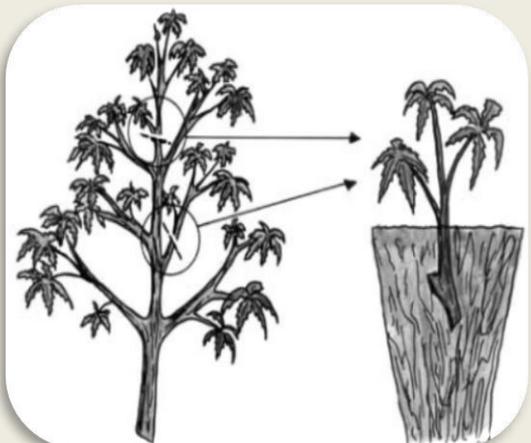
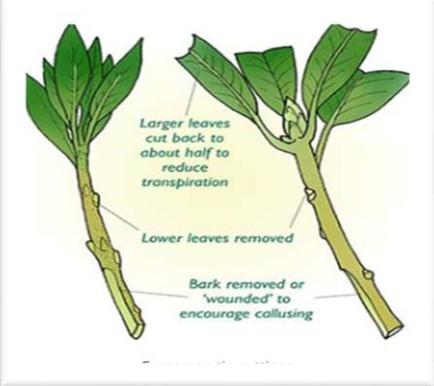
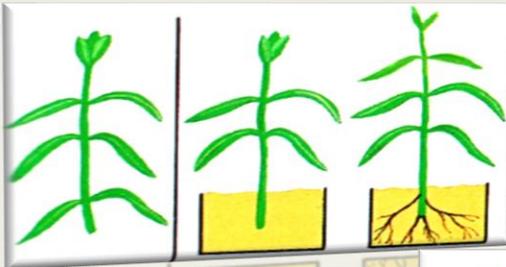
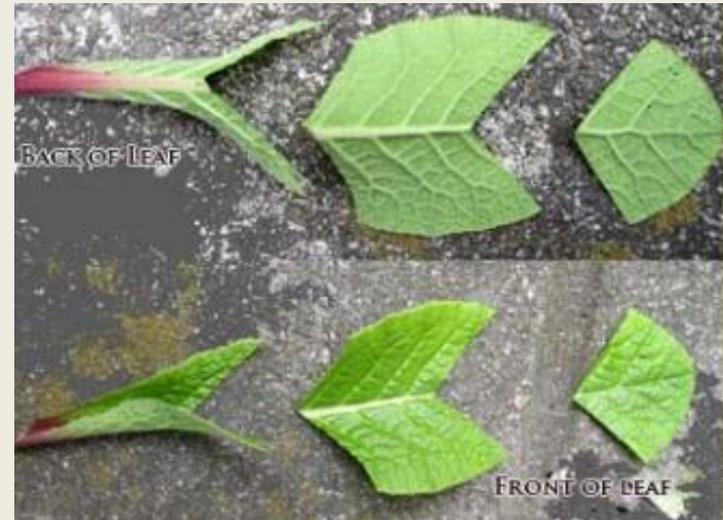


3.- CUTTINGS



CUTTING DEFINITION:

A portion of the stem, root, or leaf is cut from the parent plant, and placed under certain favorable environmental conditions and induce to form the missing parts. The plant will form a daughter plant which is usually identical to the parent plant.



IMPORTANCE AND ADVANTAGES:

- 1.80 – 85% of plants propagated in US by cuttings
2. Propagate a great deal of plants in a limited amount of space.
3. A few mother block of plants will usually yield a great deal of daughter plants. Ex: Bougainvilleas – Ficus 'Green Gem'.
4. It is inexpensive, simple, does not require technical skills.
5. No problem of incompatibility.
6. Get advantages of rootstocks. – Avocados, Dwarfing citrus.



ANATOMICAL DEVELOPMENT OF ROOTS ON STEM CUTTINGS

1. Involves the development of adventitious roots on the stem. (Ficus have them already there).
 - Preformed already on stem but will not emerge until stem is severed.
 - Wound expose more cambium.





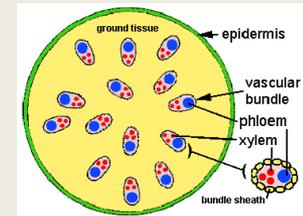
STEPS INVOLVED IN THE STEM DURING ROOT DEVELOPMENT.

1. Dedifferentiation of specific mature cells, and formation of root initials.
 - Herbaceous plants – outside and between the vascular bundles.
 - Woody plants – usually between the cambium and phloem. (cell division).
2. Development of root initials (swelling of the stem) into root primordia. (actual first roots)
3. Development of root and conducting tissues between roots and stems.

