Los Lunas Plant Materials Center

2009 Progress Report of Activities

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Dwarf false indigo (*Amorpha nana* Nutt.)

CW Smith 2009

In This Report:

- Assisting the National Park Service
- Assisting with Conservation Concerns
- Windbreak Technology Workshop
- Youth Water Awareness Day
- Evaluating Sunn Hemp
- Potential Releases for Commercial Growers
- Seeding Trial with Starch Polymer on Disturbed Lands
- Longstem Transplants and Pole Cuttings at 93% Survival Rate by the 3rd Year
- New Technical Note for Selecting Native Plants
- Available Publications from the LLPMC
- 2009 Plant and Seed Distribution

Littleleaf mock orange
Philadelphus microphyllus
A. Gray

Assisting the National Park Service

The Los Lunas Plant Materials Center (LLPMC) has agreements with the Department of the Interior's National Park Service (NPS) for Carlsbad Caverns National Park, Grand Canyon National Park, Pipe Spring National Monument, and Zion National Park. These agreements allow the LLPMC to assist the NPS to revegetate disturbed areas in the parks, such as roadsides, trails, campgrounds, and other construction areas. The LLPMC provides the NPS with plant materials of the parks' local native ecotypes by producing both seed and containerized transplants for revegetation purposes.

In 2009, the LLPMC had ten native grass species in production on a total of 10.25 acres. The seed production fields for the NPS were harvested and seed processing is underway. In September, 10,317 transplants and 185 lbs. of seed were delivered to the Grand Canyon National Park.

Bottlebrush Squirreltail Seed Production Field for Zion National Park.

Grand Canyon National Park Plant Delivery

Assisting with Conservation Concerns

The Los Lunas Plant Materials Center (LLPMC) has been assisting USDA Natural Resources Conservation Services (NRCS) Field Offices, Resource Conservation and Development Offices, and Soil and Water Conservation Districts to find solutions for many conservation concerns, including wind and water erosion issues. To address these issues, the LLPMC has been testing the usefulness and range of adaptability of the grass species giant sacaton (*Sporobolus wrightii*) by establishing planting trials for this purpose. The LLPMC grows and provides the giant sacaton transplants for these planting trials throughout the LLPMC service area.

The first of the trial plantings was established in 1999 in Columbus, New Mexico. Since then, the LLPMC has established planting trials in twelve other locations in New Mexico: Jal, Milan, Deming, Espanola, Estancia, Tucumcari, Los Lunas, Lovington, Taos, Clayton, Hobbs, and Tatum. A trial planting also was established at The Gap, Arizona to protect non-irrigated cropland on the Navajo Reservation.

In 2009, a new trial planting was established at the Joshua Sanchez Farm in Lordsburg, New Mexico. The LLPMC, the Hidalgo Soil and Water Conservation District, and the Lordsburg USDA-NRCS Field Office worked together to help this landowner with a high-wind erosion problem. The giant sacaton planting will help to protect Mr. Sanchez's irrigated cropland during the windy season.

By assisting various organizations and landowners with solutions to conservation concerns, the LLPMC has been provided with the opportunity to test new plant materials and to demonstrate new planting techniques. The LLPMC continues its service to its partners with innovate uses of plant species and planting techniques.

Joshua Sanchez Farm Giant sacaton planting installed in May 2009.

Joshua Sanchez Farm Giant sacaton planting evaluated in September 2009.

Windbreak Technology Workshop

Danny Goodson, an agronomist at the LLPMC, participated as an instructor at the *Windbreak Technology Workshop* held in Clovis, New Mexico in April 2009.

A four-day workshop concentrated on the current windbreak technologies, from the design phase to the installation phase, and had participants from several agencies around the State. The LLPMC is currently researching and evaluating using giant sacaton (Sporobolus wrightii) in windstrips and windbreaks to address erosion control issues: this technology was included in the workshop.

Windbreak Technology Workshop in Clovis, New Mexico, April 2009.

Youth Water Awareness Day

On May 12-13, 2009, Danny Goodson, Agronomist at the Los Lunas Plant Materials Center (LLPMC), attended the McKinley County Youth Water Awareness Day in Gallup, New Mexico. Danny was invited to present water conservation techniques and technologies through the use of native plants. Children from elementary through high school age attended the two-day event. An exhibit with photographs and live plants from the LLPMC were on display to emphasize the need for using native species of plants to help reduce the use of water in our daily lives.

