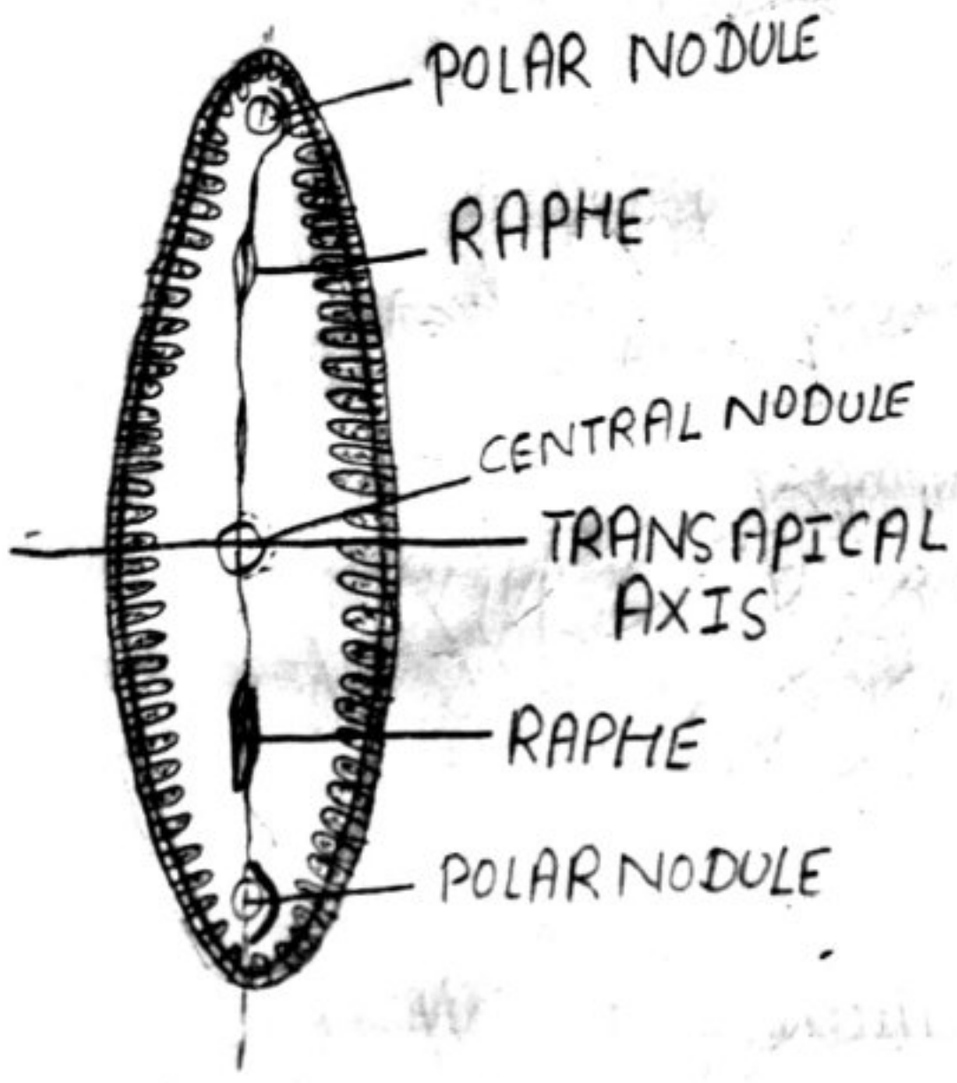


FIG- FRUSTULE OF PINNULARIA

Expt. No..... Page No....10..... Date...../...../.....

PINNULARIA

CLASSIFICATION –

Class – Bacillariophyceae
Order – Pennales
Family – Naviculoideae
Genus – Pinnularia.

Comments –

1- Colonial form are surrounded by mucilaginous sheath.
2- The cell wall consistes of two halves, overlapping each other in the form of two part, of a petri-dish.
3- The outer and inner halves are known as epitheca and hypotheca respectively.
4- Both epitheca and hypotheca are made up of two parts i.e. value and a connecting band.
5- Main Surface of the thallus body is formed by valve and the longitudinal sides are formed by connecting band.
6- Cell wall consists of pectin and some silica compounds.
7- From the cell wall arise many pinnately arranged striations or striae.
8- In the centre, a longitudinal raphae is present.

Rajan
20/12/2021

Teacher's Signature : .....

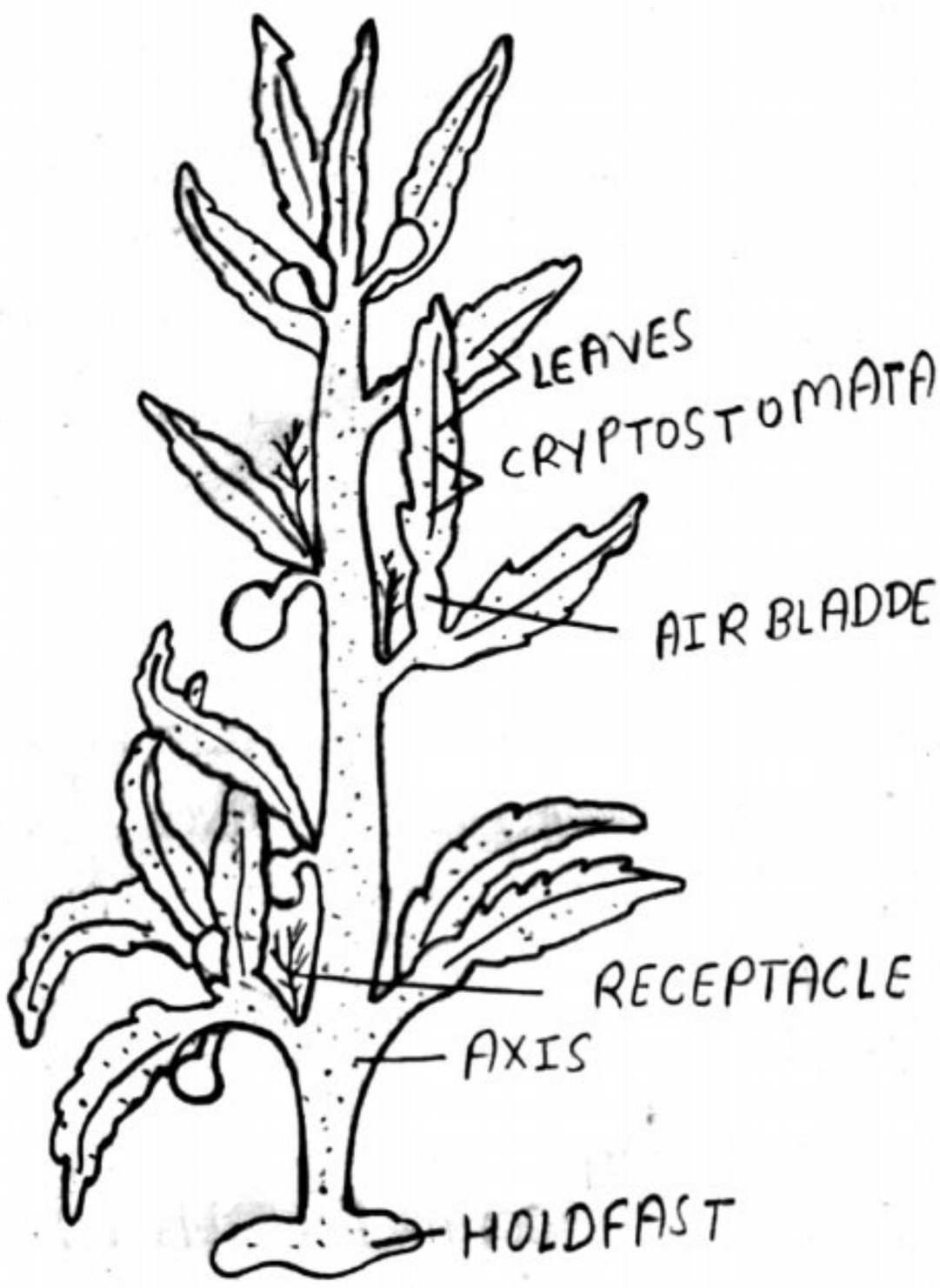


FIG- SARGASSUM. A MATURE PLANT

Expt. No..... Page No. 11 Date...../...../.....

SARGASSUM

CLASSIFICATION —

Sub-division — Algae
Class — Phaeophyceae
Order — Fucales
Family — Sargassaceae
Genus — Sargassum

Comments —

1- Thallus is erect, thalloid and branched.
2- It remains attached to the substratum by discoid holdfast.
3- Main axis stands out from the holdfast.
4- Varies from a few many centimeters height.
5- Main axis bears large number of primary laterales forming a larger part of vegetative structure. Branches are radially symmetrical and spirally arranged.
6- Secondary branches are repeated branched.
7- Many branches are flattend along the plane, of branching into leaf like structure called 'leaves'.
8- Leaves are narrow and their margins are mostly serrate. A few species also a clear mid-rib.
9- In the lower part, leaves are replaced by air bladders.
10- How ever, leaf or its part is modified almost at any place an air bladder.

Rajput 20/12/2021

Teacher's Signature : .....

FIG- POLYSIPHONIA . THALLUS TO SHOW HABIT

Expt. No..... Page No...12..... Date...../...../.....

POLYSIPHONIA

CLASSIFICATION —

Sub-division — Algae
Class — Rhodophyceae
Sub-class — Florideae
Order — Ceramiales
Family — Rhodomelaceae
Genus — Polysiphonia.

Comments —

1. Plant body is filamentous, filaments are multicellular branched and polysiphonous.
2. Branching is dichotomous. Each branch terminates in to a single celled apex, followed by a number of flat cells.
3. Thallus is polysiphonous i.e. made of series of parallel filaments.
4. Centre is occupied by a large barrel shaped cell (axial cell or central siphon).
5. It is surrounded by 4-24 peripheral cells (Pericentral siphones).
6. The cell wall thick cell is uninucleate. It has a large central vacuole.
7. Chromatophores are small discoid and many times without pyrenoids. Reserve food is in the form of starch grains- floridoside.
8. The neighbouring cells are connected, with one another by cytoplasmic lining known as pit connections.

