PROJECT TITLE: Western Regional Dry Pea, Lentil and Chickpea Trials

EXPERIMENT NO.: #8107; 8607; 8907

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OBJECTIVES: To evaluate dry pea, lentil and chickpea lines for grain production potential in dryland environments.

METHODS: The Western Regional Dry Pea Trial consisted of 14 smooth green and smooth yellow dry pea lines from the USDA-ARS breeding program at Pullman, Washington, along with Majoret green and Delta yellow peas as checks (**Table 1**). The Western Regional Lentil Trial consisted of 19 lentil (6 commercially separate types: Laird, Brewer, Chilean, Turkish, Eston and Pardina) lines from the USDA-ARS program, along with five checks; Brewer, CDC Richlea, Crimson, Eston and Pardina (**Table 1**). The Western Regional Chickpea Trial consisted of eight Café and White kabuli-type and one desi-type USDA-ARS breeding lines, as well as Dwelley, Sierra and Myles chickpeas as checks (**Table 1**). The trials were seeded no-till into chemical fallow barley stubble on May 3, 2005 (**Table 2**). Additional trial production methods can be found in **Table 2**.

RESULTS: Due to wet conditions in late April, the trials were seeded later (May 3rd) than desirable. As a result, yields were significantly depressed. Grain yields are reported as both harvest moisture and 12% moisture equivalent.

Dry Pea Grain Yields (at 12% moisture) averaged 1,214 lbs of dry pea production per acre at 12 (**Table 3**). Delta yellow pea had the highest grain production (1,474 lbs acre^{-1}) but was only significantly different from seven of the lines evaluated (based on $LSD_{(0.05)}$). **Kernel Weights**: The average dry pea seed size for the trial was 205.4 g 1,000 kernels^{-1} and the average test weight was 63.3 lbs bu^{-1} (**Table 3**). The yellow pea selection PS0010836 had the largest seed size (234 g 1,000 kernels^{-1}), but was only significantly larger than six other lines. Majoret green pea had the highest test weight (64.8 lbs bu^{-1}), but was only significantly higher than lines PS810162 and PS0110460 smooth green peas. **Plant Heights**: Delta yellow pea had the tallest grain maturity plant canopy height (42.0 cm) but was not significantly taller than Majoret, line PS00110827, line PS0010804, line PS011085, and line PS0110745 green peas (**Table 3**).

Lentil Grain Yields (at 12% moisture) averaged 825 lbs of lentil grain production per acre (**Table 4**). The Turkish-type line LC01602062T red lentil had the greatest production (951 lbs acre^{-1}), but was only statistically different from two other entries. **Kernel Weights**: Seed size among the lines tested ranged widely (28.0 to 73.3 g 1,000 kernels^{-1}) and averaged 48.0 g 1,000 kernels^{-1} (**Table 4**). The Laird-type lentil lines LC99602075L and LC860616L were the largest (73.3 and 72.3 g 1,000 seeds^{-1}, respectively). The test weight averaged 62.0 lbs bu^{-1}. The Turkish-type line LC01601751T had the heaviest test weight (65.3 lbs bu^{-1}), but was not statistically heavier than the Eston-type line LC02600698E and Pardina-type line LC01602245P. **Plant Heights**: Laird-type lines LC99600747L and LC99602075L had the tallest grain maturity canopy height (33.0 and 31.0 cm, respectively) (**Table 4**).

Chickpea Grain Yields (at 12% moisture) averaged 509 lbs of grain production per acre (**Table 5.**). Sierra kabuli-type chickpea produced the most grain (705 lbs acre^{-1}), but was only significantly more than Dwelley, line CA0190B839C and line CA9890233W. **Kernel Weights**: A large variation in 1,000 seed weights exists and the trial averaged 369 g 1,000 kernels^{-1}. Test weights averaged 52.9 lbs bu^{-1} (**Table 5.**) with the Café, Kabuli-type line CA0090B347C weighing the most (58.4 lbs bu^{-1}), but was only significantly (based on $LSD_{0.05}$) greater than CA0090B015W and CA0190B839C. **Plant Heights**: The average canopy height of the trial was 33.0 cm (**Table 5.**). The Desi-type line CA0090B659D and Café-type line CA0190B839C had the highest canopy heights at harvest (42.0 and 39.5 cm, respectively).

