PROJECT TITLE: 2008 Western Regional Spring Dry Pea and Lentil Evaluations

EXPERIMENT NOs.: #8108 & 8608

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OBJECTIVES: To evaluate dry pea and lentil selections from the USDA-ARS Grain Legume Genetics and Physiology program in Pullman, Washington, for grain production potential in Central Montana.

METHODS: The 2008 Western Regional Spring Pulse Trials were conducted on-station at the Central Agricultural Research Center, near Moccasin, Montana. The Dry Pea Line evaluations consisted of 10 selections, of which, two are recent USDA-ARS smooth green variety releases that are commercially available (Stirling and Medora), four are experimental smooth green lines and four are experimental smooth yellow lines (**Table 1a**). The dry pea trial was incorporated with a larger variety trial and was seeded no-till into barley stubble on April 10, 2008. The trial was harvested in entirety on August 1, 2008 (**Table 2**). The spring lentil line evaluation consisted of 22 selections, of which, six were commercially available varieties (Eston, Pardina, Crimson, Merrit, Richlea and Riveland). The remaining 16-lines were separated by five "Types" and included four "Eston-type", five "Pardina-type", four "Turkish Red" or "Crimson-type", one "Richlea-type" and two "Laird-type" (**Table 1b**). The lentil trial was seeded no-till into winter wheat stubble on April 13, 2008 and was harvested starting Aug 10th and finished on Aug 13, 2008 (**Table 2**). Additional trial production methods can be found in **Table 2**.

RESULTS:
Dry Pea Grain Yields were much below long-term means and is thought to be due to poor sub-soil moisture, a hail storm, snow and record lows in mid-June, and an insect (pea leaf weevil) infestation. The trial grain yield mean was 1,038 lbs acre^{-1} (converted to 13% grain moisture - field grain moisture was 923 lbs acre^{-1}; **Table 3**). The smooth yellow line PS03101822 had the greatest grain production at 13% moisture, averaging 1,282 lbs acre^{-1}, but was not significantly greater than the smooth green line PS03101445 (based on $LSD_{0.05}$). **Kernel Weights**, measured as test weight, averaged 62.7 lbs bu^{-1} (**Table 3**). Smooth yellow line PS04100710 had the largest test weight (63.2 lbs bu^{-1}), but was only significantly heavier than two other lines (Medora smooth green and PS03101822 smooth yellow). **Plant Heights** were measured at physiological maturity (July 21, 2008) and just prior to grain harvest (**Table 3**). Medora smooth green was reported as having the tallest canopy height (significant at physiological maturity). **Flowering** occurred around June 29, 2008 (**Table 3**) with the smooth green lines PS04100505 and Stirling reaching flowering first on June 27 (not statistically significant at 5% level).

Lentil Grain Yields averaged (at 13% moisture) 1,688 lbs acre^{-1}, which was the best Western Regional lentil production at Moccasin since the 2000 crop-year, which averaged an all-time best of 2300 lbs acre^{-1} at 13% grain moisture (**Table 4**). At field grain moisture, the Turkish-red line LC01601724T had the highst grain production (not significant). When yields were converted to 13% grain moisture, Eston had the greatest grain production (1,883 lbs acre^{-1}; not significant based on $LSD_{0.05}$). **Test Weights** averaged 63.2 lbs bu^{-1} (**Table 4**). The Pardina-type line LC03601426P had the heaviest test weight (not statistically significant, based on $LSD_{0.05}$). **Plant Heights** at grain maturity averaged 30.3 cm with the Laird-type Riveland lentil having the tallest (not significant) grain height (36.3 cm; **Table 4**).

FUTURE PLANS: Future testing of the dry pea and lentil lines from the Grain Legume Genetics and Physiology program at the USDA-ARS Pullman, Washington location is uncertain.

Table 1a. 2008 Western Regional Spring Dry Pea Line Evaluations - Line Characteristic Table -Exp. 8008. Central Agricultural Research Center, Moccasin, Montana.

