

# BRYOPHYTES

**SEMESTER – I**

**PAPER : BOT-111**

**UNIT – IV**

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# MARCHANTIA



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# MARCHANTIA

- Cosmopolitan in distribution.
- Genus *Marchantia* has 65 species ww.
- Grows best in cool, moist and shady places.
- *Marchantia polymorpha* grows as a pioneer in the burnt forest soil after fire.
- 11 species in India, growing mainly in the Himalayas and the South-Indian hills.
- *Marchantia palmate* : eastern Himalayas.
- Reproductive phase during February & March in the Hiamalayas and during October-November in South Indian hills.

Division : Bryophyta

Class : Hepaticopsida

Order : Marchantiales

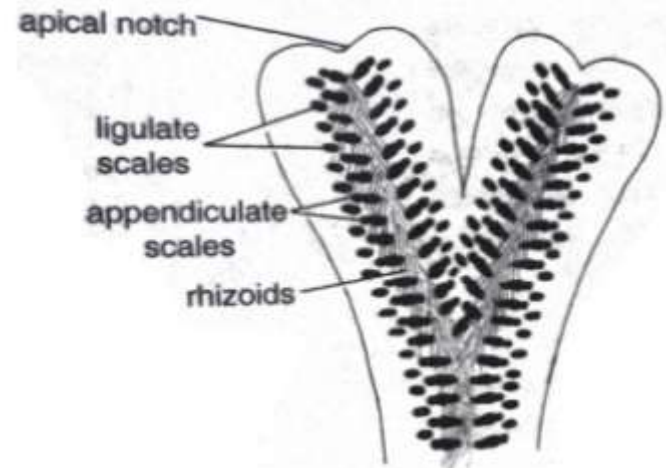
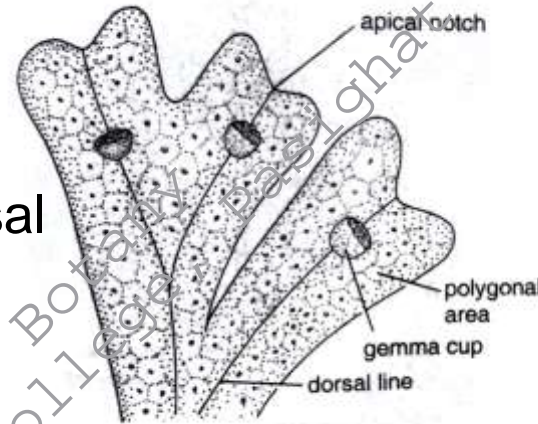
Family : Marchantiaceae



## A. VEGETATIVE STRUCTURE:

### 1. Morphology / External Structures:

- The vegetative plant represents the gametophytic plant body.
- Prostrate, dorsiventral and dichotomously branched thallus.
- Distinct midrib, marked on the dorsal surface by a shallow groove.
- Ventral: Rhizoids and Scales
- Rhizoids hyaline and unicellular.
- Scales are multicellular & violet in colour. (anthocyanin pigments).
- Gemma Cups: contain specialized, multicellular, asexual reproductive bodies/granules called Gemma.



