

TRACHEOPHYTES

VASCULAR TISSUES

Tracheophytes form a large and diverse group of the present day land plants. They are called vascular plants because of the presence of vascular tissues. The vascular systems facilitate the transport of water and nutrients to all parts of the plant.

TRACHEIDS Koracademy.com

They are called tracheophytes because all of them have cells called Tracheids. Tracheids are water-conducting cells of xylem.

GENERATION

In tracheophytes the sporophytic generation is dominant and the gametophyte small, reduced and short lived.

SUCCESSFUL LAND PLANTS

Tracheophytes include most of the dominant land plants. They form successful

group of land plants because they can adapt themselves even to rough land as well. They can save themselves from high temperature by transpiration and can gain a large height without facing any problem of water supply.

SUB-DIVISIONS OF ~~PTERIDOPHYTES~~ TRACHEOPHYTES

Vascular plants are divided into two major sub-divisions namely:

1. Lower Vascular plants (~~Tracheophytes~~ Pteridophytes)
2. Higher Vascular plants (Spermatophytes)

1. LOWER VASCULAR PLANTS

In lower vascular plants seeds are not produced. They reproduce by spores e.g. Rhynia, Psilotum, club mosses, horsetails and ferns.

2. HIGHER VASCULAR PLANTS

The higher vascular plants are seed producing plants i.e. gymnosperms and angiosperms.

SUB-PHYLA

The phylum tracheophyta is further divided into the following four sub-divisions or sub-phyla, or major groups:

1. Sub-Phylum Psilopsida
2. Sub-Phylum Lycopsidea
3. Sub-Phylum Sphenopsida
4. Sub-Phylum Pteropsida

1. SUB-PHYLUM PSILOPSIDA

OLDEST GROUP

These are the oldest known vascular plants. Most of them have become extinct (e.g. Rhynia, Horneophyton). Only two living ^{genera} ~~species~~, Psilotum and Tmesipteris, are now available.

These are the ^{the oldest group of} most primitive rootless, leafless vascular plants.

SPOROPHYTE BODY

The sporophyte body is very simple and shows little organ differentiation.

STEM

The stem is differentiated into an underground rhizome and an aerial part.

The upright stem shows dichotomous or ~~branched~~ forked (Y-shaped) branching. The stem is either naked or have small

spirally arranged leaves which carry out photosynthesis.

RHIZOME

The rhizome grows horizontally in soil and may bear rhizoids but no roots.

SPORANGIA

The sperms are found in the sporangia. Sporangia are directly borne on the stem (i.e. cauline). (In book: Sporangia are produced at the tip of the branches)

EXAMPLES

Examples of Psilopsida are Rhynia, Cooksonia, Psilophyton (Psilopsidom), Psilotum and Tmesipteris.

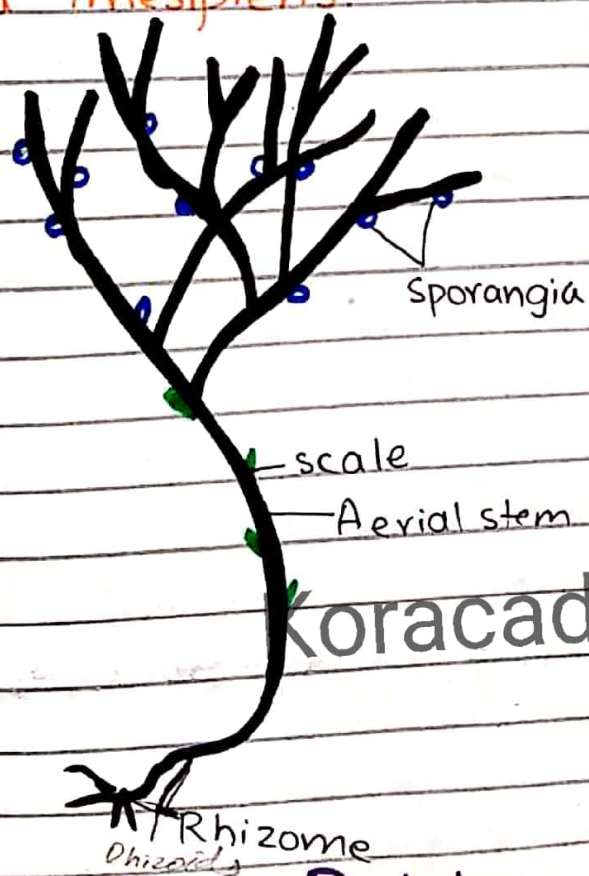


Fig: Whisk Fern, Psilotum

2. SUB-PHYLUM LYCOPSIDA (CLUBMOSS)

GENERA

Lycopsidea include both the living and fossil genera. The living genera are Lycopodium, Selaginella, Isoetes and Phylloglossum. The fossil genera are Lepidodendron and Sigillaria etc.

SPOROPHYTES

The plants of lycopsidea are sporophytes, differentiated into roots, stem and true leaves.

