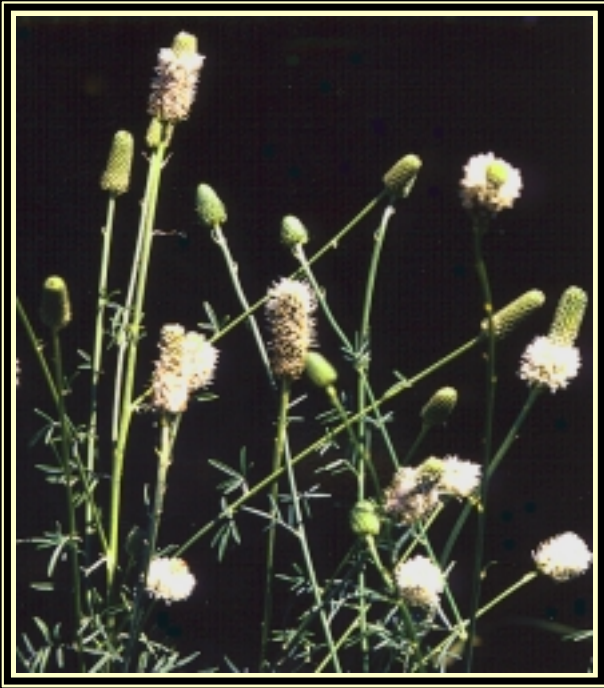


BRIDGER PMC 2000



New Plant Releases

'Antelope' Slender White Prairieclover



'Garnet' Mountain Bromegrass



Photo courtesy of Bismarck PMC



'High Plains' Sandberg Bluegrass



'Dupuyer' & 'Pondera' Silverberry

PLANT MATERIALS CENTER BRIDGER, MONTANA

History

The Bridger Plant Materials Center (PMC) opened its doors in 1959 for evaluation, selection, and development of plant materials for Montana and Wyoming. From 1959 to 1970, the PMC operated on 80 acres of a privately owned, 140-acre farm leased by the Carbon County, Montana Conservation District. In 1970, the 104 Conservation Districts in Montana and Wyoming purchased the 140-acre farm. The USDA Soil Conservation Service leased 110 acres of this farm from 1970 to 1984. Due to an ever-expanding program, the Natural Resources Conservation Service now leases 130 acres from the Conservation Districts.

Staffing

PMC Manager	Mark Majerus
Assistant Manager/Horticulturist	Joe Scianna
Agronomist	Susan Winslow
Resource Conservationist	Connie Reynolds
Farm Foreman	Lynnel Hoffman
Biological Technician	Larry Sticka
Plant Scientist (Deer Lodge Valley CD)	Leslie Marty
National PM Information Coordinator	John Scheetz

Facility

The 140 acres are irrigated primarily by furrow irrigation; however, a small, hand-moved sprinkler system is used for establishment-year irrigation. Major buildings include:

- 40' x 80' metal building for seed cleaning,
- 30' x 50' addition to seed cleaning building for seed storage,
- 50' x 80' metal building for shop and machinery storage,
- 26' x 52' office building,
- 19' x 31' greenhouse with 19' x 31' headhouse,
- 20' x 48' coldframe/lath house, and
- 30' x 40' addition to headhouse for laboratory.

Laboratory

The Bridger Plant Materials Center was one of five centers nationwide selected as a site for a national plant materials laboratory. Although originally slated as a plant tissue culture lab, the facility is currently used for seed germination and dormancy research, limited soil testing, and other general laboratory work. In 1993, construction was completed on a 20' x 40' annex on our greenhouse/headhouse complex. Lab development continued in 1994 with additional design modifications and equipment procurement. The media preparation area -- a sort of high tech kitchen -- was designed and cabinetry specifications released for bid. The contract was awarded and we received cabinet delivery in January 1995.

Approximately one-half of the equipment and supplies needed for startup have been funded and procured to date. Although no funding is targeted specifically for the lab, the PMC staff continues with limited lab development and uses equipment for general program support.

MAJOR PROJECTS

Arid Rangeland and Mineland Revegetation

This project was initiated in 1980 with the following objectives:

1. Increase the number and diversity of species available for revegetating arid (<10 inches precipitation) range and mine sites in Montana and Wyoming, and
2. Evaluate techniques for successful establishment of these plant materials.

Two field evaluation sites were used for this project:

1. Bridger Coal Company, Rock Springs, Wyoming
-- 7" - 9" precipitation.
2. Dresser Minerals, Greybull, Wyoming
-- 5" - 9" precipitation.

Plantings were made spring and fall 1980-81 at Bridger Coal, spring and fall 1981-82 at Dresser Minerals, and fall 1984 at both sites. A total of 3,587 rod rows were planted, evaluating 915 different accessions. All accessions were also planted at the Bridger PMC.

Field Tests:

To test superior collections of Sandberg bluegrass, bottlebrush squirreltail, and Gardner's saltbush, seed mixture trials (four mixtures utilizing released cultivars and potential release material) were established at two sites along the recently constructed Express Pipeline. The arid sites (7-9 inch ppt. zone) are in the Bighorn Basin of Wyoming near Greybull and Worland. These research sites are in cooperation with the USDI Bureau of Land Management.

Releases:

In the Spring of 2000 'High Plains' Sandberg bluegrass was released in cooperation with Montana State University-Bozeman and the University of Wyoming. Foundation seed will be available in the spring of 2001. Depending on the success of seed increase fields, a selection of Gardner saltbush may be released in 2001.

Plant Materials for Western Montana and Wyoming

Initial Evaluation Plantings (IEPs) were established at the Montana State Forest Tree Nursery, Missoula, Montana, beginning in October 1983. Approximately one thousand accessions have been evaluated at this field evaluation site. In 1989, 25 accessions were selected for advanced evaluation.

The objectives of this project are:

1. Prevent soil erosion from road construction associated with timber harvesting activities, streambank erosion, mining, and urbanization, and
2. Select adapted native species with good seedling vigor for revegetating low-condition rangelands.

Advanced trials:

The superior Idaho fescues have been established in a replicated Comparative Evaluation Trial at the Bridger PMC, evaluating vigor, forage production and seed production. It is anticipated that two releases can be made: one for the mountains and foothills of western Montana and Wyoming and one for the rolling hills/ponderosa pine savanna areas of eastern Montana and northeastern Wyoming.

The Recurrent Phenotypic Selection of bluebunch wheatgrass is in its 3rd cycle, with a potential release for areas east of the Continental Divide.

Releases:

The first release out of this project is a joint release with the Meeker, Colorado Environmental Plant Center of 'Garnet' mountain brome. The release was official in May 2000, with the first Foundation seed being sent out to growers in several western states this spring.

National Park Service Cooperative Agreements

Beginning in 1986, the Bridger PMC has maintained cooperative agreements with the National Park Service for revegetation work relating to on-going highway reconstruction projects. The work is funded through the Federal Highway Administration which provides the National Park Service with monies to upgrade roads within national parks boundaries nationwide. The Bridger PMC has assisted both Yellowstone and Glacier National Parks with numerous aspects of this work, including:

- identifying early successional or colonizing species that can be used to revegetate roadside disturbances.
- identifying species that lend themselves to traditional cultural practices.
- determining the method and timing of seed collection.
- determining seed cleaning methods.
- collecting, cleaning, inventorying, and storage of seed collections.
- developing germination and dormancy-breaking techniques for hard-to-propagate species.
- developing asexual propagation techniques for woody plants.
- developing cultural techniques for seed, container plant, and bareroot production.

