

MCC, Department of Botany

**M. PHIL. BOTANY**

**PALYNOLOGY**

**PAPER II & III**

## PAPER II FUNDAMENTALS OF PALYNOLOGY

### UNIT I

History and scope of palynology  
Terminologies used in spore and pollen description according to LLP 1994.  
Difference between pollen and spores.  
Sporoderm:- Exine and Intine, Chemical composition, structure and function. Evolutionary trends and adaptive significance. Harmomegathy;  
Exineless pollen.

### UNIT II

Aperture: Inaperturate grain, simple and compound  
Aperture, form and function. NPC classification, Pseudoaperture, aperture membrane.

### UNIT III

Sculpture: LO Analysis, various types of ornamentation. Significance of ornamentation in pollination ecology.

### UNIT IV

Pollen development in angiosperms, (including sporoderm). Shape and size of pollen. Chemical constituents of pollen; Uses of pollen in pharmaceuticals, Crop Science as PGR, Nutrition and in Cosmetics.

### UNIT V

Pollination Ecology: Cohesion mechanism in pollen.  
Threads - Nature, form (i) Sporopollenin threads, (ii) Nonsporopollenin threads. Stickyness - Pollenkitt - origin, Chemical composition and function. Polyads - Types of Polyads and cohesion mechanism; structure and function. Correlation between pollen morphology and pollination, Electrostatic forces in insect pollination.

### UNIT VI

Anemophilous, entomophilous and amphiphilous pollen, saccate pollen, pollen- pistil interaction; formation of pollen tube, sperms.

### UNIT VII

Pollen Physiology: Purpose of Pollen collection, collection methods and storage of pollen- Cryopreservation.

Pollen viability- factors that affect pollen viability.

Viability Test: - Germination assay, in vitro, in vivo

Non Germination assay FCR Test, Redox dyes, Pseudoformation.

#### UNIT VIII

Pollen wall proteins, Sporophyte fraction and gametophyte fraction and their significance in compatibility- Pollen enzymes, isoenzymes, extraction and their significance. Pollen culture to propagate haploids.

#### UNIT IX

Technique: Acetolysis method of pollen preparation. Sample preparation for TEM and SEM.

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## PAPER III APPLIED PALYNOLOGY

### UNIT I

Aeropalynology: Methods of collecting air borne particles. Identification, preparation of pollen calendar. Aerobiological studies in relation to allergy - Pollinosis - Extraction of allergens, Testing patients and treatment. Other uses of Aeropalynology in relation to pollination, vegetation, yield in citrus-grapes.

### UNIT II

Iatropalynology: Pollen in pharmaceuticals.  
Copropalynology: Uses of coprolite in Archeology - human settlement.  
Forensic Palynology: Recent development in Forensic palynology in USA and New Zealand.

### UNIT III

Palynotaxonomy: Use of pollen character for plant classification. Recent use of other characters such as - Stratification, ontogeny, biochemistry, surface coating, orbicules.

### UNIT IV

Mellitopalynology: Bees that are commonly domesticated in India. Bee colony, Pollen nectar. Source (plant), pollen collection, packing, pollen basket, Bee bread.  
Honey flow period, dearth period. Role of Mellitopalynology in Bee keeping. Season of honey production, Origin of honey, evaluation.  
Mellitopalynological studies in India with special reference to Andhra Pradesh, Tamil Nadu. Extract of pollen from honey, slide preparation, Identification.

### UNIT V

Geo/paleopalynology: Pollen production - transport, preservation, sample collection, extraction techniques, identification, pollen diagram construction, and interpretation of data. Paleoenvironment, vegetation, climate.  
Early Cretaceous pollen: Circumpolloid pollen, Normapolles pollen, Some of the common palynomorph during the carboniferous period of India.  
Tertiary palynology with special reference to Neyveli lignite. Quaternary palynology of some South Indian Hills and Pulicat.

## REFERENCES

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