

Dry Pea, Lentil, Chickpea and Winter Legume Breeding

2003 Progress Report



**Prepared by
Grain Legume Genetics and Physiology Research Unit**

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Table of Contents

Acknowledgments	ii
Personnel, Cooperators and Cooperating Growers	1
Dry Pea Breeding	2
Winter Pea Breeding	27
Lentil Breeding	29
Winter Lentil Trial Results	51
Lentil Disease Experimental Results	53
Chickpea Breeding	54
Chickpea Disease Experimental Results	65
Lupin Yield Trial.....	70
Western Regional Dry Pea, Lentil and Chickpea Yield Trials:.....	73
Colorado; Colorado State University (Abdel Berrada)	75
Idaho; University of Idaho (Stephen Guy and Ying Wu)	76
Montana; Montana State University (Karnes Neill, Dave Wichman, Louise Strang and Duane Johnson)	85
Nebraska; University of Nebraska (David Baltensperger and Glen Frickel)	89
North Dakota; North Dakota State University (Neil Riveland, Mark Halvorson, Bob Henson, Blaine Schatz, Steve Zwinger and Eric Eriksmoen)	92
Oregon; Oregon State University (Stephen Machado)	102
South Dakota; South Dakota State University (John Rickertsen)	106
Washington; Central Washington Grain Growers, Inc. (Howard Nelson)	114
Wyoming; University of Wyoming (Jim Krall).....	115

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Spring Pea Yield Testing

Advanced breeding lines of green, yellow and marrowfat peas were compared in yield trials at Pullman, Fairfield and Walla Walla, WA, and at Genesee, ID (Tables 1, 5 and 9). Trials in 2003 produced below average yields compared to previous years due to the dry conditions followed by unseasonably warm temperatures (Tables 3, 7 and 11). The trial at Fairfield produced the greatest yield overall followed by Pullman, Walla Walla and Genesee. In addition to advanced and preliminary trials in the Palouse, a small trial of twenty early generation breeding lines was evaluated at four North Dakota environments, Minot, Carrington, Williston and Hettinger. This was the second year of this trial and with the encouraging results we hope to continue the trial and possibly expand testing and selection efforts in North Dakota environments.

Green Pea Trial Results

The advanced green pea yield trial contained 11 experimental lines from the USDA breeding program and 19 checks from the USDA and other breeding programs. 'Stirling' the most recent release from the USDA program, was slightly above the trial mean (1657 kg/ha vs. 1587 kg/ha). Stirling the first semi-leafless, upright cultivar with green cotyledons and resistance to seed bleach was released from the USDA legume breeding program in 2003. It continues to show a yield advantage compared to 'Columbian' and other cultivars. Foundation seed of Stirling was produced in Washington, Idaho and North Dakota and will be available to growers for the 2004 season.

Among the top yielding lines in the 2003 trial were PS9910592, PS0010804 and PS0010902. Among these lines, PS9910592 and PS0010804 have great agronomic characteristics including consistent yield, upright growth habit (height index = 0.91 and 0.86, respectively), excellent seed quality and disease resistance (Tables 1 and 2).

Physical appearance and cooking quality are priorities in the breeding program. Overall quality was good in 2003 with seed bleach at a low level. It has been an objective of the breeding program to develop upright plant types. All the green pea breeding lines have been selected to have the semi-leafless (afila) leaf type which contributes to upright growth. Plant height index for the breeding lines in the 2003 trial ranged from 0.78 to 0.92, a significant improvement over previous years. Additional selection for improved stem properties will continue to improve overall plant stature.

The preliminary yield trial for green pea selections containing 31 experimental lines and 5 checks was planted at Pullman, WA (Table 4). Nineteen breeding lines out-yielded 'Joel', 'Lifter' and Columbian and 24 breeding lines out-yielded the mean of all checks. All selections had excellent agronomic characteristics and seed quality. PS0110767 was the highest yielding breeding line (2257 kg/ha) and maintained a plant height of index of 0.85.

Disease Screening

All pea selections in the advanced and preliminary yield trials were screened at Corvallis, OR for resistance to pea enation mosaic virus (PEMV). Unfortunately, nearly all selections are susceptible to PEMV; therefore, introduction and selection for resistance will be a major focus of the program in the future. Resistance to Fusarium wilt race 1 was evaluated at the Spillman Research Farm. Individual selections with resistance identified in these trials are being used to transfer their respective resistances to new varieties.

Variety Releases

Stirling a new green cotyledon pea, selection number PS610152, was released in 2003. Stirling has been under test for the past seven years and has been among the highest yielding lines in Pacific Northwest field trials. It has excellent seed quality and is resistant to seed bleaching. It maintains an upright growth habit through harvest due to the combination of stiff stems and the semi-leafless trait. The upright growth habit provides greater ease of harvest and improved crop quality through reduced foreign matter being harvested with the seed. Breeder seed was increased in southern California during the winter of 2002-2003. Foundation seed was produced in the Palouse during the 2003 season and will be available to producers in spring 2004.

Table 1. Location Yield Summary (kg/ha) for the Advanced Green Dry Pea Yield Trial, 2003 (0301)

Cultivar	Origin	Leaf Type	Plant Type	Fairfield	Genesee	Pullman	Walla Walla	Mean Seed Yield
Bluebird	.....	-	-	2081	1617	1886	1732	1829
CEB-1090	.....	-	-	1968	1653	1801	1859	1820
Camry (CEB-1080)	.....	-	-	2015	1571	1760	1859	1801
PS9910592	X95P122	-	-	1855	1810	1990	1535	1797
Stratus (CEB-1171)	.....	-	-	1933	1660	1903	1588	1771
CDC-Verdi	.....	-	-	1734	1781	1967	1593	1769
Cooper (CEB-1081)	.....	-	-	1950	1644	1556	1707	1714
Ariel	.....	-	-	1775	1663	1837	1580	1714
PS0010804	BX94P64-11	-	-	1831	1799	1679	1527	1709
Karita	.....	-	-	1789	1534	1606	1866	1699
PS0010902	SH95-58-1	+	-	1780	1631	1643	1737	1698
PS810162	X94P058	-	-	1814	1715	1752	1484	1691
PRO-98106	.....	-	-	1957	1546	1618	1602	1681
Stirling	X93P022	-	-	1622	1791	1582	1635	1657
PS810191	X94P164	-	-	1405	1416	2051	1700	1643
Joel	X84F172	+	+	1870	1576	1548	1510	1626
Lifter	X93P045	+	-	1554	1560	1665	1683	1616
PS810240	X94P106	-	-	1836	1405	1321	1862	1606
PS0010792	BX94P26-12	+	-	1749	1466	1424	1611	1563
SW98692(PRO)	.....	-	-	1517	1464	1741	1491	1553
Toledo	.....	-	-	1604	1326	1574	1686	1548
Cruiser	.....	-	-	1618	1485	1437	1466	1501
PS710048	X92P202	-	-	1685	1373	1570	1338	1491
Columbian(LOT I)	.....	+	+	1451	1360	1558	1375	1436
Hero	.....	-	-	1440	1506	1423	1250	1405
PS0010128	X95P768	+	-	1437	1405	1195	1347	1346
PS9910346	X93P123	-	-	1640	1013	1216	1513	1346
CEB-1170	.....	-	-	1466	800	1335	1448	1262
Franklin	X93P046	+	-	1155	1137	1350	1077	1180
PS00101215	SH91-119-5-1-2	+	-	1611	772	978	1162	1130
Grand Mean				1705	1483	1599	1561	1587
C.V. (%)				10	13	9	9	10
LSD ($\alpha=0.05$)				229	261	186	184	128
Planting Date				4/28/03	4/21/03	5/1/03	4/29/03	
Harvest Date				8/4/03	7/24/03	7/30/03	7/24/03	

Leaf type; + = normal leaf, - = *afila* or semileafless type. Plant type; + = tall plant type, - = short plant type.

Yield data are means of three replications at each of the four locations.

Table 2. Agronomic Data for the Advanced Green Dry Pea Yield Trial, 2003 (0301)

Cultivar	Origin	FW	Aphano- myces	PEMV	Days to Flower	Days to Maturity	Nodes to First Flower	Pods/ Peduncle	Mean Pod Ht (green) ..cm..	Mean Pod Ht (mature) ..cm..	Mean Pod Ht Index	Mean Plant Ht (green) ..cm..	Mean Plant Ht (mature) ..cm..	Mean Plant Ht Index	Rep Nodes	Weight 100 Seed ..g..
Bluebird	.....	+	3.3	-	54	83	15	2	25	20	0.80	39	31	0.79	2	21.7
CEB-1090	.....	..	3.4	-	50	84	17	2	39	28	0.73	50	46	0.92	3	24.2
Camry (CEB-1080)	.....	+	3.6	-	55	85	15	2	26	20	0.73	38	32	0.91	3	21.7
PS9910592	X95P122	+	3.2	-	53	83	13	3	25	20	0.86	35	33	0.91	3	20.1
Stratus (CEB-1171)	.....	+	3.1	-	54	84	14	2	26	19	0.69	37	32	0.86	3	22.6
CDC-Verdi	.....	+	2.0	-	54	85	17	2	36	29	0.82	48	46	0.91	4	19.1
Cooper (CEB-1081)	.....	+	3.0	-	62	87	18	2	38	33	0.85	49	48	0.92	3	22.7
Ariel	.....	+	3.2	-	52	81	17	2	38	31	0.79	51	44	0.89	3	17.3
PS0010804	BX94P64-11	+	3.3	+	52	79	17	2	33	25	0.77	47	39	0.86	3	22.0
Karita	.....	+/-	2.7	-	52	82	17	2	37	29	0.77	47	40	0.87	4	23.2
PS0010902	SH95-58-1	+	3.1	-	51	81	15	2	36	27	0.71	51	40	0.82	2	22.3
PS810162	X94P058	+	3.8	-	46	80	11	2	27	22	0.83	41	38	0.92	3	21.2
PRO-98106	.....	+	2.8	+	48	79	14	2	27	22	0.74	39	37	0.88	3	19.4
Stirling	X93P022	+	3.5	-	50	80	13	2	25	19	0.80	39	35	0.85	3	19.6
PS810191	X94P164	+	2.9	-	55	83	16	2	29	20	0.69	43	38	0.91	4	19.1
Joel	X84F172	+	3.0	-	47	80	13	2	50	11	0.22	77	30	0.46	4	20.6
Lifter	X93P045	+	2.5	-	53	87	14	2	36	8	0.21	52	20	0.43	3	20.4
PS810240	X94P106	+/-	3.2	+	55	84	17	2	37	28	0.73	50	40	0.78	2	19.4
PS0010792	BX94P26-12	+	2.5	-	54	83	16	2	35	25	0.76	47	42	0.85	3	24.5
SW98692(PRO)	.....	..	2.9	-	51	82	15	2	34	25	0.76	47	43	0.92	4	19.1
Toledo	.....	..	3.1	-	52	79	17	2	36	29	0.79	48	44	0.91	4	22.4
Cruiser	.....	+	3.3	-	52	80	17	2	36	28	0.75	50	44	0.88	4	19.2
PS710048	X92P202	+/-	2.7	-	55	81	15	2	32	21	0.68	41	36	0.91	2	20.5
Columbian(LOT I)	.....	+	3.0	-	41	82	10	1	32	6	0.14	70	23	0.28	4	18.8
Hero	.....	+	3.0	-	53	81	16	2	28	25	0.84	40	34	0.89	3	20.4
PS0010128	X95P768	+/-	2.6	-	55	81	16	2	33	25	0.77	45	36	0.80	2	20.6
PS9910346	X93P123	+	3.0	-	47	80	12	2	28	21	0.78	43	35	0.83	3	19.2
CEB-1170	.....	+	3.2	-	53	84	16	2	36	27	0.74	53	45	0.78	5	26.9
Franklin	X93P046	+	2.9	-	54	79	14	2	25	11	0.42	35	23	0.67	3	18.8
PS00101215	SH91-119-5-1-2	+/-	3.2	-	48	79	15	2	35	22	0.59	46	39	0.86	3	22.5

Table 2. Agronomic Data for the Advanced Green Dry Pea Yield Trial, 2003 (0301) Continued.

Page 2 of 2

Cultivar	Origin	FW	Aphano- myces	PEMV	Mean Days to Flower	Days to Maturity	Nodes to First Flower	Pods/ Peduncle	Mean Pod Ht (green) ..cm..	Mean Pod Ht (mature) ..cm..	Mean Pod Ht Index	Mean Plant Ht (green) ..cm..	Mean Plant Ht (mature) ..cm..	Mean Plant Ht Index	Rep Nodes	Weight 100 Seed ..g..
Grand Mean			3.0		52	82	15	2	26	23	0.69	47	37	0.82	3	21.0
C.V. (%)			17		2	1	7	7	12	18	19	7	11	12	19	
LSD ($\alpha=0.05$)			0.7		1	1	1	0	4	4	0	3	4	0	1	

FW = Fusarium wilt race 1; + = resistant, - = susceptible.

Aphanomyces = Aphanomyces root rot; 1 = no symptoms, 2 = 20% of lower leaves symptomatic, 3 = 50% of leave symptomatic and plant stunted, 4 = 80% of leaves symptomatic and plant stunted, 5 = all plants dead.

PEMV = Pea enation mosaic virus, + = resistant, - = susceptible.

Pod height was measured at the green pod stage and at harvest maturity. Pod height index was determined by dividing pod height at harvest maturity by the green pod height.

Plant height was measured at the green plant stage and at harvest maturity. Plant height index was determined by dividing plant height at harvest maturity by the green plant height.

Agronomic data are means of three replications at Pullman, WA. Means data are means of three replication over 3 locations; Fairfield, Genesee and Pullman.

