

PROPAGATION AND PRODUCTION OF TENNESSEE PERENNIAL NATIVES

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Native perennials or wildflowers have become very popular with the gardening public in the past several years. Until recently, the source for wildflowers has been wild collection. The great increase in the demand for these plants, coupled with ever-increasing habitat destruction from development, has jeopardized the continued survival of many populations and species. Environmentally aware gardeners are rejecting wild-collected plants and are seeking a wide variety of high-quality, nursery-propagated wildflowers. Sunlight Gardens has been developing and refining wildflower propagation and production techniques for the past six years. In the following article, we will share some of our knowledge with you.

PROPAGATION TECHNIQUES

Basically, the propagation techniques for native perennials are the same as for traditional non-native perennials. Some species still present problems as their mysteries have not yet been unraveled. Following is a brief summary of basic techniques for propagating wildflowers.

Sexual propagation. Seed propagation is used when genetic variation is desirable or acceptable. Seeds are collected when the fruiting stems and heads are brownish and dry. This may be obvious and persist for a long time (*Asteraceae*), or the collection period may be very brief (*Geranium*, *Mertensia*). It is generally a good idea to collect the seeds before the capsule splits open (*Silene*), or the head shatters (*Echinacea*). In some species, the mature fruit is moist and not brown. *Trillium* and *Arisaema* have fleshy, red fruits. But generally, mature seeds are dark-brown or black. In any case, a general rule of thumb is that if the mature fruit is dry, the seed should be cleaned and stored dry. If the mature fruit is fleshy, then the seeds should be cleaned and stored moist, never being allowed to dry out, which may result in delayed and reduced germination, as in *Dicentra* and *Sanguinaria*.

Depending upon your production schedule and the species being grown, seeds may be sown during January and February in a heated greenhouse, or outdoors from June through August. For the summer sowings, sufficient time must be allowed for seedlings to

become established either in their flats or as transplants before cold weather. Seeds of some species need light to germinate and should not be covered with the medium (*Gentiana*, *Heuchera*). Others require a cold stratification period (*Silene*, *Sanguinaria*) or some alternating temperature/moisture regime (*Lilium*) before seeds will germinate.

Clean seeds are sown on a sterile, commercial medium designed for seeding. Flats are placed over heat to maintain a soil temperature of about 75° F. Seeds of species more difficult to germinate or slow to grow may be sown in prepared beds outdoors. To discourage damping-off, seed flats are drenched with Banrot after sowing. We begin fertilizing with a dilute liquid feed when 1 or 2 sets of true leaves are present on the seedlings and we begin transplanting when at least 2 sets are present. Some species will flower within a few months of sowing (*Dicentra*, *Coreopsis*); others must go through a winter first (*Aquilegia*, *Stokesia*). Still others take many years to flower (*Arisaema*, *Trillium*, *Mertensia*). This will largely determine your propagation schedule and method.

Asexual propagation. Cuttings, layering, and division are appropriate methods of increase when genetic variation is not wanted, or when seed propagation is difficult or slow. We take our softwood stem cuttings from supple stems while the plants are in active growth during the summer. It is best not to use stock that is flowering. Many species do not need a rooting hormone, but for those that do we have had success using up to 1000 ppm IBA or K-IBA. Cuttings are stuck in community flats of mixes such as peat:perlite, peat:sand, sand:perlite, or straight sand, depending on their propensity to root. Flats are drenched with Banrot and put under mist under 67% shade. Again, sufficient time must be allowed for rooted cuttings to be hardened off before cold weather.

Root cuttings are taken when plants are dormant in the winter. It is important to maintain polarity when the cut root portions are inserted into the rooting medium (sand). The following may be propagated by root cuttings: *Asclepias*, *Mertensia*, *Viola*, *Echinacea*, *Liatris*, *Claytonia*.

Division is used to obtain larger specimens quickly. We divide plants when they are not in active growth. Generally, spring bloomers are divided just after flowering or in early fall. Fall bloomers are divided in spring. Summer bloomers may be divided in spring or early fall. Anything with a spreading crown or with runners is a good candidate for division (*Aster*, *Monarda*, *Geranium*, *Polygonatum*, *Rudbeckia*, *Phlox*), while plants with tap roots would be poor choices (*Asclepias*, *Baptisia*, *Echinacea*).

