

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 nine smooth green and smooth yellow dry pea lines from the USDA-ARS breeding program at Pullman, Washington, along with Delta yellow and Majoret, Stirling and Medora green peas as checks (**Table 1a**). The Western Regional Lentil Trial consisted of 14 lentil (6 commercially separate types: Laird, Brewer, Chilean, Turkish, Eston and Pardina) lines from the USDA-ARS program, along with eight checks; CDC Vantage, Pennell, Brewer, Merritt, CDC Richlea, Crimson, Eston and Pardina (**Table 1a**). The Western Regional Chickpea Trial consisted of seven Café and White kabuli-type USDA-ARS breeding lines, as well as Dwelley, Dylan and Sierra chickpeas as checks (**Table 1b**). The dry pea and lentil trials were seeded no-till into chemical fallow barley stubble on April 24, 2007 (**Table 2**). The chickpea trial was seeded into tilled fallow on April 25, 2007. Additional trial production methods can be found in **Table 2**.

RESULTS:

Dry Pea Grain Yields averaged 1,422 lbs of dry pea production per acre (**Table 3**). Delta smooth yellow pea had the highest grain production (1,627 lbs acre⁻¹) but was not significantly higher than eight other pea lines (based on LSD_(0.05)). **Kernel Weights:** Kernel weights averaged 199.5 g 1,000-kernels⁻¹. The smooth green line PS03101340 had the heaviest seed weight (235.5 g 1000⁻¹; significant based on LSD_(0.05)). The average test weight was 63.9 lbs bu⁻¹ (**Table 3**). Delta yellow pea had the highest test weight (65.0 lbs bu⁻¹; significant based on LSD_(0.05)). **Plant Heights:** Green pea line PS3101340 had the tallest mature (grain-ripe) plant canopy height measuring 59.0 cm (23.2 in) but was not significantly (based on LSD_(0.05)) taller than six other selections (**Table 3**).

Lentil Grain Yields Lentil yields were suppressed and may have been due to a growing nematode problem in adjacent fields (not confirmed in field trial established). The trial averaged 955.1 lbs per acre (**Table 4**). The “Brewer”-type lentil, Merrit, produced the most seed, averaging 1128.0 lbs acre⁻¹, but was not statistically higher (based on LSD_(0.05)) than eight other lines. **Kernel Weights:** The test weight averaged 62.4 lbs bu⁻¹. The Turkish-type lines LC03600482T and LC02601276T had the heaviest test weights (66.5 lbs bu⁻¹; statistically significant based on LSD_(0.05)). **Plant Heights:** Laird-type Riveland lentil had the tallest grain maturity canopy height (35.5 cm), but was not significantly taller than four other lines (**Table 4**).

Chickpea Grain Yields averaged 758.5 lbs of grain production per acre (**Table 5**). Dylan kabuli-type chickpea produced the most grain (978.8 lbs acre⁻¹), but was significantly similar to line CA0090B347C (based on LSD_(0.05)). **Kernel Weights:** The trial had an average test weight of 56.3 lbs bu⁻¹ (**Table 5**). The Café, Kabuli-type line CA0090B347C had the highest test weight (58.1 lbs bu⁻¹), but was not different from four other lines. **Plant Heights:** The average canopy height of the trial was 39.4 cm (**Table 5**). The kabuli-type line CA0190B839C had the highest canopy height at harvest (45.8 cm).

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

Table 1a. 2007 Western Regional Dry Pea and Lentil Line Evaluation Trial - Cultivar Characteristics
 - Exp. 8#0707. Central Ag. Research Center, Moccasin, MT. {File: 800707:WRCharacter}

PEA TRIAL:						
Selection	Seed Source	Type	Useage	Seed Size ^{1/}	Vine Length	Leaf Type
Majoret	Central Ag.	Smooth Green	Food/Feed	Medium	Semi-dwarf	Semi-leafless
Delta	Central Ag.	Smooth Yellow	Food/Feed	Medium	Semi-dwarf	Semi-leafless
Stirling	USDA-ARS	Smooth Green	Food/Feed	Small	Semi-dwarf	Semi-leafless
Medora	USDA-ARS	Smooth Green	Food/Feed	Small	Semi-dwarf	Semi-leafless
PS02100107	USDA-ARS	Smooth Green	Food/Feed	Medium	Semi-dwarf	Semi-leafless
PS03101340	USDA-ARS	Smooth Green	Food/Feed	Large	Semi-dwarf	Semi-leafless
PS03101445	USDA-ARS	Smooth Green	Food/Feed	Medium	Semi-dwarf	Semi-leafless
PS03101459	USDA-ARS	Smooth Green	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
PS03100278	USDA-ARS	Smooth Yellow	Food/Feed	Medium	Semi-dwarf	Semi-leafless
PS03100280	USDA-ARS	Smooth Yellow	Food/Feed	Medium	Semi-dwarf	Semi-leafless
PS03101822	USDA-ARS	Smooth Yellow	Food/Feed	Large	Semi-dwarf	Semi-leafless

