

Charophyceae

CHARA

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Charophyceae

- The stoneworts usually occur in still and clear waters in attached condition to the mud of the bottom of the pools.
- They are found in less oxygenated water and best survive in clear and hard waters.
- The thallus is attached to the mud by a rhizoidal system.
- The plant body is erect and possesses nodes and internodes.
- Secondary laterals, also called 'leaves' arise from the nodes which are of limited growth. The leaves may or may not be differentiated into nodes and internodes.

- The reproduction takes place by vegetative and sexual methods.
- Asexual reproduction is altogether absent.
- Vegetative reproduction takes place by means of special vegetative
- bodies such as amylum stars, bulbils, secondary protonema, etc. Sexual reproduction is oogamous and takes place by oogonia (nucule) and antheridia (globule).
- The zygote nucleus divides reductionally producing 4 haploid nuclei.
- Out of these 4 haploid nuclei one is functional and rest degenerate.
- The functional nucleus divides into two cells, the lower cell is rhizoidal and the upper one gives rise to main thallus.

Chara

Systematic Position:

Class	Chlorophyceae
Order	Charales
Family	Characeae
Genus	<i>Chara</i>

Occurrence

- *Chara* is a fresh water, green alga found submerged in shallow water ponds, tanks, lakes and slow running water.
- *Chara* is found mostly in hard fresh water, rich in organic matter, calcium and deficient in oxygen.
- *Chara* often emits disagreeable onion like odour due to presence of sulphur compounds.

C. baltica is found growing in brackish water

C. fragilis is found in hot springs

In India Chara is represented by about 30 species of which common Indian species are

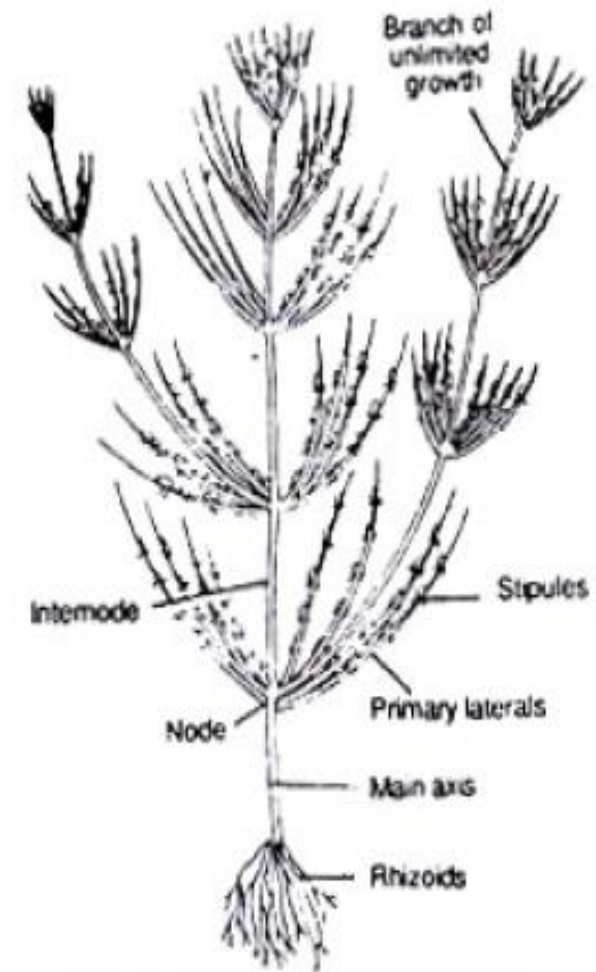
- ✓ *C. zeylanica*
- ✓ *C. braunii*
- ✓ *C. gracilis*
- ✓ *C. hatei*
- ✓ *C. sgymnoptiy etc.*

The logo of Galgotias University is a stylized, circular emblem. It features a central blue swoosh that curves upwards and to the right, surrounded by concentric, overlapping bands of yellow, orange, and red, creating a sense of motion and energy.

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Structure of *Chara*:

- The thallus of *Chara* is branched, multicellular and macroscopic.
- The thallus is normally 20-30 cm. in height but often may be up to 90 cm to 1 m.
- Some species like *C. hateri* are small and may be 2-3 cm. long.
- The plants in appearance resemble Equisetum hence *Chara* is commonly called as aquatic horsetail
- The thallus is mainly differentiated into rhizoids and main axis.



