

# REPRODUCTION

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1. Production of similar organism by similar organism is known as reproduction.
2. It is one of the chief characters of living organisms.
3. It helps in continuity of life from generation to generation.
4. It is a ~~pure~~ biological process.
5. It is an important method of multiplication and perpetuation of the species.
6. It is helpful in population organisation.

On the basis of involvement of sex it is of two types,

[A]  $\rightarrow$  Asexual Reproduction :- Here sex is not involved.

[B]  $\rightarrow$  Sexual Reproduction :- Here sex is involved.

## [A] ASEQUAL REPRODUCTION

1. Here only one of the parents is involved — Uniparental.
2. There is no gamete formation.
3. There is no fertilization.
4. There is no meiosis.
5. There is ~~no~~ only mitosis / or amitosis.
6. Off springs are genetically alike. (Clone)
7. They are all (similar) alike.
8. There is no variation.
9. Takes less time.

10. It is easy.

11. It is found mainly in lower organisms

12. Primitive

Clone :-

A population produced by a single organism in which all the individuals are genetically alike. This population is known as clone & its one individual is known as Ramet.

e.g. acellular, Monerans, Protisten, Fungi etc.

Types:- There are various types →

- (i) Fission,
- (ii) Budding
- (iii) Sporulation
- (iv) Fragmentation .
- (v) Regeneration
- (vi) Parthenogenesis
- (vii) Vegetative

(i) Fission :- Here the parent divide into two or more part .

a) Binary Fission :- Here the individual divide into

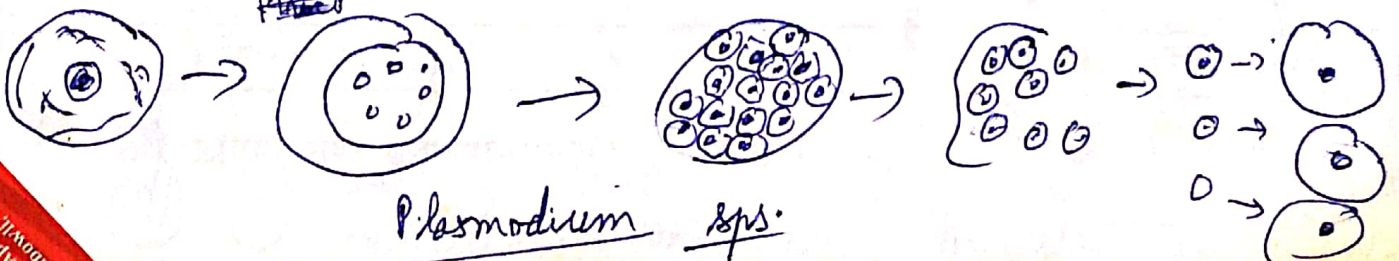
two almost equal parts

→ Simple :- It occurs in any plane e.g. Amoeba .  
 → Longitudinal - Division occurs through longitudinal axis of the organism e.g. Euglena sps, Vorticella sps

→ Oblique → It forms The plane of division is with an angle to its transverse axis e.g. Sarcodinium sps, Goniodex sps.

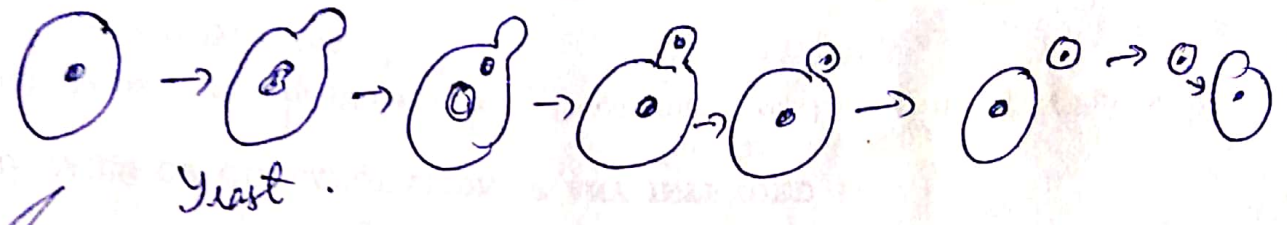
→ Transverse → The plane of division is through transverse axis of the organism e.g. Paramecium sps, Diatom sps, Bacteria sps

b) Multiple Fission → Nucleus divide into several nuclei & form spores. Each of them is gets surround by thin or thick cytoplasm. On coming of favourable condition ~~each~~ spores liberate. and Each one of them develop into a new individual e.g. Amoeba sps, Plasmodium sps, Monocystis sps.

