Seva Bharati Mahavidyalaya, Kapgari, Jhargram, W.B.

Department of Botany

Lesson Plan

Session: 2022-2023

Course Plan: Even/Odd Semester UG (Gen. Botany)

Faculty Name: Dr. Pampi Ghosh (Asst. Prof. Stage III) & Sanjoy Sinha (SACT II)

Sub: Botany (Semester I to VI including GE)

Class- B.SC (Botany) VI SEM: DSE -2: Research Methodology

February 2023:

Unit: 1. Basic Concept of Research: Research Definition and types of research, research methods, versus research methodology. Literature review and its consolidation, library research, field research and laboratory research.

Unit 2: General Laboratory Practices: Common calculations in Botany laboratories, Understanding the details on the label of the reagentbottles.

March 2023:

Unit: 1. Basic Concept of Research: Literature review and its consolidation, library research, field research and laboratory research.

Unit 2: Molarity and normality of common acids and bases, preparation of solutions, dilutions, percentage solution, Molar and molal, normal solutions, techniques of handling of micropipettes, knowledge about common toxic chemicals and safety measures in their handling.

Unit: 3 :Data Collection and documentation of observations: Maintaining a laboratory record, tabulation and generation of graphs.

Practical: No.1. Experiments based on chemical calculations.

No. 3. The art of imaging of samples through microphotography and field photography.

April 2023

Unit: 3: Imaging of tissue specimens, and applications of scale bars, the art of field photography.

Unit: 4: Overview of Biological Problems: History, key biological research areas.

Unit: 5: Methods to study plant cell /tissue structure: Whole mounts, peel mounts, squash preparation, clearing, maceration and sectioning.

Practical: No. 2: Plant micro technique experiments.

May-2023

Unit-4: Model organisms in biology, genetics, physiology, biochemistry and molecular biology, cell biology, genomics, proteomics, transcriptional regulatory network.

Unit: 5: Tissue preparation, living versus fixed, physical versus chemical fixation, coagulating fixatives, non-coagulant fixatives, tissue dehydration using graded solvent series, paraffin and plastic infiltration, preparation of thin and ultrathin sections.

Unit: 6: Plant micro techniques: Staining: Staining procedures, classification and chemistry of stains, staining equipment, reactive dyes, fluorochromes, cytogenic techniques and squashed plant materials.

Unit-7: The Art of Scientific writing and its presentation:Numbers, units, abbreviations and nomenclatures used in scientific writing, writing references.

Practical: No.: 4: Poster presentation on defined topics.

No: 5: Technical writing on topics assigned.

June-2023

Unit-7: Power point presentation, poster presentation, scientific writing and ethics, introduction to copyright, academic misconduct/plagiarism.

Doubt clearing Classes and extra practical including field photography, internal assessment.

Class- B.SC (Botany) VI SEM : SEC 4- Medicinal Botany:

Feb 2023:

Unit: 1: History, scope, and importance of medicinal plants, Indigenous medicinal sciences, definition andscope-ayurveda, : History, origin, panchamahavutas, saptadhatu and tridosha concepts, rasayana, plants used in ayurveda treatments, Siddha,: Origin of Siddha medicinal systems, basisi of siddha system, plants used in siddha medicine. Unani: History, concept, Umoor-e-tabiya, tumour treatments/therapy, polyherbal formulations.

March 2023

Unit: 2: Conservation of endangered and endemic medicinal plants. Definition of endangered and endemic medicinal plants. Red list criteria, *in-situ* conservation, biosphere reserve, sacred groves, national parks, ex-situ conservation, botanic gardens, ethnomedicinal plant gardens, propagation of medicinal plants, objectives of the nursery, its classification, important components of nursery, sowing, pricking, use of green house, for nursery production, propagation though cuttings, layering, grafting and budding.

April 2023

Unit: 3: Ethnobotany and Folk medicines, definition, ethnobotany in India; methods to study ethnobotany; applications on ethnobotany; national interacts, palaeo-ethnobotany, folk medicines of ethnobotany, ethnomedicine, ethnoecology, ethnic communities of India.

May 2023

Unit: 3: Application of natural products to certain diseases-Jaundice, cardiac disease, infertility, diabetics, blood pressure and skin diseases.

June 2023:

Doubt clearing Classes and internal assessment.

