



United States Department of Agriculture

NRCS Tucson Plant Materials Center

2022 Progress Report of Activities

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This report highlights the major activities at the Tucson Plant Materials Center (PMC) during 2022. For more detailed information, contact the PMC at 520-292-2999.

Studies

Warm-Season Cover Crop Adaptation Trial

During the summers of 2021 and 2022, the Tucson PMC, in collaboration with other Plant Materials Centers (PMCs) across Southwestern region, conducted a warm season cover crop study to evaluate the adaptability of 15 varieties. The species evaluated were brown top millet (*Panicum ramosum*), dove proso millet (*Panicum milaceum*), german foxtail millet (*Setaria italica*), Japanese millet (*Echinochloa esculenta*), leafy 22 hybrid pearl millet (*Pennisetum glaucum*), tifleaf 3 hybrid pearl millet (*Pennisetum glaucum*), white proso millet (*Panicum milaceum*), and white wonder foxtail millet (*Setaria italica*). Cowpea species including Chinese red cowpea (*Vigna unguiculata*), iron & clay cowpea (*Vigna unguiculata*), and red ripper cowpea (*Vigna unguiculata*). Other species include Sunn hemp (*Crotalaria juncea*), sorghum-sudangrass (*Sorghum bicolor*), sesbania (*Sesbania sesban*) and lablab (*Lablab purpureus*). In both years, all varieties scored very good to excellent in germination and most provided a good canopy cover although, variety performance differed significantly for this trait. Variation among varieties was also observed for flowering date. For example, white proso millet flowered at 28 days after planting (DAP), while lablab flowered at 92 DAP. Biomass production also varied with Iron & clay cowpea, leafy 22 hybrid pearl millet, lablab, sun hemp, sorghum sudangrass, and tifleaf 3 hybrid pearl millet producing higher amounts of biomass than other varieties in both years (Figure 2). Our tallest variety, sunn hemp, was almost 9 ft tall at 90 DAP! A final study report on this project will be produced in 2023.



Figure 1: Summer cover crop study at 60 days after planting in 2022.

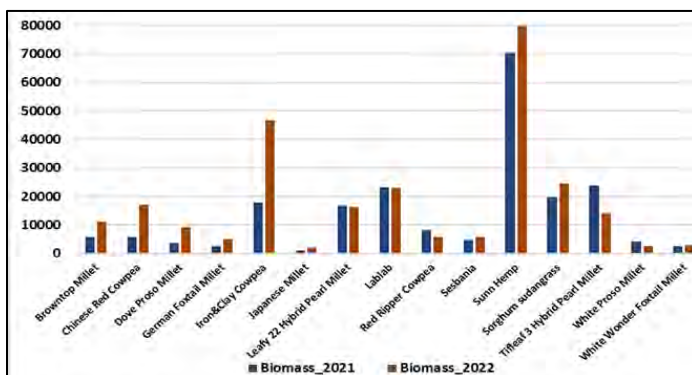


Figure 2: Biomass production (lb/acre) by variety in 2021 and 2022.



Figure 3: Sunn Hemp at 90 days after planting in 2022.

Plant Development

Bush muhly and big galleta

We continue our research and development partnership with the Bureau of Land Management to develop two additional releases of locally adapted native plant species, big galleta (*Pleuraphis rigida*), and bush muhly (*Muhlenbergia porteri*). We are conducting maintenance and seed harvests from both the bush muhly and big galleta crossing blocks and a big galleta production field. We will establish an additional big galleta field in 2023 to further increase seed production and plan the same increased field production for the bush muhly.



Figure 4: Bush muhly crossing block in June 2022.

Desert panicgrass

In 2014, NRCS staff from the Victorville Soil Survey Office, Lewis Center for Educational Research (LCER) staff, and Restoration Ecologist Dr. Ken Lair harvested desert panicgrass seeds from different sites along the lower Mojave River channel riparian area. The primary objective was to test seed germination in different soil textures, seeding depths and stratification treatments. Desert panicgrass germinated well in different sandy soil textures suggesting that it could be included in seed mixtures for erosion control, plant diversity and wildlife habitat improvement projects. We established on-site field plantings with seed from five collection locations for further evaluation, and possible seed increase.



Figure 5: Desert panicgrass seedlings in our shadehouse in August.



Figure 6: Desert panicgrass accessions ready to be planted.

Seed production

The Tucson PMC maintains seed production of our active releases which include ['Loetta' Arizona cottontop](#) (*Digitaria californica*), [Vegas Germplasm alkali sacaton](#) (*Sporobolus airoides*), [Pima Germplasm Pima pappusgrass](#) (*Pappophorum vaginatum*), [Moapa Germplasm scratchgrass](#) (*Muhlenbergia asperifolia*), and this year, we planted a new production field of [Bonita Germplasm plains lovegrass](#) (*Eragrostis intermedia*).

Other active releases

- Cochise Germplasm spike dropseed (*Sporobolus contractus*).
- Saltillo Origin Germplasm cane bluestem (*Bothriochloa barbinodis*).
- 'Seco' barley (*Hordeum vulgare*).
- 'Stevan' plains bristlegrass (*Setaria leucopila*).
- 'Santa Rita' Fourwing saltbush (*Atriplex canescens*).
- Batamote Germplasm desert zinnia (*Zinnia acerosa*).



Figure 7: Moapa Germplasm scratchgrass production field in October.



Figure 8: Planting the new Bonita Germplasm plains lovegrass production field.

Technology Transfer

Technical Documents

During 2022, PMC personnel developed Plant Guides for spike dropseed (*Sporobolus contractus*) and desert marigold (*Baileya multiradiata*). All documents can be found on the [NRCS Plant Materials Technical Documents](#) hub.

Tours, Presentations, and Trainings

During the year, the Tucson PMC hosted multiple events on site. In February, the Tucson PMC hosted a Management and Restoration of Wildland Vegetation class of 19 students from the University of Arizona. We presented an overview of the PMC and how the PMC fits into commercial seed production. The students toured our facility and learned about common seeding equipment. Also in February, the PMC hosted a soil health field training for 12 NRCS staff. On June 24th, 2022, we hosted the “AgDiscovery” event with a total of 24 participants including high school students and a few college students from all over the country. Students learned about core disciplines in NRCS. During the first week of August 2022, West Region Plant Materials Specialist, Heather Dial, visited the Tucson PMC for training and assessment of the facility and equipment inventory. Thank you, Heather!



Figure 9: U of A students observing seed cleaning operations



Figure 10: Soil health training during AgDiscovery event

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: Eninka Mndolwa
Agronomist: Jim Thomas
Farm Foreman: Jeff Carter (left 11/2022)

Helping People Help the Land

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January 2023