

NATIVE PLANT PROPAGATION, SEED INCREASE AND REVEGETATION EFFORTS: THE ROLE OF THE CORVALLIS PLANT MATERIALS CENTER IN WESTERN OREGON AND WASHINGTON

Abstract for Native Plant Conference:

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The USDA Natural Resources Conservation Service (NRCS) operates 26 Plant Materials Centers (PMCs) across the nation. Each works on finding vegetative solutions to conservation problems that occur within the geographic area they serve. The Corvallis Plant Materials Center near Corvallis, Oregon, primarily serves the ecoregions of western Washington, western Oregon, and northwestern California. Its mission is to develop applied plant technology in the realm of native plant propagation, establishment, seed production, revegetation, and erosion control, and to increase and release plants or seed sources for rehabilitation or improvement of riparian areas, wetlands, and uplands.

In operation since 1957, the Corvallis PMC is, in part, a small agronomy seed research farm and a native plant nursery. The operation consists of four permanent staff members, 52 acres of land, two greenhouses, a laboratory/office, seed processing facility, nine wetland plant cells, and related equipment facilities. Work is conducted on and off the Center, in cooperation with Oregon State University, the state Agricultural Experiment Station, Crop and Soil Science Department Hyslop Research Farm, and various Federal, State, local, and nonprofit organizations.

There are four areas of focus at the PMC. The first is native plant and seed propagation technology development. Demonstrations and studies include determining traditional vegetative propagation protocols and seed increase practices. Most of the work in the last 20 years has concentrated on native riparian and wetland shrubs, grasses, and several legumes. Examples include rooting trials on native shrubs, agronomic grass seed increase studies on residue management, fertilization, and herbicide treatments, and seed germination studies, including scarification and stratification. *Elymus glaucus*, *Deschampsia caespitosa*, *Danthonia californica*, and *Beckmannia syzigachne* are among the grasses most researched. Legumes studied have included several species of *Lupinus* and *Lotus*.

The second major area of investigation is plant establishment: planting methods, revegetation techniques, and plant adaptation to geographic areas or soils, wetlands, and riparian zones. Significant effort has gone into evaluating the potential of native willows (*Salix* spp.) and shrubs for soil bioengineering practices and streambank stabilization. Since 1994, 10 streamside field trials have been installed in cooperation with others to test the performance of woody species for live fascines, live stakes, poles, and brush mattresses. Trial locations include Dairy Creek, Mill Creek, and Minihaha Creek in Oregon and Schnieder Creek in Washington. Erosion control and seeding practices incorporating mats, mulches, different seeding rates and mixes, soil amendments, and various site preparations have been evaluated. On and off farm variety trials and field plantings along roadsides and streams, on farmland, or in wetlands have been used to evaluate adaptation and performance of plant sources, species, or cultivars. Recent examples include establishing camas (*Camassia* spp.) from seed using different site preparation methods, comparing the inundation depth tolerance of native grasses, shrubs, and sedges (*Carex* spp.) in wetland cells, and testing the competitive ability of native grasses such as *Beckmannia syzigachne* with *Phalaris arundinacea*.

The third area of work at the Corvallis PMC has been native plant seed source "development" and population studies. In the 1970s and 80s native plants were sampled from 40 to 70 wild populations throughout the service area and grown in common gardens to compare growth and performance. Select populations were chosen based on form, seed yield, or other desirable traits, increased by the PMC, tested in field plantings, and released as plant cultivars, even though they had not been bred or hybridized. Because of this, all cultivars released by Corvallis are still considered native and are recommended by NRCS for revegetation in the PMC service area. Examples of PMC native plant releases are 'Hederma' pine lupine (*Lupinus albicaulus*), 'Elkton' and 'Arlington' blue wildryes (*Elymus glaucus*), 'Mason' western redosier dogwood (*Cornus sericea* var. *occidentalis*), 'Bashaw' Douglas spirea (*Spiraea douglasii*), and six native willow varieties. Releases are made in cooperation with the state Agricultural Experiment Station, in this case Oregon State University, and on occasion Washington State University.

