



Corvallis Plant Materials Center 2006/7 Progress Report of Activities

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Development of vegetative solutions for conservation problems is a primary function of the USDA NRCS Plant Materials program. The Corvallis Plant Materials Center (PMC) is one of 27 centers nationally and serves western Oregon, western Washington, and northwestern California. The PMC's primary mission is to develop new technology in plant propagation and establishment, seed production, revegetation, restoration, and erosion control, and to test and release new plant sources for use in riparian areas, wetlands, and uplands. Most of the focus is on native grasses, forbs, and shrubs.

The principal program customers include:

- ✓ NRCS field offices, who in turn serve both rural and urban land owners, farmers, ranchers and other land managers,
- ✓ Public agencies, universities, tribes, and private conservation organizations that utilize technology and plants selected or produced by the program, and
- ✓ Commercial seed producers and nurseries who receive information on production technology as well as seed and plants of selected species for further increase.



The "moon rover" is used to harvest mature seed heads (in this case those of California brome) or flower stalks directly in the field. The material is cut then bagged off the conveyor belt, and later dried and mechanically threshed in a separate operation. The machine is named after the designers/builders Carroll Moon and Daryl Ehrensing of Oregon State University.

PLANT EVALUATIONS AND RELEASE

Wild populations of plants are collected, propagated, and selected for their physical attributes, area of adaptation, potential performance, or documented capabilities from a series of evaluations aimed at addressing conservation needs. Purposeful selection can be important for farm or other pragmatic uses such as erosion control, forage, seed production, windbreaks, or water quality improvement. However, species are not bred, genetic changes are intentionally minimized, and genetic diversity is emphasized when ecological restoration is the primary goal.

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September 2007

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Studies may begin with assemblies of numerous wild ecotypes and the establishment of an initial evaluation planting or common garden. After populations are chosen from comparative evaluations, propagation and increase methods are determined and field tests are conducted. The material may then be released and made available to commercial growers. They in turn produce the seed or plants on a much larger scale and make it available for sale to the public for conservation, reclamation, or restoration purposes.

Currently, the Corvallis Plant Materials Center maintains and promotes 14 plant cultivar and pre-varietal releases. The latest release is Skamania Germplasm Sitka alder (*Alnus viridis* spp. *sinuata*) which was completed in 2006. Plants will be commercially available next year.

Pre-varietal Native Plants to Address Resource Needs

Commercial sources of genetically appropriate native plants are needed for wetland, upland, and riparian revegetation and other resource conservation and enhancement needs on the basis of ecoregion, seed zone, or Major Land Resource Area (MLRA). The PMC addresses this need by providing pre-varietal releases of species from specific areas for use in the same or similar areas. Pre-varietal release is a process whereby a plant (individual, population, or group of populations) from a specific location or area is identified and studied (by the PMC), increased (by the PMC or private grower), and certified (by the official seed certification agency in the state it was collected or grown). Pre-varietal releases may be “source identified”, “selected”, or “tested class”, depending on the degree of testing, selection, or evaluation they undergo.

Upcoming Releases

Meadow barley (*Hordeum brachyantherum*) is a versatile native grass useful for wetland restoration, quick cover, and erosion control along ditches, waterways, and streams. It prefers full sun and tolerates summer drought as well as long term winter and spring flooding to a depth of one foot or more. In 2008 the

PMC plans to release a source identified population called Jackson-Frazier Germplasm meadow barley for use in the Willamette Valley of Oregon.

Oceanspray (*Holodiscus discolor*) is native shrub useful for riparian revegetation and wildlife habitat in western Oregon, western Washington, and northwestern California. Two or more pre-varietal germplasm releases of this species are targeted for completion within a few years. Thanks to Dr. Matt Horning of the US Forest Service in Corvallis, data from the original common garden study was re-analyzed. Based on statistical correlations between plant growth and environmental factors such as collection site elevation and temperature, unique seed zones or genetic regions are suggested for this species. The PMC is establishing isolated seed orchards for selected populations. Seed certification and harvest began in 2007.



