

Tucson Plant Materials Center

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This report highlights the major activities at the Tucson Plant Materials Center (PMC) during fiscal year 2012. For more detailed information, contact the PMC or the state Plant Materials Specialist at 520-292-2999 ext. 102.

Studies

Technology and Pre-Release Development

Field Planting Establishment

In August, PMC employees worked with a land owner and the Tucson Field Office to establish a 0.5 acre field planting of bush muhly (*Muhlenbergia porteri*). Bush muhly is a highly desirable warm season bunchgrass found in the desert southwest. However, there is currently no germplasm available from commercial growers. This may in part be due to the difficulties encountered in the bush muhly seed cleaning process.

The PMC has two composites of bush muhly in initial evaluation. One of the composites was developed for use in Major Land Resource Area (MLRA) 40 and the other in MLRA 41. The recently installed study will determine the efficacy of establishing bush muhly using baled material and will also compare the performance of the two composites. The study will be in place and evaluated for five years.



Figure 1: Bush muhly field planting established from hay bales



Figure 2: After bush muhly bales were spread, they were cultipacked

Forb Development

Three species are in advanced evaluation at the PMC as potential candidates for their ability to be put into commercial production for revegetation projects in the Mojave Desert: Virgin River brittlebush (*Encelia virginensis*), Eastern Mojave buckwheat (*Eriogonum fasciculatum*), and globemallow (*Sphaeralcea ambigua*). Initial observational rows of these species were established at the PMC in 2011. In June of 2012, seed from the harvest of the observational rows of *Encelia virginensis* was used to produce transplants for the establishment of an approximately 0.25 acre increase field. Additional increase fields for the remaining two species will be established in 2013. The increase fields will be used to evaluate harvesting technology. Commercially available equipment such as the Woodward Flail-Vac and the Massey Ferguson MX-8 plot combine will be used to conduct the evaluations.



Figure 3: *Encelia virginensis* seedlings in August 2012

Big Galleta & Indian Ricegrass

The PMC is collaborating with the United States Department of the Interior Bureau of Land Management (BLM) to develop two species for potential release to commercial seed producers: Big galleta (*Pleuraphis rigida*) and Indian ricegrass (*Achnatherum hymenoides*). There is a high demand for these two perennial bunchgrass species in the Mojave Desert and adjacent areas for ecosystem restoration and enhancement. Ten populations of big galleta, propagated from seed and vegetative rhizomes collected from the Mojave Desert, were hand transplanted into a crossing block study in August 2012.



Figure 4: Hand transplanting of big galleta



Figure 5: One gallon plants were transplanted into the crossing block study

In addition to the ten populations of big galleta, BLM personnel collected seed from ten populations of Indian ricegrass in support of this project. The populations are scheduled to be transplanted to the field in the spring of 2013. Genetic analysis of the populations of big galleta and Indian ricegrass are scheduled to be conducted by the staff of the USDA-Agriculture Research Service, Forage and Range Research Laboratory in Logan, Utah. The analysis will determine how much genetic variation is found among the populations collected for both species. The development studies for big galleta and Indian ricegrass will be conducted until 2016.

Cover Crop Plantings



Figure 6: Cotton height difference-small grain (L) vs. legume(R).

Cover crops include grasses, legumes, and forbs that are planted for use as seasonal cover and to address ten conservation purposes. Some of the major conservation purposes include: reducing soil erosion, increasing soil organic matter, weed suppression, and recycling nutrients in the soil profile. Cover crops are not new to Arizona but have generally been limited to small grains.

In 2011, the NRCS entered into a long term evaluation of cover crops with the University of Arizona and producers in Pima, Graham, and Cochise counties. These trials include six cover crop species (oats, triticale, peas, vetch, turnips, and kale), three irrigation systems (furrow, center pivot, and drip) and their relationship to yield on succeeding cash crops, such as cotton. Due to various issues, only the Pima county location is currently involved in the trial. This location reflects a surface-furrow irrigation system.

First year data have been finalized with somewhat mixed results. The cover crop species were planted in December 2010 and incorporated into the soil in late April 2011. Cotton was planted on May 18, 2011. The cover crops were measured for biomass production approximately 10 days before termination (figure 7). The annual grains had higher production but this was in part due to their stage of maturity with fully formed seed. During the 2011 cotton season, soil nitrate-nitrogen ($\text{NO}_3\text{-N}$) was measured during the peak bloom stage in July (figure 8). The 2011 cotton crop was harvested on November 28 using a 6-row picker with a yield monitor. Yield was recorded for each replication (figure 9). The trial continued in 2012 with the cover crops planted February 3, 2012, and terminated on May 1, 2012. Cotton was planted on May 21, 2012, and harvested November 13, 2012. Results for the 2012 season are not available but will be included in the next progress report. The third and final year of this trial will be 2013. Figures are courtesy of Dr. Sam Wang, Maricopa Ag Center, University of Arizona

