

Aparna FS
UG scholar
S.Thangapazham Agricultural College
Vasudevanallur
Tenkasi
Tamil Nadu
India - 627 760

Corresponding Author

Aparna FS
aparnafs3@gmail.com

Mechanism Promoting Pollination

There is a universal fact that every individual plant species in this world will multiple into several new species or copies either through sexual or asexual reproduction. For this sexual reproduction to be taking place, pollination has a pivotal role in each & every flowering plants. The male gametophytes are present in the pollen grains & are produced in the anthers & the female gametophytes are present in the stigma on which the male gametophyte the pollen grains are attached & thus pollination takes places in flowering plants. Homozygosity of crop species can be increased by autogamy. Autogamy leads to heterosis but do not show inbreeding depression. Allogamy shows considerable amount of heterosis & show mild to severe inbreeding depression. They are highly heterozygous. Considering the tremendously increasing population, the world can't be survived if there is no pollination in the flowering plants. This makes us to realize," how much precious is the pollination is".

INTRODUCTION

Usually, many cultivated species are reproduced by Self-Pollination. It is believed that self-pollinated species are originated from cross-pollinated species in response to the environmental conditions. Plants that show self-pollination are usually annuals or in many cases are short lived. Because as these species have hermaphrodite flowers. Sometimes, due the environmental factors like humidity, temperature or may be due to the plant variety or also may be due to the location, the self-pollination doesn't takes place & there is a chance for the cross pollination to occur at the rate of 5%.

Hmm.. That may be the best version for plants right?

**So, where wise actions are the fruit of life, wise discourse is –
pollination**

Most of the time we fail to realize, "How precious is the word Pollination is". Is it?

MODE OF POLLINATION

Usually, it occurs in two categories. They are as follows (Figure 1),

1. Self-Pollinating crops
2. Cross-Pollinating crops

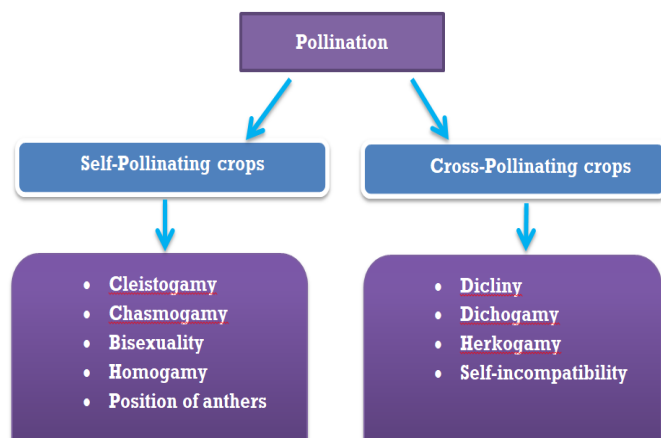


Figure 1. Mode of Pollination

SELF-POLLINATING CROPS

• CLEISTOGAMY

When pollination & reproduction occurs in unopened flowers it is known as Cleistogamy.

Eg. Several grass species

• CHASMOGAMY

When fertilization occurs in opened flowers it is known as Chasmogamy.

Eg. Rice and Oats.

• BISEXUALITY

Usually, all the living organisms including flowering plants have male & female reproductive organs, this is universally fact. But in some cases, when the male & female organs are present in the same flower the condition known as bisexuality occurs.

Eg. All Self-pollinated plants.

• HOMOGAMY

As already mentioned, for pollination to take place both male as well as female reproductive organs should be present either in the same flower or in the different flower. Self-pollination will be carried out only if the maturation of both the reproductive organs occurs at the same time & this is designated as Homogamy.

• POSITION OF ANTHERS

Anthers are the essential organs of all the flowering plants because they help in producing the pollen grains. Hence, the positions of anthers are important too.

It occurs in two modulations. They are:

- In tomato, the stigmas are usually enclosed by the anthers & this favours the self-pollination.
- In legumes, both the stigmas & stamens are enclosed by the petals.

Here, as the stigmas & anthers are located nearby, the self-pollination can be favoured easily.

CROSS-POLLINATING CROPS

• DICLINY

It is one kind of reproductive whorl in flower. It may be one of the following types (Figure 2).

