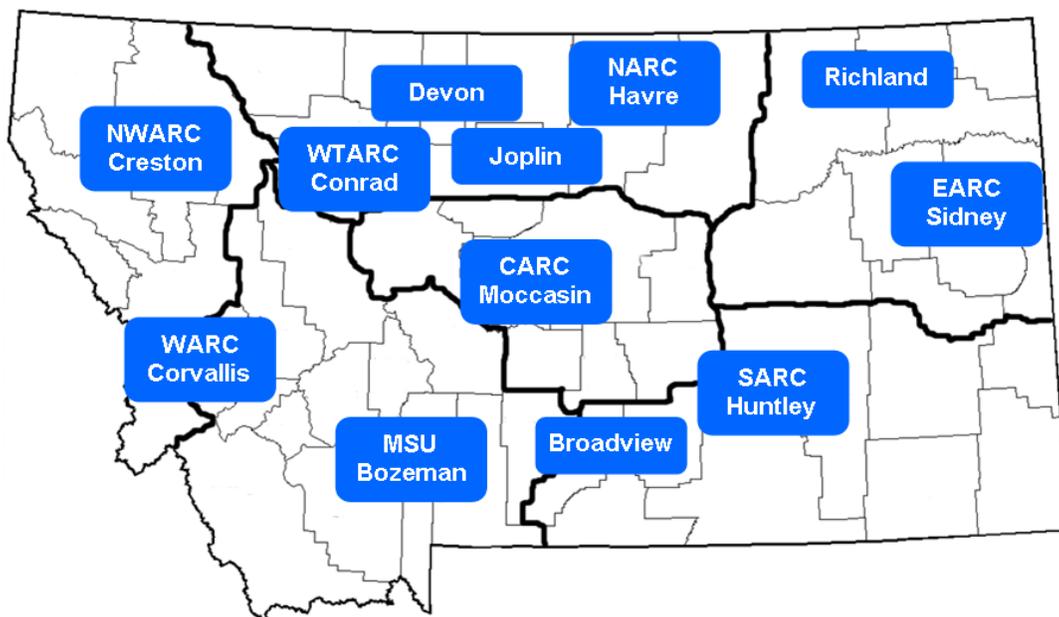


2012 Report for Montana Statewide Spring Pulse Variety Evaluations

*Prepared by
Johnna Heser, Yesuf Mohammed and Chengci Chen*



**Montana State University
Montana Agricultural Experiment Stations**

For more information, visit our Annual Reports section at:
<http://ag.montana.edu/carc/>



Table of Contents:

Cooperators.....2

Project Description and Objectives5

Weather Data6

Summary of Locations7

Site Management8

Spring Peas9

Statewide Pea Variety Evaluations9

Yellow Varieties11

Green Varieties17

Statewide Pea Multi-Year Summaries.....23

Western Regional Pea Variety Evaluations27

Spring Lentils31

Statewide Lentil Variety Evaluations.....31

Statewide Lentil Multi-Year Summaries.....38

Western Regional Lentil Variety Evaluations40

Chickpea Variety Evaluations44

Cooperators:

These pulse crops trials were made possible, in part, by the generosity and grant funding support from the Northern Pulse Growers Association and the USA Dry Pea and Lentil Council. Private breeding and seed trading companies also paid fees for varieties they submitted in these trials. As with any trial, many individuals were involved and need to be acknowledged for their help in the successful completion of the 2012 Variety Evaluation Trials. The following list is not inclusive, as there are others who may not be listed but were just as vital in the success of these trials.

Montana State University:

Chengci Chen
Cropping Systems Associate Professor
Central Ag Research Center
52583 US Hwy 87
Moccasin, MT 59462
(406) 423-5421
cchen@montana.edu

Peggy Lamb
Research Scientist
Northern Ag Research Center
3710 Assiniboine Road
Havre, MT 59501
(406) 265-6115
plamb@montana.edu

Yesuf Mohammed
Research Associate
Central Ag Research Center
52583 US Hwy 87
Moccasin, MT 59462
(406) 423-5421
yesuf.mohammed@montana.edu

John Miller
Research Associate
Western Triangle Ag Research Center
9546 Old Shelby Road
Conrad, MT 59425
(406) 278-7707
jhmiller@montana.edu

Johnna Hesper
Research Assistant III
Central Ag Research Center
52583 US Hwy 87
Moccasin, MT 59462
(406) 423-5421
johnna.hesper@montana.edu

Brooke Bohannon
Research Assistant III
Northwestern Ag Research Center
4570 Hwy 35
Kalispell, MT 59901
(406) 755-4303
brooke.bohannon@montana.edu

Marty Knox
Research Specialist
Western Ag Research Center
580 Quast Lane
Corvallis, MT 59828
(406) 961-3025
mknox@montana.edu

Joyce Eckhoff
Research Agronomist
Eastern Ag Research Center
1501 North Central
Sidney, MT 59270
(406) 433-2208
joyce.eckhoff@montana.edu

Kent McVay
Assistant Professor, Cropping Systems
Southern Ag Research Center
748 Railroad Hwy
Huntley, MT 59037
(406) 348-3400
kmcvay@montana.edu

Qasim Khan
Research Associate
Southern Ag Research Center
748 Railroad Hwy
Huntley, MT 59037
(406) 348-3400
qkhan@montana.edu

Perry Miller
Professor
Montana State University
Land Resources & Environmental Sciences
Bozeman, MT 59717
(406) 994-5431
pmiller@montana.edu

Jeff Holmes
Research Associate
Montana State University
Land Resources & Environmental Sciences
Bozeman, MT 59717
(406) 994-5138
jholmes@montana.edu

Shelley Mills
Valley County Extension Agent
501 Court Square
Glasgow, MT 59230
(406) 228-6241
smills@montana.edu

Bobbie Roos
Daniels County Extension Agent
106 Railroad Ave East
Scobey, MT 59263
(406) 487-2861
broos@montana.edu

North Dakota State University:

Kevin McPhee
Pulse Breeder
North Dakota State University
Fargo, ND
(701) 231-8156
Kevin.McPhee@ndsu.edu

USDA – Agricultural Research Service:

George Vandemark
Research Geneticist
USDA-ARS
Pullman, WA 99164
(509) 335-7728
George.vandemark@ars.usda.gov

Rebecca McGee
Research Geneticist
USDA-ARS
Pullman, WA 99164
(509) 335-0300
Rebecca.mcgee@ars.usda.gov

Industry:

USA Dry Pea & Lentil Council
2780 W. Pullman Road
Moscow, ID 83843
(208) 882-3023
pulse@pea-lentil.com
www.pea-lentil.com

Northern Pulse Growers Association
1710 Burnt Boat Drive
Bismarck, ND 58503
(701) 222-0128
info@northernpulse.com
www.northernpulse.com

Kurt Braunwart & Mike Wood
ProGene Plant Research
1720 Industrial Lane
Othello, WA 99344
(509) 488-3977
kurt@progenellc.com
www.porgenellc.com

Mike Strand
Pulse USA
1900 Commerce Drive
Bismarck, ND 58501
(701) 530-0734
www.pulseusa.com

Tanya Deforest
Alternative Seed Strategies
PO Box 2169
Tisdale, SK SOEITO
(306) 387-2345

Jay Hould
Big Sky Seeds/Montech Seed Group
Shelby, MT 59474
(406) 434-5011
seeds@bigskyseeds.com

Brad Hertel
Meridian Seeds LLC
(701) 347-9965
bhertel@meridianeeds.com

Dick Roland
Legume Logic
301 3rd St NW
Crosby, ND 58730
(701) 965-6058

Producers:

Richard (Dick) Fulton
Richland, MT

Marvin Tarum
Richland, MT

Rob and Steven Moog
Joplin, MT

Brian Aklestad
Devon, MT

Keith & Karen Schott
Broadview, MT

Project Description and Objectives:

Project Description:

Pulse crop planting acres have been increasing rapidly in the past decade in Montana. Variety development and testing is crucial to sustain pulse crop production in Montana. A coordinated multi-year, multi-location variety testing project was initiated in 2008. This report contains the results from 2012 season, and a summary from multiple years. Three trials were established to evaluate spring pea, lentil and chickpea varieties. The trials were conducted at seven Montana State University Agricultural Research Centers across Montana and in cooperating producers' fields near Broadview, Devon, Joplin and Richland, Montana (Table 2).

Objectives:

The objectives of these trials were to evaluate spring dry pea, lentil and chickpea commercial varieties and experimental lines for grain production potential in the diverse Montana environments.

Methods:

All sites were dryland except two irrigated sites at Huntley and Corvallis. The trials were organized and packaged at CARC in Moccasin, then shipped to each individual testing site. All seed in the trial was pre-treated with fludioxinil and mefenoxam fungicides (Apron MAXX®RTU, Syngenta Crop Protection, Inc) to protect against soil seed and seedling diseases, with the exception of Moccasin, where the seed was additionally treated with thiamethoxam insecticide (CruiserMAXX®, Syngenta Crop Protection, Inc) to control a heavy pea leaf weevil infestation. All seed was properly inoculated prior to seeding. Best management practices were employed using available resources at each site (Table 3).

Future Plans:

Statewide spring dry pea, lentil and chickpea variety evaluations will continue across Montana as industry funding and support continues.

Note: The following results and summary are for **informational purposes only**. Inclusion of any commercial variety in this summary does not constitute a recommendation by MSU-MAES or CARC.

Table 1. Weather Information and Observations by Location:

	Conrad (WTARC)	Corvallis (WARC)	Creston (NWARC)	Havre (NARC)	Huntley (SARC)	Moccasin (CARC)	Sidney (EARC)
Season							
Precipitation (April – Sept)	7.13"	4.05"	13.29"	7.90"	3.70"	7.33"	7.78"
Site Ave	9.80"		12.06"	9.12"	7.90"	10.73"	9.53"
Irrigation		6" in 3 2" sets					

Table 2. Summary of Locations Participating in the 2012 Spring Pulse Evaluation:

Location		Conditions	Peas	Lentils	Chickpeas	Observations
Bozeman	MSU	Dryland	X	X	X	
Broadview	SARC	Dryland	X	X		Dry; poor establishment; no data reported
Conrad	WTARC	Dryland	X	X	X	
Corvallis	WARC	Irrigated	X	X	X	Dry growing season
Creston	NWARC	Dryland	X	X	X	Deer harvested the chickpeas, no data reported.
Devon	WTARC	Dryland	X	X		
Havre	NARC	Dryland	X	X		Dry growing season
Huntley	SARC	Dryland	X	X		Dry growing season
Huntley	SARC	Irrigated	X	X	X	
Joplin	WTARC	Dryland	X	X		
Moccasin	CARC	Dryland	X	X	X	Dry growing season; warm temps at flowering
Richland	CARC	Dryland	X	X	X	Timely rains; cooler temps during flowering
Sidney	EARC	Dryland	X	X		Dry conditions at planting; generally hot, dry summer. Rain was timely.

Table 3. Site Management Information by Location:

	Bozeman	Conrad (WTARC)	Corvallis (WARC)	Creston (NWARC)	Havre (NARC)	Huntley (SARC)	Huntley (SARC)	Moccasin (CARC)	Richland	Sidney (EARC)
	Dryland	Dryland	Irrigated	Dryland	Dryland	Dryland	Irrigated	Dryland	Dryland	Dryland
Tillage		No-till	Chisel plow, harrowed	Conventional	No-till	No-till	Discing and leveling	No-till	No-till	Fallow
Soil Type		Scoby CL	Burnt Fork L	Sandy L	Joplin CL			Judith CL	Farnuf L	Williams CL
Elevation	4775'	3665'	3600'	2970'	2700'	3020'	3020'	4250'	2950'	2200'
Pea Trials										
Dates:										
Seeding	April 11	April 11	April 18	April 11	April 13	April 5	April 3	April 11	April 17	April 17
Harvest	July 26	July 30	Aug 1	Aug 6	July 23	July 16	July 30	July 12	Aug 9	July 30
Previous		Barley	Wheat	Alfalfa	W. Wheat	Barley	Barley	W. Wheat	Fallow	
Fertilizer		11-52-20	11-52-40-3	138-0-75-14						28-0-0
Herbicides		Prowl H2O (30 oz/a)	Pursuit (1 oz/a) Prowl H2O (1.5 pt/a)		MustangMax (4 oz/a)	RT3 (22 oz/a) Prowl (2 pt/a)	RT3 (22 oz/a) Prowl (2 pt/a)	RT3 (12oz/a) Prowl H2O (1.75pt/a) Assure II (10 oz/a)		Sonalan (1.5 pt/a) Treflan (1 pt/a)
Lentil Trials										
Dates:										
Seeding	April 11	April 11	April 18	April 11	April 13	April 5	April 3	April 11	April 17	April 17
Harvest	July 26	Aug 11	Aug 8	Aug 16	July 20	July 16	July 30	July 24	Aug 9	Aug 8
Previous		Barley	Wheat	Alfalfa	W. Wheat	Barley	Barley	Cereal Forage	Fallow	
Herbicides		Prowl H2O (30 oz/a)	Pursuit (1 oz/a) Prowl H2O (1.5 pt/a)		MustangMax (4 oz/a)	RT3 (22 oz/a) Prowl (2 pt/a)	RT3 (22 oz/a) Prowl (2 pt/a)	RT3 (12oz/a) Prowl H2O (1.75pt/a) Assure II (10 oz/a)		Sonalan (1.5 pt/a) Treflan (1 pt/a)
Chickpea Trials										
Dates:										
Seeding	April 11		April 18	April 11			April 3	April 20	April 17	
Harvest	Aug 28		Aug 24	Aug 22			Aug 13	Aug 29	Sept 3	
Previous			Wheat	Alfalfa			Sugar beet	W. Wheat	Fallow	

Spring Peas:

2012 Montana Statewide Dry Pea Variety Evaluations:

Dry pea entries (both commercial and experimental) for the 2012 Statewide Dry Pea Evaluation were tested at 12 locations (Bozeman, Conrad, Corvallis, Creston, Devon, Havre, Huntley, Broadview, Joplin, Moccasin, Richland and Sidney).

