
Bridger Plant Materials Center

Year 2011 Progress Report of Activities



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98 South River Road, Bridger, MT 59014; Tel:406.662.3579; Fax:406.662.3428; Web Site: [http:// Plant-Materials.nrcs.usda.gov](http://Plant-Materials.nrcs.usda.gov)

What is the Bridger Plant Materials Center?



The Natural Resources Conservation Service (NRCS)-Bridger Plant Materials Center (BPMC) is one of 27 Centers nationwide using plants to solve natural resource problems. These problems include soil erosion, water quality deterioration, native habitat disturbance, mining and logging impacts, wildlife habitat loss, wetlands damage, and other conservation issues. Our work reflects the current needs of numerous Farm Bill programs. Plant testing/selection and the development of new conservation technologies are the primary products of the program. The BPMC serves Montana and Wyoming.

Program Emphasis

Although the BPMC addresses many resource issues, our current program emphasis is in the following areas:

- seed production
- woody plant selection and establishment
- native habitat restoration and enhancement
- mined land reclamation
- plant cultural trials
- plant testing and selection
- pollinator- and wildlife-friendly plantings
- outreach

This document presents an overview of Year 2011 activities at the BPMC. For detailed information, contact the BPMC staff or Montana Plant Materials Specialist.

Seed Production

Maintaining Foundation seed for use by commercial seed growers to establish fields of certified seed for retail is a large part of every PMC program, and is especially true for the BPMC since we maintain 31 releases. The BPMC's newest release is Meriwether Germplasm blanketflower. The native wildflower was selected to add species diversity in seed mixes, provide cover and food for pollinators, wildlife, and livestock, and for ornamental use in low maintenance landscapes. The seed harvest season at the BPMC extends from mid-June with alpine bluegrass until late December with Rocky Mountain juniper. Foundation seed is distributed through the Montana and Wyoming Seed



Seed production field of Meriwether Germplasm blanketflower.



Harvesting Bozoisky-Select Russian wildrye.

Certification programs, with proceeds supporting graduate research at Montana State University and the University of Wyoming. A large portion of our cooperative efforts with the National Park Service (Glacier, Yellowstone, Craters of the Moon, and Grand Teton), Bureau of Land Management (BLM) and Deer Lodge Valley Conservation District (acid/heavy metal-tolerant project) involves seed production and associated research.

To improve the quality of Foundation seed production, two studies were initiated in the fall of 2011 to determine which herbicides control both broadleaf and grassy weeds without affecting subsequent seed production. The two species selected were 'Pryor' slender wheatgrass and 'Critana' thickspike wheatgrass.

Woody Plant Selection and Establishment

The BPMC strives to improve the performance of woody plants used in conservation practices in order to maximize benefits to the environment and consumers. This work includes the maintenance of seed orchards of released selections, the continued testing of promising seed sources for potential release, and the testing of novel establishment techniques.

A new study was installed at Fort Keogh, Montana, in 2011 testing long narrow seedling containers to determine if root depth effects the early survival and establishment of plains



Plains cottonwood seedlings cultured in 36-inch long containers.

cottonwood. First year results show a significant improvement in seedling survival with the 24-inch and 36-inch containers as compared to the 10-inch size.



Plains cottonwood test plot at Fort Keogh.

A second study at the BPMC will compare plains cottonwood plants grown from seed to vegetative cuttings to determine if plant form and anatomy, as well as long-term survival and function, vary by stock type.

Evaluations continued in 2011 of two replicated studies, installed in 2005, comparing the effects of sub-irrigation tubes and ground cover type on the survival and growth of four woody conservation species. Dramatic differences in growth were recorded between the fallow and vegetated sites over the course of the study. This study will be completed in 2012 and results published.

Native Habitat Restoration and Enhancement

Habitat restoration involves the reclamation of disturbed sites with an emphasis on increasing species diversity and the development of plant communities to enhance wildlife habitat. Bridger PMC efforts in this arena include the following:

Since 1985, the BPMC has assisted the National Park Service with the collection, propagation, and re-establishment of native indigenous plant materials along re-constructed roadsides. The Parks have utilized native plants to reduce soil erosion, compete with invasive plants, and improve the aesthetics on these disturbed sites. What began with a single cooperative effort with Yellowstone National Park has expanded to include projects with Glacier, Devils Tower, Craters of the Moon, and Grand Teton National Parks.



Seed production for Glacier National Park.

In 2008, the BPMC became involved in a new Yellowstone National Park project aimed at improving critical wildlife habitat by re-vegetating disturbed land near the Northern Boundary. In addition to seed increase at the Center, a study was installed at two sites not far from Gardiner, Montana, to evaluate the effects of seed coating treatments on the establishment of eight native grasses.



October seeding in Yellowstone National Park at Reese Creek.

A new cooperative agreement was established in 2010 with Craters of the Moon National Monument. The BPMC is processing seed and growing plants indigenous to the park for use in various restoration projects within park boundaries.



Native plant propagation for Craters of the Moon National Monument.

