Species Peony Propagation

Nate Bremer-Solaris Farms, Reedsville, Wisconsin

Producing more of a plant (propagation) is often desired when it comes to Paeonia species, but there are some challenges. Most members of the species group are smaller than their hybrid counterparts and take up less room in the garden, allowing more plants to be grown in a smaller space. The variation in a single species can be quite great and being able to share, sell or enjoy more of them are major reasons to propagate. Due to their rarity, demand is also quite high and finding homes in other gardens is generally not a problem. Scarcity in the wild is also a good reason to propagate plants that are already domesticated, which helps to reduce the stresses place upon natural populations.

P. mairei seed in author's garden

Wild collected plants should be avoided, as further impacts on declining populations due to poaching are certainly not helpful. However, sometimes seed is available from collectors that visit natural growing areas and purchasing these may be a good substitute for wild plants. Over collection of seed can certainly impact a species population and should be considered before purchasing seed. Controlling the desire to purchase seed of the rarest Paeonia species helps to reduce demand and ultimately will reduce collecting. Climate change and habitat destruction are also impacting these 'gems', thus propagation from plants existing outside of their natural habitats is recommended.

Herbaceous Propagation. Basically two forms of propagation exist for herbaceous species-division and seedling production. Both forms have upsides and downsides.

Division. Division of herbaceous species peonies is carried out the same way as for *P. lactiflora* and hybrids grown in our gardens. *P. lactiflora*, which constitutes a large group of selected species cultivars in our modern day gardens are good candidates for division and respond positively to division. Other species that respond fairly to division include *P. officinalis, P. tenufolia and P. peregrina* and their variants. *P.*

mairei can be easily divided, but due to its rather unusual root system, divisions are often ungainly looking.

P. daurica and its many subspecies and variants can be divided to create excellent looking divisions, but a fairly high percentage of them fail to grow, for unknown reasons. The same can be said for some of the *P. anomala* variants and subspecies. These should probably be avoided for propagation through division. Example: Some years ago, a large plant of a select Mongolian form of *P. anomala subsps.veitchii* was dug and divided at our farm. The plant yielded 8 excellent looking divisions that had ample roots and buds on each for future growth. All were carefully planted and taken care of in the fall of the season. The following spring, 7 failed to emerge and were dead. The one remaining division grew and prospered. Similar experiences with *P. daurica subsps. mlokosewitschii* have occurred, leading us to avoid the propagation of these plants through division.

Many of the remaining species, not mentioned above, exhibit unusual crown configurations making them difficult candidates for division. For example, *P. intermedia, P. emodi* and many of the Mediterranean species, have elongated crowns with buds closely packed together, making division nearly impossible.

Another often ignored method, that may or may not be considered division, is asexual reproduction through **roots which produce adventitious shoots**. A number of species have the potential of producing new plants from roots that initially lack crown material-they are simply roots to start out with. *P. tenufolia, P. officinalis, P. arientina* and *P. intermedia* (perhaps *P. peregrina*) all have the capabilities of producing adventitious growth from roots. To accomplish adventitious growth, simply collect 'blind roots' in the fall, when peonies are dug. Wash the roots completely, so no soil remains and place them in a plastic bag with lightly dampened peat. Place this bag in a cool place for the remaining fall season and store for the winter in a similar location (one that does not freeze). In the spring inspect the roots for any buds that have begun to form. Plants that have formed buds or begun to grow should be planted immediately in the garden, any that have not begun growth can continue to be held in afore mentioned way. These plants are clonal divisions of the original plant.

P. officinalis adventitious division

All of the species exhibit unique morphologies (structural forms) and can be expected to present different challenges for division, if they can be divided at all. Most or all of the species can probably be propagated through division with some invention and creativity, but this does not mean that the product will be a plant that will grow.

Seed production. Growing species from seed is likely a much better method of propagation, but there are cautions and concerns. Peony seeds are relatively easy to germinate and the resulting plants generally have youthful vigor, making this an attractive method of propagation. As discussed earlier, seeds can be purchased inexpensively from collectors, gardeners or from your own plants.

P. arientina seed pod (carpels)

Peonies do not come true from seed, that is, they are not copies of their parents. Seedlings will produce some variability in flower and plant characteristics, within the scope of the species. Thus, a select form of a species will not produce copies of itself through seed propagation, which is somewhat disappointing. However, the seeds will contain the parental donor's genes for these select traits and some of these may be expressed in the offspring.

Peony species grown in a garden are often subject to cross pollination with other species blooming at the same time. The resulting seeds will no longer be species seeds, but rather hybrids and probably look quite different than the parent donor as they begin to grow and bloom. Because this problem is commonplace, the gardener wishing to produce true species from seed in their garden will need to perform controlled pollinations and then protect the flowers from natural pollinators. Many species are not self-fertile and require a partner to produce viable seed, thus growing at least two of a particular species will be required. See the hybridizing section to learn about pollinating and protecting crosses.

