

Western Regional Cool Season Legume Evaluation Trials & Nurseries



Prepared by
Grain Legume Genetics and Physiology Research Unit

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and

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We would like to acknowledge contributions of the Cool Season Food Legume Program to the Grain Legume Variety Development program.

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Project Description and Objectives

New varieties of cool season food legumes are needed by the expanding industry in the northern plains region as well as the Pacific Northwest. Candidate varieties are being developed by the USDA-ARS Grain Legume Genetics program located at Washington State University; however, the germplasm being generated needs to be evaluated in all production regions. Specifically, new varieties are needed that are better adapted to the northern plains and with improved disease resistance, yields and quality. Potential new varieties of dry peas, lentils and chickpeas were evaluated through a coordinated set of trials, the Western Regional Evaluation Trials, in the major production zones of the northern plains and the Pacific Northwest. These trials compared currently available varieties to the most recent material from the USDA-ARS breeding program in uniform replicated trials. Winter hardy pea and lentil selections with high yield potential were also evaluated. In addition to evaluation of advanced breeding lines at locations throughout the northern plains and the Pacific Northwest, nurseries were established to evaluate early-generation segregating breeding populations of chickpea and spring and winter pea and lentil in North Dakota and make selections for resistance to prevalent diseases, agronomic adaptation and suitable plant types. Screening winter pea and lentil breeding populations in North Dakota will provide an opportunity to identify selections with increased winter hardiness. The goal of this project is to provide producers throughout the U.S. with higher yielding disease resistant varieties that will increase overall farm productivity and profitability while expanding the use of grain legumes in crop rotations. Data and information generated are being made available through websites, meetings, conferences and in printed documents.

- Objective 1: Identify regions of adaptation for new cultivars and breeding lines through establishment of a network of Western Regional Evaluation Trials in the target environments. Informed selection of varieties for production depends on an understanding of how environments differentiate among genetic material. This information is also important to plant breeders in order to optimize the choice of parents, methods of selection and the extent of yield testing in the target region.
- Objective 2: Establish a satellite breeding program in North Dakota to identify early generation breeding lines for potential use in the northern plains region. A range of diseases and environmental stresses are specific to the northern plains region and therefore the prospects for successful selection of adapted high yielding disease resistant germplasm would be most effective if carried out in the target region.

During the 2004 crop year, 80 Western Regional Trials were established at 24 sites in 8 states including 23 for spring dry pea, 17 for spring lentil, 17 for chickpea, 11 for winter dry pea, and 12 for winter lentil. Several sites were lost due to various environmental factors including hail and severe cold temperatures resulting in poor stands in the winter legume trials. Overall, data were collected and received for 53 of the 80 trials. In addition, selections were made in the segregating populations of lentil for plant habit, resistance to lodging and disease resistance.

Spring Pea Trials

Ten spring pea entries in the Western Regional Yield Trial were evaluated at 19 locations across seven states in 2004 (Table 1). The entries comprised three checks and seven breeding lines including four green and three yellow cotyledon types. The checks were 'Lifter' (green), 'Stirling' (green) and 'Delta' (yellow). The trials were conducted primarily under dryland conditions; however, three trials in Nebraska and one in Wyoming were irrigated. Information regarding experimental design, location and specific observations for some of the locations are included below.

Overall means are presented for each entry based only on those locations including all entries (Table 2). Average yield for the checks was 2431 lb/a and Delta (2611 lb/a) was the highest yielding line across the trials. Stirling, a recently released upright green cotyledon variety, produced an average yield of 2413 lb/a. The highest yielding breeding lines were PS9910140 (yellow) (2522 lb/a) followed by PS0010792 (green) (2507 lb/a) and PS0010804 (green) (2461 lb/a).

Nebraska

Grain pea trials were planted at five locations. Irrigated and dryland trials were planted southwest of Hemingford in Box Butte county. An irrigated trial was planted at Scottsbluff, and irrigated and dryland trials were planted near Sidney. Weeds were a problem in the irrigated Box Butte and Scottsbluff trials. Extreme drought reduced yields considerably at the Box Butte dryland location. A few timely rains produced fair yields at the Sidney dryland location in spite of severe drought. Cool June weather was beneficial to all locations. (Glen Frickel)

South Dakota

The Selby site had some problems with root disease and was highly variable, so results from that location should not be used for yield comparisons. The Wall location suffer from heavy rains, hail and wind just before harvest. There was a lot of shatter especially on the early varieties, I think easily 15 Bu/A was left on the ground. The other two locations, like most of western South Dakota were dry again this summer, which probably was the biggest factor limiting yield. (John Rickertsen)

Wyoming

Ten lines of dry peas were grown at the Powell Research and Extension Center (elevation: 4400 ft.) in northwestern Wyoming. The soil type was a Garland clay loam (fine, mixed, mesic typic Haplargid, 40% sand, 24% silt, and 36% clay) with 1.2% organic matter and pH 7.2. Dry pea seeds were planted in rows spaced 22 or 7 inches apart. Plots were established under furrow irrigation and all lines were arranged in a randomized complete block design with four replications (Abdel Mesbah)

Table 1. Summary of Locations Participating in the 2004 Spring Pea Western Regional Yield Trial

Location	Contact	Conditions	Nurseries		
			No. Sent	Data Returned	Data Lost
Idaho					
Moscow	Stephen Guy, Ying Wu	Dryland	✓	✓	-
NezPerce	Stephen Guy, Ying Wu	Dryland	✓	-	✓
Genesee	Stephen Guy, Ying Wu	Dryland – No-till	✓	✓	-
Montana					
Kalispell	Louise Strang, Duane Johnson	Dryland	✓	✓	-
Moccasin	Chengci Chen, Karnes Neill	Dryland	✓	✓	-
Nebraska					
Box Butte	David Baltensperger, Glenn Frickel	Dryland	✓	✓	-
Sidney	David Baltensperger, Glenn Frickel	Dryland	✓	✓	-
Box Butte	David Baltensperger, Glenn Frickel	Irrigated	✓	✓	-
Scottsbluff	David Baltensperger, Glenn Frickel	Irrigated	✓	✓	-
Sidney	David Baltensperger, Glenn Frickel	Irrigated	✓	✓	-
North Dakota					
Carrington	Blaine Schatz, Steve Zwinger	Dryland	✓	✓	-
Hettinger	Eric Eriksmoen	Dryland	✓	✓	-
Minot	Mark Halvorson	Dryland	✓	✓	-
Williston	Neil Riveland	Dryland	✓	✓	-
South Dakota					
Bison	John Rickertson	Dryland	✓	✓	-
Hayes	John Rickertson	Dryland	✓	✓	-
Selby	John Rickertson	Dryland	✓	✓	-
Wall	John Rickertson	Dryland	✓	✓	-
Washington					
Davenport	Dennis Tonks	Dryland	✓	✓	-
Wyoming					
Powell	Abdel Mesbah	Dryland	✓✓	✓✓	-
Torrington	Jim Krall, Jerry Nachtman	Dryland	✓	-	✓
Torrington	Jim Krall, Jerry Nachtman	Irrigated	✓	✓	-
Grand Totals			23	21	2

Table 2. Location Yield Summary (lb/a) for Western Regional Spring Pea Trials

Location	PS810162	PS9910140	PS9910592	PS0010792	PS0010804	PS0010806	PS0010836	Delta	Lifter	Stirling
Moscow, ID	3456	...	4205	...	3598	...	3117	3493	3326	3432
Genesee, ID	...	...	...	...	...	...	...	...	...	3710
Kalispell, MT	1835	2374	2286	3131	2828	2313	2786	2767	1897	3079
Moccasin, MT	2207	2258	2210	2293	2111	2282	2251	2358	1990	2110
Sidney, NE (Irr)	4320	3780	2620	3870	4150	3300	3750	4310	2610	3470
Sidney, NE (Dry)	830	920	610	1240	1110	970	1150	1140	770	1080
Box Butte, NE (Irr)	1450	1520	880	1650	1160	1050	1680	1820	1030	640
Box Butte, NE (Dry)	380	300	180	550	330	350	250	250	230	430
Scottsbluff, NE (Irr)	1440	2680	940	2350	2130	1480	1660	2360	2390	2040
Carrington, ND	4416	3756	4152	3942	4308	3762	4164	4416	4050	4128
Hettinger, ND	510	1003	1065	1199	1403	1657	882	1714	1623	630
Minot, ND	3054	3606	2262	4386	3882	3018	3774	3990	3348	3678
Williston, ND	2939	3534	3571	3833	3607	2949	3488	3824	3085	3382
Bison, SD	...	...	...	...	...	...	...	1392	1230	900
Hayes, SD	...	...	...	...	...	...	...	1656	1470	1434
Selby, SD	...	...	...	...	...	...	...	2886	2286	2034
Wall, SD	1830	1596	1158	930	1344	1056	1830	1596	1122	1333
Davenport, WA	1203	1559	1511	732	...	1197	1042	1707	1171	1453
Powell, WY (22" row)	2731	3411	2249	2518	2700	2681	2275	2211	4101	3369
Powell, WY (7" row)	4306	3840	4021	3351	3688	4326	3035	3538	3362	4775
Torrington, WY	2258	3256	1621	2356	2161	1978	2302	2870	2436	2054
Grand Mean	2300	2522	1988	2507	2461	2211	2352	2611	2270	2413

Grand mean taken from locations with a complete set of data.

Table 3. Green Dry Pea Variety Performance Results at Moscow, ID - 2004
Data from Stephen Guy and Ying Wu, University of Idaho

Variety or Selection	Seed Yield lb/acre	Seed Weight g/100	Vine Length inches	Canopy Height inches
Ariel	3356	19.3	29	29
Bluebird	3307	26.2	23	22
Camry	3063	25.5	20	20
Columbian	3322	20.0	42	16
Cooper	3902	27.9	31	31
Cruiser	3056	20.7	32	32
Journey	3319	16.7	47	17
Lifter	3326	21.4	32	14
Karita	3436	26.7	30	30
K 2	3444	21.6	30	30
Monarch	3288	21.2	26	26
Nitouche	3338	25.6	32	32
Pacifica	3251	22.1	32	27
Stirling	3432	21.1	26	26
Stratus	3665	26.4	23	23
Supra	2917	34.1	25	25
Toledo	2650	25.6	29	29
Ceb 1090	3587	27.7	32	32
PS 810162	3456	23.6	28	26
PS9910592	4205	20.8	28	18
PS0010804	3598	24.4	27	27
Pro 011-3172	3130	22.7	32	32
AP-18	3364	21.9	31	31
Average	3366	23.6	30	26
LSD (0.10)	597	1.1	1	5
CV (%)	15	3.8	9	15

Table 4. Yellow Dry Pea Variety Performance Results at Moscow, ID - 2004
Data from Stephen Guy and Ying Wu, University of Idaho

Variety or Selection	Seed Yield lb/acre	Seed Weight g/100	Vine Length inches	Canopy Height inches
Badminton	3477	23.4	25	25
Delta	3493	23.1	30	30
Fallon	3299	24.4	29	28
Maribu	3252	23.6	26	26
Rex	3667	24.5	30	24
Shawnee	3118	21.9	45	17
Swing	3142	22.5	33	33
Topeka	3972	24.6	26	23
FDP007	3866	24.4	33	33
FDP2010	3681	26.7	33	33
PS991040	3561	23.9	27	23
PS0010836	3117	24.4	25	25
SW 995848	3806	25.8	35	35
Average	3496	24.1	31	27
LSD (0.10)	597	1.1	1	5
CV (%)	15	3.8	9	15

Table 5. Seed Yield Averages For Green and Yellow Pea Varieties Tested for Three Years in Northern Idaho
Data from Stephen Guy and Ying Wu, University of Idaho

Variety or Selection	2002	2003	2004*	Average
.....lb/acre.....				
Green Pea				
Ariel	1972	1543	3356	2077
Bluebird	3083	1849	3307	2634
Columbian	2188	1394	3322	2097
Cruiser	2185	1529	3056	2097
Journey	2060	1261	3319	1992
Karita	2112	1778	3436	2243
Monarch	2374	1546	3288	2226
Stirling	2479	1159	3432	2142
Stratus	2798	1833	3665	2585
Supra	1645	1138	2917	1697
Toledo	2565	1710	2650	2240
Average	2315	1522	3250	2185
LSD (0.10)	172	139	597	--
Yellow Pea				
Badminton	2484	1768	3477	2396
Fallon	2259	1425	3299	2133
Rex	2317	1615	3667	2306
Shawnee	2180	1782	3118	2208
Swing	2824	1710	3142	2442
Average	2413	1660	3341	2297
LSD (0.10)	172	139	597	--

* 2004 results are Moscow only and the averages are for five locations.

Table 6. No-Till Dry Pea Variety Performance Results at Genesee, ID – 2004
Data from Stephen Guy and Ying Wu, University of Idaho

Variety or Selection	Seed Yield lb/acre	Seed Weight g/100	Vine Length inches	Canopy Height inches	Erect Index 0.0-1.0
Ariel	3326	19.0	37	20	0.5
Bluebird	3637	24.1	30	21	0.7
Camry	3782	21.9	30	21	0.7
Columbian	2845	17.5	60	17	0.3
Cruiser	3322	19.9	36	21	0.6
Joel	3296	21.8	54	20	0.4
Karita	3178	24.7	35	29	0.8
K 2	3350	20.4	38	25	0.7
Monarch	3668	19.8	33	18	0.5
Stirling	3710	19.8	35	16	0.5
Stratus	3537	21.7	36	16	0.4
Supra	2906	31.5	36	17	0.5
Toledo	3452	24.7	38	27	0.7
Badminton	3990	23.1	33	16	0.5
Fallon	3771	25.8	38	15	0.4
Maribu	3611	23.3	35	18	0.5
Rex	3932	22.1	41	19	0.5
Shawnee	3120	22.0	46	16	0.3
Swing	3824	21.5	34	24	0.7
Topeka	3833	20.9	33	16	0.5
Average	3505	22.3	38	20	0.5
LSD (0.10)	337	1.9	6	3	--
CV (%)	8	7.1	13	14	--

Table 7. No-Till Dry Pea Variety Performance Results at Moscow, ID – 2004
Data from Stephen Guy and Ying Wu, University of Idaho

Variety or Selection	Seed Yield lb/acre	Seed Weight g/100	Vine Length inches	Canopy Height inches	Erect Index 0.0-1.0
Ariel	2647	18.4	33	33	1.0
Bluebird	2890	25.6	29	29	1.0
Camry	2764	24.8	25	25	1.0
Columbian	2966	19.3	49	16	0.3
Cruiser	2572	21.1	35	35	1.0
Joel	2817	24.1	49	18	0.4
Karita	2646	26.2	33	33	1.0
K 2	2589	20.9	34	34	1.0
Monarch	3144	20.9	28	28	1.0
Stirling	3154	21.0	32	28	0.9
Stratus	3316	25.4	27	27	1.0
Supra	2253	34.5	28	28	1.0
Toledo	2570	24.9	34	34	1.0
Badminton	3112	24.8	28	27	1.0
Fallon	2619	24.4	31	31	1.0
Maribu	2379	23.8	29	29	1.0
Rex	2891	24.3	32	22	0.7
Shawnee	2517	22.9	41	17	0.4
Swing	2569	23.1	34	34	1.0
Topeka	2812	24.3	28	28	1.0
Average	2761	23.7	33	28	0.9
LSD (0.10)	348	0.7	3	4	--
CV (%)	11	2.4	8	12	--

Table 8. Seed Yield and Seed Weight for No-Till Dry Pea Varieties Tested for Three Years in Northern Idaho.
Data from Stephen Guy and Ying Wu, University of Idaho

Variety or Selection	Seed Yield				Seed Weight			
	2002	2003	2004	Average	2002	2003	2004	Average
	lb/acre				g/100			
Ariel	1424	1373	2987	1928	17.1	17.2	18.7	17.7
Bluebird	1725	1568	3264	2186	22.8	22.0	24.9	23.2
Columbian	1582	862	2906	1783	19.2	19.4	18.4	19.0
Cruiser	1281	1287	2947	1838	19.2	18.5	20.5	19.4
Joel	1515	1873	3057	2148	18.8	20.2	23.0	20.7
Karita	1358	1493	2912	1921	23.5	23.7	25.5	24.2
Monarch	1460	1714	3406	2193	18.2	19.0	20.4	19.2
Stirling	1107	1106	3432	1882	18.4	19.7	20.4	19.5
Stratus	1701	1702	3427	2277	24.5	22.5	23.6	23.5
Supra	1203	886	2580	1556	34.0	31.8	33.0	32.9
Toledo	1613	1576	3011	2067	23.0	23.5	24.8	23.8
Badminton	1518	1350	3551	2140	21.7	21.6	24.0	22.4
Fallon	1365	1372	3195	1977	21.1	21.7	25.1	22.6
Rex	1493	1256	3412	2054	24.4	23.2	23.2	23.6
Shawnee	1656	1788	2819	2088	19.7	20.4	22.5	20.9
Swing	1776	1744	3197	2239	20.4	21.4	22.3	21.4
Average	1486	1434	3131	2017	21.6	21.6	23.1	22.1
LSD (0.10)	147	122	242	--	1.6	0.4	0.9	--

Table 9. Western Regional Dry Pea Yield Trial at Kalispell, MT - 2004
Data from Louise Strang and Duane Johnson, Montana State University