Cell Structure of *Chara*:

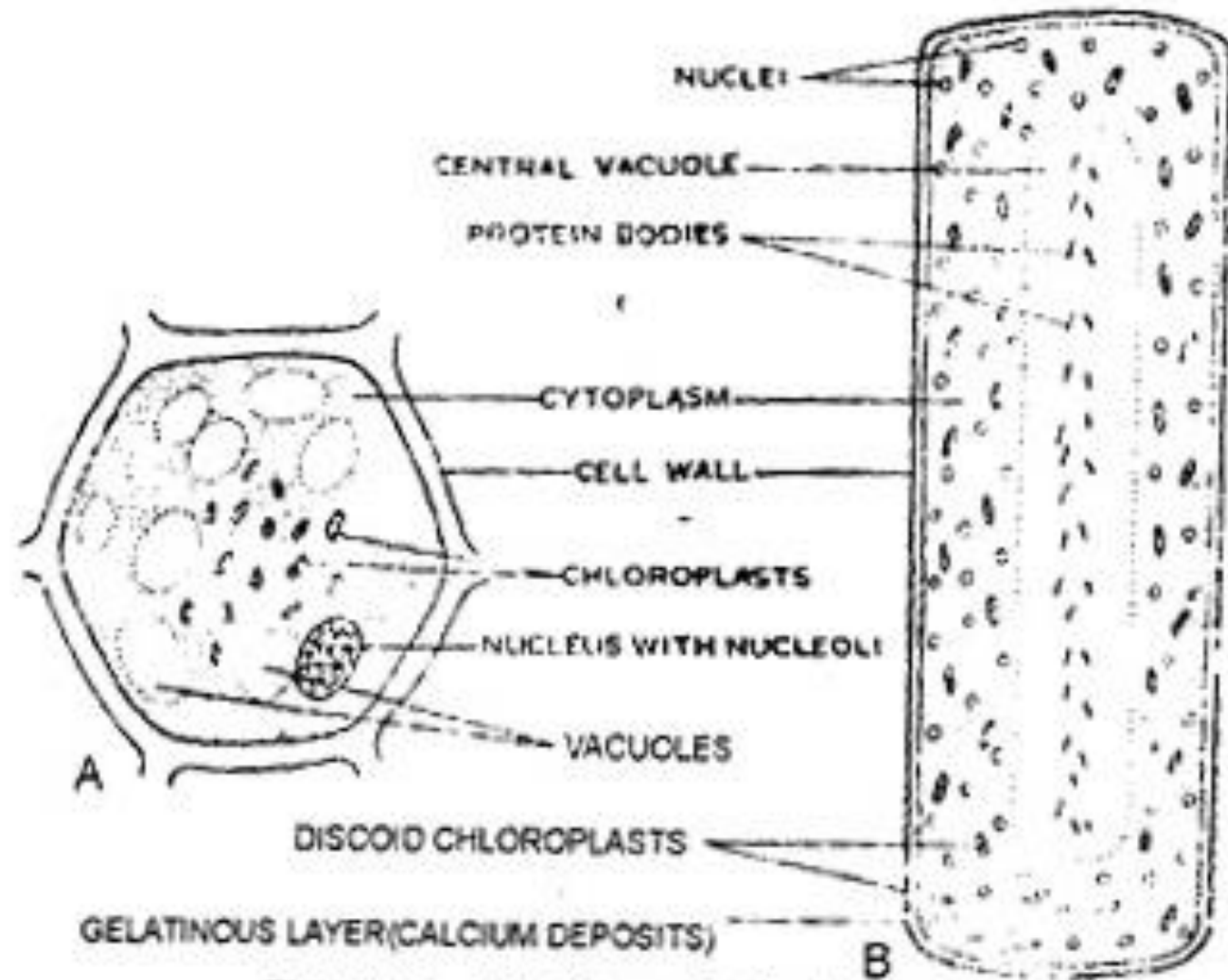
The main axis of *Chara* consists of mainly two types of cells:

➤ *Nodal cells:*

- ❖ The nodal cells are smaller in size and isodiametric.
- ❖ The cells are dense cytoplasmic, uninucleate with few small ellipsoidal chloroplasts.
- ❖ The central vacuole is not developed instead many small vacuoles may be present.
- ❖ The cytoplasm can be differentiated in outer exoplasm and inner endoplasm.

➤ *Inter-nodal cells:*

- ❖ The inter-nodal cells are much elongated.
- ❖ The cytoplasm is present around a large central vacuole.
- ❖ The cells are multinucleate and contain many discoid chloroplasts.
- ❖ The cytoplasm is also differentiated into outer exoplasm and inner endoplasm.



**Fig. 5. (A, B). *Chara*. Cell structure.
(A) Nodal cell, (B) Internodal cell.**

Reproduction in *Chara*:

Reproduction in *Chara* takes place by vegetative and sexual methods. Asexual reproduction is absent.