A total of 43 entries were tested across the state. Some varieties were submitted by private companies on a fee basis and tested at select locations only. Of the varieties tested, 11 are commercially available smooth green, 18 are commercially available smooth yellow and the remaining are experimental dry pea lines from public and private breeding companies (Table 4 and 10).

Summary of 2012 Montana Statewide Dry Pea Variety Evaluations:

Pea yields varied greatly from location to location in 2012 due to the differences in environmental conditions (Table 5 and 11). Average yellow pea yields were 1008 lb/a at Bozeman, 2745 lb/a at Conrad, 2907 lb/a with irrigation at Corvallis, 3494 lb/a at Creston, 1681 lb/a at Devon, 2039 lb/a at Havre, 1630 lb/a for dryland and 3338 lb/a with irrigation at Huntley, 1454 lb/a at Joplin, 1241 lb/a at Moccasin, 3566 lb/a at Richland, and 1421 lb/a at Sidney (Table 5).

The average yields for green peas were 961 lb/a at Bozeman, 2393 lb/a at Conrad, 2630 lb/a with irrigation in Corvallis, 3129 lb/a at Creston, 1646 lb/a at Devon, 1891 lb/a at Havre, 1482 lb/a for dryland and 2898 lb/a with irrigation at Huntley, 1686 lb/a at Joplin, 1207 lb/a at Moccasin, 3439 lb/a at Richland, and 1406 lb/a at Sidney (Table 11).

Drought, uneven seedling emergence, and hail damage in several locations (Moccasin and Sidney) have not only resulted in low yield, but also caused high yield variability within the trial. Despite the variability within the trial, the varietal differences were diluted in certain locations; we found significant yield differences among varieties at several locations (Table 5 and 11). Yellow peas yielded 7% higher than spring peas in 2012. Several varieties have performed well in certain locations in the past five years (Table 16). Stirling yielded very well at many locations, but this variety has a short plant stature (Table 10 and 14). The exceptionally high yields at Richland were due to timely rainfall, cool temperatures, and the crops were planted into a field that was prevented from planting in the previous year due to flooding. Therefore, a lot of moisture was stored in the soil profile.

Note: The following results and summary are for **informational purposes only**. Inclusion of any commercial variety in this summary does not constitute a recommendation by MSU-MAES or CARC.

DISCLAIMER:

The information given herein is supplied with the understanding that no discrimination is intended and no endorsement by the Montana Agricultural Experiment Station is implied. The results of individual trials and studies are considered to be of a **PRELIMINARY** nature and should **NOT** be considered as a product endorsement or recommendation for commercial use.

NOT FOR PUBLICATION

Table 4. Yellow Dry Pea Variety Sources and Characteristics:

Variety	Sponsor ¹	Size ²	Maturity ³	Height ³	Breeding ⁴ Program	Release Date
AC Agassiz	MS	M	Late	Mod	AC	2007
Bridger	LL	M	Mod	Mod	LL	2011
CDC Golden	MT	M	Mod	Tall	CDC	2003
CDC Meadow	MT		Mod	Tall	CDC	2006
CDC Treasure	AST	M		Tall	CDC	2009
Delta	MT	M	Mod	Short		1995
DS Admiral	MT	L	Mod	Tall		2000
Jetset	LL	L	Late	Mod		
Korando	PUSA	L	Late	Mod		
Montech 1103	MonT	L	Mod	Short	SW	
Montech 4152	MT	L	Mod	Mod	SW	2009
Montech 4193	MonT	M	Mod	Short	SW	
Mystique	PUSA	L	Late	Mod		
Navarro	LL	VL	Early	Mod		
NDP080164	NDSU	L	Mod	Short	NDSU	
Pro 083-7406	PG	M	Mod	Short	PG	
Pro 127-2	PG	M	Mod	Mod	PG	
Pro 793	PG	VL	Early	Short	PG	
Pro 822	PG	L	Early	Mod	PG	
Spider	LL	L	Mod	Tall	LL	2008
SW Midas	LL	M	Mod	Mod	SW	2004
Trapeze	LL	VL	Late	Short	SW	2010
Vegas	LL	VL		Tall		
Yellow Wrinkled Peas – High Amylose Content						
B10-10	MSU	M	Mod	Short	MSU	
B10-37A	MSU	M	Mod	Short	MSU	

¹ Refers to sponsor: AST = Alternative Seed Strategies; LL = Legume Logic; MS = Meridian Seeds; MonT = Montech Seed Group; NDSU = North Dakota State University; PG = ProGene Plant Research; PUSA = Pulse USA; MSU = Montana State University; MT = Statewide Selection

² Seed size ranges (g/1000 seeds) – {Size of seed at planting}: VL = Very Large = >270; L = Large = 230-270; M = Medium = 190-230; S = Small = <190

³ Compared to trial means

⁴ Refers to developer: CDC = Crop Development Centre, University of Saskatchewan; AC = Agriculture Canada; LL = Legume Logic; SW = Svalöf-Weibull; PG = ProGene Plant Research; NDSU = North Dakota State University; MSU = Montana State University; USDA = USDA-ARS Grain Legume Genetics and Physiology Research

Table 5. 2012 Montana Statewide Dry Yellow Pea Variety Evaluations – Grain Yield (lb/a)

Yellow Variety	Bozeman	Conrad	Corvallis (Irrigated)	Creston	Devon	Havre	Huntley (Dry)	Huntley (Irrigated)	Joplin	Moccasin	Richland	Sidney
AC Agassiz	905	2746	2812	2882	---	1965	---	---	---	1100	3242	1619
B10-10	---	---	---	---	---	2130	---	---	---	1179	3100	---
B10-37A	---	---	---	---	---	2073	---	---	---	1552	3355	---
Bridger	1085	2793	3170	3747	1768	1837	1975	3442	1387	1064	3878	1249
CDC Meadow	---	---	---	---	---	---	2035	3184	---	---	---	---
CDC Treasure	---	---	---	---	---	---	---	---	---	---	3479	---
Delta	1011	2526	2987	3352	2077	2222	1414	3313	1454	1313	3706	1464
DS Admiral	910	2204	2518	3468	1573	1798	1261	3437	1299	1295	3564	1158
Golden	---	---	---	---	---	---	1796	3255	---	---	---	---
Jetset	---	---	---	---	---	---	---	---	---	1479	3481	---
Korando	---	---	---	---	---	---	---	---	---	1268	3503	---
Montech 1103	---	---	---	---	---	1885	---	---	---	1177	---	---
Montech 4152	1074	3116	2899	4017	1753	2146	1491	3508	1679	1084	3409	1586
Montech 4193	---	---	---	---	---	2108	---	---	---	1318	---	---
Mystique	---	---	---	---	---	---	---	---	---	1276	3555	---
Navarro	---	---	---	---	---	2298	---	---	---	1294	3994	---
NDP080164	---	---	---	---	---	2267	---	---	---	1026	3625	---
Pro 083-7406	---	3209	---	---	---	1985	---	---	---	---	3536	---
Pro 127-2	---	2656	---	---	---	1879	---	---	---	---	4002	---
Pro 793	---	3251	---	---	---	2351	---	---	---	---	3585	---
Pro 822	---	2598	---	---	---	2103	---	---	---	---	3701	---
Spider	1037	2426	2899	3657	1463	1903	1220	3125	1202	1252	3476	1297
SW Midas	1048	2674	3064	3340	1453	1729	1855	3440	1702	1165	2983	1571
Trapeze	---	---	---	---	---	---	---	---	---	1282	3469	---
Vegas	---	---	---	---	---	---	---	---	---	---	4193	---
Yellow Pea Means	1008	2745	2907	3494	1681	2039	1630	3338	1454	1241	3566	1421
P-Value	0.1208	0.7360	0.3370	0.0227	0.1525	0.0007	0.4307	0.3720	0.5318	0.0854	0.6218	0.4058
LSD 0.05	NS	NS	NS	597	NS	292	NS	NS	NS	NS	NS	NS
CV (%)	10.48	29.16	13.00	11.63	17.30	10.88	33.33	7.82	25.88	17.33	15.03	21.39
Trial Analysis:												
Trial Means	986	2569	2779	3326	1664	1970	1556	3118	1570	1226	3508	1414
P-Value	0.0341	0.7368	0.0442	0.0048	0.0047	<0.0001	0.2558	<0.0001	0.3395	0.0602	0.6504	0.0286
LSD (0.05)	144	NS	537	598	386	322	NS	374	NS	NS	NS	465
CV (%)	10.20	28.77	13.50	12.59	13.78	11.68	29.30	8.44	23.45	15.93	15.35	19.63

Table 6. 2012 Montana Statewide Dry Yellow Pea Variety Evaluations – TKW Summary (g/1000seed)

Yellow Variety	Bozeman	Conrad	Corvallis (Irrigated)	Creston	Devon	Havre	Huntley (Dry)	Huntley (Irrigated)	Joplin	Moccasin	Richland	Sidney
AC Agassiz	178	227	---	229	---	187	---	---	---	176	216	213
B10-10	---	---	---	---	---	197	---	---	---	186	212	---
B10-37A	---	---	---	---	---	195	---	---	---	180	210	---
Bridger	178	222	---	222	205	196	184	185	216	191	223	209
CDC Meadow	---	---	---	---	---	---	161	161	---	---	---	---
CDC Treasure	---	---	---	---	---	---	---	---	---	---	197	---
Delta	184	247	---	241	172	211	161	197	232	203	230	216
DS Admiral	199	237	---	248	190	209	178	200	240	211	222	221
Golden	---	---	---	---	---	---	---	179	---	---	---	---
Jetset	---	---	---	---	---	---	---	---	---	203	236	---
Korando	---	---	---	---	---	---	---	---	---	228	258	---
Montech 1103	---	---	---	---	---	232	---	---	---	225	---	---
Montech 4152	199	253	---	257	230	223	188	189	256	218	242	240
Montech 4193	---	---	---	---	---	207	---	---	---	203	---	---
Mystique	---	---	---	---	---	---	---	---	---	206	229	---
Navarro	---	---	---	---	---	232	---	---	---	218	249	---
NDP080164	---	---	---	---	---	194	---	---	---	196	201	---
Pro 083-7406	---	209	---	---	---	192	---	---	---	---	196	---
Pro 127-2	---	235	---	---	---	200	---	---	---	---	226	---
Pro 793	---	271	---	---	---	248	---	---	---	---	267	---
Pro 822	---	252	---	---	---	232	---	---	---	---	259	---
Spider	190	245	---	249	186	202	180	195	238	198	232	220
SW Midas	169	214	---	205	192	---	166	176	200	174	195	193
Trapeze	---	---	---	---	---	---	---	---	---	208	239	---
Vegas	---	---	---	---	---	---	---	---	---	---	243	---
Yellow Pea Means	185	237	---	236	196	208	173	185	230	201	228	216
P-Value	0.0002	<0.0001	---	<0.0001	0.5617	<0.0001	0.5768	<0.0001	<0.0001	<0.0001	<0.0001	0.0058
LSD 0.05	11.83	14.03	---	11.87	NS	5.61	NS	8.93	13.67	11.69	10.33	18.87
CV (%)	4.33	4.11	---	3.42	19.23	1.90	11.65	3.30	3.33	4.09	3.18	4.99
Trial Analysis:												
Trial Means	182	224	---	227	194	198	166	182	221	195	218	209
P-Value	<0.0001	<0.0001	---	<0.0001	0.4416	<0.0001	0.1116	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
LSD (0.05)	9.86	14.71	---	9.95	NS	5.26	NS	9.36	14.87	10.74	10.64	15.53
CV (%)	3.78	4.64	---	3.06	13.80	1.89	9.03	3.61	3.99	3.92	3.46	4.43

