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Mode of Pollination

Pollination refers to the transfer of pollen grain from anthers to stigmas. Pollen from an anther may fall on the stigma of the same flower leading to self pollination or auto gamy. Sometimes pollen from an anther may fall on the stigma of another flower of different plants leading to cross pollination or allogamy. Some times pollen from an anther fall on the stigma of the anther flower of same plant leading to the geitonogamy.

Self Pollination: It is transfer of pollens from and to the stigma within the same flower, is always found in bisexual flower. In most of these species self-pollination is not complete and cross-pollination may occur up to 5%.

There are various mechanism / contrivances that promote / facilitate self- pollination.

i) Bisexuality: Male and female sexual organs present in the same flower e.g Wheat, rice, groundnut, etc.

ii) Homogamy: Male and female sexual organs mature at the same time e.g wheat, groundnut, etc.

iii) Cleistogamy: In this condition flowers does not open at all and ensure complete self pollination e.g Oat, Barley, Wheat, Grasses, etc.

iv) Chasmogamy: In some species, flower open but only after pollination has taken place. E.g Barley, Wheat, Oat, and many cereals.

v) In crop like Tomato and Brinjal stigma are closely surrounded by anthers , hence pollination occurs after opening of flower but the position of anther in relation to stigma ensure self – pollination.

vi) In crop like pea, bean, soybean, the flower open but stigma and anther are hidden by floral organ and ensures self pollination.

vii) In few species stigmas become receptive and elongate through staminal column, ensures self pollination.

Genetic Consequences of Self Pollination:

i) It leads to a very rapid increase in homozygosity; therefore self pollinated species highly homozygous in nature.

ii) Self pollinated species do not show inbreeding depression, exhibit considerable heterosis.

Cross Pollination: The transfer of pollen from a flower to the stigma of the other flower of different flower plant. In cross pollinated species pollination may be brought about by wind, water insect or animals. Wind (anemophily), water (hydrophily) , insect (entomophily) and animal (Zoophily). In most of the cross pollinated sp. Viz. Bajara, maize, sunflower, alfalfa, castor, cross pollination is not complete and self pollination may occurs 5-10%.

There are several mechanism contrivances that facilitate cross pollination.

i) Dicliny (Unisexuality): It is a condition in which flower is either staminate or pistilate.

a) Monoecy: Staminate and pistilate flowers occur in the same plant either in the same inflorescence. E.g Mango, banana, coconut or in the separate inflorescence. E.g Maize, Cucurbit, Strawberry, etc.

b) Dioecy: The male and female flowers are present on different plants i.e. the in such species are male or female i.e. sex is governed by a single gene. E.g. Papaya, hemp, date, palm, etc.

ii) Dichogamy: Anther and stigma of hermaphrodite flower mature at different time, facilitating cross pollination.

a) Protogyny: Gynoecium matures earlier than the androecium E.g. Bajara.

b) Protandry: Androecium matures earlier than gynoecium. E.g. marigold, maize, cotton, etc.

iii) Heterostyly: Different length of style and filaments E.g Linseed.

iv) Herkogamy: Presence of physical barrier or mechanical obstacles between the anther and stigma ensures cross pollination. E.g. Rui (*Calotropis gigantea*).

v) In lucerne or alfalfa stigma are covered by waxy film and it does not become receptive unless this waxy film is broken by honeybees.

vi) A combination of two or more of the above mechanism may occurs in some species, E.g Maize, - Monoecy and Protandry.

vii) Self –Incompatibility: It refers to the failure of pollen from a flower to fertilize the same flower or other flowers on the some plants. It may be saprophytic or gametophilic e,g mustard , tobacco, sunflowers, reddish.

Viii) Male Sterility: It refers to the absence of functional pollen grains in hermaphrodite flower.

Genetic Consequences of Cross Pollination:

1) It preserves and promotes heterozygosity in population.

2) Cross pollinated species shows inbreeding depression and considerable heterosis.

3) Usually hybrid and synthetic without reducing heterozygosity. Often Cross Pollination: In this type plants are self pollinated, however the extent of cross pollination often exceed 5 to 50 % such species are generally known as often cross pollinated species. E.g. Jawar, Cotton, Safflower, Arhar, etc. The genetic architecture of such crop is intermediate between self and cross pollinated crops and breeding methods suitable for both of them may be profitably applied.