Cultivar	Entry	Cotyledon Color	Vine Type	Leaf Type	First Flower	First Flower	Maturity	Maturity	Yield	SeedWt
					date	day	date	day	lbs/a	#/lb
Lifter	1	Green	Short	Normal	6/16	64	7/23	101	1897	2576
Stirling	2	Green	Short	Semi-leafless	6/13	61	7/22	100	3079	2158
PS810162	3	Green	Short	Semi-leafless	6/10	58	7/22	100	1845	2003
PS9910592	4	Green	Short	Semi-leafless	6/16	64	7/22	100	2286	2122
PS0010792	5	Green	Short	Normal Leaf	6/15	63	7/23	101	3131	1939
PS0010804	6	Yellow	Short	Semi-leafless	6/16	64	7/21	99	2828	2072
Delta	7	Yellow	Short	Semi-leafless	6/15	63	7/20	98	2767	2029
PS9910140	8	Yellow	Short	Semi-leafless	6/16	64	7/22	100	2374	2246
PS0010806	9	Yellow	Short	Semi-leafless	6/16	64	7/22	100	2313	2035
PS0010836	10	Yellow	Short	Semi-leafless	6/17	65	7/22	100	2786	1948
Mean						63		100	2531	2113
LSD(0.05)						1.13		1	612	95
Pr>F						<0.00		0.00	0.00	<0.00

Seeding date: 4/13/04

Seeding rate: 8.3 seeds/ft²

Fertilizer: 13 lbs N/a + 62 lbs P₂O₅/a

Herbicide: Pursuit (3 oz./a) + Prowl (1.8 pints/a) pre-plant incorporated

Table 10 . 2004 Western Regional Dry Pea Trial - Dry-land dry pea agronomic summary.- Exp: 810704 Central Ag Research Center, Moccasin, MT
Data from Chengci Chen and Karnes Neill, Montana State University

	Flower (date)	Grain Harvest			
		Plant Ht (cm)	Yield (lbs/acre)	Test (lbs/bu)	Moisture (%)
Delta (yellow)	6/26	53.0 ^a	2,358 ^a	64.43 ^a	12.0 ^a
PS0010792	6/25	55.5 ^a	2,293 ^a	63.48	11.0
PS0010806	6/27	53.3 ^a	2,282 ^a	62.75	11.6 ^a
PS9910140	6/28	50.5	2,258 ^a	63.38	12.0 ^a
PS0010836	6/28	42.8	2,251 ^a	62.80	12.4 ^a
Majoret (green)	6/27	60.8 ^a	2,232 ^a	63.78 ^a	11.1
PS9910592	6/27	39.5	2,210 ^a	63.15	11.5
PS810162	6/14	45.5	2,207 ^a	62.58	11.2
PS0010804	6/27	47.8	2,111	63.73 ^a	11.8 ^a
Stirling	6/18	45.5	2,110	63.05	11.6 ^a
Lifter	6/27	32.0	1,990	63.80 ^a	11.7 ^a
Means (<i>n</i> = 44)	6/24	47.8	2,209	63.4	11.6
LSD (0.05 by t)		9.4	221	0.9	0.8
CV% (s/mean)		13.6	6.9	1.0	4.7
F-Value		6.12	1.82 ⁿ	3.12	2.23

^a - Denotes values equal highest value (in **bold**) based on LSD_(0.05).

ⁿ - Denotes not statistically significant at 0.05 level.

Table 11. Nebraska Grain Pea Trials – 2004
Data from David Baltensperger and Glen Frickel, University of Nebraska

Listed Alphabetically	Sidney Irrigated	Box Butte Irrigated	Scottsbluff Irrigated	Sidney Dryland	Box Butte Dryland
	Yield		Lbs. / Acre		
Admiral	4270	2780	2270	1180	330
Arvika	2150	2070	2490	880	100
Carneval	1740	1190	2080	1580	350
Circus	3230	2050	1750	1270	350
Cruiser	4200	1710	2260	1370	430
Delta	4310	1820	2360	1140	250
Forager	2120	1170	1970	1040	400
Integra	3950	--	2130	1100	--
Lifter	2610	1030	2390	770	230
Majoret	3810	1920	2290	1030	180
PS0010792	3870	1650	2350	1240	550
PS0010804	4150	1160	2130	1110	330
PS0010806	3300	1050	1480	970	350
PS0010836	3750	1680	1660	1150	250
PS810162	4320	1450	1440	830	380
PS9910140	3780	1520	2680	920	300
PS9910592	2620	880	940	610	180
Salute	4330	2380	2540	1330	400
Stirling	3470	640	2040	1080	430
Toledo	3710	--	1930	1110	--
Average	3485	1563	2060	1090	320
LSD (.05)	700	682	636	267	213
Planting Date	April 2	April 3	March 31	March 26	April 3
Harvest Date	July 29	August 12	August 2	July 28	July 19

Table 12. NDSU Carrington Research Extension Center Western Regional Field Pea Nursery (0497), 2004
Data from Blaine Schatz and Steve Zwinger, North Dakota State University

Obs	Variety	Emerged Plant Stand ft ²	Days to Bloom	Bloom Duration	Days to PM	Vine Length cm	Canopy Ht at Harvest cm	Height Index %	Lodging at PM 0-9	Harvest Ease 0-9	Seeds/ Pound	1000 KWT gms	Test Weight lbs/bu	Seed Yield bu/ac
1	PS0010792	6.9	54.0	22.7	95.7	70	32	46	6.0	6.7	1685	270	64.7	65.7
2	PS0010804	7.5	55.3	17.3	93.0	72	23	32	5.7	8.7	1775	256	64.9	71.8
3	PS0010806	5.9	55.7	25.0	96.3	73	27	37	5.3	6.7	1523	299	64.0	62.7
4	PS0010836	6.0	55.7	17.7	94.3	70	26	37	4.7	7.7	1568	290	64.3	69.4
5	PS510718	8.3	56.0	25.7	99.7	74	28	39	6.3	7.3	2047	222	65.2	67.5
6	PS610152	6.5	51.3	24.0	94.7	70	29	42	5.0	6.7	2079	219	64.8	68.8
7	PS810162	6.5	49.7	22.7	90.3	65	28	43	5.0	7.0	2065	221	64.0	63.5
8	PS960007	7.3	55.3	18.3	91.0	72	33	46	4.7	6.7	1753	259	65.0	73.6
9	PS9910140	6.9	56.0	24.3	94.7	61	24	40	7.3	9.0	1761	260	63.9	62.6
10	PS9910592	6.3	55.0	21.7	93.3	67	17	25	7.7	9.0	2299	198	64.4	69.2
MEAN		6.8	54.4	21.9	94.3	69.4	26.7	38.6	5.8	7.5	1838	252	64.5	67.1
C.V.%		9.6	1.2	9.9	1.9	8.5	14.8	18.2	11.1	11.5	7.1	7.1	1.0	8.4
LSD.05		1.1	1.1	3.7	3.0	NS	6.8	12.0	1.1	1.5	229	32	NS	NS
LSD.01		1.5	1.5	5.1	4.2	NS	9.3	NS	1.6	2.1	319	44	NS	NS
#REPS		3	3	3	3	3	3	3	3	3	3	3	3	3

Planting Date = May 6; Harvest Date = September 2 ; Previous Crop = Durum

Harvest Ease scores; 0 = all plants upright ~ very easy harvest, to 9 = all plants flat ~ very difficulty to harvest direct.

Harvest Index; Plant height at time of harvest relative to plant height at end of bloom.

** PS510718 = Lifter , PS610152 = Stirling , PS960007 = Delta.

Table 13. Field Pea Performance Test - NDSU Carrington Research Extension Center 2004
Data from Blaine Schatz and Steve Zwinger, North Dakota State University

Obs	Variety	Plant Stand ft-2	Days to Bloom	Bloom Duration	Days to PM	Vine Length cm	Canopy Ht at Harvest cm	Height Index %	Lodging at PM 0-9	Harvest Ease 0-9	Seed Protein %	Seeds/ Pound	1000 KWT gms	Test Weight lbs/bu	Seed Yield bu/ac
<i>Green Cotyledon Type</i>															
1	AP-18	6.3	58.8	18.3	98.8	85	57	68	2.0	2.3	20.7	1927	236	63.5	72.9
2	AP-7	5.8	59.8	18.5	99.3	85	58	69	2.5	2.8	20.6	1771	256	63.1	70.7
6	Ballistic	6.1	54.8	19.5	97.8	81	47	58	5.0	5.8	24.0	2029	224	63.8	64.5
11	CDC Montero	6.0	57.8	22.3	101.0	80	39	48	5.3	7.0	20.4	1998	227	63.4	70.0
14	CDC Striker	7.3	58.3	14.8	94.5	86	52	61	3.5	4.8	22.5	1701	267	64.0	71.8
15	Camry	7.0	54.8	20.0	98.0	81	45	57	4.3	5.5	21.4	1615	281	63.0	77.8
17	Ceb 1090	6.3	61.5	13.5	99.3	92	60	65	2.0	2.3	20.4	1480	307	63.0	81.3
18	Ceb 1093	6.7	60.5	12.5	96.3	91	62	68	1.8	2.5	19.8	1480	307	62.3	83.8
22	Cooper	6.6	60.5	15.0	99.0	91	51	56	1.8	2.8	21.2	1473	309	63.1	80.1
23	Cruiser	6.8	55.3	20.0	96.0	82	55	67	2.8	3.0	21.2	2055	221	63.4	68.0
32	Grommet	6.9	57.0	18.3	92.8	87	55	64	2.5	3.3	21.5	1720	264	62.9	76.2
34	Journey	7.2	54.0	27.3	99.0	80	45	56	6.8	8.0	19.9	2136	213	61.4	58.4
35	Majoret	6.6	56.5	18.0	94.0	90	53	59	3.0	4.8	22.3	1857	245	63.0	75.1
36	Nitouche	6.8	55.8	19.3	96.8	89	57	64	3.0	3.8	22.3	1568	290	62.5	74.6
37	Pro 011-3172	6.1	54.5	19.8	94.8	79	49	62	6.0	6.3	19.7	2010	226	62.6	67.9
40	SW 98692	5.6	54.8	21.3	96.0	87	55	64	2.8	3.5	20.6	1943	234	63.6	72.4
41	SW B 6117	6.4	56.0	19.8	93.8	79	43	55	4.3	5.5	20.4	1934	235	62.7	70.2
42	SW B 6118	5.8	55.8	20.8	93.3	84	54	64	4.8	6.3	21.4	1818	250	62.1	69.5
45	SW C 6198	6.7	58.3	21.0	99.8	89	57	65	2.5	3.5	20.4	1778	255	63.6	70.8
46	SW C 6199	6.9	53.3	21.8	92.8	80	43	55	5.0	6.5	21.0	1718	264	62.3	75.5
47	SW C 6203	6.6	54.3	24.5	101.0	79	44	57	3.0	4.8	21.5	1564	290	62.7	69.1
48	SW C 6204	6.6	55.8	23.5	98.5	81	57	71	3.5	3.5	19.3	1856	245	62.9	75.1
56	Stirling	6.2	52.8	24.0	99.0	82	45	56	5.3	6.5	22.1	1946	233	62.4	73.7
57	Stratus	6.3	55.0	19.8	96.3	87	38	43	6.0	7.5	21.9	1612	282	60.8	82.5
58	Toledo	7.0	53.0	18.3	90.5	84	55	65	2.3	3.0	21.0	1581	287	61.9	72.3
MEAN		6.4	56.3	19.8	95.4	84.6	51.5	61	3.4	4.4	21.2	1774	261	62.9	72.6
C.V.%		12.9	2.3	7.6	1.9	8.2	12.9	14.2	24.0	20.0	3.3	3.2	3.1	0.6	6.6
LSD.05		0.7	1.8	2.1	2.6	9.6	9.2	12	3.2	1.2	1.0	80	11	0.5	6.6
LSD.01		0.9	2.4	2.7	3.4	12.7	12.1	16	4.2	0.4	1.3	105	15	0.6	8.7
#REPS		4	4	4	4	4	4	4	4	4	4	4	4	4	4

Planting Date = May 7; Harvest Date = August 30; Previous Crop = Oats

Harvest Ease scores; 0 = all plants upright ~ very easy harvest, to 9 = all plants flat ~ very difficulty to harvest direct.

Harvest Index; Plant height at time of harvest relative to plant height at end of bloom.

Table 13. Field Pea Performance Test - NDSU Carrington Research Extension Center 2004
Data from Blaine Schatz and Steve Zwinger, North Dakota State University

Obs	Variety	Plant Stand ft-2	Days to Bloom	Bloom Duration	Days to PM	Vine Length cm	Canopy Ht at Harvest cm	Height Index %	Lodging at PM 0-9	Harvest Ease 0-9	Seed Protein %	Seeds/ Pound	1000 KWT gms	Test Weight lbs/bu	Seed Yield bu/ac
Yellow Cotyledon Type															
3	APCM 61758	6.5	53.8	22.5	94.5	83	57	69	4.0	4.5	22.3	1623	280	62.6	62.8
4	APCM 714204	6.4	61.0	15.8	98.5	106	80	77	0.0	0.0	21.6	1457	312	64.3	62.4
5	APCM 78301	6.6	61.3	12.3	92.8	90	62	69	1.5	2.5	21.3	1394	326	64.0	72.0
7	CDC Bronco	5.9	61.0	19.3	102.0	83	32	39	4.3	7.0	24.1	2020	225	63.0	57.7
8	CDC Golden	6.7	57.5	20.5	93.5	91	58	64	3.0	4.0	20.9	1969	231	63.5	71.8
9	CDC Handel	6.2	56.5	24.0	99.5	77	43	56	5.5	7.0	21.9	2102	216	62.7	67.8
10	CDC Minuet	5.7	60.0	19.5	96.5	79	53	67	4.3	4.8	20.9	2145	212	63.2	79.7
12	CDC Mozart	6.6	55.3	23.8	95.5	85	40	48	5.8	6.5	19.9	1750	259	63.5	81.1
13	CDC Sonata	6.9	56.0	27.5	102.0	74	33	46	4.5	7.8	20.3	1601	284	62.6	71.4
16	Carneval	7.0	58.8	18.0	93.0	87	60	69	2.0	3.0	20.6	1937	235	63.0	73.8
19	Ceb 4132	6.4	55.3	19.5	95.5	80	43	54	4.0	5.8	22.2	1533	296	63.0	84.5
20	Ceb 4133	6.3	53.0	23.0	94.5	88	47	54	4.0	4.5	20.7	1575	288	62.6	80.5
21	Ceb 4135	7.0	53.8	22.8	93.8	88	56	63	1.8	3.3	22.7	1470	309	63.2	75.8
24	Cutlass	3.3	56.3	24.3	102.0	78	38	49	4.3	6.0	21.1	1923	238	63.1	61.1
25	DP68-36192	6.9	55.0	20.0	94.0	85	53	64	3.5	5.3	21.1	1615	281	62.7	71.3
26	DP68-38877	6.1	56.5	18.3	92.3	86	55	65	2.8	3.5	20.9	1697	268	63.1	73.9
27	DP68-38910	5.9	52.8	19.8	90.8	78	46	59	4.0	4.8	21.3	1647	276	62.4	72.6
28	DS Admiral	6.6	57.0	18.3	92.8	94	58	61	2.0	2.5	20.8	1686	269	62.9	76.7
30	Eclipse	6.5	54.8	23.0	97.0	96	51	54	2.3	3.5	22.7	1778	256	63.3	77.8
31	FDP 2010	6.0	54.5	17.5	91.3	81	51	64	4.0	4.5	20.1	1523	298	63.1	75.7
MEAN		6.4	56.3	19.8	95.4	84.6	51.5	61	3.4	4.4	21.2	1774	261	62.9	72.6
C.V.%		12.9	2.3	7.6	1.9	8.2	12.9	14.2	24.0	20.0	3.3	3.2	3.1	0.6	6.6
LSD.05		0.7	1.8	2.1	2.6	9.6	9.2	12	3.2	1.2	1.0	80	11	0.5	6.6
LSD.01		0.9	2.4	2.7	3.4	12.7	12.1	16	4.2	0.4	1.3	105	15	0.6	8.7
#REPS		4	4	4	4	4	4	4	4	4	4	4	4	4	4

Planting Date = May 7; Harvest Date = August 30; Previous Crop = Oats

Harvest Ease scores; 0 = all plants upright ~ very easy harvest, to 9 = all plants flat ~ very difficulty to harvest direct.

Harvest Index; Plant height at time of harvest relative to plant height at end of bloom.

