

Tucson Plant Materials Center

Year 2007

Progress Report of Activities

3241 North Romero Road, Tucson, AZ 85705 Tel: 520-292-2999 FAX: 520-292-9099
Web Site: www.az.nrcs.usda.gov

Who We Are

In 1934, before the establishment of the Soil Conservation Service, and following the Dust Bowl, the first USDA Plant Materials Center was established in Tucson, Arizona. The Tucson Plant Material Center was created to address the need for adapted plant material to revegetate eroded rangelands due to drought in the American southwest. Today drought continues to threaten western rangelands, in addition to a list of other resource concerns including fire, invasive species, and wildland-urban interface issues. As one of 27 Plant Materials Centers across the US, the Tucson PMC continues to address these conservation issues through the use of adapted plant material throughout its service area, which encompasses areas within the Sonoran, Mojave and Chihuahuan Desert regions of California, Arizona, Nevada, and New Mexico. Over the past 70 years the Tucson PMC has developed and evaluated plant materials and technologies for plant establishment that have enhanced conservation efforts throughout the service area.



The Tucson Plant Materials Center in the 1940s, "4 miles northwest of Tucson"

What We Do

The goal of the Tucson PMC is to provide effective, economical vegetative solutions 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 as well as ease of establishment and persistence in their native plant communities.

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

A brief summary of many of our 2007 accomplishments follows. For more detailed information please contact the address or website listed above.

Desert Zinnia, Sand Dropseed and a 2nd Bush Muhly Established at the Center

2007 was a drought year at the Tucson PMC, not because it didn't rain but because the well was being replaced exactly through the height of the growing season, starting in July. At the end of October the well was back in action, just in time for three plantings before fall set in. Desert Zinnia (*Zinnia acerosa*) is not currently available to the market but is an excellent conservation



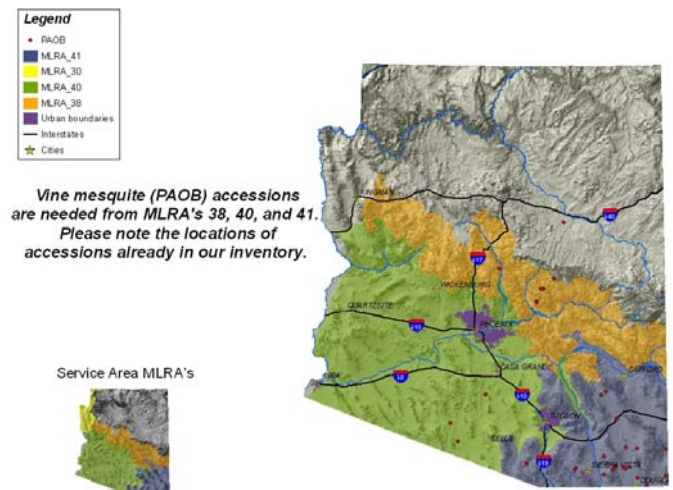
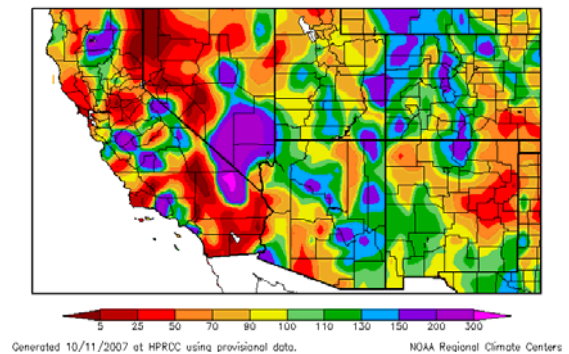
Desert zinnia at the PMC