Table 7. 2012 Montana Statewide Dry Yellow Pea Evaluations – Test Wt (lb/bu)

Yellow Variety	Bozeman	Conrad	Corvallis (Irrigated)	Creston	Devon	Havre	Huntley (Dry)	Huntley (Irrigated)	Joplin	Moccasin	Richland	Sidney
AC Agassiz	---	65.82	---	65.30	---	63.73	---	---	---	62.90	62.00	---
B10-10	---	---	---	---	---	61.03	---	---	---	60.30	58.77	---
B10-37A	---	---	---	---	---	60.25	---	---	---	59.90	58.83	---
Bridger	---	65.78	---	64.33	65.49	65.25	65.57	64.28	64.66	63.73	63.23	---
CDC Meadow	---	---	---	---	---	---	65.53	65.15	---	---	---	---
CDC Treasure	---	---	---	---	---	---	---	---	---	---	64.17	---
Delta	---	65.80	---	66.70	66.07	66.23	66.07	65.13	65.11	63.87	63.83	---
DS Admiral	---	65.00	---	65.10	64.35	64.10	64.27	62.88	63.14	63.00	61.43	---
Golden	---	---	---	---	---	---	65.50	65.25	---	---	---	---
Jetset	---	---	---	---	---	---	---	---	---	63.48	62.23	---
Korando	---	---	---	---	---	---	---	---	---	64.10	62.50	---
Montech 1103	---	---	---	---	---	64.98	---	---	---	63.10	---	---
Montech 4152	---	67.06	---	66.48	65.94	65.53	63.70	65.27	63.66	63.65	62.75	---
Montech 4193	---	---	---	---	---	65.30	---	---	---	62.88	---	---
Mystique	---	---	---	---	---	---	---	---	---	62.90	62.10	---
Navarro	---	---	---	---	---	64.93	---	---	---	63.38	63.07	---
NDP080164	---	---	---	---	---	64.50	---	---	---	62.83	61.33	---
Pro 083-7406	---	65.91	---	---	---	64.53	---	---	---	---	63.50	---
Pro 127-2	---	66.44	---	---	---	65.35	---	---	---	---	63.47	---
Pro 793	---	66.04	---	---	---	65.65	---	---	---	---	61.87	---
Pro 822	---	65.26	---	---	---	65.40	---	---	---	---	62.87	---
Spider	---	67.05	---	62.75	65.67	64.78	65.27	64.38	63.48	63.93	62.90	---
SW Midas	---	65.11	---	63.83	64.60	---	64.27	63.38	64.25	62.20	62.53	---
Trapeze	---	---	---	---	---	---	---	---	---	62.95	62.17	---
Vegas	---	---	---	---	---	---	---	---	---	---	62.77	---
Yellow Pea Means	---	65.93	---	64.93	65.25	64.45	65.22	64.27	64.05	62.87	62.29	---
P-Value	---	0.0019	---	0.2528	0.0649	<0.0001	0.0041	<0.0001	0.5136	<0.0001	<0.0001	---
LSD 0.05	---	1.04	---	NS	NS	0.79	0.86	0.62	NS	0.73	0.88	---
CV (%)	---	1.09	---	3.66	1.10	0.86	0.76	0.66	2.15	0.81	0.98	---
Trial Analysis:												
Trial Means	---	65.53	---	64.94	64.91	64.47	64.93	64.22	64.31	62.92	62.41	---
P-Value	---	<0.0001	---	0.2059	0.0076	<0.0001	0.0004	<0.0001	0.2796	<0.0001	<0.0001	---
LSD (0.05)	---	0.91	---	NS	1.12	0.81	0.92	0.60	NS	0.65	0.81	---
CV (%)	---	0.98	---	2.88	1.03	0.89	0.85	0.66	1.76	0.74	0.92	---

Table 8. 2012 Montana Statewide Dry Yellow Pea Evaluations – Plant Height (cm)

Yellow Variety	Bozeman	Conrad	Corvallis (Irrigated)	Creston	Devon	Havre	Huntley (Dry)	Huntley (Irrigated)	Joplin	Moccasin	Richland	Sidney
AC Agassiz	35	75	87	79	---	58	---	---	---	41	67	61
B10-10	---	---	---	---	---	44	---	---	---	41	57	---
B10-37A	---	---	---	---	---	45	---	---	---	40	53	---
Bridger	33	74	83	80	63	45	58	85	63	40	74	58
CDC Meadow	---	---	---	---	---	---	59	86	---	---	---	---
CDC Treasure	---	---	---	---	---	---	---	---	---	---	82	---
Delta	32	66	68	73	56	47	47	73	56	41	71	61
DS Admiral	35	77	82	88	67	57	53	86	73	44	76	63
Golden	---	---	---	---	---	---	55	81	---	---	---	---
Jetset	---	---	---	---	---	---	---	---	---	42	74	---
Korando	---	---	---	---	---	---	---	---	---	44	70	---
Montech 1103	---	---	---	---	---	54	---	---	---	42	---	---
Montech 4152	32	79	80	94	61	52	53	91	72	42	82	62
Montech 4193	---	---	---	---	---	57	---	---	---	44	---	---
Mystique	---	---	---	---	---	---	---	---	---	46	84	---
Navarro	---	---	---	---	---	52	---	---	---	43	76	---
NDP080164	---	---	---	---	---	40	---	---	---	43	42	---
Pro 083-7406	---	64	---	---	---	41	---	---	---	---	58	---
Pro 127-2	---	67	---	---	---	53	---	---	---	---	69	---
Pro 793	---	73	---	---	---	37	---	---	---	---	59	---
Pro 822	---	74	---	---	---	43	---	---	---	---	75	---
Spider	37	79	84	86	64	61	48	93	70	45	81	67
SW Midas	35	67	75	76	57	---	53	85	58	40	65	59
Trapeze	---	---	---	---	---	---	---	---	---	41	59	---
Vegas	---	---	---	---	---	---	---	---	---	---	81	---
Yellow Pea Means	34	72	77	82	61	49	53	85	65	42	69	60
P-Value	0.0002	0.5689	0.0845	0.0007	0.2375	0.1902	0.2841	0.0540	0.0023	0.0514	0.0016	0.1417
LSD 0.05	2.17	NS	12.72	8.71	NS	NS	NS	11.43	8.32	3.63	15.83	NS
CV (%)	4.33	15.87	10.85	7.19	9.45	24.52	11.75	9.24	7.16	6.06	16.04	10.28
Trial Analysis:												
Trial Means	36	71	76	78	60	50	54	82	63	42	68	58
P-Value	<0.0001	0.8308	0.0007	<0.0001	0.2104	0.1160	0.4683	0.1277	0.0002	<0.0001	0.0010	0.0474
LSD (0.05)	2.04	NS	11.89	10.76	NS	NS	NS	NS	7.88	3.88	16.33	9.32
CV (%)	3.92	17.43	10.89	9.70	8.91	24.88	11.38	10.81	7.40	6.62	17.04	9.50

Table 9. 2012 Montana Statewide Dry Yellow Pea Variety Evaluations – Days to Flowering

Yellow Variety	Bozeman	Conrad	Corvallis (Irrigated)	Creston	Devon	Havre	Huntley (Dry)	Huntley (Irrigated)	Joplin	Moccasin	Richland	Sidney
AC Agassiz	---	77	69	82	---	67	---	---	---	79	---	64
B10-10	---	---	---	---	---	60	---	---	---	75	---	---
B10-37A	---	---	---	---	---	61	---	---	---	75	---	---
Bridger	---	74	64	79	---	65	66	69	---	76	---	62
CDC Meadow	---	---	---	---	---	---	---	---	---	---	---	---
CDC Treasure	---	---	---	---	---	---	---	---	---	---	---	---
Delta	---	74	64	77	---	65	66	70	---	76	---	61
DS Admiral	---	76	68	79	---	67	67	72	---	76	---	62
Golden	---	---	---	---	---	---	68	71	---	---	---	---
Jetset	---	---	---	---	---	---	---	---	---	75	---	---
Korando	---	---	---	---	---	---	---	---	---	75	---	---
Montech 1103	---	---	---	---	---	66	---	---	---	77	---	---
Montech 4152	---	73	64	76	---	63	66	70	---	77	---	62
Montech 4193	---	---	---	---	---	66	---	---	---	76	---	---
Mystique	---	---	---	---	---	---	---	---	---	76	---	---
Navarro	---	---	---	---	---	59	---	---	---	75	---	---
NDP080164	---	---	---	---	---	67	---	---	---	80	---	---
Pro 083-7406	---	77	---	---	---	66	---	---	---	---	---	---
Pro 127-2	---	75	---	---	---	65	---	---	---	---	---	---
Pro 793	---	72	---	---	---	61	---	---	---	---	---	---
Pro 822	---	73	---	---	---	62	---	---	---	---	---	---
Spider	---	77	70	80	---	66	68	72	---	77	---	64
SW Midas	---	75	69	79	---	---	68	72	---	77	---	62
Trapeze	---	---	---	---	---	---	---	---	---	76	---	---
Vegas	---	---	---	---	---	---	---	---	---	---	---	---
Yellow Pea Means	---	75	67	79	---	64	67	71	---	76	---	62
P-Value	---	<0.0001	0.0006	0.0005	---	<0.0001	0.0540	<0.0001	---	<0.0001	---	0.7970
LSD 0.05	---	1.19	2.92	2.31	---	1.25	NS	0.97	---	0.69	---	NS
CV (%)	---	1.11	2.97	2.00	---	1.00	1.43	0.94	---	1.00	---	5.00
Trial Analysis:												
Trial Means	---	74	66	79	---	65	67	71	---	77	---	62
P-Value	---	<0.0001	<0.0001	<0.0001	---	<0.0001	0.0408	<0.0001	---	<0.0001	---	0.4045
LSD (0.05)	---	0.99	3.24	2.39	---	1.45	1.54	0.92	---	1.19	---	NS
CV (%)	---	0.95	3.42	2.12	---	1.60	1.38	0.91	---	1.11	---	4.50

Table 10. Green Pea Variety Sources and Characteristics:

Variety	Sponsor ¹	Size ²	Maturity ³	Height ³	Breeding Program ⁴	Release Date
Aragorn	PG	M	Mod	Mod	PG	2006
Arcadia	MT	M	Mod	Short		2009
Banner	PG	M	Early	Tall	PG	2007
Bluemoon	LL	VL	Late	Short		
CDC Patrick	MT	S	Early	Tall	CDC	2008
CDC Striker	MT	L	Mod	Mod	CDC	2002
Cruiser	MT	S	Mod	Tall	PG	2002
Daytona	MS/LL	VL	Late	Short		
K2	LL	M	Mod	Mod	LL	2005
Majoret	MT	M	Mod	Short	SW	1994
Medora	MT	M	Late	Tall	USDA	2006
NDP080111	NDSU	M	Late	Mod	NDSU	
NDP080114	NDSU	M	Late	Short	NDSU	
NDP080138	NDSU	L	Mod	Mod	NDSU	
Pro 081-7116	PG	M	Early	Mod	PG	
Pro 091-7137	PG	M	Mod	Tall	PG	
Pro 7040	PG	L	Mod	Tall	PG	
PS07ND0190	NDSU	M	Late	Tall	NDSU	
Stirling	MT	M	Early	Short	USDA	2002
Viper	PUSA	L	Late	Mod		

¹ Refers to sponsor: LL = Legume Logic; MS = Meridian Seeds; MonT = Montech Seed Group; NDSU = North Dakota State University; PG = ProGene Plant Research; PUSA = Pulse USA; MT = Statewide Selection

² Seed size ranges (g/1000 seeds) – {Size of seed at planting}: VL = Very Large = >270; L = Large = 230-270; M = Medium = 190-230; S = Small = <190

³ Compared to trial means

⁴ Refers to developer: CDC = Crop Development Centre, University of Saskatchewan; LL = Legume Logic; SW = Svalöf-Weibull; PG = ProGene Plant Research; NDSU = North Dakota State University; USDA = USDA-ARS Grain Legume Genetics and Physiology Research

