



Bhagalpur National College, Bhagalpur

(A Constituent unit of Tilka Manjhi Bhagalpur University, Bhagalpur)

PPT Presentation for B.Sc. I- Life Cycle of Oedogonium



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SCIENTIFIC CLASSIFICATION OF

OEDOGONIUM

KINGDOM	PROTISTA
DIVISION	CHLOROPHYTA
CLASS	CHLOROPHYCEAE
ORDER	OEDOGONIALES
GENUS	OEDOGONIUM



OEDOGONIUM

- The filament is attached with the help of colourless disc like hold fast to the substratum.
- Plant body is of filamentous, unbranched.
- It is aquatic found in permanent, semipermanent fresh water of pools, tanks ditches etc.
- Presence of large single nucleus and a reticulate chloroplast with numerous pirenoids.
- Presence of caps in the dividing cells.
- The cell wall with outer chitin, middle pectin and inner cellulose.

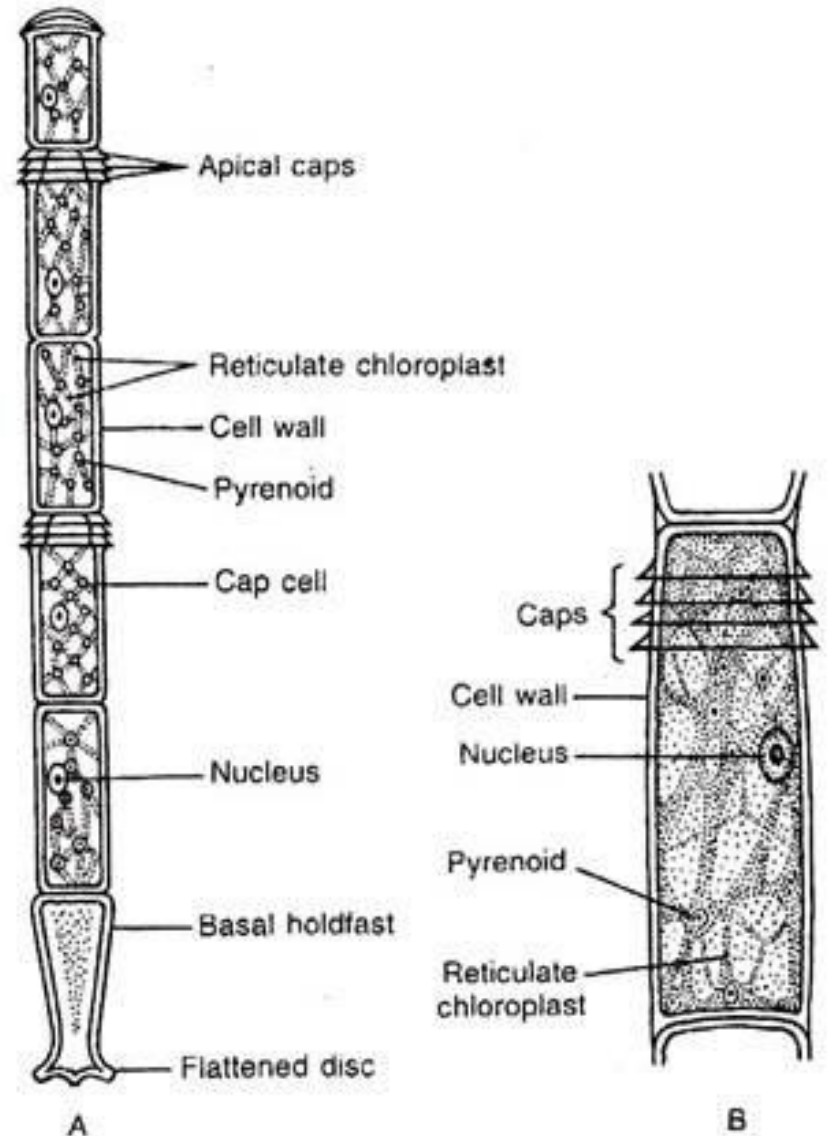


Fig. 3.72 : *Oedogonium* sp. : A. Single vegetative filament with holdfast and apical cell, B. Single vegetative cell

Vegetative Reproduction

1. Fragmentation:

It takes place by accidental breakage of the filament, dying off of inter-calary cells or by the formation of intercalary sporangia. The fragments are capable of developing into new filaments.

2. Akinete:

During unfavourable condition the entire protoplast of a cell becomes a thick-walled, reddish-brown, round or oval structure, the akinete. The akinete germinates during favourable condition and develops a new filament. They generally form in chain.