## 2. Anatomy / Internal Structures:

### i. Epidermal Region:

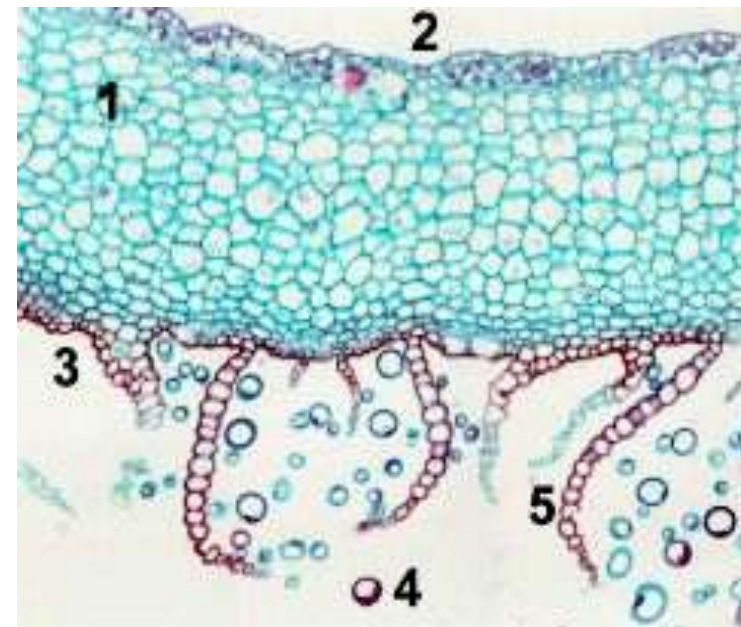
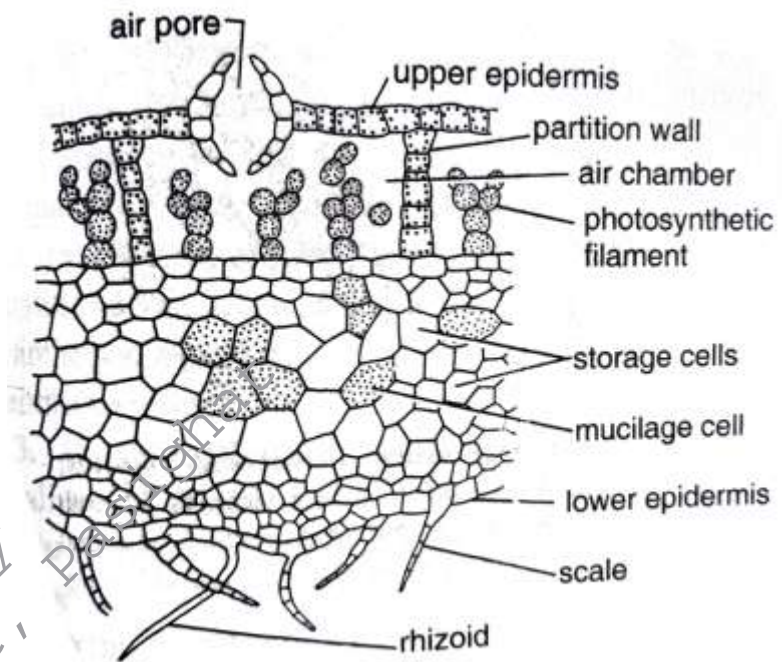
- Outermost region: upper and lower
- Numerous air pores analogous to the stomata in higher plants;
- Rhizoids and scales on lower epidermis.

### ii. Photosynthetic Region:

- Just beneath the upper epidermis.
- Simple or branched photosynthetic filament
- Composed of Chlorophyll containing cells.

### iii. Storage Region:

- Just below the photosynthetic region.
- Compact zone of several layers of polygonal parenchymatous cells.
- Achlorophyllous without intercellular spaces.
- Mostly contain starch or protein granules, mucilage and oil.

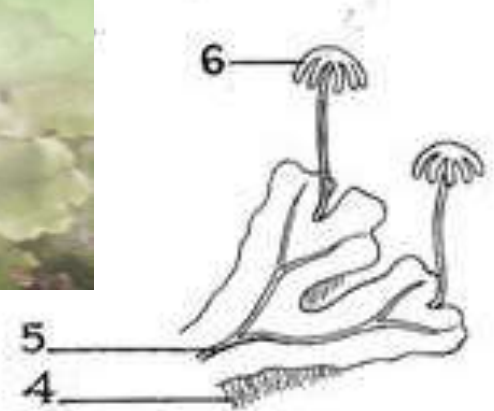
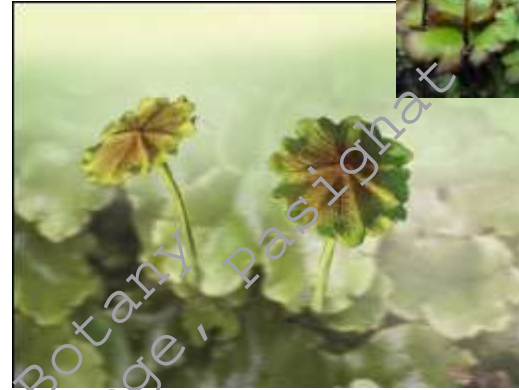




## B. REPRODUCTIVE STRUCTURES:

### 1. External Structures:

- The main thallus represents the Gametophyte.
- It reproduces sexually through gametes.
- *Marchantia* is heterothallic or dioecious.
- Gametophores develop at the distal end of respective thallus (*apical notch*)
- Antheridia: on Antheridiophore.
- Archegonia: on Archegoniophore.
- They are terminal.



