

**Reproduction** → The coenobium of volvox is considered to be the most highly evolved on the basis of great differentiation between vegetative and reproductive cells. In the young colonies all the cells are similar and vegetative in function. As the colony grows older some cells of them become enlarged and function as either Asexual or Sexual reproductive cells. They are recognized by their large sizes, large nuclei and dense cytoplasm. A coenobium has all its reproductive cells either entirely as asexual or all the sexual. So the volvox reproduces by two methods. That is -

1. Asexual (Season in favourable)
2. Sexual (End of growing season)

**1. Asexual Reproduction** → Under favourable condition a coenobium may develop 5 to 25 gonidia which is 10 times bigger than the vegetative cells. The enlargement in size is related to the heavy deposition of reserve food material. These non-motile, spherical gonadium, lies embedded in a flask shaped sheath which is towards the anterior of the colony.

Each gonadium further increase in size and undergoes repeated division but the first division is longitudinal and second division is vertical. So that a 4 celled

plate in form which is slightly in curve with concave surface is called Platea state. The next division is called structure forms a minute hollow sphere with distinct pore. The tapering pointed ends of all the daughter cells are found towards its cavity. Subsequently it divides and redivides continuously and forms a large number of cells.

Formation of daughter colony by invagination (Inversion) → When the cell division ceases

The young colony starts ~~in~~ invagination either the cells towards the centre starts going inside out and lastly the whole sphere turns inside out. The entire process of invagination requires 3 to 5 hours.

The tapering ends of all the cells now directed out side and develop flagella and all the cells start separate from each other by the development of mucilaginous cell wall. In this way a new daughter colony is produced inside the parent cell within the enlargement of gonadial cell wall. After the gonadial cell wall after some time transform into mucilage envelop which surrounding the daughter colony. New daughter colony escape as a result of the rupture of the mucilaginous envelop and they leads to ~~independant~~ independant.

2. Sexual Reproduction → This reproduction is oogamous. The coenobium may be either monoecious (*V. globosum*) or dioecious (*V. aureum*). The sex organs which develop in these coenobia which have may or may not have gonidia.

Development of Oogonium → The position and structure of oogonium in a coenobium are quite similar to a gonidium. Its entire protoplast gets transformed into an ovum which is uninucleate and haploid. The spherical ovum in initial stage greenish in colour but at maturity it enlarges slightly and develops a minute papillate, receptive spot which is ready for fertilization.

Development of Antheridium → At the initial stage the position and structure of an Antheridium is similar to oogonium. As a result of repeated division of the protoplast an antheridium may produce 64 to 512 antherozoids. Antherozoids are arranged in a hollow sphere which undergoes inversion similar to asexual reproduction. In some species they are arranged as a plate like colony. Each antherozoid is spindle shaped, uninucleate, biflagellate, pale yellow or yellowish green in colour. Flagella are apical or subapical. After the rupturing of mucilaginous sheath they come out on the water and are ready for fertilization.

Fertilization → The antherozoids liberated in water and when they in contact with oogonium and penetrate the oogonium and one of them fuse with the ovum. The fertilized zygote being cytologically diploid ( $2x$ ) which secrets a three layered wall and turns a orange seed or reddish in colour due to the presence Haematech pigment. It then goes rest for a period and retain in the mother colony. On liberation the zygote sinks to the bottom to the water where it takes ~~ft.~~ some time for maturation. with the return of favourable condition the zygote starts germination. Its exosporium and mesosporium rupture while the endosporium produced a thin, vesicle like structure. Then the diploid nucleus of zygote migrates to the vesicle and it divides and redivides in order to form a daughter colony. But the nuclear division is always reductional. According to Peck (1933) in case of *V. cornuicis* the zygote produce 4 microspheres in the vesicle of which 3 degenerate and the remaining 1 liberate from the vesicle which divides and redivides which form about 500 celled coenobium. Before the division of the cells the ~~zygote~~<sup>zoospore</sup> with draw three flagella.