PRODUCTION

Containers. At Sunlight Gardens, we produce plants primarily in 3 1/2 in. square pots for our mail-order business, and in 1-gal. containers for wholesale sales to landscapers and retailers. Our container medium is based on ProMix BX, to which we add perlite or composted bark depending on individual species requirements. Osmocote 14-14-14 or Sierra, with minors, is incorporated into the potting mix in varying amounts but usually not exceeding 250 ppm nitrogen. When visual inspection or soil tests indicate the need, we begin liquid feeding with Peters Peat-Lite Special. For most species it is unnecessary to add lime.

Ground. For the majority of the species we grow, container production works well. But there are others that are grown in ground beds. Slow growers like *Hepatica*, *Lilium*, and *Polygonatum* are grown in the ground and then potted the season before they are sold. Others that have a brief flowering period followed by a long dormancy, are kept in the ground as much as possible. These include *Mertensia*, *Dodecatheon*, *Arisaema*, and *Claytonia*.

We have ground beds both in the shade and in full sun. Our shade beds are frames constructed of treated 2 x 6 in. boards in varying lengths. For beds under natural high, open shade, tree roots growing under the beds pose a problem. So the frames are constructed over a layer of thick weed prevention fabric. The beds are filled with topsoil and compost. Sunny ground beds are tilled into existing top soil with no additives. All ground beds are fumigated with methyl bromide, which provides good weed control for an entire season. So far, we have resorted to mulching and hand weeding the following seasons.

WINTER PROTECTION

Winters can be very hard on containerized perennials in east Tennessee (USDA Zone 6) where an average winter day may range from 15 to 50° F. The freeze/thaw routine must be moderated. We put all plants pot-to-pot either in walk-in cold frames 17 x 100 x 7 ft. or low hoops 6 x 100 ft x 18 in. All are covered with white poly that can be opened and ventilated easily. This year we will use an additional spun polyester blanket in the taller houses. We cover in mid-November and uncover in mid-to-late-April. Back-up electric heat is available to protect the flowers from the inevitable late April drop into the low 20s. Last, when all plants are in place, we give a Banrot drench and then try to keep plants on the dry side.

TEN EXAMPLES

The following are popular plants that are good sellers and fairly easy to grow. The production and propagation techniques discussed are those that we use at Sunlight Gardens.

Echinacea purpurea—Seed is collected when heads are dry in fall, cleaned, and stored dry. After 6 weeks cold stratification, seed is sown in January on flats with germination occurring in 2 weeks. Seedlings are transplanted into 3½ in. pots and will flower the first summer. *Echinacea tennesseensis* and *E. pallida* are treated the same way except that seeds are sown in July, and young plants are over-wintered since flowering will not occur the same year seeds are sown. Echinaceas hybridize freely so maintaining pure seed is essential. They also are harmed by winter dampness and will rot if precautions are not taken.

Dicentra eximia—This species flowers from April to November, which makes it just about the longest flowering wildflower there is. Seed is collected continually which helps keep the plants in bloom. Attached to each seed is a white fleshy aril or eliasome which should never dry out. If it does, germination may not occur. Immediately upon collection, seeds are placed in a plastic bag of moist, milled sphagnum moss and put in the refrigerator. Seeds are ready to be sown after 5 weeks of cold stratification. Germination is rapid and flowering plants may be obtained just 4 months after sowing.

Lobelia cardinalis—Seed is collected in the fall and requires 6 weeks of cold stratification for germination to occur. They should be sown thinly and covered sparsely since they are tiny. *Lobelia cardinalis* will not flower the first year from seed, so seed should be sown in summer. *Lobelia siphilitica* will flower the first year and so is sown in January. Both are easy from division and from stem cuttings, which are good ways to increase the rare color forms.