Class- B.SC (Botany) V SEM : DSE-1

DES-1: **Economic Botany & Biotechnology**

August-2022:

Unit 1: Origin of cultivated plants: Concept of centres of origin, their importance with the reference to Vavilov's work Unit 8: Introduction to Biotechnology: Unit 9: Plant Tissue Culture: Micropropagation:

September 2022:

Unit 2: Cereals: Wheat-Origin, morphology and uses. Unit 3: Legumes: General account with special reference to Gram and Soybean Unit 4: Spices: General account with special reference to Clove and Blak Pepper (Botanical name, family, parts used, morphology and uses) Unit 5: Beverages: Tea (Morphology, Processing, uses) Unit 9: Plant Tissue Culture: Haploid production through androgenesis and gynogenesis; brief account of embryo and endosperm culture with their applications. **Practical: 1.** Study on economically important plants: Wheat, gram, soybean, black pepper, Clove. Sections and microchemical tests.

November 2022:

Unit 6: Oils and Fats: General description with special reference to groundnut Unit 7: Fibre yielding plants: General description with special reference to cotton (Botanical name and family, parts used, morphology and uses) Unit 10: Recombinant DNA techniques: Blotting techniques, northern, southern and western blotting. Practical: 1 : Study on economically important plants : Tea, Cotton, Ground Nut through specimens. Sections and microchemical tests.

December 2022:

Unit 10: Recombinant DNA techniques: finger printing, molecular DNA marker, DNA sequencing, PCR and reverse transcriptase PCR, Hybridoma and monoclonal antibody, ELISA and immune detection, molecular diagnosis of human disease and human gene therapy.

Practical: No. 2 Familiarization with equipments in tissue culture

No. 3: Study through phtographs: Anther culture, somatic embryogenesis, endosperm and embryo culture, micro-propagation.

No. 4: Study of molecular techniques. PCR, Blotting techniques, AGE and PAGE

Doubt clearing Classes, practical classes and internal assessment.

Class- B.SC (Botany) SEM IV : DSC –1D: Plant Physiology and Metabolism

Februaray-2023

Introductory Class:

March-2023

Unit-I: Plant water relations: Importance of water, water potential and its component, transpiration and its significance, factors affecting transpiration, root pressure and guttation.
Unit 2: Mineral nutrition: Essential elements, macro and micro nutrients, criteria of essentiality of animals. Role of essential elements, transport of ions across cell membrane, active and passive transport, carriers, channels and pumps.
Unit 6: Enzymes: Structure and properties, mechanism of enzyme catalysis and enzyme inhibition.
Practical: Osmotic potential study by Plasmolytic methos
Transpiration under different environmental factors
Demonstration on Bolting
Effects of Auxins on rooting

April -2023

Unit 3: Translocation in Phloem: Composition of phloem sap, girdling experiment.
Unit 7: Nitrogen metabolism: Biological nitrogen fixation, nitrate and ammonium assimilation.
Practical: Stomatal Index study including frequency on mesophytesand xerophytes
Evolution of oxygen under different carbon-dioxide concentration
Demonstration on Hill Reactions
Suction due to transpiration

May-2023

Unit 3: Translocation in Phloem: Pressure flow model, phloem loading and unloading.
Unit 8: Plant Growth Regulators: Discovery and physiological roles of Auxin, Gibberellins, Cytokinin, ABA, ethylene.
Practical: Comparison of rate of respiration in any 2 parts of a plant
R.Q- Demonstration: Respiration in roots

June-2023

Unit 4: Photosynthesis: Photosynthetic pigments, Photosystem-I, II, reaction centre, antenna molecules, electron transport and mechanism of ATP synthesis, C3, C4, CAM pathways of Carbon fixation, photorespiration. Unit 5: Respiration: Glycolysis, Anaerobic respiration, TCA Cycle, Oxidative Phosphorylation, Glyoxylate cycle, Oxidative Pentose phosphate pathway. Unit 9: Plant response to light and temperature: Photoperiodism (SDP, LDP, Day Neutral Plant), Phytochrome, Red and far-red light responses on photomorphogenesis, vernalization. Internal Assessment

July-2023

Doubt Clearing Class if required

Class- B.SC (Botany) SEM IV : SEC-2: Mushroom Culture Technology

March-2023

Unit-I: Introduction, history, nutritional and medicinal value of edible mushroom; poisonous mushrooms, types of edible mushrooms available in India-*Volariellavolvacea, Pleurotus citrinopileatus, Agaricus bisporus.*

Unit-II: Cultivation technology: Infrastructure: Substrates (locally available) polythene bags, vessels, inoculation hook, inoculation loop, low-cost stove, seeds, culture rack, mushroom unit (thatched house), water sprayer, tray, small polythene bags.

