

Growing Shrubs at the George O. White State Forest Nursery: What Has Worked and What Has Not

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In: Riley, L. E.; Dumroese, R. K.; Landis, T. D., tech. coords. 2006. National Proceedings: Forest and Conservation Nursery Associations-2005. Proc. RMRS-P-43. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 160 p. Available at: <http://www.rngr.net/nurseries/publications/proceedings>

Keywords: native species, shrubs, bareroot, riparian restoration, wildlife restoration

Introduction

At, the George O. White State Forest Nursery in Licking, MO, we annually grow about 20 species of shrubs. That number has been larger in some years. For most species, we purchase seeds locally and process them at our nursery. Our shrubs are used for wetland restoration, windbreaks, visual screens, riparian buffers, and wildlife plantings.

Sales of shrubs continue to be high, and we sell out of most species every year. Even during years of sluggish sales in conifers or hardwood trees, our shrub demand tends to remain high. Since 2001, we have had about 5.8 million shrubs available for purchase and have sold 5.3 million, or about 91 percent of the inventory.

So what have we learned? We have great success with some species, but have not been so successful with others. We have, however, learned better ways of getting the seedlings we need.

Shrub Species Grown at the George O. White Nursery

Dogwood (*Cornus* spp.)

We grow five species of dogwood, including flowering (*C. florida*), roughleaf (*C. drummondii*), red-osier (*Corpus sericea*), gray (*C. racemosa*), and silky (*C. oblique*) dogwood. The dogwoods are the first seeds we sow in the fall, with a target planting date of October 1 if possible. Over the years, we have also found that dogwood seeds store very well. Last year we sowed the last of our 1988 collection of flowering dogwood seeds and we were still getting very good germination and seedling growth. The reason that we still had 1988 seed available is that I rarely plant all seeds from one source and year. I sow seeds like this with nearly every species we grow, for both large trees and shrubs. We may plant 100 lb (45 kg) of flowering dogwood seeds in a year, and these seeds will come from three to five sources from at least that many different years. Much of our flowering dogwood is locally collected, so the source may be local, but the year collected is different. This helps to avoid total disasters.

Flowering Dogwood—Flowering dogwood is the hardest of the dogwoods to grow, and the seeds are the most expensive. We get more complaints when we are sold out of this species than about anything else we grow, and we get more complaints about survival. The seedlings store and outplant poorly. During the growing season, this species is the slowest growing of the dogwoods, and powdery mildew is a constant problem. About 200 lb (91 kg) of nitrogen (N) are applied each summer to get the seedlings to 12 in (30 cm) or greater in size, and we treat seedlings with fungicide on a 7- to 10-day schedule. But we sell over 100,000 every year—year in year out—so we keep growing it!

Gray Dogwood—Gray dogwood is not nearly as difficult to grow or handle as flowering dogwood. We have found that it likewise takes about 200 lb (91 kg) of N per year to get them to 12 in (30 cm) in height. They are faster growing than flowering dogwood, but not by much. We spray them on the same fungicide schedule as flowering dogwood, but I am not so sure that it is necessary.

Roughleaf, Red-Osier, and Silky Dogwood—The other three dogwoods are very different than growing flowering and gray dogwood. These require less than half the nitrogen (N), and all three of these dogwoods usually reach 24 to 36 in (61 to 91 cm) in height with little effort. In addition, they do not require as much or any fungicide as flowering or gray dogwood. All three species store very well for months in cold storage, and we almost never have any complaints about survival.

Smooth Sumac (*Rhus glabra*)

Smooth sumac is a mildly popular species. We only grow about 25,000 per year. Some years we sell most of the seedlings, but now and then we have some left. I really only grow it because, when I took over the nursery, we had about 300 lb (136 kg) of clean seeds in cold storage that had been collected in the mid 1980s. We sow about 20 lb (9 kg) per year, so my replacement will be growing it for years after I am gone! We do not sow this species until about the first week of June. If it is planted any earlier, it gets really big. We treat the seeds for 60 minutes in H₂SO₄ prior to sowing. This same routine for seed treatment and sowing time has also worked for shining sumac (*R. copallina*).

Buttonbush (*Cephalanthus occidentalis*)

Buttonbush is a new species for us that we only began to grow about 3 years ago. Missouri Department of Conservation Fisheries and Wildlife Divisions wanted us to add more wetland species, and this is one we added. Customer requests for this species have been good, but the learning curve on growing this was steep. Our first crop yielded 275 seedlings from 4 lb (2 kg) of seeds. The next year we got 44,000 seedlings from 4 lb (1.8 kg) of seed. We now plant buttonbush the same time and the same way we do river birch (*Betula nigra*) and sycamore (*Platanus* spp.). We lay the seeds on top of the ground, press it in, and then cover it with hydromulch-no sawdust. We then water it twice per day until it germinates. This is another of those shrubs that can get huge in one growing season—3 ft (0.9 m) or more.

