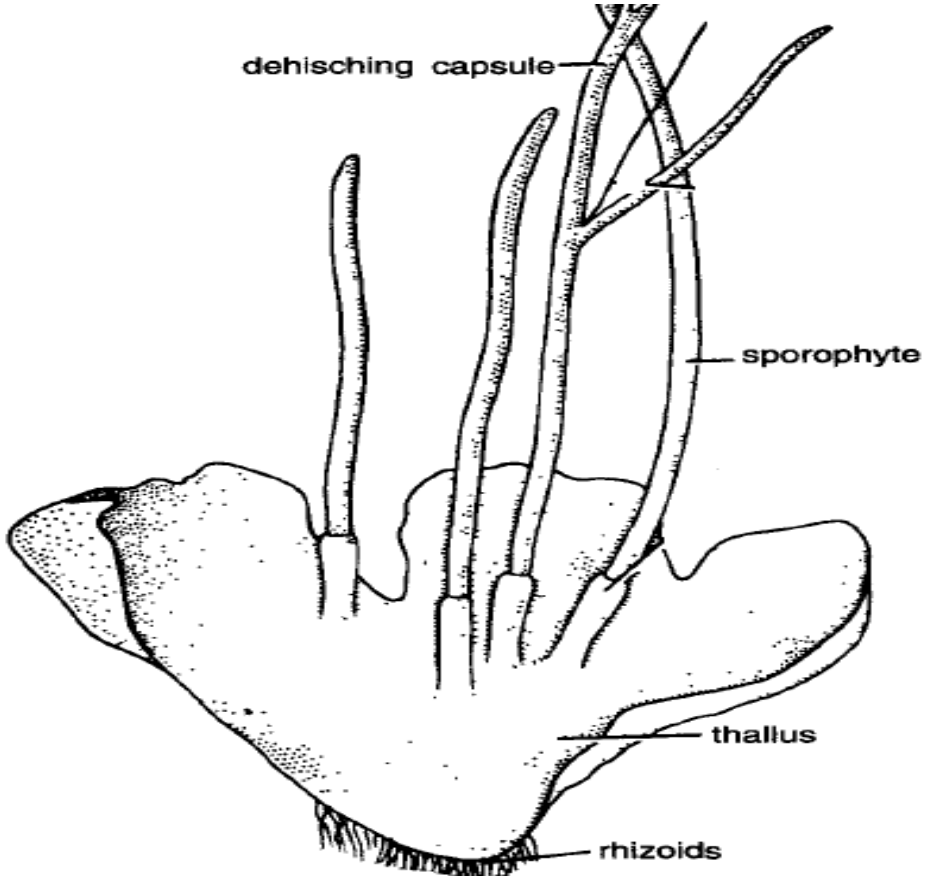
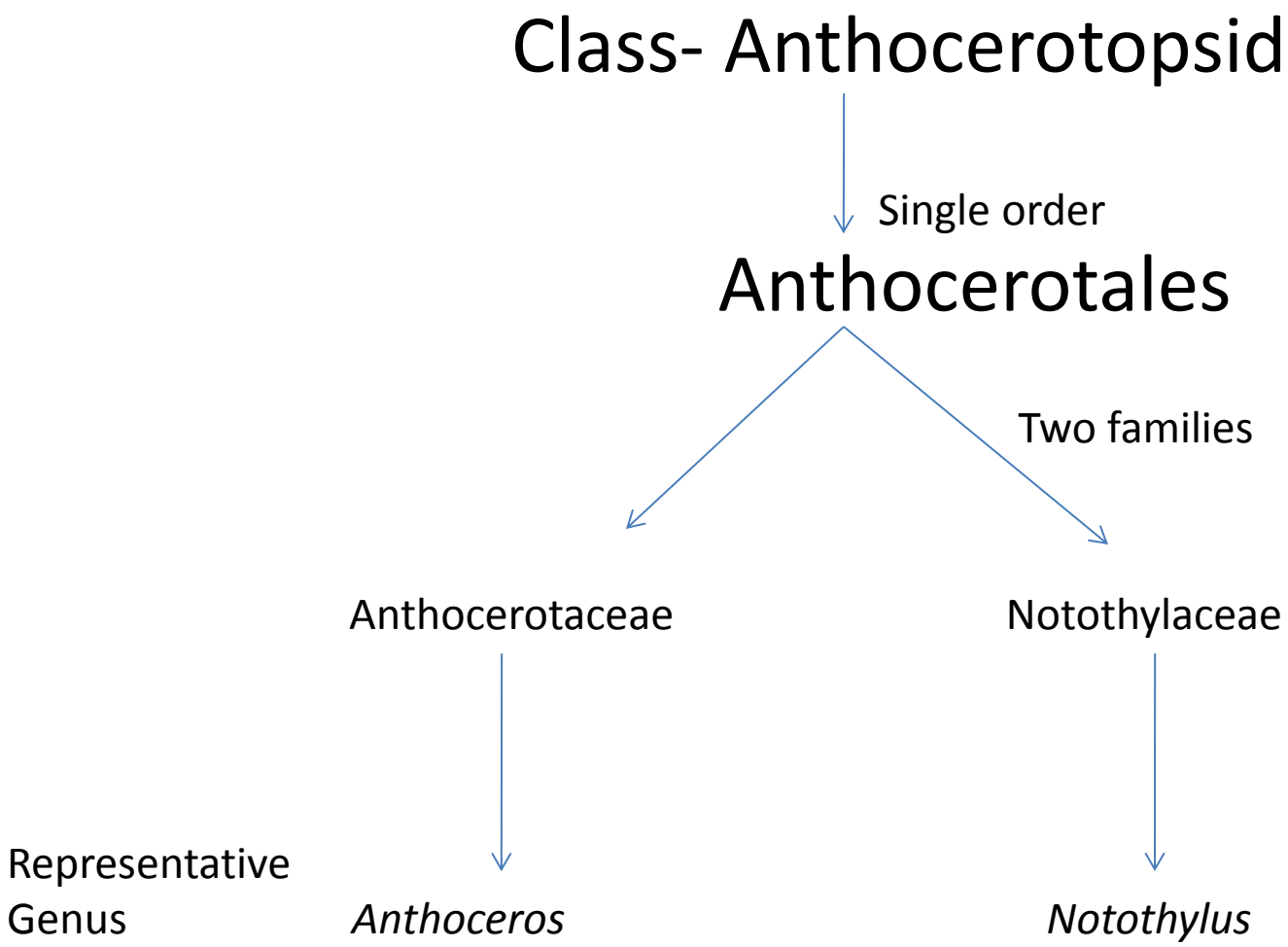
Morphology, Anatomy and Reproduction of *Anthoceros*



