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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.

A Call for Field Plantings

The purpose of field plantings is to assess the conservation potential of new or developing plant materials and technology under actual use conditions. The Plant Materials (PM) Program depends on landowner participation to field-test new selections of grasses, forbs, and woody plants and the best methods to get them established. This happens by working with local conservation districts and NRCS field offices that are routinely in contact with local cooperators who show interest in looking at new plants and technologies. This unique relationship allows us to field-test new plant materials and establishment technologies in a "real world" setting on farms and ranches in Montana and Wyoming. The results of field plantings provide information to help conservation planners make recommendations for application of plant materials and technology to address conservation needs.

The Bridger PMC has limited quantities of seed of 12 grass and three forb species for field testing in Montana and Wyoming. The grasses are 'Rimrock' Indian ricegrass *Achnatherum hymenoides*, 'Garrison' creeping foxtail *Alopecurus arundinaceus*, 'Critana' thickspike wheatgrass *Elymus lanceolatus* ssp*. lanceolatus*, 'Pryor' slender wheatgrass *Elymus trachycaulus*, 'Goshen' prairie sandreed *Calamovilfa longifolia*, 'Trailhead' basin wildrye *Leymus cinereus,* 'Rosana' western wheatgrass *Pascopyrum smithii*, Washoe basin wildrye *Leymus cinereus*, Foothills Canada bluegrass *Poa compressa*, High Plains Sandberg bluegrass *Poa secunda (sandbergii)*, 9005439 switchgrass *Panicum virgatum,* and Spirit sweetgrass *Hierochloe odorata* (sprigs). The forbs are Great Northern western yarrow *Achillea millefolium* var. *occidentalis*, Antelope slender white prairieclover *Dalea candida*, and Stillwater upright prairie coneflower *Ratibida columnifera*. In addition to seed available from the Bridger PMC, other Plant Materials Centers have seed available that we are interested in testing. These include 'Rush' intermediate wheatgrass *Thinopyrum intermedium,* 'NewHy' hybrid wheatgrass *Elymus hoffmannii*, 'Goldar' bluebunch wheatgrass *Pseudoroegneria spicata* ssp*. spicata*, 'Bannock' thickspike wheatgrass *Elymus lanceolatus* ssp*. lanceolatus*, and Garnet Germplasm mountain brome *Bromus marginatus*. Other plant materials may be available if producers or field offices have a particular conservation problem they would like to study.

Additional information on these plants and their potential application can be found on the Montana NRCS home page under plant materials, then MT Supplement to National PM Program, then Long-Range Plan for Field Plantings. The information can also be found under plants, on the Wyoming NRCS home page. All herbaceous plantings with successful establishment are evaluated for 10 years and woody plantings are evaluated for 15 years.

We are also looking for sites to test plant materials to use for revegetation after control of four noxious/invasive weeds. These include Japanese knotweed on farmsteads, saltcedar and/or Russian olive in riparian areas, or cheatgrass (downy brome) on pastureland. These trials will involve herbicidal control of the weeds and planting of appropriate plant materials to replace them. We are interested in the tolerance of plant materials to herbicides and their competitive ability with the weeds. For more information contact Jim Jacobs.

The 2009 list of seed availability for field plantings can be accessed via the Montana and Wyoming NRCS websites. Montana applicants must submit requests on the form, MT-ECS-9 Field Planting Plan, which can also be accessed on the Montana NRCS website, under plants, then plant materials forms. Applications are due to Jim Jacobs no later than March 15, 2009. Applications will be reviewed at the Montana State Plant Materials Committee meeting tentatively scheduled this spring.

In Wyoming, the 2009 list of seed availability for field plantings can be accessed via the Wyoming NRCS website www.wy.nrcs.usda.gov and clicking on

"technical resources" and then "plant materials". Wyoming applicants will need to submit requests on the form, WY-ECS-54 Field Planting Plan, which also can be accessed on the Wyoming NRCS website, under government forms, then Wyoming ECS forms. Also complete and attach the form, WY-ECS-25 Seeding Application/As-built Spreadsheet. Applications are due to Jim Jacobs by February 23, 2009. The Wyoming State Plant Materials Committee will meet to review requests on February 24 and 25.

By Jim Jacobs, Plant Materials Specialist.

Local versus Non-Local Seed Sources

The following is an abstract of a synthesis article the PMC feels is important to our subscribers and others interested in using seed of native species to revegetate disturbed lands. An electronic pdf is available upon request, or contact your local library to obtain a written copy.

Seed supply for broadscale restoration: maximizing evolutionary potential. Restoring degraded land to combat environmental degradation requires the collection of vast quantities of germplasm (seed). Sourcing this material raises questions related to provenance selection, seed quality and harvest sustainability. Restoration guidelines strongly recommend using local sources to maximize local adaptation and prevent outbreeding depression, but in highly modified landscapes this restricts collection to small remnants where limited, poor quality seed is available, and where harvesting impacts may be high. We review three principles guiding the sourcing of restoration germplasm: (i) the appropriateness of using "local" seed, (ii) sample sizes and population characteristics required to capture sufficient diversity to establish self-sustaining populations and (iii) the impact of over-harvesting source populations. We review these topics by examining current guidelines and the evidence supporting these, then we consider if the guidelines can be improved and the consequences of not doing so. We find that the emphasis on local seed sourcing will, in many cases, lead to poor restoration outcomes, particularly at broad geographic scales. We suggest that seed sourcing should concentrate less on local collection and more on capturing high quality and genetically diverse seed to maximize the adaptive potential of restoration efforts to current and future environmental change.

