TOPIC: MORPHOLOGY OF FLOWERING PLANTS-STEM AND LEAF

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THESTEM

- The stem is the ascending part of the axis bearing branches, leaves, flowers and fruits.
- It develops from the **plumule** of the embryo of a germinating seed.
- The stem bears nodes and internodes. The region of the stem where leaves are born are called nodes while internodes are the portions between two nodes.
- The stem bears buds, which may be terminal or axillary.
- The main functions of the stem are –
  - spreading out branches bearing leaves, flowers and fruits.
  - conducts water, minerals and photosynthates.
  - Some stems perform the function of storage of food, support, protection and of vegetative propagation.

Modifications of Stem

- **Modification for food storage –**

Underground stems of potato, ginger, turmeric, zaminkand, Colocasia are modified to store food in them. They also act as organs of perenation to tide over conditions unfavourable for growth.

- **Modification for support –**

  Stem tendrils which develop from axillary buds, are slender and spirally coiled and help plants to climb such as in gourds (cucumber, pumpkins, watermelon) and grapevines.

- **Modification for defense –**

  Axillary buds of stems may also get modified into woody, straight and pointed thorns. Thorns are found in many plants such as Citrus, Bougainvillea. They protect plants from browsing animals.

- **Modification for photosynthesis (phylloclade)–**

  Some plants of arid regions modify their stems into flattened (Opuntia), or fleshy cylindrical (Euphorbia) structures. They contain chlorophyll and carry out photosynthesis.

- **Modification for vegetative propagation –**

  Runner – Underground stems of some plants spread to new niches and when older parts die new plants are formed. e.g., grass and strawberry

  Stolon – In these plants a slender lateral branch arises from the base of the main axis and after growing aerially for some time arch downwards to touch the ground. e.g., mint and jasmine

  Offset – A lateral branch with short internodes and each node bearing a rosette of leaves and a tuft of roots is found in aquatic plants. e.g., Pistia and Eichhornia.

  Sucker – in these, the lateral branches originate from the basal and underground portion of the main stem, grow horizontally beneath the soil and then come out obliquely upward giving rise to leafy shoots. e.g., banana, pineapple and Chrysanthemum.

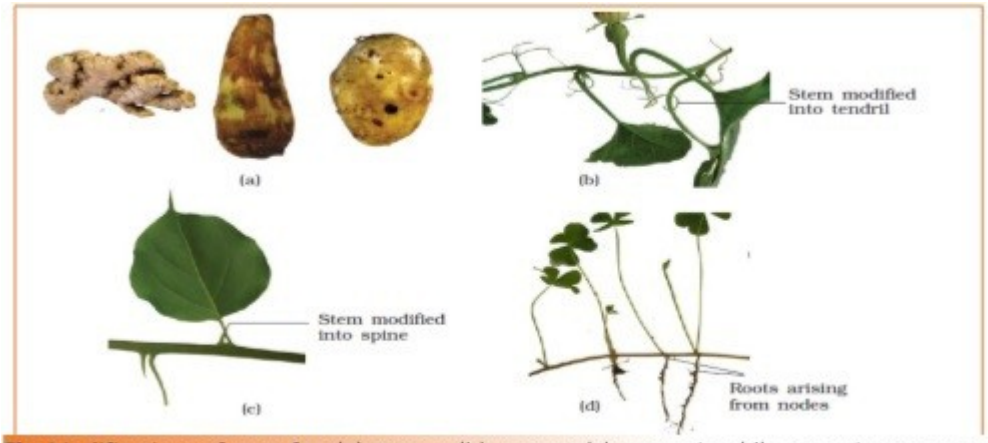

Fig: Modifications of stem for: (a) storage (b) support (c) protection (d) vegetative propagation

THE LEAF

- The leaf is a lateral, generally flattened structure borne on the stem.
- It develops exogenously at the node and bears a bud in its axil – the axillary bud, which later develops into a branch.
- Leaves originate from shoot apical meristems and are arranged in an acropetal order.
- They are the most important vegetative organs for photosynthesis.

Parts of leaf

A typical leaf consists of three main parts:

1. **Leaf base –** The leaf is attached to the stem by the leaf base and may bear two lateral small leaf like structures called **stipules**.

In monocotyledons, the leaf base expands into a sheath covering the stem partially or wholly – **Sheathing leaf base.**

In some leguminous plants the leaf base may become swollen – **Pulvinus leaf base.**

2. **Petiole –** The petiole helps hold the blade to light. Long thin flexible petioles allow leaf blades to flutter in wind, thereby cooling the leaf and bringing fresh air to leaf surface.
3. **Lamina –** The lamina or the leaf blade is the green expanded part of the leaf with veins and veinlets. There is, usually, a middle prominent vein, which is known as the midrib. Veins provide rigidity to the leaf blade and act as channels of transport for water, minerals and food materials.

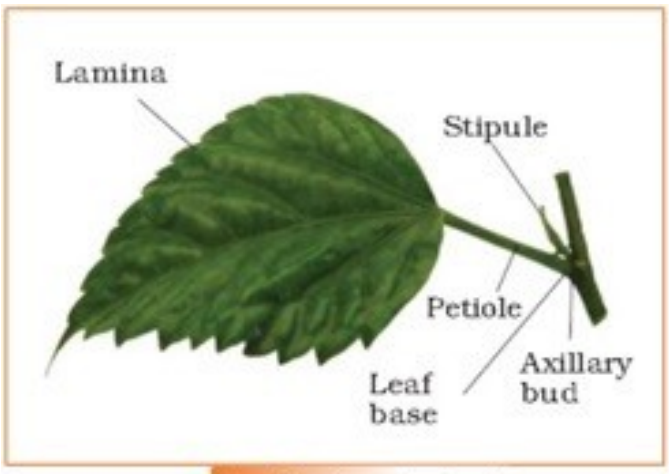

Fig: Parts of a leaf