- INDRESH KUMAR PANDEY

Taxonomic Position of *Anthoceros*



General features of Anthocerotopsida

- Forms an isolated evolutionary line
- Sometimes considered independent from Bryophytes and placed in division Anthocerophyta
- Called as ‘Hornworts’ due to horn like structure of sporophyte
- Commonly recognised genera includes

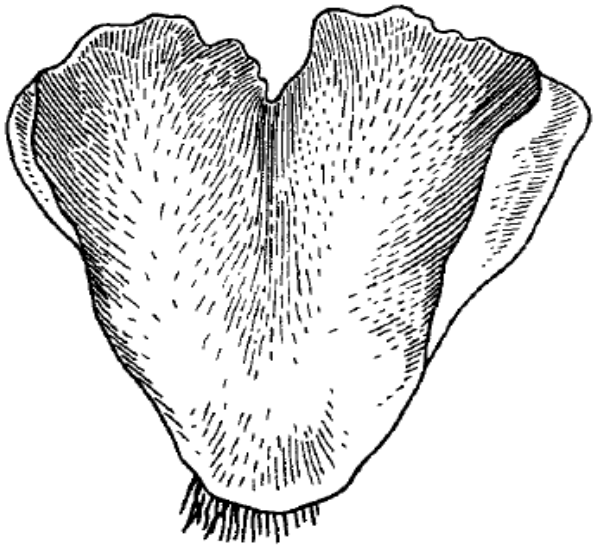
  Anthoceros, Megaceros, Nothothylus, Dendroceros

Anthoceros :Habitat & Distribution

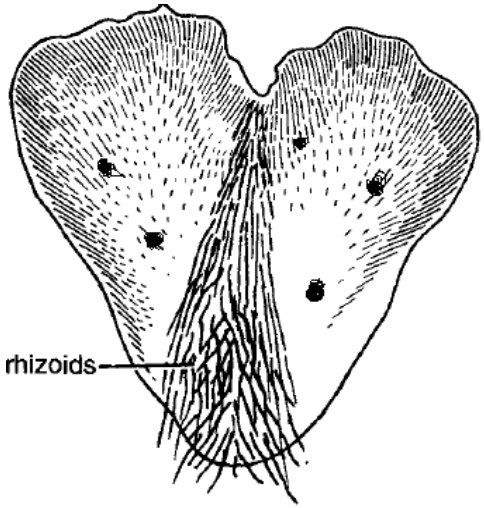
- Cosmopolitan
- Mainly in temperate & tropical regions
- More than 200 species, 25 sp. Recorded from India.
- Mostly grows in moist shady places, sides of ditches or in moist hollows among rocks
- Few species grow on decaying wood.
- Three common Indian species- *A. erectus,*

  A. crispulus, A. himalayensis

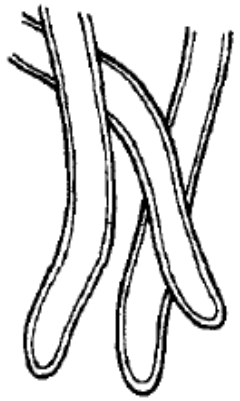
Anthoceros: Morphology



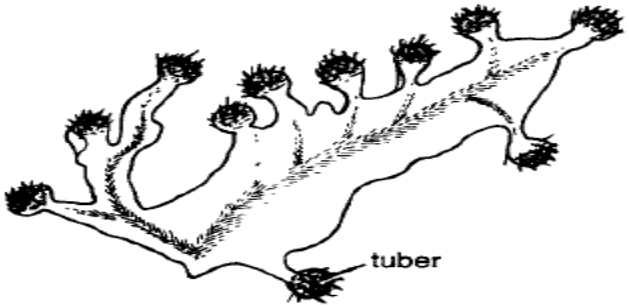
Dorsal surface



Ventral surface

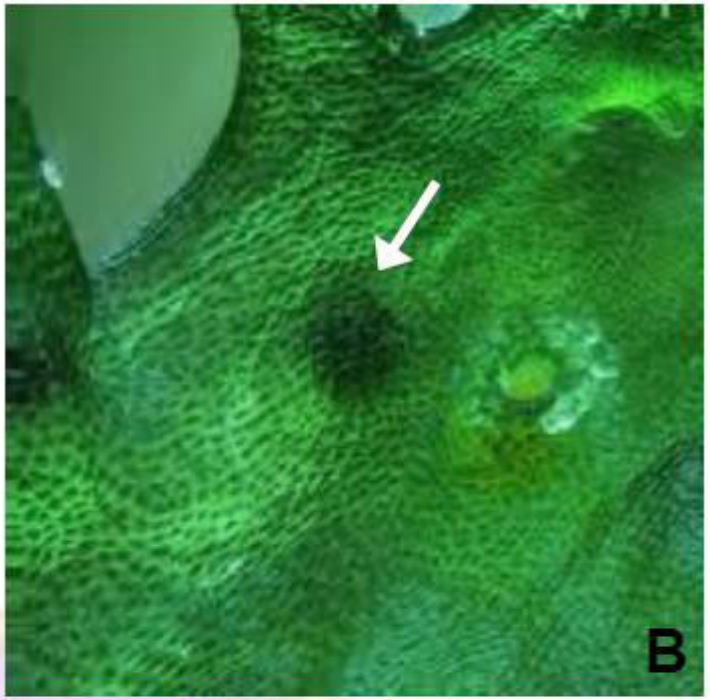


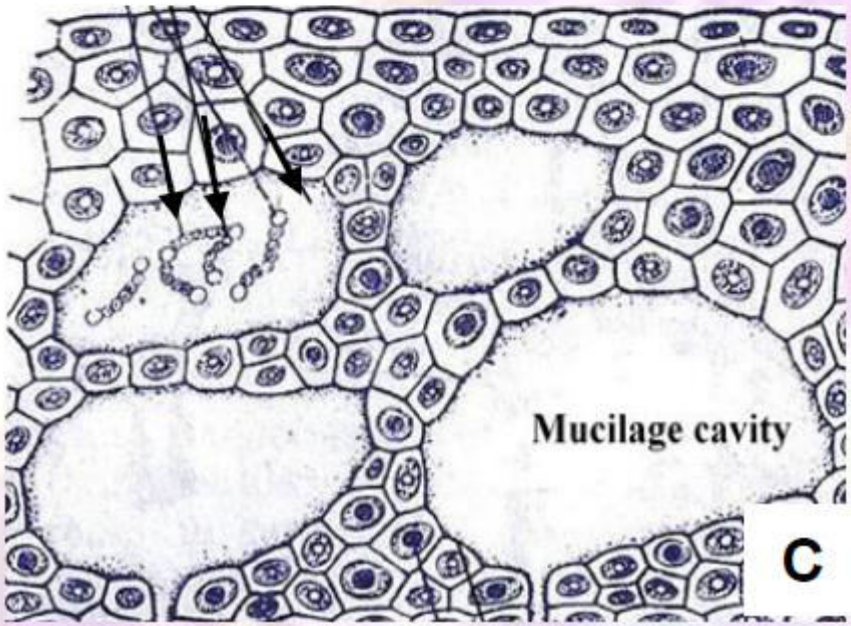
Rhizoids
(smooth walled)