ASEXUAL REPRODUCTION;

- Oedogonium is a form of filamentous green algae.
- It is capable of reproducing sexually, which means that each oedogonium has both male and female reproductive organs.
- In asexual reproduction, the oedogonium fragments produces zoospore.
- Zoospores are able to move spontaneously through the water. Once the zoospore is produced, it is released and is free to find a suitable substrate. Once found, the zoospore's cells are able to divide and form a new filament of oedogonium.



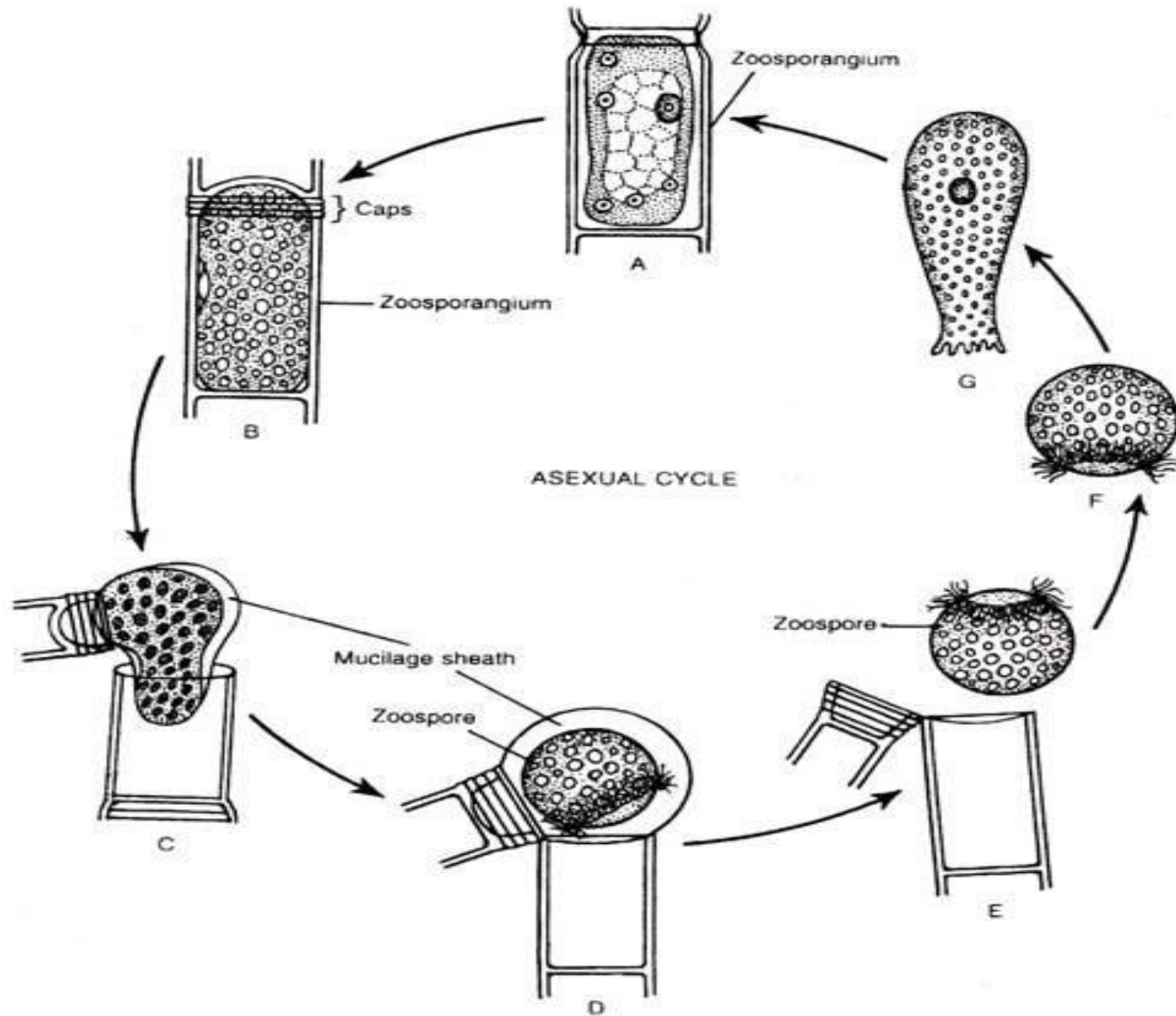


Fig. 3.74 : *Oedogonium* sp. Asexual reproduction : A-E. Successive stages of zoospore formation, F. Single zoospore, and G. Germination of Zoospore

Sexual Reproduction:

- Advanced **Oogamous type**.
- The male gametes or antherozoides are produced in antheridium and the female gamete or egg is produced in oogonium .
- Male and female gametes differ both morphologically and physiologically.
- Only one egg is produced in each oogonium and two antherozoides in each antheridium.
- Another motile structure, the androspore, is produced singly in each androsporangium.
- Deficiency of nitrogen and alkaline pH are the important factors for promoting sexual reproduction.

