ECOLOGICAL ANATOMY

[T.Y.B.Sc. SEM-VI; PAPER-II; UNIT-II]

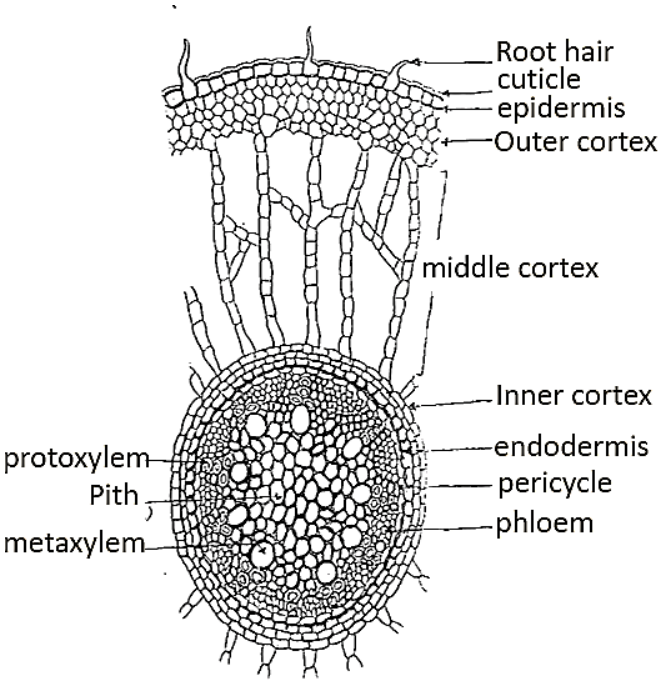
HYGROPHYTES

Plants of this group grow in shallow water with their basal parts submerged in water saturated and muddy soil and the shoots emerge well above water surface. They are also called emergent hydrophytes.

- Hygrophytes are adapted for aqueous as well as aerial life (eg. *Typha, Jussian, Marsilea*).
- Hygrophytes show internally presence of large air cavities characteristic of hydrophyte.
- Leaves show presence of cuticle, hypodermal sclerenchyma and well developed mechanical system (I-girders).
- It thus shows characteristics of hydrophytes as well as xerophytes.

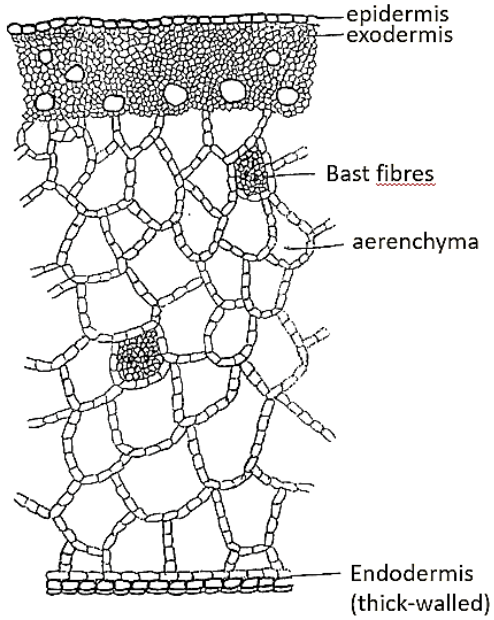
Ecological anatomy of hygrophytes:

(1) Internal structure of *Typha* root:



- Cuticle thin and poorly developed.
- Epidermis single-layered made up of thin-walled parenchymatous cells. Unicellular root hair present.
- Cortex well-developed, thin-walled, outer cortex parenchymatous, middle cortex occupied by well-developed prominent air spaces – which offers resistance to bending stress, increases buoyancy and allows rapid gaseous exchange. Inner cortex also parenchymatous.
- Vascular tissues comparatively differentiated to some extent. Protoxylem and metaxylem elements seen with phloem.
- Mechanical tissues represented by sclerenchymatous pith.

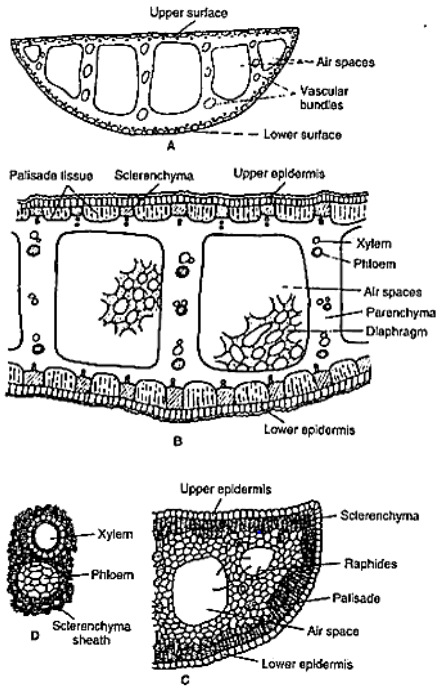
(2) Internal structure of *Typha* stem:



- Cuticle mostly absent.
- Epidermis usually single-layered made up of thin-walled parenchymatous cells.
- Exodermis few-layered with thin to thick-walled cells.
- A large layer of aerenchyma cells present, characteristic of all types of aquatic and semi-aquatic plants. Aerenchyma shows the presence of bast fibres for internal mechanical support.

- Endodermis is thick-walled, again for mechanical support.
- Vascular bundles differentiated, like in the roots.
- Pith is sclerenchymatous.

(3) Internal structure of *Typha* leaf:



A – T.S. of *Typha* leaf (diagrammatic); B – T.S. in detail;
C – Detail of corner of leaf; D – Single vascular bundle

- Mainly traversed by large air spaces.
- Epidermis single layered compactly arranged with thin cuticle.
- Palisade tissue interspersed with sclerenchyma tissue for mechanical strength.
- Large air spaces show the presence of raphides as cell inclusions.
- Vascular bundles present between the air spaces. Each vascular bundle consists of a large xylem towards the upper side and a patch of phloem on the lower side. Sclerenchyma sheath surrounds the vascular bundles, adding to the mechanical tissues.