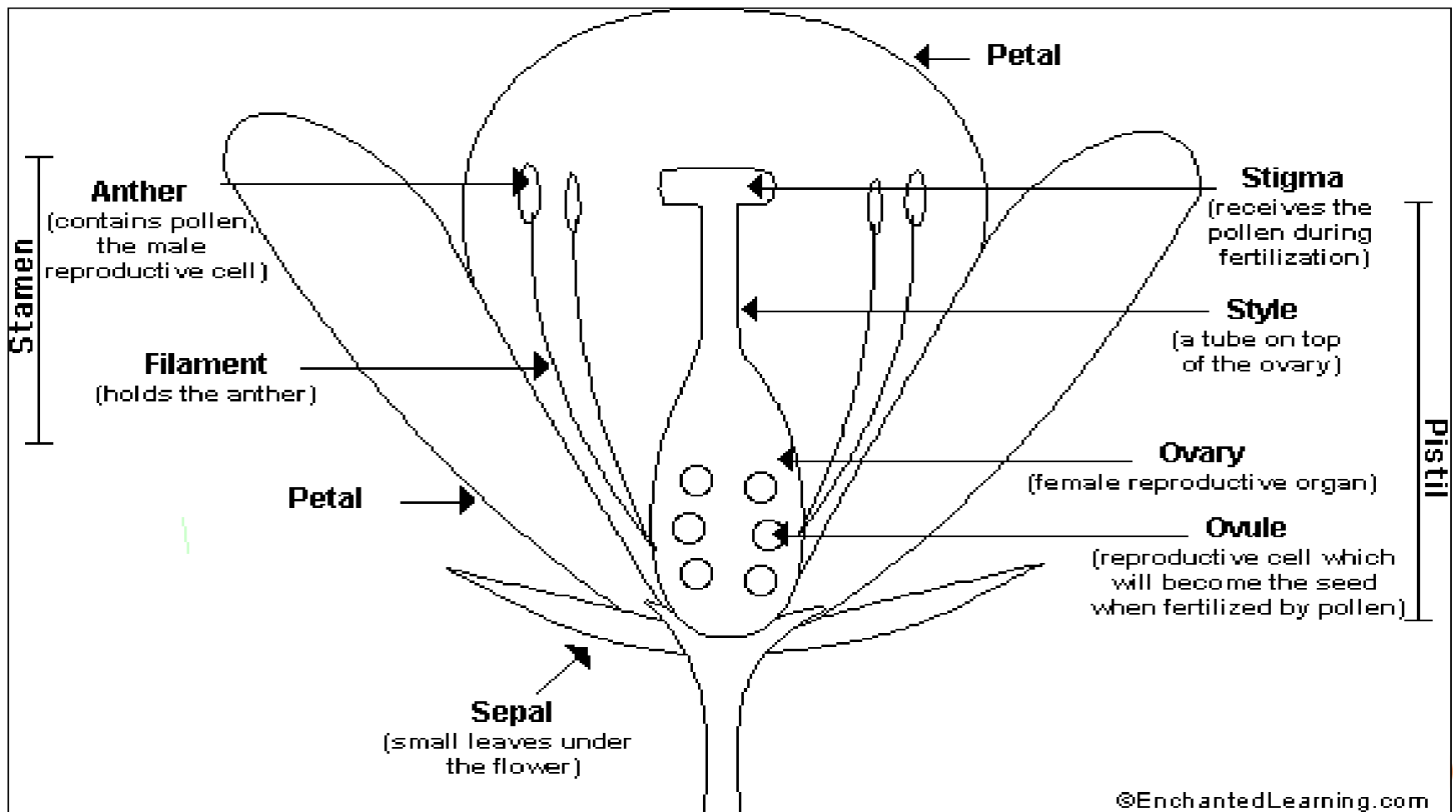


Floral types: Biology in relation to pollination mechanisms



PARTS OF A FLOWER



THE CALYX (K): TOTALITY OF SEPALS IN THE FLOWER.

