

Topic: Rhynia
B.Sc. Botany (Hons.) I
Paper: II Group:B

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Systematic position

Division – Psilophyta

Class – Psilophytopsida

Order – Psilophytales

Family – Rhyniaceae

Genus – *Rhynia*

Occurrence

The genus *Rhynia* was first discovered in 1913 by Kidston and Lang from the village Rhynie of Aberdeenshire district of Scotland and hence the name Rhynie. It is a fossil plant and its two major species *R. gwynne vaughani* and *R. major* have only been described by Kidston and Lang from old Red sand stone Beds (middle Devonian) of this locality.

There are evidences that those plants were growing in peaty habitats near volcanoes where the atmosphere surrounding them contained sulphurous vapours and

the soil was situated with acidic water of hot springs. According to the remains of plants they were found embedded and impregnated with silica.

External structure

- The plant of both the species were similar in structure. They were herbaceous and the plant body was divided into (i) Rhizome and (ii) Aerial stem.
- The rhizome was dichotomously branched, creeping and buried in peat formed by the dead remains of other plants of the same kind.
- The root was completely absent and at the place of it there were tufts of rhizoids originating from rhizomes.
- The aerial stem was erect, cylindrical, dichotomously branched, naked, leaflets and ended either tapering vegetative apices or borne oval, elongated terminal sporangia.
- The stem was the continuation of underground rhizome turned gradually or abruptly upward.
- The aerial stem of *R. major* was longer and attaining height of above 50 cms.

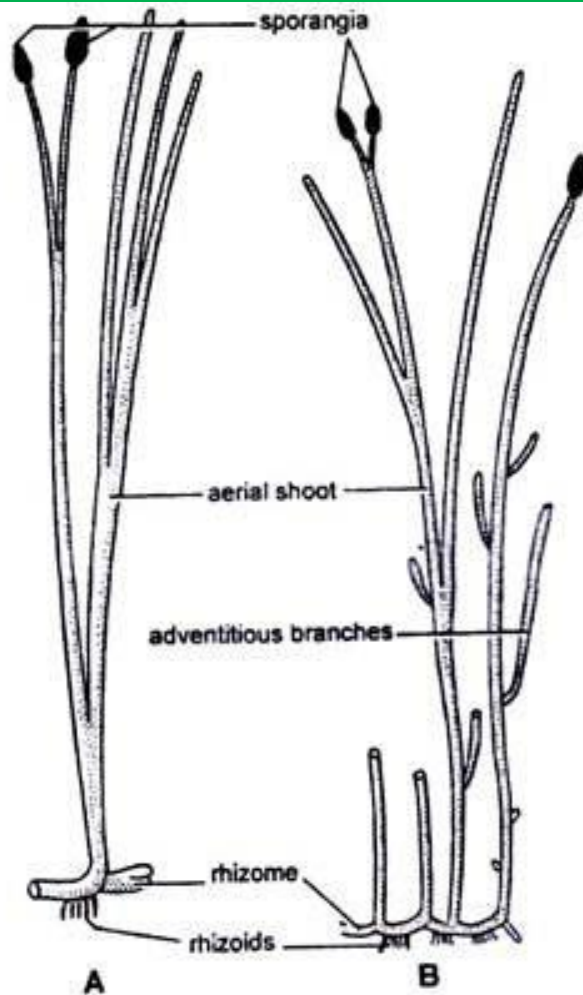


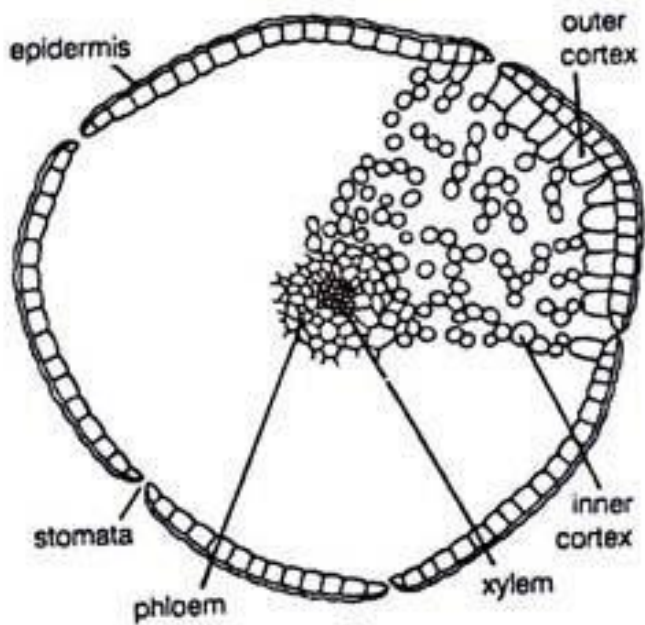
Fig. (A-B). *Rhynia*. External features. A. *R. major*, B. *R. gwynne-vaughani*

whereas *R. gwynne vaughani* was about 18-20 cms. in height.

