



United States Department of Agriculture

**NRCS Kansas Plant Materials Center**

# 2024 Progress Report of Activities

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| <https://www.nrcs.usda.gov/plant-materials/kspmc>

The Manhattan, Kansas Plant Materials Center (KSPMC) develops plants and new plant technologies for America's heartland. The KSPMC offers services to a diverse region of the heartland including northeastern Colorado, Kansas, Nebraska, and northern Oklahoma. The Center is located on sandy loam soil in the Kansas River Valley, southwest of Manhattan, Kansas. The primary objective of the KSPMC is to develop plant materials and technology for conservation innovation.

The objectives for plant and technology development of the KSPMC include water quality and soil health improvement, wildlife and pollinator habitat improvement, erosion protection, and plant development/seed production. The Center's primary studies include work on the effects of seed quality and planting methods in native species stand establishment/enhancement, cover crop species performance, and varietal differences among cereal grain cover crops. The KSPMC develops management and cultural techniques necessary for the establishment and acceptance of promising plant materials by the conservation community. The KSPMC also produces limited quantities of Foundation and breeder class seed and plants to facilitate commercial production of the releases.

The KSPMC has developed 30 improved conservation plants, including cultivars of big bluestem, Indiangrass, switchgrass, sideoats grama, thickspike gayfeather, purple prairie clover, and little bluestem.



'Aldous' little bluestem.



'Eureka' thickspike gayfeather.



'El Reno' sideoats grama.



'Blackwell' switchgrass.

## **Current Studies**

### ***Cover Crop Studies***

The KSPMC is participating in a National cover crop study to evaluate the effects of seeding rate, planting date, and termination timing on biomass and other associated attributes of cover crops used within production agriculture. Cereal rye is the first species to be evaluated in this study, with additional species to be included in following years. The purpose of this is to investigate the cereal rye variety ‘Elbon.’ Elbon has proven to be well adapted to the range of growing conditions commonly encountered at the KSPMC.



Mixed cereal rye variety plots at the KSPMC.

Continuing the trajectory of our previous cover crop work centered around cool season grass cover crops and their phenological differences by variety, the KSPMC initiated a study in 2022 to evaluate the use of multiple phenotypes of cool season grass cover crops planted together in a blend to maximize conservation benefits in the fall and spring. Theoretically, a blend of cereal rye varieties could produce rapid establishment in the fall and continued vigorous growth in the spring. If successful, this combination would provide livestock forage in the fall while still providing soil erosion protection and weed suppression in the spring. In addition to planting at the KSPMC, this study also planted the cereal rye blend at a second location 20 miles north of the KSPMC near Leonardville, Kansas. This location is situated on a Wymore silty clay loam soil, a soil that is much more representative of soils in Kansas than the sandy flood plain soils of the KSPMC. Initial measurements of canopy cover, plant height, and biomass were collected in the spring of 2024 and the cereal rye blend was planted again in the fall of 2024.

### ***Forage Sorghum Plant Height to Weight Ratio Demonstration***

Many land managers mention the upfront costs with no immediate financial return as an impediment to including cover crops in their soil health management systems. This is one reason that utilizing cover crops as a source of livestock forage is a popular practice that continues to increase in interest as people explore ways to integrate livestock production with crop production in their efforts to improve the health of the soil that they manage.

In late July 2024 (following wheat harvest), the KSPMC (in collaboration with Doug Spencer, Kansas State Grazing Specialist) planted a forage sorghum demonstration to support conservation planners in their planning of grazing annual forages. Specifically, we wanted to confirm or revise the guidance that forage sorghum produces 200 pounds per acre for every inch of plant height. The total amount of biomass available for grazing is always of interest in a forage study but this demonstration was tailored to measure both the total biomass and the amount of biomass produced per inch of plant height. This information will help managers estimate the material that has been grazed by measuring the height of the remaining sorghum. We also considered the livestock safety concern of prussic acid and nitrate poisoning when grazing sorghum. Both issues typically arise during the early growth/regrowth of sorghum plants or after plant stress events (such as extreme drought or freeze damage). When sorghum plants accumulate prussic acid or nitrates



the dangerous concentrations typically occur in the lower portions of the plant. The current Natural Resources Conservation Service (NRCS) recommended minimum plant height to initiate grazing of sorghum is 24 inches. Because we experienced moderate drought during this study, we used a minimum of 30 inches as an added safety measure in order to prevent prussic acid/nitrate poisoning concerns. The clipping data below shows the mean forage sorghum pounds per acre per inch of plant height was 257 pounds. This updated examination of forage sorghum production per inch of plant height confirms the existing guidance of 200 pounds per acre produced per inch of plant height.