Calyx with free sepals

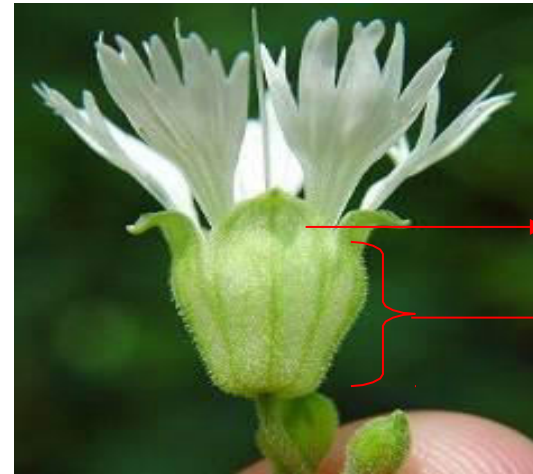


Rosa spp.



Stellaria media -chickweed

Calyx with connate (united) sepals:



Silene spp.



Fabaceae flower



Function of petals:
To attract insects



Petals may have markings to guide insects

Bees typically visit **yellow** or **blue** flowers

- Yellow flowers are marked in distinctive ways that are normally invisible to us

with visible light



with UV light



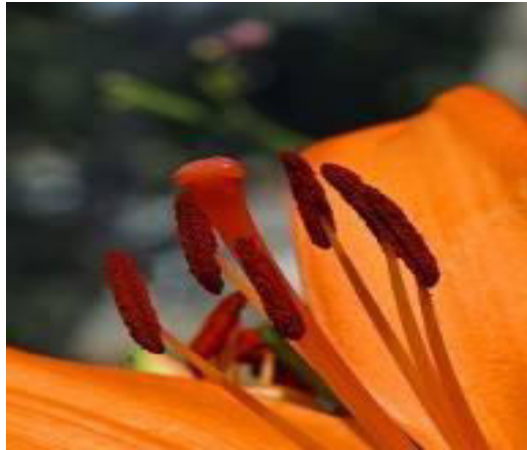


Some flowers, like this pansy (*Viola tricolor*), **have differently coloured lines:**

- to guide pollinators to the center of the flower
- provide a landing platform for them.

ANDROECIUM (A): TOTALITY OF STAMENS IN THE FLOWER

[♂]



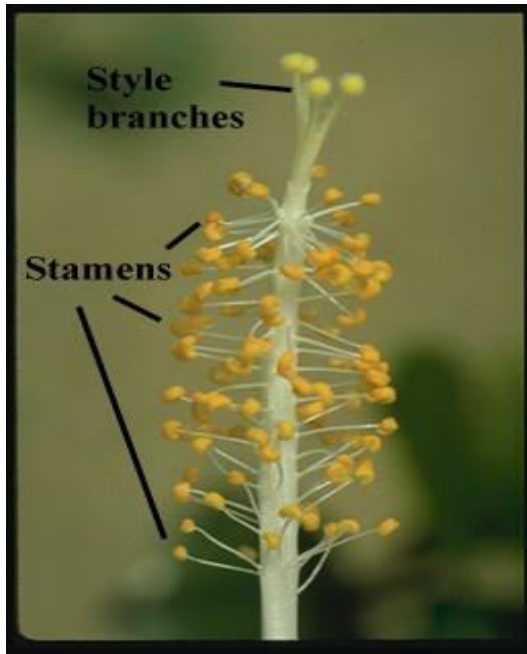
“normal”



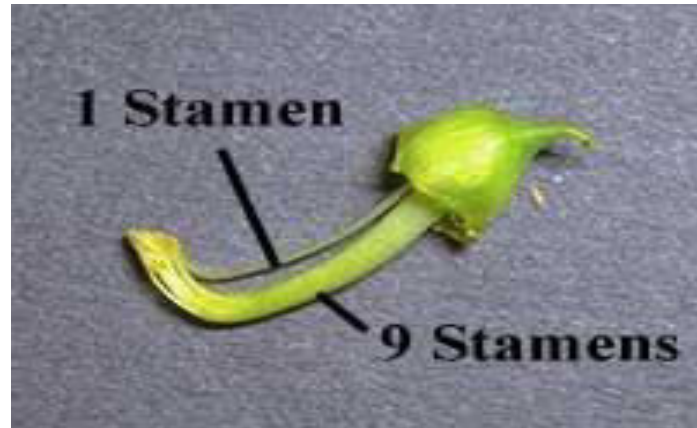
Didynamous
Mint family (Lamiaceae)



