S. G. V. C. Vidya Prasarak Trust's,
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Ref. No. : 643/21

Date : 2021-22

DEPARTMENT OF BOTANY

PROJECT WORK - 2021-22

B.Sc IInd SEMESTER

Sl.No	Seat No	Name of the Students	Project
1	U15NU21S002	Khwajabandenawaz Mulawad	Bryophytes
2	U15NU21S004	Tasneem.Soudagar	Bryophytes
3	U15NU21S023	Tanveer Attar	Bryophytes
4	U15NU21S024	Manjula.Lakkanavar	Bryophytes
5	U15NU21S027	Pratiba.Dodamani	Bryophytes
6	U15NU21S032	Muskan.Mujawar	Bryophytes
7	U15NU21S034	Vidyashree.Sasnur	Bryophytes
8	U15NU21S035	Sangeeta	Bryophytes
9	U15NU21S040	Sohail.Desai	Bryophytes
10	U15NU21S042	Sachin	Bryophytes
11	U15NU21S065	Vinuta	Bryophytes
12	U15NU21S093	Bhagyashree.K	Bryophytes
13	U15NU21S072	Muskan	Bryophytes
14	U15NU21S086	Rajiyabegum.Rudrawadi	Bryophytes
15	U15NU21S090	Malappa.Kashinakunti	Bryophytes

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DEPARTMENT OF BOTANY

PROJECT WORK

ON

BRYOPHYTES

LIVEWORTS

HORNWORTS

MOSSES

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DEPARTMENT OF BOTANY

CERTIFICATE

EXAMINATION SEAT NO : U15NU21S0024 **CLASS; B.Sc II SEM**

This is to certity that Mr/Mrs. : **MANJULA. S. LAKKANAVAR** has satisfactorily completed project work on : **BRYOPHYTES.**

" Under my supervision in M.G.V.C Arts, Commerce And Science College muddebihal year 2021-2022

Staff Member in charge

DEPARTMENT OF BOTANY

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

Bryophytes :

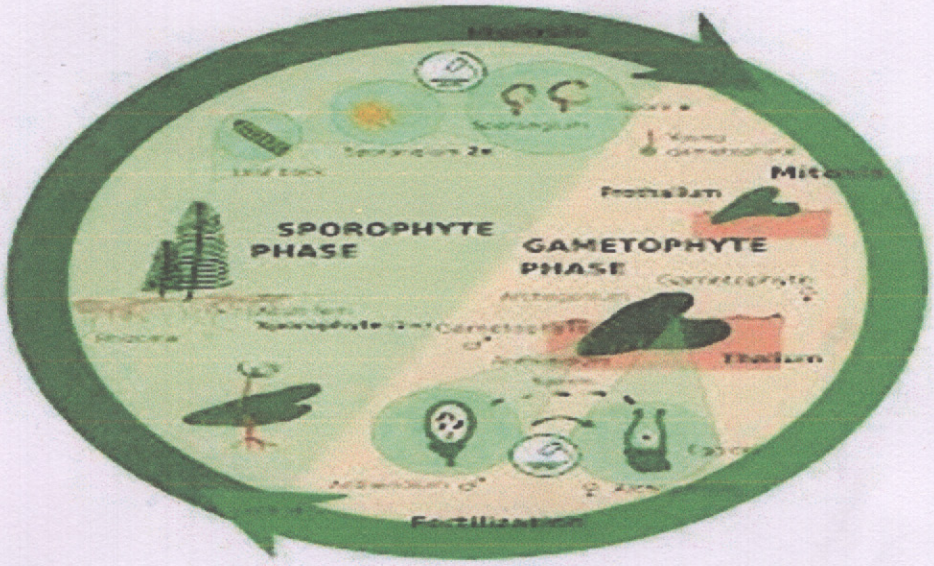
The term Bryophyte originates from the word ' Bryon meaning mosses and python meaning plants.

Bryophyte 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 dody is thallus like, I e prostate or erect
- It is attached to the substratum by rhizoids which are unicellular or multicelluar
- 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 genetation 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 atherozoids. Which are biflagellted
- The shape of an archegonium is like a flask and produces one egg
- The atherozoids fuse with egg to form a zygote
- The zygote develops into a multicelluar sprorophyte
- The sporophyte is semi parasitic and dependent on the gametophyte for its nutrition.
- Cells if sporophyte undergo meiosis to from haploid gametes which from a gametophyte.
- The juvenile gametophyte is known as protonema.
- The sporophyte is differentiated into foot seta and capsule.