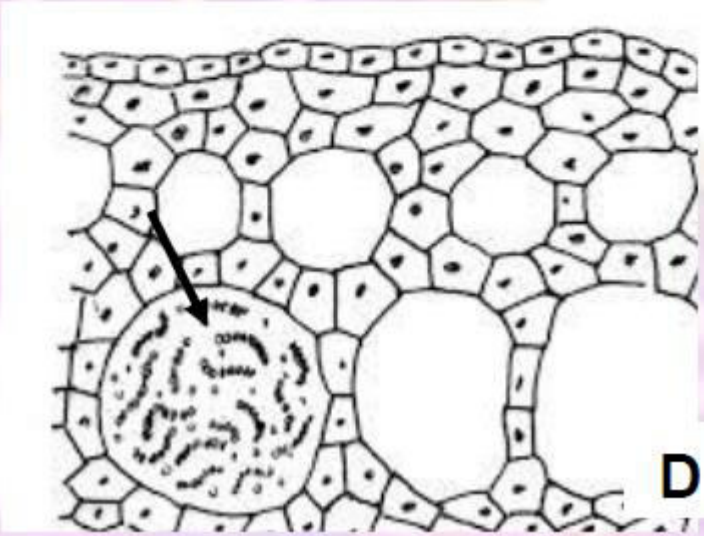


Thallus showing tubers


A

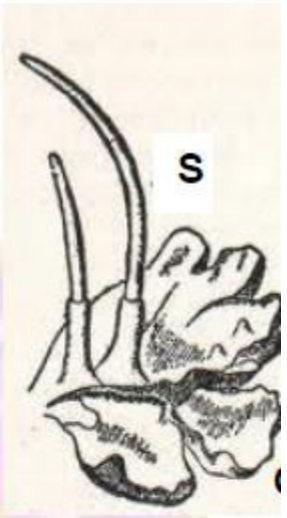

B


Mucilage cavity
C


D


S
G
A


B


S


D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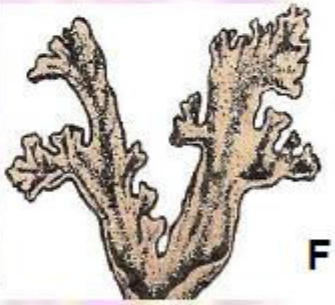
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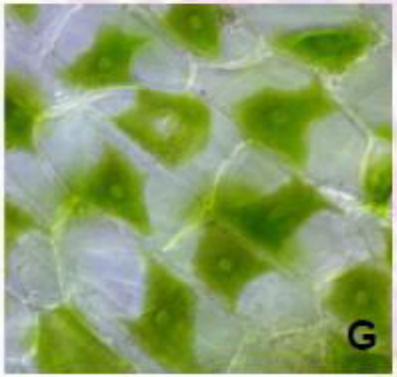

G


P
H


I


J

External features

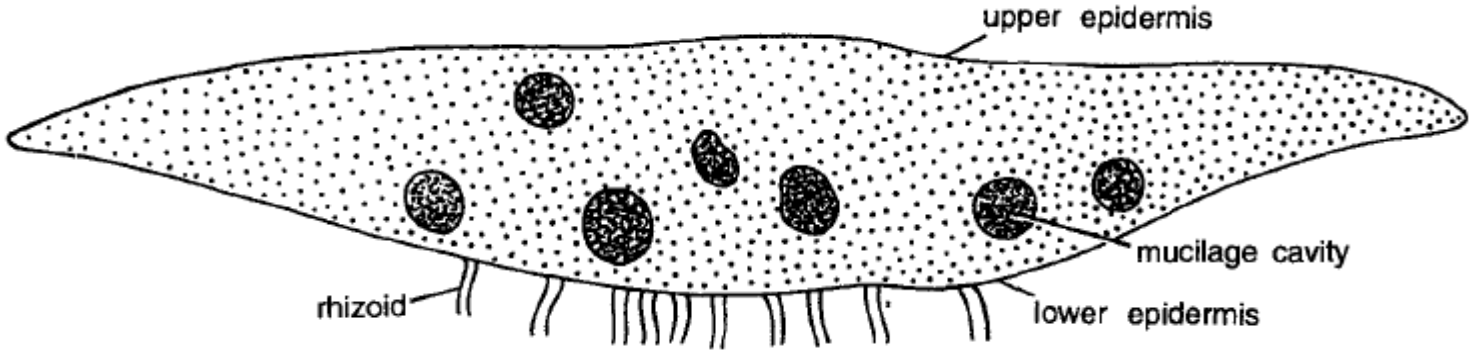
- Thallus (gametophyte)- small, dark green, dorsiventral, prostrate, branched or lobed
- No midrib, spongy due to presence of underlying mucilaginous ducts
- Dorsal surface varies from species to species

  Smooth- *A. laevis*

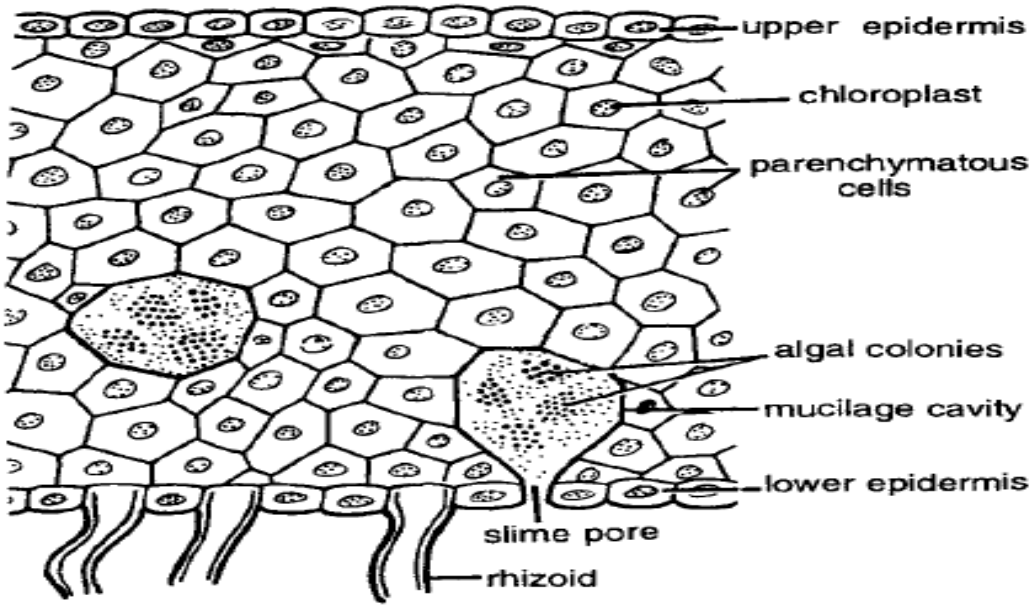
  Velvety- *A. crispulus*

  Rough- *A. fusiformis*
- Smooth walled rhizoid on ventral surface
- Rounded bluish green thickened area on ventral surface- *Nostoc* colonies