Tetradynamous
Cabbage family
Brassicaceae

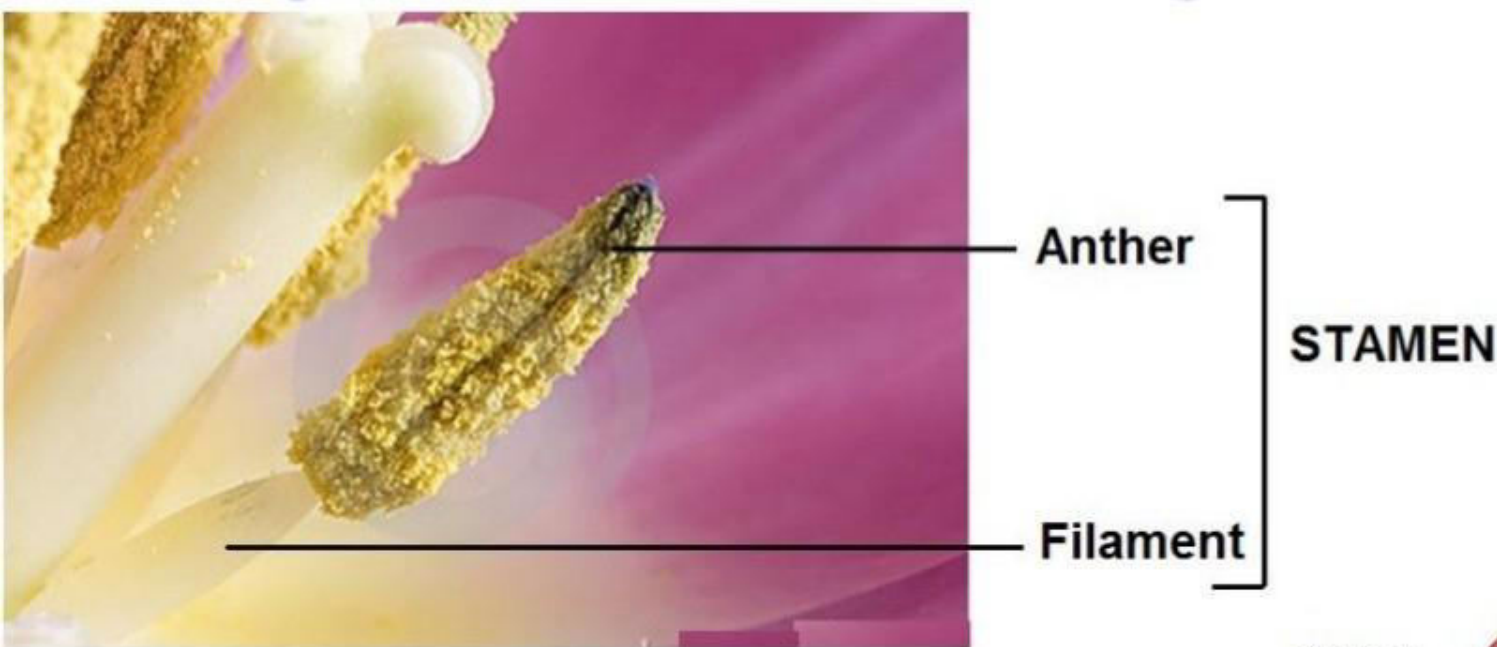


Monadelphous Malvaceae



Diadelphous: many Fabaceae

Reproductive floral organs: male



Function of:

- **anther**: forms pollen grains
- **filament**: hold anther
- **pollen grain**: contains the male gamete