Teacher's Signature : .....

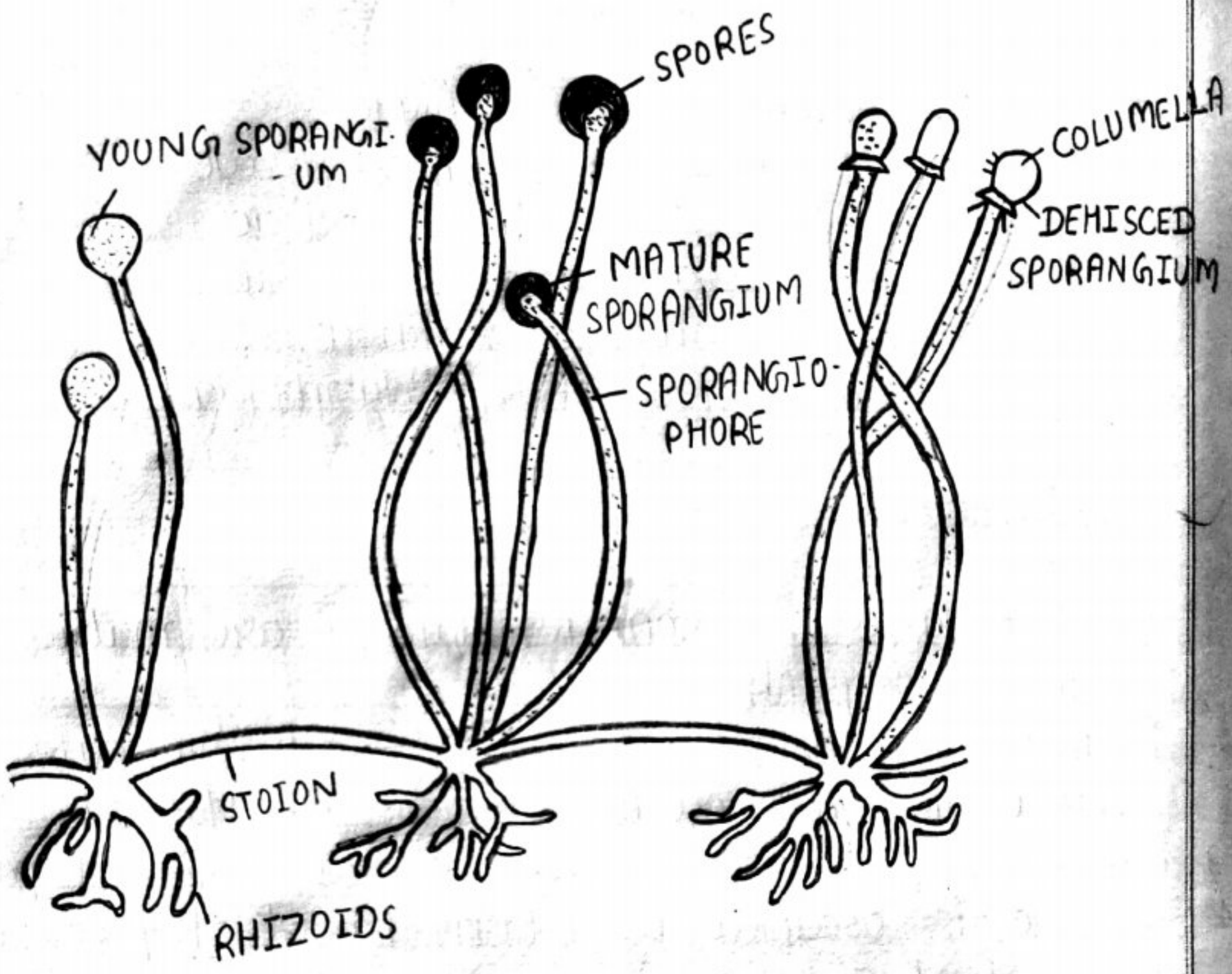


FIG - RHIZOPUS

Rakesh
21/12/2021

Expt. No..... Page No. 13 Date...../...../.....

FUNGI

RHIZOPUS

CLASSIFICATION —

Kingdom — Mycota
Division — Eumycota
Sub-division — Zygomycotina
Class — Zygomycetes
Order — Mucorales
Family — Mucoraceae
Genus — Rhizopus.

Comments —

1. Rhizopus artocarpi causes fruit drop of jack fruit (Artocarpus heterophyllus; vern. kathal; fam Moraceae).
2. R. artocarpi causes fruit rot of apples (pyrus malus; vern. sev; fam. Rosaceae).
3. The mycelium shows abundant, white, cottony growth.
4. The young mycelium is multinucleate, aseptate with all the hyphae alike.
5. The asexual reproductive structure are sporangia borne by the sporangiophores.
6. Each sporangiophore is swollen at the tip and forms a sporangium.
7. The aplanospores are angular or rounded and multinucleate.
8. Spore are liberated by breaking of the sporangial wall.
9. Each spore germinates to from a new mycelium.
10. The hyphae of the apposite strains produce erect branches.

Teacher's Signature : .....

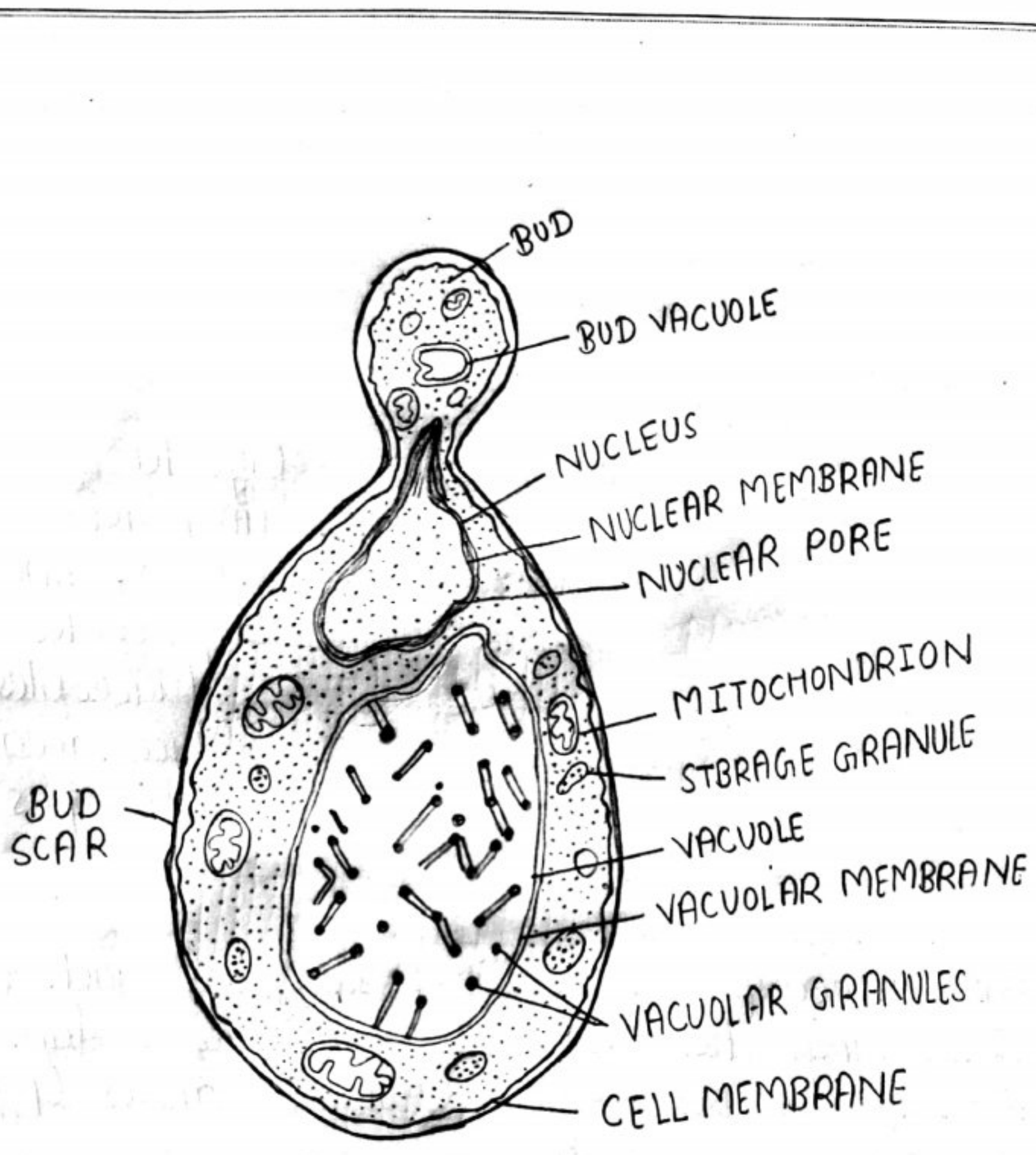


FIG ★ SACCHAROMYCES

Rakesh
22/12/2021

Expt. No..... Page No. 14 Date...../...../.....

