

*2021 Progress Report of
Activities for the James E.
"Bud" Smith Plant
Materials Center*

Responsibility

The United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) James E. "Bud" Smith Plant Materials Center (PMC), established in 1965, is located 5.5 miles northwest of Knox City, Texas, in the Rolling Red Plains Major Land Resource Area (MLRA). It is one of 25 federally funded Plant Materials Centers strategically placed throughout the United States, and one of three Plant Materials Centers located in Texas.

The PMC develops conservation plants and cultural techniques for use within targeted MLRAs in Texas, Oklahoma, Kansas, Colorado, and New Mexico. The Center produces Breeder and Foundation seed of conservation plant releases for commercial production and promotes the plants for use in natural resource conservation efforts. The PMC serves 136 counties in Texas that comprises parts of 25 MLRAs, and 39 counties in southwestern Oklahoma comprising parts of 13 MLRAs. The PMC also serves seven counties in southwestern Kansas including parts of four MLRAs, one county in the southeastern corner of Colorado comprising parts of three MLRAs, and seven counties in eastern New Mexico comprising parts of seven MLRAs.

Program Mission and Objectives

The mission of the James E. "Bud" Smith PMC 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 at the PMC and off-center sites with cooperating partners. Plant and technology development objectives of the PMC include:



**James E. "Bud" Smith Plant Materials
Center**

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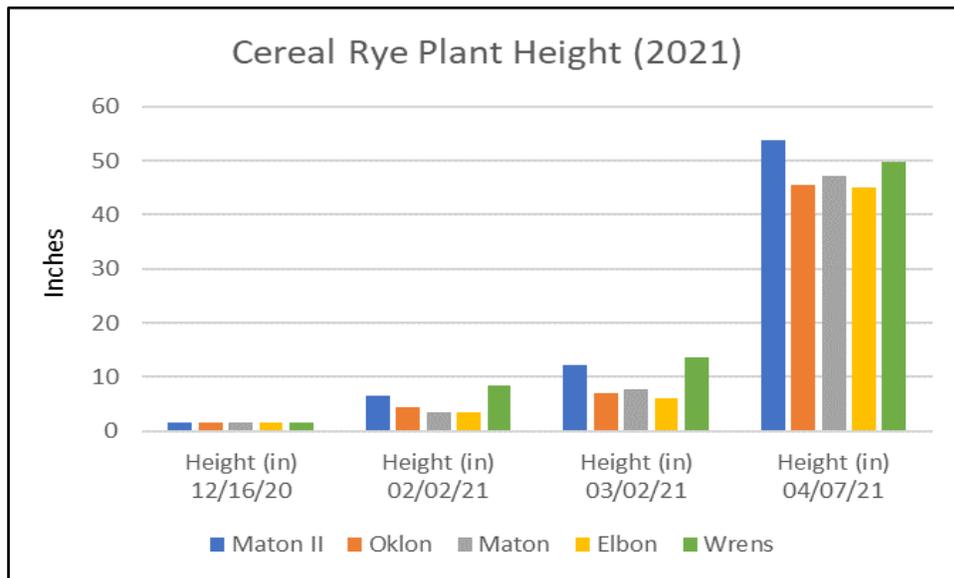


- Soil Health
- Saline Site Restoration
- Erosion Control: wind and water
- Range and Pasture Improvement
- Wildlife Habitat Improvement
- Water Quality Improvement on Agricultural Land

