

**Class- B.Sc.**  
**Semester I**  
**Subject- Botany**  
**Unit III - Phycology**

**Topic - Classification and Life Cycle of -**  
***Chara***

# Classification and Life Cycle of - *Chara*

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# Genus- *Chara*

## Classification

Class- Chlorophyceae

Order- Charales

Family- Characeae

Genus- *Chara*



Chara

[https://commons.wikimedia.org/wiki/File:Chara\\_braunii\\_1.JPG](https://commons.wikimedia.org/wiki/File:Chara_braunii_1.JPG)

# Genus- *Chara*

Chara is commonly called **stonewort** as the thallus is encrusted with calcium and magnesium carbonate.

It is a **freshwater attached forms**.

Plant is 6 -10 inches tall .The **main axis** is differentiated into **nodes** and **internodes**.

Each node bears the **branches of limited growth** ( primary laterals) in whorls which also have nodes and internodes.

From the nodes of main axis **branches of unlimited growth** also arise which are also divided into nodes and internodes and have whorl of primary laterals on the nodes.

**Node** consists of a pair of **central cells** surrounded by a **peripheral group of 6-20 cells**.

The **internode** is always composed of a **single elongate cell which may be corticated**.

Branched **multicellular rhizoids with oblique septa** are from the lowermost one or two nodes.

The main axis and primary laterals grow by means of a **dome-shaped apical cell**.

# Genus- *Chara*

## Cell Structure

Cells are eukaryotic.

The nodal cells contain dense cytoplasm, a single nucleus and a few discoid or elliptical chloroplasts.

In the internodal cells there is a large central vacuole, hundreds of nuclei and many discoid chloroplasts.

The chloroplast lacks pyrenoid.

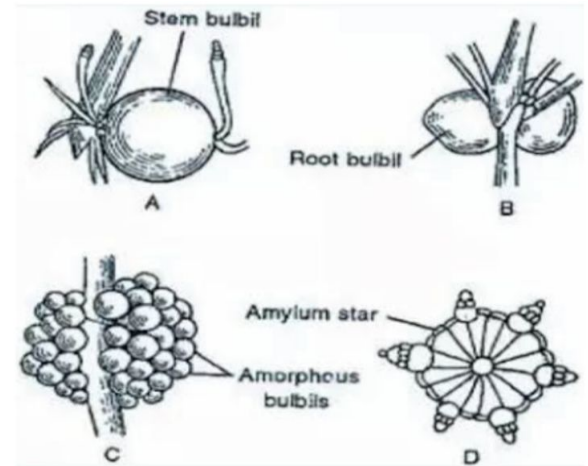
# Genus- *Chara*

## Reproduction

### Vegetative reproduction:

Reproduction in some cases takes place by means of **amylum stars** which are stellate aggregates of cells densely filled with starch grains and produced from the lower nodes.

Other means of vegetative propagation are by the formation of **bulbils** upon rhizoids and on lower nodes of cells, or by the formation of **protonemal outgrowths** derived from the nodes.



Vegetative reproduction in *Chara*: A. Stem bulbils; B. Root bulbils; C. Amorphous bulbils; D. Amylum star

# Genus- *Chara*

## Sexual reproduction:

Highly advanced type of Oogamous sexual reproduction.

Most species are monoecious and protandrous. Some species are dioecious.

