Asexual Reproduction

Asexual Reproduction in Flowering Plants

Different methods of asexual reproduction are:

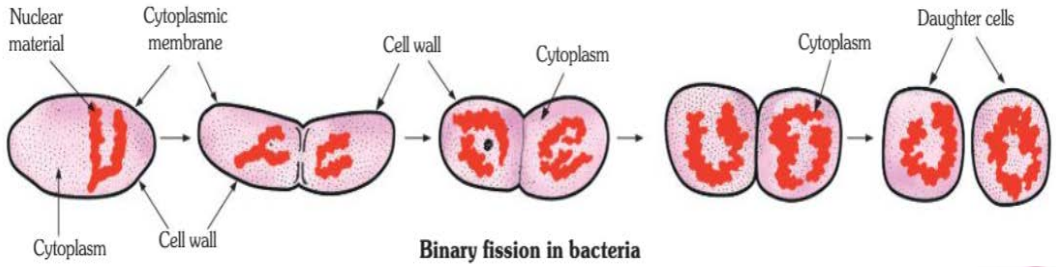
- Cell Fission
- Budding
- Spore formation
- Fragmentation
- Vegetative propagation

Cell Fission

- Splitting of a mature cell into two or more cells of the same type is called cell fission.
- The splitting of a cell into two cells of the same types is called **binary fission**.
- The splitting of a cell into more than two cells of the same type is called **multiple fission**.

In binary fission first the nucleus divided into two nuclei.

- The cytoplasm then divides into two parts each containing a nucleus.
- Further stretching leads to the formation of the two daughter cells. The cells so formed grow into mature cells and then undergo similar binary fission.
- It is the most common method of a sexual reproduction in unicellular organisms such as Bacteria and Amoeba.

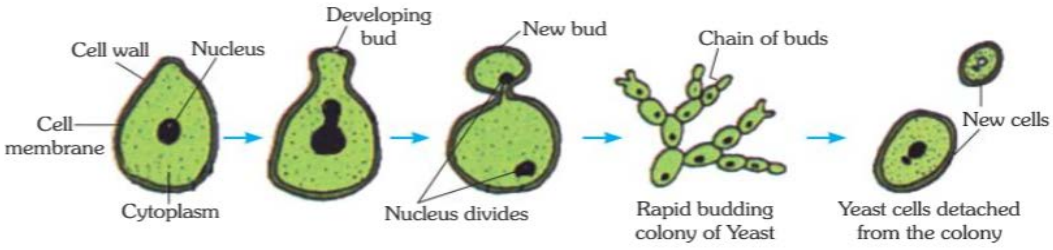


Binary fission in bacteria

Asexual Reproduction

Budding

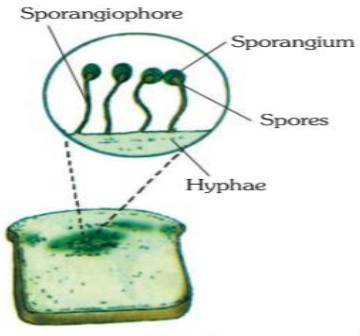
- Yeast (a non-green plant) reproduces by budding. A bulb- like projection formed on the body of an organism is known as the bud.
- The nucleus of the parent body divides into two, or one of the nuclei goes into the bud.
- When the bud gets matured, it detaches itself from the parent body and becomes and independent individual.



Reproduction in yeast by budding

Spore Formation

- During unfavourable climatic conditions such as heat or dryness, scarcity of water, food, etc.
- The lower parts like bacteria, Mucor (fungus), algae and moss produce heat resistant reproductive structures called spores.
- Their number is variable. Reproduction by spore formation is called sporulation.

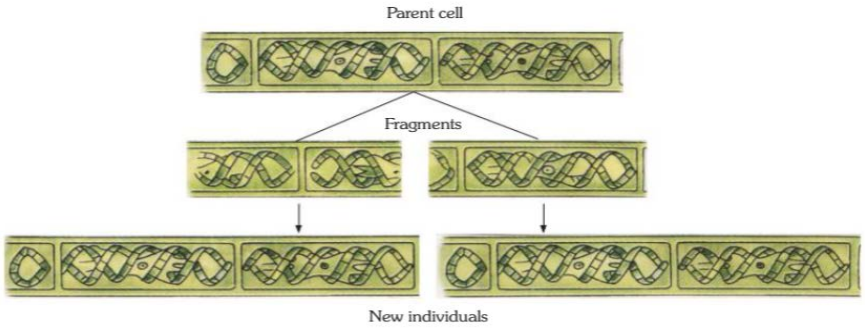


Reproduction by spores in Rhizopus

Asexual Reproduction

Fragmentation

- In certain algae such as spirogyra, the long ribbon- like (or filamentous) body breaks up into two or more parts call fragments.
- The breaking of body into one or more parts is called **fragmentation**.
- Each fragment than grows into a new individual.



Fragmentation in spirogyra (an alga)

Vegetative Propagation

Vegetative propagation is a process of producing new plantlets by the use of vegetative parts of a plant like roots, stems and leaves. It can be done by the following methods:

1. Natural Methods: by the use of i) roots ii) stems and iii) leaves

2. Artificial Methods: i) by cutting ii) layering iii) grafting tissue iv) culture

Asexual Reproduction

1. Vegetative propagation by natural methods (natural propagation)

Vegetative propagation by natural method means in multiplication of plants without the involvement of humans.

(i) Vegetative propagation by roots

- The roots of some plants bear special types of buds called adventitious buds.
- These buds give rise to leafy shoots (tufts of leaves) at some distance away from the parent plant on the ground above, and below form adventitious roots.
- Example: guava, sweet potato, mint, dahlia, etc.