Internal structure



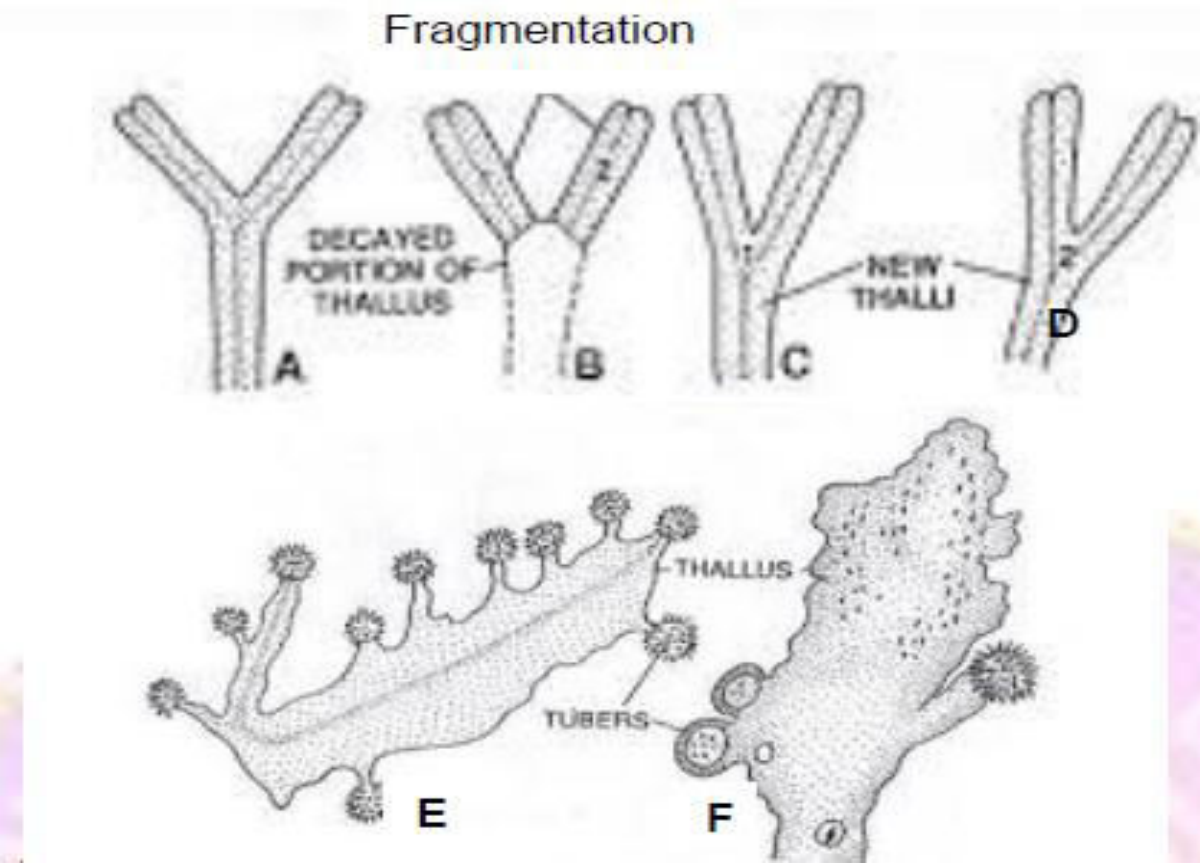
Vertical Transverse Section- Diagrammatic



Vertical Transverse Section- Cellular

Internal Structure

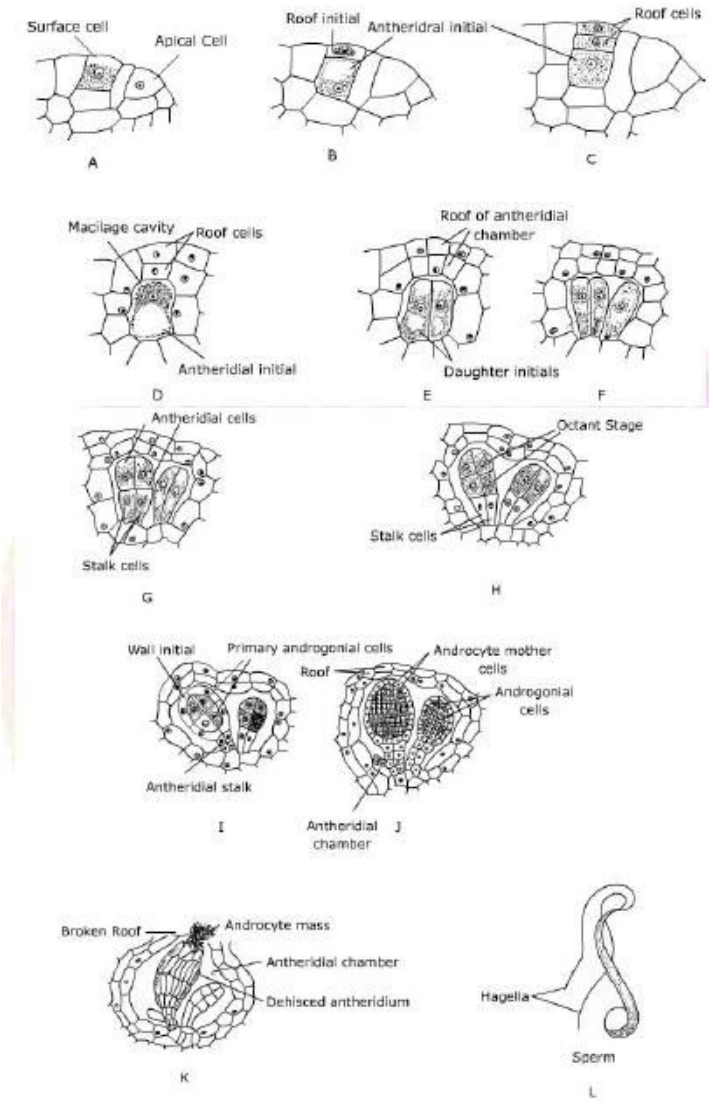
- Simple, without cellular differentiation
- 1-6 chloroplast per cell, oval or discoid with lamellar structure like higher plants
- Chloroplast contains pyrenoids, like green algae, *Isoetes* and *Selaginella*
- *Nostoc* gain entry from slime pores



