

BLM Colorado Plateau Project Update by The Los Lunas Plant Materials Center (2010-present)



By Greg Fenchel, PMC Manager
Dave Dreesen
Danny Goodson
Keith White

Our Mission for the Colorado Plateau Project:

- Increase seed from grams to pounds for distribution to interested commercial producers
- Within species and same chromosome number, select populations with desirable phenotypic traits, bulk germplasm, and test progeny.
- Develop Planting Guides for our new plant materials

Elevation 4,800 ft.

Rio Grande

Los Lunas Plant Materials Center

East

River

Central

Alluvium

West

210 acres

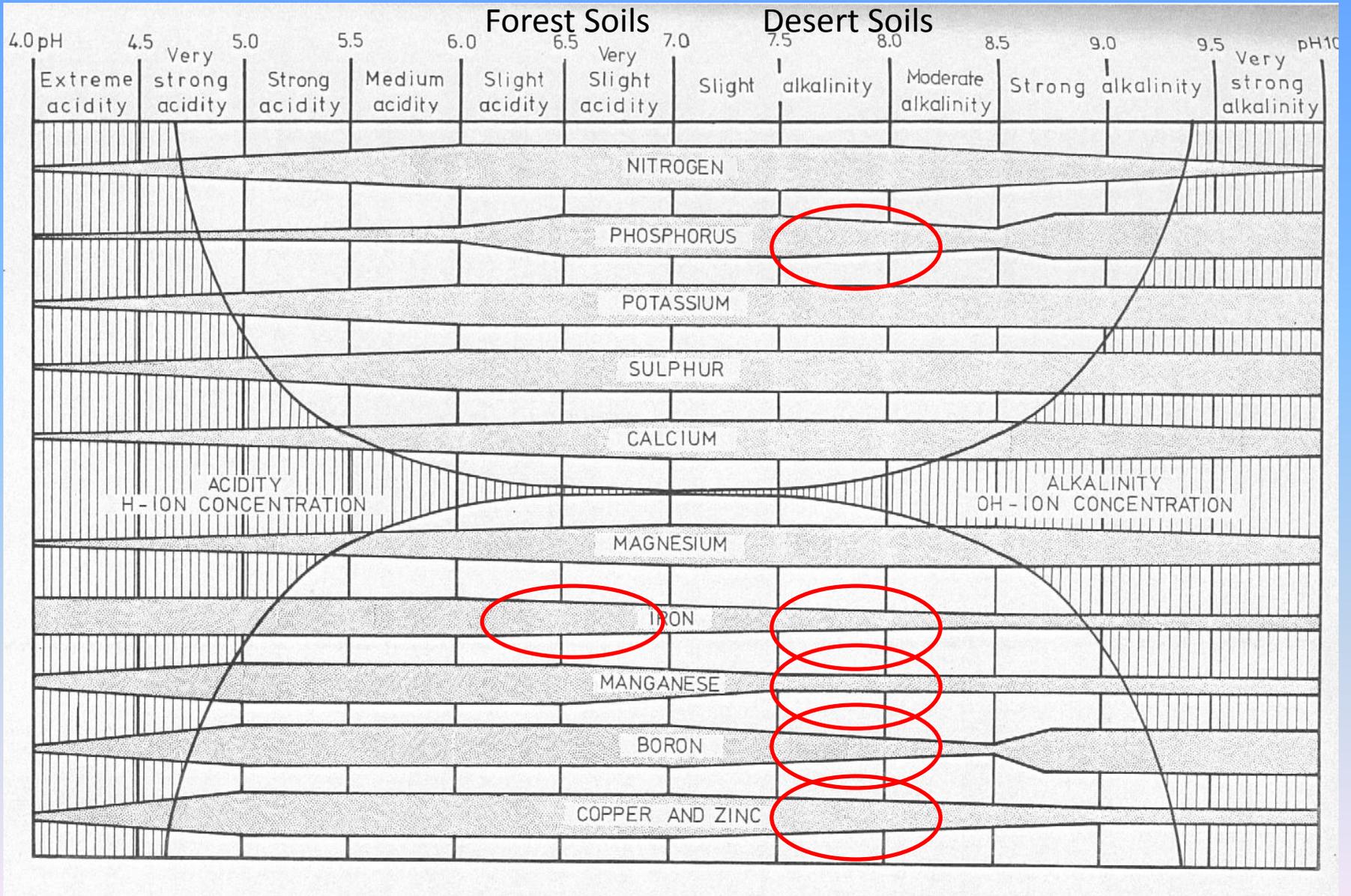
Seedling
2009
John R. R. R.

