

Sexual Reproduction in Flowering Plants

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Introduction

- **Sexual reproduction** is a fundamental process in flowering plants (angiosperms).
- It ensures:
 - Genetic diversity
 - Continuity of plant species
- Many attractive features of flowers (e.g., vibrant colors, pleasing scents, and distinct shapes) are not just for human appreciation.
- These features have evolved as adaptations to aid in the process of sexual reproduction.
- They help attract pollinators, enabling the transfer of pollen and successful reproduction.

Significance of Flowers in Reproduction

- The **flower** is the reproductive unit in angiosperms.
- Features like color, fragrance, and nectar serve to attract pollinators, which are essential for transferring pollen between flowers.
- These adaptations increase the efficiency of pollination, fertilization, and ultimately, the formation of fruits and seeds.

Role of Floral Structures

- The diversity in the structure of inflorescences, flowers, and floral organs reflects the wide range of adaptations plants have developed to enhance reproductive success.
- Each part of the flower plays a specific role in facilitating **sexual reproduction**.

Flower – A Fascinating Organ of Angiosperms

Human and Cultural Significance of Flowers

- Flowers have had a deep and intimate relationship with humans since ancient times.
- They are valued for their:
 - Aesthetic beauty
 - Ornamental appeal
 - Social and religious significance
 - Cultural symbolism

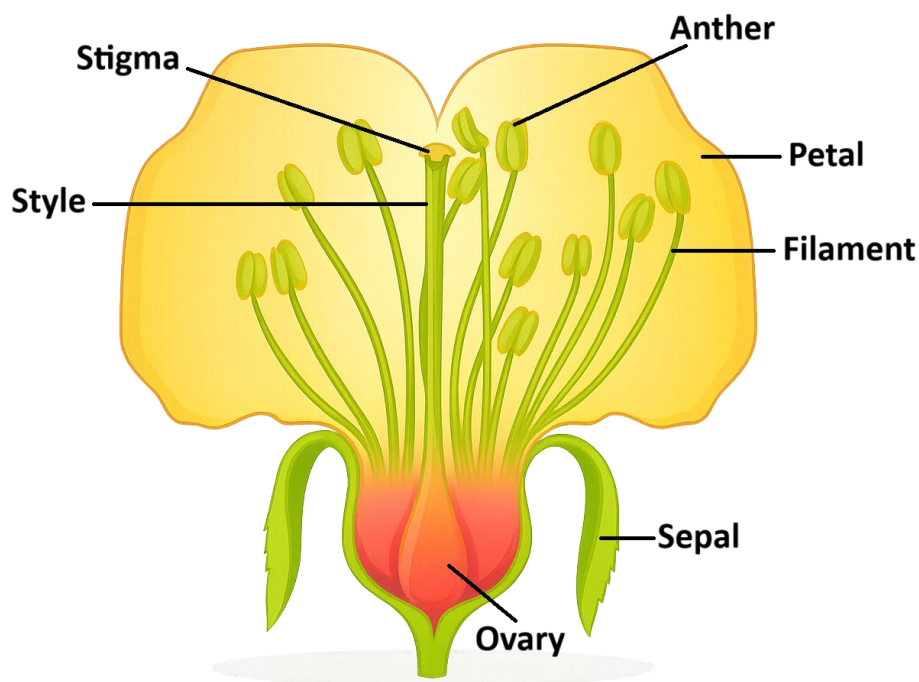
- Flowers are often used to express human emotions such as:
 - Love
 - Affection
 - Happiness
 - Grief
 - Mourning

Activity Prompts

- List at least five flowers of ornamental value commonly cultivated at homes and in gardens.
 - **Examples:** Rose, Hibiscus, Marigold, Petunia, Jasmine
- Identify five flowers used in social and cultural celebrations in your family.
 - **Examples:** Lotus, Marigold, Jasmine, Champa, Tuberose
- Have you heard of floriculture?
 - *Floriculture* refers to the cultivation and management of flowering and ornamental plants for gardens, floral industry, and decorative purposes.

Biological Significance of Flowers

- To a biologist, a flower is:
 - A morphological and embryological marvel
 - The site of sexual reproduction in angiosperms
- In earlier classes, you have studied the various **parts of a typical flower**.



A diagrammatic representation of L.S. of a flower

Check Your Understanding

- Can you name the two parts of a flower where the two most important units of sexual reproduction develop?
 - **Answer:**
 - Stamen – produces pollen grains (male gametophytes)
 - Carpel (Pistil) – contains ovules (female gametophytes)

Pre-Fertilisation: Structures and Events in Flowering Plants

Initiation of Flowering

- The process of flowering begins much before the flower becomes visible on the plant.
- A developmental decision is made by the plant to initiate flowering.
- This decision triggers a series of:
 - Hormonal changes
 - Structural modifications

Formation of Floral Structures

- These changes lead to the differentiation and development of the floral primordium.
- As a result, inflorescences (clusters of flowers) are formed.
- Inflorescences give rise to floral buds, which eventually develop into **flowers**.

