

# Exercise 1

**Aim:** To study the reproductive parts of commonly available flowers

**Principle:** The male reproductive parts of a flower are the stamens collectively called androecium and the female reproductive parts are the carpels/pistils collectively called gynoecium. The individual units of stamen consist of a filament, which supports the anther lobes. Gynoecium consists of stigma, style and ovary. Many variations are found in different characteristics of both the stamens and carpels. We shall try to study these variations in the reproductive parts of flowers in the exercise.

**Requirement:** Commonly available flowers, needles, forceps, razor/scalpel blade, brush, slides, cover slip, watch glass, magnifying lens, dissecting microscope, compound microscope, etc.

## Procedure

- (i) Familiarise with the terms to describe the reproductive parts of flowers given in annexures of Exercise No. 11 of Laboratory Manual: Biology (Class XI) and at the end of this experiment.
- (ii) Observe the flower with the naked eye, hand lens or under a dissecting microscope. Study their reproductive parts and count the number of stamens and record their cohesive and adhesive features.
- (iii) Cut L.S. of the flower and place it on a slide to observe the following characters:
  - (a) Placement of anthers
  - (b) Position of the ovary: epigynous/perigynous/hypogynous.
- (iv) Mount one stamen on a slide and study the following characters:
  - (a) Attachment of filament to anther
  - (b) Dehiscence pattern of the anther lobes for discharge of pollen.
- (v) Cut T.S. of anther lobe to observe the number of pollen sacs.
- (vi) Mount the pistil on a slide and study style, stigma and ovary. Record the number of stigma and nature of pistil.
- (vii) Cut T.S. of ovary, mount it on a slide and observe
  - (a) Number of locules in the ovary

- (b) Type of placentation
- (c) Number of ovules per locule
- (viii) Draw labelled figures of your preparation and observations.

### Questions

1. Name the most common type of placentation observed.
2. What is the most common type of dehiscence pattern in anthers?
3. Name a few unisexual flower-bearing plants studied by you.
4. "Flower is a modified shoot." Justify the statement based on your observation.

