Sexual Reproduction

Sexual Reproduction in plants

Any process of reproduction in which both parents and sex cells are involved in sexual reproduction.

It has following characteristics:

- Both parents (male and female) are involved.
- Sex cells (gametes) are involved in this process of reproduction.
- The reproduction is comparatively slower than asexual reproduction.

Sexual Reproduction in Flowering Plant

The plants that bear flowers during their life cycle are called **flowering plants**.

1. Flower the reproductive part of plant

- A typical flower has four whorls. Such a flower is said to be a complete flower.
- A Flower without any one or more than 4 whorls is called an incomplete flower.
- These whorls are arranged one above the other.
- A Flower having both male and female parts is called bisexual orhermaphrodite., e.g., petunia, mustard, rose, etc.
- Unisexual flower is the one that has one part either male or female, e.g., corn, cucumber, papaya, etc. It may be present on the same plant or on different plants.

Sexual Reproduction

2. Parts of a complete flower. Different parts of a flower are:

(a) Calyx: It forms the outermost whorl of the flower.

- Each member of this whorl is called **sepal**. It is usually green.

(b) Corolla: It is the second whorl of the flower.

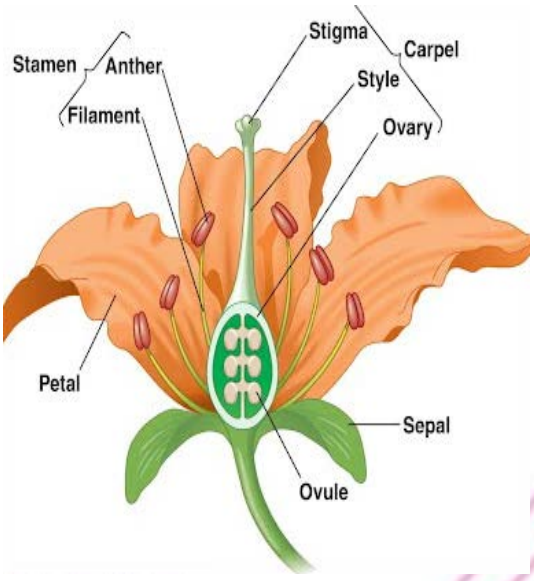
- Each member of this whorl is called **petal**.
- They attract man, insects, birds, etc. and protect inner parts.

(c) Androecium: It is the male reproductive whorl of flowers next to the corolla.

- Each member is called **stamen**. Stamen has two parts: **filament** and **anthe**r.
- Anthers produce pollen grains and male gametes are found inside the pollen grains.

(d) Gynoecium: It is the female reproductive part of a flower. It is also called **pistil or carpel.**

- It is composed of one or more carpels.



Sexual Reproduction

Each pistol has three parts:

Stigma: it is a terminal knob- like part. It may be lobed and leathery or hairy or glandular. It is sticky and forms platform for landing of pollen grains.

Style: it is a long tubular stalk connecting stigma and ovary.

Ovary: it is the swollen basal part of the carpel.

- Female gametes are made in ovaries
- Female gametes are found in ovules.

Mechanism of Sexual Reproduction in Plants

Pollination: Pollination involves transfer of pollen grains from anther of the stamen to stigma of the pistil.

Fertilization: During fertilization the male and female gametes unite to form a zygote.

Formation of seed: Here the zygote develops into a seed.

Formation of fruit: Ovary matures into fruit.

Germination of seed: In the presence of moisture, the seed swells up and the shell bursts open. Its radicle goes into the soil to form the root. The plumule cross upwards and forms a shoot of the plant.

Sexual Reproduction

Let's discuss these steps in detail:

Pollination

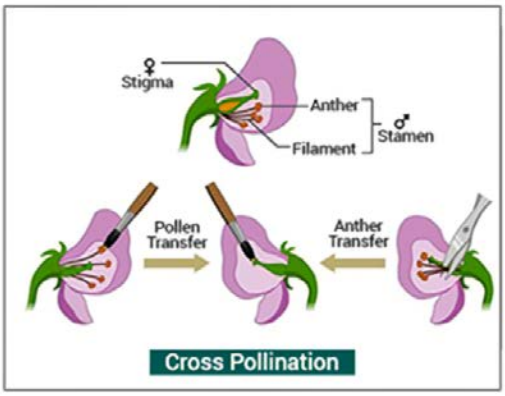
The transfer of pollen grains from the anther of the stem and to the stigma of the pistil by air, water, insects, etc. is called **pollination.**

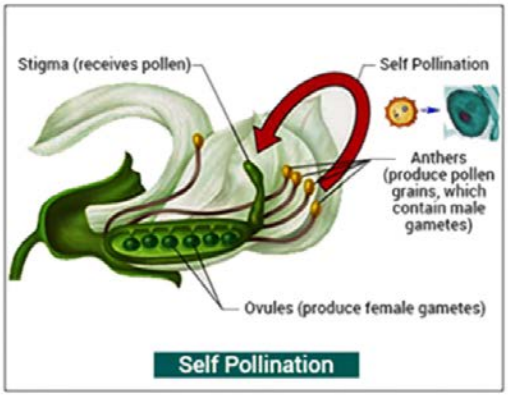
In nature pollination takes place in two ways.