Development of antherozoid

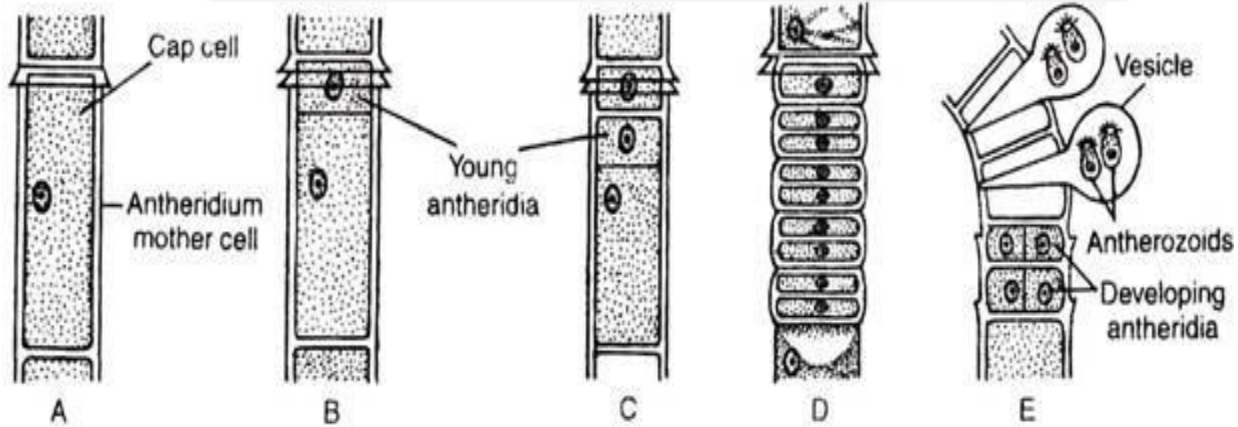


Fig. 3.75 : *Oedogonium* sp. : A-E. Successive stages of development of antherozoids

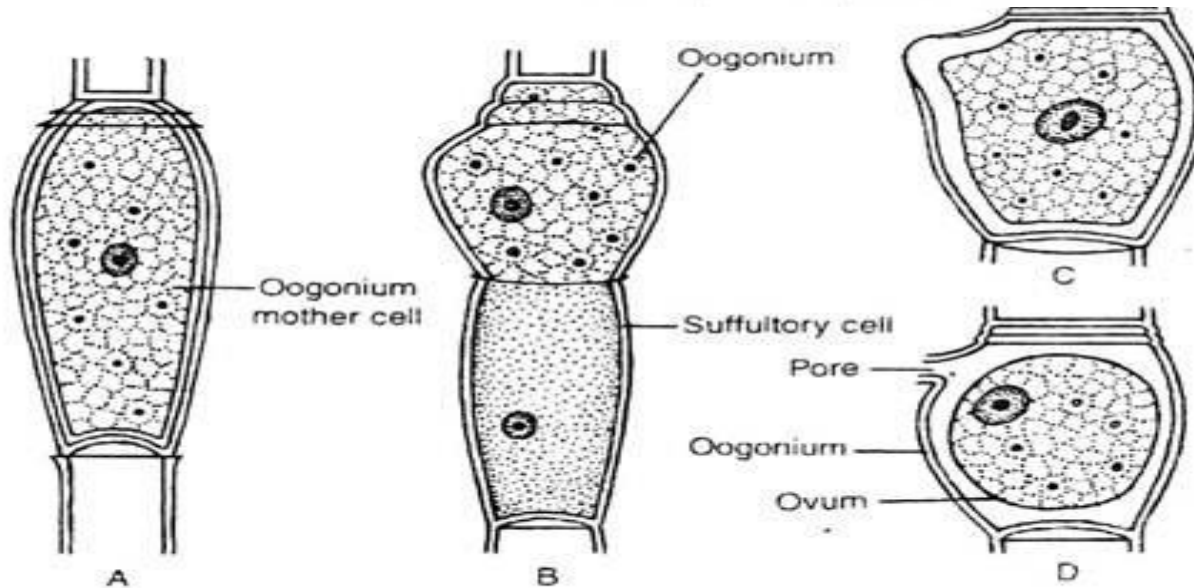


Fig. 3.76 : *Oedogonium* sp. : A-D. Successive stages of development of ovum

Development of ovum

Distribution of Sex Organ in Oedogonium

- Based on the size of the male (antheridial) filament the species of Oedogonium are divided into two groups **macrandrous** and **nannandrous** type
- **1. Macrandrous Type-** In macrandrous type the antheridium develops in the filament of normal size.
 - a) **Monoecious-** In this type (e.g., *O. fragile*, *O. nodulosum* and *O. hirnii*) antheridia and oogonia are borne on the same filament.
 - b) **Dioecious type-** (heterothallic or unisexual). In this type (e.g., *O. gracilius*, *O. cardiacum* and *O. aquaticum*) the antheridia and oogonia are borne on the different filaments .

