

S.G.V.C. Vidya prasarak Trust's

M.G.V.C. ARTS, COMMERCE AND SCIENCE  
COLLEGE MUDDEBIHAL

DEPARTMENT OF BOTANY

PROJECT WORK  
ON

BRYOPHYTES

**BRYOPHYTES**



Hornworts




Liverworts



Mosses

  
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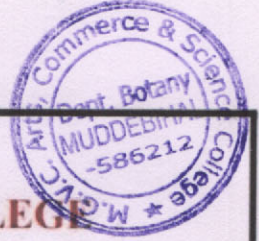
  
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M.G.V.C. Arts, Com. & Science College  
MUDDEBIHAL - 586212.



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**M.G.V.C ARTS, COMMERCE AND SCIENCE COLLEGE**  
**MUDDEBIHAL-586212**



**DEPARTMENT OF BOTANY**

# CERTIFICATE


Examination Seat No: **S1928055**

Class: **B. Sc III**

This is to Certify that, Mr/Mrs. **Husenbasha. N. Havaragi**

Has satisfactorily completed Project work on "Bryophytes."

"Under my supervision in M.G.V.C Arts,  
Commerce and Science College Muddebihal year 2020-2021

  
Staff Member in charge

  
Head of the Department of Botany  
M.G.V.C. College, MUDDEBIHAL-586212  
Dist: Bijapur.



# Bryophytes:

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The term Bryophyta originates from the word 'Bryon' meaning mosses and 'phyton' meaning plants.

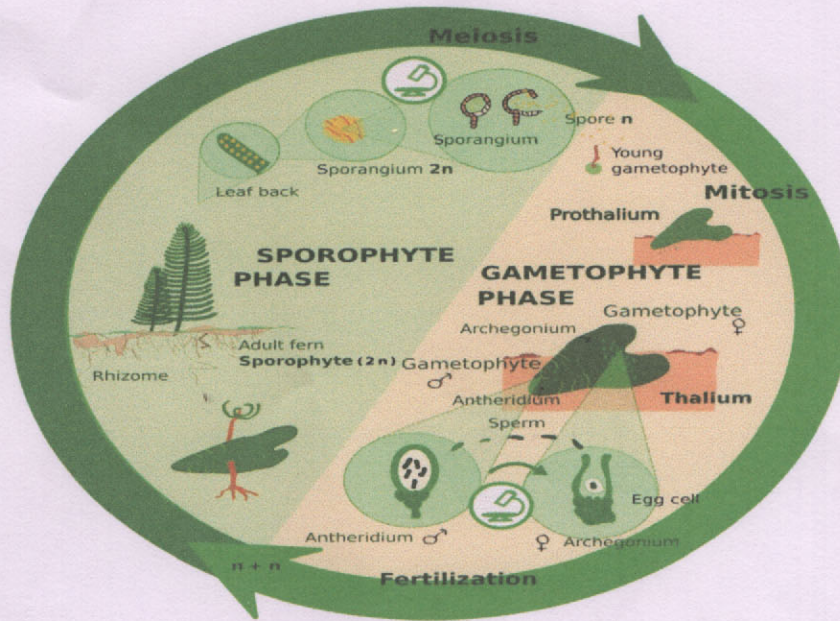
Bryophyta includes embryophytes like mosses, hornworts, and liverworts. These are small plants that grow in shady and damp areas. They lack vascular tissues.

## General Characteristics of Bryophytes:

- Plants occur in damp and shaded areas
- The plant body is thallus like, i.e. prostrate or erect
- It is attached to the substratum by rhizoids, which are unicellular or multicellular
- They lack true vegetative structure and have a root-like, stem-like and leaf-like structure
- Plants lack the vascular system (xylem, phloem)
- Bryophytes show **alternation of generation** between independent gametophyte with sex organs, which produces sperm and eggs and dependent sporophyte which contains spores
- The dominant part of the plant body is gametophyte which is haploid
- The thalloid gametophyte is differentiated into rhizoids, axis and leaves
- The gametophyte bears multicellular sex organs and is photosynthetic
- The antheridium produces antherozoids, which are biflagellated
- The shape of an archegonium is like a flask and produces one egg
- The antherozoids fuse with egg to form a zygote
- The zygote develops into a multicellular sporophyte
- The sporophyte is semi-parasitic and dependent on the gametophyte for its nutrition
- Cells of sporophyte undergo meiosis to form haploid gametes which form a gametophyte
- The juvenile gametophyte is known as protonema
- The sporophyte is differentiated into foot, seta and capsule



## Life cycle of Bryophyte



## Classification Of Bryophytes :

- Hepaticopsida (Liverworts)
- Anthocerotopsida (Hornworts)
- Bryopsida (Mosses)



# Riccia



## Classification :

- 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

**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

## 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.

## REPRODUCTION

- Vegetative Reproduction :



