

Riccia



Systematic Position

Division : Bryophyta

Class : Hepaticopsida

Order : Marchantiales

Family : Ricciaceae

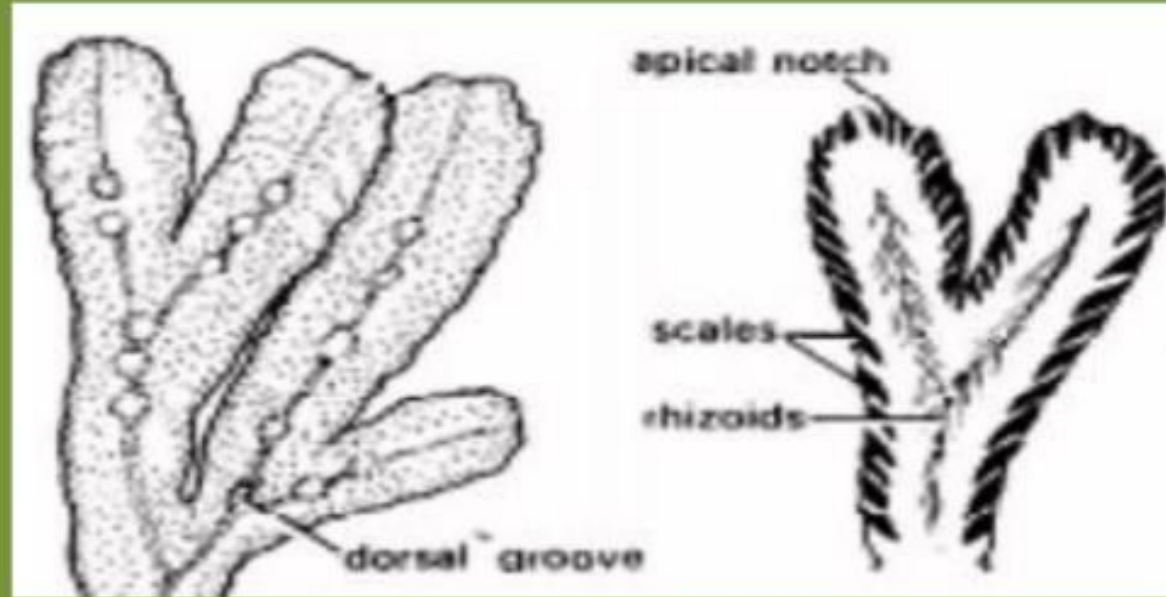
Genus : *Riccia*

OCCURENCE

- The genus was named after an Italian botanist F. F. Ricci
- All the species grow as terrestrial plants on damp soils except *Riccia fluitans* which grows in water
- The common Indian species are : *R. discolor*, *R. gangetica*, *R. frostii*, *R. melanospora*, *R. crystallina*, *R. fluitans*

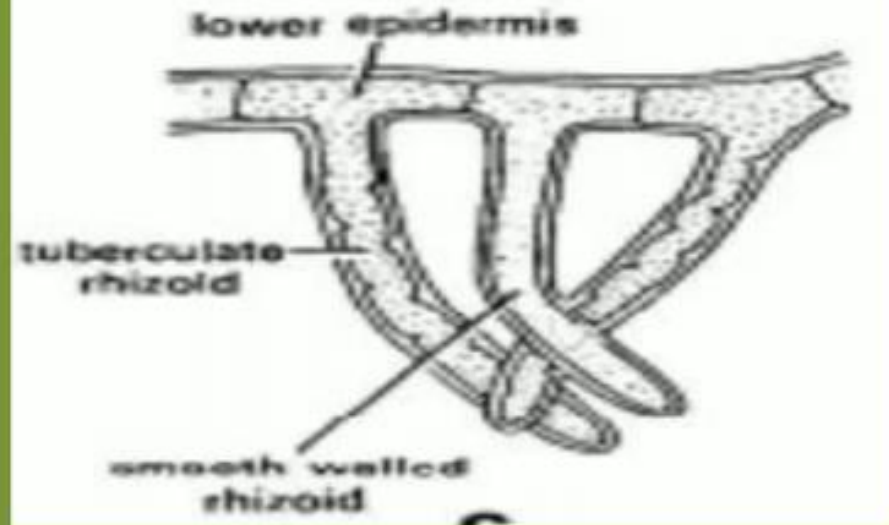
GAMETOPHYTIC GENERATION

GAMETOPHYTIC PLANT BODY



- thalloid body
- small, flat, dorsiventral
- dichotomously branched
- dorsal surface shows prominent midrib
- growing point is situated in the apical notch
- ventral surface shows the presence of a large number of rhizoids and scales