FUTURE PLANS: Western Regional dry pea and lentil trials will continue at Moccasin.

Table 1a. 2005 Western Regional Dry Pea and Lentil Trial - Variety characteristics summary.
- Exp. 81 & 860705. Central Ag. Research Center, Moccasin, MT. **{File: 810705:Character}**

PEA TRIAL:

Selection	Seed Source	Type	Useage	Seed Size [1/]	Vine Length	Leaf Type
Delta	Central Ag.	Smooth Yellow	Food/Feed	Medium	Semi-dwarf	Semi-leafless
PS9910140	USDA-ARS	Smooth Yellow	Food/Feed	Medium	Semi-dwarf	Semi-leafless
PS0010806	USDA-ARS	Smooth Yellow	Food/Feed	Medium	Semi-dwarf	Semi-leafless
PS0010836	USDA-ARS	Smooth Yellow	Food/Feed	Medium	Semi-dwarf	Semi-leafless
PS01102958	USDA-ARS	Smooth Yellow	Food/Feed	Medium	Semi-dwarf	Semi-leafless
Majoret	Central Ag.	Smooth Green	Food/Feed	Medium	Semi-dwarf	Semi-leafless
Stirling	USDA-ARS	Smooth Green	Food/Feed	Small	Semi-dwarf	Semi-leafless
PS810162	USDA-ARS	Smooth Green	Food/Feed	Medium	Semi-dwarf	Semi-leafless
PS9910592	USDA-ARS	Smooth Green	Food/Feed	Small	Semi-dwarf	Semi-leafless
PS0010792	USDA-ARS	Smooth Green	Food/Feed	Medium	Semi-dwarf	Semi-leafless
PS0010804	USDA-ARS	Smooth Green	Food/Feed	Medium	Semi-dwarf	Semi-leafless
PS0110460	USDA-ARS	Smooth Green	Food/Feed	Medium	Semi-dwarf	Semi-leafless
PS0110745	USDA-ARS	Smooth Green	Food/Feed	Small	Semi-dwarf	Semi-leafless
PS0110767	USDA-ARS	Smooth Green	Food/Feed	Medium	Semi-dwarf	Semi-leafless
PS0110805	USDA-ARS	Smooth Green	Food/Feed	Small	Semi-dwarf	Semi-leafless
PS0110827	USDA-ARS	Smooth Green	Food/Feed	Medium	Semi-dwarf	Semi-leafless

[1/] - Size Classes (g/1000 seeds): Very Large = >290-295; Medium = 190-250; Large = 250-290; Small = <190

LENTIL TRIAL:			Color		Size	
Variety	Seed Source	Type	Seedcoat	Cotyledon	Class[1/]	Maturity
Pennell	USDA-ARS	Laird	Green	Yellow	Large	Medium
LC860359L	USDA-ARS	Laird	Green	Yellow	Large	Late
LC860616L	USDA-ARS	Laird	Green	Yellow	Large	Medium
LC99600747L	USDA-ARS	Laird	Green	Yellow	Large	Unknown
LC99602075L	USDA-ARS	Laird	Green	Yellow	Large	Medium
LC01600698L	USDA-ARS	Laird	Green	Yellow	Large	Unknown
Brewer	CARC	Brewer	Green-Mottled	Yellow	Medium	Early
Merritt	USDA-ARS	Brewer	Green-Mottled	Yellow	Medium	Early
CDC Richlea	USDA-ARS	Chilean	Green	Yellow	Medium	Medium
LC01600732R	USDA-ARS	Chilean	Green	Yellow	Medium	Medium
LC01600828R	USDA-ARS	Chilean	Green	Yellow	Medium	Medium
Eston	USDA-ARS	Eston	Green	Yellow	Small	Early
LC01600736E	USDA-ARS	Eston	Green	Yellow	Small	Unknown
LC01602307E	USDA-ARS	Eston	Green	Yellow	Small	Medium
LC02600698E	USDA-ARS	Eston	Green	Yellow	Small	Unknown
Crimson	USDA-ARS	Turkish	Brown	Red	Small	Unknown
LC01602062T	USDA-ARS	Turkish	Brown	Red	Small	Very Early
LC01600405T	USDA-ARS	Turkish	Brown	Red	Small	Very Early
LC01601751T	USDA-ARS	Turkish	Brown	Red	Small	Unknown
LC02600449T	USDA-ARS	Turkish	Brown	Red	Small	Unknown
Pardina	USDA-ARS	Pardina	Purple-Mottled	Yellow	Small	Early
LC01602245P	USDA-ARS	Pardina	Purple-Mottled	Yellow	Small	Early
LC01601640P	USDA-ARS	Pardina	Purple-Mottled	Yellow	Small	Early
LC02600397P	USDA-ARS	Pardina	Purple-Mottled	Yellow	Small	Early

