

PLANT PROPAGATION

Cuttings

Many types of plants, both woody and herbaceous, are propagated by cuttings. A cutting is a vegetative plant part severed from the parent plant that ultimately will form a whole new plant.

Take cuttings with a sharp knife or razor blade to reduce injury to the parent plant. Dip the cutting tool in rubbing alcohol or a mixture of 1 part bleach and 9 parts water to prevent transmitting diseases from infected plant part to healthy ones. Remove flowers and flower buds from the cutting to allow it to use its energy and stored carbohydrates for root and shoot formation rather than fruit and seed production.

To hasten rooting, to increase the number of roots, or to obtain uniform rooting (except on soft, fleshy stems), dip the cut tip in rooting hormone, preferably one containing a fungicide. Prevent possible contamination of the entire supply of rooting hormone by putting some in a separate container for dipping cuttings.

It is important to choose the correct rooting medium to get optimum rooting in the shortest time. In general, rooting medium should be sterile, low in fertility, well drained, and able to retain enough moisture to prevent water stress. Use coarse sand, vermiculite, soil, or a mixture of peat and perlite. Moisten the medium before inserting cuttings, and keep it evenly moist while cuttings are rooting and forming new shoots.

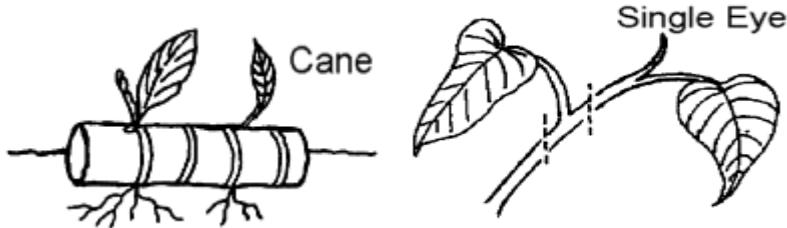
Place stem and leaf cuttings in bright, but indirect, light. Root cuttings can be kept in the dark until new shoots appear.

Stem Cuttings

Many plant species are propagated by stem cuttings. For some plants, you can take cuttings at any time of the year. However, to root successfully, stem cuttings of many woody plants must be taken in the fall or in dormant season. There are three types of stem cuttings, depending on location of the cut. They are discussed below.

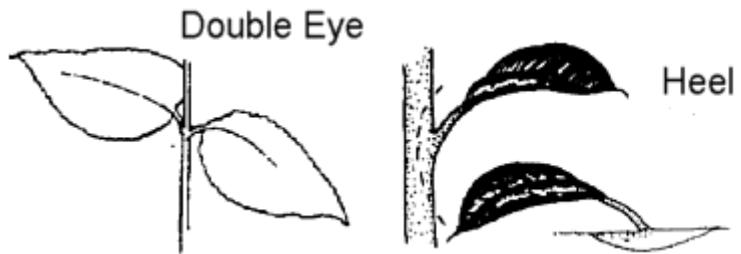


Figure 3. Tip Cutting (a) and medial cutting (b)



(a) Correct planting position

(b) Single-eye



(c) Double-eye

(d) Heel

Figure 4 – Cane cuttings

Tip – Detach a 2- to 6-inch piece of stem that includes the terminal bud (Figure 3a). Make the cut just below a node. Remove lower leaves that would touch or be below the growing medium. Dip the cut end of the stem in rooting hormone if desired, and gently tap the end of the cutting to remove excess hormone. Insert the cutting deeply enough into the medium to support itself. At least one node must be below the surface.

Medial – Make two cuts on the stem (Figure 3b). The first cut should be just above a node, and the second cut just above another node 2 to 6 inches down the stem. Prepare and insert the cutting as for a tip cutting. Be sure to position it right-side up. (Look for axial buds; they always are above the leaves.)

