

3206

THIRD YEAR B.Sc. Botany

PRACTICALS:

The practical exercises have been divided into following two groups :

Group-I : Paper I + Exercise 1,2,7 & 8 of Paper III.

Group-II : Paper II + Exercise 3,4,5 & 6 of Paper III.

PAPER - I

A Plant adaptive modifications : Specimens / Slides.

1. Succulents : *Opuntia, Euphorbia*
2. Halophytes : *Tamrix/ Salsola*
3. Xerophytes : *Cocoloba, Parkinsonia, Acacia, Capparis, Leptadaenia pyrotechnica*
4. Hydrophytes : *Eichhornia, Trapa, Hydrilla*

B Soil analysis

5. Soil texture
6. Soil moisture
7. Water holding capacity
8. Soil pH
9. Qualitative tests of nitrate, phosphate and carbonate.

C Water analysis

10. Hardness of water
11. Water temperature
12. Visibility of light in water column.
13. Carbonate, bicarbonate and chloride test.

D Ecological instruments

14. Maximum/minimum thermometer.
15. Hair hygrometer
16. Anemometer
17. Lux meter
18. Universal moisture meter

Field exercises

19. Determination of frequency, density and abundance of different species present in the community by quadrat method.
20. Determination of minimum size of a quadrat by species area curve method.

PAPER-II
PLANT PHYSIOLOGY AND
BIOCHEMISTRY

1. Demonstration of colloidal systems: Suspension, Emulsion, Brownian movement.
2. To observe streaming movement of protoplasm (*Hydrilla*)
3. Demonstration of phenomenon of plasmolysis using *Rhoeo discolor* leaves.
4. Demonstration of phenomenon of osmosis by potato osmoscope.
5. Demonstration of opening and closing of stomata.
6. Demonstration of unequal transpiration using cobalt chloride paper.
7. Effect of various wave-lengths of light on the process of photosynthesis.
8. Demonstrate that light, CO₂ and chlorophyll are necessary for photosynthesis.
9. Determine the value of respiratory quotient (RQ) of different respiratory substrates.
10. Demonstration of activity of respiratory enzymes (Peroxidase, Catalase, Dehydrogenase) in plant tissues.
11. Introduction and demonstration of following instruments/ techniques : pH meter, centrifuge, colorimeter, chromatography.
12. Phytochemical tests of the following : starch, cellulose, sucrose, glucose/ fructose, proteins, fat, oxalic acid, malic acid, citric acid, tannins, ascorbic acid, anthocyanins.
13. DNA isolation by spooling method.
14. Calculation of stomatal index and stomatal frequency of a mesophyte and a xerophyte.
15. To study the effect of light intensity and bicarbonate concentration on O₂ evolution in photosynthesis.
16. Separation of amino acids/plant pigments by paper chromatography.

Demonstration experiments (any three)

1. Bolting.
2. Effect of auxins on rooting.
3. Suction due to transpiration.
4. R.Q.
5. Respiration in roots
6. Moll's half leaf Experiment

PAPER - III
MOLECULAR BIOLOGY AND BIOTECHNOLOGY

1. Introduction to tools and techniques: Laminar flow bench, Autoclave and filter sterilization.
2. Preparation of culture media and solutions of nutrients and growth regulators.
3. Inoculation techniques: explant preparation and aseptic transfer.
4. Anther culture.
5. Preliminary exercise on isolation and culture of plant protoplasts.
6. Exercises for cloning of plants.

7. Tests and separation of secondary metabolites.
8. Experiments on antibiotics resistance.
9. Demonstration of Agarose gel electrophoresis.
10. Study through photographs: somatic embryogenesis, endosperm and embryo culture, protoplast isolation and culture and micropropagation.
11. Demonstration of molecular techniques: PCR and Blotting techniques.

BOOKS RECOMMENDED

- Ambasht, R.S. : A Text-book of Plant Ecology, Studies Friends and Co., Varanasi, 1975.
- Bhatia, K.N. and Parasher, A.N. : Plant Physiology, Krishna Brothers, Jullundhur, 1975.
- Daubenmire, R.F.: Plants and Environment, John Wiley & Co., London, 1970.
- Gopal, B.: Padap Paristhitiki Avam Padap Bhugol Ke Mool Tantra, Rajasthan Hindi Granth Academy, 1977.
- Misra, R.: Ecological Workbook, Oxford and IBH Publishing, New Delhi, 1968.
- Mishra, R. and Puri, G.S.: Bhartiya Padap Paristhiti Vigyan, Rajasthan Hindi Granth Academy, Jaipur, 1974.
- Nair, P.K.G.: Principles of Environmental Biology, Minalaya Publishing House, Delhi, 1990.
- Pandey, S.N. and Sinha, B.K.: Plant Physiology, Vikas Publishing House, Delhi, 1996.
- Rao, K.N. Partha, T.S. and Rao, G.S.: Outline of Physiology, S. Chand And Co., New Delhi, 1975.
- Smith, R.L.: Ecology and Field Biology, Harper and Raw, 1972.
- Verma, V: A Textbook of Plant Physiology, Emkay Publication, Delhi, 1972.
- Noggle, G. Ray and Fritz, J., George : Introductory Plant Physiology, Prentice Hall 1976