REPRODUCTION

4
CHAPTER

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REPRODUCTION

Reproduction is a process by which every living organism produce an organism like their own.

◈ **Types of reproduction :**

(a) Asexual reproduction : In this type of reproduction only one parent organism either mother or father produces new organism.

(b) Sexual reproduction : In this type of reproduction both parent are involved & produces new organisms.

◈ **Asexual reproduction in unicellular organism :**

1. Binary fission : During this process, two daughter organisms of equal sizes are formed from one parent by the division of the parent body. This is the most common method of reproduction in algae, fungi and bacteria (fig.).

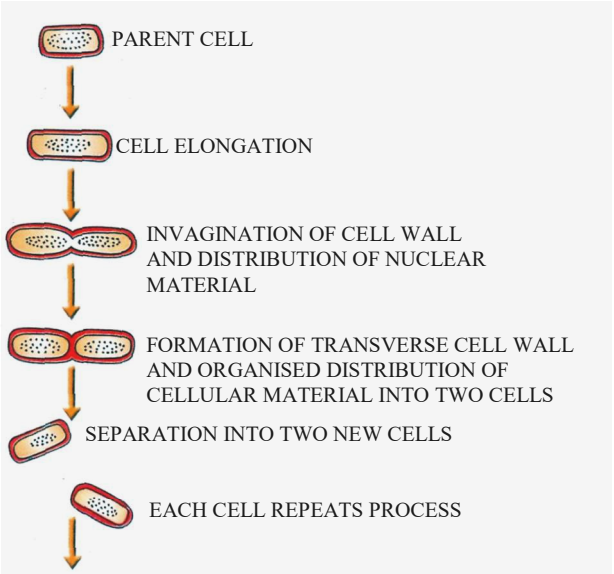

FIGURE : BINARY FISSION (BACTERIA)

(2) Budding : In this type of reproduction, a small outgrowth appears on the body of the organism. This outgrowth is called a bud. The buds grow and finally detach from the parent body and begin to live as independent organisms.

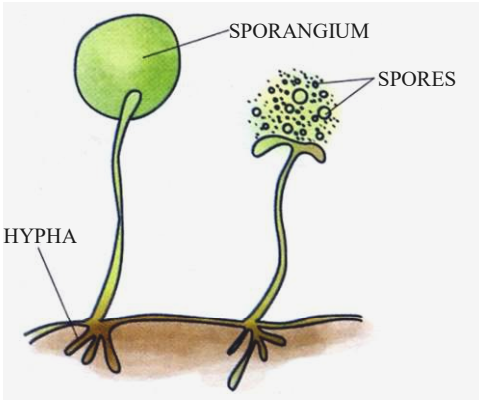

FIGURE : Spore formation in fungus

(3) Fragmentation : This takes place in algae like spirogyra and oscillatoria. The filament of the alga breaks into two or more pieces called fragments, and the process is known as fragmentation. Each fragment the grows into a new plant.

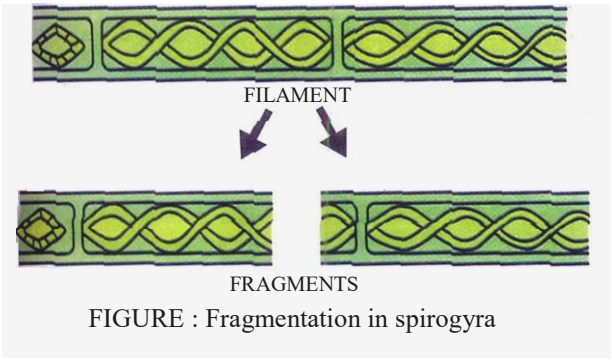

FIGURE : Fragmentation in spirogyra

(4) Spore formation : Some lower plants such as ferns, mosses, lichens and fungi reproduce through spore formation under unfavourable conditions. Spores are tiny, microscopic bodies, which are covered by hard protective coats. The protective coats enable them to tide over adverse environmental conditions. When favourable conditions return, each spore gives rise to a new individual.

➢ ASEXUAL REPRODUCTION IN PLANTS

When reproduction takes place only from the vegetative parts of plant known as vegetative reproduction.