Table 13. Field Pea Performance Test - NDSU Carrington Research Extension Center 2004
Data from Blaine Schatz and Steve Zwinger, North Dakota State University

Obs	Variety	Plant Stand ft-2	Days to Bloom	Bloom Duration	Days to PM	Vine Length cm	Canopy Ht at Harvest cm	Height Index %	Lodging at PM 0-9	Harvest Ease 0-9	Seed Protein %	Seeds/ Pound	1000 KWT gms	Test Weight lbs/bu	Seed Yield bu/ac
Yellow Cotyledon Type															
33	Integra	7.6	55.3	16.0	89.0	82	58	72	2.5	3.3	22.4	1619	281	62.5	72.3
38	Pro 024-7510	6.5	61.5	16.3	101.0	91	36	40	2.8	5.5	21.2	2225	204	63.3	69.9
39	SW 5126	5.7	55.0	22.5	93.5	80	53	66	3.8	4.5	21.2	2295	198	63.9	65.0
43	SW C 5101	6.5	54.8	20.3	92.3	87	55	64	3.3	4.5	20.8	1813	251	62.7	72.3
44	SW C 5116	6.3	57.8	20.3	93.8	90	61	68	2.3	3.3	18.6	1678	271	62.6	75.0
49	SW Cabot	7.3	54.0	21.3	90.8	91	59	65	1.5	2.5	22.8	1760	258	62.8	79.9
50	SW Capri	7.2	56.3	16.8	88.0	88	62	71	1.0	1.0	20.6	2117	215	63.5	80.0
51	SW Circus	6.3	56.0	18.0	89.3	83	60	72	2.5	3.3	19.8	1980	229	63.3	73.7
52	SW Marquee	6.1	57.5	20.3	92.3	85	60	71	2.5	3.0	22.0	2072	219	62.9	71.9
53	SW Midas	6.8	57.0	18.8	91.5	91	57	63	2.3	3.5	21.0	1962	231	63.2	79.5
54	SW Prize	6.3	55.3	21.8	99.3	80	59	75	3.3	3.3	22.3	1616	281	63.7	61.5
55	SW Salute	6.1	54.8	24.5	95.0	78	52	68	5.0	6.5	20.9	1786	254	63.3	73.5
59	Topeka	6.9	55.0	16.8	91.0	76	32	43	6.3	7.5	21.0	1754	259	62.2	80.1
60	Tudor	6.8	58.5	15.5	91.3	88	58	67	2.5	3.3	20.8	1603	283	62.7	80.0
Marrowfat															
29	DS49519	6.6	54.3	18.5	97.5	81	47	59	5.3	6.5	20.6	1061	428	61.1	63.9
	MEAN	6.4	56.3	19.8	95.4	84.6	51.5	61	3.4	4.4	21.2	1774	261	62.9	72.6
	C.V.%	12.9	2.3	7.6	1.9	8.2	12.9	14.2	24.0	20.0	3.3	3.2	3.1	0.6	6.6
	LSD.05	0.7	1.8	2.1	2.6	9.6	9.2	12	3.2	1.2	1.0	80	11	0.5	6.6
	LSD.01	0.9	2.4	2.7	3.4	12.7	12.1	16	4.2	0.4	1.3	105	15	0.6	8.7
	#REPS	4	4	4	4	4	4	4	4	4	4	4	4	4	4

Planting Date = May 7; Harvest Date = August 30; Previous Crop = Oats

Harvest Ease scores; 0 = all plants upright ~ very easy harvest, to 9 = all plants flat ~ very difficulty to harvest direct.

Harvest Index; Plant height at time of harvest relative to plant height at end of bloom.

Table 14. Field Pea : Preliminary Yield Trial NDSU Carrington Research Extension Center 2004
Data from Blaine Schatz and Steve Zwinger, North Dakota State University

Obs	Variety	Emerged Plant Stand ft ²	Days to Bloom	Bloom Duration	Days to PM	Vine Length cm	Canopy Ht at Harvest cm	Height Index %	Lodging at PM 0-9	Harvest Ease 0-9	Seed Protein %	Seeds/ Pound	1000 KWT gms	Test Weight lbs/bu	Seed Yield bu/ac
1	Delta	7.3	55.7	17.7	89.0	77	36	47	3.7	6.7	24.5	1676	271	62.6	59.0
2	Integra	6.7	53.3	19.0	88.3	81	57	71	1.7	2.7	22.1	1530	297	62.4	64.4
3	PS0010792	6.4	53.3	22.0	94.3	73	39	54	5.7	7.3	23.4	1539	296	62.7	62.6
4	PS0010803	6.8	55.3	17.0	92.0	75	37	49	4.7	7.3	19.8	1707	266	61.9	57.4
5	PS0010836	7.5	56.3	16.7	90.3	66	37	56	4.0	7.3	22.4	1468	309	62.6	57.4
6	PS0010902	6.3	54.0	22.7	92.3	85	40	49	5.3	7.3	23.3	1656	274	62.0	59.4
7	PS0010971	6.5	56.0	17.0	92.0	77	37	48	4.3	7.0	20.6	1630	279	62.5	57.2
8	PS0010993	7.8	56.3	16.3	89.7	79	41	53	2.3	6.3	22.2	1600	284	61.9	62.7
9	PS0110060	5.5	56.7	20.3	94.3	71	33	47	6.3	8.7	20.5	1852	245	61.4	50.3
10	PS01102958	7.5	55.7	19.3	91.7	72	38	53	5.7	8.7	21.9	1614	281	62.3	62.2
11	PS01103430	5.2	61.7	20.3	95.7	71	33	47	6.3	8.0	21.5	1511	301	63.1	51.8
12	PS0110663	3.1	56.3	24.0	95.3	84	50	60	5.0	6.7	22.1	1597	284	63.1	45.7
13	PS0110671	4.8	55.0	18.0	90.3	73	33	46	5.7	9.0	22.2	1741	261	61.5	56.4
14	PS0110745	6.3	54.7	17.7	89.3	69	34	50	4.3	8.0	21.2	1874	242	62.2	51.5
15	PS0110762	5.3	55.0	21.7	92.0	73	41	57	5.3	7.0	22.7	1748	260	62.6	54.2
16	PS0110767	5.5	54.3	18.3	91.7	69	40	59	4.3	7.7	21.8	1682	270	62.6	52.8
17	PS0110827	4.6	56.3	22.0	94.0	87	54	61	2.7	4.3	22.7	1659	274	62.8	54.7
18	PS99102238	6.8	58.0	20.3	91.7	81	50	62	2.0	4.0	21.2	1841	248	62.1	61.2
19	Stirling	6.9	52.3	20.3	90.3	71	42	60	3.7	6.7	22.5	1830	252	62.2	59.0
20	Toledo	6.7	53.0	18.7	90.3	71	41	58	3.3	6.0	22.7	1671	273	61.7	55.9
MEAN		6.2	55.5	19.5	91.7	75.2	40.8	54.4	4.3	6.8	22.1	1672	273	62.3	56.7
C.V.%		12.0	2.6	10.5	2.1	9.2	12.8	14.8	22.2	16.1	4.0	5.3	5.0	0.8	9.8
LSD.05		1.2	2.4	3.4	3.2	11	9	13.4	1.6	1.4	1.5	147	23	0.8	9.2
LSD.01		1.6	3.2	4.5	4.3	NS	12	NS	2.1	1.9	2	197	30	1.1	NS
#REPS		3	3	3	3	3	3	3	3	3	3	3	3	3	3

Planting Date = May 6; Harvest Date = September 3 ; Previous Crop = Durum

Harvest Ease scores; 0 = all plants upright ~ very easy harvest, to 9 = all plants flat ~ very difficulty to harvest direct.

Harvest Index; Plant height at time of harvest relative to plant height at end of bloom.

Table 15. Western Regional Field Pea Nursery at Hettinger, North Dakota Continuously Cropped No-till, 2004
Data from Eric Eriksmoen, North Dakota State University

Entry	Line	Date of 10% Bloom Julian	Plant Ht at Harvest cm	Lodg. 0-9*	1000 Seed wt grams	Yield lbs/Ac
1	Lifter	169	36	3.3	229	1623
2	Stirling	163	28	0.0	215	630
3	PS810162	161	31	0.3	233	510
4	PS9910592	166	30	2.7	201	1065
5	PS0010792	166	38	1.0	247	1199
6	PS0010804	166	33	2.0	220	1403
7	Delta	167	37	0.7	219	1714
8	PS9910140	170	30	1.3	209	1003
9	PS0010806	167	33	2.0	251	1657
10	PS0010836	169	26	1.3	250	882
Trial Mean		166	32	1.5	227	1169
C.V. %		0.4	7.3	51.0	2.9	8.5
LSD .05		1	4	1.2	11	171
LSD .01		1	6	1.7	16	234

*Lodging: 0 = none, 9 = lying flat on ground.

Planting Date: April 6, 2004

Harvest Date: August 18, 2004

Previous Crop: barley

Note: Hard frost (25° F) on June 18 caused moderate leaf chlorosis and blossoms to abort.

Table 16. 2004 McPhee Field Pea Nursery at Hettinger, North Dakota, Continuously Cropped No-till

Entry	Line	Date of 10% Bloom June	Plant Ht at Harvest cm	Lodg. 0-9*	1000 Seed wt grams	Yield Bu/A
1	Delta	17	32	0.7	222	47.1
2	Integra	15	36	1.0	254	36.5
3	Stirling	12	31	1.0	210	18.1
4	Toledo	14	35	0.0	243	38.5
5	PS99102238	19	41	0.3	211	43.0
6	PS0010792	15	41	1.7	255	40.0
7	PS0010803	17	34	0.7	241	39.7
8	PS0010836	18	25	0.7	231	16.3
9	PS0010902	17	37	2.3	241	40.6
10	PS0010971	17	39	1.3	239	37.9
11	PS0010993	15	32	1.0	205	32.6
12	PS0110060	NOT PLANTED				
13	PS0110663	17	42	1.7	249	37.0
14	PS0110671	17	29	0.7	236	23.4
15	PS0110745	13	28	1.0	190	24.6
16	PS0110762	17	42	0.7	217	39.4
17	PS0110767	15	34	0.7	210	40.6
18	PS0110827	17	37	2.3	216	32.6
19	PS01102958	16	28	1.0	241	22.2
20	PS01103430	19	33	3.3	275	48.0
Trial Mean		16	35	1.2	231	34.6
C.V. %		5.7	8.6	65.4	2.7	11.1
LSD .05		2	5	1.3	10	6.3
LSD .01		2	7	1.7	14	8.5

*Lodging: 0 = none, 9 = lying flat on ground.

Planting Date: April 6, 2004

Harvest Date: August 18, 2004

Seeding rate: 250,000 live seeds/A

Previous Crop: barley

Note: Hard frost (25° F) on June 18 caused moderate leaf chlorosis and blossoms to abort.

Table 17. North Central Research Extension Center Dry Pea Variety Trial Western Regional at Minot, 2004
Data from Mark Halvorson, North Dakota State University

Variety	Days to Bloom	Bloom Duration	Days to Maturity	Ht to 1st Pod in	# of Nodes to 1st Pod	# of Repro. Nodes	# of Pods/ Peduncle	Plant Ht in	Canopy		Lodge 0-9	Protein %	Seed Weight g/1000	Test Weight lb/bu	Seed Yield				
									Ht at Harvest in	Ht Index %					2002	2003	2004	2 Year	3 Year
															-----bu/A-----				
Lifter	64	20.5	109	10.9	4.9	7.4	1.5	25.1	12.4	50.0	7.8	23.6	216.0	63.5	--	--	55.8	--	--
Stirling	62	21.0	105	6.4	3.5	7.1	1.1	18.7	20.2	111.7	1.0	20.2	220.4	64.8	--	65.5	61.3	63.4	--
PS810162	61	21.3	105	8.2	4.6	5.5	1.1	18.6	19.9	109.4	0.5	21.0	236.2	64.0	--	61.1	50.9	56.0	--
PS9910592	64	20.5	106	8.9	5.0	3.4	1.3	16.8	8.3	50.2	9.0	19.4	195.6	63.8	--	49.9	37.7	43.8	--
PS0010792	62	21.0	107	11.1	6.0	5.3	1.4	21.4	19.1	90.3	4.4	21.5	265.8	64.3	--	--	73.1	--	--
PS0010804	64	20.5	105	9.3	6.3	5.5	1.3	19.0	16.4	88.3	4.0	17.2	240.1	64.6	--	--	64.7	--	--
Delta	64	21.0	104	13.5	7.3	3.5	1.8	18.8	23.9	127.8	0.0	20.6	247.0	64.7	--	--	66.5	--	--
PS9910140	64	20.5	106	11.2	4.9	5.9	1.6	21.3	11.0	51.8	8.0	19.4	243.5	63.0	--	65.7	60.1	62.9	--
PS0010806	64	20.8	108	11.7	5.6	7.9	1.6	25.6	13.9	54.4	6.8	21.6	280.2	63.4	--	--	50.3	--	--
PS0010836	64	20.8	106	11.3	5.9	3.4	1.4	16.1	19.9	125.1	1.0	21.2	268.4	63.5	--	--	62.9	--	--
LSD 5%	1	NS	2	3.24	1.3	1.9	NS	3.4	2.7	21.2	1.4	1.9	8.8	0.5	--	4.0	10.4	--	--
C.V.%	0.6	2.6	1.3	21.8	16.5	24.3	30.5	11.7	11.5	17.0	22.9	6.5	1.6	0.6	--	4.5	12.3	--	--
Mean	63	20.8	106	10.25	5.4	5.5	1.4	20.1	16.5	85.9	4.2	20.6	241.3	64.0	--	61.3	58.3	--	--

Lodging score based on scale 0-9 (0=upright, 9=flat)

Hail Damage on June 6, 2004

Table 18. North Central Research Extension Center—Minot, Dry Pea Variety Trial—McPhee Advanced Lines

Variety	Days to Bloom	Bloom Duration	HT to 1st Pod in	HT to 1st Flow in	# of Nodes to 1st Pod	# of Pods/Peduncle	Plant Ht in	Canopy Ht at Harvest in	Ht Index %	Lodge 0-9	Seed Weight g/1000	Test Weight lb/bu	Protein %	Seed Yield				
														2002	2003	2004	2 Year	3 Year
														-----bu/A-----				
Delta	60	25.0	9.7	7.8	4.2	1.5	18.5	24.2	130.2	0.7	250.2	64.4	20.4	--	71.5	74.1	72.8	--
Integra	59	25.3	10.7	7.2	6.5	1.7	24.3	23.5	97.2	0.0	267.9	63.1	20.2	--	62.0	62.0	62.0	--
Stirling	58	26.0	8.0	5.5	4.5	1.2	17.0	20.9	131.2	0.0	214.2	64.8	19.9	--	--	68.4	--	--
Toledo	59	26.0	10.1	6.3	7.5	1.0	23.2	23.1	99.9	0.0	272.0	62.1	20.5	--	56.1	56.5	56.3	--
PS99102238	63	25.0	13.1	7.0	4.3	1.5	21.3	27.2	129.2	0.7	223.6	253.7	19.2	--	52.3	68.6	60.4	--
PS0010792	59	26.0	9.7	5.7	4.8	1.2	18.7	19.1	104.0	4.7	271.9	63.6	20.7	--	63.3	63.1	63.2	--
PS0010803	60	25.0	9.9	6.0	6.7	1.0	21.1	16.5	87.0	3.0	252.7	63.7	18.4	--	65.0	60.7	62.8	--
PS0010836	59	25.7	6.8	3.3	6.0	1.0	14.9	18.1	123.8	3.0	272.1	62.5	21.9	--	59.1	60.8	60.0	--
PS0010902	59	26.3	9.4	6.2	4.8	1.5	17.9	20.1	112.8	3.3	251.8	63.5	21.9	--	57.6	54.8	56.2	--
PS0010971	60	24.7	11.9	7.8	7.3	1.0	26.8	20.1	75.0	3.0	259.6	64.3	19.0	--	60.4	52.9	56.6	--
PS0010993	60	24.7	8.4	6.2	4.2	1.5	17.7	21.7	123.4	0.7	240.2	64.1	18.9	--	65.6	63.3	64.4	--
PS0110060	60	25.0	9.8	6.8	5.3	1.2	22.5	20.2	92.6	6.0	242.2	63.3	16.8	--	--	54.8	--	--
PS0110663	60	25.7	11.0	6.0	5.7	1.2	23.2	21.3	91.7	4.7	267.2	63.4	20.9	--	--	33.5	--	--
PS0110671	60	24.7	9.8	6.7	6.3	1.3	22.5	21.8	96.8	1.7	248.7	63.0	21.6	--	--	57.6	--	--
PS0110745	59	25.7	8.6	6.2	6.5	1.0	18.3	19.8	110.3	1.3	222.0	64.0	19.2	--	62.1	53.0	57.5	--
PS0110762	59	25.7	10.6	5.3	7.3	1.0	23.0	22.3	97.7	0.7	239.1	63.4	20.8	--	--	59.5	--	--
PS0110767	59	25.3	10.6	5.3	6.2	1.8	21.5	22.9	108.4	0.0	238.1	64.5	19.6	--	--	54.6	--	--
PS0110827	60	25.0	12.9	5.8	5.2	1.7	22.5	24.5	108.7	3.0	239.9	63.4	20.6	--	--	51.9	--	--
PS01102958	60	25.0	8.7	7.0	4.2	1.5	16.2	19.3	128.0	2.0	253.1	63.7	19.5	--	62.9	67.2	65.1	--
PS011103430	62	26.0	9.9	5.5	7.0	1.8	24.5	10.5	43.8	8.3	259.3	63.3	19.3	--	--	55.9	--	--
LSD 5%	1	NS	2.9	2.1	NS	0.5	5.4	3.1	33.4	2.8	7.8	NS	1.7	--	592	11.4	--	--
C.V. %	1.3	2.8	17.7	20.1	30.1	23.9	15.7	9.1	19.4	72.3	1.9	100.9	5.0	--	10.0	11.7	--	--
Mean	60	25.4	10.0	6.2	5.7	1.3	20.8	20.9	104.6	2.3	249.3	73.1	20.0	--	3580	58.6	--	--

Lodging score based on scale 0-9 (0=upright, 9=flat)

Hail Damage on June 6, 2004

Table19. Western Field Pea Variety Evaluation - Williston Research Extension Center, 2004
Data from Neil Riveland, North Dakota State University

Cultivar	Days to Bloom	Bloom Duration	Canopy		Test Weight	Seed Protein	Harvest Ease	Seed	
			Height	Height				Yield	Yield
			cms	inches	gms	%	0-9*	bus/a	lbs/a
Lifter	66.0	20.8	40.8	16.0	62.8	20.7	8.3	51.42	3084.9
Stirling	61.0	22.8	49.0	19.3	64.8	18.9	2.5	56.37	3381.9
PS810162	60.0	20.0	45.5	17.9	63.8	20.8	2.5	48.99	2939.3
PS9910592	64.0	22.8	45.8	18.0	64.7	17.8	4.8	59.51	3570.5
PS0010792	62.5	19.0	60.3	23.7	65.4	19.5	1.5	63.89	3833.3
PS0010804	65.5	18.8	56.3	22.1	65.0	14.4	1.3	60.12	3607.3
Delta	65.3	17.8	59.3	23.3	65.6	18.6	.0	63.73	3824.0
PS9910140	65.5	21.3	58.5	23.0	64.4	16.6	3.5	58.90	3534.1
PS0010806	63.8	23.5	49.0	19.3	63.7	19.9	4.8	49.16	2949.6
PS0010836	65.8	19.8	47.3	18.6	63.5	19.1	2.8	58.14	3488.1
High Mean	66.0	23.5	60.3	23.7	65.6	20.8	8.3	63.89	3833.3
Low Mean	60.0	17.8	40.8	16.0	62.8	14.4	.0	48.99	2939.3
Exp Mean	63.9	20.6	51.2	20.1	64.4	18.6	3.2	57.02	3421.3
C.V. %	1.1	5.0	13.1	13.1	.7	6.2	34.2	5.30	5.3
LSD 5%	1.0	1.5	9.7	3.8	1.0	2.6	1.6	4.38	263.0
LSD 1%	1.4	2.0	13.1	5.2	1.4	3.7	2.1	5.92	355.3
# of Reps	4	4	4	4	2	2	4	4	4
F-TRT	35.2	13.7	4.2	4.2	9.1	5.8	18.3	13.19	13.2

* - Harvest Ease scores; 0-9 0 = all plants upright to 9 = all plants flat
Location of the WREC: Latitude 48 8'; Longitude 103 44'W; Elevation 2105 ft.
Planted: April 22 on Fallow. Applied Fertilizer in lbs/a: 0N:0P2O5:0K:
Soil Test to two feet in lbs/a: 123N:20P:315K:50S 1.8 OM pH-5.4
Soil Type: Williams-Bowbells Loam
Harvested: August 5 Harvested Area: 56 ft2
Protein not available at this time.
Protein percentages reported on a oven dry moisture basis.
Trifluralin at 0.9 lbs/a ai PPI gave excellent weed control.