SACCHAROMYCES

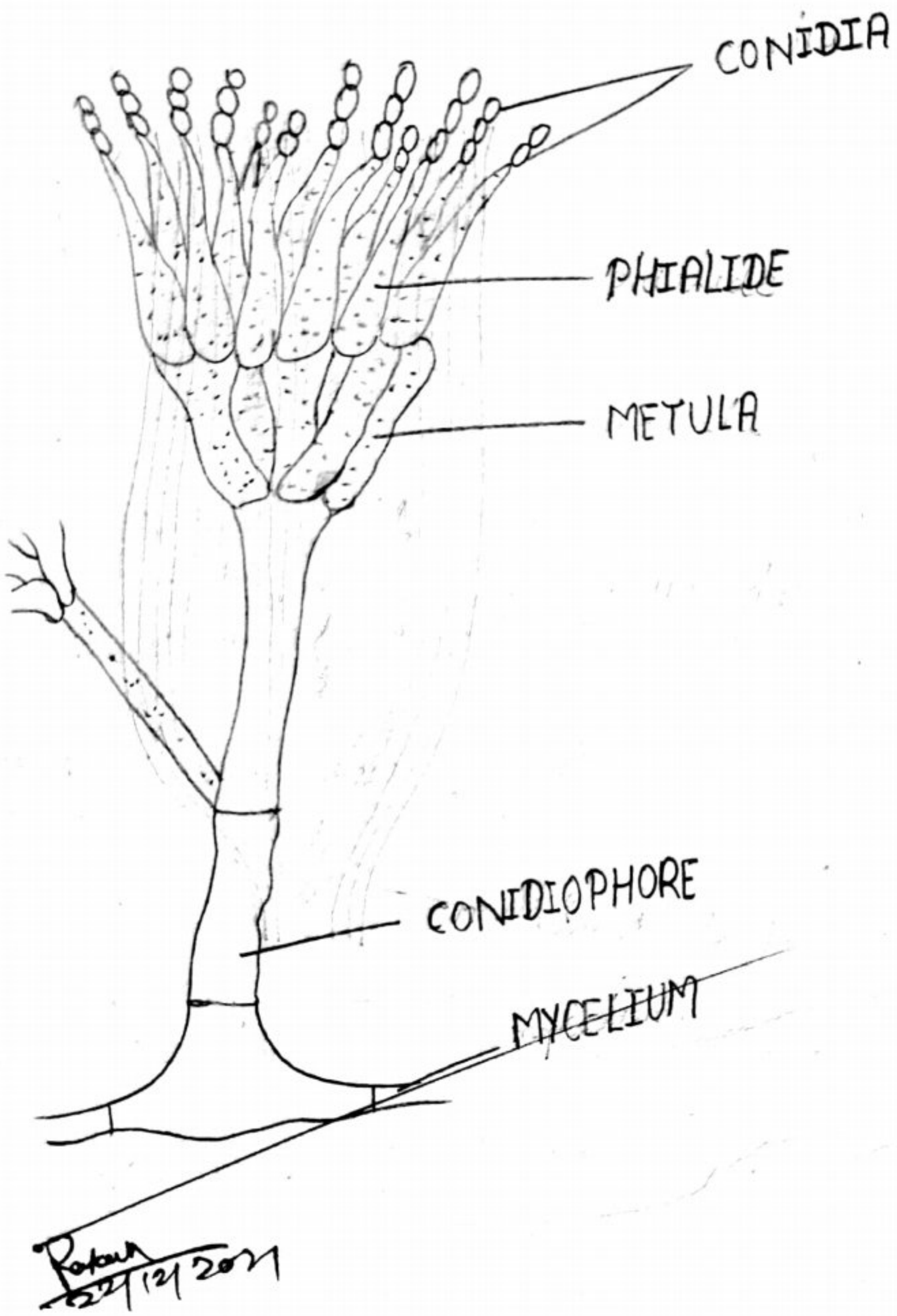
CLASSIFICATION —

Division - Ascomycotina
Class - Endomycetales
Family - Saccharomycetaceae
Genus - Saccharomyces.

Comments —

1. The thallus consists of single cell.
2. A few cells remain attached in chains to form a pseudomycelium.
3. The cells are very small and globose, ovoid or elongated in shape.
4. Each cell has a distinct cell wall that surrounds protoplasm.
5. Protoplasm is differentiated into an outer cytoplasm and a nucleus.
6. A large centrally situated vacuole is present.
7. Numerous inclusions like storage granules, droplets of oil and Organelles, like mitochondria are present in the cytoplasm.
8. Buds or out growth appear on all sides of a parent cell
9. The buds are either smaller or of almost the same size as that of parent cell.
10. The buds separate at a later stage and leave a scar.

Teacher's Signature : .....



PENICILLIUM

Expt. No..... Page No. 15 Date...../...../.....

PENICILLIUM

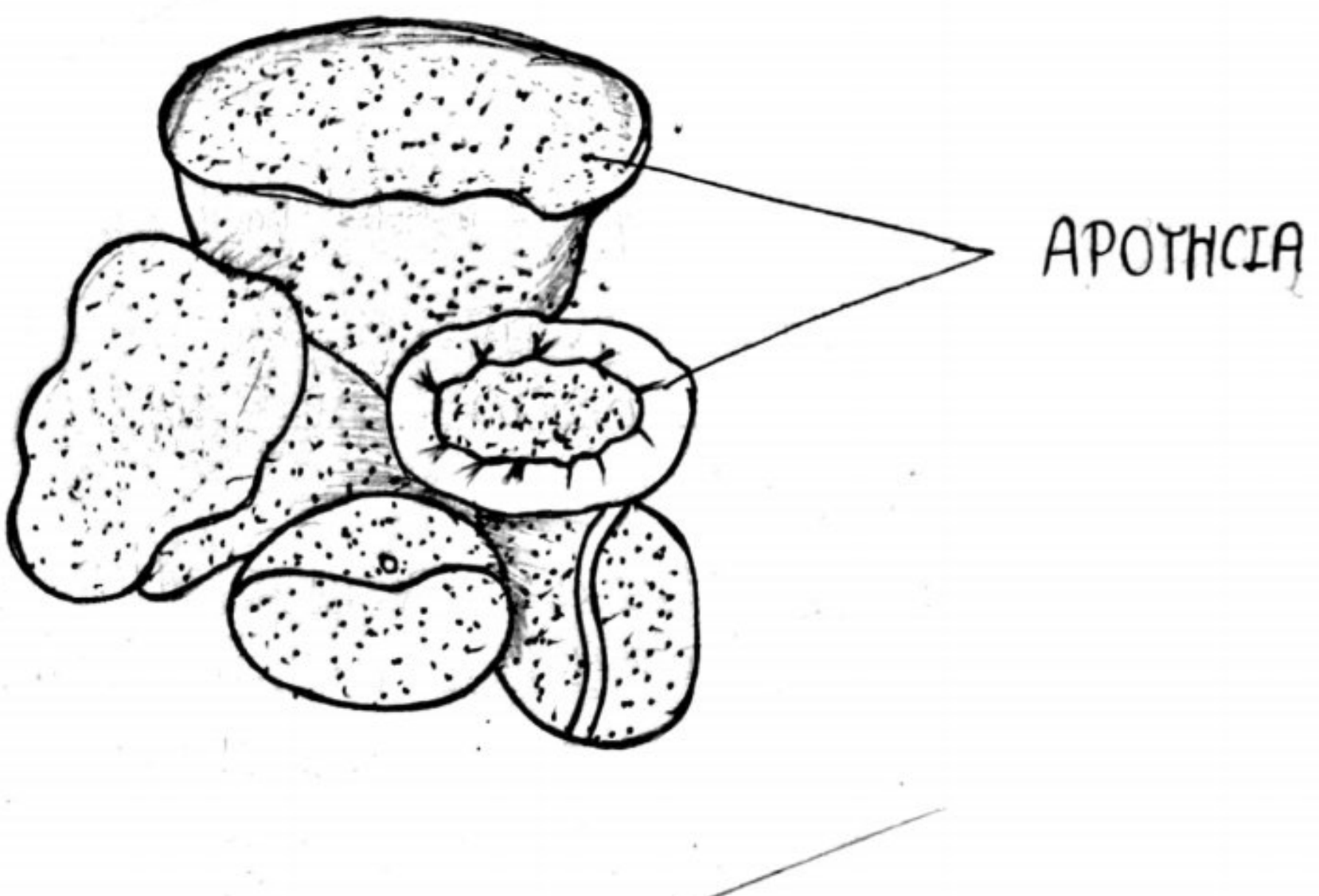
CLASSIFICATION —

Sub-Division — Ascomycotina
Class — Pyrenomycetes
Order — Sphaeriales
Family — Melanosporaceae
Genus —

Comments —

1. The fungus is a saprophyte and is commonly found on citrus and other fruits, jellies and other foodstuffs.
2. The mycelium is freely branched, septate and each cell is uni- or multinucleate.
3. The mycelium may grow superficially on the surface of substratum or may penetrate deeply.
4. The hyphae are generally coloured due to pigments on the surface of hyphal walls.
5. The conidia are the asexual spores borne on long, erect and branched conidiophores.
6. The branched conidiophore, with its conidia looks like a small 'Penicillus' (a brush in Latin).
7. The ultimate branches are known as Metulae.
8. Each conidiophore grows vertically from the mycelium and branches at its upper end.

Teacher's Signature : .....



Expt. No..... Page No.....16..... Date...../...../.....

-! PEZIZA !-

CLASSIFICATION —

Sub-division - Ascomycotina
Class - Discomycetes
Order - Pezizales
Family - Pezizaceae
Genus - Peziza

Comments —

1- It is a common saprophyte growing on rich humus soild and decaying woods.
2- Sometimes it becomes coprophilous (i.e. grows on dung).
3- The mycelium is profusely branched, septate and the cells are multinucleate.
4- The is a complex system that penetrates the substratum.
5- The mycelium becomes visible only in the form of apothecial cups above the ground surface.
6- The conidia are the asexual reproductive, bodies. These are produced rarely.
7- On germination chlamydospore produces a new mycelium.

Teacher's Signature : .....

