

You Want Us to Do What!? Diversifying Plant Products at the J. Herbert Stone Nursery¹

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INTRODUCTION

It seems like only yesterday when a few of us were talking in the hallways after a coffee break about what we might do with our nursery fields when the demand for seedlings fell off. One suggested, "why don't we plant native grasses?" It was as wild an idea as suggesting that a cattle rancher try growing chickens. This was 1990 and we had been riding high on what seemed like a tidal wave of seedling orders for reforestation areas created by the fires and increased logging of the late 1980's. Looking back at this period, it seems that we, in a Forest Service nursery, were in the center of the cyclone as the rest of the Forest Service and Bureau of Land Management were swirling in forest politics. One thing seemed certain, when the storm settled there would be less demand for bareroot seedlings for reforestation. Less demand for seedlings meant more fields fallow, which would lead to higher seedling costs and ultimately less demands for seedlings. This negative cycle was something we wanted to avoid. Keeping our fields in crops, whether it be conifers or some other plant material, was one way to keep it from happening. This paper describes how we accomplished the transition to diversification of our plant products and at the same time, met the changing plant material needs of many of our federal land managing customers.

NATIVE GRASS SEED PROGRAM

Native grasses did not come up in our conversations until a year later when Wayne Rolle, forest botanist for the Rogue River National Forest, walked through the door with 15 little bags of seed he had collected from native stands of grass in the surrounding Siskiyou Mountains. "Do you want to grow these? I can't seem to locate a grass seed farmer interested." So began our native grass program.

The program started very small. We sowed Wayne's 15 species on small plots in a part of the field that never had grown a very good conifer crop due to its hard soil and poor drainage. The seeds were sown in the fall amidst a few snickers from onlookers. Yet many of us were curious and even some, like myself, could be seen on our hands and knees, on many mornings, watching them grow. By the following spring, most of the grasses had grown into large plants, covering much of the beds. Since these plots were next to the main road, the clients who visited us were curious too and subsequently spread the word to their botanists and other resource people back at their field offices. Over the next few years we received bags of field-collected seed from field offices all over Oregon, Northern California and Montana with instructions to sow them in our beds for grass seed production.

The learning curve was steep. Stratification seemed simple for most species - just soak, sow, and in a week they germinate. But for 25% of the species we had to experiment with special stratification treatments to break dormancy. Learning how to grow grass plants in four-foot-wide nursery beds designed for bare root conifers was another challenge. We tried a variety of methods and eventually settled on sowing the rows a foot apart during mid to late fall and covering the beds with a sawdust mulch. We learned that the late fall sow avoided many of the weed species that germinate during the warmer late summer and early fall weather. Late fall sowing was just one of the many methods we used to put a dent in our weed problems. We also learned to attack them with brush hoe weeders, mechanical path weeders, flame throwers, hand weeders and eventually herbicides. Since our aim was to cultivate pure seed, our hand weeders needed to weed out any plant, including grass species, that did not belong in the seedlot. Six years, 55 acres in production and 20 tons of seed later, we can finally stick a grass straw (native that is) between our teeth with pride.

The intent of the native grass program from the beginning was to produce breeder seed for grass seed growers who would use it to grow bulk quantities. We believed that our nursery operations were ideal for this purpose. Our 4 foot beds and all the equipment designed for them lent themselves to growing small orders of seed. The challenge we faced was growing the seed source collections we were receiving for the same species without mixing pollen between seed sources.

The trick was to grow these seed sources far enough apart (150 to 300 feet depending on the species) to avoid the risk of pollen contamination. This meant that we had to keep track of all collections and their locations in our fields. For some of the 24 species that we grow, this was not a problem since there were few seed sources, but for other species like *Elymus glaucus*, we needed to locate growing areas on our 210 acre nursery to isolate over 25 separate collections. Keeping track of all of this is much like a hotel owner scheduling rooms for 24 families where no two members of the same family could have rooms next to each other. It is not uncommon to hear our native grass seed manager, Colleen Archibald, who has around 120 collections a year to keep track of, say "the rooms are getting full for that species!"

For species like *Elymus glaucus* and *Bromus carinatus*, the rooms are getting full. Fortunately, some of our local farmers are becoming interested in producing native grass seed. There are now a half a dozen local private growers producing seed on contract for the Forest Service and Bureau of Land Management. Our nursery is a source of expertise for these growers and we will refer our clients to them for seed production. Most of these growers are experienced farmers who are learning how to obtain very high yields from these easy-to-grow species. However there are many species that are still too difficult and risky for them to be interested in growing. Until this changes, we continue to work with the more challenging species.



