

## 2009 Progress Report of Activities

### Prairie Harvest Germplasm Hackberry

The release of a new northern source hackberry (*Celtis occidentalis*) is a good example of the full cycle of plant materials improvement, which includes collection, evaluation, increase, and release. The development of this new hackberry was started in October 1982. SCS District Conservationist James Ayen, located at Crookston, Minnesota, collected hackberry seed at the request of the Bismarck Plant Materials Center (PMC).



*Prairie Harvest hackberry has improved form and growth rates.*

The collection site was on land near Fisher, Minnesota, owned by friend and nursery manager Roger Wagner. The site was described as wooded alluvial land with occasional flooding. Seed was collected, from and near, two mature hackberry trees growing in an oxbow of the Red Lake River. Accession ND-3878 was compared with 179 other collections as part of a large regional assembly of hackberry from throughout the Great Plains. A replicated trial, located near Mandan, North Dakota, was evaluated for 16 years. The Fisher source had improved growth rates and superior form compared to the other entries. Rate of growth was 20 percent greater than 'Oahe' hackberry. Oahe is also subject to winter injury in Plant Hardiness Zone 3. Prairie Harvest Germplasm hackberry is a seed propagated selected class pre-varietal release. The primary area of adaptation is in conservation plantings throughout North Dakota and the northern half of Minnesota. Secondary adaptation is anticipated in regions of the Upper Midwest and Northern Great Plains. Prairie Harvest should be considered as an alternative to planting green ash (*Fraxinus pennsylvanica*), because of potential problems with the emerald ash borer. Larger stock is currently available in limited quantities at selected nurseries. Conservation grade seedlings will be available beginning in 2011.

### Black Currant is Electrifying

The sweet, glossy black fruit is edible by people and wildlife, and is packed with nutrients and antioxidants. Crimson fall leaf colors add to the attractiveness of the plant. Black currant (*Ribes americanum*) is not defoliated by leaf spot disease in late summer, as is golden currant (*Ribes odoratum*). The origin of the seed source being tested in evaluation plantings is from fruit collected by Big Sioux Nursery staff from native plants growing along the Big Sioux River. The nursery is located near Watertown, South Dakota, in the northeastern part of the state. Plants have been evaluated, in both Off-Center Evaluation Plantings (OCEP) and Field Plantings (FP), since 2001. A review was conducted this summer in all three states. Average survival in five OCEPs was 96 percent. Height averaged 3.5 feet and width 5.5 feet depending on site conditions. Age of planting varied from 6-9 years. Field Plantings are probably a more realistic test of actual in-the-field performance based on variable planting conditions. Fourteen cooperator sites were reviewed. Planting sites varied from heavy grass competition to weed-free conditions. Plant size and performance generally responded accordingly, but survival was surprisingly good even with heavy weed competition. Survival averaged 84 percent. Insect problems were not noted, and disease, mainly leaf spot, was minimal. This information was provided to the State Conservationists' Advisory Committee in September. The committee recommended that written documentation be prepared for review and official release approval in 2010. It will be considered for Selected Class natural-track germplasm release with numerous partners. Currant species should not be planted near white pine (*Pinus strobus*) because of the potential association with the blister rust fungus.



*Fall colors are shades of red and gold.*

## Herbaceous Evaluation Nurseries

A primary responsibility of the Plant Materials Program is the release of adapted plant materials for conservation plantings. Steps leading to an herbaceous release include collection, accessioning (ID number), propagation of collections, establishment of a replicated evaluation plot, evaluations, establishment of a breeder seed increase field, and establishment of a foundation seed field. Following is a list of species that are currently at the Bismarck PMC in various stages of the release process. Initial collection for Indiangrass was vegetative material. Seed was collected for all other species. Field plots consist of three plant plots of each accession, replicated three times except for prairie dropseed. A standard of comparison, if available was included in field evaluation plots.

**Prairie sandreed** is a tall, warm-season, perennial grass with strong creeping rhizomes. It is an important species for soil stabilization particularly on sandy soils. **Progress:** Field evaluations were completed in 2008. Plants were selected for a breeder population. A breeder seed field was established in 2009 using plants propagated from rhizome pieces. The selected plants comprising the breeder population had similar flowering dates and leaf and stem rust was minimal. The seven selected plants had Minnesota origins from the counties of Sherburne, Polk, Norman, Douglas, and Chisago. The size of the breeder block will be increased in early spring of 2010.

