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8 Reproduction in Plants

To produce its kind is a characteristic of all living organisms. You have already learnt this in Class VI. The production of new individuals from their parents is known as **reproduction**. But, how do plants reproduce? There are different modes of reproduction in plants which we shall learn in this chapter.

8.1 Modes of Reproduction

In Class VI you learnt about different parts of a flowering plant. Try to list the various parts of a plant and write the functions of each. Most plants have roots, stems and leaves. These are called the **vegetative parts** of a plant. After a certain period of growth, most plants bear flowers. You may have seen the mango trees flowering in spring. It is these flowers that give rise to juicy mango fruit we enjoy in summer. We eat the fruits and usually discard the seeds. Seeds germinate and form new plants. So, what is the function of flowers in plants? Flowers perform the function of reproduction in plants. Flowers are the **reproductive parts**.

There are several ways by which plants produce their offspring. These are categorised into two types: (i) asexual, and (ii) sexual reproduction. In **asexual reproduction** plants can give rise to new plants without seeds, whereas in **sexual reproduction**, new plants are obtained from seeds.

Paheli thought that new plants always grow from seeds. But, she has never seen the seeds of sugarcane, potato and rose. She wants to know how these plants reproduce.

Asexual reproduction

In asexual reproduction new plants are obtained without production of seeds.

Vegetative propagation

It is a type of asexual reproduction in which new plants are produced from roots, stems, leaves and buds. Since reproduction is through the vegetative parts of the plant, it is known as **vegetative propagation.**

Activity 8.1

Cut a branch of rose or *champa* with a node. This piece of branch is termed a **cutting**. Bury the cutting in the soil. A node is a part of the stem/branch at which a leaf arises (Fig. 8.1). Water the cutting every day and observe its growth. Observe and record the number of days taken for roots to come out and

new leaves to arise. Try the same activity by growing money plant in a jar of water and record your observations.

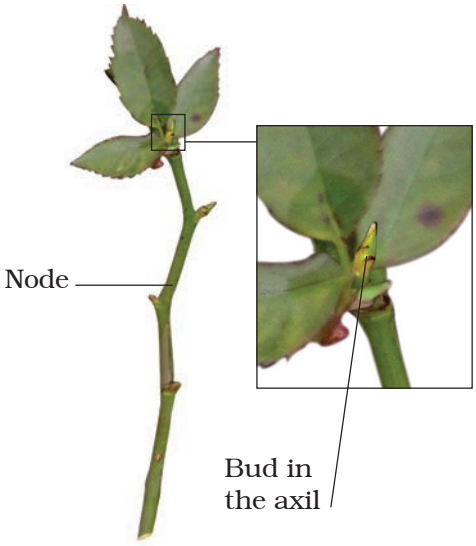

Fig. 8.1 *Stem-cutting of rose*

You must have seen flower buds developing into flowers. Apart from flower buds, there are buds in the axil (point of attachment of the leaf at the node) of leaves which develop into shoots. These buds are called vegetative buds (Fig. 8.2). A bud consists of a short stem around which immature overlapping leaves are present. Vegetative buds can also give rise to new plants.

Activity 8.2

Take a fresh potato. Observe the scars on it with the help of a magnifying glass. You may find bud(s) in them. These scars are also called **"eyes"**. Cut the potato into small portions, each with an eye and bury them in the soil. Water the pieces regularly for a few days and observe their progress. What do you find?

Fig. 8.2 *Potato plant sprouting from an 'eye'*

Likewise you can also grow ginger (Fig. 8.3) or turmeric.

Bryophyllum (sprout leaf plant) has buds in the margins of leaves (Fig. 8.4). If a leaf of this plant falls on a moist

Fig. 8.3 *Ginger with new plants sprouting from it*

soil, each bud can give rise to a new plant.

Roots of some plants can also give rise to new plants. Sweet potato and dahlia are examples.

Plants such as cacti produce new plants when their parts get detached

Fig. 8.4 Leaf of Bryophyllum with buds in the margin

from the main plant body. Each detached part can grow into a new plant.

Plants produced by vegetative propagation take less time to grow and bear flowers and fruits earlier than those produced from seeds. The new plants are exact copies of the parent plant, as they are produced from a single parent.