Table 3. Mean Yields (kg/ha) from Advanced Green Dry Pea Yield Trial 1999-2003

Cultivar	Origin	Leaf Type	Plant Type	1999	2000	2001	2002	2003
Bluebird	.....	-	-	2392	1891	2893	2083	1829
CEB-1090	.....	-	-	....	....	....	....	1820
Camry (CEB-1080)	.....	-	-	....	....	....	....	1801
PS9910592	X95P122	-	-	....	....	....	1928	1797
Stratus (CEB-1171)	.....	-	-	....	....	3059	2198	1771
CDC-Verdi	.....	-	-	....	....	2453	1980	1769
Cooper (CEB-1081)	.....	-	-	....	....	....	....	1714
Ariel	.....	-	-	1859	1476	2462	1911	1714
PS0010804	BX94P64-11	-	-	....	....	....	....	1709
Karita	.....	-	-	....	1698	2544	2052	1699
PS0010902	SH95-58-1	-	+	....	....	....	....	1698
PS810162	X94P058	-	-	....	....	2521	1993	1691
PRO-98106	.....	-	-	....	....	2534	1964	1681
Stirling	X93P022	-	-	2209	1792	2625	2025	1657
PS810191	X94P164	-	-	....	....	2627	2046	1643
Joel	X84F172	+	+	2072	1650	2375	1908	1626
Lifter	X93P045	-	+	2214	1983	2381	1938	1616
PS810240	X94P106	-	-	....	....	2532	2056	1606
PS0010792	BX94P26-12	-	+	....	....	....	....	1563
SW98692(PRO)	.....	-	-	....	....	....	....	1553
Toledo	.....	-	-	1639	1623	2559	1644	1548
Cruiser	.....	-	-	....	1527	2518	1890	1501
PS710048	X92P202	-	-	....	1513	2634	1910	1491
Columbian(LOT I)	.....	+	+	....	....	....	1728	1436
Hero	.....	-	-	2108	1983	2538	2007	1405
PS0010128	X95P768	-	+	....	....	....	....	1346
PS9910346	X93P123	-	-	....	....	....	1955	1346
CEB-1170	.....	-	-	2093	1504	2530	1755	1262
Franklin	X93P046	-	+	1988	1686	2049	1733	1180
PS00101215	SH91-119-5-1-2	-	+	....	....	....	....	1130
Grand Mean				1937	1646	2477	1850	1587
LSD ($\alpha=0.05$)				177	152	152	159	128

Leaf type; + = normal leaf, - = *afila* or semileafless type. Plant type; + = tall plant type, - = short plant type.

Yield data are means of three replications at each of the four locations.

Table 4. Agronomic Data for the Preliminary Green Dry Pea Yield Trial, 2003 (0303)

Cultivar	Origin	Leaf Type	Plant Type	FW	PM	Aphano- myces	PEMV	Days to Flower	Days to Maturity	Nodes to First Flower	Pod Ht (green) ..cm..	Pod Ht (mature) ..cm..	Pod Ht Index	Plant Ht (green) ..cm..	Plant Ht (mature) ..cm..	Plant Ht Index	Rep Nodes	Weight 100 Seed ..g..	Seed Yield ..kg/ha..
PS0110767	X98P022	-	-	+	..	2.9	-	52	82	17	43	24	0.79	54	37	0.85	3	20.8	2257
PS0110947	X98P197	-	-	-	..	3.8	-	55	82	16	37	23	0.84	48	34	0.82	2	19.2	2128
PS0110950	X98P197	-	-	-	..	3.8	-	54	84	15	33	33	0.97	46	46	0.97	3	18.9	2090
PS01101386	X98P112	-	-	+	..	3.4	-	55	83	15	35	39	0.95	46	44	0.88	3	23.6	2049
PS0110537	BX96P32-13	+	-	+	..	3.2	-	52	75	14	45	24	0.60	56	41	0.79	3	24.2	2043
PS0110459	BX97P9-6	-	-	+	+	4.0	-	53	82	14	30	32	0.83	40	40	0.86	4	22.0	2014
PS0110926	X98P192	-	-	-	..	3.5	-	56	86	16	38	23	0.65	56	37	0.61	4	17.2	2004
PS0110461	BX97P9-6	-	-	+	..	3.8	-	53	84	14	31	25	0.67	41	39	0.84	4	22.7	1995
PS0110762	X98P021	-	-	+/-	..	2.8	-	52	81	16	47	30	0.76	62	46	0.78	3	19.6	1925
PS0110682	X98P010	-	-	+	..	3.5	-	54	82	14	29	21	1.00	45	31	0.94	3	19.2	1923
PS0110851	X98P032	-	-	+	..	3.5	-	54	83	15	39	35	0.79	48	47	0.87	2	16.5	1914
PS0110060	BX97P16	-	-	+	..	3.6	-	54	83	17	39	29	0.86	50	46	0.94	3	20.3	1911
PS0110539	BX96P32-13	+	-	+	+	3.2	-	53	86	15	43	30	0.61	52	42	0.81	5	25.1	1906
PS0110904	X98P041	-	-	+/-	..	3.7	-	53	81	17	37	27	0.73	48	37	0.69	4	20.0	1880
PS0110864	X98P035	-	-	+	..	3.8	+	55	84	14	32	25	0.65	42	34	0.78	3	19.3	1875
PS0110460	BX97P9-6	-	-	+	..	3.2	-	53	82	14	29	32	0.95	40	42	0.94	3	22.2	1869
PS0110756	X98P021	-	-	+/-	..	3.6	-	55	85	17	32	38	1.00	48	46	0.97	3	18.5	1869
PS0110745	X98P020	-	-	+	..	3.5	-	52	82	15	34	34	0.85	46	46	0.91	3	18.9	1853
PS0110716	X98P015	-	-	+	..	3.8	-	53	81	14	22	13	0.90	35	25	0.96	3	18.6	1847
Stirling	X93P022	-	-	+	..	3.5	-	52	84	13	32	28	0.88	49	45	0.79	4	19.3	1846
PS0110786	X98P024	-	-	+	..	3.4	-	53	82	17	48	43	0.87	60	54	0.89	3	19.8	1843
Joel	X84F172	+	+	+	..	3.5	-	46	81	13	61	18	0.29	87	44	0.49	4	21.0	1836
PS0110677	X98P007	-	-	+	+	3.1	-	48	80	15	35	19	0.58	51	33	0.71	4	20.2	1833
PS0110753	X98P021	-	-	+/-	+	3.8	-	55	85	18	47	31	0.43	62	45	0.74	4	19.1	1831
PS0110827	X98P026	-	-	+/-	..	3.7	-	53	82	17	52	40	0.82	63	50	0.87	4	21.8	1817
PS0110797	X98P024	-	-	+	..	3.6	-	55	82	18	49	38	0.95	61	55	0.98	3	18.3	1800
Columbian(Lot I)	.....	+	+	+	+	3.9	-	39	83	9	37	0	0.00	83	25	0.42	6	19.5	1793
PS0110815	X98P025	-	-	+	..	3.7	-	55	84	16	41	39	0.85	51	53	0.97	3	18.2	1771
PS0110805	X98P025	-	-	+	..	3.4	-	55	85	19	51	48	0.97	64	59	0.95	3	19.0	1761
PS0110671	X98P006	-	-	+	..	3.4	-	54	80	18	41	39	0.87	52	48	0.87	3	21.3	1734
Lifter	X93P045	+	-	+	..	2.8	+	56	88	14	45	6	0.26	70	27	0.37	5	20.2	1711

Table 4. Agronomic Data for the Preliminary Green Dry Pea Yield Trial, 2003 (0303) Continued

Page 2 of 2

Cultivar	Origin	Leaf Plant		FW	PM	Aphano- myces	PEMV	Days to Flower	Days to Maturity	Nodes to First Flower	Pod Ht	Pod Ht	Pod Ht	Plant Ht	Plant Ht	Plant Ht	Rep Nodes	Weight 100	Seed Yield									
		Type	Type								(green)	(mature)	Index	(green)	(mature)	Index		Seed										
												..cm..	..cm..			..cm..		..cm..		..g..	..kg/ha..							
Franklin	X93P046	+	-	+	..	3.7	+	55	83	15	32	1	0.27	42	13	0.44	3	19.2	1685									
PS0110807	X98P025	-	-	+	..	3.5	-	53	82	16	43	34	0.85	53	44	0.90	3	20.0	1669									
PS0110795	X98P024	-	-	+	..	3.0	-	49	80	15	45	40	0.91	64	65	0.97	4	19.9	1604									
PS01102902	X95P768	+	-	-	..	3.1	-	57	85	18	46	44	0.73	57	48	0.76	3	19.9	1547									
PS0110778	X98P023	-	-	-	..	2.8	-	52	81	16	41	32	0.74	60	49	0.85	5	17.8	1537									
Grand Mean						3.5		53	83	15	39	29	0.75	54	42	0.81	3	20.0	1860									
C.V. (%)						11		1	3	5	8	22	23	10	13	15	19		7									
LSD ($\alpha=0.05$)						1		1	3	1	4	9	0	7	7	0	1		180									

Planting date 5/1/03. Harvest date 7/31/03.

FW = Fusarium wilt race 1; + = resistant, - = susceptible. PM = Powdery mildew; + = susceptible, - = resistant.

Aphanomyces = Aphanomyces root rot; 1 = no symptoms, 2 = 20% of lower leaves symptomatic, 3 = 50% of leaves symptomatic and plant stunted, 4 = 80% of leaves symptomatic and plant stunted, 5 = all plants dead.

PEMV = Pea enation mosaic virus, + = resistant, - = susceptible.

Pod height was measured at the green pod stage and at harvest maturity. Pod height index was determined by dividing pod height at harvest maturity by the green pod height.

Plant height was measured at the green plant stage and at harvest maturity. Plant height index was determined by dividing plant height at harvest maturity by the green plant height.

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

Marrowfat Pea Trial Results

Development of marrowfat pea germplasm with large seed size and durable dark green color has been progressing. This past year 8 experimental lines were compared to three commercial check lines, 'Guido' and 'Supra' at Pullman, Fairfield and Walla Walla, WA and at Genesee, ID (Table 5). PS710909 was the highest yielding breeding line and yielded approximately equal to the checks. All breeding lines had excellent seed quality and maintained moderate upright growth despite a conventional leaf type (Table 6). Significant emphasis has been placed on converting the marrowfat germplasm to a semi-leafless type to reduce lodging.

Several experimental lines have been advanced from early generation trials into the advanced yield trial for additional testing. These lines will be evaluated in large replicated trials at multiple sites during the 2004 field season. Early generation breeding material will continue to be advanced in the greenhouse and field and selected for improved seed characteristics, upright plant type and multiple disease resistance.

Table 5. Location Yield Summary (kg/ha) for the Advanced Marrowfat Dry Pea Yield Trial, 2003 (0333)

Cultivar	Origin	Leaf Type	Plant Type	Fairfield	Genesee	Pullman	Walla Walla	Mean Seed Yield
Supra	.....	-	-	1179	892	1233	1031	1084
PS710909	X95P017	+	-	966	874	1242	913	999
Guido	.....	+	-	1019	595	1312	995	980
PS9101380	X95P554	+	-	606	749	1051	919	831
PS99101429	X95P560	+	-	661	459	961	930	753
PS99101381	X95P554	+	-	583	436	798	783	650
PS0010408	X95P272	+	-	486	448	674	901	627
PS99101364	X95P554	+	-	445	466	743	842	624
PS0010545	X95P554	+	-	567	366	712	748	598
PS9101365	X95P554	+	-	358	378	759	786	570
Grand Mean				687	566	948	885	771
C.V. (%)				22	10	7	16	14
LSD ($\alpha=0.05$)				210	78	97	195	90
Planting Date				4/28/03	4/21/03	5/1/03	4/29/03	
Harvest Date				8/5/03	7/24/03	7/30/03	7/24/03	

Leaf type; + = normal leaf, - = *afila* or semileafless type. Plant type; + = tall plant type, - = short plant type.
Yield data are means of three replications at each of the four locations.

Table 6. Agronomic Data for the Advanced Marrowfat Dry Pea Yield Trial, 2003 (0333)

Cultivar	Origin	FW	PM	Aphano- myces	PEMV	Days to Flower	Days to Maturity	Nodes to First Flower	Pods/ Peduncle	Mean Pod Ht (green) ..cm..	Mean Pod Ht (mature) ..cm..	Mean Pod Ht Index	Mean Plant Ht (green) ..cm..	Mean Plant Ht (mature) ..cm..	Mean Plant Ht Index	Rep Nodes	Weight 100 Seed ..g..
Supra	.....	+	+	4.1	-	54	85	14	2	27	24	0.89	39	39	0.96	3	31.8
PS710909	X95P017	+	..	3.9	-	52	83	14	2	24	16	0.64	33	29	0.87	3	28.5
Guido	.....	+	+	3.9	-	54	85	14	2	26	18	0.70	37	32	0.84	3	33.3
PS9101380	X95P554	+	..	3.8	-	49	83	14	2	28	19	0.71	38	33	0.84	2	27.7
PS99101429	X95P560	+	..	4.3	-	50	83	14	2	24	17	0.76	32	30	0.92	3	28.1
PS99101381	X95P554	+	..	4.0	-	49	83	15	2	28	19	0.67	39	35	0.84	3	29.4
PS0010408	X95P272	+	..	4.3	-	49	83	15	2	23	17	0.71	33	28	0.87	2	29.1
PS99101364	X95P554	+	..	3.8	-	49	84	14	2	27	19	0.73	36	31	0.84	2	30.1
PS0010545	X95P554	+	..	4.4	-	50	83	14	2	26	21	0.81	36	32	0.89	3	28.7
PS9101365	X95P554	+	..	4.6	-	49	83	14	2	26	20	0.78	38	33	0.87	3	29.0
Grand Mean				4.1		51	83	14	2	26	19	0.74	36	32	0.88	3	29.6
C.V. (%)				11		1	1	4		7	17	20	8	9	10	18	
LSD ($\alpha=0.05$)				1		1	1	1		2	3	0	3	4	0	1	

FW = Fusarium wilt race 1; + = resistant, - = susceptible. PM = Powdery mildew; + = susceptible, - = resistant.