Figure 1. Jack Campbell looks over the first crop of *Elymus glaucus*



Figure 2. Native Grass Seed Program Manager, Colleen Archibald, with a handful of recently harvested *Elymus glaucus* seed.

As of this year, harvested grass seed from our nursery has been shipped to 32 ranger districts and BLM resource areas for a variety of projects such as restoring meadows, wildfire erosion control, road obliteration and weed control. For these clients, sowing native grass seed is a new experience, requiring experimentation and monitoring. One such project, administered jointly by the Bureau of Land Management and the Forest Service near Eugene, Oregon, evaluated how native grass seedlings would work on road cuts for erosion control. They compared eight treatments of applying native grass seed including: hydromulching, hand sowing, and installing several types of erosion control netting or mulches over the seed. They also compared the success of these native grasses to a sterile wheat mixture commonly used for these purposes. According to Jenny Dimling, Forest Botanist for the Willamette National Forest, the native grass treatments worked as well as the sterile wheat on the roadcuts in this area and all treatments met the objective of the project - to stabilize the roadcuts. Projects like these are invaluable in building our experience base for the proper application of these species.

CONTAINER PRODUCTION OF DIVERSE SPECIES.

The early 1990's was a time when the Forest Service and BLM would place very serious attention on a noncommercial tree species - the Pacific yew. As it turned out, this species would take on the unique role as "poster" plant for plant diversity on federal forests. Taxol, a chemical located in the bark and needles of the tree, had been found to be effective in treating ovarian cancer. With the production of the new drug, harvesting of the bark began in earnest and the need for yew seedlings for reforesting these areas was created. In 1992 the nursery built a greenhouse and shadehouse to meet the orders. We grew between 60 and 80 thousand yew plants annually, propagated mainly from cuttings. This continued for several years until the demand for yew bark ended on federal lands, as well as the requests for Pacific yew seedlings. But in its place came requests for a variety of different species and stocktypes for restoration projects.

In the mid 1990's a new emphasis on watershed restoration began to generate orders for native plants for erosion control projects. One such project is located on a very erosive site in the high Siskiyou Mountains on the Rogue River National Forest. Attempts at establishing a soil cover by sowing native grass seed or by fall planting native shrubs were unsuccessful.

Results from a study in 1995 by Dr. Nan Vance, PNW Research Station, indicated that with the proper species, timing and techniques, restoration of these sites is very possible. Between 1996 and 1997, over 10 thousand native grass seedlings were planted by a Jobs-in-the-Woods crew at McDonald Basin. The grasses were grown for three months in Styro 6 containers and planted within several weeks of snow melt. Over time these seedlings are expected to stabilize some of the erosive granitic soils that are contributing sediment to the Little Applegate watershed, a key watershed for salmon habitat.



Figure 3. Jobs-in-the-Woods crew member plants native grass seedlings at McDonald Basin

Watershed specialists are also restoring riparian areas with deciduous species like willows, maples, cottonwoods and aspen. A project to improve the fish habitat of the Applegate Reservoir in Southern Oregon, using native willows, has been in progress for the past 7 years. As with most reservoirs, the type of vegetation that can endure submersion during the spring and portions of the summer months, and extreme drought the rest of the year, is very limited. Willow is a good species for this environment, however the standard methods of establishment, like sticking or waddling, do not work in these drastically changing conditions. Ashland Ranger District project spokesperson, Laura Hardin, states that the seedlings must be planted in the fall and winter months when the water level of the reservoir is down. It is important that root initiation begin immediately after planting, three or four months before they become submersed in the spring. She needed a willow with roots, so she has been ordering a Deepot 40 stuck with vegetative material collected from willow stooling beds we have established at the nursery for her district. Since this type of container comes in a rack of 20, the seedlings are easily transported to the planting sites by the Boy Scouts and other community groups that are involved with this project. The goal of this project is to plant a total of 7,000 seedlings over the life of the project.

"Bigger is better" is a relatively new approach to the reestablishment of conifers. Portions of our shadehouse now look like a small forest where we currently have an inventory of 10,000 large containers ranging in size from one gallon to five gallon. These are being used for recreational areas, riparian zones, and restoration areas. The Siuslaw National Forest began experimenting with large potted seedlings several years ago in an effort to reestablish conifers in the riparian areas of the coast range.

According to reforestation specialist Ed Obermeyer, many of the stream systems lack large logs that are essential for good salmon habitat. Establishing conifers will eventually supply these stream systems with logs and much needed shade. The challenges that these clients face are an extremely dense shrub understory that limits the survival and growth of bareroot or containerized seedlings and the very rocky soils associated with stream terraces. They realized they needed a larger tree. On a trip down to the J. Herbert Stone Nursery 5 years ago, Ed and others from the Sluslaw National Forest saw the large campground trees we were growing and realized the potential for their unique sites. Using 2 to 4 foot high western hemlock and western red cedar grown in 1 gallon to 4 gallon containers, they learned that this stocktype could survive in the cobbly soils and were tall enough to quickly outgrow the shrub understory.



