Good day students.

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Today we will be seeing early land plants.

Rhynia from the unit **Pteridophytes .**

outline.

We will be seeing.

The systematic position
introduction

Rhynia morphology ***Rhynia*** anatomy of

the rhizome and the aerial shoot.

Rhynia reproductive structure that

is the sporangia and the spores of

Rhynia.
learning outcome
describes the early day plant ***Rhynia***

SYSTEMATIC POSITION

DIVISION:	Pteridophyta
CLASS:	Rhyniopsida
ORDER:	Rhyniales
FAMILY:	Rhyniaceae
GENUS:	*Rhynia*

now introduction
the geological occurrence of *Rhynia* is in the

lower Devonian era.

The geographical distribution of *Rhynia*

- is known only from the Rhynie chert in Aberdeenshire, Scotland

Coming to the morphology of *Rhynia*

Kidston and Lang (1917) discovered

the fossils of *Rhynia* two species,

namely *R. major* and *R. gwynne-vaughani* were found.

Preserved as whole plants

in a petrified condition,

these plants grew in the vicinity

of a silica rich hot spring.

Rhynia was a herbaceous plant.

The plant consisted of a

subterranean Prostrate,

cylindrical and dichotomously

branched rhizome,

which had dichotomously branched leafless

aerial shoots as seen in the picture.

The aerial shoots of *Rhynia* major

were estimated to be 50 centimeters

long and six millimeters in diameter,

and those of Rhynia *gwynne-vaughani* were comparatively smaller.

Rhynia plants lacked roots,

but it showed the presence of a tuft

of rhizoids which was present on the

lower portion of the subterranean rhizome.

Many adventitious branches

were found in the rhizome.

And the aerial shoots,

and they were probably the means

of vegetative reproduction.

The aerial branches both appear shaped

terminal sporangia again as seen in

the picture coming to the anatomy of Rhynia.

The anatomy of rhizome and the aerial shoot.

Anatomical study showed that

Rhynia showed three major parts,

the epidermis, the cortex,

and the vascular bundles.

Let's see them one by one.

Firstly speaking about the

anatomy of Rhynia epidermis,

the epidermis, as you all know,

is the outermost layer.

In this case,

this epidermis is thick walled and shows

the presence of a thick layer of cuticle.

The aerial shoots had

Stomata with two guard cells and was

surrounded by many subsidiary cells.

coming to the anatomy of the cortex.

The cortex in this case was distinguished

with an outer region and an inner region.

The outer region consisted

of one to four layers,

and these layers were made up of cells

which were compactly arranged and

were angular parenchymatous cells.

This region perhaps represented

the HYPODERMIS.

The inner cortex also consisted

of parenchymatous cells.

However,

here with intercellular spaces which

were connected to the outer stomata,

the cortex also showed the presence

of some fungal hyphae moving to the

vascular system of linear approach,

Stele was seen present in the

central zone of the shoot,

and Rhizome in which the

phloem surrounded the Xylem.

- The Xylem was made up of tracheids with annular or spiral thickenings.

The phloem consisted of four to five

layers of thin walled elongated

cells with oblique and walls.

There was some minute,

see if like areas on the lateral

walls of the phloem cells,

the endodermis and pericycle,

however, were not distinct.

Moving to the reproductive structure,

the spore producing structure

called the sporangia.

The sporangia would present singly

terminally on the aerial shoots.

The sporangia were more or less over

in structure as seen in the image and

size wise they were 12 millimeters

long and four millimeters wide.

This sporangium had a multi layer jacket

which showed the presence of an outer wall,

some mid layers and the innermost layer.

The outer wall was made up

of thick walled cells.

Then two to three layers

of thin walled palisade,

like rectangular cells,

and then the innermost layer had small

rounded cells which seemed to be the tapetum.

There were many spore tetrads present in

this sporangia. coming to the ***Rhynia*** spore,

the spore of ***Rhynia*** was 65 microns in size.

showed the presence

of only one kind of spores.

Therefore the plant was homosporous

in nature.

- These spores had a thick cutinized wall.
- The gametophyte in pteridophytes is generally very fragile and
- There is no information of the gametophyte of *Rhynia.*

Let's summarize what we have just seen.

We saw the early day plant *Rhynia* right now

was not differentiated into root stem leaves.

However it bore an aerial shoot

which was dichotomously branched.

These aerial shoot.

Had a terminal sporangia this

sporangia was over in structure.

This sporangia was about 12 millimeters

long and four millimeters wide.

The sporangium bore the spores

which were about 65 microns in size.

The anatomical studies of

Rhynia are also known.

Rhynia anatomy shows the presence of

three major parts, the epidermis,

the cortex and the central vascular tissue.

The epidermis is thick walled

with an thick walled cuticle.

Also,

it showed the presence of stomatal cells.

The cortical region was divided

into two types or two regions,

the outer cortex and the inner cortex.

The outer cortex made up of one to four

layers of parenchymatous cells could

have probably been the hypodermis.

The inner cortex consists

of parenchymatous cells,

with intercellular spaces.

Also,

it was noted that the cortex had

the presence of some fungal hyphae.

The vasculature heard was a

simple proto stele where the

phloem surrounded the Xylem.

It also showed the presence of tracheids in

the Xylem with annular or spiral thickenings.

The phloem was seen to be consisting

of four to five layers of thin walled

elongated cells with oblique end walls.

Also, minute areas were

seen on the lateral walls of phloem.

However,

in a plant like *Rhynia*,

the endodermis and pericycle

were not distinct at all.

The reproductive structures Sporangia we saw.

Which was Oval shape which is present

at the tip of the aerial shoot

which had a multi layer jacket.

The outer wall made up of thick walled sales.

The middle layer is made up of thin walled

palisade cells and then the innermost

layer which had small rounded cells

which seemed to be like the tip it down.

A lot of spore tracheids we saw already

were found in this sporangium and

then we saw the *Rhynia* spore which

also had a thick cutanized wall.

All the spores were of the same kind.

So that was homosporous in nature and

the size of the sport was 65 microns.

The gametophytes information

about *Rhynia* is not known.

These are my references .
Thank You.