April-2023

Unit-II: Pure culture: Medium, sterilization, preparation of spawn, multiplication, mushroom bed preparation, paddy straw, sugarcane trash, maize straw, banana leaves, Factors affecting the mushroom bed preparation.

Unit-III: Storage and nutrition, short term storage, long term storage, drying, storage in salt solution, nutrition, proteins, amino acids, mineral elements nutrition, carbohydrates. Crude fibre content and vitamins

May-2023

Unit-II: Low-cost technology of mushroom culture, composting technology in mushroom production.

Unit-IV: Food preparation, types of food prepared from mushroom.

June-2023

Unit-II: Mushroom production (Hands on training)

Unit: IV: research Centres- National level and regional level visit, Cost benefit ratio, marketing in India and abroad and export value.

Class- B.SC (Botany) SEM IV : GE-Plant Physiology and Metabolism

Februaray-2023

Introductory Class

March-2023

Unit-I: Plant water relations
Unit 2: Mineral nutritions
Unit 6: Enzymes
Practical: Osmotic potential study by Plasmolytic methos
Transpiration under different environmental factors
Demonstration on Bolting
Effects of Auxins on rootings

April -2023

Unit 3: Translocation in Phloem
Unit 7: Nitrogen metabolism
Practical: Stomatal Index study including frequency on meso and xerophytes
Evolution of oxygen under different carbon-dioxide concentration
Demonstration on Hill Reactions
Suction due to transpiration

May-2023

Unit 3: Translocation in Phloem
Unit 8: Plant Growth Regulators
Practical: Comparison of rate of respiration in any 2 parts of a plant
R.Q- demonstration
Respiration in roots

June-2023

Unit 4: Photosynthesis
Unit 5: Respiration
Unit 9: Plant response to light and temperature
Internal Assessment

Or,

Class- B.SC (Botany) SEM IV : GE-4 :Plant Anatomy and Embryology

February -2023

Introductory Class

March-2023

Unit 1: Meristematic and permanent tissues: Root and shoot apical meristem, simple and complex tissues Unit 2: Structure of dicot and monocot root, stem and leaves. Unit 6: pollination and fertilization: Pollination mechanism and adaptations, double fertilization. Practical: 1. Study of meristems through permanent slides and photographs. 2. Tissues ; Macerated xylary elements, Phloem (Permanent slides, Photographs) 9. Female gametophyte: *Polygonum* (monosporic) type of Embryo sac Development (Permanent slides/ photograph)

April-2023

Unit 3: Secondary growth : Vascular cambium- Structure and function, Seasonal activity. Secondary growth in root and stem, Wood (heartwood and Sapwood) Unit 4: Adaptive and protective systems: Epidermis, cuticle, stomata. Unit 6: pollination and fertilization: Seed- structure appendages and dispersal mechanisms. Practical: 3.Stem: Monocot: *Zeamays*; Dicot: *Helianthus*; Secondary: *Helianthus* (only permanent slides) 4.Root: Monocot: *Zeamays*; Dicot: *Helianthus*; Secondary: *Helianthus*(only permanent slides) 5.Leaf: Dicot and Monocot leaf (only permanent slides) 11.Pollination types and seed dispersal mechanisms (including appendages, aril, caruncle) (Photographs and specimens)

May-2023

Unit 4: Adaptive and protective systems: General account of adaptations in Xerophytic and Hydrophytes. Unit 5. Structural organization of flower Structure of anther and pollen; Structure and types of ovules. Unit 7: Embryo and endosperms Endosperm types, structure and functions, dicot and monocot embryo, embryo endosperm relationship Practical: No. 6: Adaptive anatomy: xerophyte-Nerium leaf and Hydrophyte-Hydrilla stem. 7. Structure of anthers (Young and mature), tapetum (Amoeboid and secondary) (Permanent slides). 8. Types of ovules, anatropous, orthotropous, circinotropous, amphitropous, campylotropous. 10. Ultrastructure of mature egg apparatus cells through electron micrographs. 12. Dissection of embryo /endosperm from developing cells.