Variety	Color	Type	Size[1/]	Relative Maturity
Stirling	Smooth Green	Food/Feed	Medium	Early
Medora	Smooth Green	Food/Feed	Medium	Late
PS04100328	Smooth Green	Food/Feed	Large	Medium
PS04100462	Smooth Green	Food/Feed	Medium	Medium
PS04100505	Smooth Green	Food/Feed	Medium	Early
PS03101822	Smooth Yellow	Food/Feed	Medium	Medium
PS04100710	Smooth Yellow	Food/Feed	Medium	Medium
PS04100910	Smooth Yellow	Food/Feed	Large	Medium
PS04100922	Smooth Yellow	Food/Feed	Medium	Medium

[1/] - Seed Size Ranges (g/1000 seeds) : Very Large = >290-295 Medium = 190-250
- {Size of seed at planting} Large = 250-290 Small = <190

Table 1b. 2008 Western Regional Spring Lentil Line Evaluation - Line Characteristics - Exp: 860708. Central Agricultural Research Center, Moccasin, Montana

Line	Seed Coat	Cotyledon	Type	Size[1/]	Relative Maturity
Eston	Yellow-Green	Yellow	Eston	Small	Early
LC01602307E	Yellow-Green	Yellow	Eston	Small	Moderate
LC03601590E	Yellow-Green	Yellow	Eston	Small	Moderate
LC05600810E	Yellow-Green	Yellow	Eston	Small	Moderate
LC05600812E	Yellow-Green	Yellow	Eston	Small	Moderate
Pardina	Brown	Yellow	Pardina	Small	Early
LC02601144P	Brown	Yellow	Pardina	Small	Early
LC03600204P	Brown	Yellow	Pardina	Small	Early
LC03601426P	Brown	Yellow	Pardina	Small	Early
LC04600350P	Brown	Yellow	Pardina	Small	Early
LC05600995P	Brown	Yellow	Pardina	Small	Early
Crimson	Brown	Red/Orange	Crimson	Small	Moderate
LC01601724T	Brown	Red/Orange	Turkish Red	Small	Moderate
LC01602062T	Brown	Red/Orange	Turkish Red	Small	Early
LC04600751T	Brown	Red/Orange	Turkish Red	Small	Moderate
LC05600840T	Brown	Red/Orange	Turkish Red	Small	Moderate
Merrit	Yellow-Green-Mottled	Yellow	Brewer	Large	Early
Richlea	Yellow-Green	Yellow	Richlea	Medium	Moderate
LC01602300R	Yellow-Green	Yellow	Richlea	Medium	Moderate
Riveland	Yellow-Green	Yellow	Laird	Large	Moderate
LC03600854L	Yellow-Green	Yellow	Laird	Large	Late
LC04600705L	Yellow-Green	Yellow	Laird	Large	Late

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

Table 2. 2008 Western Regional Spring Pulse Line Evaluations - Management summary.
-Exp. 81 & 860708. Central Agricultural Research Center, Moccasin, Montana

Field Summary		
	Dry Pea	**Lentil**
Environment:	Dryland	Dryland
Tillage History:	No-Till	No-Till
Previous Crop:	Spring Barley	Winter Wheat
Soil Type:	Judith Clay-loam; Fine-loamy; carbonatic Typic Calciboroll	
Elevation:	4300'	

Trial Management	**Dry Pea**	**Lentil**
Seeding Date:	4/10/2008	4/13/2008
Fertilizer:	None	
Plot Dimensions:	5-rows x 11" spacing x 20'	
Pesticides: (rates)		
	RT 3 (16oz/acre) + ProwlH_2O (2pt/acre) - Fall App (11/07/08) - Pea	
	RT 3 (14oz/acre) - Pre-Plant App (04/11/08) - Lentil	
	Assure II (10oz/acre) - Post Emergence (05/29/07) - All	
Harvest Date:	8/1/08	8/7&11/2008
- Using a 5' plot harvestor		
- At grain maturity		

			(99-Yr Ave)	
Precipitation:	Dry Pea	7.98"	8.57"	- April 10 - Aug 1, 2008
	Lentil	8.23"	8.92"	- April 13 - Aug 7, 2008

Table 3. 2008 Western Regional Spring Dry Pea Trial - Agronomic Summary
- Exp: 810708. Central Agricultural Research Center, Moccasin, MT

