* Reproduction:

Algae reproduce by vegetative, asexual and sexual processes.

Vegetative Reproduction:

The type of reproduction in which the whole new plant is produced from an organ (or vegetative part of the plant) which is not involved in sexual reproduction, is called vegetative reproduction.

Vegetative = any part of plant which is not involved in sexual reproduction.

- It is a form of asexual reproduction in which specialized organs, formed by the parent, become detached and generate new individuals.
- The offspring produced by vegetative reproduction will be genetically identical to the parent plant.

1. Fragmentation:

In this process, the plant body breaks into several parts or fragments and each such fragment develops into an individual.

- This type of vegetative reproduction is commonly found in filamentous forms.
eg. Ulothrix, Spirogyra, Stichococcus.
- The fragmentation also takes place in Blue green algae (Cyanophyta)
eg. Nostoc, Hormidium, Aphanocapsa, Aphanothece, etc.

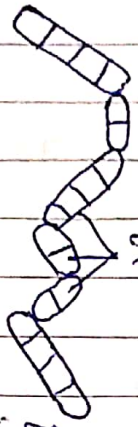

Fig: Fragmentation in Hormidium

2) Hormogone formation:
When the trichomes break in small pieces of two or more cells, such pieces are called hormogones.
- Each hormogone develops into a new plant
- eg. Oscillatoria, Nostoc, Lyngbya

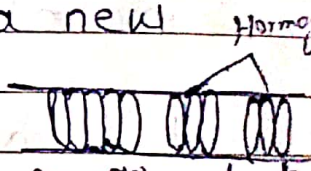

Fig: Filament of Lyngbya with hormogone

3. Hormospore or Hormocyst:
They are thick walled hormogones, Produced in somewhat drier conditions.

4. Cell division:
The mother cell divides and the daughter cells are produced, which become new plants
- This is type of reproduction in Pleurococcus, desmids, diatoms, Euglena, etc.

(In desmids cell div^n occurs when a sed size is attained by Alga.
In diatoms, vegetative or mitotic cell division starts after a period of increase in cell volume, thus resulting in a progressive reduction in cell size.)

5. Bulbils:
Small bud like structures are called as bulbils.
- They are usually developed on the rhizoids of chara.
- These are rich in food material, and on being detached they develop into new plants

6. Propagule / Adventitious thalli:
- Certain special structures of thalli are formed which help in vegetative repro.
- These are some wedge-shaped modified branches, developed in some genera as in Sphacelaria, Bryopsis, Nereocystis, etc.

7. Tubers:
- The rounded bodies filled up with abundance of starch are known as tubers.
- Each body may give rise to a new plant
eg. Chara.

8. Amylum stars:
- Special star shaped, starch filled bodies developed on the lower nodes are known as amylum stars.
- They gives rise to new plant body
- Frequently reported from chara.

9. By primary secondary protonema:
Thread like vegetative bodies develop in the case of chara, which help in repro.

10. Akinetes:

- The formation of thick-walled cells containing large quantity of food reserves is very common in several algae. These cells are called akinetes.
- Usually the protoplast of each cell converts in a single akinete. Sometimes they are formed in chains.
- Akinetes are generally filled with food materials such as starch and oil.
- It loose the photosynthetic pigments & surrounded by thick wall usually composed of three layers.
- Each akinete may develop into a new plant.

eg. Pithophora, Oedogonium, Ulothrix, & BGA — Anabaena, Nostoc x

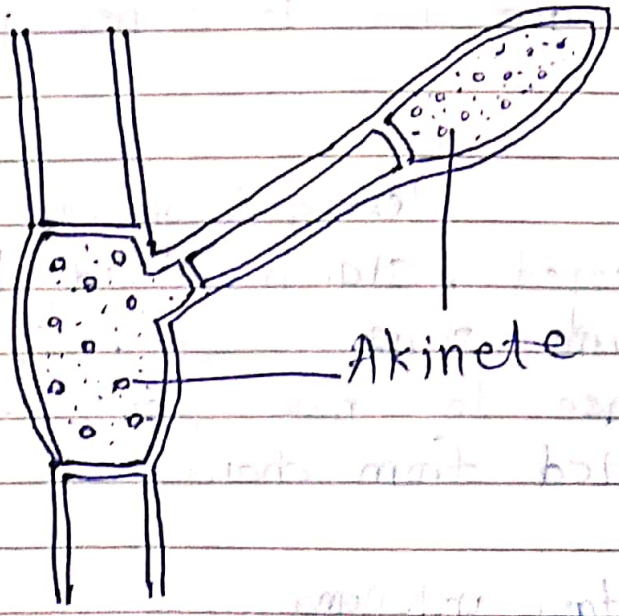

Fig: Akinetes of Pithophora.