LIFE CYCLE OF BRYOPHYT



Classification of bryophyte

a. Hepaticopsida (Liveroworts)

b. Anthocerotopside(Hornworts)

c. Bryopsida (Mosses)

RICCIA

Classification ;

Division	;	Bryophyta
Class	;	Hopaticopsida
Order	:	Marchantiales
Family	;	Ricciaceae
Genus	:	Riccia

Occurrence ; the genus named alter an Italian botanist F F ricci all the species grow as terrestrial plants on damp soils except riccia flultars which grows in water.

Gametophytic plant body ; thallold 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 lange number of rhizoids and scales.

Scales and Rhizoids two types of rhizoids smooth inner walls living cells main function is absorption.

INRERNAL STRUCTURE PHOTOSYNTHIREC ZONE

1. consists of compactly arranged vertical rows of chiorenchymatous cells (assimilatory filaments) separated by narrow vertical air chambers.
2. cells possess chioroplasts and perform photosynthesis.

REPRODUCTION ;

Vegetative Reproducation.

1. Fragmentation
2. Formation of advenitilous brances
3. Porsistent gorwing apices
4. Formation of tubers

SEXUAL REPRODUCATION ;

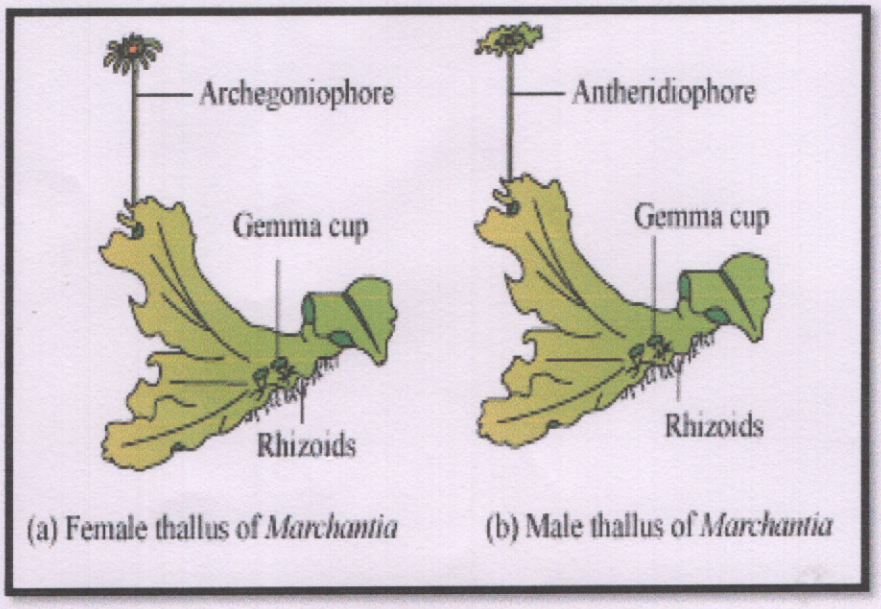
Oogamous male sex organs are antheridla borne in athericial chambers and female sex organs are archgont borne in antheridial chambers some of the species are monoecious and some are dioecious sex organs arise singly in acroperal succession youngest at the apex and oldest at the base.

STRUTURE OF ANTHERIDIUM :

Differetiat into two parts : stalk and body of antheridium body of antheridum consists of single layered jacket enclosing a mass of androcytes each androcyte differentiates to produce single diflagellated antherozoid.

STRUCTRURE 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 nack : consists of 6-9 tiers of cells arranged in sex vertical rows surrounding a narrow nack canal.