Later in this chapter you will learn that plants produced by sexual reproduction have characters of both the parents. Plants produce seeds as a result of sexual reproduction.

Budding

You have already learnt about the tiny organisms like yeast can be seen only under a microscope. These grow and multiply every few hours if sufficient nutrients are made available to them. Remember that yeast is a single-celled organism. Let us see how they reproduce?

Activity 8.3

(To be demonstrated by the teacher)

Take a piece of yeast cake or yeast powder from a bakery or a chemist shop. Take a pinch of yeast and place it in a container with some water. Add a spoonful of sugar and shake to dissolve it. Keep it in the warm part of a room. After an hour, put a drop of this liquid on a glass slide and observe under a microscope. What do you observe? You may see the formation of new yeast cells (Fig. 8.5).

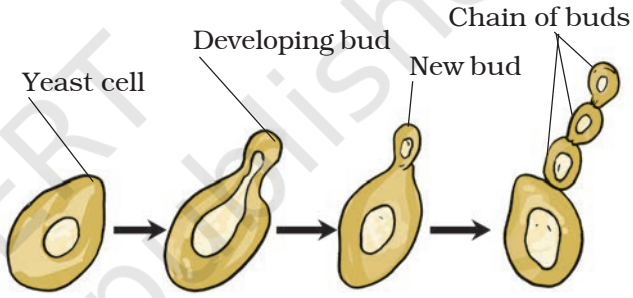

Fig. 8.5 Reproduction in yeast by budding

The small bulb-like projection coming out from the yeast cell is called a **bud**. The bud gradually grows and gets detached from the parent cell and forms a new yeast cell. The new yeast cell grows, matures and produces more yeast cells. Sometimes, another bud arises from the bud forming a chain of buds. If this process continues, a large number of yeast cells are produced in a short time.

Fragmentation

You might have seen slimy green patches in ponds, or in other stagnant water bodies. These are the algae. When

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water and nutrients are available algae grow and multiply rapidly by fragmentation. An alga breaks up into two or more fragments. These fragments or pieces grow into new individuals (Fig. 8.6). This process continues and they cover a large area in a short period of time.

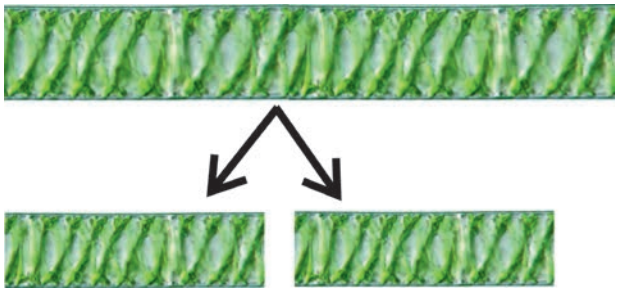


Fig. 8.6 Fragmentation in spirogyra (an alga)

Spore formation

In Chapter 1 you learnt that the fungi on a bread piece grow from spores which are present in the air. Repeat Activity 1.2. Observe the spores in the cotton-like mesh on the bread. When spores are released they keep floating in the air. As they are very light they can cover long distances.