[2/] - Size Classes (g/1000 seeds): Large: >60-65; Medium: 50-60; Small <50

Table 1b. 2005 Western Regiona Chickpea Trial - Variety characteristics summary.
- Exp. 890705. Central Ag. Research Center, Moccasin, MT. **{File: 810705:Character}**

CHICKPEA TRIAL: Variety	Type	Class	Seed Size[1/]	Leaf Structure[2/]	*Ascochyta* Tolerance	Maturity
Myles	Desi		Very Small	Fern-like	Fair	Early
CA0090B659D	Desi		Small	Fern-like	Unkonw	Moderate
Dwelley	Kabuli	Café	Very Large	Unifoliate	Very Poor	Very Late
Sierra	Kabuli	Café	Large	Unifoliate	Unkown	Very Late
CA9783163C	Kabuli	Café	Very Large	Fern-like	Unkown	Very Late
CA99901604C	Kabuli	Café	Very Large	Fern-like	Unkown	Early
CA9990B1579C	Kabuli	Café	Very Large	Unifoliate	Unkown	Moderate
CA0090B347C	Kabuli	Café	Med-Large	Unifoliate	Unkown	Moderate
CA0190B839C	Kabuli	Café	Very Large	Unifoliate	Unkown	Moderate
CA9890233W	Kabuli	White	Very Large	Fern-like	Uknown	Late
CA9990B015W	Kabuli	White	Very Large	Fern-like	Uknown	Moderate
CA00901875W	Kabuli	White	Very Large	Fern-like	Uknown	Moderate

[1/] - Seed Size class ranges (g/1,000 seeds): Very Small: 175 - 250; Small: 250 - 350; Large: 375 - 475; Very Large: 475+

[2/] - "Fern-like" indicates a pinnately compound leaf structure

Table 2. 2005 Western Regional Dry Pea and Lentil Trials - Moccasin trial management summary.
-Exp. 81,86&890705. Central Ag Research Center, Moccasin, MT. **{File: 810705-Manage}**

Field Summary				
	Environment:	Dryland		
	Tillage History:	No-Till	Previous Crop:	Barley
Trial Management				
	Seeding Date:	5/3	Plot Dimensions:	5-rows x 11" spacing x 20'
	Fertilizer:	None		
	Pesticides: (rates)	Prowl (1.5pt/acre)+Roundup Ultra (12oz/acre)-Post Plant/Pre-Emerge (5/3/05)		
		Assure II (10oz/acre) - Post Emergence (5/27/05)		
	Harvest Dates:		Dry Pea:	8/4
	- Using a 5' plot harvestor		Lentil:	8/4&8/8
	- At grain maturity		Chickpea:	9/2
	Precipitation:	5.22"	- Pea/Lentil Crop year (5/3 - 7/31)	
		6.30"	- Chickpea Crop year (5/3 - 8/24)	
	Elevation:	4300'		

Table 3. 2005 Western Regional Dry Pea Trial - Dry-land dry pea agronomic summary.
- Exp: 810705 Central Ag Research Center, Moccasin, MT. **{File: 810705-Summary}**

