

2012



Progress Report of Activities

Issued January 2013 **Manhattan, Kansas, Plant Materials Center**

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Cover Crops

Cover crops provide many benefits to soil health and overall profitability within farming systems. Significant benefits vary by location, season, and cover crop. A partial list of the positive results of using cover crops includes:

- Reduction in soil erosion
- Enhancement of organic matter in soil
- Reduction in fertilizer input
- Conservation of soil moisture
- Protection of water quality
- Reduction in weed competition

The Manhattan Plant Materials Center (PMC) planted a replicated Conservation Innovation Grant (CIG) cover crop study cooperatively with Kansas State University (KSU). The cover crop plot species included rye sown at two different seeding rates (1X and 2X), with hairy vetch, Austrian winter pea, and radish as components within the lower rate rye plots (1X), and control plots that were not seeded. Forty-five days following planting an evaluation of the canopy cover and species composition revealed that the rye plots at both rates were doing well despite the lack of precipitation. The broadleaf components planted within the lower seeding rate rye plots (1X) were present, but in relatively low numbers. The most obvious finding was the huge reduction in weed species numbers between the unseeded control plots and the rye seeded plots at both planting rates. An observation of the plots containing rye revealed a reduction of weed cover by a minimum of 33% over the control plots.

This CIG cover crop study will continue to look at the benefits of cover crops along with the incorporation of vegetables into the covers. This study will continue for several years.

Plastic Culture

The PMC is using a new machine that allows researchers to plant seedlings directly into a plastic or fabric weed barrier. Use of the machine is labor intensive, but the benefits may justify that.



Pitcher sage plants being planted through plastic mulch

The goal is to establish a long-term, low maintenance environment primarily for the production of forb species. The weed barrier conserves moisture and limits competition from weeds, so it is especially beneficial in establishing forbs. Historically, weed control in forb plantings has been difficult because of the open canopy and the limited availability of approved herbicides.

The initial results have been positive with the harvest of pitcher sage from a first-year planting. If the use of plastic mulch continues to show labor and expense benefits, our plan is to apply the process to additional forb plantings.



Purple prairie clover planted into plastic mulch

Sandy Study

Progress continues in the Kearney County, Kansas, sandy-site study planting. The study contained 15 species in a replicated planting. A wheat-straw mat was placed over the seeding to serve as a cover and to protect the seeding from soil erosion. Species continuing to show some success include sand bluestem, black blue grama, prairie sandreed, needle and thread, and sand lovegrass. This study was initiated after seeding failures under the Conservation Reserve Enhancement Program (CREP) in Kansas. Several plant materials centers contributed seed to the study.

Because of low survival rates in CREP plantings, our investigations have moved into soil health, which has identified an extreme hard pan on these sandy soils. Under typical conditions, this hard pan softens with the availability of soil moisture from rainfall and/or irrigation and allows root growth into and through this layer. Currently, the limited availability of irrigation and the extreme drought make the hard pans an impenetrable layer that restricts the establishment of normally adapted plants.



Soil hardpan restricts roots of sorghum cover crop

After assessing the challenges presented by hard pan, an evaluation of Natural Resources Conservation Service (NRCS) planting specifications, starting with cover crops and progressing through stand establishment, took place. A shift from traditional summer sorghum cover crops to a fall or early spring multi-species mix, or even stacking multiple cover crops seems to provide a viable solution. The soils are very fragile and very susceptible to wind erosion. The goal of the cover crop is to have 80% to 100% ground cover prior to drilling permanent vegetation. Vegetative mixes will include a mix of warm- and cool-season native grasses, forbs, and a selection of shrubs.



Irrigated cropland field planted to native vegetation

Shale Site Study

Starting in 2000 and concluding in 2002, a critical area planting of common reed, 'Phragmites australis' was established with rhizomes on a blue shale site in Jewell County, Kansas. Soil pH on the site averages between 2.8 and 3.9, so establishing any vegetation on the site is very difficult. As the common reed began to stabilize the site, native species such as little bluestem and big bluestem began to establish themselves in the site. Even in a dry year, there are many established plants as well as many new seedlings growing. With proper management, including prescribed burning and grazing, the site should continue to stabilize and improve with native grasses.



Little bluestem begins to establish on blue shale soils

Evaluation of the shale site study planted in 2010 continues. Initial seed collections were made in 2009 and consisted of switchgrass, big bluestem, and little bluestem. Containers of each were grown at the PMC and reintroduced into a study planting at the site. Evaluations of the 2010 planting resulted in the loss of three of the original 263 plants. In 2011, evaluation showed the loss of 29 additional plants. Evaluations in 2012 indicate a loss of 141 (46%) from the original planting. Most of the remaining plants show various amounts of stress due to the soils and drought. Despite the loss, several plants within the study are showing potential for adaptation to the low pH soils of the site.