Studies

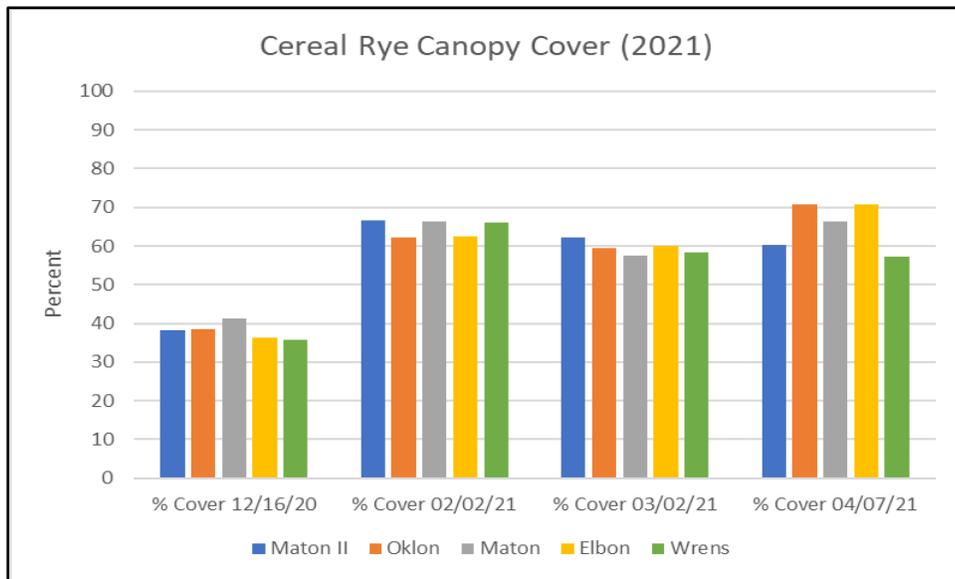
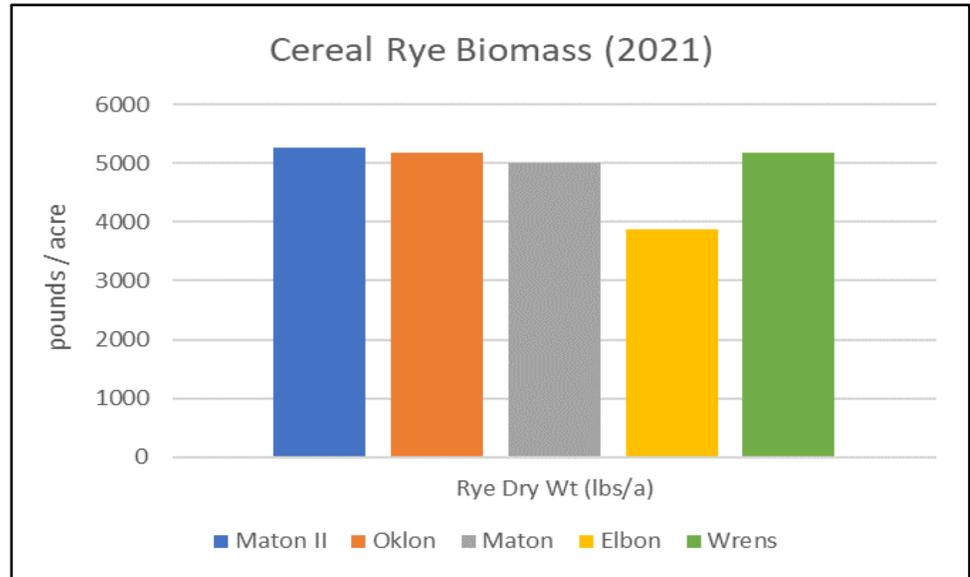
- Characterizing cereal rye (*Secale cereal* L.) varieties

The objective of this project is to further evaluate and characterize cereal rye varieties Elbon, Maton, Maton II, Oklon, Prima, and Wrens Abruzzi; as these varieties showed the most promise in North-Central Texas and Southwestern Oklahoma during a previous cover crop adaptation trial [[Plant Materials Technical Note No. 3, Evaluation of Cool Season Cover Crops in the South-Central Region, May 2020](#)]. Further evaluation and characterization of these varieties is needed to support NRCS [Cover Crop conservation practice standard \(Code 340\)](#) and will solidify future recommendations when addressing resource concerns. Evaluations include above ground biomass production, percent canopy cover via visual estimation (Canopeo App), plant height, spring green-up, nitrogen content, and carbon-to-nitrogen ratio (C:N). Prima was excluded from the data analyses due to poor germination and field emergence.



Plant heights (inches) during 2021 of five cereal rye varieties evaluated at the James E. “Bud” Smith PMC near Knox City, Texas.

Above ground biomass production (pounds/acre) during 2021 of five cereal rye varieties evaluated at the James E. “Bud” Smith PMC near Knox City, Texas.

