Even for Perennials, Timing is Everything in Propagation

David J. Beattie
Department of Horticulture, 103 Tyson Building, University Park, Pennsylvaia 16802 U.S.A.

INTRODUCTION

Public demand for color seems insatiable. Some have questioned whether the market can absorb all the perennials being produced today. As one wag recently commented, the pie is getting bigger, but the pieces smaller. The only way one can remain competitive in today's booming economy is to bring to market new plants and to more efficiently propagate those already in demand. How? Expand your knowledge base, go to those International Plant Propagator or PPA meetings, and network. So you can quickly propagate and bring to market that new *Dysosma* (*Podophyllum*) you received from a plant hunting expedition in China, or bulk-up the latest yellow *Helleborus* strain. To accomplish this the propagator must apply skill and timing along with a good working knowledge of plant physiology and anatomy.

Perennials are propagated by most of the same methods used for woody ornamentals, but the methods and timing are somewhat different, depending on the plant's timing demands, when you or your labor have the time for propagatioin, as well as the size and time of the year the market wants your propagule.

PROPAGATION METHODS

Seed. Although traditional perennial nurseries propagate a much greater diversity of taxa today, the greatest number of seed-propagated perennials are done by greenhouse growers for the bedding plant market. Here, too, timing is a critical factor. The propagator must weigh factors like need for cold stratification (some perennials do not require one), whether an after ripening period will help to enlarge an immature embryo, or whether just plain room temperature storage will result in more rapid and complete germination. Some germinate best in light, others in the dark. Some like *Platycodon*, *Heuchera*, or *Coreopsis* will flower from seed like annuals (without plants receiving any cold treatment) others like most *Aquilegia*, and *Lupinus* must be germinated, then the small seedlings exposed to cold (vernalizing) temperatures to ensure flowering for sales. In order to schedule these for spring sales, the propagator must locate reliable sources of high quality seed. For spring sales scheduling may begin during the summer of the pervious year.

Hellebores are the rage of the gardening community, but the really great ones are not available in sufficient numbers and may not be for some time. No reliable tissue culture yet (although I understand that it is being done in Japan), division is maddeningly slow, and cutting propagation is not possible. So, that pretty much leaves seed propagation as the only reliable way to grow great, but still not entirely uniform, strains of this outstanding evergreen. Seed collection can be chancy, and if your timing is wrong, the capsules ripen and the seed becomes mouse food in a matter of a few hours. Propagators and seed collectors alike rely on placing muslin bags over the clusters of seed capsules as they approach ripeness in late May or early

June so that when the seed does ripen all drop into the bags. Once collected though, the propagator must be timely and not let the seed dry out. Plant the ripe black seed before the papery membrane attached to the seed coat dries out. Planting in a warm moist medium allows the embryo to continue developing so that it can then be stratified under cool conditions that promote germination either outdoors the following spring, or in the greenhouse during the winter. Another way to propagate hellebores according to Sam Jones, "Mr. Hellebore", from Bishop, Georgia, is to collect ripe seed and sow directly into ground beds. His are shaded in a wooded area on the edge of his nursery. Seeds after-ripen, stratify, and germinated in these beds the following spring. Again, timely collection and quick seeding is still of critical importance.

Division. Division is the traditional way that many perennials are propagated and cloned. Although some can be done almost any month, most division begins in early spring after the ground or pot thaws and continues through the fall months. Timing depends on a number of crop and facility related factors, but most important is to determine when you will sell the propagule and whether is will be sold bare root or in a container.

Probably the most popular perennial is the daylily and one of the easiest to propagate. Although more cultivars, particularly the new "hot" ones are being done in tissue culture, most wholesale growers, gardeners, landscapers, and others propagate by division. *Hemerocallis* is one of those plants that, if necessary, can be propagated almost any month of the year when the ground is not frozen. Propagation begins in the early spring when the fans are just emerging. Plants are lifted, shaken free of soil, and the fans separated either by hand or with the aid of a sharp knife. If you do not have time to propagate them in the spring, then just after bloom in July or August is another good time. In fact, in many ways it's easier because the fans have now grown and the plant has a handle. I do not like to wash fans as they seem to re-establish al little faster in thedirty condition. Probably the second — and the first in shade gardens — most popular perennial is *Hosta*. Again, spring division is best, but division can continue well into the summer. Although propagation can continue into fall, leave enough time for plants to reestablish roots so they do not heave out of the soil the following spring.

Astilbe, *Polygonatum*, German iris, *Dodecatheon*, and herbaceous peonies and a variety of other perennials can be divided in summer.

I divide and pot my bare-root astilbes beginning in March, but if market demand exceeds supply, I re-divide those with multiple eyes in late June and July. This still gives plenty of time for re-establishment for late August sales. Those not sold are held until after the first hard frost and washed for either bare-root sales or winter storage.

If German iris is not done in early spring before growth begins, then wait until mid summer to divide the rhizomes. Lift, remove the soil, and divide so that each rhizome segment has a fan attached to it. Cut back the foliage to facilitate handling and replant so that the rhizome is partially visible. With the onset of mid summer heat, crops like *Dodecatheon* go dormant. After a few weeks of dormancy, *Dodecatheon* crowns are lifted, and the roots separated from the crown. Each large *Dodecatheon* root has a small bud at the junction with the crown that is removed when the root is torn off.