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## i. Antheridiophore:

- Arises at the apical notch.
- 1-3 cm long stalk
- 8-lobed peltate disc at its apex.
- Each lobe on the peltate disc have numerous minute cavities on the u.s.
- Antheridial chambers embedded in the photosynthetic region.
- Each antheridial chamber contains a single antheridium.



## ii. Archegoniophore:

- Arises at the apical notch.
- 3-5 cm stalk and a terminal disc.
- Disc is star shaped with 8-9 radiating arms or 'Rays,'
- Each ray contains a row of 12-14 archegonia embedded in a fertile pocket along the ventral ridge.

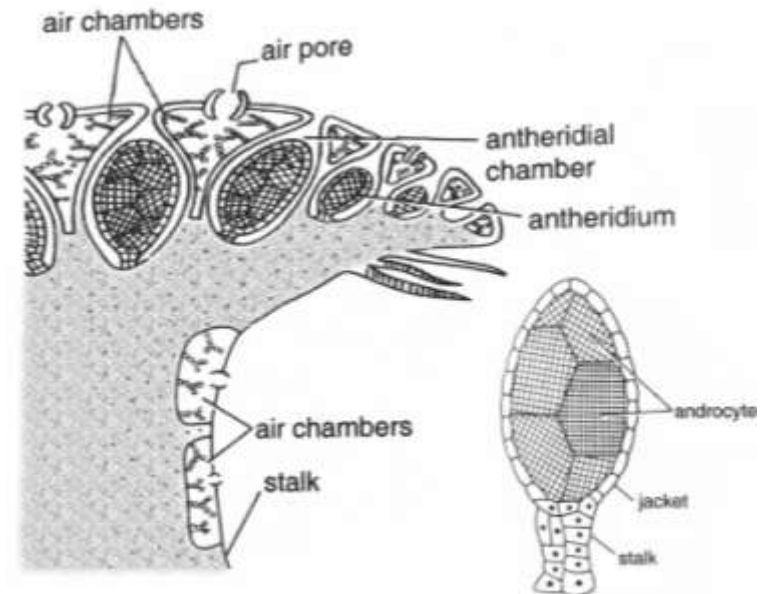


## 2. Internal Structures:

Ontogenically, the gametophores are the extension of the vegetative thallus. Therefore, they show the characteristics of the vegetative thallus, i.e., their anatomy shows the presence of air chambers, air pores and photosynthetic filaments all over the upper epidermis and storage region just beneath them.

### i. Antheridia:

- The air chambers on the upper surface are alternated with numerous flask-shaped cavities, called the **Antheridial Chambers**.
- The antheridial chambers open externally by a pore, called **Ostiole**.
- Each antheridial chamber contains a single **Antheridium**.
- The mature antheridium is a globular structure, attached to the floor of the antheridial chamber by a multicellular **stalk**.
- The antheridium has a single layered sterile **jacket**, enclosing a mass of androcytes, which eventually metamorphose into **antherozoids** (minute, rod-like biflagellate male gametes).

