B.Sc. PLANT BIOLOGY & PLANT BIOTECHNOLGY

ALGOLOGY AND MYCOLOGY

B. Sc. va (Candidates admitted from the academic year 2008-2009)

Paper 1a ALGOLOGY AND MYCOLOGY

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CORE THEORY

Algology

UNIT I

Introduction to Algae: Definition; Distribution of algae: Freshwater algae, Brackish Water algae and marine algae. Classification of Algae: Divisions of algae and their important features. Major criteria for algal classification and characteristic features of the classes such as Cyanophyceae, Chlorophyceae, Phaeophyceae, Bacillariophyceae and Rhodophyceae.

UNIT II

Ultrastructure of prokaryotic and eukaryotic algal cells. Thallus organization among algae: Unicellular, colonial, filamentous, siphonous and parenchymatous thallus organizations with suitable examples. Vegetative reproduction in algae: Binary cell division, autocolony formation, fragmentation, Homogones, hormocysts, planococcus, propagules, bulbils and adventitious branches. Asexual reproduction in algae: zoospores, aplanospores, hypnospsores, autospores, monospores, tetraspores, endospores and exospores.

UNIT III

Sexual reproduction and life cycles in algae: Isogamous, anisogamous and oogamous sexual reproduction. Monophasic, biphasic and triphasic life histories. Life cycles in algae: Zygotic, gametic, sporic (biphasic). Sporic (triphasic) and somatic life cycles.Use of algae for human welfare: Algae as a source of single cell protein, pigments and biofertilizers; Diatomites; Utilization of agarophyhtes, carragenophytes and alginophytes; toxic algae.

Mycology

UNIT IV

Distribution and position of fungi inWhittaker's classification, characteristic feature of Zygomycotina, Ascomycotina, Basidomycotina and Deuteromycotina with an example. Bread fungi (*Mucor*), *Pezzia*, *Polyporus* and *Cercospora*.

Key words: Hyphae, Mycelium, Coenocytic, Homokaryon, Heterokaryon, Homothallic, Heterothallic, Holocarpic, Eucarpic, Haustoria, Conidia, Zoospore.

UNIT V

Importance of fungi: nutrient recycling, antibiotic production, fermentation technology (Yeast). Fungi as pathogens in plants: seed fungi, damping off disease in seedling, late blight of potato, downy mildew of maize and brown rust of wheat.

Key words : Antibiotic, Mycotoxin, Dextroins, Smut, Rust, Mildew, Rot.

UNIT VI

Biology of lichen: Structure, function and symbiosis of mycobiont and phycobiont. Local examples and case study in *Usnea*. Lichens and environment. Mycorrhizae: endomycorrhizae and ectomycorrhizae, AM, mycorrhizae in agriculture.

Key words : AM (Arbuscular Mycorrhizae), Biofertilizer, Sporocarp

Suggested Reading

ALGOLOGY

BARSANTI, LAURA AND PAOLO GUALTIERI. 2005. *Algae-Anatomy, Biochemistry and Biotechnology*. Taylor & Francis, London, New York.

FRITSCH, F.E. 1935 Structure and Reproduction of Algae, Vol. I, Cambridge University Press, Cambridge.

FRITSCH, F.E. 1945 Structure and Reproduction of Algae, Vol. II, Cambridge University Press, Cambridge.

LOBBAN, C.S. AND M.J. WYNNE (Eds.) *The Biology of Seaweeds*. Blackwell Scientific Publications, Oxford.

SOUTH, G.R. AND A. WHITTICK 1987 *Introduction to Phycology*. Blackwell Scientific Publications, Oxford.

MYCOLOGY

ALEXOPOLOUS, C.J and C.W. MISRA. 1972. Introductory mycology. John Wiley and Sons, New York.

BURNETT, J.H. 1976. Fundamentals of mycology. Edward Arnold Publishers, London.

MARGULIS, L., AND K.V. SCHWARTZ. 1988. Five Kingdoms. W.H. Freeman ad Co. New York.

WEBSTER, J. 1970. Introduction to fungi. Cambridge University Press, London.

MEHROTRA, R.S. 1980. Plant Pathology. Tata McGraw Hill Publishing Company Ltd, New Delhi.

SINGH. R.S. 1980. Introduction to Principles of Plant Pathology. III - Edition. Oxford. IBM. Publishing Co. Pvt. Ltd, New Delhi.

Paper 2a ALGOLOGY AND MYCOLOGY

B. Sc. va (Candidates admitted from the academic year 2008-2009)

Core Practical

Algology

Examination of suitable algae to observe different types of thallus organization as given below:

Desmids – Unicellular thallus; *Microcystis*, *Volvox* – Colonial thallus; *Spirogyra*, *Hincksia* – Filamentous thalli; *Caulerpa* – Siphonous thallus; *Gracilaria* - Parenchymatous thallus.

Examination of the following algae to observe the structures listed against them:
Oscillatoria – Hormogones, planococcus; *Sphacelaria*, *Hypnea* - Propagules; *Dicryota*, *Grateloupia* – adventitious branches.

Oedogonium, *Hincksia* – zoospores; Chlorella – autospores; Audouinella - monospore; Polysiphonia – Tetraspore; Dermocarpa – Endospore; Chamaesiphon - Exospore.

Examination of different stages of the following algae to study their life cycle:
Caulerpa – Isogamous, monophasic, diplontic/gametic life cycle.
Hincksia – Anisogamous, biphasic, diplohaplontic/sporic life cycle
Chara – Oogamous, monophasic, haplontic/zygotic life cycle
Batrachospermum-Oogamous, triphasic, haplobiontic/somatic life cycle
Gracilaria – Oogamous, triphasic, diplobiontic/sporic life cycle

Observation of spotters prepared with photographs/photomicrographs of algae to show the ultrastructural features, thallus organization, algal habitats, asexual and sexual reproductive structures.

Observation of spotters to identify industrially useful algae and their products.

Mycology

Examination of vegetative and reproductive structures of fungi and lichens. Viz. *Mucor*, *Polyporus*, *Peziza*, *Cercospora* and *Usnea*.

Collection and observation of plant and plant parts infected by fungal pathogen.

Culture and observation of seed fungi.