

# GENERAL CHARACTERISTIC OF PTERIDOPHYTES

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# INTRODUCTION AND DEFINITION

- ❖ The term "Pteridophytes" refers to a class of early terrestrial plants having a well-developed vascular system. Pteron is Greek for "feather," and "phyta" means "plants."
- ❖ Vascular cryptogams are the name given to this group, and Carolus Linnaeus (1754) categorised them under the Cryptogamia class (the Greek terms kruptos, which means hidden, and gamos, which means wedded; both phrases relate to plants with concealed blossoms or plants without visible sex-organs).
- ❖ The pteridophytes are a group of vascular plants that have effectively colonised the land but lack flowers, seeds, and seeds.

## **OCCURENCE:**

- The majority of pteridophytes are terrestrial and prefer damp, shaded environments, although some, like Selagiophylla, do well in open, arid settings with xeric conditions.
- - Some pteridophytes are epiphytes (*Ophioglossum pendulum*), while some are aquatic (*Marselia*, *Azolla*).

# SPOROPHYTIC PLANT BODY

- **Sporophyte is the primary autonomous plant body. From the diploid zygote, it develops.**
- **True roots, stems, and leaves distinguish plants from one another. True roots and fully formed leaves are absent from certain early members (Psilophytales and Psilotales, for example).**
- **Primary roots don't last very long. It is swapped out for accidental roots.**
- **Dorsiventral or radial symmetry is seen in plants.**
- **- The stem can branch in either a monopodial or dichotomous manner. Vascular tissues are present in every region of the plant, arranged in distinct groups and steles.**
- **- The stem bears leaves that can be either small (microphyllous type, like Equisetum) or enormous (megaphyllous type, like ferns), depending on the size of the leaves in proportion to the stem.**

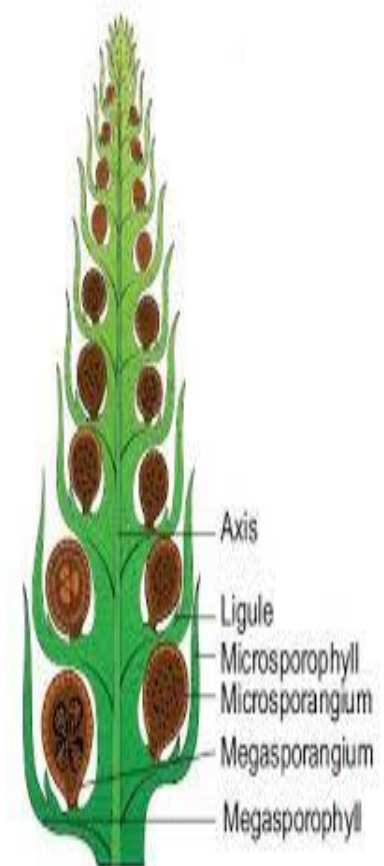
# REPRODUCTION

- Sporophytes procreate by use of spores that are generated inside sporangia.
- Sporangia are carried either on the leaves (foliar) or in the axils of the leaves in certain pteridophytes, while in others they develop on stems (i.e., cauline in origin).



# SPOROPHYLLS

- Sporophytes procreate by producing spores within sporangia.
- Sporangia in certain pteridophytes grow on stems, meaning they are cauline in origin, however in other pteridophytes, they are carried in the axils of the leaves or on the leaves themselves (foliar).
- Sporophylls are the leaves that contain sporangia. The sporophylls of a plant, like ferns, can be widely dispersed.
- alternatively they might be grouped in certain regions and formations known as cones or strobili (such as Selaginella, Equisetum).



a) L.S. of cone

# SPOROCARP

Sporangia are generated inside specialised structures called sporocarps in some pteridophytes (e.g., Marsilea, Salvinia and Azolla).