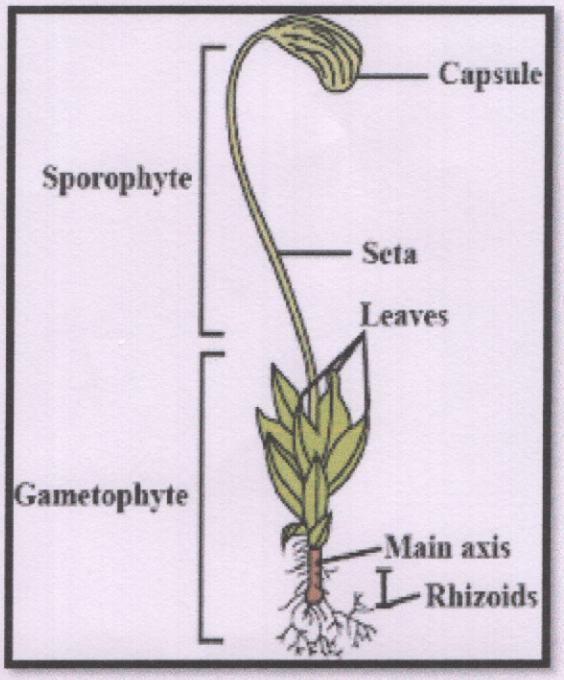


(a) Female thallus of *Marchantia* (b) Male thallus of *Marchantia*

Fertilization ;

1. Occurs In the presence of water provided by rain or dew.
2. water is needed for dehiscence of antheridia liberation of antherozoids
3. a single antherozoid which reaches first fuses with the egg.
4. fusion results In the formation of diploid zygote the gametophytic phase of the life cycle ends with the formation of zygote.
5. the zyote is relained inside the venter and starts germinating it produces dipioid sporophytic plant body.
6. spores are haploid and are the first cells of sporophytic generation the germination requires presence of light low temperature and sufficient moisture.
7. Alternation of generation ; is hereromorphic type since the plant bodies to two generatons ae morphologically dissimllar.

Funaria



Classfication ;

Division	:	Bryophyte
Class	:	Bryopsida
Order	:	Funariales
Family	;	Funariacese
Genus	;	Funaria

OCCURRENCE : it grows in class 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 outemost cells become reddish brown colour and become thick walled.
They help in the conduction of water and minerals.

Reproducation :

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 bulbits on the rhizoids.

Sexual Reproduction :

Funaria is monoecious the male and female reproeductive 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 enter neck of the archegonium but only one fuses with the egg to form a diploid zygote represents the first cell of sporophytic generation and divides to form a sporophyte.

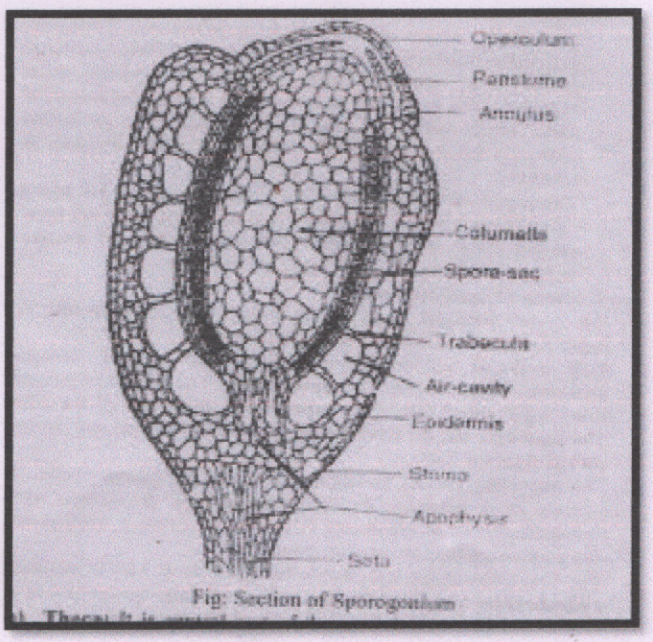
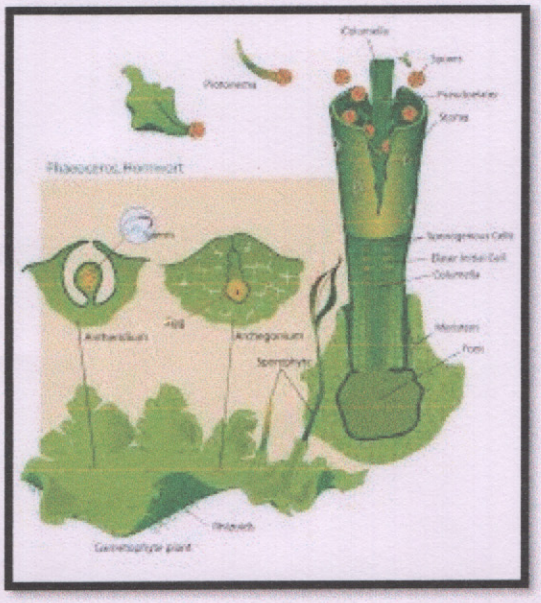