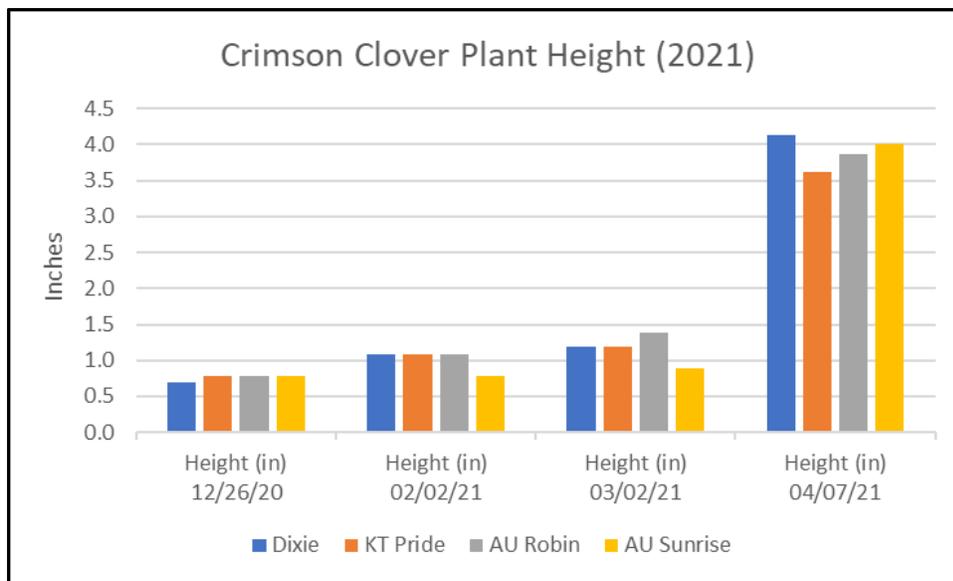


Percent canopy cover (%) during 2021 of five cereal rye varieties evaluated at the James E. “Bud” Smith PMC.

Maton II was the tallest variety at 54 inches, produced the largest biomass of 5264 lbs·a⁻¹, and produced an overall percent canopy cover of 60%. Be advised that this is only one year of data; therefore, drawing any conclusions may be premature.

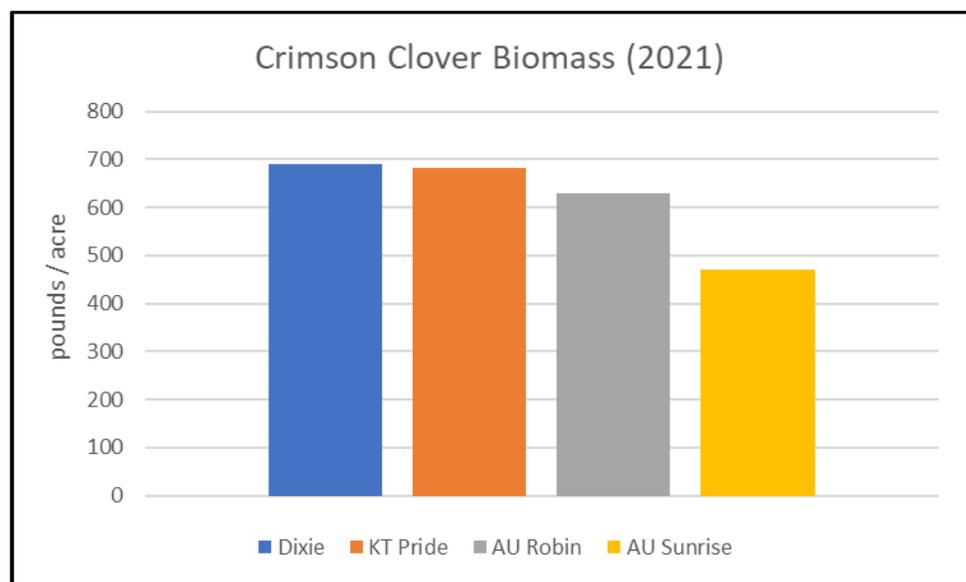
- Characterizing crimson clover (*Trifolium incarnatum* L.) varieties