June-2023

Unit 5: Structural organization of flower Types of embryo sacs, organization and ultra structure of mature embryo sac Unit 8: Apomyxis and Polyembryony Definition, types and practical applications Practical 13 Calculation of % of germinated pollen in a given medium

July-2023

Internal assessment and doubt clearing classes.

Class- B.SC (Botany) SEM III : DSC 3-Plant Anatomy and Embryology

September -2023

Unit 1: Meristematic and permanent tissues:

Root and shoot apical meristem, simple and complex tissues

Unit 2:

Structure of dicot and monocot root, stem and leaves.

Unit 6: pollination and fertilization:

Pollination mechanism and adaptations, double fertilization.

Practical: 1. Study of meristems through permanent slides and photographs.

2. Tissues ; Macerated xylary elements, Phloem (Permanent slides, Photographs)

9. Female gametophyte: *Polygonam* (monosporic) type of Embryo sac Development (Permanent slides/ photograph)

November -2023

Unit 3: Secondary growth :

Vascular cambium- Structure and function, Seasonal activity. Secondary growth in root and stem, Wood (heartwood and Sapwood)

Unit 4: Adaptive and protective systems:

Epidermis, cuticle, stomata.

Unit 6: pollination and fertilization:

Seed- structure appendages and dispersal mechanisms.

Practical: 3. Stem: Monocot: *Zea mays*; Dicot: *Helianthus*; Secondary: *Helianthus* (only permanent slides)

4.Root: Monocot: *Zea mays*; Dicot: *Helianthus*; Secondary: *Helianthus* (only permanent slides)

5.Leaf: Dicot and Monocot leaf (only permanent slides)

11.Pollination types and seed dispersal mechanisms (including appendages, aril, caruncle) (Photographs and specimens)

December -2023

Unit 4: Adaptive and protective systems:
General account of adaptations in Xerophytic and Hydrophytes.
Unit 5. Structural organization of flower
Structure of anther and pollen; Structure and types of ovules.
Unit 7: Embryo and endosperms
Endosperm types, structure and functions, dicot and monocot embryo, embryo endosperm relationship
Practical: No. 6: Adaptive anatomy: xerophyte-Nerium leaf and Hydrophyte-Hydrilla stem.
7. Structure of anthers (Young and mature), tapetum (Amoeboid and secondary) (Permanent slides).
8. Types of ovules, antropous, orthotropous, circinotropous, amphitropous, campylotropous.
10. Ultrastructure of mature egg apparatus cells through electron micrographs.
12. Dissection of embryo /endosperm from developing cells.

January-2023

Unit 5: Structural organization of flower
Types of embryo sacs, organization and ultra structure of mature embryo sac
Unit 8: Apomixis and Polyembryony
Definition, types and practical applications
Practical 13 Calculation of % of germinated pollen in a given medium
Internal assessment and doubt clearing classes.

Class- B.SC (Botany) SEM III : GE -3-Economic Botany & Biotechnology

September 2022:

Unit 2: Cereals

Unit 3: Legumes

Unit 4: Spices

Unit 5: Beverages

Unit 8: Introduction to Biotechnology

Unit 9: Plant Tissue Culture: Haploid production through androgenesis and gynogenesis; brief account of embryo and endosperm culture with their applications.

Practical: 1. Study on economically important plants : Wheat, gram, soybean, black pepper, Clove. Sections and microchemical tests.

November 2022:

Unit 6: Oils and Fats

Unit 7: Fibre yielding plants

Unit 10: Recombinant DNA techniques: Blotting techniques, northern, southern and western blotting.

Practical: 1 : Study on economically important plants : Tea, Cotton, Ground Nut through specimens. Sections and microchemical tests.

December 2022:

Unit 10: Recombinant DNA techniques: finger printing, molecular DNA marker, DNA sequencing, PCR and reverse transcriptase PCR, Hybridoma and monoclonal antibody, ELISA and immune detection, molecular diagnosis of human disease and human gene therapy.

Practical: No. 2 Familiarization with equipment in tissue culture

No. 3: Study through photographs: Anther culture, somatic embryogenesis, endosperm and embryo culture, micropropagation.

No. 4: Study of molecular techniques. PCR, Blotting techniques, AGE and PAGE

January-2023:

Unit 1: Origin of cultivated plants

Unit 9: Plant Tissue Culture: Micropropagation.

