

The ABCs of Propagating Herbaceous Perennials by Stem Cuttings, Root Cuttings, and Division

David J. Beattie

Department of Horticulture, Penn State University, University Park, Pennsylvania 16802

Propagating herbaceous perennials is very similar to propagating woody plants. Methods such as cuttings and tissue culture are used and the same environmental factors influence propagation: temperature, photoperiod, light, and humidity. However, there are some important differences. For instance, while the perennial propagator uses some mist propagation, cuttings usually root faster, so are often placed in poly tents, covered with Remay, or simply syringed periodically. Probably the biggest differences in asexual propagation are: today, few herbaceous perennials are grafted, with the exception of tree peonies; herbaceous perennials require little or no rooting hormone; and many perennials are divided while very few woody plants are propagated by this method.

With experience, the perennial propagator becomes aware of some of the keys to successful propagation. This involves an intimate knowledge of each taxon, a daunting task with the thousands of different plants that a large nursery may grow. However, careful observation, attention to detail and timing are the first steps. In addition, the propagator must develop an extensive information network. This usually comes with time and a willingness to share information, adhering to the I.P.P.S. motto of sharing, since very little specific information about perennial propagation is written in books. With these rules in mind, let's examine some propagation methods as they apply to a few major crop areas.

STEM CUTTINGS

Many perennials can be readily rooted from cuttings, but taxon, methods, and rooting environment must be considered in order to achieve efficient results.

There are two types of cuttings taken from perennials: basal and stem. Both types can be harvested only during the growing season. Basal cuttings are short shoots with a few roots attached and are gathered in early spring from plants like *Geranium* or *Achillea*, or from plants that bloom early in the season where the presence of a flower bud inhibits rooting. In contrast, stem cuttings are harvested from plants like *Coreopsis*, *Veronica*, or *Physostegia* that have shorter internodes and bloom later in the season. Rooting of these is also inhibited by the presence of flower buds except that the vegetative growth phase is somewhat longer. Here though, the cutting season can be extended by shearing to produce new lateral shoots. In some situations, the cutting may root rapidly and develop a large root ball, but not survive winter storage. This has happened in *Coreopsis* if rapidly growing shoot tips are used and the base of the cutting may not contain a node. To overcome this situation, be sure at least one node, preferably two, are stuck into the medium to encourage the development of new shoots which, in turn, form roots.

Most propagators use no rooting hormone, but others will use weak concentrations of no more than about 3000 ppm, equivalent to a Hormodin #2. Cuttings can be stuck in a mist bench, but due to the herbaceous nature of the stems, more care must be taken, so cuttings are not overly misted causing disease to develop. Some cuttings

do not really need mist. For instance, I have rooted *Sedum*, *Tricyrtis*, and *Physostegia* by using light shade and daily misting. In another example, many of the silver-leaved plants like *Artemisia* and *Stachys* must be stuck and rooted before the onset of hot weather. Otherwise, disease problems can severely reduce rooting results. In addition, many plants like *Artemisia* and *Scabiosa* respond to extended photoperiods. If you have greenhouse facilities, they can be brought into the greenhouse early, and placed under HID lights, forcing growth so cuttings are available before hot weather.

ROOT CUTTINGS

Some plants produce a type of growth where only leaves rise above soil level. Many of these can be efficiently propagated by root cuttings. As with all root cuttings, when successful, new shoots are initiated from the root tissue and grow, eventually rooting at the base of this new shoot. The new root system is then initiated at the base of these new shoots. Most oriental poppies (*Papaver orientale*) are produced by root cuttings. Poppies are usually a field-grown crop, but go dormant in late summer. When most of the foliage dies down in late August, plants are lifted, shaken free of soil, and placed in crates; no cool storage is necessary since they will be cut immediately. A few of the largest roots are removed from those with a sufficiently large root system and the rest of the plant is sold as a bare root division. The roots are cut into 1- to 1.5-inch segments and planted into cells, just deep enough so the proximal end of the root is under the medium surface. The cell flats are then placed into cold frames and watered lightly. Plants are kept on the dry side for the first week or so to allow the cut ends of the roots to cure before normal watering is resumed. By early October, new foliage should appear and the cell should be filled with roots. Fertilize once or twice, then harden the plants off for winter. The cells can remain in these frames where they should be covered with microfoam and white copolymer for winter protection.

