

## Chara

Write short notes on globules - 90 - 92

Sex organ of chara - 91

Distinguish between Globule & nucleolus of chara - 93

Or

### L. H. of chara

Chara - or stone wort a submerged aquatic green alga growing attached by rhizoids to the muddy or sandy bottom of small pools, lakes and slowly flowing streams, represented by 27 spp in India - belongs to

Charophyta  
Charophyceae  
Charales  
Characeae

aquatic - water  
sandy, muddy  
bottom

flexuous -  
झुंझुंदा,  
गुंजावा

differentiated -  
गुंजावा

Composed - RMC

constituting -  
रचनात्मक

conspicuous -  
बहुल  
numerous - अधिक

huge - विशाल,  
बड़ा आकार

Represent - अधिकांश

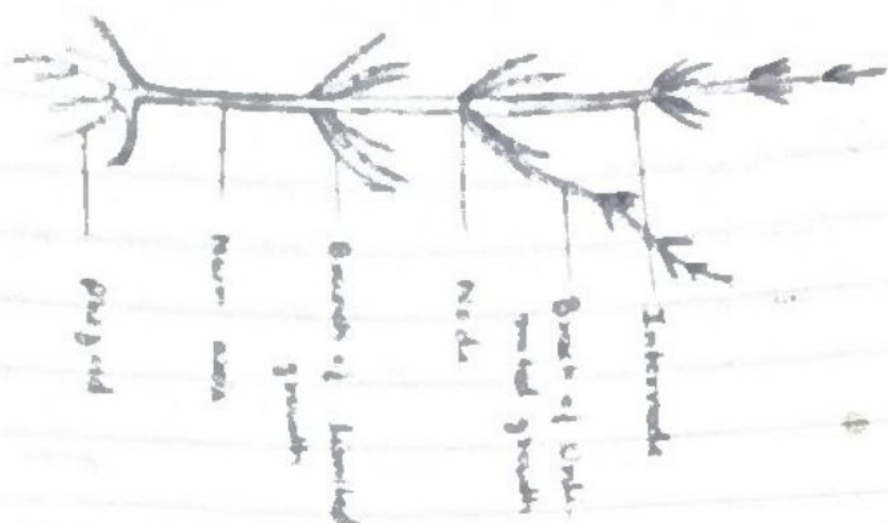
upright - erect

slender - पतला

Thallus :- The plant body is a thallus attached in the mud by multicellular rhizoids. The thallus has a long, slender, flexuous upright branched main axis differentiated into nodes and internodes with whorls of lateral branches of limited growth, arising from nodes. The internodes are composed of a central cylindrical cells having length having many times longer than breadth encased by elongated narrow cells arising from basal nodes constituting the cortex.

### Cell Structure :-

The cells near the apex or at the nodes are small in size, uninucleate with dense cytoplasm having no conspicuous vacuoles, numerous small discoid chloroplasts without pyrenoids are present. The internodal cells are elongated, multinucleate with numerous small chloroplast embedded in cytoplasmic layer living a huge central vacuole. The endoplasm shows cyclosis.



Reproduction - It takes place by vegetative or sexual reproduction.

(i) Vegetative reproduction :- It takes place by as follows.

(1) Amylum Stars - star shaped aggregated cell filled with starch that are developed on the lower nodes of main axis which on detachment grow into a new plant...  
eg. C. Stelligera

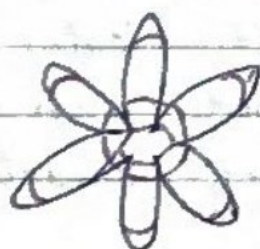
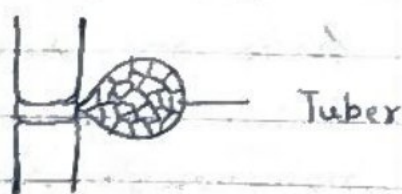
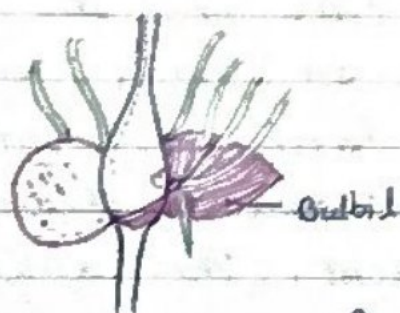
(ii) Tuber :- Tuber like structure formed on the rhizoids eg. C. aspera.

(iii) Amorphous bulbils :-

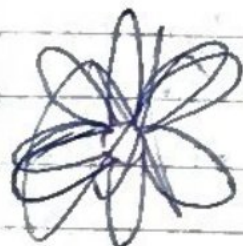
It is produced on the lowest stem nodes C. delicatula or nodes of rhizoids eg. C. fragifera, C. baltica.