		Grain Harvest				
	Plant	Grain Yield			Grain Weights	
Selection	Height	@ Harvest	Moisture	@ 12%	Test	Kernel
	cm	lbs/ac	%	lbs/ac	lbs/bu	g/1,000
Delta	**42.0** [a]	**1,483** [a]	12.5 [a]	**1,474** [a]	64.6 [a]	206.4 [a]
PS01102958	34.5	1,435 [a]	12.6 [a]	1,422 [a]	64.0 [a]	227.7 [a]
PS0010804	39.8 [a]	1,372 [a]	12.5 [a]	1,363 [a]	63.7 [a]	215.2 [a]
PS0010836	34.0	1,340 [a]	13.1 [a]	1,321 [a]	63.4 [a]	**233.8** [a]
PS9910140	35.0	1,301 [a]	13.0 [a]	1,284 [a]	63.3 [a]	215.7 [a]
PS810162	35.5	1,267 [a]	11.3	1,277 [a]	61.9	202.0 [a]
Stirling	32.5	1,259 [a]	11.7	1,262 [a]	63.1 [a]	188.3
PS0010806	34.3	1,244 [a]	12.5 [a]	1,233 [a]	63.8 [a]	233.4 [a]
PS9910592	31.8	1,223 [a]	11.6	1,229 [a]	63.7 [a]	188.1
PS0110745	39.1 [a]	1,194	11.6	1,198	62.6 [a]	188.3
PS0010792	36.5	1,135	12.2	1,132	63.8 [a]	218.3 [a]
Majoret	41.8 [a]	1,108	**13.1** [a]	1,093	**64.8** [a]	204.9 [a]
PS0110460	30.0	1,059	12.2	1,057	60.3	172.3
PS0110827	41.5 [a]	1,055	12.1	1,054	63.5 [a]	215.5 [a]
PS0110767	33.9	1,045	11.5	1,050	63.7 [a]	192.2
PS0110805	39.8 [a]	984	12.0	982	63.1 [a]	184.2
Mean (n = 64)	36.4	1,219	12.2	1,214	63.3	205.4
LSD (0.05 by t)	4.6	263	0.7	261	2.6	36.5
CV% (s/means)	8.9	15.2	4.2	15.1	2.9	12.5
F-Value (15,45 df)	5.5	2.5	4.9	2.5	1.4 [n]	2.1

[a] - Denotes values equal to highest value (in **bold**) based on $LSD_{(0.05)}$.
[n] - Denotes not statistically significant at 0.05 level.

Table 4. 2005 Western Regional Lentil Trial - Dry-land lentil agronomic summary.
- Exp: 860705 Central Ag Research Center, Moccasin, MT. **{File: 860705-Summary}**