Soil Properties at a 6-inch Depth at the Los Lunas Plant Materials Center

Location	Soil Texture	Electrical Conductivity (mmhoes/cm)	Sodium Absorb. Ratio (SAR)	Soil pH
West	Sandy – Loamy Sand	0.40 - 0.79	0.91 – 3.8	7.7 – 8.31
Central	Loamy Sand – Sandy Loam	0.46 - 1.8	1.63 - 1.8	7.63 - 7.91
East	Sandy loam - Clay	0.85 - 1.57	1.65 - 2.61	7.51 - 7.64

Soil Analysis performed by New Mexico State University SWAT Laboratory
over a 20-year period (1985 -2005)

Nutrient Availability as Affected by Soil pH



Source: E.J. Hewitt and T. A. Smith, Plant Mineral Nutrition, 1975

Thirty-Year Average Precipitation at Los Lunas PMC

	Low	High	Mean
January	0.31	0.44	0.38
February	0.31	0.46	0.38
March	0.33	0.54	0.44
April	0.34	0.52	0.43
May	0.46	0.50	0.48
June	1.18	0.70	0.94
July	1.64	2.35	2.00
August	0.89	2.47	1.68
September	0.36	1.56	0.96
October	0.44	1.25	0.84
November	0	0.54	0.27
December	0	0.57	0.27
Total	6.26	11.9	6.96

Last spring frost average = Apr. 15
Frost date average = Oct. 28
Average frost free days = 176

Field Preparation for Flood Irrigation



Fields are laser leveled with the slope set at 0.03 % from the water source



Water source is the Rio Grande delivered by the Middle Rio Grande Conservancy from Mar. – Oct.

Winter Irrigation at the Los Lunas Plant Materials Center



The west well (10" diameter) at the Los Lunas PMC has a 454 Chevy engine that runs at 1750 rpm or slower.



Winter irrigation at the Los Lunas PMC from November - February

Germplasm for the Colorado Plateau Project (February 2010)



	Acc. #	Seed Weight	Transplants Produced FY-2010
Prairie coneflower (<i>Ratibida columnifera</i>)	W6-32619	1.9 grams	4,000
Pale evening-primrose (<i>Oenothera pallida</i>)	W6-32708	0.3 grams	30
Scarlet gilia (<i>Ipomopsis aggregata</i>)	W6-32589	6.1 grams	2,000
Smallflower globemallow (<i>Sphaeralcea parvifolia</i>)	W6-	0.6 grams	600

Seed Pre-Treatment for Germination

- Prairie cone flower – Sown into plug trays covered with 4mm peat/perlite mix and germinated in the greenhouse.
- Pale evening primrose and Scarlet gilia – broadcast on surface of plug trays with peat/perlite mix, moistened, and then cold stratified for six weeks at 3° C.
- Smallflower globemallow – Scarified with a MAT-OSU pneumatic seed scarifier for 10 seconds at 20 psi, broadcast on surface of plug trays with peat/perlite mix, and then cold stratified for six weeks at 3° C.

Walk-in seed stratification cooler with temperature set at 3° C.



Plug Transplants Used to Establish Seed Production Fields



Plug transplants are started in a controlled greenhouse environment for 6–8 weeks depending on species

Afterwards plants are set outside in direct sunlight for two weeks for acclimation before field planting

Seed Production Fields are Established Using Mechanical Transplanters



For larger size transplants (up to 2x2x4" root ball), a 1600 Rain Flow Series II transplanter is used



For smaller transplants (plugs) we use a Holland single-row punch transplanter

Prairie Coneflower Progress

Prairie Coneflower Seed Production Field of 4,000 Transplants on 1/3-Acre with Row Spacing on 76-Inch Centers (September 2010)



Irrigated weekly for first 4 weeks
Irrigated 2X/month (Apr-Sep)
Applied 80 lbs N/acre (split app)

Prairie Coneflower Progress, Continued



Combine harvesting 1/3 acre of prairie coneflower seed from plants on 76-inch row spacing (November 2010)



Prairie cone flower seed (0.44 lbs) after being cleaned in a M2B seed cleaner (December 2010)

Prairie Coneflower Progress, Continued

Prairie Coneflower Seed Production Field October 2011 (2nd year)



Prairie Coneflower Progress, Continued

Prairie Cone Flower Seed Harvest FY-2011 from One-Third Acre Production Field



Combine harvest yielded about 200 bulk lbs. of seed
(December 2011)



Seed cleaning process yielded 48 bulk lbs
or 31 pls lbs
(purity = 85.3%; germination = 75%; pls = 64 %)

How much seed is 31 pls Lbs.?