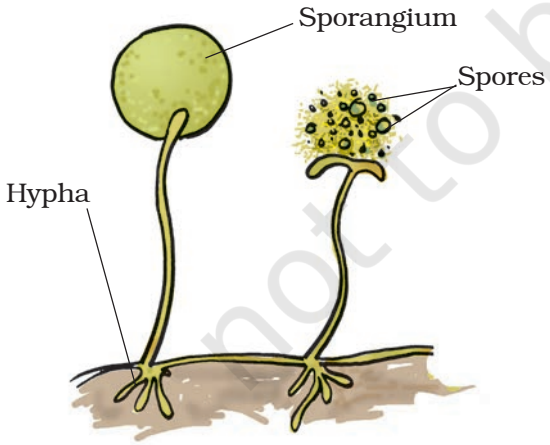


Fig. 8.7 Reproduction through spore formation in fungus

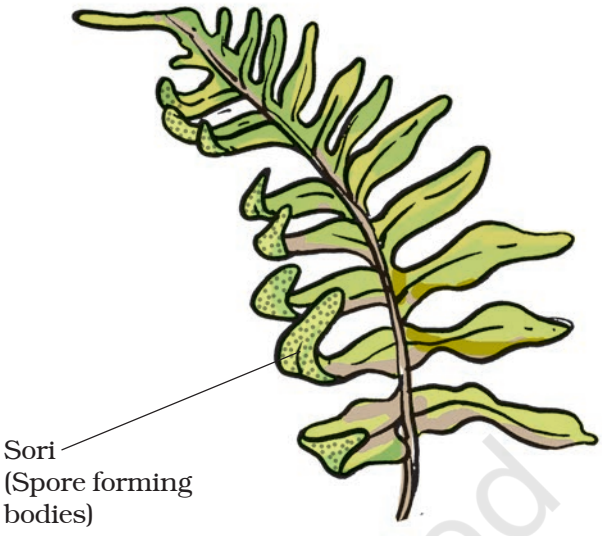


Fig. 8.8 Reproduction through spore formation in fern

Spores are asexual reproductive bodies. Each spore is covered by a hard protective coat to withstand unfavourable conditions such as high temperature and low humidity. So they can survive for a long time. Under favourable conditions, a spore germinates and develops into a new individual. Plants such as moss and ferns (Fig. 8.8) also reproduce by means of spores.

12.2 Sexual Reproduction

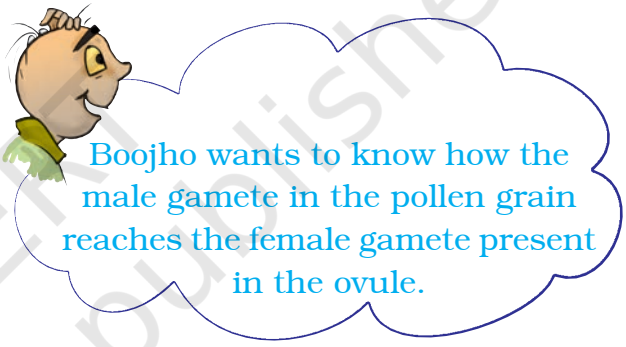
You have learnt earlier the structure of a flower. You know that the flowers are the reproductive parts of a plant. **Stamens** are the male reproductive part and **pistil** is the female reproductive part (Fig. 8.9).

Activity 8.4

Take a mustard/China rose/petunia flower and separate its reproductive parts. Study the various parts of a stamen and pistil.

Flowers which contain either only pistil or only stamens are called **unisexual flowers**. Flowers which contain both stamens and pistil are called **bisexual flowers**. Corn, papaya and cucumber produce unisexual flowers, whereas mustard, rose and petunia have bisexual flowers. Both male and female unisexual flowers may be present in the same plant or in different plants.

Could you identify the anther and the filament of a stamen? [Fig. 8.9 (a)]. Anther contains pollen grains which produce **male gametes**. A pistil consists of stigma, style and ovary. Ovary contains one or more ovules. The **female gamete** or the **egg** is formed in an ovule [Fig. 8.9 (b)]. In sexual reproduction a male and a female gamete fuse to form a **zygote**.



Pollination

Generally, pollen grains have a tough protective coat which prevents them from drying up. Since pollen grains are light, they can be carried by wind or