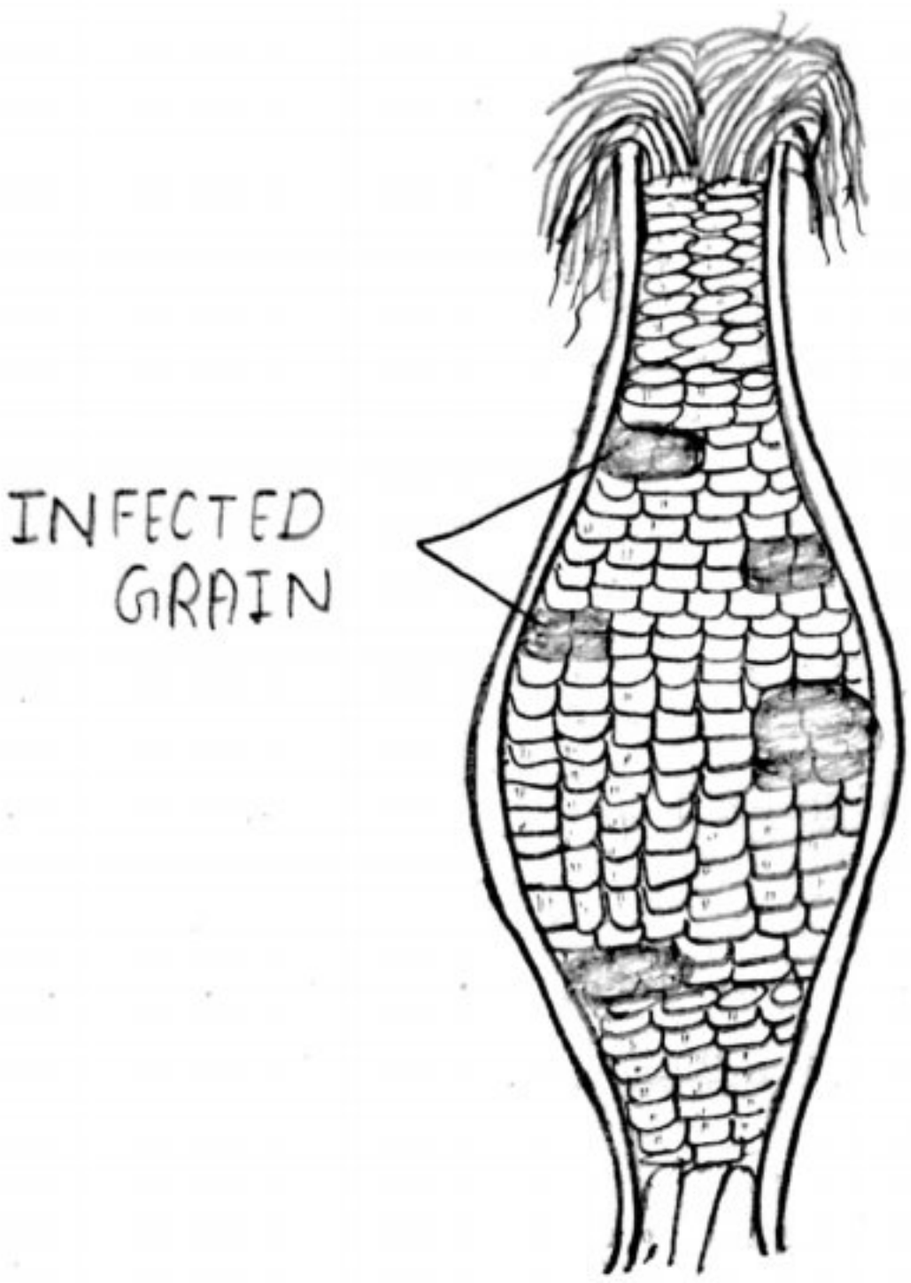


FIG - USTILAGO NUDA VAR. MAYDIS
ON MAIZE

Expt. No..... Page No....17..... Date...../...../.....

USTILAGO

CLASSIFICATION —

Sub-division – Basidiomycotina
Class – Teliomycetes
Order – Ustilaginales
Family – Ustilaginaceae
Genus – Ustilago

Comments —

1- In loose smut, the spores occur in the grains which are exposed only on maturity of the ear and are easily blown away by wind (infection air borne).
2. In the covered smut, spore masses remain covered by the wall of grain and glumes (not exposed).
3- U. tritici infects wheat (Triticum vulgare; vern; gehun; fam. Poaceae) and causes loose smut of wheat).
4- U. nuda a U. hordei infect barley (Hordeum, vulgare; vern. jaii, fam). and causes loose smut and covered smut of barley, respectively.
5- Ustilago avenae and U. kolleri infect oat (Avena sativa; vern. jaii; fam. poaceae) and causes loose smut and covered smut respectively.
6- U. Scitaminea attacks sugarcane (saccharum officiarum; vern; ganna; fam. poaceae). Causing whip smut of sugarcane.

Teacher's Signature : Rahul 28/12/2021

PUCCINIA

PUCCINIA

CLASSIFICATION —

Division – Eumycota
Sub-division – Basidimycotina
Class – Teliomycetes
Order – Uredinales
Family – Pucciniaceae
Genus – Puccinia

Comments —

1- Puccinia graminis tritici and Puccinia striiformis infect wheat, the primary host and barberry, the alternate host.
2- They cause black rust or stem rust and yellow or stripe rust respectively on wheat.
3- Puccinia recondia host and Thalictrum sp. the alternate host and causes orange leaf rust of wheat.
4- P. Sacchari causes leaf rust, attracks Launea s.p. and causes Leaf rust.
5- In case of other leaf rusts orange to black pustules are seen on leaves and sometimes also on leaf sheaths.
6- The diease is known as leaf rust.
7- The mycelium is well developed, branched and septate.
8- It is generally intercellular and sometimes shows globular haustoria also.
9- The mycelium is called dikaryotic because it possesses two nuclei of different strains in each cell.

Teacher's Signature : .....

FIG - ALTERNARIA

Rakesh
28/12/2021

Expt. No..... Page No. 19 Date...../...../.....

ALTERNARIA

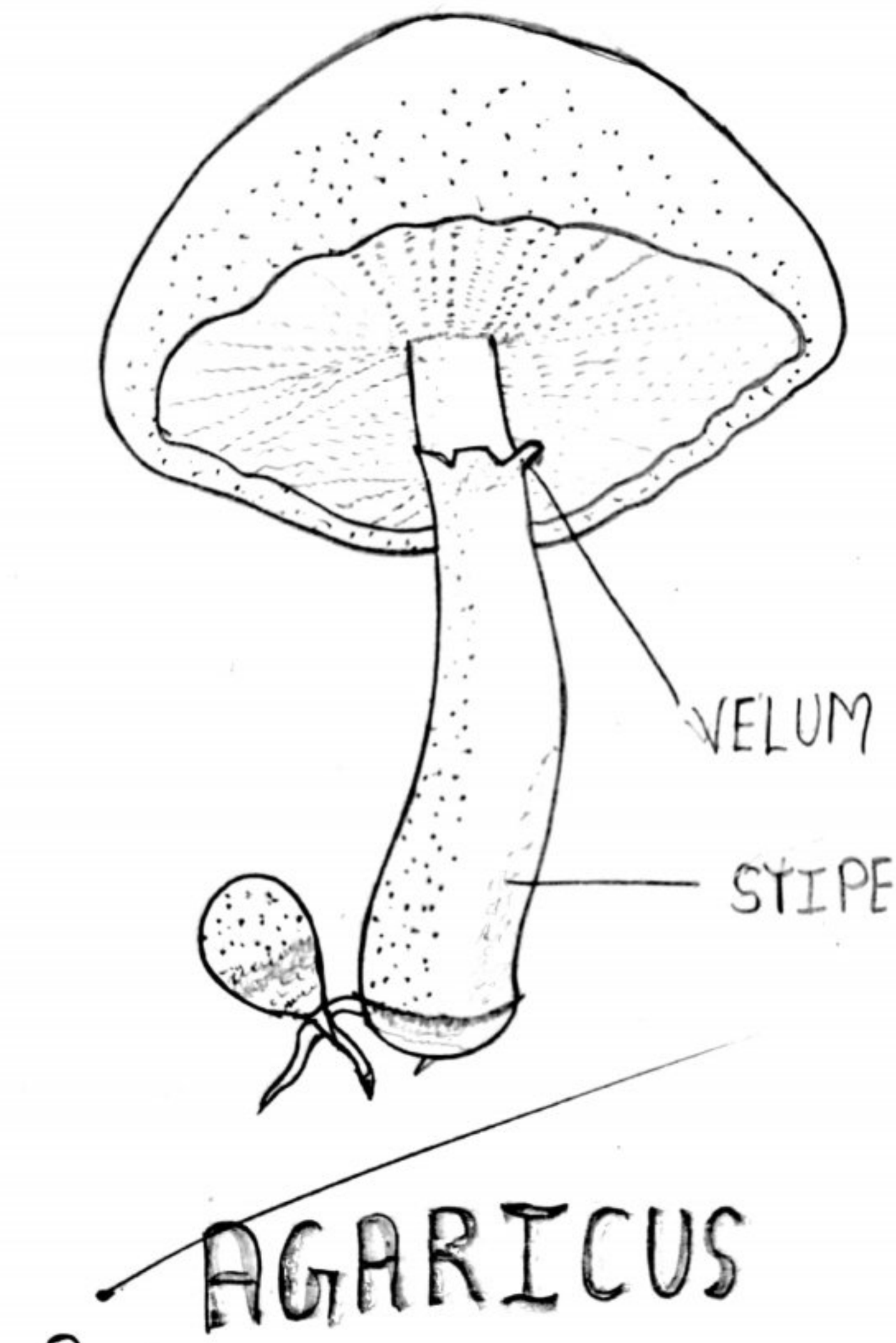
CLASSIFICATION –

Sub-division – Deuteromycotina
class – Hyphomycetes
Order – Moniliales
Family – Dematiaceae
Genus – Alternaria.

Comments –

1. Of all the species, A solani is economically very important, as it attacks potato plant and causes early blight of potato.
2. I India plains, early blight is more destructive than late blight.
3. A. brassicae and alternaria brassicicola cause grey and dark leaf spots of Brassia spp.
4. A. burnsi parasitizes cumin (cuminum, Triticum, vern. Jeera. fam. Umbelliferae).
5. Conidia of A. tenuis also cause 'alternariasis in guinea pig'.
6. Hyphae are multicellular and branched.
7. Hyphae are also septate. Each cell is uninucleate.
8. The conidia also are usually yellowish brown in colour.

Teacher's Signature : .....



AGARICUS

Pokaw
23/12/2021

Expt. No..... Page No. 20 Date...../...../.....