More recently, with the advent of pre-varietal seed certification procedures (source identified, selected, and tested classes) formulated by the Association of Official Seed Certifying Agencies (AOSCA 1996) and the development of pre-varietal plant release procedures by the Natural Resources Conservation Service

(USDA 2000), the Corvallis PMC since 2000 has released three certified selected class, natural germplasm, native grasses: Tillamook and Willamette Germplasm tufted hairgrasses (*Deschampsia caespitosa*) (Darris and Lambert 2001), and Baskett Slough Germplasm California oatgrass (*Danthonia californica*) (Darris and Lambert 2000). A native shrub, Skamania germplasm sitka alder (*Alnus viridis* sp. *sinuata*), is targeted as the next selected class release. It represents a high quality seed source from, and for use at, low elevations. Skamania Germplasm (as with all PMC releases) is not necessarily intended to replace "local" or on-site sources of native sitka alder for ecological restoration plantings. With the trend toward greater localization of seed sources, releases in the near future will also include five selected class populations of oceanspray (*Holodiscus discolor*) that are ecoregion specific. While all older cultivar and newer selected class releases address erosion control and revegetation objectives, NRCS makes no claims concerning their suitability for native plant restoration efforts. Individuals with such concerns for a particular environment or ecosystem should make their decisions on a case by case basis.

Since 1995, the Corvallis PMC has modified its objectives with regards to plant assemblages and selection. It now works closely with others on native plant common garden studies that evaluate phenotypic variation among populations for the purpose of seed zone and seed transfer guideline development, rather than trait selection per se. A team approach is used with a partner other than NRCS taking the lead on specialized genetic and statistical issues. Examples include broadleaf lupine (*Lupinus latifolius*) with the US Forest Service (Doede et. al. 1998), big deervetch (*Lotus crassifolius*) with the Forest Service and Bureau of Land Management, and beginning in 2002, Roemers fescue (*Festuca roemerii*) with the Institute for Applied Ecology in Corvallis, OR. It is likely these studies will also result in the release of certified source-identified as well as selected class populations as before, but the basis will be a stronger population analysis tied to ecosystem variables such as elevation, latitude, precipitation, soil type, etc.

Finally, the PMC multiplies seed and plants of its releases and conducts special seed and plant increases and revegetation studies with cooperating agencies. In the first case, the PMC increases supplies of breeder, foundation, G1, or G2 seed or propagules for further testing and for larger scale increase by commercial seed growers and private nurseries. Second, special projects are undertaken with other Agencies that include growing species or sources that are difficult to produce, high risk, or not readily available. The Center began with a small grass seed increase for Olympic National Park in 1987. The largest projects over the period 1990-2000 have been increases, revegetation studies, technical reports, and other evaluations for Crater Lake and Mt. Rainier National Parks. Material and technology produced by the PMC is used for revegetation on highway and other construction projects at mid to high elevations within the Parks. Work also began in 2002 on wetland plant production for the BLM in Eugene, OR. Another extensive, long term project may involve consulting and increase work for revegetation along the Elhwa River in Olympic National Park. Lastly, the PMC has cooperated with and assisted various Tribes on culturally significant plants. Most notable are propagation and establishment studies on Tule (*Schenoplectus acutus*) with the Confederated Tribes of the Warm Springs Reservation of Oregon, as well as revegetation and seeding trials using camas.

In summary, the Corvallis Plant Materials Center, operated by the Natural Resources Conservation Service in Oregon, focuses exclusively on species native to western Oregon, western Washington, and northwestern California. Efforts are geared toward developing revegetation techniques and traditional seed and plant propagation methods, as well as identifying, releasing, and promoting seed sources for use within the region. Within the last two decades, many native species that previously had no commercial value have now become important players, if not in scale, at least in content. However, unknown or poorly tested establishment techniques and unknown, difficult, or high cost seed and vegetative production methods remain major impediments to further cultivation and the use of many important natives. The PMC has a significant role to play in addressing these needs and hopefully contributing to the health, stability, and diversity of our environment.

References

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