Hydrophytes

Plants that grow in water or very wet places are called hydrophytes (hydro – water, phyton – plant). They may be submerged, partly submerged,floating or amphibious. Their structural adaptations are mainly due to the high water availability and deficient supply of oxygen. Their various adaptations are as follows :

i. The reduction of protective tissue (epidermis here is meant for absorption and not for protection)

ii. Reduction of supporting or mechanical tissue (e.g., lack of sclerenchyma)

iii. Reduction of conducting tissue (minimum development of vascular tissue)

iv. Reduction of absorbing tissue(Roots chiefly act as anchors, root hairs lacking)

v. Development of air chambers (aerenchyma) for aeration of internal tissues and buoyancy.

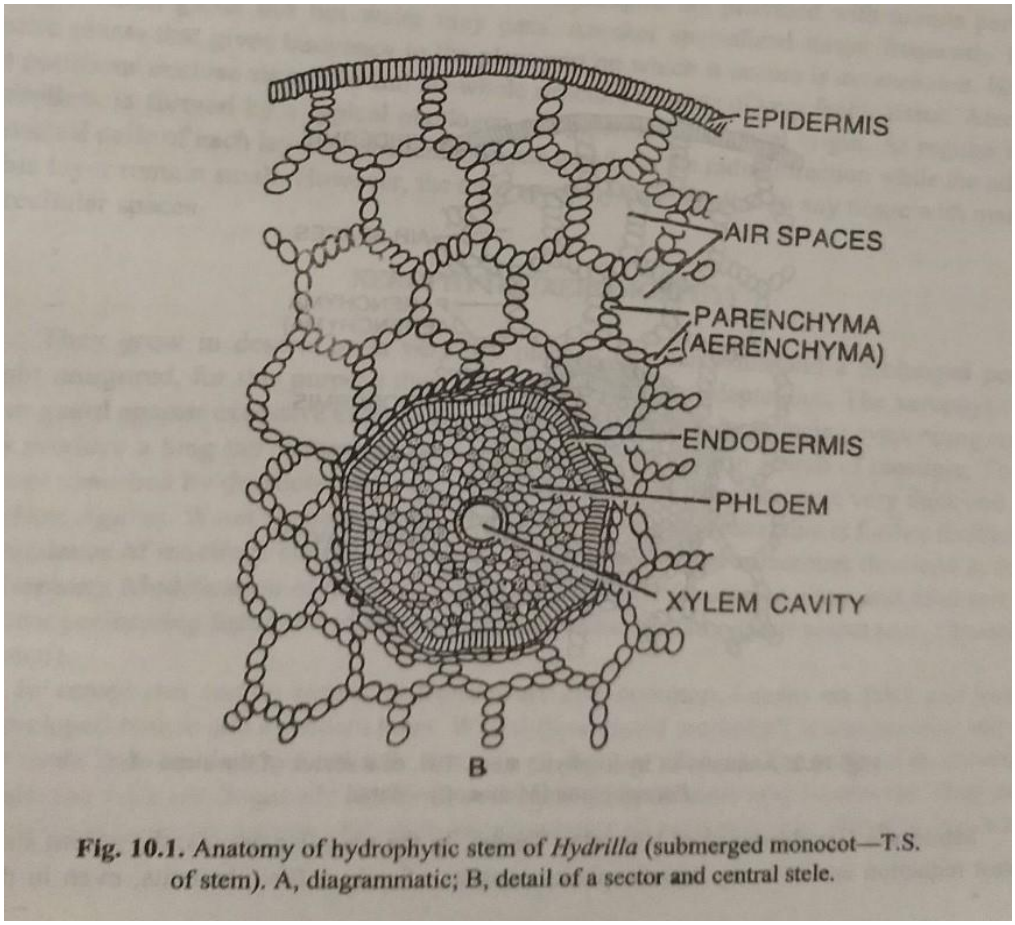

Fig. 10.1. Anatomy of hydrophytic stem of *Hydrilla* (submerged monocot—T.S. of stem). A, diagrammatic; B, detail of a sector and central stele.

Epidermis :

***** In aquatic plants, epidermis is not protective but absorbs gases and nutrients directly from water. Extremely thin cuticle and thin cellulose walls permits easy absorption from surrounding water.

* Epidermal cells of leaves generally contain chloroplast, especially when leaves are very thin. These chloroplasts utilize the weak light under water for photosynthesis.

* In submerged plants, stomata are not present and exchange of gases takes place directly through cell walls. Floating leaves of submerged plants have abundant stomata on the upper surface.

Lack of Sclerenchyma :

- Few or no sclerenchyma tissues in submerged plants. The water itself gives support to the plant.
- The strands of sclerenchyma occasionally occur, especially along leaf margins,and increases tensile strength.

Reduced vascular tissues :

- Xylem greatly reduced and in many aquatic plants consists of only a few elements.
- In some aquatic plants these are lacking and replaced by a well developed xylem lacunae in the position of xylem.
- These lacunae resemble typical air-chambers.
- In many aquatic plants, the phloem is fairly well developed as compared to the xylem.