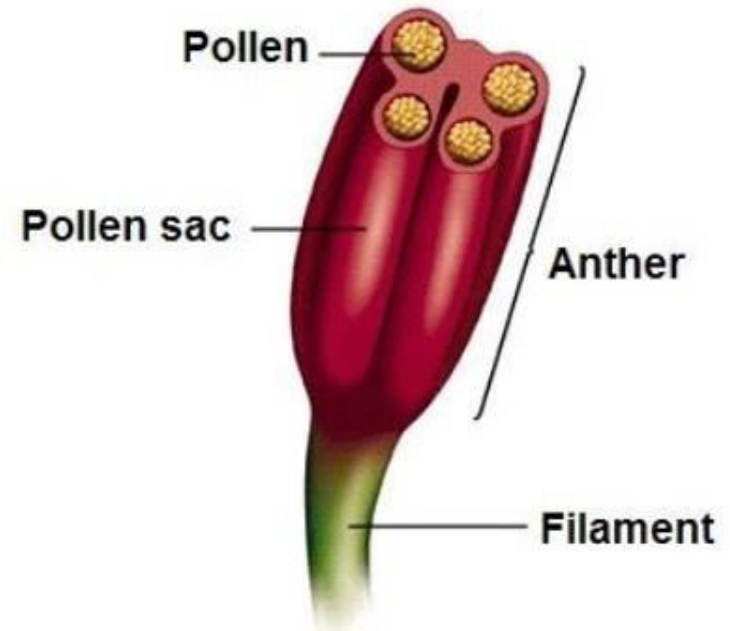
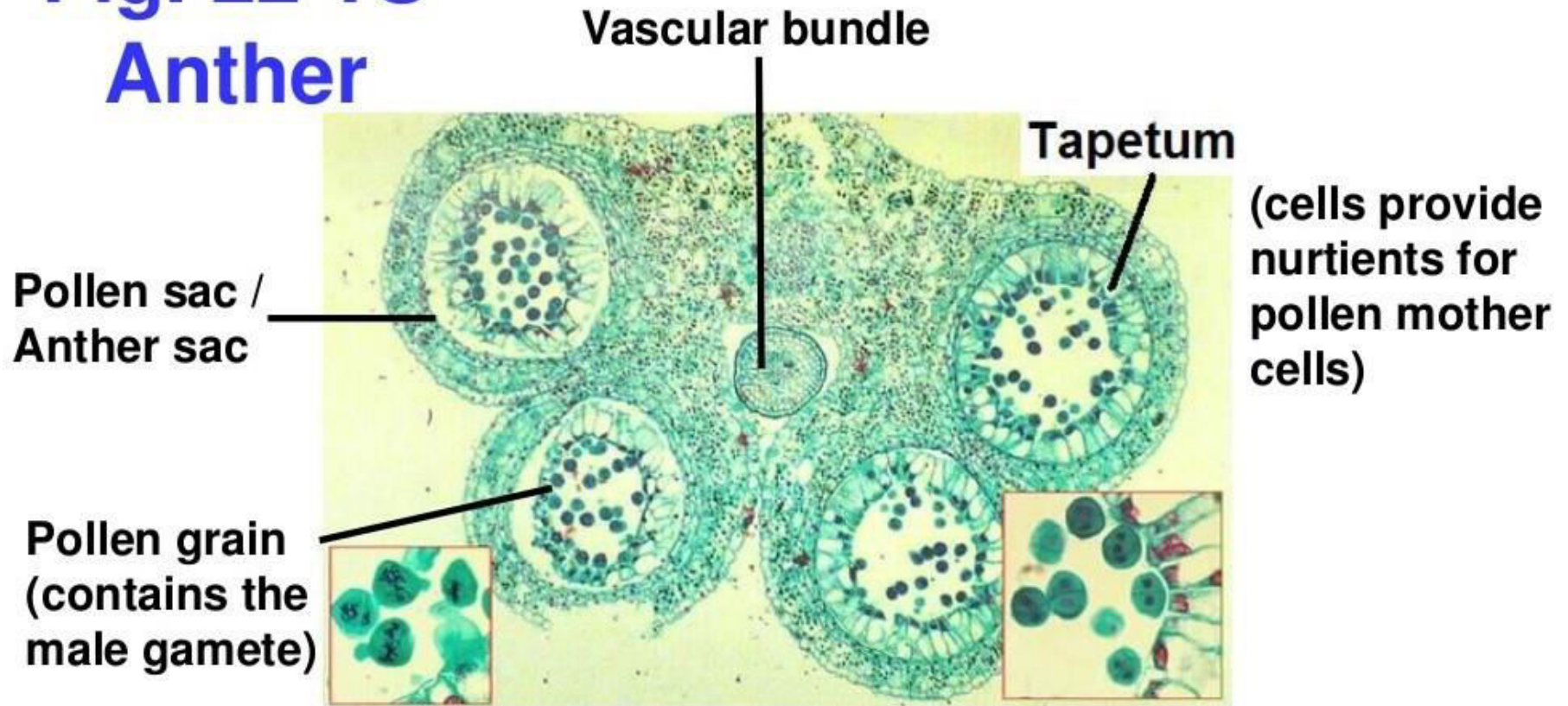


