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This is a quarterly field office newsletter to transfer plant materials technology, services, and needs. The plant materials personnel will be featuring short articles on project results, new cultivar releases and establishment techniques, seed collection, and field planting needs, etc. All offices are encouraged to submit articles about plant material-related activities relative to plant performance, adaptation, cultural and management techniques, etc. Direct inquiries to USDA NRCS, Plant Materials Center, 98 South River Road, Bridger, MT 59014, Phone 406-662-3579, Fax 406-662-3428; or Jim jacobs, Plant Materials Specialist, USDA NRCS Montana State Office, Federal Bldg., Rm 443, 10 East Babcock Street, Bozeman, MT 59715-4704, Phone 406-587-6995, Fax 406-587-6761.

And the Winners Are….

The Bridger PMC is pleased to announce the results of the Montana and Wyoming NRCS Field Office seed collection efforts in 2008. Montana field staff contributed 16 collections from 10 counties with a combined weight of 1.2 pounds. NRCS personnel from the Bozeman Area sent in the majority of the collections. Rebecca Wolenetz and Matt Ricketts tied for sending the most collections. The largest sample was bluebunch wheatgrass weighing more than ⅓ pound submitted by Don Feist of the Plains FO.

Wyoming field staff contributed 13 collections from three counties with a combined weight of more than 5 pounds. The most collections were sent from the Little Snake River CD in Baggs. The largest sample submitted was prairie thermopsis weighing nearly one pound from the BLM staff in Rawlins.

Despite the overall poor conditions across the region for wildland seed production, dedicated collectors persevered! 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. We really appreciate the effort and hope you folks will continue to make collections of plants with promising conservation applications. Annual results will be included in PMC reports and promising material will advance for further testing.

By Susan R. Winslow, PMC Agronomist.

Field Office 2009 Seed Collection List

The Plant Materials (PM) Program is requesting seed collections of eight species in Montana and Wyoming. In 2009, continued collection is requested of bluebunch wheatgrass *Pseudoroegneria spicata,* silverleaf Indian breadroot *Pediomelum argophyllum* (synonym *Psoralea argophylla*), large Indian breadroot *Pediomelum esculentum* (synonym *Psoralea esculenta*), and slimflower scurfpea *Psoralidium tenuiflorum* (synonym *Psoralea tenuiflora*). New to the list this year are wild grape *Vitis riparia*, Canadian milkvetch *Astragalus candensis*, meadow milkvetch *Astragalus diversifolius*, and larchleaf penstemon *Penstemon laricifolius* ssp. *laricifolius*.

We are seeking seed from plants that can tolerate harsh environmental conditions including temperature and moisture extremes and less than ideal soil conditions. When scouting around for likely sites in which to make seed collections, look for populations of healthy plants growing in condtions harsher than normally found. Specific guidelines for seed collecting are published in the Plant Materials Technical Note number MT-50, "The NRCS Field Office Guide to Collecting Wildland Seed" found on the Montana Plant Materials web site (www.mt.nrcs.usda.gov/technical/ecs/plants/) under Seed Collections (or Technical Notes). The Technical Note can also be accessed on the Wyoming Plant Materials web site (www.wy.nrcs.usda.gov/Plant/plants.html) under Wyoming Plant Materials Technical-Notes with the title "WYPM11 Collecting Wildland Seed." Collections are needed from all areas in Montana and Wyoming where populations can be found.

A bulletin will be distributed electronically to each field office in Montana and Wyoming to provide guidance on accessing the seed collection instructions via each state's homepage. For immediate access to the respective guidance documents, species descriptions, and photos, go to the Montana or Wyoming NRCS homepage and click on Plant Materials, and then the Seed Collection List. When sufficient collections from representative regions of Montana and Wyoming are acquired, seed will be planted in evaluation studies to test performance and utility for solving conservation problems as outlined in the Plant Materials Long-Range Plans for Montana and Wyoming.

By Jim Jacobs, Plant Materials Specialist.

Restoring Vegetation in Deer Lodge Valley, Montana

How about an update on one of our long-standing endeavors here at the Center – the Development of Acid and Heavy Metal Tolerant Releases (DATR) Project? The Bridger PMC has cooperated with the Deer Lodge Valley Conservation District since 1995 on this important conservation project. The project is currently under an extension until spring 2010.