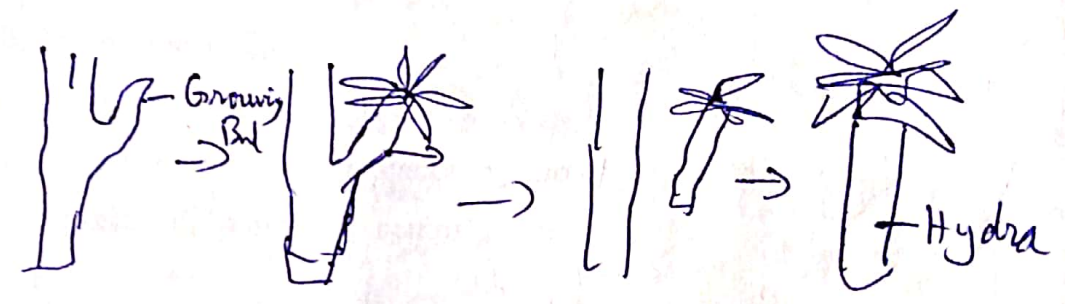
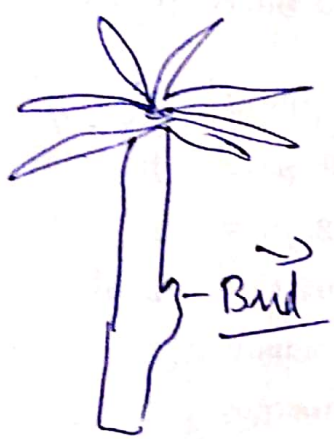


(ii) Budding :-

A small projection arise from the parent body is known as bud. It may arise one or more. This phenomenon is known as Budding  
 e.g. Yeast. sps (Saccharomyces sps. Hydra sps.), Scypha sps.; Salpa sps, Hydra

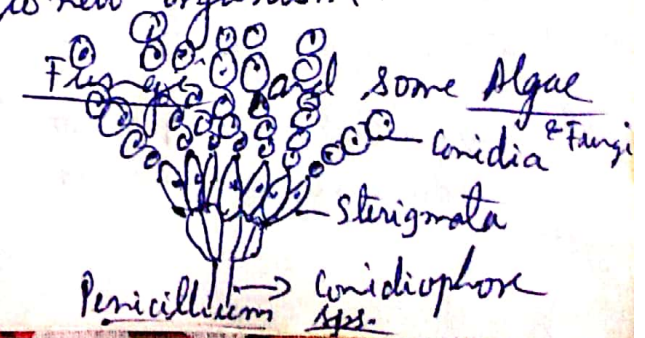


Yeast.



(iii) ~~Fragmentation~~ :- Sporulation :- Spores are minute, single celled thin walled structures. They are formed by different means. They may differ → e.g. Hypnosporos, Aplanosporos, Conidiosporos etc. The process of formation of spores is known as sporulation. They are helpful in dispersal and dissemination also. They are formed in large number. ~~In~~ On the onset of favourable conditions, they germinate and give rise to new organism.

e.g. Monerans, Protistans, Chlamydomonas sps.



Vegetative Propagation: Development of a new individual from the somatic parts is (Vegetative part) is known as vegetative reproduction or propagation.

In lower plants it takes place through - fission - Fragmentation, Spores, Resting Buds, Gemmae etc.

In higher plant any part that i.e. root, stem, leaf other than seed can may be used for vegetative propagation.

There are two types

- [A] Natural
- [B] Artificial.

