



General Information on Propagation by Stem Cuttings

Propagating from cuttings is taking a section of stem, leaf or root from a parent plant and manipulating it to create a new plant. Since the reproduction is asexual, the new plant is genetically identical to the parent and is often referred to as a clone. In this way, a favorite perennial can be reproduced over and over at minimal cost to the propagator and the plants will have exactly the same desired characteristics. Of course a propagated clone will also have the same defects as the parent. Propagation of this type also hampers genetic diversity.

Types of Stem Cuttings

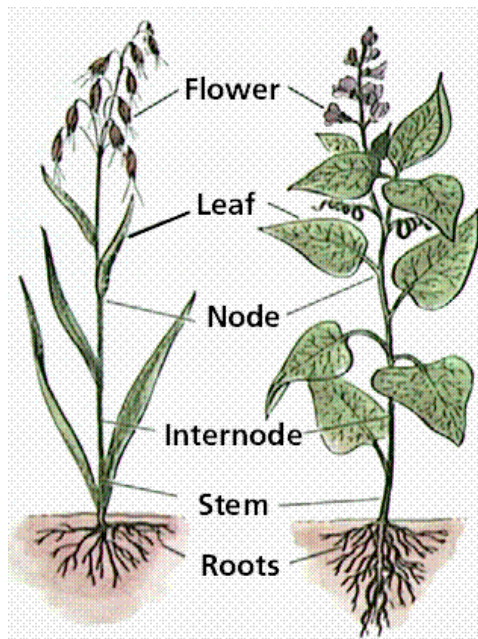
Herbaceous Cuttings are cut from the new growth of non-woody plants. They can be taken from new growth at any time during their growing season. Water the parent plant about 1 hour before taking cuttings.

Softwood, semi-hardwood and hardwood cuttings are taken from woody plants.

Softwood or Greenwood Cuttings are taken from new growth, usually in mid to late spring or early summer before the wood has matured. This is one of the easiest methods and can be used for many kinds of plants including a wide variety of trees and shrubs.

Semi-hardwood Cuttings are taken from new growth usually in late summer after stems have grown somewhat, but are not yet fully mature.

Hardwood Cuttings are taken usually in late fall through mid winter when the wood is dormant. These cuttings should be misted daily to keep the buds and newly forming foliage from drying out and to keep the soil or growing medium moist but not soggy. Watering is especially important during dry periods.



Taking Stem Cuttings

You will need sharp scissors or pruners, labels, pots and clear plastic bags. The bags are used to cover the cuttings to keep humidity up while they are forming roots, since they will have no way to replace water lost through transpiration. You can also purchase trays with clear plastic domes if your pots and cuttings are not too tall. You can use plastic pots or flats, or build wooden flats like those used for seed starting or root cuttings. All items should be clean and sterile, so if you use your old pots be sure to clean them thoroughly.

The best cutting materials come from the parts of a plant that are growing, since the hormones that stimulate growth are produced in the new leaves and tips. While it is wise to look for the newest growth to take cuttings from, stems that have flowers or flower buds do not make good cuttings. Roots develop more easily from the bottom portion of the stem, i.e., the bottom node.

Sharp pruners or scissors should be used to take cuttings so that the parent plant suffers less damage and thus is more protected from diseases entering the cuts. Avoid taking cuttings during the hot time of the day. The best time is early morning or late afternoon. Cut about 1/4 to a 1/2 inch above a leaf node, depending on the size and kind of plant. Protect the cuttings from dehydration by wrapping them in paper towels, grass or any moist material and putting them in a plastic bag, if possible, away from

sunlight. If the cuttings cannot be processed immediately they can be wrapped in damp paper towels and placed in a zip lock or other plastic bag with some air in it. They will keep for several days in the refrigerator.

Propagation media

The ideal propagation medium is porous, drains easily and retains moisture. To get your plants off to a healthy start it is important that the media is sterile. Don't use garden soil or compost because they may contain diseases. You can purchase ready to use seed

starting mixes or you can make your own by using any of following combinations. (Caution: don't use beach sand as it will contain salt.)