**Sand bluestem** is a tall, warm-season perennial grass found almost exclusively on sandy soils. Production of viable seed for the species in the Northern Great Plains is generally poor. **Progress:** Flowering date and production of viable seed were evaluated in 2009 for all plants of the field evaluation plot. Preliminary selections were made for a breeder population. Additional evaluations will be made for plants in 2010 to narrow the selected breeder population.

**Indiangrass** is a tall, tufted, warm-season, perennial grass. It is co-dominant with big bluestem and switchgrass in tallgrass prairies. **Progress:** Plants have been evaluated for various parameters including flowering date, leafiness, color, size, and seed production. A breeder population was selected in 2009. The 25 selected plants originated from the following Minnesota counties: Redwood, Douglas, Sherburne, and Kittson. Selected plants will be divided and grown in the greenhouse for establishment of a breeder seed increase plot to be planted in the spring of 2010.

**Prairie junegrass** is a cool-season, perennial, short, bunchgrass very common in mixed and shortgrass prairies. It produces very early season palatable forage. **Progress:** Seed collections were propagated in 2008 and a field evaluation plot was established. Data collection will begin in 2010.

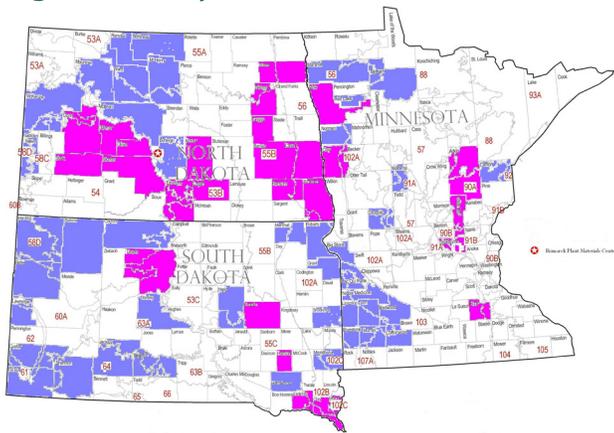
**Prairie Dropseed** is a densely tufted warm-season perennial, often forming large circular clumps. Seed production and quality, and seedling vigor are often poor for the species. **Progress:** Seedlings were initially planted in single rows for each of the three accessions. Seed has been harvested each year for each species. The harvested seed will be separated by size in 2010 and larger seed will be propagated and evaluated in an effort to develop a population with increased seedling vigor.

Table 1 Herbaceous Evaluation Nurseries

| SPECIES   | COLLECTIONS |     | SELECTION CRITERIA   | PROJECTED RELEASE YR. | USE  |
|---|-------------|-----|--|-----------------------|--|
|   | YEAR        | NO. |  |                       |  |
| <b>Prairie sandreed</b> ( <i>Calamovilfa longifolia</i> ) | 2003        | 38  | disease resistance, rhizome spread, leafiness, seed production, flowering date, forage quality | 2010                  | sandy soils                                |
| <b>Sand bluestem</b> ( <i>Andropogon hallii</i> )         | 2003-2004   | 21  | leafiness, seed production, flowering date   | 2011                  | sandy soils, rangeland, landscape          |
| <b>Indiangrass</b> ( <i>Sorghastrum nutans</i> )          | 2005        | 41  | leafiness, texture, flowering date, color, plant form, forage quality, seed production         | 2012                  | forage, landscaping                        |
| <b>Prairie dropseed</b> ( <i>Sporobolus heterolepis</i> ) | 1998-2005   | 3   | seed production, plant form, forage quality, seed germination and seedling vigor               | 2012                  | prairie restoration, wildlife, landscaping |
| <b>Prairie junegrass</b> ( <i>Koeleria macrantha</i> )    | 2006-2007   | 97  | seed production, forage quantity and quality, flowering date                                   | 2013                  | early forage, prairie restoration          |
| <b>Virginia wildrye</b> ( <i>Elymus virginicus</i> )      | 2008-2009   | 81  | forage production, flowering date, disease resistance, longevity, plant form and size          | 2014                  | wildlife, tree rows, shady sites           |



## Virginia Wildrye Status



*Elymus Virginicus* Seed Collections from Minnesota, North Dakota, and South Dakota counties in 2008 (pink) and 2009 (blue).