Scales and Rhizoids



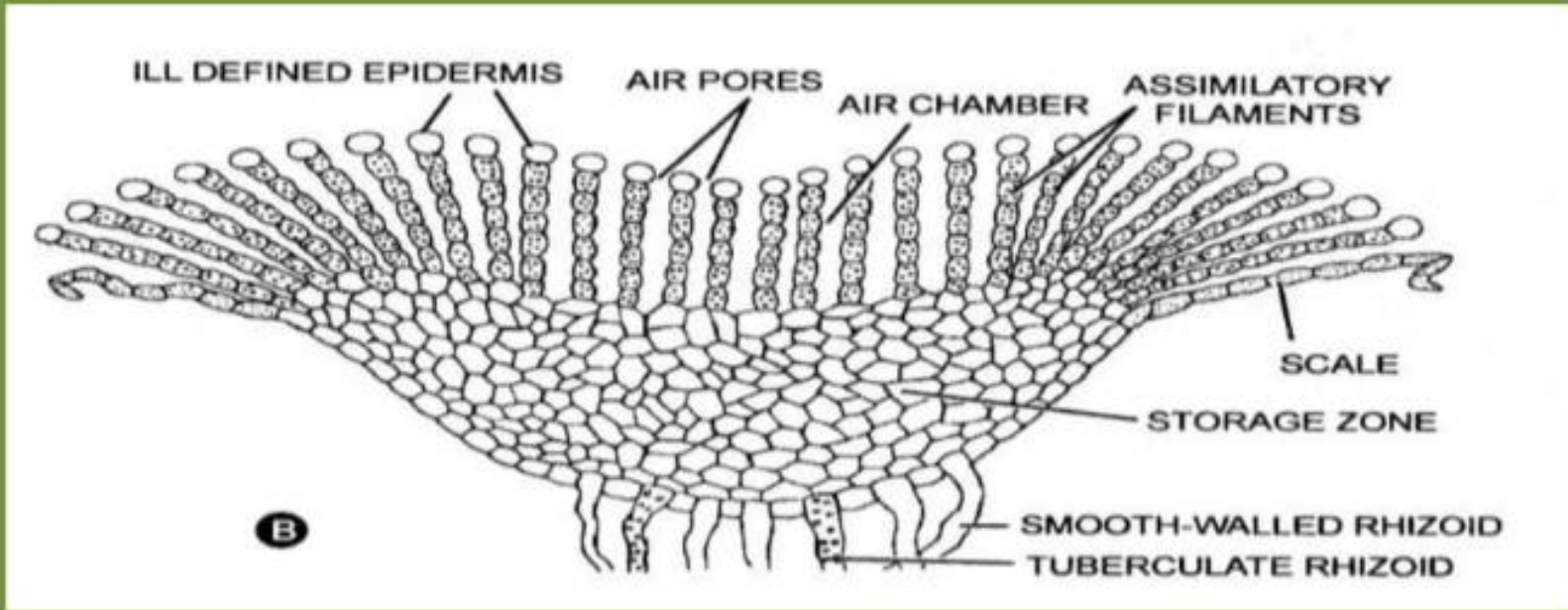
Two types of rhizoids:

- Smooth walled : smooth inner walls, living cells, main function is absorption
- Tuberculate : peg like projections in inner wall, devoid of protoplasm, main function is mechanical support

Scales:

- present on the ventral surface of thallus
- simple and ligulate type
- help to protect the growing point
- each scale is simple, multicellular and one cell in thickness

INTERNAL STRUCTURE



Photosynthetic Zone : 1) consists of compactly arranged vertical rows of chlorenchymatous cells (assimilatory filaments) separated by narrow vertical air chambers.

