United States Department of Agriculture

THE GRAMA PHONE

A Newsletter from the Southwestern Plant Materials Centers ☼ Fall 2015

Greetings!

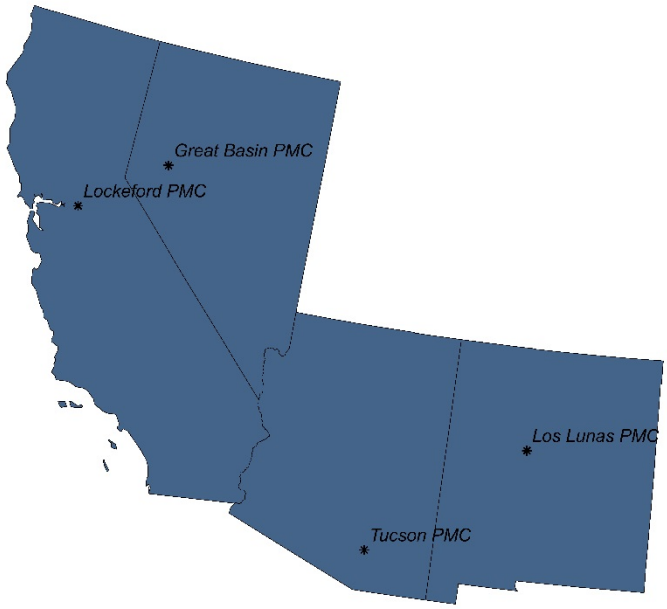
The staff of the four southwestern Plant Materials Centers (PMC) are happy to introduce a consolidated newsletter describing work and events occurring at our PMCs. In 2014, the mission and vision of the Plant Materials Program evolved. The evolution is titled PMC 360. As part of the 360, each PMC was assigned a focus and accompanying resource concerns with the overall goal of targeting PMC activities on work that will have the greatest contribution to NRCS goals. Our PMCs and their focus and targeted resource concerns are:

Lockeford Plant Materials Center
Focus: Soil Health & Water Quality
Resource Concerns: cropland, grazing land

Great Basin Plant Materials Center
Focus: Grazing Land Health
Resource Concerns: rangeland with sage grouse emphasis

Tucson Plant Materials Center
Focus: Climate Change
Resource Concerns: grazing areas, riparian zones

Los Lunas Plant Materials Center
Focus: Water Quality & Climate Change
Resource Concerns: riparian zones, rangeland



In addition to these individual focus areas and resource concerns, PMCs will work to develop products targeted to specific field office needs. Field staff throughout the Southwest can call any PMC for direct assistance. Increased coordination among PMCs will allow us to address your concerns no matter where your home office is. This newsletter is a first step in reaching all field staff in the Southwest. Contact information for each PMC can be found on the last page of the newsletter. Please, read about some of our ongoing projects and give us a call. We look forward to assisting you!

Sincerely, The Southwestern PMC Staff

Ongoing Projects

Figure 1: Drilling summer cover into a field at the Los Lunas PMC.

The Los Lunas Plant Materials Center installed two cover crop studies in July of 2015. The first study evaluates two reputedly low water use summer cover crops: sorghum x sudan (Sordan Headless) and cowpea (Iron and Clay) for germination, nitrogen content, canopy cover, forage production, and disease/insect resistance. Soil moisture and soil temperature in cover crop fields will be compared to the soil moisture and temperature of a fallow field. Following termination of the cover crop, a winter commodity crop will be planted to evaluate the effects on crop performance.

These projects apply to Conservation Cover (327); Cover Crop (340); and Residue and Tillage Management, No Till (329).

Figure 2: Summer cover crops emerging at the Los Lunas PMC.

The second study uses the same species and evaluates some of the same criteria but was established with a no-till drill in a former alfalfa field. The use of high nutrient applications and various termination techniques (crimping versus swathing) will also be evaluated. Information gained from both studies will be used to identify effective plant species and the best resource management practices for using cover crops in the Los Lunas area.

In March, Tucson PMC personnel, with the assistance of Willcox Field Office Soil Conservationist, Cary Ely, installed a field planting in a newly established pecan orchard. Pecans take an average of 5-6 years to bear nuts. During this developmental stage, pecan saplings are susceptible to damage from blowing dust and do not provide adequate ground cover to hinder wind erosion and the prevailing dust. Many of the over 20,000 acres of pecan orchards in Arizona are located in areas prone to large dust storms or haboobs.