Seed production plots (varying from .05 to .5 acres) are established at the Bridger PMC and harvested using hand harvesting, a seed stripper, or a plot combine. Presently there are approximately 7 acres of seed production for the two national parks. For Glacier, there are 10 species (17 different collections) of grasses and 1 forb species (1 collection) in production. For Yellowstone, there are 11 species (25 collections) of grasses and 3 species (3 collections) of forbs in production.

Not all Park Service collections are increased at the Bridger PMC. Although most collections made in the parks are sent to the Bridger PMC for cleaning, accessioning, and storage, some seed is returned directly to the respective parks for direct seeding or sent to commercial growers for seed or plant increase. Yellowstone and Glacier are making approximately 300 individual collections per year. To date, Yellowstone has made collections from 141 different sites from within Yellowstone National Park. Glacier National Park has made collections from 95 different sites, both from within the park and from adjacent National Forest Land.

The Woody Plant Program supports this agreement through studies involving the collection, processing, storage, production, planting, and inventorying of native woody seed and plants. Most of this work involves the bareroot production of species such as Wood's rose, snowberry, serviceberry, chokecherry, currant, Oregon grape, silverberry, and other species with conservation and revegetation applications. In some cases, the clonal propagation of plants is necessary through the use of stem cuttings, this research is being conducted in the PMC greenhouse under highly controlled conditions.

Yellowstone National Park Cooperative Agreement

Numerous projects are currently underway at the PMC for Yellowstone National Park that include:

- seed increaser fields of rough bentgrass *Agrostis scabra*, mountain brome *Bromus marginatus*, nodding brome *Bromus anomalus*, tufted hairgrass *Deschampsia cespitosa*, bottlebrush squirreltail *Elymus elymoides*, blue wildrye *Elymus glaucus*, slender wheatgrass *Elymus trachycaulus*, Idaho fescue *Festuca idahoensis*, basin wildrye *Leymus cinereus*, bluebunch wheatgrass *Pseudoroegneria spicata* ssp. *spicata*, needleandthread *Stipa comata*, yarrow *Achillea millefolium*, and sulphur wild buckwheat *Eriogonum umbellatum*.

- asexual propagation of common juniper *Juniperus communis*, Russet buffaloberry *Shepherdia canadensis*, bearberry *Arctostaphylos uva-ursi*, chokecherry *Prunus virginiana*, serviceberry *Amelanchier alnifolia*, currant *Ribes* species, and Oregon grape *Mahonia repens*.

Glacier National Park Cooperative Agreement

The PMC currently has several projects in support of our cooperative agreement with Glacier National Park, including:

- using container production of grasses and forbs to reduce seed production interval

and increase product quality.

- a germination study of beargrass *Xerophyllum tenax* that compares duration of cold chilling and the use of soil inoculant.

- a germination study involving several alpine species to determine the effect of light or darkness on the ability of these species to germinate.

- seed increaser fields of several sedge *Carex* species, blue aster *Aster laevis*, mountain brome *Bromus marginatus*, slender wheatgrass *Elymus trachycaulus*, blue wildrye (*Elymus glaucus*), alpine timothy (*Phleum alpinum*), alpine bluegrass *Poa alpina*, Idaho fescue *Festuca idahoensis*, Nelson's needlegrass *Stipa nelsonii*.

Plant Materials Project for Development of Trees and Shrubs

Woody plant research at the Bridger Plant Materials Center is becoming an increasingly significant aspect of our program. The demand for trees and shrubs that can tolerate the severe conditions characteristic of the Northern Great Plains and the variety of applications for their use continues to grow. Woody plant research, like most plant studies, requires evaluation over the anticipated life or usefulness of the planting. This makes for slow progress. Many projects initiated 10, 20, or even 30 years ago are just now nearing fruition. As data is tabulated and summarized, selections of superior trees and shrubs will be identified and targeted for release. Fortunately, the PMC can now use new prevarietal release procedures to get superior selections on the market sooner. To the consumer, this means plants that can better tolerate Montana and Wyoming's severe environmental conditions while performing such conservation functions as reducing soil erosion, providing wind and sun protection, preventing snow drifts, providing food and shelter for wildlife, riparian restoration, and more.

Two common threads running through our woody plant program are the GP-13 [Forestry subcommittee of the Great Plains Ag Council, now the Plains & Prairie Forestry Association (PPFA)] and MITOSIS (Montana Interagency Tree and/or Shrub Improvement Study) projects. The various GP-13 projects were coordinated through the ARS (Agricultural Research Service) at Mandan, North Dakota, and the Prairie Farm Rehabilitation Administration Shelterbelt Center at Indian Head, Saskatchewan. The goal of this program was to evaluate numerous superior collections of a species over much of the range of the Great Plains in an attempt to identify superior plants or ecotypes.

The MITOSIS program is a multi-agency project that attempts to improve the quality, survivability, and diversity of trees and shrubs for windbreaks and shelterbelts for Montana. Trees from superior, old aged windbreaks and shelterbelts, as well as plants performing exceptionally well on harsh sites, are incorporated into these studies for evaluation.

Plant Materials For Saline Soils

The objectives of this project are:

1. Develop plant materials for use in reclamation of saline-seeped lands in Montana and Wyoming, and
2. Develop techniques for the successful establishment of these plant materials.

Active plantings for this project include:

1. Initial Seed Increase of selected material,
2. Field Plantings of selected material,
3. Seeding Mixture Trials, and
4. Saline Demonstration with Released Cultivars.

A project plan is currently being developed for a multi-state effort to establish the saline tolerance ranges of several woody conservation species.

Development of Acid/Heavy-Metal Tolerant Cultivars DATC

The DATC project was initiated in 1995 to evaluate and select locally adapted plant materials that demonstrate tolerance to acid/heavy metal contaminated soils. The project is funded through a Natural Resources and Conservation, Reclamation and Development grant. The Deer Lodge Valley Conservation District sponsors the study and works in conjunction with the NRCS Bridger Plant Materials Center to implement and administer the project.

Starting in 1995, wildland seed was collected from numerous mine-affected sites throughout western Montana. The collections were processed and seeded, along with commercial material, in two initial evaluation plantings (IEPs) near Anaconda, Montana. Results of the IEP data analysis identified the top performing plant species. In 1998, follow-up collections were made of many of the better performing species - 11 grass, 6 forb, 5 shrub accessions have been put into ~ 5 acres of seed production at the PMC. Two unsuccessful attempts have been made to establish a Comparative Evaluation Planting (CEP) on an impacted site near Anaconda with an average soil pH of 4.5. A third re-seeding effort is planned in the near future.