Self-pollination: Pollination which takes place within the same flower or between two flowers of the same plant is called self-pollination.

Cross-pollination: Pollination which takes place between two flowers present on two different plants of the same species is called cross- pollination.

The male gametes are safely packed inside the pollen grains. That tough, protective coat on the pollen grains prevents the gametes from drying.





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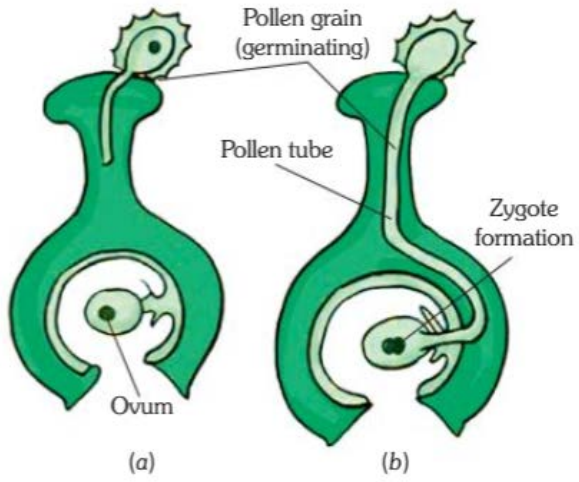
Fertilisation:

- During pollination, pollen grains are carried from the anther of a flower to the stigma of the same or some other flower of the same kind.
- After pollination, pollen grain forms a tube called **pollen tube**.
- The pollen tube grows through the style and reaches one of the ovule in the ovary. The pollen tube enters the ovule through a small opening called **microphyle**.
- Pollen tube contains two main gametes. One of the male gametes passes through the pollen tube and reaches the egg in the ovule. Here, it fuses with the egg and zygote is formed. This fusion is called **fertilisation**. Other male gamete fuses with two polar nuclei to form endosperm. Since this process involves the fusion of three gametes, it is called **triple fusion**. In this way **double- fertilisation** occurs in plants.



Fertilisation in a plant

Sexual Reproduction

Fruit and Seed Formation

In general, plants reproduce either asexually i.e. without seed formation or sexually i.e. with seed formation. The parts of plants involved in asexual reproduction are called vegetative parts (e.g. leaves, roots, stem) and parts of plants involved in sexual reproduction are called reproductive parts (e.g. a flower).

Formation of seed

After the fertilisation, the petals, stamen, style and stigma of the flower fall off.

- The sepaldries up and holds on to the ovule. Only the ovary remains. It contains the fertilised ovule.
- Each fertilised ovule contains a **zygote.** The zygote then begins to divide and forms an embryo.
- Embryo contains one or two cotyledons, which store food for future. The fertilised and developed ovule containing embryo is called a **seed.**

Formation of fruit

- With time the seed hardens and dries.
- The ovary wall may harden and become a pod as in poppy, or it may become fleshy and succulent as in plums or tomatoes. The whole ovary after fertilisation grows to form the fruit.

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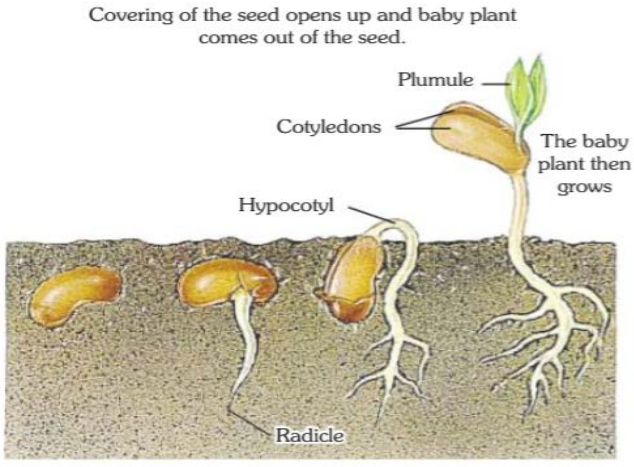
Germination of seeds

- A seed has a hard covering. When a seed is placed in moist soil, it's covering becomes soft.
- The food inside swells up and the shell bursts open. In the presence of water, the enzymes present in the seed, digest the stored food and make it soluble.
- This soluble food helps radical and plumule to grow. The radical grows first and moves into the soil to form the stem.
- The plumule moves upwards and comes out of the soil to form the stem. The plumule now utilises the sunlight to start photosynthesis.
- At this stage the plant starts making its own food.



Germination of a seed