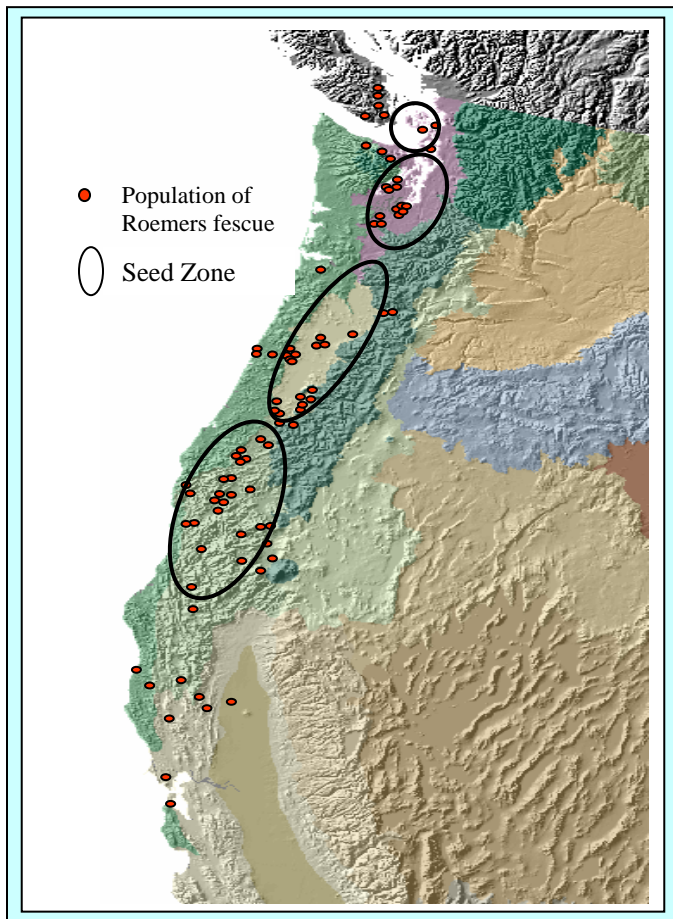
Part of a seed orchard of oceanspray representing a selected population from Douglas County, Oregon.

Roemers Fescue Moves into Seed Increase Phase

Roemers fescue (*Festuca roemerii* synonym *Festuca idahoensis* ssp. *roemerii*) is a native fine leaf fescue found exclusively west of the Cascade Mountains in Washington and Oregon as well as northwestern California. It was once a dominant bunchgrass of oak savannas, prairies, and coastal headlands throughout the region. Because of extensive

agriculture, urbanization, and other land use changes, there remain only small remnant populations throughout much of its natural range. There is considerable interest in this species for ecosystem restoration as well as revegetation, cover, and erosion control.

To address the need, a common garden study of Roemers fescue was conducted between 2003 and 2005 in cooperation with the Institute for Applied Ecology (IAE) in Corvallis, the Bureau of Land Management (BLM), and the US Forest Service (USFS). By collecting seed from throughout its geographic range and growing out plants in a common garden, it is possible to identify patterns of genetic variation that statistically correlate to environmental variables such as elevation or precipitation. The study contained 14 populations from Washington, 30 from Oregon, and 3 from California.



Data analysis helped to define clusters of populations as seed zones that corresponded with ecological regions of western OR, western WA, and northwestern CA [San Juan Islands, (top), Puget Lowlands, Willamette Valley, and Klamath-Siskiyou region (bottom).]

Each zone will be represented by a composite mixture of three to nine populations of Roemers fescue originally evaluated in the study. The four composites or groups of populations will become selected class releases for use in plant community restoration. A fifth highly productive population from the Oregon coast has also been targeted for increase and use in general erosion control.

This spring isolated crossing blocks were established to allow for inter-mating between populations from within each seed zone. Seed harvested from the crossing blocks in 2008 will be used to initiate G2 seed increase fields of each composite germplasm.



Crossing block of 7 populations of Roemers fescue from the Puget Lowlands of Washington State. The block represents 1 composite germplasm.

PLANT TECHNOLOGY and INCREASES

The NRCS is a USDA agency with the responsibility of administering technically based conservation programs. Many of these programs, such as CRP, CREP, GRP, WRP, and WHIP directly involve the use of plant materials and plant technology. For the agency, the primary responsibility for developing new plants and related technology lies within the PM program.