For the first time in 2011, the BPMC began working with Grand Teton National Park to propagate four native species for use in various restoration projects within the park.

Mined Land Reclamation

Since the BPMC was established in 1959, there has been an emphasis on the development of native plants for use on all disturbances on semi-arid grasslands and foothills of Montana and Wyoming. The BPMC continues to select native grasses, forbs, and shrubs to add species diversity to reclamation mixes. Since 1995, the BPMC has been partnering with the Deer Lodge Valley Conservation District and the State of Montana to collect, test, increase, and release

plant materials adapted to the acid and heavy metal contamination resulting from historic smelting operations in the Anaconda and Butte areas. To date, six accessions collected at the Anaconda Smelter Superfund Site in western Montana have been released to the commercial



Old Works fuzzytongue penstemon.

seed market. Selections include Washoe Germplasm basin wildrye, Old Works Germplasm fuzzytongue penstemon, Prospectors Germplasm common snowberry, Copperhead Germplasm slender wheatgrass, Opportunity Germplasm Nevada bluegrass, and Mill Creek Germplasm silver buffaloberry.

Additional promising accessions are still being tested and increased, and include silverleaf phacelia, Woods' rose, horizontal juniper, and wooly cinquefoil.

As plants are released to commercial seed/plant producers, they will then be available to reclamationists for the seeding and planting of mined land sites in the Anaconda:Butte area, as well as other types of disturbances in locations with climatic conditions similar to the Rocky Mountain foothills. The BPMC represents a necessary and integral part of the seed-source production of these valuable conservation plant materials.

Revegetation After Russian Olive Removal

What do you do with a riparian site after you remove the Russian olive? To answer that question, a woody plant study was initiated in 2010 along the Yellowstone River in eastern Montana. The project, initiated by the Miles City, Montana, Area Office in cooperation with the Agricultural Research Service at Fort Keogh Livestock and Range Experiment Station, will investigate strategies to establish both herbaceous and woody cover after Russian olive removal. The study progressed nicely in 2011 with over five acres of test plots cleared of Russian olive and the installation of wildlife exclusion fencing around the test plots.



Plains cottonwood gallery along the Yellowstone River cleared of Russian olive.

Plant Cultural Trials

How to grow or culture plants is an integral part of nearly every aspect of operations at the BPMC. In addition to growing plants for restoration, field testing, seed increase, and conservation applications, the BPMC develops



Indian ricegrass seed in cold:moist chilling.

propagation protocols for seed dormancy-breaking and vegetative propagation of numerous native species each year. Irregular stand establishment problems with 'Rimrock' Indian ricegrass fields resulted in the initiation of seed dormancy-breaking trials in 2011 in order to identify the optimum amount of cold:moist chilling and to determine if scarification actually increases germination. Testing is on-going.

Conservation Effects Assessment Project/CEAP

The BPMC is participating in a pilot project being conducted in the western region of the United States. The project measures and quantifies plant growth parameters collected at eight PMCs for input into the Agricultural Research Service's ALMANAC (Agricultural Land Management Alternative with Numerical Assessment Criteria) computer model. The model will predict the effects of conservation practices applied through Farm Bill programs. In 2011, the BPMC used a Decagon ceptometer to sample the amount of light penetrating a plant canopy, and harvested biomass to determine leaf area index and forage quality. Evaluations were conducted every two weeks throughout the growing season on 'Critana' thickspike wheatgrass, Rimrock Indian ricegrass, 'Rosana' western wheatgrass, and 'Trailhead' basin wildrye. Preliminary results indicated the four species produce an adequate number of leaves that are moderately efficient at intercepting light and protecting soil and water resources.



Ceptometer sampling in Rosana western wheatgrass.

Grass and Legume Salinity Tolerance Study

This project was initiated by a request from the Montana Salinity Control Association to assist them and NRCS Field Offices in the prevention and reclamation of saline seeps. In the fall of

2011, four alfalfa varieties and four grass varieties were strip-planted at the BPMC on a salt-affected site with a natural salinity gradient site. Data will be collected for three years on seedling vigor, plant vigor, and forage yield, and then correlated with soil salinity level.

Plant Testing and Selection

A. Collection and Evaluation of Forbs.

Field Office seed collections are the fundamental backbone of the Plant Materials Program and the driving force behind all conservation germplasm released to the commercial seed industry. In 2011, Montana field staff contributed 20 forb, nine grass, and five tree collections. Wyoming field staff contributed 22 forb and four grass collections. Every five years an Initial Evaluation Planting (IEP) is assembled to evaluate performance of the new collections.

The current IEP was installed November 2008. In 2011, there were more than 300 phenological observations recorded on the 98 wildflower plots. Several of the entries show potential for re-vegetating disturbed environments and enhancing wildlife habitat, including prairie thermopsis, American vetch, oneflower sunflower, narrowleaf milkvetch, and waxleaf penstemon.



SCEP student Carolyn Edenbo evaluating the IEP.