Polygonatum and *Cimicifuga* rhizomes can be lifted, divided, and successfully re-

established in early spring but do so before growth is evident, Many *Polygonatum* are imported by bare-root suppliers in the spring. In my experience many of these divisions do not establish and grow very well. In fact, some remain in the pot without any shoot growth until the following spring. For me, the best time is in August, again when plants normally initiate new root growth in response to cooling soil temperatures and renewed moisture. Rhizomes are segmented . Depending on your needs, they can be divided into segments that include a mature, visible bud, or can be cut down into smaller units without a visible bud; one will develop later. Here, each segment is analogous to the node and internode parts of a branch. At this time of the year when the rhizomes are replanted they continue to root and grow in preparation for additional shoot growth the following spring.

Herbaceous peonies should be divided ONLY in late summer or early fall. That is the only time when they "put down" new roots. Buying and trying to re-establish peonies in the spring just invites poor results. In addition, one problem I have seen with fall-potted peonies is that the grower tries to stuff the large tuberous root into too small a pot. Choose a pot large enough that the eyes will be just below the surface of the medium. Gallon containers are just too small for most field-grown roots. Unfortunately, many grafted tree peonies are available in the spring. They too will root in poorly, so, choose a domestic source (there are a few) if possible.

Cuttings. Cutting propagation is a reliable way to mass produce many herbaceous perennials clones. It usually requires greenhouse or outdoor mist systems, although some plants like sedum can be direct stuck into a small container or pot without the aid of mist. Since herbaceous perennials die back to the ground, the seasonal window of gathering cuttings is somewhat restricted compared to rooting woody plants. However, there are some ways to extend that season. For example, placing potted stock plants in the greenhouse to force cutting growth under HID lights. This works well with *Artemisia* 'Silver Mound' or *Scabiosa* 'Butterfly Blue' (the Perennial Plant Association Perennial of the Year for 2000). Stock plants are brought in anytime after January 1 or after they have completed their cold requirement. Although cuttings propagated in this manner are more expensive, it does allow an extended propagation period to meet market demand. For *Artemisia* it is especially useful as rooting decreases rapidly with the onset of hot weather in June. As with "woodies", some perennials root more slowly when they flower. Shearing *Coreopsis* 'Moonbeam' stock plants will produce new cuttings. One of the biggest problems with rooted perennial cuttings comes at transplanting. Here, at least a node or two should be planted below ground to encourage crown development so plants acquire enough storage material for successful overwintering.

Perhaps the lowest tech cutting propagation method I have ever seen was demonstrated by Dale Hendricks at North Creek Nurseries, Landenberg, Pennsylvania. He propagates *Pachysandra procumbens*, normally much more difficult to root than *P. terminalis*, by planting stock plants in raised beds into a loose, friable medium. He waits until August when new growth has hardened and at a time when root growth will soon reactivate. After a soaking rain or, if necessary, irrigation, he grasps new shoots near their base and pulls firmly upward. He is rewarded with well rooted shoots that break free of the stock plant that are then potted into small containers.

Root Cuttings. While rooting vegetative shoot cuttings is done during the growing

season, root cuttings are harvested during the dormant season. A range of plants like *Acanthus*, *Anenome*, *Bergenia*, green forms of *Brunnera*, some *Geranium* species and cultivars, Oriental poppy, *Pulmonaria* 'Bertram Anderson', and some *Tricyrtis* can be commercially propagated by this method.

For Oriental poppies, propagation begins in August after they go summer dormant. Plants are dug and placed in cold storage. Large roots — straw size and larger — are cut into segments 2 to 3 inches long and placed into cells or small pots. Here, they produce new shoots that in turn root. Small plants must be protected in frames for the winter. In spring these liners can be planted out to the field, sold, or containerized. *Brunnera* can be done in October and November using the same method, but remember, the great variegated ones can only be propagated by division. For many of the late flowering anenomes, bare root the plants and hold in storage. By late winter roots will start to form shoots, These can be removed still leaving enough of a root system to either sell the plant bare root, or to containerize it. Finally, I propagate *Tricyrtis* from root cuttings (*Tricyrtis* can also be propagated from shoot cuttings in June) from containerized stock. Over winter, the crown will die leaving an in-tact root system. By April plants can be separated from the medium. The large roots will have begun to form new shoots. These can be removed and potted. Do not throw the rest of the root system away. Scatter the remaining roots in a lug or flat. Cover with medium and by May new shoots will begin to appear. Root cuttings are a excellent way to propagate many perennials and, because they are done during the dormant season, help to spread out propagation labor.

Micropropagation. Since micropropagation, usually called tissue culture or TC, is a laboratory procedure, it allows specialist propagators or larger nurseries that have TC labs to propagate any time of the year. Once a culture is established, it can be used to produce plants continually, or held quiescent and used to meet seasonal production demands. In addition to producing pathogen free plants, TC is especially useful for introducing new cultivars. This is one of the ways that some of the new snakeroots like *Cimicifuga* 'Hillside Black Beauty' and 'Brunette' have been popularized in recent years.