



United States Department of Agriculture

NRCS Tucson Plant Materials Center

2023 Report of Activities

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This report highlights the major activities at the Tucson Plant Materials Center (PMC) during 2023. For more detailed information, contact the PMC at 520-292-2999.

Studies

Cool-Season Cover Crop Adaptation Trial

The Tucson PMC, along with other southern PMCs across the country participated in a study to evaluate growing characteristics of 'Soil Saver' black oats and 'Cosaque' black seeded oats. The trial was planted at 60 PLS pounds per acre (lb/ac) in October of 2022 and terminated in March 2023 when the oats reached 50% bloom. Plots did not receive any supplemental irrigation. Data collected will be used for wind and water erosion prediction conservation planning tools. Canopy coverage and plant height values were collected each month after planting until termination, while biomass was collected at 60 days after planting, at termination, and residue of the terminated cover crop at 1 month after termination. At 5 months after planting, 'Soil Saver' reached 13 inches in average height, and 'Cosaque' reached 17 inches. Average biomass at termination for 'Soil Saver' was 3115 lb/ac, and 6042 lb/ac for 'Cosaque'. The final study report can be found at our website.



Figure 1: Biomass clipping data collection at 60 days after planting.



Figure 2: 'Cosaque' black seeded oats at 90 days after planting.

National Cover Crop Seeding Rate Planting Date Trial

PMC personnel implemented a national study in 2023 to evaluate multiple cover crop species to understand the interaction of planting date and seeding rate. The objective is to evaluate the effect of seeding dates, rates, and timing of termination on attributes of adapted cover crop varieties. This year, the study includes a commercially available variety of cereal rye (*Secale cereale* L.) that was planted on three dates in November and December to evaluate different planting dates in the region. The study also contains five different seeding rates including 15, 30, 60, 90 and 120 PLS lb/ac. Parameters to be evaluated include fall and spring canopy coverage, days after planting to closed canopy, canopy cover at biomass termination, plant height, and biomass harvests.



Figure 3: National cover crop seeding rate planting date study. Cereal rye plots at 6 weeks after first planting.



Figure 4: First planting date (T), second planting date (B). From left to right, each 4 rows represent the plantings of 15 (not pictured), 30, 60, 90, and 120 lb/ac at 6 weeks after first planting.

Restoration of Abandoned Cropland

Large acreages of abandoned cropland span the state resulting in wind and water erosion and affected ecosystems. The PMC started a collaborative restoration project at a site near Tucson, AZ located southwest of Three Points, AZ and along the western side of the Sasabe highway, to plant and evaluate native species in abandoned cropland. The objective was to evaluate the germination, establishment, and persistence of PMC releases and PMC abandoned cropland restoration technology by obtaining qualitative results. Three berms of 500 ft long were given to the PMC with 50, 75, and 100 ft distance between berms. The various distances were placed to determine the appropriate width of berm placement for the most effective watershed area between each berm. Berm construction included scraping the soil to build the berms to an approximate height of 18 inches, and a width of approximately 36 inches. The mean annual precipitation in the area is 11.2 inches and elevations range from 2570 to 2770 feet. PMC personnel seeded three native species in 2017 including Pima germplasm Pima pappusgrass, 'Loetta' Arizona cottontop, and 'Santa Rita' four-wing saltbush, marking five years of the study in 2023. Evaluations were conducted throughout the years to monitor the seeded areas. Data collection was made in 2023 and the final report will be available in 2024.



Figure 5: Abandoned cropland prior to seeding in 2016 (T), same berm location with vegetation in 2023 (B).



Figure 6: Berm covered in vegetation after monsoonal rains in 2023, facing east.

Technology Transfer

Technical Documents

During 2023, PMC personnel developed a final study report titled the “Evaluation of Warm Season Cover Crops in Southern Arizona”. The PMC also assisted Regional Plant Material Specialists on “Cover Crop Growth Characteristics of ‘SoilSaver’ Black Oats and ‘Cosaque’ Black Seeded Oats for Use in Conservation Planning Tools” document. All documents can be found on the [NRCS Plant Materials Technical Documents](#) hub.