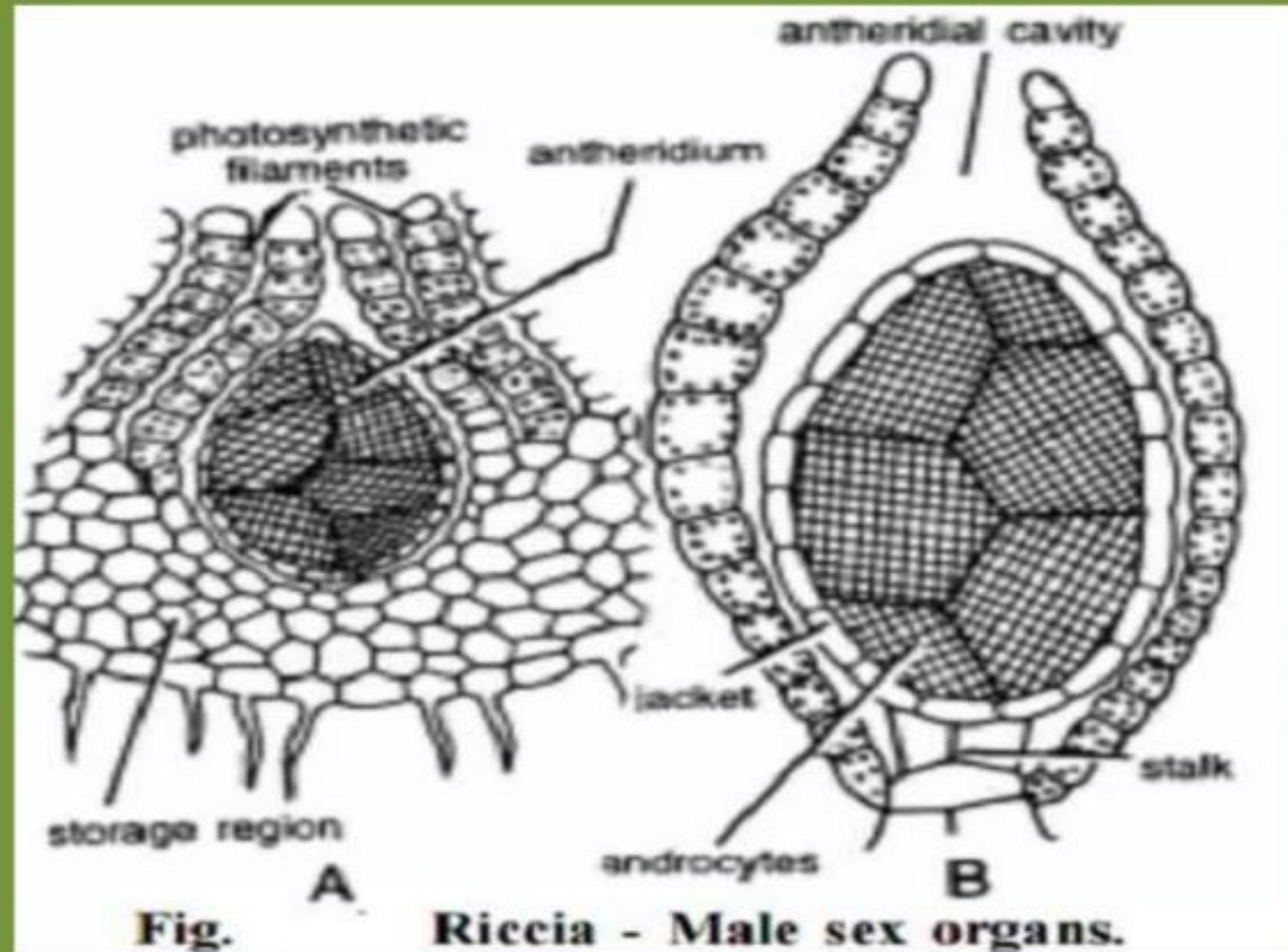
2) cells possess chloroplasts and perform photosynthesis.

Storage zone : 1) consists of compact, colourless parenchymatous tissue without intercellular spaces.

2) cells contain abundant starch grains.

3) few cells of lower epidermis elongate to produce rhizoids.