Vegetative Reproduction in *Chara*:

Bulbils:

- The bulbils are spherical or oval tube-like structures which develop on rhizoids.
- The bulbils on detachment from plants germinate into new thallus.

Amylum Stars:

- In some species of *Chara* e.g., *C. stelligna*, on the lower nodes of main axis develop multicellular star shape aggregates of cells.
- These cells are full of amyllum starch and hence are called Amyllum stars.
- The amyllum stars do detachment from plants develops into new *Chara* thalli.

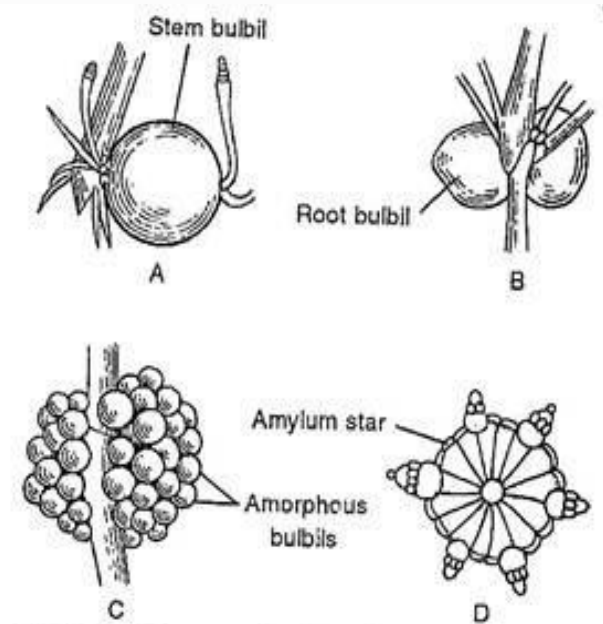


Fig. 3.93 : *Chara* sp. : A. Stem bulbil, B. Root bulbil, C. Amorphous bulbil, and D. Amyllum star

Amorphous bulbils:

- The amorphous bulbils are group, many cells, irregular in shape which develop on lower node main axis.
- The amorphous bulbils are perennating structures, when the main plant dies under unfavorable conditions; these bulbils survive and make Chara plants on return of favourable conditions.

Life Cycle of *Chara*:

- The plant body of *Chara* is haploid.
- The vegetative reproduction takes place by the formation of **amylum stars, bulbils** and secondary protonema.
- Asexual reproduction is absent.
- The sexual reproduction is advanced **oogamous** type.
- The male and female sex organs are globule and nucule respectively

Life Cycle of *Chara*:

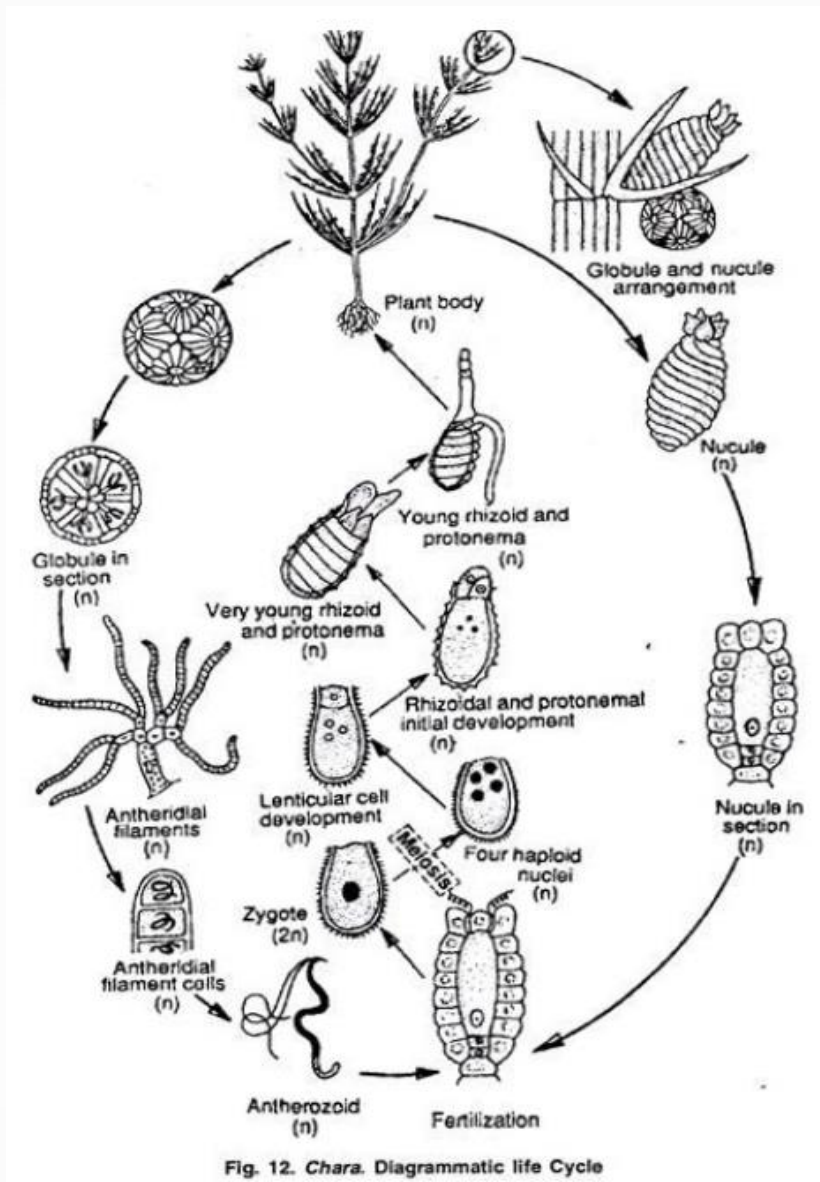
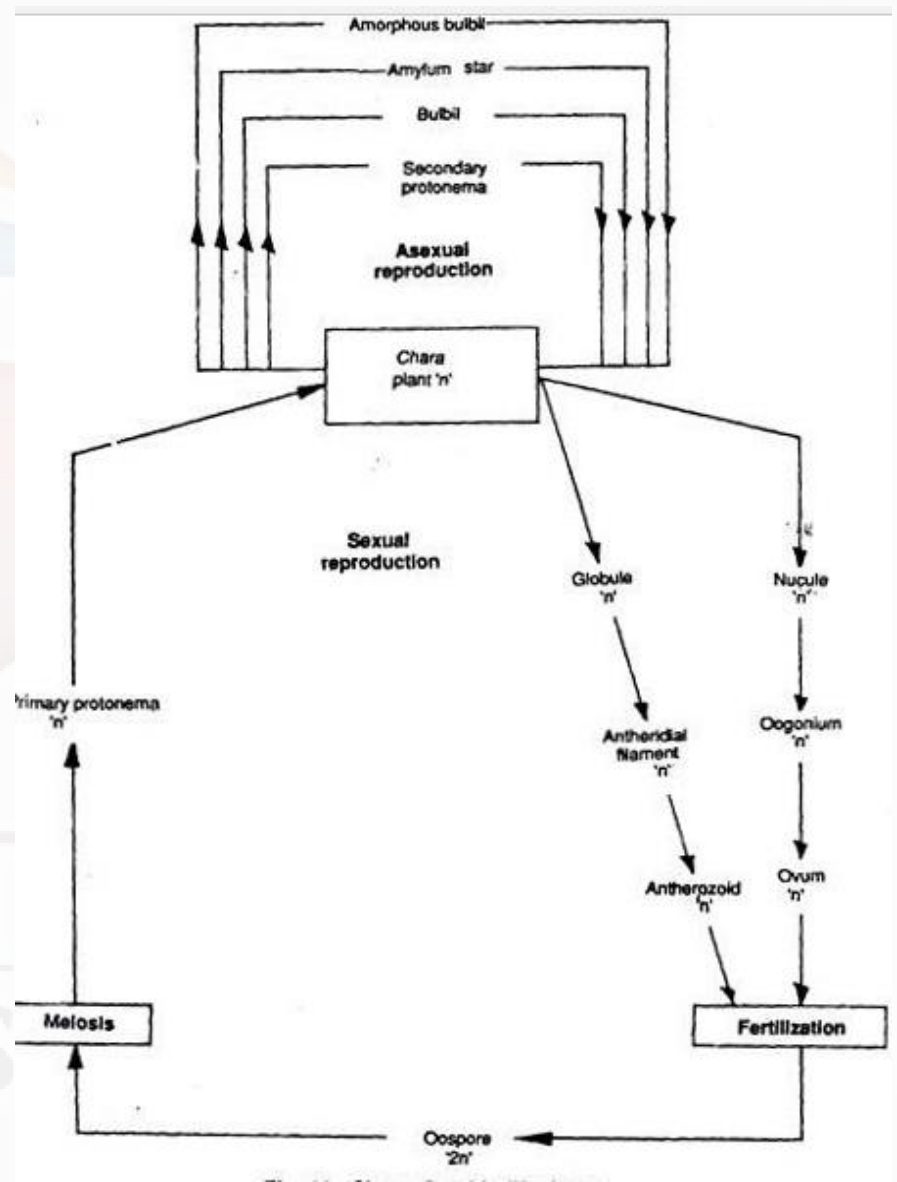


Fig. 12. *Chara*. Diagrammatic life Cycle



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