Table 11. 2012 Montana Statewide Dry Green Pea Variety Evaluations – Grain Yield (lb/a)

Green Variety	Bozeman	Conrad	Corvallis (Irrigated)	Creston	Devon	Havre	Huntley (Dry)	Huntley (Irrigated)	Joplin	Moccasin	Richland	Sidney
Aragorn	---	2465	---	---	---	2004	---	---	---	1301	3296	---
Arcadia	966	2281	3029	3545	1933	1930	1639	3349	2017	1186	3143	1302
Banner	---	2497	---	---	---	1998	---	---	---	---	3950	---
Bluemoon	---	---	---	---	---	---	---	---	---	1343	3361	---
CDC Patrick	---	---	---	---	---	---	1327	2848	---	---	---	---
CDC Striker	918	2254	2375	3126	1306	1953	1128	2175	1517	1193	3270	1122
Cruiser	872	2002	2562	2763	1355	1735	1232	3018	1588	1123	3010	1202
Daytona	---	---	---	---	---	---	---	---	---	1237	3768	---
K2	962	2246	2470	2982	1706	1463	1736	2954	1457	1123	3476	1435
Majoret	961	2407	2447	3082	1603	1685	1525	2709	1688	1027	3078	1336
Medora	---	---	---	---	---	---	1331	2478	---	---	---	---
NDP080111	---	---	---	---	---	2024	---	---	---	1056	3245	---
NDP080114	---	---	---	---	---	1687	---	---	---	1241	3585	---
NDP080138	---	---	---	---	---	1899	---	---	---	1233	3868	---
Pro 081-7116	---	2237	---	---	---	1703	---	---	---	---	3187	---
Pro 091-7137	---	2639	---	---	---	2023	---	---	---	---	3431	---
Pro 7040	---	2549	---	---	---	2463	---	---	---	---	---	---
PS07ND0190	---	---	---	---	---	1679	---	---	---	1144	3806	---
Stirling	1088	2746	2903	3278	1976	2122	1942	3660	1854	1392	3725	2041
Viper	---	---	---	---	---	---	---	---	---	1267	3197	---
Green Pea Means	961	2393	2630	3129	1646	1891	1482	2898	1686	1207	3439	1406
P-Value	0.8851	0.9348	0.1128	0.2357	0.0003	0.0005	0.1345	<0.0001	0.429	0.2071	0.6088	0.0074
LSD 0.05	NS	NS	NS	NS	254.94	363	NS	388	NS	NS	NS	433
CV (%)	9.84	28.09	14.14	13.80	8.70	13.48	23.44	9.16	21.33	13.80	15.75	17.29
Trial Analysis												
Trial Means	986	2569	2779	3326	1664	1970	1556	3118	1570	1224	3508	1414
P-Value	0.0341	0.7368	0.0442	0.0048	0.0047	<0.0001	0.2558	<0.0001	0.3395	0.0602	0.6504	0.0286
LSD (0.05)	144	NS	1057	598	386	322	NS	374	NS	NS	NS	465
CV (%)	10.20	28.77	13.50	12.59	13.78	11.68	29.30	8.44	23.45	15.93	15.35	19.63

Table 12. 2012 Montana Statewide Dry Green Pea Evaluations – TKW Summary (g/1000 seed)

Green Variety	Bozeman	Conrad	Corvallis (Irrigated)	Creston	Devon	Havre	Huntley (Dry)	Huntley (Irrigated)	Joplin	Moccasin	Richland	Sidney
Aragorn	---	225	---	---	---	196	---	---	---	171	196	---
Arcadia	158	199	---	204	174	175	145	167	200	170	195	190
Banner	---	210	---	---	---	184	---	---	---	---	197	---
Bluemoon	---	---	---	---	---	---	---	---	---	198	229	---
CDC Patrick	---	---	---	---	---	---	162	178	---	---	---	---
CDC Striker	192	233	---	243	208	207	176	203	230	195	228	213
Cruiser	175	209	---	224	191	189	151	183	204	169	192	197
Daytona	---	---	---	---	---	---	---	---	---	214	247	---
K2	189	203	---	212	201	180	164	176	211	181	202	205
Majoret	191	215	---	225	198	187	163	180	220	189	212	209
Medora	---	---	---	---	---	---	157	175	---	---	---	---
NDP080111	---	---	---	---	---	163	---	---	---	164	179	---
NDP080114	---	---	---	---	---	187	---	---	---	188	200	---
NDP080138	---	---	---	---	---	200	---	---	---	195	222	---
Pro 081-7116	---	223	---	---	---	202	---	---	---	---	211	---
Pro 091-7137	---	204	---	---	---	188	---	---	---	---	193	---
Pro 7040	---	202	---	---	---	189	---	---	---	---	---	---
PS07ND0190	---	---	---	---	---	184	---	---	---	195	205	---
Stirling	166	211	---	199	183	185	158	173	207	183	199	189
Viper	---	---	---	---	---	---	---	---	---	197	244	---
Green Pea Means	178	212	---	218	192	188	159	179	212	187	208	201
P-Value	<0.0001	0.0016	---	<0.0001	<0.0001	<0.0001	0.0392	<0.0001	0.0219	<0.0001	<0.0001	0.0046
LSD 0.05	7.95	15.89	---	7.99	6389	4.98	14.24	10.24	17.49	9.76	11.37	12.58
CV (%)	3.00	5.21	---	2.47	2.02	1.86	5.11	3.91	4.63	3.65	3.81	3.52
Trial Analysis												
Trial Means	192	224	---	227	194	198	166	182	221	195	218	209
P-Value	<0.0001	<0.0001	---	<0.0001	0.4416	<0.0001	0.1116	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
LSD (0.05)	9.86	14.71	---	9.95	NS	5.26	NS	9.36	14.87	10.74	10.64	15.53
CV (%)	3.78	4.64	---	3.06	13.80	1.89	9.03	3.61	3.99	3.92	3.46	4.43

Table 13. 2012 Montana Statewide Dry Green Pea Variety Evaluations – Test Wt (lb/bu)

Green Variety	Bozeman	Conrad	Corvallis (Irrigated)	Creston	Devon	Havre	Huntley (Dry)	Huntley (Irrigated)	Joplin	Moccasin	Richland	Sidney
Aragorn	---	64.13	---	---	---	63.35	---	---	---	61.77	62.30	---
Arcadia	---	64.63	---	64.00	64.13	63.93	65.27	64.63	65.86	62.93	62.67	---
Banner	---	65.77	---	---	---	65.43	---	---	---	---	63.37	---
Bluemoon	---	---	---	---	---	---	---	---	---	62.73	62.67	---
CDC Patrick	---	---	---	---	---	---	64.23	64.03	---	---	---	---
CDC Striker	---	65.88	---	65.60	64.89	65.05	65.00	64.75	64.55	63.73	62.40	---
Cruiser	---	64.40	---	64.10	63.79	63.58	64.10	63.75	64.26	62.38	62.13	---
Daytona	---	---	---	---	---	---	---	---	---	63.50	63.20	---
K2	---	65.19	---	65.05	64.99	64.63	64.20	63.80	63.76	63.03	62.97	---
Majoret	---	65.94	---	65.05	65.18	65.25	65.27	64.80	64.57	63.48	62.90	---
Medora	---	---	---	---	---	---	64.03	63.40	---	---	---	---
NDP080111	---	---	---	---	---	63.85	---	---	---	62.90	62.77	---
NDP080114	---	---	---	---	---	64.48	---	---	---	62.85	62.57	---
NDP080138	---	---	---	---	---	64.00	---	---	---	63.43	62.00	---
Pro 081-7116	---	64.46	---	---	---	64.88	---	---	---	---	62.53	---
Pro 091-7137	---	65.43	---	---	---	64.45	---	---	---	---	62.20	---
Pro 7040	---	65.69	---	---	---	65.73	---	---	---	---	---	---
PS07ND0190	---	---	---	---	---	63.85	---	---	---	62.45	62.23	---
Stirling	---	64.92	---	65.30	64.43	65.23	65.07	64.40	64.48	63.33	62.60	---
Viper	---	---	---	---	---	---	---	---	---	63.18	61.73	---
Green Pea Means	---	65.13	---	64.95	64.57	64.51	64.64	64.19	64.58	62.98	62.54	---
P-Value	---	<0.0001	---	0.1048	0.1058	<0.0001	0.0595	0.0003	0.1167	<0.0001	0.0447	---
LSD 0.05	---	0.79	---	NS	NS	0.86	NS	0.61	NS	0.28	0.75	---
CV (%)	---	0.85	---	1.53	0.95	0.93	0.93	0.65	1.24	0.63	0.84	---
Trial Analysis												
Trial Means	---	65.53	---	64.94	64.91	64.47	64.93	64.22	64.31	62.92	62.41	---
P-Value	---	<0.0001	---	0.2059	0.0076	<0.0001	0.0004	<0.0001	0.2796	<0.0001	<0.0001	---
LSD (0.05)	---	0.91	---	NS	1.12	0.81	0.92	0.60	NS	0.65	0.81	---
CV (%)	---	0.98	---	2.88	1.03	0.89	0.85	0.66	1.76	0.74	0.92	---

Table 14. 2012 Montana Statewide Dry Green Pea Variety Evaluations – Plant Height (cm)

Green Variety	Bozeman	Conrad	Corvallis (Irrigated)	Creston	Devon	Havre	Huntley (Dry)	Huntley (Irrigated)	Joplin	Moccasin	Richland	Sidney
Aragorn	---	76	---	---	---	51	---	---	---	39	57	---
Arcadia	37	58	68	65	55	46	54	75	60	38	61	57
Banner	---	72	---	---	---	57	---	---	---	---	63	---
Bluemoon	---	---	---	---	---	---	---	---	---	42	67	---
CDC Patrick	---	---	---	---	---	---	53	76	---	---	---	---
CDC Striker	41	68	77	80	62	55	49	83	69	42	63	58
Cruiser	38	71	86	79	62	54	59	79	62	39	61	57
Daytona	---	---	---	---	---	---	---	---	---	42	66	---
K2	40	71	70	74	64	41	55	77	59	38	68	56
Majoret	41	66	73	72	58	42	53	85	64	39	69	60
Medora	---	---	---	---	---	---	56	85	---	---	---	---
NDP080111	---	---	---	---	---	61	---	---	---	46	80	---
NDP080114	---	---	---	---	---	41	---	---	---	46	72	---
NDP080138	---	---	---	---	---	57	---	---	---	46	73	---
Pro 081-7116	---	72	---	---	---	47	---	---	---	---	56	---
Pro 091-7137	---	70	---	---	---	58	---	---	---	---	67	---
Pro 7040	---	69	---	---	---	64	---	---	---	---	---	---
PS07ND0190	---	---	---	---	---	54	---	---	---	44	89	---
Stirling	39	67	61	63	57	41	53	80	52	36	49	49
Viper	---	---	---	---	---	---	---	---	---	43	72	---
Green Pea Means	39	69	72	72	59	51	54	80	61	41	67	56
P-Value	0.0018	0.8936	0.0057	0.0779	0.2836	0.1788	0.6493	0.7246	0.0258	<0.0001	0.0875	0.1793
LSD 0.05	2.04	NS	11.74	NS	NS	NS	NS	NS	8.32	4.29	NS	NS
CV (%)	3.51	18.98	10.91	12.55	8.31	25.24	11.00	12.34	7.67	7.30	18.21	8.34
Trial Analysis												
Trial Means	36	71	75	78	60	50	54	82	63	42	68	58
P-Value	<0.0001	0.8308	<0.0001	<0.0001	0.2104	0.1160	0.4683	0.1277	0.0002	<0.0001	0.0010	0.0474
LSD (0.05)	2.04	NS	11.62	10.76	NS	NS	NS	NS	7.88	3.88	16.33	9.32
CV (%)	3.92	17.43	10.91	9.70	8.91	24.88	11.38	10.81	7.40	6.62	17.04	9.50

Table 15. 2012 Montana Statewide Dry Green Pea Variety Evaluations – Days to Flowering