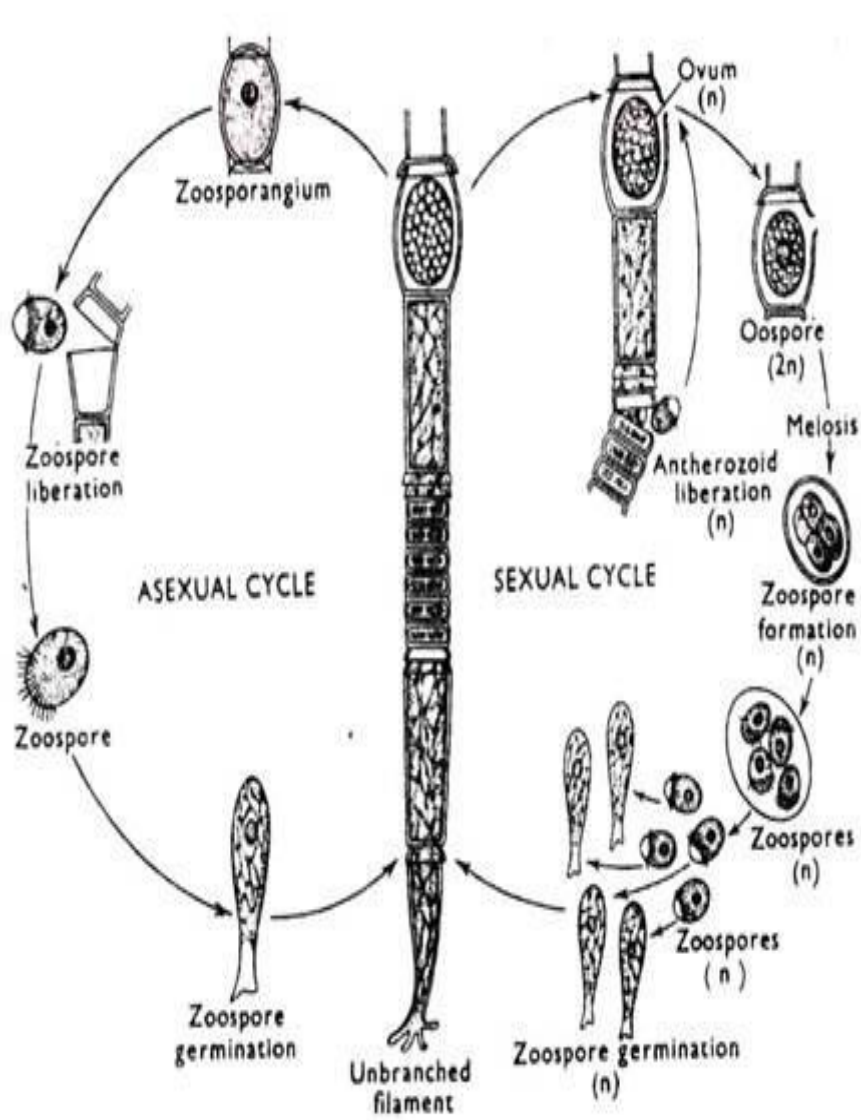


Fig. 3.79 : Life cycle of macrandrous monoecious species of *Oedogonium*

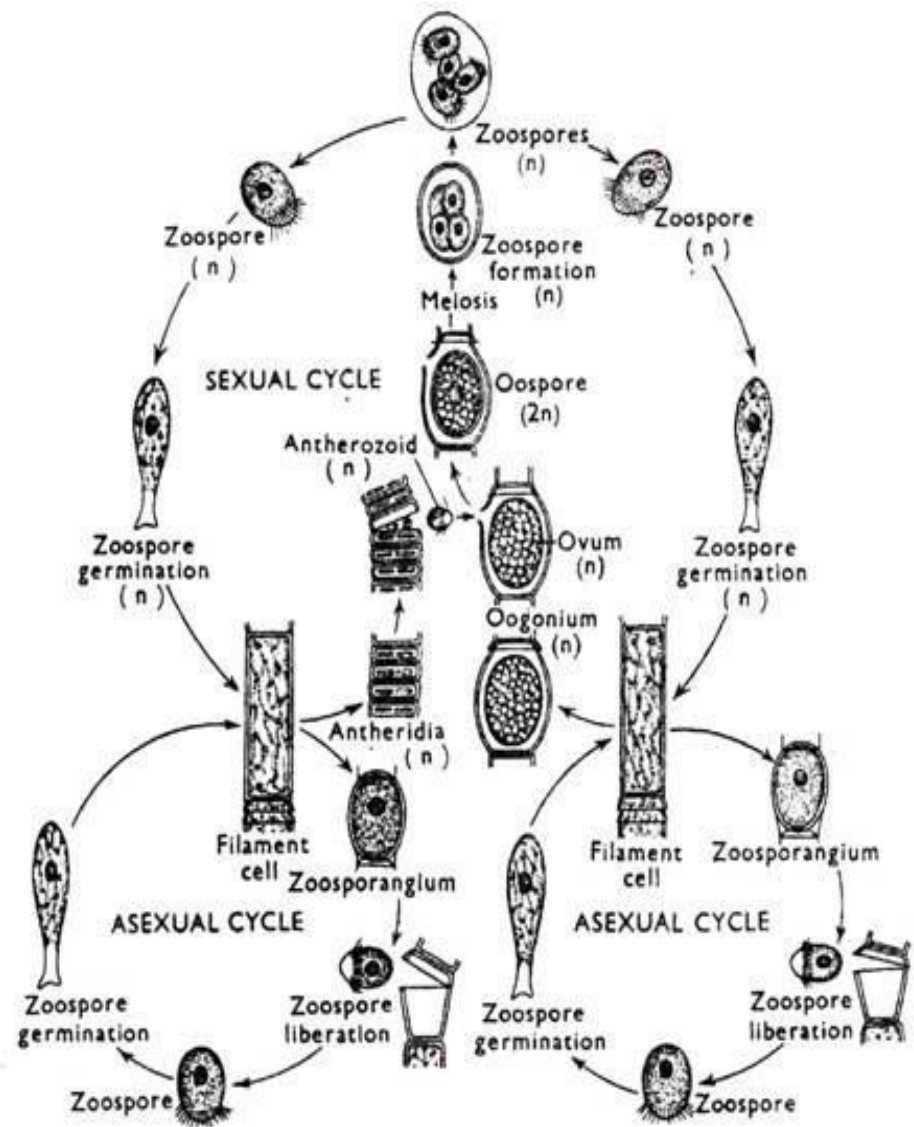


Fig. 3.80 : Life cycle of macrandrous dioecious species of *Oedogonium*

2. Nannandrous Type

- The nannandrous species are always dioecious (heterothallic) i.e., antheridia and oogonia are borne on different filaments.
- The antheridia develop on a very small filament termed as dwarf male or nannandrium.
- Initially androsporangia are developed in series on normal sized filament. The andro-spore form singly within androsporangium.
- Each antheridium produces two antherozoides.
- The androspores are smaller than zoospores (produced asexually) but larger than antherozoides.

Nannandrous Type { Gynandrosporous Type- androsporangia and oogonia born on same filament
Idiosporous Type- androsporangia and oogonia born on different filament

