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Life Cycle of *Rhynia*

Classification
Plantae
Tracheophtes
Rhyniopsida
Rhyniales
Rhyniaceae
Rhynia

Introduction

They are simplest extint vascular plant. The fossil of the genus was discovered by Kidston and Lang in 1917, 1921 from Rhynie locality (Chert) of Aberdeen Shire in Scotland.

External Features of Rhynia

1.Plant body was sporophytic.

2.*Rhynia major* was bigger and attained a height of 50 cm. with a diameter of 1.5 to 6 mm.,while *R.gwynne-vaughani* had a height of 20 cm. and a diameter of 1 to 3 mm.

3. Plants had a rhizome which was dichotomously branched.
4. From rhizone developed many dichotomously branched erect aerial shoots towards the upper side while many rhizoids towards the lower side.

5. There were no roots on the plants.

6. Aerial shoots of *Rhynia major* were smooth and devoid of leaf or any other outgrowth, while in case of *R.gwynne-vaughani* many adventitious branches were present on the aerial shoots.

7. Aerial shoots were either ending into simple vegetative tips or having terminal sporangia.

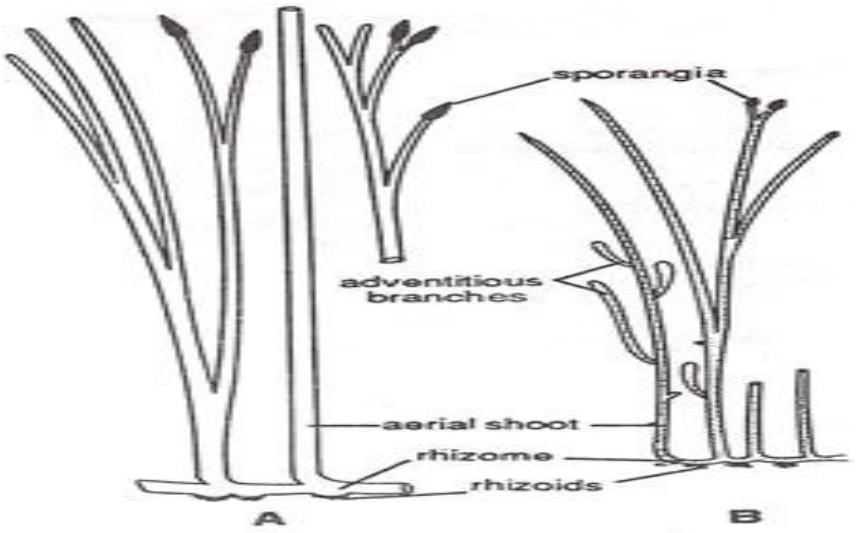


Fig: *Rhynia* External Feature A) *R. major* B) *R.gwynne. vaughani*

Common character of both the *Rhynia species*

- Root is absent
- Rhizoids are present instead of root
- Aerial stem was dichotomously branched and tapper
- The tip of aerial branch bear solitary terminalϖ sporangia