Green Variety	Bozeman	Conrad	Corvallis (Irrigated)	Creston	Devon	Havre	Huntley (Dry)	Huntley (Irrigated)	Joplin	Moccasin	Richland	Sidney
Aragorn	---	73	---	---	---	62	---	---	---	75	---	---
Arcadia	---	75	66	80	---	65	68	71	---	76	---	62
Banner	---	73	---	---	---	57	---	---	---	---	---	---
Bluemoon	---	---	---	---	---	---	---	---	---	75	---	---
CDC Patrick	---	---	---	---	---	---	67	69	---	---	---	---
CDC Striker	---	76	68	80	---	66	67	73	---	77	---	64
Cruiser	---	74	69	79	---	65	67	70	---	76	---	62
Daytona	---	---	---	---	---	---	67	---	---	78	---	---
K2	---	75	64	80	---	65	68	70	---	77	---	59
Majoret	---	77	68	80	---	66	68	73	---	78	---	64
Medora	---	---	---	---	---	---	---	73	---	---	---	---
NDP080111	---	---	---	---	---	70	---	---	---	80	---	---
NDP080114	---	---	---	---	---	69	---	---	---	80	---	---
NDP080138	---	---	---	---	---	65	---	---	---	78	---	---
Pro 081-7116	---	73	---	---	---	62	---	---	---	---	---	---
Pro 091-7137	---	74	---	---	---	64	---	---	---	---	---	---
Pro 7040	---	74	---	---	---	64	---	---	---	---	---	---
PS07ND0190	---	---	---	---	---	69	---	---	---	79	---	---
Stirling	---	72	58	75	---	62	66	71	---	75	---	59
Viper	---	---	---	---	---	---	---	---	---	77	---	---
Green Pea Means	---	74	65	79	---	65	67	71	---	77	---	62
P-Value	---	<0.0001	<0.0001	0.0028	---	<0.0001	0.1911	<0.0001	---	<0.0001	---	0.1271
LSD 0.05	---	0.81	3.79	2.64	---	1.69	NS	0.92	---	0.93	---	NS
CV (%)	---	0.78	3.91	2.25	---	1.83	1.33	0.88	---	0.85	---	4.14
Trial Analysis												
Trial Means	---	74	66	79	---	65	67	71	---	77	---	62
P-Value	---	<0.0001	<0.0001	<0.0001	---	<0.0001	0.0408	<0.0001	---	<0.0001	---	0.4045
LSD (0.05)	---	0.99	3.01	2.39	---	1.45	1.54	0.92	---	1.19	---	NS
CV (%)	---	0.95	3.42	2.12	---	1.60	1.38	0.91	---	1.11	---	4.50

Table 16. Montana Statewide Dry Pea Variety Evaluations – 2008-2012 Multi-year Grain Yield Summary (lb/a)

Variety	Bozeman					Conrad					Corvallis					Variety
	2008	2009	2010	2011	2012	2008	2009	2010	2011	2012	2008	2009	2010	2011	2012	
Yellow Peas																Yellow Peas
AC Agassiz	---	---	---	---	905	---	---	---	2867	2746	---	---	---	---	2812	AC Agassiz
Bridger	---	---	---	2476	1085	---	---	---	3259	2793	---	---	---	1862	3170	Bridger
Delta	1882	2158	3118	2105	1011	2177	3996	869	2832	2526	1725	3276	3671	1674	2987	Delta
DS Admiral	1846	2486	3439	2206	910	1966	3607	1212	3070	2204	1844	2882	2941	1770	2518	DS Admiral
Montech 4152	---	---	---	2378	1074	---	---	---	3066	3116	---	---	---	1946	2899	Montech 4152
Spider	---	---	---	2188	1037	---	---	1100	2664	2426	---	---	---	2155	2899	Spider
SW Midas	---	2018	3436	2382	1048	---	3620	1212	2774	2674	---	2828	4029	1998	3064	SW Midas
Yellow Ave	1777	2193	3277	2246	1008	2091	3789	1181	2853	2745	1923	3057	3590	1865	2907	Yellow Ave
Green Peas																Green Peas
Arcadia	---	---	---	2378	966	---	---	---	3178	2281	---	---	---	2272	3029	Arcadia
CDC Striker	---	2343	2585	2081	918	---	3189	1147	2632	2254	---	3144	3068	1866	2375	CDC Striker
Cruiser	1438	2247	3041	2152	872	1592	3154	965	2746	2002	1332	3046	3144	1967	2562	Cruiser
Majoret	1766	2218	3008	2039	961	1884	3345	1623	2382	2407	2074	3278	3812	1641	2447	Majoret
K2	---	---	---	2018	962	---	---	1304	2622	2246	---	---	---	1894	2470	K2
Stirling	1994	2031	3288	2184	1088	1887	3932	926	2651	2746	1654	3144	3525	1475	---	Stirling
Green Ave	1724	2246	2934	2123	961	1794	3307	1164	2581	2373	1706	3173	3313	1750	2630	Green Ave
Trial Means	1747	2214	3145	2177	986	1836	3585	1174	2702	2577	1835	3101	3483	1801	2779	Trial Means
LSD (0.05)	227	310	639.8	NS	144	583	479	298	NS	NS	NS	627	495	NS	1057	LSD (0.05)
CV (%)	9	10	14	7	10	19	8	18	14	29	39	14	10	23	14	CV (%)

----- Continued on next page -----

Table 16. Statewide Dry Pea Variety Evaluations – 2008 – 2012 Multi-year Grain Yield Summary (lbs/a)...continued

Variety	Havre					Huntley (Dry)					Joplin					Variety
	2008	2009	2010	2011	2012	2008	2009	2010	2011	2012	2008	2009	2010	2011	2012	
Yellow Peas																Yellow Peas
AC Agassiz	---	---	---	2236	1965	---	---	---	---	1965	---	---	---	---	---	AC Agassiz
Bridger	---	---	---	2149	1837	---	---	---	2360	1975	---	---	---	773	1387	Bridger
Delta	3021	2446	3600	2139	2222	1612	2542	2517	1904	1414	---	---	2491	775	1454	Delta
DS Admiral	2789	2331	3325	2102	1798	---	2669	2743	2128	1261	---	---	2236	1012	1299	DS Admiral
Montech 4152	---	---	3505	2266	2146	---	---	---	2337	1491	---	---	---	1040	1679	Montech 4152
Spider	---	---	---	2071	1903	---	---	---	2283	1220	---	---	---	908	1202	
SW Midas	2849	2314	3348	2111	1729	---	2329	2760	2106	1855	---	---	2371	1060	1702	SW Midas
Yellow Ave	3027	2340	3495	2173	2039	1457	2591	2773	2065	1630	---	---	2365	969	1454	Yellow Ave
Green Peas																Green Peas
Arcadia	---	---	---	2405	1930	---	---	---	2224	1639	---	---	---	1142	2017	Arcadia
CDC Striker	2682	2154	3222	2012	1953	---	2417	2556	1568	1128	---	---	2016	606	1517	CDC Striker
Cruiser	2735	2254	3194	2286	1735	---	2520	2575	1998	1232	---	---	2162	977	1517	Cruiser
Majoret	2694	2352	3451	1612	1685	1277	2501	2945	1660	1331	---	---	2514	465	1688	Majoret
K2	---	---	---	1576	1463	---	---	---	2092	1525	---	---	---	748	1457	K2
Stirling	3103	2327	3274	1915	2122	1841	2633	2874	1527	1942	---	---	2630	1257	1854	Stirling
Green Ave	2758	2252	3241	1987	1874	1462	2471	2632	1729	1482	---	---	2259	790	1686	Green Ave
Trial Means	2942	2306	3397	2069	1968	1486	2545	2719	1878	1556	---	---	2324	870	1570	Trial Means
LSD (0.05)	317	290	325	NS	309	355	274	NS	NS	NS	---	---	562	NS	NS	LSD (0.05)
CV (%)	8	9	7	13	11	17	8	12	20	29	---	---	17	46	23	CV (%)

----- Continued on next page -----

Table 16. Statewide Dry Pea Variety Evaluations – 2008 – 2012 Multi-year Grain Yield Summary (lbs/a)...continued

Variety	Moccasin					Richland					Sidney					Variety
	2008	2009	2010	2011	2012	2008	2009	2010	2011	2012	2008	2009	2010	2011	2012	
Yellow Peas																Yellow Peas
AC Agassiz	---	---	2855	1123	1100	---	---	---	2224	3242	---	---	---	---	1619	AC Agassiz
Bridger	---	---	2981	1160	1064	---	---	3295	2494	3878	---	---	---	2998	1249	Bridger
Delta	991	1177	3139	963	1313	1633	2015	3226	1501	3706	1420	1887	3105	2662	1464	Delta
DS Admiral	1060	1158	2642	999	1295	1536	2018	3264	1664	3564	1078	1757	3016	2517	1158	DS Admiral
Montech 4152	---	---	2533	1018	1084	---	---	---	1809	3409	---	---	---	2463	1586	Montech 4152
Spider	---	---	2572	1005	1252	---	---	2731	1910	1252	---	---	---	2504	1297	Spider
SW Midas	697	903	2603	1031	1165	2007	1435	2321	2166	2983	---	1511	3639	2589	1571	SW Midas
Yellow Ave	930	1058	2796	992	1241	1761	1855	2999	1855	3566	1261	1884	3489	2502	1421	Yellow Ave
Green Peas																Green Peas
Arcadia	---	---	---	978	1186	---	---	---	1494	3143	---	---	---	2772	1302	Arcadia
CDC Striker	809	1066	2427	774	1193	---	1918	2976	1732	3270	---	1988	3408	2212	1122	CDC Striker
Cruiser	682	1001	2680	988	1123	1456	1797	2642	1684	3010	1398	1806	2820	2223	1202	Cruiser
K2	---	---	2436	851	1457	---	---	2721	1772	3476	---	---	2751	2296	1435	K2
Majoret	722	1091	2608	848	1027	1457	2221	2981	1653	3078	1048	2080	3342	2233	1336	Majoret
Stirling	885	1136	2907	838	1392	1590	1565	2566	1493	3725	1159	1658	3052	2601	2041	Stirling
Green Ave	783	1091	2665	887	1200	1513	1927	2798	1628	3410	1221	1898	3104	2341	1406	Green Ave
Trial Means	875	1071	2754	934	1224	1677	1882	2922	1729	3501	1794	1964	3341	1659	1414	Trial Means
LSD (0.05)	172	208	203	120	NS	NS	577	NS	289	NS	1005	301	792	NS	465	LSD (0.05)
CV (%)	14	12	5	9	16	15	21	13	10	16	39	9	9	14	20	CV (%)

Table 17. Claims and/or Resistance of Commercial Pea Varieties:

(This table is claims made by the breeding programs and/or commercial dealers and is not based on research conducted by MAES or CARC).

Variety	Powdery Mildew Resistant ¹	Lodging Resistant ²	Height	<i>Fusarium</i> Resistance ³	Bleach Resistant ⁴	Maturity
AC Agassiz	X	X				
Aragorn		X			X	Med
Arcadia	X	X				Early
Banner		X				Early
Bluemoon	X	X	Tall			Med
Bridger	X	X	Tall			Early
CDC Striker			Med			Med
CDC Treasure	X	X				
Cruiser	X	X		X		Med
Daytona	X	X	Tall			Med
Delta				X		
DS Admiral	X	X				Early
Jetset	X	X				Med
K2	X	X			X	Early
Korando						Early
Majoret		X				Med
Medora	X		Tall			
Montech 4152			Tall			
Navarro	X	X				Early
Spider	X	X				Med
Stirling	X					Early
SW Midas	X	X				Early
Trapeze	X	X	Med			Early
Vegas	X	X	Tall			Med

¹ Varieties exhibit above average resistance to Powdery Mildew

² Varieties have above average resistance to lodging

³ Varieties are resistant to *Fusarium*

⁴ Varieties are resistant to bleaching

Western Regional Pea Variety Evaluation:

The Western Regional pea variety evaluations were tested at 3 locations (Corvallis, Moccasin and Richland). The trial consisted of 5 commercially available varieties and 4 advanced breeding lines from the USDA-ARS Grain Legume Genetics and Physiology Program in Pullman, Washington.

Summary of Western Regional Pea Variety Evaluation:

The average yields of green peas were reported 2826 lb/a with irrigation at Corvallis, 1220 lb/a at Moccasin, and 3499 lb/a at Richland. The yellow peas had average yields of 2747 lb/a with irrigation at Corvallis, 1218 lb/a at Moccasin, and 3572 lb/a at Richland. The exceptional high yields at Richland were due to timely rainfall, cool temperatures, and the crops were planted into a field that was prevented from planting in the previous year due to flooding. Therefore, a lot of moisture was stored in the soil profile. Due to high yield variability within trial (high CV), the varietal differences were diluted and could not be detected. Generally, the newly developed experimental lines performed well.

