

## On Line study material (e-content)

College: S.S. College, Tehriabad

Department: Botany

Subject: - Gymnosperm

Topic: - Morphology of Pinus

Medium of study: - What's App &  
college web site

Date: -

Time: - 11.00-12.00

Teacher's name: Dr. S.S. Sharma

Class: Biotech PI - Sub.

B.Sc (Bot) PII - Hous.

### PINUS PLANT MORPHOLOGY

Pinus is a large, perennial, evergreen, resinous plant growing 3-80m. (10-260 ft) tall. It is a long lived (100-1000 years) and the oldest extant conifer genera. Its branches grow spirally and thus, the plant gives the appearance of a conical or pyramidal structure.

\* Structure: - Plant body is differentiated into roots, stems and acicular (needle like) leaves.

#### (i) Root -

A tap root with few root hairs is present but it disappears soon. Later on many lateral roots develop for absorption and anchorage. The ultimate branches of these roots remain covered by 9 layers of fungal hyphae called "ectotrophic mycorrhiza". Small pine trees have root length of 4-15 feet while roots of larger pines can extend up to a length of 35-75 feet deep.

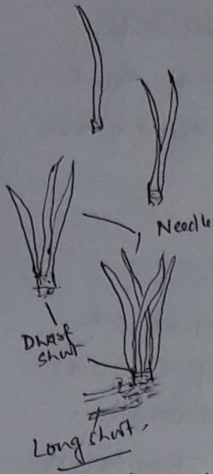
#### (ii) Stem:-

The stem is cylindrical and erect and remains covered with bark. Branching is monopodial. Two types of branches are found in Pinus, these are →

PRO.

⑩

in different species. on the basis of their number they are called —



- a) Unifoliar (1-needle) → In Pinus monophylla
- b) Bifoliar (2-needles) → In Pinus sylvestris
- c) Trifoliar (3-needles) → In P. Gerardiana
- d) Quadri-foliar (4-needles) → In P. quadri-folia
- e) Pentafoliar (5-needles) → In P. Wallichiana

### \* Anatomy / Internal Structure of Root:-

#### ① T.S. Young Root:-

- i) The outermost layer is <sup>thick walled</sup> epiblema with many root hairs.
- ii) Epiblema is followed by many layers of <sup>of</sup> cortex. Cortex is made up of parenchymatous cells.
- iii) Inner of the cortex is a layer of endodermis followed by many layers of pericycle.
- iv) Vascular bundles are radially arranged and are diarch to tetrarch with exarch <sup>arrangement</sup> of protoxylem.
- v) Protoxylem is 'Y' shaped and in between each bifurcation <sup>are in canal</sup> is present. Vessels are absent from the xylem.
- vi) Phloem is situated alternate to the protoxylem. Companion cells are absent from phloem.
- vii) Pith is poorly developed or even absent.

(a) Long shoots:-

(15)

They are also known as "branches of unlimited growth". They contain apical bud and grow indefinitely. Many scaly leaves are present on the long shoot.

(b) Dwarf shoots:-

They are also called as "branches of limited growth". They are devoid of apical buds and thus are limited in their growth. Dwarf shoots arise on the long shoots in the axil of scaly leaves. They are about 1-2 cm long.

A dwarf shoot has two scaly leaves called prophylls, followed by 5-13 cataphylls arranged in  $2/5$  phyllotaxy and generally 1-5 needles. A dwarf shoot with its foliage leaves is called "Spur".

(iii) Leaves:-

In pinus leaves are dimorphic. These are -

(a) Scaly leaves:- These are thin, brown, coloured, non-photosynthetic and scale like. They develop on long and dwarf shoots and remain arranged spirally. They are protective in function.

(b) Foliage leaves:- They are found at the apex of the dwarf shoots only. They are green, photosynthetic, needle like and found in cluster called "fascicles". In fascicle, the number of needle varies from 1-7 (generally 1-5)

→ P.T.O.