

Chara:
Structure and life history

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Chara

➤ Introduction and characteristics:

- *Chara* is commonly known as “**stonewort**”. The plant body of *Chara* is encrusted with calcium and magnesium carbonate especially on the plants growing in heavy water.
- Thus the plants become strengthened and called stoneworts. Generally they grow in fresh water of ponds, lakes, tanks etc. in submerged condition. Some species like *C. fragilis* grows in hot spring, whereas *C. baltica* grows in brackish water.

Structure of Plant Body:

- *Chara* is a macroscopic, multicellular, profusely branched thalloid plant body, generally attains a height of about 20-30 cm.
- It is differentiated into rhizoid and main axis.
- **Rhizoids:**

The rhizoids are thread-like, white, multicellular, uniseriate and branched. It is an elongated branched structure having oblique septa. They are developed either from the base of the plant body or from peripheral cells of lower nodes of the main axis.

- **Main Axis:** It is an erect, long, branched epigeal portion of the plant body, which is differentiated into internodes and nodes.

Internodes: Generally it consists of two types of cells:

i. axial cell or internodal cell

ii. cortical cells.

i. Axial Cell: It consists of an elongated central cylindrical cell.

ii. cortical cells: These are elongated but much smaller in diameter than axial cell and corticated as a layer on the outer surface of axial cell. They originate from the node.

- After originating from the node, 50% of the cortical cells grow upward as the ascending filaments and the rest 50% grow downward as the descending filaments.
- The ascending filaments cover the lower half and descending filaments cover the upper half of the axial cell. Cortication is not common in all the species.
- Depending on the presence or absence of cortex, the species of *Chara* are divided into two types: Corticate (e.g., *C. fragilis*, *C. zeylanica*, *C. hatei* etc) and Ecorticate (e.g., *C. corallina*, *C. succinata*, *C. wallichii*, *C. braunii* etc.).

- **Node:** The node consists of two cells surrounded by 6-20 peripheral cells. Three types of appendages are developed from each node:
 1. Branches of unlimited growth,
 2. Branches of limited growth, and
 3. Stipulodes.
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Reproduction in *Chara*:

Chara reproduces by both vegetative and sexual means. Asexual reproduction is absent.

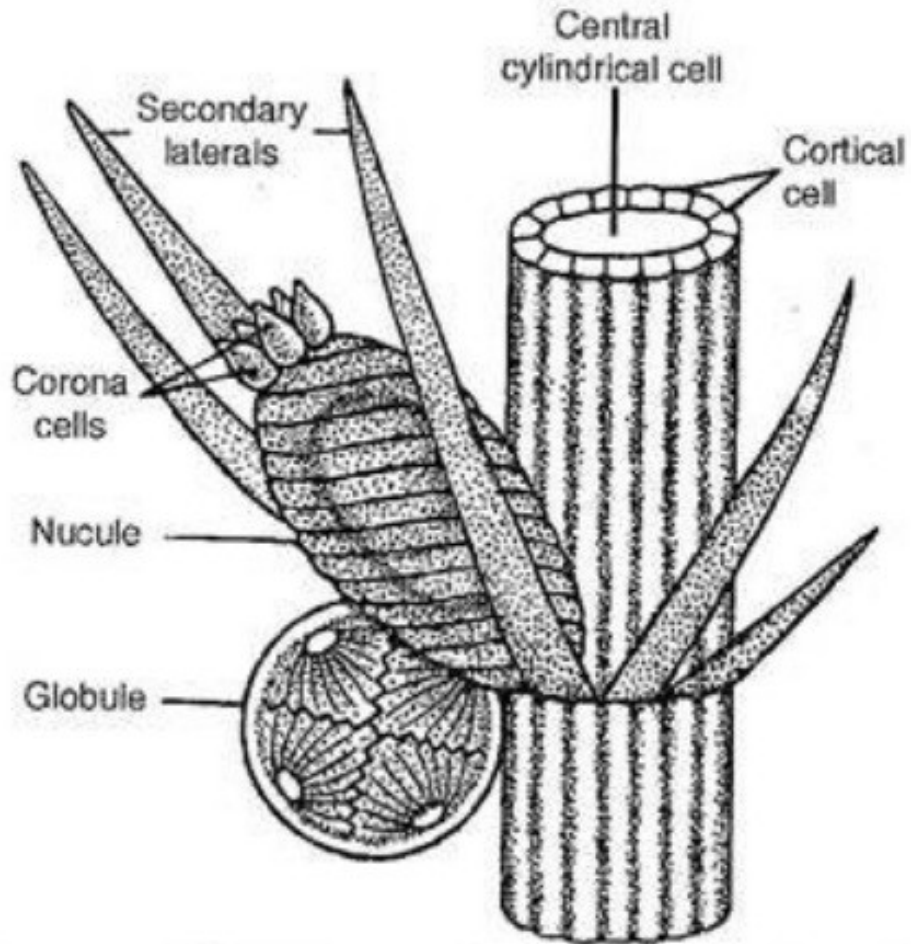
❖ Vegetative Reproduction:

The vegetative reproduction takes place by the formation of following structures:

1. Bulbils
2. Amorphous Bulbils
3. Amylum Stars
4. Secondary Protonema

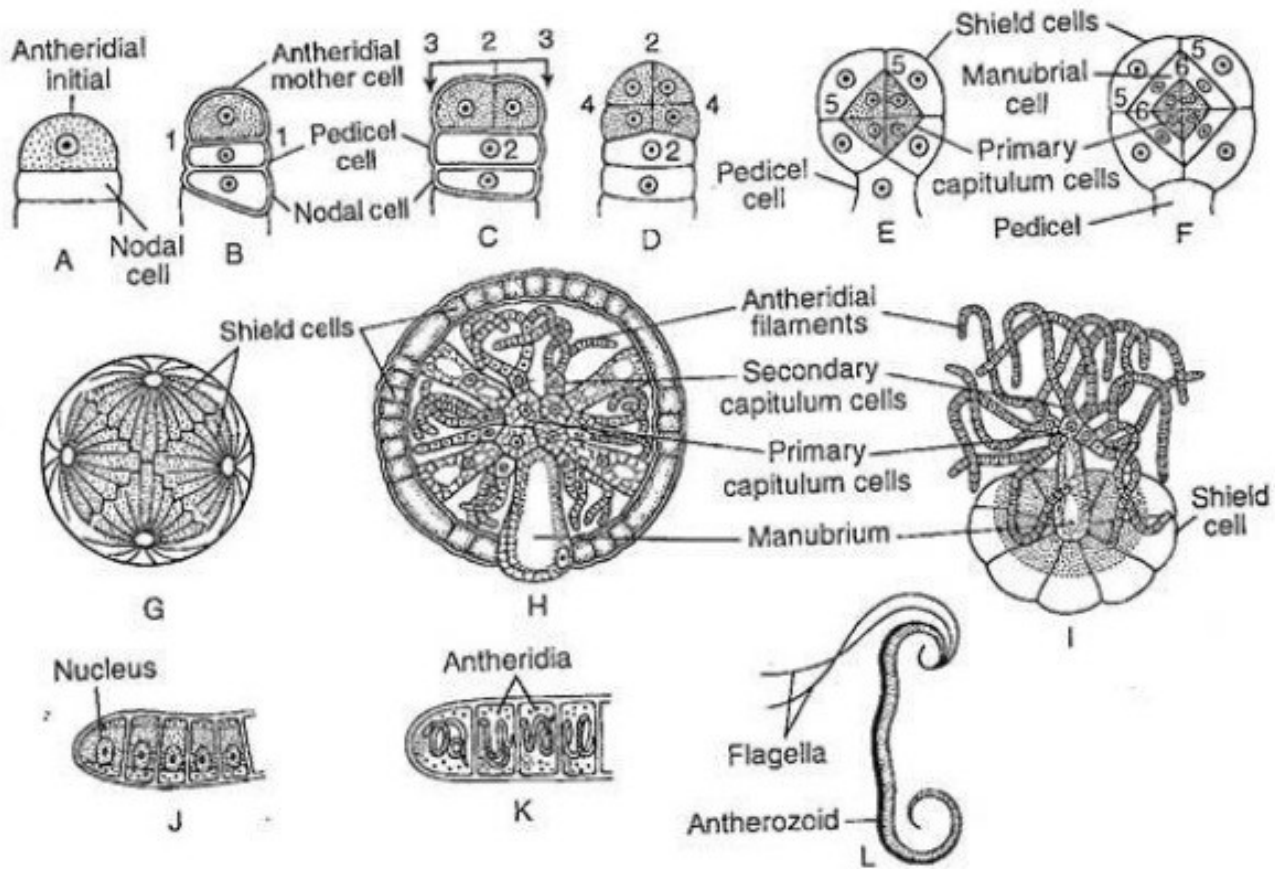
❖ Sexual Reproduction:

- Sexual reproduction of *Chara* is an advanced **oogamous** type.
- The sex organs are macroscopic and large.
- The male sex organ is spherical and yellow to red in colour, called **globule**.
- The female sex organ is more or less oval and green in colour, called the **nucule** or oogonium.

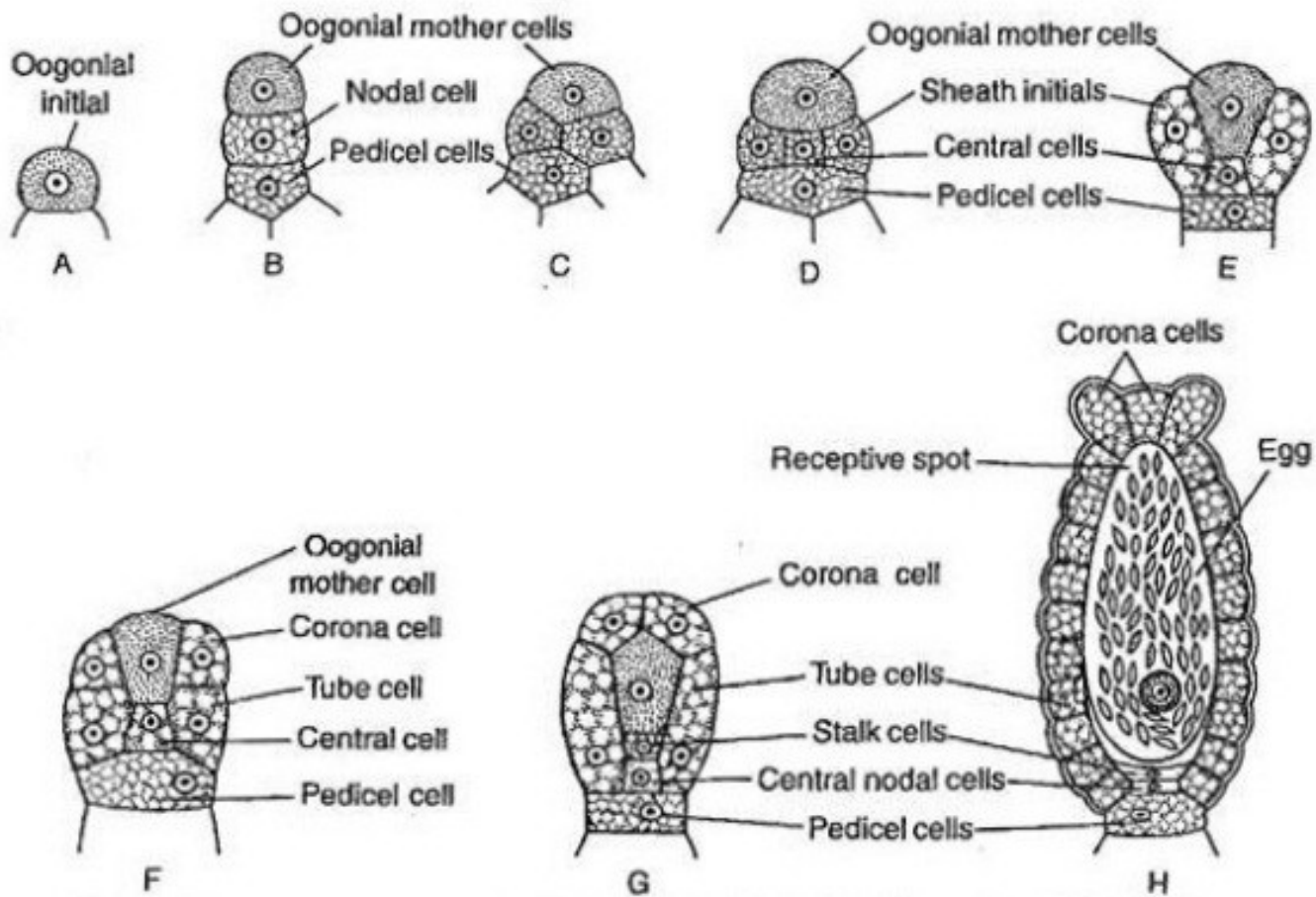


: *Chara* sp. : A portion of the branch of limited growth showing attachment of nucule, globule and secondary laterals at the node