[A] Natural → These are natural parts of plants which may be used as propagules.

(i) Roots → Tuberos roots of Sweet potato, Topioca, Dahlia, Trispora. There are buds which grow into leafy shoots (stips). Adv. buds also develop on ordinary roots and may be propagated → e.g. Guava, Murraya, Sisso, Populus etc.

Mint, Mentha, Chrysanthemum, They arise from the base of stem (erect shoot) and then comes out forming an aerial shoot.

- Rhizome → Ginger, Turmeric, Canna, Typha, Lotus, Saccharum, Water hyacinth.
- Bulb → Onion, Lili, Garlic
- Tuber → Potato
- Corm → Banana, Crocus, Gladiolus, Colocasia (Amorphophallous)

(ii) Creepers → Runner → Cynodon sps, Oxalis sps, Centella sps.  
 → Stolons → Vallisneria sps, Fragaria sps. (strawberry)  
 → Offsets → Pistia (water lettuce).

(iii) Aerial Stems → Opuntia विल्व

(iv) Leaves → Bryophyllum sps. Streptocarpus sps.  
Kalenchoe sps. Santpaulia sps.  
Begonia sps.

(v) Bulbils:- Fleshy buds produced in the axil of foliage leaves in place of axillary buds. When these come on a suitable ground they form a new plant in favourable conditions. e.g. Kalanchoe sps.; Begonia sps.; Streptocarpus sps.

(vi) Turions → This special type of fleshy bud develop in aquatic plants. e.g. Utricularia sps.; Potamogeton sps.

Artificial Methods:- These are developed by human being mainly by horticulturists and gardeners for commercial production of crops.

- a) Cutting → Pieces of any plant organ other than seed
  - Root → Citron, Tamarind.
  - Stem → Sugarcane, Rose, Grapes, Duranta sps., Bougainvillea sps.; Coleus sps.; Carnation

b) Layering  
In case of Herbs - Ground layering - The lower branch of the stem is defoliated → Bent down → injury is made the injured portion is covered with moist soil. e.g. Jasmine sps., Grapes; Cherry. The adv. roots get develop. Then it same as a new plant.

In case of Shrubs & Trees → Air layering (Gootee) - A ring of bark is removed and covered with moist moss or grafting clay and wrapped with polythene. The injured portion is known as Gootee. e.g. Litchi, Orange, Lemon, Bougainvillea, Pomegranate.

c) Grafting → Lower main one is known as Stock. Upper new one is known as Scion. → Tongue or Whip Grafting → Both stock and scions are cut obliquely at about same angles.

- Wedge Grafting → stock is cut & scion is cut in V → wedge shape
- Crown Grafting → several wedge shaped scions are grafted on the slits of top stock.
- Side grafting → Wedge shaped scions is fitted in lateral slit in the stock.

e.g. Mango, Roses, Apples, Pear, Plum, Peach, Rubber, Citrus etc.

→ Side grafting

d) Bud Grafting :- Similar to grafting but with a difference that buds are used in place of scions. e.g. Rose, Apple, Peach

e) Tissue culture :- Culturing of cell, tissue or org. organ into a new plant is known as tissue culture.

Initially any plant organ is cultured in artificial medium which results into formation of undifferentiated mass of cells known as Calbus

From this calbus a large number of plants can be formed by sub culting with a proper artificial medium.

It is used to get disease free plant, desired plants through homozygous diploids and haploid plants and artificially created (manipulated) plants. also for micropropagation. e.g. Orchids, Galadialus, Chrysanthemum, Carnation

- Importance:-
1. Some plants have lost the prode capacity of seed production in them it is the only method. e.g. Banana, Rose, Dahlia, Pine apple, Fig, Jasmine, Seedless grapes, oranges etc.
  2. Those which seed are no viable or less viable e.g. quantity of viable seeds. Cynodon dactylon.
  3. Poor viable seeds, Long dormant seeds
  4. With no variation. → helpful in physio chemical and radiially treated plants.
  5. Production of disease free and desired plants. For mints & Demints.