

POLLINATION

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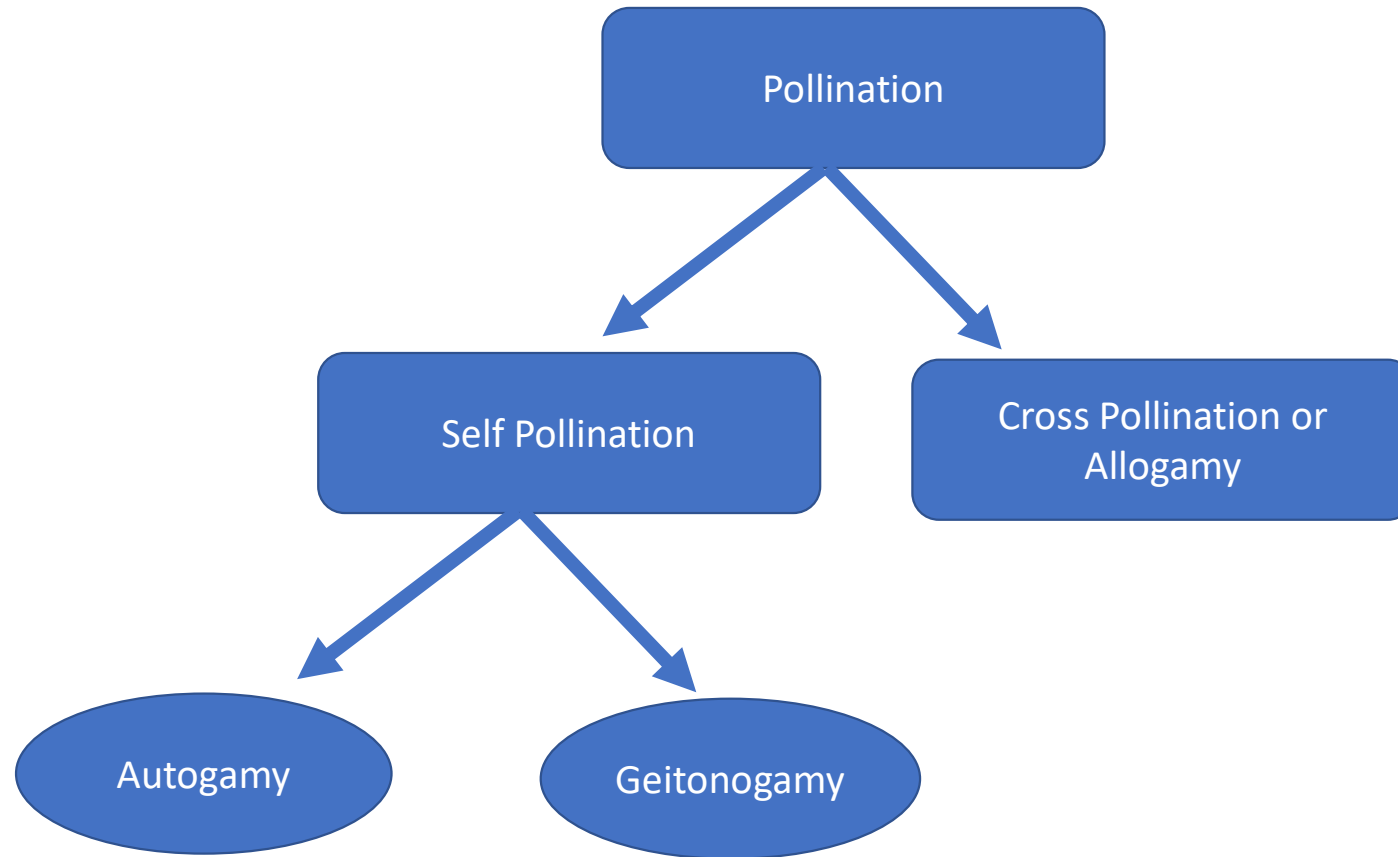
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Pollination

- Transfer of pollen from anther to the receptive stigma of a flower.
- Anther dehiscence is the 1st requisite for pollination.
- The opening of anther sacs to release the pollen grains is called anther dehiscence.
- Anther dehiscence involves three types of specialized cells namely stomium, septum and endothecium.