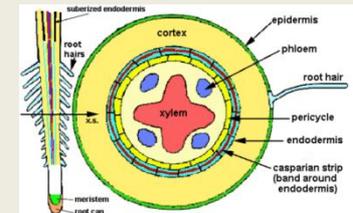


STEM ANATOMY

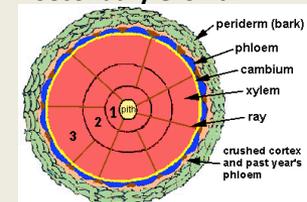
Herbaceous Monocot Primary Growth



Herbaceous Dicot Gymnosperm or Monocot - Primary Growth

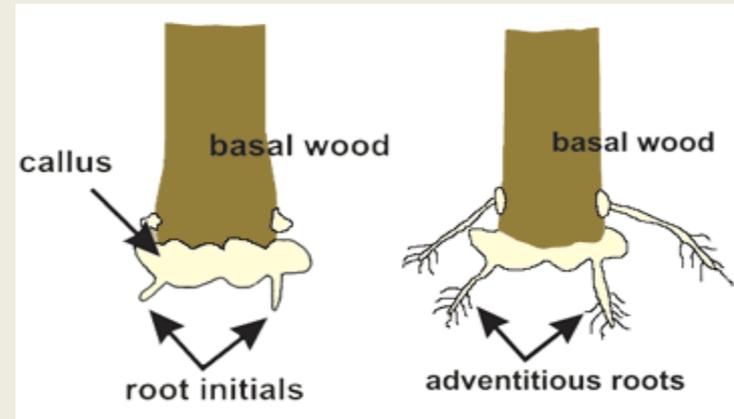


Woody Dicot or Gymnosperm – Secondary Growth



CALLUS

- Develops at the basal end of the cuttings.
- Irregular mass of parenchyma cells (arises from cambium.)
- Usually the first roots appear thru the callus-leading to the belief that callus is necessary for root development.
- But in most cases the formation of callus and the formation of roots are independent of each other.
- Some cases will inhibit the development of roots. Ex: *photinia*, Burford Holly, *Cupressocyparis leylandii*.



LEAF CUTTINGS



1. Leaf cuttings with primary meristems.
 - Small plants arise from the notches around leaf margin.
 - When come in contact with soil, will develop roots and grow.
Ex: Piggyback – Kalanchoe – Sansevieria – Mother Fern.
2. Leaf cuttings with secondary meristems.
 - New plants develop from secondary meristems arising from the base of the *leaf blade* and *petioles* or as a result of wounding a major vein on a leaf.
 - Some species will develop roots but never stems – unless treated with cytokine (shoot development) (Benzyladenine) – Gynura, Ficus elastica, crassula.



ROOT CUTTINGS

1. Usually develop an adventitious shoot and then this develop new roots. Otherwise the new roots here to come from the original root piece.



STEM CUTTINGS

1. Divided into four groups:
 - Hardwood
 - Semi hardwood
 - Soft wood and
 - Herbaceous.



STEM CUTTINGS

Hardwood Cuttings:

- Usually take shoots of deciduous plants after the leaves have fallen off and before new shoots emerge.
- Usually no greenhouse required, will stored for a long period of time. Ex Myrtles, Sycamore, Rose, Willow, Poplar, Grapes, Figs, Quince, Pomegranate, Gooseberry, Peach.



STEM CUTTINGS pg1.

Hardwood Cuttings:

- Usually are rich in carbohydrates and will not transpire.
- Can cut long sometimes 30 inches plus.
 - Straight – cut bottom at slant.
 - Heel – portion of mother stem.
 - Mallet entire bud.
- Treat the cutting with a root promoting substance.
- Many times bundle and put in media to callus outside.
- Or allowed to callus in warm temperature to initiate roots, then plant.
- Some species store in refrigeration until spring, then plant (wrap in wet paper and poly).
- Direct planting – put directly into the field.

STEM CUTTINGS pg2.

Hardwood – Narrow Leafed Evergreens:

(Will stored / week – month)

- Chamaecyparis (false cypress), Thuja, and Prostrate Junipers root easily.



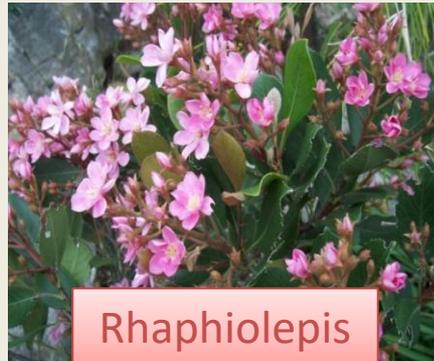
- Upright Junipers and Pines are slow.
- Need hard freeze (otherwise don't store carbohydrates).
- Type will vary from tip to heel.



STEM CUTTINGS pg3.

Semi-Hardwood :

- Taken early spring and summer from a near flush of growth that has just matured.
- Have carbohydrates so they will be able to take some time rooting.
- Need mist.



STEM CUTTINGS pg4.

Softwood :

- Taken from succulent foliage produced in early spring.
- Root easier but requires more attention high mist, warm temperatures.
- Stick cuttings immediately – will not store.

Herbaceous :

- Cuttings made from geraniums, mums, coleus, or carnations.
- Some cuttings that exudates a sap such as geraniums and poinsettias, cactus, we will allow the basal end to dry before they are inserted in the rooting media to prevent entrance of decay.
- Cuttings – Dieffenbachia – dip in sulphur.