- Portions of the plant technology developed are incorporated into the Field Office Technical Guide (FOTG) or supporting handbooks, technical notes, fact sheets, etc, and therefore integrated into conservation practices implemented on public and private lands.
- The National PM program maintains a web site which contains useful

information on plant releases as well as progress reports, technical reports and other publications developed by the PM program. The website address is <http://plant-materials.nrcs.usda.gov>

- The PM program supports other NRCS computer applications such as the PLANTS database and VEGSPEC.
- New plant propagation and seed increase protocols are entered in the Native Plant Network website.
- Other publications appear in conference proceedings, abstracts, trade magazines, and scientific journals.

Technology studies at the Corvallis PMC to address priority resource needs involve:

- ✓ determining vegetative propagation, seed production, and establishment methods of plant materials (native forbs, shrubs, and grasses) for rehabilitating, stabilizing or restoring riparian areas, wetlands, and uplands, primarily at low elevations;
- ✓ studying and increasing plant materials for use in soil bioengineering;
- ✓ evaluating progress and monitoring maintenance needs of sites restored or revegetated through direct seeding, planting, and soil bioengineering;
- ✓ assessing flood inundation tolerance and other adaptive qualities of select grass, forb, and woody species;
- ✓ increasing and testing seed and plant materials for revegetation at low to high elevation areas in National Parks;
- ✓ increasing and determining seed propagation methods of native species for the Bureau of Land Management and Federal Highways; and
- ✓ installing demonstration plantings and providing materials to illustrate and promote the use of native species for windbreaks, landscaping, and wildlife.

Overall, about 60 new or ongoing studies and increases were conducted in 2006-2007. In terms of production, over 32,000 container plants, 1000 cuttings, and an estimated 990 pounds of seed were produced in 2007 alone.

Native Shrub Rooting Trials Expanded in 2007 are Applicable to Streamside Planting and Soil Bioengineering

Native shrubs that root readily from hardwood (dormant) branches and cuttings continue to play a role in supplementing the use of willows for riparian restoration, streambank erosion control, and soil bioengineering practices such as live stakes, fascines (branch bundles) and brush layering. Native shrubs do not establish as readily as willows from dormant cuttings. Therefore, the PMC began a new study in January 2006 to look at the effect of wood fiber mulch, slow release fertilizer, and end sealing (application of wax or paint to top end of cutting) on improving the survival and growth of native shrubs from unrooted live stakes. Black cottonwood (*Populus balsamifera* ssp. *trichocarpa*), Scouler's willow (*Salix scouleriana*), and salmonberry (*Rubus spectabilis*) were added to the study in 2007.

First year results with these species and a second year of data on twinberry (*Lonicera involucrata*), redosier dogwood (*Cornus sericea*), mock orange (*Philadelphus lewisii*), ninebark (*Physocarpus capitatus*), snowberry (*Symphoricarpos alba*), and Sitka willow (*Salix sitchensis*) confirm that fiber mulch makes a substantial difference in the initial establishment and growth of shrubs from live stakes. End sealing and slow release fertilizer have minimal effects. No supplemental water was applied to the plots.



Establishment and growth of native shrubs from unrooted live stakes were superior in mulched treatments (front row left to right : Pacific ninebark, black twinberry, common snowberry)

Dormant Cutting Pre-soak Experiment with Cottonwood and Willows

Rooting and streamside establishment of 'live stake' cottonwood, willow, or certain other shrubs may be improved by pre-soaking dormant cuttings in clean water. Soaking should be just long enough to stimulate rooting without actual callus or root formation so that these tissues will not be damaged during on-site installation.

In early 2006, an experiment was conducted to test the effect of four water temperatures on the timing of callus formation and root initiation on hardwood cuttings taken from six native willows and three shrubs. A second, similar experiment was conducted in December 2006 using three water temperatures and dormant cuttings of black cottonwood and seven local willow species. Scouler's willow was represented with both upland and wetland ecotypes. Cuttings were checked daily for calluses and roots.

At a water temperature of 84°F, callusing first appeared on day six (all selections except upland Scouler's willow) followed by the first roots on cottonwood and arroyo (*Salix lasiolepis*), Columbia River (*Salix sessilifolia*), and especially erect willows (*Salix ligulifolia*) on day seven. The first roots for Sitka, Hooker (*Salix hookeriana*), and Scouler's (wetland) willows appeared on day eight and Piper willow (*Salix piperi*, synonym *Salix hookeriana*) showed roots on day nine. The upland selection of Scouler's willow did not produce any roots until day 21.