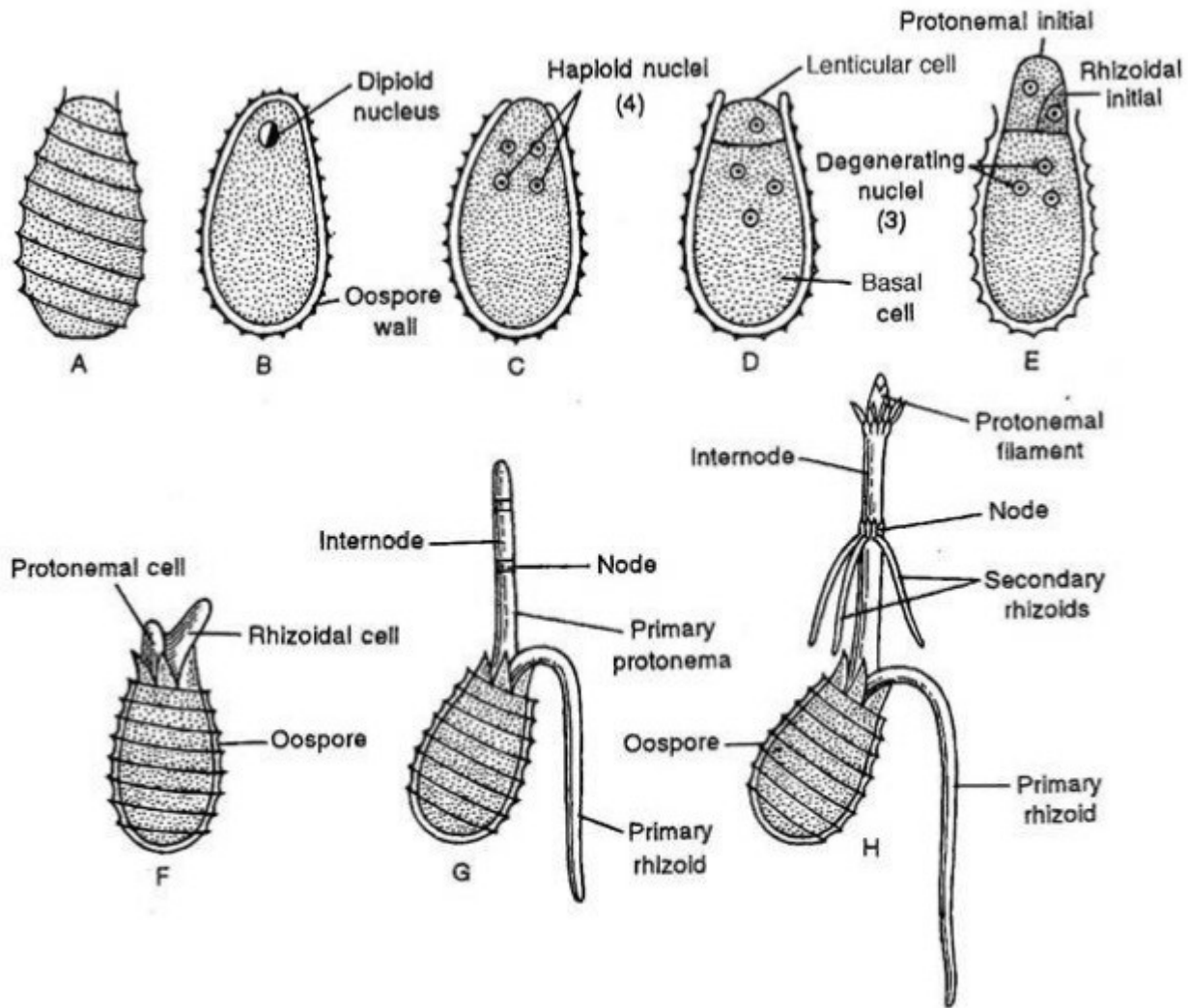
- In *Chara*, reproductive organs develop on the nodes of the branch of limited growth (i.e., primary lateral), intermingled with secondary laterals.
- Nucule is always situated singly above the globule.
- Most of the species are homothallic or monoecious (i.e., male and female sex organs develop on the same plant).
- Although, some are heterothallic or dioecious (e.g., *C. wallichii*).



