# Classification of Pteridophyta

Pteridophyta

| Classes: | Psilopsida | Lycopsida | Sphenopsida | Pteropsida |
|---|---|---|---|---|
| Orders | Psilotales | Lepidodendrales | Equisetales | Cheiropteridales |
| | Psilophytales | Lycopodiales | Sphenophyllales | Filicales |
| | | Pleuromeiales | Calamitales | Marattiales |
| | | Isoetales | Hymeniales | Ophioglossales. |

## Characters of Psilopsida

(i) Most of them are fossils (except Psilotum).
(ii) Plant body is relatively less differentiated.
(iii) Roots are absent instead of dichotomously branched rhizome present.
(iv) Aerial axis is either naked or have small spirally arranged leaves
(v) Sporangia are cauline (i.e. directly borne on the axis or stem) they are lateral and terminal in position.

## Characters of Lycopsida

(i) Plant body is differentiated into root, stem and leaves
(ii) leaves small
(iii) Sporangia developed in the axil of the sporophylls.
(iv) Sporophylls generally form compact strobili eg. Lycopodium Selaginella.
(v)

## Characters of Sphenopsida :

(i) Stem differentiated into nodes and internodes
(ii) Leaves microphyllous, present in whorls in each node.
(iii) Sporangia are borne on the sporangiophore which form compact cones at the apex of the fertile branches eg- Equisetum.

## Characters of the Pteropsida :

(i) Plant body well differentiated into root, stem and leaves.
(ii) leaves megaphyllous, pinnately compound.
(iii) Sporangia developed on the ventral surface of the sporophyll, usually aggregated into sori. eg. Pteris, Dryopteris, Pteridium etc.

## Pteridophyta

Pteron — Feather
Phyton — Plants

Pteridophyta are the most primitive vascular Plants They are also known as vascular cryptogams.

The Pteridophytes shows heteromorphic alternation of generation.

The main Plant body is sporophytic and autotrophic. The sporophyte produces spores after Meiosis division. Each spore after germination give rise to a gametophyte called Prothallus. It is small and short lived structure which bears sex organs.

Pteridophyta are usually placed between bryophyta and higher vascular Plants eg. Gymnosperm and angiosperms.

Although they resembles with bryophytes in many of their fundamental characters such as.

(a) Presence of sterile jacket around sex organs
(b) Well developed archegonium
(c) Necessity of water for fertilization.

but differs in some striking features; such as.

(a) Presence of sporophytic Plant body and vascular plants.
(b) The presence of a sporophytic plant body, vascular tissue and similar reproductive organs shows the affinity of Pteridophytes with Gymnosperm
(c) But Pteridophyte do not bears seeds like Gymnosperm

## General Characters of Pteridophytes

(2) Pteridophytes occur in a variety of habitats
(ii) Most of them are terrestrial, growing in moist and shady places
(iii) A few are aquatic (Azolla and Marsilea).
(iv) Some are xerophytic eg- Selaginella and Equisetum.
(v) Some Pteridophytes are epiphytes eg- Lycopodium growing on tranks of tree.

Most Pteridophytes are small annual herbs eg- Azolla, Selaginella but few are Perennial and tree like Angiopteris and lepidodendron a fossil Pteridophytes 30 mts in height and 2 mts in diameter.

## Structure:

The sporophyte is differentiated into root, stem & leaves. The primary root is short lived and soon replaced by adventitious roots. Thus adults sporophyte has only adventitious roots.

The stem is usually branched. In many ferns the stem forms underground rhizome
leaves are scaly eg- Equisetum, simple and sessile also in selaginella and Lycopodium.
The vascular tissue in root as well as stem is differentiate into xylem and Phloem.
The xylem consists of tracheids only. While the Phloem has only sieve tubes.
Cambium is absent hence Pteridophyte do not show secondary growth.
The stele is either without central Pith i.e. Protostelic condition
The stele has well developed Pith i.e. siphonostelic eg. Equisetum

## Reproduction.

Pteridophytes reproduce by spores which are produced in sporangia. The sporangia developed either on the ventral surface of the leaves (as in ferns) or on the axils of stem and leaves eg- Lycopodium, Selaginella
Sporangia bearing leaves are called sporophylls.
Sporangia are borne either singly or in group called sori or sorus.
Most of the Pteridophytes are homosporous i.e. only one type of spore eg- ~~Lycod~~ Lycopodium. but a few are heterosporous eg. selaginella.
The heterosporous produce two different types of spores called small microspores and larger megaspores. both of them are produced in different sporangia
The development of sporangia is of two types.
Eusporangiate and leptosporangiate.

Eusporangiate type: when the sporangium develops from a group of superficial cells eg- Lycopodium, Selaginella and Equisetum.

Leptosporangiate type: where the sporangia develops from a single initial cells eg. Pteris etc.

Spores germinate to give rise to the gametophyte known as Prothallus. (green and independent)
The Prothallus bears sex organs antheridia and archegonia.
In homo sporous Pteridophytes the prothalli are monoecious but the heterosporous forms they are dioecious.
The microspores forms male gametophyte while the megaspore form female gametophyte.
The antherozoids are biciliate or multiciliate.
water is essential for fertilization.
A diploid zygote is formed by the fussion of male and female gametes. After development it give rise to the sporophyte.
The heterosporous Pteridophytes have given rise to seed habit in Plants.

Apospory and Apogamy:

Apogamy: It is the development of sporophyte form gametophyte without the fussion of male and female gamet. Such sporophytes are naturally haploid.

Apospory: is the process in which any cell of the sporophyte other than spores forms gametophyte prothallus They are diploid.

## Economic importance of Pteridophytes:

Some of their uses are as follows.

(i) useful in soil conservation.
(ii) use in ornamentals - eg- selaginella & ferns.
(iii) Medicine-lycopodium Homoeo medicine.
(iv) Equisetum use in urine discharge properly.