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

LENTIL TRIAL:				Color	Size	
Variety	Seed Source	Type	Seedcoat	Cotyledon	Class ^{2/}	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	Early
LC01600724L	USDA-ARS	Laird	Green	Yellow	Medium	Late
LC02600793L	USDA-ARS	Laird	Green	Yellow	Large	Medium
Brewer	CARC	Brewer	Green-Mottled	Yellow	Medium	Early
Merritt	USDA-ARS	Brewer	Green-Mottled	Yellow	Medium	Early
CDC Vantage	CARC	Chilean	Green	Yellow	Medium	Medium
CDC Richlea	USDA-ARS	Chilean	Green	Yellow	Medium	Medium
LC01602300R	USDA-ARS	Chilean	Green	Yellow	Medium	Medium
LC02600193R	USDA-ARS	Chilean	Green	Yellow	Medium	Early
Eston	USDA-ARS	Eston	Green	Yellow	Small	Early
LC01602273E	USDA-ARS	Eston	Green	Yellow	Small	Early
LC01602307E	USDA-ARS	Eston	Green	Yellow	Small	Medium
LC03601590E	USDA-ARS	Eston	Green	Yellow	Small	Medium
Crimson	USDA-ARS	Turkish	Brown	Red	Small	Medium
LC01602062T	USDA-ARS	Turkish	Brown	Red	Small	Early
LC02601276T	USDA-ARS	Turkish	Brown	Red	Small	Late
LC03600482T	USDA-ARS	Turkish	Brown	Red	Small	Early
Pardina	USDA-ARS	Pardina	Purple-Mottled	Yellow	Small	Early
LC02601144P	USDA-ARS	Pardina	Purple-Mottled	Yellow	Small	Early

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

Table 1b. 2007 Western Regional Chickpea Line Evaluation - Cultivar characteristics summary.
 - Exp. 890707. Central Ag. Research Center, Moccasin, MT. {File: 890707:Character}

CHICKPEA TRIAL:						
Variety	Type	Class	Seed Size ^{1/}	Leaf Structure ^{2/}	Ascochyta Tolerance	Maturity
Dwellely	Kabuli	Café	Very Large	Unifoliate	Very Poor	Very Late
Dylan (CA99901604C)	Kabuli	Café	Very Large	Fern-like	Unkown	Early
Sierra	Kabuli	Café	Large	Unifoliate	Unkown	Very Late
CA9783163C	Kabuli	Café	Very Large	Fern-like	Unkown	Very Late
CA9990B1579C	Kabuli	Café	Very Large	Unifoliate	Unkown	Moderate
CA0090B347C	Kabuli	Café	Med-Large	Unifoliate	Unkown	Moderate
CA0190B839C	Kabuli	Café	Very Large	Unifoliate	Unkown	Moderate
CA0290B730C	Kabuli	Café	Very Large	Unifoliate	Unkown	Moderate
CA9890233W	Kabuli	White	Very Large	Fern-like	Uknown	Late
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. 2007 Western Regional Dry Pea Line Evaluations - Management summary.
 -Exp. 810707. Central Ag Research Center, Moccasin, MT. {File: 800007:MngWR}

Field Summary	
Environment:	Dryland
Tillage History:	No-Till
Previous Crop:	Spring Barley
Soil Type:	Judith Clay-loam; Fine-loamy; carbonatic Typic Calciboroll
Elevation:	4300'
Trial Management	
Seeding Date:	Pea/Lentil: 4/24/2007 Chickpea: 4/25/2007
Fertilizer:	None
Plot Dimensions:	5-rows x 11" spacing x 20'
Pesticides: (rates)	
RT 3 (16oz/acre) + ProwlH ₂ O (2pt/acre) - Fall App (11/07/06) - Pea/Lentil	
Assure II (10oz/acre) - Post Emergence (5/17/07) - All	
Quadris (12 oz/acre) - (6/12 & 6/26/07) - on Chickpeas; Ascochyta present	
Harvest Date:	Pea: 7/25/07 Lentil: 7/27/07 Chickpea: 8/21/07
- Using a 5' plot harvester	
- At grain maturity	
Precipitation:	8.32" Pea/Lentil - April 24 - July 25, 2007
	9.06" Chickpea - April 24 - Aug 21, 2007
	6.87" - April 1 - July 31 (98-Yr Average)

Table 3. 2007 Western Regional Spring Pea Selection Evaluations - Agronomic Summary.
 -Exp: 810707. Central Agricultural Research Center, Moccasin, MT **{File:800707:SUMWR}**