LEAVES

The leaves are small, simple and are called microphyllous leaves. Microphyllous leaves are small having a single unbranched vein in the midrib region. The leaves usually densely surround the stem.

BRANCHING

Branching is mostly dichotomous.

GAMETOPHYTES

The gametophyte of lycopsidea is large, underground and independent.

SPORANGIA

The spores are formed in the sporangia. The sporangia develop singly on the upper side of the sporophylls. The sporophylls usually form strobili. At the base of sporophylls is present a small outgrowth called ligule to retain moisture. In some Lycopsidea such as *Lycopodium*, the ligule is absent.

CLUB MOSSES

Lycopsidea are commonly called club mosses. They are not mosses but called club mosses bcz their strobili are club shaped and their leaves resemble the mosses. One example is *Selaginella*.

EXAMPLE: SELAGINELLA

Selaginella comprises over three hundred species, most of which are tropical and grow abundantly on hills.

Selaginella grows in damp places in the hills and in the plains. It is a slender, much-branched plant, either creeping on the wall or on the ground.

LEAVES

The slender stem bears four rows of leaves - two rows of small leaves on the

upper surface and two rows of larger leaves at the two sides.

RHIZOPHORE

A long slender, root-like organ is given off from the stem which is known as the rhizophore (root-bearer).

SPOROPHYTE

Selaginella plant is the sporophyte. It bears two kinds of sporophylls - microsporophylls and megasporophylls. Both kinds of sporophylls may occur together in the same cone, or they may be borne in two separate cones either on the same plant or on two separate plants. All the sporophylls are nearly of equal size and spirally arranged, usually in four rows, round the apex of the reproductive shoot, in the form of a more or less distinct four-angled cone, called the sporangiferous spike or strobilus. The sporophylls are similar to the vegetative leaves in appearance, but are smaller in size.

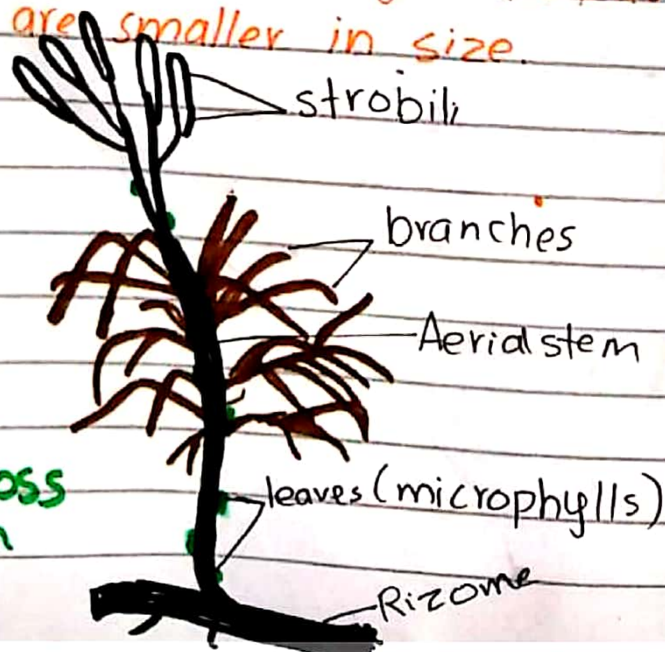


Fig: Club Moss
Lycopodium

3. SUB-PHYLUM SPHENOPSIDA (HORSE TAILS)

This group includes both extinct (e.g. Calamites) and living plants e.g. Equisetum, the only surviving genus.

HEIGHT

In this group, the individual plant is seldom more than a few feet high.

SPOROPHYTE

The plant is sporophyte, distinguished into roots, stem and leaves.

STEM / ARTHROPHYTES

The stem is not smooth but has ridges, furrows or ribs, and divided into joints, nodes and internodes. Therefore these plants are also called arthropytes. Called arthropytes bc they have jointed stem.

LEAVES

The leaves are reduced to scales and arranged into whorls at each node. Leaves are microphyllous and scale like. Leaves are sessile (without stalk) and arise from node.

ADVENTITIOUS ROOTS

The underground stem or

rhizome branches frequently and is anchored by adventitious roots usually formed at the node.

BRANCHES

The upright green branches are numerous.

SPORANGIA

Special lateral appendages called sporangiophores are developed which bear sporangia. Spores are produced in each sporangium. Sporangia are closely packed to form terminal cone or strobilus.

GAMETOPHYTE

The mature gametophyte body is more or less flattened, ^{photosynthetic} irregularly shaped structure called a 'Prothallus'. It is held to substrate by slender root like rhizoids. The antheridia and archegonia are borne on the upper surface. There is a distinct alternation of generation.



Fig: Horsetail,
Equisetum

4. SUB-PHYLLUM PTEROPSIDA (FERNS AND SEED PLANTS)

Sub Phylum Pteropsida constitutes a group of best known plants on the earth. Pteropsida is a heterogenous group, consisting of three classes namely:

1. Filicinae
2. Gymnospermae
3. Angiospermae

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