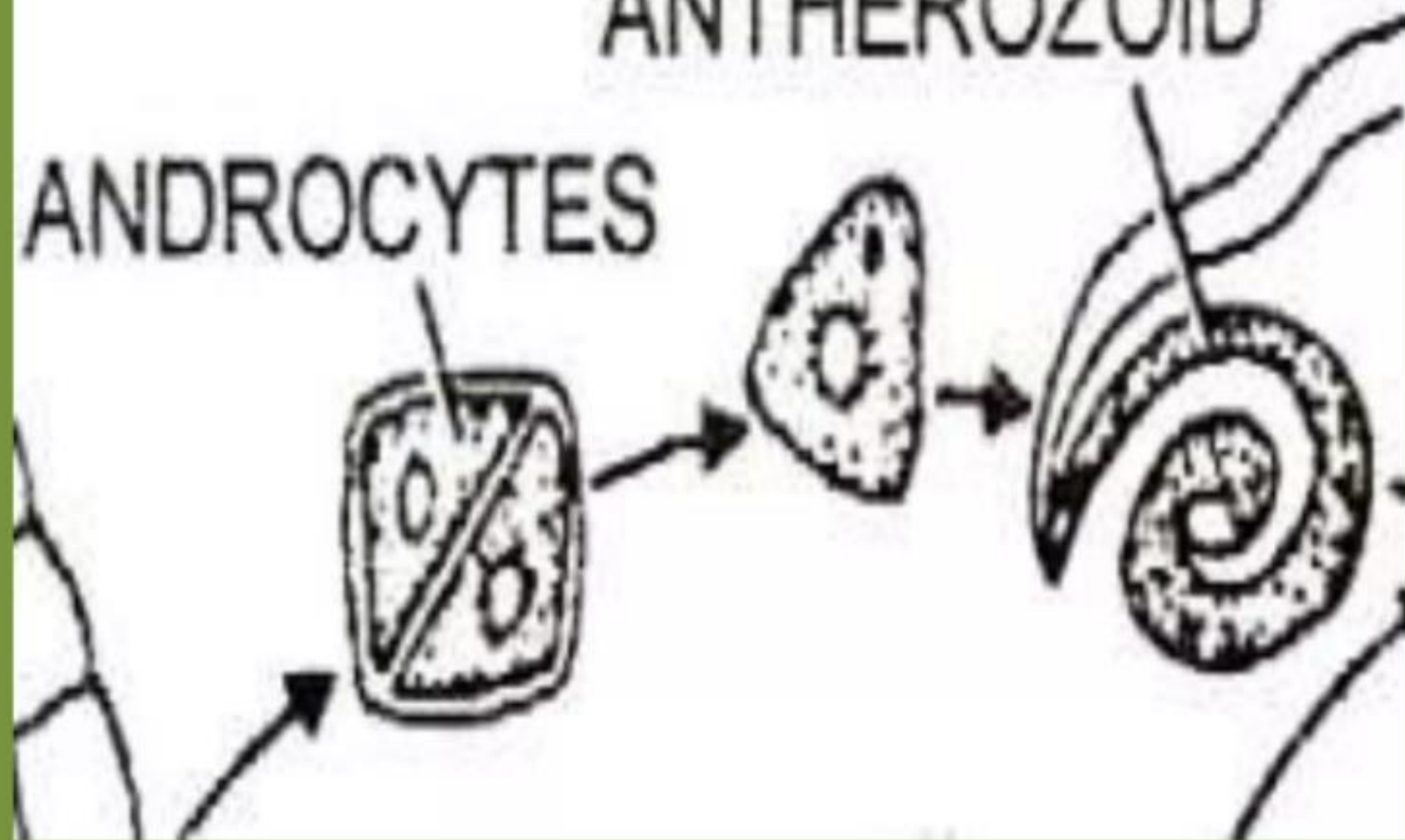
STRUCTURE OF ANTHERIDIUM



- differentiated into two parts : stalk and body of antheridium
- body of antheridium consists of single layered jacket enclosing a mass of androcytes
- each androcyte differentiates to produce single biflagellated antherozoid