Aphanomyces = Aphanomyces root rot; 1 = no symptoms, 2 = 20% of lower leaves symptomatic, 3 = 50% of leave symptomatic and plant stunted, 4 = 80% of leaves symptomatic and plant stunted, 5 = all plants dead.

PEMV = Pea enation mosaic virus, + = resistant, - = susceptible.

Pod height was measured at the green pod stage and at harvest maturity. Pod height index was determined by dividing pod height at harvest maturity by the green pod height.

Plant height was measured at the green plant stage and at harvest maturity. Plant height index was determined by dividing plant height at harvest maturity by the green plant height.

Agronomic data are means of three replications at Pullman, WA. Means data are means of three replications over 3 locations; Fairfield, Genesee and Pullman. Plant height mature and Plant height index are means of three replications over 2 locations; Fairfield and Pullman.

Table 7. Mean Yields (kg/ha) from Advanced Marrowfat Dry Pea Yield Trial 1999-2003

Cultivar	Origin	Leaf Type	Plant Type	1999	2000	2001	2002	2003
Supra	.....	-	-	1808	1326	2074	1712	1084
PS710909	X95P017	+	-	....	1396	1614	1513	999
Guido	.....	+	-	....	1358	2192	1638	980
PS9101380	X95P554	+	-	....	....	1742	1460	831
PS99101429	X95P560	+	-	....	....	....	1433	753
PS99101381	X95P554	+	-	....	....	....	1459	650
PS0010408	X95P272	+	-	....	....	....	....	627
PS99101364	X95P554	+	-	....	....	....	1386	624
PS0010545	X95P554	+	-	....	....	....	....	598
PS9101365	X95P554	+	-	....	....	1611	1459	570
Grand Mean				1858	1376	1864	1365	771
LSD ($\alpha=0.05$)				172	111	109	109	90

Leaf type; + = normal leaf, - = *afila* or semileafless type. Plant type; + = tall plant type, - = short plant type.

Yield data are means of three replications at each of the four locations.

Table 8. Agronomic Data from the Preliminary Yellow and Marrowfat Dry Pea Yield Trial, 2003 (0304)

Page 1 of 2

Cultivar	Origin	Leaf Type	Plant Type	FW	PM	Aphano- myces	PEMV	Days to Flower	Days to Maturity	Nodes to First Flower	Pod Ht	Pod Ht	Pod Ht	Plant Ht	Plant Ht	Plant Ht	Rep Nodes	Weight 100 Seed	Seed Yield
											(green)	(mature)	Index	(green)	(mature)	Index			
											..cm..	..cm..		..cm..	..cm..			..g..	..kg/ha..
Fallon	X87F061	-	-	+	..	3.8	-	53	85	16	40	35	0.85	55	47	0.85	3	21.8	2690
PS0110181	BXM94P18-3	-	-	+	+	3.8	-	53	82	14	32	23	0.71	42	37	0.92	3	22.8	2524
PS01103450	X99P005	-	-	+	+	3.9	-	54	83	16	38	16	0.41	51	25	0.53	2	25.3	2494
PS01103430	X96P138	-	-	+	-	4.1	-	58	88	17	43	23	0.57	56	38	0.67	4	24.9	2337
Midas	.....	-	-	+	..	3.8	-	56	83	17	46	40	0.86	55	57	1.00	3	19.1	2283
Delta	.....	-	-	+	..	4.1	-	53	81	18	40	34	0.81	51	49	0.92	3	19.7	2204
PS0110125	BXM95P9-72	-	-	+	+	4.2	-	55	81	16	37	28	0.75	47	42	0.87	2	26.3	2198
PS0110135	BXM95P18-1	+	-	-	..	4.0	-	52	80	15	50	20	0.37	65	39	0.61	3	20.3	2160
PS0110519	BX97P2-67	-	-	+/-	..	3.6	-	52	83	14	39	38	0.94	55	54	0.98	4	19.7	2120
PS0110131	BXM95P13-4	+	-	-	+	4.0	-	49	81	15	35	23	0.68	47	34	0.76	3	26.7	2078
PS01102958	X96P124	-	-	+	-	4.5	-	55	82	16	37	27	0.74	48	45	0.92	4	22.8	2066
PS0110050	BX97P13-1	+	-	+	+	3.8	-	49	80	15	33	12	0.39	43	29	0.65	3	20.8	1945
PS0110611	BX96P31-13	-	-	+	..	3.9	-	52	81	16	45	37	0.79	61	59	0.93	5	22.0	1908
CEB-2027	.....	-	-	+	-	3.7	-	55	88	16	34	30	0.89	44	46	0.98	4	30.5	1903
PS0110665	BX92P125-2	+	-	-	+	4.2	-	49	81	13	36	31	0.86	49	44	0.93	2	23.6	1902
PS0110612	BX96P31-13	-	-	+	+	4.0	-	52	82	16	41	38	0.96	57	63	1.00	5	22.8	1890
PS0110123	BXM95P9-21	-	-	+	+	3.4	-	51	83	14	44	24	0.57	59	33	0.59	3	25.3	1873
PS0110663	BX94P88-47	-	-	-	..	3.8	-	52	82	17	64	28	0.39	83	58	0.72	4	21.6	1826
PS01101501	X98P088	-	-	+	+	3.8	-	57	85	15	40	43	1.00	52	56	1.00	3	19.3	1764
Big-Daddy	.....	-	-	+	+	3.7	-	53	85	13	34	29	0.88	46	48	1.00	3	33.6	1760
PS0110141	BXM95P24-1	-	-	+	+	3.9	-	53	83	14	29	20	0.67	41	36	0.96	3	23.6	1721
Guido	.....	+	-	+	+	4.0	-	55	87	14	31	27	0.92	40	40	0.95	2	33.3	1715
Supra	.....	-	-	+	+	3.8	-	54	86	13	36	30	0.84	53	49	0.91	4	31.5	1683
PS01101287	X95P555	+	-	+	..	3.9	-	53	84	14	27	9	0.33	38	22	0.59	3	31.7	1637
PS01101328	X95P590	+	-	+	..	3.7	-	49	85	15	35	12	0.37	47	25	0.54	3	30.0	1350
PS01101063	X95P055	+	-	+	+	3.6	-	53	85	14	27	17	0.65	38	28	0.75	2	31.6	1320
PS01102929	X95P014	+	-	+	..	4.4	+	47	82	14	29	11	0.44	39	26	0.72	2	29.3	1222
PS01101184	X95P329	+	-	+	+	3.7	-	53	88	15	27	20	0.71	37	24	0.70	3	31.1	1009

Table 8. Agronomic Data from the Preliminary Yellow and Marrowfat Dry Pea Yield Trial, 2003 (0304) Continued

Page 2 of 2

Cultivar	Origin	Leaf Type	Plant Type	FW	PM	Aphanomyces	PEMV	Days to Flower	Days to Maturity	Nodes to First Flower	Pod Ht (green) ..cm..	Pod Ht (mature) ..cm..	Pod Ht Index	Plant Ht (green) ..cm..	Plant Ht (mature) ..cm..	Plant Ht Index	Rep Nodes	Weight 100 Seed ..g..	Seed Yield ..kg/ha..
Grand Mean						3.9		53	83	15	38	26	0.69	50	41	0.82	3	25.4	1913
C.V. (%)						9.4		2	2	5	7	17	18	6	12	11	14		8
LSD ($\alpha=0.05$)						0.5		1	2	1	3	6	0	4	7	0	1		219

Planting date 5/1/03. Harvest date 7/31/03.

FW = Fusarium wilt race 1; + = resistant, - = susceptible. PM = Powdery mildew; + = susceptible, - = resistant.

Aphanomyces = Aphanomyces root rot; 1 = no symptoms, 2 = 20% of lower leaves symptomatic, 3 = 50% of leave symptomatic and plant stunted, 4 = 80% of leaves symptomatic and plant stunted, 5 = all plants dead.

PEMV = Pea enation mosaic virus, + = resistant, - = susceptible.

Pod height was measured at the green pod stage and at harvest maturity. Pod height index was determined by dividing pod height at harvest maturity by the green pod height.

Plant height was measured at the green plant stage and at harvest maturity. Plant height index was determined by dividing plant height at harvest maturity by the green plant height.

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

Yellow Pea Trial Results

The advanced yellow pea yield trial was grown at Pullman, Fairfield and Walla Walla, WA, and at Genesee, ID (Table 9). The trial contained six experimental lines and 12 checks. 'Fallon', a past release from the USDA breeding program, was the highest yielding line in the 2003 trials. Three breeding lines, PS0010836, PS9910188 and PS9910140, were the highest yielding selections in the trials and ranked 2, 3 and 4 respectively. The trial mean was 1651 kg/ha while the mean of these three breeding lines was 1792 kg/ha. It is the goal of the breeding program to release an improved yellow cotyledon dry pea in the next year or two.

The plant type of the yellow pea breeding lines has been successfully converted to one with semi-leafless morphology and semi-dwarf plant type. These characters together have improved standing ability and resulted in improved plant height index ranging from 0.82 to 0.98 (Table 10). This is a significant improvement over previous years.

Table 9. Location Yield Summary (kg/ha) for the Advanced Yellow Dry Pea Yield Trial, 2003 (0302)

Cultivar	Origin	Leaf Type	Plant Type	Fairfield	Genesee	Pullman	Walla Walla	Mean Seed Yield
Fallon	X87F061	-	-	2129	1845	1810	1543	1831
PS0010836	SH95-6-1	-	-	1923	1993	1635	1666	1804
PS9910188	X94P161	-	-	1827	1880	1905	1568	1795
PS9910140	X92P303	-	-	1985	1963	1975	1195	1779
Topeka (CEB-1489)	.....	-	-	1880	1867	1806	1491	1761
Universal	.....	-	-	1884	1850	1696	1524	1739
Midas	.....	-	-	1820	1763	1668	1456	1677
CDC-Mozart	.....	-	-	1852	1786	1703	1349	1673
PS0010993	SH94-77-2-4-4	-	-	2036	1485	1748	1377	1662
SW995848 (PRO)	.....	-	-	1911	1582	1746	1405	1661
Rex	.....	+	-	1968	1533	1697	1419	1654
Delta	.....	-	-	1793	1624	1585	1555	1639
Eiffel	.....	-	-	1863	1623	1439	1420	1586
Badminton	.....	-	-	1742	1540	1749	1311	1585
PS0010806	X94P81-2	-	-	1822	1693	1567	1190	1568
Swing	.....	-	-	1749	1402	1542	1297	1497
CEB-1484	.....	-	-	1745	1413	1354	1343	1464
PS0010946	SH94-37-2-6-4	-	-	1679	999	1536	1173	1347
Grand Mean				1867	1658	1676	1405	1651
C.V. (%)				4	8	5	10	7
LSD ($\alpha=0.05$)				98	185	111	204	91
Planting Date				4/28/03	4/21/03	5/1/03	4/29/03	
Harvest Date				8/5/03	7/24/03	7/31/03	7/24/03	

Leaf type; + = normal leaf, - = *afila* or semi leafless type. Plant type; + = tall plant type, - = short plant type.

Yield data are means of three replications at each of the four locations.

Table 10. Agronomic Data for the Advanced Yellow Dry Pea Yield Trial, 2003 (0302)

Cultivar	Origin	FW	Aphano- myces	PEMV	Days to Flower	Days to Maturity	Nodes to First Flower	Pods/ Peduncle	Mean Pod Ht (green) ..cm..	Mean Pod Ht (mature) ..cm..	Mean Pod Ht Index	Mean Plant Ht (green) ..cm..	Mean Plant Ht (mature) ..cm..	Mean Plant Ht Index	Rep Nodes	Weight 100 Seed ..g..
Fallon	X87F061	+	3.2	-	52	81	16	2	33	23	0.73	45	39	0.91	3	21.6
PS0010836	SH95-6-1	+	3.4	-	54	80	14	2	28	23	0.82	39	36	0.93	3	22.2
PS9910188	X94P161	+	3.7	-	53	81	15	2	30	23	0.73	43	37	0.84	3	24.4
PS9910140	X92P303	+	3.3	-	54	81	16	2	30	20	0.61	43	35	0.82	3	20.3
Topeka (CEB-1489)	.....	+	3.5	-	54	80	15	2	27	22	0.78	39	34	0.93	3	21.8
Universal	.....	+/-	3.5	-	51	80	16	2	36	29	0.79	48	46	0.92	3	19.8
Midas	.....	+	3.5	-	55	81	17	2	37	30	0.77	49	44	0.89	3	18.5
CDC-Mozart	.....	+	2.6	-	54	81	15	2	29	23	0.76	41	40	0.90	3	20.3
PS0010993	SH94-77-2-4-4	+	2.9	-	54	79	17	2	34	29	0.87	43	39	0.94	2	20.9
SW995848 (PRO)	.....	..	3.3	-	54	84	19	2	42	34	0.81	51	48	0.95	3	22.2
Rex	.....	-	3.5	-	52	80	15	2	34	23	0.71	50	40	0.85	3	23.1
Delta	.....	+	3.3	-	53	78	16	2	32	26	0.80	43	39	0.87	3	19.9
Eiffel	.....	-	3.1	-	49	79	14	2	34	29	0.86	47	45	0.96	3	23.5
Badminton	.....	+	3.5	-	54	80	14	2	25	22	0.88	39	35	0.89	3	20.9
PS0010806	X94P81-2	+	2.6	-	53	84	14	2	30	23	0.74	44	38	0.87	4	23.6
Swing	.....	+	4.1	-	52	79	15	2	35	29	0.82	52	47	0.92	4	21.3
CEB-1484	.....	+	3.6	-	53	80	13	2	30	24	0.84	43	40	0.97	4	20.1
PS0010946	SH94-37-2-6-4	+	3.2	-	53	81	15	2	41	36	0.89	57	54	0.98	4	21.8
Grand Mean			3.3		53	80	15	2	33	26	0.79	45	41	0.91	3	21.5
C.V. (%)			13		1	1	7	7	9	17	18	8	11	11	17	
LSD ($\alpha=0.05$)			1		1	2	2	0	3	4	0	3	4	0	1	

FW = Fusarium wilt race 1; + = resistant, - = susceptible. PM = Powdery mildew; + = susceptible, - = resistant.