Asclepias tuberosa, butterfly weed—Seed is collected in summer and fall just before the follicle splits and the seeds blow away. Fresh seed, if sown immediately, will germinate readily with flowering occurring the following summer. Seed stored dry needs 5 weeks of cold stratification. January sowing produces flowering plants that summer. Stem cuttings may be taken in early summer and stuck in 1:1 perlite sand, or root cuttings may be taken in winter. Cut roots into 3-in. pieces, maintain polarity, and stick in sand. During all phases of its growth it should be grown in dry, well-drained soil, and in plenty of light. Avoid winter dampness.

Mertensia virginica—Seed which matures in June is very hard to collect since they drop off immediately. Seeds require a 6 week cold stratification, but since it may take 3 years or longer to obtain a flowering plant from seed, we sow seeds in prepared nursery beds. A more efficient method of production is to grow stock plants in beds. Take root cuttings when plants go dormant in summer through early fall. These may be potted at that time for spring sales in pots.

Tiarella cordifolia var. *cordifolia*—This variety of foamflower sends out leafy stolons which root at the nodes. In rich loose soil, it is a good ground cover. Cuttings may be taken in late summer when root initials form spontaneously on the stolon nodes. These stem cuttings do not root easily at other times. Seed may be collected in early summer and sown for flowering plants the next spring. Seeds are tiny and need not be covered with medium. The tiny seedlings are somewhat slow to get started. Plants can also be divided successfully in early fall. *Tiarella cordifolia* var. *collina* is a clump-forming, non-stoloniferous variety so, therefore, cannot be propagated by stolon cuttings.

Iris cristata—In the wild, dwarf crested iris grows on shaded banks and produces fans every 2 to 6 in. on spreading runners. For maximum production purposes, grow this iris in light shade (47%), in a well-drained mix, and be generous with the fertilizer. This results in very compact clumps that can be divided into many fans in late summer and early fall. Fans produced on fattened rhizomes with multiple eyes will fill in a 3 1/2-in. pot and yield 10 to 20 divisions the following fall. Fans with no eyes will either need another year or can be induced to produce additional eyes or breaks by piercing the growing tip (apical meristem area) of the fan with a sharp knife or razor blade. Seed, which is sparsely produced and difficult to collect because the fruits are well-hidden among the leaves, should be sown immediately without drying into a prepared outdoor bed. Flowering from seed takes 3 to 4 years.

Phlox divaricata and *Phlox stolonifera*—These species and their cultivars are easily propagated by stem cuttings taken all summer and stuck directly into plugs or pots. They can also be divided during summer through fall. Seed propagation is not recommended since the phloxes hybridize readily so cannot be used for propagating the named cultivars.

Conradina verticillata—Cumberland rosemary is a new plant in the trade and is grown much like lavender and rosemary. It is hardy at least through Zone 7. Softwood cuttings dipped in 500 ppm IBA and stuck in 2:1 perlite:peat are taken all summer. Taking regular cuttings helps to prevent flowering, which normally occurs in mid-summer. *Conradina* needs good drainage and full sun. Plants need to be kept dry during winter.

Lilium superbum—Turk's cap lily produces masses of seeds in early fall. The seeds show a double dormancy, but by following the procedure outlined here, you can gain one year. Place seeds in moistened peat or sphagnum moss for 2 months. During this time, small white bulbs should form. Then give the bulbs 2 months of cold stratification. Finally, after all danger of frost has passed, sow the small bulbs out in a nursery bed where a single leaf should emerge the first year. Expect to see flowers in about 5 years! A quicker, easier method of increasing numbers is by dividing the bulbs when plants have gone dormant in late summer and fall. Small daughter bulbs produced on short shoots may be snapped off of the mother bulbs. These may flower the following year. Or remove the outer layer of scales from the mother bulbs. Replant the scales 2 in. deep in nursery beds where they will develop bulbs and flower in 2 to 3 years. Turk's cap lily needs moist, fertile soil and at least 5 hours of sun each day.

CONCLUSIONS

Wildflowers are very popular now and the demand is increasing for nursery-propagated plants. Although the trade is still a long way off in the efficient and cost effective production of native orchids and *Trillium*, for most species, production methods are easy and fast enough to provide a viable alternative to wild-collected plants.