Evaluating Sunn Hemp – The LLPMC Participates in a National Plant Materials Project

In 2009, the LLPMC participated in a national plant materials project to determine if Sunn hemp (*Crotalaria juncea*) can be used efficiently as a green manure or cover crop. Sunn hemp produces high yields of organic matter while fixing large amounts of nitrogen. The LLPMC's role in the study is to determine if this plant may have the potential for green manure or being used as a cover crop in this area of the country. Nationally, the high cost of energy has brought the use of leguminous cover crops back to the forefront of sustainable agriculture production.

Sunn hemp (*Crotalaria juncea*) growing at the Los Lunas Plant Materials Center in 2009.

Potential Releases Should Have Commercial Value in the Southwest

We have identified several potential releases which should have a commercial value for revegetation use in the Southwest.

- Mesa dropseed and spike dropseed populations from Fort Bliss should be adapted to MLRA 42 (Southern Desertic Basins, Plains, and Mountains).
- Foxtail prairieclover from the Gila National Forest should be well adapted for MLRA 38 (Mogollon Transition) and MLRA 39 (Arizona New Mexico Mountains) and perhaps for MLRA 35 (Colorado Plateau) and MLRA 36 (Southwestern Plateaus, Mesas, and Foothills).

Mesa Dropseed and Spike Dropseed from Fort Bliss

Fort Bliss requires that restoration of native plants will be accomplished using germplasm from populations as closely related genetically and ecologically as possible to the existing populations on the military training lands. The intent of plant materials development at the Los Lunas Plant Materials Center (LLPMC) is to develop source-identified, germplasm releases that will be made available to commercial seed growers in the Southwest. The goal is to eventually produce a sufficient amount of seed for large-scale rehabilitation and restoration projects.

The Fort Bliss staff collected seed of mesa dropseed (*Sporobolus flexuosus* (Thurb. ex Vasey) Rydb.) and spike dropseed (*Sporobolus contractus* Hitchc.) during the middle of October 2007. The collected seed was sent to the LLPMC for cleaning, producing plug seedlings, and installing the seedlings into seed production fields. Seed production fields totaling 0.30 acre for spike dropseed and 0.95 acre for mesa dropseed were installed in late June through early August 2008. The seed fields yielded 59 PLS lb/acre for mesa dropseed and 44 PLS lb/acre for spike dropseed in 2008, the first growing season.

The initial 2009 harvest of mesa dropseed on August 17, 2009 had a cleaned weight 122 lb. The mesa dropseed fields produced additional seedheads in September and were harvested for a second time on November 4, 2009 (cleaned weight 120 lb). The spike dropseed field was harvested on August 18, 2009 (cleaned weight 41 lb). On a per acre basis, mesa dropseed yielded 118 PLS lb/acre for the first harvest and 110 PLS lb/acre for the second harvest and spike dropseed yielded124 for PLS lb /acre.

Ft. Bliss 2009 mesa dropseed seed production field at the Los Lunas Plant Materials Center

Foxtail prairieclover (Dalea leporina) for Burn Rehab in Southwestern Pinyon/Juniper Communities

The purpose of this project is to develop releases of native legumes that could be established after prescribed burns or wildfire in pinyon/juniper communities in the Southwest.

Native annual foxtail prairieclover *(Dalea leporina)* seed was collected on October 7, 2005 by US Forest Service personnel near Silver City, New Mexico. The limited seed was used to grow seedlings in the greenhouse which were planted in two field rows in mid June 2006. Approximately 40% of the plants survived to maturity and were harvested in late October. Approximately 175 plants yielded 30 PLS lbs with 24% of the seed germinating readily and 72% classified as hard seed.

On April 19, 2007, we direct-seeded a 0.3 acre field of *Dalea leporina* in LLPMC Field 7. Each 300-foot row was sown with 30 grams (2 tablespoons) of seed (approximately 10,000 seed). According to our greenhouse germination tests, about 40% were readily germinable; therefore 4,000 germinable seed were sown per row (or about 13 germinable seed per foot). Seed harvested on October 30, 2007 was tested at the NMDA State Seed Laboratory and had 99.97% purity, 62% germination, and 30% hard seed. The yield was 880 PLS lbs per acre.