The initial objective of seed production is to provide seed for further testing and to determine the best production methods, since many of these species have not previously been cultivated. Ultimately when a species is released, the purpose of seed production is to provide a supply of foundation seed for distribution to commercial seed growers. Final selection for the release of grass and forb species will be based on:

- Superior comparative field performance at acid/heavy metal affected site
- Ease of establishment
- Commercial seed production capability
- Low heavy metal accumulation in aerial plant tissues

ACTIVE STUDIES

Annual Food Plot Field Evaluation Planting

Providing food and cover for wildlife is an important component in conservation planning. Technical information is lacking on wildlife species preferences, seasons of use, food plot establishment, and plant species mixture compatibility. The PMC is cooperating with the NRCS State Biologist is examining these issues with the installation of a 2.4 acre planting of a variety of grains and row crops suitable for consumption by desirable upland game birds, waterfowl, and ungulates. The objectives of the study are twofold: 1. to determine species compatibility in a simple mixture; 2. to gain technical information about annual food plot establishment, maintenance, and reestablishment. Oats, wheat, barley, canary seed, pinto bean, Austrian winter pea, corn, lentil, millet, sorghum, safflower, canola, and sunflower were seeded in 15 ft x 525 ft strips and then cross-seeded in 30 ft x 195 ft strips. This randomly designed seeding matrix produced a mix of two species per plot. The perimeter was border-seeded in a custom, seven species wildlife mix donated by Circle S Seed of Three Forks, Montana. Pure live seeding rates ranged from 74 lbs/acre for pinto bean to 5.1 lbs/acre for canola. Factors that will be evaluated include: number of plants of each species per m², number of seeds produced per species per m²; determination of individual wildlife food preferences; food crop persistence over winter; wildlife utilization in winter; and self-seeded (volunteer) emergence in Spring 2001. Also in the spring, the east end of the planting will receive three follow-up treatments – natural or no manipulation, disking, and re-seeding.

Seedling Emergence of Altai Prairieland and Shoshone Beardless Wildrye

The sale of Foundation seed through the Foundation Seed Program at Montana State University-Bozeman generates money that is used to support graduate work on seed physiology and seed production projects. Neil Foster, Director of the Montana Seed Testing Lab, is working toward a PhD in Seed Physiology. He has taken two wildryes that exhibit some seed dormancy and attempted to select for increase seed viability and speed of germination. The product of these trials have been established in a replicated trial at the Bridger PMC comparing seed germination and emergence of the improved material in comparison with the existing releases of Altai and beardless wildrye.

Xeriscape Demonstration

There is presently a great interest in utilizing low maintenance/low water requirement grasses, both native and introduced, for landscaping. Plots of nine different grasses have been established under dryland conditions (Introduced--crested wheatgrass, Russian wildrye, sheep fescue, and Canada bluegrass; Native--thickspike wheatgrass, streambank wheatgrass, western wheatgrass, buffalograss, blue grama). Half of each plot is mowed, while the other half is allowed to reach full growth. A vehicle will be driven across the plots to evaluate trampling resistance.

Recurrent Selection of Bluebunch Wheatgrass - *Pseudoroegneria spicata* ssp. *spicata*

Bluebunch wheatgrass -- Montana's state grass -- is found on coarse, well-drained sites. The released cultivars of 'Goldar', 'Secar', and 'Whitmar' originate from the Palouse country of western Idaho and eastern Washington. In an attempt to develop an ecotype for Montana, 20 collections of east-slope bluebunch wheatgrasses were established in a Recurrent Restricted Phenotypic Selection block. Plants were evaluated in Cycle 1 and 20% selected for evaluation in Cycle 2. Another 20% selection criteria was imposed on the second cycle. Seed from each of the 2 crossing blocks were planted in containers. Goldar, Secar, Whitmar, and MOPX (Utah) were seeded as standards of comparison. On Jun2 23-24, 1999, a CEP study in a randomized complete block design, with 20 replications of the six entries, was spaced-planted for performance testing.

Comparative Evaluation of Winterfat - *Krascheninnikovia lanata*

Winterfat is a long-lived, drought-resistant forage shrub. It has an extensive, fibrous root system, as well as a deep, penetrating taproot. The leaves are persistent year-round, providing excellent winter forage for livestock and wildlife. In the semi-arid grasslands (wheatgrass-needlegrass) of Montana and Wyoming, winterfat is a minor component of the plant community; however, winterfat is one of the few desirable shrub species that can be commercially used in range reseeding and disturbed area reclamation.

From an IEP of 30 accessions of winterfat, five superior accessions were selected and established in replicated plots comparing them with 'Hatch', a released cultivar from New Mexico. Three accessions exhibited exceptional forage and seed production. These three ecotypes were allowed to cross-pollinate, and the resulting seeds from all plots of all three accessions were bulked and used to establish a seed increase field. The origin of the three accessions are Carbon County and Prairie County, Montana, and Carbon County, Wyoming.

Miscellaneous Initial Evaluation Plantings

On November 7, 1997, seed from a variety of collection origins, received over a period of 9 years, were planted in three separate evaluation trials. In addition to testing plant species, the performance of two types of weed barrier (one type placed before seeding, the other after seeding) will be monitored. There are 38 accessions of 21 cool-and warm-season grass species, 118 accessions of 19 forb (wildflower) species, and 29 accessions of 14 legumes. The individual studies may be evaluated for factors such as percentage stand, height, vigor, flowering attributes, weediness, and seed production capabilities. After several years, top-performing accessions will be identified and may progress to the next level of testing.

Sainfoin-Grass (alternate row/solid) Study - University of Wyoming

A new sainfoin (PXWY84) has been developed by Dr. Fred Gray, University of Wyoming. This variety has been selected for improved disease and pathogen resistance. This study compares PXWY84 with 'Remont', and will compare forage production of the sainfoin accessions and forage grasses ('Bozoisky-Select' Russian wildrye for dryland) when

grown in solid stands or in alternate grass-legume rows. A row spacing of 12 inches was used on the irrigated site and 18 inches on the dryland site.

Forage Quality Comparative Evaluation

A graduate student in the Plant, Soil, & Environmental Sciences Department at Montana State University-Bozeman is presently examining the forage quality of various forage grasses at different phenology stages, i.e. early growth, boot, heading, seed maturity, fall and winter. Twenty-nine accessions of crested wheatgrass, Siberian wheatgrass, slender wheatgrass, bluebunch wheatgrass, western wheatgrass, thickspike wheatgrass, intermediate wheatgrass, pubescent wheatgrass, Russian wildrye, basin wildrye, Altai wildrye, and green needlegrass were planted in a replicated study to gather phenology and biomass production data for subsequent analysis of total digestible nutrients and crude fiber content. This project also allowed field observations of some of the newest released cultivars.

Saline Mixture Trials

In most saline-affected sites, both soil moisture and salinity gradients exist. As a result, seed mixtures should be planted on these variable soils so that each species can establish in the niche for which it is best adapted. Some species do not do well in a mixture; some are very competitive and dominate all other species in the mix, while others may not compete well, necessitating monoculture plantings.

