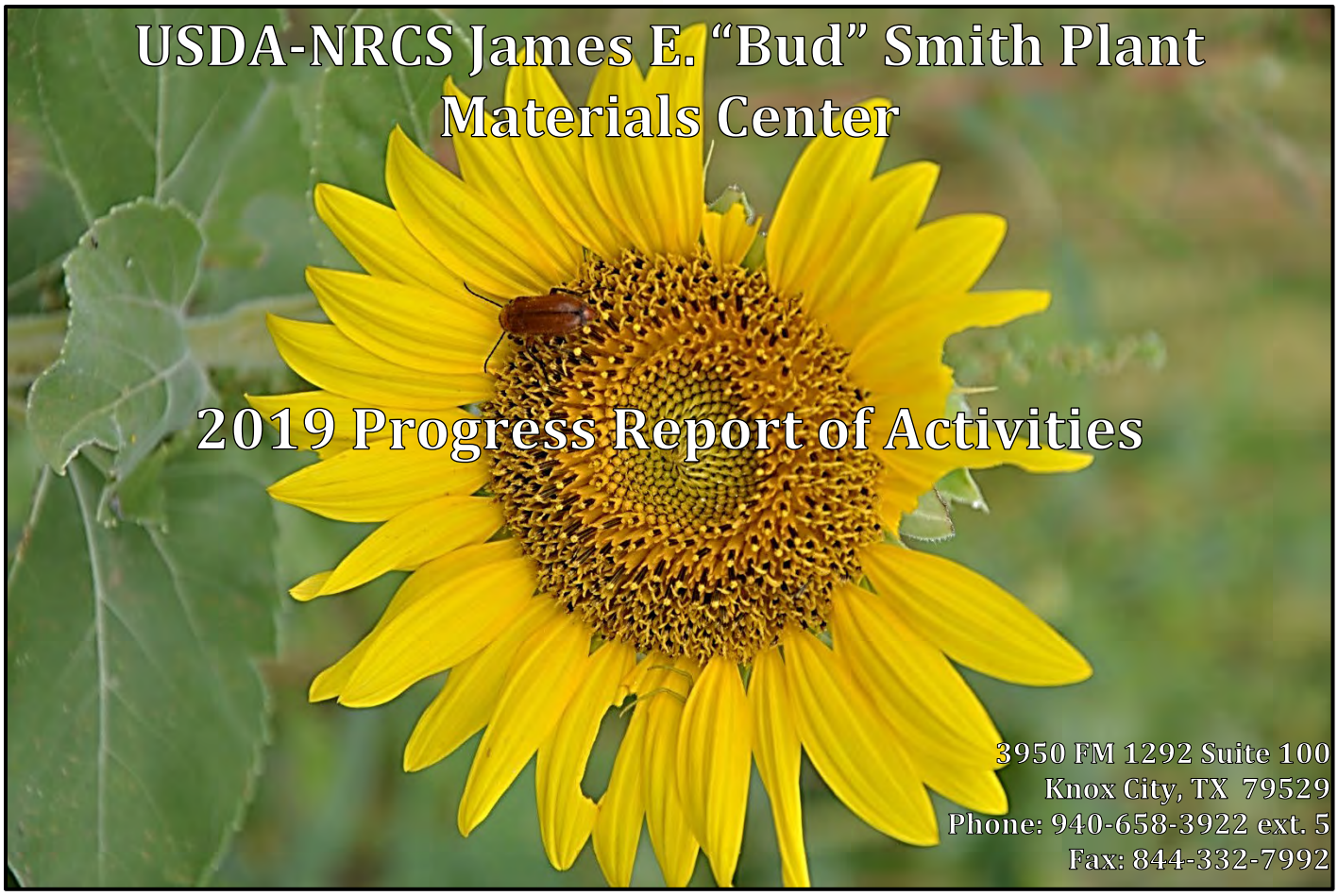
United States Department of Agriculture



Fall vs Spring Forb & Legume Planting Evaluation

Spring and fall plantings allow producers to take advantage of favorable temperatures and moisture that are typical during this time in the southern plains. Many native species show increase germination after exposure to a stratification period when exposed to cool and moist conditions. These conditions mimic the natural process of the seed falling to the ground after maturity, overwintering, and germinating in the spring. This has led to speculation that fall plantings may improve germination through the natural seed stratification process. The Plant Materials Center (PMC) is conducting a trial to evaluate forb and legume releases to determine optimal planting time for maximum plant establishment and plant performance. Species being evaluated include: 'Sabine' Illinois bundleflower (*Desmanthus illinoensis*), 'Comanche' partridge pea (*Chamaecrista fasciculate*), Hondo germplasm velvet bundleflower (*Desmanthus velutinus*), Cuero germplasm purple prairie clover (*Dalea purpurea*), Plains germplasm prairie acacia (*Acacia angustissima*), 'Aztec' maximilian sunflower (*Helianthus maximiliani*), 'Plateau' awnless bushsunflower (*Simsia calva*), and 'Eldorado' Engelmann's daisy (*Engelmannia peristenia*).