Doubt clearing Classes, practical classes and internal assessment.

Class- B.SC (Botany) SEM III : SEC-1: Biofertilizers

September-2022

Unit-I: Biofertilizers: General account about microbes used as biofertilizer-*Rhizobium*-isolation, identification. Mass multiplication, carrier-based inoculants, Actinorhizal symbiosis.

November-2022

Unit-II: *Azospirillum*: Isolation and mass multiplication, carrier-based inoculant, associative effect of different microorganisms. Azotobacter: Classification, characteristics-crop response to *Azotobacter* inoculum, maintenance and mass multiplication.

December-2022

Unit-III: Cyanobacteria (BGA), Azolla and Anabaena azollae association, N2-fixation, factors affecting growth, BGA and *Azolla* in rice cultivation.

Unit-V: Organic farming- green manuring and organic fertilizers, recycling of biodegradable municipal, agricultural and industrial wastes-bio compost making methods, types and methods of vermicomposting, field applications.

January-2023

Unit_IV: Mycorrhizal association, types of mycorrhizal association, taxonomy, occurrence and distribution, phosphorus nutrition, growth and yield, colonization of VAM-isolation and inoculum production of VAM and its influence on growth and yield of crop plants.

Class- B.SC (Botany) SEM II : DSC -2 : Plant Ecology and Taxonomy
&
GE2: Plant Ecology and Taxonomy

March-2023

Unit 1: Introduction

Unit 2: Ecological Factors

Soil. Origin, formation, composition, soil profile

Water: states of water in the environment., precipitation types,

Light and temperature: Variation

Optimal and limiting factors; Shelford law of tolerance

Adaptation of hydrophytes and xerophytes

Practical: 1. Study of instruments used to measure microclimatic variables: soil thermometer, maximum and minimum thermometer, anemometer, psychrometer/hygrometer, raingauge, lux meter.

April -2023

Unit 6: Introduction to Plant taxonomy, identification, classification, nomenclature

Unit 8: Taxonomic evidences from palynology, cytology, phytochemistry and molecular data

Practical: 2. Determination of pH and analyses of two samples for carbohydrates, chlorides, nitrates, sulphates, organic matter and base deficiency by rapid field test.

3. Comparison of bulk density, porosity and rate of infiltration of water in soil of 3 habitats.

Study of morphological adaptations of hydrophytes and xerophytes (4 each).

May-2023

Unit3: Plant Communities: Characters, ecotones, and edge effects, succession, process and types.

Unit 7: Identification:

Functions of herbarium, important herbaria and botanical gardens of the world and India: documentation: flora

Keys: single access and multiaccess

Unit 9: Taxonomic hierarchy, rank, categories, and taxonomic groups.

Unit 10: Botanical nomenclature, principles and roles, ICN, rank and names, binomial systems, typification, author's citation.

Practical 3. Practical: Study of biotic interactions of the following:

Stem parasite, root parasite, epiphytes, predation

7. Mounting of a properly dried and pressed specimens of any wild plant with herbarium label. Local excursion, campus visit with MoU Colleges.

June-2023

Unit4: Ecosystem: Structure, function, energy flow, trophic organization, food chains and food webs, ecological pyramids, production and productivity, biogeochemical cycles, cycling of carbon, nitrogen and phosphorous.

Unit 10: Valid publication, rejection of names, principles of priority and its limitation

Unit 11: Classification: Types of classification, artificial, natural and phylogenetic. Bentham and Hooker's classification upto series. Engler and Prantl's classification upto series.

Practical 6. Practical: Study of vegetative and floral characters of the following families:

Brassicaceae, Asteraceae, Solanaceae, Lamiaceae, Liliaceae

July -2023

Unit 5: Phytogeography

Unit 12: Bimetrics, numerical taxonomy and cladistics:

Charavcters, variations, OTUs, character weighting and coding, cluster analysis, phenograms, cladograms, 9definition and differences).

Practical : Field visit and Campus visit (MoU Institutes)

Practical: 4. Determination of minimal quadrat size for the study of herbaceous vegetation in the College campus by species area curve method. (Species to be listed).

5. Quantitative analysis of herbaceous vegetation in the college campus for frequency and comparison with Raunkaer's frequency distribution law.

Internal Assessment and Doubt clearing classes.