## Annexure 1

## Description of reproductive parts of flowers

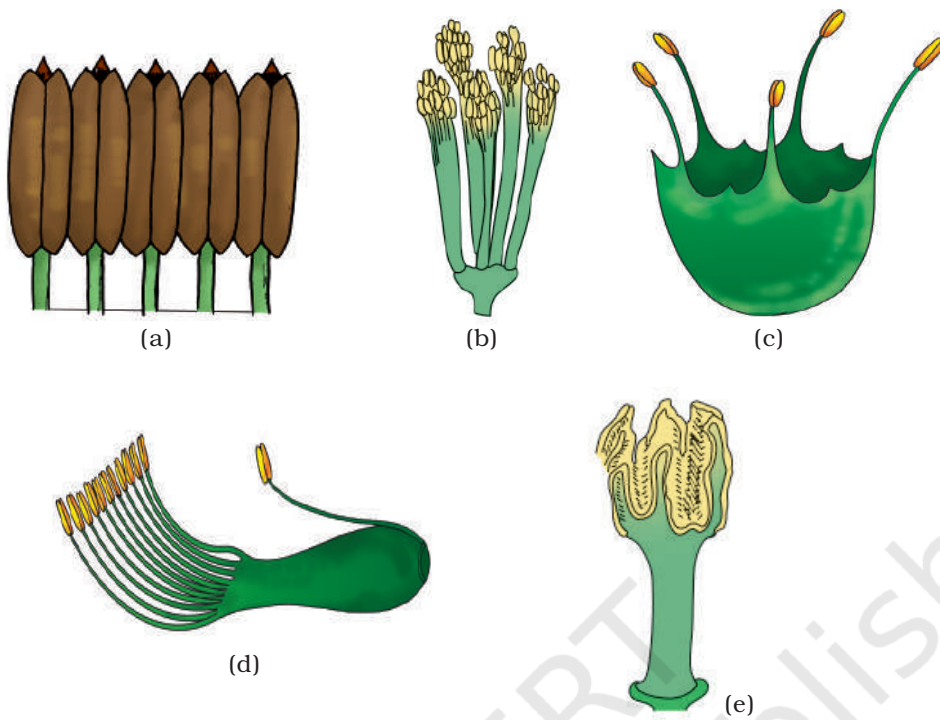
## Androecium

Number of stamens	The number of stamens may vary from a few to many in different flowers
Cohesion (Fig. 1.1 a–e)	<p>Stamens may be free or united. If united they can be of the following type:</p> <ul style="list-style-type: none"> <li>(i) <b>Syngenesious</b>: Filaments free and anthers united, e.g., Sunflower.</li> <li>(ii) <b>Synandrous</b>: Stamens fused all through their length, e.g., <i>Cucurbita</i></li> <li>(iii) <b>Adelphous</b>: Anthers remain free and filaments are united. Adelphous condition can be <ul style="list-style-type: none"> <li>(a) Monoadelphous—United to form 1 bundle, e.g., China rose</li> <li>(b) Diadelphous—United to form 2 bundles, e.g., Pea</li> <li>(c) Polyadelphous—United into more than two bundles, e.g., Lemon</li> </ul> </li> </ul>
Adhesion (Fig. 1.2)	<p>Fusion of stamens with other parts of the flower</p> <ul style="list-style-type: none"> <li>(i) <b>Epipetalous</b>: Stamens fused with petals, e.g., Sunflower, <i>Datura</i></li> <li>(ii) <b>Epiphylloous</b>: Stamens fused with perianth, e.g., Lily</li> </ul>
Attachment of filament to anther (Fig.1.3 a–d)	<ul style="list-style-type: none"> <li>(i) <b>Basifixed</b>: Filament attached to the base of anther, e.g., Mustard</li> <li>(ii) <b>Adnate</b>: Filament attached along the whole length of anther, e.g., <i>Michelia</i>, <i>Magnolia</i></li> <li>(iii) <b>Dorsifixed</b>: Filament attached to the back of anther, e.g., <i>Passion flower</i></li> <li>(iv) <b>Versatile</b>: Anther lobes attached with filament in the middle portion with both ends free, e.g., Gramineae family</li> </ul>
Dehiscence pattern (Fig. 1.4 a,b)	<ul style="list-style-type: none"> <li>(i) <b>Porous</b>: Pollens released through pores, e.g., <i>Brinjal</i>, <i>Potato</i></li> <li>(ii) <b>Longitudinal</b>: Pollens released through the longitudinal slit of another lobes, e.g., <i>China rose</i>, <i>Cotton</i></li> </ul>

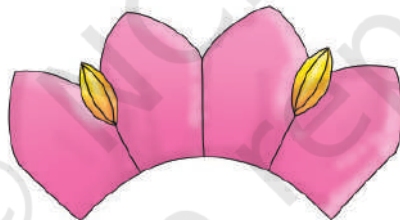
**Gynoecium**

<b>Number of stamens</b>	<b>The number of stamens may vary from a few to many in different flowers</b>
Position of ovary (Fig. 1.5 a–d)	<ul style="list-style-type: none"> <li>(i) <b>Epigynous</b>: Position of ovary inferior to other floral parts, e.g., Mustard, China rose</li> <li>(ii) <b>Perigynous</b>: Other floral parts are attached around the ovary, e.g., Apple, Guava</li> <li>(iii) <b>Hypogynous</b>: Position of ovary superior to other floral parts, e.g., Sunflower</li> </ul>
Cohesion (Fig. 1.6 a–c)	<p>If number of carpels is more than one, they may be</p> <ul style="list-style-type: none"> <li>(i) <b>Apocarpous</b>: Carpels are free. Each carpel has its own style and stigma, e.g., Rose</li> <li>(ii) <b>Syncarpous</b>: Carpels are united, e.g., Lady's finger, Tomato</li> </ul>
Number of locules in ovary	<p>Vary from one to many</p> <ul style="list-style-type: none"> <li>(i) <b>Unilocular</b>: One locule, e.g., Rose, Pea</li> <li>(ii) <b>Bilocular</b>: Two locules, e.g., Datura</li> <li>(iii) <b>Multilocular</b>: Many locules, e.g., Lady's finger, China rose</li> </ul>
Placentation (Fig. 1.7 a–e)	<ul style="list-style-type: none"> <li>(i) <b>Marginal</b>: The placenta forms a ridge along the ventral suture of the ovary and the ovules are borne on this ridge, e.g., Pea</li> <li>(ii) <b>Axile</b>: The ovary is partitioned into several chambers or locules and the placentae are borne along the septa of the ovary, e.g., Tomato, China rose</li> <li>(iii) <b>Parietal</b>: The ovules develop on the inner wall of the ovary or on peripheral part. Ovary unilocular but in some cases becomes two chambered due to formation of a false septum, e.g., Mustard</li> <li>(iv) <b>Free central</b>: Ovules are borne on the central axis and septa are absent, e.g., Carnation, Chilly</li> <li>(v) <b>Basal</b>: Placenta develops at the base of the ovary, e.g., Sunflower.</li> </ul>

