

# Reproduction In Plants

- **Reproduction** is the process of producing new individuals of the same kind.
- It is not needed for an organism to survive, rather it helps the organisms to produce their offsprings and thereby continue their generation.
- It is mainly of **two** types :- **Asexual** and **Sexual**.

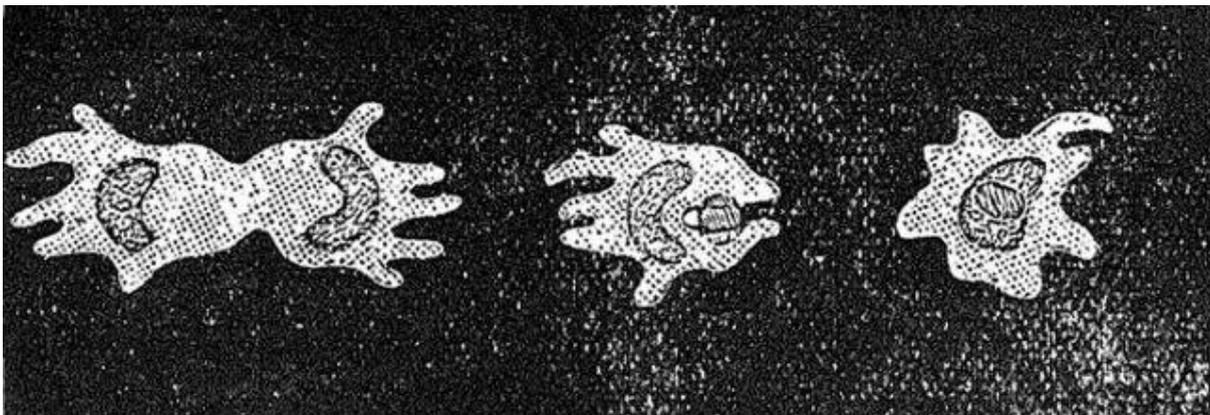
Asexual Reproduction	Sexual Reproduction
<ul style="list-style-type: none"> <li>● In this type of reproduction, no fusion of gametes occurs i.e only one parent is involved.</li> </ul>	<ul style="list-style-type: none"> <li>● In this type of reproduction, two parents bearing gametes of opposite sex are involved.</li> </ul>
<ul style="list-style-type: none"> <li>● No variation of genes occurs as the full set of genes are transferred from parent to offspring.</li> </ul>	<ul style="list-style-type: none"> <li>● Here, fusion of gametes occurs.</li> </ul>
<ul style="list-style-type: none"> <li>● Usually seen in unicellular organisms or lower grade multicellular organisms.</li> </ul>	<ul style="list-style-type: none"> <li>● Usually seen in higher plants or animals.</li> </ul>

- **Types of Asexual Reproduction:**

1. **Fission-** In this, a unicellular organism splits to form two or more new organisms.

i).**Binary Fission-** The unicellular organisms like Amoeba, Euglena, Paramecium and Leishmania( causative agent of kala azar) etc reproduce by binary fission.

Binary fission in Amoeba



ii).**Multiple Fission-** The organism splits to form many organisms at the same time. Eg. Plasmodium (causes malaria , vector-female anopheles), Algae and Yeast etc. Sometimes, In this type of fusion a cyst(protective wall is formed around a unicellular organism. Inside this cyst, the nucleus splits into many nuclei and along

with this nuclei and a little bit of cytoplasm, many new daughter cells are formed and when the cyst breaks, daughter cells are released.

**2. Fragmentation-** In this, the body of the parent organism breaks into two or more distinct pieces, such that each fragment can develop into a new organism.

Eg. Spirogyra, Sea Anemone, Flatworms.

This occurs in simple multicellular organisms. Such that there must be a single cell type in an organism that is capable of growing, proliferating and making other cell types under the right circumstances.

**3. Regeneration-** The process of getting back a full organism from its body parts is called regeneration. It is carried out by specialised cells.

Eg. Hydra, Planaria and Starfish.

In this type of reproduction, the organism is cut or broken up into many pieces and many of these pieces grow into separate individuals.

**Note:-**Multicellular organisms can not regenerate its body parts as they have complex specialised cells that make up the tissue, tissues make up organs, organs make up organ system and finally make up an organism.

**4. Budding-** In this, a bulb-like projection called bud occurs on the body of the parent organism. The bud increases in size and eventually breaks off from the parent and develops into a new individual.

