Batrachospermum

Systematic position:

Division- Rhodophycophyta

Class- Rhodophyceae

Sub-class- Florideae

Order- Nemalionales

Family- Batrachospermaceae

Genus- Batrachospermum.

Occurrence:

This is one of the fresh water forms of Rhodophyceae. This alga is found in slow running streams and on the banks of lakes and ponds. It is more commonly found in well aerated waters. The plants are blue-green, olive-green, violet and reddish in colour. The colour varies as a result of the differences in light intensity.

Image Courtesy: i178.photobucket.com/albums/w277/jerrytheplater/Algae/Batrachospermum2.jpg

The species which grow in deep water are reddish or violet in colour whereas the species growing in shallow water are olive-green in colour. The alga is also known as the 'frog spawn'. The plants are mucilaginous, moniliform or beaded in appearance to the naked eye. The plants may reach a length of twenty centimetres and may easily be collected from the slow running streams around Dehradun especially in winter season.

Structure:

The thallus is filamentous, profusely branched and with a mucilaginous feel. The filament consists of only one axial filament of main axis which has been produced by a single apical cell cutting off the segments parallel to the base. This way, the central filament or main axis consists of a uniseriate row of axial cells. The main axis bears the laterals at various points on its length. These laterals are very short in comparison to the main filament. They are called the branches or the laterals of limited growth.

At the nodal point just beneath the septum, usually four basal cells are formed each producing a whorl of the branches of limited growth. The laterals of limited growth possess constricted cells of moniliform or beaded appearance. The ultimate cells of the branches of limited growth usually terminate in unicellular colourless hairs. The clusters of the laterals at nodes are called the glomerules.

In addition to the numerous branches of limited growth, resemble the main filament in structure. The basal cells from which the branches of unlimited growth arise also produce filaments growing downward and ensheathing the main axis. They are called corticating filaments and they form the pseudocortex.

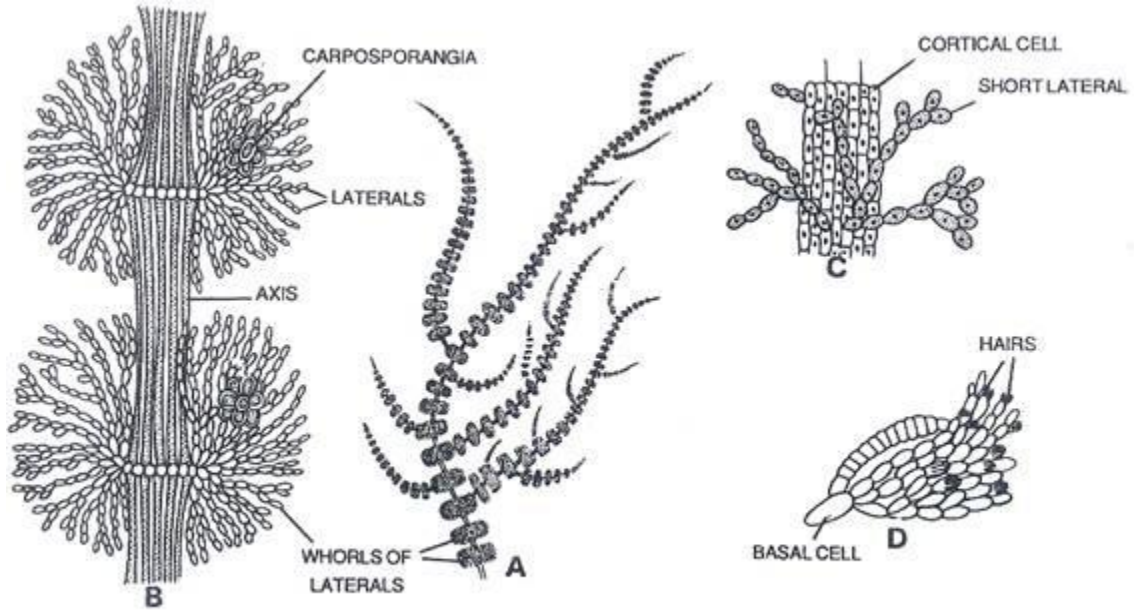

Fig. 7.7. *Batrachospermum*. A, portion of plant; B, two whorls of laterals; C, short laterals; D, basal cell with laterals.