(ii) Vegetative propagation by stem

- The stems of certain plants are very efficient means of propagation such as:

(a) Subaerial stems: like runners, suckers, stolons, e.g. common grass, strawberry, mint, etc.

- Runners are side shoots (stems) growing from parent (mother) plants.

(b) Underground stems: like tuber, bulb, rhizome and corm.

- Tubers are underground stems. They are oval and round- shaped structures store in food (starch), e.g. potato. Potato tubers have scaly leaves bearing the buds in their axles which are called '**eyes**'.
- Bulb is a bulb- shaped structure made up of scaly leaves the store food such as in onion, garlic and lily.
- Rhizome is a stem that grows horizontally through the soil.

Asexual Reproduction

- It is irregular in shape and swollen with food.
- They have scaly leaves and axillary buds.
- These buds give rise to new plantlets, example, ginger, turmeric, etc.
- Corm is a short oval thick stem swollen on with stored food.
- It has several buds which give rise to plants, when separated and grown, e.g., gladiolus, colocasia, etc.

(iii) Vegetative propagation by leaves

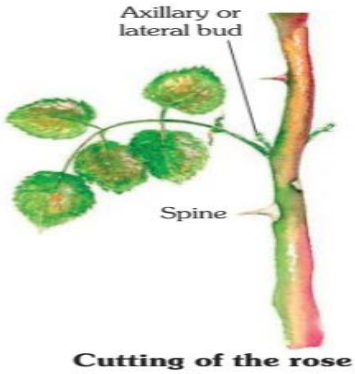
- Leaves of Bryophyllum plant have notches on the margin.
- The adventitious buds are present in these notches. The buds develop into new plant plantlets under favourable conditions.

2. Vegetative propagation by artificial methods (artificial propagation)

Vegetative propagation which does not take place naturally but the multiplication of plants is done by man-made methods or artificially is called artificial propagation.

(i) Stem cutting: is generally used in plants like rose, champa, sugar cane and bougainvillea.

- A stem cutting is a short piece of a branch of a plant having a node. This cutting when placed in the soil under suitable conditions develops roots and leaves.
- Finally the complete plant develops.

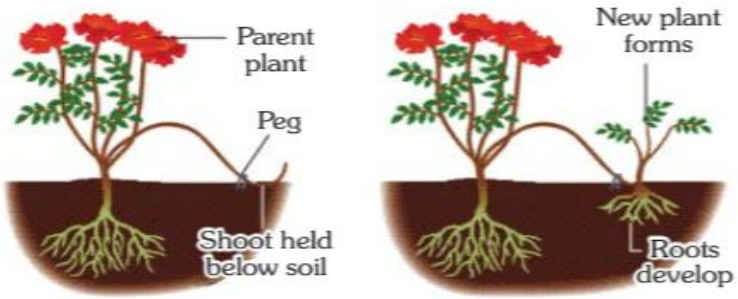


Cutting of the rose stem with some leaf buds

Asexual Reproduction

(ii) Layering: It is done when the other propagation methods are unsuccessful and only a few plants are needed.

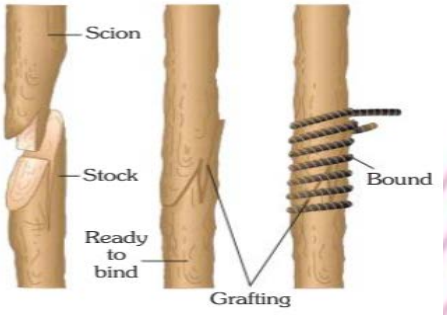
- It is a method in which roots develop on a shoot or branch that is still attached to the parent plant.
- The stem is cut off from the parent plant only after it has rooted.
- Layering is generally used in plants like honeysuckle, rhododendron and forsythia.



Propagation by layering

(iii) Grafting: It is a very common method of artificial vegetative propagation in fruit plants like mango.

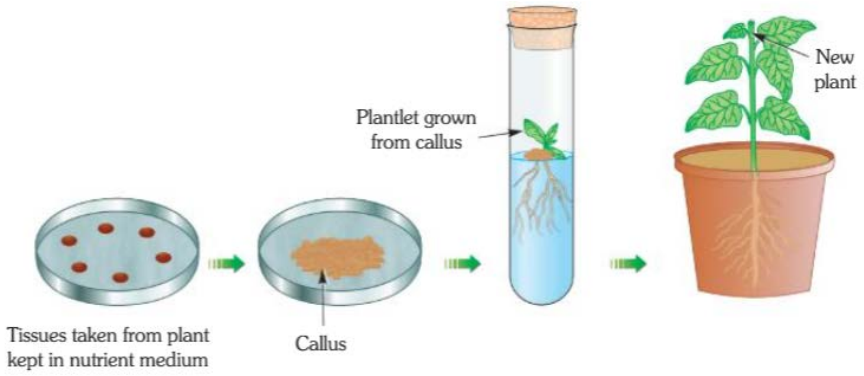
- New varieties can be developed by this method. In this method, the root portion is taken from one plant.
- This is called the stock. The stem portion, with several buds, is taken from another plant called the **scion**.
- The scion is taken from a plant which has the desired features that are intended to be introduced in the root portion.
- The ends of the stock and the scion are obliquely cut and firmly tied together. In this manner, a new plant variety is developed.



Asexual Reproduction

(iv) Tissue Culture: It is the method of propagation of plants by the use of a few cells from the mother plant and growing it into a tissue in a nutritive medium. This is called tissue culture.

Example: orchids, asparagus, etc.



Tissue culture