Fig. 22 TS

Anther



A tetrad of 4 haploid cells – separate to become pollen grains



Dehiscing anther



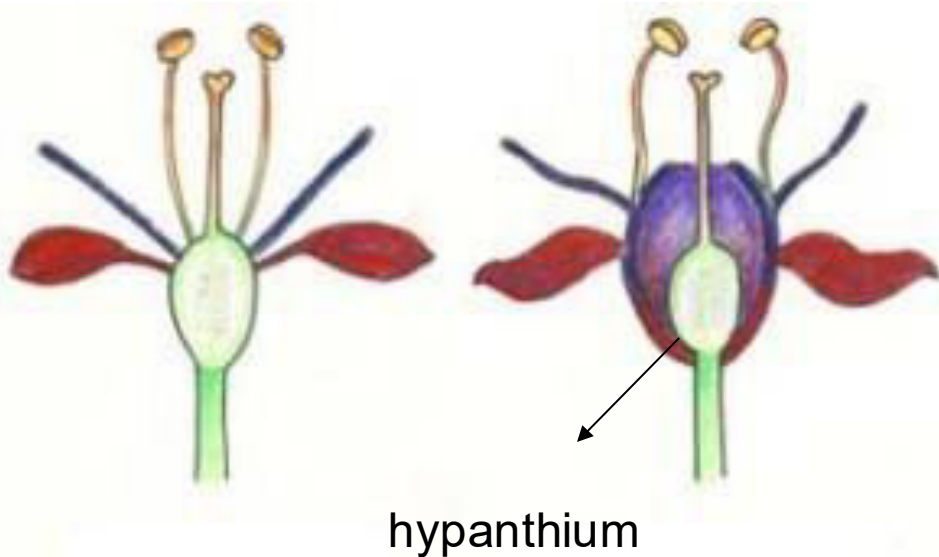
Pollen grains

**(contain a
haploid nucleus)**

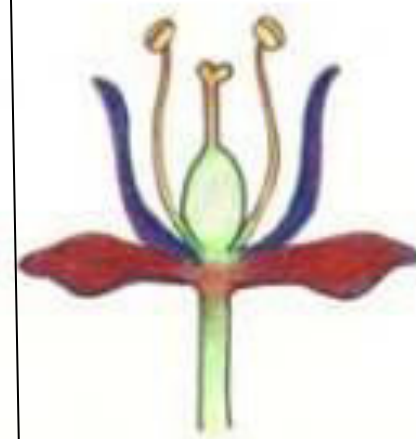


GYNOECIUM (G): TOTALITY OF CARPELS IN THE FLOWER [♀]

Depending on the **position of the ovary** in relation to the calyx and corolla:



Inferior ovary



superior ovary

Ovary Position



inferior



hypanthium



superior

FLOWER SYMMETRY

Actinomorphic. Radially symmetric; divisible into two essentially equal portions along any median longitudinal plane.

Zygomorphic: Bilaterally symmetric; divisible into two essentially equal portions along only one median longitudinal plane.



POLLINATION

- The transfer of pollen grains from the anther to the stigma of a flower.