Fig: Section of Sporogonium

FIRTILIZATION :

- Occurs in the presence of wafer provided by rain or dew.
- Water is needed for dehiscence of antheridia liberation of atheridia antherazoids.
- A single antherozoid which reaches first fuses with the egg
- Fusion results n 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 geminating it produces diploid sporophytic plant body.
- Spores are haploid and are first cells of sporophytic generation the germination requires presence of light low lemperature and sufficient moisture.

Anthoceros



\Classification ;

Divisions	;	Bryothyta
Class	;	Anthocerotopsida
Order	;	Anthocerotaies
Family	:	Anthocerortacane
Genus	;	Anthoceros

OCCURRENCE : Anthoceros gorws of moist soil they are present in shady places tru trevices of rocks.

INTERNAL STRUCTION ; Anthoceros has thallus it is lobed and it has irregular or dichotomous branches the lobes have a wavy margin

REPRODUCTION ;

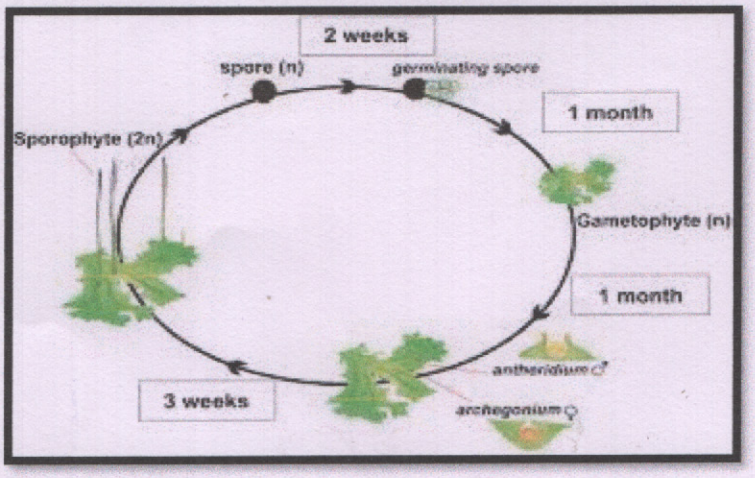
Vegetative Reproduction
1. Death of older pans
2. Tuber
3. Gammae.

Sexual reproduction : the atheridia are present on the upper side of the thallus in small cavities.
Archegonia are produce close to the growing point archegoia are embedded in the tissue of the thallus.

Fertilization ; the plant becomes wet with dew rain during fertilization atherozoids enter the archegonium through the nack 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 spogogogium is borne on the gametophyte.

Anthoceros shows heteromorphic alternation 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 sporpphytes are semi independent the tissues of the sporophyte is diploid the spore mother cells undergo meisosis and give rise to spores spores mother cells undergo meiosis and give rise to spores spores germinate to form haploid gametopyte.



ECOLOGY AND ECONOMIC IMPORTANCE OF BRYPHYTES

A) Pioneer of the land plants Bryophyes are pioneer of the land plants because they are the first plants to grow and colonize the barren rocks and lands.

B) soil erosion Bryophytes prevent soil erosion they usually grow densely and hence act as soil binders mosses grow in dense strands forming mat or carpet like structure.

They prevent soil erosion by:

I) Bearing the impact of falling rain drops.

II) holding much of the falling water and reducing the amount of run off water.

III) formation of soil mosses and lichens are slow but efficient soil formers the acid secreted by the lichens and progressive death and decay of mosses help In the formation of soil.

IV) Bog succession peat mosses change the banks of likes of shallow bodies of water into solid soil which supports vegetation e g sphagnum.

V) Rock builders. Some mosses in association with some green algae (e.g chara) grow in water of streams and lakes which contain large amount of calcium bicarbonate these mosses bring about decomposition of bicarbonic ions by abstracting free carbon dioxide the insoluble calcium carbonate precipitates and on exposure hardens calcateous (lime 0 rock like deposits.