(iv) Secondary Protonema :-

Protonema like out growth developing from the primary rhizoid ring or dormant apices.

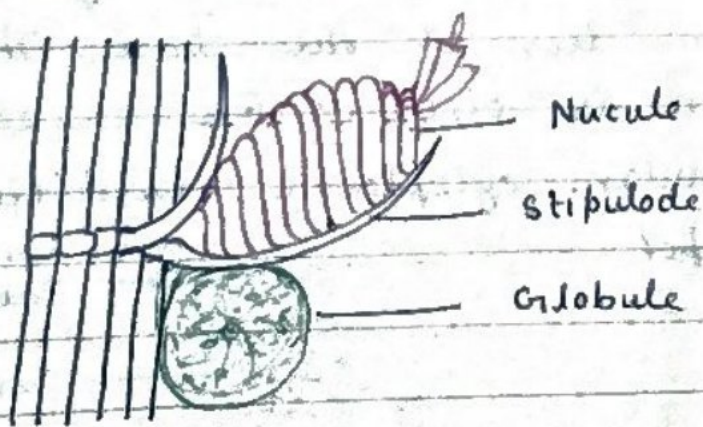


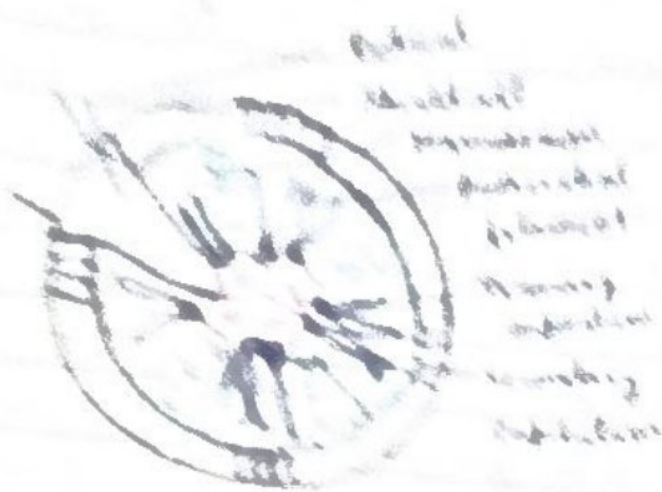
Amylum star



Sexual reproduction : - It is oogamous and the sex organs are more complicated and than any other thallophytes. It takes place by glabule (antheridium) or nucule (oogonium). Most of the spp are homothallic and protandrous but a few are heterothallic eg - C. wallichii. Sex organs are formed on the side facing the axes.

The glabule : - The matured glabule is large, hollow, spherical, stalked, 1 mm in diameter and bright yellow to red in colour. Its wall is composed of eight curved plates, the shield cells, joined end to end giving the wall a pseudocellular appearance. Each shield cell bears in its centre a rod-shaped cell - the manubrium from whose distal end arise rounded cells - the primary capitula, each of which produces six secondary capitula. From each of these capitula arise two long, whip like threads, the antheridial filaments. Each antheridial filament is composed of single row of cells ranging between 5 and 20, in number, each of which produces one elongate biflagellate, band shaped, antherozoid. The mechanism of escape of antherozoid is disputed.





Flagellum

Anterior end

The nucule - The nucule is a large stalked oval structure about 7 mm long at maturity. It is surrounded by an envelop of five long filaments placed side by side arranged spirally exhibiting a twisted appearance and offering protection to the enclosing organism. Each staminal cell terminates in a small erect cell. The five erect cells of the five filaments together form five celled crown or corona capping a mature nucule. According to Sunderalingam (1954), a gap is formed where an organism is sealed on the primary laterals. The protrusion of the organism produces a single large crown which is packed with starch and oil. The single nucleus in the crown lies at the base. The apex of the crown is occupied by a colourless finely granular cytoplasm constituting the receptive spot.



Crown cell  
Tube cell

Femal nucleus  
Oogonium

Fertilization — Before fertilization, five slits below the corona develop due to slight separation of tube cells from one another. Through these slits, antherozoids enter the sheath. One antherozoid penetrates the ovum at the receptive spot and fuses with egg nucleus. Immediately after fusion, the zygote nucleus travels to the apex of the oospore surrounding which develops a thick wall. Carbonate of lime deposits on the walls and the oospore goes to rest at the bottom of pond.