When held at 66°F, the cuttings followed a similar pattern with first calluses appearing on day seven and the first roots of most selections emerging on days nine through 11. Piper and Sitka willows produced roots on days 13 and 15 respectively. Upland Scouler's willow produced its first roots at this temperature on day 25.

The first calluses occurred on day 12 for cuttings soaked in 57°F water and roots first appeared on erect willow on day 14. Hooker

and wetland Scouler's willows produced roots on day 17, Arroyo willow and cottonwood on day 19, and Sitka and Pacific willows on day 23. Upland Scouler's willow had yet to produce any roots by the end of the study on day 29.

This experiment shows that pre-soaking dormant cottonwood and willow cuttings, if undertaken, should be done for no more than five to 11 days depending on water temperature.

Seed Production, Germination and Establishment Studies

The major challenges facing the widespread increase and availability of native grasses and forbs are unknown seed production techniques and inherent low seed yields for many species. To address this bottleneck, the Center conducts studies and evaluates seed production and establishment methods. Topics include fertilization, post harvest residue management, harvest methods, seed dormancy, processing, and germination, and control of annual grasses and broadleaf weeds. Twenty-two species of grasses are being evaluated.

NATIVE GRASSES UNDER INCREASE OR STUDY

Common name	Scientific name	Technology Issues
Lemmon's needlegrass	<i>Achnatherum lemmonii</i>	Seed yields, harvesting, indeterminate flowering
Hall's bentgrass	<i>Agrostis hallii</i>	Establishment, harvest technology, seed yields
Spike bentgrass	<i>Agrostis exarata</i>	Production methods
Western sloughgrass	<i>Beckmannia syzigachne</i>	Soil moisture mgt., rust, production techniques
California brome	<i>Bromus carinatus</i>	Volunteer seedlings, production, control
Columbia brome	<i>Bromus vulgaris</i>	Establishment, stand longevity
Bluejoint	<i>Calamagrostis canadensis</i>	Seed fill, establishment from seed, stand mgt.
California oatgrass	<i>Danthonia californica</i>	Establishment, seed dormancy, adaptation
Tufted hairgrass	<i>Deschampsia caespitosa</i>	Adaptation (inundation, salinity) ecotypic variation
Slender hairgrass	<i>Deschampsia elongata</i>	Soil moisture management, longevity
Bottlebrush squirreltail	<i>Elymus elymoides</i>	Harvest methods and awn removal
Blue wildrye	<i>Elymus glaucus</i>	Seed shattering
Slender wheatgrass	<i>Elymus trachycaulus</i>	Stand longevity, production management

Sand fescue	<i>Festuca ammobia</i>	Seed yield, rust, harvest techniques
Roemers fescue	<i>Festuca roemeri</i>	Seed fill, longevity, low yields, rust disease
Red fescue	<i>Festuca rubra</i>	Seed yields
Tall mannagrass	<i>Glyceria elata</i> (<i>G. striata</i>)	Soil moisture mgt., seed dormancy, establishment
Meadow barley	<i>Hordeum brachyantherum</i>	Seed retention, harvest techniques, diseases
Rice cutgrass	<i>Leersia oryzoides</i>	Harvest techniques, stand rejuvenation, seed dormancy, production, establishment
Harford's melic	<i>Melica harfordi</i>	Seed fill, variable seed dormancy, stand mgt., harvesting methods
Pine bluegrass	<i>Poa secunda</i> (<i>P. scabrella</i>)	Stand longevity, harvesting, row spacing
Weak alkaligrass	<i>Torreyochloa pallida</i> var. <i>pauciflora</i>	Stand longevity, soil moisture management, establishment

Weed Control in Native Grasses and Lupine Grown for Seed

One of the biggest impediments facing the commercialization of native grass and forb seed production is the lack of labeled herbicides for weed control. In May 2006, a study was initiated looking at the effect of various herbicides on weed control in an established stand of broadleaf lupine (*Lupinus latifolius*). In October 2006, studies were added to include an established stand of blue wildrye and the effect of various rates of diuron (coupled with carbon band seeding) on weed control in blue wildrye, tufted hairgrass, meadow barley, river lupine (*Lupinus rivularis*), and Roemers fescue. The work is cooperative with the Oregon State University Crop and Soil Science Department.