Table 20. Pea Variety -Williston Research Extension Center – 2004
Data from Neil Riveland, North Dakota State University

Cultivar	Days to Bloom	Bloom Duration	Canopy		Test Weight	1000 Kwt	Seeds/ Pound	Seed Protein	Harvest Ease	Seed Yield
			Height	Height						
			cms	inches	lbs/b	gms		%	0-9*	bus/a
Yellow Cotyledon Type										
CDC Mozart	63.3	22.2	58.0	22.8	65.6	224.9	2017	16.8	4.0	61.92
Carneval	66.8	17.0	62.5	24.6	65.3	221.8	2046	16.8	0.8	55.33
DS Admiral	66.0	14.5	63.0	24.8	64.6	255.6	1776	18.4	0.3	54.43
SW Marquee	65.3	16.7	71.0	28.0	64.9	212.7	2133	18.8	1.5	53.46
SW Salute	65.8	18.0	67.5	26.6	64.9	236.4	1921	15.1	0.8	57.59
Eclipse	65.0	19.7	65.8	25.9	65.2	241.2	1881	18.4	2.5	50.42
CDC Handel	66.0	20.2	52.8	20.8	64.8	207.9	2182	17.0	2.5	55.67
CDC Minuet	68.3	17.7	71.0	28.0	64.5	188.7	2405	17.7	2.3	61.55
CDC Bronco	68.3	18.0	64.8	25.5	64.5	200.3	2265	20.0	2.5	53.69
CDC Golden	66.8	17.2	69.3	27.3	65.1	217.8	2086	19.2	1.3	54.31
CDC Sonata	63.3	25.5	61.3	24.1	63.8	248.8	1823	19.4	4.3	61.02
Cutlass	65.0	23.2	61.5	24.2	64.5	227.7	1993	17.8	4.3	42.55
Green Cotylydon Type										
Majoret	66.0	17.5	57.5	22.6	66.5	228.2	1988	17.7	1.3	52.27
Cruiser	64.8	16.5	65.5	25.8	66.1	223.7	2029	19.0	0.8	49.93
Nitouche	63.8	17.0	72.0	28.3	64.9	301.1	1509	18.3	0.8	53.39
Stirling	61.0	20.5	49.5	19.5	64.7	223.9	2026	19.0	3.5	52.84
Toledo	62.3	19.2	59.8	23.5	63.4	299.5	1517	21.0	2.0	45.12
CDC Montero	66.5	16.0	60.8	23.9	65.6	220.7	2056	17.6	3.5	53.47
CDC Striker	67.0	15.5	61.5	24.2	65.8	236.2	1920	19.7	1.5	51.64
Scuba	63.5	19.5	60.3	23.7	64.1	225.6	2011	17.8	3.5	47.07
High Mean	68.3	14.5	72.0	28.3	66.5	301.1	2405	21.0	4.3	61.92
Low Mean	61.0	25.5	49.5	19.5	63.4	188.7	1509	15.1	0.3	42.55
Exp Mean	65.2	18.6	62.8	24.7	64.9	232.1	1979	18.3	2.2	53.38
C.V. %	1.0	11.0	13.3	13.3	1.0	2.2	2	5.0	70.1	7.34
LSD 5%	.9	2.9	11.8	4.6	1.4	10.7	66	1.9	2.2	5.55
LSD 1%	1.3	3.8	NS	NS	NS	14.6	91	2.6	2.9	7.38
# of Reps	4	4	4	4	2	2	2	2	4	4
F-TRT	33.3	7.2	2.0	2.0	2.6	60.1	91	4.2	2.9	6.55

* Harvest Ease scores; 0-9 0 = all plants upright to 9 = all plants flat
Location of the WREC: Latitude 48 8'; Longitude 103 44'W; Elevation 2105 ft.
Planted: April 22 on Fallow. Applied Fertilizer in lbs/a: 0N:0P20S:0K:
Soil Test to two feet in lbs/a: 123N:20P:315K:50S 1.8 OM pH-5.4
Soil Type: Williams-Bowbells Loam
Harvested: August 5 Harvested Area: 56 ft²
Protein percentages reported on a oven dry moisture basis.
Trifluralin at 0.9 lbs/a ai PPI gave excellent weed control.

Table 21. Williston Research Extension Center - 2004 McPhee Pea Variety

Cultivar	Days to Bloom	Bloom Duration	Canopy		Test Weight	1000 Kwt	Seed Protein	Harvest Ease	Seed	
			Height	Height					Yield	Yield
			cms	inches	lbs/b	gms	%	0-9*	bus/a	lbs/a
PS0110671	64.0	19.5	59.0	23.2	64.0	261.3	21.0	3.0	37.34	2240.6
PS0010836	64.8	18.8	48.0	18.9	64.7	289.5	19.6	3.0	51.42	3085.1
PS01100767	62.5	22.8	54.3	21.4	64.7	248.4	18.8	2.8	44.92	2695.1
PS01100827	66.8	19.3	67.8	26.7	64.1	246.4	19.8	3.8	32.87	1972.4
PS01100060	67.0	20.3	59.3	23.3	64.3	231.4	16.6	3.5	40.45	2426.9
PS0010803	65.5	18.8	60.5	23.8	65.9	283.0	16.2	2.0	51.34	3080.4
PS0010792	63.3	17.8	54.5	21.5	65.5	286.4	18.5	2.3	53.97	3238.2
PS0010971	66.0	17.8	60.5	23.8	65.1	287.6	17.6	3.3	47.96	2877.7
PS0010902	62.8	19.0	72.3	28.4	64.2	247.2	19.2	3.8	49.71	2982.4
PS01100663	65.8	22.8	76.5	30.1	65.4	279.9	20.2	4.8	31.62	1897.2
PS01103430	68.5	20.3	71.3	28.1	64.6	280.4	18.3	6.0	44.91	2694.8
PS01100762	64.8	21.0	73.5	28.9	63.2	238.5	20.5	5.0	40.88	2452.8
PS0110745	63.0	19.3	49.0	19.3	64.4	229.8	18.3	3.3	42.85	2571.0
PS99102238	68.3	18.3	72.0	28.3	64.0	224.5	15.5	1.3	50.06	3003.8
PS01102958	64.0	19.5	60.3	23.7	64.6	272.8	19.7	2.8	51.76	3105.4
PS0010993	65.3	19.3	59.3	23.3	65.3	255.0	17.9	1.0	53.60	3216.1
Integra	62.0	18.5	65.5	25.8	63.3	312.8	19.9	1.3	42.15	2528.8
Delta	65.5	16.3	60.0	23.6	66.2	280.3	18.8	.5	52.47	3148.0
Stirling	61.0	22.8	54.8	21.6	65.5	237.2	18.3	2.8	49.45	2967.3
Toledo	62.3	20.5	60.3	23.7	62.9	304.1	21.1	1.5	40.43	2425.7
High Mean	68.5	22.8	76.5	30.1	66.2	312.8	21.1	6.0	53.97	3238.2
Low Mean	61.0	16.3	48.0	18.9	62.9	224.5	15.5	.5	31.62	1897.2
Exp Mean	64.6	19.6	61.9	24.4	64.6	264.8	18.8	2.9	45.51	2730.5
C.V. %	1.2	8.1	13.7	13.7	1.1	2.3	4.1	46.4	5.53	5.5
LSD 5%	1.1	2.2	2.0	4.7	1.0	12.8	1.6	1.9	3.57	213.9
LSD 1%	1.4	3.0	16.0	6.3	1.3	17.5	2.2	2.5	4.74	284.5
# OF REPS	4	4	4	4	4	2	2	4	4	4
F-TRT	31.3	4.7	3.6	3.6	6.8	36.5	8.0	4.5	28.71	28.7

* - Harvest Ease scores; 0-9 0 = all plants upright to 9 = all plants flat
Location of the WREC: Latitude 48 8'; Longitude 103 44'W; Elevation 2105 ft.
Planted: April 22 on Fallow. Applied Fertilizer in lbs/a: 0N:0P2O5:0K:
Soil Test to two feet in lbs/a: 123N:20P:315K:50S 1.8 OM pH-5.4
Soil Type: Williams-Bowbells Loam
Harvested: August 9 Harvested Area: 56 ft2
Protein percentages reported on a oven dry moisture basis.
Trifluralin at 0.9 lbs/a ai PPI gave excellent weed control.

Table 22. SDSU Dry Pea Trial – Bison, South Dakota, 2004
Data from John Rickertsen, South Dakota State University

Variety	Height Jul-14-04 ..in..	Yield ..bu/A..
40-10 Magda	24.3	25.3
Arvika	25.0	27.9
Forager	28.0	30.9
Lifter	18.7	20.5
Victoria	32.7	29.9
Grade	19.3	29.6
Admiral	14.3	24.4
Carneval	16.7	22.5
Circus	16.0	21.5
Delta	12.0	23.2
Eclipse	12.3	24.1
CDC Mozart	12.3	21.1
Salute	13.7	23.8
Crusier	13.3	23.2
Journey	20.7	22.2
Majoret	13.7	22.4
Millennium	11.3	17.0
Stirling	11.0	15.0
Grand Mean	17.52	23.58
CV	13.63	13.22
LSD (P=.05)	3.98	4.41
Standard Deviation	2.39	3.12
Bartlett's X2	32.542	13.635
P(Bartlett's X2)	0.013*	0.693
Replicate F	2.889	15.454
Replicate Prob(F)	0.0694	0.0001
Treatment F	21.109	7.162
Treatment Prob(F)	0.0001	0.0001
Footnote Number		1
Assessed By		6.4
ARM Action Codes		TY1
# Subsamples, Dec.		45 1

Means followed by same letter do not significantly differ (P=.05, Duncan's New MRT)

Table 23. SDSU Dry Pea Variety Trial – Hayes, South Dakota, 2004
Data from John Rickertsen, South Dakota State University

Variety	Height Jul-28-04 ..in..	Lodging Jul-28-04 0-9	Test Wt ..lb/bu..	Yield ..bu/A..	Yield ..kg/ha..
40-10 Magda	30.8	8.0	62.8	25.2	1697
Arvika	34.0	8.0	60.4	22.6	1523
Forager	31.3	8.0	62.1	30.1	2025
Lifter	21.0	8.0	61.6	24.5	1648
Victoria	30.8	8.0	62.7	25.8	1736
Grade	23.3	4.3	63.7	31.2	2098
Admiral	18.8	0.0	61.8	32.0	2155
Carneval	19.0	1.0	62.9	26.7	1793
Circus	16.0	1.0	63.3	25.6	1724
Delta	17.0	0.8	64.3	27.6	1859
Eclipse	18.8	0.3	63.6	28.6	1925
CDC Mozart	14.0	0.3	64.8	28.1	1890
Salute	19.5	0.8	63.5	32.5	2185
Crusier	19.3	1.8	62.6	26.6	1787
Journey	27.0	7.8	62.8	22.2	1495
Majoret	18.5	0.0	63.0	25.9	1744
Millennium	15.8	0.3	62.8	15.0	1010
Stirling	14.0	0.5	63.1	23.9	1605
Grand Mean	21.58	3.25	62.87	26.35	1772.24
CV	9.5	18.64	1.01	13.11	13.11
LSD (P=.05)	2.90	0.86	0.90	4.94	332.1
Standard Deviation	2.05	0.61	0.63	3.46	232.4
Bartlett's X2	31.569	10.419	17.559	30.199	30.2
P(Bartlett's X2)	0.017*	0.318	0.417	0.025*	0.025*
Replicate F	0.604	2.068	1.386	4.372	4.372
Replicate Prob(F)	0.6157	0.1160	0.2575	0.0082	0.0083
Treatment F	38.698	137.564	10.081	5.691	5.691
Treatment Prob(F)	0.0001	0.0001	0.0001	0.0001	0.0001
ARM Action Codes			T1	TY2	TY3
# Subsamples, Dec.			1	1	0

Means followed by same letter do not significantly differ (P=.05, Duncan's New MRT)

Table 24. SDSU Dry Pea Variety Trial – Selby, South Dakota, 2004
Data from John Rickertsen, South Dakota State University

Variety	Height Jul-12-04 ..in..	Test Wt ..lb/bu..	Yield ..bu/A..
40-10 Magda	51.0	63.10	30.7
Arvika	49.8	62.15	34.6
Forager	45.5	63.85	31.9
Lifter	29.0	63.85	38.1
Victoria	47.8	64.65	37.5
Grade	31.0	64.20	32.6
Admiral	32.8	65.36	51.1
Carneval	27.5	64.25	32.3
Circus	25.0	63.50	24.9
Delta	28.3	65.50	48.1
Eclipse	24.5	64.45	31.4
CDC Mozart	27.3	64.52	36.7
Salute	27.8	65.93	41.1
Crusier	27.5	63.77	28.9
Journey	44.3	63.47	34.1
Majoret	31.5	63.83	51.8
Millennium	25.0	64.43	31.4
Stirling	25.3	64.50	33.9
Grand Mean	33.36	64.18	36.16
CV	11.81	1.51	32.91
LSD (P=.05)	5.57	1.384	17.01
Standard Deviation	3.94	0.969	11.90
Bartlett's X2	17.569	21.415	19.76
P(Bartlett's X2)	0.417	0.208	0.287
Replicate F	5.448	1.272	2.632
Replicate Prob(F)	0.0025	0.2944	0.0601
Treatment F	23.183	3.387	1.586
Treatment Prob(F)	0.0001	0.0004	0.1042
ARM Action Codes	TY1		
# Subsamples, Dec.	1		
Means followed by same letter do not significantly differ (P=.05, Duncan's New MRT)			

Table 25. SDSU Dry Pea Variety Trial – Wall, South Dakota, 2004
Data from John Rickertsen, South Dakota State University