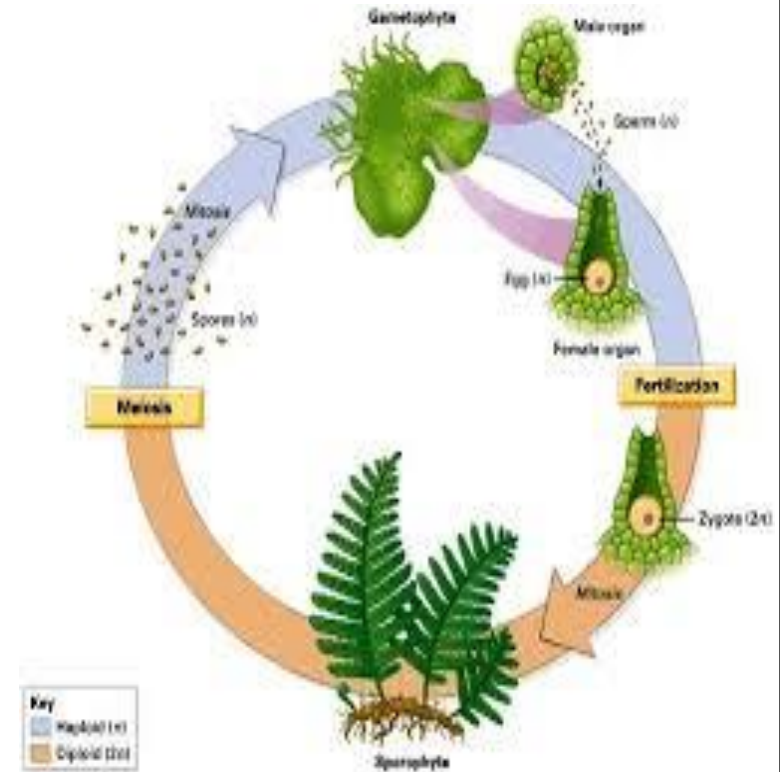
# TYPES

- Sporangia can develop in two ways: either as leptosporangiate (like Marsilea) or eusporangiate (like Selaginella and Equisetum).
- The sporophyte plant can be heterosporous (like Selaginella, Isoetes, and Marsilea) or homosporous (like Lycopodium, Dryopteris).



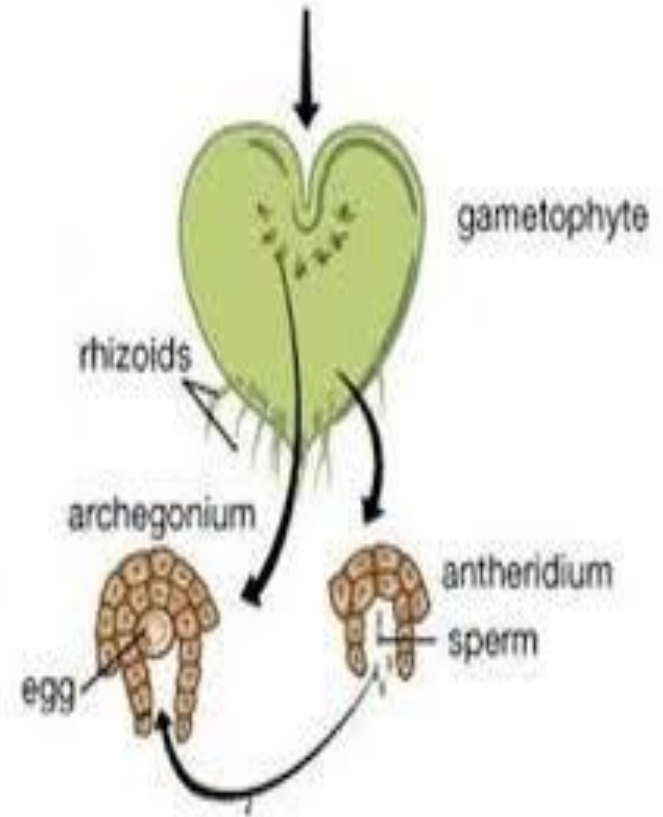
# THE GAMETOPHYTE

- Sporangia can develop into leptosporangiate (Marsilea) or eusporangiate (Selaginella, Equisetum, etc.) organisms.
- The sporophyte plant can be heterosporous (Selaginella, Isoetes, Marsilea) or homosporous (Lycopodium, Dryopteris, etc.).



# SEX - ORGANS

- Oogamous sexual reproduction occurs.
- Antheridia and archegonia, the sex organs, are carried by the gametophyte or prothallus. Typically, gametophytes derived from homosporous species are monoecious, meaning they bear both antheridia and archegonia on the same prothallus or gametophyte.
- The gametophytes that result from heterosporous development are dioecious, meaning that separate male and female gametophytes arise from the antheridia and archegonia.



# THE ANTHERIDIA

- The gametophyte may have the antheridia embedded in it or projecting from it. While projecting antheridia are typically seen in leptosporangiate ferns, embedded antheridia are typically found in eusporangiate pteridophytes.
- The mature antheridium is spherical in shape and is made up of a high number of androcytes inside of an outer sterile wall. One motile antherozoid is produced from each androcyte during metamorphosis.

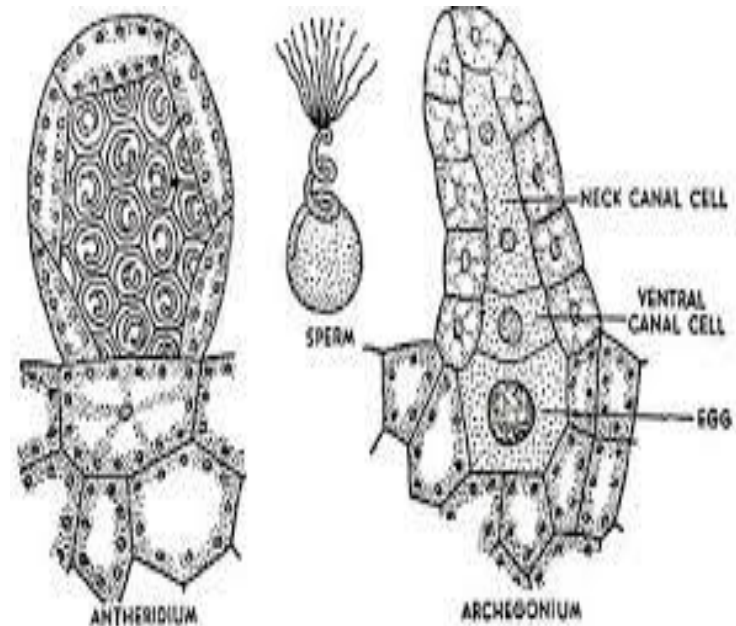


Fig. 213. Antheridium and archegonium of fern.