Internal structure

Anatomy of stem

Epidermis

1. It is thick walled and coverd by thin cutical

2. stromata is present on the epidermal surface

3. Cortex is

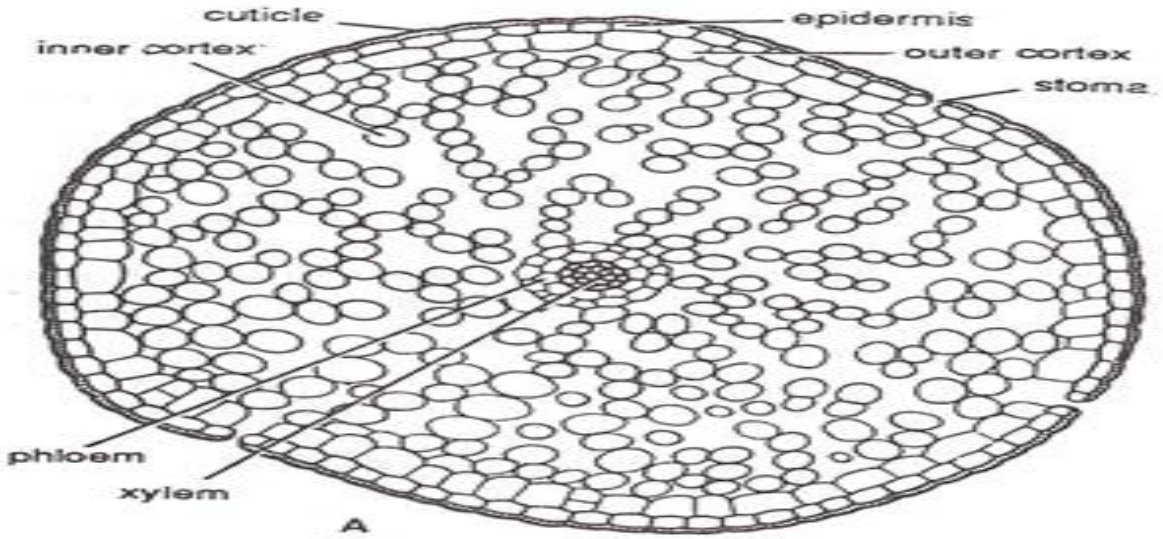
1)Differnciated into outer and inner cortex

2)Having intercellular spaces with chloroplast

3)Endodermis and pericycle are absent

4)Stele:- 1) Presence of Protostele

2)xylem made up of annular trachides and no sieve element in phloem



Rhynia :T.S of Rhizome

Reproductive structure of Rhynia

It takes placed by sporangia formation. Born singly apices of apical branches ,oval and cylindrical . 12 mm long & 4mm breadth.