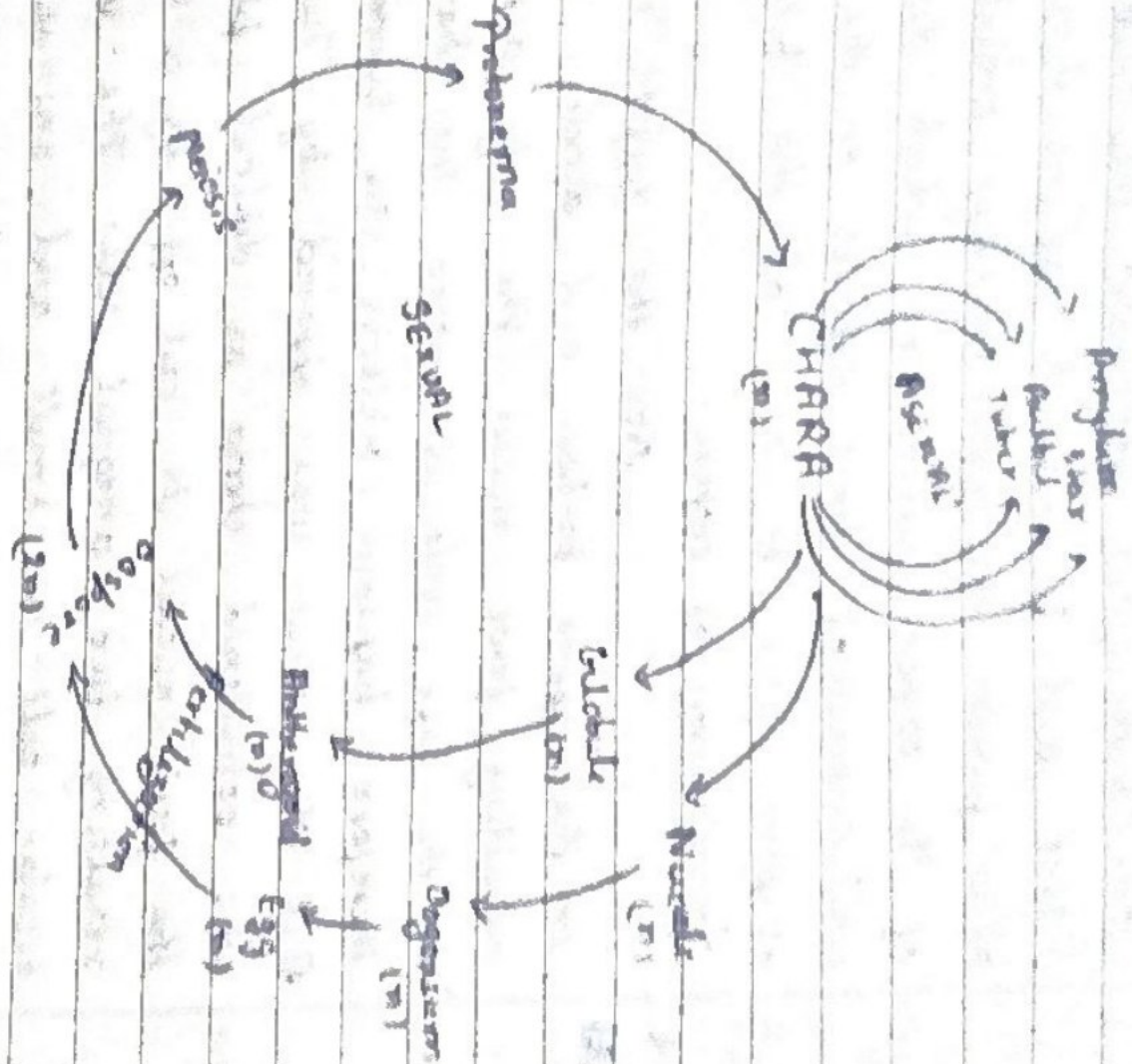
Germination of oospore —

Now the zygote nucleus migrates in the upper position and divides by meiosis resulting four nuclei. The only diploid structure in the life cycle is zygote. The chara plant is therefore haploid (Loebkess, 1916, Sunderalingam (1946)). But this view was opposed by Tuttle (1926) who considered chara as diploid plant. One of the four nuclei is cut off by a cell wall resulting two unequal cells. The upper cell lenticular cell is small and uninucleate whereas the lower basal cell is large containing three nuclei and is packed with reserve food. The three nuclei degenerate soon. The lenticular cell divides vertically to give rise rhizoidal initial and protonemal initial which grow in opposite direction forming a colourless rhizoid & protonema respectively and ultimately develops into a mature chara plant.



germination of zygote

# Graphic life cycle →



graphic life cycle of para