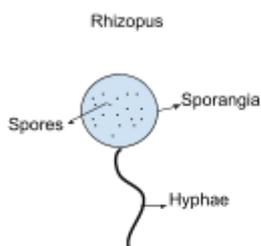
Eg. Hydra, Yeast and Spongilla.

**5. Spore Formation-** In this, the parent plant produces hundreds of microscopic reproductive units called 'spores'. When the spore case of a plant bursts, then the spore bursts into air. When these air borne seeds land on food or soil under favourable conditions, they germinate to produce new plants.

Eg. Rhizopus and Penicillin.

Reproductive part of rhizopus- Sporangia(bulb like structure)

Non- Reproductive part of Rhizopus- Hyphae.



**6. Vegetative Propagation-** In this, new plants are obtained from the parts of old plants(stems, roots and leaves), without the help of any reproductive organ.

There are two ways by which the plants reproduce by vegetative propagation- **naturally** and **artificially**.

### **Natural Methods-**

**(a) Modified Tuberos roots-** There are few roots which apart from providing support and absorbing water and minerals, also store food and thus take part in vegetative propagation.

Eg. Tuberos roots of Dahalia, Sweet potato, Asparagus become swollen due to food stored in them.

**(b) Propagation through stems-** Different types of stem modifications are-

- **Tubers-** Some plants have underground stems called tubers which are swollen due to food stored. Tubers possess scars or depressions called 'eyes'. Each eye represents a node in which small buds are present. These buds give rise to new plants.
- **Rhizomes-** It is found in ginger, turmeric etc. Ginger and turmeric are thick, have horizontally growing stems in which buds develop into branches that grow upwards and produce green leaves. Roots develop from the lower surface of underground stems.
- **Bulbs-** The buds present inside the bulb give rise to plants.  
Eg. Onion, garlic.

**(c) Propagation through leaves-** Some plants develop adventitious buds in the notches of the leaves present along their margin. When such a leaf falls on moist soil, each bud grows into an independent plant.

Eg. Bryophyllum, Begonia etc.

**Artificial methods-** These methods are developed by plant growers and horticulturists for commercial production.

**(a)Cutting-** The small piece of any plant organ(root, leaf or most commonly stem) used for propagation is called cutting. The stem cutting has to be planted in moist soil to grow into a new plant. It allows many new plants(similar to parent plant) to be produced from a single plant without waiting for flowers and seeds.

Eg. Grape, phalsa, rose, sugarcane and bougainvillea etc.

**(b)Layering-** The development of roots on a stem while the stem is still attached to the parent plant is called layering.

In this method, a branch of the plant is pulled towards the ground and a part of it is covered with moist soil leaving the tip of the branch exposed above ground. After some time, new roots develop from the part buried in soil. The branch then cut off from the parent plant and allowed to grow into a new plant.

Eg. Jasmine, cherry, litchi, hibiscus and lemon etc.

**(c)Grafting-** It is the method of obtaining a superior quality plant from two different plants by taking the root system (stock) of one plant and the shoot system (scion) of

another. Stock and scion ends are cut obliquely and placed face to face in close contact and covered.

The vegetative characteristics of plants are influenced by scion eg- colour, size and flavour of fruit and the rooting and stem is contributed by stock.

This technique is not possible in monocots as they have no cambium (layer underneath bark of woody stem which encourages secondary growth of roots and stem).

Eg. Mango, guava, pear, apricot, apple and peach etc.

**Artificial propagation** is usually used for propagation of those plants which produce either very few seeds or do not produce viable seeds.

**Tissue culture-** The production of new plants from a small piece of tissue removed from growing tips of a plant in a suitable growth medium is called tissue culture.

In this method, a small piece of tissue is cut off from the growing plant and placed on a sterile jelly containing plant hormones and nutrients (agar).

Hormones make the cell tissue divide rapidly forming a shapeless lump called 'callus'.

The callus is then transferred into another nutrient medium to develop roots and shoots to form a tiny plantlet. The plantlets so formed can now be grown in pots filled with soil.

This technique is being used increasingly for production of ornamental plants like Orchids, Dahlia, Chrysanthemum etc.

This technique is also known as '**micropropagation**'.

#### **Advantages-**

1. Plants produced by vegetative propagation take less time to grow and bear fruits and flowers.
2. It is a more rapid, easier and cheaper method.
3. The new plants produced are exact copies of parent plants with the required characteristics like resistance to disease.
4. With the help of tissue culture, we can grow plants round the year irrespective of weather.
5. Very little space is needed to develop new plants and also they are disease free.