Blackberry (*Rubus* spp.)

We sell about 100,000 blackberry seedlings each year—if we can get that many. It is somewhat tricky to grow, I think. We plant this species the first week of July to give it warm, then cold stratification. It germinates in early April of the following year. It must be planted very shallow and allowed to sit for almost a year before germination. It seems that we get 5,000 to 100,000 seedlings from year to year with the same seedlot. Our wildlife folks are really pushing this species for quail management, so the demand will stay high. Our shippers, including United Parcel Service (UPS) and the United States Postal Service (USPS), do not much care for these plants sticking out the tops of the bundles, so they have to be top clipped. Workers don't care much for this species either.

Deciduous Holly (*Ilex deciduas*)

We purchase and clean all seeds that we use for deciduous holly, which are very slow to germinate. We sow this species in late September and it does not germinate until April, a year and 7 months later. There does not appear to be any way to get these seeds to germinate any earlier. This is a slow growing species that requires about 200 lb (91 kg) of N each year to get the seedling to 12 in (31 cm) or greater in height. We have found this species to store somewhat poorly, so we lift it as we need it.

Redbud (*Cercis canadensis*)

Redbud is one of the easiest seedlings to grow. We give the seed a 30-minute soak in H₂SO₄, and sow it in the first or second week of May. This is another species that gets very big. Seedlings cold store very well.

Hazelnut (*Corylus americana*)

Another very popular species is hazelnut, selling out every year even if we grow 125,000 or more plants. Hazelnut is one of the most costly seedlings we grow. We buy all seeds locally starting in mid-August. The seeds are in green husks. Thousands of pounds of husked seeds are spread out on screens for about 2 months. (Stir occasionally!) A large amount of mold is generated on the husks, but seed quality does not seem to be affected. Seeds continue to ripen in the husks, so it can be picked green. We run the dried husks through our HA400 brush machine to remove the husks. Clean seeds are sown in mid- to late October. Two years ago we were able to purchase more seeds than needed (usually we cannot buy enough), so we stored about 500 lb (227 kg) for a year. Seeds were placed in plastic bags in seed cans and stored at 34 °F (1 °C) for a year. The germination was great on our 1-year-old seeds. We have excess seeds in storage now. Because the seed crop of hazelnuts for this year appears to be poor, this 2004 seed will be great to have in storage.

Wild Plum (*Prunus* spp.)

Wild plum is so easy to grow. We sow seeds in mid-October and it is one of the first trees to germinate the following spring. Late frosts don't bother it a bit. At our nursery, it is about 15 in (38 cm) tall by mid May. It does not require much fertilizer or irrigation, and may need only minimal treatment for leaf diseases. We lift a bunch of tall seedlings in fall. Seedlings store great for months in cold storage, and customers love it. We sell upwards of 125,000 to 150,000 seedlings per year. We buy all plum seeds locally.

We used to sell this as *P. americana*, but there are six species of wild plum native to the county where our nursery is located and we have seeds of all these species brought in. So we no longer call it *P. americana*, but just *Prunus* spp.

Aromatic Sumac (*Rhus aromatica*)

Sumac is another very popular species for us. We sell 100,000 or more seedlings per year, if we have the stock. This is another fall-planted species. Typically we treat our sumac seeds with H₂SO₄ for 30 minutes and then sow it late October. Several years ago I decided, because the seeds are sown in the fall, to not bother with acid treatment. Here is one you can take home. We sow 20 lb (9 kg) of seeds per year. The year we did not treat with acid, we got less than 30,000 seedlings out of the 20 lb. In each of the last 5 years we did treat with acid, we have averaged over 95,000 seedlings per year. All sowings were done with the same seedlot. Treat it with acid! One word of caution, if you do treat with acid, wait until warm fall weather is over. In 1999, I planted this species in late September. We had a wet, warm October and

the first week of November quite a bit of this germinated. It did fine for a week or so, but then it got down to about 15 °F (-9 °C) one night—the rest is history.

Washington Hawthorn (*Crataegus phaenopyrum*)

Hawthorn *is* another species that is fairly easy to grow, but somewhat slow growing. We have found that it requires 150 to 200 lb (68 to 91 kg) N fertilizer to reach a 12-in (30-cm) seedling. Occasional problems with leafhoppers slow the growth. This is another species that we have planted in early October one year and had the seeds germinate and die in November. So we wait until late October to sow this species.