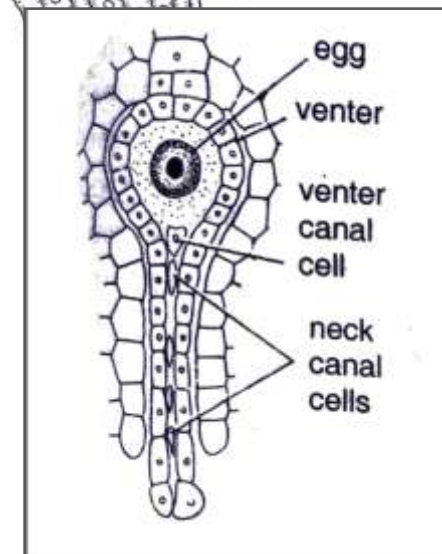
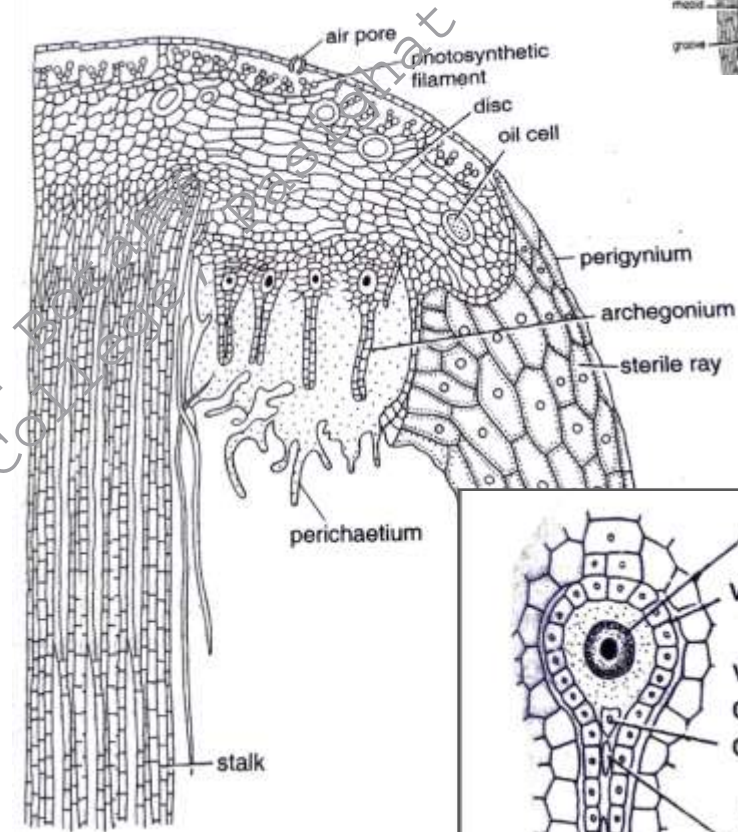
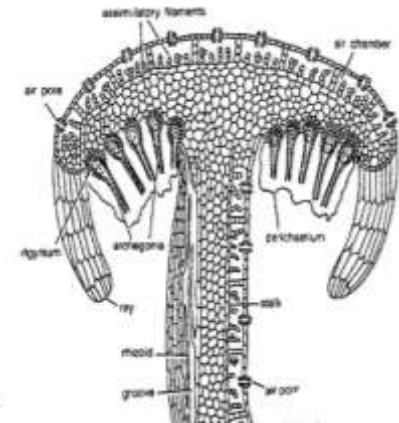




