Quadrant II – Transcript and Related Materials

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Unit: 01 -Morphology of Angiosperms

Module Name: Form of stem- Weak stem

Modification of stem

Module No: 06

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Notes

Stem:

Form of stem- Weak stem i) Prostrate weak stem ii) Climbing weak stem

Modification of stem – Phylloclade, Cladode, Bulbil.

Form of stem -Weak Stem

These stems are delicate, thin, soft and weak. They are unable stand erect and therefore, require a support. Weak stems grow prostrate on the ground or climb up on support as climbers and thus they are classified in to:
i) Prostrate weak stems and
ii) Climbing weak stems.

i) Prostrate Weak Stems

The weak trailing stems lying flat on the ground or may become buried in the top soil is called **Prostrate Weak Stems.** The prostrate branches of these plants bear adventitious roots and aerial branches at their respective nodes. These plants are usually known as **creepers**. They are of the following types:

1. Runner

It is a special narrow, green, above ground horizontal or prostrate branch which develop at the bases of erect shoot called **crown**. A number of runners arise from buds present in the axil of lower leaves on an erect shoot. They spread in different directions and ultimately bear new crowns and tufts of adventitious roots. Each runner has generally one or more nodes and long internodes. The nodes bear scale leaves and axillary buds. When older parts of the plant die, the branches separate from the parent plant and form independent plant.
e.g. *Cynodon dactylon* (Doob grass), *Centella asiatica* (Brahmi), *Oxalis minima*.

2. Sucker

It is a special non-green slender branch arising from the axillary buds of a plant present at the base of an erect shoot or crown. It grows horizontally in the soil and ultimately comes out to form a new aerial shoot or crown. Each sucker has one or more nodes with scale leaves and axillary buds. Adventitous roots develop from the lower side of the nodes. e.g., *Chrysanthemum sp*., *Mentha sp*. (Mint).

3. Stolon

It is a slender lateral branch which appear from the lower part of the main axis**.** This lateral branch grows aerially for some distance. Owing to its great length,arches or bends downwards. Its tip touchesthe soil and the terminal bud produce roots as well as a leafy shoot. e.g., *Jasminum spp.* (Jasmine), *Fragaria sp.* (Wild Strawberry), and Peppermint.

4. Offsets

It is a prostrate branch, but is shorter and thicker than the runner. It is usually found in the aquatic plants.The tip ends in a tuft of roots and a rosette of leaves. They are one internode long. e.g., *Pistia stratiotes* (Water Lettuce).

5. Trailers

The shoots trail or spread horizontally along the ground without rooting at intervals, e.g. *Boerhaavia diffusa* (Punarnava), *Convolvulus microphyllus*.

ii) Climbing Weak Stems

They are of the following type

1. Twinners

The stem is long, flexible and sensitive to the touch. It can coil around an upright support like a rope e.g., *Dolichos lablab* (Lablab), *Ipomoea spp*., and *Convolvulus arvensis*.

2. Lianas

They are thick, woody twinners in which the young stems are sensitive and flexible due to which it coils around the support.e.g. *Calicopteris floribunda Bauhinia vahli*, *Tinospora sp*., *Hiptage sp.*

3. Climbers

The stem is weak and flexible but is unable to coil around an upright support by itself. It requires the help of certain clasping or clinging structures.

Depending upon the type of clinging structures, the climbers are of three types:

(x) Root Climbers: The weak stem cling to the support by adventitious roots, e.g. *Piper betle* (Betel), *Pothos spp*.(Money plant).

(y) Tendril Climbers: Tendrils are green, thread like sensitive structures which are formed by the modification of stem or leaf or floral buds. These tendrils are slender and spirally coiled (spring like structures) can coil around a support and help the weak-stemmed shoots to climb up.

Tendrils may be modified stems (e.g. *Passiflora sp. and Cucurbita spp.*), floral buds (e.g. *Antigonon spp.*), leaf (*Lathyrus sp.)* or leaf part (e.g. *Gloriosa sp.*).

(z) Spine climbers: The climbing organs are spines. The curved spines help the plant to climb up a support by clinging to it. e.g. *Asparagus sp*.

Modification of stem

The stem may be modified to perform diverse functions according to specific requirements of the plant.

1. Phylloclade / Cladophyll

It is a green, fleshy, flattened or swollen cylindrical stem which takes the form and function of leaf. It contains chlorophyll and carries out the photosynthesis. It bears succession of nodes and internodes at long or short intervals. Phyllocaldes are found in xerophytic plants where the leaves grow either feably or fall of early or modified in to spines. eg. *Opuntia sp., Muehlenbeckia sp*. (Cocoloba).

2. Cladode

It is a special type of phylloclade with one or two internodes only. For example in *Asparagus sp.,* cladodes are needle like, slightly flattened green structures which appear in clusters in the axil of scaly leaf. Main stem bears leaf spines at its nodes. A scale leaf is found just above the

spine. Every branch on main stem bears only scale leaves. In the axil of scale leaves cluster of cladodes appear.

3. Bulbil

Bulbil is the modification of vegetative or floral bud. It is swollen due to storage of food. It can function as an organ of vegetative propagation. e.g. *Dioscorea bulbifera* . In *Agave sp.* and *Allium cepa* (onion), bulbils are found on inflorescence and represent the modified flowers.