Class- B.SC (Botany) SEM I: DSC 1 : Biodiversity (Microbes, Algae , fungi and Archegoniate)

&

GE1: Biodiversity (Microbes, Algae, fungi and Archegoniate)

September-2022

Unit 1: Introductory Class on microbes

Viruses-Discovery, general structure, replication, (general account), DNA virus (T Phage), Lytic and lysogenic cycle, RNA virus (TMV), economic importance.

Unit 4: Introduction to Archegoniate: Unifying features of Archegoniate, transition to land habit, alternation of generations.

Practical: 1. EMS/Model of viruses-T phage and TMV, Line drawing and photographs of lytic and lysogenic cycle.

Morphological study on archegoniate as per syllabus

November -2022

Unit 1: Bacteria: Discovery, general characteristics and cell structure: reproduction-vegetative, asexual and recombination (Conjugation, transformation and transduction); economic importance.

Unit2: Algae-General characteristics, ecology and distribution.

Unit 5: Bryophytes: general characteristics, adaptation to land habit, classification, range of thallus organization. Classification upto family, morphology, anatomy and reproduction of *Marchentia* and *Funaria* : Ecologyand economic importance of Bryophytes with special mention of Sphagnum.

Practical: 2. Types of Bacteria, from photographs, EM of Bacterium, Binary fission, conjugation; structure of root nodule and gram staining.

3. Study of vegetative and reproductive structure of *Oedogonium, Vaucheria*, *Polysiphonia* and *Chlamydomonas* and *Nostoc.*

10. Marchantia-Morphology of thallus, rhizoid and scales, V.S. of thallus through gemma cup. w.m. whole mount, antheridiophores, archegoniophores, sporophytes.

11. Funaria- Morphology,w.m. pf leaf, rhizoid, operculum, peristome, annulus, spores, antheridial and archegonial heads, l.s. of capsules and protonema.

December-2022

Unit-2: Algae: Range of thallus organization, and reproduction, classification of algae, morphology and life cycles of Nostoc, Chlamydomonas, Oedogonium, Vaucheria, Fucus, Polysiphonia, Economic importance of algae.

Unit 6: Pteridophytes: General characteristics, classification-upto family, early land plants, *Cooksonia*and *Rhynia,* Morphology, anatomy and reproduction of *Selaginella*, *Equisetum* and *Pteris*. Heterospory and seed habit, stelar evolution, ecological and economic importance of Pteridophytes.

Practical: 12. Selaginella-morphology, whole mount (w.m.) of leaf with ligule, strobilus, microsporophyll and mega sporophyll, T.S. of Stem, L.S. of Strobilus.

13. Equisetum- Morphology, T.S through internodes, L.S. of strobilus, T.S of strobilus, w.m. of Sporangiophores, spores w.m, t.s of rhizome.

14. Pteris-Morphology, T.S of rachis, rhizome, V.S of sporophyll, w.m. of Sporangium, spores, prothallus, with sex organs and young sporophytes.

January-2023

Unoit-3: Fungi: Introduction: General characteristics, ecology and significance, range of thallus organization, cell wall composition, nutrition, reproduction and classification, true fungi, general characteristics, ecology and significance, life cycle of *Rhizopus* and *Penicillium*, *Alternaria*, *Puccinia, Agaricus.*

Lichen: General Account, reproduction and significance.

Unit 7: Gymnosperms

General characteristics, classification, upto family, morphology, anatomy and reproduction of *Cycas* and *Pinus.* Ecological and economic importance.

Practical: 4. *Rhizopus, Penicillium*,

5. *Alternaria*

6. *Puccinia*

7. *Agaricus*

8. Lichens

15. Cycas and Pinus: Morphology (Coralloid root and Bulbil and leaf), T.S. of Coralloid root, rachis, v.s. of leaflet, microsporophyll, w.m. of spore, LS of ovule, T.S. of root.

16. Pinus: Morphology, w.m. of dwarf shoot, male and female, w.m. dwarf shoot, t.s.needle, t.s stem, l.s /t.s/ male cone, w.m. microsporophyll, microspores, lsl of female cone, t.l.s. and r.l.s. of stem (Permanent slides)

February -2023

Unit-3. Mycorrhizae, Ecto and endo mycorrhizae and their significance.
Practical: 9. Ecto and endo mycorrhizae (Photographs)
Internal Assessment & Doubt clearing class and remaining practical if any.

Bumpi Ghosh
29/8/2022

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