

BACHELORS WITH BOTANY AS MAJOR (CT - I)

6th SEMESTER

BOT622J1: BOTANY _ EMBRYOLOGY OF ANGIOSPERMS

CREDITS: THEORY: 3; PRACTICALS: 1

COURSE OBJECTIVES:

The objectives of this course are as under

1. To make students understand the structure of male and female sex organs
2. To make students learn how gametophytes develop in angiosperms
3. To make students learn about events of pollination, fertilization and post fertilization developmental outcomes in angiosperms

COURSE OUTCOMES

After completing this course students must be able to know how angiosperms bring about the formation of their sexual offsprings, seeds, fruits and how they bring about the alternation of their sporophytic and gametophytic generations.

UNIT 1. FLOWER ORGANIZATION AND GAMETOPHYTE DEVELOPMENT (15 HOURS)

Structure of flower; structure of anther; Microsporogenesis; Pollen wall, apertures-NPC system; Development of male gametophyte; Ovule structure and types; Megasporogenesis; Embryo sac - Embryo sac types (monosporic, bisporic and tetrasporic); structure and development of polygonum type of embryo sac.

UNIT II. POLLINATION AND SEXUAL INCOMPATIBILITY (15 HOURS)

Pollination-types and their adaptations; Agencies of pollination-abiotic and biotic. Pollen germination-in vitro and in-vivo; pollen viability, Pollen storage; Pollen pistil interaction; Sexual Incompatibility-Interspecific and intraspecific; Self incompatibility-Sporophytic and gametophytic self-incompatibility. Biochemical mechanism of self-incompatibility; Elementary idea of Heteromorphic incompatibility; Methods to overcome incompatibility barrier.

UNIT III. FERTILIZATION AND ITS OUTCOME (15 HOURS)

Double fertilization and its significance. Triple fusion; Endosperm- types, development, structure and functions. Embryogenesis- Development and structure of typical dicot and monocot embryos. Seed and fruit formation.

Polyembryony-source of supernumerary embryos, types of polyembryony and its significance; Apomixis-Introduction, types and its practical applications.

LABORATORY EXERCISES

1. Study of typical flower(structure), its different whorls along with their functions.
2. Study of flowers of different self-pollinating and cross-pollinating plants.
3. Study of anther structure (young and mature) through temporary slide preparation or through permanent slides.
4. Observation of microspore tetrads/pollen grain shapes, sculpture and apertures through slide preparations.
5. Study of in-vitro pollen germination using any available material.
6. Study of pollen viability through various staining techniques.
7. Study of ovule types through permanent slides or models.
8. Study of embryo sac structure (Polygonum type) through permanent slides/models/charts.
9. Study of endosperm by dissecting developing cucumber seeds.
10. Isolation of monocot and dicot embryos from any suitable material.

SUGGESTED READINGS

1. Bhojwani, S.S. and Bhatnagar, S.P. (2011). The Embryology of Angiosperms, Vikas Publishing House. Delhi. 5th edition.
2. Johri, B.M. I (1984). Embryology of Angiosperms, Springer-Verlag, Netherlands.
3. Maheshwari, P. 1950. An Introduction to the Embryology of Angiosperms. Mc Graw Hill, New York.
4. Pandey, S.N. and Chadha. A 1996. Plant Anatomy and Embryology. Vikas Publishing house, New Delhi
5. Singh V, Pandey P. C and Jain D. K 2010. Structure, development and Reproduction in Angiosperms. Rastogi Publications Meerut India.