Figure 4. Yohan Visser, greenhouse manager, next to large western red cedar and western hemlock

Campgrounds are another environment where large potted trees are being planted. They are being used to create visual screens between campsites and to replace trees that have died. Establishing small seedlings in these areas is often impossible because they are overlooked by most unsuspecting campers (I know from personal experience, having spent an uncomfortable night sleeping on several small seedlings!). Taller trees have been purchased in the past but often from seed sources and even species not endemic to the site. Seedlings grown in 4 gallon containers or larger, from locally collected seed sources, not only command greater respect from the camper but are well adapted to the site.

In and amongst the potted trees that dominate our shadehouse facilities are an assortment of shrub and forb species. Currently we are growing a wide variety of species in all types of containers and propagative material. Many of these are small orders for specific revegetation projects - species like huckleberries, Oregon grape, thimbleberry, salal and snowberry are being grown for the moist forests; oaks, Whipple vine, manzanita and bitter cherry for the drier climates. Propagating many of these species is often by trial and error, since very little can be found in the literature on how to propagate them. Often the orders for these species are not consistent from year to year, with some years lacking any orders at all. Weekly monitoring and yearly consolidation of this information for each species helps us carry over our learning experiences between years.

BAREROOT PRODUCTION OF DIVERSE SPECIES.

Growing diverse species in our bareroot fields is not new to our nursery. For many years we have received requests from our drier site clients to grow bitter brush and mountain mahogany. This year for instance, we are growing 100 thousand bitter brush seedlings for the Goosenest Ranger District in Northern California. The silviculturists on this district work with their range and wildlife specialists planting their harvested units with a mix of ponderosa pine and bitter brush seedlings. The objective is to produce forage for deer that migrate through these areas in the winter and grazing cattle during the summer months, while establishing a new forest. Dave Ross, reforestation specialist for the district, sees a future district planting program to restock between 200 and 400 acres a year with this combination

of species.

In wetter climates, like western Washington and Oregon, Forest Service and BLM personnel are requesting moisture-loving species like maples and alders. These species are being used to revegetate decommissioned roads and watershed restoration projects.

Responding to two successive years of flooding on the Gifford Pinchot National Forest, district watershed specialists and fisheries biologists have identified many disturbed areas in need of revegetation. One of the major problems associated with the flooding was landslides. Until these areas are revegetated, they will contribute sediment to the river systems. According to Gail Bouchard, plant specialist for the Wind River Ranger District, deciduous trees, like Sitka alder, vine maple and cascara, can quickly return cover and stability to these disturbed sites. She is currently gearing up to plant 10 large slides next spring. Seedlings will be planted only inches apart across the slope to create a live silt fence every 10 to 20 feet. We will be supplying over 50,000 1-0 bareroot Sitka alder to this project. One of the major obstacles in meeting these requests is obtaining enough viable seed for germination. Seed from many of these species have low germination rates and do not store for very long. The challenge to our nursery is learning how to obtain optimum seed viability through special seed handling and culturing practices.



Figure 5. Culturist, Steve Feigner, looks over a crop of 1-0 Sitka alder.

DIVERSIFICATION HAS CHANGED OUR NURSERY

The diverse species program at J. Herbert Stone Nursery now accounts for 15 percent of our income from the sale of native plant materials. In the past 7 years it has literally changed the landscape of the nursery as well as how we manage it. Not only have we been able to keep our fields in full production, we have also been able to maintain a vital workforce too. We estimate that the work generated from the production of diverse species is responsible for 5 full-time positions. This is work that is shared across the workforce and spread throughout the year. We used to think that the winter and spring months were our busiest time of year, between lifting and processing of seedlings and sowing the 1-0's and culturing the 2-0's. Summer and fall were periods to relax and regroup. The diverse species program has changed that! Now, between harvesting grass seed in the summer and sowing grass beds in the fall we are busy year round.

In a time of down-sizing, having the equivalent of five additional employees has given us the depth and stability needed to maintain the production of high quality plant materials, including the production of bareroot conifers for reforestation. Growing a wide variety of species (over 100) and stocktypes has also challenged all of us working at J. Herbert Stone Nursery to grow professionally and creatively. These are intangible benefits, yet I believe they are the ingredients that have helped develop a highly motivated workforce that is

responsive to the changing needs of our clients.

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