Field 7 was not cultivated, disced, or plowed during the winter of 2007-2008. We irrigated the field in April to see if a sufficient quantity of seed remained on the ground following combining to allow self-sowing. A good stand of seedlings resulted from the April irrigations. Most of the field was cultivated to our standard row spacing of 38 inches, but one section was not cultivated and allowed to form a mass planting. On October 30, 2008, we harvested a cleaned seed weight of 377 pounds or a yield of 980 PLS lbs per acre.

Again during the winter of 2008-2009, we did not cultivate, disc, or plow Field 7. A good stand of seedlings resulted from the late April irrigation. This stand yielded a cleaned seed weight of 218 lb or a yield of 683 PLS lbs per acre.

Because of the initial success with direct sowing, the expectation is that the cost to commercially produce *Dalea leporina* would be quite reasonable. The high forage quality of this species (crude protein 24%, neutral detergent fiber 31%, and relative feed value of 215) indicates potential wildlife benefits if it can be established as a part of post-fire rehab.

Considering the seed yield and ease of establishment of the *Dalea leporina* 2007 through 2009 crops, this species should be released as selected germplasm for commercial production.

Field of *Dalea leporina* at the Los Lunas Plant Materials Center

Seeding Trial with Starch Polymer on Disturbed Lands

In an effort to improve seeding of disturbed lands in the Estancia, New Mexico area, the USDA Natural Resources Conservation Service (NRCS) in cooperation with the Estancia NRCS Field Office, East Torrance Soil and Water Conservation District, and the Edgewood Soil and Water Conservation District initiated a 52 variety seeding trial with and without a starch polymer establishment enhancement treatment in 2009.

This study is located on a Wilt loam with a 2-3 percent north facing slope at an elevation 6,600 feet in Chilili, New Mexico on the Linderman Ranch. The area receives a mean annual precipitation of 13 inches, with 75 percent occurring from April to October, and the wettest months being July and August.

Often soil moisture is the factor that limits seedling establishment in the arid Southwest. Even seedlings of drought tolerant species require moist soil conditions during the three-to four-week period of emergence to establishment. Often if a seedling can establish its roots below a 4-inch depth (the zone below rapid soil surface evaporation) the seedling can be considered established. A surface, straw mulching treatment provides for a moist/cool soil surface microclimate. This reduces seedling evapotransporation and reduces surface erosion by enhancing water infiltration. However, purchasing the material and applying the mulch may triple the cost of a seeding when applied at the recommended rate of two tons per acre (the rate required for a single layer of straw to cover the soil surface).

Extensive research has been conducted as early as the 1950's exploring the use of organic polymers for soil property amendments such as water retention. These compounds have been estimated to hold 40-800 times their own weight in water. With precise placement of the polymer in the seed furrow, surface moisture retention maybe enhanced enough to allow for seedling establishment during the arid periods between rainfall events. In theory, when precipitation hydrates the dry powder polymer material, the seed lying in contact would be able to use this moisture.

Polymer is placed next to the seed in the seed furrow

Because many of the polymer retention products sell for less than $7.00 per dry pound, the potential exist to significantly reduce dryland seed cost with this substitution for hay mulch. Subsequently, the NRCS Estancia Field Office requested the testing of hydrophilic polymers in this seeding study. Ten grams, equivalent to the application rate of 10 lbs/acre of 'Soil Moist' (a starch polymer manufactured by JRM Chemicals, Cleveland, OH) was sown with the seed in half of the seeding trial plots.

This planting is part of a regional trail, with the germplasm being provided by Idaho, Colorado, and Montana NRCS Plant Material Centers and the Agricultural Research Service (ARS) in Logan, Utah. Currently, the best performing accessions in descending order are 'Arriba' western wheatgrass, 'Anatone' bluebunch wheatgrass, 'Manifest' intermediate wheatgrass, and 'Prior' slender wheatgrass. The starch polymer did not significantly have an effect on seedling density. However, the result of the starch polymer is inconclusive and it is still being considered as a viable substitute for hay mulching. Subsequently, with an improvement in the experimental design comparing several application rates in a future study, there is potential for the starch polymer to effect seedling survival.