Development of Reproductive Organs

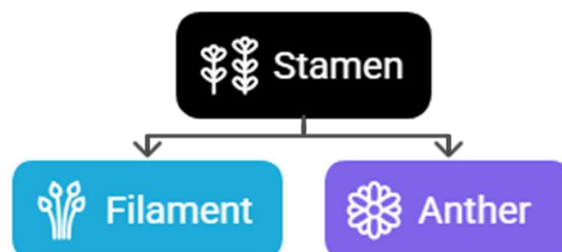
- Within the developing flower, the reproductive structures differentiate and mature:
 - **Androecium**: The male reproductive part, consisting of a whorl of stamens.
 - **Gynoecium**: The female reproductive part, typically comprising one or more carpels.

Stamen – The Male Reproductive Organ of Flowering Plants

- The **stamen** is the male reproductive organ of a flower.
- It plays a crucial role in the production and release of pollen grains, which contain the male gametes necessary for fertilisation.

Structure of a Stamen

A typical stamen consists of two main parts:

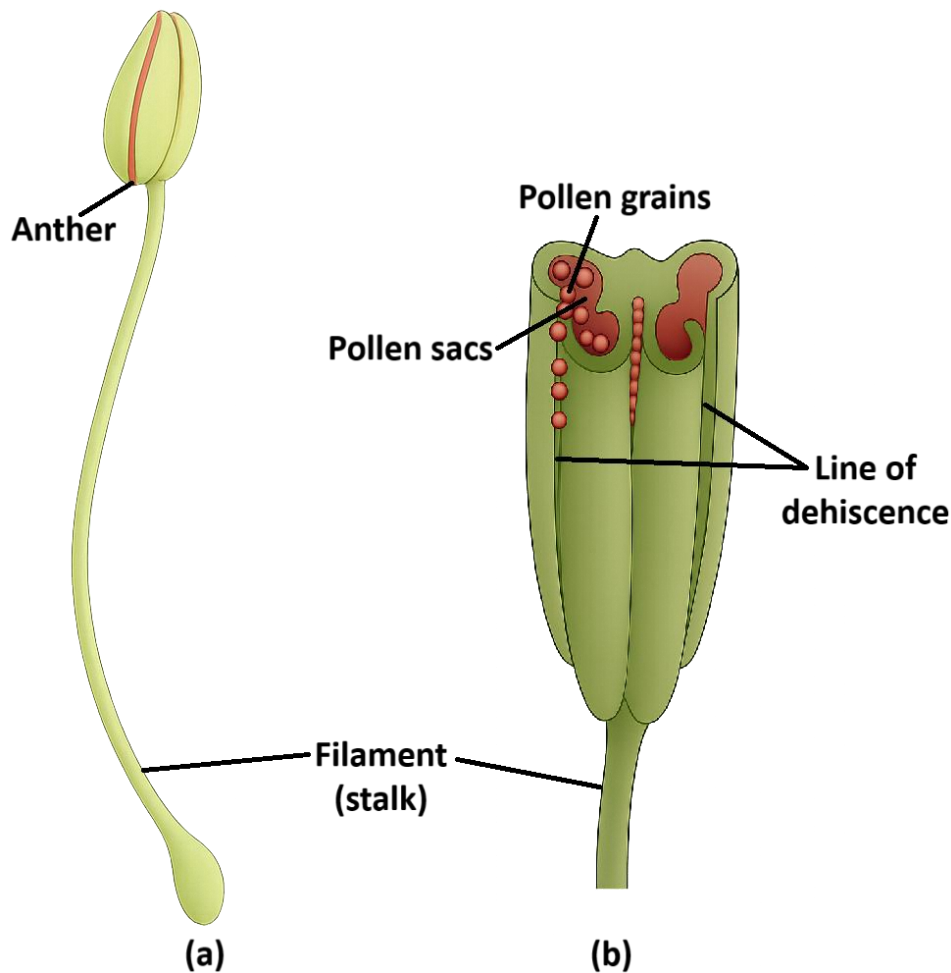


A. Filament

- A long and slender stalk that supports the anther.
- The proximal end of the filament is attached to the thalamus (receptacle) or to the **petal** of the flower.

B. Anther

- The terminal part of the stamen.
- Generally bilobed, meaning it has **two lobes**.
- Each lobe is typically dithecous, meaning it contains **two theca** (chambers).
- A longitudinal groove often separates the two theca lengthwise.



(a) A typical stamen; (b) three-dimensional cut section of an anther

Variation in Stamens

- The number and length of stamens can vary widely among different plant species.
- If stamens from flowers of ten different species are arranged and observed under a dissecting microscope, one can clearly see:
 - Differences in size
 - Variation in shape
 - Diversity in anther attachment

Anatomy of a Typical Anther

- A typical angiosperm anther is:
 - Bilobed – having two lobes



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