species, establishing on rocky calcareous slopes. It was planted in 40" rows in 2006, but harvesting difficulties required a new planting design, so two types of plantings were established to experiment with: wider row spacing of 80" and plantings up on 1ft raised beds. Hopefully either the wider rows or raised plants will allow the Flail Vac to better reach the low growing plants without damaging the plants in the adjacent rows. Sand Dropseed (*Sporobolus cryptandrus*) was planted as part of a reimbursable project with Zion National Park. While this species is widely available to the market, the Park requires that an increase of their local ecotype be used for restoring vast acreage that was burned in a forest fire 2 years ago. Bush muhly (*Muhlenbergia porteri*) is a third planting at the Center in 2007, a composite of 25 accessions. A section of the 0.7 ac planting was organized into a replicated plot design and labeled in order to evaluate differences between the accessions in the future. This planting is unique in that it features only accessions from the Sonoran Desert Major Land Resource Area (MLRA), and was developed to be specifically adapted to that region. This is the second population development of Bush muhly currently in production at the Tucson PMC; the Bush muhly population development from 2006 was collected from the southeast Arizona MLRA, and is being developed for that region.

System Developed for Requesting Seed Collections According to Rain Data

In order to continue to bring in seed collections of desirable species from across our service area, the Tucson PMC devised a system where field offices, other NRCS field personnel and individuals from outside the agency, can get involved in the process. Using precipitation maps of the southwest generated from the NOAA website, measurements of summer and winter rainfall predict regions for suggested seed collection. A list of desired species, precipitation maps, instructions for seed collecting including approximate timing for seed maturity, is sent to a list of people who have expressed interest in helping meet our seed collection goals (the better coverage of collections across the MLRA, the sooner we will work with that species, so there is a certain amount of personal motivation involved). In 2007 we received many seed collections from interested individuals, and we plan to continue this process every year.

Percent of Normal Precipitation (%)
7/1/2007 - 9/30/2007



Off-Center Plantings Feature Seed or Hay

Five PMC releases were tested in Bonita in 2006 near Willcox, Arizona, to compare germination and establishment between two seeding rates. Arizona



PMC employees compare cane beardgrass plots of single and double seeding rates

cottontop, Cane beardgrass, Pima Pappusgrass, Spike Dropseed and Plains bristlegrass were drilled both at a typical range planting rate of 40 seed/ft as well as at double that rate. Following 2006's heavy summer rains, in 2007 these planting demonstrated that indeed, all five

plantings came in at a much greater density at the doubled rate.

In 2007 a planting was conducted on the Babocomari Ranch to investigate the potential for restoration using mulch (containing seed) instead of seed alone on a degraded site. The mulch used was harvested off the PMC's borders that were planted using seed harvested from the Babocomari's neighbor, the



Jace and Leslie of the PMC and Katie of the Tucson Field Office work the mulch blower

Appleton-Whittell Research Ranch of the Audubon Society. Without concern for plant material adaptability, this planting site was also chosen because of its degree of erosion and the surrounding

infestation of Lehmann lovegrass, which continues to increase throughout southern Arizona. A mulch blower was used to spread the hay bales evenly across the site, followed by crimping of the mulch to secure it to the ground.

Camp Creek Restoration Project: Finding Appropriate Species for Site and Residents

A collaborative project was initiated in 2007 with the Tonto National Forest to restore a section of the Camp Creek drainage near Cave Creek, Arizona.

This area was burned in a wildfire in 2005 and exotic invasive Vinca (*Vinca major*) has begun to dominate the area's riparian zones and steep dry slopes. When the Forest received a grant for this project, it requested assistance from the Tucson PMC to provide advice on the restoration process as a whole. The PMC and the Forest worked together from the start to select appropriate



Golden columbine, one species replacing Vinca

replacement species—those that are adapted to the area, will provide coverage to reduce erosion, can be grown in pots in the greenhouse, and are attractive enough for residents to tolerate replacement of ornamental Vinca. This year the PMC assisted with two field trips of the area - one with local residents to discuss the project, and another with a group of volunteer seed collectors to locate species and collection sites and to explain the seed collection process. The PMC has cleaned and inventoried over 70 seed collections of over 30 species that the Forest and volunteers have collected. Following two years of weed control in the Camp Creek drainage, containerized plants of these species as well as pole plantings grown at the PMC and a local nursery will be used to restore the site back to native diversity.