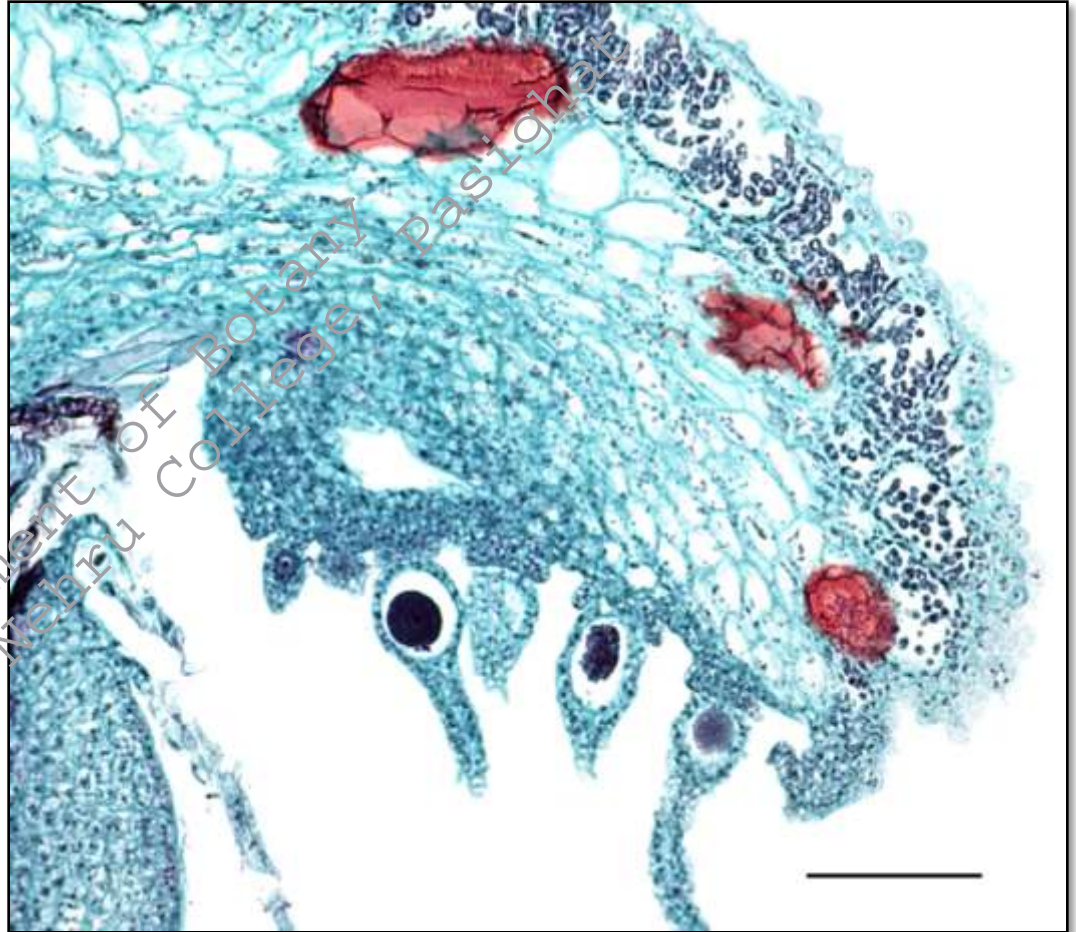
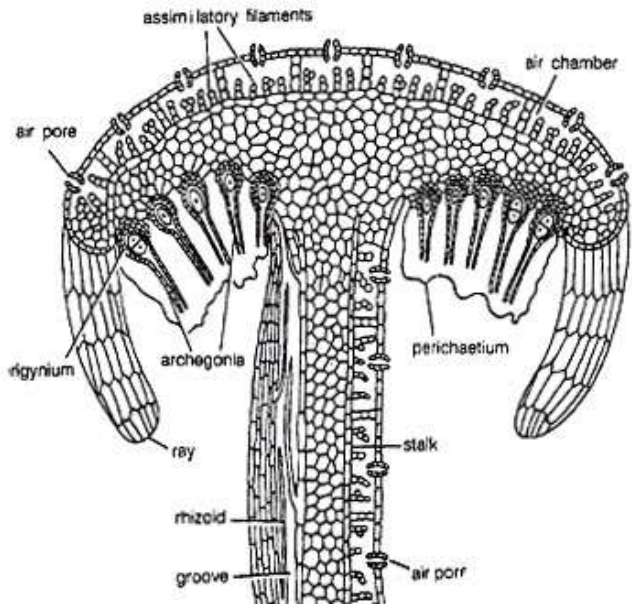


## ii. Archegonium:

- Archegonia are found in uniseriate fertile pockets along the ventral ridges of radiating discs, near the stalk.
- They are enclosed inside a mass of sterile tissue, called **Perichaetium**.
- The mature archegonium is pendant and attached to the ventral ridges of the radiating disc by a short stalk.
- It is an inverted flask-shaped structure, with a basal swollen **Venter** and an elongated **Neck**.
- The venter is surrounded by a single layered sterile Jacket and contains a large egg and a relatively smaller Venter Canal Cell.
- The neck consists of 6 vertical rows of cells, called the **Neck Cells**, which enclose a narrow canal with 4-8 **Neck Canal Cells**.
- The tip of the neck has a rosette of four **Cover Cells**.