Role of petals in pollination of a leguminous flower

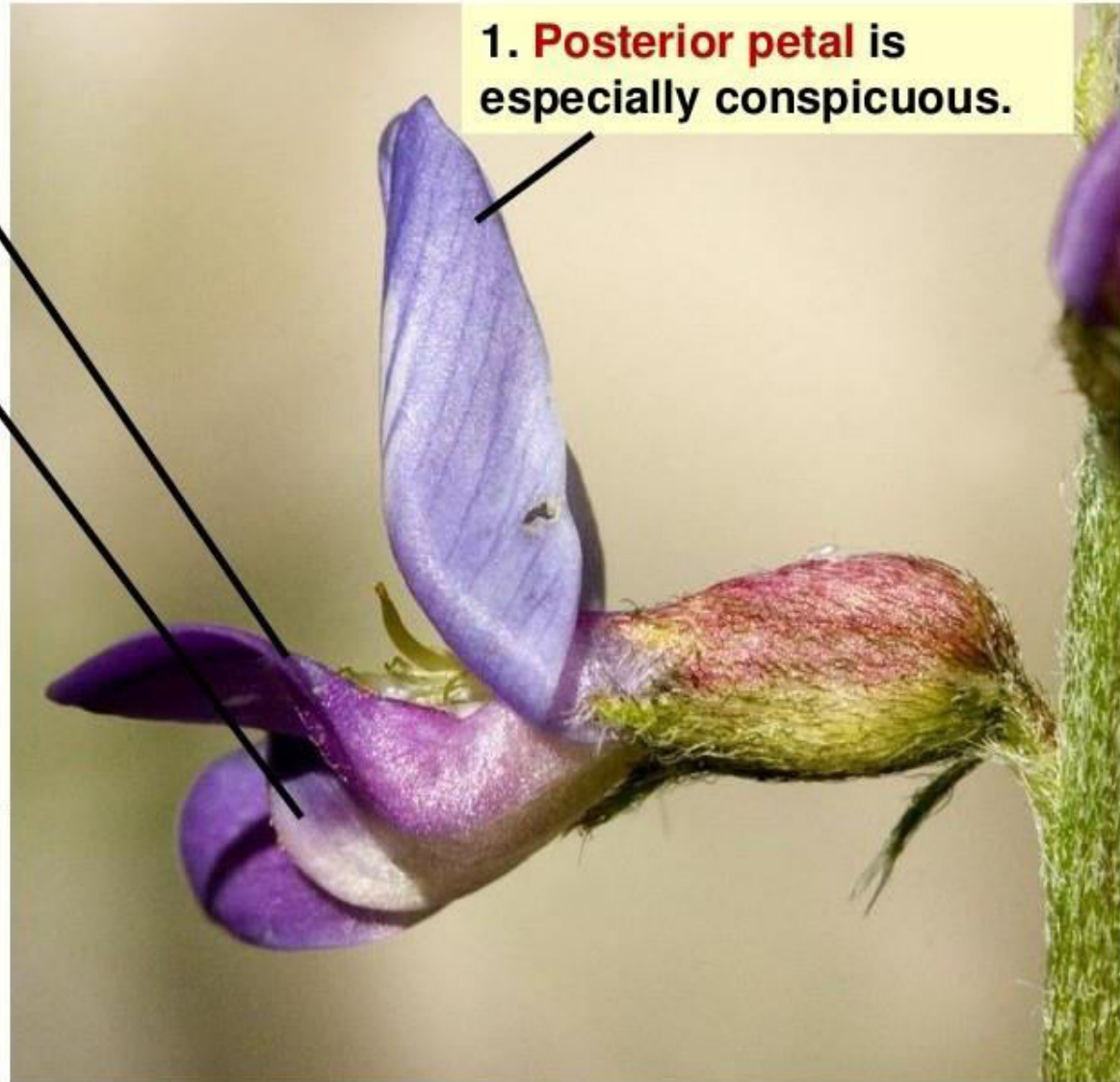
2. **Lateral petals** act as a landing platform for bee.