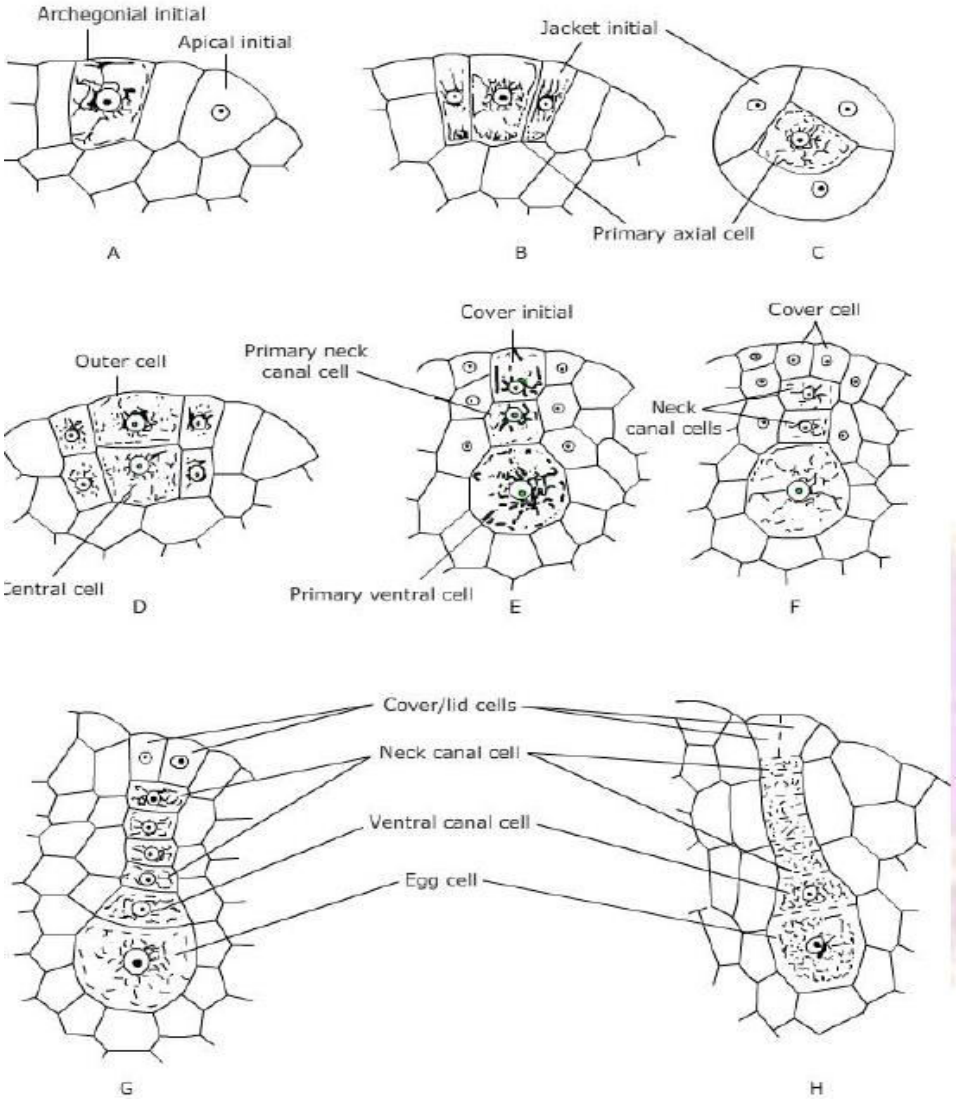
Vegetative Reproduction

Apical Growth

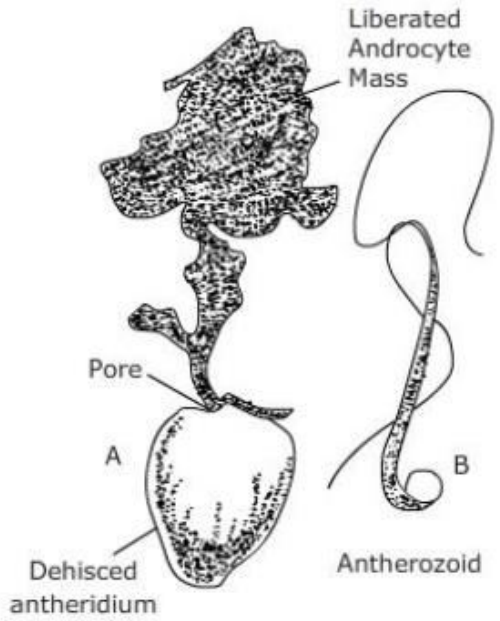
- By single apical cell or group of cells
- Campbell(1918)- difficult to determine
- Leitgeb(1879)- by group of cells
- Mehra & Handoo(1953)- by group of cells in *A. erectus* & *A. himalayensis*