Selection	Plant Height	Grain Yield @ Harvest	Grain Yield Moisture	Grain Yield @ 12%	Grain Weights Test	Grain Weights Kernel
	cm	lbs/acre	%	lbs/acre	lbs/bu	g/1,000
LC01602062T	27.0	**976.5** [a]	14.3 [a]	**951.1** [a]	63.5	44.6
Pennell	27.5	938.7 [a]	12.3	936.6 [a]	58.6	64.4
Pardina	24.5	961.4 [a]	15.0 [a]	927.2 [a]	64.3	38.5
LC02600698E	25.8	931.0 [a]	12.9	925.1 [a]	64.9 [a]	28.0
LC01600405T	25.8	908.7 [a]	14.4 [a]	883.0 [a]	64.0	42.5
LC860616L	29.0	882.8 [a]	13.4	869.4 [a]	58.6	72.3 [a]
LC01600736E	28.0	885.1 [a]	14.0 [a]	868.0 [a]	62.9	36.8
Eston	25.5	878.0 [a]	13.0	865.2 [a]	63.9	32.0
Merrit	29.0	872.5 [a]	14.5 [a]	845.0 [a]	59.0	62.4
LC01600698L	28.3	843.0 [a]	12.8	839.6 [a]	58.8	67.1
LC99600747L	**33.0** [a]	865.5 [a]	14.9 [a]	835.3 [a]	59.3	67.3
LC01602245P	24.3	846.4 [a]	13.9 [a]	828.4 [a]	64.6 [a]	38.3
LC01602307E	26.5	850.4 [a]	14.7 [a]	826.9 [a]	62.9	44.3
LC01601640P	24.3	843.2 [a]	14.5 [a]	818.2 [a]	63.3	38.2
LC01600732R	28.8	812.5 [a]	11.9	813.8 [a]	61.5	48.3
Brewer	29.3	826.5 [a]	13.9 [a]	809.3 [a]	59.5	56.8
LC99602075L	31.0 [a]	810.1 [a]	12.7	806.0 [a]	58.9	**73.3** [a]
Crimson	25.0	820.7 [a]	13.7 [a]	804.4 [a]	64.1	31.9
LC01600828R	27.0	809.1 [a]	**16.1** [a]	771.1 [a]	61.9	46.4
LC01601751T	29.3	779.6 [a]	13.6	766.3 [a]	**65.3** [a]	32.4
CDC Richlea	29.0	787.6 [a]	15.0 [a]	761.5 [a]	60.2	51.2
LC02600397P	27.0	757.5	13.9 [a]	744.3 [a]	64.3	33.5
LC860359L	28.5	706.4	12.7	700.6	60.1	60.7
LC02600449T	25.0	593.6	12.1	593.0	63.7	42.5
Means (*n*=96)	27.4	841.1	13.8	824.5	62.0	48.0
LSD (0.05 by t)	2.6	213.2	2.5	214.0	0.8	1.8
CV% (s/means)	6.7	18.0	13.0	18.4	1.0	2.6
F-Value (23,69 df)	5.88	1.20 [n]	1.40 [n]	1.10 [n]	64.10	492.9

[a] - Denotes values equal to highest value (in **bold**) based on $LSD_{(0.05)}$.

[n] - Denotes not statistically significant at 0.05 level.

Table 5. 2005 Western Regional Chickpea Trial - Dry-land chickpea agronomic summary.
- Exp: 890705 Central Ag Research Center, Moccasin, MT. **{File: 890705-Summary}**

Selection	Plant Height	Grain Yield @ Harvest	Moisture	Grain Yield @ 12%	Grain Weights Test	Kernel
	cm	lbs/ac	%	lbs/ac	lbs/bu	g/1,000
Sierra	37.3	**679.5** [a]	8.58 [a]	**705.0** [a]	57.4 [a]	413.9 [a]
CA0090B347C	33.0	662.9 [a]	**8.93** [a]	686.0 [a]	**58.4** [a]	394.5 [a]
CA0090B015W	30.0	588.3 [a]	8.55 [a]	611.0 [a]	41.9	373.1
Myles	26.3	538.2 [a]	8.58 [a]	559.0 [a]	57.4 [a]	148.9
CA9990B1579C	37.3	500.5 [a]	8.70 [a]	519.5 [a]	55.4 [a]	417.7 [a]
CA0090B659D	**42.0** [a]	490.4 [a]	7.63	514.8 [a]	54.7 [a]	212.8
CA9990I604C	30.3	490.7 [a]	8.35	511.3 [a]	55.0 [a]	411.8 [a]
CA0090I875W	27.8	458.5 [a]	8.70 [a]	474.3 [a]	51.5 [a]	431.8 [a]
CA9783163C	30.0	428.6 [a]	8.50	445.5 [a]	54.6 [a]	402.3 [a]
Dwelley	34.3	387.5	8.73 [a]	401.5	55.7 [a]	409.2 [a]
CA0190B839C	39.5 [a]	341.0	8.53 [a]	354.3	41.8	**435.5** [a]
CA9890233W	28.8	317.4	8.20	331.0	51.2 [a]	371.3
Means (n=48)	33.0	490.3	8.50	509.4	52.9	368.6
LSD (0.05 by t)	3.5	259.3	0.42	267.0	15.4	41.7
CV% (s/means)	7.3	36.8	3.4	36.4	20.2	7.9
F-Value (11,33 df)	17.14	1.62	5.18	1.64	1.09	39.35

[a] - Denotes values equal to highest value (in **bold**) based on $LSD_{(0.05)}$.

[n] - Denotes not statistically significant at 0.05 level.