Study adaptation planting of big bluestem, little bluestem and switchgrass on blue shale soil

Woody Adaptation Study

A study to evaluate the adaptation of trees and shrubs was initiated in 2011 at Chadron, Nebraska. The PMC and USDA Forest Service Bessey Nursery provided materials for the planting. The purpose of the study is to identify woody species that show potential to survive in the northwestern part of the PMC service area. Species planted included: pecan, hawthorn, dwarf Russian almond, river birch, New Jersey tea, black current, McKinsey black chokeberry, white poplar, ninebark, black cherry, hazelnut, and sea buckthorn. Evaluations in 2012 indicated mixed results with minimal survival of some species. An additional planting of pines also was completed in 2011, but none of the pines survived.



Trees and shrubs in study planting

Plant Materials Committees

Plant Materials Committees from Kansas, Nebraska, and Oklahoma met in 2012. The Kansas committee met and toured the PMC. The Oklahoma committee toured Cow Creek Riparian Study Project, along with a nutrient filtering system at a local golf course. In addition to the tours, plant materials issues and priorities were discussed. State Plant Materials Long-Range Plans were updated in Kansas and Oklahoma. State committees play a critical role in identifying priorities and direction of the program.



Oklahoma Plant Materials Committee touring Cow Creek Riparian Study Project

2012 Field Day

The PMC celebrated 2012 achievements with a field day on September 12, 2012. PMC staff led guided tours of the PMC's buildings and grounds. Activities included breakout sessions on soil health, pollinators, range health, and riparian management. Participants included NRCS and Konza Prairie employees, KSU students and faculty, and the public. The field day provided an opportunity for discussion, interaction and education.



Chad Remley, NRCS Soil Scientist discusses soil health issues



Dwayne Rice, Rangeland Management Specialist, discusses plant issues



Richard Wynia, PMC Manager, reviews forb plot during PMC tour

Plant Materials Notable Achievement

Jerry D. Longren, Biological Science Technician (BST), received the National Plant Materials Notable Achievement Award. The award was presented by Eric B. Banks, NRCS State Conservationist, Salina, Kansas. Jerry developed and fabricated a new system for handling foundation seed from the point of harvesting through all the intermediate steps to the final cleaning of the seed. It is estimated that the new system is about 50% quicker than the former cleaning system. We appreciate everything Jerry has done at the PMC.



Eric Banks presents notable achievement award to Jerry Longren

Who We Are

The PMC is one of 27 centers nationwide that uses plants to solve natural resource problems. It is owned and operated by the NRCS. The PMC offers services to a diverse region of the Heartland including Kansas, Nebraska, northern Oklahoma, and northeastern Colorado (see map at right). It is located on 169 acres of sandy loam soil in the Kansas River Valley, south of Manhattan, Kansas.



What We Do

The mission of the Plant Materials Program (PMP) is to develop and deliver plant science technology to meet the nation's natural resource conservation needs. The PMP vision is "Productive Lands–Healthy Environment." The PMP is recognized as the nation's leading technical source of plant solutions and plant technology to meet natural resource conservation needs. This includes the production of improved varieties of plants for commercial use and the development of plant science technology for incorporation into the Field Office Technical Guide (FOTG).

Plant and technology development objectives of the PMC include:

- Water quality improvement
- Erosion control
- Range and pasture improvement
- Native American outreach
- Plant variety selection and production
- Soil Health

Seeking Vegetative Solutions to Conservation Problems

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Plant Materials Program Web site:

<http://www.plant-materials.nrcs.usda.gov>

PMC Tours

Tours of the PMC are available Monday through Friday during regular business hours. Advance reservations are recommended for individual or group tours.

PMC Seed Production

The PMC maintains a variety of native grass and forb fields for foundation seed production. Native grass varieties include:

- Kaw big bluestem
- Pete eastern gamagrass
- Osage Indiangrass
- Cheyenne Indiangrass
- Aldous little bluestem
- Cimarron little bluestem
- Garden sand bluestem
- Bend sand lovegrass
- El Reno sideoats grama
- Blackwell switchgrass
- Kanlow switchgrass
- Barton western wheatgrass
- Pronghorn prairie sandreed



Pollinator on Milkweed Plant



Flag being raised on new flag pole by PMC staff

Native forb varieties include:

- Midas false sunflower
- Sunglow grayhead prairie coneflower
- Prairie gold maximilian sunflower
- Nekan pitcher sage
- Kaneb purple prairie clover
- Kanoka round-head lespedeza
- Eureka thickspike gayfeather
- Reno germplasm Illinois bundleflower
- Riley showy partridge pea

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