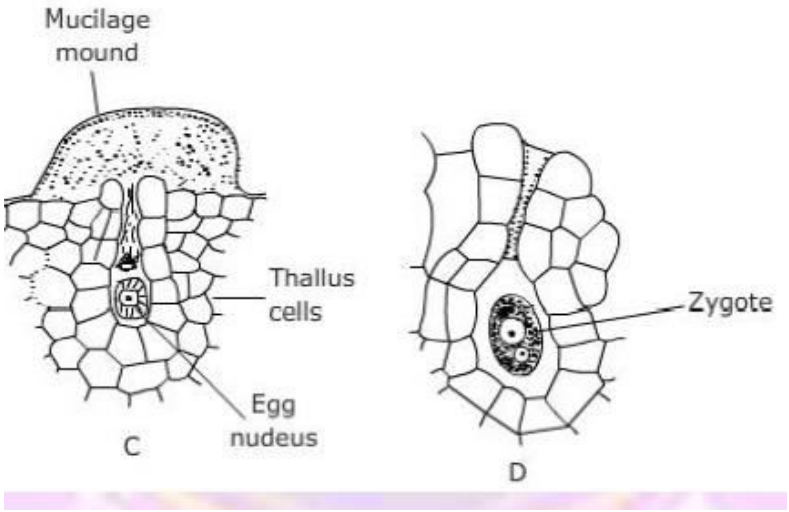


Development of Antheridium

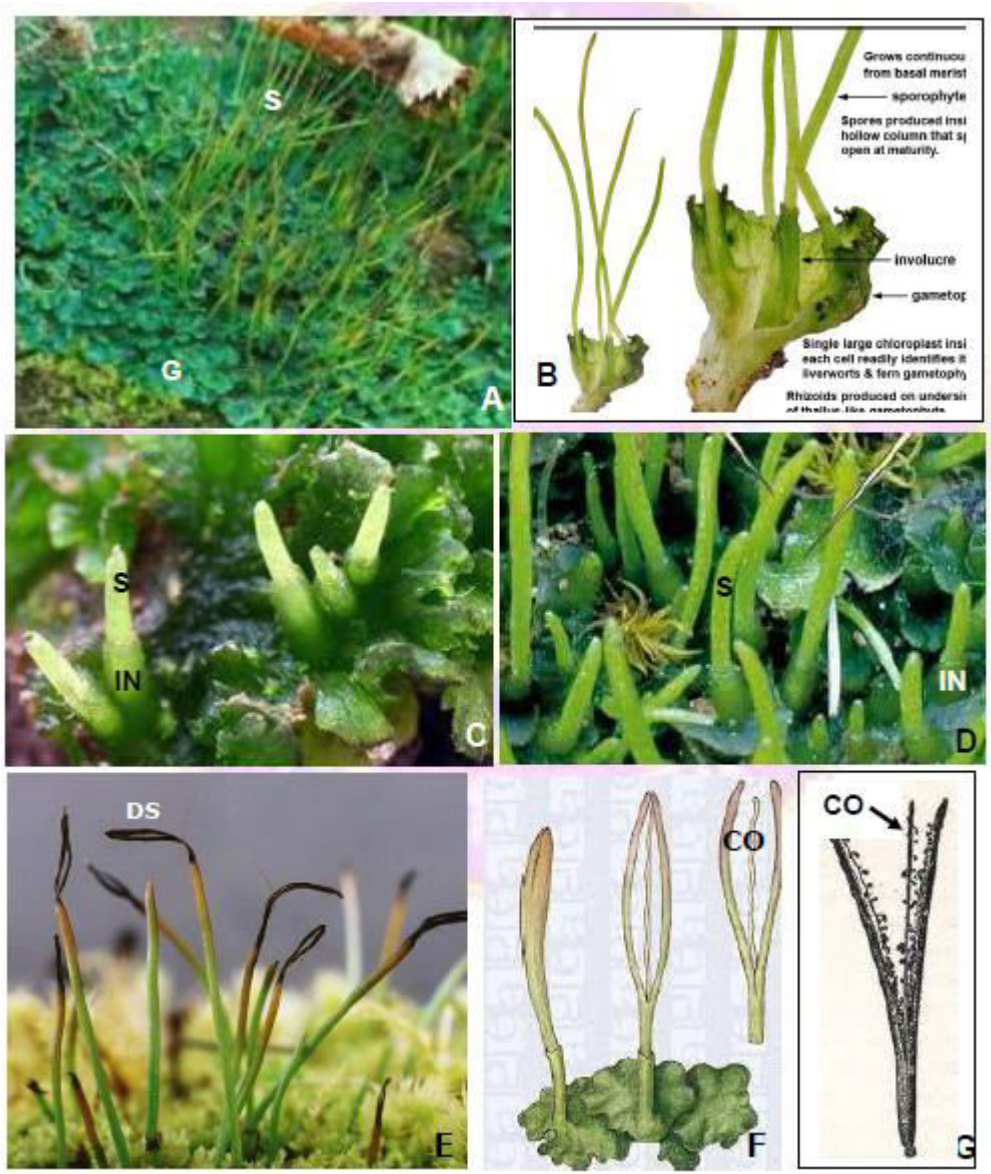


Development of Archegonium

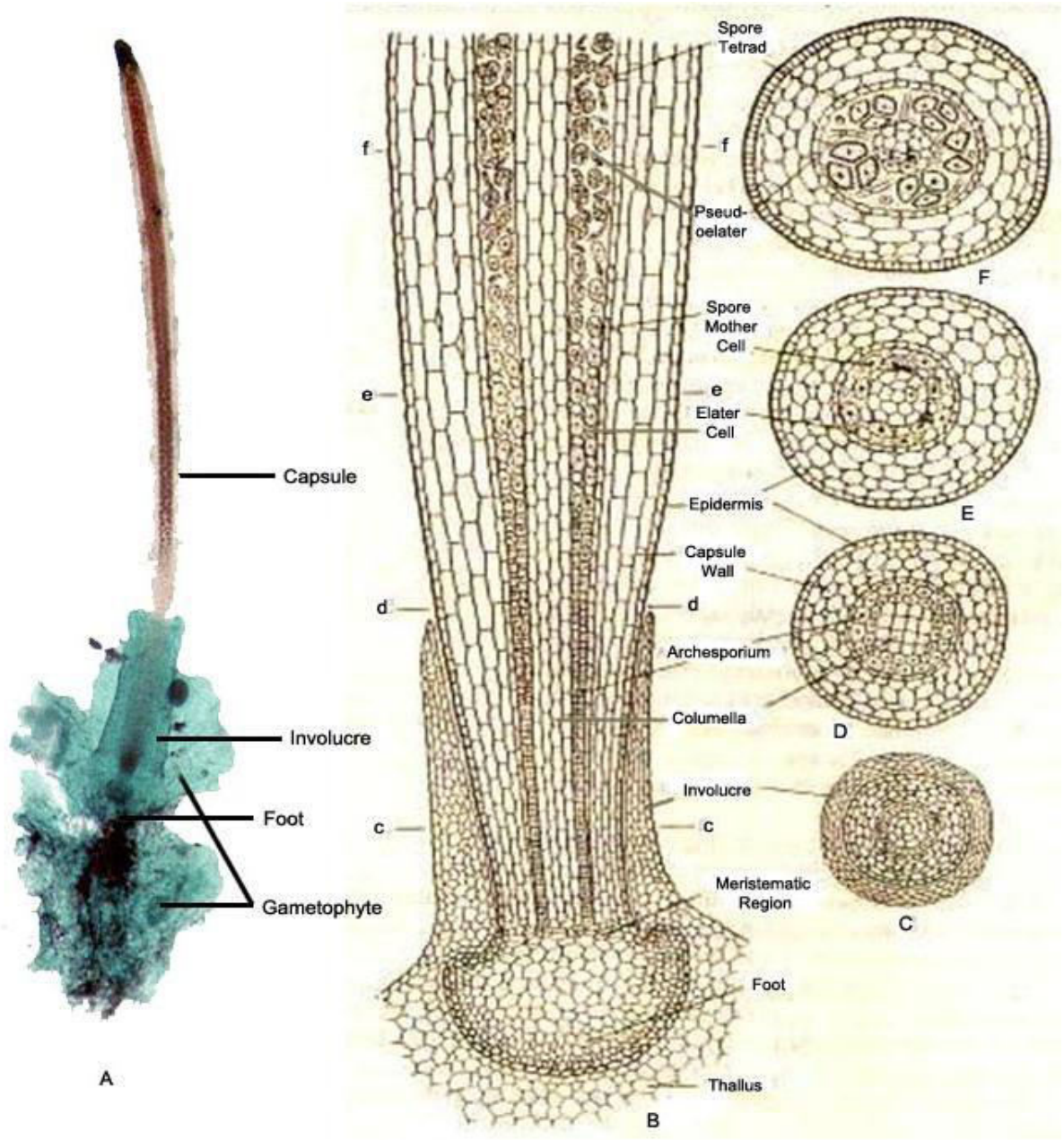