ANTHEROZOID

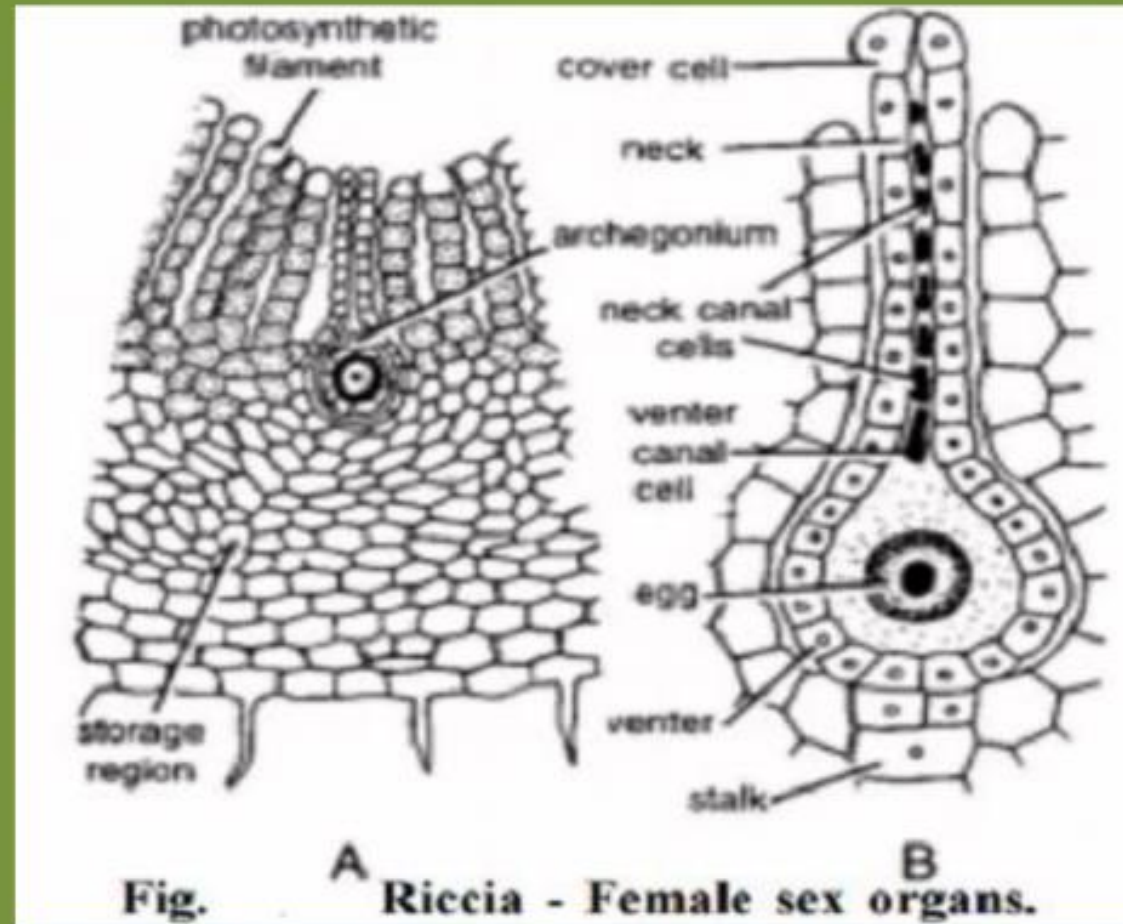
ANDROCYTES



DEHISCENCE OF ANTHERIDIUM

- At maturity, the pore of antheridial chamber becomes wide open
- antherozoids float in a viscous fluid formed by dissolution of cell walls of androcytes
- sterile jacket of antheridium imbibes water, become softened and disorganises
- antherozoids ooze out in mass through an opening
- antherozoids escape and come to dorsal surface of thallus
- where they swim in the film of water present on the dorsal surface of thallus due to rain or dew
- the presence of water is essential for the liberation of antherozoids

STRUCTURE OF ARCHEGONIUM



It is a flask shaped structure differentiated into three parts :

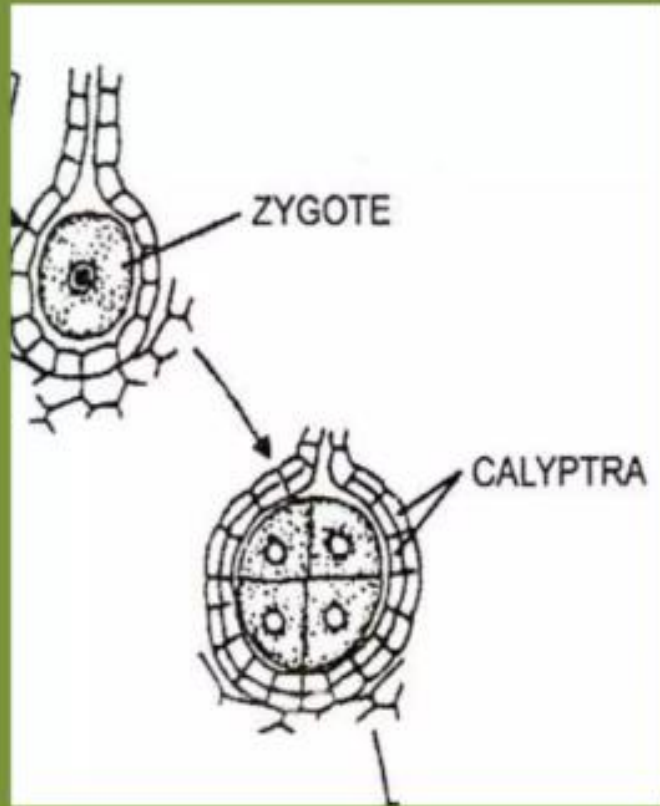
- 1) **Stalk.**
- 2) **Swollen Venter :** Consists of single layered wall. It encloses a venter canal cell and a large naked egg.
- 3) **Long neck :** consists of 6 - 9 tiers of cells arranged in six vertical rows, surrounding a narrow neck canal.

FERTILIZATION

- occurs in the presence of water provided by rain or dew.
- water is needed for dehiscence of antheridia, liberation of antherozoids, opening of archegonial neck, movement of antherozoids to archegonia.
- at maturity, the neck canal cells and venter canal cell disintegrates and become mucilaginous.
- the mucilaginous substance, when hydrated, exerts a pressure so that the cover cells spread apart.
- a passage is created at the opening of archegonial neck through which some of the mucilaginous substance oozes out.
- antherozoids are attracted chemotactically towards some chemical substances present in mucilage.
- some of them enter into the neck canal.
- a single antherozoid which reaches first, fuses with the egg.
- fusion results in the formation of diploid zygote.
- the gametophytic phase of the life cycle ends with the formation of zygote.