Investigations and field studies related to the Anaconda Smelter Superfund Site identified expansive areas of barren soil and stressed vegetation in and around Anaconda, primarily due to decades of dust-fall from smelter stack emissions containing arsenic, copper, lead, zinc and sulfur. It has been estimated approximately 13,000 acres of uplands have been visibly altered by activities in the Valley related to the smelter operations. In severely impacted areas, there was a complete elimination of native plant communities and topsoil loss from lack of vegetation. Historic photos of the area documented a shift in plant community structure from forests with open grassland to barren or sparsely vegetated grassland with low species diversity. A lack of plant materials able to withstand the severe edaphic conditions of acid and/or heavy metal-contaminated soils created a need for native plant materials demonstrating not only inherent tolerances to these conditions, but also adaptation to the climatic conditions of the intermountain valleys and foothills of western Montana. To date, the DATR project has assembled 130 seed collections of 72 native species of grasses, forbs, shrubs, and trees within the Upper Clark Fork River Basin. These collections have been planted at various study sites in comparison with non-local native and introduced plant species. One such study site local to the area is the Stucky Ridge Uplands.

Stucky Ridge Uplands Comparative Evaluation Planting

The plot site is situated on a stream terrace above Lost Creek north of the smelter, at an elevation of 5,308 feet and covers most of the relatively flat ground on the east end of Stucky Ridge. Annual precipitation at the site ranges from 10 to 14 inches with most of the precipitation occurring in the spring. The parent material is alluvium and the soil has a gravelly loam texture, which is well drained. Slope at the plot site averaged approximately 5 to 10 percent.

A remedy identified in a Remedial Action Work Plan/Final Design Report for the treatment area was soil tilling to 12 inches with the addition of a neutralizing amendment to ameliorate the low pH soil conditions. The entire treatment area was pre-tilled with a Rhome™ disc to approximately 12 inches. Lime kiln dust was then applied at a rate of approximately 22 ton/acre to neutralize the soil. Four additional passes were made with the Rhome™ disc to a depth of 12 inches to incorporate the lime. Soil analyses indicated the initial soil pH between 4.0 and 5.0 was adjusted to a pH of approximately 7.0 to 8.0 after lime addition. The site was fertilized at a rate of 500 bulk pounds/ acre and incorporated to six inches using a chisel plow.

The species tested consisted of 36 grass accessions representing nine genera, 14 forb accessions representing five genera, two subshrub entries of one species, and four seed mixtures. Each genus tested included at least one accession originating from metalliferous soil sites in the proximity of the Anaconda Smelter Site, with the exception of two entries of winterfat *Krachenninnikovia lanata*. The study was arranged in a randomized complete block design replicated four times.

Results and Conclusions

Seedling density was the growth response variable used to assess performance during the first (2003) growing season. For the years 2004 through 2008, variables evaluated included percentage stand, vigor, average plant height, and biomass production. In addition, for years 2004 through 2007, plant tissue and soil sampling was conducted and analyzed for heavy metals of concern, and soil pH was tested. Local source species exhibiting superior performance included Washoe Germplasm basin wildrye, Copperhead Germplasm slender wheatgrass, and Opportunity Germplasm Nevada bluegrass. The three grasses have been released to the commercial seed industry through the Pre-Varietal release mechanism and are distributed via the Foundation Seed Programs at Montana Sate University and the University of Wyoming. Other indigenous plant materials are being increased and tested for potential future release to address restoration uses on this project, as well as other northern Rocky Mountain and intermountain West sites.

Seed Demand

It is understandable why many would assume the local plant materials released under the DATR project would be considered specialized selections. No doubt the acid-tolerant releases will hopefully play a significant role in revegetation associated with the Anaconda Smelter Superfund Site and other mine land restoration. The remainder of the project, however, aims to promote use of these plant selections and associated technologies for broader applications in other conservation practices and geographic areas.

Please contact the Bridger PMC for copies of release brochures of the three grasses, as well as two other DATR releases, Prospectors Germplasm common snowberry and Old Works Germplasm fuzzytongue penstemon.