In Medicines :

Some bryophytes are used medicinally in various diseases for e g

1. Pulmonary tuberculosis and affliction of liver marchantia spp

2) acute hemorrhage and diseases of eye – decoction of sphagnum

3) stone of kidney and gall bladder polytrichum commune

4) antiseptic properties and healing of wonds sphagnum leaves and extracts of some bryophytes for e g conocephalum conicum dumortiera. Sphagnum rotoricens s strictum show antiseptic properties.

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PROJECT WORK- 2021-22

B.Sc IInd SEMESTER

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15	U15NU21S090	Malappa.Kashinakunti	Paleobotany

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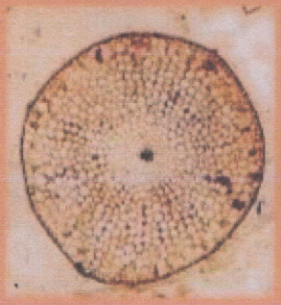
DEPARTMENT OF BOTANY

PROJECT WORK
ON

PALEOBOTANY



Rhynia

Lepidodendron

Lyginopteris

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

DEPARTMENT OF BOTANY

CERTIFICATE

Examination seat No: U15NU21S0065 Class:B.Sc.II sem

This is to certify that ,Mr/Mrs. VINUTA

has satisfactorily completed project work on PALEOBOTANY

Under my supervision in M.G.V.C. Arts,

Commerce and Science college Muddebihal year 2021- 2022

Staff member in charge

Head Department of Botany

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

PALEOBOTANY

Paleobotany is the study of extinct plants which had flourished once in the geological past. It is a branch of palaeontology. It is restricted to plant fossils only.

Paleobotany which is also spelled as palaeobotany, is the branch of botany dealing with the recovery and identification of plant remains from geological contexts and their use for the biological reconstruction of past environments (paleogeography) and the evolutionary history of plants,with a bearing upon the evolution of life in general.A synonym is paleophytology.

General characteristics of Paleobotany

- The fossils are the preserved vestiges of past plant life.
- They are mostly found in stratified rocks which are formed of sediments accumulated in the bottom of lakes,seas,swamps,flooded valleys and so on.
- When these stratified rocks are exposed to the natural forces that cause erosion, the fossils get released free.
- The fossils can also be obtained while digging the soil for other purposes. The fossils serve as a *tool* for palaeobotanical studies.

- Paleobotany is important in the reconstruction of ancient ecological systems and climate, known as paleoecology and paleoclimatology respectively; and is fundamental to the study of green plant development and evolution.

- Paleobotany has also become important to the field of archaeology, primarily for the use of phytoliths in relative dating and in paleoethnobotany.

- The emergence of paleobotany as a scientific discipline can be seen in the early 19th century, especially in the works of the German paleontologist Ernst Friedrich von Schlotheim, the Czech (Bohemian) nobleman and scholar Kaspar Maria von Sternberg, and the French botanist Adolphe-Theodore Brongniart

A fossil *Betula leopoldae*(birch)leaf
From the Early Eocene of Washington state, approximately 49 million years ago

Scope and Objectives

The scope and objectives of palaeobotanical studies are mentioned here under:

1. The palaeogeographical distribution of land and water has been investigated by critical analysis of different fossils.

2. The past of the green World has been traced to invent the extinct plants.

3. The morphology and distribution of extinct plants give us a clear insight to trace the *past climate* and solve the problems of phylogeny and evolution of present day plants.

4. Palaeobotanical studies of microfossils indicate the oil and coal bed.

5. Microfossils are used as *stratigraphic markers* to localise a stratum in relation to oil bearing strata.

6. The mummified plants (large tree fossils without much damage to their branches) indicate that there is a *coal field* near to them

7. Fossil evidences help us to understand the *direction of drifting* of different continents during the earth's history.