Type of pollination or Pollen Transfer



Self Pollination

- Transfer of pollen grains from an anther to the stigma of the same flower or to a flower on the same plant .
- Self pollination is occur in bisexual flowers as well as in unisexual flower which occur on the same plants (Monoecious condition)

Types of Self Pollination

- **Autogamy**

- Pollination of a flower by its own pollen.
- Possible only in bisexual flowers.

- **Geitonogamy**

- Occurs between two different flowers present on the same plant.

- In autogamy and geitonogamy all the flowers have same genetic constitution.

Adaptations for Self Pollination

- **Bisexual or Hermaphrodite flower:** Male and female floral organs are present in the same flower.
- **Homogamy:** Anthers and stigma of a flower mature at the same time. Example- *Mirabilis jalapa*, *Argemone Mexicana*, *Grewia asiatica*, *Catharanthus*. In *Mirabilis*, when the stamens mature the filaments recoil and bring the anthers near to the stigma so that when they burst self-pollination is achieved.
- **Cleistogamy:** In these cases the flower never open as opposed to most flowers which show chasmogamy (Flower open normally during anthesis)
 - Pollen are shed within the closed flower so that self-pollination is obligatory.
 - Plants bearing normal as well as cleistogamous flowers are called chasmocleistogamous.
 - Underground flowers of *Commelina benghalensis* (Small and inconspicuous) are cleistogamous. However, it also bear chasmogamous blue flowers above.
 - Other examples are *Impatiens balsamina*, *Viola tricolor*, *Oxalis*, *Portulaca*, *Ajuga*, *Juncus*, *Saxifraga*, *Scrophularia*, *Drosera*, *Sibularia* etc.

CROSS POLLINATION

- Transfer of pollen grains from the anther of the flower on the one plant to the stigma of the flower on another plant is called cross pollination or allogamy.**
- Occur in both dioecious and monoecious species.**
- Dioecious species are necessarily cross pollinated.**
- Cross pollination has advantage of genetic recombination.**
- Nature also favours cross-pollination.**

Adaptations for Cross Pollination

Dicliny

- Cross-pollination is the rule among diclinous plants, i.e. those bearing unisexual flowers. In monoecious plants the only alternative is geitonogamy.

Self- sterility or Self-incompatibility

- Pollen of a flower do not grow or grow very slowly if they fall on the stigma of the same flower so as to prevent self-fertilization.
- Many species of *Solanum* (Potato, Tobacco) and the tea plant are self-sterile because of genetic reasons.

Dichogamy

- Stigma become receptive before or after the pollens of the same flower are mature.
- Dichogamy may be of two types:
- Protandry: Anther mature before the stigma receptive . Example- *Saxifraga*, *Impatiens*, *Epilobium*, *Salvia* and members of Umbelliferae and Malvaceae
- Protogyny: Stigma mature first and losses its receptivity by the time the anthers shed their pollens. Examples- Members of Anonaceae (e.g. *Anona*, *Polyalthia*) and Magnoliaceae (*Magnolia*, *Machelia*), Aristolochia, Scrophularia, and *Arum maculatum*
- In nature protandry flowers are much more common then protgynous flowers

Herkogamy

- In bisexual flowers, the structure of anthers and styles is such that autogamy is mechanically impossible.
- In Caryophyllaceae and Cruciferae, the style is much longer than the stamens due to this the pollens of the flower fail to reach the stigma.
- In orchidaceae and Asclepiadaceae, the pollens of an anther sac are united into single compact pollinium. These large and heavy polinia can only be transported from one place to another by ants, beetles etc.
- The extrorse anthers of *Gloriosa* dehisce the anthers out of reach of its own stigmas

Heteromorphism

- Flower having two (Dimorphic) or three (Trimorphic) different forms with anther and stigma.
- This dimorphism or trimorphism usually involves **heterostyly** (Style of different lengths) and heteroanthy (different types of anthers)
- Long styled flowers: Possess a long style (2 to 3 time long) . Small stamen with smaller and oblong pollen grains
- Short styled flowers : Which bears stigma of about half the height of corolla tube thus standing well below the anther
- Different types of insects moving about these flowers will naturally touch floral organs at the same level because of the difference in the length of their organs, so that the short style will be cross pollinated by pollens from low anthers and vice versa.
- Examples: Primulaceae, Oxildaceae, Polygonaceae, Plumbaginaceae, Gentianaceae, Boraginaceae, Rubiaceae etc.

References

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Thank You