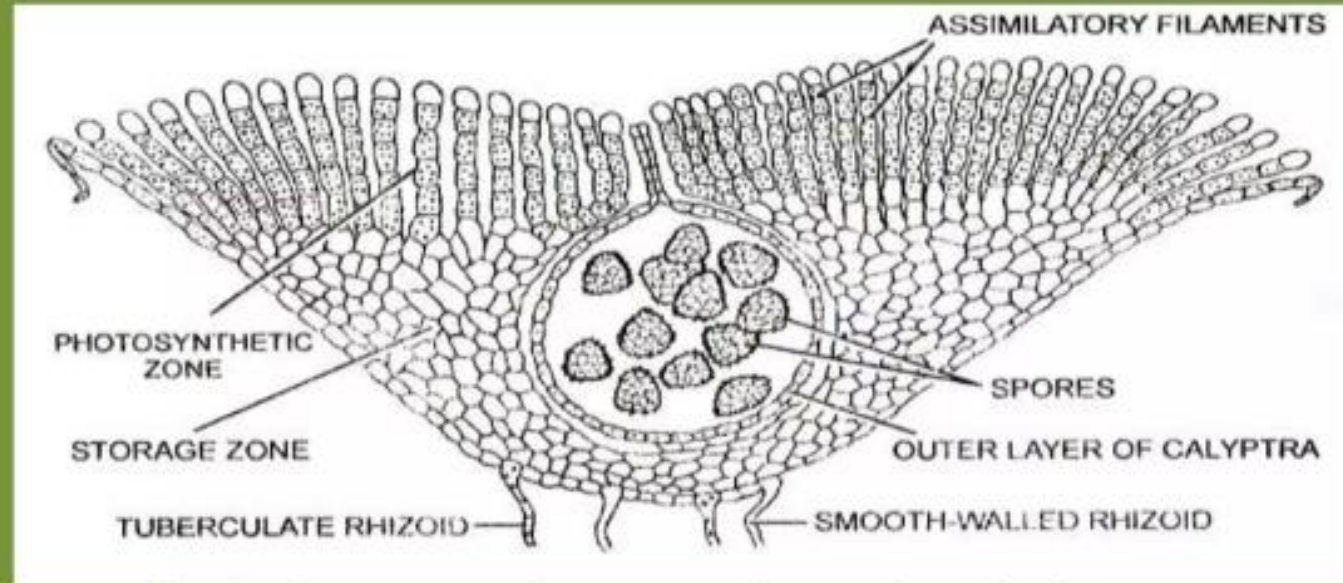
SPOROPHYTIC GENERATION

ZYGOTE



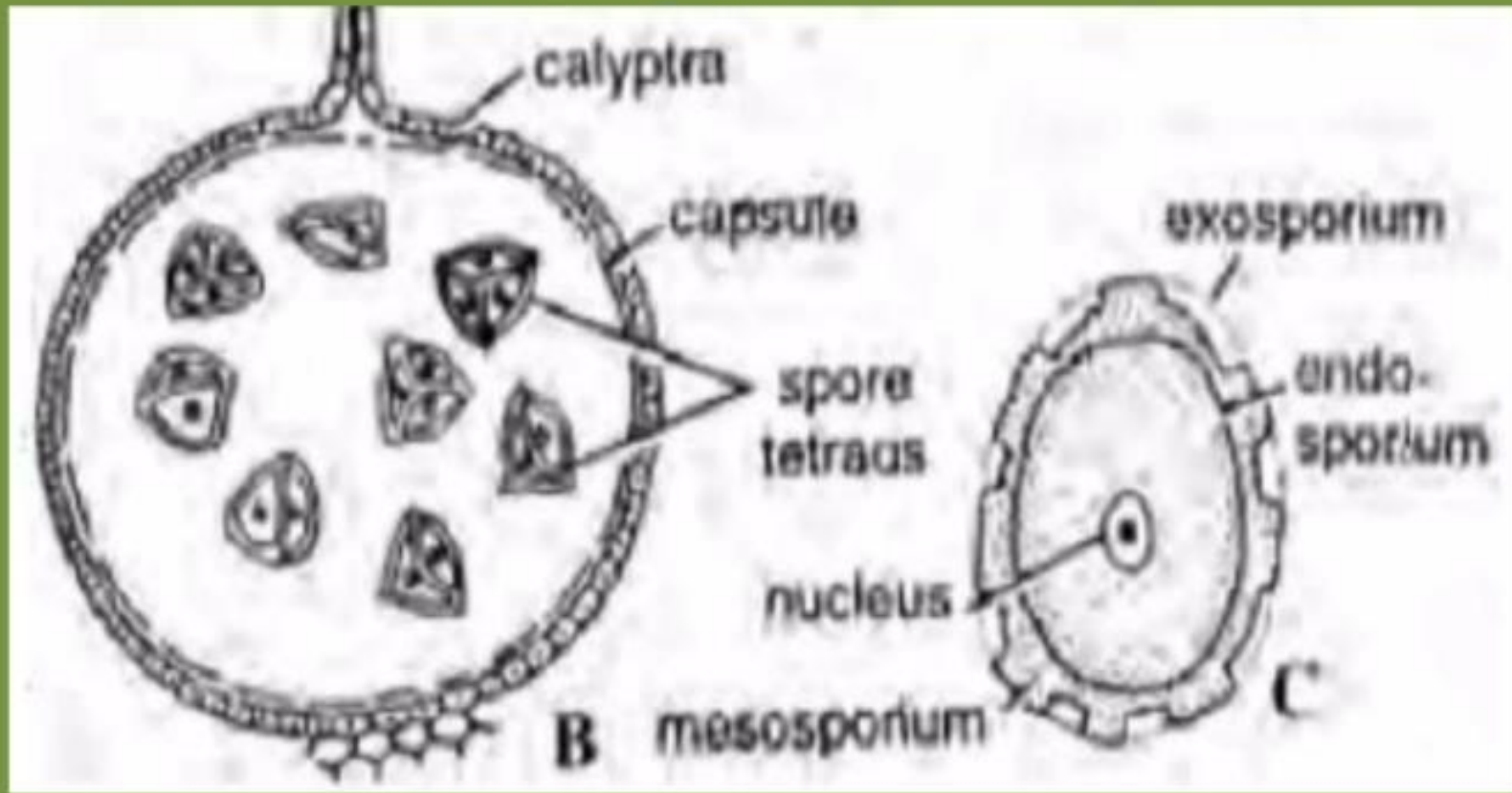
- First cell of sporophytic generation
- It is diploid
- The zygote is retained inside the venter and starts germinating
- It produces diploid sporophytic plant body (i.e. the sporogonium) which is dependent on gametophytic plant body

