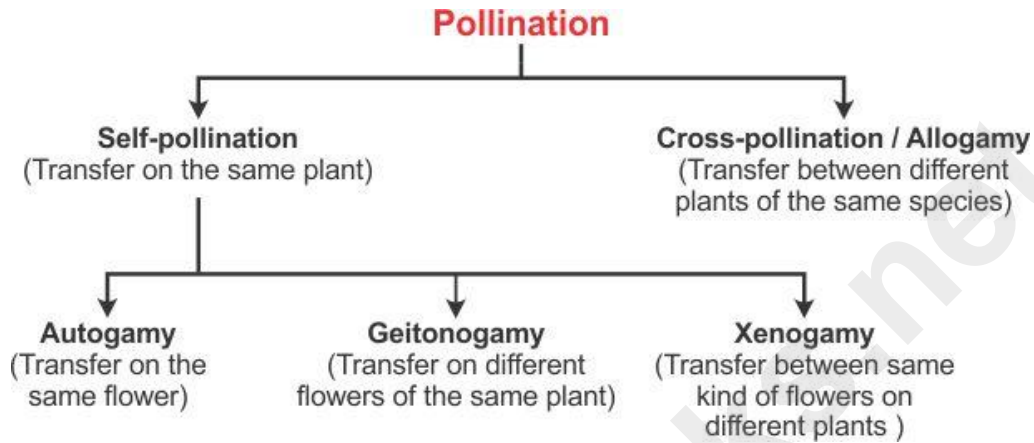


# Pollination and Fertilisation

- **Pollination** is the process of transfer of pollen grains from the anther of a stamen to the stigma of a carpel of a flower.



- The transfer of pollen grains from the anther of a flower to the stigma of the same flower or another flower on the same plant is called **self-pollination**. Examples: Wheat, tobacco, pea etc.
- **Conditions favouring Self-Pollination**
  - a. Bisexuality, monoecious
  - b. Homogamy
  - c. Cleistogamy
- The transfer of pollen grains from the anther of a flower on one plant to the stigma of a flower on another plant of the same species is called **cross-pollination**. Examples: *Hibiscus*, china rose, brinjal etc.
- **Conditions favouring Cross-Pollination**
  - a. Unisexuality
  - b. Self-sterility
  - c. Self-poisoning
  - d. Heterostyly
  - e. Herkogamy
  - f. Dichogamy
  - g. Protandry
  - h. Protogyny

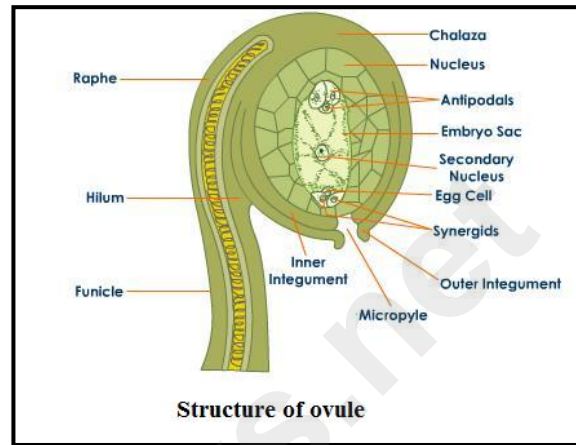
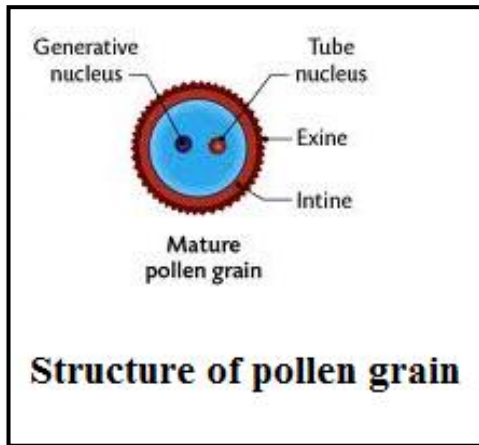
- **Agents of Cross-Pollination**

