Sexual Reproduction in Flowering Plants Class 12 Key Points

CBSE Class 12 Biology · NCERT · for boards, NEET and JEE revision

ChapterNotes

Flower as a Reproductive Unit

Whorls (outside→in): Calyx → Corolla → Androecium → Gynoecium

Determinate growth; 'perfect' = bisexual; 'complete' = all 4 whorls present.

- Accessory whorls: calyx (sepals) + corolla (petals)
- Essential whorls: androecium (stamens, male) + gynoecium/pistil (carpels, female)
- Stamen = filament + anther; carpel = stigma + style + ovary

Anther & Microsporogenesis

Microsporangium wall (out→in): Epidermis · Endothecium · Middle layers · Tapetum

Tapetum nourishes pollen; endothecium aids dehiscence. 1 MMC → 4 pollen grains.

- MMC undergoes meiosis → microspore tetrad (4 haploid microspores)
- Tapetum = innermost nutritive layer; often multinucleate
- Pollen count = MMCs × 4 (per microsporangium)

Pollen: The Male Gametophyte

Exine = sporopollenin (most resistant) · Intine = cellulose + pectin

~60% shed at 2-celled stage; rest 3-celled. Germ pores = thin exine spots.

- 2-celled: large vegetative cell + small generative cell
- Generative cell divides → two male gametes (3-celled)
- Parthenium pollen causes allergy/asthma

Ovule (Megasporangium)

Funicle → Hilum · Integuments (gap = Micropyle) · Nucellus · Chalaza

Micropyle = the doorway; nucellus = nutritive tissue.

- MMC meiosis → 4 megaspores; 3 degenerate, 1 functional (monosporic)
- Hilum = funicle-ovule junction; chalaza is the basal region
- Polygonum-type development from a single functional megaspore

Embryo Sac (Female Gametophyte)

Mature embryo sac = 7-celled, 8-nucleate ($2^3 = 8$ nuclei)

Single most-asked fact: 7 cells, 8 nuclei - never write 8-celled.

- Micropylar end: egg apparatus = 1 egg + 2 synergids (filiform apparatus)
- Chalazal end: 3 antipodal cells
- Centre: 1 central cell with 2 polar nuclei

Pollination & Outbreeding

Autogamy (same flower) · Geitonogamy (same plant, genetically self) · Xenogamy (cross)

Anemophily = light dry pollen + feathery stigma; hydrophily = Vallisneria, Zostera.

- Outbreeding devices: dichogamy, herkogamy, self-incompatibility, dioecy
- Geitonogamy needs an agent but is genetically self-pollination
- Cleistogamy guarantees autogamy (flowers never open)

Double Fertilisation

Egg(n) + sperm(n) → Zygote(2n) ; 2 polar nuclei(n+n) + sperm(n) → PEN(3n)

Discovered by Nawaschin. Triple fusion = 3 nuclei → endosperm is 3n (triploid).

- Syngamy: 1 male gamete + egg → zygote (2n) → embryo
- Triple fusion: 1 male gamete + 2 polar nuclei → PEN (3n) → endosperm
- Male gametes released into a synergid, not directly into the egg

Seed, Fruit & Apomixis

Seed = fertilised ovule · Fruit = ripened ovary · Endosperm forms first (from PEN)

Albuminous (wheat, maize, castor) retain endosperm; non-albuminous (pea, bean) consume it.

- Integuments → testa + tegmen; perisperm = persistent nucellus (black pepper, beet)
- True fruit (ovary only) vs false fruit (thalamus, e.g. apple); parthenocarpy = seedless (banana)
- Apomixis = seed without meiosis/fertilisation → clones; polyembryony = many embryos (Citrus)

Quick revision

- Flower: 4 whorls - calyx, corolla, androecium (male), gynoecium (female)
- Microsporogenesis: MMC (2n) → meiosis → 4 microspores (n) → pollen
- Pollen: exine (sporopollenin) + intine (cellulose); 2 or 3 cells
- Megasporogenesis: MMC → 4 megaspores → 1 functional → 7-celled, 8-nucleate embryo sac
- Embryo sac: 3 (egg+2 synergids) + 1 (central cell, 2 polar nuclei) + 3 (antipodals)
- Double fertilisation: sperm + egg → zygote (2n); sperm + polar nuclei → PEN (3n)
- Ovule → seed; Ovary → fruit
- Endospermic seeds: wheat, maize; Non-endospermic: pea, bean
- Apomixis: seeds without fertilisation; Parthenocarpy: seedless fruits
- Sporopollenin: most resistant biological material

Full chapter notes with solved examples and practice questions: https://chapternotes.in/cbse/class-12-biology/sexual-reproduction-in-flowering-plants-class-12-notes/