



James E. “Bud” Smith Plant Materials Center

2025 Progress Report of Activities

December 2025

The mission of the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Plant Materials Program and the James E. “Bud” Smith Plant Materials Center (TXPMC) is to develop and transfer effective state-of-the-art plant science technology to meet customer and resource needs by conducting plantings, studies, and evaluations throughout the assigned conservation-resource areas. Plant and technology development objectives include:

- Soil Health
- Saline Site Restoration
- Wildlife Habitat Improvement
- Range and Pasture Management
- Wind and Water Erosion Control
- Water Quality Improvement on Agricultural Land
- Climate Smart Agriculture Initiatives Support
- Local Field Office Staff Support and Training



The James E. “Bud” Smith Plant Materials Center, established in 1965, is located 5.5 miles northwest of Knox City, Texas, in the Rolling Red Plains Major Land Resource Area (MLRA) and is one of twenty-five federally funded Plant Materials Center across the nation.

STUDIES

Effects of Seeding Rate, Date, and Termination Timing on Biomass and other Attributes of Cereal Rye in the Texas Red Rolling Plains

The TXPMC, along with multiple plant materials centers across the nation, is evaluating the difference in biomass production, canopy cover, and other attributes of cereal rye to develop guidance and recommendations in an attempt to lower the seed cost while addressing resource concerns such as sheet and rill erosion, organic matter depletion, and compaction.

In fiscal year (FY) 2025, TXPMC evaluated three planting dates (late September, mid-October, and mid-November) at five different planting rates (15-30, 60, 90, and 120 PLS lbs/acre) based on established recommendations. Biomass produced from September and October plantings were considerably higher due to the



Cereal rye plots at the James E. “Bud” Smith Plant Materials Center near Knox City, Texas.



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increased growing season before normal mid-November freeze. All five planting rates increased biomass 2000 lbs/acre or more when planted in September and October compared to the November planting (Figure 1).

Percent cover was recorded at various growth stages in each planting date. The September and October planting dates increased cover by >78% in each planting rate prior to stem elongation. In the November planting date, only the 90 and 120 PLS lbs/acre rates reached >80% while the 15, 30, and 60 PLS lbs/acre planting rates ranged from 58-65% (Figure 2). Percent cover at flag leaf stage showed most planting dates and seeding rates reaching 80-90% cover except for the November planting date where the 15, 30, 60, and 90 PLS lbs/acre planting rates only achieved 62, 69, 65, and 74% respectively (Figure 3). As the plants reached seed head development, the percent cover for all three planting dates ranged from 42-54% (Figure 4). The overall decrease in cover can be attributed to the plants transitioning from vegetative growth to seed production. This evaluation will continue in 2026 to further refine planting dates and seeding rates for cereal rye cover crops.

Figure 1. 2024-2025 Comparison of Cereal Rye Biomass (lbs/acre) Collected at Termination of Different Planting Dates and Rates at the James E. "Bud" Smith Plant Materials Center in Knox City, Texas.

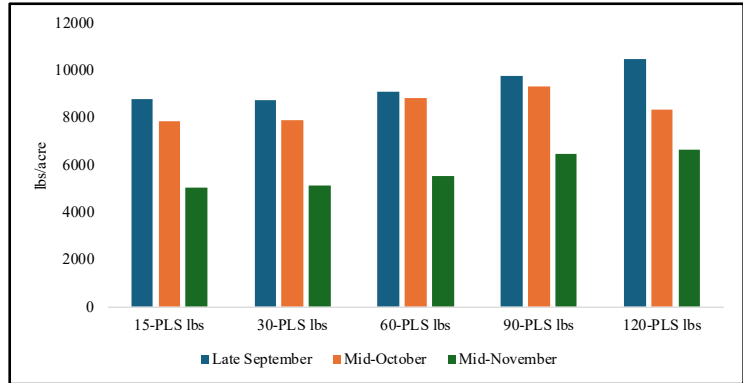


Figure 2. 2024-2025 Cereal Rye Percent Cover Comparison of Seeding Dates and Rates at Stem Elongation at the James E. "Bud" Smith Plant Materials Center in Knox City, Texas.

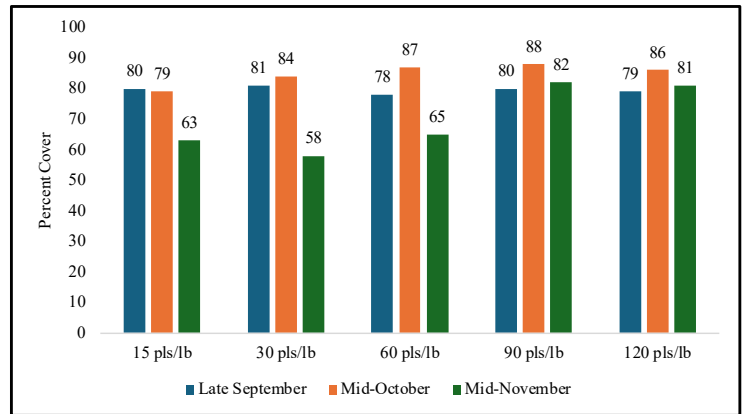


Figure 3. 2024-2025 Cereal Rye Percent Cover Comparison of Seeding Dates and Rates at Flag Leaf Stage at the James E. "Bud" Smith Plant Materials Center in Knox City, Texas.