Virginia wildrye (*Elymus virginicus* L.) is a perennial, cool-season bunchgrass that resembles Canada wildrye (*Elymus canadensis* L.). It prefers moist, low ground along woods and streams, but can grow in various upland sites. It typically grows 2-3 feet tall and has straight stiff heads with short awns. The glumes around the seed are thick and horseshoe shaped. It is native to most of the continental USA. Wildlife and other conservation plantings may benefit with inclusion of Virginia wildrye.

The goal of the study is to release a Virginia wildrye adapted to Minnesota, North Dakota, and South Dakota. A total of 81 native seed collections were made by PMC and other NRCS personnel in North Dakota, South Dakota, and Minnesota in 2008 and 2009. Each seed collection has been assigned a number (accession) that will remain with the plant throughout the 3-5 years of evaluation. Seed will be propagated in the greenhouse in late winter/early spring 2010. Nine seedlings from each collection will be planted to a field in early spring of 2010. Seedlings will be in three plant groups and replicated three times for a total of 9 plants being planted in the field plot. A release from the collections is anticipated in the next 5-7 years. Thanks to all who made seed collections!

### Plant Materials Specialist's Comments

The Plant Materials Program is being reassessed at the national level. Plant releases are no longer required every year. The foundation seed program is being reviewed and new guidelines will be included in the updated National Plant Materials Manual. Individual PMC's are being asked to increase the amount of time they spend on National Action Plans. A minimum of 25 percent of the workload is to reflect national concerns such as pollinators, energy, and climate change, transition to organics, air quality, and plant data collection.

What impact will this have on the Bismarck PMC? We have 37 active releases over the years for which we are responsible for maintaining foundation quality seed stocks. Historically,

about 50 percent or more of our total workload is related to this effort. Tree and shrub evaluations at Off-Center Evaluation Planting (OCEP) sites have also been a high priority and a significant workload. Both of these efforts may be reduced to make room for emerging needs and national priorities. Downward trends in both budgets and staffing may also reflect changes to local Plant Materials Programs. Related reimbursable projects with other agencies such as the National Park Service are encouraged.

The strong interest in field plantings continues. I believe the quality of the plantings is up, and site selection and plot maintenance has improved. Overall, black cherry continues to perform well, even though several plantings did experience some dieback last winter. The pin cherry generally has not performed well. Interest in field office demonstration plantings is up. I have seen some excellent examples at various Service Centers in the three states. Many of these plantings will qualify as People's Gardens and the data can be entered into the national database on the USDA website. More information will be available later. Thanks to the efforts of National Plant Materials staff and Leslie Glass at the Bismarck PMC, the [Plant Materials Program Web site](#) gets better every day.

### Foundation Seed Program

Foundation seed production continues to be an important workload item at the center. Those that worked with NRCS during the early Conservation Reserve Program Signups in the late 1980's probably remember some of the challenges of obtaining good quality seed in the large amounts needed to satisfy this program's needs. Seed availability at that time was often limited, especially native species. Often, if it was available, it was in limited supply and/or carried a hefty price.

We continue to work closely with commercial seed growers to assure that conservation seed is available for the many conservation programs that our agency works with on a daily basis. Foundation seed distribution has been on the decline the past few years but we are anticipating an increased interest as the spring of 2010 approaches. We allocated seed to five commercial growers in 2009 totaling 497 PLS pounds. The 2009 season had the lowest pounds shipped on record. As a comparison, in 2008, 1705 PLS pounds were shipped as compared to 1998 when 6,209 PLS pounds were shipped. North Central Research and Extension Center (Minot, North Dakota) continues to be a valuable partner in our foundation seed production program. They currently assist us with growing three species. We have done some major field renovations at the center this past year. Five foundation fields were removed in 2009. Four new fields, Pierre sideoats grama, Bismarck Germplasm stiff sunflower, Bismarck Germplasm purple prairieclover, and Bismarck Germplasm narrow-leaved purple coneflower were seeded. The year ended with very good harvests on most species, and our seed cooler is full of good quality foundation seed.