B. Forage Kochia Comparative Evaluation Planting (CEP).

The BPMC, in collaboration with ARS, installed a CEP at the Center in early 2011 comparing four lines of tall-statured forage kochia to the industry standard 'Immigrant' prostrate kochia. The replicated study is designed to look at the range of adaptation and production of forage kochia for improved forage value for late-season grazing.



Planting forage kochia CEP on snow in late winter.

C. Off-Center Field Evaluation Plantings (FEP).

Off-center FEPs test plant materials and technology developed at the BPMC throughout our service area of Montana and Wyoming. In 2011, our program had 80 active field plantings with cooperators in both states. Three of these plantings are replicated studies. The Rim Country planting tests the effect of three herbicide treatments on the establishment of a native seed mix on a cheatgrass dominated rangeland with the goal of increasing native plant diversity and improving wildlife habitat. Half of the plots were established in 2011. The Bales planting tests four seed-bed preparation treatments on the establishment and production of winterfat or forage kochia with the goal of improving winter forage quality. This planting also addresses the cheatgrass resource concern. The Riverton planting tests seeding method and irrigation management on the establishment of a native mix on three soil types and in two precipitation zones. The objective is to maintain wildlife habitat in areas of intensive gas exploration and extraction.

Four grass forage variety trials were harvested for the second production year in 2011 at the MSU Havre and Moccasin Experiment Stations. The studies are grown under dryland and irrigated conditions. Due to abnormally high spring rainfall for the second year, the dryland trial has similar yields to the irrigated trial at Havre. All the trials are harvested once in June and then again after a killing frost in the fall. The second harvest simulates a crop livestock could harvest by grazing the re-growth. Another irrigated trial and alternate grass/alfalfa row trial was established at Bridger in April, 2010. In November of 2011, both dryland and alternative row grass/alfalfa trials were dormant planted at the University of Wyoming's Sheridan Research and Extension Center. Thirty-two grass accessions are in the dryland trials, 17 in the irrigated trials and 12 in the alternate row trials. Results will assist NRCS Field Office personnel, farmers and ranchers, and private reclamationists in choosing grass species for their conservation needs and improved pastures.



Forage harvest at the Havre dryland trial, 2011.

Pollinator- and Wildlife-Friendly Plantings

In cooperation with the Wyoming BLM, seed collections are being made of native wildflowers that are critical sources of food and cover for sage grouse. The objective of the study is to evaluate performance for potential habitat enhancement in re-vegetating disturbed environments. To date, there are 23 entries in the trial being evaluated for phenological development, and seed production potential.



Tiger swallowtail butterfly on a penstemon flower.

Low-Maintenance Landscaping

Introduced dryland forage and native reclamation grasses are finding new uses—*xeriscaping*. These hardy, drought-tolerant species have lower maintenance requirements than typical turf grasses. Monoculture plots of 10 grasses were established in 1998 and mixture plots of seven grasses were established in 2005. To date, the biannual mowing treatment has reduced percentage basal cover in six monoculture plots and all the mixture plots. Rhizomatous grasses tend to be dominant when mixed with a bunch-type grass. The warm-season grasses, blue grama and buffalo grass, rated highest in turf suitability. This study remains one of the most popular demonstrations at the Center. The brochure 'Creating Native Landscapes' has been reprinted several times with more than 120,000 copies distributed.



Xeriscape demonstration area.

Culturally Significant Plants

The BPMC continues to provide technical assistance on the culture and propagation of sweetgrass. It maintains vegetative material of Spirit Germplasm for distribution to commercial nurseries through MSU's Foundation Seed Program in Bozeman. It has been distributed to researchers, growers, and American Indian Reservations across the western United States and Canada. To learn more about growing Spirit sweetgrass, see the Montana NRCS website to access a short YouTube video.



Spirit sweetgrass flowering stalk.

Outreach

Connecting with traditionally underserved groups has always been part of the BPMC program. We have a long history of working with local school systems, small farm operations, and Native American tribes. In 2011, we continued this tradition by participating in the local Science Fair contest (advising and judging), assisting with outdoor nature hikes, and judging FFA and 4-H agricultural projects.

In 2011, a collaborative project between Chief Plenty Coups State Park, the Hardin Field Office, the Crow Indian tribe, and the BPMC was initiated to propagate cuttings from trees planted by the famous Chief Plenty Coups at his

homestead and state park outside Pryor, Montana. The BPMC also provided sprigs of Spirit sweetgrass to the Park.



Collecting cottonwood cuttings for propagation.



Chief Plenty Coups planting of Spirit sweetgrass.



Science Fair student collecting plant data.

2011 is the second year of production of YouTube videos of conservation plants and technology developed BPMC. The videos are intended to give Field Office personnel a quick reference when developing conservation plans, and to show their producer clients how the plant materials and technology can help them in their operations. The videos are intentionally brief, about a minute or less. You can find and view them on our web site;

<http://www.mt.nrcs.usda.gov/technical/ecs/plants/bridgerpmctv.html>

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