While poppies are propagated at the end of summer, most other root-propagated crops are prepared during the winter season and some can be done in early spring. *Acanthus*, *Pulmonaria longifolia*, and some *Geranium* taxa like *G. cinereum* 'Ballerina' are normally done by lifting plants after they are fully dormant, but before the ground freezes. They can be put into cold storage until they are prepared. The root system is shaken free of soil (washing often helps) and remove the thickest root pieces available. *Acanthus* often forms buds on the roots that are visible at this time, so they can be removed and potted immediately. Otherwise, roots can be prepared in one of two ways. Pieces 2 to 3 inches long can be placed upright (proximal end up) in rows in flats of potting medium. Again, the medium should just cover the tops of the cut ends. The flats are then watered lightly and placed in a cool greenhouse at about 60F. In another method, the roots are washed, cut into 2- to 3-inch pieces, bundled, and placed proximal end up in 48 or 72-cell trays WITHOUT medium. The trays are placed in a shaded grafting case in a cool greenhouse and lightly syringed to prevent them from drying out. As buds form, the individual roots are removed and planted so the bud is just below the surface. Again, new roots will form at the base of the new shoot. Finally, plants like hybrid *Anemone* can be lifted from the field in the fall and placed into cold storage. Usually, shoots will form on roots during cold storage. At shipping time the new shoots can be removed and potted without substantially reducing the size of the root system to be shipped. I also

do *Sanguisorba canadensis* in early spring or as soon as I can lift the plants from the field. Like *Acanthus*, the root system is very thick and contains many visible eyes that can be removed and immediately potted. The remainder of the root system can be cut up into 1-inch pieces and placed horizontally in a flat, lightly covered with medium, and placed in a cool greenhouse.

DIVISION

Division is the most common and foolproof method of propagating perennials. As with other propagation methods, timing is still important. For instance German, Siberian, and Japanese irises are best propagated in summer after flowering. The rhizomes are lifted, some foliage removed to facilitate replanting. *Hemerocallis* are among the toughest plants and can probably be divided any month of the year. However, early spring before shoot elongation and in summer after flowering are usually the most convenient times for the propagator. Commercially, a few *Hemerocallis* are divided every year so the clumps do not get too large, but most remain in the ground for 2 years before they are lifted, the soil removed from the root system, and the fans divided. The fans of some, like 'Pardon Me', can be snapped apart using your fingers, but most fans must be cut apart. A few, like 'Mary Todd' seem to be so brittle that even under the best of conditions, neat division seems nearly impossible. Finally, for those new cultivars where you are trying to increase numbers, and where the base of the fan is at least 2 inches in diameter, the propagator can often cut the single fan vertically in half. Some *Hemerocallis* cultivars produce scape plantlets that can be removed when they are 4 to 6 inches long and stuck like a cutting. No rooting hormone is necessary and the plantlets can be stuck directly into small pots or cells.

Peonies are also popular as either cut flowers or as garden plants. However, timing *Paeonia* propagation is most critical and must be done in late summer or fall; spring-divided plants often fail to re-establish. Most peonies are grown in the field for 2 to 3 years before division is attempted. Plants are lifted, soil is removed from the root system, and 2- to 3-eye divisions are removed with the aid of a stout knife and pruning shears.

Hosta is the number one shade perennial and most are propagated by division. Like *Hemerocallis*, these are tough plants that can be propagated almost any month of the year. Traditional division methods are employed, although shoots are separated during the growing season, while eyes are divided when the plants are dormant. Here too, when numbers are important and the eyes or shoots are sufficiently large, the entire structure can be sliced in half longitudinally. Some *Hosta* taxa, particularly cultivars of *H. tokudama*, under field or container conditions, normally do not form many new eyes. Here, the formation of new eyes can be encouraged by disturbing the shoot during the growing season in a variety of ways. Some insert a needle and destroy the growing point during active growth, usually in late summer. Others remove the shoot nearly to the top of the crown early in the growing season.

In summary, the propagator employs a variety of methods to propagate perennials. Sometimes more than one method will be used on the same plant, depending on the season or the available facilities. The key to successfully propagating perennials is in-depth knowledge of the plant's growth habit and by taking advantage of season and facilities.