Figure 3: Blase Evancho, Tucson PMC Farm Manager, and Cary Ely, Willcox Field Office Soil Conservationist, planting between pecan orchard rows.

Pecan orchards utilize different tree spacing to ensure maximum yield of fruits. In general, there is 30'- 40' of bare soil between orchard rows. The bare soil is allowed to fill in with volunteer weed species. However, the weeds do not provide adequate ground cover between the orchard rows. Finding adapted plant species that establish and persist in the understory of non-bearing age orchards in the arid Southwest has the potential to reduce particulate matter emissions from the soil surface for the years it takes the trees to develop a closed canopy. There is also the added benefit of improving soil health within the orchard.

This project applies to Conservation Cover (327) and Cover Crop (340).

PMC personnel looked for low growing native, perennial grasses that could withstand the mowing and traffic of the orchard. 'Plains' buffalograss, 'Hachita' blue grama, 'Moapa', and 'Westwater' scratchgrasses were selected. Initial evaluations taken in June show that the buffalo grass and blue grama have successfully established despite heavy competition from weeds. The planting will be monitored over the next year. Final results from the study will be used to develop seeding recommendations to reduce wind erosion, save water, and increase soil health in similar situations.

Figure 4: Bee counts being conducted on a Central Valley pollinator plot in the Commercial Pollinator study.

California produces 80% of the world's almonds with 890,000 bearing acres planted in 2015. Major problems facing almond producers include drought and the high cost of pollination services. When trees bloom in February and March, bee keepers bring hives of honey bees from all over the US into the orchards for pollination. Once bloom is over a lack of suitable forage causes nutritional stress for the introduced and native bees. Pollination efficiency is increased when native pollinators are present but many orchard floors are not planted to cover crops.

Almond mixes are selections of annuals that bloom early in spring to provide forage for bees, set seed, and then are mowed to provide a 'clean' floor for harvest. These reseed when the rains come in the fall. We have collaborated with Jessa Guise of the Xerces Society to plant almond mix plots in 2011 and 2013 at the CAPMC. Results from these studies have contributed to the development of commercial pollinator mixes. Field Office staff can access the mixes in the California eVeg Guide. In fall of 2014, a study of commercial pollinator mixes was installed to compare 4 almond and 4 Central Valley seed mixes. These plots were not irrigated, and cover, bloom, and bee visitation were assessed.

This project applies to Conservation Cover (327), Cover Crop (340), and Residue and Tillage Management (329).

Soil health improvements under cover cropping and conservation cover are being tracked in the previously planted pollinator mixes with clear improvements over time. Soil health and water infiltration will also be assessed with these different pollinator mixtures.

Figure 5: Top view of a showy milkweed flower showing the corolla, corona, and five hoods, each with a prominent horn.

The Great Basin Plant Materials Center studied milkweed pollination biology to help producers provide seed for Monarch butterfly habitat. A short description of the mechanics of milkweed pollination follows.

Each individual milkweed flower has fused, highly modified male (anthers and filaments) and female (stigmas and styles) floral parts. The corolla is the outer and lower part of the flower, and the corona is the showy, upper part of the flower. Five hoods (in some species each hood has a prominent horn) surround the corona. Pools of nectar form at the base of each hood. Together these slick, waxy corona structures manipulate the behavior of insects to achieve pollination. All species of milkweed produce their pollen in waxy sacs called pollinia. The pollinia are located in anther pouches adjacent to vertical stigmatic slits of the flowers. Pairs of adjacent pollinia are connected to each other by translator arms from a clamp called the corpusculum. The complete structure is called a pollinarium.

Insects that visit a flower to drink nectar struggle to grasp the slippery surfaces and may accidently slip their leg, foot, mouthpart, or other appendage into the opening at the bottom of the stigmatic slit. This slit is formed by guide rails, which are lined with bristles that prevent the insect moving its appendage any direction but up. The top of the slit leads into the opening of the corpusculum, which clamps firmly to the insect by pinching onto the insect's appendage. In its efforts to escape, if the insect is large enough, it can withdraw the pair of pollinia from the anther pouches and fly away. Effective pollination is essential to sustain milkweed populations for monarch butterfly habitat. The knowledge gained from this research has been shared with USDA collaborators in an effort to increase milkweed seed availability.

