Propagating Leatherwood: A Lesson in Humility

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It is often assumed that because I work in the greenhouses of the Arnold Arboretum, I should be able to solve any plant-propagation problem that comes along. With all that heat and light, the reasoning goes, you should be able to make dead sticks sprout. Unfortunately, technology is not always the most effective solution to the difficulties that arise with plants. This fact was brought home to me rather dramatically recently in attempting to determine the seed-germination requirements of *Dirca palustris*, the Atlantic leatherwood.

This beautiful little shrub is native to the east coast of North America, from New Brunswick to Florida and east to the Mississippi. In the wild, *Dirca* tends to form dense thickets in the forest understory, growing best in moist areas that have a high limestone content. Henry David Thoreau tracked the plant down in its native haunts in Brattleboro, Vermont, on September 8, 1856:

> . . . for the first time I see growing indigenously the *Dirca palustris*, leather-wood, the largest on the low interval by the brook. I notice a bush there seven feet high. In this form it is somewhat like a quince bush, though less spreading, its leaves are broad, like entire sassafras leaves; now beginning to turn yellow. It has remarkably strong thick bark and soft white wood which bends like lead (Gray says it is brittle!), the different layers separating at the end. I cut a good-sized switch, which was singularly tough and flexible, just like a cowhide, and would answer the purpose of one admirably. The color of the bark is a very pale brown. I was much interested in this shrub, since it was the Indian's rope. Frost said that the farmers of Vermont used it to tie up their fences with.

The great tensile strength of the bark of leatherwood has been noted by nearly all botanical writers — before and after Thoreau — who have discussed the plant. None, however, have presented quite so memorable a description as the late Edgar Anderson, former dendrologist of the Arnold Arboretum and long-time botanist at the Missouri Botanical Garden:

> Delicate though the flowers may be, the species is well deserving of its popular name as anyone will find who attempts to gather the flowering twigs without a sharp knife. The branches are surprisingly limber and the bark is tough and strong. One can actually tie the twigs in bow knots. If one attempts to snap off a branch quickly, the wood itself may break and separate from the bark. It may even come away altogether, leaving the startled flower-gatherer with a perfectly bare twig in his hand and on the bush, dangling like an empty glove, the bark with its flowers and leaves still intact.

Horticulturally, *Dirca* is noteworthy for reasons other than its bark, not the least of which is that it produces bright yellow flowers in early April, when most other plants are still dormant. Another point of interest is its tendency to develop a single stem. This habit, which is unusual for a shrub, gives the plant the appearance of a miniature tree and makes it extremely useful in rock gardens and perennial beds. Despite leatherwood's preference for moist, shady sites in the wild, it will tolerate full sun under cultivation. Interestingly, when grown in the open the plant assumes a more compact habit of growth, and the foliage, which is light green in the shade, takes on a distinct yellowish cast.

Because propagation data on leatherwood were either nonexistent (Schopmeyer 1974) or imprecise (Esson 1949), I undertook a seed germination project in 1979. At that time there were two *Dirca* plants at the Arboretum, both collected in New Hampshire in 1961. In early June the mature fruits were falling off. They were green at that point, with a slight tinge of yellow. The fruit is a berry with a fleshy outer seed coat and a hard, black inner coat surrounding a single large embryo.

I followed my usual practice when processing seeds preparatory to sowing them: I put them in a plastic bag and set them on a headhouse bench until the fleshy part of the fruit softened enough so that it could be easily washed off. This "fermentation" clean-

The Atlantic leatherwood (*Dirca palustris*) produces bright yellow flowers in early April.

ing, as it is called, usually takes about one week and works wonders with fleshy fruits like those of *Malus, Cornus,* and *Sorbus.* While this technique is not generally recommended in the seed germination literature (Schopmeyer 1974), it has long been used successfully with many types of plants at the Arboretum.

After a week I removed the rotting *Dirca* fruits from the bag and washed them clean with water. I then subjected the seeds to various tests: some I sowed immediately in the greenhouse, some I stratified (this involves packing the seeds in a moist medium and storing them in a refrigerator for three months), and some I treated with the plant hormone, gibberellic acid (GA_3). To my disappointment, none of these treatments produced a single plant.

Trying again in 1980, I collected 1177 seeds and designed an experiment that I thought would cover all possible types of seed-dormancy mechanisms. I put all the fruits in a plastic bag for fermentation cleaning, except for 77 that I pulled out at the last minute to use as a control. These I sowed in a flat, which was then planted outdoors to simulate the conditions the seeds would have been subjected to had they been allowed to fall from the plant.

The remaining 1100 seeds were allowed to rot for several days, after which they were cleaned and then subjected to every possible seed-germination test I could think of: stratification in the refrigerator, as well as in the greenhouse, gibberellic-acid soaks, and scarification with a knife. Finally, I carefully excised over 400 embryos from their seed coats and gave them the same treatments.

To my amazement, of the 1100 seeds so carefully cleaned and treated, not a single seedling was produced, but of the 77 uncleaned ones planted outdoors, 47 seedlings germinated the following spring — a staggering 61 percent. Here I had brought to bear nearly 10 years of experience in botantical research, along with a barrage of hormones and climate-control devices, when success could be achieved only by doing nothing. Humility is what I learned from that experiment.

In 1981 I collected another 600 fruits from *Dirca* to see if perhaps my experience in 1980 had been a fluke. This time I set up a surefire test. I divided the seeds into six lots: some I cleaned by hand, peeling the thin green skin off with my fingernail; some I cleaned by the usual fermentation method in a plastic bag; and some I left uncleaned. I then planted replicate lots outdoors under shade cloth and indoors in a greenhouse heated to a minimum of 45°F in the winter time. The results are shown below.

Treatment	*Location*	*Seedlings Produced*
100 seeds uncleaned	outside	32
100 seeds uncleaned	inside	25
100 seeds hand cleaned	outside	54
100 seeds hand cleaned	inside	9
100 seeds fermentation cleaned	outside	1
100 seeds fermentation cleaned	inside	0

In all cases, the seeds sown outdoors did better than those treated in the same manner but sown indoors, and as a whole, the uncleaned seeds performed almost as well as the hand-cleaned seeds. Fermentation clean-

Flowers of Atlantic leatherwood (*Dirca palustris*)

ing was, of course, a disaster all around. More than anything else, this experiment demonstrates that some plants propagate themselves best when left to their own devices. With *Dirca palustris,* letting nature run its course is not only easy, but also very effective.

References

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