Unit E: Plant Propagation

Lesson 3: Propagating Plants by Cuttings
Terms

- Asexual propagation
- Growing medium
- Hardwood cuttings
- Herbaceous cuttings
- Leaf cutting
- Leaf-bud cutting
- Root cutting
- Semi-hardwood cuttings
- Softwood cuttings
- Stem cuttings
What Are the Reasons for Propagating Plants Asexually?

• Asexual reproduction in plants involves the reproduction of new plants using only the vegetative parts of the parent plant
  – These include the stems, leaves and roots
  – This is possible because many plants have the ability to regenerate not only the vegetative parts of the plant but also missing plant parts

Courtesy of Interstate Publishers
• Asexual propagation enables the production of plants that would otherwise be difficult or impossible because the plant does not produce viable seed or the seed is difficult to germinate.

• Asexual reproduction is also used when plants will not breed true to seed or when specific genetic forms of the plant are necessary.
– This form of reproduction produces plants that are identical to the parent plant.
• Asexual propagation may be faster than propagation by seed
  – Germination and growth of seedlings is often slow compared to propagation by cuttings
  – It may also be more economical to produce plants asexually and in many cases it is easier

Courtesy of Interstate Publishers
What Are Leaf & Leaf-bud Cuttings & How Are They Used to Produce a New Plant?

• Entire leaves or portions of a leaf can be removed from the parent plant for use as a leaf cutting
  – A leaf cutting is a piece of a leaf blade, or a leaf blade with a petiole attached
  • They have the ability to reproduce new stems and roots from the edge of the leaf
  • After the roots develop to support the new plant, the old leaf dies

Courtesy of Interstate Publishers
A leaf-bud cutting consists of a leaf blade, the petiole, and a short piece of stem with an attached bud.

- The small bud will develop into a new plant stem that will eventually produce the new plant roots.
- Example - English Ivy

Courtesy of Interstate Publishers
Leaf Cuttings Continued

• Healthy leaves that have just reached maturity should be used for leaf cuttings
  – Some plants may be propagated using only the leaf blade or a section of the leaf
    • The leaf is cut from the parent plant and the cut edge placed on top of the rooting medium or inserted into the medium
– New plants develop along the edges of the leaf
  – Example, *Sedum* or *Jade*

• Some plants require that both the leaf blade and petiole be removed from the parent plant
  – These cuttings should be placed deep enough in the medium to keep the cutting upright
  – Examples, African violet or *Peperomia*

• Leaf-bud cuttings are important to the propagator when there is limited plant material and many new plants are needed
– This type of cutting consists of a leaf blade, petiole and short piece of stem with an attached bud
– Leaf-bud cuttings should be made from healthy growing leaves and well developed buds
– The stem of the cutting is inserted into the growing medium with the bud just below the surface of the medium
– Examples, English ivy, Philodendron or Maple

Courtesy of McGraw Hill Publishers
What Are the Three Types of Stem Cuttings & How Do They Differ?

- Portions of stems that contain terminal or lateral buds are used for *stem cuttings*
  - There are many types of stems: herbaceous, softwood, semi-hardwood and hardwood
– The end of the stem from the leaf to the next bud (terminal cutting) is placed in the medium

– Stem cuttings may also be made by sectioning the stem (heel cuttings & mallet cuttings) but this may require two to three weeks longer to produce a new plant

*Courtesy of Interstate Publishers*
Herbaceous Cuttings

- **Herbaceous cuttings** are made from plants with stems that do not become woody
  - Many greenhouse plants are propagated by the use of herbaceous cuttings
  - They should be 7 to 10 centimeters long and contain several leaves
  - This type of cutting may be taken at any time of the year
  - These cuttings root easily
    - Examples: geranium, coleus & carnation
Softwood Cuttings

- **Softwood cuttings** are taken from the soft, new growth in the spring or early summer
  - These cuttings root easily but require a moist environment
  - The stems are cut and placed in moist media
  - All flower buds and one third of the lower leaves are removed to prevent moisture loss
  - A rooting hormone is applied to the cutting before planting to stimulate root production
Semi-hardwood Cuttings

- **Semi-hardwood** cuttings are usually made from woody broadleaf plants in the summer
  - The 7 to 15 centimeter cuttings are taken from the plant after it has finished its rapid summer growth
  - The cuttings are treated with rooting hormone and planted in moist medium
    - Examples: Yew, Juniper, and Holly
Hardwood Cuttings

- **Hardwood cuttings** are used to propagate evergreens and deciduous plants with wood stems
  - The cuttings are made during the winter when the plant is in the dormant stage
  - The cuttings are 5 to 15 centimeters in length and are dipped in rooting hormone before planting in moist medium
  - Several months later, in spring, the cuttings develop roots
How Are Roots Used to Propagate Plants?

• Root cuttings are similar to stem cuttings, except that a root cutting uses the root or part of the root to propagate a new plant.

• This method of propagation is perhaps the least favorite because of the lack of a standardized technique for most plants.

• Root cuttings are not as predictable, being more dependent on seasonal influences.
  - It is useful for plants that are difficult to propagate.
• Winter and early spring when the parent plant is dormant seems to be the best times to obtain root cuttings
  – Usually the parent plant is lifted from the ground and the roots are cleaned with water
  – Then the new root growth is removed from near the crown of the plant
  • The parent plant can be thrown away or replanted
  • If the parent plant is replanted, the top must be severely pruned to enable the plant to recover
• Most root cuttings should be 10 cm long
• They need sufficient food to support itself while it develops stem and leaves
• Root cuttings are affected by gravity and need to be planted “right side up”
  – Cuttings planted vertically and with the correct end up will have a much higher success rate
What Environmental Factors Affect the Rooting of Cuttings?

- Plants are very individual and each seems to have a preferred method of propagation.
- Plants also seem to have a preference for the type of medium, amount of moisture, and temperature for the rooting of their cuttings.
Most plants do best in a loose, well-drained growing medium

- The *growing medium* will provide the moisture, aeration, nutrients and other conditions favorable for root formation
- Sterile, disease free rooting medium is essential for success
  - Sand, vermiculite, peat moss, perlite and wood pulp are common examples of materials used alone or in combination in good growing medium
– Moisture is very important for the growth of the cutting
  • The cuttings cannot absorb water quickly so they must be kept moist
    – However, too much water will cause the cuttings of most plants to rot
    – Misting systems are excellent for providing moisture at frequent intervals to promote root formations
– Many plants root easily and do not need special treatment
  • However, some plants root better when treated with root-inducing chemicals
  • These powders or liquids contain synthetic root promoting hormones of varying strengths that hasten root initiation as well as increase the number of roots formed
    – Examples: Rootone, Hormodin
Summary

- Why are plants propagated asexually?
- What parts of the plant can be used for this type of propagation?
- How is a leaf cutting used to propagate a plant such as a geranium?
- How is a stem cutting used in propagation? What has to be on the stem?
- How is an herbaceous plant different from a hardwood plant?
Summary Continued

- When is the best time to take a softwood cutting?
- What is the problem with taking a root cutting?
- Describe the characteristics of a good growing medium for cuttings.
- What can be used to enhance the root development on a cutting?