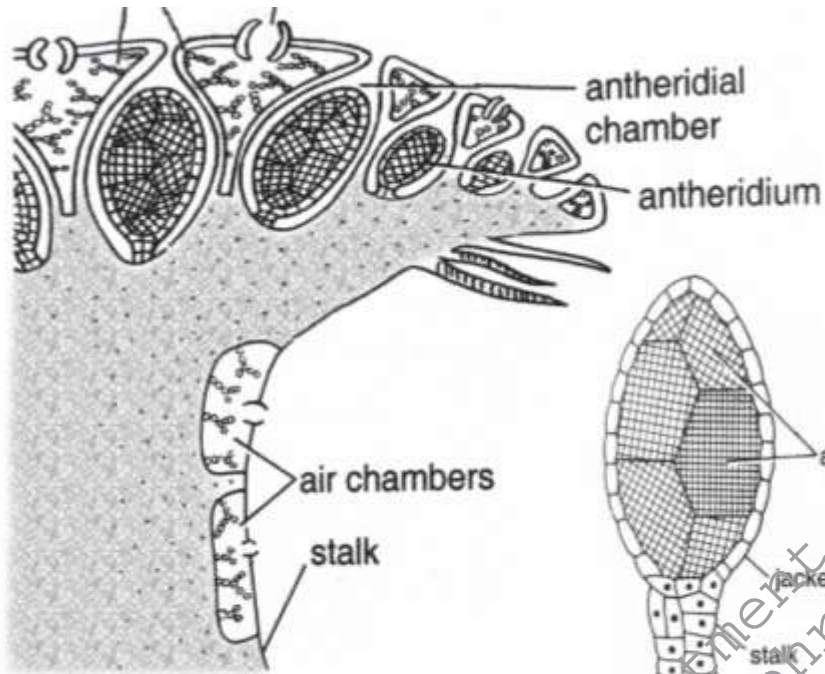




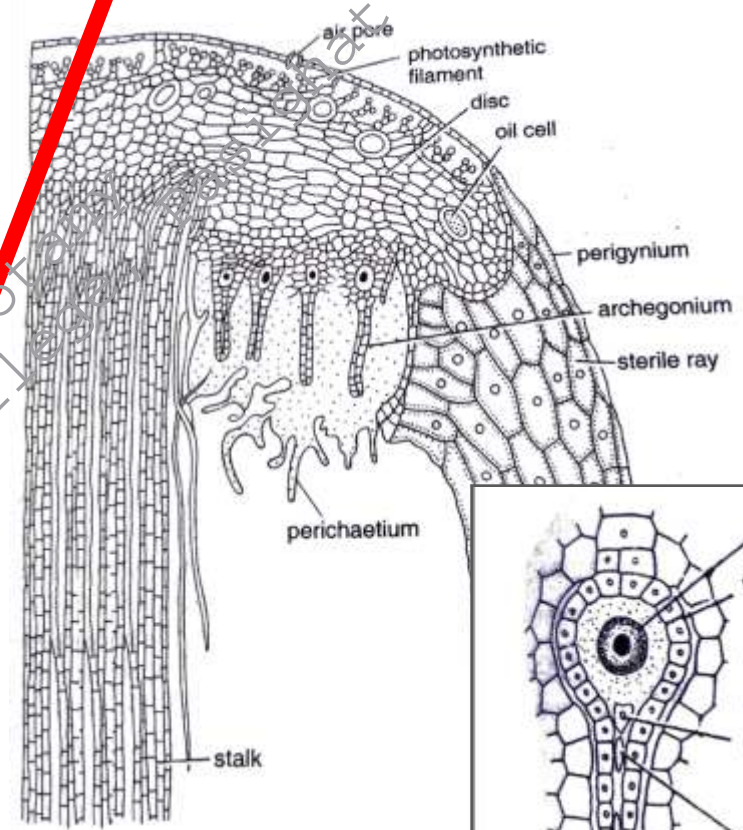
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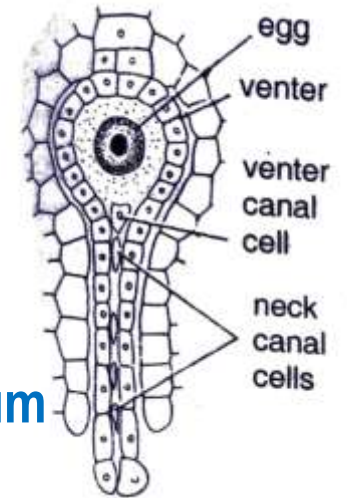
# FERTILIZATION



