United States Department of Agriculture

Los Lunas Plant Materials Center

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2022 Progress Report of Activities

The Los Lunas Plant Materials Center (NMPMC) is one of 25 Plant Materials Centers operated under the nationally coordinated USDA NRCS Plant Materials Program. The mission of the Plant Materials Program is to develop and transfer effective state-of-the art plant science technology to meet customer and resource needs. Each Plant Materials Center serves a specific geographical and ecological area. The NMPMC serves the Southwest arid and semi-arid region, including northeast Arizona, southeast Colorado, New Mexico, southeast Utah, and southwest Texas.

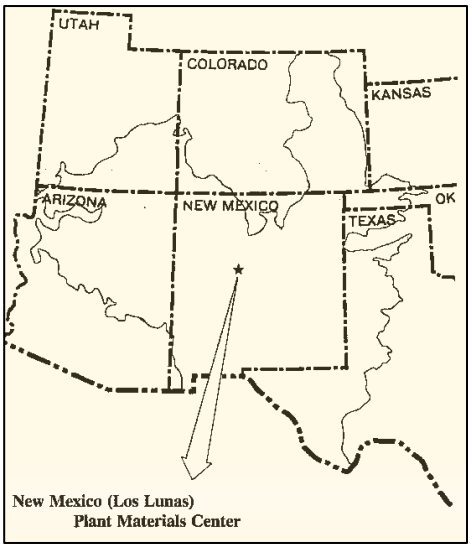

Fig. 1. NMPMC area map.

The NMPMC has provided the Southwest with plant solutions for over 70 years. The major focus of the NMPMC includes developing plants and plant technologies for improving soil heath in range and agricultural lands, abandoned cropland, improving wildlife habitat, and urban conservation.

Fig. 2. Western region plant materials specialist, Heather Dial, and NM state soil scientist, Rick Strait, discuss cover crop studies. In the background is one of the cover crop study fields at NMPMC.

NMPMC works closely with NRCS Field offices, State Office technical teams, regional plant materials specialists, fellow Southwest PMCs, and local universities to develop innovative technologies to meet conservation needs. In addition, NMPMC has established communications with commercial seed growers, private landowners, and local conservation groups to form close partnerships that will benefit all partners and stakeholders.

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Field Study: Tillage and cover crops for improving soil health and forage production

Fig. 3. A cover crop study field planted with forage corn-, millet-, and sorghum sudan-cowpea (left) and a closer view of millet- cowpea plot (right) in early growing season, 2022.

Soil health plays a crucial role in enhancing farm productivity and profitability in the long run. All forms of soil disturbance, either physical, chemical, or biological, destroy organic matter, and diminish the soil food web that is critical for nutrient, energy, and water cycling. Soil cover reduces soil erosion, conserves moisture, reduces soil temperature, suppresses weeds, and provides habitat for soil biota. A combination of practices such as no-till, cover cropping, and crop rotation generates synergistic effects that benefit soil health.

We started a five-year field study at the NMPMC in collaboration with the New Mexico State University (NMSU). The overall goal of the study is to improve cover crop and tillage recommendations in irrigated forage production in the arid Southwest. The study includes 3 tillage methods (no-till, reduced till, conventional), and 3 summer forage crops (forage corn, millet, sorghum-sudan hybrid) mixed with cowpea. Soil health indicators including total organic carbon and nitrogen, soil bulk density, and aggregate stability are measured annually. Plant samples are collected at 30, 60, and 90 days after planting to measure total biomass and forage quality.

Fig. 4. NMSU forage specialist, Dr. Mark Marsalis and his student, Heather Abeita collecting plant samples for forage quality analysis.

We expect this study will demonstrate that cover crops can be planted to gain soil health benefits without an excessive disruption in forage production, as well as help us improve cover crop and tillage recommendations.

Fig. 5. NMSU cropping systems specialist, Dr. Rajan Ghimire transferring soil core samples for measuring soil C and N.

Demonstration: Cover crop mixes under different growing conditions in New Mexico

In 2022, New Mexico State Plant Materials Committee (SPMTC) identified a need to demonstrate long-term soil health and economic benefits of cover cropping in irrigated and dryland production systems across the state. The NMPMC, teaming with the SPMTC, has started a five-year cover crop demonstration plot project to address the need. A single species and six other cover crop mixes that are readily available, low cost, and easily terminated (e.g., winter kill) are being compared. Cover crop mixes include a small grain and a legume or a small grain, brassica, and legume (Table. 1).

Table 1. Cover crop species used in demonstration plots in northern and southern New Mexico.

