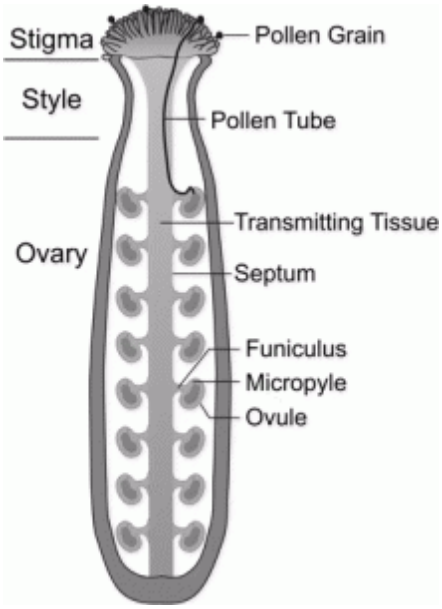
Pollen-Pistil Interaction & Outbreeding Devices

KUMARI SONA RANI
ASSISTANT PROFESSOR
DEPARTMENT OF BOTANY
S.SINHA COLLEGE, AURANGABAD

FOR M.Sc 2ND SEMESTER STUDENTS

Pollination is the process, which plants depend on to transfer pollen grains from anther to stigma/pistil. It can be either cross-pollination or self-pollination. Most of the plants are bisexual/ hermaphrodite which promote self-pollination. Is this self-pollination desirable? What are the factors promoting cross-pollination?

What is pollen-pistil interaction?



Outbreeding Devices

Self-pollination is common and more likely to happen in the case of hermaphrodite flowers but a successive series of self-pollination affects negatively and causes inbreeding depression. This also results in homozygous genes. Thus plants are adapted

to promote cross-pollination. This is known as outbreeding. Factors which encourages cross-pollination are as follow:

- **Unisexual flower:** If a flower is unisexual i.e., contain only one sex either female or male, cross-pollination is the only choice.
- **Non-Synchronization:** Timing is important for successful pollination. Pollen release and receptivity of stigma should happen simultaneously. Sometimes, pollen matures and releases before the stigma is open which leads to loss of pollen vitality or vice-versa. This prevents self-pollination; even though the flower is hermaphrodite.
- **Self-incompatibility:** Incompatibility within a flower (or plant) includes self-sterility; structural barrier. Self-sterility means even though pollination takes place it can't proceed to fertilization due to further pollen growth failure. Structural barriers include height difference between gynoecium and androecium and some structures which hinder the stigma from receiving pollen. These are the more or less genetic mechanism.

Pollen–Pistil Interaction

All pollinations do not lead to successful fertilization because for successful fertilization, the pistil of a flower has to recognize the pollen of the same species. Therefore, the interaction between pollen grains and the stigma needs to be understood properly. Once compatible pollen is accepted by pistil, events for fertilization proceed, whereas incompatible pollens are rejected. This interaction where a pistil is capable of recognizing its pollen is the result of long term pollen-pistil interaction and chemicals released by pollen.

Events of pollen-pistil interaction proceed as follows:

- The landing of true pollen on the compatible pistil.
- Germination of pollen and formation of pollen tube where pollen grains release its contents.
- Pollen tube growth through the style of the pistil towards the ovary.
- The entry of male gametes into the ovule and then to synergid.