Aphanomyces = Aphanomyces root rot; 1 = no symptoms, 2 = 20% of lower leaves symptomatic, 3 = 50% of leave symptomatic and plant stunted, 4 = 80% of leaves symptomatic and plant stunted, 5 = all plants dead.

PEMV = Pea enation mosaic virus, + = resistant, - = susceptible.

Pod height was measured at the green pod stage and at harvest maturity. Pod height index was determined by dividing pod height at harvest maturity by the green pod height.

Plant height was measured at the green plant stage and at harvest maturity. Plant height index was determined by dividing plant height at harvest maturity by the green plant height.

Agronomic data are means of three replications at Pullman, WA. Means data are means of three replication over 3 locations; Fairfield, Genesee and Pullman.

Table 11. Mean Yields (kg/ha) from Advanced Yellow Dry Pea Yield Trial 1999-2003

Cultivar	Origin	Leaf Type	Plant Type	1999	2000	2001	2002	2003
Fallon	X87F061	-	-	2432	1758	2807	2073	1831
PS0010836	SH95-6-1	-	-	....	....	....	....	1804
PS9910188	X94P161	-	-	....	....	....	2292	1795
PS9910140	X92P303	-	-	....	....	....	2218	1779
Topeka (CEB-1489)	.....	-	-	....	....	3164	2295	1761
Universal	.....	-	-	....	....	....	1885	1739
Midas	.....	-	-	....	....	....	2249	1677
CDC-Mozart	.....	-	-	....	1989	2876	2129	1673
PS0010993	SH94-77-2-4-4	-	-	....	....	....	....	1662
SW995848 (PRO)	.....	-	-	....	....	....	....	1661
Rex	.....	+	-	2026	1487	2740	2020	1654
Delta	.....	-	-	2181	1322	2870	2272	1639
Eiffel	.....	-	-	....	....	....	2248	1586
Badminton	.....	-	-	2287	1694	3000	2214	1585
PS0010806	X94P81-2	-	-	....	....	....	....	1568
Swing	.....	-	-	1922	1529	2789	2077	1497
CEB-1484	.....	-	-	....	....	2905	2158	1464
PS0010946	SH94-37-2-6-4	-	-	....	....	....	....	1347
Grand Mean				2142	1605	2754	2048	1651
LSD ($\alpha=0.05$)				203	159	179	112	91

Leaf type; + = normal leaf, - = *afila* or semileafless type. Plant type; + = tall plant type, - = short plant type.

Yield data are means of three replications at each of the four locations.

Table 12. Agronomic Data from the Preliminary Green, Yellow and Marrowfat Dry Pea Observation Trial, 2003 (0305)

Cultivar	Origin	Leaf Type	Plant Type	Days to Flower	Days to Maturity	Nodes to First Flower	Pod/ Peduncle	Pod Ht (green) ..cm..	Pod Ht (mature) ..cm..	Pod Ht Index	Plant Ht (green) ..cm..	Plant Ht (mature) ..cm..	Plant Ht Index	Rep Nodes	Weight 100 Seed ..g..	Seed Yield ..kg/ha..
Green Cots																
PS02100093	X98P020	-	-	54	85	17	2	42	32	0.76	54	56	1.00	4	20.3	2230
PS02100040	X98P010	-	-	54	88	16	2	36	33	0.92	51	51	1.00	4	19.5	2035
PS02100090	X98P020	-	-	52	80	15	2	37	28	0.76	49	49	1.00	3	18.7	1979
PS02100151	X98P025	-	-	56	81	17	2	44	37	0.84	55	54	0.98	4	17.8	1771
PS02100121	X98P024	-	-	55	82	17	2	39	36	0.92	51	55	1.00	3	16.4	1739
PS02100120	X98P024	-	-	52	79	15	2	37	33	0.89	48	50	1.00	2	16.9	1685
PS02100084	X98P017	-	-	50	78	16	2	39	36	0.92	50	55	1.00	3	20.6	1642
PS02100078	X98P016	-	-	52	79	15	2	30	35	1.00	42	47	1.00	3	20.7	1635
PS02100111	X98P023	-	-	55	79	16	2	33	36	1.00	42	47	1.00	2	17.4	1605
PS02100026	X98P006	-	-	54	83	17	2	39	36	0.92	55	48	0.87	4	21.1	1526
PS02100135	X98P024	-	-	52	..	23	2	35	..	....	40	..	....	3	17.6	1519
PS02100225	X99P235	-	-	52	83	12	2	25	30	1.00	36	42	1.00	3	23.0	1465
PS02100194	X98P197	-	-	53	81	16	2	40	31	0.78	49	46	0.94	2	18.6	1450
PS02100148	X98P025	-	-	53	79	15	2	31	32	1.00	41	45	1.00	2	17.3	1442
PS02100117	X98P023	-	-	50	78	15	2	29	28	0.97	40	43	1.00	2	18.8	1435
PS02100140	X98P025	-	-	52	78	16	2	32	28	0.88	44	44	1.00	2	18.2	1433
PS02100074	X98P015	-	-	52	80	15	2	34	29	0.85	45	46	1.00	2	19.5	1395
PS02100229	X99P235	-	-	55	85	17	2	38	27	0.71	45	48	1.00	3	21.4	1391
PS02100107	X98P022	-	-	52	78	16	2	31	22	0.71	38	38	1.00	2	17.5	1388
PS02100155	X98P025	-	-	50	82	15	2	43	36	0.84	65	58	0.89	5	20.7	1373
PS02100129	X98P024	-	-	53	78	17	2	36	..	....	50	..	....	2	20.9	1354
PS02100128	X98P024	-	-	54	78	18	2	44	34	0.77	54	51	0.94	3	16.2	1342
PS02100240	X99P240	-	-	53	82	15	2	30	19	0.63	36	45	1.00	2	23.9	1329
PS02100219	X99P231	-	-	55	84	18	2	49	42	0.86	60	57	0.95	3	23.1	1324
PS02100022	X98P006	-	-	52	78	16	2	30	28	0.93	42	45	1.00	3	19.4	1316
PS02100119	X98P024	-	-	52	81	16	2	41	42	1.00	49	54	1.00	2	17.8	1292
PS02100014	X98P005	-	-	48	79	14	2	35	28	0.80	46	44	0.96	3	19.8	1253
PS02100062	X98P014	-	-	49	79	13	2	32	33	1.00	39	45	1.00	2	17.7	1228
PS02100016	X98P005	-	-	53	78	16	2	36	36	1.00	46	48	1.00	2	20.1	1225
PS02100015	X98P005	-	-	52	78	16	2	31	30	0.97	39	43	1.00	2	17.9	1223
PS02100057	X98P013	-	-	52	78	16	2	33	33	1.00	43	49	1.00	3	17.2	1171
PS02100098	X98P021	-	-	52	78	16	2	33	36	1.00	44	42	0.95	2	18.0	1163
PS02100095	X98P020	-	-	49	78	16	2	32	29	0.91	41	41	1.00	3	16.7	1119

Table 12. Agronomic Data from the Preliminary Green, Yellow and Marrowfat Dry Pea Observation Trial, 2003 (0305)

Page 2 of 5

Cultivar	Origin	Leaf Type	Plant Type	Days to Flower	Days to Maturity	Nodes to First Flower	Pod/ Peduncle	Pod Ht (green) ..cm..	Pod Ht (mature) ..cm..	Pod Ht Index	Plant Ht (green) ..cm..	Plant Ht (mature) ..cm..	Plant Ht Index	Rep Nodes	Weight 100 Seed ..g..	Seed Yield ..kg/ha..
PS02100195	X98P197	-	-	54	79	15	2	33	33	1.00	47	43	0.91	3	17.9	1095
PS02100046	X98P012	-	-	52	78	15	2	28	18	0.64	35	36	1.00	3	17.6	1057
PS02100025	X98P006	-	-	54	81	17	2	33	33	1.00	42	37	0.88	3	19.4	998
PS02100215	X99P230	-	-	51	80	14	2	30	22	0.73	41	43	1.00	3	23.0	976
PS02100050	X98P013	-	-	50	78	16	2	37	29	0.78	44	43	0.98	3	17.2	948
PS02100213	X99P230	-	-	49	78	14	2	30	30	1.00	45	44	0.98	3	24.5	948
PS02100224	X99P235	-	-	49	81	16	2	39	30	0.77	51	45	0.88	3	23.5	833
PS02100206	X99P228	-	-	54	85	19	2	49	31	0.63	59	52	0.88	2	21.3	738
PS02100024	X98P006	-	-	49	78	15	2	36	29	0.81	42	40	0.95	2	19.7	536
<i>Sub-mean Green Cots</i>				52	80	16	2	36	31	0.89	46	47	1.00	3	19.4	1348
Marrowfats																
PS02100738	X98P049	-	-	55	88	18	2	30	30	1.00	44	45	1.00	4	30.4	1719
PS02100758	X00P193	+	-	53	81	15	2	27	20	0.74	39	29	0.74	3	27.8	1551
PS02100755	X00P193	+	-	52	81	15	2	27	25	0.93	37	33	0.89	2	28.0	1546
PS02100264	X95P014	+	-	53	88	14	2	35	13	0.37	45	38	0.84	3	31.5	1537
PS02100740	X98P049	-	-	55	85	17	2	33	32	0.97	46	46	1.00	2	31.9	1527
PS02100741	X98P052	-	+	54	87	17	2	60	21	0.35	85	48	0.56	3	28.3	1526
PS02100756	X00P193	+	-	54	86	15	2	26	17	0.65	37	35	0.95	3	29.1	1450
PS02100732	X98P046	-	-	49	85	14	2	30	28	0.93	44	49	1.00	4	34.1	1368
PS02100344	X95P076	+	-	50	83	14	2	23	22	0.96	38	35	0.92	4	29.0	1349
PS02100739	X98P049	-	-	56	87	17	2	42	19	0.45	47	42	0.89	3	32.0	1329
PS02100733	X98P046	-	-	52	86	15	2	32	21	0.66	41	37	0.90	4	31.3	1289
PS02100726	X98P042	-	-	53	85	17	2	35	40	1.00	46	48	1.00	3	33.4	1240
PS02100725	X98P042	-	-	54	86	16	2	35	26	0.74	41	47	1.00	3	34.2	1237
PS02100266	X95P014	+	-	49	89	15	2	28	15	0.54	38	38	1.00	2	29.0	1190
PS02100660	X95P574	+	-	55	86	15	2	28	19	0.68	37	32	0.86	3	32.2	1159
PS02100260	X95P014	+	-	52	86	13	2	36	14	0.39	48	48	1.00	3	29.9	1106
PS02100759	X00P193	+	-	53	83	15	2	24	20	0.83	32	34	1.00	2	27.8	1102
PS02100753	X00P193	+	-	54	80	15	2	23	27	1.00	31	37	1.00	2	25.2	1087
PS02100364	X95P272	+	-	50	83	14	2	22	16	0.73	35	36	1.00	2	31.0	1077
PS02100340	X95P076	+	-	52	86	16	2	33	25	0.76	43	44	1.00	2	29.9	1064
PS02100743	X00P193	+	-	54	81	14	2	26	27	1.00	36	35	0.97	2	26.0	1062
PS02100737	X98P049	-	-	53	85	14	2	24	25	1.00	33	40	1.00	3	29.6	1047
PS02100373	X95P294	+	-	50	79	15	2	27	21	0.78	38	30	0.79	3	27.2	1033

Table 12. Agronomic Data from the Preliminary Green, Yellow and Marrowfat Dry Pea Observation Trial, 2003 (0305)

Page 3 of 5

Cultivar	Origin	Leaf Type	Plant Type	Days to Flower	Days to Maturity	Nodes to First Flower	Pod/ Peduncle	Pod Ht (green) ..cm..	Pod Ht (mature) ..cm..	Pod Ht Index	Plant Ht (green) ..cm..	Plant Ht (mature) ..cm..	Plant Ht Index	Rep Nodes	Weight 100 Seed ..g..	Seed Yield ..kg/ha..
PS02100681	X96P082	+	-	54	83	16	2	28	21	0.75	36	34	0.94	2	30.0	1027
PS02100539	X95P541	+	-	52	86	14	2	30	14	0.47	44	33	0.75	4	35.2	1023
PS02100427	X95P344	+	-	54	85	15	2	29	17	0.59	38	33	0.87	2	31.2	1006
PS02100426	X95P344	+	-	53	81	15	2	26	28	1.00	39	35	0.90	3	27.9	845
PS02100558	X95P553	+	-	54	88	17	2	18	5	0.28	34	35	1.00	4	27.0	835
PS02100428	X95P344	+	-	54	83	15	2	30	29	0.97	42	37	0.88	3	30.0	822
PS02100742	X98P052	-	+	55	89	16	2	60	12	0.20	71	49	0.69	3	30.7	807
PS02100388	X95P298	+	-	53	87	14	2	24	22	0.92	34	36	1.00	3	32.2	795
PS02100735	X98P049	-	-	53	85	15	2	33	33	1.00	44	46	1.00	3	32.2	763
PS02100309	X95P051	+	-	50	83	15	2	32	30	0.94	43	42	0.98	3	31.1	734
PS02100430	X95P344	+	-	53	82	15	2	23	15	0.65	31	28	0.90	2	28.6	714
PS02100284	X95P026	+	-	50	82	14	2	34	15	0.44	50	39	0.78	4	35.0	612
PS02100282	X95P026	+	-	50	78	14	2	33	25	0.76	41	44	1.00	3	32.7	546
PS02100443	X95P435	+	-	52	83	15	2	42	10	0.24	57	34	0.60	4	26.3	536
PS02100372	X95P294	+	-	49	80	15	2	28	18	0.64	35	35	1.00	2	24.6	435
PS02100262	X95P014	+	-	52	83	13	2	45	24	0.53	58	45	0.78	2	27.5	351
PS02100579	X95P554	+	-	49	83	13	2	28	17	0.61	39	28	0.72	3	26.1	346
PS02100402	X95P315	+	-	53	83	15	2	28	21	0.75	39	31	0.79	2	28.6	343
<i>Sub-mean Marrowfats</i>				52	84	15	2	31	21	0.72	42	38	0.93	3	29.9	1028

