# POLLINATION

- Transfer of pollen from anthers to stigma is called pollination
- In flowering plant it occurs prior to fertilization.
- In angiosperms pollen fall on the stigma as the ovules are place inside the ovary hence is called **indirect pollination**
- In gymnosperms ovules are naked so pollen falls directly on them and hence called **direct pollination**
- **Pollination in angiosperms is o0f two types**
- **Self pollination: transfer os pollen grains from anther to stigma of same flower is called self pollination or autogamy** eg. Found in bisexual flowers Clistogamous and chasmogamous flowers.
- (flowers do not open are called cleistogamous flowers & flowers which open are called chasmogamous flowers)
- **Cross pollination**: transfer of pollengrains from the anthers of one flower to the stigma of another flower of the same species is called cross pollination or allogamy.
- It occurs in chasmogamous flowrers. May also found in some cleistogamous flowers in which stigma and anther protrude out of the flower

**Cross pollination is of two types**

i. **Geitonogamy** : cross pollination between two flowers present on the same plant is called Geitonogamy
ii. **Xenogamy:** pollen grains of one plant reach the stigma of another flower of the same species is called xenogamy

Cross pollination is advantageous to plants and hence in many angiosperm though the flowers bisexual self pollination is prevented.

**Contrivances for cross pollination:**

1. Dicliny or unisexuality; development of unisexual flowers. Croos pollination is only possible in these plants eg. vallisnaria
2. Dichogamy: male and female flowers of a bisexual plant are matured at different time points thus preventing self pollination. It is of two types
    a. Protandry: male flowers (androecium)mature early than( Gynoecium)female flowers eg; Helianthus, gossypium
    b. Protogyny: Gynoecium mature earlier than androecium eg; Solanum and scrophularia
3. Herkogamy: arrangement of male and female flowers at different heights to prevent self pollination is called Herkogamy. Eg: stigma projects beyond the stamens in Hibiscus, in some flowers stigma bend in opposite direction to stamens as in Gloriosa superb
4. Heterostyly: presence of styles in different lengths in the flowers of the same species is called Heterostyly. There are two types

a. Diheterostyly: arrangement of styles in two different heights in dimorphic flowers of the same species is called dihetrostyly Eg: Primula, Pldenlandia.
b. Triheterostyly: styles and stamens are arranged in three different heights called triheterostyly eg: Lythrum and Oxalis

5. Self sterility: inability of self pollen to germinate on the stigma is called self sterility eg. Abutilon & Passiflora. In some case the self pollen becomes poisonous and make the flower wither on self pollination. Eg: orchids
6. Pollen prepotency: germination of cross pollen earlier than self pollen and taking part in fertilization is called pollen pre potency Eg. Dolichos
7. Sensitive Stigma: stigma and stigmatic lobes are closed when the anthers of the same flowers are dehisced due to their sensitivity to touch. But the receptive surface of stigma opens up later on to allow cross pollination eg. Martynia, Mimulus.

**Self pollination:**

It occurs most of the time because cross pollination does not occur all the time.
In Yucca plant cross pollination occurs only by a moth called Pronuba Yuccasella, if the moth is absent cross pollination does not occur so plant takes self pollination.
Though the croos pollination beneficial it does not occur all the time so plants depend on self pollination

**Contrivances for self pollination:**

1. Homogamy: to ensure pollination plants produce bisexual flowers. Stamens and ovary of the flowers mature at same time to allow self pollination eg; Caltha
2. Saftey mechanism: generally cross pollinating flowers under go self pollination when cross pollination fails to occur. It is called safety mechanism Eg: Helianthus
3. Cleistogamy: pollen released in cleistogamous flowes spreads only with in the un opened flowers favoring self pollination Eg: Commelina bengalensis, streptocarpus princeps

Agents for cross pollination:

Pollen grains are not capable of reaching the stigma spontaneously they take the help of some external agents to get pollinated.

Cross pollination requires an abiotic and biotic agents for pollination

Abiotic agents: Wind and water

Pollination that occurs through wind is called **anemophily** Eg; oryza sativa

Pollination that occurs through water is called **Hydrophily .** it is of two types

i. Epihydrophily: pollination that occurs on the water surface Eg. Vallisnaria
ii. Hypohydrophily: pollination that occurs beneath the water surface eg: Zostera

Biotic agents are animals

Zoophily: cross pollination favoured by the animals is called Zoophily

Depednding upon the type of animal it is of following types

i. Ornithophily: cross pollination by birds Eg. Bigonia
ii. Chiropterophily: cross pollination by bats eg: Kiglia pinnata (sausage tree)
iii. Entamophily; cross pollination by insects . this is the most common type of zoophily Eg: cestrum nocturnum
iv. Malacophily: the cross pollination that is favourted by slugs is called malacophily Eg: Aroids