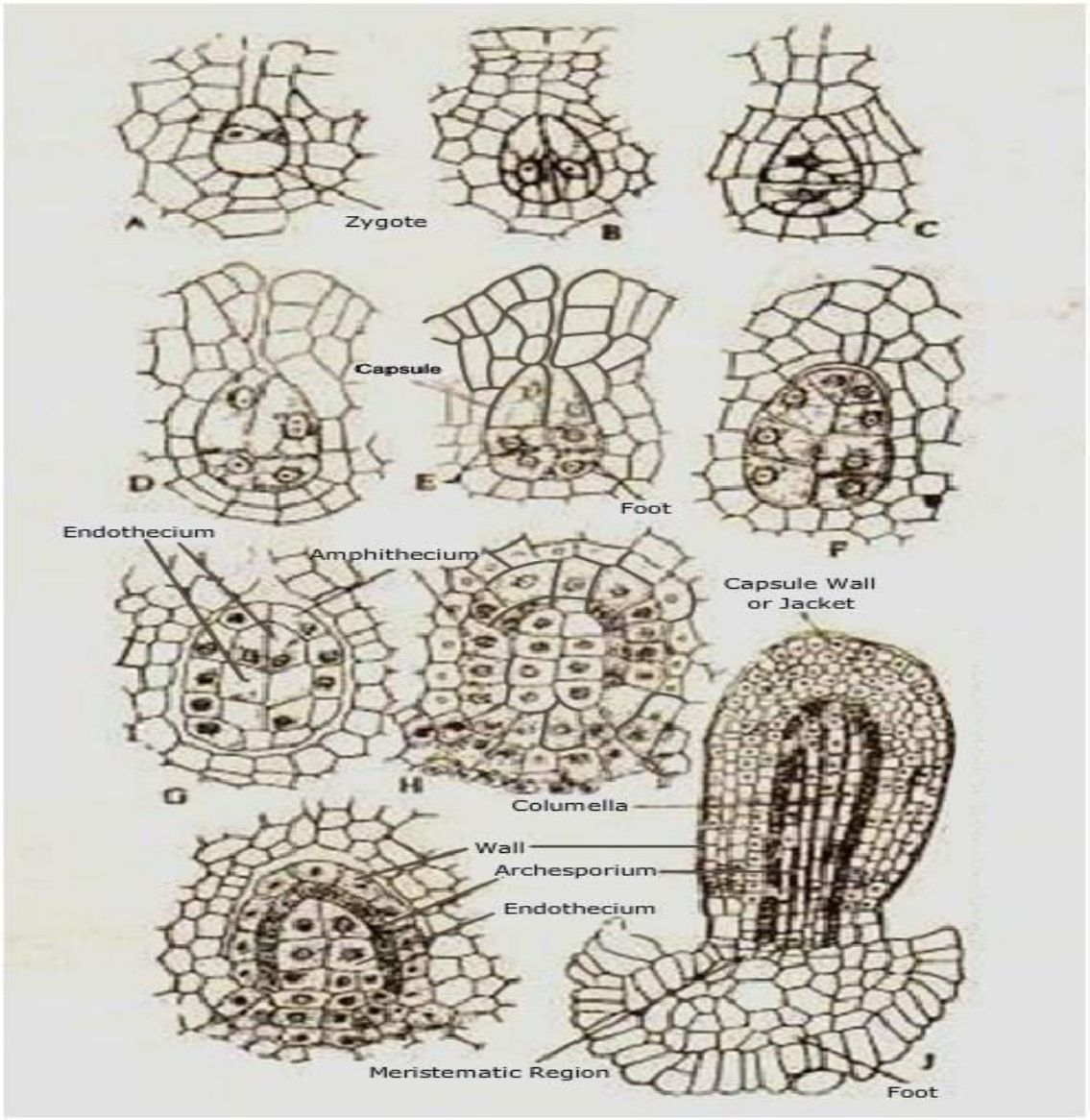
FERTILIZATION



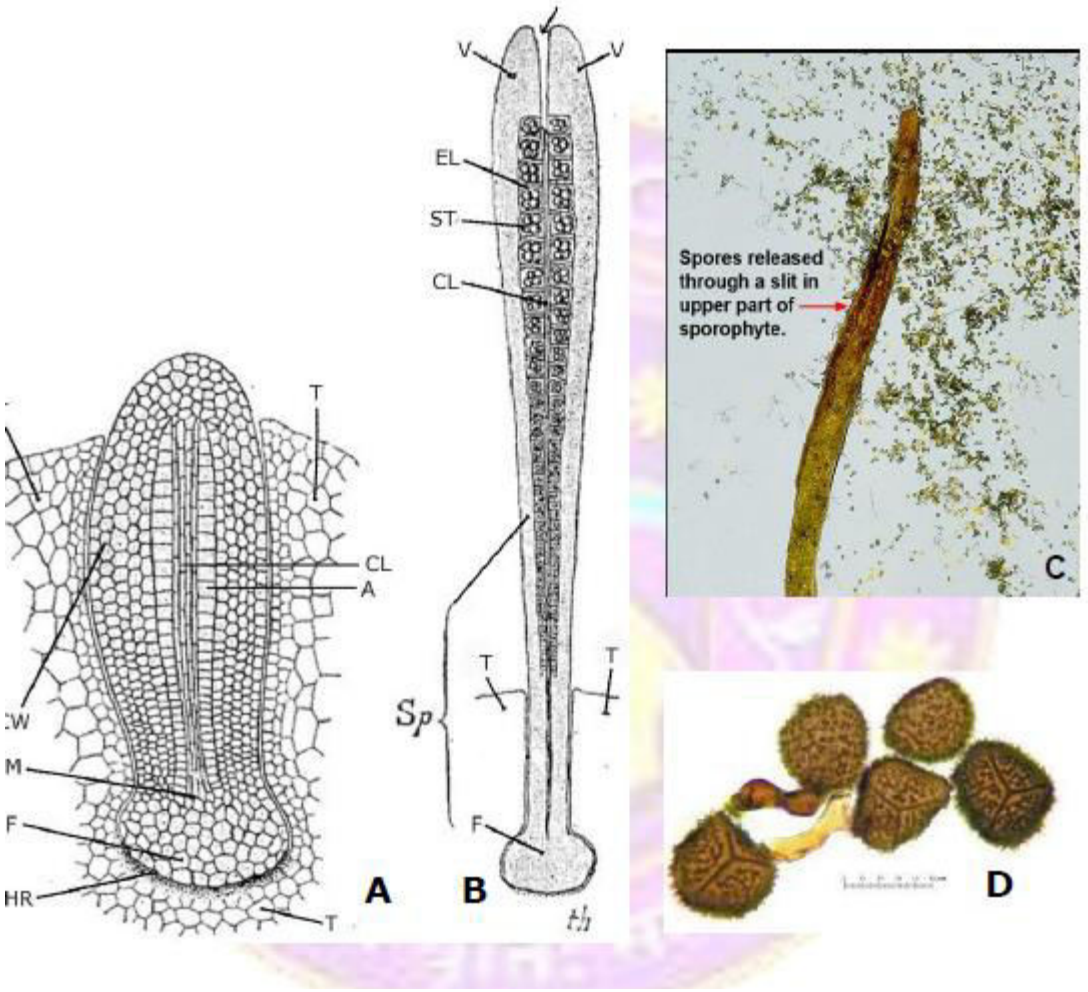
Morphology of Sporophyte



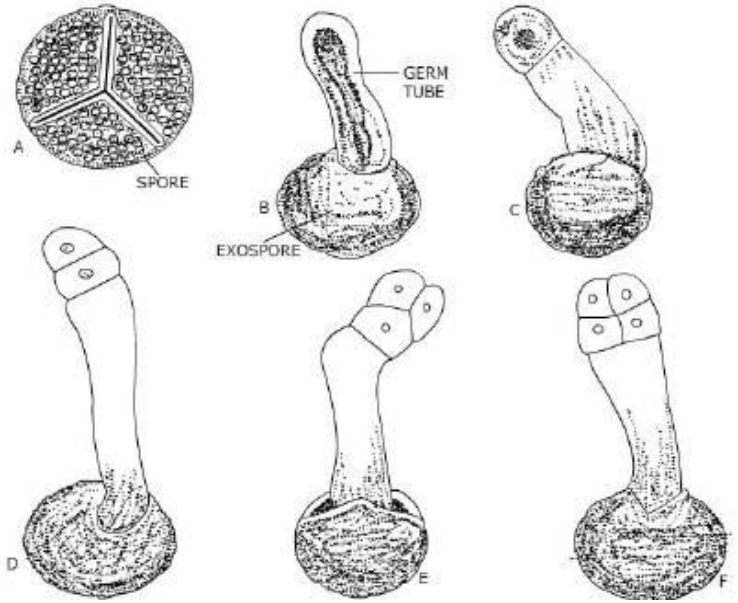
Detailed structure of Sporophyte