Table 18. 2012 Western Regional Dry Pea Variety Evaluation – Corvallis, MT (Irrigated)

Variety	Grain Yield		# of days to flower	Height (cm)	Test Wt (lbs/bu)	TKW (g/1000 seeds)	Grain Moisture (%)
	Harvest	13% Moist.					
Green Peas							
Aragorn	2706	2798	68	76	---	---	10.3
Ariel	2640	2716	69	66	---	---	10.5
Banner	2859	2942	67	77	---	---	10.5
PS05100736	2543	2627	75	61	---	---	10.1
PS05100840	2961	3053	74	76	---	---	10.3
Green Pea Means	2741	2826	70.5	71.2	---	---	10.32
P-Value	0.4536	0.4479	<0.0001	0.0450	---	---	0.6894
LSD (0.05)	NS	NS	2.24	12.09	---	---	NS
CV (%)	12.47	12.27	2.10	11.26	---	---	3.56
Yellow Peas							
Carousel	2687	2751	67	76	---	---	10.9
PS03101822	2404	2481	69	58	---	---	10.2
PS07100925	2785	2862	69	63	---	---	10.6
Universal	2823	2897	69	72	---	---	10.7
Yellow Pea Means	2674	2747	68.5	67.2	---	---	10.61
P-Value	0.4034	0.4228	0.1187	0.0132	---	---	0.0303
LSD (0.05)	NS	NS	NS	10.9	---	---	0.51
CV (%)	13.76	13.64	2.00	10.52	---	---	2.64
Trial Analysis:							
Trial Means	2712	2791	69.61	69.43	---	---	10.45
P-Value	0.5148	0.5150	<0.0001	0.0040	---	---	0.0505
LSD (0.05)	NS	NS	2.08	11.04	---	---	0.48
CV (%)	13.04	12.88	2.06	10.96	---	---	3.17

Table 19. 2012 Western Regional Dry Pea Variety Evaluation – Moccasin, MT

Variety	Grain Yield		# of days to flower	Height (cm)	Test Wt (lbs/bu)	TKW (g/1000 seeds)	Grain Moisture (%)
	Harvest	13% Moist.					
Green Peas							
Aragorn	1104	1138	75	39	62.05	183.20	10.3
Ariel	1255	1294	70	42	62.48	161.20	10.5
Banner	1319	1351	67	39	63.88	165.15	10.5
PS05100736	1095	1095	58	38	62.65	194.07	10.1
PS05100840	1186	1222	52	40	62.08	178.32	10.3
Green Pea Means	1191	1220	64.2	39.6	62.63	176.03	10.3
P-Value	0.8006	0.7605	<0.0001	0.552	0.0071	<0.0001	0.6894
LSD (0.05)	NS	NS	2.65	NS	1	5.86	NS
CV (%)	25.43	25.53	2.65	9.10	1.03	2.19	3.56
Yellow Peas							
Carousel	973	985	64	39	63.50	216.86	10.9
PS03101822	1322	1359	59	39	63.43	215.01	10.2
PS07100925	1534	1570	47	37	62.78	224.36	10.6
Universal	939	959	42	40	63.60	200.45	10.7
Yellow Pea Means	1191	1218	52.75	38.31	63.29	214.17	10.6
P-Value	0.0820	0.0739	<0.0001	0.7232	0.1991	<0.0001	0.0303
LSD (0.05)	NS	NS	1.72	NS	NS	6.62	0.43
CV (%)	28.44	28.28	2.12	9.99	0.83	2.01	2.64
Trial Analysis:							
Trial Means	1191	1219	59.11	39	62.9	193.47	10.45
P-Value	0.2471	0.2196	<0.0001	0.7090	<0.0001	<0.0001	0.0505
LSD (0.05)	NS	NS	2.13	NS	0.87	5.91	0.48
CV (%)	26.81	26.78	2.49	9.49	0.95	2.10	3.17

Table 20. 2012 Western Regional Dry Pea Trial – Richland, MT

Variety	Grain Yield		# of days to flower	Height (cm)	Test Wt (lbs/bu)	TKW (g/1000 seeds)	Grain Moisture (%)
	Harvest	13% Moist.					
Green Peas							
Aragorn	3222	3296	---	57	62.30	196.00	11.0
Ariel	3194	3272	---	49	62.40	170.07	10.8
Banner	3864	3951	---	63	63.37	196.77	11.0
PS05100736	3332	3422	---	44	63.00	215.67	10.7
PS05100840	3481	3557	---	67	62.33	198.77	11.1
Green Pea Means	3418	3499	---	56	62.68	195.45	10.92
P-Value	0.2889	0.2947	---	0.2353	0.1975	<0.0001	0.7252
LSD (0.05)	NS	NS	---	NS	NS	8.6	NS
CV (%)	11.52	11.46	---	23.32	0.98	2.41	3.81
Yellow Peas							
Carousel	3590	3662	---	62	63.33	229.73	11.2
PS03101822	3700	3784	---	34	61.55	232.25	11.0
PS07100925	3234	3311	---	50	61.37	248.43	10.9
Universal	3540	3620	---	62	62.85	217.05	11.1
Yellow Pea Means	3495	3572	---	53	62.29	233.31	11.05
P-Value	0.1871	0.8201	---	0.0775	0.0454	0.0004	0.7309
LSD (0.05)	NS	NS	---	NS	1.23	6.19	NS
CV (%)	16.71	16.61	---	19.31	1.14	1.53	2.64
Trial Analysis:							
Trial Means	3449	3529	---	54.64	62.52	210.6	10.97
P-Value	0.6909	0.6993	---	0.1067	0.0197	<0.0001	0.8309
LSD (0.05)	NS	NS	---	NS	0.97	6.49	NS
CV (%)	13.75	13.67	---	22.06	1.04	2.06	3.41

Statewide Spring Lentil Variety Evaluation:

The 2012 Statewide Lentil Variety Evaluation was tested at 13 locations, same as the spring pea trials. The 2012 variety trial consisted of 18 entries. Among the commercially available varieties, we had 2 small green, 3 medium green, 3 large green, 1 small red, and 1 Spanish brown and 2 Red-Turkish. The remaining varieties are experimental lentil lines from public and private breeding companies (Table 21).

Summary of Statewide Spring Lentil Variety Evaluation:

Lentil yields varied greatly from location to location in 2012 due to the differences in environmental conditions (Table 22). Average lentil yields were 560 lb/a at Bozeman, 1496 lb/a at Conrad, 700 lb/a with irrigation at Corvallis, 1345 lb/a at Creston, 685 lb/a at Devon, 830 lb/a at Havre, 614 lb/a for dryland and 2006 lb/a with irrigation at Huntley, 2077 lb/a at Joplin, 833 lb/a at Moccasin, 1666 lb/a at Richland, and 371 lb/a at Sidney.

Drought and uneven seedling emergence affected lentil yields at Sidney site, and root diseases reduced lentil yields at Corvallis. The average yield was 700 lb/a with irrigation at Corvallis, compared with 2006 lb/a at Huntley.

Despite the variability within the trial, the varietal differences were diluted; we found significant yield differences among varieties at several locations (Table 22). Different classes of lentils performed differently at various locations. Generally, medium green lentils yielded well at most of the locations, especially for the newly developed experimental line **LC01602300R**.

Note: The following results and summary are for **informational purposes only**. Inclusion of any commercial variety in this summary does not constitute a recommendation by MSU-MAES or CARC.

DISCLAIMER:

The information given herein is supplied with the understanding that no discrimination is intended and no endorsement by the Montana Agricultural Experiment Station is implied. The results of individual trials and studies are considered to be of a **PRELIMINARY** nature and should **NOT** be considered as a product endorsement or recommendation for commercial use.

NOT FOR PUBLICATION

Table 21. Lentil Variety Sources and Characteristics:

Variety	Type	Maturity ¹	Breeding Program ²	Release Date
Small Green				
Essex (LC1602307E)	Green	Late	USDA	2009
Eston	Green	Mod	USDA	<1990
LC07ND055E	Green	Late	NDSU	
LC07ND068E	Green	Late	NDSU	
Medium Green				
Brewer	Green-Mottled	Early	USDA	1984
CDC Meteor	Green	Late	CDC	2005
CDC Vantage	Green	Late	CDC	1998
LC01602300R	Green	Early	USDA	
Richlea	Green	Mod	CDC	1994
Large Green				
CDC Greenland	Green	Mod	CDC	2006
Merrit	Green	Mod	USDA	2003
Riveland	Green	Mod	USDA	2007
Small Red				
Crimson	Red	Mod	USDA	1990
Spanish Brown				
Morena (LC02601144P)	Pardina	Early	USDA	2011
Red Turkish				
CDC Impact CL	Red-Turkish	Mod	CDC	2006
CDC Redberry	Red-Turkish	Mod	CDC	2004
LC07ND176T	Red-Turkish	Late	NDSU	
LC07ND202T	Red-Turkish	Late	NDSU	

¹ Compared to trial means

² Refers to developer: CDC = Crop Development Centre, University of Saskatchewan; NDSU = North Dakota State University; USDA = USDA-ARS Grain Legume Genetics and Physiology Research

Table 22. 2012 Montana Statewide Lentil Variety Evaluations – Grain Yield (lb/a)

Variety	Bozeman	Conrad	Corvallis (Irrigated)	Creston	Devon	Havre	Huntley (Dry)	Huntley (Irrigated)	Joplin	Moccasin	Richland	Sidney
Small Green												
Essex	462	1823	536	1409	970	---	569	2016	2521	809	1705	458
Eston	523	1674	509	1307	881	---	485	2097	2187	767	1720	302
LC07ND055E	---	---	---	---	722	---	---	---	---	790	1856	---
LC07ND068E	---	---	---	---	937	---	---	---	---	761	1723	---
Medium Green												
Brewer	528	1120	405	1250	508	1121	583	1833	2027	756	1882	184
CDC Meteor	---	---	---	---	---	---	632	2232	---	---	---	---
CDC Richlea	569	1800	893	1625	551	830	734	2018	1919	958	1874	530
LC01602300R	685	1696	837	1790	1254	874	---	---	2421	955	2041	453
Vantage	---	---	---	---	---	---	797	1767	---	---	---	---
Large Green												
CDC Greenland	---	1654	624	---	577	934	553	1550	2284	933	1875	393
Merrit	607	1243	394	1038	528	977	523	1921	2127	838	1710	222
Riveland	567	1464	552	1310	536	1033	727	1641	2303	827	1712	401
Small Red												
Crimson	588	1543	838	1245	722	902	607	2214	1479	907	1734	261
Spanish Brown												
Morena	569	1358	929	1466	843	701	---	---	2257	984	1452	504
Red Turkish												
CDC Impact CL	472	1246	753	1014	867	756	550	2196	1685	799	1688	301
CDC Redberry	---	1338	706	---	417	846	620	2106	1717	---	1743	448
LC07ND176T	---	---	---	---	---	172	---	---	---	862	1039	---
LC07ND202T	---	---	---	---	---	632	---	---	---	562	1410	---
Trial Analysis:												
Trial Means	560	1496	700	1345	685	830	614	2006	2077	833	1666	371
P-Value	0.0077	0.1488	0.0032	0.0192	0.4163	<0.0001	0.0213	<0.0001	0.1104	<0.0001	0.0002	0.1609
LSD (0.05)	98	NS	354	421	NS	179	167	264	NS	144	332	NS
CV (%)	12.00	25.11	35.78	21.69	55.41	15.19	19.02	9.23	19.85	12.20	12.16	41.99

Table 23. 2012 Montana Statewide Lentil Variety Evaluations – TKW (g/1000 seeds)

