

The name of the module is general characteristics of Pteridophytes.

Myself, Miss Prachi Vernekar, Assistant professor, Government College of Arts, Science and commerce, sanquelim, Goa.

In this module we are going to deal with introduction to Pteridophytes and also general characters of Pteridophytes.

At the end of this module you will be able to Explain in general the different characteristics of Pteridophytes.

The Pteridophytes occupy the intermediate position in between the bryophytes on one hand and the phanerogams on the other.

They possess certain combinations of major characters which are not found in bryophytes or in phanerogams.

The most characteristic feature of the pteridophyte is the presence of independent gametophyte and sporophyte at maturity.

The meaning of the term Pteridophytes is Pteron means feathers, and phyton means plants.

That means this plants resembles to that of the feathers.

Pteridophytes are also known as vascular cryptogams is because of the presence of well developed vascular systems and they do not produce any flowers and seeds.

The Pteridophytes comprises over 300 genera and about 12,000 species.

They are spore bearing vascular plants and distinguished from other cryptogams by the possession of vascular tissues: xylem and phloem.

All pteridophytes have a sporophytic plant body rather than gametophytic.

The sporophytic plant body is composed of roots, stems and leaves.

Moving on to the general characteristics of the Pteridophytes,

The plants vary from small sized annuals (*Azolla*, *Salvinia*) to large tree like perennials (*Angiopteris*).

The small sized annuals includes a *Azolla* and *Salvinia* and the large tree like perennials includes *Angiopteris*.

The images of *Azolla*, *Angiopteris* are shown on the slide.

The second character is habitat.

They occur in variety of habitats. Mostly they are terrestrial plants, grow well in abundant moisture and shaded places. Some grow in xeric conditions, in aquatic environments, while some are epiphytic in nature.

The next character is plant body.

Plant body is sporophytic in all the pteridophytes. The sporophyte develops from the zygote. Most of the pteridophytes have herbaceous stem, except some woody ferns. The sporophytic plant body is composed of roots, stem and leaves. The primitive members lack true roots and well developed leaves.

Primary roots are short lived and are soon replaced by adventitious roots.

Branching in case of pteridophytes stem is dichotomous type while it is monopodial in other.

The 4th character is leaves

The sporophyte plant bears two types of leaves.

The first one is microphyllus and the other is macrophyllus.

The Microphyllus leaves are simple, small, and have a single central vein, as you can see in the picture given.

Macrophyllus leaves are compound, large sized, supplied with vascular bundles.

The next character is Vascular system.

All the vegetative organs have well developed vascular system.

The vascular system of pteridophytes is composed of xylem and phloem.

Xylem is composed of tracheids and xylem parenchyma.

Phloem is composed of sieve tubes and phloem parenchyma. The phloem lacks companion cells.

Secondary growth does not take place in living pteridophytes because of the absence of cambium.

Moving on to the next character, that is, reproduction.

The sporophytic plant reproduces asexually by spores. Spores are produced in sporangia. The leaf bearing sporangia is called sporophyll.

The sporophyll which bears microspore is called as microsporophyll and the sporophyll which bears megaspore is called as megasporophyll.

The image which is shown on the screen is of *Selaginella* strobilus, which shows the presence of micro spores in the microsporangia which are present on the microsporophyll.

And on the other side the presence of macrospores in the macrosporangia which are present on the macrosporophyll.

The development of sporangia is of two fundamental types.

The first one is Eusporangiate type and the other is Leptosporangiate type.

In case of Eusporangiate type the sporangium develops from group of sporangial initial cells.

In case of leptosporangiate type, the sporangium develops from single sporangial initial cell.

The spores which are produced in the pteridophytes are usually of two different types.

The first one is homosporous and the other is heterosporous.

In case of homosporous, the plant produces only single type of the spores.

In case of Heterosporous, plant usually produces two types of spores.

The smaller sized spore is called as microspore which is present in the microsporangia and the larger sized spores are called as megaspores which are present in megasporangium.

The next character is gametophyte.

the spores germinate to produce the haploid gametophytes or prothalli. The gametophytes are usually small and insignificant structure. The sporophyte is the dominant part of the life cycle while the gametophyte is much reduced.

in the given picture, you can see the formation of the gametophyte from the spore and from the gametophyte the sporophytic plant body is developed.

Moving on to the next character that is the sex organs,

The gametophyte or prothallus bear sex organs, antheridia is the male sex organ and archegonia is the female sex organ. The gametophyte which develops from the homospore is called as monoecious, that is both sex organs antheridia and archegonia on same thallus.

The gametophyte, which is developed from heterospore is called as dioecious, that is both the male and the female sex organ that is antheridia and archegonia are developed onto the different prothallus.

Let us know about the structure of antheridia in details

Antheridia are embedded either wholly or partially in the tissues of the gametophyte, or they are projected from prothallus.

Each antheridium is a globular structure and is composed of an outer sterile wall and inner a large number of androcytes.

Each androcyte gives rise to a single biflagellated or multiflagellated motile antherozoid.

Moving on to the structure of archegonia,

Each archegonium is flask shaped structure and is composed of a basal swollen venter and a short narrow terminal neck.

The venter lies embedded in the tissue of the prothallus.

The venter encloses an egg.

Fertilization takes place in the venter of archegonium, water is necessary during the process of fertilization for the male gamete to travel to the archegonia.

The male gamete fuses with the egg to form the zygote.

The next character is formation of the embryo that is the new sporophyte.

The zygote divides repeatedly to form a new sporophyte.

The basal half forms foot and root and the apical half forms the shoot.

The sporophyte is dependent on the gametophyte only during its early stages. It develops into stem, roots and leaves.

Here are the references.