- |                              |                                       |
|------------------------------|---------------------------------------|
| 1) Fragmentation             | 2) Formation of adventitious branches |
| 3) Persistent growing apices | 4) Formation of tubers                |

### • Sexual Reproduction : -

oogamous - male sex organs are antheridia (borne in antheridial chambers) and female sex organs are archegonia (borne in antheridial chambers) - some of the species are monoecious and some are dioecious - sex organs arise singly in acropetal succession (youngest at the apex and oldest at the base)

#### **STRUCTURE OF ANTERIDIUM**

- 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

#### **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
- 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.
- The zygote is retained inside the venter and starts germinating. It produces diploid sporophytic plant body
- Spores are haploid and are the first cells of sporophytic generation . The germination requires presence of light, low temperature and sufficient moisture.
- **Alternation of generations** is heteromorphic type since the plant bodies of two generations are morphologically dissimilar.



## Funaria



**Figure 2.18:**  
*Funaria* Habit

### Classification:

**Division:** Bryophyte  
**Class :** Bryopsida  
**Order:** Funariales  
**Family :** Funariaceae  
**Genus :** Funaria

**OCCURENCE** - It grows in close tufts on rocks, trunks of trees, damp walls and damp soils. They help in the process of soil formation.

**INTERNAL STRUCTURE** - The epidermis is the outermost layer and contain chloroplast bearing cells. The cortex is made up of parenchymatous tissue. The cells of the young axis bear chloroplasts. In mature stems the outermost cells become reddish brown colour and become thick walled. They help in the conduction of water and minerals.



## REPRODUCTION

### • Vegetative Reproduction

1. Fragmentation of primary protonema,
2. Formation of secondary protonema from any part of the gametophyte
3. Formation of gemmae on terminal cells of the protonema.
4. Development of Bulbils on the rhizoids.

### • Sexual Reproduction : -

\* *Funaria* is monoecious the male and female reproductive sex organs are borne on different branches of the same gametophyte.

\* Male sex organ is antheridium and it is formed in groups on the antheridial branch.

\* The female sex organ are the archegonia and are borne in clusters on the archegonial branch. Archegonial branches arise laterally at the base of the male branch.

\* A large number of antherozoids enter the neck of the archegonium but only one fuses with the egg to form a diploid zygote. The diploid zygote represents the first cell of sporophytic generation and divides to form a sporophyte.

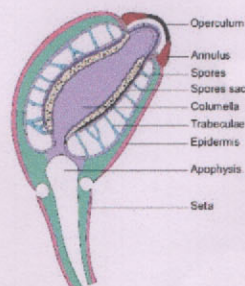


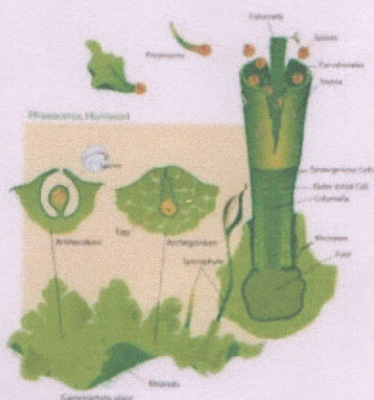
Figure 2.22: L.S. of capsule

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# Anthoceros



## Classification:

<b>Divisions-</b>	Bryophyta
<b>Class-</b>	Anthocerotopsida
<b>Order-</b>	Anthocerotales
<b>Family-</b>	Anthocerotaceae
<b>Genus-</b>	Anthoceros

**OCCURENCE** -Anthoceros grows on moist soil. They are present in shady places or in the crevices of rocks.

**INTERNAL STRUCTURE** Anthoceros has thallus body. It is lobed and it has irregular or dichotomous branches. The lobes have a wavy margin.

## REPRODUCTION

### • Vegetative Reproduction



1. Death of older parts: .
2. Tuber
3. Gemmae:

• **Sexual Reproduction** The antheridia are present on the upper side of the thallus in small cavities.

Archegonia are produced close to the growing point. Archegonia are embedded in the tissue of the thallus.

• **Fertilization:** The plant becomes wet with dew or rain during fertilization. Antherozoids enter the archegonium through the neck canal. One of them fuses with the egg to complete the fertilization. The zygote increases in size and completely fills the venter.

• **Sporophyte or Sporogonium:** The sporophyte of Anthoceros has certain unique features. Sporogonium is borne on the gametophyte.

Anthoceros shows heteromorphic alternation of generation. Thallus is a gametophyte. It develops sex organs which produce the gametes. The gametes fuse to form oospore. Oospore gives rise to the sporophyte. The sporophytes are semi-independent. The tissue of the sporophyte is diploid. The spore mother cells undergo meiosis and give rise to spores. Spores germinate to form haploid gametophyte.