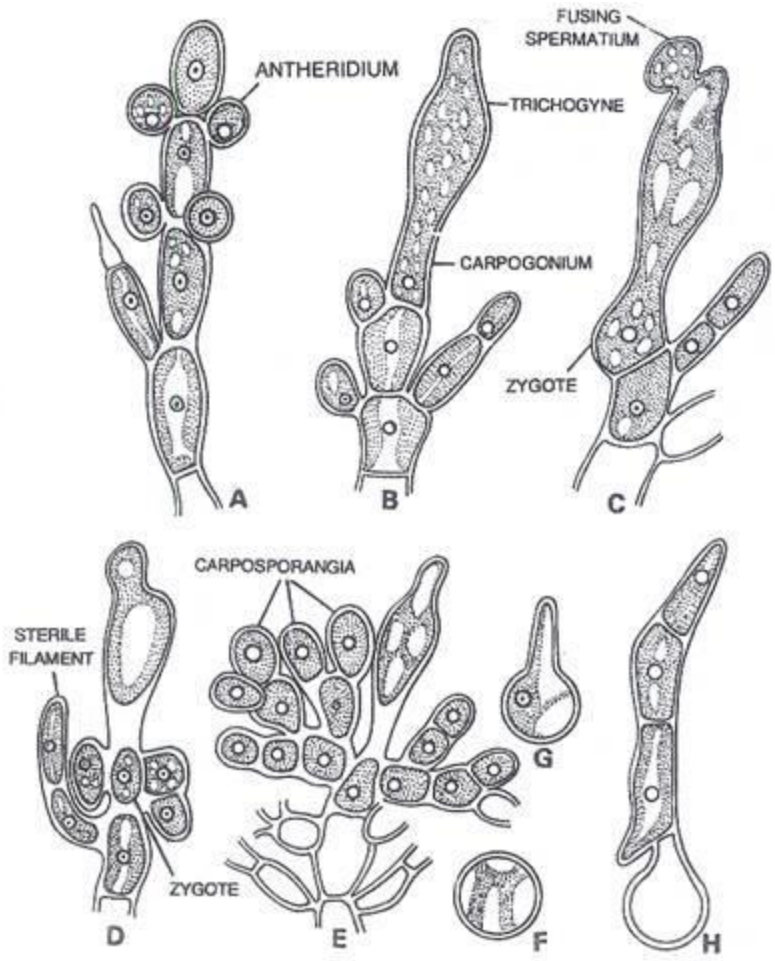

Fig. 7.8. *Batrachospermum*, A, antheridial branch with globular antheridia; B, carpogonial branch with carpogonium; C, fusion of trichogyne with spermatium; D and E, germination of zygote and formation of carposporangia; F, carpospore; G,germination of carpospore; H. *Chantransia* Stage.

The cell wall of each cell is two layered. The outer layer consists of pectin and the inner one of the cellulose. The cells are uninucleate. Each cell contains many (more than one) parietal chromatophores. The cells of Batrachospermum do not have pit connections which are common in the other members of Florideae. Each chromatophore contains single pyrenoid.

The reproduction takes place by means of sexual and asexual methods.

Sexual reproduction:

The sexual reproduction is advanced oogamous and takes place by means of male and female sex organs known as antheridia and carpogonia respectively. The plants may be monoecious or dioecious.