AGENT	METHOD	EXAMPLES OF PLANTS
• Insect	Entomophily	Sweet pea, <i>Dahlia</i>
• Wind	Anemophily	Maize
• Water	Hydrophily	<i>Vallisneria</i>
• Bird	Ornithophily	<i>Bignonia</i> , <i>canna</i>
• Bat	Chiropterophily	<i>Agave</i> , <i>Saguaro</i>
• Snail	Malacophily	<i>Volvulopsis nummularium</i>
• Elephant	Elephophily	<i>Rafflesia</i>
• Bee	Melittophily	Apple, almond
• Butterfly	Psychophily	<i>Asclepias tuberosa</i> , <i>Echinacea purpurea</i>
• Moth	Phalaenophily	<i>Liatris spicata</i> , <i>Camassia scillioides</i>
• Fly	Myophily/Sapromyophily	<i>Habenaria obtusata</i> , <i>Trichopoda sp.</i>
• Beetle	Cantharophily	Pond lily, <i>Magnolia</i>

- **Differences between Self-Pollination and Cross-Pollination**

SELF-POLLINATION	CROSS-POLLINATION
<ul style="list-style-type: none"> <li>• It is the transfer of pollen grains from the anther to the stigma of the same flower.</li> </ul>	<ul style="list-style-type: none"> <li>• It is the transfer of pollen grains from the anther of one flower to the stigma of another flower of a different plant of the same species.</li> </ul>
<ul style="list-style-type: none"> <li>• It does not require any external agent, such as wind, water or insects to carry out pollination.</li> </ul>	<ul style="list-style-type: none"> <li>• It requires an external agent for pollination to occur.</li> </ul>
<ul style="list-style-type: none"> <li>• It can take place even when the flower is closed.</li> </ul>	<ul style="list-style-type: none"> <li>• It can occur only when the flower is open.</li> </ul>
<ul style="list-style-type: none"> <li>• In self-pollinated flowers, the anther and stigma mature at the same time.</li> </ul>	<ul style="list-style-type: none"> <li>• In cross-pollinated flowers, the anther and stigma mature at different times.</li> </ul>
<ul style="list-style-type: none"> <li>• It preserves parental characters.</li> </ul>	<ul style="list-style-type: none"> <li>• It does not preserve parental characters.</li> </ul>
<ul style="list-style-type: none"> <li>• New varieties cannot be produced.</li> </ul>	<ul style="list-style-type: none"> <li>• New varieties can be produced.</li> </ul>
<ul style="list-style-type: none"> <li>• As new variations are not possible, the offsprings cannot adapt to changing environmental conditions.</li> </ul>	<ul style="list-style-type: none"> <li>• As new variations are possible, the offspring are healthier and are able to adapt to changing environmental conditions.</li> </ul>

- **Fertilisation** is the fusion of the male gamete present in the pollen with the female gamete or the egg present in the ovule.



- **Events in Fertilisation**

The pollen grains germinate after falling on the stigma of the same plant species.

The pollen tube grows out of the pollen grain.

The generative nucleus divides into two nuclei.

The pollen tube grows through the stigma and style and reaches the ovary.

It pushes through the micropyle and reaches the embryo sac.

The tube nucleus eventually disintegrates.

The pollen tube enters one of the synergids and releases two sperm nuclei.

One sperm nucleus enters the egg cell and fuses with its nucleus.

The other sperm nucleus moves towards the two polar nuclei and fuses with them.

- **Fate of Floral Parts After Fertilization**

FLORAL PART	FATE
• Sepals	Usually wither away, but in some cases these remain attached to the fruit. Examples: Brinjal, tomato etc.
• Petals	Wither away
• Stamens	Wither away
• Style	Withers away
• Stigma	Withers away
• Ovary	Fruit
• Ovary wall	Pericarp
• Ovule	Seed
• Placenta	Stalk of the seed
• Outer integument	Testa (seed coat)
• Inner integument	Tegmen (seed coat)
• Secondary nucleus	Endosperm
• Egg cell and synergids	Embryo
• Antipodal cells	Disorganised