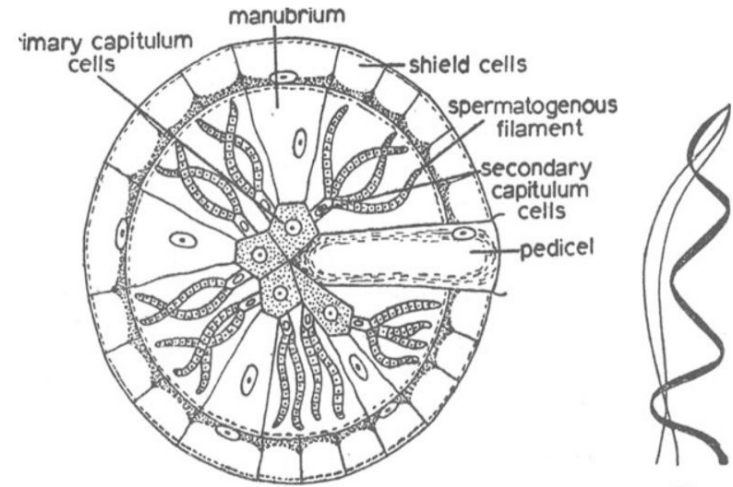
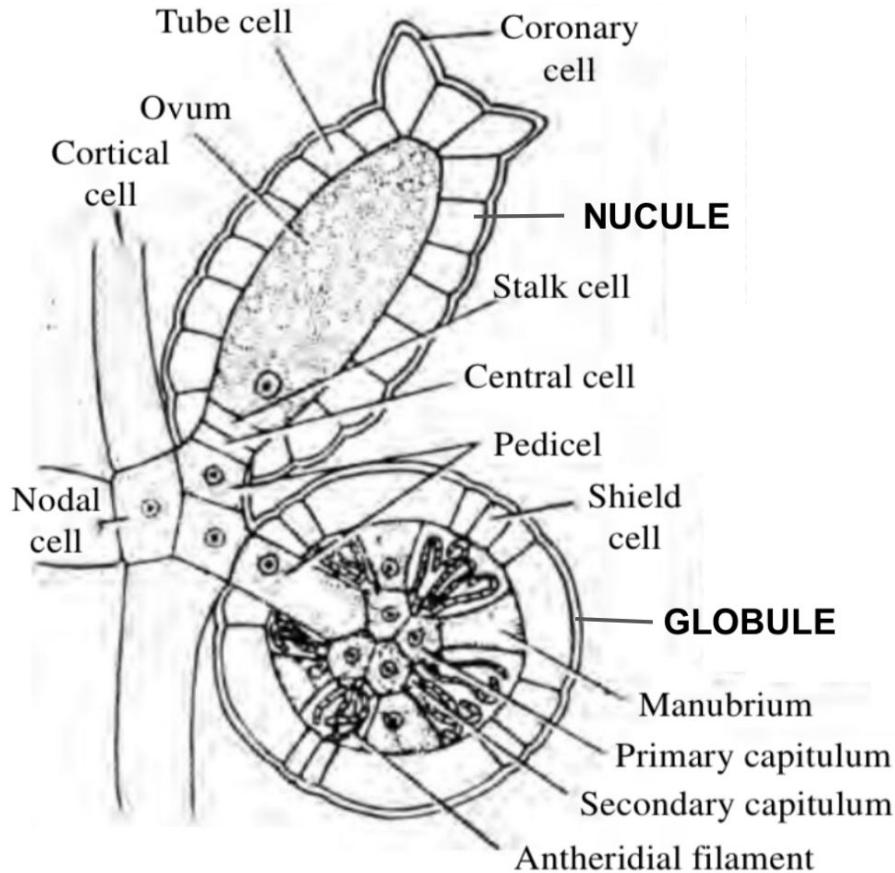
Antheridia is known as globule and oogonia is known as nucule.

Nucule and globule are found at the nodes of branches of limited growth or primary laterals. Stipulodes or secondary laterals are also present on the nodes.



<https://pin.it/7RNJaBr>

## Sex organs of Chara- NUCULE & GLOBULE





# Genus- *Chara*

A mature **globule** is spherical, orangish yellow or red structure whereas nucule is oblong or oval and greenish in colour.

Globule has a jacket of **8 shield cells**, in the centre are present **8 primary capitulum cells** which divide to form secondary capitulum cells. Secondary capitulum cells produce **antheridial or spermatogenous filaments**. Each cell of antheridial filament forms a **spiral biflagellate antherozoid**. **8 radially elongated manubrial cells** join the shield cells to the primary capitulum cells.

The **nucule** is attached to the node with the help of **pedicel cell** and consist of **five spirally coiled tube cells** which form a sterile envelope around the oogonium and of **five corona cells** that project beyond the apex of the oogonium. In the centre is present a large **oogonial cell** on a stalk cell. Oogonial cell contains a **large uninucleate egg** and reserve food in the form of starch and oil.

# Genus- *Chara*

## **Fertilization and germination of zygote:**

In the mature nucule, spiral tube cells separate and the antherozoid finds its way inside the oogonium and fuses with the ovum.