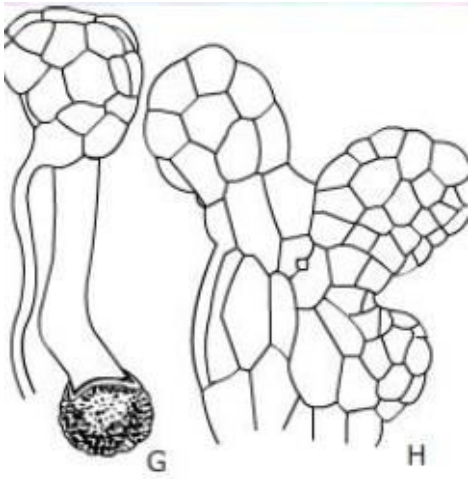


Development of Sporophyte

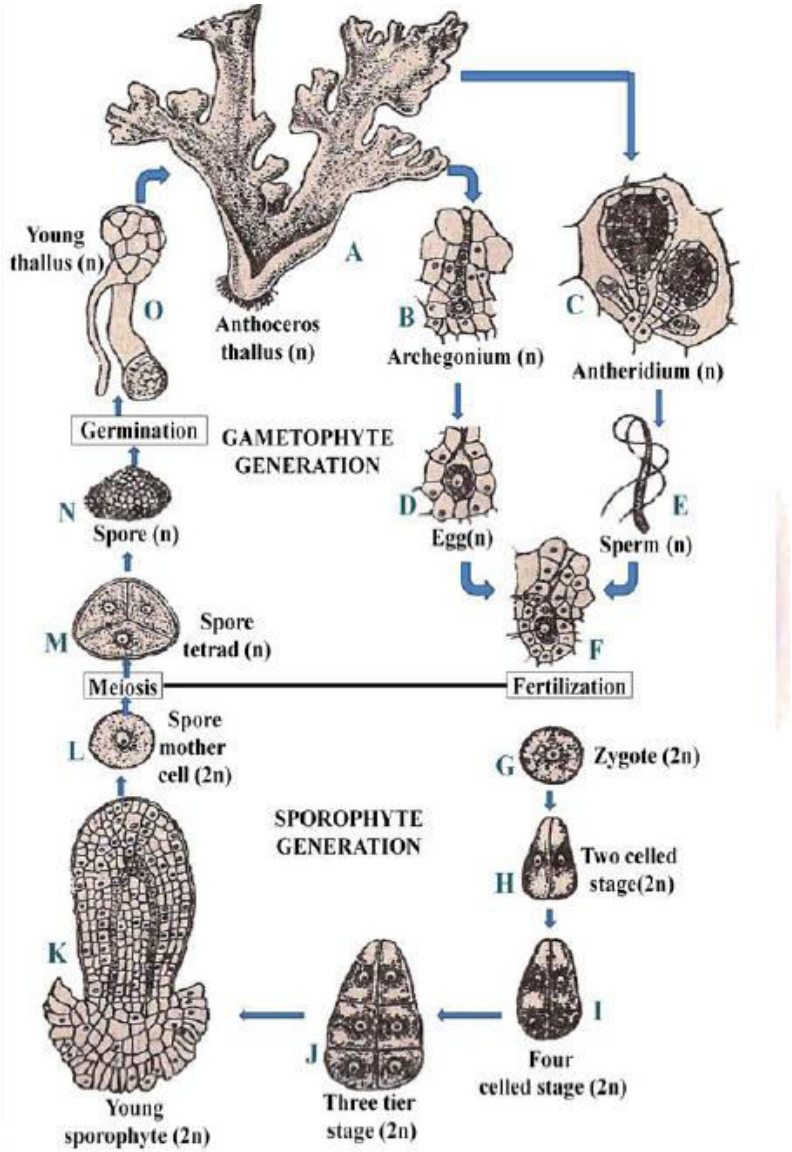


Structure of Sporophyte





Spore germination



Life cycle of *Anthoceros*