On a wet saline area at the Bridger PMC, six mixtures and two monocultures were established in a replicated study. Tall wheatgrass is very competitive and should be planted alone. Russian wildrye and tall fescue both do well on saline soils, but are slow to establish and do not compete well with other species. When in a mix they will only provide a small amount of the total stand despite the seeding rate. Slender wheatgrass is a short-lived perennial grass that can be used as a quickly establishing species in a mix. It establishes and matures quickly, but decreases or dies out after 3-4 years. The small seeded species, such as alkali sacaton, Nuttall alkaligrass, plains bluegrass, and alkali bluegrass, appear to be quite compatible with each other. Species such as Altai wildrye, beardless wildrye, western wheatgrass, and creeping foxtail are quite compatible, with creeping foxtail doing best in very wet, moderately saline sites. Beardless wildrye dominates on the wet, highly saline soils; whereas Altai wildrye and western wheatgrass perform best on sites between these two extremes.

Saline Forage Species Comparative Evaluation

In the fall of 1996, drill-width replicated plots were established along a salinity gradient to compare 'Shoshone' beardless wildrye, 'Pryor' slender wheatgrass, 'NewHy' hybrid wheatgrass, 'Jose' tall wheatgrass, and 'Praeland' Altai wildrye. The primary purpose of this study is to evaluate the performance of NewHy under saline conditions in comparison to the most commonly used salt-tolerant cultivars.

Cultural and Establishment Trials

Threatened and Endangered Plant Species

The Montana Natural Heritage Program has funded projects for the inventory and management needs of *Penstemon lemhiensis* for several years, and in 1996 expressed interest in the seed viability of a collection sent to the PMC in 1989. A successful collection of seed was made in September 1997 for comparison in a germination study initiated in January 1998 and currently under investigation at the Center.

The NRCS Cheyenne Field Office and the Wyoming Natural Diversity Database collaborated to collect seed of *Guara neomexicana* ssp. *coloradensis* in September of 1996. The seed was sent to the Center for propagation, determination of germination requirements, seed increase, and follow-up DNA testing. Therefore, a common garden planting of this species was established in the spring of 1997 at the PMC, and seed produced in 1998 was harvested and will be sent for processing genetic isozyme gel analysis. Other cooperators in this project are the Wyoming Nature Conservancy and the US Fish & Wildlife Service.

Culturally Significant Plants

In July of 1994, a demonstration plot of sweetgrass *Hierochloa odorata* (L.) was established in Field 4 at the PMC. This collection, 9063351, originated in the Sweetgrass Hills, north of Galata, Montana, and was received as vegetative material in October 1991. In 1996, 175 1-gallon pots of sweetgrass plants were presented to the seven NRCS Tribal Liaisons in Montana for distribution to Tribal elders and other interested members of their respective tribe. Furthermore, the natural tendency of sweetgrass to reproduce vegetatively resulted in the initiation of a basic fertilizer trial in the fall of 1996 in an effort to determine physiological requirements for sexual reproduction. The results will contribute to the development of standardized cultural practices, technology, and techniques necessary for commercial seed production.

Wayne Barry Off-Center Testing Site

A warm-season grass and legume adaptation trial and a cool-season grass/forb replicated study were planted on May 3, 1994, at Sidney, MT. The 47-acre trial area is considered a Bismarck and Bridger PMC joint study since it is located near the North Dakota and Montana border.

The warm-season trial includes 22 cultivars/accessions representing 7 species. Each entry was planted with a grass drill in approximately 2-acre blocks. An intensive grazing management system will be designed, and the landowner will monitor livestock preferences and performance. The cool-season trial was planted in four row plots, 20 feet long and replicated four times. The plots will be evaluated for plant emergence, establishment, vigor, stand, and biomass production. Periodic evaluations are planned for 10 years.

The objectives of the trials are to study the adaptation and performance of various grasses, legumes, and forbs, and to determine their value and use in the Northern Great Plains dryland pasture/hayland resource management systems. The need to extend the grazing season to provide a longer period of high quality forage for livestock is a high priority need identified in the Bridger PMC long-range plan.

Soda Lake Off-Center Testing Site

The purpose of this planting is to demonstrate the value and use of species and cultivars under the climate and soil conditions around Pinedale, Wyoming. The planting features over 100 entries that are evaluated for stand, vigor, and height. This study is a joint effort between the Bridger PMC and Meeker PMC.

On October 10, 1991, 15 grasses were drilled into replicated plots and six grasses were drilled into single drill-width plots by the Agricultural Research Service (ARS), Logan, Utah range research unit. The cooperative planting features some of the recent wheatgrass and wildrye hybrids being developed by ARS for western rangeland improvement. The plots are being evaluated by ARS for stand establishment and forage production as compared to standard released forage cultivars.

On September 19, 1995, 50 accessions were seeded in four-row plots replicated three times. Genera represented are: *Elymus*, *Stipa*, *Festuca*, *Poa*, *Bromus*, *Leymus*, and *Penstemon*. Accessions of *Oryzopsis*, *Pseudoroegneria*, *Astragalus*, and *Krascheninnikovia* were planted in 1996.

Non-point Source Pollution Control Using Dryland Vegetative Filter Strips

This study was in cooperation with the Montana NRCS State Agronomist. The objectives were to test the effectiveness of grass species and associated design-strip widths in minimizing non-point source pollution, specifically sedimentation from cropland, under Montana dryland climatic conditions. Nine treatments will be used in this study: 'Rosana' western wheatgrass, 'Critana' thickspike wheatgrass, 'Rush' intermediate wheatgrass, 'Hycrest' crested wheatgrass, 'Manchar' smooth brome, spring wheat, winter wheat (seeded in the spring), and fallow. In 1997 and 1998, once the grasses were established, a sprinkler system was used to saturate the soil profile of the plot area. After saturation of the profile, sediment-laden water was applied over each plot. The amount of sediment in the water was measured every 5 feet within the plot, indicating the width of filter strip needed to capture sediment.

Bur Oak Seed Source Study - *Quercus macrocarpa*

Bur oak is a native species widely distributed across much of the United States. Although found only in the far southeastern corner of Montana in uncultivated, natural stands, it is found in numerous small communities across the state as a street tree or landscape plant. Adapted to a wide variety of soil conditions, this species tolerates relatively high soil pH, is drought tolerant, and has few insect or disease problems. Capable of reaching heights over 100 feet on good sites, it normally attains a maximum height of about 50 feet in Montana. Like all oaks, bur oak is a strong-wooded species capable of surviving in environments that seem to support only weak-wooded, deciduous trees.

A 24-accession, replicated study was established at Bridger in June of 1994. The goal of this project is to identify well adapted accessions with better than average rates of growth and superior form for use in windbreaks. Annual evaluations have been taken each year

since 1994 and will occur again in 2000. Performance data is already identifying superior seed sources and final selections are anticipated as early as 2002.

GP-13 Ponderosa Pine Seed Source Study - *Pinus ponderosa*

Ponderosa pine, Montana's state tree, is one of the most widely distributed pines in western North America. Traditionally valued as a timber species, ponderosa pine makes an excellent tall tree in windbreak and shelterbelt plantings. It has a wide range of adaptability, is drought and cold tolerant, and typically has a uniform branching pattern and symmetrical form. In addition, this species has several wildlife applications and aesthetic appeal as an ornamental landscape plant.

The study at Bridger was established in 1989 and consists of nearly 2,000 trees from 79 different collections from Montana, South Dakota, and Nebraska. Each plant is evaluated annually for survival, height, width, vigor, and freedom from injury -- generating over 7,000 pieces of data each year. In addition, stem diameter, form, density, color, and ornamental value were evaluated in 1995. Final selections were made in 1996 and a 202 tree orchard of superior material established in May 1996.