AGARICUS

CLASSIFICATION—

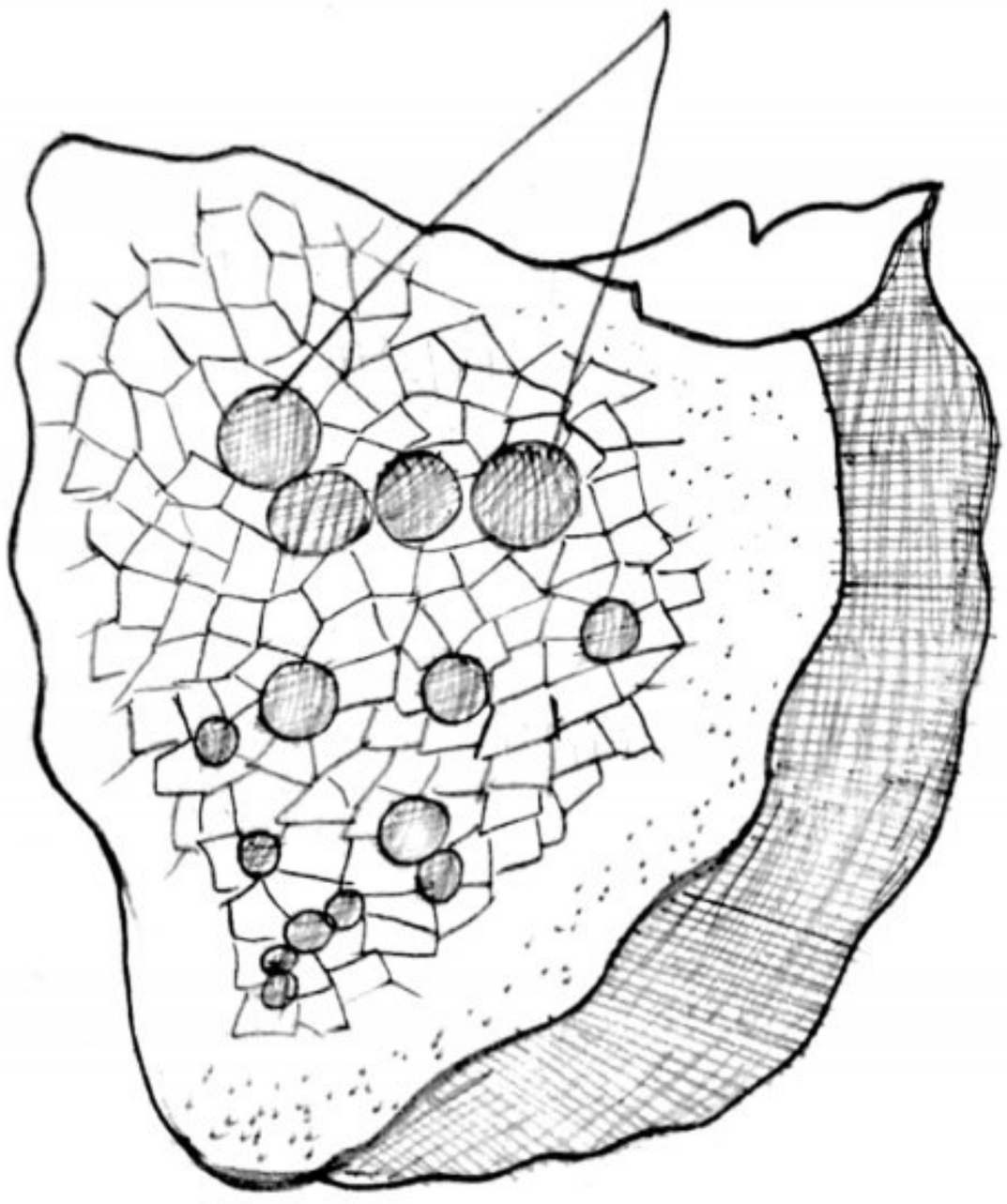
Kingdom – Mycota
Sub-division – Basidiomycotina
Class – Hymenomycetes
Order – Agaricales
Family – Agaricaceae
Genus – Agaricus.

Comments—

1- The mycelium is underground and consis of much branched hyphae, anastomosing at their point of contact, forming a network in the substratum.
2- Hyphae are septate, dikaryotic with granular protoplasm and prominent oil globules.
3- The aerial portion constitutes the fruiting body.
4- This is a developmental stage of the basidiocarp.
5- It is formed above the ground in the form of a small, globose body.
6- In a longitudinal cut, it reveals a small stips surrounded by the pileus.
7- In between pileus and stipe, there is a constriction.
8- The lamellar cavities or chambers have small lamella or gills.

Teacher's Signature : .....

FRUITING BODIES



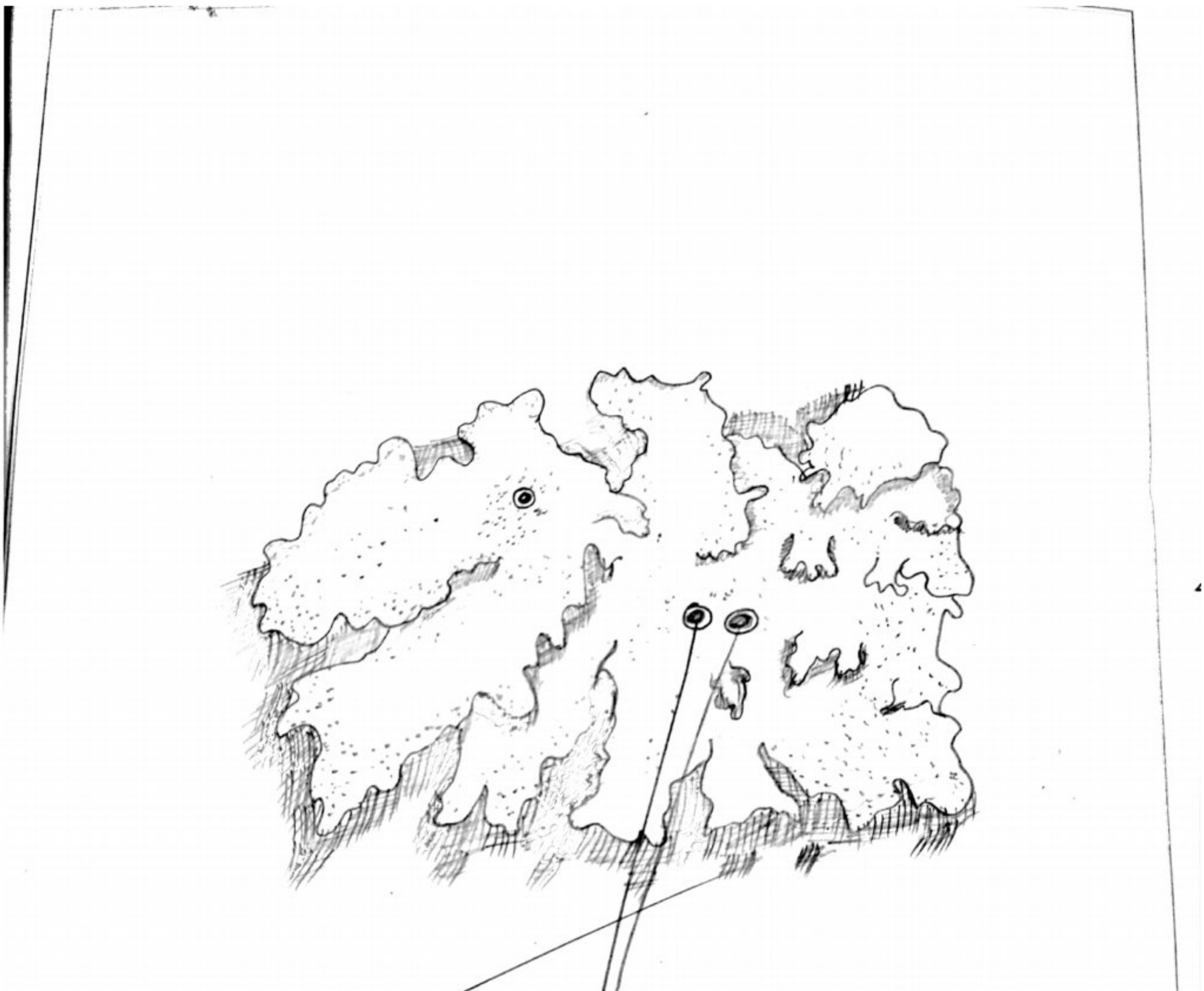
CRUSTOSE LICHEN

CRUSTOSE LICHENS

Comments —

1. The crustose lichens are hard crusts on rocks and bark of the trees.
2. The thalli are partially or completely embedded in the substratum.
3. Some of the common examples include Graphis and Lecanora.
4. The thallus is poorly differentiated.
5. The upper cortex is made up of highly developed hyphal layer.
6. Algal layer lies just beneath this layer.
7. The layer shows algal filaments and fungal hyphae in close association.
8. The thallus is poorly differentiated.

Teacher's Signature : .....