## South Dakota Conservation Field Trials

**Bison Field Office Demo:** On July 21, 2009, we dusted off the forage harvester and headed to northwestern South Dakota to clip plots. NRCS staff from Bison, South Dakota, and Hettinger, North Dakota, assisted. The plots were planted in 2007 to evaluate performance of various species of grasses, forbs, and legumes in that part of the state. They also included various mixtures. The plots were somewhat slow to establish with periods of spotty rainfall. However, in 2009, some of them were looking good enough to harvest. Ten feet by two feet strips were clipped in each plot after contaminants were removed. SDSU yellow alfalfa (6,477 lbs/ac) out-yielded 'Travois' alfalfa (4,018 lbs/ac). The SDSU yellow alfalfa did well with the following grass mixtures: 'Rodan' western wheatgrass (7,456 lbs/ac); 'AC2' crested wheatgrass (5,167 lb/ac); 'Lodorm' green needlegrass (5,112 lb/ac); and 'Fleet' meadow bromegrass (4,466 lbs/ac). 'NewHy' hybrid wheatgrass also did well with the alfalfa varieties. 'Eski' sainfoin performed best with AC2 crested wheatgrass (3,626 lbs/ac). Contact the Bison Field Office or Bismarck PMC for additional information. Complete data will be included in the 2009 Technical Report.



Plots were sampled using a flail forage harvester.

**Wessington Springs Field Office Demo:** Plant materials plots were established in 2007 by the Jerauld County Conservation District and the NRCS field office at Wessington Springs, South Dakota. Property on the north edge of Wessington Springs was purchased by the District to be used as a plant materials demonstration area. The site was divided into a tree and shrub evaluation area to evaluate species performance comparing weed barrier to clean tillage.

A second area was used to compare performance of various grasses, forbs, and legumes. The Bismarck PMC assisted with the seeding and evaluation of herbaceous plots. Data has been collected on the 52 entries regarding weed contamination, stand density, vigor, and seed production. Generally, the cool-season grasses established most rapidly and had the least weed contamination. Warm-season grass species were slower, but many entries had good stands in 2009. Forb and legume species had the most variability in performance. Some of the species with outstanding performance in 2009 included 'Fleet' meadow bromegrass, 'NewHy' hybrid wheatgrass, 'Alkar' tall wheatgrass, 'AC2' crested wheatgrass, 'Rebound' smooth bromegrass, all five

varieties of pubescent/intermediate wheatgrass, 'Mandan' Canada wildrye, 'Lodorm' green needlegrass, 'Pierre' sideoats grama, 'Bowie' buffalograss, 'Lutana' cicer milkvetch, 'Travois' alfalfa, SDSU yellow-blossom alfalfa, and 'Dawn' birdsfoot trefoil.

A few of the poorer performing entries included prairie junegrass, alsike clover, and Ladino white clover. A complete data summary of all entries will be included in the 2009 Annual Technical Report.



The Jerauld County demo site is highly visible and well labeled.

## Bioenergy Grant

Perennial crops that improve habitat, reduce soil water runoff, store carbon, and conserve energy as potential bioenergy fuels are being evaluated at the Central Lakes College Ag Center at Staples, Minnesota. The college is the recipient of a grant to evaluate the best variety and associated management practices for each energy crop. The Bismarck PMC provided some of the plant materials and used their native grass drill to seed the plots in May 2009. Seven sites were planted. Entries and plot size varied at each location. Soils in the area are high water table sands with extreme erosion hazard. Included in the evaluation were 'Manska' pubescent wheatgrass, 'Manifest' intermediate wheatgrass, 'Forestburg' switchgrass, 'Bonilla' big bluestem, 'Sunnyview' big bluestem, Red River Germplasm prairie cordgrass, and a CP-25 mix of native grasses and forbs.