1. Monoecy.
2. dioecy.

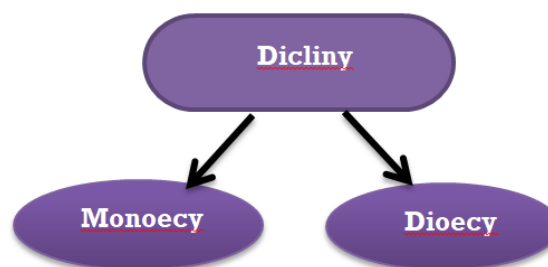


Figure 2. Types of dicliny

1. MONOECY

In Monoecy, the male & female inflorescence present in the same plants either in same inflorescence or in separate inflorescence.

Eg. Mango and Maize respectively.

2. DIOECY

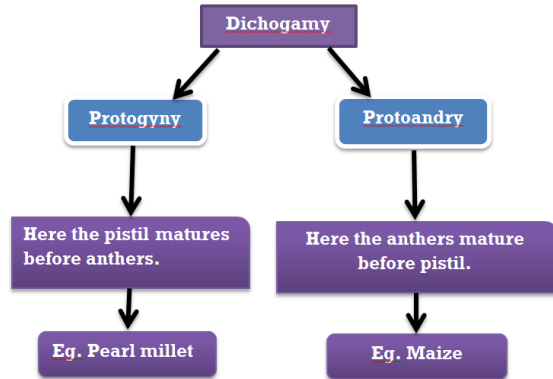
When the staminate & pistillate flowers are located far apart that is when they are present on the different plants, this signifies the condition dioecy.

Eg. Papaya.

• DICHOGAMY

When the maturation of the female & male reproductive organs occurs at the diverse time, the condition known as dichogamy is pointed out. There is an interesting fact in dichogamy is that

even in the hermaphrodite species it promotes cross pollination.



• HERKOGAMY

There is an interesting fact in herkogamy is that a **hyaline membrane** is present around the anther. Such membrane doesn't allow the dehiscence of pollen. Eg. Alfalfa.

• SELF-INCOMPATIBILITY

Usually, pollination takes place when the pollen grains fall on the stigma but here even the fertile pollen can't fertilize the flower due to its incompatibility. This impotence of the fertile pollen grains is designated as self-incompatibility.

“But why this fertile pollen grains can't fertilize the flowers...?”

Because of the two main facts that are as follows:

- Due to the failure of the pollen grains to germinate on the stigma of the flower.
- Due to the poor growth of the pollen tubes to effect fertilization before the flower drops.

• MALE STERILITY

The sterile state of the male reproductive organ in flowering plants signifies the male sterility. And there is an astonishing fact in male sterility that, it is a useful tool in hybrid seed production, ornamental species or in those species where vegetative part is of great economic value.

ADVANTAGES OF AUTOGAMY

- There is no wastage of pollen grains.
- The purity of race is maintained as there is no diversity in the genes.
- They show homozygosity, means they are true breeding.
- They do not have deleterious genes.

- They are tolerant to inbreeding.
- Even smaller quantities of pollen grains can result in gaining of higher rate of pollination.

ADVANTAGES OF ALLOGAMY

- The seeds so produced are good in vigour & vitality.
- They show heterozygosity.
- Desirable new genes can be introduced due to the fertilization between genetically different gametes so that desirable new varieties can be produced.
- Results in higher crop yield.
- Undesirable characters of the plants can be eliminated.

CONCLUSION

Thus, the mode of Pollination has a efficacious impact on gene action, genetic constitution, adaptability, genetic purity & transfer of genes. Gene action refers to the mode of expression of genes for various characters in a population. Thus, mode of pollination determines the type of gene action in a population. By this way the profitable breeding procedure for the genetic improvement of crop plants can be decided .In genetic constitution, inbreeders have advantage of homozygosity & out breeders have advantage of heterozygosity. For maintaining the purity in parental lines, self-pollination is essential even in cross pollinated species. For combining desirable genes from different sources into a single genotype is be possible only through cross pollination.

“If there is no pollination, then there is no more plants, no more animals & no more man left to live”.

REFERENCES

Phundan Singh.(2014). *Modes of Reproduction:Essentials of Plant Breeding*,62-70.New Delhi,Kalyani Publishers.

Singh,B.D.(2015). *Modes of Reproduction in Crop plants:Plant Breeding Principles & Methods*,52-63.New Delhi,Kalyani Publishers.

Simpson Michael,G.(2019). *Plant Reproductive Biology:From Plant Reproductive Biology(Third Edition)*.