3. When bee lands, it pushes lateral petals & **keel** down.

4. The style & stigma emerge, striking undersurface of bee that may carry pollen.

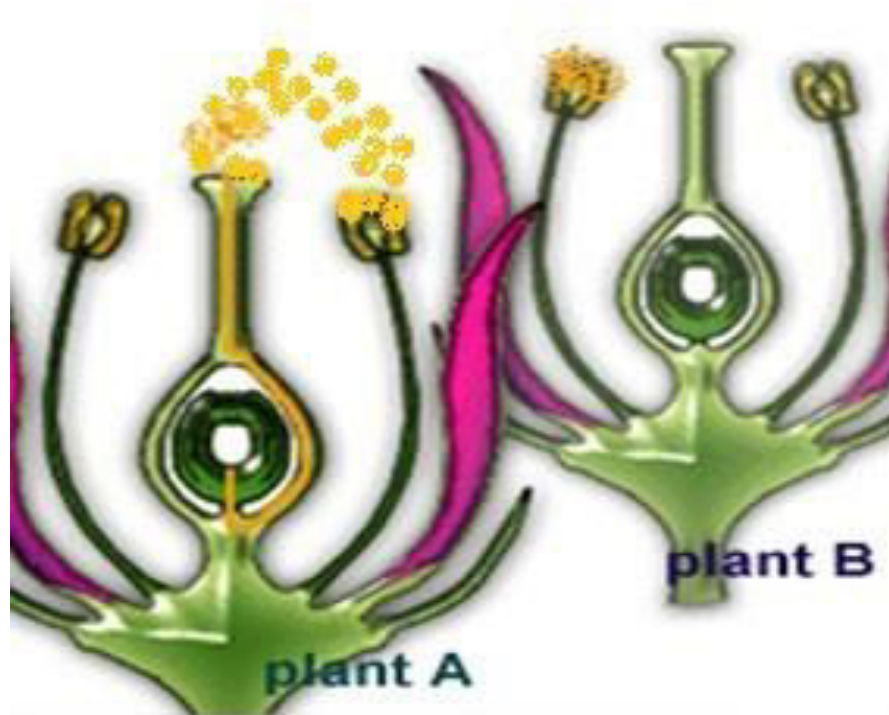
5. As bee searches for nectar at base of the ovary, anthers may rub pollen on the undersurface of style, & may be passed to the bee.

1. **Posterior petal** is especially conspicuous.



TWO TYPES OF POLLINATION

Self-pollination : Transfer of pollen grains within one



MECHANISM PROMOTING SELF POLLINATION:

- **1. Cleistogamy:** In this case, flowers do not open at all. This ensures complete self pollination since foreign pollen cannot reach the stigma of a closed flower. Cleistogamy occurs in some varieties of wheat (*Triticum* sp), oats (*Avena* sp), barley (*H.vulgare*) and in a number of other grasses.



2. Chasmogamy:

In some species, the flowers open, but only after pollination has taken place. This occurs in many cereals, such as wheat, barley, rice and oats. Since the flowers do open, some cross-pollination may occur.

i) Bisexuality:

Male and female sexual organs present in the same flower e.g Wheat, rice, groundnut, etc.