Volunteers, Forest and PMC personnel visit sites for seed collecting.

Year Two of Planting First-Time Growers in Nevada: Fanfare and also Failure

The second year of the establishment of first-time native seed growers in Nevada took place in October, to plant newly released Moapa Alkali muhly,



BLM employees get a kick out of planting the Scratchgrass

otherwise known as Scratchgrass (see related story on this page). This year, the plantings at both farms were accompanied by organized public events. Both days were attended by

enthusiastic supporters of this project, including an aide to Senator Harry Reid, who presented each farmer with a conservation plaque. Some visitors got a chance to ride the planter, and everyone had the opportunity to visit the previous year's planting of Vegas Alkali sacaton (*Sporobolus airoides*). Both events were fun and upbeat, but the reality of the situation could not be overlooked. The previous plantings at both locations were overrun with weeds, and it was apparent the fields were not being maintained according to specifications of the grant. One day prior to both public events, the project partners and some volunteers from the community arrived to inspect the fields and ended up manually weeding a section of the field at one farm,



Project partners get less of a kick out of weeding this farm's alkali sacaton fields.

and working the soil at the other farm, in preparation for the new plantings and events. These farmers proved their inexperience or lack of motivation failed to bring this project to success. Indeed, following these plantings in Nevada, one of the contracts was subsequently discontinued.

New Release: Alkali Muhly for the Mojave

Moapa germplasm Alkali muhly (*Muhlenbergia asperifolia*), otherwise known as Scratchgrass, has been released in collaboration with the BLM-Las Vegas Field Office. This composite was developed at the PMC in 2005 from seed collected from three sites in southern Nevada, including one in the Moapa Valley. Its salt-tolerance, ability to establish from rhizomes, stolons and seed, and matting growth form make this species a great conservation plant. It will be used to help prevent invasive Salt Cedar (*Tamarix ramossisoma*) from continuing to establish in southern Nevada's riparian areas.



Don Decker checks out the Alkali muhly lawn

Vegas Alkali Sacaton and Moapa Alkali Muhly Seed Production at the PMC

While floundering at farms in Nevada, both Alkali sacaton and Alkali muhly are thriving in their fields in Arizona. The increase fields of Alkali sacaton produced 50 lb of seed from 0.65 ac 1.5 years after they were established—and would likely had produced at least this much in a second harvest had the well been functional. The 0.25 ac Alkali muhly composite field, one year following establishment, produced 4.5 lb of seed in October 2006. The 0.8 ac increase fields of Alkali muhly were established in May 2007, and although the stolons and rhizomes did not cover these fields in the first year as they had in the composite field, they surprising survived the lack of water through the growing season.



Foundation fields of Alkali muhly planted at the PMC in June 2007

Patch Establishment of Native Species into Boer lovegrass Infestation: Year Two

A replicated study was initiated in 2006 on the Appleton-Whittell Research Ranch of the Audubon Society as a collaboration between the Ranch and the PMC to investigate the potential for patch establishment of native species into invasive-dominated sites of Boer lovegrass (*Eragrostis curvula*). The following control treatments, in conjunction with seeding (using native seed harvested from the ranch), were monitored for the second time in 2007:

- mow & seed
- mow & herbicide (Round up) & seed
- seed only
- control



Jace and Megan seed natives into one of the Boer lovegrass treatment

Results of monitoring from 2006 and 2007 reveal interesting implications for native establishment into invasive-dominated sites. While more native and exotic seedlings established in the first year and persisted as mature plants in the second year in the sprayed and seeded

plots, the sprayed plots also had the greatest species composition in the second year. These results suggest that although continued control efforts of the germinated exotic seedlings may be required, patch establishment of native diversity can be attained through the use of herbicide, but not through seeding only. Results of the mowing treatment suggests additional options. Fewest exotic seedlings established in the mowed plots, suggesting that mowing (or the presence of mulch) suppressed the establishment of exotic seedlings, perhaps through shading. Exotic lovegrasses require light to germinate, but native species do not. The use of mulch may be an additional tool to increase native diversity without increasing exotics from the seedbank.