Cane- Cut cane-like stems into sections containing one or two “eyes” (nodes) (Figure 4). Dust ends with fungicide or activated charcoal. Allow to dry for several hours. Lay the cutting horizontally with about half of the cutting below the medium surface, eye facing upward (Figure 4a). Cane cuttings usually are potted when roots and new shoots appear, but new shoots from dracaena and croton often are cut off and re-rooted in sand.

Use *single-eye* cane cuttings for plants with alternate leaves when space or stock material is limited (Figure 4b). Cut a stem about $\frac{1}{2}$ inch above and $\frac{1}{2}$ inch below a node. Place the cutting horizontally or vertically in the medium.

Use *double-eye* cuttings for plants with opposite leaves when space or stock material is limited (Figure 4c). Cut a stem about $\frac{1}{2}$ inch above and $\frac{1}{2}$ inch below the same node. Insert the cutting vertically in the medium with the node just touching the surface.

A *heel* cutting efficiently uses stock material from woody stems (Figure 4d). Make a shield-shaped cut about halfway through the wood around a leaf and axial bud. Remove the shield containing the leaf and bud, and insert it horizontally into the medium.

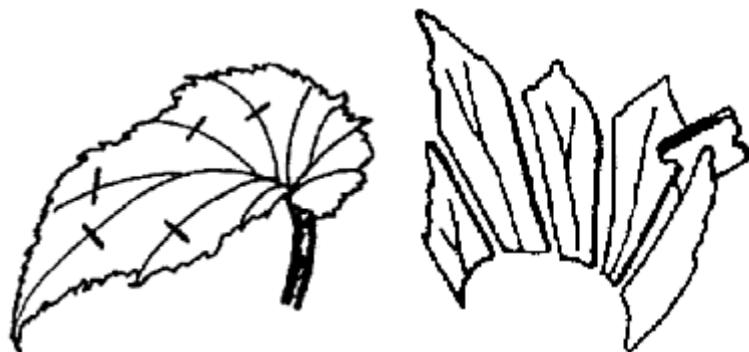
Leaf cuttings

Leaf cuttings are used almost exclusively for a few indoor plants. Leaves of most plants either produce a few roots but no plant, or just decay. The four types of leaf cuttings are described below (Figure 5).



(a) Whole leaf with petiole

(b) Whole leaf without petiole



(c) Split Vein

(d) Leaf section

Figure 5 – Types of leaf cuttings.

Whole leaf with petiole (Figure 5a) – Detach a leaf and $\frac{1}{2}$ to $1\frac{1}{2}$ inches of petiole. (The petiole is the part that attaches a leaf to a stem). Insert the lower end of the petiole into the medium. One or more new plants will form at the base of the petiole. Once the new plants have their own roots, you can sever the leaf and reuse the petiole for additional cuttings.

Whole leaf without petiole (Figure 5b) – This method is used for plants with petiole-less leaves. Insert a leaf vertically into the medium. A new plant will form from the axillary bud. You can remove the leaf when the new plant has its own roots.

Split vein (Figure 5c) – Detach a leaf from the stock plant. Slit its veins on the lower leaf surface. Lay the cutting lower side down, on the medium. New plants will form at each cut. If the leaf tends to curl up, hold it in place by covering the margins with rooting medium.

Leaf section (Figure 5d) – This method frequently is used with snake plants and fibrous-rooted begonias. Cut begonia leaves into wedges, each with at least one vein. Lay wedges flat on the medium. A new plant will arise at the vein. Cut snake plant leaves into 2-inch sections. Consistently make the lower cut slanted and the upper cut straight so you can tell which is the top. Insert the cuttings vertically. Roots will form fairly quickly, and eventually a new plant will appear at the base of the cutting. These and other succulent cuttings rot if kept too moist.

Root Cuttings

Root cuttings usually are taken from 2- to 3-year-old plants during their dormant season, when they have a large carbohydrate supply. Root cuttings of some species produce new shoots, which then form their own root systems. Other plants develop root systems from the cuttings before producing new shoots.