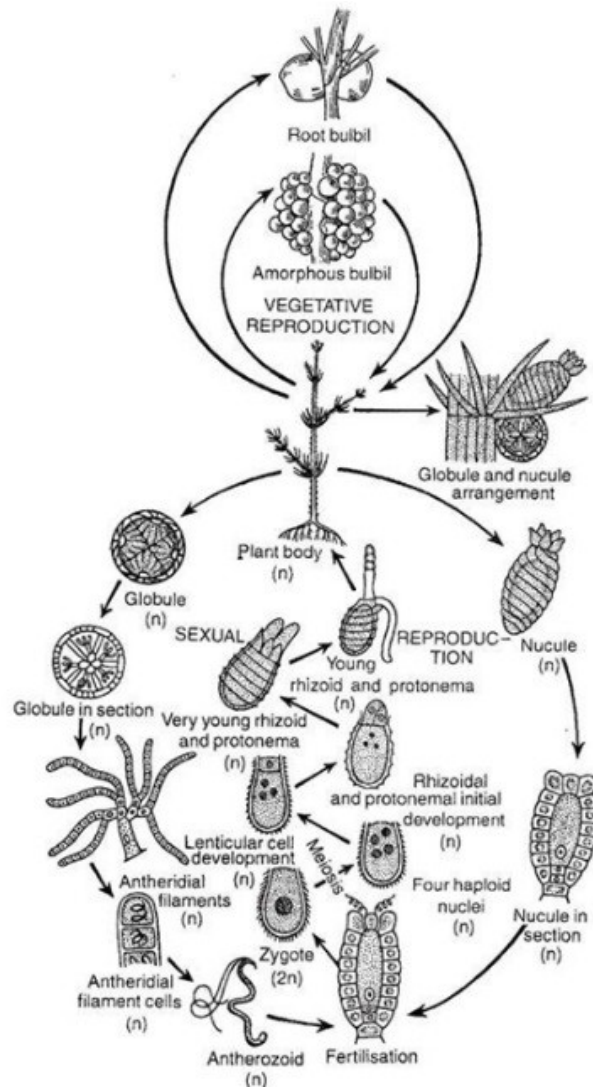
Chara sp. Development of globule. A-F. Stages in the development of globule, G. Mature globule, H. Globule in longitudinal section, I. A shield cells with manubrium, primary and secondary capitulum cells and spermatogenous filaments, J-K. Stages in spermatogenesis, L. An antherozoid



Chara sp. Development of nucule : A-G. Stages in the development of nucule, and H. L.S. of Mature nucule



: *Chara* sp. : A-H. Successive stages in oospore germination



***Chara*: Life cycle**