RHYINA

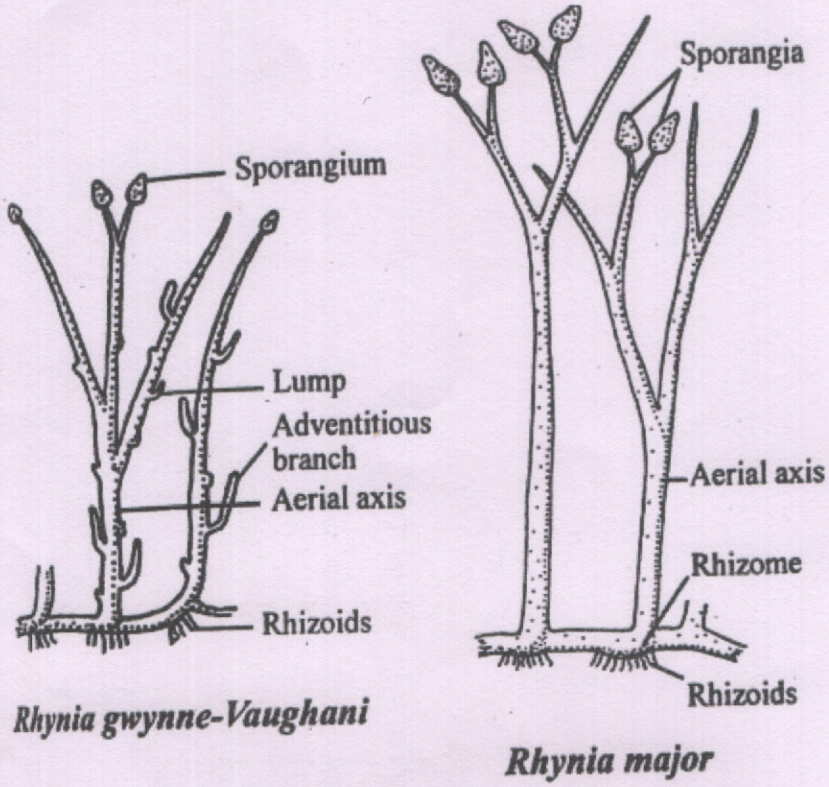
Division - Psilophyta
Class - Psilophytopsida
Order - Psilotales
Family - Rhyniaceae
Genus - Rhynia

Rhynia is a *fossil pteridophyte.*It has no living representative today.It was first discovered in 1913 from *Rhynie chert* in Scotland. Rhynia had flourished well in the *Devonian* period of *paleozoic* era.

Rhynia was a sporophytic plant. *Rhynia gwynne vaughani* was a small plant,attaining a height of 20cm. Rhynia major was larger in size and about 50 cm in height. The plant body consisted of a cylindrical *rhizome* and di-chotomously branched *aerial stems.*

The rhizome was buried in the *mud* or *peat.* It was slender and *dichotomously branched.* Aerial branches arose from the rhizome and grew upwards. There was no root on the rhizome. *Tufts of rhizoids* arose some places on the lower surface of the rhizome and fixed it in the substratum.

The rhizoids might have absorbed minerals and water form the substratum.



Reproductive structures of Rhynia

The sporangia were borne singly on the apices of some aerial branches, each sporangium being oval or slightly cylindrical structure with a little greater diameter than that of aerial branch on which it is developed.They were 12 mm long and 4 mm in breadth in R. major and 4 mm long and 1 mm broad in R. gwynne-vaughanii.

The innermost layer was 1 cell thick tapetum. The wall was surrounding a spacious sporangial cavity which was without columella and contained large number of spores. The spores were of same size and measured upto 60 μ in diameter.

It means that Rhynia was homosporous. In many specimens the sporangium contained tetrahedral tetrads of spores (Fig.3. B, C) which suggest that they were formed by reduction division and the plant bearing them represented the sporophytic generation.

There was no special mechanism of sporangium dehiscence. The liberation of spores seems to have taken place by disintegration of the sporangial wall. Nothing definite about the gametophyte of Rhynia is known.

