

C) Fertilisation:- Fusion of one of the two sperms with the egg cell, to produce a diploid zygote, is known as fertilisation and the fusion of the remaining sperm with the secondary nucleus leading to the formation of primary endosperm nucleus known as double fertilisation or triple fusion.

➤ The zygote divides mitotically to produce diploid embryo. The primary endosperm nucleus produces endosperm by mitotic division; it may be absorbed completely in legumes or may form endospermous seed in cereals.

Modes of Pollination:

Pollination: - Pollination refers to the transfer of pollen grains from anthers to stigmas.

Types of Pollination: - I) Self pollination and II) Cross pollination.

Self Pollination:- It is the transfer pollen grain from the anther of a flower to the stigma of either the same or genetically similar flower. Its of two types – autogamy and geitonogamy.

- a) **Autogamy** :- It is a type of pollination in which an intersexual or perfect flower is pollinated by its own pollen. It occurs by two method – homogamy and cleistogamy.
- **Homogamy** - The anthers and stigma of chasmogamous or open flower are brought together by growth, bending or folding.
- **Cleistogamy** - In this case, flowers do not open at all. This ensures complete self- pollination since foreign pollen cannot reach the stigma of a closed flower. Cleistogamy example - wheat, oats, barley and in a number of other grasses.
- b) **Geitonogamy**:- It is a type of pollination in which pollen grains of one flower are transferred to stigmas of another flower belonging to either the same plant or genetically similar plants.

Cross Pollination: - It is the transfer pollen grain from the anther of one flower to the stigma of genetically different flower. It is performed with the help of an external agency.

- c) **Dicliny**:- Dicliny or unisexuality is a condition in which the flowers are either staminate (male) or pistillate (female).
- **Monoecy**:- Staminate and pistillate flowers occur in the same plant, either in the same inflorescence, e.g., Castor, mango and coconut, or in separate inflorescences, chestnut, strawberries, rubber, grapes and cassava.

- **Dioecy:-** The male and female flowers are present on different plants, i.e., the plants in such species are either male or female, e.g., papaya, date, hemp, asparagus, and spinach. In general, the sex is governed by a single gene, e.g., asparagus and papaya. In some cases, there are hermaphrodite plants in addition to males and females, and a number of intermediate forms may also occur.
- d) Stamens and pistils of hermaphrodite flowers may mature at different times facilitating cross-pollination.
 - **Protogyny:-** In crop species like bajra, pistils mature before stamens.
 - **Protandry:-** In crops like Maize and sugar beets, stamens mature before pistils.
- e) In Lucerne or alfalfa, stigmas are covered with a waxy film. The stigma does not become receptive until this waxy film is broken. The waxy membrane is broken by the visit of honey bees which also effect cross-pollination.
- f) A combination of two or more of the above mechanisms may occur in some specie. This improves the efficiency of the system in promoting cross-pollination. For example, Maize exhibits both monoecy and protandry.
- g) **Herkogamy-** in some bisexual flowers the structure of male and female sex organs itself prove a barrier to self pollination.
- h) **Self incompatibility** – pollen grain of a flower do not germinate on there stigma of the same flower due to presence of similar self sterile gene.
- i) **Male sterility-** Male sterility refers to the absence of functional pollen grains in otherwise hermaphrodite flowers.

Often Cross Pollination: - In many crop plants, cross -pollination often

exceeds 5 per cent and may reach 30 per cent. Such species are generally known as often cross-pollinated species, e.g., Jowar, Cotton, Arhar, Safflower etc.

- The genetic architecture of such crops is intermediate between self-pollinated and cross- pollinated species.

Consequently, in such species breeding methods suitable for both of them may be profitably applied. But often hybrid varieties are superior to others.