Variety	Height Jul-22-04 ..in..	Lodging Jul-22-04 0-9	Moisture %	Test Wt ..lb/bu..	Yield ..bu/A..	Yield ..kg/ha..
40-10 Magda	36.0	8.5	10.27	61.55	26.3	1767.5
Arvika	34.0	7.8	10.77	62.13	27.9	1874.9
Forager	34.8	7.5	10.08	59.95	30.6	2060.4
Lifter	19.5	6.8	10.70	62.70	18.7	1259.7
Victoria	35.3	8.0	11.35	60.85	30.8	2070.2
Grande	23.8	4.8	11.18	60.98	25.4	1708.9
Adminral	21.8	0.3	10.30	61.28	25.1	1689.3
Carneval	22.0	0.3			14.2	957.0
Circus	18.5	0.3	10.50	61.05	21.1	1415.9
Delta	18.5	1.0	9.95	62.45	26.6	1787.0
Eclipse	17.3	0.3	10.07	60.30	24.8	1669.8
CDC Mozart	18.3	0.3	10.70	62.80	23.8	1601.4
Salute	20.0	0.5	10.33	62.10	21.6	1455.0
Crusier	20.0	0.5	10.45	61.00	21.6	1455.0
Journey	33.5	7.8	9.50	60.65	25.4	1708.9
Majoret	20.5	1.0	10.67	62.03	24.4	1640.5
Millennium	16.5	0.5	10.00	61.60	20.3	1367.1
Stirling	17.8	2.8	9.85	62.30	22.2	1494.0
Stratus	19.5	1.5	10.07	60.47	27.9	1874.9
PS810162	15.8	0.8	9.65	59.80	30.5	2050.6
PS9910592	19.5	7.0	9.90	61.20	19.3	1298.7
PS0010792	17.3	2.8			15.5	1044.8
PS0010804	16.8	1.5	9.93	61.40	22.4	1503.8
PS9910140	21.8	3.3	10.40	61.70	26.6	1787.0
PS0010806	18.0	2.5			17.6	1181.6
PS0010836	16.3	0.3	9.77	60.78	30.5	2050.6
Grand Mean	22.02	3.0	10.28	61.35	23.89	1606.7
CV	11.05	33.0	6.43	2.18	13.19	13.19
LSD (P=.05)	3.44	1.40	0.944	1.915	4.46	299.71
Standard Deviation	2.43	0.99	0.661	1.340	3.15	211.93
Bartlett's X2	31.18	38.418	55.888	13.745	34.813	34.813
P(Bartlett's X2)	0.183	0.031*	0.001*	0.798	0.092	0.092
Replicate F	1.536	1.020	3.807	0.401	1.314	1.314
Replicate Prob(F)	0.2121	0.3885	0.0160	0.7527	0.2763	0.2760
Treatment F	29.484	38.510	2.011	1.573	8.476	8.476
Treatment Prob(F)	0.0001	0.0001	0.0224	0.0961	0.0001	0.0001
ARM Action Codes					TY1	TY2
# Subsamples, Dec.					1	1

Means followed by same letter do not significantly differ (P=.05, Duncan's New MRT)

Table 26. Evaluation of Spring Pea Varieties
Data from Dennis Tonks, Washington State University

Entry No.	Entry Name	Yield lb/a
1	Universal (Y)	1546.4
2	Cruiser (G)	1180.4
3	Prodigy (G)	1038.8
4	Monarch (G)	1163.7
5	Lifter (PS510718)	1171.4
6	Stirling (PS610152)	1452.7
7	PS810162	1202.6
8	PS9910592	1511.4
9	PS0010792	731.7
10	PS960007	1707
11	PS9910140	1559
12	PS0010806	1196.5
13	PS0010836	1041.6
LSD (P=.05)		431.62
Standard Deviation		302.03
CV		24.01
Grand Mean		1258.02
Bartlett's X2		15.532
P(Bartlett's X2)		0.275
Replicate F		3.712
Replicate Prob(F)		0.0198
Treatment F		3.039
Treatment Prob(F)		0.004
Means followed by same letter do not significantly differ (P=.05, LSD)		

Table 27. Western Regional Dry Pea Yield Trial - Powell, WY, 2004 (0497)
Data from Abdel Mesbah and Rob Smith, University of Wyoming

Entry	Cultivar	Accession No.	22-inch rows		7-inch rows
			Stand	Yield	Yield
			10 ³ plants/ac	lbs/ac	lbs/ac
1	Lifter	PS510718	105.7	4101	3362
2	Stirling	PS610152	104.5	3369	4775
3		PS810162	118.8	2731	4306
4		PS9910592	84.9	2249	4021
5		PS0010792	94.5	2518	3351
6		PS0010804	94.5	2700	3688
7	Delta	PS960007	102.8	2211	3538
8		PS9910140	92.7	3411	3840
9		PS0010806	82.0	2681	4326
10		PS0010836	82.0	2275	3035
Mean			96.2	2825	3824
C.V. %			15.8	19.9	21.4
LSD (5%)			22.3	817	1680

Planting date: May 14, 2004

Harvest date: August 30, 2004

Table 28. Irrigated Spring Dry Grain Pea Variety Evaluation – U-W
Research and Extension Center, Torrington, WY 2004

Data from James Krall and Jerry Nachtman, University of Wyoming

Entry	Yield	Bushel wt
	(lb/A)	(lb/bu)
PS9910140	3256	58.1
Delta	2870	59.4
Lifter	2436	59.3
PS0010792	2356	58.4
PS0010836	2302	57.9
PS810162	2258	58.4
PS0010804	2161	57.7
Stirling	2054	59.7
PS0010806	1978	58.2
PS9910592	1621	53.4
Average	2329	58.0
DRS 0.05	535	1.9

Winter Feed Pea Trials

Eight winter feed pea entries were included in the Winter Feed Pea Western Regional Yield Trial and evaluated at 11 locations across five states. Data were collected from six locations, while the remaining five locations suffered from poor stand establishment and/or severe winter kill and were abandoned in spring. All eight entries represent the most advanced breeding lines from the USDA-ARS breeding program and included one green and seven yellow cotyledon types. Breeding line PS9830F009 was recently released under the name 'Specter' and is the first white-flowered winter feed pea to be released from the program. Information regarding experimental design, location and specific observations for some of the locations are included below. Among the locations returning results for all eight lines the highest yielding line was PS9830S358 (2539 lb/a) followed by PS9830F011 (2271 lb/a). Specter produced an average yield of 1710 lb/a.

Williston, ND

We planted the "Fall Seeded" material. The fall of 2003 was very dry so no emergence or even germination occurred. There were a few plants of lentils and a few more pea plants in the plots in the spring but tilled them down as the area was very weedy also. We did plant them again this fall. (Neil Riveland)

Carrington, ND

We did plant the fall sown field pea and lentil nursery. In both cases the stands that survived were very poor. I do believe that Carrington trials reflected the best winter survival among the four North Dakota sites. This comment is based on feedback from the other site agronomists. However, the degree of survival and the consistency of plants did not allow for yield determinations. We did make some selections from within each nursery. I believe we had some segregation for improved winter survival. I made selections from within two lines and then made one composite selection for each crop. These three lines were then included with the other lines you sent for this fall's winter nurseries. (Blaine Schatz)

Minot, ND

We did plant them, however the lentils did not make any yield and the dry pea material was harvested by plot (few plants / plot) and samples were sent back to Fred. No yield data on that material. (Mark Halvorson)

Amsterdam, MT

We did plant them in a timely fashion next to the agronomy studies out at Amsterdam but like the agronomy studies emergence was practically zero and so we abandoned them in the spring. You should probably make a note of this since we did everything we could and mother Nature took over and wiped us out. Spring pea in that field produced 55 bu/ac so it would have been an excellent year to get the trials through. (Perry Miller)

Pierre, SD

I lost the Wall peas to poor stands and winterkill. The Dakota Lakes (Pierre) site had a lot of variation, which can be seen by the high CV's. (John Rickertsen)

Pendleton, OR

Six lines of winter peas and 8 lines of winter lentils were grown at the Columbia Basin Agricultural Research Center (CBARC) in Pendleton (45°N, 118° West, elevation 1440 ft). Soils at both stations are

Walla Walla silt loams that are 4 to 6 feet deep. Pendleton received 20 inches of rain in the 2003-04 crop-year, when these crops were evaluated. Peas and lentils were planted on October 10, 2003 at a seeding rate of 7 and 20 seeds/ft², respectively. The previous crop was winter wheat. Data obtained are presented below. For both crops, the plant stand was low due to poor germination and emergence. Seedbed conditions were not ideal due to too much straw from the previous wheat crop. However, despite the low plant stands, both peas and lentils produced higher grain yields than in 2003. (Stephen Machado)

Table 29. Summary of Locations Participating in the 2004 Winter Pea Western Regional Yield Trial

Location	Contact	Conditions	Nurseries		
			No. Sent	Data Returned	Data Lost
Montana					
Bozeman	Perry Miller	Dryland	✓	-	✓
Kalispell	Duane Johnson/Louise Strang	Dryland	✓	✓	-
Moccasin	Chengci Chen/Karnes Neil	Dryland	✓	✓	-
North Dakota					
Carrington	Blaine Schatz/Steve Zwinger	Dryland	✓	-	✓
Hettinger	Eric Eriksmoen	Dryland	✓	✓	-
Minot	Mark Halvorson	Dryland	✓	-	✓
Williston	Neil Riveland	Dryland	✓	-	✓
Oregon					
Moro	Brian Tuck	Dryland	✓	-	✓
Pendleton	Stephen Machado	Dryland	✓	✓	-
South Dakota					
Dakota Lakes	John Rickertsen	Dryland	✓	✓	-
Wyoming					
Torrington	James Krall/Jerry Nachtman	Dryland	✓	✓	-
Grand Totals			11	6	5

Table 30. Location Yield Summary (lb/a) for Western Regional Winter Peas

Location	PS7530726	PS9430706	PS9630448	PS9830F009 (Specter)	PS9830F010	PS9830F011	PS9830S358	PS9830S431
Kalispell, MT	1811	1256	1328	1618	1296	2070	2722	2503
Moccasin, MT	1802	1450	1533	1650	1405	2096	2366	1482
Pendleton, OR	...	...	2367	3137	2628	2459	2860	1902
Dakota Lakes, SD	2093	911	1851	1861	1887	2646	2529	1192
Torrington, WY	...	2067	1740	2511	2203	3119	907	2190
Grand Mean	1902	1206	1571	1710	1529	2271	2539	1726

Grand mean taken from locations with a complete set of data.

Table 31. Western Regional Winter Pea Yield Trial at Kalispell, MT – 2004
Data from Louise Strang and Duane Johnson, Montana State University

Cultivar	Stand %	First Flower date	Nodes to 1 st fl	Maturity date	Yield lbs/a	SeedWt #/lb
PS9430706	69	6/7	16	7/19	1256	3614
PS7530726	51	6/6	15	7/19	1811	3373
PS9630448	45	6/7	17	7/19	1328	3713
PS9830F009	56	6/10	16	7/19	1618	3347
PS9830F010	43	6/6	15	7/19	1296	3554
PS9830F011	54	6/4	13	7/19	2070	3178
PS9830S358	54	6/3	16	7/19	2722	3165
PS9830S431	65	6/1	15	7/19	2503	3913
Mean	55		15		1825	3482
LSD(0.05)	ns		2		1079	399
Pr>F	0.99		0.16		0.24	0.02

Table 32. Western Regional Winter Dry Pea Trial - Dry-land winter dry pea agronomy results - Exp. 820704 Central Ag Research Center, Moccasin, MT – 2004
Data from Chengci Chen and Karnes Neill, Montana State University

Selection	-----Stand (Spring)-----		-- Forage Production --		----- Grain Production -----			
	Density (#/m ²)	Survive (%) ^{1/}	Canopy Ht (cm)	Dry Matter (lbs/acre)	Canopy (cm)	Yield (lbs/acre)	Test Wt (lbs/bu)	Moisture (%)
PS9830S358	64.9 ^a	111.6	44.8	3,164	51.8 ^a	2,366^a	64.13^a	12.6 ^a
PS9830F011	63.7 ^a	124.1ⁿ	48.3	3,659	54.3^a	2,096 ^a	63.68 ^a	12.2 ^a
Granger AWP	72.8^a	120.2	97.0 ^a	4,913 ^a	49.3 ^a	1,886	63.75 ^a	13.0 ^a
PS7530726	56.1	122.9	46.8	4,263 ^a	42.5	1,802	62.55	12.3 ^a
PS9830F009	23.6	94.6	97.3^a	3,981 ^a	52.3 ^a	1,650	62.93	13.1 ^a
PS9630448	23.6	91.5	96.3 ^a	4,156 ^a	46.3 ^a	1,533	62.60	11.8
PS9830S431	28.6	94.4	71.3	2,313	42.0	1,482	63.38	13.2 ^a
PS9430706	42.5	93.7	86.8 ^a	4,790^a	50.8 ^a	1,450	63.15	14.0^a
PS9830F010	23.9	103.3	86.8 ^a	3,224	50.5 ^a	1,405	62.33	13.5 ^a
Mean (n = 36)	44.4	106.2	75.0	3,829	48.8	1,741	63.16	12.9
LSD (t = 0.05)	16.1	35.3	11.3	840	8.2	383	0.69	1.9
CV % (s/mean)	20.87	19.2	10.28	15.04	11.53	15.06	0.7496	10.07
F-value	14.29	1.34 ⁿ	34.91	8.38	2.36	6.23	6.76	1.21 ⁿ

^{1/} - Survival greater than 100% indicates seed germinated during winter or in early spring.

a - Denotes values equal highest value (in bold) based on LSD(0.05).

n - Denotes not statistically significant at 0.05 level.

Table 32. Winter Pea Evaluations at Hettinger, North Dakota
Continuously Cropped No-till, 2004
Data from Eric Eriksmoen, North Dakota State University

Entry	Line	Winter Kill
		%
1	PS9430706	94
2	PS7530726	91
3	PS9630448	96
4	PS9830F009	97
5	PS9830F010	98
6	PS9830F011	98
7	PS9830S358	87
8	PS9830S431	96
Trial Mean		95
C.V. %		3.5
LSD .05		5
LSD .01		7

Planting Date: September 19, 2003

Notes: Trial was seeded into relatively heavy HRSW stubble.

Good Fall moisture and excellent plant stands going into freeze up.

Relatively good winter snow cover.

Table 34. Grain Yield and Height of Elite Winter Pea Lines Evaluated in 2003-04 Crop-Year at CBARC, Pendleton, Oregon.
Data from Stephen Machado, Oregon State University

Entry #	Accession #	Grain yield	Plant height
		(lb/a)	(in)
1	PS9830F010	2628.0	52.0
2	PS9830S431	1902.4	42.8
3	PS9630448	2367.1	47.3
4	PS9830S358	2859.3	33.5
5	PS9830F011	2459.7	33.1
6	PS9830F009	3136.8	45.8
LSD _{0.05}	-	1183	11.0

Table 35. SDSU Winter Pea Variety Trial – Dakota Lakes, South Dakota, 2004
Data from John Rickertsen, South Dakota State University

Variety	Height Aug-06-04 ..in..	Lodging Aug-06-04 0-9	Test Wt ..lb/bu..	Yield ..lb/plot..	Yield ..kg/ha..
PS9430706	54.0	9.0	58.30	1024	1024
PS7530726	39.0	9.0	58.28	2352	2352
PS9630448	51.0	9.0	58.45	2080	2080
PS9830F009	62.0	9.0	59.55	2091	2091
PS9830F010	51.5	9.0	59.58	2102	2102
PS9830F011	30.5	9.0	59.97	2973	2973
PS9830S358	28.5	8.5	59.92	2842	2842
PS9830S431	45.5	9.0	56.70	1339	1339
Grand Mean	45.25	8.94	58.84	2100.41	2100.41
LSD (P=.05)	10.03	0.59	3.057	829.9	829.9
CV	9.38	2.8	3.47	26.86	26.86
Standard Deviation	4.24	0.25	2.039	564.3	564.3
Bartlett's X2	3.589	0.0	7.685	17.849	17.849
P(Bartlett's X2)	0.61	0.00*	0.262	0.013*	0.013*
Replicate F	3.556	1.000	0.095	0.181	0.181
Replicate Prob(F)	0.1013	0.3506	0.9619	0.9081	0.9081
Treatment F	15.341	1.000	1.217	5.589	5.589
Treatment Prob(F)	0.0009	0.5000	0.3493	0.0010	0.0010
ARM Action Codes			TY1	TY2	
# Subsamples, Dec.			0	0	

Means followed by same letter do not significantly differ (P=.05, Duncan's New MRT)

Table 36. Irrigated Winter Dry Grain Pea Variety Evaluation - U-W Research
and Extension Center, Torrington, WY 2003-2004
Data from James Krall and Jerry Nachtman, University of Wyoming

Entry	Yield (lb/A)	Bushel wt (lb/bu)	Winter Survival (%)
PS9830F011	3119	59	88
PS9830F009	2511	60.3	100
PS9830F010	2203	60.6	99
PS9830S431	2190	59.9	95
PS9430706	2067	59.2	100
PS9630448	1740	60.4	100
Delta	966	58.1	20
PS9830S358	907	60.2	98
PS953072	886		86
Shawnee	0		6
Average	1559	59.8	79
DRS 0.05	1052	2.3	15

Lentil Trials

Twelve spring lentil entries in the Western Regional Yield Trial were evaluated at 14 locations across five states (Table). The entries comprised three checks, 'Pennell', 'Merit' and 'Castillion', and nine breeding lines including three Laird, two each of Eston, Pardina and Turkish Red types. Information regarding experimental design, location and specific observations for some of the locations are included below. The highest yielding line was LC1602307E (1679 lb/a) and the checks produced average yields of 1410, 1390, and 1267 lb/a for Pennell, Merit, and Castillion, respectively. LC860616L, a line proposed for release, produced average yield of 1285 lb/a. Overall, the large-seeded lines produced greater seed yield than the small-seeded lines.