Reduction of root system :

- Root system in hydrophytes is poorly developed and root hairs and root cap are absent.
- In some floating plants like Urticularia, Ceratophyllum, no roots are developed and in submerged plants such as Vallisneria, Hydrilla etc., water dissolved mineral salts and gases areabsorbedby theirwhole surface.
- In Pistia, Eichhornia, no root cap develops but root pocket is formed.

Development of air-chambers :

- The air-chambers filled with gases are commonly found in the leaves and stems of hydrophytes. The air chambers air chambers are large, usually regular intercellular spaces, e.g., Potamogeton.
- Air chambers provide buoyancy to the plant for floating.
- They also store air (oxygen and carbon dioxide). The carbon dioxide released in respiration are stored in these cavities for use in photosynthesis.
- The oxygen released in photosynthesis during daytime is similarly stored in them for respiration.
- Another specialized tissue frequently found in aquatic plants that gives buoyancy to the plant parts containing it is the aerenchyma.

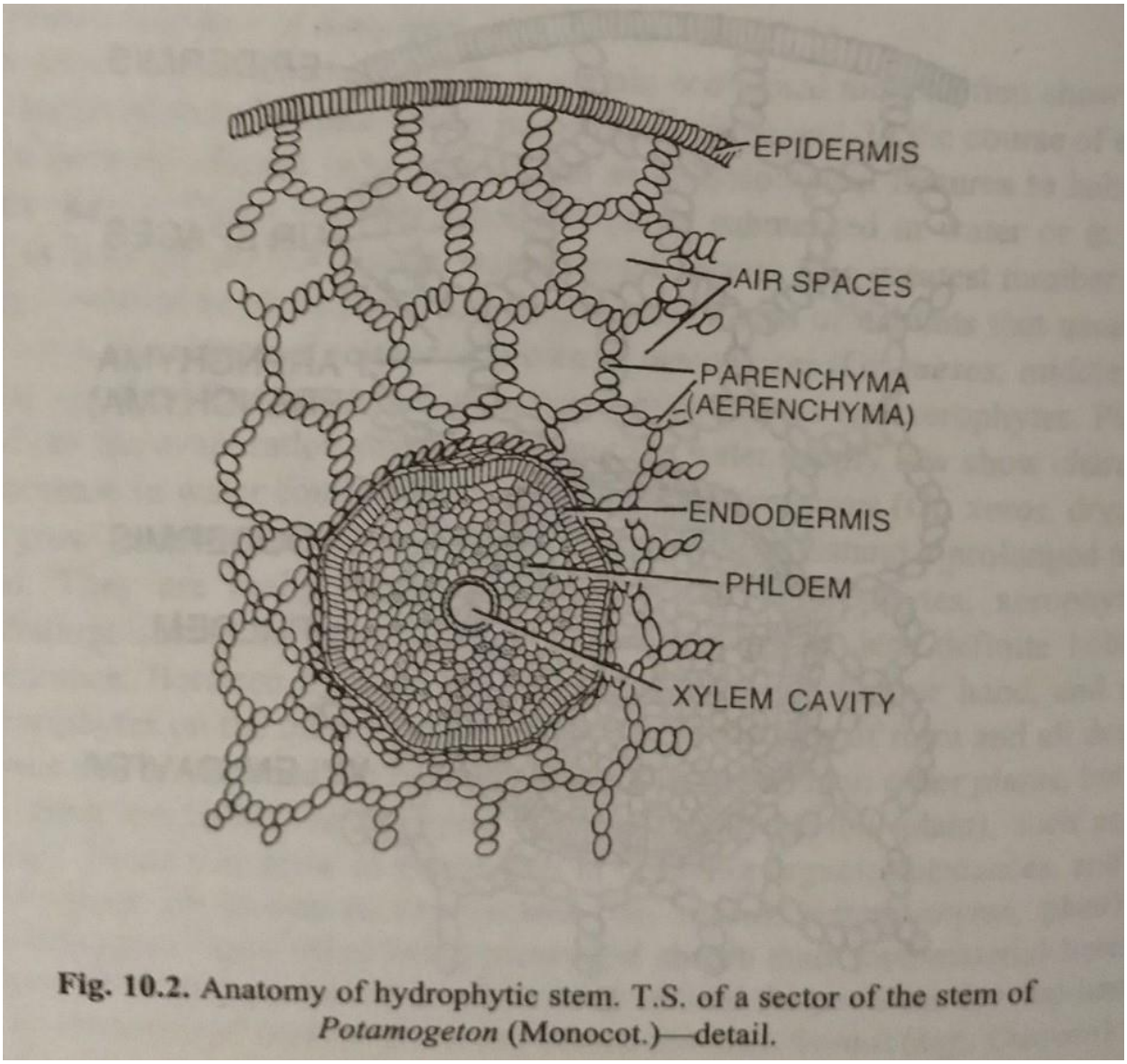

Fig. 10.2. Anatomy of hydrophytic stem. T.S. of a sector of the stem of *Potamogeton* (Monocot.)—detail.

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