Female and male flower production was evaluated in 1998, the first year that a major cone crop was produced. In the fall of 1999, over 11,000 cones were collected that yielded 53 pounds of clean seed. The cones were isolated by individual tree so that seed source production data could be taken. The orchard will continue to be evaluated for male and female cone production in order to determine long term trends. The seed collected in 1999 will be used for seedling production. A Selected Class release is planned for 2001.

GP -13 Rocky Mountain Juniper Seed Source Study - *Juniperus scopulorum*

Rocky Mountain juniper, a close relative of eastern redcedar, has many of the same attributes that favor bur oak and ponderosa pine as windbreak and shelterbelt trees. Widely adapted, drought and cold tolerant, used extensively by wildlife, this species is found on some of the toughest sites in Montana and Wyoming. Numerous ornamental cultivars have been released by the nursery industry.

When our replicated study was established in 1980, it consisted of 48 collections of Rocky Mountain juniper and eastern redcedar from Montana, Wyoming, North Dakota, South Dakota, Nebraska, and New Mexico. The goal of this study was to reduce the variability in form typical of this species. Rate of growth, seedling survival, vigor, and freedom from insect and disease were all considered. When final selections were made in 1994, no eastern redcedar was retained. In all, over 960 trees were initially planted with 181 superior trees remaining today. Seed from this study is already being used by the Montana Conservation Seedling Nursery in Missoula to produce superior quality seedlings. This selection was formally released in 1998 as Bridger-Select, using the new prevarietal release procedure. Both seed and cutting experiments are currently being conducted to better understand how to improve the production of this difficult-to-grow species. A replicated germination study was completed in 1999 and is currently being summarized. The study examined various scarification, warm stratification and cold chilling treatments to overcome dormancy. Seed production is quite variable by year, with our largest crop

occurring in 1999 at 54 pounds. Seed production data will again be collected in 2000 to determine the productivity of the various seed sources.

MITOSIS Snowberry Selection Study - *Symphoricarpos albus*

As a result of the aforementioned plant evaluations at the Montana Conservation Seedling Nursery at Missoula, a bulk of several superior accessions of snowberry was developed and is currently in the process of seed increase and prevarietal release. Cuttings were taken from the original test plants at Missoula in 1996 and used to establish a seed orchard at the PMC. In 1999, additional cuttings were taken from the PMC plants for further increase. A Selected class release of this synthetic is anticipated in the next 2 years for use in various western Montana revegetation applications.

Initial Seed Increase for Arid Rangeland and Mineland Revegetation

In the early 1980s, a major seed collection project was initiated to collect from areas in Wyoming receiving less than 10" annual precipitation. Collection efforts were concentrated in the Red Desert (southwestern Wyoming). All collections were seeded on a coal strip mine near Rock Springs, Wyoming, and on a bentonite mine near Greybull, Wyoming. As a result of this study, we are presently increasing superior accessions of Gardner saltbush, bottlebrush squirreltail, Sandberg bluegrass, and needleandthread.

Initial Seed Increase of Plant Materials for Western Montana and Wyoming

Initial Evaluation Plantings were established at the Montana State Forest Tree Nursery, Missoula, Montana, beginning in October 1983. Approximately 1,000 accessions have been evaluated at this field evaluation site. In the fall of 1989, after 5 years of evaluation, the most promising collections were transplanted to the Bridger PMC for seed increase. Accessions of rough fescue, Idaho fescue, spike fescue, California oatgrass, mountain brome, Sandberg bluegrass, tufted hairgrass, Columbia needlegrass, and big bluegrass are being increased for advanced evaluations.

Initial Seed Increase of Plant Materials for Biological Diversity in Rangeland and Restoration Seedings

Initial Evaluation Plantings were established at the PMC beginning in 1994. Approximately 68 accessions of three species have been evaluated at this field site. In the spring of 1998, after 3 years of evaluation, the most promising collections were planted in seed increase. One accessions of common yarrow *Achillea millefolium* L. are being increased for release in the selected class.

RELEASED CULTIVARS

Rosana Western Wheatgrass - *Pascopyrum smithii*

'Rosana' western wheatgrass is a native perennial grass selected for reseeding depleted rangelands, mined lands, and abandoned cropland. It was collected in Rosebud County, Montana, and cooperatively released by the Bridger PMC and Montana Agricultural Experiment Station in 1972. Rosana is adapted to medium- to fine-textured soils, neutral to strongly saline, and 12 or more inches of precipitation, run-in, or overflow range sites. Rosana is usually seeded in mixtures with other plant species such as green needlegrass *Nassella viridula*.

Garrison Creeping Foxtail - *Alopecurus arundinaceus*

'Garrison' creeping foxtail was released by the Bismarck PMC and the University of Wyoming in 1959. The Bridger PMC has responsibility for Breeder and Foundation seed production. It is an excellent grass for irrigated or subirrigated hay or pasture. Garrison produces a light fluffy seed that is difficult to plant. Rice hulls have been used as a carrier, and pelletizing the seed reduces seeding difficulty. In some instances, wet meadows are too wet to prepare a clean seedbed and, consequently, producers have resorted to feeding Garrison hay to livestock on areas where they would like to establish Garrison. Sprigging is also an excellent way of establishing Garrison.

Bozoisky-Select Russian Wildrye - *Psathyrostachys juncea*

'Bozoisky-Select' Russian wildrye was released by ARS, NRCS, and Montana, Utah, and Idaho Agricultural Experiment Stations in 1984. Russian wildrye is native to the steppe and desert regions of Russia and China. It has not been used much in the past because of poor seedling vigor. Through recurrent selection, Bozoisky-Select was developed with improved seedling and vegetative vigor, leafiness, and seed yield. Bozoisky-Select can add substantial flexibility to a grazing management program. Much like crested wheatgrass, it provides for early spring grazing, but retains greenness and nutritive value over the entire summer. It cures well and provides good winter roughage for grazing animals.

Trailhead Basin Wildrye - *Leymus cinereus*

'Trailhead' basin wildrye was cooperatively released by the Bridger PMC and the Montana and Wyoming Agricultural Experiment Stations in 1991. Trailhead is a native, collected near Roundup, Montana, and is noted for its production and longevity under droughty conditions -- exceeding 'Magnar', the only other released cultivar. Due to its large size and ability to remain standing over winter, basin wildrye provides excellent cover for upland game birds and good forage for wildlife such as elk, deer, and bighorn sheep.

Critana thickspike wheatgrass - *Elymus lanceolatus* ssp. *lanceolatus*

'Critana' thickspike wheatgrass was originally collected by Montana State University in 1960 near Havre, Montana, and was released by Bridger PMC and the Montana Agricultural Experiment Station in 1971. This grass has been used mostly for mine

reclamation, road sides, recreation areas, and range reseeding. Critana has excellent seedling vigor and forms a dense sod. Critana is noted for its variable genetic expression. For example, a Critana plant may produce rhizomes that have characteristics of Montana wheatgrass or slender wheatgrass. Genetic expression has created problems in producing certified seed and, in the past, has allowed standards for allowable slender wheatgrass included in Critana seed to approach 30 percent. However, for its intended use in mine reclamation or range reseeding, genetic expression has not posed a problem.