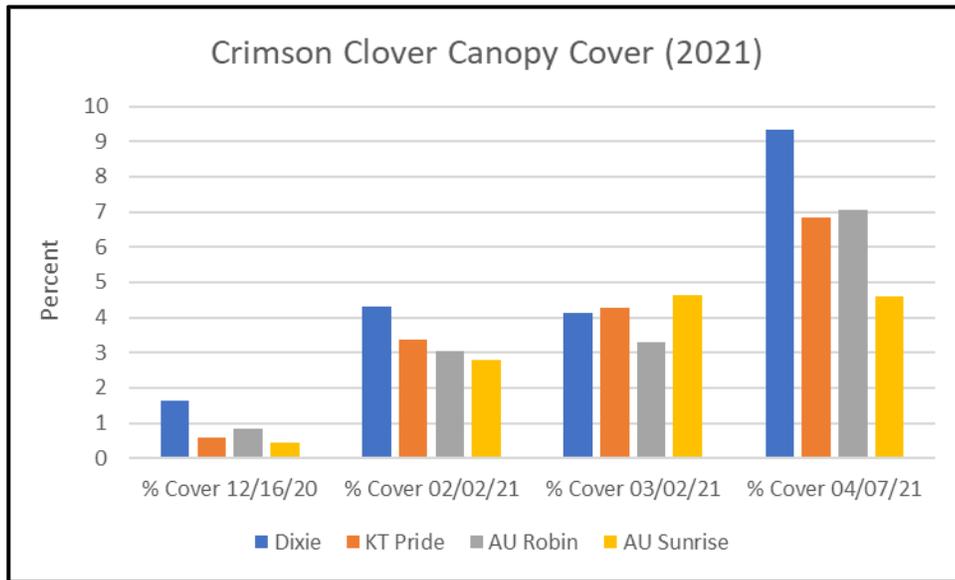
Crimson clover varieties AU Robin, AU Sunrise, Dixie, and Kentucky Pride are under further evaluation as these varieties showed the most promise in North-Central Texas and Southwestern Oklahoma during a previous cover crop adaptation trial [[Plant Materials Technical Note No. 3, Evaluation of Cool Season Cover Crops in the South-Central Region, May 2020](#)]. The objective of this project is similar to the “cereal rye” evaluation to further to support NRCS [Cover Crop conservation practice standard \(Code 340\)](#), and to solidify future recommendations when addressing resource concerns. Datasets under evaluation include above ground biomass production, canopy cover via visual estimation (Canopeo App), plant height, spring green-up, nitrogen content, and carbon-to-nitrogen ratio (C:N).



Plant heights (cm) during 2021 of four crimson clover varieties evaluated at the James E. “Bud” Smith PMC near Knox City, Texas.

Above ground biomass production (kg/ha) during 2021 of four crimson clover varieties evaluated at the James E. “Bud” Smith PMC near Knox City, Texas.





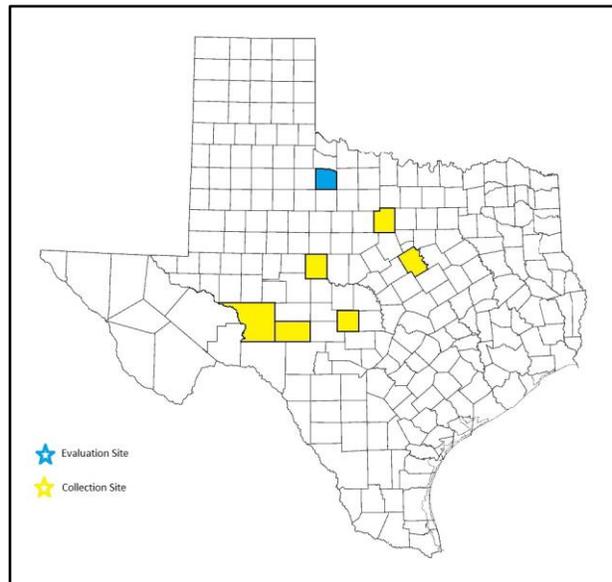
Percent canopy cover (%) during 2021 of four crimson clover varieties evaluated at the James E. “Bud” Smith PMC. Please note the Y-axis values are 0-10 to show separation of plant canopy cover as no species produced over 10%.

Dixie crimson clover was the tallest variety at 4.1 inches, produced the largest overall biomass at 690 lbs·a⁻¹, and produced an overall percent canopy cover of 9.3%. As stated about the cereal rye study, only one year of data has been collected and analyzed; therefore, developing conclusions is not advised.

Plant Releases

- Centex Germplasm threeflower melicgrass [*Melica nitens* (Scribn.) Nutt. ex Piper.]