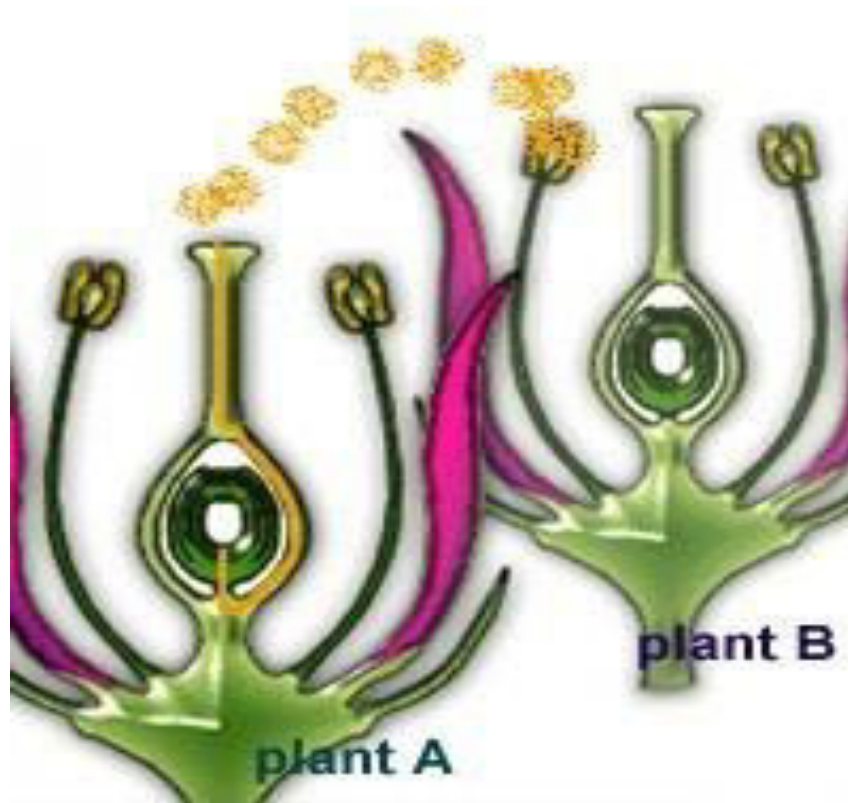
ii) Homogamy:

Male and female sexual organs mature at the same time e.g wheat, groundnut, etc.

GENETIC CONSEQUENCES OF SELF-POLLINATION

- Self pollination leads to a very rapid increase in homozygosity. Therefore, populations of self-pollinated species are highly homozygous.
- Self – pollinated species do not show inbreeding depression, but may exhibit considerable heterosis. Therefore, the aim of breeding method generally is to develop homozygous varieties.

CROSS-POLLINATION: TRANSFER OF POLLEN GRAINS FROM ONE FLOWER TO ANOTHER



MECHANISM PROMOTING SELF POLLINATION:

- i) Dicliny (Unisexuality):
 - It is a condition in which flower is either staminate or pistilate.
- a) Monoecy:
 - Staminate and pistilate flowers occur in the same
 - plant either in the same inflorescence. E.g Mango, banana, coconut or in the separate inflorescence.
 - E.g Maize, Cucurbit, Strawberry, etc.
- b) Dioecy:
 - The male and female flowers are present on different plants i.e. the in such species are male or female i.e. sex is governed by a single gene. E.g. Papaya, hemp, date, palm, etc.

ii) Dichogamy:

Anther and stigma of hermaphrodite flower mature at different time, facilitating cross pollination.

a) Protogyny: Gynoecium matures earlier than the androecium E.g. Bajara.

b) Protandry: Androecium matures earlier than gynoecium. E.g. marigold, maize, cotton, etc.

iii) Heterostyly: Different length of style and filaments E.g. Linseed.

iv) Herkogamy: Presence of physical barrier or mechanical obstacles between the anther and stigma ensures cross pollination. E.g. Rui (Calotropis gigantea).

v) In lucerne or alfalfa stigma are covered by waxy film and it does not become receptive unless this waxy film is broken by honeybees.

vi) A combination of two or more of the above mechanisms may occur in some species, E.g. Maize, - Monoecy and Protandry.

- **vii) Self –Incompatibility:** It refers to the failure of pollen from a flower to fertilize the same flower or other flowers on the some plants. It may be saprophytic or gametophilic e,g mustard ,tobacco, sunflowers, reddish.
- **Viii) Male Sterility:** It refers to the absence of functional pollen grains in hermaphrodite flower.

GENETIC CONSEQUENCES OF CROSS POLLINATION:

- 1) It preserves and promotes heterozygosity in population.
- 2) Cross pollinated species shows inbreeding depression and considerable heterosis.
- 3) Usually hybrid and synthetic without reducing heterozygosity.

A close-up photograph of a bouquet of daisies in various colors including yellow, pink, and red. A white card with the words "Thank You" in a black cursive font is placed among the flowers. The card is slightly tilted and partially obscured by the petals of a large pink daisy in the foreground. The background is softly blurred, showing more flowers and green foliage.

Thank You