Development of antheridium:

The antheridium develops from an uninucleate, colourless antheridium mother cell. From each antheridium mother cell one to four antheridia are developed. The antheridia are produced in clusters at

the apical points of the short laterals. In the beginning they appear as protuberances arising sub terminally and successively from different sides of the mother cell. Later on, the small protuberances sub terminally become spherical.

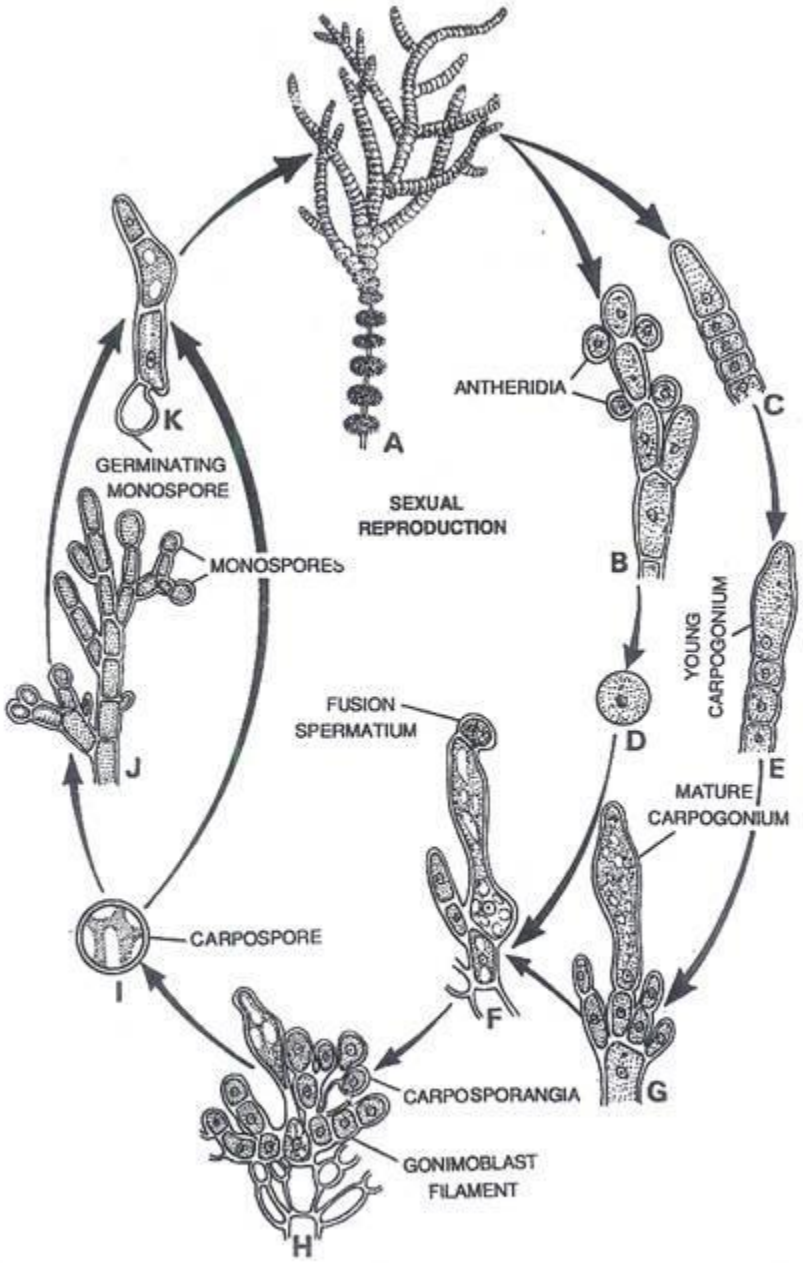

Fig. 7.9. *Batrachospermum*. Life-cycle, A. a portion of plant; B., antheridial branch with antheridia; C and E, formation of carpogonium; D, spermatium; E, young carpogonium; F, fusion of spermatiun; G, mature carpogonium; H. carposporophyte; I, carpospore; J, *Chantransia* stage producing monospores; K, germinating monospore.