Powell, WY

Seeds were planted on May 14. At flowering time, plants getting yellowish one after one. By the first week of August, most of the plants died. (Abdel Mesbah)

Table 37. Summary of Locations Participating in the 2004 Spring Lentil Western Regional Yield Trial

Location	Contact	Conditions	Nurseries		
			No. Sent	Data Returned	Data Lost
Idaho					
Nez Perce	Stephen Guy/Ying Wu	Dryland	✓	-	✓
Moscow	Stephen Guy/Ying Wu	Dryland	✓	✓	-
Montana					
Kalispell	Duane Johnson/Louise Strange	Dryland	✓	✓	-
Moccasin	Chengci Chen/Karnes Neill	Dryland	✓	✓	-
Nebraska					
Box Butte	David Balensperger/Glen Frickel	Dryland	✓	-	✓
Sidney	David Balensperger/Glen Frickel	Dryland	✓	-	✓
Box Butte	David Balensperger/Glen Frickel	Irrigated	✓	-	✓
Scottsbluff	David Balensperger/Glen Frickel	Irrigated	✓	-	✓
Sidney	David Balensperger/Glen Frickel	Irrigated	✓	-	✓
North Dakota					
Carrington	Blaine Schatz/Steve Zwinger	Dryland	✓	-	✓
Hettinger	Eric Eriksmoen	Dryland	✓	✓	-
Minot	Mark Halvorson	Dryland	✓	✓	-
Williston	Meil Riveland	Dryland	✓	✓	-
Washington					
Walla Walla	Fred Muehlbauer/Rick Short	Dryland	✓	✓	-
Wyoming					
Powell	Abdel Mesbah	Dryland	✓	-	✓
Torrington	James Krall/Jerry Nachtman	Dryland	✓	-	✓
Torrington	James Krall/Jerry Nachtman	Irrigated	✓	-	✓
Grand Totals			17	7	10

Table 38. Location Yield Summary (lb/a) for Western Regional Lentil Trials

Location	Pennell	LC860359L	LC860616L	LC99602075L	Merrit	Castillion	LC01600405T	LC01602062T	LC01602307E	LC01602341E	LC01601640P	LC01602245P
Moscow, ID	2060	1953	2709	2360	...	1964	...	2669	2251	2268	2457	...
Kalispell, MT	566	754	587	496	720	617	854	761	777	840	860	701
Moccasin, MT	1315	1144	1147	1361	1461	1303	1466	1622	1748	1230	1580	1651
Carrington, ND	1835	...	...	...	2007	...	...	...	...	...	...	...
Hettinger, ND	1289	1498	1417	1396	1534	1537	723	878	2249	903	384	791
Minot, ND	1743	1719	1320	1214	1187	1296	575	948	1764	640	282	434
Williston, ND	1529	1318	1242	1293	1381	1209	1144	1131	1352	1361	1254	1235
Walla Walla, WA	2016	2434	1996	1970	2055	1641	2154	2574	2185	1796	2290	2033
Grand Mean	1410	1478	1285	1288	1390	1267	1153	1319	1679	1128	1108	1141

Grand mean taken from locations with a complete set of data.

Table 39. Lentil Variety Performance Results at Moscow, ID - 2004
Data from Stephen Guy and Ying Wu, University of Idaho

Variety or Selection	Seed Yield ----lb/acre----	Seed Weight ----g/100----	Plant Height ----inches----
Brewer	2850	5.6	20
Castillion	1964	6.5	20
Crimson	2102	3.3	17
Eston	2471	3.1	19
Mason	2725	6.8	20
Merrit	2824	6.0	19
Pardina	2849	3.5	19
Pennell	2060	6.3	20
Richlea	2571	4.7	18
LC 860359L	1953	6.8	22
LC860616L	2709	7.3	19
LC 99602075L	2360	7.5	20
LC01602062T	2669	4.4	19
LC01602307E	2251	4.3	19
LC01602341E	2268	2.9	16
LC01601640P	2457	3.9	17
Average	2443	5.2	19
LSD (0.10)	270	0.4	1
CV (%)	17	5.6	10

Table 40. Seed Yield for Lentil Varieties Tested for Three Years In Northern Idaho
Data from Stephen Guy and Ying Wu, University of Idaho

Variety or Selection	2002	2003	2004 *	Average
	lb/acre.....			
Brewer	1522	1285	2850	1693
Castillion	1390	1233	1964	1442
Crimson	1407	1074	2102	1413
Eston	1516	1229	2471	1592
Mason	1594	1297	2725	1701
Merrit	1557	1285	2824	1702
Pardina	1688	1426	2849	1815
Pennell	1590	1258	2060	1551
Richlea	1532	1426	2571	1697
Average	1533	1279	2491	1623
LSD (0.10)	100	180	270	--

* Moscow data only.

Table 41. Western Regional Lentil Yield Trial at Kalispell, MT – 2004
Data from Louise Strang and Duane Johnson, Montana State University

Cultivar	Entry	Cotyledon Color	Type	Flower date	Flower day	Yield lbs/a	SeedWt #/lb
Pennell	1	Yellow	Laird	6/21	69	565.7	7216
LC860359L	2	Yellow	Laird	6/21	69	753.7	7417
LC860616L	3	Yellow	Laird	6/18	66	587.2	6783
LC99602075L	4	Yellow	Laird	6/16	64	496.4	6980
Merrit	5	Yellow	Brewer	6/17	65	720.4	8627
Castillion	6	Yellow	Castilion	6/17	65	617.4	7415
LC01600405T	7	Red	Turkish Red	6/17	65	853.7	11025
LC01602062T	8	Red	Turkish Red	6/18	66	760.8	10905
LC01602307E	9	Yellow	Eston	6/20	68	777.0	11210
LC01602341E	10	Yellow	Eston	6/19	67	839.9	13374
LC01601640P	11	Yellow	Pardina	6/19	67	859.5	12052
LC01602245P	12	Yellow	Pardina	6/17	65	700.6	11707
Mean					66	711.0	9559
LSD(0.05)					2	206.1	1390
Pr>F					<0.00	0.02	<0.00

Fertilizer: 13 lbs N/a + 62 lbs P₂O₅/a

Herbicide: Pursuit (3 oz./a) + Prowl (1.8 pints/a) pre-plant incorporated

Seeded 4/13/04

Seeding rate: 8.3 seeds/ft²

Table 42. 2004 Western Regional Lentil Trial - Dry-land lentil agronomic summary.- Exp: 860704 Central Ag Research Center, Moccasin, MT.
Data from Chengci Chen and Karnes Neill, Montana State University

	Flower (date)	Height (cm)	Grain Harvest			
			Yield (lbs/acre)	Test Weight (lbs/bu)	Moisture (%)	
LC01602307E	6/29	34.3	1,748 ^a	63.97	14.3 ^a	
LC01602245P	6/25	30.0	1,651 ^a	65.15 ^a	12.4 ^a	
LC01602062T	6/23	34.9 ⁿ	1,622 ^a	63.95	12.4 ^a	
LC01601640P	6/25	30.3	1,580 ^a	65.10 ^a	12.3 ^a	
CDC Richlea	6/28	29.2	1,575 ^a	62.29	13.7 ^a	
LC01600405T	6/23	31.8	1,466 ^a	64.78 ^a	11.9 ^a	
Merrit	6/26	33.3	1,461 ^a	60.30	12.6 ^a	
LC99602075L	6/28	30.5	1,361	59.72	12.8 ^a	
Pennell	6/28	33.3	1,315	59.65	13.0 ^a	
Castillion	6/27	31.5	1,303	60.05	12.8 ^a	
LC01602341E	6/26	32.2	1,230	65.22 ^a	12.2 ^a	
LC860616L	6/29	31.3	1,147	60.55	11.5	
LC860359L	7/2	27.5	1,144	61.75	10.4	
Means (<i>n</i> = 52)	6/26	31.5	1,431	62.50	12.5	
LSD (0.05 by t)		8.2	296	0.89	2.5	
CV% (s/mean)		17.96	14.33	0.98	13.86	
F-Value		0.54 ⁿ	3.71	54.4	1.28 ⁿ	

^a - Denotes values equal highest value (in **bold**) based on LSD_(0.05).

ⁿ - Denotes not statistically significant at 0.05 level.

Table 43. NDSU Carrington Research Extension Center Lentil Variety Trial, 2004
Data from Blaine Schatz and Steve Zwinger, North Dakota State University

Obs	Variety	Seed Coat Color	Market Type	Emerged Plant Stand per ft ²	Days to Bloom	1000 KWT gms	Seeds / Pound lbs/bu	Test Weight lb/acre	Seed Yield
1	CDC Blaze			5.4	52.0	38.4	11875	55.4	1473
2	CDC Milestone	Green	Small	6.4	53.5	37.3	12362	52.1	2553
3	CDC Richlea	Green	Medium	6.3	54.8	54.6	8355	53.0	2543
4	CDC Sedley			6.4	53.0	75.6	6003	54.7	2251
5	Crimson	Red	Small	5.9	53.0	39.8	11427	53.1	1522
6	Laird	Green	Extra Large	5.7	56.5	75.1	6054	55.1	2255
7	Merrit	Green	Medium	6.0	50.0	67.1	6802	54.3	2007
8	Pardina	Brown	Small	5.2	50.8	42.2	10786	56.4	1294
9	Pennell	Green	Extra Large	7.0	55.0	73.0	6234	52.3	1835
10	Red Robin	Red	Small	6.0	53.3	29.3	15639	55.6	2894
MEAN				6	53.2	53.2	9585	54.2	2050
C.V.%				13.8	1.1	6.4	10.1	1.5	20.6
LSD.05				NS	0.8	5.0	1404	1.2	614
LSD.01				NS	1.1	6.7	1898	1.6	830
#REPS				4	4	4	4	4	4

Planting Date = May 7 ; Harvest Date = October 5 ; Previous Crop = Oats

** Seed was generally of poor quality due to disease influence of sclerotinia and anthracnose.

Table 44. Western Regional Lentil Nursery – Continuously Cropped - No-till, Hettinger, North Dakota, 2004
Data from Eric Eriksmoen, North Dakota State University

Entry #	Cultivar	Days to Bloom	Plant Height cm	1000 Seed wt. grams	Test Weight Lbs/bu	Seed Yield Lbs/Ac
1	Pennell	73	20	63.3	58.5	1289
2	LC860359L	74	26	60.0	60.0	1498
3	LC860616L	72	27	60.0	57.6	1417
4	LC99602075L	72	25	67.3	59.0	1396
5	Merrit	71	23	60.0	59.1	1534
6	Castillion	72	23	65.3	58.8	1537
7	LC01600405T	71	19	39.3	60.8	723
8	LC01602062T	72	18	40.0	61.6	878
9	LC01602307E	72	25	45.3	60.3	2249
10	LC01602341E	71	22	32.7	60.9	903
11	LC01601640P	71	16	38.0	--	384
12	LC01602245P	72	19	36.7	--	791
Trial Mean		72	22	50.7	59.3	1217
C.V. %		0.5	11.4	5.1	1.0	25.3
LSD .05		1	4	4.4	1.1	521
LSD .01		1	6	6.0	1.5	709

Planting Date: April 6, 2004, Harvest Date: August 10, 2004

Previous Crop: barley.

Notes: The trial sustained hard frosts on May 13 (18°F), May 14 (16°F) and on June 18 (25°F). Growing season precip. (April – July) = 5.43 inches.

Table 45. North Central Research Extension Center Western Regional Lentil Variety Trial at Minot, 2004
Data from Mark Halvorson, North Dakota State University

Variety	Days to Flower	Bloom Duration	Plant Height in	Lodge 0-9	Shatter 0-9	Seed Weight g/1000	Test Weight lb/bu	Seed Yield				
								2002	2003	2004	2 Year	3 Year
Pennell (LC460197L)	63	14	12	5.5	5.8	73.1	51.1	--	1871	1743	1807	--
LC860359L	64	13	12	3.8	3.5	76.5	53.7	--	1431	1719	1575	--
LC860616L	63	13	12	5.3	4.5	79.9	52.0	--	--	1320	--	--
LC99602075L	63	13	11	6.5	5.0	82.5	51.5	--	1121	1214	1167	--
Merrit (LC460266B)	63	14	13	6.3	6.3	65.6	52.8	--	1598	1187	1393	--
Castillion (LC760209C)	63	13	13	5.8	6.0	77.0	52.6	--	1562	1296	1429	--
LC01600405T	63	13	10	7.3	6.3	47.7	55.2	--	--	575	--	--
LC01602062T	63	14	12	6.0	6.0	43.6	55.2	--	--	948	--	--
LC01602307E	63	14	11	5.8	4.8	48.6	54.8	--	--	1764	--	--
LC01602341E	64	13	9	6.0	5.0	36.1	52.4	--	--	640	--	--
LC01601640P	64	13	9	6.8	5.0	43.0	--	--	--	282	--	--
LC01602245P	64	13	9	7.5	4.5	42.9	58.5	--	--	434	--	--
LSD 5%	0	NS	2	1.7	NS	7.5	2.0	--	266	435	--	--
C.V.%	0.4	3.1	14.5	19.0	29.8	5.7	2.5	--	13.4	27.5	--	--
Mean	63	13	11	6.0	5.2	59.7	53.6	--	1365	1093	--	--

Lodging score based on scale 0-9 (0=upright, 9=flat)

Shatter score based on scale 0-9 (0=no shatter)

Hail on June 6 and August 25

Table 46. Western Lentil Yield Nursery - Williston Research Extension Center, 2004
Data from Neil Riveland, North Dakota State University

Cultivar	Bloom Date	Canopy		Test Weight	Seed Yield	1000 KWT	Harvest
		Height	Height				
	fr Plting	cms	inches	lbs/b	lbs/a	gms	Date
Pennell	66.8	29.3	11.5	59.5	1527.1	73.0	Aug.17
LC860359L	67.8	31.3	12.3	61.9	1317.9	73.9	Aug.25
LC860616L	63.0	34.3	13.5	60.2	1242.2	79.8	Aug.25
LC99602075L	63.3	36.5	14.4	59.4	1293.3	81.1	Aug.25
Merrit	61.0	31.5	12.4	60.2	1381.0	66.2	Aug.25
Castillion	62.0	31.5	12.4	59.9	1209.2	76.7	Aug.25
LC01600405T	62.3	27.0	10.6	63.9	1144.2	45.1	Aug.17
LC01602062T	62.0	28.3	11.1	62.5	1131.2	46.1	Aug.17
LC01602307E	66.3	28.8	11.3	63.3	1352.4	49.0	Aug.25
LC01602341E	64.0	26.0	10.2	63.0	1361.2	35.2	Aug.17
LC01601640P	62.0	26.0	10.2	63.1	1254.2	45.4	Aug.17
LC01602245P	62.0	24.8	9.7	64.4	1234.6	42.2	Aug.17
High Mean	67.8	36.5	14.4	64.4	1527.1	81.1	
Low Mean	61.0	24.8	9.7	59.4	1131.2	35.2	
Exp Mean	63.5	29.6	11.6	61.8	1287.4	59.5	
C.V. %	1.1	7.0	7.0	.5	11.8	3.0	
LSD 5%	1.0	3.0	1.2	.6	218.1	3.9	
LSD 1%	1.4	4.0	1.6	.9	NS	5.5	
# of Reps	4	4	4	2	4	2	
F-TRT	39.7	11.7	11.7	86.5	2.1	185.9	

Location of the WREC: Latitude 48 8'; Longitude 103 44'W; Elevation 2105 ft.

Planted: April 22 on Fallow. Applied Fertilizer in lbs/a:0N:0P2O5:0K:0SO4

Soil Test to two feet in lbs/a: 120N:23P:3315:50S 1.8 OM pH-5.4

Soil Type: Williams-Bowbells Loam

Harvested: August 17 and 25 Harvested Area: 56 ft2

Trifluralin at 0.9 lbs/a ai PPI gave good weed control. Some hand weeding.

Trial Design: RCBD

Castillion had shattered 10% to 15% at harvest.

Table 47. Lentil Variety - Williston Research Extension Center, 2004
Data from Neil Riveland, North Dakota State University

Cultivar	Flower Date	Plant Height	Plant Height	Test Weight	Seed Yield	Seed Yield	Seed Weight
	fr Plting	cms	inches	lbs/b	lbs/a	bus/a	gms/250*
Robin	62.5	27.0	10.6	61.1	1207.1	20.12	7.1
CDC Blaze	65.3	26.0	10.2	61.6	1286.8	21.45	8.8
CDC Milestone	63.3	25.8	10.1	63.0	1507.2	25.12	9.3
CDC Sedley	66.0	35.8	14.1	59.9	1276.0	21.27	20.1
Laird	66.8	33.5	13.2	60.8	1486.4	24.77	19.5
CDC Richlea	65.0	31.5	12.4	60.8	1537.5	25.63	14.0
Merrit	61.0	28.5	11.2	58.5	1170.6	19.51	17.5
Pennell	67.3	28.5	11.2	59.3	1415.7	23.60	17.9
Crimson	67.0	24.5	9.6	62.1	1172.1	19.53	8.6
CDC Sovereign	67.8	35.0	13.8	59.9	1519.7	25.33	17.4
Pardina	61.8	24.3	9.5	61.3	1316.3	21.94	9.7
CDC Richlea(1.5X)#	65.0	28.5	11.2	61.8	1681.2	28.02	13.1
High Mean	67.8	35.8	14.1	63.0	1681.2	28.02	20.1
Low Mean	61.0	24.3	9.5	58.5	1170.6	19.51	7.1
Exp Mean	64.9	29.1	11.4	60.8	1381.4	23.02	13.6
C.V. %	1.6	9.6	9.6	2.7	10.3	10.28	1.4
LSD 5%	1.5	4.0	1.6	2.3	204.4	3.41	.4
LSD 1%	2.0	5.4	2.1	NS	274.6	4.58	.6
# of Reps	4	4	4	4	4	4	2
F-TRT	18.9	8.1	8.1	2.5	5.5	5.48	1305.6

* - based on 60 lbs/bus

- 1.5X indicates a seeding rate of 1.5 times.

Location of the WREC: Latitude 48 8'; Longitude 103 44'W; Elevation 2105 ft.

Planted: April 22 on Fallow. Applied Fertilizer in lbs/a: 0N:0P2O5:0K:0SO4

Soil Test to two feet in lbs/a: 120N:23P:331S:50S 1.8 OM pH-5.4

Soil Type: Williams-Bowbells Loam

Harvested: August 17 and August 25. Harvested Area: 56 ft2

Trifluralin at 0.9 lbs/a ai PPI gave excellent weed control.