Dry conditions during seeding caused some concern, but adequate rainfall was received to establish the stands. The intermediate and pubescent wheatgrass stands established quickly. The warm-season grasses were slower, but the switchgrass and big bluestem looked good by the end of the growing season and formed seed heads on some of the plots. The prairie cordgrass had the poorest establishment and rows were not visible by the end of the growing season. The native mix showed good establishment also. Data will be collected and analyzed. A field day was held on August 12, 2009.

## Native Plant Varieties are Local Sources

Bismarck PMC native grass and forb releases are local seed sources that have been collected from a specific area. Some have been screened in initial evaluation comparisons with other collections, and others have not. Bad River blue grama has had no selection, and it originates from native seed harvested over several hundred acres. Prior to 1995, "variety" documentation was the only formal mechanism available for

release of a native plant. By today's standards, these variety releases would qualify as "natural-track germplasms" because there has been no "purposeful genetic manipulation" within the selection process. For example, 'Tomahawk' Indiangrass is a composite of local sources collected on native grasslands from three adjoining counties in southeast North Dakota and northeast South Dakota. Even though Tomahawk was released as a variety, it is a true native component of Midwest tall-grass prairie. Tomahawk would add genetic diversity to restoration plantings within its area of adaptation. Red River Germplasm prairie cordgrass is a composite release with original collections from Minnesota, North Dakota, and South Dakota. This level of genetic diversity would not be available from a single source local collection. Plant studies conducted at the Bismarck PMC over the last 50 years have shown that seeds of native species can be transferred widely within the hardiness zone in which they originated. A brochure, "[Origins of Native Grass and Forb Releases](#)", provides species information, as well as individual attributes and origins of native plant releases from the Bismarck PMC.

### Grasses for Landscaping

Grasses are becoming more popular in the landscaping trade. Greenhouse sales have shown that most perennial plant customers include at least one grass plant selection with their purchase. The ornamental grasses are still more popular than the native grasses, but native plant sales are increasing every year.



Greenhouse grass display in Fargo, North Dakota

The Bismarck PMC has a standing offer to provide a small amount of seed to greenhouse and nursery operations in the area to get them started in the containerized production of recommended native varieties for this region. Grasses, which seem to have the most interest, are the warm-season species including big and little bluestem, switchgrass, blue and sideoats grama, and Indiangrass.

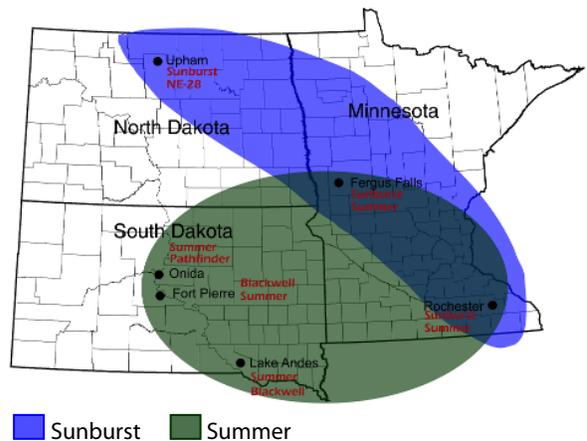
It is especially important to stay with the recommended varieties for your area. These recommendations are in the [Native Landscaping booklets](#), which have been developed for each of the three states. Recommendations may also be available from horticultural plant trials at the state agricultural experiment stations. Beware of untested varieties of unknown origins! The warm-season species are much more sensitive to winter temperature extremes than are cool-season. Another problem with grasses in the nursery trade is

misidentification and contaminant weedy grasses growing in the pot. Grasses without seed heads all look alike to many people. Remember to plant only recommended varieties and double-check what is in the container. Plant native and enjoy the floral diversity of prairie grasses in your landscaping.

### Switchgrass for Biomass

Switchgrass is a native, perennial, warm-season grass that commonly grows in Minnesota, North Dakota, and South Dakota. Switchgrass has potential as a renewable energy crop for several reasons, which include: a wide array of commercially available cultivars; production fields are easily established; conventional farm equipment is compatible with management and harvest of a switchgrass crop; and potential for high yield of biomass, depending on seasonal precipitation patterns.