Author-- Linda M. Broadhurst et al.

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New NRCS Riparian Publication

The Idaho and Oregon plant materials program teamed up to make available a new pocket field guide entitled "*Field Guide for the Identification and Use of Common Riparian Woody Plants of the Intermountain West and Pacific Northwest Regions*". This guide is intended to provide a few simple identification characteristics of these woody plants in both the summer and winter. The primary focus of this field guide is to provide information on the identification and collection of native riparian plant materials for practitioners of riparian restoration, particularly for streambank soil bioengineering.

The species descriptions provide information on the identification and use of native riparian woody species plant materials. Dormant woody plants have few of the typical identification characteristics used to key the species in the summer. A number of field-tested traits have been listed to help with identification of these species during the winter months The guide is small enough to fit in a field pack. The user is encouraged to take notes on the pages. The information in the guide is meant to provide a quick reference while in the field working on a project.

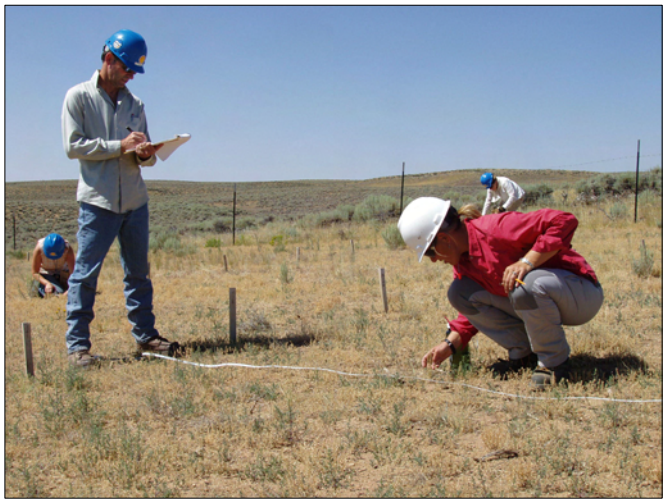
Copies are available from the Aberdeen Plant Materials Center at 208-397-4133 or on the web at

http://www.plant-materials.nrcs.usda.gov/pubs/idpmcpu7969.pdf

By Chris Hoag, Aberdeen PMC Wetland Plant Ecologist.

SPECIAL INSERT *Update on Shell Field Evaluation Planting, Pinedale, Wyoming*

The third year of data is in for the Shell Cooperative Field Evaluation Planting approximately 35 miles south of Pinedale. The trial consists of 72 entries in a replicated, precision-planted plot and two different seed mixes both broadcast- and drill-seeded adjacent to the replicated plots on an oil & gas well site in need of reclamation. The site is contained inside an antelope-proof woven wire fence. The plots were initially seeded in the fall of 2005.



In the image above, Karen Clause, Rangeland Management Specialist in Pinedale, and Mary Jacobs, Earth Team Volunteer, collect production data in the background, while Aimee Davison of Shell Exploration, and Pat Davey, formerly Colorado Plant Materials Specialist, collect density data in the foreground.

A climate summary for the past three years indicates 2006 and 2007 temperatures were above normal with below normal precipitation. Temperatures were below average with closer to average precipitation in 2008 with notable precipitation events in May that led to more "normal" spring growing conditions for grasses and forbs. See Table 1 for detailed climate information in the area.

Table 1. Climate data for 2006-2008 in the vicinity of the seeding trials.

Weather stations:	Jonah*	Big Piney	La Barge	Pinedale
30-year annual average:		(% of avg)	(% of avg)	(% of avg)
Avg max temp (f)	-	52.7	55.6	51.7
Avg min temp (f)	-	17.6	21.4	19.9
Precipitation (inches)	-	7.46	8.04	10.87
2006 water year				
Avg max temp	53.6	53.8	56.4	52.8 (102%)
Avg min temp	18.2	16.6 (94%)	20.9 (98%)	21.0 (106%)
Precipitation	1.78	5.98 (80%)	6.02 (75%)	8.06 (74%)
2007 water year				
Avg max temp	55.8	55.3	57.6	51.6 (100%)
Avg min temp	22.5	18.4	24.6	21.0 (106%)
Precipitation	5.15	5.48 (74%)	7.57 (94%)	10.53 (97%)
2008 water year				
Avg max temp	-	50.4 (96%)	53.3 (96%)	49.7 (96%)
Avg min temp	-	14.1 (80%)	20.6 (96%)	19.4 (97%)
Precipitation	-	5.59 (75%)	5.85 (73%)	10.14 (93%)

*This station is located the closest to the trial area, however no historic data exists, and recently the weather station was removed due to performance problems.