Variety	Bozeman	Conrad	Corvallis (Irrigated)	Creston	Devon	Havre	Huntley (Dry)	Huntley (Irrigated)	Joplin	Moccasin	Richland	Sidney
Small Green												
Essex	47.23	43.25	---	46.40	39.75	---	---	---	44.17	39.20	38.50	42.67
Eston	31.20	30.50	---	33.58	32.03	---	---	---	33.10	29.30	31.97	32.00
LC07ND055E	---	---	---	---	33.05	---	---	---	---	32.30	35.93	---
LC07ND068E	---	---	---	---	35.38	---	---	---	---	34.80	36.37	---
Medium Green												
Brewer	55.20	50.00	---	55.70	52.67	48.03	---	---	55.87	47.50	49.63	51.67
CDC Meteor	---	---	---	---	---	---	---	---	---	---	---	---
CDC Richlea	50.60	47.50	---	53.20	52.00	46.30	---	---	52.00	45.70	47.83	47.67
LC01602300R	47.50	47.25	---	52.25	48.33	42.58	---	---	51.13	44.70	45.23	47.67
Vantage	---	---	---	---	---	---	---	---	---	---	---	---
Large Green												
CDC Greenland	---	62.00	---	---	62.33	59.00	---	---	65.77	58.10	58.10	60.00
Merrit	64.30	58.50	---	59.05	59.00	56.50	---	---	61.47	53.10	56.67	58.33
Riveland	66.53	67.50	---	71.40	65.33	62.18	---	---	72.37	60.40	68.17	64.00
Small Red												
Crimson	35.47	31.25	---	32.60	32.00	29.40	---	---	33.03	28.90	30.83	34.00
Spanish Brown												
Morena	36.10	36.25	---	39.20	35.00	34.83	---	---	38.13	34.10	33.40	36.67
Red Turkish												
CDC Impact CL	33.60	31.25	---	34.28	34.67	30.95	---	---	34.77	30.60	34.20	33.33
CDC Redberry	---	38.75	---	---	42.00	36.05	---	---	41.80	---	39.23	39.33
LC07ND176T	---	---	---	---	---	29.63	---	---	---	29.00	28.90	---
LC07ND202T	---	---	---	---	---	---	---	---	---	26.80	28.97	---
Trial Analysis:												
Trial Means	46.9	45.33	---	47.77	46.67	40.24	---	---	46.63	40.31	41.98	45.61
P-Value	<0.0001	<0.0001	---	<0.0001	<0.0001	<0.0001	---	---	<0.0001	<0.0001	<0.0001	<0.0001
LSD (0.05)	5.31	1.73	---	1.79	2.45	3.68	---	---	2.71	1.66	6.34	2.04
CV (%)	7.78	2.66	---	2.59	3.11	6.44	---	---	3.31	2.89	9.21	2.66

Table 24. 2012 Montana Statewide Lentil Variety Evaluations – Test Weight (lb/bu)

Variety	Bozeman	Conrad	Corvallis (Irrigated)	Creston	Devon	Havre	Huntley (Dry)	Huntley (Irrigated)	Joplin	Moccasin	Richland	Sidney
Small Green												
Essex	---	62.48	---	64.78	62.93	---	62.68	61.55	61.97	63.03	62.67	60.33
Eston	---	62.05	---	62.53	63.63	---	63.85	63.13	63.30	64.25	64.93	62.83
LC07ND055E	---	---	---	---	63.08	---	---	---	---	63.63	63.20	---
LC07ND068E	---	---	---	---	63.05	---	---	---	---	63.78	64.27	---
Medium Green												
Brewer	---	49.38	---	61.88	56.60	60.23	60.53	60.00	60.20	60.68	60.37	59.83
CDC Meteor	---	---	---	---	---	---	60.75	60.45	---	---	---	---
CDC Richlea	---	61.15	---	62.10	58.73	59.98	62.38	61.78	60.93	61.13	60.57	59.33
LC01602300R	---	61.88	---	63.00	59.83	61.43	---	---	61.80	61.90	61.93	60.17
Vantage	---	---	---	---	---	---	62.70	62.13	---	---	---	---
Large Green												
CDC Greenland	---	60.08	---	---	59.50	59.28	59.45	59.05	59.50	59.38	60.03	57.17
Merrit	---	58.78	---	61.43	55.97	59.48	58.60	60.88	59.70	59.08	61.00	57.67
Riveland	---	59.13	---	60.70	58.53	58.78	58.20	58.63	58.90	59.03	59.80	56.67
Small Red												
Crimson	---	62.55	---	66.18	63.07	63.78	64.23	63.83	62.67	64.35	64.07	62.50
Spanish Brown												
Morena	---	63.70	---	66.18	62.90	65.33	---	---	64.07	65.30	65.23	63.33
Red Turkish												
CDC Impact CL	---	63.53	---	63.20	62.53	64.78	65.18	64.78	63.27	64.93	65.27	63.33
CDC Redberry	---	62.30	---	---	61.45	63.53	63.13	63.53	62.70	---	63.43	61.67
LC07ND176T	---	---	---	---	---	---	---	---	---	65.13	63.90	---
LC07ND202T	---	---	---	---	---	64.80	---	---	---	65.60	65.20	---
Trial Analysis:												
Trial Means	---	60.58	---	63.20	60.00	62.27	62.06	61.86	61.58	62.74	63.06	60.40
P-Value	---	0.1533	---	0.0806	0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
LSD (0.05)	---	NS	---	NS	2.81	0.64	0.62	1.29	0.49	0.36	0.96	0.76
CV (%)	---	10.21	---	4.33	2.77	0.72	0.70	1.46	0.47	0.40	0.92	0.74

Table 25. 2012 Montana Statewide Lentil Variety Evaluations – Plant Height (cm)

Variety	Bozeman	Conrad	Corvallis (Irrigated)	Creston	Devon	Havre	Huntley (Dry)	Huntley (Irrigated)	Joplin	Moccasin	Richland	Sidney
Small Green												
Essex	39	29	27	31	29	---	31	30	32	25	32	29
Eston	35	30	28	34	29	---	32	33	34	25	33	25
LC07ND055E	---	---	---	---	28	---	---	---	---	26	31	---
LC07ND068E	---	---	---	---	30	---	---	---	---	27	28	---
Medium Green												
Brewer	28	25	19	33	29	30	36	30	33	26	27	27
CDC Meteor	---	---	---	---	---	---	34	29	---	---	---	---
CDC Richlea	38	32	25	34	30	30	34	29	37	28	34	31
LC01602300R	35	31	30	37	30	31	---	---	35	27	34	31
Vantage	---	---	---	---	---	---	34	30	---	---	---	---
Large Green												
CDC Greenland	---	32	22	---	30	30	36	31	34	30	32	29
Merrit	34	28	22	34	28	29	32	32	30	26	33	29
Riveland	37	35	23	37	28	32	34	26	38	28	30	31
Small Red												
Crimson	38	23	22	26	24	26	30	25	28	22	24	26
Spanish Brown												
Morena	32	30	---	34	28	32	---	---	31	26	35	27
Red Turkish												
CDC Impact CL	28	21	25	26	27	24	29	38	31	23	32	23
CDC Redberry	---	29	33	---	28	30	33	42	33	---	33	29
LC07ND176T	---	---	---	---	---	30	---	---	---	26	32	---
LC07ND202T	---	---	---	---	---	25	---	---	---	23	29	---
Trial Analysis:												
Trial Means	34	29	26	32	28	29	32	31	33	26	31	28
P-Value	<0.0001	<0.0001	0.0003	<0.0001	0.5844	0.0059	0.0009	0.0004	0.0467	<0.0001	0.0100	0.0005
LSD (0.05)	2.57	3.63	6.28	3.94	NS	3.99	3.77	6.87	5.26	2.67	6.09	3.43
CV (%)	5.18	8.84	17.07	8.40	13.54	9.67	8.11	15.63	9.49	7.27	12.04	7.28

Table 26. 2012 Montana Statewide Lentil Variety Evaluations – Days to Flowering

Variety	Bozeman	Conrad	Corvallis (Irrigated)	Creston	Devon	Havre	Huntley (Dry)	Huntley (Irrigated)	Joplin	Moccasin	Richland	Sidney
Small Green												
Essex	---	---	70	79	---	---	71	78	---	75	---	65
Eston	---	---	69	79	---	---	69	76	---	75	---	60
LC07ND055E	---	---	---	---	---	---	---	---	---	75	---	---
LC07ND068E	---	---	---	---	---	---	---	---	---	75	---	---
Medium Green												
Brewer	---	---	63	---	---	61	68	74	---	75	---	58
CDC Meteor	---	---	---	---	---	---	71	76	---	---	---	---
CDC Richlea	---	---	70	---	---	67	70	77	---	75	---	65
LC01602300R	---	---	68	---	---	65	---	---	---	75	---	61
Vantage	---	---	---	---	---	---	69	77	---	---	---	---
Large Green												
CDC Greenland	---	---	70	---	---	69	72	77	---	75	---	64
Merrit	---	---	68	75	---	63	68	75	---	75	---	59
Riveland	---	---	66	76	---	65	69	76	---	75	---	59
Small Red												
Crimson	---	---	70	78	---	67	71	75	---	75	---	66
Spanish Brown												
Morena	---	---	66	77	---	64	---	---	---	75	---	66
Red Turkish												
CDC Impact CL	---	---	70	79	---	66	71	77	---	75	---	66
CDC Redberry	---	---	70	---	---	67	71	76	---	---	---	65
LC07ND176T	---	---	---	---	---	71	---	---	---	76	---	---
LC07ND202T	---	---	---	---	---	71	---	---	---	77	---	---
Trial Analysis:												
Trial Means	---	---	68	77	---	66	70	76	---	75	---	62
P-Value	---	---	<0.0001	<0.0001	---	<0.0001	<0.0001	0.1474	---	<0.0001	---	<0.0001
LSD (0.05)	---	---	2.87	1.38	---	1.24	1.54	NS	---	0.43	---	2.98
CV (%)	---	---	2.98	1.24	---	1.32	1.54	2.29	---	0.40	---	2.85

Table 27. Statewide Lentil Variety Evaluations – 2008 – 2012 Multi-year Grain Yield Summary (lbs/a)

Variety	Bozeman					Conrad					Corvallis					Variety
	2008	2009	2010	2011	2012	2008	2009	2010	2011	2012	2008	2009	2010	2011	2012	
Small Green																Small Green
Essex	---	---	2111	1538	462	512	3248	436	2842	1823	1688	2224	1087	---	536	Essex
Medium Green																Medium Green
Brewer	---	---	1855	1340	528	357	2272	381	2034	1120	738	940	964	---	405	Brewer
CDC Richlea	---	---	2266	1534	569	---	2831	623	2307	1800	---	2552	973	---	893	CDC Richlea
LC01602300R	---	---	2224	1578	685	559	3113	687	2284	1696	1338	2495	1052	---	837	LC01602300R
Large Green																Large Green
Merrit	---	---	2064	1360	607	510	2183	385	2151	1243	1192	1411	690	---	394	Merrit
Riveland	---	---	1825	1558	567	433	2127	324	1821	1464	798	1353	430	---	552	Riveland
Small Red																Small Red
Crimson	---	---	1999	1281	588	403	1921	544	1762	1543	1262	1629	1095	---	838	Crimson
Red-Turkish																Red-Turkish
CDC Redberry	---	---	982	1400	---	---	2234	833	2318	1338	---	2411	1059	---	706	CDC Redberry
Trial Means	---	---	1953	1476	560	450	2451	533	2227	1496	1112	1802	860	---	700	Trial Means
LSD (0.05)	---	---	382	138	98	142	559	214	NS	NS	386	395	348	---	354	LSD (0.05)
CV (%)	---	---	14	7	12	22	14	28	21	25	24	15	28	---	36	CV (%)
Variety	Creston					Havre					Huntley (Dry)					Variety
	2008	2009	2010	2011	2012	2008	2009	2010	2011	2012	2008	2009	2010	2011	2012	
Small Green																Small Green
Essex	2670	2395	2464	2091	1409	1680	1654	3119	1838	---	1586	2103	464	784	569	Essex
Medium Green																Medium Green
Brewer	1844	2460	2164	1464	1250	1371	1173	2487	1024	1121	950	494	425	402	583	Brewer
CDC Richlea	---	2831	2150	1873	1625	---	1546	2853	1743	830	---	1603	569	873	734	CDC Richlea
LC01602300R	2676	3016	2626	2024	1790	1844	1807	2790	1385	874	1457	1916	926	877	---	LC01602300R
Large Green																Large Green
Merrit	2445	2829	1954	1730	1038	1892	1331	2868	1127	977	1210	947	466	717	523	Merrit
Riveland	2046	2478	1898	1547	1310	1686	1368	2463	968	1033	957	1814	399	717	727	Riveland
Small Red																Small Red
Crimson	2309	2082	2259	2095	1245	1277	1072	2343	1705	902	1597	1629	738	458	607	Crimson
Red-Turkish																Red-Turkish
CDC Redberry	---	2326	2346	2090	---	---	1217	2592	904	846	---	2411	684	819	620	CDC Redberry
Trial Means	2312	2522	2164	1822	1345	1598	1399	2736	1362	830	1336	1397	573	672	614	Trial Means
LSD (0.05)	270	448	456	NS	421	325	302	340	299	179	244	NS	272	NS	167	LSD (0.05)
CV (%)	8	12	15	22	22	14	15	9	10	15	9	43	33	54	19	CV (%)

----- Continued on next page -----

Table 27. Statewide Lentil Variety Evaluations – 2008 – 2012 Multi-year Grain Yield Summary (lbs/a)...continued