Overview of the Chilili, New Mexico Seeding Trial

For more information contact the Los Lunas PMC for the complete, sixteen page *Chilili Seeding Trial 2009 Progress Report.*

Longstem Transplants and Pole Cuttings at 93% Survival Rate by the 3rd Year

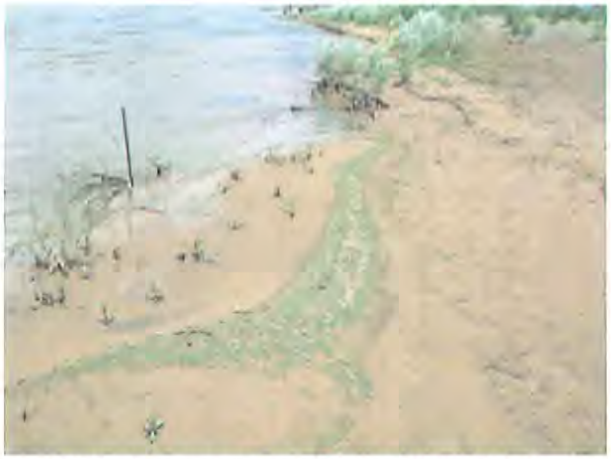
During an eight day period in the winter of 2006, the Los Lunas PMC installed 2,481 plants in Rio Grande riparian zone in Bernalillo, New Mexico located approximately ½ -mile south of the Bernalillo Bridge on the east side of the river. This area receives an annual precipitation of less than 10 inches. The planting area was defined by ground water depth of less than eight feet which occurs at this location only near the river. Subsequently, only the river frontage was planted which incorporated about 3,000 linear feet.

Overview of the Bernalillo Priority Site Planting

The establishment of obligate riparian plants in the arid Southwest requires either lengthy irrigation until the transplants' root systems can extend into the permanent soil moisture above the water table (capillary fringe), or planting techniques that allow immediate or rapid root extension into the water source by utilizing deep planting methods (such as the Longstem Planting Method and the Whip and Pole Cutting Method). Five hundred and thirty-three Longstem transplants were planted on the flood plain terrace above bankfull (the incipient elevation on the bank where flooding begins). The lower portion of the root ball was placed in contact with the capillary fringe of the water table. For some plants, root crowns were buried as deep as 6 ft. to reach the capillary fringe. Eighteen cottonwood pole cuttings, 26 Gooding's willow pole cuttings, and 1,597 coyote willow whip cuttings were planted on the flood plain terrace also above bankfull at water table depth with a 9"x 8' auger mounted to the front end loader of a farm tractor.

Drilling down to the capillary water to plant tallpot| longstem transplants

Plants did not require any irrigation. Poultry wire treeguards (5'x10") were used to protect cottonwoods and Goodings willow from mainly beaver. Because the longstem transplants and coyote willow stands were not protected, they suffered beaver damage but readily re-sprouted. Those plants left untouched by beaver grew one to two feet per year.



Established resprouting coyote willow whip cuttings after beaver predation.

Established longstem transplant group of Emory's Baccharis that are more than 6-feet high.

The survival of the coyote willow was not measured because they were heavily cut at base by beaver but readily re-sprouted. Some of the stumped ends may have been buried in the sand while others had two or more shoots sprouting from the original single stem. Other coyote willow cuttings may have been washed away by spring runoff which had caused some bank erosion.

Established whip cuttings of coyote willow with many suckering at root crown depth adding new shoots to the stand.

The combined survival rate of longstem transplants, cottonwood pole cuttings, and Goodings willow pole cuttings was at 93% by June 2009. For a copy of the report *Bernalillo Priority Site Longstem Transplant Study Project No. NMPMC–T-0901-RI*, contact the Los Lunas PMC.

New Technical Note #69 – Selecting the Appropriate Native Plants for Revegetation and Restoration Purposes in the Southwest

The LLPMC has developed a new technical note (No. 69) to provide NRCS Field Offices, restoration specialists, and land managers with a number of methods to select the appropriate native species for use in the revegetation or restoration of disturbed lands. This technical note describes several approaches for selecting suitable native species:

- Using native plant lists or floras from nearby or similar sites.
- Accessing Ecological Site Descriptions through the NRCS Ecological Site Information System (ESIS) website or through the New Mexico NRCS State Website
- Using the USDA-NRCS Web Soil Survey Website to access Ecological Site Descriptions
- Using the NRCS PLANTS Database to find the dominant species within an ecoregion having characteristics suitable for the revegetation site.
- Using the NatureServe Explorer website to find plant association information.