Lutana Cicer Milkvetch - *Astragalus cicer*

'Lutana' cicer milkvetch was the first release in the United States of this species (1971). The original germplasm was introduced from Sweden in 1926. Cicer milkvetch is a nonbloating legume adapted for use as hay and pasture in irrigated meadows or in dryland areas receiving at least 15" annual precipitation. Cicer milkvetch will tolerate a high water table or standing water better than alfalfa. This legume has coarser stems and a higher moisture content than alfalfa, making cicer less desirable as a hay crop. It will, however, withstand heavy grazing pressure and is compatible with most irrigated forage grasses.

Shoshone Beardless Wildrye - *Leymus triticoides*

'Shoshone' was released in 1980 by the Bridger PMC and Montana and Wyoming Agricultural Experiment Stations after extensive testing on saline soils throughout Montana and Wyoming. Prior to release, this grass was tested in over 100 field plantings. Shoshone is one of the most salt-tolerant grasses on the commercial market. Once established in strongly saline soil, Shoshone is capable of spreading by rhizomes into soils with electrical conductivity in excess of 30 dS/m.

Pryor Slender Wheatgrass - *Elymus trachycaulus* ssp. *trachycaulus*

'Pryor' originated from a collection from a saline intermittent drainage-way in a saline upland range site approximately 15 miles south of Bridger, near the Wyoming border. Pryor was released by the Bridger PMC and Montana and Wyoming Agricultural Experiment Stations in 1988. Pryor has been found to have better seedling vigor, salt tolerance, and longevity than the other released cultivars of slender wheatgrass ('Primar', 'Revenue', and 'San Luis'). Pryor has a larger seed than other cultivars of slender wheatgrass (97,000 seeds per pound compared to 147,000 seeds per pound). Pryor is a self-fertile, short-lived, forage grass that is used in a variety of seeding mixtures to provide quick cover and soil stabilization without competing with the slower developing, long-lived species.

Goshen Prairie Sandreed - *Calamovilfa longifolia*

'Goshen' prairie sandreed was released to stabilize and revegetate sandy range sites in eastern Montana and Wyoming receiving more than 12 inches of annual precipitation. Goshen was cooperatively released by the Bridger PMC and the Montana and Wyoming Agricultural Experiment Stations. Good stands of Goshen are usually established using standard rangeland seeding methods when planted between April and mid-May. Goshen does well when seeded in a grass mixture including Critana thickspike wheatgrass, Rosana western wheatgrass, green needlegrass, or Indian ricegrass. At Bridger, Montana, Goshen

grows to about 34 inches high on dryland and to 70 inches with irrigation. Vigorous spring growth begins by the end of April, full bloom usually occurs by August, and the seed ripens by October.

Wytana Fourwing Saltbush - *Atriplex X aptera*

'Wytana' was cooperatively released in 1976 by the Bridger PMC and the Montana and Wyoming Agricultural Experiment Stations. Wytana was released primarily for mine reclamation and range revegetation. Plantings should be in mixtures with native grasses. In mixtures, adequate plant populations have been obtained by using a seeding rate of 1/2 to 1 pound of bulk seed-per-acre. Protein content is good (15%) and remains so throughout the winter. Wytana is the first released cultivar of a shrub species to be successfully harvested for seed with standard farm equipment.

Rimrock Indian Ricegrass - *Oryzopsis hymenoides*

'Rimrock' was cooperatively released in 1996 by the Bridger PMC, the Montana and Wyoming Agricultural Experiment Stations, and the USDA, Agricultural Research Service, Logan, Utah. Rimrock is a native perennial grass that can be used in seed mixtures for range revegetation and reclamation of disturbed sandy soils. This species produces an abundance of high protein plump seed that makes excellent food for upland gamebirds and songbirds. Rimrock was released primarily because of its ability to retain mature seed better than the cultivars 'Paloma' (origin Pueblo, CO) or 'Nezpar' (origin Idaho). The more acute angle of the glumes of Rimrock helps retain seed longer and protects from catastrophic shattering events such as high winds and heavy rain.

Bridger-Select Rocky Mountain juniper - *Juniperus scopulorum*

Bridger-Select Rocky Mountain juniper was formally released in 1998, and represents the first Bridger PMC selection to utilize the new prevarietal release mechanism. This release represents a bulk of 26 superior seed sources collected from across the northern Great Plains. In 1980, a total of 960 juniper (including Eastern redcedar) from six states and 48 seed sources was assembled at Bridger and tested for survival, rate of height and width growth, uniformity of shape, vigor, and freedom from snow breakage, insect, and disease damage. In 1994, final selections were made based primarily on height, form (as it reflects uniformity and freedom from snow breakage), vigor (as it reflects freedom from signs of winter injury, insect or disease damage), and crown density. It also exhibits excellent seedling survival (97%). The final collection consists of 181 trees representing 26 seed sources from five states. Bridger-Select performs best in areas of Montana and Wyoming with 12 inches or more of annual precipitation and in USDA Hardiness Zone 3b (-30° to -35°F average minimum temperatures) or warmer. It is recommended as a medium component in windbreaks and shelterbelts offering low maintenance, year-round protection, and numerous wildlife applications.

Antelope Slender White Prairieclover - *Dalea candida*

Antelope was released in the spring of 2000 in cooperation with the Bismarck PMC and the Agriculture Experiment Stations of Montana, Wyoming, and North Dakota. The original collection was made in Stark County, near Dickenson, North Dakota. This collection has been evaluated in North Dakota, Montana, and Wyoming since its collection in 1947. Although it performed well in comparison with other collections of slender white prairieclover and purple prairieclover, there was never a significant demand for seed of this species until just recently. Several of the Farm Assistance programs are requiring the seeding of native grasses and forbs. There is one release of purple prairieclover (Kaneb) and no previous releases of slender white prairieclover.

Garnet Mountain Brome – *Bromus marginatus*

Garnet mountain brome was released in the spring of 2000 by the Meeker, CO Environmental Plant Center in cooperation with the Bridger PMC. The ecotype of mountain brome originated in Powell County, Montana near the ghost town of Garnet. This mountain brome has done well in Montana, Wyoming, Colorado, outperforming the only other release of this species, Bromar. Garnet is longer lived and has a much higher level of head-smut resistance. Mountain brome is a short-lived, pioneer/colonizing species that is used for critically disturbed sites. It is adapted for use in forest and meadow habitat types throughout the northern Rocky mountain region.

High Plains Sandberg Bluegrass – *Poa secunda*

Numerous collections of Sandberg bluegrass were collected from arid sites in Wyoming, particularly the Big Horn Basin and the Red Dessert. High Plains, released in 2000, is a composite of three superior ecotypes from Uinta County (Granger, WY), Natrona County (Casper, WY), and Campbell County (Gillette, WY). Sandberg bluegrass is a short-lived, short statured native grass that can be included in seeding mixtures for reclamation of disturbed sites and rangeland reseeding.