(a) Natural vegetative propagation.

(b) Artificial vegetative propagation.

◈ Natural vegetative propagation :

- **Natural propagation by leaf :** Vegetative propagation by leaves can be seen in very few plants like bryophyllum and begonia. In these plants buds are produced on leaf margins. These buds after falling on the ground grow into new plants.

- **Natural propagation by stem :** Underground stems are modified for storage of food. ?These underground stems produce several new plants from their buds. Modified stems like tuber, bulb, rhizome and corm help the plants to multiply.

- **Natural propagation by root :** Roots also help in vegetative propagation. For example, sweet potato and dahlia give rise to new plants from their fleshy roots. (figure)

◈ Artificial vegetative propagation :

- **Grafting :** In this commonly practiced method a new variety is obtained from the mother plant (figure). In this process a detached part of one plant is inserted into the stem or the root system of another plant.

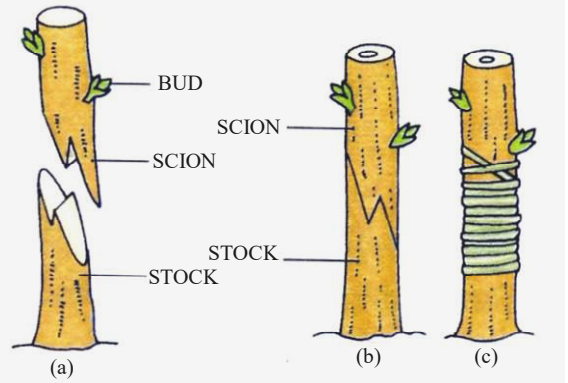

FIGURE : Grafting

The short piece of detached shoot containing several buds is called scion. The lower portion of the plant that is fixed to the soil by its roots system is called the stock. They establish vascular connection with each other after a few days.

- **Layering :** In this method a young branch is bent towards the ground and covered with moist soil. After some days, new roots develop from the covered part, which is in contact with the soil. This is called a layer and the process is called layering. The branch is then separated from the parent plant and allowed to grow into a new independent plant.

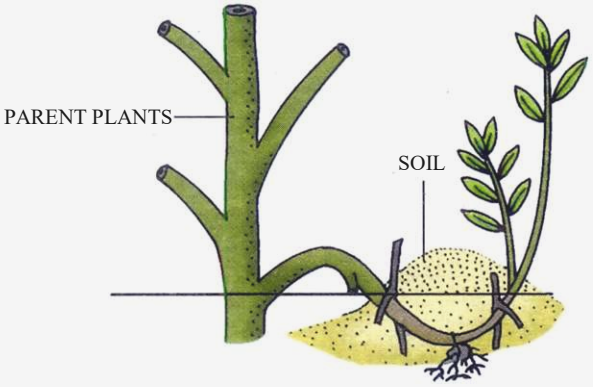

FIGURE : Layering

- **Cutting :** In this method a healthy young branch of a plant having leaf buds is cut out and planted in moist soil (figure). The branch develops root and grows into a new plant. Bougainvillea, sugarcane, rose and grapes are grown from cuttings.

SEXUAL REPRODUCTION IN PLANTS

Flower is a reproductive part of plant. Which contain male & female sex organ & produce ovum & pollen grain.

A normal flower consists of four whorls namely sepals, petals, androecium and gynoecium (figure).

The androecium is the male reproductive part of the flower. Androecium may consist of one or more tube-like stamens. Each stamen consists of thin stalk called filament and a two-lobed head called the anther. Anther contains pollen grains which produce male gametes.

The pistil or gynoecium is the female reproductive part of the flower. Each pistil consist of stigma, style, and ovary. The ovary contains one or more ovules.