Yellow Cots

PS02101229	X98P067	-	-	56	..	15	2	33	40	1.00	50	64	1.00	4	24.7	3827
PS02101238	X98P176	-	-	57	..	16	2	30	24	0.80	44	53	1.00	2	20.6	3795
PS02101239	X98P072	-	-	55	..	16	2	49	10	0.20	79	42	0.53	8	26.4	3315
PS02101224	X98P062	-	-	54	..	15	2	30	29	0.97	63	62	0.98	8	24.9	2942
PS02101178	X96P133	-	-	53	87	15	2	34	36	1.00	52	55	1.00	4	21.7	2794
PS02101181	X96P133	-	-	52	83	16	2	38	31	0.82	47	47	1.00	2	20.5	2718
PS02101175	X96P133	-	-	52	83	15	2	43	34	0.79	55	55	1.00	4	20.6	2603
PS02101193	X96P141	-	-	50	87	16	2	49	19	0.39	74	55	0.74	6	20.7	2603
PS02101219	X98P056	-	-	52	..	16	2	34	22	0.65	59	56	0.95	6	26.1	2532
PS02101164	X96P131	-	-	56	88	17	2	47	30	0.64	64	62	0.97	4	22.9	2512
PS02101186	X96P140	-	-	50	87	16	2	32	24	0.75	47	47	1.00	5	23.1	2463
PS02101201	X96P154	-	-	49	88	14	2	36	35	0.97	51	56	1.00	4	25.7	2423
PS02101174	X96P133	-	-	55	86	17	2	45	40	0.89	63	62	0.98	4	21.7	2245
PS02101148	X96P129	-	-	57	86	16	2	35	32	0.91	50	54	1.00	3	19.6	2209

Table 12. Agronomic Data from the Preliminary Green, Yellow and Marrowfat Dry Pea Observation Trial, 2003 (0305)

Page 4 of 5

Cultivar	Origin	Leaf Type	Plant Type	Days to Flower	Days to Maturity	Nodes to First Flower	Pod/ Peduncle	Pod Ht (green) ..cm..	Pod Ht (mature) ..cm..	Pod Ht Index	Plant Ht (green) ..cm..	Plant Ht (mature) ..cm..	Plant Ht Index	Rep Nodes	Weight 100 Seed ..g..	Seed Yield ..kg/ha..
PS02101168	X96P131	-	-	56	85	17	2	38	24	0.63	49	52	1.00	3	20.8	2201
PS02101159	X96P130	-	-	53	85	15	2	36	31	0.86	43	50	1.00	3	22.6	2051
PS02101200	X96P154	-	-	51	..	14	2	38	48	1.00	65	71	1.00	6	25.4	2018
PS02101150	X96P130	-	-	50	86	15	2	35	26	0.74	51	46	0.90	5	25.4	1922
PS02101160	X96P130	-	-	51	85	14	2	34	36	1.00	48	53	1.00	4	23.2	1909
PS02101119	X96P122	-	-	52	82	16	2	41	34	0.83	54	53	0.98	4	23.7	1895
PS02101128	X96P126	-	-	55	80	16	2	28	25	0.89	36	40	1.00	3	23.9	1843
PS02101167	X96P131	-	-	56	85	17	2	40	36	0.90	49	55	1.00	2	21.4	1746
PS02101127	X96P126	-	-	52	81	14	2	25	19	0.76	35	36	1.00	3	20.9	1682
PS02101114	X96P121	-	-	52	83	15	2	35	30	0.86	52	48	0.92	4	25.4	1657
PS02101125	X96P126	-	-	52	81	15	2	28	15	0.54	41	42	1.00	4	20.2	1657
PS02101108	X99P246	-	-	57	85	20	2	53	38	0.72	69	62	0.90	4	24.1	1652
PS02101140	X96P128	-	-	54	83	15	2	28	20	0.71	42	38	0.90	3	22.6	1620
PS02101133	X96P127	-	-	52	79	17	2	45	28	0.62	58	51	0.88	3	21.0	1527
PS02101137	X96P127	-	-	53	80	18	2	33	29	0.88	42	49	1.00	3	20.9	1438
<i>Sub-mean Yellow Cots</i>				53	84	16	2	37	29	0.80	53	52	1.00	4	22.8	2269
Parentals																
M40		+	-	55	..	13	2	50	21	0.42	86	49	0.57	8	23.8	4268
Orgor(K8239)		+	+	51	..	14	2	46	6	0.13	100	39	0.39	7	21.2	4056
Paris/CSM85/(K7821)		+	+	47	88	14	2	59	13	0.22	117	44	0.38	8	16.7	3772
Ramonskii-85(K8124)		+	+	52	..	13	2	54	7	0.13	94	53	0.56	7	23.7	3243
Ran/Frezchenit/(K7609)		+	+	51	84	13	2	51	4	0.08	84	37	0.44	5	22.5	3241
Friplex(K6936)		+	-	51	..	15	2	36	16	0.44	78	41	0.53	9	15.1	3219
Flagman(K8192)		+	+	49	..	13	2	45	9	0.20	69	42	0.61	5	27.4	3028
No-140(K5455)		+	-	52	..	14	2	40	14	0.35	71	39	0.55	7	31.0	2997
Salome(K7899)		+	+	48	..	12	2	45	8	0.18	125	40	0.32	11	22.9	2991
Krevash(K8447)		+	+	56	..	16	2	80	12	0.15	120	42	0.35	6	16.0	2797
Fidelia(K8453)		+	+	55	..	15	2	79	19	0.24	160	54	0.34	6	16.0	2740
Maple(KG115)		+	+	59	..	14	3	67	17	0.25	130	45	0.35	9	14.4	2739
Belkovaya-Grizd(K8195)		+	+	51	88	14	3	61	8	0.13	89	35	0.39	6	20.0	2687
Mira(K8271)		+	-	57	..	15	2	44	14	0.32	72	37	0.51	6	13.0	2555
Celep(K8290)		-	-	52	88	17	3	52	50	0.96	78	75	0.96	5	22.5	2387
Helia(K8454)		+	+	56	..	16	2	63	33	0.52	101	62	0.61	6	15.8	1867
Eroica(K6285)		+	-	47	..	10	2	25	14	0.56	71	46	0.65	11	42.6	1865

Table 12. Agronomic Data from the Preliminary Green, Yellow and Marrowfat Dry Pea Observation Trial, 2003 (0305)

Page 5 of 5

Cultivar	Origin	Leaf Type	Plant Type	Days to Flower	Days to Maturity	Nodes to First Flower	Pod/ Peduncle	Pod Ht (green) ..cm..	Pod Ht (mature) ..cm..	Pod Ht Index	Plant Ht (green) ..cm..	Plant Ht (mature) ..cm..	Plant Ht Index	Rep Nodes	Weight 100 Seed ..g..	Seed Yield ..kg/ha..
MIR-12(K8529)		+	+	61	..	19	2	78	20	0.26	116	48	0.41	5	11.7	1771
GUR-II(K7565)		+	+	56	..	17	2	65	13	0.20	150	64	0.43	7	13.4	1665
<i>Sub-mean Parentals</i>				53	87	14	2	55	16	0.30	101	47	0.49	7	20.5	2836
Grand Mean				53	83	15	2	37	25	0.73	54	45	0.91	4	23.6	1667

Planting date 5/1/03. Harvest date 8/1/03.

Leaf type; + = normal leaf, - = *afila* or semileafless type. Plant type; + = tall plant type, - = short plant type.

Pod height was measured at the green pod stage and at harvest maturity. Pod height index was determined by dividing pod height at harvest maturity by the green pod height.

Plant height was measured at the green plant stage and at harvest maturity. Plant height index was determined by dividing plant height at harvest maturity by the green plant height.

Agronomic and yield data are one replication at Pullman, WA

Table 13. Agronomic Data for the Canadian and Australian Pea Observation Nursery, 2003 (0307P)

Page 1 of 2

Cultivar	Leaf Type	Plant Type	PEMV	Aphano- myces	Days to Flower	Days to Maturity	Nodes to First Flower	Pods/ Peduncle	Pod Height (green) ..cm..	Pod Height (mature) ..cm..	Pod Height Index	Plant Height (green) ..cm..	Plant Height (mature) ..cm..	Plant Height Index	Rep Nodes	Weight 100 Seed ..g..	Mean Seed Yield ..kg/ha..
CDC-Minuet	-	-	-	2.5	58	87	19	2	38	33	0.87	46	48	1.00	2	20.9	2152
CDC-0007	-	-	-	3.5	56	83	22	2	61	41	0.67	67	55	0.82	2	20.0	2073
Excell	-	-	-	3.0	52	84	14	2	46	42	0.91	67	65	0.97	3	19.6	2006
CDC-0102	-	-	-	3.0	55	80	16	2	36	32	0.89	44	44	1.00	3	18.1	1959
89-036-*9-10	-	-	-	2.0	54	79	17	2	46	30	0.65	56	48	0.86	3	18.5	1910
CDC-0101	-	-	-	2.5	56	83	16	2	47	33	0.70	56	50	0.89	2	22.0	1887
CDC-0009	-	-	-	3.5	58	86	15	2	43	36	0.84	60	43	0.72	3	19.0	1778
Kaspa	-	-	-	2.5	63	86	23	2	60	60	1.00	71	70	0.99	3	18.6	1766
89-036-*9-2	-	-	-	2.5	54	80	19	2	61	41	0.67	69	60	0.87	2	21.1	1744
CDC-Montero	-	-	-	2.0	55	83	16	2	41	35	0.85	53	48	0.91	3	25.2	1737
CDC-Sonata	+	-	-	2.5	55	89	20	2	57	30	0.53	70	55	0.79	3	18.8	1726
CDC-Acer	-	-	-	4.0	64	89	20	2	45	25	0.56	50	42	0.84	3	17.3	1707
92-256-*1-3	-	-	-	2.5	53	79	16	2	45	20	0.44	57	56	0.98	3	14.7	1684
Stirling [†]	-	-	-	0.0	51	80	12	2	30	20	0.67	43	34	0.78	3	18.5	1660
93-062*14	-	-	-	3.5	57	88	15	2	43	18	0.42	70	50	0.71	6	19.1	1623
CDC-Verdi	-	-	-	2.5	51	83	18	2	48	41	0.85	60	54	0.90	3	19.1	1620
CDC-0105	-	-	+	4.0	54	79	17	2	38	23	0.61	46	45	0.98	3	19.5	1541
Snowpeak	-	-	-	3.0	51	80	16	2	48	40	0.83	58	53	0.91	3	19.1	1516
92-104P5*6	-	-	-	2.5	51	79	15	2	34	28	0.82	41	30	0.73	3	20.6	1497
CDC-653-8	-	-	-	4.5	55	79	19	2	49	30	0.61	60	48	0.80	3	18.7	1468
92-038-*9-2	-	-	-	3.5	53	78	14	2	46	1	0.02	52	35	0.67	2	18.3	1450
96-286-*1	-	-	-	3.5	54	89	15	2	57	20	0.35	66	50	0.76	3	18.3	1450
89-036-*9-8	-	-	-	2.5	54	79	17	2	44	40	0.91	52	49	0.94	3	21.8	1425
CDC-0107	-	-	-	4.0	54	83	16	2	43	22	0.51	53	38	0.72	4	15.5	1401
92-297-*10-1	-	-	-	3.0	0	85	14	2	39	20	0.51	56	30	0.54	4	15.5	1396
92-254-*7-6	-	-	-	2.5	52	79	15	2	37	23	0.62	50	34	0.68	3	17.5	1395
90-158*8-5	-	-	-	3.0	56	84	18	2	48	30	0.63	59	55	0.93	3	17.6	1334
CDC-651-2	-	-	-	4.5	55	79	17	2	42	18	0.43	48	30	0.63	2	18.5	1326

Table 13. Agronomic Data for the Canadian and Australian Pea Observation Nursery, 2003 (0307P) Continued

Page 2 of 2

Cultivar	Leaf Type	Plant Type	PEMV	Aphanomyces	Days to Flower	Days to Maturity	Nodes to First Flower	Pods/ Peduncle	Pod Height (green) ..cm..	Pod Height (mature) ..cm..	Pod Height Index	Plant Height (green) ..cm..	Plant Height (mature) ..cm..	Plant Height Index	Rep Nodes	Weight 100 Seed ..g..	Mean Seed Yield ..kg/ha..
92-190-*5-6	-	-	-	2.5	53	78	18	2	41	33	0.80	47	43	0.91	2	19.7	1317
CDC-0106	-	-	-	4.0	53	80	21	2	51	20	0.39	57	43	0.75	1	14.7	1300
CDC-672-1	-	-	-	4.5	54	82	17	2	51	20	0.39	60	34	0.57	3	18.3	1248
92-112-*1-3	-	-	-	2.5	53	78	16	2	42	33	0.79	49	43	0.88	2	17.8	1232
CDC-647-1	-	-	-	4.5	56	80	18	2	37	20	0.54	44	35	0.80	2	16.8	1227
92-026-*5-11	-	-	-	3.0	54	80	15	2	33	31	0.94	41	40	0.98	3	18.6	1208
92-208-*12	-	-	-	2.5	54	83	18	2	48	28	0.58	58	48	0.83	3	18.7	1171
90-131*27-7	+	+	-	2.0	55	83	15	1	62	1	0.02	82	30	0.37	5	18.2	1161
90-166*30-5	-	-	-	3.0	57	82	17	2	57	40	0.70	66	68	1.00	3	17.3	1158
CDC-715-4	-	-	-	4.0	56	83	15	2	35	16	0.46	39	30	0.77	2	19.0	1149
CDC-0108	-	-	-	4.0	55	81	18	2	42	24	0.57	46	37	0.80	3	19.1	1124
92-218*9*6	-	-	-	3.0	56	83	17	2	41	20	0.49	52	50	0.96	3	18.2	1077
92-218-*8-5	+	-	-	3.0	54	79	17	2	41	10	0.24	49	30	0.61	3	20.6	1050
96-288-*1	+	-	-	4.0	53	78	14	2	36	2	0.06	48	20	0.42	3	18.3	996
CDC-0103	-	-	-	3.0	58	80	20	2	44	25	0.57	50	37	0.74	2	19.0	963
92-133-*2-9	+	+	-	2.5	52	78	14	2	56	1	0.02	74	30	0.41	3	25.3	781
95-072*3	-	+	-	3.0	57	88	18	2	63	4	0.06	83	20	0.24	3	16.8	753
Grand Mean				3.0	54	82	17	2	46	26	0.58	56	43	0.79	3	19.1	1448

[†]Values are the average of 12 check plots

Planting date was 5/2/03. Harvest date was 7/30/03.