Diuron herbicide trial on Roemers fescue. In October 2006 plots were sown with carbon bands applied over the rows of seed and treated with herbicide. Control of annual bluegrass (*Poa annua*) and damage to the fescue varies by rate of chemical applied.

The goal in 2007 is to expand and repeat the experiments with the hope of eventually having enough data to obtain "special local needs labels" for herbicides useful in native seed production. Results will be reported in 2008 with OSU.

Adaptation: Flood (Inundation) Tolerance of Wetland Plants

Evaluating the water depth and the length of season of flooding that native grasses, forbs, and shrubs can tolerate helps determine where these species perform best in the landscape. The results become part of the planting or seeding prescriptions for wetland enhancement and riparian area rehabilitation work. The PMC has conducted several related trials since 1998 in water tanks and sloped ponds that create a water depth gradient.



Sloping pond planted to 10 native wetland grasses in May 2006 to test adaptation to a gradient of soil moisture and water depth.

In 2006, the fourth study in a series of experiments was undertaken to evaluate native grasses and other plants for their ability to survive and grow under a gradient of hydrologic conditions varying from moist soil to 12+ inches of water depth. Plugs of 10 native wetland grasses, two sedges, and one forb were planted into two ponds on May 22, 2006. Water levels were maintained at constant level from mid November through late March 2007. Ponds were drained for the summer and will be refilled in November 2007 to follow the same hydroperiod as last year (winter inundation, summer exposure).

Waterway Seeding Trials with Native Wetland Grasses

Native wetland grasses may have the potential to control erosion in the bottom of grass waterways where prolonged flooding often eliminates less tolerant species. In 2005, the PMC in partnership with the OSU Extension Service, the Linn County Soil and Water Conservation District, and select growers, began testing certain wetland grasses in grassed waterways. Among the most promising species to date are meadow barley, spike bentgrass, introduced 'Seaside' creeping bentgrass, and tufted hairgrass.

PARTNERSHIPS WITH OTHER AGENCIES

Upland Plants and Technology for the National Park Service

The Native Plants for Parks Program is a cooperative agreement between NRCS and the National Park Service (NPS). It began in 1989 to share technical expertise and develop plant materials for use in park programs. Over the past 19 years, the Corvallis PMC has collected, increased, and tested more than 80 native species, grown several thousand pounds of native grass and forb seed, produced tens of thousands of containerized plants, and investigated revegetation techniques on-site (Crater Lake and Mount Rainier in the 1990s). High standards of seed quality and genetic integrity are maintained by isolating fields for each species and ecotype. Information on collection, field establishment and management, seed increase and processing, propagation, and container production of herbaceous and woody species, and results of tests or trials are compiled and published in annual reports and presented at meetings. These species are continuously added as protocols to the Native Plant Network website: (www.nativeplantnetwork.org).

Projects with Mt Rainier NP, Crater Lake NP, and Olympic NP have been ongoing since the early 1990s. This year, Lassen Volcanic NP began its first project with the Corvallis PMC.



Lassen Peak from Kings Creek meadow, Lassen Volcanic National Park, October 16, 2006

Lassen Volcanic National Park is a rugged area with unique and diverse flora. Propagation techniques are not known for many plants growing in Lassen Volcanic NP. In the spring of 2007, research trials were completed on ten species (mostly sub-alpine sedges and rushes). This information will be used to grow plants for the new visitor's center as well as degraded areas of the park. The PMC delivered 1300 pinemat manzanita (*Arctostaphylos nevadensis*) plants to the Park in September of 2007.

Current projects also include two roadside revegetation projects (SR 123 in Mount Rainier National Park and Hurricane Ridge Road in Olympic National Park). Over 300 lbs of seed were produced in 2007 for these projects. Six grass species and three forbs are being grown for seed production at the PMC. These projects will continue through 2008. Mount Rainier suffered severe flooding in November of 2006. The park received 18 inches of rain in 36 hours! Many roads were completely destroyed. Thanks to numerous volunteers, the trails and roads in the park have mostly reopened. Since the PMC had already been growing native grasses in seed increase fields for roadside projects, these fields will be expanded and the seed they produce will be used to revegetate some of the disturbed areas. In September, the PMC will send 50lbs of blue wildrye to repair some of the flood damaged areas, as well as help the Park with native seed collection.