Trial Design: RCBD

Table 48. Western Regional Lentil Yield Trial, Walla Walla, WA, 2004 (0498)
Data from USDA-ARS, Pullman

Cultivar	Origin	Seed Yield ..kg/ha...
LC01602062T	X96L057	2892
LC860359L	X93L035	2735
LC01601640P	X93L018	2573
LC01602307E	X98L047	2455
LC01600405T	X96L063	2420
Merrit		2309
LC01602245P	X98L038	2284
Pennell		2265
LC860616L	X95L073	2243
LC99602075L	X96L092	2213
LC01602341E	X98L054	2018
Castillion	X89L007	1844
Grand Mean		2354
C.V. (%)		12
LSD _($\alpha=0.05$)		384

Planting date 3/31/04. Harvest date 7/26/04.

Agronomic and yield data are means of three replications at Walla Walla, WA.

Winter Lentil Trials

Eight winter lentil entries in the Western Regional Yield Trial were evaluated at 12 locations across five states. The entries comprised one check, 'Morton', and seven breeding lines. Data were collected from six locations (Tables 49 and 50), while the remaining six locations suffered from poor stand establishment and/or severe winter kill and were abandoned in spring. Information regarding experimental design, location and specific observations for some of the locations are included below. Morton produced an average yield of 1245 lb/a, while the breeding lines produced average yields of 1256 lb/a (LC9979065) and 1255 lb/a (LC9979120). WA8649041, a longstanding winterhardy check line, produced an average seed yield of 916 lb/a.

Williston, ND

We planted the "Fall Seeded" material. The fall of 2003 was very dry so no emergence or even germination occurred. There were a few plants of lentils and a few more peas plants in the plots in the spring but tilled them down as the area was very weedy also. We did plant them again this fall. (Neil Riveland)

Carrington, ND

We did plant the fall sown field pea and lentil nursery. In both cases the stands that survived were very poor. I do believe that Carrington trials reflected the best winter survival among the four North Dakota sites. This comment is based on feedback from the other site agronomists. However, the degree of survival and the consistency of plants did not allow for yield determinations. We did make some selections from within each nursery. I believe we had some segregation for improved winter survival. I made selections from within two lines and then made one composite selection for each crop. These three lines were then included with the other lines you sent for this fall's winter nurseries. (Blaine Schatz)

Minot, ND

We did plant them, however the lentils did not make any yield and the dry pea material was harvested by plot (few plants / plot) and samples were sent back to Fred. No yield data on that material. (Mark Halvorson)

Bozeman, MT

We did plant them in a timely fashion next to the agronomy studies out at Amsterdam, but like the agronomy studies, emergence was practically zero and so we abandoned them in the spring. You should probably make a note of this since we did everything we could and mother Nature took over and wiped us out. Spring pea in that field produced 55 bu/ac so it would have been an excellent year to get the trials through. (Perry Miller)

Pendleton, OR

Six lines of winter peas and 8 lines of winter lentils were grown at the Columbia Basin Agricultural Research Center (CBARC) in Pendleton (45°N, 118° West, elevation 1440 ft). Soils at both stations are Walla Walla silt loams that are 4 to 6 feet deep. Pendleton received 20 inches of rain in the 2003-04 crop-year, when these crops were evaluated. Peas and lentils were planted on October 10, 2003 at a seeding rate of 7 and 20 seeds/ft², respectively. The previous crop was winter wheat. Data obtained are presented below. For both crops, the plant stand was low due to poor germination and emergence. Seedbed conditions were not ideal due to too much straw from the previous wheat crop. However, despite the low plant stands, both peas and lentils produced higher grain yields than in 2003. (Stephen Machado)

Table 49. Summary of Locations Participating in the 2004 Winter Lentil Western Regional Yield Trial

Location	Contact	Conditions	Nurseries		
			No. Sent	Data Returned	Data Lost
Montana					
Bozeman	Perry Miller	Dryland	✓	-	✓
Kalispell	Duane Johnson/Louise Strange	Dryland	✓	✓	-
Moccasin	Chengci Chen/Karnes Neill	Dryland	✓	✓	-
North Dakota					
Carrington	Blaine Schatz/Steve Zwinger	Dryland	✓	-	✓
Hettinger	Eric Eriksmoen	Dryland	✓	✓	-
Minot	Mark Halvorson	Dryland	✓	-	✓
Williston	Neil Riveland	Dryland	✓	-	✓
Oregon					
Moro	Brian Tuck	Dryland	✓	-	✓
Pendleton	Stephen Machado	Dryland	✓	✓	-
South Dakota					
Dakota Lakes	John Rickertsen	Dryland	✓	✓	-
Wall	John Rickertsen	Dryland	✓	✓	-
Wyoming					
Torrington	James Krall/Jerry Nachtman	Dryland	✓	-	✓
Grand Totals			12	6	6

Table 50. Location Yield Summary (lb/a) for Western Regional Winter Lentil Trials

Location	WA8649041	LC9976079	LC9978057	LC9978094	Morton	LC9979062	LC9979065	LC9979120
Kalispell, MT	353	781	805	656	1139	1527	1107	1004
Moccasin, MT	504	815	815	792	953	881	1002	1206
Pendleton, OR	1099	962	1125	1427	1826	1531	1658	1643
Dakota Lakes, SD	1546	1579	1383	1274	1492	1263	1677	1579
Wall, SD	1080	878	1068	972	816	747	834	844
Grand Mean	916	1003	1039	1024	1245	1190	1256	1255

Grand mean taken from locations with a complete set of data.

Table 51. Western Regional Winter Lentil Yield Trial at Kalispell, MT - 2004
Data from Louise Strang and Duane Johnson, Montana State University

Cultivar	Spring Stand %	Flower date	Maturity date	Yield lbs/a	Seed Size #/lb
WA8649041	88	6/1	7/21	353	18132
LC9976079	88	5/26	7/18	781	12671
LC9978057	90	5/26	7/18	805	12833
LC9978094	90	5/31	7/21	656	14055
LC9979010	89	5/31	7/19	1139	14024
LC9979062	76	5/26	7/20	1527	13993
LC9979065	79	6/1	7/20	1107	14578
LC9979120	88	5/31	7/20	1004	16998
Mean	86			922	14661
LSD(0.05)	ns			333	1493
Pr>F	0.79			<0.00	<0.00

Seeded 9/24/03

Table 52. Western Regional Winter Lentil Trial - Dry-land winter lentil agronomy results- Exp: 840704. Central Ag. Research Center, Moccasin, MT – 2004
Data from Chengci Chen and Karnes Neill, Montana State University

Selection	- Stand (Spring) -		-Forage Production -		----- Grain Production -----			
	Density (#/m ²)	Survival (%) ^{1/}	Canopy (cm)	Dry Matter (lbs/acre)	Canopy (cm)	Yield (lbs/acre)	Test Wt (lbs/bu)	Moisture (%)
LC9979120	37.7^a	85.3 ^a	27.3	2,008	31.5	1,206^a	65.45 ^a	13.0
LC9979065	26.7 ^a	58.7	26.8	1,877	31.8	1,002 ^a	64.68	13.9 ^a
Morton	22.2	61.8	28.3	2,421	31.5	953 ^a	65.53^a	13.2
LC9979062	21.7	64.1	31.8 ^a	2,297	33.3 ^a	881	64.7	13.7 ^a
LC9976079	18.6	53.2	29.0	2,847	32.8 ^a	815	63.8	12.9
LC9978057	33.7 ^a	71.2 ^a	25.9	1,264	29.0	815	64.81	13.9 ^a
LC9978094	37.5 ^a	88.5^a	27.8	2,466	29.3	792	64.75	14.6^a
Toni (MSU release)	34.9 ^a	67.5	34.5^a	4,129^a	35.8^a	545	63.83	14.2 ^a
WA8649041	33.4 ^a	78.2 ^a	33.3 ^a	3,398 ^a	33.5 ^a	504	64.25	12.8
Mean (n = 36)	29.6	69.8	29.7	3,523	32.0	835	64.64	13.56
LSD (0.05 by t)	15.3	18.7	3.0	965	3.3	254	0.4992	1.099
CV% (s/mean)	29.9	15.5	7.0	26.1	7.0	20.8	0.5	5.5
F-Value (8,23 df)	2.08 ⁿ	3.73 ⁿ	8.95	6.65	3.60	6.25	12.92	2.94

^{1/} - Survival greater than 100% indicates seed germinated during winter or in early spring.

^a - Denotes values equal highest value (in **bold**) based on LSD_(0.05).

ⁿ - Denotes not statistically significant at 0.05 level.

Table 53. Winter Lentil Evaluations at Hettinger, North Dakota
Continuously Cropped No-till, 2004
Data from Eric Eriksmoen, North Dakota State University

Entry	Line	Winter Kill
		%
1	WA8649041	97
2	LC9976079	99
3	LC9978057	85
4	LC9978094	94
5	Morton	94
6	LC9979062	96
7	LC9979065	96
8	LC9979120	94
Trial Mean		94
C.V. %		6.1
LSD .05		NS
LSD .01		NS

Planting Date: September 19, 2003

Notes: Trial was seeded into relatively heavy HRSW stubble. Good

Fall moisture and excellent plant stands going into freeze up.

Relatively good winter snow cover.

Table 54. Grain Yield and Height of Elite Winter Lentil Lines Evaluated in 2003-04 Crop-Year at CBARC, Pendleton, Oregon.
Data from Stephen Machado, Oregon State University

Entry #	Accession #	Grain yield (lb/a)	Plant height (in)
1	WA8649041041	1098.5	17.4
2	LC9979062	1531.3	16.6
3	LC9976079	961.9	15.3
4	LC9979120	1642.6	15.9
5	LC9978057	1124.9	14.1
6	LC9978094	1426.8	15.6
7	Morton	1825.9	14.8
8	LC9979065	1657.5	15.8
LSD _{0.05}	-	508.6	1.7

Table 55 . SDSU Winter Lentil Variety Trial – Dakota Lakes, South Dakota, 2004
Data from John Rickertsen, South Dakota State University

Variety	Height Aug-06-04 ..in..	Yield Aug-06-04 ..lb/ac..
WA8649041	20.5	1546
LC9976079	17.0	1579
LC9978057	18.5	1383
LC9978094	20.0	1274
Morton (LC9979010)	17.5	1492
LC9979062	18.5	1263
LC9979065	17.5	1677
LC9979120	18.0	1579
Grand Mean	18.44	1474.23
CV	10.03	26.25
LSD (P=.05)	4.37	569.2
Standard Deviation	1.85	387.0
Bartlett's X2	1.168	7.057
P(Bartlett's X2)	0.992	0.423
Replicate F	0.164	0.186
Replicate Prob(F)	0.6972	0.9046
Treatment F	0.896	0.616
Treatment Prob(F)	0.5560	0.7366
ARM Action Codes		TY2
# Subsamples, Dec.		0
Means followed by same letter do not significantly differ (P=.05, Duncan's New MRT)		

Table 56. SDSU Winter Lentil Variety Trial – Wall, South Dakota, 2004
Data from John Rickertsen, South Dakota State University

Variety	F. Stand	S. Stand	Height Jul-21-04	Test Wt	Yield Aug-03-04
	%	%	..in..	..lb/bu..	..lb/ac..
WA8649041	90.0	90.0	11.5	66.0	1080
LC9976079	90.0	90.0	12.5	65.1	878
LC9978057	90.0	90.0	10.8	65.8	1068
LC9978094	90.0	90.0	12.8	65.9	972
Morton (LC9979010)	90.0	90.0	12.5	66.1	816
LC9979062	90.0	90.0	11.3	66.4	747
LC9979065	90.0	90.0	10.8	65.8	834
LC9979120	90.0	90.0	11.0	67.0	844
Grand Mean	90.0	90.0	11.63	66.03	904.88
CV	0.0	0.0	17.15	1.33	26.34
LSD (P=.05)	0.00	0.00	2.93	1.29	350.6
Standard Deviation	0.00	0.00	1.99	0.88	238.4
Bartlett's X2	0.0	0.0	4.872	6.13	4.412
P(Bartlett's X2)	0.00*	0.00*	0.676	0.525	0.731
Replicate F	0.000	0.000	1.551	0.833	3.077
Replicate Prob(F)	1.0000	1.0000	0.2309	0.4917	0.0498
Treatment F	0.000	0.000	0.701	1.530	1.049
Treatment Prob(F)	1.0000	1.0000	0.6714	0.2139	0.4283
ARM Action Codes				T1	TY3
# Subsamples, Dec.				1	0

Means followed by same letter do not significantly differ (P=.05, Duncan's New MRT)

Chickpea Trials

Ten chickpea entries in the Western Regional Yield Trial were evaluated at 14 locations across six states. The entries comprised two checks, 'Dwelley' and 'Sierra', and seven breeding lines including four Café, three Spanish white and one desi type. The trials were conducted primarily under dryland conditions; however, three trials in NE and one in WY were irrigated. Information regarding experimental design, location and specific observations for some of the locations are included below. The two checks, Sierra and Dwelley, produced average seed yields of 1143 and 1306 lb/a, respectively. The highest yielding line in the trial was CA0090B3783C (1448 lb/a), a café type, and two breeding lines proposed for release, a café type, CA0090I604C and a Spanish white type, CA9890233W, produced average seed yields of 1083 and 921 lb/a, respectively.

Nebraska

Chickpea is another alternative crop that has worked in the Nebraska panhandle. Four trials were planted in 2004. Seed sources were local producers, the chickpea program at Washington State, and USDA Plant Introduction. Dryland and irrigated trials were planted on the Watson farm near Berea in Box Butte county, and also at the University of Nebraska High Plains Ag Lab near Sidney. The Sidney trials were destroyed by hail on July 29. At the Watson farm, the plots were planted on April 27. Both plots were direct seeded into corn stubble. The irrigated trial was fertilized with 25# P2O5. Spartan and Assure II were applied to both trials. The irrigated trial was treated with Headline fungicide. The dryland plot was harvested August 30, and the irrigated plot on September 20. Maturity was delayed by cool August weather, and damp conditions in September. (Glen Frickel)

Wyoming

Eight lines of chickpea were grown at the Powell Research and Extension Center (elevation: 4400 ft.) in northwestern Wyoming. The soil type was a Garland clay loam (fine, mixed, mesic typic Haplargid, 40% sand, 24% silt, and 36% clay) with 1.2% organic matter and pH 7.2. Chickpea seeds were only planted in rows spaced 22 inches apart. Plots were established under furrow irrigation and all lines were arranged in a randomized complete block design with four replications (Abdel Mesbah)

Table 57. Summary of Locations Participating in the 2004 Chickpea Western Regional Yield Trial

Location	Contact	Conditions	Nurseries		
			No. Sent	Data Returned	Data Lost
Idaho					
Moscow	Stephen Guy/Ying Wu	Dryland	✓	✓	-
Montana					
Moccasin	Chengci Chen/Karnes Neill	Dryland	✓	✓	-
Nebraska					
Box Butte	David Baltensperger/Glen Frickel	Dryland	✓	✓	-
Sidney	David Baltensperger/Glen Frickel	Dryland	✓	-	✓
Box Butte	David Baltensperger/Glen Frickel	Irrigated	✓	✓	-
Scottsbluff	David Baltensperger/Glen Frickel	Irrigated	✓	-	✓
Sidney	David Baltensperger/Glen Frickel	Irrigated	✓	-	✓
North Dakota					
Carrington	Blaine Schatz/Steve Zwinger	Dryland	✓	✓	-
Hettinger	Eric Eriksmoen	Dryland	✓	✓	-
Minot	Mark Halvorson	Dryland	✓	✓	-
Williston	Neil Riveland	Dryland	✓	✓	-
South Dakota					
Hayes	John Rickertsen	Dryland	✓	✓	-
Selby	John Rickertsen	Dryland	✓	-	✓
Wall	John Rickertsen	Dryland	✓	✓	-
Wyoming					
Powell	Abdel Mesbah	Dryland	✓	✓	-
Torrington	James Krall/Jerry Nachtman	Dryland	✓	✓	-
Torrington	James Krall/Jerry Nachtman	Irrigated	✓	✓	-
Grand Totals			17	13	4

Table 58. Location Yield Summary (lb/a) for Western Regional Chickpea Trials

Location	CA0090B347C	CA0090B383C	CA0090I604C	CA0090B659D	CA9890233W	CA9990B015W	CA99901875W	CA9783163C	Sierra	Dwelley
Moscow, ID	...	...	3007	...	2862	...	2474	...	2464	2133
Moccasin, MT	...	1122	1112	1031	1005	994	...	912	683	664
Box Butte, NE (Irr)	...	3250	830	3320	1850	1680	...	1740	1930	1550
Box Butte, NE (Dry)	...	1140	590	940	510	590	...	520	710	480
Carrington, ND	1146	1650	863	1266	1073	440	422	1059	689	1088
Hettinger, ND	1445	1522	1256	1134	1011	2378	2300	1889	1711	1934
Minot, ND	...	822	682	739	650	...	...	...	661	666
Williston, ND	2147	2023	2015	1688	2271	2034	2166	2065	1901	1904
Hayes, SD	1507	1586	1333	1150	871	906	784	880	1133	1037
Wall, SD	1361	1252	1296	1154	741	1089	1056	1253	1176	1372
Powell, WY	...	1923	1245	1499	1064	1191	...	1895	1481	1876
Torrington, WY	2245	1931	660	1719	393	686	529	1123	1189	1649
SAREC, WY	107	169	155	317	86	124	108	139	205	157
Grand Mean	1423	1448	1083	1204	921	1094	1052	1201	1143	1306

Grand mean taken from locations with a complete set of data.