Leaf type; + = normal leaf, - = *afila* or semileafless type. Plant type; + = tall plant type, - = short plant type.

Aphanomyces = Aphanomyces root rot; 1 = no symptoms, 2 = 20% of lower leaves symptomatic, 3 = 50% of leaves symptomatic and plant stunted, 4 = 80% of leaves symptomatic and plant stunted, 5 = all plants dead.

PEMV = Pea enation mosaic virus, + = resistant, - = susceptible.

Pod height was measured at the green pod stage and at harvest maturity. Pod height index was determined by dividing pod height at harvest maturity by the green pod height.

Plant height was measured at the green plant stage and at harvest maturity. Plant height index was determined by dividing plant height at harvest maturity by the green plant height.

Agronomic and yield data are one replication at Pullman, WA

Winter Pea Trial Results

The white-flowered, clear-seeded, winter pea yield trial included 8 breeding lines and was grown at three locations in 2003, WSU Spillman Farm, Russ Zenner's farm near Genesee and Joe Schmitz farm near Rosalia, WA. Unfortunately, due to the dry soil conditions, which made seed placement difficult, all locations were lost in 2003. These three trials have been established again for the 2004 harvest season and will test the same 8 breeding lines.

Despite the loss of the trials, the breeding line PS9830F009 (tentatively named 'Spector') was approved for preliminary increase of breeder seed at the fall meeting of the Washington State University Variety Release Committee. This variety will be released as a winter feed pea due to the presence of 'ghost' mottling on the seed coat making it less desirable for traditional human food consumption markets. Individual single plants will be grown in the USDA greenhouse during the winter of 2003-2004 to produce pre-breeder seed. Seed from each plant will be used to establish microplots in the spring of 2004 and produce Breeder seed. Production of Foundation seed is projected for the fall of 2004 resulting in seed being available to producers the fall of 2005.

Two trials were established in 2003 as a continuation of a project funded by the Cool Season Food Legume Research Program to evaluate the adaptation of winter pea and winter lentil advanced breeding lines to direct seeding conditions. Treatments that were evaluated were sowing date (early fall, late fall and spring), stubble height (15 cm and 30 cm) and two breeding lines of each pea and lentil. Results from these trials are summarized in Tables 14 and 15. In general, early sowing was superior to late sowing and stubble height showed no significant effect on seed yield. Fall-sown pea and lentil irrespective of sowing date produced greater seed yield than the spring-sown treatments. PS9430706 produced the greatest seed yield among the winter pea breeding lines and LC9979010 ('Morton') produced the greatest seed yield among the winter lentil breeding lines.

Table 14. Summary of seed yield from winter pea produced under direct seeding conditions in 2002 and 2003. The experimental design was a split plot factorial with four replications.

Treatment Genotype	Sowing Date	Rosalia		Genesee	
		2002	2003	2002	2003
		..kg/ha..	..kg/ha..	..kg/ha..	..kg/ha..
PS9430706	Early fall	2628	1890	4038	1568
PS9530726	Early fall	2067	1481	3482	667
PS9430706	Late Fall	1662	1896	3918	---
PS9530726	Late Fall	1389	1627	3006	---
PS9430706	Combined	2125	1893	3978	1568
PS9530726	Combined	1728	1554	3244	667
Delta	Spring	891	1197	2213	1160
Mozart	Spring	1391	1252	2882	1181
Combined	Early Fall	2347	1686	3760	1118
Combined	Late Fall	1525	1761	3462	---
Combined	Spring	1141	1225	2548	1170
Winter vs. Spring (%)	Combined	170	141	142	95
Tall Stubble		991	1557	3077	1145
Short Stubble		985	1556	2804	1143

Table 15. Summary of seed yield from winter lentil produced under direct seeding conditions in 2002 and 2003. The experimental design was a split plot factorial with four replications.

Treatment Genotype	Sowing Date	Rosalia		Genesee	
		2002	2003	2002	2003
		..kg/ha..	..kg/ha..	..kg/ha..	..kg/ha..
LC9979010	Early fall	963	1412	3883	1768
LC9976079	Early fall	1072	733	3468	1558
LC9979010	Late Fall	1004	1474	3302	---
LC9976079	Late Fall	1217	923	2987	---
LC9979010	Combined	983	1443	3593	1768
LC9976079	Combined	1145	828	3228	1558
Brewer	Spring	1013	836	2756	789
Richlea	Spring	813	1138	2191	915
Combined	Early Fall	1017	1073	3676	1663
Combined	Late Fall	1111	1199	3145	---
Combined	Spring	913	987	2474	852
Winter vs. Spring (%)	Combined	116	112	138	195
Tall Stubble		992	1101	3077	1292
Short Stubble		985	1088	2805	1222

Lentil Trial Results

Fifty-four entries and five check varieties ('Pennell', 'Merri', 'Richlea', 'Mason' and 'Brewer') were included in the advanced large-seeded yellow lentil yield nursery in 2002. The nursery was planted at three locations (Pullman and Farmington, WA, and Genesee, ID) (Tables 16, 17 and 18). Yields were generally depressed due to the exceptionally dry summer. Mean yield of the nursery over the three locations was 1087 kg/ha (about 978 pounds per acre). Several lines (LC860616L, Richlea, LC860359L, LC00600233L and CDC_950-8) were the highest for yield and very similar to each other when averaged over the three locations. Pennell and Merri, the two recently released large seeded lentil varieties, were somewhat lower yielding when compared to the Brewer check and indicates that these two varieties were affected by the hot and dry season. LC860616L has been in the trials for three years and will be proposed for preliminary release. Besides being higher yielding, LC860616L was taller and had larger seed size when compared to Pennell and Merri. Standing ability was also very good. A final decision on the selection will be made after the 2004 season.

A specialty type being considered for the Spanish market, LC760209C, had large seed size and seed coat mottling and is reportedly suited for use as a precooked lentil. LC760209C was very similar in yield to Brewer and Merri but seed size was considerably larger. Overall, the selections in the trial have been selected for good plant height indices and have good standing ability. Data collected on the fifty-four selections in the trial indicate that progress has been made in improving seed weights and yields as well as standing ability. Future variety releases are expected to stand more erect, ensuring greater ease of harvest, seeds will be larger and yields should be improved.

Advanced yield trials of Turkish red, Eston, and Spanish brown types were also planted at three locations (Pullman, Farmington and Genesee, ID) (Tables 19, 20 and 21). A Turkish red selection, LC1602062T, was the highest yielding red cotyledon type in the trial and also had good plant height and seed size; however, it is a new selection and we only have one year of data from replicated trials at more than one location. The check variety, 'Crimson', had a mean yield of 1324 kg/ha (about 1192 lbs/acre). The major objectives in selection of Turkish red types are increasing plant height, improving standing ability and seed quality.

'Eston' and 'Athena' were used as checks in to compare new Eston type selections (Tables 22, 23 and 24). Two selections (LC01602307E and LC01602341E) were significantly higher yielding when compared to Athena and Eston checks. LC01602307E also was taller and had a mean plant height index of 0.86 that indicated good resistance to lodging. Additional testing of this line is needed before we can propose it for release.

Spanish brown type selection LC01601640P was significantly higher yielding when compared to the Pardina check; however, additional years of testing are needed before this selection can be recommended for release. LC99602427P performed very well in the previous two years and was equal to Pardina in 2003 (Tables 25, 26 and 27).

The preliminary yield trial for large yellow lentil selections contained 30 selections and six checks (Table 28). Five of the selections were significantly higher yielding when compared to the Brewer check. The Laird type lines were selected for exceptionally large seeds prior to inclusion in this nursery, which was planted at Pullman, WA. Lines in this preliminary trial were also selected for increased biomass and residue production as well as standing ability.

Zero tannin type selections were evaluated in a yield trial at Pullman in 2003. Two of the selections, one with yellow cotyledons and the other with red cotyledons, were higher yielding when compared to the Brewer check.

The preliminary screening nursery contained 141 selections that were evaluated for the first time at Pullman, WA (Table 30). The nursery contained 58 large yellow lentil selections that were scored for large uniform seed size with no mottling and blunt seed edge. The preliminary screening nursery also contained 3 zero-tannin lines, 24 Richlea type lines, 9 Spanish brown type lines, 29 Eston type lines, 15 Turkish red type lines, and 3 Castilian type lines. All were evaluated for days to flowering, standing ability, days to maturity, seed size, seed color and yield. Data from these lines was evaluated and promising selections were advanced to preliminary yield trials for the 2004 season.

As part of germplasm exchange with counterparts in Canada and Australia we conducted a trial to compare their varieties and selections with our material. The results of the trial are somewhat inconclusive because of there only being a single replication and the site of the trial lacked uniformity.

POTENTIAL VARIETY RELEASES:

LC860616L has been in the trials for three years and will be proposed for preliminary release for the purpose of developing breeder and foundation seed. The selection has exceptionally large seeds, good plant height, good standing ability and high yields.

Table 16. Summary (kg/ha) of the Advanced Large Yellow Lentil Yield Trial over Locations, 2003 (0352)

Page 1 of 2

Cultivar	Origin	Farmington	Genesee	Pullman	Mean Seed Yield
LC860616L	X95L073	955	1402	1403	1253
Richlea	.....	943	1383	1420	1249
LC860359L	X93L035	902	1427	1388	1239
LC00600233L	X96L095	940	1380	1368	1229
CDC_950-8	.....	1033	1367	1279	1226
LC99602075L	X96L092	959	1364	1306	1210
LC00600470L	X97L005	969	1297	1338	1202
LC99600747L	X95L078	946	1335	1306	1196
CDC_Grandora	.....	959	1280	1341	1193
LC99600345L	X93L027	1019	1284	1268	1190
LC660272L	X89L080	896	1315	1340	1184
LC7601080R	X89L039	994	1261	1265	1173
LC00600560L	X97L028	961	1276	1281	1173
LC00600010L	X93L035	812	1395	1309	1172
Brewer	.....	1012	1291	1206	1170
LC860443L	X93L011	877	1335	1291	1168
Merrit	.....	1100	1254	1145	1166
LC99600153L	X93L008	953	1279	1262	1165
Mason	.....	1019	1264	1210	1164
Castillion	X89L007	1019	1238	1226	1161
LC99600087L	X93L035	891	1250	1343	1161
LC00600562L	X97L028	922	1279	1231	1144
LC00600256L	X96L096	890	1242	1292	1141
LC760722L	X95L233	839	1278	1267	1128
Pennell	.....	939	1192	1213	1114
LC00600746L	X97L050	830	1253	1246	1110
LC00600774L	X97L052	770	1253	1293	1105
LC00600051L	X93L026	938	1183	1186	1103
CDC_Sovereign	.....	879	1171	1243	1098
LC00600086L	X93L036	843	1265	1171	1093
LC99600058L	X93L035	845	1232	1176	1084
LC8601384L	X95L233	885	1159	1165	1069
LC00600157L	X95L245	909	1181	1106	1065
LC99600273L	X93L025	775	1273	1136	1062
LC00600242L	X96L096	703	1196	1259	1053
LC99601165L	X95L090	833	1135	1164	1044
LC99602173L	X96L096	766	1321	1042	1043
LC00600128L	X95L093	826	1185	1081	1031
LC00600166L	X95L251	825	1289	938	1017
LC00600394L	X96L111	808	1146	1085	1013
LC00600596L	X97L035	671	1235	1126	1011
LC00600252L	X96L096	803	1182	1037	1007
LC00600295L	X96L100	796	1078	1135	1003

Table 16. Summary (kg/ha) of the Advanced Large Yellow Lentil Yield Trial over Locations, 2003 (0352)

Page 2 of 2

Cultivar	Origin	Farmington	Genesee	Pullman	Mean Seed Yield
LC00600150L	X95L241	740	1190	1045	992
LC00600656L	X97L039	765	1097	1034	965
LC00600423L	X96L118	709	1169	997	958
LC00601166e	.....	829	1039	996	955
LC00600346L	X96L107	729	1062	1072	954
LC00600262L	X96L099	564	1062	1154	927
LC00600698L	X97L042	679	1016	1044	913
LC00600683L	X97L042	654	1040	1011	902
LC00600268L	X96L099	544	1033	1020	866
LC99601934L	X96L077	727	899	911	846
LC00600296L	X96L100	679	992	830	834
Grand Mean		853	1222	1185	1087
C.V. (%)		10	6	10	9
LSD ($\alpha=0.05$)		119	99	154	86
Planting Date		4/23/03	4/21/03	4/28/03	
Harvest Date		8/6/03	7/28/03	8/8/03	

Yield data are means of three replications at each location, over three locations.