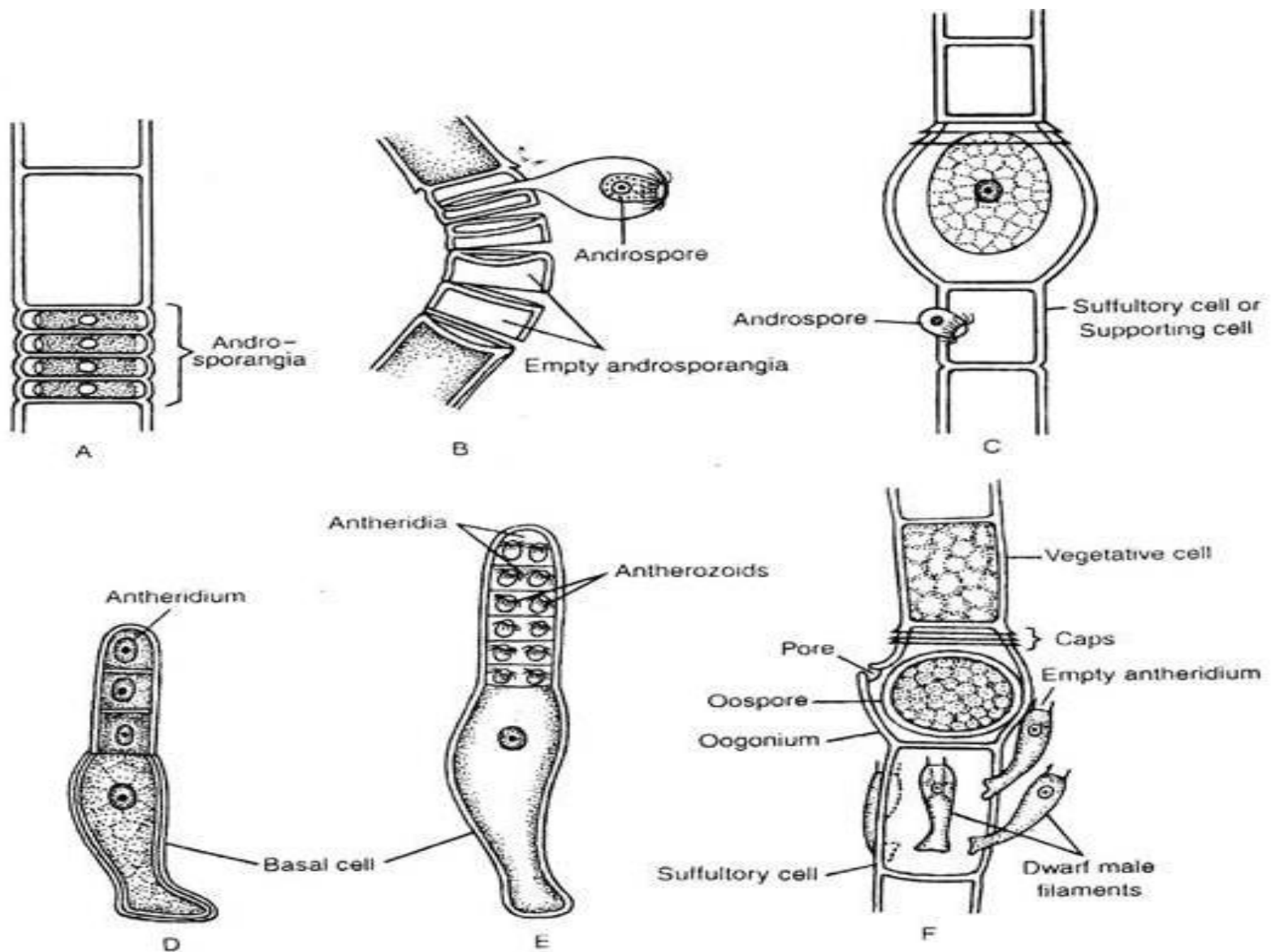


Fig. 3.77 : *Oedogonium* sp. Development of dwarf male : A-B. Development of androspore, C. Attachment of androspore on suffultory cell, D-E. Development of dwarf male and formation of antherozoid, and F. Formation of oospore after fertilisation.