**Table 1. Sorghum plant height density and yield. USDA-NRCS, Manhattan, Kansas Plant Materials Center, Summer 2023.**

Plot	Height (inches)	Stem Number	Yield (lb/acre)	Yield/inch (lb/acre)
101	30	11	7080	236
102	30	13	8155	271
103	30	11	7445	248
104	30	14	8232	274

### ***Pollinator Habitat Establishment Study***

In 2024, the KSPMC entered the third year of a four-year pollinator habitat establishment method study. This study is an effort to improve the rate of success in pollinator habitat establishment. Plant species included in the study are showy milkweed, plains coreopsis, purple prairie clover, Illinois bundleflower, black samson, Engelmann's daisy, dotted gayfeather, grayhead coneflower, and pitcher sage. These species were selected for the study because they are important for pollinator species and widely adapted across the KSPMC service area. The study treatments include all combinations of dormant and spring seeding periods, no-till and conventional tilled seedbed preparations, and drilled and surface broadcast seeding methods. Replication is accomplished by planting year and weed control is consistent across treatments.



Pollinator establishment plots at the KSPMC.

## **Trainings Conducted at the KSPMC**

### ***Herbaceous Vegetation Establishment Training***

The KSPMC initiated a new training targeted towards new conservation planners. This training was well attended, so much so that two sessions were necessary. This training opportunity was a hybrid of classroom and field sessions and provided the 46 participants with a deep look into both the policy/planning considerations of what it takes to successfully establish herbaceous vegetation and the

intricacies of selecting and calibrating equipment, planting the seed, and evaluating/documenting success. The KSPMC received positive feedback from the participants and is currently incorporating suggestions to improve this course in the future.

### ***Prescribed Fire Training at the KSPMC***

Prescribed fire is a valuable management tool for land managers within the service area of the KSPMC. Regular burning is one of the best management practices to control invasive tree species (such as eastern red cedar) in the tall grass prairie biome. Prescribed burning is also used to manage other resource concerns including forage quantity, forage quality, and vegetative community composition. As valuable as prescribed fire is to land managers and conservation planners, it is not without its risks and therefore, NRCS requires planners to obtain job approval authority (JAA) to plan prescribed fire. The KSPMC plays a vital role in helping NRCS Rangeland Management Specialists and other conservation planners obtain the required JAA by providing a hands-on training opportunity as part of their certification process. The seed production fields and other areas of tall grass prairie vegetation at the KSPMC provide a unique opportunity to learn prescribed fire techniques and experience fire behavior in a safe and readily controlled setting. The participants leave the training with firsthand experience and the seed fields benefit from the early season weed control, increased plant vigor, and nutrient cycling. The KSPMC provided this important opportunity once again in 2024.



Hands-on portion of the prescribed burning job approval authority certification held annually at the KSPMC.

### ***Informal Training Opportunities***

In addition to formal training opportunities, the KSPMC hosts and/or supports several other trainings, certifications, and field days throughout the year. In-Field Soil Health Assessment, Conservation Planning, and ATV Safety trainings occur on a regular basis at the KSPMC. In 2024, the PMC hosted a tour for NRCS employees (from 9 different states) as part of a nationally led New Employees Orientation Training. These participants left the



Participants of the New Employee Orientation training at the KSPMC.

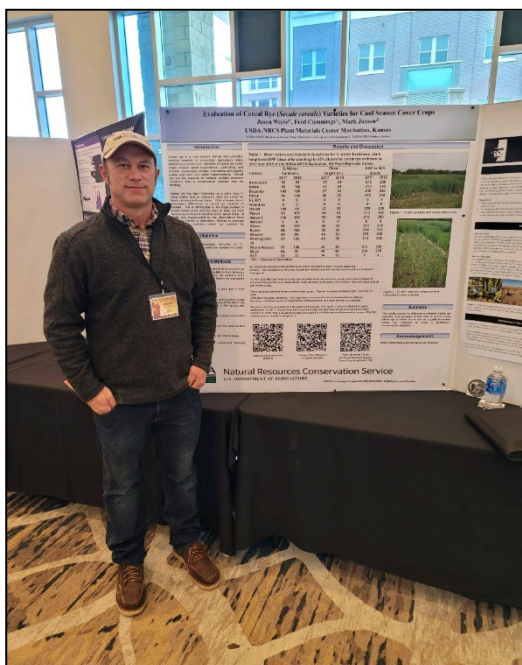


PMC with a much better understanding of the current studies, capabilities, and resources available, not only at the KSPMC, but available through the Plant Materials Program as a whole.

## **Publications and Presentations**

Kansas Plant Materials Technical Note 31, ECS– *Perennial Herbaceous Vegetation Establishment Guide*. [https://usdagcc.sharepoint.com/sites/nrcs\\_kansas/SitePages/Ecological-Sciences.aspx](https://usdagcc.sharepoint.com/sites/nrcs_kansas/SitePages/Ecological-Sciences.aspx)

*A visual Identification Aid for Six Lespedeza Species Common in the Northern Flint Hills of Kansas.* This KSPMC resource was presented as a poster paper at the Kansas Natural Resource Conference on February 8-9, 2024, in Manhattan, Kansas. It will soon be available as a NRCS technical note.



Jason Waite, KSPMC Agronomist, presents the *Lespedeza Species Identification Aid* poster at the Kansas Natural Resource Conference in February 2024 in Manhattan, Kansas.



## **2024 Staff at the Kansas Plant Materials Center**

Fred Cummings – Manager  
Jason Waite – Study Leader, Agronomist

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