It is 7,000 times more than what we started with and accomplished in just two years

Provided with a 2-gram seed sample of Prairie coneflower

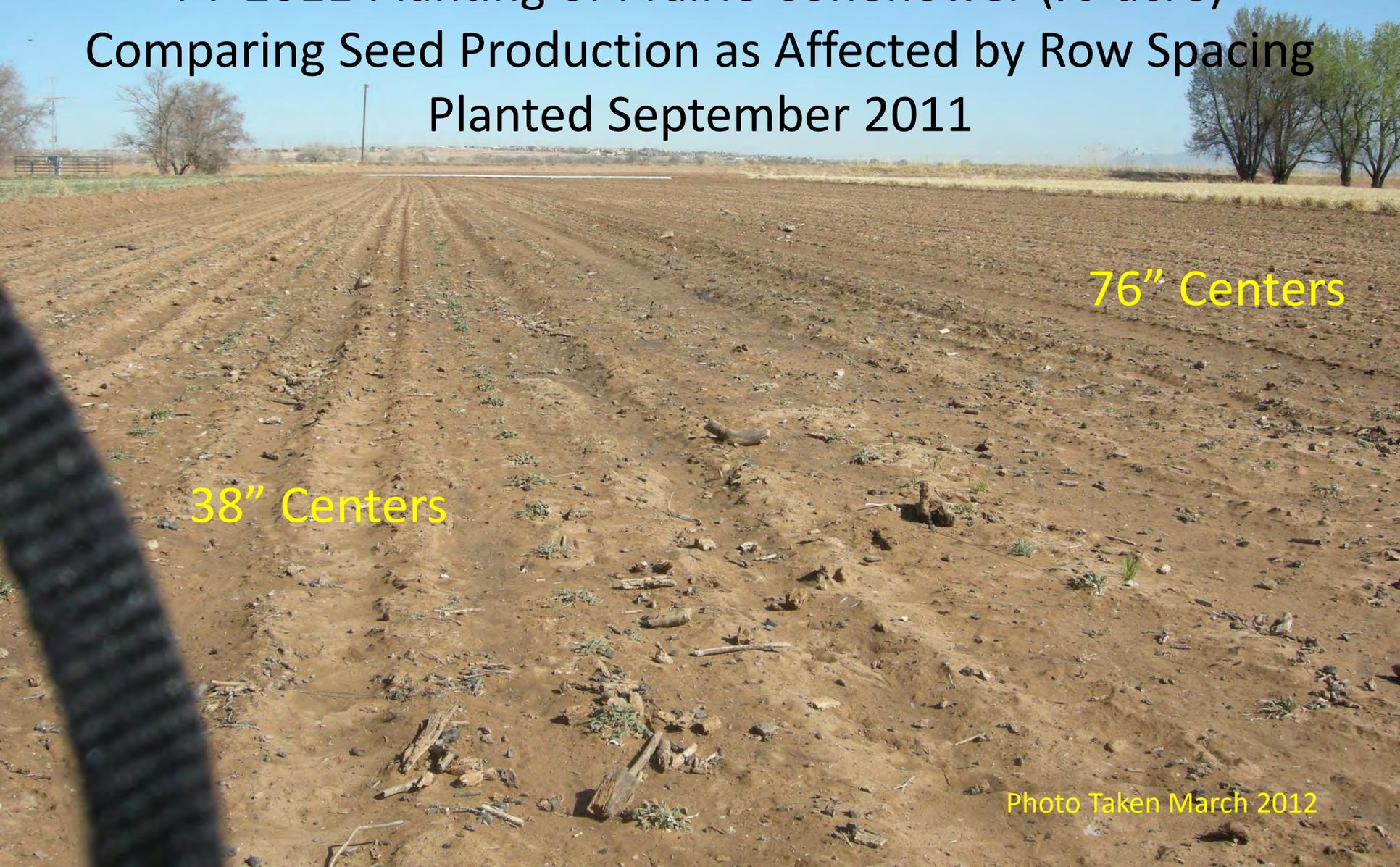
$31 \text{ pls lbs.} = 31 \text{ lbs} \times 454\text{g}/1 \text{ lb.} = 14,074\text{g}$

$14,074\text{g}/2 \text{ g} = 7,037/1$

31 pls lbs. Ready for Commercial Production

Prairie Coneflower Progress, Continued

FY-2011 Planting of Prairie Coneflower ($\frac{1}{3}$ -acre)
Comparing Seed Production as Affected by Row Spacing
Planted September 2011



38" Centers

76" Centers

Photo Taken March 2012

Pale Evening Primrose Progress



Second-year primrose plants (30) grown in raised beds at the LLPMC (June 2011)



Newly seeded primrose plug trays (February 2012)

Scarlet Gilia Progress

Scarlet Gilia Seed Production Field August 2010
(2,000 Transplants)



Irrigated 2X/month (Apr-Sep)
Applied 80 lbs N/acre (split app.)