Plants with large roots – This method often is used outdoors on woody and perennial species. Make a straight top cut first. Then make a slanted cut 2 to 6 inches below the first cut. Store about 3 weeks in moist sawdust, sphagnum peat moss, or sand at 40° F. Remove from storage. Insert the cutting vertically with the top approximately level with the surface of the rooting medium.

Plants with small roots - This method usually is done indoors or in a hotbed. Take 1- to 2-inch sections of roots. Insert cuttings horizontally about $\frac{1}{2}$ inch below the medium surface.

Layering

Stems still attached to their parent plant may form roots where they touch a rooting medium (Figure 7). When severed from the parent plant, the rooted stem becomes a new plant. This method of vegetative propagation, called *layering*, is highly successful because it helps the cutting avoid shortages of water and carbon dioxide that often affect cuttings from other methods of propagation. Rooting medium should provide aeration and a constant supply of moisture.

Some plants layer themselves naturally, but you can assist the process. Some ways to encourage layering include:

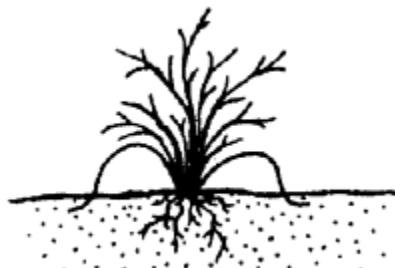
- Girdling the stem where it is bent
- Wounding one side of the stem
- Bending the stem very sharply

Tip layering – Dig a hole 3 to 4 inches deep. Insert the shoot tip and cover it with soil (Figure 7a). The tip will grow downward first, then bend sharply and grow upward. Roots form at the bend, and the recurved tip becomes a new plant. Remove the new plant and plant it in early spring or late fall. Examples of plants that propagate this way are purple and black raspberries and trailing blackberries.

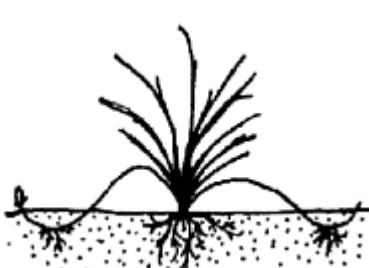
Simple layering – Bend the stem to the ground. Cover part of it with soil, leaving the last 6 to 12 inches exposed (Figure 7b). Bend the tip into a vertical position and stake in place. The sharp bend often induces rooting, but wounding the lower side of the branch or twisting the stem to loosen the bark may help. Examples of plants suitable for simple layering are rhododendrons, honeysuckle, and forsythia.

Compound layering – This method works for plants with flexible stems. Bend the stem to the rooting medium as for simple layering, but alternately cover and expose stem sections (Figure 7c). Wound the lower side of the stem sections to be covered. Heart-leaf philodendrons and pothos respond well to this method of layering.

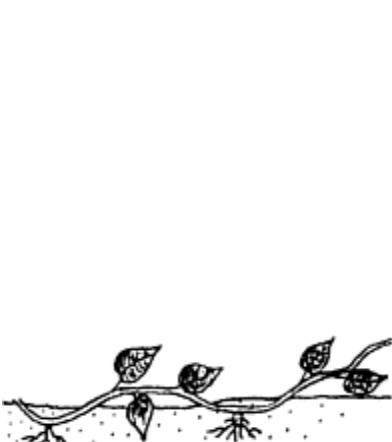
Air layering – Air layering is used to propagate some indoor plants with thick stems, or to rejuvenate them when they become leggy. Slit the stem just below a node. Pry open the slit with a toothpick. Surround the wound with wet, unmilled sphagnum peat moss. Wrap plastic or foil around the moss and tie it in place (Figure 7d). When roots pervade the moss, cut the plant off below the newly formed root ball. Air layering commonly is used with dumb-cane and rubber trees.