In addition to collecting density data (plants/m^2) on all plots, production data (kg/ha) was also collected on the grasses in the replicated plots. Tables 2-4 rank top performing grasses, forbs, and shrubs in density and height, and in grass production.

Table 2. Top performing grasses ranked by 2008 production data.

Accession/Common Name	Plants/m^2			Production kg/ha	Height cm		
	2006	2007	2008	2008	2006	2007	2008
L-46 basin wildrye	98	46	72†	179	11	14	73
Washoe basin wildrye	64	22	29	161	9	13	69
Critana thickspike w.g.	32	28	37	158	9	12	63
Trailhead basin wildrye	55	11	18	139	10	14	73
Sodar thickspike w.g.	64	46	47	131	7	11	48
9019219 squirreltail	45	14	16	12	7	12	33
P-24 bluebunch w.g.	83	36	28	115	8	13	49
Continental basin wildrye	98	40	30	102	11	13	61

† Significantly different determined by LSD ($p \leq 0.05$).

Table 3. Top performing forbs ranked by 2008 density data.

Accession/Common Name	Plants/m^2			Height cm		
	2006	2007	2008	2006	2007	2008
9087546 Palmer's penstemon	-	2	3	-	8	34
Maple Grove Lewis flax	9	4	3	1	5	32
9087552 sulfurflower buckwheat	4	0	2	2	-	5
9087553 gray aster	2	3	1	2	4	10
9087545 Eaton's penstemon	4	3	1	2	1	13
Stillwater prairie coneflower	2	0.5	1	2	1	15
Antelope white prairie clover	1	0	0.5	1	-	3
9087554 Pacific aster	1	0	0.5	1	-	9

Table 4. Top performing shrubs ranked by 2008 density data.

Accession/Common Name	Plants/m^2			Height cm		
	2006	2007	2008	2006	2007	2008
Wytana fourwing saltbush	4	6	7†	5	18	25
Snake River Plains fourwing saltbush	3	4	4	6	24	34
9016134 Gardner's saltbush	1	0.4	1	1	13	14
Hatch winterfat	1	1	1	3	10	20

† Significantly different determined by LSD ($p \leq 0.05$).

In addition to evaluating the replicated plots, the broadcast- and drill-seeded mixtures were evaluated by plant density. Table 5 summarizes the 2008 percentage composition based on density for each seed mixture and seeding method, compared to what was planted in the original seeded mix.

Table 5. Percentage composition by density for seed mixtures.

Seed Mix - Planting Method	Original Mix Composition (Grass - Forb - Shrub)	2008 Plot Composition (Grass - Forb - Shrub)
Bridger Mix - Broadcast	72% - 23% - 5%	86% - 4% - 10%
Bridger Mix - Drilled		93% - 5% - 2%
Shell Mix - Broadcast	35% - 13% - 52%	48% -0% - 52%
Shell Mix - Drilled		26% - 0% - 74%

When comparing the above data to NRCS Ecological Site Description for the Sandy 10-14" precipitation zone in the Foothills and Basins West (MLRA 34A), it appears the Bridger mix is more representative of the Bunchgrass Plant Community Phase with 70% grasses, 10% forbs, and 20% shrubs by dry weight. Meanwhile, the Shell mix may be more representative of the Big Sage/Bunchgrass Plant Community Phase, though no specific reference data is available for comparison. Even though there is not a direct correlation of density to dry weight, it is still obvious the Bridger mix is dominated by grasses whereas the Shell mix is dominated by shrubs. The low forb expression in both stands has important implications for the future study of seed mixture establishment based on timing of seeding. Spring seeding of these same mixtures would be useful to determine if timing affects forb establishment.

In general, the wheatgrass species were quick to establish and by and large maintained higher densities than slower establishing grasses, such as Sandberg bluegrass and Indian ricegrass, providing important implications for prescribing diverse native seed mixes which allow for seedling establishment of all species in the mix. The forbs were extremely variable in their establishment and persistence over the 3-year period. Varied results imply that prescribing seed mixes with an array of forbs to fill the various niches and roles in the landscape may be the most appropriate for successful plant community establishment. The shrubs had lower overall establishment with the exception of the saltbush species, and very little response of sagebrush except for in the broadcast mixes at the highest seeding rate. Results indicate that prescribing adequate seeding rates and seeding methods when trying to establish shrubs is an important consideration.

The Questar Cooperative Field Evaluation Planting was installed in the fall of 2006. Located approximately 10 miles south of Pinedale, the trial consists of 29 shrubs in a replicated, precision-planted plot and five bluebunch wheatgrass accessions broadcast-seeded adjacent to the replicated plots on an oil & gas well site in need of reclamation. The site is contained inside an eight foot high, deer-proof fence since it resides within crucial mule deer winter range. Seedbed conditions were excellent during seeding. However, due to continued drought conditions in 2007, the planting was considered a failure in 2008. Currently plans are underway to replant the site in the fall of 2009 with additional seedbed preparation and revision to the species list.

By Karen J. Clause, Rangeland Management Specialist.