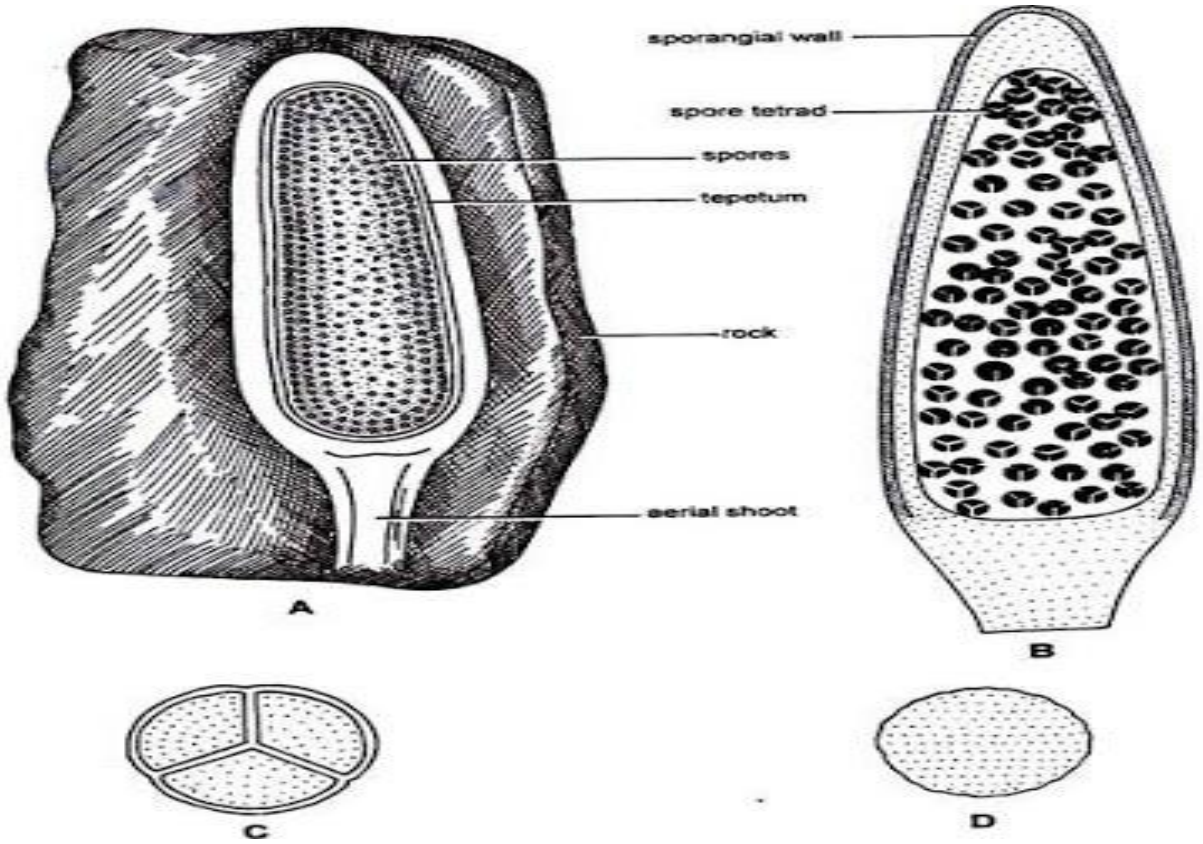
L.S of Sporangium

Outer most layer having thick epidermis

•Presence of tapatum layer

•Having tertrahadral homospore.

•No evidence of gametophyte



***Rhynia spp* sporangia and spore A) L.S of sporangia of *Rhynia major* B) L.S of sporangia of *Rhynia gwynne vaughani* C) Spore tetrad D) Spore**

Evolutionary Significance of *Rhynia*

Originally Cambell (1895) proposed the idea that Pteridophyte probably evolved from Bryophytic ancestors of *Anthoceros* type. This idea was greatly supported by Smith (1955). The gametophyticthalli of *Anthoceros* are simple, dark green and grow in moist shady places. The sex organ are embedded on the dorsal surface of the thalli. These gametophyte resemble closely with those of eusporangiate type of vascular cryptogames (e.g *Lycopodium, Equisetum*, etc). The most remarkable feature of *Anthoceros* is there highly advanced type of sporophyte. The mature sporophyte of *Anthoceros* is elongated and cylindrical and that grow continuously with the help of intercalary meristem. It is photosynthetic and possess stomata with guard cell in the epidermis. The centre of sporophyte is occupied by sterile columella that os overarched by spore-

producing sporogenous tissue. The cell of columella is elongated and and in some species possess spiral thickening like those of tracheids. The basel foot of sporophyte remain embedded in the gametophyte and produce rhizoid like unicellular protuberances that help in the absorption of nourishments. If the sporophyte od *Anthoceros* is isolated and grown in artificial culture it can grow for month but show only limited growth.

The discovery of *Rhynia* snd similar plants and similar plants by Kidston and Lang further suppoeted the view of Campbell and Smith who considered the sporophyte of *Anthoceros* as 'caught in act' of becoming an independent plant body having an intermediate growth. The plant like *Rhynia, Horneophyton and Sporogonites* provided intermediate forms between the bryophyte and complex pteridophytes. It is therefore proposed that bryophytic ancestor of *Anthoceros* type gave rise to simple pteridophyte like *Rhynia* by progressive change in the nature and structure of sporophyte. On the other hand, Haskell (1949) proposed that *Anthoceros* type of bryophytes have evolved from *Horneophyton* type of ancestors by the process of reduction. There is however a third possibility seems to be convencing. According to this Pteridophyte has not evolved from bryophyte but they evolved as pteridophyte. It is proposed that green algar *Chara* gave rise to quasi pteridophytes which further transformed to Rhyniophytes that finally gave rise to Sphenopsida, Filicopsids and Progymnospermopsids by separate evolutionary lines. Thus, the place of *Rhynia* and Rhyniophytes is most significant in the highly advanced type of pteridophytes.