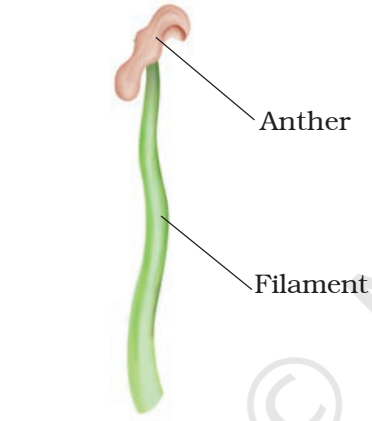


Fig. 8.9 Reproductive parts

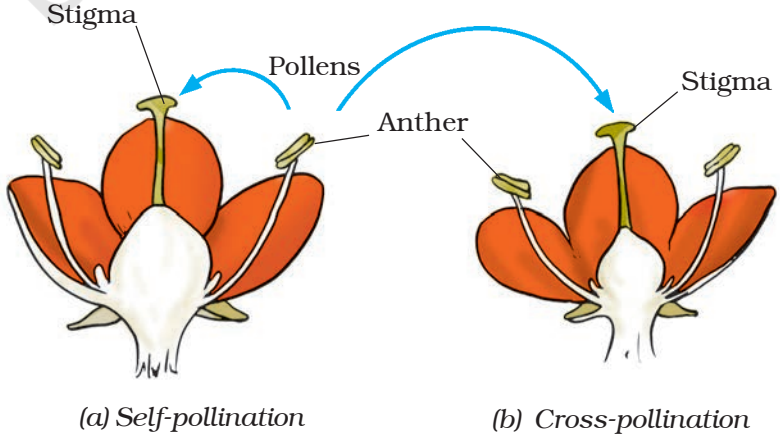


Fig. 8.10 Pollination in flower

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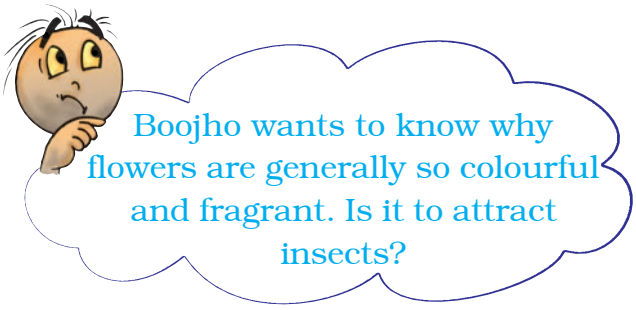

water. Insects visit flowers and carry away pollen on their bodies. Some of the pollen lands on the stigma of a flower of the same kind. The transfer of pollen from the anther to the stigma of a flower is called **pollination**. If the pollen lands on the stigma of the same flower or another flower of the same plant, it is called self-pollination. When the pollen of a flower lands on the stigma of a flower of a different plant of the same kind, it is called cross-pollination [Fig. 8.10 (a) and (b)].

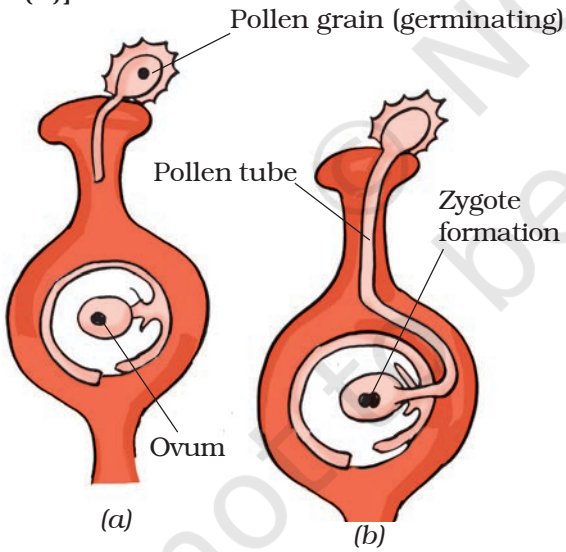

Fig. 8.11 *Fertilisation (Zygote formation)*

Fertilisation

The cell which results after **fusion** of the gametes is called a **zygote**. The process of fusion of male and female gametes (to form a zygote) is called **fertilisation** (Fig. 8.11). The zygote develops into an **embryo**.

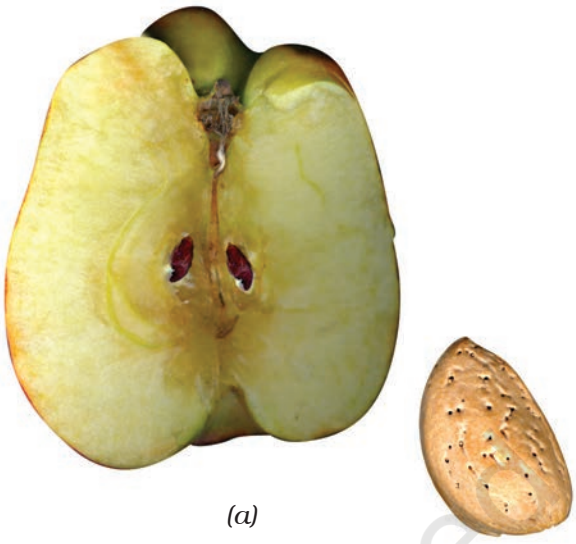

Fig. 8.12 *(a) Section of an apple, (b) Almond*

8.3 Fruits and Seed Formation

After fertilisation, the ovary grows into a fruit and other parts of the flower fall off. The fruit is the ripened ovary. The seeds develop from the ovules. The seed contains an embryo enclosed in a protective seed coat.

