HERBACEOUS STEM AND LEAF CUTTINGS


OBJECTIVES:

1. Practice making herbaceous stem and leaf cuttings.
2. Determine the effects of auxin treatments on herbaceous stem cuttings.
3. Determine the sequence of shoot and root formation on leaf cuttings.

I. HERBACEOUS STEM CUTTINGS

INTRODUCTION: Softwood refers to the succulent nature of stem cuttings taken from new growth of woody plants. Herbaceous stem cuttings are made from stems of herbaceous plants. For both types of cuttings, leaves are essential since little stored food is present in new wood or new stem tissues. These cuttings are most often used to propagate deciduous woody shrubs (e.g., lilac, forsythia, weigela, spirea) and florist crops (e.g., poinsettias, chrysanthemums, carnations, geraniums, hydrangeas). Some deciduous trees (e.g., peach and maple) and conifers (e.g., oriental arborvitae) can be propagated by softwood cuttings. Disease control and prevention of desiccation are of the utmost importance with these types of cuttings. Roots usually form quickly (2 to 4 weeks). Auxin treatment is often unnecessary, although it is sometimes beneficial.

Leaf-bud cuttings are a variation of softwood stem cuttings and consist of a leaf, its petiole, and the subtending bud, taken with a small piece of the stem. These cuttings maximize use of available stock material since each node can make one (alternate leaf arrangement) or two (opposite leaf arrangement) new plants.
Cane cuttings are often used to propagate tropical plants with fleshy stems (e.g., dracena, cordyline, and dieffenbachia). Each node will root, and a new top will grow out from lateral buds. Leaves are unnecessary, as these fleshy stems have enough food reserves to support rooting and shoot growth.

PROCEDURE:

Herbaceous Plants.

Chrysanthemums:

1. Each student should obtain ten (10) cuttings of one cultivar as directed by the instructor. To prevent the spread of pathogens knives should always be stored in a 70% ethanol or 10% bleach solution; blades should be dipped in this solution before making each cut.

2. Treat five cuttings of each cultivar with 2500 ppm IBA (K-IBA) (5 second dip). The remaining 5 cuttings will serve as a control.

3. Prepare labels including treatment and cultivar name.

4. Plant these in a market pack containing moist (Sunshine #1 mix) peat/perlite. Place on the designated area of the mist bench.

See Appendix I (on page 42) if you are interested in growing your mum cuttings to flower at a later date.

Coleus:

1. Each group should obtain 25 coleus stem tip cuttings. These cuttings should be of uniform length. If possible, snap the stems instead of cutting as this will eliminate the use of the knife blades and the necessary dip in solution after each cut.

2. Make the following treatments:

   a. five cuttings treated with talc (control)
b. five cuttings treated with Hormex 1

c. five cuttings treated with Hormex 3

d. five cuttings treated with Hormex 8

e. five cuttings treated with Hormex 16

25 cuttings total

3. Label these treatments and insert cuttings in a flat of moist Sunshine #1 mix (peat/perlite) in market packs. Place in the designated area of the mist bench.

Leaf-Bud, Cane and Stem Cuttings.

Examples will be demonstrated for “softwood stem cuttings”. Assorted plant materials will be available for you to try making herbaceous stem cuttings, and, perhaps, softwood cuttings of additional species yourself. Use the same market pack and close spacing to conserve room. You may make up to four cuttings from two of the plant materials (species) provided.

II. LEAF CUTTINGS

**INTRODUCTION:** The natural production of organs by leaves is rare, but kalanchoe is an example of a species that has buds form on leaves, giving rise to new plants. Leaves of many other plants can be induced to form roots, but shoot differentiation from leaves is more difficult. Nevertheless, the use of leaf cuttings is a standard method of propagation for many plants having fleshy leaves, leaves with enlarged, thickened petioles, or leaves with large veins. New growing points usually originate in the parenchyma cells closely associated with vascular tissues in the leaves. When **vascular bundles** of the leaf are severed and the proper conditions provided, new roots and, with more difficulty, shoots will be initiated.
PROCEDURE: Foliage of plants propagated from leaf cuttings will be available. Follow these instructions:

1. Each group can make three cuttings from each of the following plant groups (see below).

2. Put the cuttings in market packs, and use reasonably close spacing to conserve room and materials.

3. Put these cuttings under mist on the greenhouse bench.

   African violet and peperomia - cut long petioles down to 1 inch in length. The leaf plus petiole is placed in a vertical position in the medium, so that the blade is just slightly above the medium surface. New plants form at the base of the petiole.