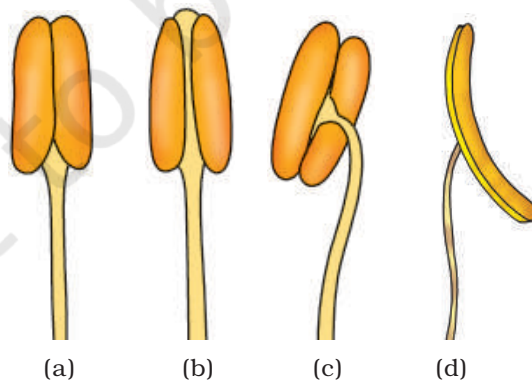
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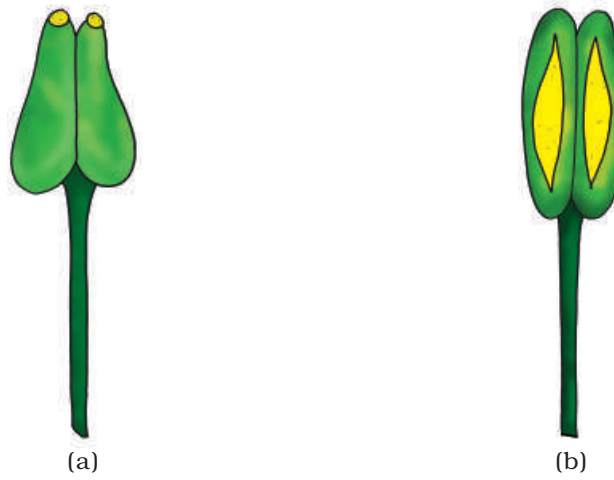
**Fig.1.1** Cohesion of stamens: (a) Syngenesious (b) Synandrous (c) Monoadelphous (d) diadelphous (e) Polyadelphous



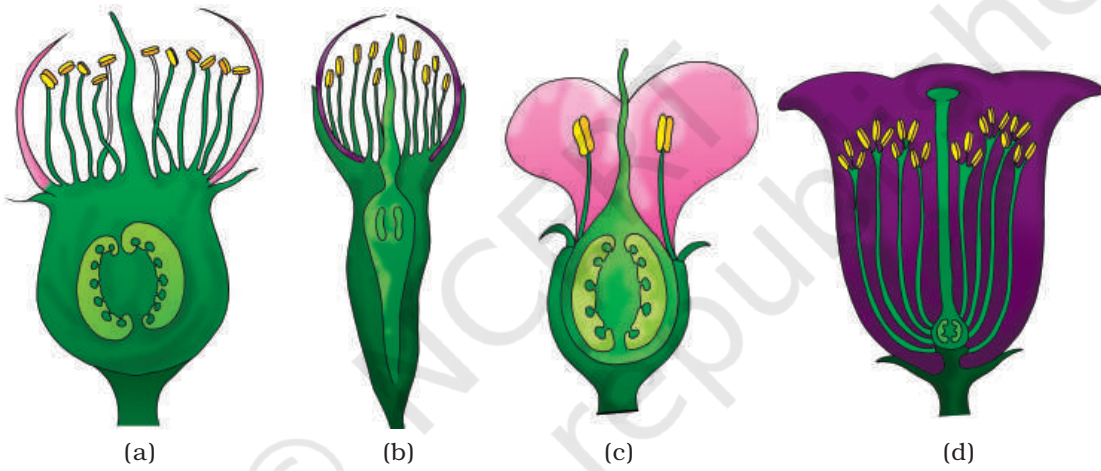
**Fig.1.2** Adhesion of Stamens: Epipetalous/Epiphyllous



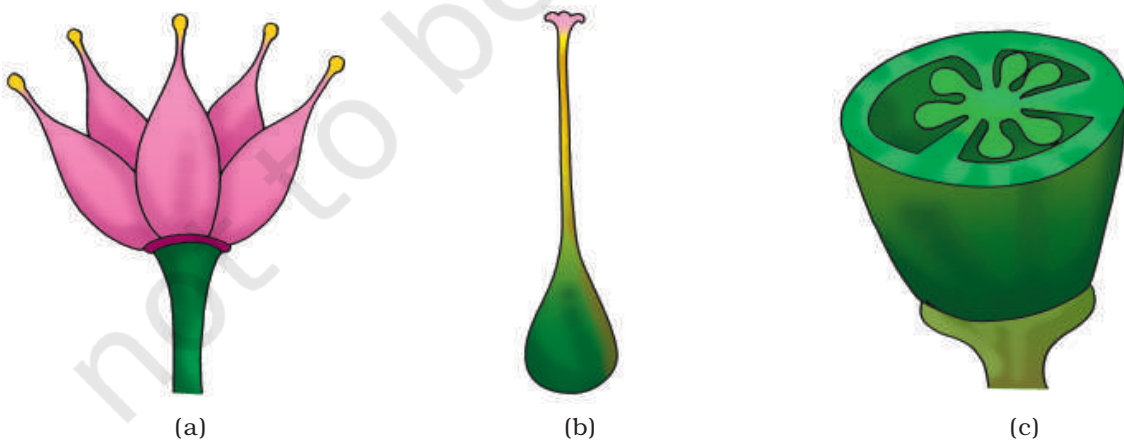
**Fig.1.3** Attachment of filament to anther: (a) Basifixed (b) Adnate (c) Dorsifixed (d) Versatile