Ninebark (*Physocarpus opulifolius*)

Ninebark is getting to be another of our big sellers. It is a great plant for dry soils, wet soils, windbreaks, wildlife cover, and visual screens. We plant about 3.5 to 4.5 lb (1.6 to 2.0 kg) of seeds for about 50,000 to 60,000 seedlings. We plant in late October. This is another species where depth is critical when sowing. It is such a small seed that, if sown too deep, you get a terrible stand. The seeds need to be laid on the surface of the bed, pressed, and lightly covered with sawdust

Chokecherry (*Prunus virginiana*)

Chokecherry is a fairly new species in our mix. It has not caught on well with our customers. Maybe it is the name? It is easy to grow and is sown in the fall. The seeds germinate quickly in the spring and seedlings need very little fertilizer to exceed 12 in (30 cm) in height. There is, however, a leaf disease that once you get it, the seedlings stop growing. No matter how much you treat with fungicide, the seedlings will not resume growing. We have already had 30,000 in the seedbeds and 25,000 are about 6 in (15 cm) tall in October. We now treat on a 7- to 10-day fungicide treatment schedule.

Witch Hazel (*Hamamelis vernalis*)

We collect all of our own seeds for witch hazel locally, and it is the most fun of all of our seeds. The collectors must pick the seeds before they are ripe. We spread the seedpods on screens and then completely cover the screens with plastic. These seeds explode out of the pods when ripe. You can stand in our seed building when we have these seeds drying and it sounds like someone is making popcorn. Even with all the plastic, we find witch hazel seeds in every corner of the building. it can be sown in early or late fall. I have sown it at the end of September with no problems. It is slow growing, and takes a lot of water and fertilizer to get this species up to 10 in (25 cm) in height. So just a word of advice—don't plant it next to your plum!

Buckbrush (*Symphoricarpos orbiculatus*)

Yes, we grow buckbrush. I inherited large amounts of seeds and when those seeds are finally gone, we will quit

growing this species. We sow in the first week of July along with the blackberry. Powdery mildew can be a problem. We typically only have approximately 15,000 seedlings to sell each year and usually sell most or all of them.

False Indigo (*Amorpha fruticosa*)

We started growing false indigo about 5 years ago. We quit growing the nonnative shrub lespedeza (*Lespedeza* spp.), and this was a legume to replace it. This is becoming very popular with our customers because it survives everything. We have had customers tell us they outplanted a bunch of trees and everything died except the indigo; not one of the false indigo died. In fact, I don't think I have ever heard anyone say they had one die. It flowers in the second growing season and produces lots of seeds. Our wildlife folks like it for quail plantings. The first year we grew this species, we sowed in the spring after acid treatment and got an excellent stand. In the years since, we sowed in the fall with no seed treatment. We were no longer getting decent stands and I blamed the seeds. Last fall, we sowed 10 lb (4.5 kg) of a seedlot and it barely came up. So we took an additional 10 lb out of the same seedlot, treated it for 8 minutes in H₂SO₄ and we have an awesome stand. Another take home message is to sow this species in the spring after acid treatment.

Spicebush (*Lindera benzoin*)

Another new species on our list is spicebush. We have only been growing this species for about 3 years. I liked it because it will tolerate a lot of shade, has lots of berries for wildlife, and has good fall color. Sales of this species have not been what I had hoped. We buy all of our seeds locally, but seeds can be difficult. We have dried the berries and cleaned the berries. Either method works well, but the seeds store poorly. If you grow this species, count on getting fresh seeds each fall for the best stands.

Elderberry (*Sambucus canadensis*)

Elderberry is our "newest" species. This is only our second year of growing this species, and last year we only had about 20,000 plants. We sold out in about 3 weeks and spent the rest of the season listening to people gripe about us being sold out. This year, we should have 30,000 to 40,000 seedlings, so we will see if people still want it. Elderberry is great for wildlife plantings. We sow in the fall, and the seeds are sown at a very shallow depth. The seedlings do get big in one year. In our one year of experience, they seem to store very well. In fact, by early spring they started leafing out in the cooler!

Hazel Alder (*Alnus serrulata*)

Our fisheries folks asked me to grow hazel alder for riparian plantings. We have tried twice. We collected the seeds ourselves and sowed it according to the seed manual and got zero seedlings. We then bought some seeds and sowed them but got zero seedlings. So this species is on hold for now. I am open to suggestions.

Other Species

On occasion we grow other shrub species. This is often done because someone gave us some seeds or requested that we grow some for a special project.

We currently have some Ohio buckeye (*Aesculus glabra*) and red buckeye (*A. pavia*), the latter of which is a great tree. Red buckeye grows much faster than Ohio buckeye, is more colorful, and tolerates lots of shade. However, the seeds are hard to come by. We also grow some white fringetree

(*Chionanthus virginicus*), which is a beautiful small tree, but takes about 3 years to get from sowing to 12 in (30 cm) seedling. We have grown corkwood (*Leitneria floridana*)—listed as an endangered species with the Federal government—for a restoration project on our lands. We will try just about anything once!

I have no doubt that shrubs will continue to be in demand for us. There are many new cost share programs in which landowners only plant shrubs. So we will continue to grow these species and may add a few more over the next few years.