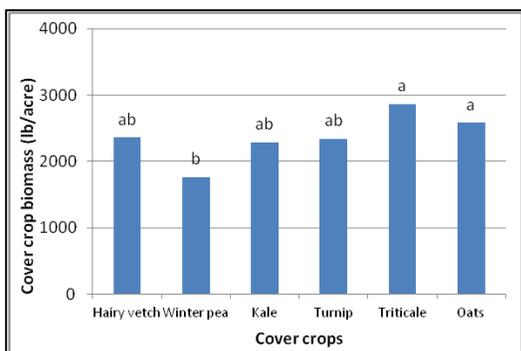


Figure 7: Biomass production of winter cover crops

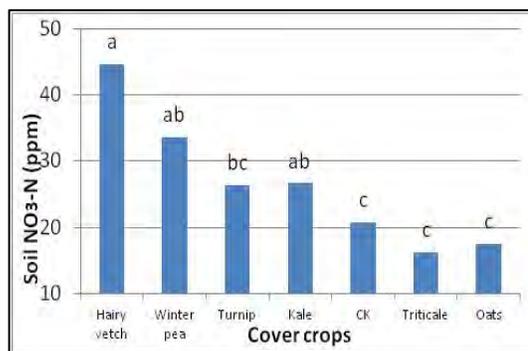


Figure 8: Soil $\text{NO}_3\text{-N}$ affected by winter cover crops at cotton peak bloom stage in mid-July

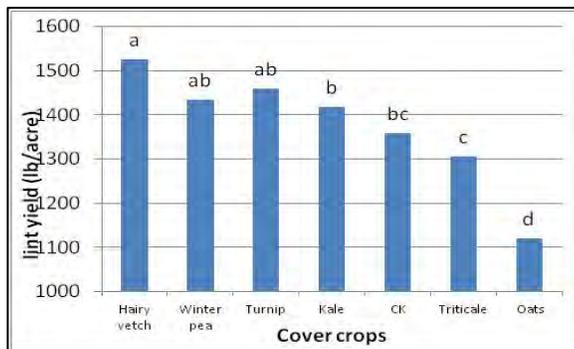


Figure 9: Graph showing cotton lint yield response to winter cover crops

Technology Transfer

Technical Documents

During 2012, PMC personnel developed and/or significantly updated four release brochures and six practice standards and specifications. Additionally, a technical note detailing plants for pollinators in the Sonoran and Mojave Deserts was co-authored by the PMC and the Xerces Society. The document titled [Plants for Enhancing Pollinator Habitat in Arizona](#) can be found and downloaded from section five of the Arizona Field Office Technical Guide or it can be found on the [PMC website](#). Propagation protocol for Arizona canyon grape (*Vitis arizonica*) was also published to the Native Plant Network's Propagation Protocol Database.

Tours, Presentations, and Trainings

Several tours were given to PMC visitors over the course of the year. Some of the tour participants included members of the Tucson Native Plant Society and students from the University of Arizona. Classroom and hands-on training sessions were also held for members of the Pima County Master Gardeners.



Figure 10: Master Gardeners training

Several trainings were also conducted over the course of the year for field office employees. Some of the topics covered included Conservation Applications and Pollinator Awareness Conservation Training. The PMC also hosted the Arizona State Conservation Planning course in February.

Outreach Activities

In October, PMC personnel set up an interactive exhibit at the Biodiversity Festival, a companion event to Saguaro BioBlitz. Each year, National Geographic helps a different national park set-up a BioBlitz. A BioBlitz is a 24-hour event in which teams of volunteer scientists, families, students, teachers, and other community members work together to identify as many species of plants, animals, microbes, fungi, and other organisms as possible. Visitors to the PMC booth were shown how to plant and care for a native grass species and provided

information on NRCS programs. Over 5,000 people attended the BioBlitz event.



Figure 11: PMC booth at the BioBlitz Event

Other events PMC personnel participated in during 2012 included the 1st Annual BEYOND: *Commemorate *Celebrate *Commit* Festival, Tucson Earth Day and the Tohono O'odham Annual Range Day.



Figure 12: Tohono O'odham Range Day



Figure 13: PMC staff and display for BEYOND Festival

The Tucson PMC: Who We Are

In 1934, the first USDA Plant Materials Center 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 27 Plant Materials Centers across the United States, the Tucson PMC continues to address these conservation issues within its service area, which encompasses areas within the Sonoran, Mojave, and Chihuahuan Desert regions.



Figure 14: 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 45-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
- Mined lands
- 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

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Helping People Help the Land

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