Dupuyer Streambank and Pondera Floodplain Germplasm Silverberry – *Elaeagnus commutata*

Silverberry is a native, small to moderate stature, multi-stemmed, deciduous shrub useful in riparian channel stabilization applications. Two Source-Identified silverberry were released in 2000 for this purpose in Montana. These seed sources were identified by Joe Carleton of the Montana Interagency Wetland Team. Although these sources have not been field tested, a critical need for additional riparian stabilization species warranted their identification and release to the commercial market. Future field testing is anticipated. Dupuyer Streambank is recommended for overbank and transitional zones whereas Pondera Floodplain can be used in transitional and upland sites.

PLANT MATERIALS CENTER
Bridger, Montana

PLANTINGS

(Plantings listed for each field in order, beginning on the north.)

Accession	Common Name	Origin or Source	Acres	Date
FIELD 1				
<u>Initial Seed Increase</u>				
10 acc.	Acid Tolerant Plants	western Montana	1.40	June '99
<u>Row Spacing/Forage Quality Study</u>			.20	3/30/94
Oahe	intermediate wheatgrass	former USSR		
Manska	pubescent wheatgrass	ARS plant breeding		
Hycrest	crested wheatgrass	Eurasia via Utah		
Bozoisky- Select	Russian wildrye	former USSR via Utah		
Trailhead	basin wildrye	Musselshell County, MT		
30 acc.	Forage Quality		.40	4/22/96
FIELD 2				
<u>National Park Service Seed Increase</u>			0.74	
2 acc.	blue wildrye	Glacier National Park		4/14/98
1 acc.	slender wheatgrass	Yellowstone National Park		4/28/00
1 acc.	mountain brome	Yellowstone National Park		4/28/00
<u>Development Acid Tolerant Cultivars</u>				
1 acc.	big bluegrass	western Montana	0.06	4/28/00
<u>Initial Seed Increase</u>				
9005617	strawberry clover	Carbon County, MT	.15	6/5/97
9063535	winterfat	MT & WY composite	.08	4/30/97
9063520	Ruby Valley pointvetch	Composite--11 accessions	.15	6/5/97
9005438	switchgrass	Platte County, WY	.16	4/19/99
<u>Breeder Blocks</u>				
Rosana	western wheatgrass	Rosebud County, MT	.15	4/30/97
Garrison	creeping foxtail	Bismarck, ND PMC	.15	4/30/97
Critana	thickspike wheatgrass	Hill County, MT	.15	7/8/94
	Crested Wheatgrass X Quackgrass	Montana State University	.17	6/14/93
FIELD 3				
<u>Initial Seed Increase</u>				
	sticky currant			1997
	squaw currant			1997
	snowberry			1997
	golden currant			1997
	blueleaf honeysuckle			1997
9057902	western yarrow	Flathead Co., MT	.12	5/1/98

Accession	Common Name	Origin or Source	Acres	Date
1 acc.	horse cinquefoil	Deer Lodge Co., MT	.12	5/1/98
1 acc.	Pacific aster	Deer Lodge Co., MT	.12	5/1/98
	Propagation Stock Rocky Mt. juniper			1996
<u>Recurrent Restricted Phenotypic Selection Block</u>				
20 acc.	bluebunch wheatgrasses	east slope Montana		5/24/91
FIELD 4				
<u>Initial Evaluation & Plant Increase</u>				
1 acc.	sweetgrass			7/26/94
1 acc.	Colorado butterfly plant			1997
<u>Seed Increase</u>				
9078591	<i>Carex athrostachya</i>	Glacier National Park	.03	1998
9081447	blue aster	Glacier National Park	.03	1998
9078315	littleflower alumroot	DATC	.15	11/3/99
9078646	<i>Carex douglasii</i>	Glacier National Park	.02	1998
2 acc.	sulfur eriogonum	Yellowstone National Park	.10	5/7/99
9081443	<i>Carex</i> species	Glacier National Park	.02	1998
9076274	wooly cinquefoil	Deer Lodge Co., MT	.02	1996
2 acc.	sulfur eriogonum	Yellowstone National Park	.10	10/14/99
9081499	alpine timothy	Glacier National Park	.03	5/7/99
3 acc.	alpine bluegrass	Glacier National Park	.15	5/7/99
9078645	<i>Carex hoodii</i>	Glacier National Park	.02	1998
Pete	eastern gamagrass	Kansas PMC		1997
Pondera Floodplain	silverberry	Pondera County, MT	28 ea	11/8/99
FIELD 5/6 East				
Critana	thickspike wheatgrass	Hill Co., MT	6.10	4/7/99
FIELD 5 West				
Shoshone	beardless wildrye	Fremont Co., WY	2.65	10/13/99
FIELD 6 West				
9016134	Gardner's saltbush	Washakie Co., WY	.62	4/27/00
FIELD 7				
Bozoisky- Select	Russian wildrye	ARS, Logan, Utah	2.25	3/26/98
<u>Initial Evaluation Planting</u>				
185 acc.	Misc. grasses, forbs, legumes		.25	11/7/97
<u>Wildrye Seedling Emergence Study</u>				
	Altai/beardless wildryes	MSU	.20	5/2/00
<u>Comparative Evaluation Plantings (W)</u>				
9 acc.	Idaho fescue	MT, WA, ID	.04	5/19/98

Accession	Common Name	Origin or Source	Acres	Date
<u>Initial Seed Increase</u>				
3 acc.	winterfat	MT & WY	.05	4/21/89
<u>Recurrent Selection</u>				
Cycle 2	bluebunch wheatgrass	east slope Montana	.09	3/25/97
FIELD 8				
	Woody Species		4.78	
FIELD 9				
	Plant Materials Demonstration Rows	greenhouse transplants	.14	6/16/93
<u>Orchard Understory Trial (East to West)</u>				
Parkway	crested wheatgrass			
Covar	sheep fescue			
Paiute	orchardgrass			
Ephraim	crested wheatgrass			
Durar	hard fescue			
FIELD 10				
<u>Seed Increase</u>				
9063535	winterfat	composite	.45	4/13/00
High Plains	Sandberg bluegrass	composite (3 acc.)	.88	4/4/00
<u>National Park Service Seed Increase</u>				
1 acc.	bluebunch wheatgrass	Yellowstone National Park	.27	5/11/95
1 acc.	Idaho fescue	Glacier National Park	.27	5/4/95
3 acc.	mountain brome	Yellowstone National Park	.46	5/15/97
1 acc.	rough bentgrass	Yellowstone National Park	.11	5/15/97
1 acc.	blue wildrye	Glacier National Park	.31	4/13/00
1 acc.	tufted hairgrass	Yellowstone National Park	.18	4/17/00
1 acc.	bluebunch wheatgrass	Yellowstone National Park	.08	4/17/00
FIELD 11				
<u>National Park Service Seed Increase</u>				
1 acc.	blue wildrye	Glacier National Park	.32	4/14/98
1 acc.	slender wheatgrass	Yellowstone National Park	.23	4/19/99
1 acc.	needleandthread	Yellowstone National Park	.27	4/19/99
1 acc.	mountain brome	Yellowstone National Park	.23	4/19/99
1 acc.	rough bentgrass	Yellowstone National Park	.23	4/19/99
1 acc.	bluebunch wheatgrass	Glacier National Park	.20	4/13/00
1 acc.	Nelson's needlegrass	Glacier National Park	.13	4/13/00
1 acc.	nodding brome	Yellowstone National Park	.31	4/25/00
Medallion	barley	commercial	1.5	2000
FIELD 12				
8 acc.	filter strip study	w/State Agronomist	.88	5/7/96