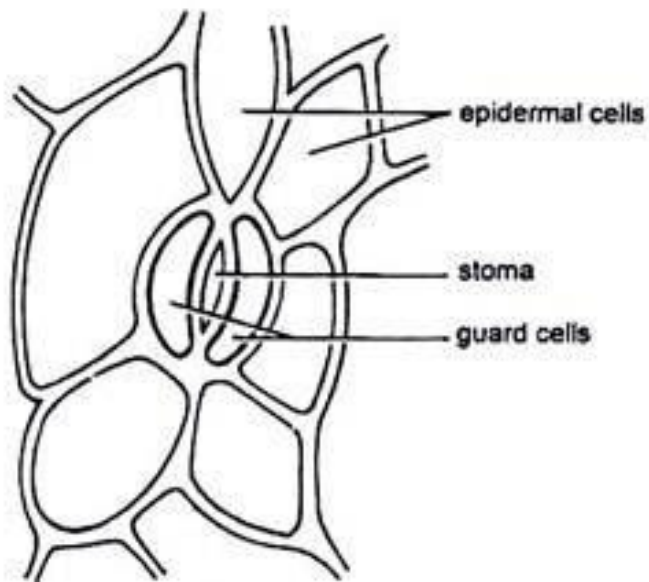
Internal structure

The internal structures of rhizome and aerial stem were essentially similar. The transverse section revealed the following structures-

- **Epidermis-** There was a distinct layer of epidermis interrupted by stomata and containing thick cuticle from outside. The stomata were absent on rhizome.
- **Cortex-** Below the epidermis the cortex was divided into outer and inner cortex.
- The outer cortex was situated below the epidermis and was composed of larger angular parenchymatous cells without intercellular spaces except below the stomata.
- It is represented the hypodermis. The inner cortex was broader and consisted of smaller and somewhat rounded cells with intercellular spaces which communicated through gaps to the stomata. The inner cortex was considered as the photosynthetic region.



A



B

Fig. (A-B). Rhynia. Internal Structure : A. T. S. of aerial shoot, B. a stoma

- **Stele-** The centre of the stem was occupied by protosteles. The xylem was cylindrical and composed of annular tracheids. Just outside the xylem tube had been a larger phloem made up of elongated thin walled cells with oblique septa. The phloem was lacking sieve plates.

Reproductive structure

- The sporangia were the reproductive structure which were borne terminally on the apices of the aerial stem singly.
- They were club shaped, oval or slightly cylindrical. The sporangial wall consisted of three distinct layers.
- The outer layer was cuticularized epidermis, the middle layer was about three cells deep and composed of thin walled cells and the inner layer was of small rounded cells which probably functioned as tapetum.
- Inside the sporangial wall there were a large number of spores. All the spores were

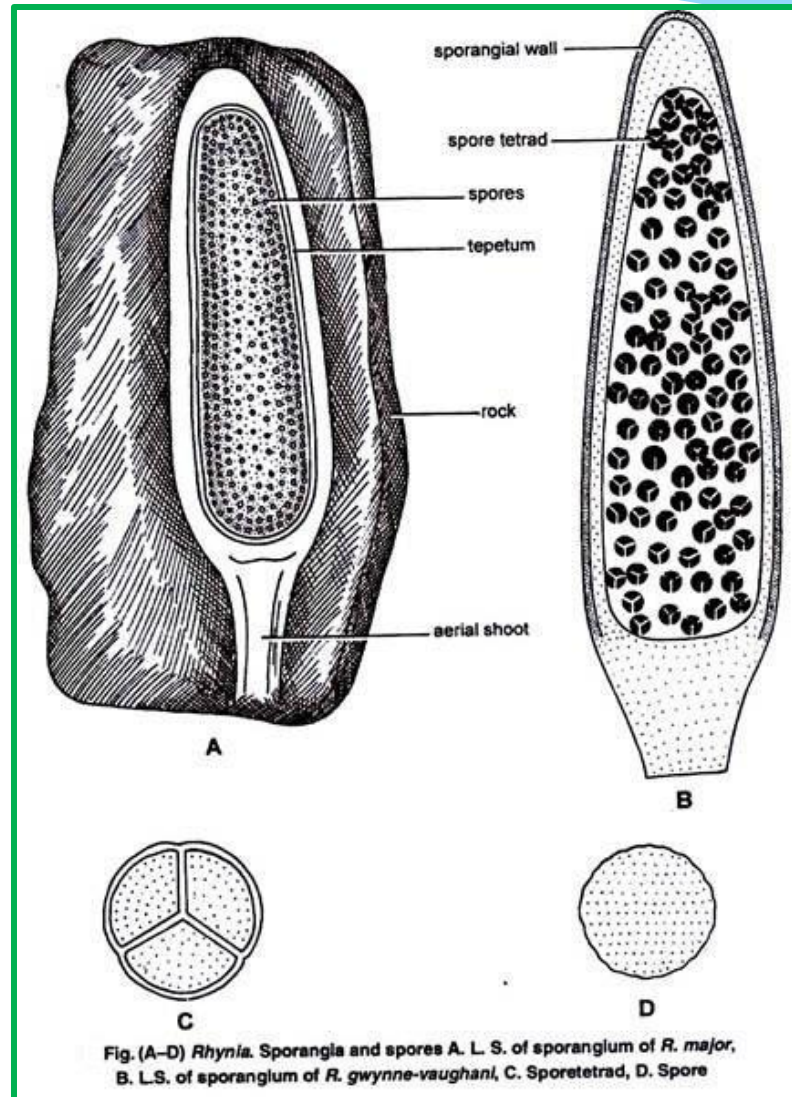


Fig. (A-D) *Rhytisma*. Sporangia and spores A. L. S. of sporangium of *R. major*, B. L.S. of sporangium of *R. gwynne-vaughani*, C. Sporetetrad, D. Spore

of same size presenting homosporous condition.

- The spores were arranged in tetrads which suggested that they were formed after reduction division.
- The spores were cuticularized and more typical triradiate ridge.
- They were 40μ to 65μ in diameter.
- The device of sporangial dehiscence and the germination spore and formation of new gametophyte structure are not known.