FOLIOSE LICHEN

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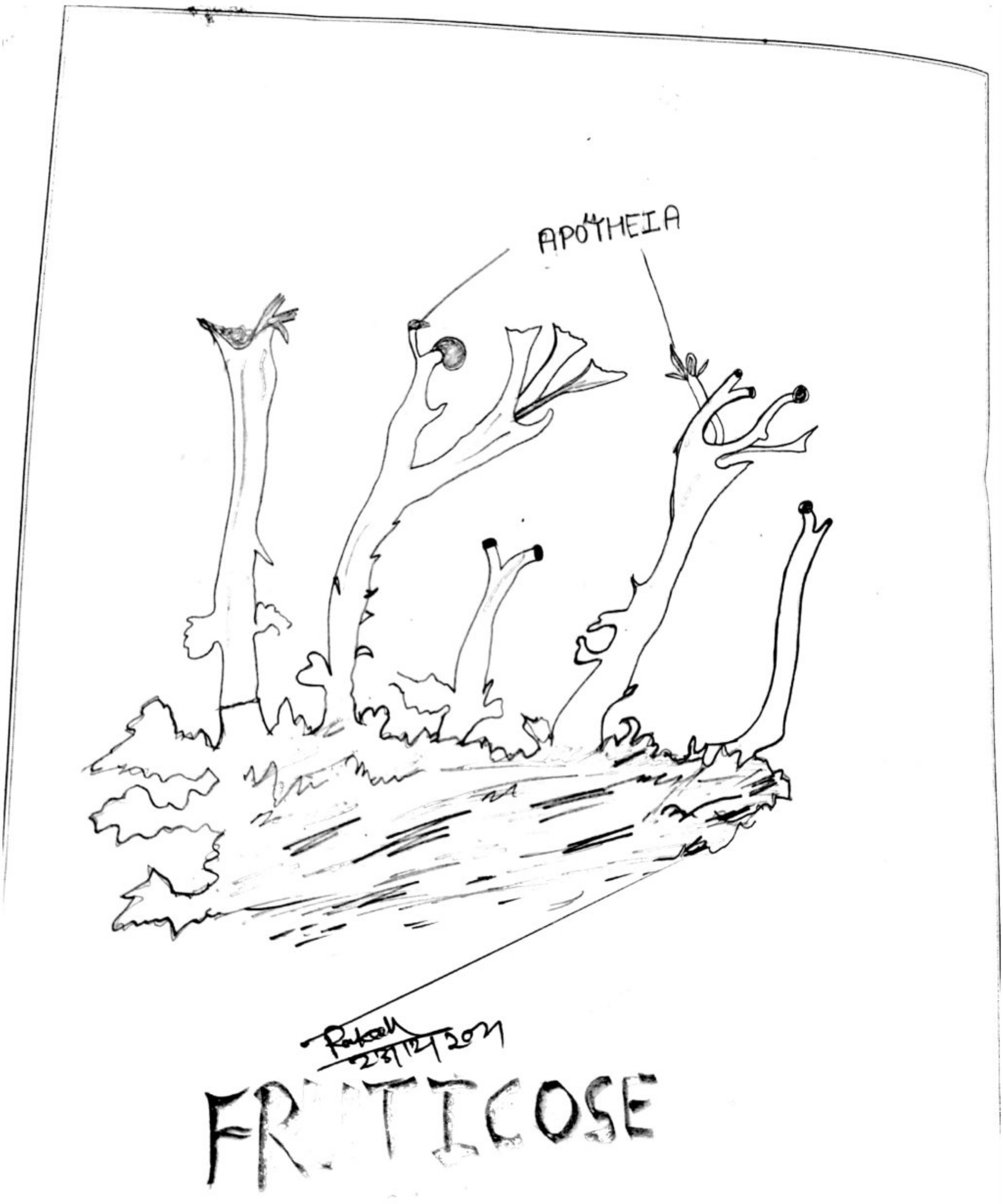
FOLIOSE LICHENS

Comments —

1. The foliose lichens have a flat leaf-like, lobed or deeply incised thallus.
2. It is attached to the substratum only at certain points by rhizines.
3. Rhizines are rhizoid-like outgrowths which arise from the under surface.
4. The thallus may be attached to the substratum either by a single rhizine or by several rhizines.
5. The thalls is generally greyish or brownish a colour.
6. Certain small, hard, dark and gall, outgrowths, called cephalodia may also be present.
7. These help in retaining moisture.
8. Heteromerous type of thallus shows four distinct regions or zones.

Teacher's Signature : .....



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FRUTICOSE LICHENS

Comments —

1- These are shrubby with cylinderical, or ribbon-like bodies.
2. The common examples include Usnea, cladonia etc.
3. It remains attached to the substratum by rhizoid-like structure forming a disc.
4- It is upright, branched and pendulous.
5- The transverse section of the thallus appears almost circular.
6- The internal appears almost structure shows four distinct regions, outer most, cortex, the algal zone, medulla and the centrally located chondroid axis.

1-
2.
3-

1.
2.
3-
4.

BACTERIAL BLIGHT OF RICE

Expt. No..... Page No. 24 Date...../...../.....

PLANT PATHOLOGY

Bacterial Blight of Rice —

This common disease of rice was first reported India in 1951, and now occurs widely in Bihar, Maharashtra, weast Bengal and Terai regions of U.P and several other rice-growing regions.

Symptoms —

1- The leaf sheaths and culms are also soon affected.
2- The bacterial mass oozes out from the infected blighted parts.
3- The affected tillers show withering and finally die.

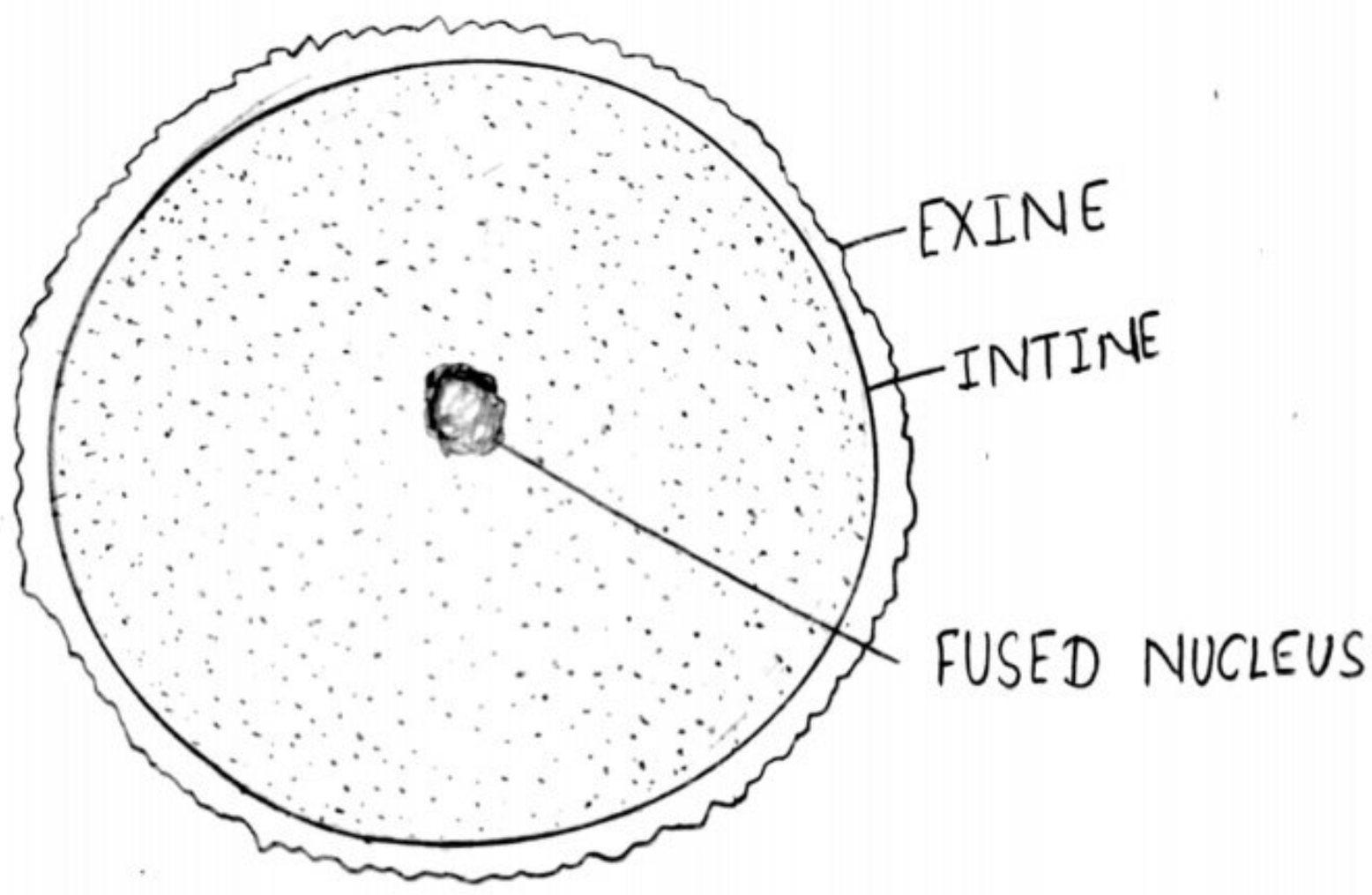
Causal Organism —

1- The causal organism is a bacterium of order Pseudomonadales and family Pseudomonadaceae.
2- It is a rod-shaped Gram negative bacterium occuring singly or in pairs.
3- It is aerobic, capsulating, non-spore-forming and contains a single polar flagellum.
4- It measures 0.5-0.8 x 1-3μ

Control —

Use of resistant varieties (e.g. TKM6, IR 42, N22, IR20 and IR22) is the effective control measure. Since the disease is seed borne, the seeds should be disinfected before sowing.

Teacher's Signature : .....



LOOSE SMUT OF WHEAT

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LOOSE SMUT OF WHEAT

This serious disease of wheat is responsible for heavy losses in wheat production in the world. It is caused by Ustilago nuda var. tritici. The disease is worldwide in occurrence and occurs in India in almost all wheat-producing states, and mainly in U.P. and Punjab.

Symptoms —

1- Soon the flowers in the ear are replaced by blak powdery mass of spores.
2- The general appearance and growth of plants is not much affected.
3- Only the inflorescence axis, ends of glumes and awns remain in the entire inflorescence.
4- All other parts are replaced by spores.