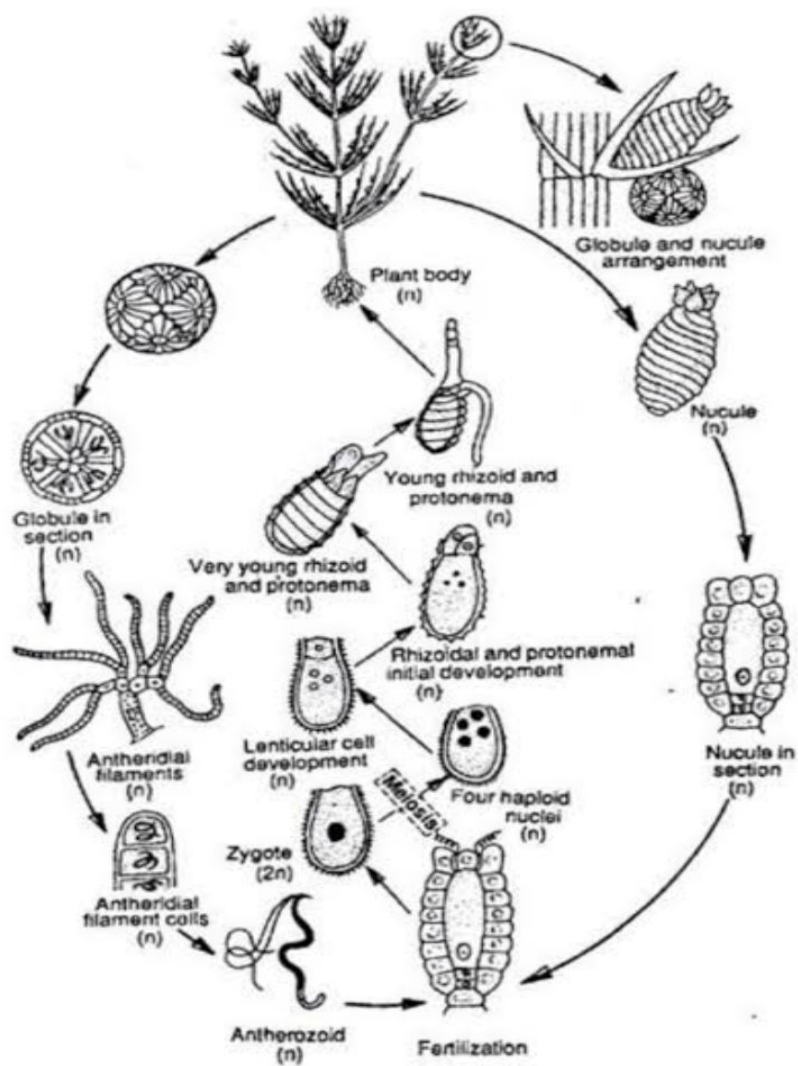
The wall of the **zygote** thickens and after perennation the oospore germinates.

the nucleus migrates to the anterior region and divides **meiotically**.

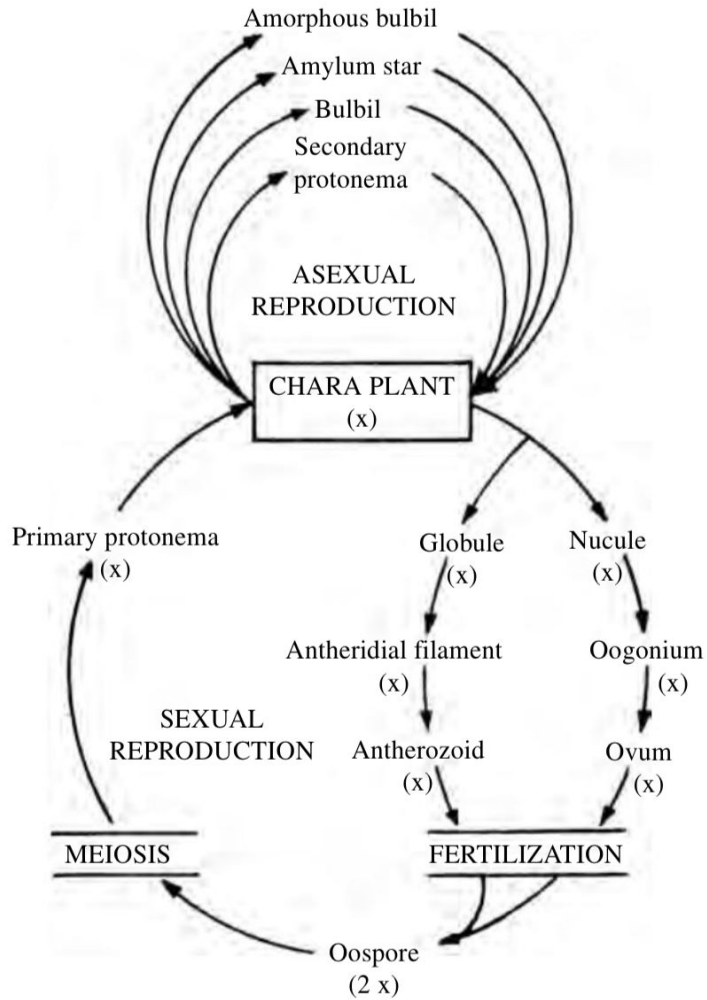
A septum is then laid down forming a **uninucleate upper cell** and a degenerative, trinucleate lower cell .

The upper cell divides to form **protonemal initial and rhizoidal initial**. These initials form the filamentous protonema and the colourless rhizoids respectively. **Protonema forms the axis**.

**Life cycle of Chara is haplontic.**



**Life cycle of Chara**



## Let's revise

- Q.1 Describe the thallus structure of Chara.
- Q.2 Describe vegetative reproduction in Chara.
- Q.3 Draw a well labelled diagram of sex organs of Chara.
- Q.4 Draw a diagrammatic sketch of life cycle of Chara.
- Q.5 Why Chara is called “stonewort”.