The primary goal of biomass production is to produce high yields with minimal inputs. The Bismarck PMC established a series of studies of warm-season grass at six locations in Minnesota, North Dakota, and South Dakota between 1982 and 1992. Ten seed sources/cultivars of switchgrass were evaluated for five years at each site. Based on these evaluations, 'Sunburst' switchgrass was one of the highest biomass-yielding cultivars for eastern North Dakota and central Minnesota. Sunburst originates from near Yankton, South Dakota. It was the highest yielding cultivar at Upham, North Dakota, and the second highest at Fergus Falls and Rochester, Minnesota. 'Summer' switchgrass from Otoe County, Nebraska, was one of the best performing cultivars in eastern South Dakota and Southern Minnesota. (See map below.)



### National Park Service Project Update

The PMC currently has cooperative projects with the Theodore Roosevelt National Park in North Dakota and the Badlands National Park in South Dakota. The four-year cooperative projects are focused on the production of native seed originally collected within each of these park boundaries. The PMC helped with these seed collections, cleaned, and planted the seed to establish seed increase fields at the Center. The goal of these projects is focused on production of native seed for use in reseeding areas disturbed along roadways within the parks that have been targeted for road improvement. Completion of the two park projects is

scheduled in 2010 but have the potential to be extended if additional seed is needed. We are growing five native grass species for the Badlands National Park. The species include green needlegrass, western wheatgrass, slender wheatgrass, sand dropseed, and blue grama. Six native grasses are in production for the Theodore Roosevelt National Park. Those species include green needlegrass, western wheatgrass, thickspike wheatgrass, blue grama, and sideoats grama.

### Direct Woody Seeding Trials

Direct seeding of woody plants can be successful. Moisture availability, however, is very critical. One can seed into a site with good moisture, but germination may occur many months later when there is no soil moisture or rainfall to sustain the seedlings. The success of direct seeding appears to be related to total precipitation. Several plantings have been made with varying success in North Dakota. The PMC staff established a plot of five species of shrubs in grassland in Sheridan County, southwest of McClusky, North Dakota. Initially, a patch of silver buffaloberry did become established. In 2004, two sites were planted in western North Dakota, but they did not become established. The most successful study was a riparian planting near Walhalla, North Dakota, where some of the tall trees have grown beyond the reach of the deer. The annual precipitation at that location is 19.5 inches.

### Bur Oak

Bur oak is a hardy, drought-resistant, long-lived tree adapted to a wide range of soils. It has been found growing in almost all counties of North Dakota and South Dakota, as well as Minnesota. In 1991 and 1992, acorn collections were made in all three states. Acorns were gathered from 27 counties in North Dakota, 11 counties in South Dakota, and 5 counties in Minnesota. Most of these oak seed sources were planted at the Northern Great Plains Research Lab at Mandan, North Dakota, in 1993. After 15 growing seasons, the trees were measured in 2007. The tallest trees, at close to 20 feet in height, were grown from acorns collected in Cass County, North Dakota. In 2009, the PMC staff identified superior trees from the Northern Plains. These trees will be managed as a seed orchard, to provide seed to conservation nurseries.

### New Buildings Under Construction

The PMC staff has been kept busy with the construction of two new buildings this past year. A new greenhouse/head house is nearing completion. It will be in operating order for use this winter. The new greenhouse/head house will be a valuable addition to the Center. The new greenhouse replaces an old greenhouse constructed in 1972. It will provide increased project space and incorporates some of the new greenhouse technology, including increased energy efficient construction. An equipment storage and shop building is also under construction at this time and will provide indoor storage space for field equipment.

### Sunn Hemp Update

Sunn hemp (*Crotalaria juncea*) has been described as a great green manure and cover crop since the 1930s, when it was reported to be an excellent soil-improving crop. Sunn hemp

is a legume that fixes nitrogen and can produce an abundance of organic matter. The tropical, sub-tropical plant acts like a summer annual when grown in the continental US. It is adapted to a wide range of soils including poor sandy soil. Sunn hemp does not produce seed north of 28 degrees N latitude (southern tip of Florida or Texas)

A national Plant Materials study began in 2009 to determine the areas of the US where sunn hemp has potential as a green manure and cover crop. Various Plant Materials Centers throughout the US participated.