			Plant Canopy Height		Ease of			Grain Yield	
Selection	1st Flower		Phys Mat.	Grain Mat.	Harvest[1/]	Test	Moisture	Field	@13%
	(Julian)	(day)	(cm)	(cm)	(Grn/Phys)	(lbs/bu)	(%)	(lbs/acre)	(lbs/acre)
Stirling	179.3	27-Jun [a]	27.5	26.3	1.00	62.6 [a]	11.0	865	1025
Medora	183.0	1-Jul	**44.3** [a]	**40.3** [a]	0.92	62.3	11.5	805	912
PS03101445	182.5	30-Jun	32.8	31.5	0.97	62.7 [a]	11.3	980 [a]	1123 [a]
PS04100328	181.3	29-Jun	34.3	37.0 [a]	**1.11** [ns]	62.8 [a]	**12.5** [a]	951 [a]	995
PS04100462	181.8	29-Jun	31.8	30.0	0.96	62.7 [a]	11.7	935	1045
PS04100505	**179.0**	**27-Jun** [a]	25.0	25.0	1.00	62.7 [a]	11.3	905	1046
PS03101822	180.3	28-Jun [a]	30.8	32.3	1.05	62.3	11.7	**1149** [a]	**1282** [a]
PS04100710	180.5	28-Jun	28.5	28.8	1.02	**63.2** [a]	11.8	887	987
PS04100910	180.3	28-Jun [a]	31.0	28.3	0.91	62.7 [a]	11.3	851	978
PS04100922	182.8	30-Jun	28.3	29.3	1.06	62.8 [a]	11.9 [a]	899	984
Means (n = 40)	181.1	29-Jun	31.4	30.9	1.00	62.7	11.6	923	1038
$LSD_{0.05}$ (by t)		1.5	6.1	4.8	0.26	0.7	0.6	203	234
CV% (s/means)		0.55	13.45	10.66	17.79	0.823	3.314	15.13	15.53
F-Value (9,27 df)		8.1	6.24	8.16	0.49	1.02	4.7	1.83	1.61

[a] - denotes values equal to highest (lowest - Flower Date) values (in **bold**) based on $LSD_{0.05}$

[ns] - indicates value is not significantly higher than other values (based on $LSD_{0.05}$)

[1/] - Ease of Harvest represents the degree of plant height shrinkage from physiological to grain-ripe maturity

Table 4. 2008 Western Regional Spring Lentil Line Evaluations - Agronomic Summary - Exp: 860708. Central Agricultural Research Center, Moccasin, MT

Selection	Canopy Height	Test Weight	Grain Yield: @ Harvest	Grain Moisture	Grain Yield: @ 13% Moist
	(cm)	(lbs/bu)	(lbs/acre)	(%)	(lbs/acre)
Eston	30.3 [a]	63.6	1430	9.9	**1883** [a]
LC01602307E	32.3 [a]	62.9	1459 [a]	11.0	1731 [a]
LC03601590E	31.7 [a]	63.2	1457 [a]	10.4	1815 [a]
LC05600810E	27.7	63.9	1460 [a]	10.9	1746 [a]
LC05600812E	29.7	63.8	1503 [a]	11.2	1750 [a]
Pardina	27.0	64.7	1366	10.9	1635
LC02601144P	31.1 [a]	64.7	1469 [a]	10.4	1828 [a]
LC03600204P	28.6	65.4 [a]	1456 [a]	10.8	1752 [a]
LC03601426P	30.1 [a]	**65.7** [a]	1343	10.2	1713 [a]
LC04600350P	24.6	65.4 [a]	1334	10.3	1678
LC05600995P	27.1	65.1	1341	10.6	1646
Crimson	26.0	63.5	1282	10.1	1650
LC01601724T	27.3	65.6 [a]	**1575** [a]	11.1	1838 [a]
LC01602062T	31.0 [a]	63.5	1318	10.7	1605
LC04600751T	26.7	65.7 [a]	1374	9.9	1800 [a]
LC05600840T	30.7 [a]	65.3 [a]	1249	10.2	1595
Richlea	33.1 [a]	60.7	1395	10.9	1655
LC01602300R	33.0 [a]	61.8	1472 [a]	10.6	1806 [a]
Merrit	33.7 [a]	58.9	1221	10.4	1532
Riveland	**36.3** [a]	57.8	1266	10.7	1539
LC03600854L	34.0 [a]	58.4	1397	**11.8** [a]	1546
LC04600705L	34.0 [a]	59.5	1083	10.1	1402
Means (n = 66)	30.3	63.2	1375	10.6	1688
$LSD_{0.05}$ (by t)	6.5	0.5	134	0.4	186
CV% (s/means)	12.90	0.48	5.89	2.34	6.66
F-value (21,36 df)	1.89	206.23	5.63	10.29	3.48

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