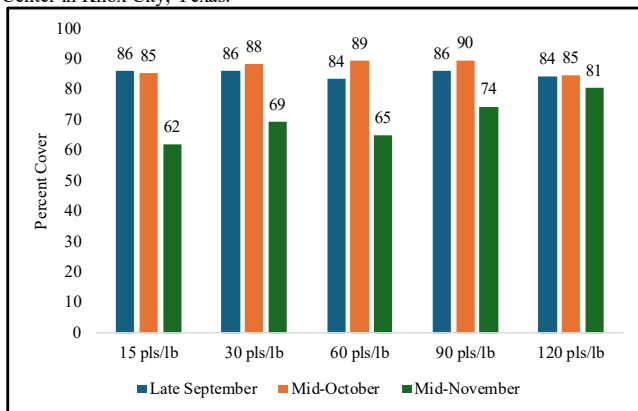
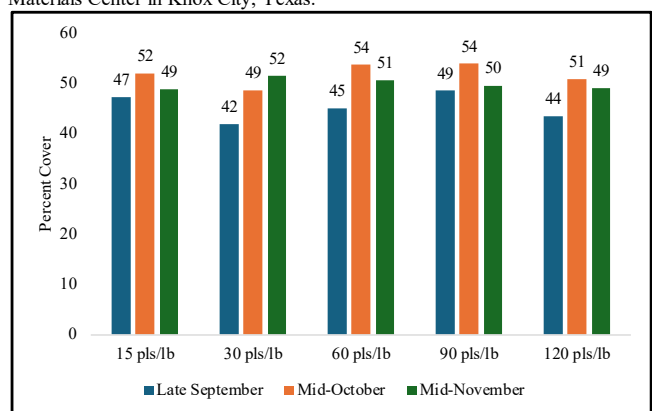


Figure 4. 2024-2025 Cereal Rye Percent Cover Comparison of Seeding Dates and Rates at Seedhead Development Stage at the James E. "Bud" Smith Plant Materials Center in Knox City, Texas.





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Effects of Seeding Rate, Date, and Termination Timing on Biomass and other Attributes of Hairy Vetch in the Texas Red Rolling Plains

The TXPMC, along with multiple plant materials centers across the nation, is evaluating the difference in biomass production, canopy cover, and other attributes of hairy vetch to develop guidance and recommendations in an attempt to lower the seed cost while addressing resource concerns such as sheet and rill erosion, organic matter depletion, and compaction.

In fiscal year (FY) 2025, TXPMC evaluated three planting dates (late September, mid-October, and mid-November) at five different planting rates (5-10-20-30-45 PLS lbs/acre) based on established recommendations. Biomass produced from September and October plantings were considerably higher due to the increased growing season before normal mid-November freeze. All five planting rates increased substantially when planted in September and October compared to the November planting (Figure 5).

Percent cover was recorded at various growth stages in each planting date. The September and October planting dates increased percent cover by > 50% in each planting rate in the vegetative stage with the exception of 5 PLS lbs/acre which only reached 39% in September and 25% in October. In the November planting date, each planting date failed to produce 10% cover. (Figure 6). Percent cover at 20-40% flowering increased in all planting dates with September plantings producing > 70% cover. October planting produced less coverage but was still greater than 50% with the exception of the 5-PLS lbs/acre rate



Hairy vetch plots at the James E. "Bud" Smith Plant Materials Center near Knox City, Texas.

Figure 5. 2025 Comparison of Hairy Vetch Biomass (lbs/acre) Collected at Termination of Different Planting Dates and Rates at the James E. "Bud" Smith Plant Materials Center in Knox City, Texas.

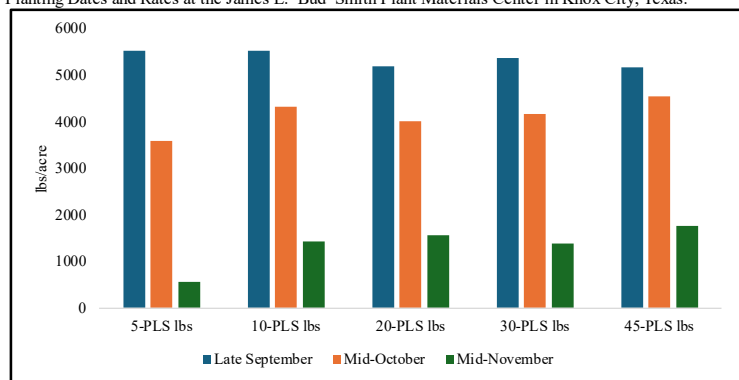
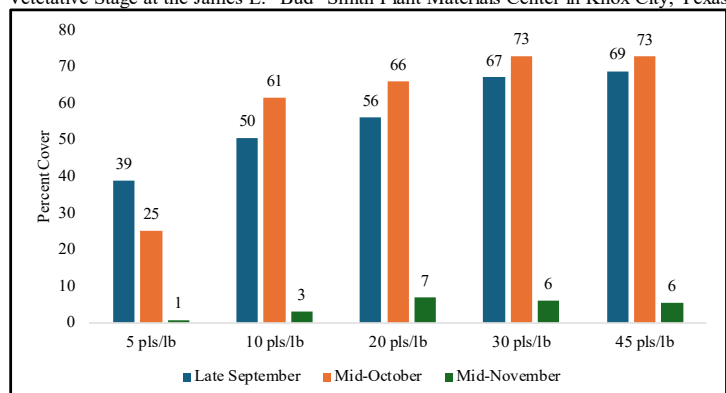