Most of the species bloom early in the season and mature their seeds well before other herbaceous peonies. *Paeonia tenufolia* often has mature seeds that are ready for harvest and planting by July 4 in Wisconsin. Other species may follow within a couple weeks, thus monitoring plants for splits in the carpels (seed pods) during mid to late summer will assure that they do not fall on the ground and become lost. Tying small muslin jewelry bags over the carpels after petal fall will capture seeds, so constant attention to the maturity status is not required. These bags allow adequate air movement and dry easily after

P. anomala subsps. Veitchii with muslin bag

rainfall, thus avoiding problems with disease caused by excessive moisture.

Collect and label your seed containers, relying on memory for identification later seldom works (speaking from experience). Plant the seed immediately as described below for best germination. If the seed is allowed to dry, germination may be delayed and an extra year may be required before the young plants produce plumules (their first leaves).

Outdoor Method. Seed is best planted outdoors, as other herbaceous peony seeds are. Outdoor planting will supply the needed temperature changes to breakdown dormancy factors in the seed during late summer, winter and spring. Mother Nature performs these duties far better than human invention does.

1) Select a planting site that will receive at least ½ day of sunlight during the growing season, is well drained and does not become wet at any time during the year. The area should also be protected from drying wind or excessive heat. This area will serve as a nursery bed that will provide the young plants with suitable growing conditions for their first 2 to 3 years of life.

2) Fresh seed will be planted immediately after harvest (early autumn) and generally produces superior results. Dry seed, such as, those purchased in winter and spring should be planted in mid-summer. Dry seed takes longer to hydrate than fresh seed and dormancy is more difficult to break, thus they are given a longer period in damp warm soil.

3) Till or cultivate the area to a fine texture. Soil should be moist, but not wet. If the soil is one of the heavy dense sorts (clay), mix coarse sand, gravel, peat and vermiculite into it as it is being cultivated before planting. A somewhat sandy loam soil is desired for species, as they require good drainage and soil aeration.

4) Press peony seeds into the surface of the area, no more than ½ inch depth. The seeds do not need to be covered with soil, simply firm or pack them into the surface. Space seeds the 1 to 2 inches apart to conserve space in the controlled bed. Seeds may be given greater space, but maintenance in the form of weeding and watering may be greater. Please remember to place a long lasting garden marker in the seed bed so that plants can be identified later in life. Knowing the identity of what comes up in the bed is both interesting and valuable, especially if you end up with a superior plant that could be shared or distributed later on.

P. tenufolia seedlings planted outdoors

5) Cover the bed with approximately one inch of fine wood chips, wood/bark/mulch, sawdust, or wood shavings. The wood mulch will keep the bed evenly moist and supply the young seedlings with a degree of protection from atmospheric change. Young peonies appear to have an affinity to decaying wood, which promotes growth.

6) Cover the entire bed (wood mulch and all) with a sheet of clear plastic. You can bury the edges of the plastic with soil so that it seals and is not easily moved by the wind or other conditions. The plastic will create a greenhouse effect, warming them during their first stage of dormancy reduction. The plastic will also protect the seed bed from evaporation or excessive watering (natural or gardener produced). The covering should remain on the bed through the entire winter and be removed as soon as possible in the spring. If left on too long, the small seedlings will begin to grow under the plastic and will not be in synchronization with the season. We often remove the plastic when snow still remains and temperature are still below freezing at night.

7) Young seedlings will emerge as the temperatures allow in the spring. It is not unusual for seedlings to emerge in the bed for up to 3 years (most will come up in the first year), thus patience is required. The first season, the plants will only produce a single leaf (plumule). Keep them well watered (never wet), and protect them from hot sun if possible.

The bed should be left intact for two to three years, after which time the seedlings will have grown large enough to transplant in early fall with greater spacing between them. Some may begin to bloom in the third year, some in the fourth year, and the stragglers in the fifth/sixth years. If they are well taken care of, most will bloom in year four.

Indoor Method: Some growers use a plastic bag with damp medium to move seedlings through the various temperature changes required in germination. This procedure requires practiced skill and perhaps some luck. Constant monitoring and the removal of rooted seedlings from the bags for planting in containers, as their development requires, makes this interesting, but challenging. Seedlings grown indoors often succumb to a variety of maladies and losses can be frustrating. Seeds started indoors are usually out of synchronization with the outdoor environment and moving them to the garden may cause more losses. For more information on the bag method, see 'Germinating Peony Seeds (Indoor Method)' under Herbaceous Peony propagation.