Fertilization

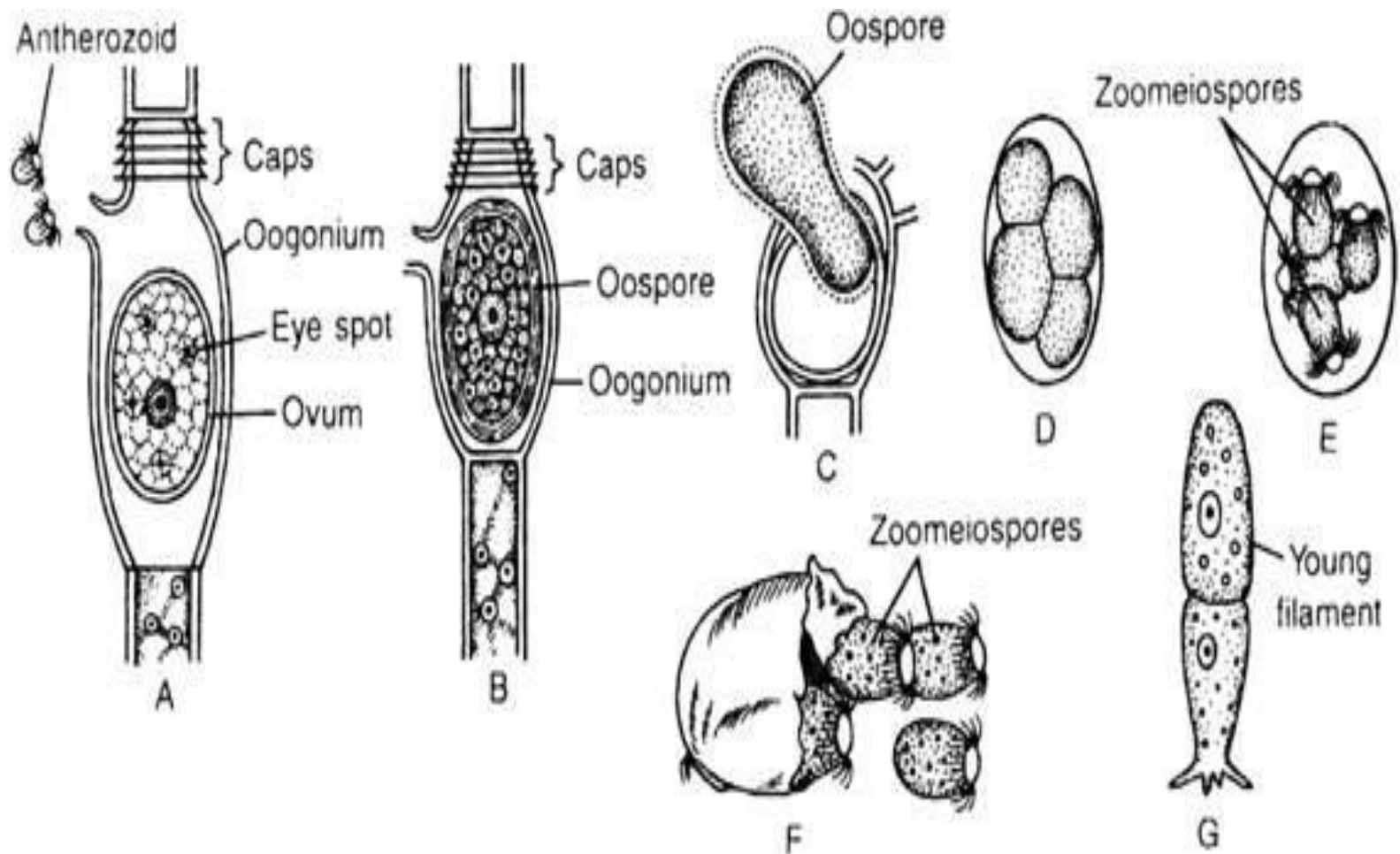


Fig. 3.78 : *Oedogonium* sp. : A. A stage before fertilization, B. Oospore in oogonium, C. Liberation of oospore from oogonium, D-E. Stages of zoospore formation, F. Liberation