Northern New Mexico (including Clovis/Portales area)						
Mix-1	**Mix-2**	**Mix-3**	**Mix-4**	**Mix-5**	**Single Spp.**	**Control**
Triticale	Winter Oats	Triticale	Winter Oats	Triticale	Triticale	Fallow
Winter Pea	Winter Pea	Winter Pea	Winter Pea	Winter Pea		
Radish	Radish	Radish	Radish			
Turnip	Turnip					
Southern New Mexico						
Mix-1	**Mix-2**	**Mix-3**	**Mix-4**	**Mix-5**	**Single Spp.**	**Control**
Triticale	Winter Oats	Triticale	Winter Oats	Winter Oats	Winter Oats	Fallow
Winter Pea	Winter Pea	Winter Pea	Winter Pea	Winter Pea		
Radish	Radish	Radish	Radish			
Turnip	Turnip					

Fig. 6. Phil Herrera, State Agronomist (left) and Keith White, Bio. Sci. Tech. (right) unloading a no-till drill for planting cover crops, San Patricio, NM.

We planted two demonstration plots in southern New Mexico this year. One was to demonstrate cover cropping in orchards and another was for transitioning abandoned fields to croplands. Preparations for planting demonstration plots in low productivity pastures in northern New Mexico are underway, and we will continue to work with Field Offices and producers in other parts of the state.

Fig. 7. A conventionally managed pecan orchard, where soil is tilled to achieve a clean surface (left), and a demonstration plot where cover crops were planted between pecan tree rows (right), Garfield, NM.

Fig. 8. A close view of cover crop plant density at the time of termination (left) and residue cover on the ground 2 weeks after the termination (right), in the demonstration plot, Garfield, NM.

Breeder and foundation seed production

NMPMC maintains breeder and foundation seed of 23 cool and warm season grass cultivars and germplasms. Many of the cultivars were released decades ago but are still used by farmers and ranchers in the Southwest.

Fig. 9. Seed production field of 'Nogal' black grama at seed maturity, NMPMC

We currently maintain seed production fields for eleven of the cultivars including ‘Alma’ and ‘Hachita’ blue grama, ‘Arriba’ and ‘Jose’ tall wheatgrass, ‘Niner’ and ‘Vaughn’ sideoats grama, ‘Nogal’ black grama, ‘Paloma’ Indian ricegrass, ‘Salado’ alkali sacaton, ‘Viva’ galleta, and ‘Windbreaker’ giant sacaton.

Fig. 10. 'Viva' galleta in a new breeder block producing seeds one year after planting, NMPMC.

While maintaining seed production fields, we have reestablished new breeder blocks to ensure the availability of high quality seeds to seed growers and other partner organizations. We planted ‘Redondo’ Arizona fescue and ‘Grenville’ switchgrass breeder blocks in May 2022.

Fig.11. 'Redondo' Arizona fescue (left) and ‘Grenville’ breeder blocks at NMPMC. Photo taken 2 months after planting, in July 2022.

Collection of cottonwood phenotypes

A collection of cottonwood phenotypes from different watersheds across the state of New Mexico is maintained at NMPMC. The plants were collected between 2012 and 2014 from La Plata, Tularosa, San Juan, Santa Fe River, Pilar, Gila, and Black River watersheds. Originally, the field was planted for producing cottonwood poles. Over the years, densely populated trees experienced dieback due to competition. Early in 2022, approximately four out of every

Fig. 12. Seven different phenotypes of cottonwood maintained at Los Lunas Plant Materials Center.

five stands were thinned out to allow better spacing. The trees appear to be growing much heathier, and the field is maintained for preserving the phenotypes and providing future education opportunities.

New Mexico State Plant Materials Technical Committee

Richard Strait	State Soil Scientist/ State Plant Materials Program Manager
Jim Armendariz	State Rangeland Management Specialist
Phillip Herrera	State Agronomist
Arthur Ariaz	Area Resource Conservationist (North)
Eddie Foster	Area Resource Conservationist (South)
Tatjana Mercado	Rangeland Management Specialist
Roxann Moore	Soil Conservationist
Vernon Mirabal	Soil Conservationist
Randy Velasquez	Soil Conservationist
Wayne Sleep	Soil Conservationist
Shawna Trujillo	Soil Conservationist
Aaron Wheeler	Soil Conservationist
Kristi Wright	District Conservationist
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All publications from the Los Lunas Plant Materials Center can be found by going to the website https://www.nrcs.usda.gov/plant-materials/publications and searching by NMPMC.
For more information contact NMPMC: New Mexico - Los Lunas Plant Materials Center | Natural Resources Conservation Service (usda.gov)