Scarlet Gilia Progress, Continued

FY-2010 Planting



Scarlet gilia plants are dying from a root rotting pathogen (September 2010)



Plants are drenched with Subdue Maxx fungicide (September 2010)

Scarlet Gilia Progress, Continued

Same Field by October 2011



About 40 scarlet gilia plants remaining



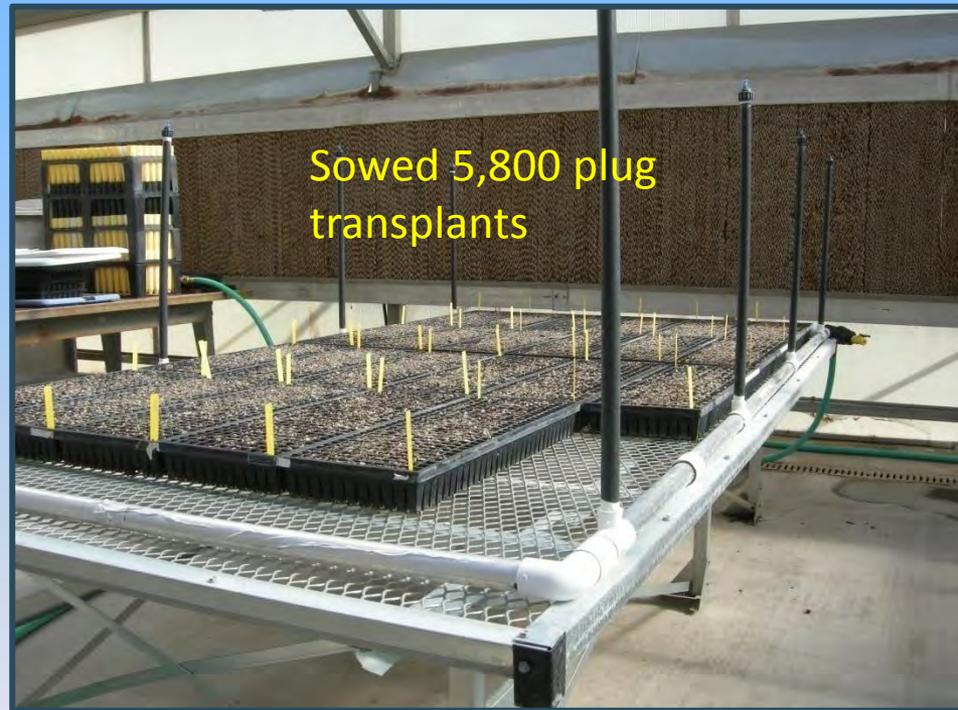
Harvested about 1 gram of seed from the 40 remaining plants (started with 6 g)

Smallflower Globemallow Progress



Smallflower Globemallow (600 transplants)

Two 300-ft. rows of smallflower globemallow
(October 2011)



Sowed 5,800 plug
transplants

Potentially 5,800 smallflower globemallow plugs (17
plug trays) enough for ½-acre field (February 2012)

New Projects for 2012

- Add new accessions of pale flower evening primrose and smallflower globemallow to the current single accessions to increase genetic diversity and therefore, area of application
- Begin working with James galleta (*Pleuraphis jamesii*)

Thank You

gregory.fenchel@nm.usda.gov



Non- Discrimination Statement

"The U.S. Department of Agriculture (USDA) prohibits discrimination in all of its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, political beliefs, genetic information, reprisal, or because all or part of an individual's income is derived from any public assistance program. (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 to USDA, Assistant Secretary for Civil Rights, Office of the Assistant Secretary for Civil Rights, 1400 Independence Avenue, S.W., Stop 9410, Washington, DC 20250-9410, or call toll-free at (866) 632-9992 (English) or (800) 877-8339 (TDD) or (866) 377-8642 (English Federal-relay) or (800) 845-6136 (Spanish Federal-relay). USDA is an equal opportunity provider and employer.