Centex Germplasm threeflower melicgrass was released in 2021 by the James E. “Bud” Smith PMC. This release is a selected plant material class of certified seed and consists of six different populations of threeflower melic from the Cross Timbers and Prairies, Edwards Plateau, and Rolling Plains ecoregions. Threeflower melic is a native, cool-season perennial bunchgrass highly palatable to livestock and wildlife. This species is likely to perform best in the Cross Timbers and Prairies, Edwards Plateau, and Rolling Plains ecoregions of central and west Texas. It may also be adapted to areas of the Trans Pecos and High Plains



Collection locations in yellow and blue location represents the evaluation site at the James E. “Bud” Smith PMC near Knox City, Texas.

ecoregions; however, additional plantings are needed to verify its full range of adaptation. Threeflower melicgrass is recommended for critical area and range plantings, wildlife habitat enhancement, and useful in pasture and hay-land mixes.

Centex Germplasm averages 29 inches tall and has a plant width of 9 inches. Smooth, hairless leaves average 8 inches long and 1/2 inches wide. Panicles are 6 inches long with abundant two or three flower spikelets, and contains approximately 235,700 seeds·lb⁻¹.



Production field (breeder block) of Centex Germplasm threeflower melicgrass at the James E. “Bud” Smith PMC near Knox City, Texas.



Individual plant of Centex Germplasm threeflower melicgrass at the James E. “Bud” Smith PMC near Knox City, Texas.

Plant Evaluations

Willowleaf sunflower (*Helianthus salicifolius*) and blue salvia (*Salvia azurea*) are under subsequent years of comparative evaluations to document their performance within the Rolling Red Plains ecoregion. These species have performed well during 2021 due to above average rainfall in the spring. Knox City typically receives 10.64 inches of total rainfall during April, May, June, and July; however, 2021 recorded a total of 19.33 inches during the same four-month timeframe giving the native plants ample moisture. Fiscal Year 2022 will start the process of eliminating non-performing accessions and finalizing selections for future plant releases of both species.

Evaluations of Virginia wildrye (*Elymus virginicus* L.) will begin during the fall of FY2022 by evaluating each collection in a greenhouse environment. This species is known to hybridize with Canada wildrye (*Elymus canadensis* L.) and looks similar to Canada wildrye in the field; therefore, a greenhouse observation will eliminate any questionable plant collections before planting into the evaluation plots.

Plant Collections and Development

Plant development continues to be a primary emphasis of the plant materials program. The PMC is currently collecting two native plant species for evaluation under various conservation uses.

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



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



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

The PMC relies heavily on zone and field staff for obtaining the plant collections used in our evaluations. These materials ensure that future plant releases represent a broad area of adaptation. For more information on these plant species, see the website at https://www.plant-materials.nrcs.usda.gov/txp_mc.

Seed Production

The PMC is responsible for producing breeder seed of cultivar releases and first generation (G0) seed of prevarietal germplasm releases. In 2021, new and larger breeder blocks were established to facilitate the increased demand for specific species in north-central and west Texas, southwestern Oklahoma, and eastern New Mexico ecoregions. One-quarter acre breeder blocks were established for ‘Lometa’ Indiangrass [*Sorghastrum nutans* L.], Cuero Germplasm Purple prairie clover (*Dalea purpurea*), Hondo Germplasm velvet bundleflower (*Desmanthus velutinus* Scheele), and ‘Plateau’ awnless bushsunflower [*Simisa calva* (Engelm. & A. Gray) A. Gray].

Currently, the PMC maintains and supplies seed for twenty-seven conservation plant releases. Below are a few prominent releases maintained at the James E. “Bud” Smith PMC near Knox City, Texas.

Prominent native plant releases currently maintained at the James E. “Bud” Smith PMC. Please visit our website for more information on these and other conservation plants released by the PMC and its cooperators.

‘Eldorado’ Engelmann’s daisy (*Engelmannia peristenia*)

‘Sabine’ Illinois bundleflower (*Desmanthus illinoensis*)

‘Aztec’ maximilian sunflower (*Helianthus maximiliani*)

‘Alamo’ switchgrass (*Panicum virgatum*)

OK select Germplasm little bluestem (*Schizachyrium scoparium*)

Plains Germplasm prairie acacia (*Acacia angustissima*)

Cuero Germplasm purple prairie clover (*Dalea purpurea*)

‘Comanche’ partridge pea (*Chamaecrista fasciculata*)



For more information contact:

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



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