By Beth Graham, Environmental Engineer, DATR Project Leader at the Bridger PMC

Greenhouse Wildflower Herbicide Screening Trial

The commercial production of wildflower seeds for revegetation and restoration purposes is a relatively new agronomic enterprise for which optimal weed management practices are still being researched. Interest in native grass and wildflower seed production has come about due to an increasing awareness of the importance of diversity, especially functional diversity. However, weed management is critical during the establishment year of native seed production as weed competition is one of the major causes of failure in prairie grass and wildflower establishment. Specifically, the management of broadleaf weeds is critical to securing establishment as weed competition is strongest among functionally similar species (such as weedy forbs and wildflowers) with similar environmental requirements. Testing wildflower species' tolerance to traditional crop herbicides represents a necessary step to facilitate the successful establishment and seed production of native wildflowers. A greenhouse herbicide screening has recently been completed for determining native wildflowers' tolerance to herbicides.

The herbicide screening was conducted at a temperature and light-controlled greenhouse at the Montana State University Plant Growth Center, Bozeman, Montana. The experimental design followed a completely randomized design with five replications, conducted first from January 12th to April 30th, 2008, and again from May 24th to September 22, 2008. The post-emergent herbicide treatments included imazapic, halosulfuron, linuron, pendimethalin, and a no-herbicide control. These herbicides were tested in four wildflower species: silverleaf phacelia, prairie coneflower, white prairie clover, and blanketflower. Herbicides were applied 20 days after planting. Leaf injury was visually estimated 15 to 20 days after spraying, Plants were harvested 30 days after spraying and dry weights were recorded after a 48-hour drying period at 105º C. In comparison to the control, seedling injury varied by species and herbicide with linuron reducing biomass for only one species, blanketflower ($P<0.001$). Halosulfuron caused injury to and reduced the biomass for prairie coneflower ($P=0.0423$), blanketflower ($P<0.001$), and silverleaf phacelia ($P<0.001$). Imazapic reduced biomass and caused injury to prairie coneflower ($P<0.001$), blanketflower ($P=0.0213$), and silverleaf phacelia ($P=0.0279$). Pendimethalin caused the least amount of injury and biomass reduction for all species.

These results indicate the use of halosulfuron and imazapic in seed production fields could cause severe injury and lower seed yields. Pendimethalin did not cause significant biomass reductions to any species tested, indicating it may be an option for broadleaf weed control in wildflower seed production fields. A field study assessing pre- and post-emergent herbicide tolerance has recently been completed to compliment this study. The results of the field study will elucidate if herbicide effects are similar with weed competition and adverse environmental conditions.

By Jessie Wiese, MSU Graduate Student.

New Field Guide for Grasses Available

"Forage and Reclamation Grasses of the Northern Great Plains and Rocky Mountains" is a book featuring 67 grasses that are currently used in the region for forage, reclamation, and wildlife plantings. There is a two-page spread for each species (37 native, 19 introduced, and 11 weedy). The book contains 275 color pictures, including individual plants, seedheads, vegetative characteristics, and seed. Information includes number of seeds/lb, seeding rate, time of planting, ease of harvest, commercially available releases, and more. Three dichotomous keys are included to identify plants based on the seedhead, vegetative characteristics, or seeds. Copies can be obtained by contacting the author, Mark Majerus majerus13@gmail.com.

By Mark Majerus, Retired BPMC Manager.

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Poster Abstract: Using Hoof Action to Control Clubmoss

Clubmoss *Selaginella densa* is a plant indigenous to eastern Montana with the undesirable tendency to dominate large areas of degraded rangeland. Hoof action by livestock may offer a viable control alternative to conventional chiseling or chemical methods on remote or irregular terrain.

The trial site consisted of a 2-acre control plot and a 4-acre treatment plot; a solar powered electric fence enclosure was constructed. The 4-acre treatment plot was fenced and then divided into two, 2-acre paddocks. One acre received a single pass with an aerator; 1 acre received two passes with an aerator and 2 acres were treated with hoof action. Surface cover sampling was via permanent 100-ft line transects, whereas, two 9.8 ft^2 hoops were used to sample production per transect. Two hundred forty-four head of cattle were confined in the hoof action plot for 24 hours. Livestock were excluded from paddocks for two growing seasons as per NRCS's technical specifications.

After sampling each treatment for 3 years, the single pass treatment with the aerator had virtually no effect on clubmoss cover, whereas the double pass reduced clubmoss cover by 60% and the hoof action by 100%. In inaccessible areas, concentrating livestock on clubmoss-dominated land is a viable control option. The results of this study were presented in a display at the

Society for Range Management's 62nd Annual Meeting in February in Albuquerque, New Mexico

By Robert Kilian, Katrina Johnson, and Renee Nelson, NRCS Miles City and Wibaux, and Wibaux CD (respectively).