# THE ARCHEGONIA

Flask-shaped archegonia are present. Every archegonium is made up of a short neck, the venter, and an implanted, enlarged basal section.

When the archegonium reaches maturity, its apical cells split off and the cells in the neck canal fall apart, creating a channel that antherozoids can use to get to the egg.

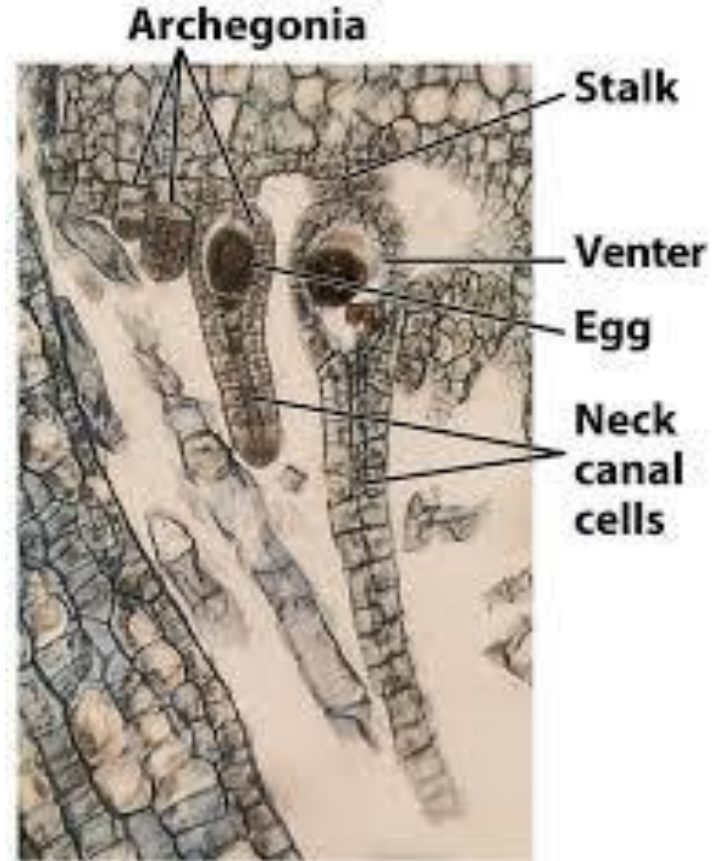


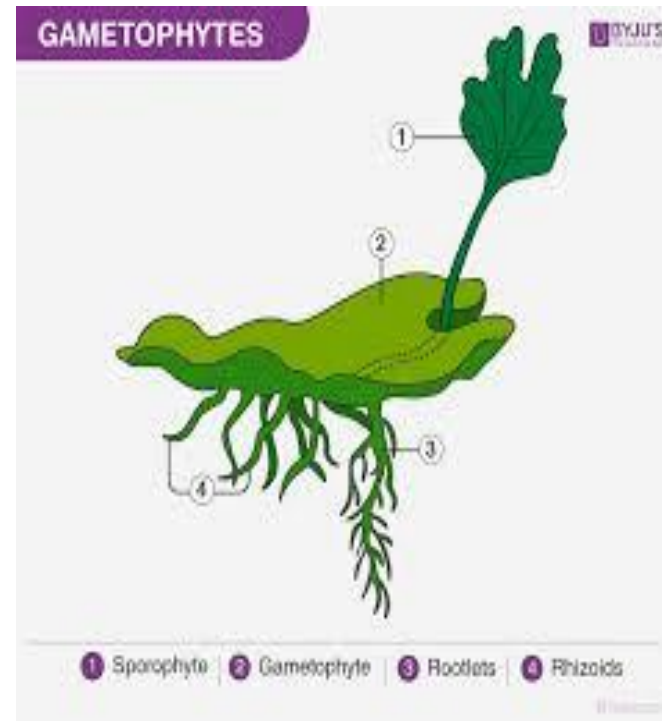
Figure 16-1b  
Biology of Plants, Seventh Edition  
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# FERTILIZATION

- Water is the means via which fertilisation is achieved in every instance.
- Water is necessary for antheridia to dehisce, antherozoids to be released, antherozoids to travel from antheridia to archegonia, archegonia to mature, and syngamy to occur.
- The first cell of the sporophytic generation is the diploid zygote, which is created when the haploid antherozoid and haploid egg combine.

# THE EMBRYO (THE YOUNG SPOROPHYTE)

- Until it grows its own stem, roots, and leaves, the young parasitizes the gametophyte with the help of a foot and feeds off of it.
- Only in its early stages is the sporophyte dependent on the gametophyte.



THANKS