STRUCTURE OF MATURE SPOROGONIUM



- embedded centrally in the tissue of gametophyte plant body
- represented only by the capsule (spore sac), foot and seta are absent
- consists of mass of spores enclosed within the outer layer of calyptra
- the spores are generally attached in tetrads
- spores are haploid and are the first cells of sporophytic generation
- the calyptra layer is a part of gametophyte
- spores are enclosed within the gametophytic thalli until the thallus dies and decays
- after that spores are set free in the soil and dispersed by the wind or rain

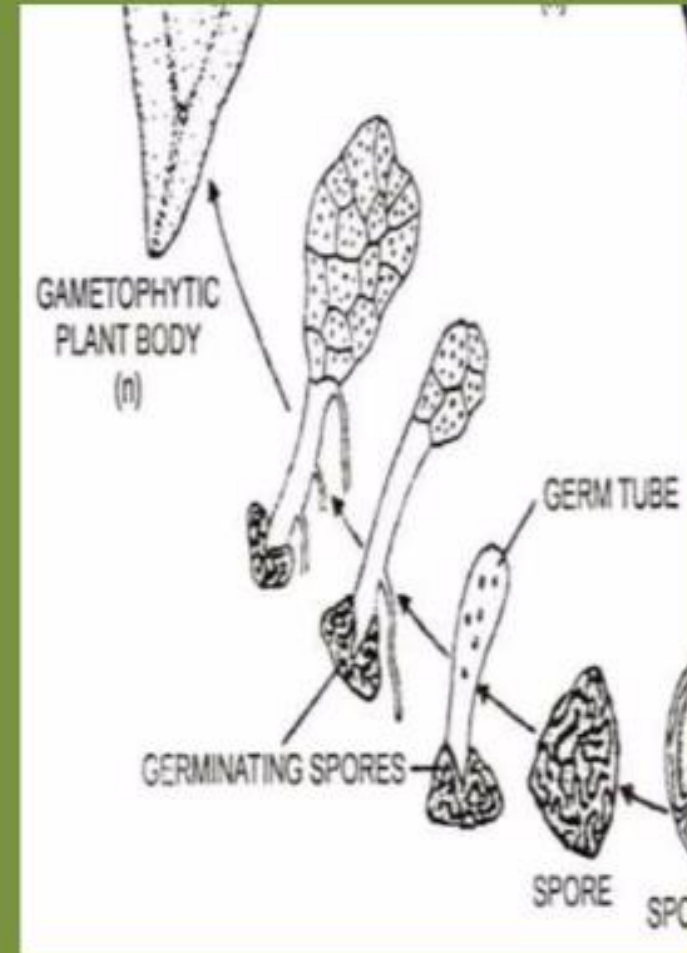
SPORE



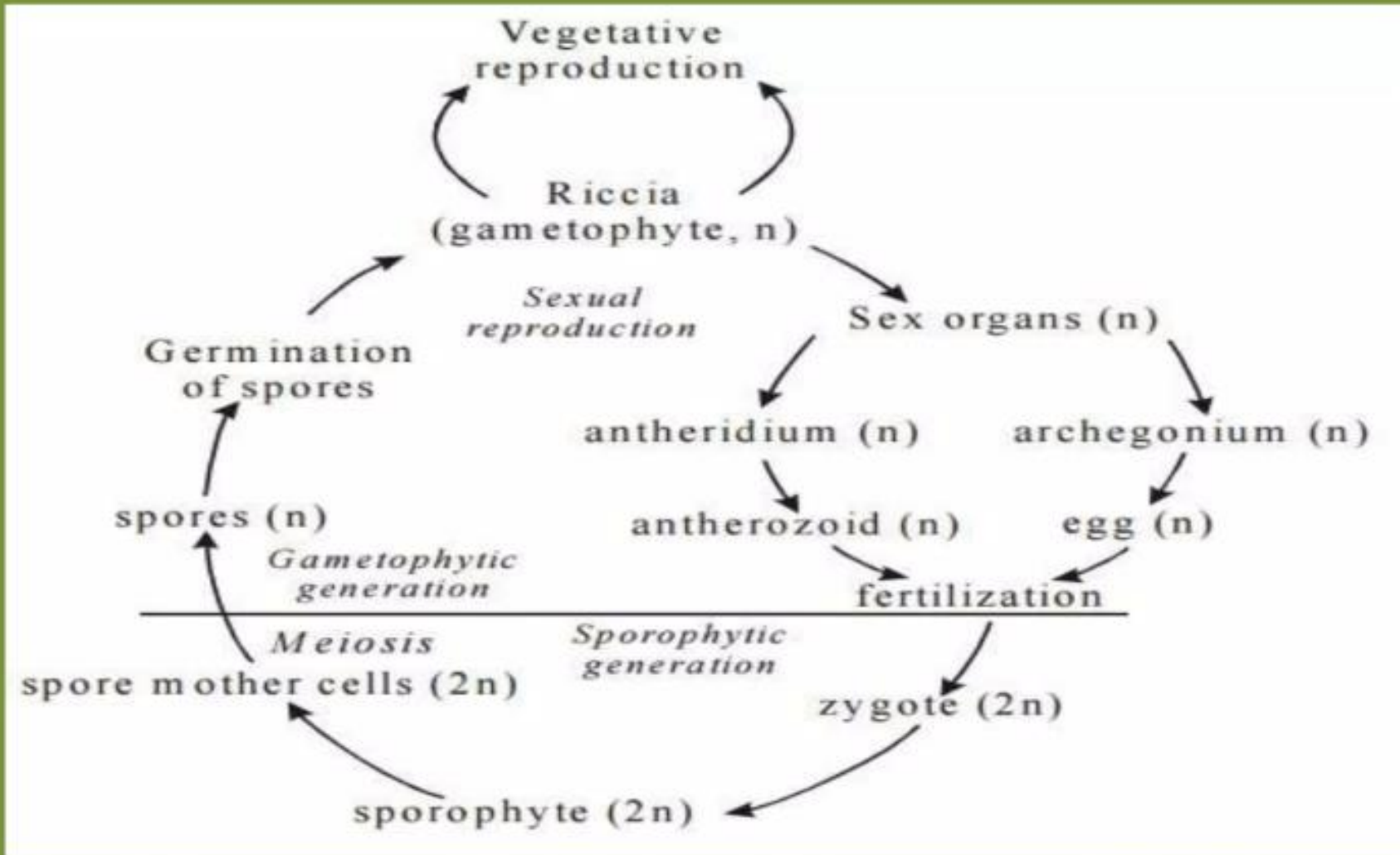
- first cell of gametophytic generation
- it consists of a mass of cytoplasm with a small haploid nucleus
- spore wall differentiated into outer exine and inner intine
- exine is hard, thick and intine is thin, translucent

GERMINATION OF SPORES

- There is no resting period
- the germination requires presence of light, low temperature and sufficient moisture
- The spores absorb moisture and swell
- a germ tube emerges out through a germ pore
- the dense protoplasm flows through the germ tube to its distal end which cuts a large terminal cell
- first rhizoid is formed near the base of tube
- the terminal cell divides resulting in the formation of two tiers of four cells each
- further growth results in the formation of a young flat thallus



LIFE CYCLE SHOWING ALTERNATION OF GENERATIONS



- Life cycle is diplohaplontic.
- Alternation of generations is heteromorphic type since the plant bodies of two generations are morphologically dissimilar.

THANKS