An example restoration site in the San Juan Basin of New Mexico representative of areas under natural gas field development was selected to show the types of species information that can be accessed using the methods described above. This technical note can be found at

http://www.nm.nrcs.usda.gov/technical/tech-notes/pmc/pmc69a1.pdf

Publications Available from the LLPMC

The Los Lunas Plant Materials Center (LLPMC) has developed several publications related to the seeding of native grasses and riparian restoration:

- *Basic Guidelines for Seeding Native Grasses in Arid and Semi-Arid Regions* (concise pamphlet with limited details)
- *Seeding Native Grasses in the Arid Southwest* (brochure with more explanation for non-professionals)
- *Revegetating Riparian Areas in the Southwest "Lessons Learned"* (describes the obstacles to consider when planning restoration projects in riparian areas)
- *Guidelines for Planning Riparian Restoration in the Southwest*
- *Guidelines for Planting Dormant Whip Cuttings to Revegetate and Stabilize Streambanks*
- *Guidelines for Planting Longstem Transplants for Riparian Restoration in the Southwest*
- *The Pole Cutting Solution*

The technologies described in the above riparian restoration publications have been summarized in a *Journal of Soil and Water Conservation July/August 2008 Vol. 63(4):129A-133A*, article *"Deep-planting methods that require minimal or no irrigation to establish riparian trees and shrubs in the Southwest."*

All of the LLPMC publications are available on the NRCS New Mexico website, and in addition to these publications, our annual reports, release information, fact sheets, published proceedings, and other informational documents also are available and can be downloaded from the following website:

http://www.nm.nrcs.usda.gov/programs/pmc/publications.html

Plant and Seed Distribution

The Los Lunas Plant Materials Center distributed materials to 75 offices or entities in 2009:

- Over 8,000 pole and whip cuttings.
- More than 6,500 larger containerized stock.
- Over 9,000 medium and 12,500 small containerized stock.
- Requests for over 1,000 pounds of seed

See the following table for the detailed 2009 plant distribution information:

Organizations, Agencies, and Institutions	Poles	Whips	2-gal Treepots & Tallpots	1-gal Longstem Treepots	1-gal Regular Treepots	D60, D40, or Treebands	D25 or D16	SC10, PC4, or mini-plugs	Bulk Seed	PLS Seed
	(no.)	(no.)	(no.)	(no.)	(no.)	(no.)	(no.)	(no.)	(lb.)	(lb.)
Federal Agencies other than National Park Service (11 offices)	113	100	587	401	766	534	49	98	1.1	248
State and Local Agencies (7 agencies)	100	5000	320	78	120	20	85	18	58.2	0
Non-governmental Organizations (10 organizations)	2670	0	350	195	909	63	30	3017	0	0
National Park Service (5 sites)	0	0	257	118	95	33	3528	7811	124.3	142.9
NRCS Offices (8 offices)	0	0	2	25	78	17	336	1501	0.2	11.6
Plant Materials Program) (6 PMC's)	0	0	0	0	27	0	0	18	0.2	33.1
Research and Extension Organizations (8 organizations)	0	0	0	0	35	0	0	18	8.1	24.9
Seed and Nursery Growers (8 growers)	0	50	0	0	20	0	0	19	4.8	347.9
SWCD's and Landowners (7 SWCD's and 5 landowners)	433	20	124	2056	295	2475	1900	0	0	4.2
Total	**3316**	**5170**	**1640**	**2873**	**2345**	**3142**	**5928**	**12500**	**196.8**	**812.7**

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United States Department of Agriculture

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April 5, 2010

SUBJECT: ECS – Los Lunas Plant Materials Center 2009 Progress Report of Activities

TO: All Field Offices Employees File Code: 190-18

In the attachment you will find the Los Lunas Plant Materials Center 2009 Progress Report of Activities. In this report:

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If you have any questions, please contact Greg Fenchel, Plant Materials Center Manager, at (505) 865-4684.

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State Conservationist

Attachment