Cuttings, Clippings, and Miscellany

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Beginning in my youth with rose cuttings stuck under mason jars placed beneath large spreading junipers through a 5-year tour at Denver Botanic Gardens (DBG) where 1000-2000 species were regularly propagated each year, the propagation of plants has been an integral part of my studies, my avocation, and vocation.

Throughout the often unusual nature of these endeavors it became apparent, in retrospect, that plant propagation in the isolated Rocky Mountains was as different as its horticulture and that the progression of the best in horticulture in the Rocky Mountain region can be ascribed to a "can do" attitude when presented with an "it can't be done" project.

Every propagator here worth his/her salt has tried to root cuttings of the local *Juniperus communis* ssp. *alpina* (common juniper) to no avail, though most have succeeded in keeping the massively callused cuttings alive for over a year in a mist bed. One grower even resorted to force feeding the fruits to starved chickens in hopes that the resultant droppings might yield a few viable seedlings. Nearly everyone has given up on the ridiculous information often repeated in texts regarding the successful germination of *Arctostaphylos uva-ursi* (kinnikinnick) after burning pine duff atop a sown flat.

Ipomoea leptophylla (bush morning glory) "can't be grown from seed" unless you realize that recently harvested seed must first be after-ripened or subjected to scarification or a hot water treatment. *Eritrichium aretioides* (alpine forget-me-not) "can't be grown at all" until you realize that highly aerated soils and cool growing conditions are all that is needed. Success with the latter garnered me a lavishly appointed trip to speak to the American Rock Garden Society in Delaware where members were treated to several discourses on how attention to soil aeration could solve many of their specialized plant growing problems. Especially intriguing to them was learning that "sharp sand", a highly regarded soil amending substance, was decidedly inferior to spherically shaped sand.

Similarly, a renowned grower of these distinctive small plants was enlightened on how to grow the infamous *Erigeron chrysopsidis* var. *brevifolius* (Wallowa yellow fleabane), a species that had previously defied pot culture and one which this grower had resorted to growing in pure Turface. Attention to soil aeration means that one can grow all cactus in a peat-perlite soil mix and that getting *Echinocereus viridiflorus* (green hedgehog) to bloom in less than 9 months from sowing is no big deal.

The three broad-leaved evergreen manzanita (*Arctostaphylos*) species native to Colorado have been exploited to no avail, due, undoubtedly, to the lack of experience in propagating rhododendrons which generally do not perform well here. Local propagators still fail to comprehend the absolute need for sanitation in all growing matters and the need for highly aerated container soils. Treating the cuttings (the seed germinates no better than kinnikinnick) like they were the easily propagated privets or willows simply does not work well. The latest excuse for failing so miserably in rooting their cuttings is the discovery of the unique root mycorrhizae

associated with native stands. Unfortunately, even when soil from these stands is mixed with the cuttings, results are the same.

Castilleja (paintbrushes) is assigned to the "you can't grow them" society as well because they are "parasites" and they must parasitize sagebrushes (*Artemisia*). Actually, paintbrushes are hemi-parasitic plants which means they have the ability to germinate, grow, and reproduce without the benefit of another plant anywhere near them. Some species will parasitize sagebrushes (and probably any other plant as well) and, apparently, give up the ability to live on their own soon after. The "secrets" of their growth includes first noting their seed is surrounded by a reticulated network of dry material that inhibits water getting to the seed. Simply rubbing between thumb and palm rids the seed of this coating. While some species must first be moist-chilled for a period before sowing, others germinate without difficulty. Seedlings are tiny and unusually subject to damping-off diseases. Again, sanitation is the key to surmounting this. Copious light (24 h, if possible) and a regime of heavy fertilization with each watering will get the seedlings to the transplant stage with no problems. They can be transplanted singly or in twos since there is some evidence that they will parasitize each other, each benefitting from the experience.

Toys have played an important part in propagating new, unusual, or important plants. High-intensity discharge (HID) lamps, capable of producing 10,000 fc of illumination ran constantly at DBG as I learned that manzanitas grown beneath them could produce easily rooted cuttings in a matter of a few weeks and that *Mimulus lewisii* (Lewis monkey flower) could be grown seed to seed in less than 60 days. The hybridization potential of the latter is enormous. Increased branching, vastly hastened growth that was retained even after removal from beneath the lamps, and the vision of plants growing beneath them at night when all else was dark and quiet are but a few of the benefits that should endear their use to all growers.

Photoperiod lamps designed to run continuously during night hours or regulated to be "on" from only 10PM to 2PM allowed me to grow temperate-zoned woody plants during winter when merely increasing greenhouse temperatures was not enough. Aspens (*Populus tremuloides*) grown to 12 ft tall and *Juglans microcarpa* (littlenut walnut), among many others, were landscape ready the following spring from seeding.

If you can't see, taste, and feel it, then it can't have any effect on your plants—right? Wrong. Carbon dioxide generated inside the greenhouse during months when vents are closed has a dramatic effect on plant growth. What else would explain the growth and blooming of *Caesalpinia gilliesii* (Mexican bird of paradise) in 6 to 9 months from seed? Numerous papers have reported the gains to be realized from these generators but so few plant growers utilize them. Why?

Unorthodox tools and toys come in handy too. What implement would you use to propagate *Trifolium repens* 'Atropurpureum' (purple four-leaf clover) that was currently outside beneath 6 in. of snow and the air temperature was -20F? Why, a pick, of course. Armed with a map of its location in the garden, a section of it was picked out of the ground, thawed in the greenhouse, propagated via cuttings, and ready for display 3 weeks later.

Fraxinus anomala (single-leaf ash) in the one literature source found states that its seed is "impossible" to germinate. Actually, it germinates with ease after 3 months of moist-chilling and further, it was found that semi-hardwood cuttings of

2- to 3-month-old seedlings rooted with even greater ease. Unlike the seedlings' roots that are problematically taprooted, cutting roots are horizontal, branched, and much more attuned to pot culture. Clues to the possible success of this venture and its potential benefits to the vegetative propagation of ashes in general were derived from a master Japanese gardener who regularly rooted pine seedlings for eventual use in shallow bonsai pots.

The Mexican phloxes (*Phlox nana* ssp. *ensifolia* [syn. *P. mesoleuca*]) hit Denver in a very big way with their sprawling habit and large fluorescent blossoms. Unfortunately, the "impossible-to-root" label stuck to them meant that only specialists who managed to root a few could charge over $6.00 for each 2-1/4-in. pot success. Putting my toys to work, it soon was possible to root them by the thousands by growing stock plants under H.I.D. lamps and CO_2 continuously, fertilizing them constantly,and taking only very short cuttings of soft stems. Cuttings could be taken from cuttings, that rooted almost 100% in 2 to 3 weeks, each 3- to 4-week period after transplanting. Even leaf pieces rooted, though these did not form entire plants.

Where, in conclusion, would I recommend that a student apply his or her newly acquired skills? Botanic gardens are potentially extraordinary places to get your feet wet. Long before you learn that propagating, growing and studying plants is not their bottom line, you will be exposed quickly to a very large number of species and probably be working in areas where no one else knows how to really measure your productivity, efficiency, or knowledge—this is your time to learn and play.