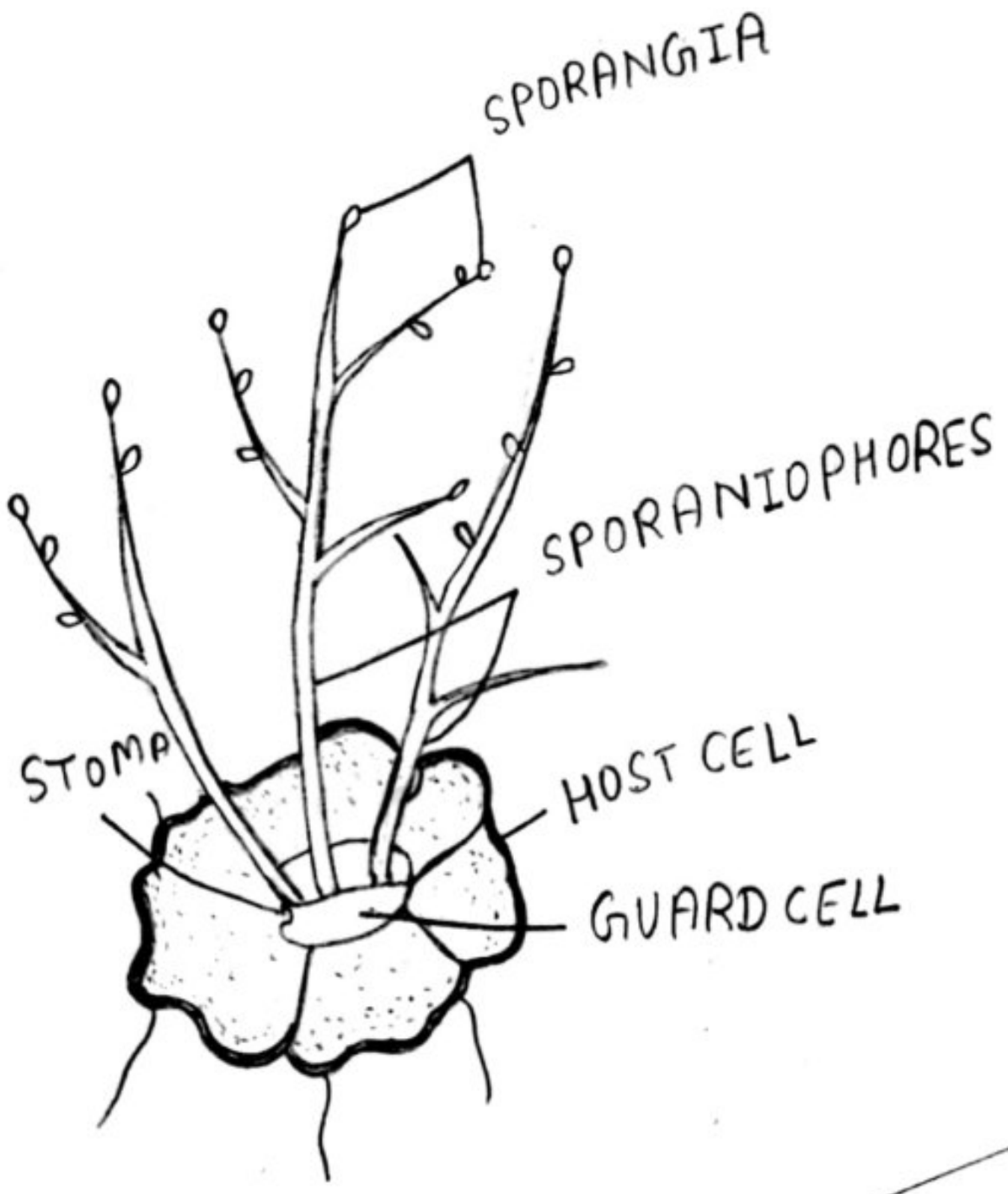
Causal organism —

Caused by Ustilago nuda var. tritici, the spores of this loose smut disease are pale olive, spherical to oval, have minute echinulate walls and measure 5-9μ in diameter. They are produced in very large number and reach the ovaries of the healthy plants in dry season.

Control —

1. Use of resistant varieties is the best control measure.
2. The disease can also be controlled, to some extent, by hot-water treatment to seeds.
3. Use of systemic fungicides, such as Vitavax, Benlate, Thiram or Maneb, also helps in checking the disease.

Teacher's Signature : .....



LATE BLIGHT OF POTATO

Rahul
24/12/2021

Expt. No..... Page No...26..... Date...../...../.....

LATE BLIGHT OF POTATO

The name "Late blight" is given to this notorious disease because it appears on potato (Solanum tuberosum) late in the season. It is caused by Phytophthora infestans.

Symptoms —

1. The early symptoms of late blight appear as water-soaked, light-brown lesions on the leaf blade.
2. These lesions with indefinite margins are mainly present on the margins or at the tips of the leaflets.
3. These light brown lesions soon change into dirty brown and then into black coloured lesions.
4. The disease spreads so fast that within a few days, the entire crops is damaged.

Causal Organism —

1. Late blight of potato is caused by phytophthora, infestans.
2. Its mycelium is branched, coenocytic, intercellular as well as intracellular.
3. The sporangiophores come out through the stomata.

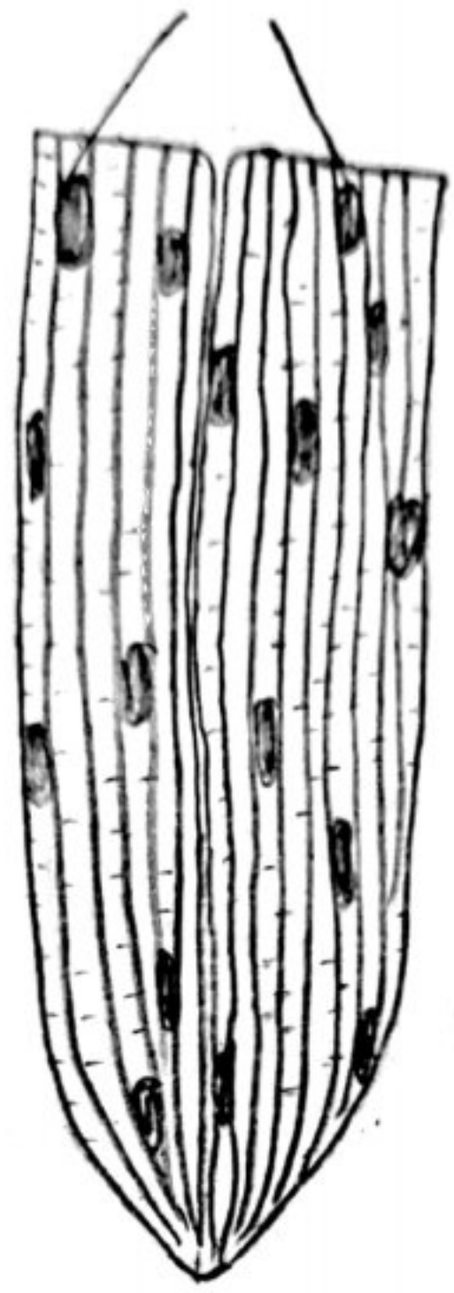
Control —

1. Sowing of disease-free tubers is the best control measure.
2. When the crop is about a month old, the plants should be sprayed continuously with copper fungicides at intervals of about 15 days.

Teacher's Signature : .....

LESIONS

BROWN SPOTS



BROWN SPOT OF RICE

Expt. No..... Page No. 27 Date...../...../.....

BROWN SPOT OF RICE

Brown spot of rice is a plant fungal disease on the host leaves and glume, as well as seedlings, sheaths, stems and grains of adult host plant.

Symptoms —

1. The fungus may cause black discoloration of the root.
2. Infected seedling are stunted or killed.
3. Lesices vary between 1mm to 14 mm long depending on cultivar.

On resistant cultivars the fungus produces tiny dark specks.

Causal Organism —

Bipolaris oryzae, Cochilobolus miyabeans (Synonyms Dreschlera oryzae, Helminthosporium oryzae).

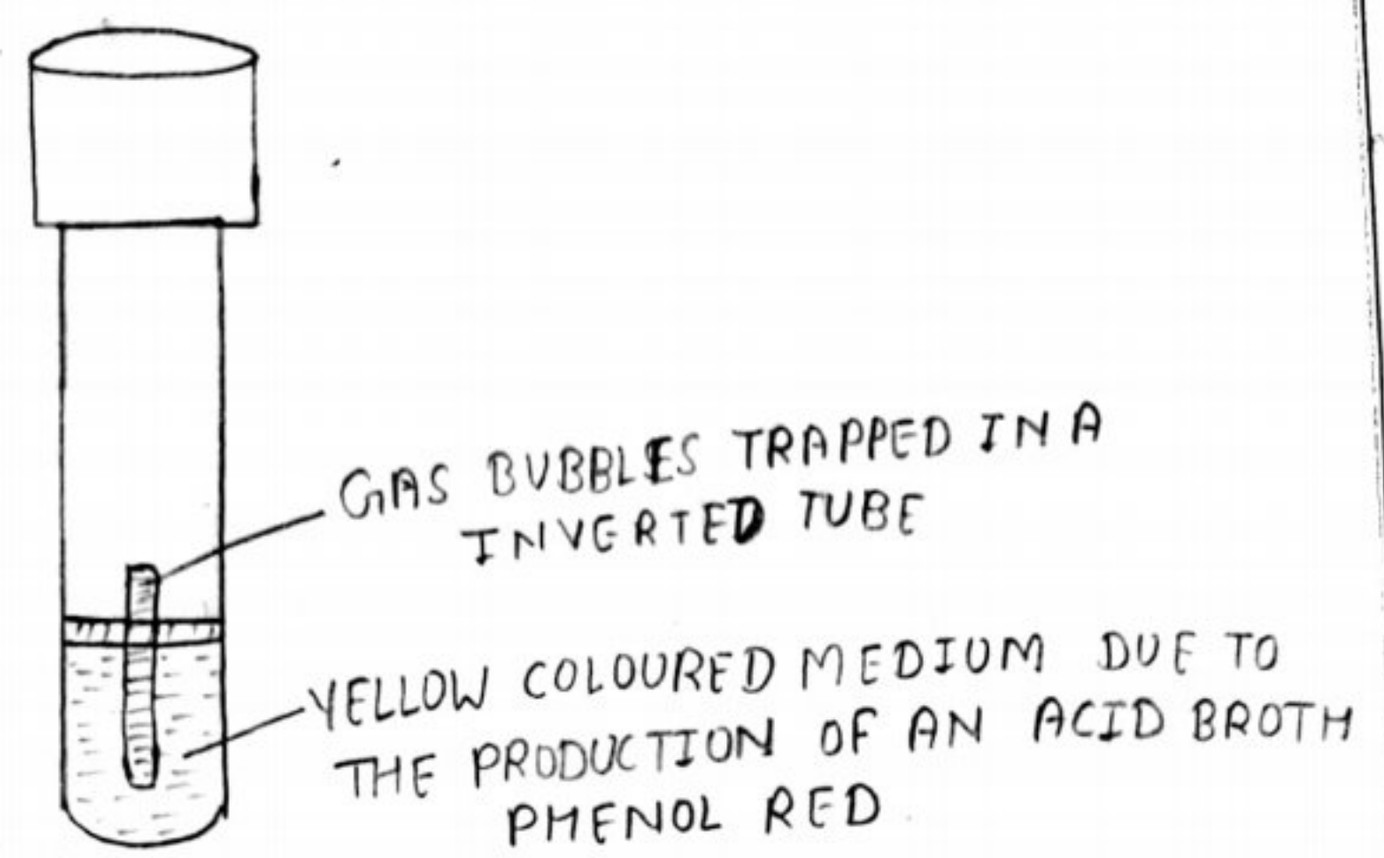
It is one of the major fungal diseases in rice in which it is caused by Bipolarisoryzae.