Each antheridium contains a single spermatium on its maturity. The non-motile, spermatium liberates through a slit formed in the wall of antheridium. The spermatia remain floating in the water.

In Batrachospermum, the nucleus divides into two as soon as it contacts the trichogyne. So at the time of the fertilization spermatium contains two nuclei and sometimes known as spermatium complex.

Development of carpogonium:

The **carpogonia** develop on the terminal ends of the short laterals. The terminal cell of the lateral divides into four cells. The uppermost cell develops into the carpogonium.

The carpogonium consists of a swollen basal portion which contains an egg and known as carpogonium and an elongated receptive part, the trichogyne. The carpogonium is **flask-like**. In the majority of Florideae the cytoplasm of the carpogonium is colourless, but in Batrachospermum it bears a pale plastid.

Fertilization:

The non-motile spermatia float in the water. Many spermatia approach the **trichogyne**. One of the spermatia attaches itself to the trichogyne. The wall of contact dissolves and one of the two nuclei of the spermatium passes through this hole into the trichogyne, reaching in the basal swollen part of the carpogonium where it fuses with the female egg and develops into the zygote. Thereafter the trichogyne shrivels down upto the constriction in between trichogyne and carpogonium. Simultaneously a cross wall develops at this juncture.

Germination of zygote:

The diploid nucleus of the zygote divides meiotically producing two haploid nuclei. Thereafter one of the two nuclei migrates into the lateral protrusion of the zygote. A wall separates this protrusion from the rest of the zygote and this way the **gonimoblast initial** is formed, other daughter nucleus divides repeatedly several times, forming a large number of gonimoblast initials. The gonimoblast initials divide again and again and a gonimoblast filament develops from each initial.

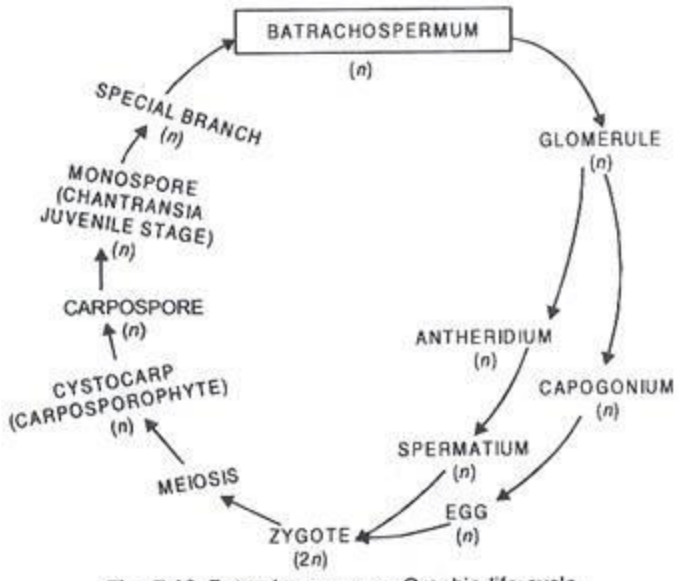

Fig. 7.10 *Batrachospermum.* Graphic life-cycle.

The **gonimoblasts** become branched and terminal cells of these develop into carposporangia. Each carposporangium produces a single rounded, haploid carpospore. The structure having gonimoblast filaments, carposporangia and carpospores is known as **cystocarp** or **carposporophyte**.

At maturity of the carposporangia, the walls split off and the carpospores are liberated. Each carpospore gives rise to the juvenile branched filamentous body. The juvenile form of Batrachospermum resembles an alga known as Chantransia, and therefore, known as the Chantransia stage. The terminal cells of these plants act as apical cells and develop into new Batrachospermum plants.

Asexual reproduction:

In several species of Batrachospermum the short branches of the filaments of **Chantransia stage** produce ***monospores***. These monospores again produce Chantransia stage, and again the apical cells of this stage produce new plants.