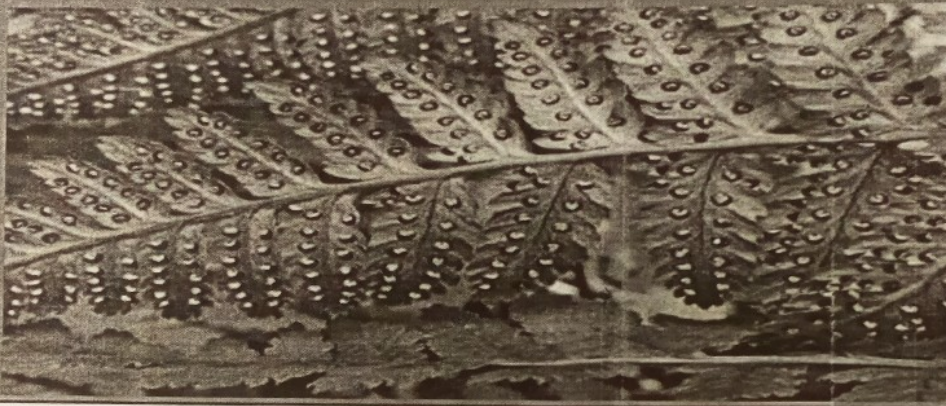


GENERAL CHARACTERS OF PTERIDOPHYTES



INTRODUCTION AND DEFINITION

- The Pteridophytes (Gk. words *Pteron* = feather and *phyta* = plants; means plants with feather like fronds or ferns) includes a group of primitive land plants with well developed vascular system
- This group has been referred to as vascular cryptogams and classified by Carolus Linnaeus (1754) under the class Cryptogamia (Greek words *kruptos* = hidden and *gamos* = wedded; means plants with concealed flowers or the plants without visible sex-organs)
- The Pteridophytes are an assemblage of flowerless, seedless, spore bearing vascular plants that have successfully invaded the land

OCCURENCE

- Most of the pteridophytes are terrestrial and grow in moist and shady places
- While some flourish well in open, dry places especially in xeric conditions (*Selaginella lepidophylla*).
- Some pteridophytes are aquatic (*Marselia*, *Azolla*) and some are epiphytes (*Ophioglossum pendulum*).

SPOROPHYTIC PLANT BODY

- The main independent plant body is sporophyte. It develops from the diploid zygote.
- Plants are differentiated into true roots, stem and leaves. Some primitive members lack true roots and well developed leaves (e.g., in Psilophytales and Psilotales).
- Primary root is short lived. It is replaced by adventitious roots.
- Plants exhibit dorsiventral or radial symmetry.
- The branching of the stem may be dichotomous or monopodial type.
- All the vegetative parts possess vascular tissues, organized in definite groups and steles.

CLASSIFICATION OF PTERIDOPHYTE

Class: Psilotopsida:

The members of this group include Psilotum and Tmesipteris

Class: Lycopsidea:

This class has a long evolutionary history and is represented both by extant and extinct genera. This group first originated during the Lower Devonian period of Palaeozoic Era (ca 390 my).

Lycopodium, Selaginella, Phylloglossum, Styhtes, and Isoetes, and fourteen extinct genera

Asteroxylon, Baragwanathia, Protolepidodendron, Lepidodendron, Sigillaria

Class: Sphenopsida:

This class is represented by only one living genus (Equisetum) and about 18 extinct forms (e.g., Calamites, Annularia). This group originated during the Devonian period of Palaeozoic Era.

Class: Pteropsida:

This group of pteridophytes is commonly known as 'ferns'. The Pteropsida differs from other classes in possessing raised leaves (mega-phylls). This is the largest and highly evolved group of pteridophytes and is represented by about 9,000 species which show a wide range of distribution.

REPRODUCTION

- The sporophytes reproduce by spores which are produced within sporangia.

- In some pteridophytes the sporangia develop on stems (i.e., cauline in origin) while in other they are borne either on the leaves (foliar) or in the axils of the leaves.



SPOROPHYLLS

-The leaves that bear sporangia are known as sporophylls.

-The sporophylls may be widely scattered on a plant (e.g., ferns)

- or may be clustered in definite areas and structures called **cones** or **strobili** (e.g., *Selaginella*, *Equisetum*).

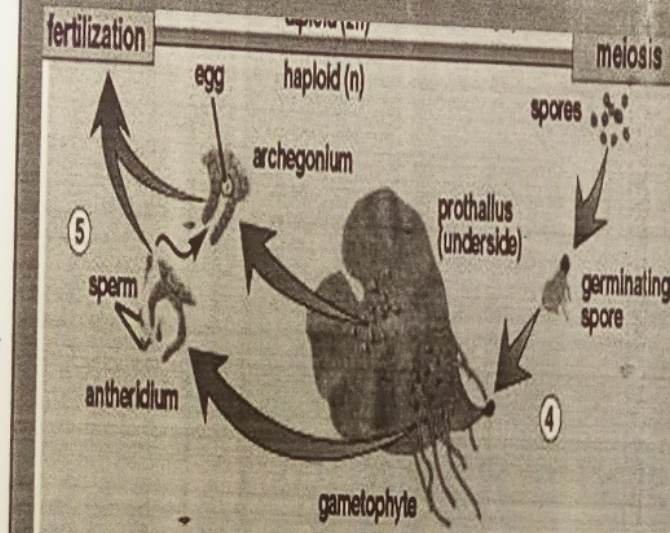


SPOROCARP

In certain pteridophytes the sporangia are produced within specialized structure, the sporocarps (e.g., *Marsilea*, *Salvinia* and *Azolla*).