PMC staff collecting seed on Steven's Canyon Rd., Mt. Rainier National Park, August 22, 2006.

Other than roadside projects, the PMC is also involved in revegetation of shorelines and exposed lakebed slopes in Olympic National Park. Two dams on the Elwha River are scheduled to be removed in 2012 in order to restore salmon habitat. This will leave 500 acres of land in need of revegetation under what are now Lake Mills and Lake Aldwell. The Center has agreed to produce plants and seed of 15 trees and shrubs, 11 forbs, six grasses, and four sedges and rushes. Total amount of seed needed for the project is estimated at 4000 lbs! In 2007, the PMC maintained seed increase fields of six grasses, seven forbs, three sedges, and three rushes. These fields total over four acres in size and produced approximately 500 lbs of seed.



Goblins Gate on the Elwha River, Olympic National Park, August 22, 2006.

Wetland and Wet Prairie Species for the Bureau of Land Management

In 2002, the Corvallis Plant Materials Center (PMC) entered into a new agreement with the

Eugene District of the Bureau of Land Management (BLM) to perform seed germination trials and conduct small scale increases of native wetland and wet prairie species. Many of these species have proven difficult to establish in restored wetlands or have very high labor costs associated with collection (as high as \$2000 an ounce!). The PMC agreed to investigate and document propagation techniques from seed for these species and to evaluate their potential for agronomic seed increase. The agreement has been renewed every year since 2002 and since its inception, the Center has successfully produced over 50 lbs of 70 species. Most of them have little if any published data on germination or production. New harvesting techniques, such as planting annuals in fields covered with weed fabric, have been developed for small scale seed increase. These new techniques have increased yields while reducing collection time for difficult-to-collect species such as smooth goldfields (*Lasthenia glaberimma*). This project contains many small, highly managed plots. These techniques have shown that, with some species, this approach often has higher yields than larger fields using a one-time harvest technique. This information is passed on to native seed growers, and will hopefully help bring the cost of native seed down as well as increase its availability on the seed market.



Kings scepter gentian (*Gentiana sceptrum*) growing in a seed increase tub.

Native Grasses and Legumes for Fire Rehabilitation in Southern Oregon

Medford and Roseburg, Oregon BLM Districts are regularly in need of native seed for fire rehabilitation projects. The PMC agreed to work with certain native grasses and forbs that are seldom grown by large-scale seed producers. Approximately 250 lbs of seed were harvested in 2007. For these two projects species of eight grasses, ten forbs, two rushes, and five legumes were produced. Both BLM contracts are renewed on a yearly basis.



River lupine (*Lupinus rivularis*) growing in a seed increase field.

SPECIAL ASSISTANCE PROJECTS

Early Blue Violet Propagation for Oregon Silverspot Butterfly Recovery

The PMC has the opportunity to assist with the recovery of Oregon silverspot butterfly (*Speyeria zerene hippolyta*). The silverspot was declared a federally threatened species in 1980 and is classified as endangered in Oregon and Washington. It occurs in small, isolated populations on grassland habitats within its range from coastal Washington south to coastal northern California.

The adult butterflies feed on flower nectar of yarrow (*Achillea millefolium*), pearly everlasting (*Anaphalis margaritacea*), Canada goldenrod (*Solidago canadensis*), and Douglas aster

(*Aster subspicatus*). These herbs are part of the coastal meadow plant community which the butterfly inhabits. The larvae of the silverspot butterfly prefer to feed on the leaves of the early blue violet (*Viola adunca*). The female lays her eggs in close proximity to this larval food source.



PMC staff assisted with releasing captive-reared Oregon silverspot butterflies, August 27, 2007.

Habitat conversion, elimination of fire, and the introduction and increase of weedy invasive species have all contributed to a decline of the violets and, subsequently, rearing habitat for the larvae. In 2005, the PMC and Anne Walker of the U.S. Fish and Wildlife Service began a collaborative effort to develop a long-term seed source for habitat restoration. Violet seed production at the PMC began in 2005 and resulted in 2 lbs of seed. It has been used to create a seed increase field at the PMC as well as to grow violet plants for use in restoration areas. Seed increase fields of the nectar source plants as well as coastal sand fescue began in 2007. As seed becomes available, research will begin on how to best restore butterfly habitat.