*Sunn hemp rhizobium nodule*

Seed of 'Tropic Sun' sunn hemp was inoculated with Bradyrhizobium (a nitrogen fixing bacteria) and planted at the Bismarck PMC on June 23, 2009, in a small plot at 50 PLS lbs/ac. Forage height and production data were collected at 30, 60, and 90 days after planting. The unusually cool spring and summer temperatures at Bismarck likely slowed plant growth. The lack of an early frost, however, extended the growing season.

Forage production in the small plots averaged approximately 300 lb/ac at 30 days, 1,100 lb/ac at 60 days, and 5,100 lb/ac at 90 days. Nodules, which usually indicate nitrogen fixation, were found on plant roots at the end of the growing season. The study will be repeated at the Bismarck PMC in 2010 to predict more accurately the performance of the species.

### 2009 Technical Transfer Products

New PMC publications include: "[Grasses for the Northern Plains, Growth Patterns, Forage Characteristics, and Wildlife Values, Volume II Warm-season](#)", (the second part of a two volume set), "[Indiangrass \(\*Sorghastrum nutans\*\) Biomass Trials - North Dakota, South Dakota, and Minnesota](#)", and the poster "[Improved Forage Grass Releases by the Bismarck Plant Materials Center and Partners](#)".

In addition, "[FOTG - List of Plant Materials References](#)" was developed for the electronic [Field Office Technical Guide](#) (FOTG). This document can be accessed from ND FOTG - Section 1, General References - Plant Materials. This document offers an alternative gateway for field office staff to quickly locate and access Plant Materials technical resources and products. Over 170 technical documents are currently available on the [Bismarck Plant Materials Program](#) Web site.

## Trees and Grass Cover

The PMC staff has had a lead role in finding a wider selection of trees and shrubs to use in conservation plantings in the Northern Great Plains. The McKenzie Slough Game Management Area, east of Bismarck, was used as an evaluation site for over 240 new trees and shrub species from 1972-1995. During that time, the soil between the trees was clean cultivated. In 1998, several grass and forb mixtures were planted in strips running from north to south. This area is managed by the North Dakota Game and Fish Department. Since the year of seeding, no mowing or burning has occurred.

Beginning on the west side, a mixture of introduced cool-season grasses and cicer milkvetch was planted. In 2009, the stand was in good condition and the cicer milkvetch was thriving. There were few weeds or volunteer trees evident. The second strip was a mix of cool-season native grasses and forbs. In 2009, the stand was thin, with invading weeds and many volunteer Siberian elm trees. The third strip included tall, warm-season grasses. This strip also had a thin stand, with broadleaf weeds invading. A strip of Russian wildrye was planted on the east side, and broadleaf weeds were not a serious problem.

In the strips where native grasses were planted, the vigor of the tall trees was better than those same species in the strip of cool-season introduced grasses. This was especially evident with the ash and hackberry seed sources. Some of the trees species, which are still very healthy after ten years of grass cover, are bur oak, hackberry, green ash, Japanese elm and, and Ohio buckeye. Most of the shrub species show a decline in vigor. This is partially due to the age of the planting, as well as the competition from the grass.

## Native Pines

Lodgepole pine (*Pinus contorta* var. *latifolia*) is one of six native pine species growing in Minnesota, North Dakota, and South Dakota. This pine occurs in an isolated stand of about 150 acres scattered among ponderosa pine west of Nahant, South Dakota, in Lawrence County. The lodgepole pines grow on the northern aspect of a ridge, just beneath the crest. Fire is important to the establishment of native stands of lodgepole pine. The serotinous cones remain attached to the branches for as long as 15-20 years. Viable seeds have been extracted from closed cones 75 to 80 years old, and a few seeds were germinated from 150-year-old cones embedded in wood.

In 2008, lodgepole pine seedlings from six accessions were planted at Carson, Dickinson, and Hettinger, North Dakota, and at Hot Springs, South Dakota. Generally, growing conditions in 2008 were good, and the seedlings overwintered well. In 2009, the pine did well at some of the locations. After two years of growth, a seed source from British Columbia was the tallest.