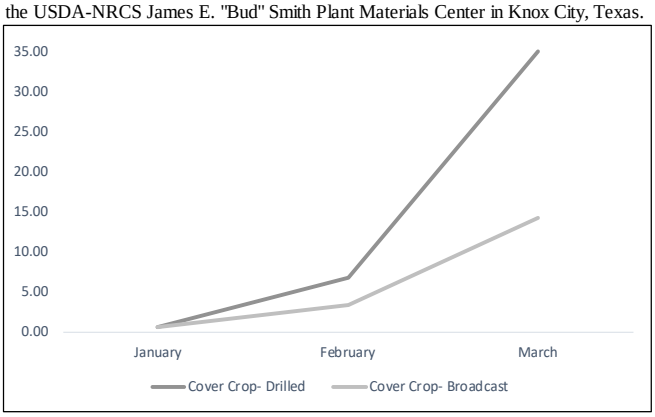
Illinois bundleflower, prairie acacia, and partridge pea emerged following the fall planting, but were killed during the first freeze. The remaining species failed to germinate before first frost and the following spring. Partridge pea, prairie acacia, purple prairie clover, maximilian sunflower and Illinois bundleflower planted in the spring emerged within thirty days; but awnless bushsunflower, purple prairie clover, velvet bundleflower, and Engelmann's daisy had poor emergence ninety days after spring planting. Additional information is needed to determine whether a spring or fall planting is more successful.

Broadcasting vs Drilling Cool Season Cover Crop Demonstration

To achieve maximum potential, cover crops should be planted in the fall to take advantage of fall moisture and warmer temperatures for establishment; however, cotton harvest in northern Texas can extend well into the winter. This poses a major challenge to producers wanting to plant cover crops.

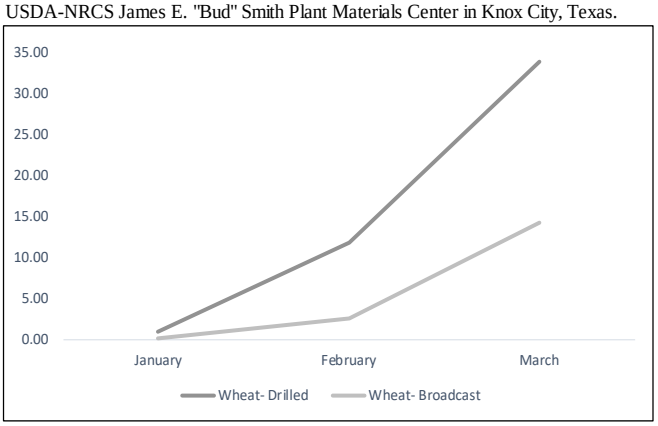
One management option for producers is to broadcast the cover crop seed before cotton is harvested. This will allow the cover crop to take advantage of warmer temperatures and moisture; however, there are disadvantages that must be considered. First, many producers use defoliants to prepare the cotton crop for harvest. These chemicals terminate not only the cotton, but also other actively growing plants. Broadcast planting also reduces good seed to soil contact which is critical for germination. The seed is exposed to predation from wildlife and depends on surface precipitation for germination. Finally, broadcast plantings also require a higher seeding rate which ultimately increases the cost for producers. Timing the broadcast application and the defoliation of the cotton crop may improve the success of cover crop germination and survival due to plant matter falling to the ground and covering the seed.

Figure 1. 2019 percent cover of drilled vs broadcast comparison of cover crop mix at the USDA-NRCS James E. "Bud" Smith Plant Materials Center in Knox City, Texas.



Drilling the cover crop following cotton harvest is an alternative management option to broadcasting. This method requires less seed and typically produces better results due to proper seed to soil contact and protection from predation. This later planting date is the greatest disadvantage of drilling the cover crops as producers lose the plant growth and development gained by planting while temperatures are warmer and adequate moisture is available.

Figure 2. 2019 percent cover of drilled vs broadcast comparison of wheat at the USDA-NRCS James E. "Bud" Smith Plant Materials Center in Knox City, Texas.



A demonstration was planted to compare drilling and broadcasting a cover crop mix and a cover of wheat in order to evaluate which planting method would produce the highest percent cover between cotton crops. The cover crop mix (Fig. 1) produced similar cover during January, but the drilled plots rapidly increased to 35% by March while the broadcast plots only reached 15%. A similar trend was also observed in the wheat system (Fig.2) with the drilled plots providing more cover (11%-drilled vs 2.5%-broadcast) by February and roughly doubling the amount of the broadcast plots by March (34%-drilled vs 14%-broadcast). Additional information is needed to determine the maximum benefit of drilling compared to broadcasting when planting cover crops.

Cracking Hard Seededness in Hairy Vetch

The plant materials center collaborated with plant breeders from the Agricultural Research Station (ARS) in Madison, Wisconsin, and the Noble Foundation in Ardmore, Oklahoma, to evaluate 800 individual hairy vetch plants. The objective of the project was to identify and produce seed to address seed dormancy in hairy vetch which is a disadvantage of planting it in annual cover crop mixes. The lines were evaluated on emergence, plant growth, and seed production. The goal is to develop new cultivars that can be grown and sold commercially as individual species or within cover crop mixes.