THE GAMETOPHYTE

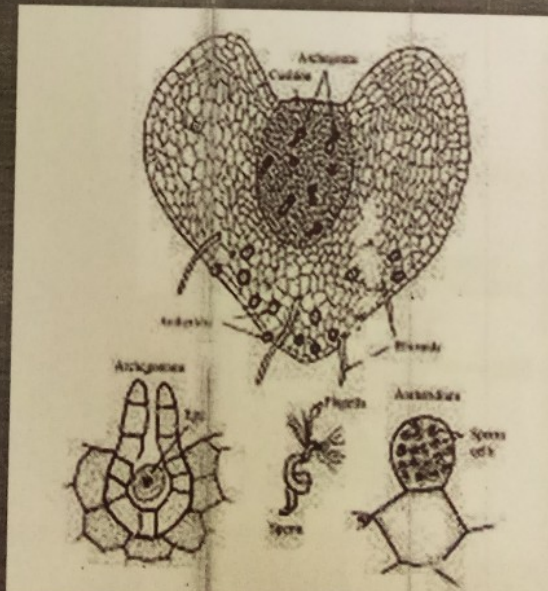


• The spores on germination give rise to the haploid gametophytes or prothalli which are small and inconspicuous.

• The gametophytes may be **exosporic** (e.g., *Pteris*) or **endosporic** (e.g., *Selaginella*, *Marselia*).

SEX - ORGANS

- The sexual reproduction is oogamous.
- The gametophyte or prothallus bears the sex organs, antheridia and archegonia.
- Normally, the gametophytes formed from the homosporous are monoecious, that is both antheridia and archegonia are borne on the same gametophyte or prothallus.
- The gametophytes formed from the heterosporous are dioecious, i.e., the antheridia and archegonia develop in separate male and female gametophytes.



THE ANTHERIDIA

•The antheridia may be embedded in the gametophyte or they may project from it. The embedded antheridia are commonly found in eusporangiate pteridophytes while the projecting ones are usually found in the leptosporangiate ferns.

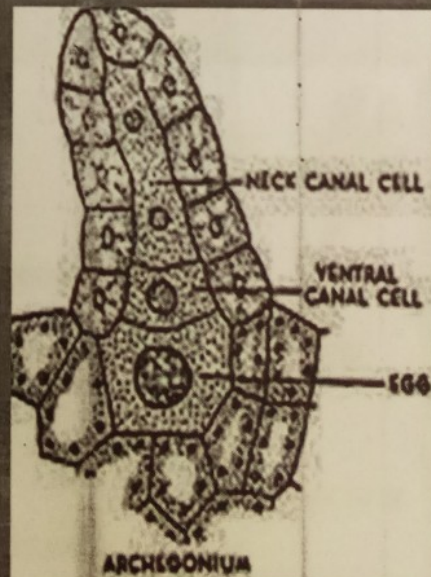
•The mature antheridium is globular and consists of an outer sterile wall inside which are found a large number of androcytes. Each androcyte metamorphoses into a single motile antherozoid.



THE ARCHEGONIA

•The archegonia are flask-shaped. Each archegonium consists of a basal swollen, embedded portion the venter and a short neck. The venter encloses the egg and ventral canal cell.

•At maturity the apical cells of archegonium separate, the neck canal cells disintegrate forming a passage for antherozoids to reach the egg.



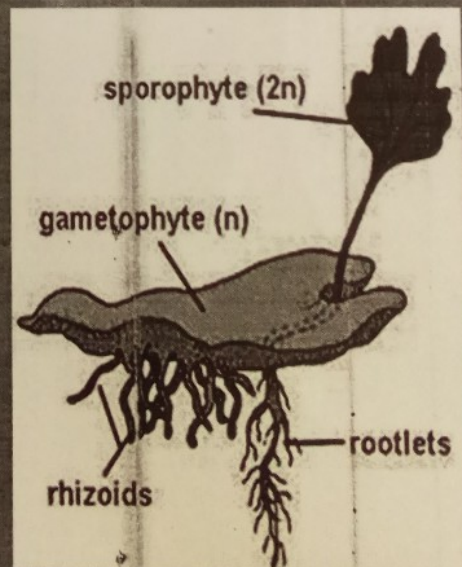
FERTILIZATION

- In all cases the fertilization is accomplished by the agency of water.
- Water is needed for dehiscence of antheridia, liberation of antherozoids, movement of antherozoids from antheridia to archegonia, maturation of archegonia and syngamy.
- The haploid antherozoid fuses with the haploid egg and forms diploid zygote, which is the first cell of sporophytic generation.

THE EMBRYO (THE YOUNG SPOROPHYTE)

•The young sporophyte remains attached to the gametophyte by means of a foot and draws nourishment from the prothallus until it develops its own stem, roots and leaves.

•The sporophyte is dependent on the gametophyte only during its early stages.



Economic Importance of Pteridophytes:

1. Food:

Like other plants, pteridophytes constitute a good source of food to animals. Sporocarps of Marsilea, a water fern, yield starch that is cooked and eaten by certain tribal.

2. Soil Binding:

By their growth pteridophytes bind the soil even along hill slopes. The soil is protected from erosion.

3. Scouring:

Equisetum stems have been used in scouring (cleaning of utensils) and polishing of metals. Equisetum species are, therefore, also called scouring rushes.

4. Azolla (a water fern) has a symbiotic association with nitrogen fixing cyanobacterium Anabaena azollae. It is inoculated to paddy fields to function as biofertilizer.

5. Medicines:

An anthelmintic drug is obtained from rhizomes of Dryopteris (Male Shield Fern).

6. Ornaments:

Ferns are grown as ornamental plants for their delicate and graceful leaves

THANKS