Accession	Common Name	Origin or Source	Acres	Date
<u>Initial Seed Increase</u>				
MB-2	meadow brome	MSU-(Cash)	.92	4/6/99
9078666	Canada bluegrass	Composite-9 acc.	.35	4/14/98
MT-9503	alfalfa	MSU-(Ditterline) seeded	.38	4/10/98
MT-9503	alfalfa	MSU-(Ditterline) transplants	.38	5/14/98
FIELD 13				
Goshen	prairie sandreed	Goshen County, WY	4.05	5/5/92
FIELD 14				
Juniper Orchard		Great Plains states	2.52	4/25/80
Sainfoin-Bozoisky Russian Wildrye		University of Wyoming	.11	5/1/96
<u>Comparative Evaluation Planting</u>				
6 acc.	bluebunch wheatgrass	recurrent selection/cultivars	.02	June '99
FIELD 15				
Rimrock	Indian ricegrass	Yellowstone Co., MT	1.85	10/13/99
Wytana	fourwing saltbush	Musselshell Co., MT	1.85	10/14/99
FIELD 16				
Garrison	creeping foxtail	Bismarck PMC, ND	2.10	3/22/00
Lutana	cicer milkvetch	Sweden	1.85	10/14/00
FIELD 17				
Trailhead	basin wildrye	Musselshell County, MT	3.80	4/6/95
FIELD 18				
Medallion	barley	commercial	3.80	2000
FIELD 19				
Ponderosa Pine Seed Orchard		Great Plains States	3.60	5/30/89
PMC Source silverberry		Wheatland Co., MT	29 ea	11/4/99
9 acc.	Xeriscape		.12	4/10/98
Covar sheep fescue cover				
<u>Development Acid Tolerant Cultivars</u>				
1 acc.	common snowberry	Deer Lodge Co., MT	2.3	5/22/00
FIELD 20				
<u>Living Snow Fence</u>				5/77
Bighorn (E)	skunkbush sumac	Los Lunas, NM PMC		
Jemez (W)	New Mexico forestiera	Los Lunas, NM PMC		
<u>Secondary Seed Increase</u>				
Antelope	slender prairieclover	Stark Co., ND	.64	4/17/96
Rimrock	Indian ricegrass	Yellowstone Co., MT	1.76	4/17/96
Antelope	slender prairieclover	Stark Co., ND	.75	6/04/99

Accession	Common Name	Origin or Source	Acres	Date
<u>Development Acid Tolerant Cultivars</u>				
2 acc.	basin wildrye	Deer Lodge Co., MT	.41	4/8/99
1 acc.	slender wheatgrass	Deer Lodge Co., MT	.20	4/8/99
1 acc.	redtop	Deer Lodge Co., MT	.25	4/8/99
1 acc.	big bluegrass	Deer Lodge Co., MT	.04	4/8/99
<u>National Park Service Seed Increase</u>				
1 acc.	basin wildrye	Yellowstone National Park	.15	4/22/96
1 acc.	Idaho fescue	Yellowstone National Park	.25	4/19/99
1 acc.	blue wildrye	Yellowstone National Park	.25	4/19/99
1 acc.	slender wheatgrass	Yellowstone National Park	.25	4/19/99
1 acc.	bottlebrush squirreltail	Yellowstone National Park	.25	4/19/99
1 acc.	mountain brome	Yellowstone National Park	.13	4/19/99
1 acc.	bluebunch wheatgrass	Yellowstone National Park	.12	4/26/00
FIELD 21				
Antelope	slender prairieclover	Bismarck PMC, ND	1.16	4/1/98
Rosana	western wheatgrass	Rosebud Co., MT	2.0	3/26/98
FIELD 22				
<u>Development Acid Tolerant Cultivars</u>				
2 acc.	Indian ricegrass	Deer Lodge Co., MT	.34	10/26/98
1 acc.	fuzzy tongue penstemon	Deer Lodge Co., MT	.04	10/26/98
1 acc.	phacelia	Deer Lodge Co., MT	.04	10/26/98
1 acc.	redtop	Deer Lodge Co., MT	.21	4/8/99
1 acc.	basin wildrye	Deer Lodge Co., MT	.21	4/8/99
1 acc.	Canada bluegrass	Deer Lodge Co., MT	.21	4/8/99
1 acc.	slender wheatgrass	Deer Lodge Co., MT	.14	4/8/99
<u>Initial Seed Increase</u>				
9016134	Gardner saltbush	Washakie Co., WY	.25	10/26/98
FIELD 23				
24 acc.	bur oak	Great Plains States	3.20	6/17/94
Ephraim	crested wheatgrass	commercial	.40	Oct. '98
FIELD 24				
Rosana (N)	western wheatgrass	Rosebud County, MT	3.00	5/4/93
<u>Initial Seed Increase</u>				
9005439	switchgrass	composite (3 acc) - WY	.15	4/19/99
High Plains	Sandberg bluegrass	composite (3 acc) - MT	.23	4/9/99
MB-1	meadow brome	MSU (Cash)	.20	4/6/99
1 acc.	slender wheatgrass	Yellowstone National Park	.33	4/25/00
1 acc.	Idaho fescue	Yellowstone National Park	.33	4/25/00
MT-9305	alfalfa (transplants)	MSU (Ditterline)	.35	5/14/98
MT-9305	alfalfa (seed)	MSU (Ditterline)	.35	4/10/98

Accession	Common Name	Origin or Source	Acres	Date
Breeders Block				
Shoshone	beardless wildrye	Fremont Co., WY	.11	4/8/96
FIELD 25				
Pryor	slender wheatgrass	Carbon Co., MT	2.90	4/23/97
FIELD 26				
<u>Saline Seep Evaluation Area</u>				
Discontinued IEPs and CEPs				1975-79
Saline Seep Seed Mixture Trial				.25 10/21/91
FIELD 27				
Medallion	barley	commercial	5.0	2000
FIELD 28				
Shoshone	beardless wildrye	Fremont Co., WY	2.65	10/25/96
<u>Saline Forage Comparative Planting</u>				
5 acc.	salt-tolerant grasses	commercial	.45	11/11/96
FIELD 29				
<u>Wildlife Food Plots</u>				
13 species	row crops	commercial	2.40	5/11/00
FIELD 30				
Woody Plantings			5.15	
Dupuyer				
Streambank	silverberry	Pondera Co., MT	30 ea	11/9/99
<u>Development Acid Tolerant Cultivars</u>				
1 acc.	Wood's rose	Deer Lodge Co., MT	1.1	7/22/99
1 acc.	western snowberry	Deer Lodge Co., MT	1.3	5/16/00
1 acc.	silver buffaloberry	Deer Lodge Co., MT	.6	5/22/00
1 acc.	currant	Deer Lodge Co., MT	.03	5/22/00
FIELD 31				
fallow			.80	

USDA-NRCS
May 2000