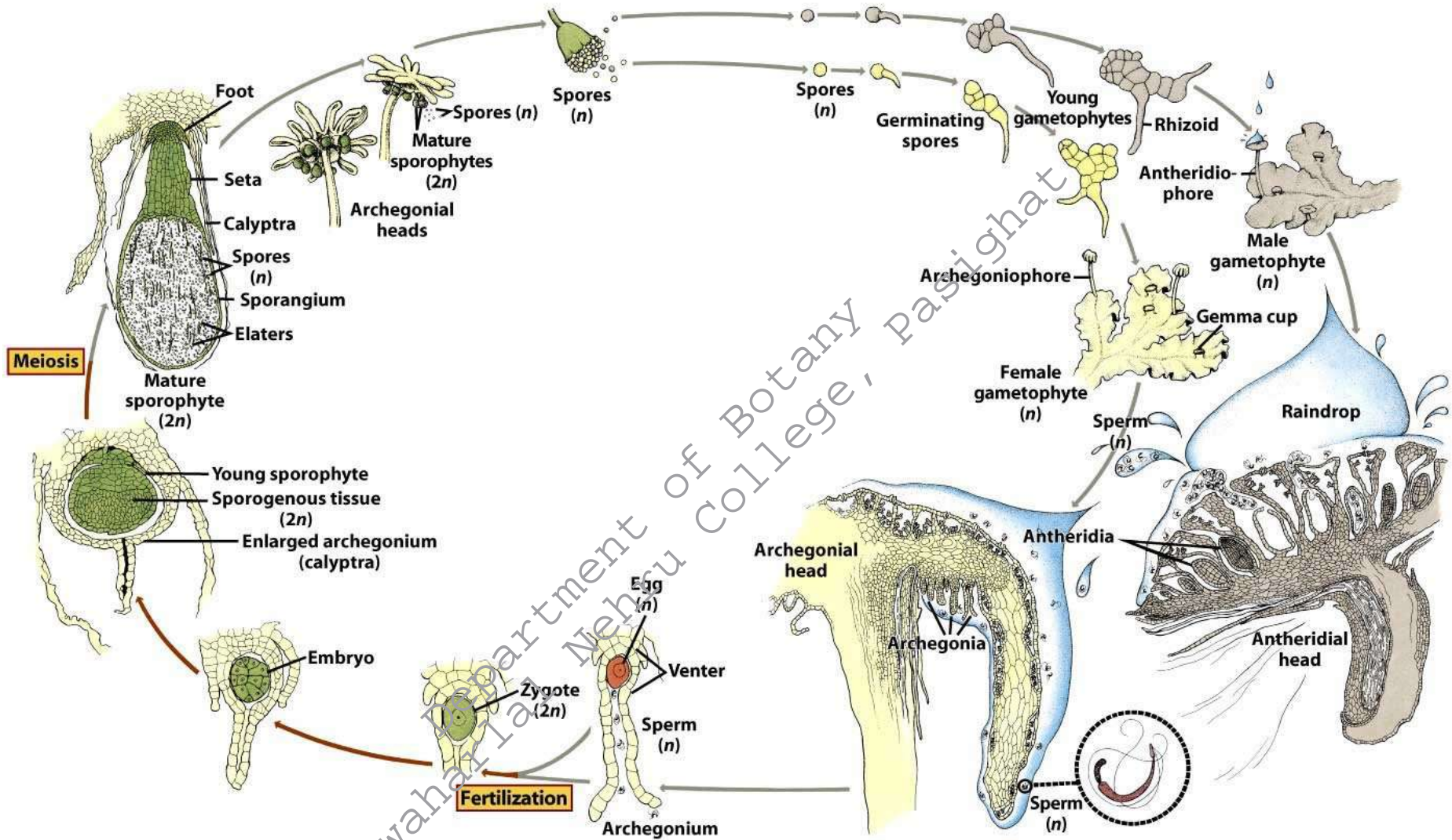
Antheridiophore > Antheridium



Archegoniophore > Archegonium



# LIFE CYCLE



**Figure 16-15**  
*Biology of Plants, Seventh Edition*  
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