Many agencies and groups have provided funds and wild collected seed to help increase seed at the PMC. In 2007, the USFW, Nature Conservancy, US Army, Federal Highways Administration, US Forest Service, and the Oregon Department of Transportation have all contributed efforts or funding towards seed increase at the PMC.



Restoration efforts are being focused on areas such as these coastal bluffs, near Rock Creek on the central Oregon coast.

In late fall of 2007, Oregon Department of Transportation will finish construction of the new bridge over Rock Creek. This bridge is within the critical habitat for the butterfly and an acre of land will be restored using plant plugs and seed produced by the PMC. Seed of yarrow and sand fescue will be broadcasted across the site and over 10,000 plugs of aster, pearly everlasting, goldenrod, violets, and sand fescue will be transplanted there as well.

Willamette Valley Seed Increase Program

In 2005, NRCS entered into a memorandum of understanding (MOU) with the Institute for Applied Ecology (IAE). IAE goals are to develop an ecologically appropriate supply of native seed for restoration of Willamette Valley wetland and upland prairie ecosystems. Over the last two years they have developed a focus list of species that will be targeted for seed increase, identified and mapped quality collection sites throughout the Willamette Valley, and collected wild seed from as many populations as possible to capture genetic diversity. The PMC began common garden studies of five high priority forbs in 2006 and five more were added in 2007. The data from these projects will be used to develop genetically appropriate releases for use on Wetland Reserve (WRP) sites.

Common gardens in 2006:

big leaf lupine (*Lupinus polyphyllus*)
 slender cinquefoil (*Potentilla gracilis*)
 common self-heal (*Prunella vulgaris* ssp. *lanceolata*)
 Oregon saxifrage (*Saxifraga oregana*)
 narrow-leaf mules ears (*Wyethia angustifolia*)



Big leaf lupine common garden at the PMC, June 13, 2007.



Self-heal common garden study at the PMC, June, 2007.

Common gardens in 2007:

barestem biscuitroot (*Lomatium nudicaule*)
 meadow checkerbloom (*Sidalcea campestris*)
 denseflower willowherb (*Epilobium densiflorum*)
 common woolly sunflower (*Eriophyllum lanatum*)
 Puget Sound gumweed (*Grindelia integrifolia*)

TECHNOLOGY TRANSFER

The PMC regularly produces publications and makes technical and popular presentations in order to disseminate technology to NRCS, SWCD, and other partners, as well as the general public. Twenty-two and twenty-eight presentations on various PMC activities and technology development topics were given in 2006 and 2007 respectively. Customers were directly assisted on over 150 occasions in 2006 and again in 2007.

Papers include technical reports, news articles, technical notes, brochures, plant guides, and fact sheets summarizing work, current events,

and plant releases. In August 2007 the PMC published its first ever electronic four page newsletter entitled "Pacific Plants and Propagules". It will be disseminated twice a year with the help of the Oregon Public Affairs Specialist. A total of 49 documents were produced in 2006 and 2007 combined. Major titles and contributions included:

- 10 "Plant Fact Sheets" on native shrubs and grasses (2-3 pages each)
- "Festuca roemerii Common Garden Study Final Report" (co-authored with the IAE and USFS, 30 pages)
- "Genetic Variation and Seed Zones for Roemers Fescue" (Poster paper co-authored with IAE and USFS)
- "Notice of Release of Jackson-Frazier Germplasm Meadow Barley" (3 pages)
- "Suggestions for Installing Hardwood Cuttings and Fascines" (Technical Note No. 38, 17 pages)
- "History, Biology, and Suppression of Japanese Knotweed" (Technical Note No. 39, 4 pages)
- 8 "Plant Propagation Protocols" (entered into the Native Plant Network website)
- "Seed Production and Establishment of Western Oregon Native Grasses" (USFS National Proceedings: Forest and Conservation Nursery Association, 10 pages)
- "Introduction to Insect Pollinators" (2 pages)
- "Native Plant Roemers Fescue to Repopulate the West" (Plant Solutions newsletter, 1 page)
- The 2005 and 2006 US Fish and Wildlife Service Annual Reports: *Viola adunca* Seed Increase Project (3 pages each)
- The Federal Highways Administration Annual Report for Rock Creek Bridge (4 pages)
- "Scientists working to shore up honeybee populations" (radio interview and news article in collaboration with Xerces Society, 2 pages)
- "Native bees in need: researchers hope to foster native backup to ailing European honeybees" (news article in Capital Press, 2 pages)
- The 2005 and 2006 Olympic National Park Annual Reports for Elwha River Ecosystem and Fisheries Restoration (16 and 12 pages)
- The 2005 and 2006 Olympic National Park Reports for Hurricane Ridge Road Revegetation Project (6 and 7 pages)

