**\*\*Life span**

Plants can be divided to many aspects according to their life cycle :-

1. Annual : A plant living and completing its life cycle in one growing season.
2. Biennial : A plant living for two seasons, growing vegetatively during the first and flowering during the second, like in *Daucus carota*.
3. Perennial : A plant living for more than 2 years and flowering several times during the life span. Perennials can be divided to :

## \*\*Plant habitat

It refers to the general environment where plant is growing, these include the following:

**1/ Terrestial:** Its growing on land like Bunium, it may be:-

A- Mesophyte : Aplant growing in normal soil.

B- Xerophyte : A plant growing in dry habitats.

C- Halophyte : A salt –adapted plant.

D- Succulent : A plant with fleshy stem like cacti or leaf like members of Aizoaceae.

**2/ Aquatic** : A plant growing in water, it may be :-

A/ Floating : Its occurring on water surface as in Lema.

B/ Submerged or emersed :- Its wholly under water as in Ceratophyllum.

C/ Emergent :- Its anchored at the bottom but with shoots exposed above water as in Typha and Phragmites.

## \*\*\*Vegetative organs

**\*\*\* Roots:**

They are plant organs that function in anchorage and absorption of water and minerals. Roots are found in all of the vascular land plants except for Psilotales. The first root to develop in a vascular plant is the **radicle** of the embryo.

\*\***Classification of roots according to origin:**-

**1/ Primary roots**: They developed from radicle as continues after embryo growth. This system is widely found in dicot. There are different types of primary roots:

A- Tap roots: In this type the primary root becomes dominant as in *Vicia faba* .

B- Storage roots : Taproots has become greatly thickened accumulating high energy compounds ( usually starch) as in carots.

**2/ Adventitious roots**: Roots that arise from a nonroot organ (stem or leaf). They could be in different kinds as following:

A- Fibrous roots : In this system the primary root soon withers after its production and group of thin roots almost equal in size and thickness will appear instead. This type is widely distributed in **monocots**.

B- Prop roots: They grow from the base of stem and function to further support of plant as in *Zea mays*.

C- Tuberous roots : Swallowen roots as food accumulating growing from stem nodes as they could be either on clusters as in *Dahlia* and sweet potato or separated as in *Bunium*.

D- Haustoria : Specialized roots that penetrate the tissues of the plant host as in *Cuscuta*

# \*\*\*\*Stems

They represent the main axes of plants, being distinguished into nodes and internodes, stem function both as supportive organs (supporting and bearing leaves and reproductive organs) and as conductive organs conducting both water /minerals and sugars through the vascular tissues.

Direction of stem growing or orientation of stem growing in higher

plants living usually in land and their stem can be divided either:

1. **Aerial stem:**

Stem is growing above ground and could be in number of directions as following:-

A- Erect stems: stems pointing upwards as in date palm.

B- Ascending stems : directed upward, with a divergence angle of 15°- 45°from upper axis( orientation) as in Nerium oleander.

C- Prostrate : the stem of these plants are adapted to lying flat on the ground but there is no rooting at nodes as in Tribulus and water melon.

D- Runner : a stem with long internode that runes on/or just below the surface of ground and terminating in new plantlet as in strawberry.

E- Twiners : a stem growing upward by helically twisting around supporting bodyas in *Convolvulus*.

**1-Subterranean stems** (underground): growing below the soil surface and specially modified :-

**A- Rhizome**: A horizontal fleshy underground stem with node and internodes, covering with scale leaves as in Ginger.

**B- Stem tuber**: they are swollen underground stems with reduced scale leaves and axillary buds as in potato.

**C- Corm** : thick fleshy shortened stems with storage function as in

Crocus.

**D- Bulb** : a reduced stem surrounding by thick fleshy scale leaves. The leaves may be arranged in concentric manner surrounded by a thin membranous scale leaf as in tunicate bulb of onion(Allium cepa) .



## \*\*\*Modification of Aerial stems

1. **Phylloclades** or cladodes: they are flattened structures that are green and photosynthetic and bear small scale leaves as in *Phyllanthus* (cultivated plant in Iraq) and *Ruscus*.
2. **Spiny** : pointed structure function as protection of plant against grazers as in *Lycium*.
3. **Tendriller** : a thin branch of stem twisted around supported body to help plant for climbing as *Vitis.*