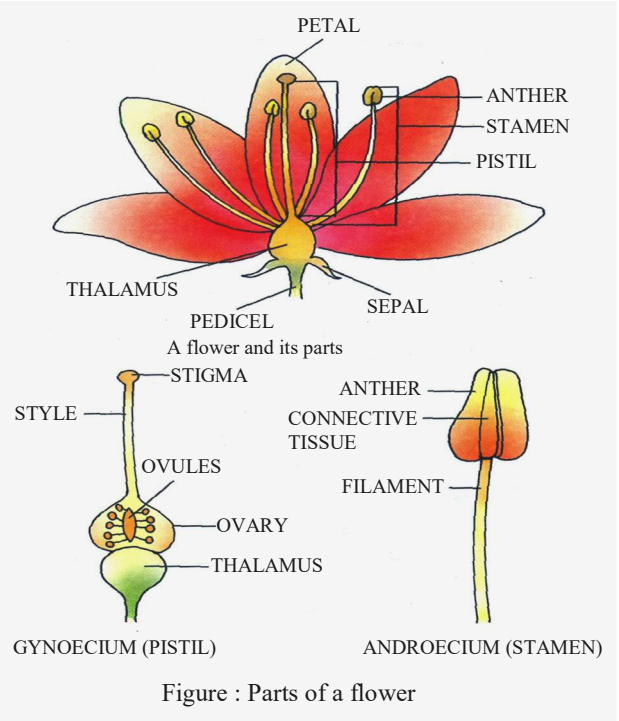

Figure : Parts of a flower

POLLINATION

Pollination is the process by which pollen grains from the anther of a flower are transferred to the stigma of the same flower or another flower.

Types of pollination :

There are two types of pollination which are described below :

- **Self-Pollination or Autogammy :**

It is the process of transfer of pollen from anther to the stigma of the same flower or to the stigma of another flower of the same plant.

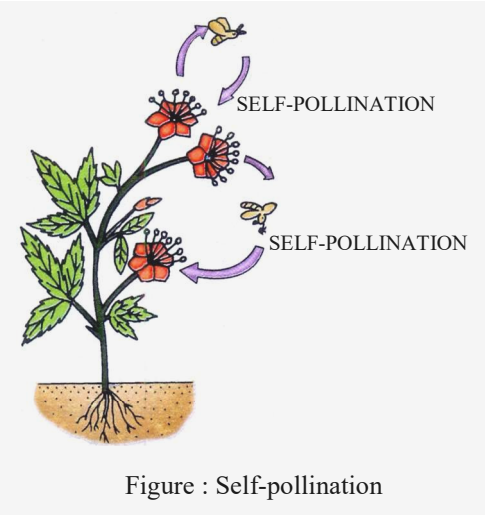

Figure : Self-pollination

- **Cross-pollination or Allogamy :**

It is the process of transfer of pollen from the anther of a flower to the stigma of a flower of another plant of the same species or sometimes of very closely related species.

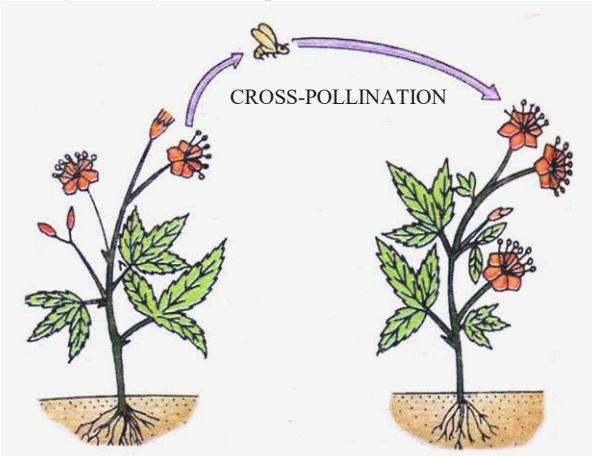

Figure : Cross-pollination

FERTILISATION

After successful pollination the stigma secretes nutrients for the lodged pollen grains. The pollen grains absorb these nutrients and grow to form a thin tube called **pollen tube**. This grows into the stigma in down the style (figure). It grows until it reaches the ovule and enters inside it. The pollen tube contains two male gametes. After reaching the ovule, it releases the male gametes, one of which fused with the egg to form the zygote. This process of fusion of a male gamete with a female gamete is called **fertilization**. The zygote develops into an embryo.