Control —

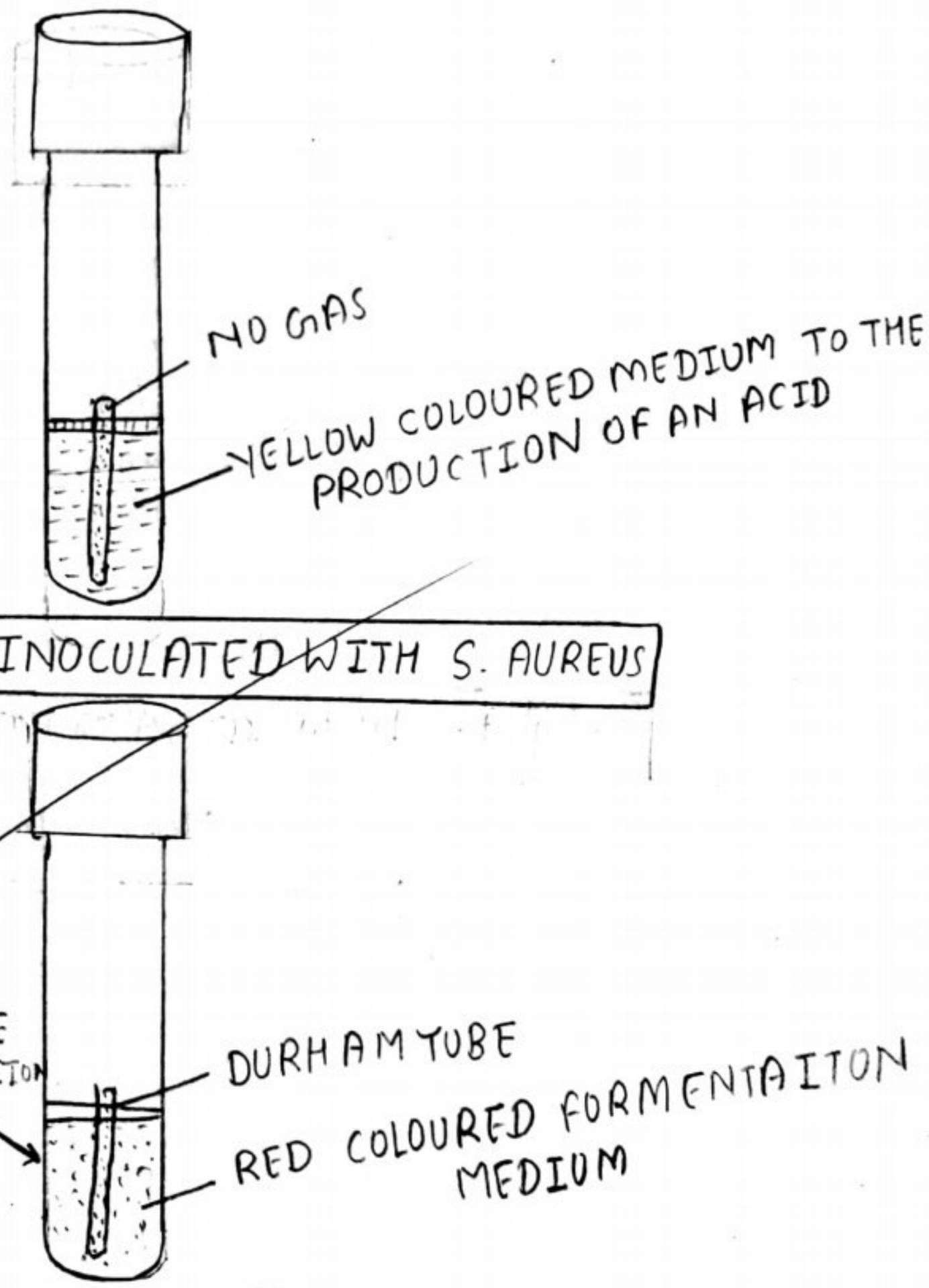
Seed treatment with captan, thiram, chitosan, carbendazim, or mancozed has been found to reduce seeding infection.

Seed treatment with tricyclazole followed by spraying of mancozeb + tricyclazole at tillering and late booting stages gave good control of the disease.

Teacher's Signature : .....



'A' TUBE INCULATED WITH E-COLI



'B' TUBE INOCULATED WITH S. AUREUS

Rakesh
29/12/2021

'C' TUBE INOCULATED WITH PSEUDOMONAS

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EXPERIMENT-01

Bacterial Disease

Object — Carbohydrate fermentation test.

Requirements —

1. Broths culture of E-coli, staphylococcus aureus and Pseudomonas.
2. Sterile fermentation tube of glucose/sucrose broth (4) lavel them A, B, C & D.
3. Inaculation loop
4. Bunsen burner.

Procedure —

1. Prepare the fermentation medium as following composition. Pepton - 10.0 gm, Glucose / sucrose - 5.0 gm, Nacl - 15 gm Phenol red - 0.018 gm, Distilled water - 1000ml, PH - 7.3
2. Inculate each broth culture in fermentation tubes separately i.e. inoculate E-coli in tube A, S aureus in tube B and Pseudomonas in tube C keep tube D as central tube.
3. Incubate all the fermentation tubes at 37°C for 24 hours.

Observation —

After incubation period observe all the carbohydrate broth culture tube for colour and presence or Absence of gas bubbles.

Teacher's Signature : .....

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The pH indicator phenol red, is red in colour pH 7, turns yellow at 6.8 or below, 6.8 due to production of gas (O_2) and organic acid.

Fermetion tube and Bacterium	observation	colour	Explanation	Result
A with E-Coli	Fermented with acid and gas Production	Yellow	Bacterium is capable of fermentation of carbohy-drate into organic acid	Positive Test
B with stephylococcus aureus	Fermented with acid Production	Yellow	Bacterium is capable of fermentation of carbohy-drate in organic acid only	Positive Test
C with pseudomonas	No fermentation no, production of acid and gas	Red	Bacterium is incapable to ferment the carbo-hydrate Inorganic acid and gas	Negative Test

Fig— CARBOHYDRATE FORMATION TEST

Teacher's Signature : .....

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EXPERIMENT-02

Object —

To the study of endospore staining Techniques.

Requirement —

1. 48 hours fresh nutrient Agar culture of Bacillus, cereus and stephylococcus aureus.
2. Malachite green (5% aquash) Solution.
3. Safranin, Inaculating loop, Glass. slide, staining plate, Blotting paper. paper tabel, sprit lamp and microscope.

Procedure —

1. Prepare smears by heat fix of Bacillus subtlish and stephylococcus aureus on separate clean slide.
2. Cover the smear with paper with paper towel, soak the paper with malachite green staining solution.
3. Gentaly in the slide on hot plate 5 minutes. The making, malachite green solution begins to steam and more stain and heat again making paper steated.
4. Remove the paper and wash the slids under slowly running tap water.
5. Counter stain with safranin for 30 seconds. Both dry slids with obsorved / blotting paper.

Signature : .....

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Observation —

On over serving the smear using microscope under-oil emersion object. The endospores and spores appear green in colour while vegetative cell stain red.

Rakesh
24/12/2021

Teacher's Signature : .....

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EXPERIMENT-03

Object —

To the study of hydrolysis test of starch.

Requirement —

1. 20-48 houres old culture of bacillus subtilish and E-coli.
2. sterlised starch agar medium.
3. Gram Iodine solution, sterilised petri-dishes, inoculation loop.
4. Bunsen burner or sprit lamp, dropper, test tube, stand.

Procedure —

1. Prepare starch agar medium adjust pH 7.2 and autoclate. it.
2. Take the medium in petri-disk and allow the medium to solidify.
3. Mark the petri-dishes as A, B and C.
4. Using sterlised inoculation loop make a single strike of bacillus subtilish culture in petri-disk A and E-coli culture in petri-disk-B, Petri disk E as control.
5. Incubate the inoculum in inverted position of petri-plates at 25°C for 3-4 days.
6. After incubation period, add the iodine solution with dropper on the surface of medium. observe the

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change in colour in medium after 30 seconds.

Observation and Result —

Petri-plate, A with bacterium bacillus subtilish show a clear yellow zone surrounding the colonies.

It indicate bacterium is amailase Positive and capable of hydrolising starch. Petri-Plate B with E. coli culture show dark blue colouration of the medium.

It indicates that E. coli is amylase negative and incapable to produce amylase.

Rakesh
24/12/2021

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EXPERIMENT-04

Object — To the study of test the catalase enzyme.

Requirement —

1. 24 hourse culture of stephylococcus aureus and streptococcus pyogenes.
2. sterilised pripticase in agar medium.
3. Test tube (3) inoculation loop, Bunsen Burner, Test tube stand 3% H_2O_2, Glass slids.

Procedure —

1. Prepare Tripticase in agar medium with following components.
   Tryphcase – 15.0 gm, Phytane – 5.0 gm, Nacl- 5.0 gm.
   Agar powder – 15.0 gm Distilled water – 1000 ml, pH – 7.3.
2. Autoculate the medium and prepare stands agar in three test tubes and level A, B and C.
3. Inoculate stephylococcus aureus in tube A, streptococcus pyogenes tube B and keep tube C control.
4. Incubate the culture at 37°C for 24-48 hours.
5. After inoculation period is over transfer the small amount of culture with sterilised loop on clean sides.
6. Place a drop of H_2O_2 (3%) on the slides, observe the presence or absence of gas bubbles.

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Observation and Result —

Side with steptophylococcus aureus culture produce bubble O_2 with 10-15 sec of H_2O_2 in indicate S. aureus is catalase positive bacterium side with streptococcus pyogenes show no bubble formation.

24/12/2021

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