Buffelgrass Removal at the Santa Rita: Results in the Second Year of Spraying

The second year of spraying Buffelgrass (*Cenchrus ciliaris*) at the Santa Rita Experimental Range covered nearly the same acreage as the first year, however required far less time. The fact that the plants sprayed were this year's plants emerging from the seed bank, rather than decadent mature plants from years in establishment, simplified the task immensely. The area of control is a 13-ac plot used by the Tucson PMC between the 1930s and 1980s to test plant materials, but is now overgrown with Buffelgrass, an African species increasing all over southern Arizona. The first year of treatment, using 5% Round up, resulted in a total kill where the tractor with boom sprayers was used. In contrast, the satellite populations, sprayed with the ATV or backpacks, had a lower rate of kill. In the second year, more of the larger satellite spots were treated with the tractor. Within the 13 ac plot being treated with Round up, three small plots were marked off for testing a grass-specific herbicide on Buffelgrass seedlings. Many young forbs have emerged following the herbicide treatments, and a grass-specific herbicide, used at the right time, may provide a tool for killing the Buffelgrass without affecting the native wildflowers moving in. Unfortunately, the treatment took place after the Buffelgrass seedlings had matured into young plants, and the herbicide was not successful. This treatment is planned for testing again next year, earlier in the season.



Jace sprays Buffelgrass plants for the second year at the Santa Rita Experimental Range

Tours of the Tucson PMC Highlight New Plantings and a ride on the Tractor Float

With all the new plantings established over the last few years at the PMC, we thought it was about time we hosted a Field Day for NRCS employees and the



Field Day 2007 assemble themselves on the float

public this year. Tours of the farm were conducted atop the native seed hay bale “float” (always a hit), as well as to the greenhouse and other facilities. A handout was developed with a map of the farm and an explanation of the studies and plantings on the farm, for those who were more interested in taking a personal tour. An even larger group toured the PMC later in the year as part of a National Parks training, called “NPS Southwest Regional Workshop: Revegetation in a Changing Environment.” Seventy Park Service employees attended the PMC tour,



which addressed topics including: methodology used by the Tucson PMC to develop composite fields and species releases, PMC service area’s species of

interest for a changing environment, projects that address both NPS and NRCS goals, and basic methods for growing containerized plants for use in revegetation. Perhaps best of all was the BBQ lunch provided, again seated atop native grass hay bales.

Master Gardeners get Educated and Enthused in Native Plant Propagation

The Master Gardeners are a great resource for the PMC, as plant enthusiasts, good connections with local nurseries, and their interest in public service. The Maricopa County and Pima County Master Gardeners teamed up in 2007 for a native seed propagation workshop at the PMC (of course they got a tour of the facilities as well). Although highly familiar with growing plants, many of them were unfamiliar the unique requirements of native plants. This group was inquisitive and very interested in our goals and activities at the PMC. A highlight for many was the Alkali sacaton field, in full growth at the time of the tour. Many came to wonder why more native plants are not used in landscaping, and why they are not available to the market. We hope trainings like these help ultimately influence the native seed market, plant nurseries and local awareness in general about native plants.



Ramona discusses native grasses with three Pima County Master Gardeners.

Tucson PMC Staff

Ramona Garner, Ph.D.
PMC Manager

Mary Hershdorfer
Asst. PMC Manager

Leslie Wood
Technician

Jace Householder
Intern/Farm manager

Heather Dial
Intern

Cash Veo
Intern

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, sex, religion, age, disability, political beliefs, sexual orientation, or marital or family status. (Not all prohibited bases apply to all programs.)

Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA’s TARGET Center at (202) 720-2600 (voice and TDD).

To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 14th and Independence Avenue, SW, Washington, DC 20250-9410 or call (202) 720-5964 (voice and TDD). USDA is an equal opportunity provider and employer.