Asexual Reproduction:

- Asexual is a type of reproduction from one individual, without the fusion of sex cells from two different parents.

Asexual = without sex

def^n: Any form of reproduction not depending on a sexual process or on a modified sexual process.

- In some aspects, asexual repn. is very similar to certain forms of vegetative repn, perticularly in flagellate algal group.
- In a broad sense, asexual repro. in algae is a process whereby the protoplast(s) is released from the cell & germinates into a new plant.
- Usually the protoplast of a cell divides into several protoplasts and thereafter they escape from the mother & develop into new plants.
- The protoplast may be released as a motile spore (c/d zoospore) or non-motile spore (c/d aplanospore)

1) Zoospore :-

. The zoospores are formed from certain older cells of the filaments.

. The zoospores are produced by mitotic div^{n} of nuclei followed by partition of protoplasts

. The zoospores are unicellular, flagellated structure

. They are always motile.

: Zoospores formed in favourable condition swim for some time, settle down on some suitable substratum, attain a cell wall & each develops into a new plant.

eg. Oedogonium, Ulothrix, Vaucheria, Fritschiella

2) Aplanospore

. When motile phase of zoospore is eliminated, the bodies are called aplanospore.

. The protoplast(s) released from the algal cell as a non-motile & non-flagellated spore is c/d an aplanospore.

. The aplanospores develop in unfavourable cond. Each such spore is surrounded by a wall.

3) Autospore

. Such aplanospores which have the same morphological features as that of parent cell are c/d autospores. except in size

. Each autospore gives rise to new plant body.

eg Chlorella, Oocystis, Scenedesmus.

4) Hypnospore
- Aplanospore with very thick wall, developed in only in adverse cond^{n} are cld Hypnospore

eg. Pediastrum, Vaucheria, Botrydium

5) Tetraspores:
The spores which are formed after meiosis, instead of mitosis are cld tetraspores.
- These are haploid, thin-walled, non-motile spores formed by diploid tetrasporangia.
eg Polysiphonia

6) Endospore
- The successive div^{n} of cell contents in three planes result in the form^{n} of endospore.
- formed within cell.
- On the approach of fav. cond^{n}, each endospore develop in new individual
eg. many BGA & Bacillariophyceae

7) Monospore
- In some brown & red algae non-motile spore developing singly in a sporangium is called monospore.
- Each spore gives rise to a new plant.
eg. Rhodophyceae (Bangia, Porphyra, porphyridium

8)

8) Neutral spore :
The vegetative cell transform directly into the spores c/d neutral spores.
. Not formed within sporangia
Rhodophyceae

9) Bispore :
In some red algae two spores develop in a sporangium, these are called bispores.
. Developing in bisporangium.
eg Callithamnion, Corallinales.

10) Polyspore - more than 4 spores, haploid, eg Spermothamnion (Red algae)

18 Auxospore
members of Bacillariophyceae.

Sexual Reproduction:

A type of reproduction which involves the fusion of two cells & their nuclei from two parent individuals, so that the offspring receives the genetic material from both parents.

- Fusion actually means the joining together of two gametes to form a zygote.
- A gamete is a haploid sex cell, whose fun^{n} is to join with a gamete of opposite sex to form a diploid zygote.

2 Main type - i) Isogamy ; ii) Heterogamy

i) Isogamy:

The process of fusion of morphological similar gametes is known as isogamy.

- They are always similar in size.
- Usually the gametes taking part in fusion come from two different individuals or filaments.

ii) Heterogamy:

The fusion of dissimilar gametes is called heterogamy.

i) Anisogamy: Differend in size.

ii) Oogamy:

The fusion of larger, non-motile female gamete with smaller, motile male gamete is known as Oogamy.

Vaucheria, Oedogonium, Chara, Fucus