

## SEXUAL REPRODUCTION IN FLOWERING PLANTS

Reproduction is the means of perpetuation off race as the older individuals undergo senescence and die. flowering plants shows sexual mode of reproduction and bears complex reproductive units as male and female reproductive units along with accessory structures.

### Pre-fertilization Structure and Rivas

■ SeYera structure and hormonal changes lead to formation and development of the floral primordium. Inflorescence is formed that bears floral buds and then flower.

- In flowers, male and female gametophytes differentiate and develop in which male and female gametes are produced.

\* Stamen consists of long and slender stalk called filament and generally has lobed anthers. Each lobe contains two theca (dithecous).

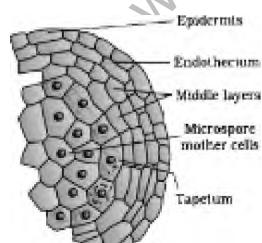
■ The anther is four-sided structure consisting of four microsporangia, two in each lobe.

- Microsporangia develop further and become pollen sacs which contain pollen grains.
- Microsporangium is generally surrounded by four layers of walls - the epicarp, mesocarp, endocarp, and innermost layer - tapetum. Innermost layer - tapetum nourishes the developing pollen grains.

■ Sporogenous tissues are present in the middle of microsporangia.

Microsporogenesis - is the process of formation of microspores from a pollen mother cell through meiotic division.

- The cells of sporogenous tissue undergo meiotic division to form microspore tetrad. As the anther matures and dehydrates, the microspores dissociate and develop into pollen grains.



a The pollen grain represents the male gametophyte. Each pollen grain has two layered wall, the outer one made up of sporopollenin and inner wall is called intine made up of cellulose and wax.

a Pollen grain exine has prominent aperture called germ pores. Pollen grain contains 2 cells - the vegetative cell and generative cell.

- In most of the angiosperms, pollen grains are shed in 2-celled stage.

The Pistil, filigree branch or style and Embryo sac

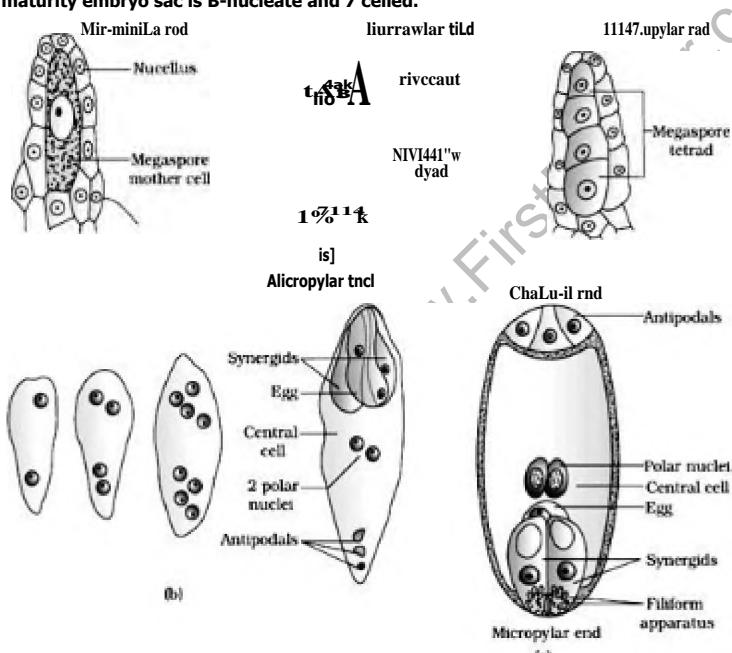
- Gynoecium may consist of single pistil (monocarpellary) or more than one pistil (polycarpellary) which may be fused (syncarpous) or free (apocarpous).
- Each pistil has three parts - stigma, style and ovary. Inside the ovary is the ovarian cavity (lumen). The placenta is located inside the ovarian cavity. Ovules arise from the placenta.

The Megasporangium (ovule) is a small structure attached to the placenta by a stalk called Funicle.

Megasporogenesis - is the process of formation of megasporangium from the megasporangium mother cell.

- Ovule differentiates a single megasporangium (Megasporangium) in the nucellar region of the nucellus. MC undergoes meiotic division that results into the production of four megasporangia.

- In most of the flowering plants three megasporangia degenerate\_ 1 megasporangium develops into female gametophyte.
- The nucleus of functional megasporangium divides mitotically to form two nuclei which move to opposite poles to form 2-nucleate embryo sac. Two more sequential mitotic divisions result in an 8-nucleate embryo sac.
- a Six of the eight nuclei surrounded by cell wall and remaining two nuclei (polar nuclei) are situated below the egg apparatus.
- ↪ Three cells are grouped at micropylar end to constitute egg apparatus and three cells at chalazal end form antipodal cells\_ At maturity embryo sac is 8-nucleate and 7-celled.



Pollination - Is transfer of pollen grains from anther to stigma..

a) Autogamy - transfer of pollen grain from anther to stigma of same flower. Types are as follows!

i. Chasmogamy - flower which do not open.

ii. Chasmogamy - exposed anther and stigma\_

b) Geitonogamy - transfer of pollen grains from anther to stigma of different flower of same plant.

c) Xeroogamy - transfer of pollen grain from anther to stigma of different plant's flower of same species\_

Agents of pollination includes a biotic (water.. wind) and biotic (insects, butterfly, honey bee etc).

MAI: Mechanisms that discourage self-pollination and encourage cross pollination a5

COW: Inhibited self-pollination leads to inbreeding depression. It includes

• Pollen release and stigma receptivity not synchronized.

■ Anther and stigma are placed at different positions.

- inhibiting pollen germination in pistil

■ Production of unisexual flowers.

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**Pollen pistil inkerattion— the pistil has ability to recognize the compatible pollen to initiate post pollination events that leads to fertilization. Pollen grain produce pollen tube through germ pores to facilitate transfer of male gametes to embryo sac.**

**Double Fertilization- after entering the egg vmergicis., each pollen grain releases two male gametes, One male gametes fuse with egg (synonym) and other male gametes Fuse with two polar nuclei (triple fusion) to produce triploid primary endosperm nucleus (PEN)**

Since two types of fusion takes place in an embryo sac the phenomenon is called double fertilization. The PEN develops into the endosperm and zygote develops into embryo.

**Post fertilization event& include endotberm and embryo development, maturation of ovule into seeds and ovary into fruits.**

**Endosperm - the primary endosperm cell divides many time to forms triploid endosperm tissue having reserve food materials- In coconut.. weler .15. flet nuclear endosperm and white kemel is the cellular endosperm,**

a The wall of ovary develops into wall of fruit called pericarp.. In true fruits only ovary contributes in fruit formation by in false fruit thalamus also contributes in fruit formation—

- Apomlocis – formation of seeds without fertilization.,

■ Polyembryony- occurrence of more than one embryo in a seed.