Variety	Joplin					Moccasin					Richland					Variety	
	2008	2009	2010	2011	2012	2008	2009	2010	2011	2012	2008	2009	2010	2011	2012		
Small Green												Small Green					
Essex	---	---	2491	726	2521	1743	---	2036	918	809	---	1181	1752	1097	1705	Essex	
Medium Green												Medium Green					
Brewer	---	---	2236	350	2027	1395	---	1768	730	756	992	939	1324	581	1882	Brewer	
CDC Richlea	---	---	2371	616	1919	---	---	2062	1100	958	---	1596	1562	1077	1874	CDC Richlea	
LC01602300R	---	---	---	581	2421	1800	---	1944	903	955	---	1284	1850	1398	2041	LC01602300R	
Large Green												Large Green					
Merrit	---	---	2549	546	2127	1501	---	1890	771	838	1105	1098	1435	880	1710	Merrit	
Riveland	---	---	---	247	2303	1572	---	1805	926	827	910	1013	1571	836	1712	Riveland	
Small Red												Small Red					
Crimson	---	---	2162	774	1479	1655	---	1919	911	907	1247	1308	1222	859	1734	Crimson	
Red-Turkish												Red-Turkish					
CDC Redberry	---	---	1973	785	1717	---	---	1642	764	---	---	1296	1390	933	1743	CDC Redberry	
Trial Means	---	---	2324	624	2077	1636	---	1906	888	833	1108	1200	1537	945	1666	Trial Means	
LSD (0.05)	---	---	562	NS	NS	176	---	NS	NS	144	230	288	294	392	332	LSD (0.05)	
CV (%)	---	---	17	44	20	7	---	11	24	12	12	17	11	25	12	CV (%)	
Variety	Sidney																
	2008	2009	2010	2011	2012												
Small Green																	
Essex		1768	2251	1737	458												
Medium Green																	
Brewer		1103	1423	1061	184												
CDC Richlea		1699	1959	1594	530												
LC01602300R		1653	2169	1774	453												
Large Green																	
Merrit		1407	1350	1418	222												
Riveland		1387	1564	1413	401												
Small Red																	
Crimson		836	1924	981	261												
Red-Turkish																	
CDC Redberry		1332	2186	1604	448												
Trial Means		1351	1835	1444	371												
LSD (0.05)		260	390	434	NS												
CV (%)			13	17	42												

Western Regional Lentil Variety Evaluation:

The Western Regional lentil variety trials were conducted at 3 sites (Corvallis, Moccasin and Richland). The trial consisted of 17 varieties, 9 commercially available and 8 advanced breeding lines from the USDA-ARS Grain Legume Genetics and Physiology Program in Pullman, Washington.

Summary of Western Regional Lentil Variety Evaluation:

The average yields of lentils were reported 701 lb/a with irrigation at Corvallis, 631 lb/a at Moccasin, and 1686 lb/a at Richland. The low yield of lentil at the Corvallis site with irrigation was due to root diseases, and the low yield at the Moccasin site was due to drought in the summer. The high yields harvested at Richland site were due to timely rainfall, cool temperatures, and the crops were planted into a field that was prevented from planting in the previous year due to flooding. Therefore, a lot of moisture was stored in the soil profile. There were significant differences among the cultivars. Several newly developed experimental lines and newly released varieties performed well at all three locations (Tables 28, 29 and 30).

Table 28. 2012 Western Regional Lentil Variety Evaluation – Corvallis, MT (Irrigated)

Variety	Grain Yld (lb/ac)		# of days to flower	Height (cm)	Test Wt (lbs/bu)	TKW (g/1000 seeds)	Grain Moisture (%)
	Harvest	13% Moist.					
Small Green							
Essex	514	536	75	27	---	---	9.3
Eston	490	509	75	28	---	---	9.6
LC01602273E	1199	1246	75	28	---	---	9.6
LC08600005E	559	622	75	34	---	---	9.6
Medium Green							
Brewer	387	405	68	19	---	---	8.9
Richlea	859	893	75	25	---	---	9.6
LC01602300R	802	837	73	30	---	---	9.2
Large Green							
LC06601734L	685	713	72	28	---	---	9.3
Merrit	377	394	73	22	---	---	9.1
Riveland	530	552	71	23	---	---	9.4
Small Red							
Crimson	804	838	75	22	---	---	9.3
LC01602062T	689	717	70	28	---	---	9.4
LC05600043T	470	489	75	29	---	---	9.5
Spanish Brown							
LC08600113P	739	770	68	23	---	---	9.4
LC08600116P	696	722	74	23	---	---	9.7
Morena	900	929	71	29	---	---	10.1
Pardina	728	758	71	24	---	---	9.4
Trial Analysis:							
Trial Means	674	701	72	25.9	---	---	9.4
P-Value	0.0010	0.0011	<0.0001	0.0037	---	---	0.0
LSD (0.05)	336	349	3	6.6	---	---	3.7
CV (%)	35.15	35.05	2.91	17.85	---	---	0.5

Table 29. 2012 Western Regional Lentil Variety Evaluation – Moccasin, MT

Variety	Grain Yld (lb/ac)		# of days to flower	Height (cm)	Test Wt (lbs/bu)	TKW (g/1000 seeds)	Grain Moisture (%)
	Harvest	13% Moist.					
Small Green							
Essex	589	609	75	27	62.80	39.35	10.0
Eston	566	590	75	23	64.33	28.38	9.2
LC01602273E	686	714	74	24	64.00	29.90	9.3
LC08600005E	699	725	75	26	64.23	40.95	9.7
Medium Green							
Brewer	559	584	74	26	60.07	50.03	9.2
Richlea	677	701	75	27	60.88	47.08	9.8
LC01602300R	655	691	75	26	61.68	44.63	9.7
Large Green							
LC06601734L	500	514	75	27	59.07	59.23	10.4
Merrit	626	650	74	26	59.10	55.65	9.5
Riveland	545	568	75	28	58.28	62.58	9.3
Small Red							
Crimson	110	123		22		30.05	
LC01602062T	608	633	75	24	64.03	38.00	9.4
LC05600043T	746	779	74	26	65.73	40.55	9.1
Spanish Brown							
LC08600113P	660	684	75	24	64.73	38.65	9.8
LC08600116P	729	755	75	25	64.80	42.28	9.9
Morena	691	717	75	26	65.28	33.55	9.8
Pardina	694	720	75	24	65.15	30.78	9.7
Trial Analysis:							
Trial Means	607	631	75	25	62.88	42.04	9.6
P-Value	<0.0001	<0.0001	0.0394	0.0004	<0.0001	<0.0001	<0.0001
LSD (0.05)	206	212	0.94	2.49	0.35	1.97	0.3
CV (%)	23.88	23.74	0.89	23.74	0.39	3.30	2.5

Table 30. 2012 Western Regional Lentil Variety Evaluation – Richland, MT

Variety	Grain Yld (lb/ac)		# of days to flower	Height (cm)	Test Wt (lbs/bu)	TKW (g/1000 seeds)	Grain Moisture (%)
	Harvest	13% Moist.					
Small Green							
Essex	1658	1705	---	32	62.37	38.52	10.5
Eston	1664	1720	---	33	64.93	31.96	10.1
LC01602273E	1735	1793	---	28	64.23	33.08	10.0
LC08600005E	1535	1583	---	38	63.77	46.49	10.3
Medium Green							
Brewer	1822	1882	---	27	60.37	49.64	10.2
Richlea	1804	1874	---	34	60.57	47.84	9.6
LC01602300R	1972	2041	---	34	61.93	45.23	9.9
Large Green							
LC06601734L	1427	1466	---	33	60.23	66.16	10.6
Merrit	1656	1710	---	33	61.00	56.68	10.1
Riveland	1652	1712	---	30	59.80	68.17	9.8
Small Red							
Crimson	1670	1734	---	24	64.07	30.80	9.6
LC01602062T	1476	1524	---	30	63.83	41.25	10.2
LC05600043T	1289	1337	---	31	65.10	41.87	9.9
Spanish Brown							
LC08600113P	1664	1714	---	29	63.07	38.81	10.4
LC08600116P	1777	1837	---	26	63.03	41.13	10.0
Morena	1413	1452	---	35	65.23	33.41	10.6
Pardina	1541	1586	---	27	64.20	34.87	10.4
Trial Analysis:							
Trial Means	1632	1686	---	30.73	62.83	43.88	10.1
P-Value	0.0233	0.0176	---	0.0102	<0.0001	<0.0001	0.4311
LSD (0.05)	327	335	---	6.6	0.99	6.75	NS
CV (%)	12.10	11.97	---	12.87	1.04	9.27	0.9

Chickpea Trials:

Statewide Chickpea Variety Evaluation:

The chickpea variety trials were conducted at seven locations (Bozeman, Conrad, Corvallis, Creston, Huntley irrigated, Moccasin and Richland). Six commercial varieties were tested at these locations. The chickpea trials at Moccasin were accidentally seeded into a field with a previous chemical history that affected stands. Thus plots had uneven emergence and maturity and some plots were harvested by hand. The chickpea trial at Creston had deer damage and failed.

Western Regional Chickpea Variety Evaluation:

At three locations (Corvallis, Moccasin and Richland) varieties from the Western Regional variety trials were seeded in combination with the Statewide Chickpea trials. The additional varieties were four experimental lines and one commercial variety (Dwelley) (Table 31).

Summary of Chickpea Variety Evaluations:

The average yields of chickpeas were 796 lb/a at Bozeman, 1750 lb/a at Conrad, 1678 lb/a at Corvallis, 2595 lb/a at Huntley, 830 lb/a at Moccasin, and 1175 lb/a at Richland. Due to drought, chickpea yields were low at Bozeman and Moccasin. Chickpeas performed very well at Huntley under irrigation. Yields ranged from 1935 to 3167 lb/a. Due to the ascochyta leaf blight disease, chickpea yields varied greatly at Richland site. The newly developed experimental line (**CA0469C025C**) and commercial variety (**CDC Frontier**) have higher disease resistance and yield well (2589 and 2488 lb/a), but the old varieties with poor disease resistance were badly damaged by the disease resulting in greater yield losses.

Note: The following results and summary are for **informational purposes only**. Inclusion of any commercial variety in this summary does not constitute a recommendation by MSU-MAES or CARC.

DISCLAIMER:

The information given herein is supplied with the understanding that no discrimination is intended and no endorsement by the Montana Agricultural Experiment Station is implied. The results of individual trials and studies are considered to be of a **PRELIMINARY** nature and should **NOT** be considered as a product endorsement or recommendation for commercial use.

NOT FOR PUBLICATION

Table 31. Chickpea Variety Sources and Characteristics:

Variety	Type	Leaf-type	Breeding Program ¹	Release Date
CA0469C025C	Small Café Kabuli	Compound	USDA	
CA04900421C	Large Café Kabuli	Compound	USDA	
CA0690B0427C	Large Café Kabuli	Compound	USDA	
CA0790B0042C	Large Café Kabuli	Compound	USDA	
CDC Alma	Med/Large Kabuli	Compound	CDC	2010
CDC Frontier	Large Kabuli	Compound	CDC	2003
CDC Orion	Large Kabuli	Compound	CDC	2010
Dwelley	Large Café Kabuli	Simple	USDA	1998
Myles	Desi	Compound	USDA	1994
Sawyer	Large Café Kabuli	Simple	USDA	2008
Sierra	Large Café Kabuli	Simple	USDA	2004

¹ Refers to developer: CDC = Crop Development Centre, University of Saskatchewan; USDA = USDA-ARS Grain Legume Genetics and Physiology Research

Table 32. 2012 Montana Chickpea Variety Evaluations – Yield (lb/a)

Variety	Bozeman	Conrad	Corvallis (Irrigated)	Huntley (Irrigated)	Moccasin	Richland
CA0469C025C	---	---	1963	---	905	2589
CA04900421C	---	---	1870	---	1223	910
CA0690B0427C	---	---	1746	---	659	759
CA0790B0042C	---	---	1801	---	981	201
CDC Alma	828	1946	1771	3056	919	1467
CDC Frontier	875	2103	1971	2745	605	2488
CDC Orion	852	2090	---	3167	1619	1907
Dwelley	---	---	1189	2052	570	58
Myles	994	1626	1693	2668	964	1588
Sawyer	777	1493	1308	2544	786	782
Sierra	450	1311	1477	1935	657	180
Trial Analysis:						
Trial Means	796	1750	1678	2595	830	1175
P-Value	<0.0001	0.0521	0.1749	0.0012	0.0143	<0.0001
LSD (0.05)	136	575	NS	526	304	577
CV (%)	9.62	18.28	21.74	11.58	19.18	29.00