- "Progress Report of Activities, Corvallis Plant Materials Center 2005-2006" (10 pages)
- The 2005 and 2006 Mount Rainier National Park Annual Reports for State Road 123 Revegetation Project (5 and 4 pages)
- The 2005 and 2006 Medford District Bureau of Land Management Annual Reports (6 and 9 pages)
- The 2005 and 2006 Roseburg District Bureau of Land Management Annual Reports (4 pages each)
- The 2005 and 2006 Bureau of Land Management Annual Reports for the West Eugene Wetlands (15 and 10 pages)
- The 2006 Lassen Volcanic National Park Annual Report: Kings Creek Revegetation Project (3 pages)
- "Pollinator plants and plantings for Oregon" (Technical Note)

Threatened and Endangered Species Training Continued in 2007

Projects and field activities using NRCS (and all Federal) funds are supposed to be in compliance with the Federal Endangered Species Act (ESA). For example, any use of federal dollars should result in no negative impacts to any federally-listed species. Or, if impacts are identified, then the US Fish and Wildlife Service should be consulted prior to project implementation.



Gentner's fritillary

In the case of plants, a field survey at the appropriate timing (when the plant is blooming) can determine whether federally-listed plants are present (and thus an issue) within a project. Many field staff had indicated that they

would like to have training on the identification of these Threatened or Endangered plants. To meet this need, five training sessions on four species were provided during the spring and summer of 2006. Another four sessions were conducted in 2007 in concert with the US Fish and Wildlife Service. Species included this year were: Kincaid's lupine (*Lupinus sulphureus* ssp. *kincaidii*), Cook's lomatium (*Lomatium cookii*), large-flowered wooly meadowfoam (*Limnanthes floccosa* ssp. *grandiflora*), hairy popcorn flower (*Plagiobothrys scouleri* var. *hispidulus*), Western lily (*Lilium occidentale*), and Gentner's fritillary (*Fritillaria gentneri*).

PMC Hosts its Annual Field Day

On May 30, 2007, the PMC held its Annual Field Day. The day started off with a general introduction of the PMC and the Plant Materials Program. A grass and shrub identification session followed which allowed participants to see and feel identifying characteristics on live plant material. The afternoon session started with a farm tour displaying the vast array of plant species grown at the PMC. At the conclusion of the field tour, participants went around to various field stations to learn about topics and studies related to proper planting techniques as well as planting live stakes. A tour of the seed cleaning facilities and the specialized equipment used by the PMC ended the day.



Participants at the Pollinator Field Day hosted by the PMC.

Conservationists Share Solutions During National Pollinator Week

June 24 – 30, 2007, was National Pollinator Week which meant a time to reflect on the enormous contributions that pollinators make in our lives. It was also a time for conservationists from NRCS, the non-profit Xerces Society, local conservation districts and other groups to gather at the PMC to learn more about native pollinators and how to promote and enhance their habitats.

Xerces Conservation Director Mace Vaughn gave a slide presentation on native pollinator biology and habitat conservation. The group then headed out to the PMC production fields to collect and observe native bumble bees, sweat bees, mining bees, flies, wasps and moths thriving among the native plants. About 20 different species were collected and observed.

Native bees help produce \$3 billion in crops across the U.S. each year. In order to thrive, these bees need protected nest sites and a diverse "buffet" of wildflowers in bloom from early spring to fall. To come up with a species list and flowering dates for the Willamette Valley, the PMC is working with the Xerces Society and Oregon State University to record flowering periods of a wide variety of native plant species grown at the PMC as well as the different pollinator species that visit them. A detailed list of plants and a Technical Note will be coming out shortly. Stay tuned!

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