of zoospore, and G. Young filament develops after germination of zoomeiospore.

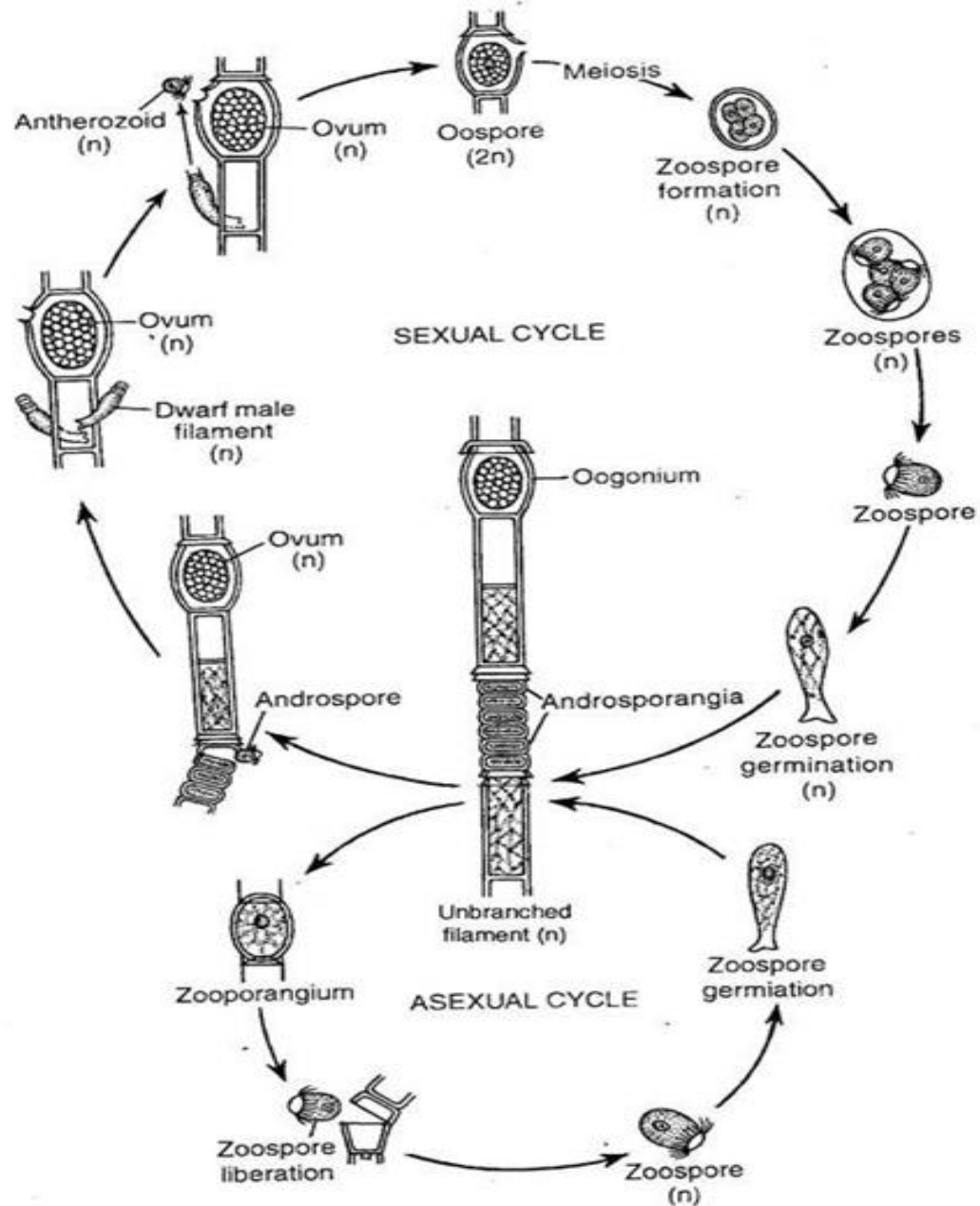


Fig. 3.81 : Life cycle of nannandrous (all are dioecious) – gynandrasporus species of *Oedogonium*