Table 17. Agronomic Data for the Advanced Large Yellow Lentil Yield Trial, 2003 (0352)

Page 1 of 2

Cultivar	Origin	Days to Flower	Days to Maturity	Pods/ Peduncle	Mean Pod Ht (green) ..cm..	Mean Pod Ht (mature) ..cm..	Mean Pod Ht Index	Mean Plant Ht (green) ..cm..	Mean Plant Ht (mature) ..cm..	Mean Plant Ht Index	Weight 100 Seed ..g..
LC860616L	X95L073	51	91	2	15	11	0.84	37	35	0.92	7.0
Richlea	.....	54	92	2	15	12	0.73	34	31	0.90	5.1
LC860359L	X93L035	57	92	2	19	17	0.78	37	32	0.88	6.5
LC00600233L	X96L095	52	91	2	18	12	0.75	38	36	0.93	7.3
CDC_950-8	.....	52	92	2	17	10	0.69	39	37	0.90	6.9
LC99602075L	X96L092	50	91	2	17	12	0.73	38	31	0.83	7.6
LC00600470L	X97L005	51	91	2	13	12	0.96	36	31	0.88	6.3
LC99600747L	X95L078	51	91	2	19	15	0.81	41	36	0.89	6.5
CDC_Grandora	.....	59	92	2	18	14	0.88	38	35	0.94	6.6
LC99600345L	X93L027	52	91	2	17	15	0.83	35	32	0.91	6.2
LC660272L	X89L080	53	92	2	19	12	0.72	34	32	0.94	6.7
LC7601080R	X89L039	51	91	2	12	11	0.77	33	31	0.95	5.3
LC00600560L	X97L028	50	91	2	11	9	0.84	35	30	0.85	6.7
LC00600010L	X93L035	59	92	3	19	16	0.82	36	34	0.93	6.3
Brewer	.....	50	91	2	13	9	0.86	35	31	0.84	5.6
LC860443L	X93L011	51	91	2	18	14	0.76	36	34	0.94	7.7
Merrit	.....	50	91	2	14	11	0.73	34	29	0.85	6.4
LC99600153L	X93L008	55	92	2	19	14	0.76	40	36	0.88	6.3
Mason	.....	50	91	2	11	9	0.84	34	28	0.82	6.7
Castillion	X89L007	50	91	2	16	13	0.81	35	31	0.86	6.9
LC99600087L	X93L035	56	91	3	19	18	0.85	35	32	0.95	6.3
LC00600562L	X97L028	50	91	1	11	8	0.73	31	28	0.90	7.2
LC00600256L	X96L096	51	91	2	15	11	0.76	35	31	0.92	7.3
LC760722L	X95L233	51	91	2	16	14	0.81	36	33	0.90	7.1
Pennell	.....	53	91	3	16	9	0.61	31	28	0.89	6.3
LC00600746L	X97L050	58	92	2	20	15	0.71	38	35	0.91	6.3
LC00600774L	X97L052	52	91	2	16	14	0.77	32	31	0.95	6.3
LC00600051L	X93L026	52	92	2	15	13	0.92	37	32	0.89	6.2
CDC_Sovereign	.....	56	92	2	18	12	0.82	37	35	0.94	6.4
LC00600086L	X93L036	58	92	2	19	14	0.70	39	36	0.98	6.8
LC99600058L	X93L035	50	91	2	13	12	0.86	37	32	0.86	6.8
LC8601384L	X95L233	51	91	2	17	13	0.81	38	33	0.88	7.1
LC00600157L	X95L245	51	92	2	15	13	0.84	36	33	0.96	8.4
LC99600273L	X93L025	54	92	2	18	15	0.75	39	35	0.90	6.4
LC00600242L	X96L096	51	92	2	17	14	0.75	37	31	0.88	7.3
LC99601165L	X95L090	51	91	2	15	12	0.77	36	34	0.90	7.2
LC99602173L	X96L096	50	92	2	18	12	0.70	37	33	0.91	6.7
LC00600128L	X95L093	51	92	2	16	13	0.87	39	34	0.90	7.2
LC00600166L	X95L251	52	93	2	15	10	0.77	36	29	0.79	7.6
LC00600394L	X96L111	50	91	2	18	13	0.85	38	34	0.92	7.5
LC00600596L	X97L035	50	92	2	15	10	0.81	36	31	0.90	6.4
LC00600252L	X96L096	51	91	2	17	10	0.64	35	33	0.90	7.0
LC00600295L	X96L100	51	91	2	15	11	0.72	33	28	0.87	8.6
LC00600150L	X95L241	56	91	2	20	13	0.71	35	31	0.90	8.4
LC00600656L	X97L039	51	92	2	13	13	0.96	35	32	0.95	7.2

Table 17. Agronomic Data for the Advanced Large Yellow Lentil Yield Trial, 2003 (0352)

Page 2 of 2

Cultivar	Origin	Days to Flower	Days to Maturity	Pods/ Peduncle	Mean Pod Ht (green) ..cm..	Mean Pod Ht (mature) ..cm..	Mean Pod Ht Index	Mean Plant Ht (green) ..cm..	Mean Plant Ht (mature) ..cm..	Mean Plant Ht Index	Weight 100 Seed ..g..
LC00600423L	X96L118	52	91	2	17	13	0.74	35	33	0.95	7.1
LC00601166e	.....	50	93	2	11	10	0.79	33	29	0.90	4.8
LC00600346L	X96L107	52	91	2	15	13	0.80	37	31	0.89	7.1
LC00600262L	X96L099	52	91	2	17	13	0.79	36	33	0.90	8.0
LC00600698L	X97L042	51	91	2	15	12	0.84	34	30	0.94	7.4
LC00600683L	X97L042	54	92	2	18	14	0.73	36	32	0.93	7.2
LC00600268L	X96L099	50	91	2	12	9	0.69	30	28	0.92	7.3
LC99601934L	X96L077	50	91	2	15	13	0.85	33	30	0.90	8.9
LC00600296L	X96L100	50	91	2	13	12	0.83	33	28	0.92	8.5
Grand Mean		52	91	2	16	12	0.78	36	32	0.90	6.9
C.V. (%)		2	1	10	15	18	18	8	9	9	
LSD ($\alpha=0.05$)		1	1	0	3	2	0	3	3	0	

Pod height was measured at the green pod stage and at harvest maturity. Pod height index was determined by dividing pod height at harvest maturity by the green pod height

Plant height was measured at the green plant stage and at harvest maturity. Plant height index was determined by dividing plant height at harvest maturity by the green plant height.

Agronomic data are means of three replications at Pullman, WA. Means data are means of three replications over 2 locations; Farmington and Pullman.

Table 18. Mean Yields (kg/ha) of Lentil Lines in the Advanced Large Yellow Lentil Yield Trial, 1999 - 2003

Page 1 of 2

Cultivar	Origin	1999	2000	2001	2002	2003
LC860616L	X95L073	....	....	1824	1282	1253
Richlea	.....	1790	1407	1968	1459	1249
LC860359L	X93L035	....	....	1764	1380	1239
LC00600233L	X96L095	....	....	....	....	1229
CDC_950-8	.....	....	....	....	....	1226
LC99602075L	X96L092	....	....	....	1382	1210
LC00600470L	X97L005	....	....	....	....	1202
LC99600747L	X95L078	....	....	....	1245	1196
CDC_Grandora	.....	....	....	....	....	1193
LC99600345L	X93L027	....	....	....	1305	1190
LC660272L	X89L080	1441	1185	1652	1278	1184
LC7601080R	X89L039	....	1361	1747	1312	1173
LC00600560L	X97L028	....	....	....	....	1173
LC00600010L	X93L035	....	....	....	....	1172
Brewer	.....	1452	1264	1585	1233	1170
LC860443L	X93L011	....	....	1667	1260	1168
Merrit	.....	1599	1125	1759	1387	1166
LC99600153L	X93L008	....	....	....	1359	1165
Mason	.....	1413	1368	1674	1304	1164
Castillion	X89L007	....	....	1720	1158	1161
LC99600087L	X93L035	....	....	....	1328	1161
LC00600562L	X97L028	....	....	....	....	1144
LC00600256L	X96L096	....	....	....	....	1141
LC760722L	X95L233	....	1257	1668	1231	1128
Pennell	.....	1539	1100	1767	1364	1114
LC00600746L	X97L050	....	....	....	....	1110
LC00600774L	X97L052	....	....	....	....	1105
LC00600051L	X93L026	....	....	....	....	1103
CDC_Sovereign	.....	....	....	....	....	1098
LC00600086L	X93L036	....	....	....	....	1093
LC99600058L	X93L035	....	....	....	1201	1084
LC8601384L	X95L233	....	....	1530	1172	1069
LC00600157L	X95L245	....	....	....	....	1065
LC99600273L	X93L025	....	....	....	1390	1062
LC00600242L	X96L096	....	....	....	....	1053
LC99601165L	X95L090	....	....	....	1160	1044
LC99602173L	X96L096	....	....	....	1238	1043
LC00600128L	X95L093	....	....	....	....	1031
LC00600166L	X95L251	....	....	....	....	1017
LC00600394L	X96L111	....	....	....	....	1013
LC00600596L	X97L035	....	....	....	....	1011
LC00600252L	X96L096	....	....	....	....	1007
LC00600295L	X96L100	....	....	....	....	1003
LC00600150L	X95L241	....	....	....	....	992
LC00600656L	X97L039	....	....	....	....	965

Table 18. Mean Yields (kg/ha) of Lentil Lines in the Advanced Large Yellow Lentil Yield Trial, 1999 - 2003

Page 2 of 2

Cultivar	Origin	1999	2000	2001	2002	2003
LC00600423L	X96L118	....	....	....	....	958
LC00601166e	.....	....	....	....	....	955
LC00600346L	X96L107	....	....	....	....	954
LC00600262L	X96L099	....	....	....	....	927
LC00600698L	X97L042	....	....	....	....	913
LC00600683L	X97L042	....	....	....	....	902
LC00600268L	X96L099	....	....	....	....	866
LC99601934L	X96L077	....	....	....	1043	846
LC00600296L	X96L100	....	....	....	....	834
Grand Mean		1484	1181	1607	1203	1087
LSD ($\alpha=0.05$)		150	163	83	251	86

Yield data are means of three replications at each location, over three locations in each year.

Table 19. Summary (kg/ha) of the Advanced Turkish Red Type Lentil Yield Trial over Locations, 2003 (0351T)

Cultivar	Origin	Farmington	Genesee	Pullman	Mean Seed Yield
LC01602062T	X96L057	1228	1305	2022	1518
LC01600405T	X96L063	923	1253	1925	1367
LC99602972T	X95L071	959	1312	1774	1348
LC99602724T	X95L041	863	1410	1758	1344
Crimson	.....	866	1260	1845	1324
LC8602354T	X95L041	916	1328	1667	1304
LC99602712T	X95L041	890	1215	1803	1303
LC01601798T	X95L061	984	1128	1693	1269
LC01601724T	X95L032	965	1218	1458	1214
LC01601751T	X95L049	989	1027	1607	1208
LC01601752T	X95L050	913	1084	1420	1139
LC01601732T	X95L041	584	966	1243	931
Grand Mean		923	1209	1685	1272
C.V. (%)		8	7	7	7
LSD ($\alpha=0.05$)		103	116	169	89
Planting Date		4/23/03	4/21/03	4/28/03	
Harvest Date		8/5/03	7/28/03	8/8/03	

Yield data are means of three replications at each location, over three locations.

Table 20. Agronomic Data for the Advanced Turkish Red Type Lentil Yield Trial, 2003. (0351T)

Cultivar	Origin	Days to Flower	Days to Maturity	Pods/ Peduncle	Mean Pod Ht (green) ..cm..	Mean Pod Ht (mature) ..cm..	Mean Pod Ht Index	Mean Plant Ht (green) ..cm..	Mean Plant Ht (mature) ..cm..	Mean Plant Ht Index	Weight 100 Seed ..g..
LC01602062T	X96L057	50	92	2	12	9	0.76	33	32	0.94	4.7
LC01600405T	X96L063	50	91	2	9	8	0.86	30	27	0.94	4.2
LC99602972T	X95L071	50	91	2	9	8	0.88	31	27	0.90	4.0
LC99602724T	X95L041	50	91	2	9	7	0.86	30	28	0.94	3.8
Crimson	.....	51	92	2	11	9	0.86	32	27	0.85	3.5
LC8602354T	X95L041	50	92	2	13	9	0.73	34	28	0.89	4.2
LC99602712T	X95L041	50	92	2	8	5	0.72	30	26	0.91	3.9
LC01601798T	X95L061	57	92	2	15	13	0.78	33	31	0.90	3.4
LC01601724T	X95L032	52	92	2	10	7	0.73	28	27	0.98	4.4
LC01601751T	X95L049	57	93	2	13	11	0.81	35	31	0.92	3.7
LC01601752T	X95L050	58	92	2	16	9	0.57	36	31	0.87	3.4
LC01601732T	X95L041	50	93	2	13	9	0.78	32	29	0.89	4.6
Grand Mean					11	9	0.78	32	29	0.91	4.0
C.V. (%)					16	23	18	7	6	7	
LSD ($\alpha=0.05$)					2	2	0	3	2	0	

Pod height was measured at the green pod stage and at harvest maturity. Pod height index was determined by dividing pod height at harvest maturity by the green pod height.

