United States Department of Agriculture

THE GRAMA PHONE

A Regional Newsletter from the Southwestern Plant Materials Centers ☼ Fall 2016

Greetings

The staff of the four Southwest Plant Materials Centers (PMC) are happy to present the third edition of our consolidated newsletter describing work and events occurring at our PMCs. In this newsletter, we focus on the topic of Soil Health as it relates to the work with plant materials at our respective PMCs. We also introduce our Regional Soil Health Specialists, Rudy Garcia and Z. "Kabir" Kabir, as we will be working closely with them. In the words of Kabir, "The PMCs are the living laboratories for soil health issues and its improvement."

Field staff throughout the Southwest can call any PMC for direct assistance. 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

Soil Health Related Studies and Activities

Arizona - Field planting on abandoned crop land

The Tucson PMC, in collaboration with the Pima County Association of Governments and Altar Valley Conservation Alliance, is installing a field trial this summer on abandoned cropland to test restoration technology. Erosion from abandoned fields in the Southwest is believed to be a source of particulate matter contributing to air pollution.

Figure 1. Abandoned fields prior to berm construction.

Figure 2. Berm construction

The area consists of approximately 200 acres of fields not cropped since the late 1970's that are largely devoid of any vegetation. Berms were developed across approximately 100 acres of the fields with a road grader to slow sheet erosion and encourage infiltration of monsoonal moisture. The upstream side of the berms were ripped and seeded. Evaluations will consist of germination and persistence of seeded species. Additionally, soil health parameters such as infiltration rate and organic matter are being tracked over time. Data collected will be used to update technical notes for field staff use.

This project applies to Critical Area Planting (342).

California –Evaluation of soil health improvement and moisture retention under cover crops and conservation cover

Figure 3. Moisture sensor with probes at four depths in almond cover crop and fallow/disked area April 2016.

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

Pollinator demonstration plantings established, in a partnership with the Xerces Society and UC Davis at the CAPMC in 2009, 2011, and 2013 will be evaluated for changes to soil health. These plantings include native Central Valley mixtures of annuals and perennials and almond mixes of early blooming annual species. All plots have been managed in a similar fashion by annual mowing. To monitor soil health, soil pits will be dug and characterized in each demonstration plot and analysis will be conducted to identify changes to organic matter, structure, infiltration, compaction, and plant available nutrients under each planting. The effect of winter cover crops on water management in California is currently poorly understood. Some producers avoid cover crops because of perceived water use, although it is known that cover crops increase infiltration by winter precipitation and as soil organic matter increases so does soil moisture holding capacity. To answer questions about infiltration and water use by cover crops; a three year study was initiated in February 2016 to compare soil-water changes in an almond pollinator mix cover crop versus a fallow/disked soil through soil moisture data collection. We will monitor soil health parameters including soil infiltration, water storage, and water availability to be able to provide science based information to field office staff and producers.

Nevada – Demonstration planting of 40 commercially available dryland grasses

Soil health is of primary concern for all Plant Materials Centers. At the Great Basin PMC (GBPMC) we are specifically focused on plant technology to reduce soil erosion and prevent the soil chemistry and microbiology alterations caused by invasive annual grasses and associated altered fire regimes. There are plants available for this, but success in the Great Basin hasn't been great due to the extreme conditions that

This project applies to Range Planting (550).

exist here. The GBPMC is in a unique situation to test plant performance in extreme conditions due to our low rainfall (~4 inches annually) and sand dominated highly erodible soils.

In April of 2016 we initiated a demonstration trial to test plant performance of 40 commercially available grass varieties. Our list included several varieties of commonly used grasses including Sandberg bluegrass (5 varieties), crested wheatgrass (2 varieties), bottlebrush squirreltail (8 varieties), Indian ricegrass (4 varieties), and others. These were planted without irrigation in a randomized block design with four replications at seed vendor recommended seeding rates. There is a replication of the entire study planned for planting in late August. The entire study is to be long-term to determine establishment and survival of each plant. Other variables to be considered are biomass growth, time of flowering, and seed production. The results of this study will inform us of the limits of our commonly used commercially available grass varieties. This will allow us to more effectively recommend the proper plant technology when addressing resource concerns.

Figure 4. Planting of commercially available grass varieties at the GBPMC.

New Mexico – Mycorrhizal Colonization Study

The Los Lunas Plant Materials Center (LLPMC) serves highly diverse environs many of which are very harsh including alkali and saline soils and annual precipitations ranging from approximately 6 to over 30 inches. The LLPMC is currently conducting trials on commercial arbuscular mycorrhizal fungi (AMF) to test their efficacy for colonizing root systems of bareroot grasses. AMF colonization research has demonstrated a variety of benfits to the plant host: increased root surface area and biomass production, greater absorption of mineral elements and water, increased salinity tolerance and pathogen resistance. Soils void of AMF provide ideal habitat for growth of opportunistic "weedy" plant species. Determination of economically feasible inoculum to increase AMF populations could substantially increase both soil and rangeland health. Results of this multi-year study will be provided to field and technical staff, as well as our conservation partners.