   *Begonia rex* - a) The large veins are cut on the under-surface of the mature leaf. The leaf is placed flat on the surface of the medium and pinned down to ensure good contact. New plants will form where veins were cut. b) Leaves are cut into large, triangular pieces. Triangles are rolled up and inserted into the medium.

   *Sansevieria* - The long, tapering leaves are cut into 2- to 4-inch sections and inserted vertically for ¾ of their length into the rooting medium. The proximal end is cut at a slant to ensure that polarity is not reversed. Make two or three cuttings of both variegated (if available) and green plants.

   Jade plant - Place the base of each leaf in sand or Sunshine #1 mix up to about ½ the length of the leaf.

Other plant material provided.
Show your market pack to the instructor - **you must be checked off** (he/she will also be checking to ensure that you follow up on your cuttings as they root). Place your pack in the proper location under mist. Although many growers do not put leaf cuttings under mist, they water very carefully and keep the greenhouse humid and shaded. Watch cuttings carefully; *as soon as they are rooted* (but before shoots necessarily form) remove them from the mist. You will have to remove and pot up (or give away) items at different times.

**RESULTS:**

Use the space below for notes from your weekly observations. Be sure to note rooting differences between cultivars and cutting types. You should understand why more succulent leaves work better than thin ones as leaf cuttings, and why we excluded auxin use on leaf cuttings. Collaboration among student groups is permitted and recommended – but don’t pull up someone else’s cuttings; instead, ask them for data to make your comparisons.

I. **Stem Cuttings:**

1. Chrysanthemum results: (auxin treated vs. control cuttings)
   - comment on the number and length of roots formed.

2. Coleus results: (control vs. treated cuttings)
   - comment on the number and lengths of roots formed; comment on cutting height.

II. **Leaf Cuttings:**

1. African violet/peperomia – comment on the number of roots and shoots formed. Which formed first? Number of weeks needed to form roots or shoots?
2. *Begonia rex* – compare the two methods of inducing shoot formation. Which method yields more shoots?

3. *Sansevieria* – observations. Which formed first, roots or shoots?

4. Jade plant – observations. Which formed first, roots or shoots?

OPTIONAL

As in previous weeks, if time and materials permit, you are encouraged to do additional work with leaf or herbaceous stem cuttings.

These cuttings are ideally suited to handling in home propagation units under artificial lights.

Other ideas:

1. Cytokinbin application to facilitate shoot differentiation.

2. Blade size on leaf cutting success.

3. Leaf age (old vs. new leaves) on leaf cutting success.

4. Stem cuttings of several indoor /house plants that are available for use

5. Your own idea.
APPENDIX I

FORCING CHrysanthemum Cuttings

Pot up rooted cuttings in about 3 weeks. Leave plants in the greenhouse under long days (>12 hrs.) until you are ready to begin photoperiod induction of flowering at home. You may “pinch” either before or after the start of short days to encourage branching. Be sure to keep your mum plants in a bright window for maximum sunlight during the day. Day length may be artificially reduced by covering the mums with a box or by moving them into a closet. Either way, the day length should be reduced (< 11.5 hrs.) until the flower buds are the size of a pea seed at which time you may discontinue the photoperiod manipulation. During this period you may want to disbud the inflorescences to achieve a desired effect.

Note: Your mums should “flower” 8 or 9 weeks from the time short days were started depending upon to which response group your cultivar belongs. Your chrysanthemums are hardy garden mums, and these plants should survive winters when grown in the ground outdoors.