Figure 6. 2025 Hairy Vetch Percent Cover Comparison of Seeding Dates and Rates at Vegetative Stage at the James E. "Bud" Smith Plant Materials Center in Knox City, Texas.





which only produced 35%. The third planting date in mid-November failed to provide 50% cover in each of the planting rates (Figure 7). As the plants reached 40-100% flowering, the September and October plantings had reached greater than 50% cover while the November planting remained lower than 50% with the 5 PLS lbs/acre rate remaining less than 10% (Figure 8). This evaluation will continue in 2026 to further refine planting dates and seeding rates for hairy vetch cover crops.

Figure 7. 2025 Hairy Vetch Percent Cover Comparison of Seeding Dates and Rates at 20-40% Flower Stage at the James E. "Bud" Smith Plant Materials Center in Knox City, Texas.

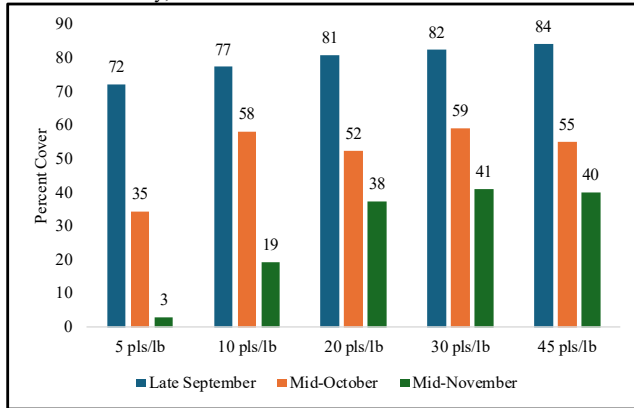
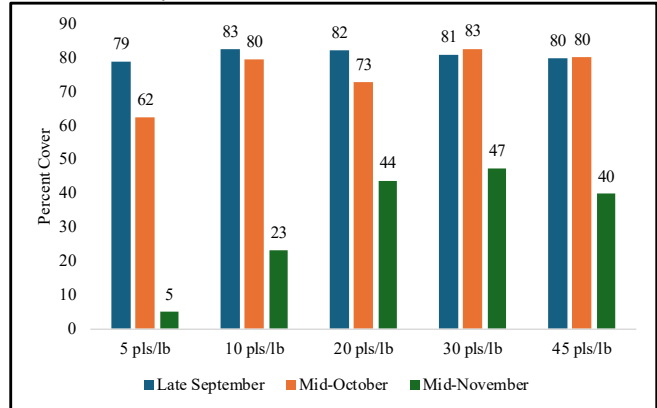


Figure 8. 2025 Hairy Vetch Percent Cover Comparison of Seeding Dates and Rates at 40-100% Flower Stage at the James E. "Bud" Smith Plant Materials Center in Knox City, Texas.



TRAINING

‘Rootin Around’

The TXPMC continued an annual training called ‘Rootin Around’ to provide information on various plant topics. This year, a virtual meeting offered “The Good, The Bad and The Ugly” a presentation on invasive species. In the future, the following topics will be offered virtually as well as in-person:

- Seed Collection
- Plant ID
- Soil Health
- Cover Crops
- Equipment
- Seed Production Process
- Release Process
- Pesticide/Fertilizer
- Early vs Late Successional Plants
- Soil Analysis
- Pollinators/Plants for Pollinators
- Invasive Species
- Burning and Plant Response



PLANT COLLECTIONS

TXPMC relies heavily on field office staff to assist with plant collections for use in our evaluations. These collections ensure future plant releases represent a broad area of adaptation in the Southern Plains. Currently, the TXPMC is collecting the following native plant species for use in range and wildlife plantings, and conservation cover in West-Central Texas and Southern Oklahoma:

- Indian blanket (*Gaillardia pulchella*)
- Golden prairie clover / golden dalea (*Dalea aurea*)



Indian blanket (Credit: Norman G. Flaigg, Lady Bird Johnson Wildflower Center)



Golden prairie clover (Credit: Campbell and Lynn Loughmiller, Lady Bird Johnson Wildflower Center)

Helping People Help the Land

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