This project relates to Critical Area Planting (342) and Range Planting (550).

Figure 5. The containerized grass on the left was inoculated with AMF and on the right no inoculum was applied.

Welcome to Regional Soil Health Staff

Rudy Garcia and Z. Kabir recently accepted positions as Regional Soil Health Specialists with responsibilities to facilitate the adoption of soil health management systems. This will require they work closely with PMCs, NRCS State Offices/Specialists, conservation partners, producers, and others to identify training needs, keep our staff updated on the latest soil health findings/assessments, tools, etc. The major emphasis will be to advance the art and science of building healthy soils through our NRCS conservation practices/management, by understanding how the soil resource ecosystem functions. The regional specialists are points of contact for soil health issues for states they are assigned to. They remain current on the latest technology related to soil health and help ensure the incorporation of that technology into NRCS technical guidance and materials.

Figure 6. Regional Soil Health specialist, Rudy Garcia, AZ, CO, NM, and UT.

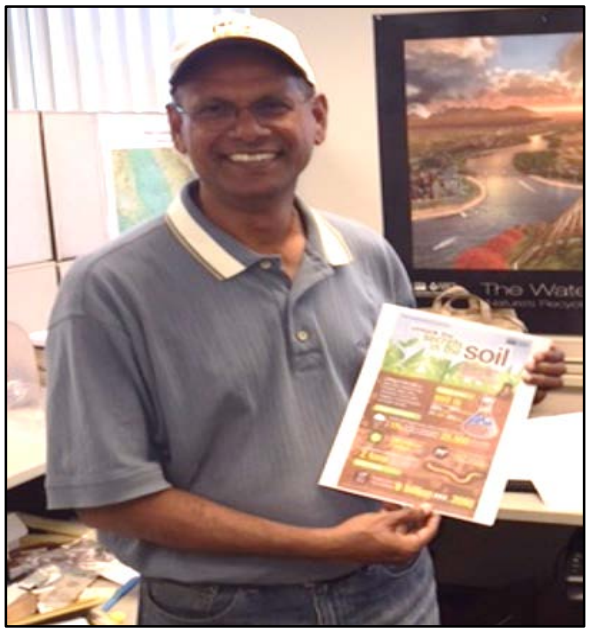
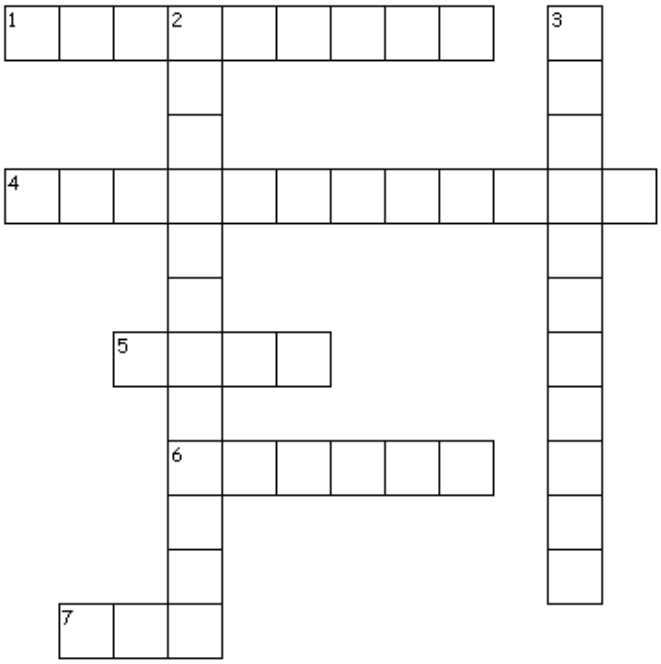


Figure 7. Regional Soil Health Specialist, Z. Kabir, CA, NV, and PI.

Rudy has responsibility for the states of Arizona, Colorado, New Mexico and Utah and Kabir for California, Nevada, and the Pacific Islands Area. Rudy has worked for the USDA-NRCS for the past 26 – years and has been the state agronomist in New Mexico for the last 10-years. The main agronomic issues that he worked on include: irrigation water management, salinity management, nutrient management, cropping systems that build soil health (i.e., crop rotations, cover crops, high quality compost, hoop houses, subsurface drip irrigation, minimum-till, etc.). Kabir has worked with USDA-NRCS for the past 7- years and has been an area agronomist and nutrient management agronomist for California. As a research manager for sustainable agricultural farming systems (safs.ucdavis.edu) at the University of California, Davis, and his focus was on an interdisciplinary approach for sustainable crop production to minimize the impact of farming practices on soil and water resources.

Southwestern Plant Materials Centers Puzzle



Across
1. soil resource……
4. Water enters the soil
5. Physical structure intended to slow erosion
6. Location of the Arizona PMC
7. Highly erodible soils

Down
2. Native grass bottlebrush…….
3. arbuscular ……. fungi

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