This research applies to conservation practices that encourage native plants and managed pollinators.

Figure 6. A pollinarium of showy milkweed on a millimeter scale and an exposed pollinarium in the background.

Figure 7. A large wasp on narrow leaf milkweed with many pollinaria attached to the bristles on her legs.

Personnel Updates

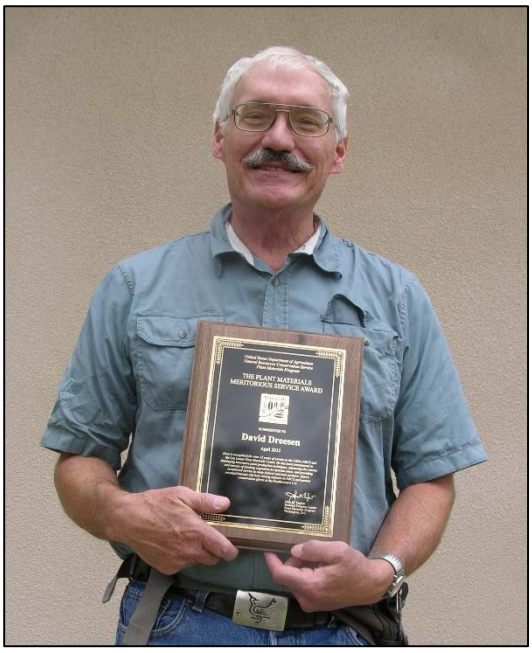


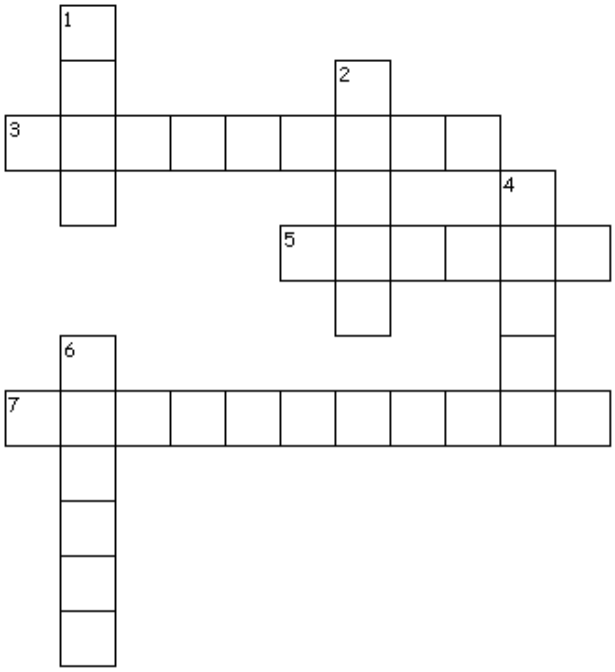
Figure 8: Dave Dreesen, Los Lunas PMC Agronomist, with his Meritorious Service Award

This year, David Dreesen, Los Lunas PMC Agronomist, received a NRCS Meritorious Service Award for his exemplary dedication to our mission to develop, test, and transfer plant science technology to meet customer and natural resource needs. He has successfully propagated many species, developed riparian tallpot technology, as well as manufactured innovative harvesting equipment. These accomplishments are but a few of the many he has facilitated throughout his 23 year tenure with the Los Lunas Plant Materials Center. We congratulate you!

Upcoming Events

On September 9th and 10th the Los Lunas Plant Materials Center will be sponsoring an interagency milkweed seed and plant production workshop in collaboration with the Institute for Applied Ecology, Pueblo of Santa Ana Native Plants Nursery and the National Park Service. The workshop will provide information on the identification and biology of milkweed, collection and propagation methods, Integrated Pest Management, along with an overview of the developing market for milkweed seed. Please contact the Los Lunas PMC for attendance information.

Southwestern Plant Materials Centers Ongoing Projects Puzzle



Across

3. Declining plant population
5. Location of the Great Basin PMC
7. Important to the almond industry

Down

1. _____ Health
2. Tucson PMC trial orchard
4. _____ Crop
6. No disturbance of the soil profile

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