However, some seeds may benefit from a some type of artificial growing scheme. These seeds might include the less cold hardy Mediterranean species. Recommendations for an alternative that works for this type of seed is as follows:

1) Purchase or create a soil mix that might be used to grow alpine plants. The goal is to create a medium with high drainage, excellent aeration and minimal amounts of nitrogen. Thus a mix of 1 part sterilized compost, 1 part coarse sand, 1 part fine perlite, 1 part finely ground pine bark and ½ part agricultural limestone works well enough.

2) Place this mixture in a deep pot (one used for small tree seedlings), water and let drain for a day.

3) Press seeds into the surface, no more than ½ inch deep. A four inch pot can accommodate anywhere from 1 to 8 seeds.

4) Cover the surface of the medium within the pot with 1" of shell based chick grit. The chick grit helps evaporate water away from the surface of the pot once stems push through. Stems are the most likely plant part to become diseased by fungal attacks in seedlings and the chick grit mitigates potential problems very well. The grit also prevents soil from splashing on to the seedlings when they are watered. Soil often carries disease organisms.

Species seed in bagged pot

5) Place the entire pot into a bag and seal it. This step prevents evaporation of water from the pot and relieves the grower of watering duties. The act of watering a container of peony seeds may cause excessively wet medium and ascertaining the need for additional water is difficult. More peony seedlings perish from overwatering than becoming dry. Thus, not watering at all avoids the pitfalls.

6) Place the bagged container in room that will remain reasonably warm for 2 to 3 months (65F to 80F). This constitutes the first stage of dormancy reduction.

7) Move the bagged container from the warm location to one that is cool (35F to 45F) for 3 months. This constitutes the second stage of dormancy reduction and can be accomplished in an unheated room in the basement, refrigerator, garage or workshop. Often seedlings will begin emerging toward the end of this step. If they begin to make rapid visible growth, the bagged container can then be moved to windowsill or be placed under grow lights.

8) Move the bagged container from the cool location to a somewhat warmer one that has a light source, even if plants have not begun to make visible growth. Temperatures should not be initially high, nor should the light be direct. The bag can be opened to allow the potted plants to breath and acclimate to the atmosphere. After a week the bag can be entirely removed. The pot may need to be watered at this time.

9) Sink the container in a garden when all chance of frost has past. The garden site should be lightly shaded and protected from harsh winds. Monitor the plant for water needs throughout the summer.

10) Bury the sunken container with an inch or two of bark mulch in the fall to protect it from winter weather.

11) After another summer of growth in the garden, dig up the entire container in fall and gently remove the potting medium. Plant the small seedlings in a protected garden and give them a few inches of space to broaden their growth.

Some may begin to bloom in the third year, some in the fourth and fifth year, and the stragglers in the sixth year. If they are well taken care of, most will bloom in year four or five.

Woody Species Propagation.

Division. For the most part these plants are not easily divided and doing so is not recommended. A number of forms of *P. delavayi (potanini var. trollioides)* are stoloniferous, creating long runners that can be dug, but they seldom have adequate root systems to develop new plants. Occasionally, *P. delavayi* produces large enough clumps that can divided as any other woody species is divided.

Seed Propagation. Woody species (tree peony) seeds are rarely available, with the exception of *P. delavayi*, in which the red form is most commonly offered. They are not difficult to grow from seed and most can be started outdoors, as the herbaceous species are. *P. ostii*, *P. rockii* and *P. qiui* are easily grown from seed outdoors and the resulting plants are rapid growers. Commonly, the only seeds of woody species offered are of garden origin. Wild collected seed would come from China, as this is the country of origin for woody species. Seldom are wild collected seed available.

P. delavayi seed

Due to cold winters and often short fall seasons in Wisconsin *P. ludlowii* and *P. delavayi* (including variants) should be dealt with as described in the indoor method for starting herbaceous species seed. These two species have large, fleshy seeds that easily rot and do not appear to be as cold hardy as the other species' seeds. Rooting is generally slow and often erratic with dried seeds of these two species, which is more easily dealt with in container culture, which provides more warmth and frost free soil. *P. delavayi* and *P. ludlowii* can be easily transplanted to the garden in the spring, or even mid-summer, as their rooting is more continuous than other peonies. Neither has particularly hardy stems in Wisconsin, thus protection should be given once planted outdoors.

Expect approximately a four to five year wait until the woody species bloom for their first time. No special care for *P. rockii*, *P. qiui* and *P. ostii* is required, beyond what would be given to the herbaceous species.

The woody species, with exception of *P. ludlowii* and P. delavayi, easily cross pollinate with other species and hybrids, much as the herbaceous species do. Care should be taken to control pollination and protect pollinated flowers of those grown in the garden, so hybrids are not produced.

P. jishanensis, *P. decomposita* and *P. rotundiloba* are being trialed in our gardens at this time, but the particulars of growing seeds from these species is unknown, as no source has yet presented itself.