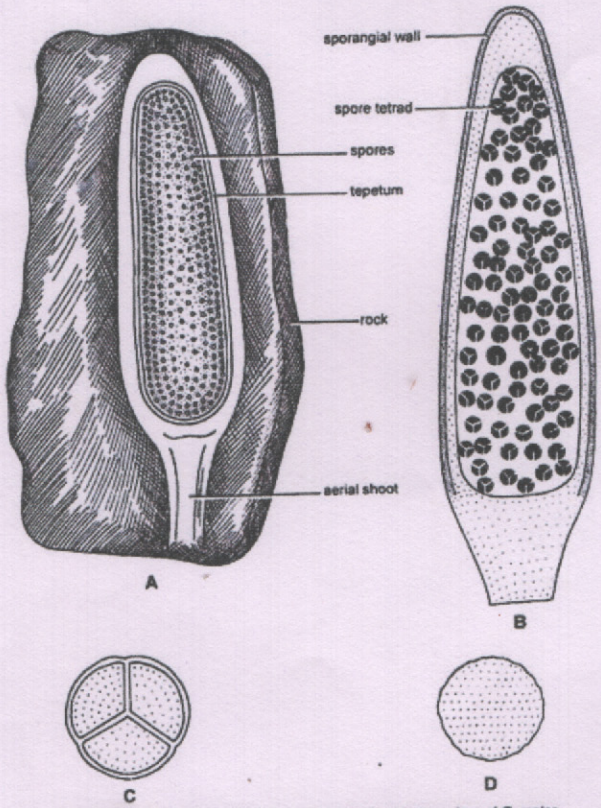
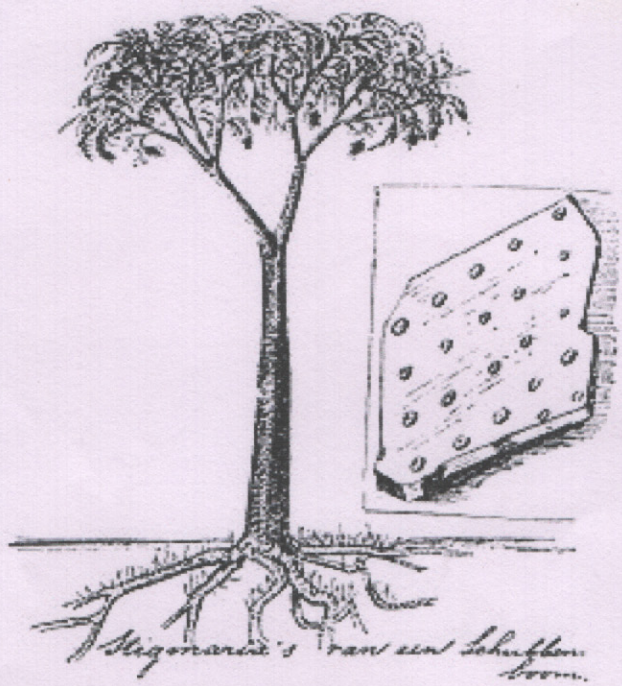


Fig. 3 (A–D) *Rhynia*. Sporangia and spores A. L. S. of sporangium of *R. major*, B. L.S. of sporangium of *R. gwynne-vaughani*, C. Sporetetrad, D. Spore

Lepidodendron

Division - Lycophytes
Class - Lycopodiopsida
Order - Lepidodendrales
Family - Lepidodendraceae
Genus - Lepidodendron



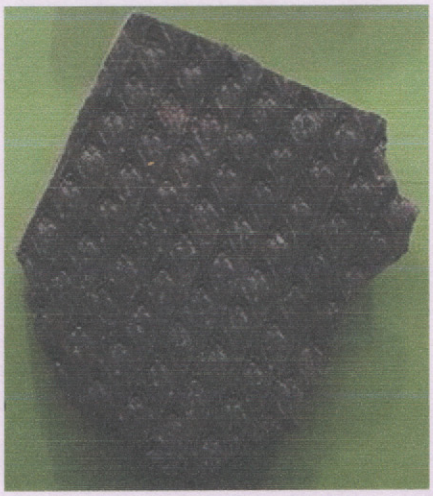
1911 reconstruction of a mature Lepidodendron, showing dichotomous branching at the top of the trunk

Lepidodendron species were comparable in size to modern trees. The plants had tapering trunks as wide as 2 m (6.6 ft) at their base that rose to about 40 m (130 ft) and even 50 m (160 ft), arising from an underground system of horizontally spreading branches that were covered with many rootlets. Though the height of the trees make the plants similar to modern trees, the

constant dichotomy of branches created a habit that

contrasts with that of modern trees. At the ends of branches were oval-shaped cones that had a similar shape to modern cones of a spruce or fir

Leaf



Closeup of Lepidodendron scale leaf bases

The leaves of the trees were needle-like and were densely spiraled about young shoots, each possessing only a single vein. The leaves were similar to those of a fir in some species and similar to those of Pinus roxburghii in others, though in general the leaves of Lepidodendron species are indistinguishable from those of Sigillaria species. The decurrent leaves formed a cylindrical shell around branches

Reproduction in Lepidodendron

Lepidodendron species had a life cycle of 10 to 15 years composed of a growth cycle, in which the trees grew to a predetermined height, and a subsequent reproductive cycle, in which the trees produced reproductive organs, after which the trees died, similar to the life cycle of a Mauna Kea silversword.