Tours, Presentations, Trainings, and Outreach Activities

Throughout the year, several tours were given to PMC visitors including multiple NRCS employees, and Borderlands Restoration of Arizona. The PMC gave a statewide webinar on our program’s needs assessment and current studies on January 19th. The University of Arizona (UofA) Restoration and Vegetation class visited the PMC on March 3rd for a field day and tour of our facilities. On March 8th, the PMC worked with the Tucson Field Office staff at the Tohono O’odham ‘Youth Range Day’ in Sells, Arizona. Information was presented on native grasses and species for conservation practices, alongside a plant identification activity to over 100 students. The Tucson PMC hosted the ‘AgDiscovery’ program event on June 23rd to provide middle and high school students with hands-on knowledge in agriculture.



Figure 7: ‘AgDiscovery’ attendees learning about warm season cover crops in the field.



Figure 8: UofA students learning about our operations while touring the PMC facilities.



Figure 9: PMC staff presenting at Sells Youth Range Day.

Personnel

Ginna Saravia was our summer intern coming from Arizona. Eninka Mndolwa left as the PMC Manager to pursue other career opportunities in June 2023. Good luck to Eninka and Ginna in their future endeavors! Tucson PMC Agronomist Jim Thomas was selected as Acting PMC Manager in July 2023 and hired as the PMC Manager in November 2023. Bryant Cruz was hired as the new PMC Biological Science Technician in July 2023. Welcome Bryant!



Figure 10: Ginna learning the basics on how to drive the tractor.

Publications

All publications from the Tucson Plant Materials Center can be found by going to the website <https://www.nrcs.usda.gov/plant-materials/publications/search> and searching "AZPMC" on the search bar. For more information, please visit us at <https://www.nrcs.usda.gov/plant-materials/azpmc>.

The Tucson PMC: Who We Are

In 1934, one of the first USDA Plant Materials Centers was established in Tucson, Arizona. The Tucson Plant Materials Center was created to address the need for adapted plant material to revegetate eroded rangelands in the Southwest. Today, erosion continues to threaten Western rangelands in addition to other resource concerns including drought, fire, invasive species, threatened and endangered species, and wildland-urban interface issues. As one of 25 Plant Materials Centers across the United States, the Tucson PMC continues to address these conservation issues within the Sonoran, Mojave, and Chihuahuan Desert regions.



Figure 11: The Tucson PMC continues to work out of the original adobe buildings built in the 1930s.

...And What We Do

The goal of the Tucson PMC is to provide effective economical vegetative solutions and technology development for conservation problems. The conservation potential of native grasses, shrubs, forbs, and trees is evaluated at the federally owned 40-acre farm, as well as test locations throughout the service area. Plant materials become part of advanced trials designed to develop cultural and management practices that enhance seed production under agronomic conditions. The ease of establishment and persistence of plant materials in their native plant communities is also evaluated. The PMC conducts studies and plantings to address resource issues in the following areas:

- Rangelands
- Urban and urban-interface areas
- Croplands
- Riparian areas

The PMC works in partnership with the Natural Resources Conservation Service (NRCS) field offices, resource conservation and development groups, conservation districts, federal and state agencies, non-profit groups, and private landowners. Cooperation with agencies other than the NRCS provides opportunities for the joint development of plant materials and management practices as well as for exchange of information, seed, and planting stock.

PMC Staff

Manager: Jim Thomas (hired 11/23)

Agronomist: Jim Thomas (Acting Manager 07/23 to 10/23, promoted 11/23)

Biological Science Technician: Bryant Cruz (hired 07/23)

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January 2024



Figure 12: PMC fields on March 2nd, 2023. Tucson received 1.5 inches of snow in 2023. A rare occurrence!