(a) Tip layering



(b) Simple layering



(c) Compound layering
Figure 7 – Types of layering



(d) Air layering

Plants with stolons or runners

Plants that produce stolons or runners also reproduce by layering because new plants grow along stems of the original one (Figure 8). A *stolon* roots wherever it touches the growing medium and then produces new shoots. A *runner* originates in a leaf axil and grows along the ground or downward from a hanging basket, producing a new plant at its tip. Plants that produce stolons or runners are propagated by severing the new plants from their parent stems. You can root plantlets at the tips of runners while they are still attached to the parent, or detach them and place them in a rooting medium. Strawberries and spider plants often are propagated this way.

Offsets

Plants with a rosetted stem often reproduce by forming new shoots, or *offsets*, at their base or in leaf axils (Figure 9). To propagate them, sever the new shoots from the parent plant after they develop their own root system. For some species, you can remove unrooted offsets and place them in a rooting medium. In some cases, you must cut the offsets from the parent, while others may simply be lifted off. Examples of plants with offsets are date palms, haworthia, bromeliads, and many cacti.

Separation

Separation is a form of propagation used with plants that produce bulbs or corms.

Bulbs – New bulbs form beside the originally planted bulb. Separate bulb clumps every 3 to 5 years to obtain the largest blooms and to increase the bulb population. Dig up the clump after the leaves have withered. Gently pull apart the bulbs, and replant them immediately so their roots can begin to develop. Small bulbs may not flower for 2 or 3 years, but large ones should bloom the first year. Tulips and narcissus produce bulbs.

Corms - A large, new corm forms on top of an old corm, and tiny cormels form around the large corm (Figure 10). After the leaves wither, dig up the corms and allow them to dry in indirect light for 2 to 3 weeks. Remove the cormels, and then gently separate the new corm from the cold corm. Discard the old corm. Dust new corms with fungicide and store in a cool place until planting time. Crocus and gladiolus reproduce via corms.

Division

You can divide plants with more than one rooted crown and plant the crowns separately (Figure 11). If the stems are not joined, gently pull apart the plants. If crowns are united by horizontal stems, cut the stems and roots with a sharp knife to minimize injury. Divisions of some plants should be dusted with a fungicide before they are replanted. Division commonly is used on snake plants, iris, prayer plants, and daylilies.

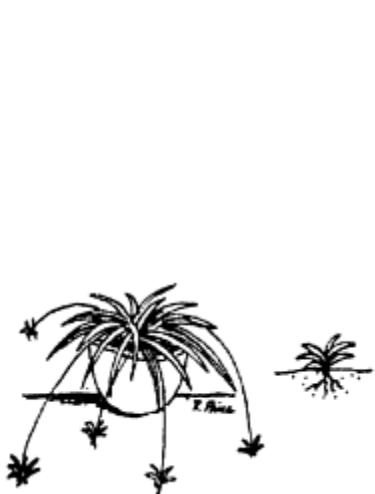


Figure 8 – Propagation using stolons.



Figure 9 – Plants with offsets

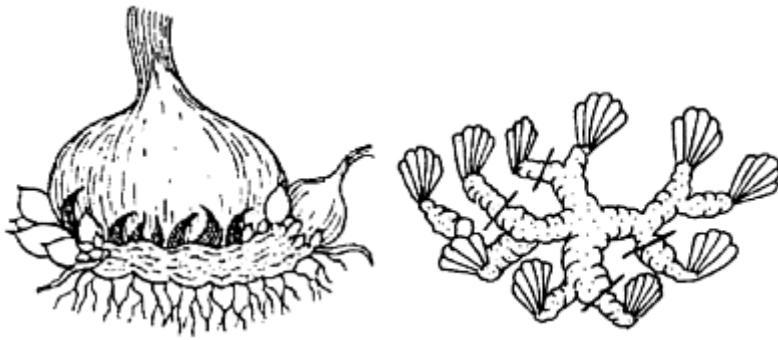


Figure 10 – Separating corms. Figure 11 – Dividing irises

Adapted from *Sustainable Gardening, The Oregon-Washington Master Gardener Handbook*, EM8742. October, 1999.

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