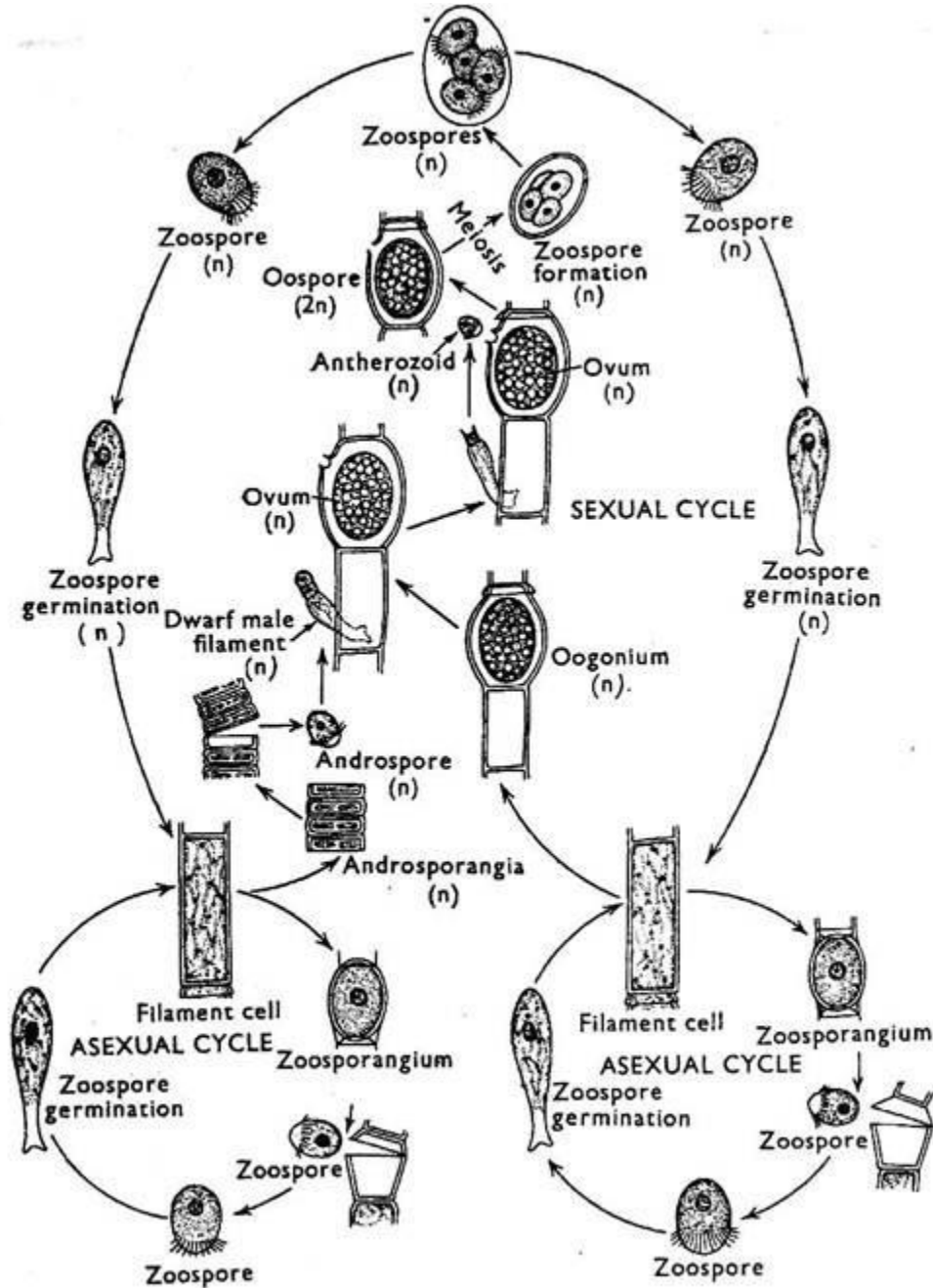


Fig. 3.82 : Life cycle of nannandrous (all are dioecious) – idioandrosporous species of *Oedogonium*

THANX

