

(2)

Asexual reproduction: A few cells of the coenobium enlarge about 10 times. These cells lose their flagella and become more or less round. They are pushed inside the colony during their development, forming a **gonidia**. (The gonidia later develop into a new daughter colony.)

The gonidium, by repeated divisions, gives rise to a hollow spherical group of cells with an opening towards the outer side, called the **phialopore**. The cells at this stage face towards the centre. **Inversion** occurs from the opposite side of phialopore which causes the cells to face away from the centre. The phialopore then gradually closes down and a complete hollow sphere is formed. The cells then secrete their own gelatinous wall and each develops two flagella. Thus the daughter colony is formed which are ultimately liberated due to rupture or decay of the mother colony.

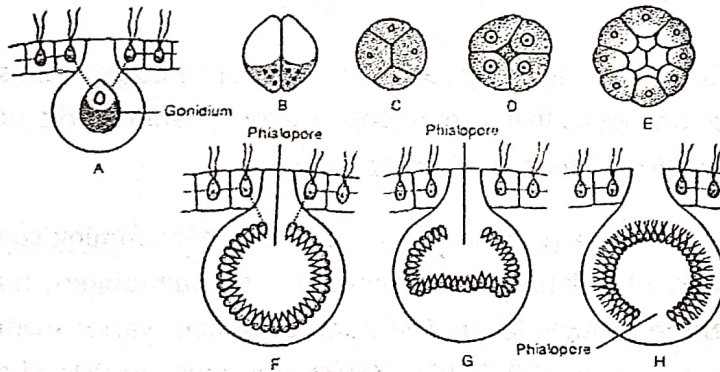


Fig: *Volvox* sp. Stages in the development of daughter coenobium:

A. A single gonidium, B-E. Stages of gonidium development, F. Final stage before inversion, G. During inversion, and H. Flagella development

Sexual reproduction: *Volvox* reproduces during unfavourable conditions, i.e. towards the end of growing season (late summer). The sexual reproduction is of **oogamous** type. Some species are monoecious while others are dioecious. A few cells of the *Volvox* colony withdraw their flagella and develop into reproductive bodies called **gametangia**.

The male gametangia are called **antheridia**. The cell of the antheridium divides a number of times and forms many cells inside. Each cell develops into unicellular, elongated, fusiform, naked and biflagellate antherozoid.

The female gametangia are called **oogonia**. A vegetative cell from the colony withdraws its flagella, enlarges in size and become a more or less flask-shaped oogonium which opens towards the surface of the colony. The entire protoplasm without undergoing any division forms an uninucleate, non-flagellated egg or female gametophyte.

After maturation, the antherozoids (=spermatozoids) are liberated from the antheridium singly or in mass. They move in water towards the surface of the oogonium. A few antherozoids may enter the oogonium but only one succeeds to fertilize the egg and forms a zygote.

During favourable condition, the zygote germinates. Before germination, the diploid ($2n$) nucleus of the zygote undergoes meiosis and forms 4 haploid cells. Depending on the type of species, only one or four of the haploid cells may form new colonies.

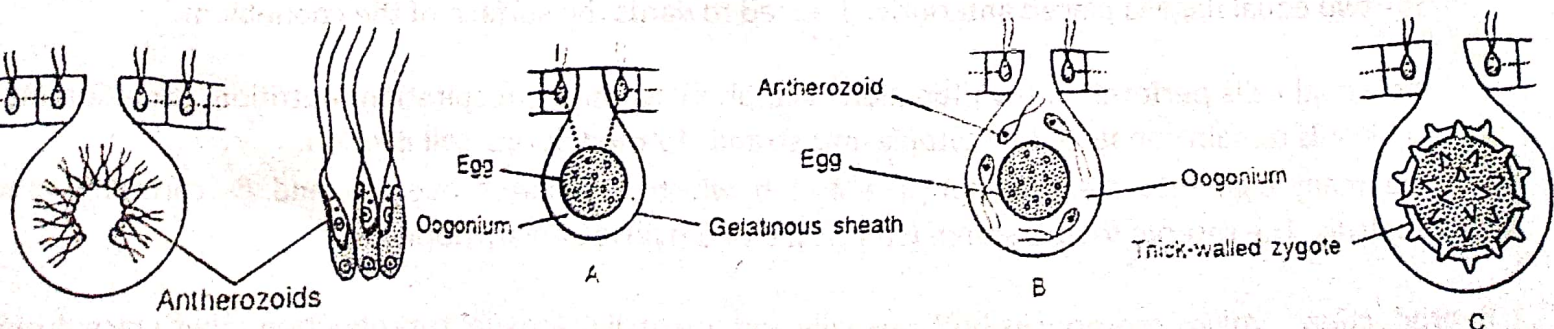


Fig: *Volvox* sp. Antheridia with

VOLVOX

Systematic Position:

Fritsch (1935)	
Class	- Chlorophyceae
Order	- Volvocales
Sub-order	- Chlamydomonadineae
Family	- Sphaerellaceae
Genus	- <i>Volvox</i>

Bold and Wynne (1978)	
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Occurrence: *Volvox* is a colonial alga, it grows in freshwater of pools, ponds etc. It is represented by about 20 species. Single colony looks like a small ball of about 0.5mm in diameter. The common Indian species of *Volvox* are *V. globator*, *V. aureus*, *V. prolificus* etc.

Morphology: Plant body of *Volvox* (L. *volvere*, to roll) is a free-swimming **coenobium**. The coenobium is hollow, spherical or ovoid of gelatinous substance. In the coenobium, huge numbers of cells are arranged towards periphery in a single layer. The number of cells varies from species to species (500-1000 in *V. aureus*) and it ranges from 500-60,000. Young coenobia consists of only vegetative cells while older coenobium consists of vegetative cells, daughter coenobia and antherozoid mother cells and/or ovum mother cells.

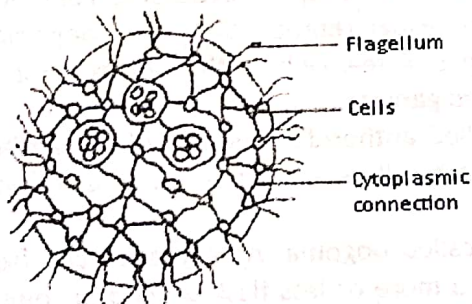


Fig. *Volvox* colony diagram.

Cell structure: The cells have a cellulose wall and are more or less oval in shape having

- 1) a single central nucleus,
- 2) one cup-shaped or stellate chloroplast with one or more pyrenoids at the posterior end,
- 3) an eye spot, reddish or brownish at anterior end,
- 4) 2-6 contractile vacuoles,
- 5) two equal flagella placed anteriorly, directed towards the surface of the coenobium.

Individual cells perform its own functions like photosynthesis, respiration, nutrition, excretion etc. Adjacent cells remain connected by cytoplasmic strands formed during cell division.

The main pigments are chlorophyll a and b which dominates over α - and β - carotenes and xanthophylls. The reserve food is starch (composed of amylose and amylopectin).

Reproduction: *Volvox* reproduces both sexually and asexually. Asexual reproduction takes place during favourable condition while sexual reproduction occurs during unfavourable condition.