Ponderosa pine and limber pine are native species found in North Dakota and South Dakota. A stand of limber pine is found north of Marmath, North Dakota, along an ancient

Indian trail. The plants may have been volunteer trees near Indian campsites, dating back to about 1300 AD. The seeds of the limber pine were a prehistoric food source. Ponderosa pine grows in several locations in western North Dakota, as well as the Black Hills and Cave Hills of South Dakota.

In Minnesota, three native pines are found. The white pine, which is the state tree of Minnesota, formerly was common in the north half of the state, except west of Red Lake, and south to the northern edge of Chisago County. Natural stands of the red, or Norway, pine cropped up after fires. It does not occur as far south as the white pine. The jack pine, also known as scrub pine, is similar to lodgepole pine, which is a western species. Its natural range was on areas with very sandy soils. The cones of the jack pine may remain closed on the tree until a fire causes them to open. Seeds retained in the cones may remain viable for at least five years. Jack pine has been cut for pulp to produce paper, but is not commonly planted in windbreaks.

## Outreach and Training

On August 11-13, 2009, 23 NRCS and SCD staff from Minnesota, North Dakota, and South Dakota attended the three-day, annual Plant Materials Center Field Office Training. We plan to offer the training again in 2010 with a scheduled date of August 10-12, 2010. If anyone is interested in this training, consult with your supervisor. A copy of last year's training agenda is available to provide additional details on training topics covered.



Outdoor plant identification session.

## Tree and Shrub Releases

The Bismarck PMC has been evaluating many different trees and shrubs since the mid 1950s. Many of the woody plants have been introduced into the nursery trade for use in conservation plantings. Through observation of the different trees and shrubs in field plantings and Off-Center Evaluation Plantings (OCEP), the PMC staff has tried to find the very best plants for conservation plantings. Many of these have been released as cultivars that are grown by local conservation nurseries. In 1973, 'Midwest' Manchurian crabapple became the first woody release by the Bismarck PMC. Since then, the PMC has released these other selections of trees and shrubs: 'Sakakawea' silver buffaloberry, 'McDermand' Usurian pear, 'Regal' Russian almond, 'Legacy' late lilac, Survivor germplasm false indigo, Silver Sands germplasm sandbar willow, 'Prairie Red' plum, and 'McKenzie' black chokeberry.

## Conservation Priorities

Current work at the PMC focuses on ten major conservation priorities: Streambank & Lakeshore Stabilization; Warm-Season Grass Promotion and Development; Alternative & Specialized Use of Conservation Plants; Tree & Shrub Related Technology; Native Prairie Ecosystem Restoration; Saline & Alkaline Tolerant Plant Materials; Wetland and Riparian Plant Materials; Filter Strips & Nutrient Management; Information, Education & Outreach; and Urban Conservation.

## Who We Are

The Bismarck Plant Materials Center is one of 27 Plant Materials Centers operated by the United States Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS). The Center serves the States of Minnesota, North Dakota, and South Dakota. It is the Mission of the Plant Materials Program to develop plant materials and plant science technology for the conservation of our natural resources.

## Bismarck PMC Staff

Dwight Tober, Plant Materials Specialist (not shown)  
Wayne Duckwitz, PMC Manager  
Mike Knudson, Forester/Assistant Manager  
Nancy Jensen, Agronomist  
Leslie Glass, PMC Secretary/NPMP Webmaster  
Rachel Bergsagel, Biological Science Technician  
Earl Aune, Biological Science Technician  
Mike Bellon, Biological Science Technician  
Dennis DeVault, Biological Science Aid (Int.)  
Sasha Bergsagel, Biological Science Aid (Int.)  
Chandra Heglund, Biological Science Aid (Int.)  
Kyle Wolf, Biological Science Aid (Int.) not shown



Back row, L-R: Mike Knudson, Wayne Duckwitz, Earl Aune  
Front row, L-R: Dennis DeVault, Chandra Heglund, Nancy Jensen,  
Rachel Bergsagel, Sasha Bergsagel, Leslie Glass, and Mike Bellon

## Helping People Help the Land

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