Table 59. Chickpea variety performance results at Moscow, ID – 2004
Data from Stephen Guy and Ying Wu, University of Idaho

Variety or Selection	Seed Yield lb/acre	Seed Weight g/100	Plant Height inches
Dwelley	2133	43.1	26
Evans	2470	40.6	27
Myles	2537	18.2	22
Sanford	2279	40.0	28
Sierra	2464	47.9	26
Spanish White	2101	50.4	24
UC 27	2803	38.4	23
CA 9890233W	2862	52.9	24
CA 99901604C	3007	35.5	27
CA 99101875W	2474	49.6	22
Average	2513	41.7	25
LSD (0.10)	412	4.5	2
CV (%)	14	9.1	7

Table 60. Seed Yield for Chickpea Varieties Tested for Three Years In Northern Idaho
Data from Stephen Guy and Ying Wu, University of Idaho

Variety or Selection	2002	2003	2004 *	Average
	lb/acre.....			
Dwelley	2070	1181	2133	1626
Evans	1870	1250	2470	1560
Myles	2180	1437	2537	1809
Sanford	1750	1287	2279	1519
Sierra	2420	1389	2464	1905
Spanish White	2050	1381	2101	1716
UC 27	2520	1476	2803	1998
Average	2123	1343	2513	1733
LSD (0.10)	200	184	412	--

* Moscow data only.

Table 61. 2004 Western Regional Chickpea Trial - Dry-land chickpea agronomic summary- Exp: 890704 Central Ag Research Center, Moccasin, MT
Data from Chengci Chen and Karnes Neill, Montana State University

	Flower	Grain Harvest			
		Plant Ht	Yield	Test	Moisture
	(date)	(cm)	(lbs/acre)	(lbs/bu)	(%)
Myles	6/28	37.3	1,245 ^a	55.23	10.7
CA0090B383C	6/30	47.0	1,122 ^a	58.79 ^a	11.5 ^a
CA99901604C	6/27	37.0	1,112 ^a	54.72	11.4 ^a
CA0090B659D	7/2	52.3 ^a	1,031 ^a	54.58	10.5
CA9890233W	7/5	33.3	1,005 ^a	55.38	12.5 ^a
CA9990B015W	7/3	37.3	994 ^a	55.63	11.5 ^a
CA9783163C	7/5	39.3	912	54.68	12.9 ^a
Sierra	7/4	43.3	683	57.60 ^a	11.3 ^a
Dwelley	7/5	41.8	664	56.10	12.9 ^a
Mean (n = 36)	7/2	40.9	974	55.85	11.7
LSD (0.05 by t)		3.0	316	1.40	1.8
CV% (s/mean)		5.0	22.2	1.7	10.6
F-Value		33.38	3.26	9.16	2.07 ⁿ

^a - Denotes values equal highest value (in **bold**) based on LSD_(0.05).

ⁿ - Denotes not statistically significant at 0.05 level.

Table 62. Nebraska Chickpeas – 2004
Data from David Baltensperger and Glen Frickel, University of Nebraska

Entry	Yield Lbs/Acre			Seed Weight		
	Average	Box Butte Irrigated	Box Butte Dryland	Average	Box Butte Irrigated	Box Butte Dryland
(milligrams)						
B90	2360	3710	1000	230	260	210
PI 17256	2300	3540	1060	320	340	290
PI Bulk	2250	3540	970	230	250	210
CA0090B383C	2200	3250	1140	350	380	320
CA0090B659D	2130	3320	940	250	280	230
Wyo 202	1330	1710	950	210	210	210
Sierra	1320	1930	710	400	450	340
CA9890233W	1180	1850	510	390	480	310
CA9990B015W	1160	1680	590	380	450	310
CA9783163C	1130	1740	520	370	490	260
Wyo 201	1050	1530	630	190	180	200
Dwelley	1010	1550	480	420	470	370
Wyo 203	980	1070	900	360	350	360
CA9960I604C	710	830	590	410	450	360
Average	1510	2230	790	320	370	290
LSD (.05)	349	709	154	35	60	50

Table 63. NDSU Carrington Research Extension Center Western Regional Chickpea Nursery, 2004
Data from Blaine Schatz and Steve Zwinger, North Dakota State University

Obs	Variety	Market Class	Emerged Plant Stand per ft ²	Days to Flower	Pod Ht inch	Plant Ht inch	1000 KWT gms	Seeds / Pound	Test Weight lbs/bu	Seed Yield lbs/ac
1	CA0090B347C	Kabuli	3.0	53.0	12.9	24.9	316	1487	54.4	1146
2	CA0090B383C	Kabuli	3.3	54.0	15.2	26.8	277	1686	52.4	1615
3	CA0090B659D	Desi	3.3	54.0	14.2	26.8	251	1832	53.5	1266
4	Dwelly	Kabuli	3.2	55.7	11.5	25.7	379	1215	53.8	1088
5	Sierra	Kabuli	3.1	54.0	13.6	26.5	312	1472	53.1	689
6	CA9783163C	Kabuli	3.8	57.0	12.3	24.4	333	1376	53.3	1059
7	CA9890233W	Kabuli	3.3	56.0	12.6	26.8	359	1298	51.7	1073
8	CA99901604C	Kabuli	3.5	56.0	11.8	26.5	356	1286	51.3	863
9	CA99901875W	Kabuli	3.8	56.3	12.9	27.6	359	1269	51.0	422
10	CA9990B015W	Kabuli	3.6	56.0	11.8	25.5	316	1446	50.6	440
MEAN			3.4	55.2	12.9	26.1	325	1441	52.6	939
C.V.%			15.2	1.2	16	10.9	12.9	13.9	3.1	24.5
LSD.05			NS	1	NS	NS	62	297	NS	NS
LSD.01			NS	1.4	NS	NS	NS	NS	NS	NS
#REPS			4	4	4	4	4	4	4	4

Planting Date = May 17 ; Harvest Date = November 8 ; Previous Crop = Spring Wheat

** Seed yield attained was of low quality due to ascochyta and botrytis plant diseases.

Table 64. Western Regional Chickpea Nursery at Hettinger, North Dakota Continuously Cropped No-till, 2004
Data from Eric Eriksmoen, North Dakota State University

Entry	Line	Date of 10% Bloom Julian	Plant Ht at Harvest cm	Disease 0-9*	Test Weight lbs/bu	1000 Seed wt grams	Yield lbs/Ac
1	Dwelly	173	34	2.7	60.1	527	1934
2	Sierra	172	33	2.3	58.9	527	1711
3	CA9783163C	174	35	1.0	57.4	532	1889
4	CA99901604C	171	28	1.0	57.3	584	1256
5	CA0090B347C	171	29	4.7	60.3	452	1445
6	CA0090B383C	172	29	3.7	58.3	403	1522
7	CA9890233W	174	30	1.0	57.5	525	1011
8	CA99901875W	173	33	1.0	57.8	622	2300
9	CA9990B015W	174	27	1.0	58.2	561	2378
10	CA0090B659D	170	35	4.0	57.7	399	1134
Trial Mean		173	31	2.2	58.4	513	1658
C.V. %		0.6	9.8	30.3	1.1	13.0	9.6
LSD .05		1	5	1.2	1.1	115	273
LSD .01		2	NS	1.6	1.6	158	375

*Ascochyta disease rating on August 3: 0 = none, 9 = completely dead.

Planting Date: April 6, 2004

Harvest Date: September 16, 2004

Previous Crop: barley

Note: Hard frost (25° F) on June 18 during bloom and pod set.

Table 65. North Central Research Extension Center Western Regional Chickpea Variety Trial at Minot, 2004
Data from Mark Halvorson, North Dakota State University

Variety	Days to Flower	Bloom Duration	Plant Height	Seed Weight	Test Weight	Seed Yield				
						2002	2003	2004	2 Year	3 Year
			in	g/1000	lb/bu	-----lb/A-----				
Dwelley (CA188359)	57	15	14	414.2	61.0	--	3535	666	2100	--
Sierra (CA9783152C)	55	14	15	473.3	60.1	--	3065	661	1863	--
CA9990I604C	52	17	11	468.2	56.3	--	3260	682	1971	--
CA0090B383C	54	14	13	430.7	61.2	--	--	822	--	--
CA9890233W	55	14	11	531.9	57.2	--	2544	650	1597	--
CA0090B659D	56	14	15	337.7	57.9	--	--	739	--	--
LSD 5%	2	2	2	52.7	--	--	421	NS	--	--
C.V. %	2.7	12.5	8.6	4.3	--	--	9.2	19.8	--	--
Mean	52	11	13	442.7	22.3	--	3125	703	--	--

Hail Damage on June 6 and August 25, 2004

Table 66. Chickpea Variety On Fallow -Williston Research Extension Center, 2004
Data from Neil Riveland, North Dakota State University

Cultivar	Bloom Date	Canopy		Test Weight	Seed Yield	1000 KWT
		Height	Height			
	fr Plting	cms	inches	lbs/b	lbs/a	gms
Dwelley	66.0	44.5	17.5	60.8	1869.8	535.2
Yuma	61.0	37.8	14.9	62.3	2038.3	491.7
Sierra	63.8	41.5	16.3	45.4	1848.3	541.8
Anna	58.0	37.5	14.8	62.1	2306.0	220.1
B90	60.5	44.3	17.4	62.1	2557.5	304.1
Myles	59.0	37.0	14.6	59.3	2004.8	203.8
High Mean	66.0	44.5	17.5	62.3	2557.5	541.8
Low Mean	58.0	37.0	14.6	45.4	1848.3	203.8
Exp Mean	61.4	40.4	15.9	58.7	2104.1	382.8
C.V. %	1.0	7.4	7.4	21.1	8.6	3.2
LSD 5%	1.0	4.5	1.8	NS	272.3	32.0
LSD 1%	1.3	6.2	2.5	NS	376.5	50.1
# of Reps	4	4	4	4	4	2
F-TRT	90.5	5.3	5.3	1.1	9.3	324.0

Location of the WREC: Latitude 48 8'; Longitude 103 44'W; Elevation 2105 ft.

Planted: May 6 on Fallow. Applied Fertilizer in lbs/a:0N:0P2O5:0K:0SO4

Soil Test to two feet in lbs/a: 120N:23P:3315:50S 1.8 OM pH-5.4

Soil Type: Williams-Bowbells Loam

Harvested: Myles and Anna, September 2: Dwelley, Yuma Sierra, September 23

Harvested Area: 56 ft2

Trifluralin at 0.9 lbs/a ai PPI gave excellent weed control.

Trial Design: RCBD

Table 67. Western Chickpea - Williston Research Extension Center, 2004
Data from Neil Riveland, North Dakota State University

Cultivar	Bloom Date	Canopy Height		Test Weight	Seed Yield	1000 KWT
	fr Plting	cms	inches	lbs/b	lbs/a	gms
Dwellely	65.0	35.0	13.8	61.8	1904.3	548.0
Sierra	64.3	34.5	13.6	60.6	1900.6	537.3
CA9783163C	66.8	36.3	14.3	58.4	2065.2	539.3
CA99901604C	60.5	29.8	11.7	57.7	2014.9	562.4
CA0090B347C	61.0	34.3	13.5	62.5	2146.5	502.3
CA0090B383C	61.3	35.5	14.0	61.7	2022.5	418.5
CA9890233W	65.5	32.5	12.8	59.1	2271.3	609.7
CA99901875W	66.8	35.0	13.8	58.2	2166.3	620.5
CA9990B015W	64.5	34.0	13.4	59.3	2034.2	575.7
CA0090B659D	66.0	39.5	15.6	57.7	1688.0	307.4
High Mean	66.8	39.5	15.6	62.5	2271.3	620.5
Low Mean	60.5	29.8	11.7	57.7	1688.0	307.4
Exp Mean	64.2	34.6	13.6	59.7	2021.4	522.1
C.V. %	1.7	11.6	11.6	.4	4.4	2.1
LSD 5%	1.6	NS	NS	.6	128.5	25.2
LSD 1%	2.2	NS	NS	.8	173.6	36.2
# of Reps	4	4	4	2	4	2
F-TRT	18.6	1.5	1.5	97.2	13.6	143.6

Location of the WREC: Latitude 48 8'; Longitude 103 44'W; Elevation 2105 ft.
Planted: May 6 on Fallow. Applied Fertilizer in lbs/a:0N:0P2O5:0K:0SO4
Soil Test to two feet in lbs/a: 120N:23P:3315:50S 1.8 OM pH-5.4
Soil Type: Williams-Bowbells Loam
Harvested: September 23 Harvested Area: 56 ft2
Trifluralin at 0.9 lbs/a ai PPI gave good weed control. Some hand weeding.
Trial Design: RCBD

Table 68. SDSU Chickpea Variety Trial – Hayes, South Dakota – 2004
Data from John Rickertsen, South Dakota State University

Variety	Height inches	Lodging 0-9*	Test Wt lb/bu	Yield lb/ac	Yield kg/ha
Dwelley	16	0	56.1	1037	1162
Sierra	16	0	54.3	1133	1269
CDC Diva	15	0	58.1	1437	1611
CDC Frontier	16	0	59.7	1847	2070
CDC Yuma	16	0	57.0	1228	1377
CDC Xena	16	0	56.7	1437	1611
CDC ChiChi	16	0	56.2	1559	1748
CDC Chico	15	0	58.6	1481	1660
Amit (B-90)	16	0	58.4	1359	1523
CDC Anna	16	0	58.0	1464	1641
CDC Cabri	16	0	54.1	1612	1807
CDC Desiray	14	0	54.2	1437	1611
Myles	14	0	53.9	1403	1572
CDC Nika	15	0	56.6	1551	1738
CA0090B659D	17	0	52.6	1150	1289
CA9783163C	16	0	51.3	880	986
CA9990I604C	15	0	54.7	1333	1494
CA0090B347C	15	0	57.8	1507	1689
CA0090B383C	16	0	55.9	1586	1777
CA9890233W	15	0	51.6	871	976
CA9990I875W	14	0	46.5	784	879
CA9990B015W	14	0	54.1	906	1016
Grand Mean	15.3	0.0	55.3	1318	1478
LSD (P=.05)	1.5	0.0	2.5	257.2	288.3
Standard Deviation	1.1	0.0	1.7	181.9	203.9
CV	6.9	0.0	3.1	13.8	13.8

* 0 = no lodging, 9 = 100% lodged.

Planted: April 15, 2004

Harvested: August 6, 2004

Table 69. SDSU Chickpea Variety Trial – Wall, South Dakota – 2004
Data from John Rickertsen, South Dakota State University

Variety	Height inches	Lodging 0-9*	Test Wt lb/bu	Yield lb/ac	Yield kg/ha
Dwelley	20	0		1372	1230
Sierra	20	0		1176	1055
CDC Diva	17	0		1318	1182
CDC Frontier	17	0		1373	1231
CDC Yuma	21	0		1165	1045
CDC Xena	17	0		1220	1094
CDC ChiChi	18	0		1405	1260
CDC Chico	18	0		991	889
Amit (B-90)	18	0		1165	1045
CDC Anna	18	0		1045	937
CDC Cabri	18	0		1067	957
CDC Desiray	17	0		1089	976
Myles	16	0		1045	937
CDC Nika	17	0		958	859
CA0090B659D	21	0		1154	1035
CA9783163C	17	0		1253	1124
CA9990I604C	17	0		1296	1162
CA0090B347C	18	0		1361	1221
CA0090B383C	20	0		1252	1123
CA9890233W	17	0		741	664
CA9990I875W	18	0		1056	947
CA9990B015W	17	0		1089	976
Grand Mean	18.1	0.0		1163	1043
LSD (P=.05)	1.9	0.0		277.2	248.6
Standard Deviation	1.1	0.0		196.0	175.8
CV	6.3	0.0		16.9	16.9

* 0 = no lodging, 9 = 100% lodged.

Planted: April 14, 2004

Harvested: August 18, 2004

Table 70. Western Regional Chickpea Yield Trial- Powell, WY, 2004 (0499)
Data from Abdel Mesbah and Rob Smith, University of Wyoming

Entry	Cultivar	Accession No.	Stand 10 ³ plants/ac	Yield lbs/ac
1	Dwelley	CA188359	71.3	1876
2	Sierra	CA9783152C	76.0	1481
3		CA9783163C	75.4	1895
4		CA99901604C	82.6	1245
5		CA0090B383C	67.7	1923
6		CA9890233W	86.7	1064
7		CA9990B015W	83.8	1191
8		CA0090B659D	86.1	1499
Mean			78.7	1522
C.V. %			16.1	35.9
LSD (5%)			18.6	802

Planting date: May 14, 2004.

Harvest date: November 04, 2004.

Table 71. Irrigated and Dryland Chickpea Variety Evaluation – U-W
Research and Extension Center, WY 2004
Data from James Krall and Jerry Nachtman, University of Wyoming

Entry	Torrington Irrigated Yield (lb/A)	SAREC Dryland Yield (lb/A)
CA0090B347C	2245	107
CA0090B383C	1931	169
CA0090B659D	1719	317
Dwelley	1649	157
WY D201	1281	121
Sierra	1189	205
CA9783163C	1123	139
WY D202	1085	187
WY K203	953	119
CA9990B015W	686	124
CA999001604C	660	155
CA99901875W	529	108
CA9890233W	393	86
Average	1190	153
DRS 0.05	528	121