

PTERIDOPHYTA

- i) They are in between bryophytes in height. Land plant. Most of them are ~~terrestrial~~ ^{terrestrial} habit but some are aquatic also.
- ii) Generally they are herbaceous but some are even woody tree.
- iii) They are vascular.
- iv) Plant body is differentiated in leaf stem and root.
- v) Root are mainly adventitious.
- vi) Stem is mostly prostrate, shrublets and give rise to aerial branches.
- vii) Leaf are heterophyll. generally there are two types:
 - (i) Microphyll
 - (ii) Megaphyll

(1) Microphyll - There are smaller in size. They are vein are weak there are also two type.

- (i) Figulate
- (ii) Elogulate

Ligulate :- They have ligules. Ligulate a small serrulate associated with leaves.

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Kennedy to the mature archegonium. They search the egg through root and fertilization is completed. The result of fertilization of zygote is first cell of sporophyte (2n) diploid. The zygote divide and subdivided and from embryo root. Pteridophytes are first among embryo-phyte. Here these embryo gives rise to the sporophytic alternation of generation by very distincting and well ceter. Pteridophyta are first plant. True vascular bundle are present. They are xylem like vessels made up of tracheids. Pteridophyta divide into phoro subgroups known as sub-philum -

Bilophyta → A sporophyte lacks root but they possess rhizoids. The stem is rhizomatous. There are axial axis leaves are generally absent. Vascular tissue are present in stem, vascular bundle. It is proto stele sporangia are homoporous. They are terminal in position. There are many members fossils -

Phyllum, Howaria, many members are living psiloleterms.

Lycophyta :- Sporophyta well development into root, stem and leaf. Leaf are microphyllous vascular. Cylinder is developed. Stele may be protostele, Symplostele, polystele. They bear sporangia and sporophylls. Sporophylls are arranged in group known as strobilus of cone. Some are they are homosporeous; eg:- Equisetum, where are heterosporeous lycoperdium, Sellaginella.

Astrophyta - Sporophyta well differentiated eg:- Sellophella, green, stem and leaf. There are clear nodes and internodes at internodes leaves are born whorl at internodes. In the stem silica particles are diatoms. Sporangia are born on sporophylls. Strobilus are found in strobilius. known as sporangia in a specialised form as homosporeous on a tip of stem. They are fossiliferous. Some are living eg:- Equisetum.

1). Pellicophyta :- (i). Sporophyte well differentiated into root, stem, leaves. Leaves are large megaphylls usually compound stem usually rhizomes. In some cases erect. It may be girth even 15 ft stem may be protostelic. Siphon and dictyo stelic. Sporangia born in large numbers. On ~~leaf~~ leaves lamella eighter in form of sorus. They may be homosporous and heterosporous.

Stelar organisation / Evaluation of stele in pteridophytes / what is stele / what is vascular tissue?

In protostele situation and in aquatic condition transport of water is very easy even not needed. When the plant grows high transportation and relation of water is new problem. To solve this problem in a better way Develop the complex tissue system. It consists of two of the complex tissue.

(i). Xylem (ii) phloem.

- Xylem is responsible for carrying the water and minerals [sap]

iv). Felicophyta :- (i). Sporophyte well differentiated into root, stem, leaves. Leaves are large megaphylls usually compound stem usually rhizomes. In some cases erect. It may be group even 15 ft stem may be protostelic. Siphon and distinct stelic. Sporangia born in large numbers. On leaf leaves lamella eighter in form of sorus. They may be homosporous and heterosporous.

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(i) Xylem (2) phloem.

- Xylem is respiration for carrying the water and minerals [sap]

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in upper direction. i.e. base to apex. where ^{as} ~~are~~ phloem facilitated transport of prepared food material from the leaves to the rest of the part. vascular tissues are arranged in axial cylinders from cortex to pericycle. This str. is known as stele.

Tridophytes are the first among the land plants. They show a great range of species. They also show a great variation in their stelar organisation. These variations may be arranged in an evolutionary way.

Stele are different kind as follows:-

(i) Protostele:- This is made in such a way that xylem is a center & completely surrounded by phloem for ex: Psilotum, Lycopodium. It is the simplest kind of stele. It may be of following types. -

(a) Haplostele:- The xylem is in a complete circle with core smooth. It is surrounded by a continuous phloem.

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~~any~~ layer of: Rhynia, Rhizome
psilotum.

b. Actinostele: - The xylem cylinder is stellate (Star-like) having radiating ribs. The xylem is tetrad or palyer. Phloem is isolated mass. Alternating way the projecting angles of axis of: Lycopodium.

c. Partially stele: - The xylem cell is grouped at certain positions and may break up into strands. Normally each strands is monarch or diarch phloem is present in rest of place. of: Lycopodium.

d. Plecostele: - It consist of several horizontal strands of xylem and phloem. The lying parallel to one another and divided xylem is dec. of: Lycopodium, clavatum.

Mixed protoste: - There are no of xylem tissue scattered in the ground phloem. Both are contripetal in some classes there may be parenchyma also.

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ex: Lycopodium serotum. Protostele
fundamental vascular bundle.

2. Siphonostele :- There is presence of
pith in centre. It may be hollow also.
They are also of two types :-

- (i). Ectophloaic
- (ii) Amphiphloaic.

(i) Ectophloaic - Phloem is outside
the xylem ex: Psilotum.

(ii) Amphiphloaic :- Xylem cylinder is
completely surrounded by phloem and
both side externally as well as
internal. ex: Marilia, Adiantum.
Protostele is primitive
where as siphonostele is advanced.
There are two different theory
regardis the horizon siphonostele.

- Flow the pith arises. at the same term
explained in 2 possible way
- a. Intra stelar origin.
 - b. Extra stelar origin.

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2. **Intra stelar origin** :- The inner mass vascular tissue may have transport into parenchymatous tissue forming pits. The advocates of this theory are F. Hodge [1901] Guyonme. vaughan (1908) Bhar (1911) Thomas (1920)

1. **Extra stelar origin** - At this theory the cortex is responsible for the invasion from outside the stele through the leaf gaps branch gaps during course of evolution. The champions of this theory are Saffers (1902, 1910, 1917)

3. **Solenostele** :- It is spiral stele having a leaf which gives it shape of 'C'. It is also two types :-

(a) **Ectophloic** :- Here outside xylem. It develops of ectophloic siphnostele.

(b) **Amphiphloic siphnostele** :- There are two set of phloem one in external and external to the central xylem strand. It developed on amphiphloic siphnostele.

ex: *Masi Marsilea*, *Adiantum*

4. **Dictyostele** :- It is also called siphono stele due to presence of two or more leaf formation by overlapping of leaf gird. The part of stele is known as meristele.

(i) **Mono cyclic dictyostele** :- It have centering of two and more meristele. Separated from one and other by presence of leaf girds. eg:-
Ophiglossum. It developed from monocyclic siphono stele.

(ii) **Poly cyclic dictyostele** :- A dictyostele having two or two even more centering of meristele known as polycyclic dictyostele. It developed from two and more siphono stele available in siphono rings of