Some fruits are fleshy and juicy such as mango and orange. Some fruits are hard like almonds and walnuts [Fig. 8.12 (a) and (b)].

8.4 Seed Dispersal

In nature same kind of plants grow at different places. This happens because **seeds are dispersed to different places**. Sometimes after a walk through a forest or a field or a park, you may have found seeds or fruits sticking to your clothes.

Did you try to observe how these seeds were clinging to your clothes?

What do you think will happen if all seeds of a plant were to fall at the same place and grow there? There would be severe competition for sunlight, water, minerals and space. As a result the seeds would not grow into healthy plants. Plants benefit by seed dispersal. It prevents competition between the plant and its own seedlings for sunlight, water and minerals. It also enables the plants to invade new habitats for wider distribution.

Seeds and fruits of plants are carried away by wind, water and animals. Winged seeds such as those of drumstick and maple [Fig. 8.13 (a) and (b)], light seeds of grasses or hairy seeds of aak (*Madar*) and hairy fruit of sunflower [Fig. 8.14 (a), (b)], get blown off with the wind to far away places. Some seeds are dispersed by water. These fruits or seeds usually develop floating ability in the form of spongy or fibrous outer coat as in coconut. Some seeds are dispersed by animals, especially spiny seeds with hooks which get attached to the bodies of animals and are carried to distant places. Examples are *Xanthium* (Fig. 8.15) and *Urena*.

Some seeds are dispersed when the fruits burst with sudden jerks. The seeds are scattered far from the parent plant. This happens in the case of castor and balsam.

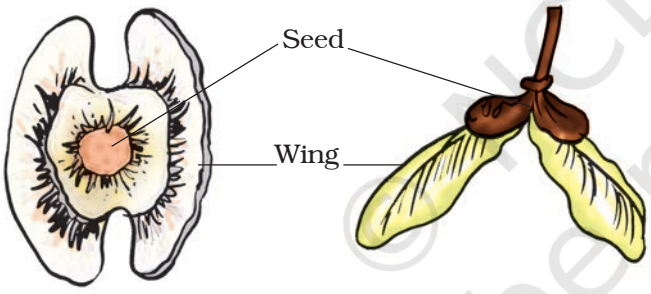

Fig. 8.13 *Seeds of (a) drumstick and (b) maple*

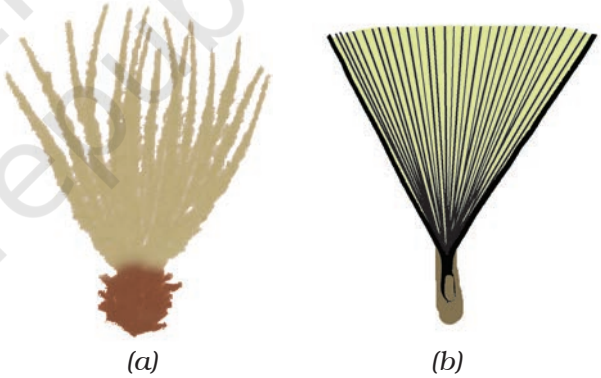

Fig. 8.14 *(a) The hairy fruit of sunflower and (b) hairy seed of madar (aak)*

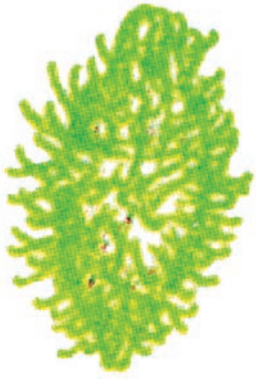

Fig. 8.15 *Xanthium*

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