

Quadrant II – Transcript and Related Materials

Programme: Bachelor of Science (Second Year)

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Paper Title: Plant Anatomy and Embryology.

Unit 4: Adaptations and protective systems.

Module Name: Adaptations in Halophytes.

Module No: 32

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Notes

ADAPTATION IN HALOPHYTES

- Plants that grow in salty environment/saline environments are called Halophiles. This plant develops numerous adaptations to salt stress. egs. Saline ponds, sea shores, islands, deltas, marshy areas, estuaries.
- Dormant species of salt tolerant plants include. *Rhizophora*, *Avicennia*, *Soneratia*, *Acanthus*, *Ceriops*, *Excoecaria* etc.

MORPHOLOGICAL ADAPTATION OF HALOPHYTES

1. Halophytes show a diversity of root system they include
 - Stilt root/prop root- these roots grow obliquely downwards from the main stem.
 - Pneumatophores- these are special type of roots which shows negative geotropism
 - Buttress root
2. Stem in halophyte plants are Succulent and Sometimes shows the

presence of lenticels

3. Leaves of halophytic plants are Thick, Succulent and Leathery.
4. The fruit is light in weight and exhibits vivipary.

Vivipary: - Vivipary is the phenomenon of germination of seeds inside the fruit while it is still attached to the parent tree. In mangroves, the seedling germinates and grows under its own energy while still attached to its parent.

ANATOMICAL ADAPTATION HALOPHYTE (LEAF)

1. Cuticle
2. Epidermal cells thick and contain calcium oxalate crystals.
3. Below the upper epidermis several layers of thin walled cells filled with water, oil and tannins.
4. Mesophyll is well differentiated.
5. Sunken stomata.
6. Upper epidermis- water storage tissues , Salt glands.
7. Lower epidermis (*Avicennia*- with special T shaped hair)

ANATOMICAL ADAPTATION HALOPHYTE (STEM)

1. Thick cuticle
2. Epidermal cells filled with oil, tannin.
3. Hypodermis several layered,thick
4. Primary cortex - tannin and oil, calcium oxalate crystals, H- shaped heavily thickened spicules.
5. Inner cortex- thick-walled cells, sclereids.
6. Pericycle- several layered, sclerenchymatous.
7. Vascular tissues are well developed.
8. Pith - lacunae and H shaped spicules.

ANATOMICAL ADAPTATION HALOPHYTE (ROOT)

- **Cork**

1. Cork remains absent in young roots.
2. 4-6 layers compactly arranged suberised cells.
3. The cork cells are dead cells.
4. Underlying the cork cells is present one or two layers of cork cambium.
5. The continuity of the cork layer is broken at places by lenticels.

- **Cortex-** well-developed, large number of air chambers.

- **Endodermis-** well developed, prominent barrel shaped cells arranged in a single layer.

- **Pericycle-** multilayered and lies beneath the endodermis.

- **Vascular system-** conjoint, collateral and open. It consists of phloem (towards the pericycle) followed by layer of cambium and a layer of xylem. Root shows presence of endarch type of xylem.

- **Pith-** rounded cells, loosely arranged

FEATURES OF ECOLOGICAL INTEREST

The pneumatophores present an interesting case of root anatomy:

1. Well-developed cork region is present which communicates with the outer atmosphere through lenticels.
2. The cortex is composed of large air chambers which help it to remain above the water surface
3. Radially elongated thickened cells in the cortex are found which give mechanical strength to the roots.
4. Sclerenchymatous pericycle also aids in giving mechanical strength.
5. Pith composed of loosely arranged parenchymatous cells, enclosing intercellular spaces, helps in keeping the roots afloat.