

Polysiphonia sp. Life cycle

Systematic position:

Division- Rhodophyta

class – Florideophyceae

Order – Ceramiales

Family – Rhodomelaceae

Genus - Polysiphonia

## General features:

- Polysiphonia is a red algae, marine, lithophyte or epiphyte,
- Polysiphonous thallus with basal filaments attached to the substrate by small flattened disks;
- Laterally or dichotomously Branched, lateral branches are two kind : the ordinary branches and the trichiblasts
- The ordinary branches are polysiphonous with unlimited growth, similar to main axis,
- The tricoblasts are uniseriate, usually colorless, and bear the sex organs,
- They are attached by rhizoids,
- The thallus consists of fine branched filaments each with a central axial filament supporting pericentral cells,
- Cytoplasmic connections between adjoining cells,
- Sexual reproduction advanced oogamy.
- Elaborate post fertilization stages.
- Presence of well developed cystocarp.
- Cystocarp, carposporangium and carpospores are diploid.
- Meiosis taking place during the development of tetraspores in the tetrasporangium borne on tetrasporic plant.
- Triphasic life cycle.
- Sporophyte comprising of two phases, an early phase dependent on the gametophyte represented by cystocarp which is followed by an independent phase exhibited by the tetrasporic plant.

## Life cycle:

There is well-developed alternation of generations in the life cycle of Polysiphonia.

- the gametophytic generation is represented by morphologically identical male and female filaments with which alternately occurs asexual or tetrasporic plant which produces tetrasporangia and tetraspores.
- The lateral branches of the male plant bear antheridia known as spermatangia, in dense clusters.
- The spermatangia are short-stalked colorless, spherical to oval, structures.
- Each spermatangium produces a single male cell or a spermatium from its entire contents.
- The wall of the mature antheridium splits open through which the spermatium is liberated.
- The carpogonium is developed terminally on a lateral carpogonial branch of the female filament.
- The carpogonium has a swollen base in which lies the female nucleus, and a narrow elongated process, the trichogyne constituting the receptive organ for spermatia.
- The spermatia are carried by water currents to the carpogonium and finally one of them adheres to the trichogyne.
- Both of the walls are dissolved and male nucleus travels down the trichogyne to the female nucleus, where fusion between two nuclei takes place.
- Sporophytic generation:
  - Its beginning in the zygote
  - After fertilization the supporting cell of the carpogonial filament cuts off an auxiliary cell from its apex.
  - Soon a tubular connection is established between the auxiliary cell and the carpogonium.
  - The thread connecting the auxiliary cell with the carpogonium is known as procarp.
  - The diploid nucleus of the carpogonium divides mitotically and one of two daughter nuclei passes in auxiliary cell through the connecting filament.
  - The carpogonium gradually shrivels and finally disappears.
  - A lateral outgrowth known as gonimoblast initial, arises from auxiliary cell.
  - This is repeated with ultimate production of a set of gonimoblast initials.
  - The diploid nucleus of auxiliary cell further divides and each gonimoblast initial receives a single nucleus.

- Now each gonimoblast initial gives rise to a short gonimoblast filament, with its cells bearing a diploid nucleus.
- The apical cells of each gonimoblast filament develops into a carposporangium, the contents of which are transformed into a single carpospore.
- Simultaneously with the development of each carposporangia and carpospores lateral sterile cells closer to the carpogonium grow out form sterile filament.
- These sterile filament form one to two layered walls surrounding the carsporangia forming an urn shaped structure open its tip through which the carpospores are liberated.
- The entire urn shaped strucrure is known as cystocarp.
- The diploid carpospores after being released, form new plants tetrasprophytic plants, which looks like the gametophytic individuals except that a few cells of which become sporangia tetrasporangia.
- The tetrasporangia are borne on the central cells of the axis.
- The diploid nucleus of a tetrasporangia divides meiotically to form four haploid nuclei around which four tetraspores are developed.
- After liberation the tetraspores germinate to form male and female gametophytes.

Its starts along with the ..... triphasic life cycle.

fig. will be added soon.