**Fig.1.4** Dehiscence pattern of anther: (a) Porous (b) Longitudinal

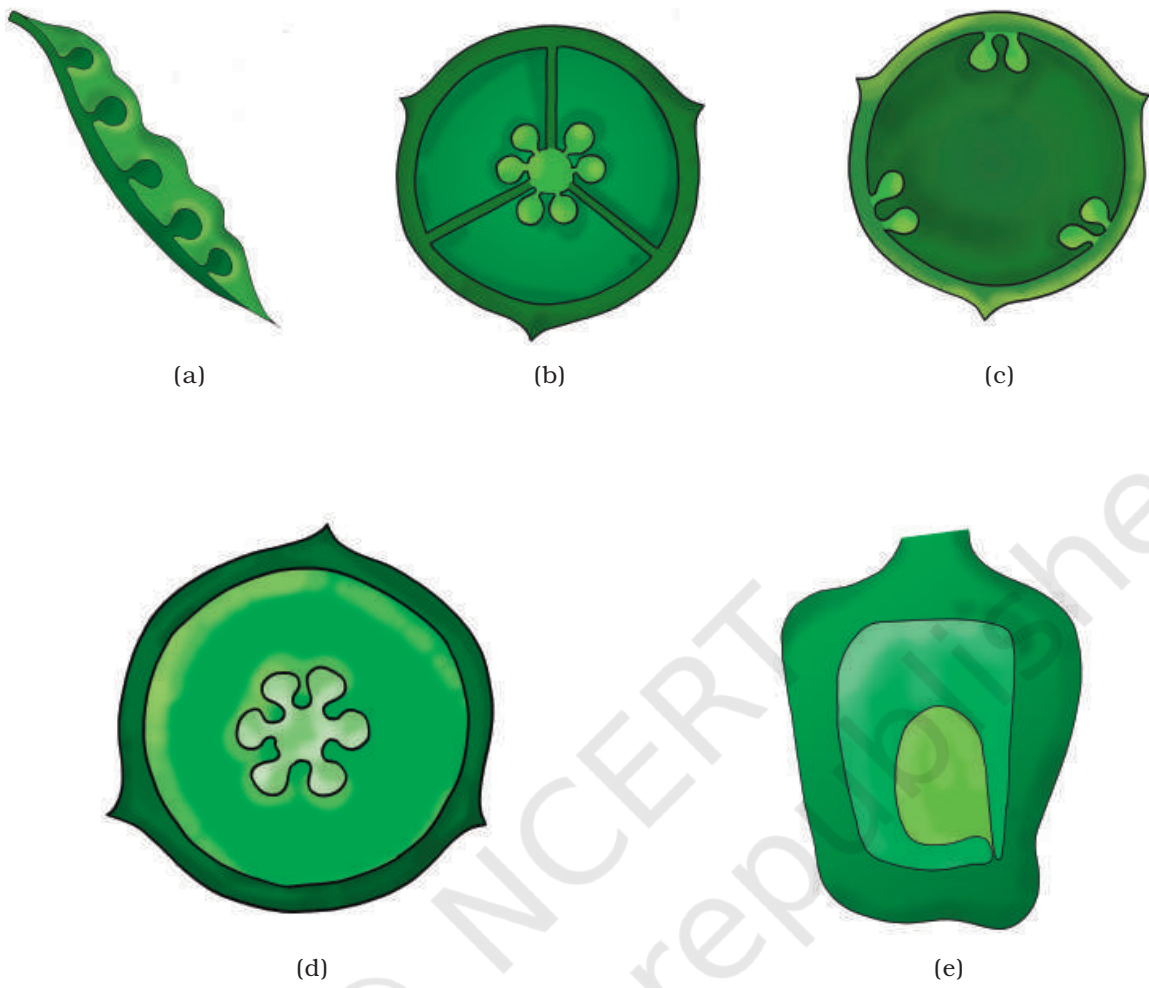


**Fig.1.5** Position of ovary: (a) Epigynous (b-c) Perigynous (d) Hypogynous



**Fig.1.6** Cohesion of carpels: (a) Apocarpous (b-c) Syncarpous

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**Fig.1.7** Placentation: (a) Marginal (b) Axile (c) Parietal (d) Free central (e) Basal