Pollination

Transfer of pollen grains from anther to stigma.
Both the gametes are non-motile.
Self Pollination: When the pollen from the anther is deposited on the stigma of the same flower, or another flower of the same plant.

- **Autogamy**– Transfer of pollen grain from anther to stigma of same flower.
  Cleistogamous – Flower which do not open.
  Are autogamous as there is no chance of cross-pollination.
  e.g Viola (common pansy), Oxalis, and Commelina.
  Chasmogamous– Exposed anther and stigma.
- **Geitonogamy** – Transfer of pollen grains from anther to stigma of different flower of same plant.

Functionally cross-pollination (involving a pollinating agent) but genetically self-pollination (similar to autogamy since the pollen comes from the same plant)

Cross Pollination: Transfer of pollen from the anther of one flower to the stigma of another flower on a different individual of the same species.
c) **Xenogamy**– transfer of pollen grain from anther to stigma of different plant's flower of same species.

Pollinators- Agents of pollination includes abiotic and biotic agents.
Adaptations in flowers Pollinated by Abiotic Agents (Wind & Water)

- Produce pollen grains in large no.
- Do not produce nectar
- Not so bright colour and odour less

I. Anemophily (Wind Pollination)

- Pollen grains :– light, non- sticky, light weighted, winged, Produce in large no.
- Anther :- Well exposed
- Stigma :- Well-exposed, Large and feathery
- Flower :- Single ovule in each ovary, numerous flowers packed into an inflorescence (corn cob – waving **tassels**-stigma fused with style)

Ex **:** corn cob**,** cotton, date palm, grasses
II. **Hydrophily** (Water Pollination)

- Limited to about 30 genera, mostly monocotyledons.
- ***Mode of transport of male gamete in Bryophytes, Pteridophytes, Thallophytes (Algae)***
- Limited distribution of ***Bryophytes, Pteridophytes*** due to need of water for the transport of male gametes and fertilisation.
- **Mucilaginous** covering protect pollen from getting wet.
- Water **Surface Pollination**: **Vallisneria & Hydrilla -** Female flower reaches surface by long stalk, male flower remain submerged, anther or pollen released goes to water surface for pollination.
- **Under water pollination**: **Seagrasses (Zostera)-** Female flowers remain submerged in water, the pollen released inside the water & carried away passively. **Pollen grains are long, ribbon like & produce in large no.**
- In majority of aquatic plants the **flowers emerge above the level of water** and are **pollinated by insects or wind**. Ex : **Water Hyacinth and Water Lily.**

Ex : Fresh water plants- Vallisneria, Hydrilla
Marine-Zostera (Sea grass)

Adaptations in flowers Pollinated by Biotic Agents
Flowers are pollinated by biotic agents like insects, butterfly, bees, flies, beetles, wasps, ants, honey bee, moths, some primates (lemurs), arboreal, rodents, or even reptiles (gecko lizard and garden lizard) are the common pollinating agents. etc.
I. **Ornithophily**- Pollinated by birds. Flowers are large sized, funnel shaped with recurved bright colour petals, more Nectar & Less Order ex: eucalyptus, orchid. (sunbirds and humming birds- **Nectar Robberer**)
II. **Chiropterophily**- Bat Pollinated Flowers- Large,dull colour, strong odour & more nectar ex: Mango, banana.
III. **Entomophily** (Insect Pollination)-

- Flowers : Colourful, Fragrant, Rich in nectar (present in locule of ovary), if small-inflorescence
- Pollen grains : Spiny, Sticky, Less in no.
- Stigma : Sticky

Certain rewards to pollinators:

- Nectar and (edible) pollen grains as foods
- Provide safe place for laying eggs. **Ex : Amorphophallus (6ft flower) provide safe places to lay eggs. Yucca- the moth deposits its eggs in the locule of the ovary of Yucca and its larva feed on its pollen, in turn yucca gets pollinated.** The larvae of the moth come out of the eggs as the seeds start developing,
- Pseudocopulation-ex: Mediterranean orchid (Ophrys) & Bee or Wasp.

Flowers	Pollinators
Cucumber	Bees, honey bees, bumblebees, etc.
Mango	Housefly, wasp, ants, flies, bees and beetles.
Peepal	Small birds, bats, moths, beetles, wasps, etc.
Coriander	Indian bees, little bees, sting bees, fruit flies, etc.
Papaya	Moths, bees, etc.
Onion	Bumble bees, moth, wasp, etc.
Labia	Wasps, etc.
Cotton	Native bees, honey bees, etc.
Banana	Birds
Tobacco	Insect
Eucalyptus	Birds & INSECTS
Rose	Insect
Lemon	Insects (bees)