

Introduction

CHAPTER 1

The division Pteridophyta comprises a large group of autophytic green plants and forms one of the four main divisions of the plant kingdom. Systematically, the division Pteridophyta occupies a position between the division Bryophyta and the division Spermatophyta (= *Phanerogamea*) as the pteridophytes have some similarities with the bryophytes in one hand and to the spermatophytes on the other. Pteridophytes include plants which are commonly called ferns, club mosses, horsetail etc.—these plants are widely distributed both in tropical and temperate regions of the world.

A. Characters of Pteridophyta resembling Bryophyta :

1. In both Bryophyta and Pteridophyta, well developed multicellular archegonium (female reproductive organ) having a single ovum or egg and a protective layer of sterile investing cells (jacket) is present. Male reproductive organ is the antheridium ; it also consists of a single layer of sterile jacket cells enclosing a mass of antherozoid (sperm) mother cells *i.e.* androcytes, each of which gives rise to a single ciliated sperm or antherozoid.
2. The opening of mature sex organs and the process of fertilization takes place in both the cases in presence of water.
3. Distinct alternation of two generations (*i.e.*, gametophytic and sporophytic) in regular succession following one another is present in the life history of both bryophytes and pteridophytes.
4. The origin and the formation of spores from spore mother cells (produced from sporogenous tissue) in both the cases are the same.

B. Differences from Bryophyta :

1. In Bryophyta, the sporophytes are leafless and *dependent* on gametophytes for supply of water and liquid food as absorbing organs like roots, rhizoids etc. are absent in the sporophytes of bryophytes—vascular tissue differentiation is also absent. In Pteridophyta, the sporophytes are leafy and independent of the gametophyte (refer point no. 1, D).
2. Plant body represents gametophytic generation which shows no vascular tissue differentiation. (For Pteridophyta refer point no. 1, C).

C. Characters of Pteridophyta resembling Spermatophyta (Gymnosperms) :

1. In their external morphology, *i.e.* plants are differentiated into root, stem and leaves. Plant body represents the sporophyte, there is regular alternation of sporophytic and the gametophytic generations.
2. In both, sporophytes are independent at maturity and larger than the gametophytes. Gametophytes are dependent, very much reduced and developed within the spore wall.
3. In the structure of vascular tissues (xylem and phloem). Xylem in both the groups consists of tracheids and xylem parenchyma only with no trachea ; the phloem is without companion cells.
4. Leaves are large and compound (*Cycas* and true ferns), ptyxis is circinate. Also in having mesarch or concentric vascular bundles of leaves.
5. In being heterosporous condition, and in the arrangement of sporangia in sori (as in true ferns and *Cycas*).

6. In having ciliated sperms (*Cycas*, *Ginkgo*).
7. In the retention of the megaspore within the megasporangium ; in gymnosperms it is a permanent feature and hence seed is formed. In pteridophytes e.g. *Selaginella* megaspore is retained within the megasporangium in the early stages only, hence seed is not developed.
8. In the development of the embryo and the formation of a suspensor e.g. *Selaginella*.

... features of Pteridophyta :