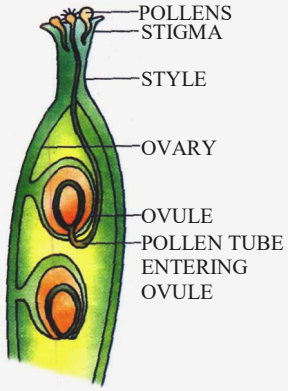

Figure : Germination of pollen and fertilisation

FRUIT & SEED FORMATION

After fertilization the ovary grows into a fruit and the ovules inside it become seeds. The other parts of the flower such as sepals, petals, and stamens fall off. A fruit is actually a biologically ripened ovary.

EXERCISE # 1

A. Single Choice Type Questions

Q.1 A method in which roots are initiated on the stem while still attached with the parent plant is called -
(A) grafting (B) budding
(C) layering (D) tissue culture

Q.2 Hydra reproduces by -
(A) budding (B) spore formation
(C) binary fission (D) fragmentation

Q.3 Pollen grains are produced in -
(A) anther (B) filament
(C) stigma (D) style

Q.4 Seeds in a matured ovary develop from -
(A) ovule (B) stigma
(C) ovum (D) pollen grains

Q.5 Seeds and fruits dispersed by wind have -
(A) wings (B) hairs
(C) censer mechanism (D) all of these

Q.6 Ferns, mosses, lichen and fungi reproduce through -
(A) spore formation (B) binary fission
(C) budding (D) fragmentation

Q.7 Bougainvillea grow from -
(A) cutting (B) grafting
(C) layeirng (D) none of these

Q.8 A plant can be grown from tissue-culture is -
(A) orchid (B) pear
(C) grapevine (D) cherry

Q.9 Stigma, style and ovary are the parts of -
(A) androecium (B) gynoecium
(C) anther (D) sepals

Q.10 Which does not belong to bisexual flower ?
(A) mustard (B) rose
(C) petunia (D) papaya

B. Fill in the blank

Q.11 Yeast reproduces by ..... .

Q.12 Two kinds of pollination are ..... and .....

Q.13 On fertilization, ovary is transformed into ..... .

Q.14 Some common methods of asexual reproduction are ..... and ..... .

Q.15 Transfer of pollens from ..... to ..... is called pollination.

C. Match the Column

Q.16

Column A	Column B
(1) Tuber	(a) Bryophyllum
(2) Bulb	(b) Potato
(3) Rhizome	(c) Onion
(4) Corm	(d) Ginger
(5) Leaves	(e) Colocasia
	(f) Rose

EXERCISE # 2

A. Very Short Answer Types Questions

Q.1 Name four forms of stems which can propagate vegetatively.

Q.2 How is bryophyllum plant propagated ?

Q.3 Which method is used to propagate begonia plant ?

Q.4 Name two plants which store food in their roots and also reproduce vegetatively.

Q.5 Give two examples of tubers.

Q.6 name two organisms which reproduce by budding.

Q.7 Name a plant which reproduce by spores.

Q.8 What is the mode of reproduction in spirogyra ?

Q.9 What is the name of male and female parts of a flower ?

Q.10 Name one plant whose fruits have a fibrous coat which makes them float in water.

B. Short Answer Types Questions

Q.11 What is a zygote and how is it formed ?

Q.12 Write two characteristics of insect pollinated flowers.

Q.13 What is tissue culture ?

Q.14 Name the male and female reproductive parts of a flower.

Q.15 What is the significance of dispersal of seeds and fruits ?

Q.16 What is the function of pollens in flowering plants ?

Q.17 Give two advantages of vegetative propagation.

C. Long Answer Types Questions

Q.18 Explain how budding sometimes results in a chain of cells in yeast.

Q.19 Why are artificial vegetative reproductive methods so commonly used nowadays ?

Q.20 What is the main difference between asexual and sexual reproduction ?

Q.21 Make a labelled diagram of the flower showing reproductive parts in it.

Q.22 How is fertilization brought about in a flower ?

Q.23 Explain the following terms :
(a) Fertilization (b) Pollination
(c) Zygote (d) Budding

Q.24 What do you understand by fertilization ? Explain it with a neat and well-labelled diagram.