Selection	Canopy Height	Yield	Moisture	Grain Weights	
				Test	Kernel
Majoret	54.3 ^a	1290	11.5	64.4	185.8
Delta	52.8	1627 ^a	12.1 ^a	65.0 ^a	202.1
Stirling	45.5	1360	11.0	63.4	178.3
Medora	58.0 ^a	1007	11.6	63.3	167.1
PS0010836	45.3	1551 ^a	11.6	63.4	213.3
PS01102958	44.3	1409 ^a	11.7 ^a	64.6	218.1
PS02100107	47.8	1495 ^a	11.3	64.0	194.6
PS03100278	57.0 ^a	1440 ^a	11.0	64.0	206.0
PS03100280	55.5 ^a	1549 ^a	11.3	64.3	209.6
PS03101340	59.0 ^a	1486 ^a	10.9	62.8	235.5 ^a
PS03101445	54.3 ^a	1408 ^a	11.2	63.3	178.4
PS03101459	56.5 ^a	1301	11.6	64.4	187.4
PS03101822	45.8	1562 ^a	11.4	63.4	218.0
Means (<i>n</i> = 52)	52.0	1422	11.4	63.9	199.5
LSD _{0.05} (by t)	6.0	237	0.4	0.4	8.0
C.V. % (s/means)	8.02	11.63	2.71	0.48	2.8
F-Value (12, 36 df)	6.88	3.81	4.6	18.33	49.43

^a - denotes values equal to the largest value (in **bold**) based on LSD_{0.05}.

Table 5. 2007 Western Regional Chickpea Trial - Agronomic Summary
 -Exp: 890707. Central Ag. Research Center, Moccasin, MT **{File: 890707:Sum}**

Selection	Canopy Height	Grain Yield	Moisture	Test Weight
	cm	lbs/acre	%	lbs/bu
Dwellely	40.8	578.4	11.0 ^a	56.5
Dylan (CA9990I604C)	34.0	978.8 ^a	10.6	54.8
Sierra	40.5	604.8	11.1 ^a	57.6 ^a
CA9783163C	38.5	764.4	11.0 ^a	56.1
CA9990B1579C	41.0	709.7	11.2 ^a	57.2 ^a
CA0090B347C	40.8	932.4 ^a	10.8 ^a	58.1 ^a
CA0190B839C	45.8 ^a	667.9	11.1 ^a	57.5 ^a
CA0290B730C	41.0	789.6	11.1 ^a	55.9
CA9890233W	35.5	802.2	10.7	55.0
CA9990I875W	36.0	756.4	10.7	54.9
Means (<i>n</i> = 40)	39.4	758.5	10.9	56.3
LSD _{0.05} (by t)	3.9	148.4	0.4	0.9
C.V. % (s/means)	6.7	13.49	2.601	1.137
F-Value (9, 27 df)	6.75	6.3	2.28	14.05

^a - denotes values equal to the largest value (in **bold**) based on LSD_{0.05}.

Table 4. 2007 Western Regional Spring Lentil Selection Evaluation - Agronomic Summary.
 -Exp: 860707. Central Agricultural Research Center, Moccasin, MT {FILE: 860707:Sum}

Selection	Canopy Height cm	Yield	Moisture	Grain Weights	
				Test	Kernel
Pennell	27.3	795.4	9.7	58.7	Not
Riveland	35.5 ^a	918.6	9.6	58.5	Complete
LC99602075L	31.5 ^a	828.4	9.5	58.4	
LC02600793L	32.0 ^a	861.8	10.1	59.3	
Merrit	33.0 ^a	1128.0 ^a	9.4	59.0	
Brewer	31.8 ^a	953.2	9.5	60.1	
Eston	28.3	986.8 ^a	9.5	64.1	
LC01602273E	30.5	1019.0 ^a	9.9	63.7	
LC01602307E	29.0	989.2 ^a	10.4 ^a	62.8	
LC03601590E	27.0	944.4	9.8	62.8	
Pardina	24.5	1018.0 ^a	10.1	65.0	
LC01602245P	26.5	1069.0 ^a	10.1	65.4	
LC02601144P	28.0	918.4	10.1	65.5	
Vantage	30.8	1016.0 ^a	9.6	62.4	
Richlea	30.8	981.8 ^a	10.0	60.2	
LC01602300R	30.3	1017.0 ^a	9.9	61.2	
Crimson	25.8	953.7	9.6	64.0	
LC01602062T	27.3	956.3	9.6	64.2	
LC02601276T	28.8	889.2	9.4	66.5 ^a	
LC03600482T	28.3	857.9	9.2	66.5 ^a	
Means (<i>n</i> = 80)	29.3	955.1	9.7	62.4	
LSD _{0.05} (by t)	4.6	161.6	0.4	0.4	
CV% (<i>s</i> / <i>means</i>)	11.06	11.95	2.584	0.455	
F-Value (19, 57 df)	2.77	2.07	6.45	387.17	

^a - Indicates values equal to highest value (in **bold**) based on LSD_{0.05}.