Plant Collections and Evaluations

Plant development continues to be an emphasis of the plant materials program. The PMC is currently collecting three native, perennial plant species for evaluation in various conservation uses. The species are:

- Blue salvia (*Salvia azurea*)
- Willowleaf sunflower (*Helianthus salicifolius)*
- Narrowleaf globemallow (*Sphaeralcea angustifolia*)

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.nrcs.usda.gov/wps/portal/nrcs/main/tx/plantsanimals/ and click on Texas Plant Materials Program, then James E. "Bud" Smith PMC.

James E. "Bud" Smith Plant Materials Center

The United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) James E. "Bud" Smith Plant Materials Center (PMC) located near Knox City, Texas, was establish in 1965. It is one of the 27 Centers located throughout the United States. The Center is responsible for developing conservation plants and cultural techniques for use within targeted Major Land Resource Areas (MLRA) in Texas, Oklahoma, Kansas, Colorado, and New Mexico. The Center is also responsible for producing breeder and foundation seed of plant releases and assisting in commercial development and promoting their use in natural resource conservation. The PMC serves all or portions of 136 counties in Texas that comprises parts of 25 MLRAs, and the areas served in all or portions of 39 counties in southwestern Oklahoma comprising parts of 13 MLRAs. The PMC also serves a portion of seven counties in southwestern Kansas including parts of four MLRAs, a portion of one county in the southeastern corner of Colorado comprising parts of three MLRAs, and a portion of seven counties in eastern New Mexico comprising parts of seven MLRAs. The PMC is located approximately four and a half miles northwest of Knox City, Texas, in the Rolling Red Plains MLRA.

Seed Production

The PMC is responsible for producing breeder seed of cultivar releases and Generation 0 seed of germplasm. Currently, the PMC maintains and supplies seed for 27 releases.

- 'Haskell' sideoats grama (*Bouteloua curtipendula*)
- 'Lometa' Indiangrass (*Sorghastrum nutans*)
- 'Alamo' switchgrass (*Panicum virgatum*)
- 'Mason' sandhill lovegrass (*Eragrostis trichodes*)
- 'Van Horn' green sprangletop (*Leptochloa dubiad*)
- 'Earl' big bluestem (*Andropogon gerardii*)
- 'Saltalk' alkali sacaton (*Sporobolus airoides*)
- 'San Marcos' eastern gamagrass (*Tripscaum dactyloides*)
- Potter County germplasm spike dropseed (*Sporobolus contractus*)
- Borden County germplasm sand dropseed (*Sporobolus cryptandrus*)
- Cottle County germplasm sand bluestem (*Andropogon halli*)
- OK select germplasm little bluestem (*Schizachyrium scoparium*)
- Duck Creek germplasm Texas dropseed (*Sporobolus texanus*)
- 'Selection 75' kleingrass (*Panicum coloratum*)
- 'Shoreline' common reed (*Phragmites australis*)
- 'Sabine' Illinois bundleflower (*Desmanthus illinoensis*)
- 'Comanche' partridge pea (*Chamaecrista fasciculate*)
- Hondo germplasm velvet bundleflower (*Desmanthus velutinus*)
- Cuero germplasm purple prairie clover (*Dalea purpurea*)
- Plains germplasm prairie acacia (*Acacia angustissima*)
- 'Aztec' maximilian sunflower (*Helianthus maximiliani*)
- 'Plateau' awnless bushsunflower (*Simsia calva*)
- Kerr germplasm Wright pavonia (*Pavonia lasiopetala*)
- 'Eldorado' Engelmann's daisy (*Engelmannia peristenia*)
- Rainbow germplasm wild plum (*Prunus* sp.)
- Yellowpuff germplasm littleleaf leadfree (*Leucaena retusa*)
- 'Boomer' bur oak (*Quercus macroparpa*)

Program Emphasis

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. The PMC conducts plantings and studies at the center and off-site with cooperating partners. Plant and technology development objectives of the PMC include:

- Soil Health
- Erosion Control - wind and water
- Range and Pasture Improvement
- Wildlife Habitat Improvement
- Water Quality Improvement on Agricultural Land
- Biomass Production (Biofuels)
- Saline Site Restoration

New Agronomist/Study Leader Joins the PMC Team

Dustin Wiggans has been selected as the Agronomist for the USDA Natural Resources Conservation Service’s James E. “Bud” Smith Plant Materials Center (PMC) in Knox City, Texas. Dustin graduated from Fort Scott, Kansas, in 1995; then spent the next 7.5 years as an Aviation Rescue Swimmer and helicopter crew-chief for the US Navy. He received his BS in Agronomy (2007) and his MS in Crop Production and Physiology (2010) from Iowa State University in Ames, Iowa. Dustin brings experiences and knowledge in agronomy, soil health, cover crops, water management, and extension outreach to the PMC. He currently resides in Knox City, Texas; and still abides by his search and rescue mantra: “so others may live…”

PMC Staff

- Brandon Carr- Manager
- Dustin Wiggans- Agronomist
- Randy Kuehler- Biological Science Technician (Plants)