- a. ½ river or sharp sand and ½ peat moss
- b. ½ perlite and ½ peat moss
- c. ½ river or sharp sand and ½ vermiculite
- d. ½ perlite and ½ vermiculite
- e. Equal parts sand, perlite, and vermiculite or peat moss

Rooting Hormones

The growth hormones responsible for the rooting of cuttings are called auxins. They are produced primarily in the plant's growing points (meristems). These hormones stimulate root initiation and development. Tip cuttings, which include the apical meristem area, are the primary site of hormone production. Auxins are transported down the stems to other plant parts. The amount of hormone varies from plant to plant, tissue maturity, the time of year, and the environment. The primary auxin produced in the plant is indoleacetic acid (IAA), but synthetic auxins are commonly used to propagate plants. The two most common synthetic auxins are indole-3-butyric acid (IBA) and 1-naphthaleneacetic acid (NAA). Commercially these are mixed with talcum powder for ease of use and a longer shelf life.

Preparing Cuttings

Cuttings should be prepared with a sharp tool; cut below a node. The bottom leaves have to be cut off, not stripped as the latter technique can damage the cambium and allow a pathway for disease. This is particularly important during winter when rooting can take several months. Leaves left on the cutting and buried tend to rot, making the whole cutting susceptible to disease and less likely to root. Use rooting hormones when rooting semi-hardwood or hardwood cuttings. Rooting hormones may not be necessary with softwood cuttings in the spring and summer. When using hormones, simply dip the cutting, and remove the excess with a gentle tap.

Placing the Cuttings in the Rooting Medium

Placing the cuttings in the rooting medium is called "sticking". The medium has to be damp and the surface even. Holes should be punched into the medium to allow for the inserting of the cuttings without damaging the cambium or removing the rooting hormones.

Care of Cuttings

Treat your new cuttings as if they were little babies, because that is what they are. If they are moved outdoors in spring or summer, they need protection from direct sunlight, wind, and rain. They need to be protected from sudden and drastic temperature changes. Use a hotbed, cold frame or build a small tent out of plastic or burlap to house the young cuttings. They need air circulation, so be sure that your structure is not completely enclosed or the cuttings will overheat, wilt and die. Continue misting frequently. After a few months of growth they will become hardier and can be repotted or planted in the garden.

Propagation from cuttings will require a little less light than is required for propagating from seed. Rooting media should be kept moist but not soggy. Mist the cuttings daily. Do not allow the leaves to dry out, but do not allow the soil to get too wet.

Cuttings can vary in how long they take to grow their own roots. Some plants set roots almost immediately, while others take weeks before roots will form. After about a week start checking if the roots are growing by *gently* tugging the stem. If you meet resistance the roots are forming.

References:

The American Horticultural Society, *Plant Propagation*, Alan Toogood, ed.

Pamela M. Geisel "Plant Propagation," *California Master Gardener Handbook*, Dennis R. Pittenger, ed.

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Propagation Basics

Step by step Instructions

Items Needed for Propagation

- Pruners or Scissors
- Gloves
- Propagation Medium
- Pots
- Household Bleach
- Plastic bags, or 2 liter size soft drink bottles, or seed starting tray with dome
- Root Hormone
- 2 Plastic Bowls
- A wooden skewer

Preparation of equipment

1. Clean pots with soap and water.
2. Fill pots with propagation medium and thoroughly wet.
3. Fill one bowl with clean, cool water.
4. Fill one bowl with a 10 percent bleach solution – 1 part household bleach to 9 parts water (Be sure to wear eye protection and gloves when preparing the solution).
5. Dip pruners or scissors in the bleach solution in order to sterilize them. To prevent rust, wash dry and lightly oil the pruners before putting them away.

Prepare the Cuttings

1. Depending on the length of the internodes trim the cutting to about two to three inches. Be sure to make the cut just below a node.
2. Remove all of the leaves, except the top most, using scissors, pruners or your nails. Avoid stripping the leaves as you may damage the cambium layer at the node and provide a pathway for disease.
3. If necessary, reduce the size of the top leaves.
4. Dip the cuttings in the bleach solution for about ten seconds.
5. Rinse them thoroughly in cold water.
6. Using a skewer drill a hole in the propagation medium.
7. Dip the cutting in rooting hormone and carefully place it in the hole made by the skewer.
8. Firm the medium around the cutting.
9. Place the cutting in a warm, moist environment.
10. Place a plastic bag/soft drink bottle/dome over the cutting pot.