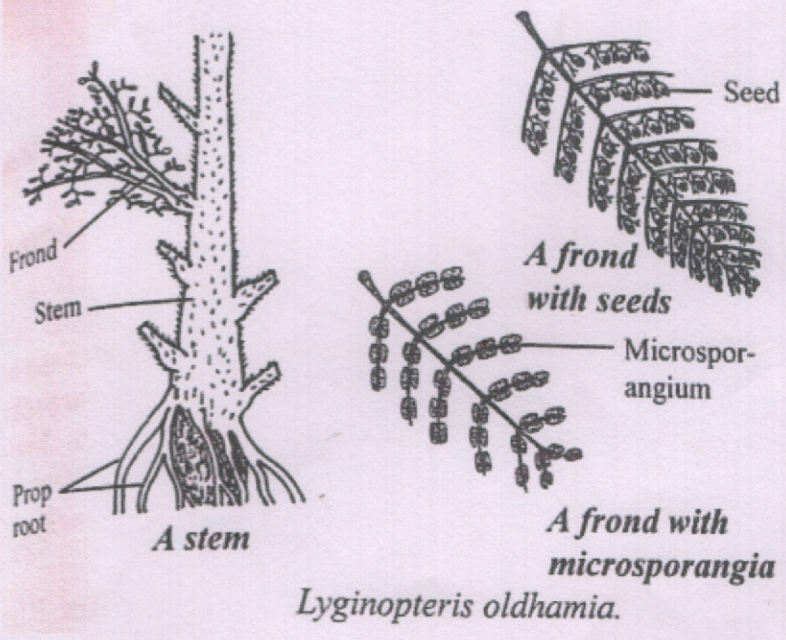
Rather than reproduce with seeds, Lepidodendron trees reproduced with spores. The spores were stored in sporangia situated on fertile stems that grew on or near the main trunk. The fertile stems grew together in cone-like structures that clustered at the tips of branches.

LYGINOPTERIS

Division - Gymnospermae
Class - Cycadopsida
Order - Cycadofilicales
Family - Lyginopteridaceae
Genus - Lyginopteris

Lyginopteris is a *fossil gymnosperm.* It was first discovered from *coal mines* of Lanscashire and Yorkshire in 1828. It flourished well on the *Devonian* period of *paleozoic* era. At present it has *no living representative* in the world.

Lyginopteris has only one representative called *Lyginopteris oldhamia.*



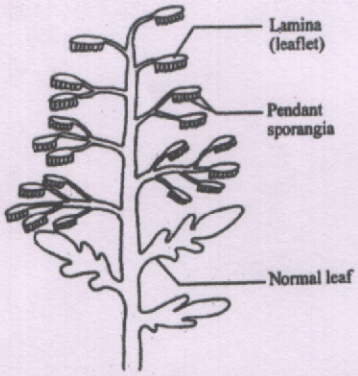
Lyginopteris oldhamia.

Reproduction

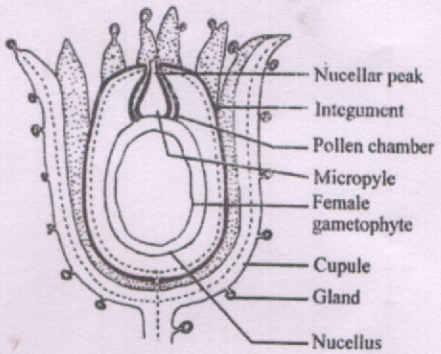
Lyginopteris oldhamia is a fossil gymnospermic plant. It has flourished in the Devonian period of paleozoic era. Lyginopteris was a sporophytic plant.

The organs of vegetative reproduction were not discovered. The sexual reproduction therefore was found to be predominant.

Lyginopteris oldhamia was a heterosporous plant. The fertile leaves of fronds bore microsporangia and ovule



A portion of leaf showing microsporangia



vertical section of ovule of Lyginopteris.