Plant height was measured at the green plant stage and at harvest maturity. Plant height index was determined by dividing plant height at harvest maturity by the green plant height.

Agronomic data are means of three replications at Pullman, WA. Means data are means of three replications over 2 locations; Farmington and Pullman.

Table 21. Mean Yields (kg/ha) of Lentil Lines in the Advanced Turkish Red Type Lentil Yield Trial, 2001 - 2003

Cultivar	Origin	2001	2002	2003
LC01602062T	X96L057	....	....	1518
LC01600405T	X96L063	....	....	1367
LC99602972T	X95L071	1480	1292	1348
LC99602724T	X95L041	1419	1399	1344
Crimson	.....	1400	1232	1324
LC8602354T	X95L041	....	....	1304
LC99602712T	X95L041	1437	1340	1303
LC01601798T	X95L061	....	....	1269
LC01601724T	X95L032	....	....	1214
LC01601751T	X95L049	....	....	1208
LC01601752T	X95L050	....	....	1139
LC01601732T	X95L041	....	....	931
Grand Mean		1270	1212	1272
LSD ($\alpha=0.05$)		86	71	89

Yield data are means of three replications at each location, over three locations in each year.

Table 22. Summary (kg/ha) of the Advanced Eston Type Lentil Yield Trial over Locations, 2003 (0351E)

Cultivar	Origin	Farmington	Genesee	Pullman	Mean Seed Yield
LC01602307E	X98L047	1080	1351	1418	1283
LC01602341E	X98L054	923	1395	1446	1255
LC01600736E	X98L011	919	1496	1288	1234
LC01602232E	X98L036	952	1426	1314	1230
LC01602273E	X98L041	953	1370	1336	1220
Athena	.....	968	1289	1189	1149
LC01600743E	X98L011	982	1295	1037	1104
LC01600830E	X98L017	840	1253	1091	1061
LC00600854E	X97L025	829	1266	985	1026
Eston	.....	815	1317	913	1015
LC8601847E	X93L035	850	1211	936	999
LC00600831E	X93L035	752	1119	999	957
Grand Mean		905	1315	1163	1128
C.V. (%)		10	8	9	9
LSD ($\alpha=0.05$)		131	149	145	95
Planting Date		4/23/03	4/21/01	4/28/03	
Harvest Date		8/5/03	7/28/03	8/8/03	

Yield data are means of three replications at each location, over three locations.

Table 23. Agronomic Data for the Advanced Eston Type Lentil Yield Trial, 2003 (0351E)

Cultivar	Origin	Days to Flower	Days to Maturity	Pods/ Peduncle	Mean Pod Ht (green) ..cm..	Mean Pod Ht (mature) ..cm..	Mean Pod Ht Index	Mean Plant Ht (green) ..cm..	Mean Plant Ht (mature) ..cm..	Mean Plant Ht Index	Weight 100 Seed ..g..
LC01602307E	X98L047	54	91	2	13	10	0.77	35	30	0.86	4.1
LC01602341E	X98L054	51	91	2	12	9	0.72	28	26	0.91	3.0
LC01600736E	X98L011	56	91	3	12	11	1.00	31	27	0.87	3.5
LC01602232E	X98L036	51	91	2	14	10	0.80	35	27	0.79	3.7
LC01602273E	X98L041	51	91	2	12	9	0.84	30	25	0.84	3.2
Athena	.....	51	91	2	12	8	0.66	28	26	0.93	4.6
LC01600743E	X98L011	57	91	3	15	12	0.83	28	28	1.00	3.5
LC01600830E	X98L017	51	91	2	13	11	0.78	34	31	0.89	3.3
LC00600854E	X97L025	59	91	2	13	12	0.95	32	29	0.92	3.5
Eston	.....	51	91	2	11	9	0.81	31	28	0.90	3.2
LC8601847E	X93L035	50	91	2	12	11	1.00	31	27	0.89	4.0
LC00600831E	X93L035	50	91	2	10	9	0.87	29	26	0.96	4.0
Grand Mean		53	91	2	12	10	0.84	31	27	0.90	3.6
C.V. (%)		1		12	12	18	17	10	8	11	
LSD ($\alpha=0.05$)		1		0	2	2	0	4	2	0	

Pod height was measured at the green pod stage and at harvest maturity. Pod height index was determined by dividing pod height at harvest maturity by the green pod height.

Plant height was measured at the green plant stage and at harvest maturity. Plant height index was determined by dividing plant height at harvest maturity by the green plant height.

Agronomic data are means of three replications at Pullman, WA. Means data are means of three replications over 2 locations; Farmington and Pullman.

Table 24. Mean Yields (kg/ha) of Lentil Lines in the Advanced Eston Type Lentil Yield Trial, 2000 - 2003

Cultivar	Origin	2000	2001	2002	2003
LC01602307E	X98L047	....	....	....	1283
LC01602341E	X98L054	....	....	....	1255
LC01600736E	X98L011	....	....	....	1234
LC01602232E	X98L036	....	....	....	1230
LC01602273E	X98L041	....	....	....	1220
Athena	.....	....	1748	923	1149
LC01600743E	X98L011	....	....	....	1104
LC01600830E	X98L017	....	....	....	1061
LC00600854E	X97L025	....	....	865	1026
Eston	.....	1081	1583	955	1015
LC8601847E	X93L035	1277	1647	851	999
LC00600831E	X93L035	....	....	884	957
Grand Mean		1090	1534	861	1128
LSD ($\alpha=0.05$)		134	86	72	95

Yield data are means of three replications at each location, over three locations in each year.

Table 25. Summary (kg/ha) of the Advanced Pardina Type Lentil Yield Trial over Locations, 2003 (0351P)

Cultivar	Origin	Farmington	Genesee	Pullman	Mean Seed Yield
LC01601640P	X93L018	1373	1501	1707	1527
LC01601641P	X93L018	1177	1446	1692	1438
LC00600812P	X93L010	1215	1593	1484	1431
LC01602245P	X98L038	1040	1377	1602	1340
Pardina	.....	1150	1292	1560	1334
LC99602427P	X93L018	1025	1493	1479	1333
LC000010D	.....	1076	1148	995	1073
LC01600389P	X96L060	1101	850	950	967
Grand Mean		1144	1338	1434	1305
C.V. (%)		14	8	9	11
LSD ($\alpha=0.05$)		237	153	197	131
Planting Date		4/23/03	4/21/03	4/28/03	
Harvest Date		8/5/03	7/28/03	8/8/03	

Yield data are means of three replications at each location, over three locations.

Table 26. Agronomic Data for the Advanced Pardina Type Lentil Yield Trial, 2003 (0351P)

Cultivar	Origin	Days to Flower	Days to Maturity	Pods/ Peduncle	Mean Pod Ht (green) ..cm..	Mean Pod Ht (mature) ..cm..	Mean Pod Ht Index	Mean Plant Ht (green) ..cm..	Mean Plant Ht (mature) ..cm..	Mean Plant Ht Index	Weight 100 Seed ..g..
LC01601640P	X93L018	50	91	2	9	8	0.89	29	27	0.93	3.9
LC01601641P	X93L018	50	91	2	10	9	0.84	31	27	0.91	3.9
LC00600812P	X93L010	51	91	2	11	8	0.79	30	27	0.93	4.1
LC01602245P	X98L038	50	91	2	10	8	0.90	29	28	0.96	3.6
Pardina	.....	50	91	2	9	8	0.90	31	29	0.90	3.6
LC99602427P	X93L018	50	91	2	11	10	0.88	33	28	0.88	4.4
LC000010D	.....	55	91	2	10	9	0.86	30	29	0.92	3.0
LC01600389P	X96L060	51	92	2	13	8	0.63	32	28	0.86	4.1
Grand Mean		51	91	2	10	8	0.84	30	28	0.91	3.8
C.V. (%)		1	0	10	17	18	20	8	8	10	
LSD ($\alpha=0.05$)		1	1	0	2	2	0	3	3	0	

Pod height was measured at the green pod stage and at harvest maturity. Pod height index was determined by dividing pod height at harvest maturity by the green pod height.

Plant height was measured at the green plant stage and at harvest maturity. Plant height index was determined by dividing plant height at harvest maturity by the green plant height.

Agronomic data are means of three replications at Pullman, WA. Means data are means of three replications over 2 locations; Farmington and Pullman.

Table 27. Mean Yields (kg/ha) of Lentil Lines in the Advanced Pardina Type Lentil Yield Trial, 2001 - 2003

Cultivar	Origin	2001	2002	2003
LC01601640P	X93L018	....	....	1527
LC01601641P	X93L018	....	....	1438
LC00600812P	X93L010	....	1359	1431
LC01602245P	X98L038	....	....	1340
Pardina	.....	1776	1409	1334
LC99602427P	X93L018	1892	1436	1333
LC000010D	.....	1636	1288	1073
LC01600389P	X96L060	....	....	967
Grand Mean		1659	1203	1305
LSD ($\alpha=0.05$)		112	80	131

Yield data are means of three replications at each location, over three locations in each year.

Table 28. Agronomic Data for the Preliminary Large Yellow Lentil Yield Trial, 2003 (0354)

Cultivar	Origin	Days to Flower	Days to Maturity	Pods/ Peduncle	Pod Ht (green) ..cm..	Pod Ht (mature) ..cm..	Pod Ht Index	Plant Ht (green) ..cm..	Plant Ht (mature) ..cm..	Plant Ht Index	Weight 100 Seed ..g..	Mean Seed Yield ..kg/ha..
LC01600732R	X98L011	53	92	2	17	11	0.67	33	30	0.90	5.0	1597
LC01602300R	X98L047	53	92	2	17	13	0.73	34	34	0.96	4.6	1586
LC01600686L	X97L086	51	91	2	19	9.7	0.54	37	33	0.88	6.6	1515
LC01601333L	X96L091	51	92	3	15	11	0.76	38	34	0.97	7.4	1506
Richlea	.....	53	91	2	16	12	0.76	38	34	0.90	4.8	1497
LC01600828R	X97L093	57	92	2	19	15	0.77	34	29	0.84	4.9	1463
LC01601051L	X93L035	59	93	3	22	13	0.55	39	38	1.00	6.7	1452
LC01600856R	X97L094	50	91	2	14	11	0.78	33	32	0.97	5.0	1416
Mason	.....	50	91	2	14	12	0.84	38	34	0.86	7.0	1412
LC01600719L	X98L010	53	91	3	16	9.7	0.67	31	30	0.95	6.3	1410
LC01600698L	X97L086	51	91	2	15	15	0.99	35	34	0.93	7.0	1399
Merrit	.....	50	91	2	13	11	0.82	35	31	0.89	6.5	1366
Brewer	.....	50	90	2	13	11	0.82	37	31	0.91	5.8	1352
LC01602252R	X98L039	57	91	3	17	17	0.98	42	38	0.87	5.1	1337
LC01600558R	.....	51	91	2	14	7.2	0.50	28	28	0.96	5.0	1326
LC01601394L	X96L110	51	92	2	18	14	0.78	39	36	0.95	7.4	1316
Pennell	.....	52	91	3	16	16	0.98	31	28	0.92	6.5	1267
LC01600745L	X98L012	50	92	3	20	13	0.71	32	33	1.00	7.1	1232
LC01600749L	X98L012	51	91	3	20	13	0.68	32	27	0.83	6.9	1220
LC01601357L	X96L095	51	93	2	19	11	0.58	36	33	0.93	7.5	1215
LC01602277R	X98L042	57	91	2	16	9.9	0.63	29	28	0.97	4.3	1187
LC01601591L	X97L051	51	91	2	15	11	0.73	36	34	1.00	7.0	1166
LC01601192L	X95L243	51	92	3	14	11	0.75	29	29	0.97	7.1	1147
LC01601603L	X97L006	51	92	2	19	14	0.75	36	36	1.00	6.7	1135
LC01601461L	X97L009	52	92	2	18	12	0.70	36	31	0.87	7.5	1104
LC01600755L	X97L109	51	92	2	16	12	0.73	32	31	1.00	7.2	1091
LC01601205L	X95L245	50	93	2	19	13	0.73	38	35	0.87	8.6	1049
LC01601325L	X96L090	50	93	2	20	16	0.81	36	34	0.91	7.1	960
LC01601225L	X95L248	51	93	2	18	12	0.65	33	32	1.00	8.2	880
LC01601548L	X97L042	50	93	2	16	8.4	0.52	35	33	0.94	7.5	852
Grand Mean		52	92	2	17	12	0.73	35	32	0.93	6.5	1282
C.V. (%)		2	1	10	10	20	22	7	5	7		6
LSD ($\alpha=0.05$)		1	1	0	2	3	0	3	2	0		108

Planting date 4/28/03. Harvest date 8/8/03.

Pod height was measured at the green pod stage and at harvest maturity. Pod height index was determined by dividing pod height at harvest maturity by the green pod height.

Plant height was measured at the green plant stage and at harvest maturity. Plant height index was determined by dividing plant height at harvest maturity by the green plant height.

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

Table 29. Agronomic Data for the Zero Tannin Lentil Yield Trial, 2003 (0363)

Cultivar	Origin	Days to Flower	Days to Maturity	Pods/ Peduncle	Pod Ht (green) ..cm..	Pod Ht (mature) ..cm..	Pod Ht Index	Plant Ht (green) ..cm..	Plant Ht (mature) ..cm..	Plant Ht Index	Weight 100 Seed ..g..	Mean Seed Yield ..kg/ha..
LC7601114YZ	X93L001	51	92	2	14	8	0.59	33	31	0.98	5.6	1207
LC99602585RZ	X95L004	51	93	2	11	7	0.70	32	28	0.91	4.3	1191
LC01601936r	X95L267	50	92	2	12	6	0.51	31	29	0.97	5.7	1116
LC99602614RZ	X95L005	51	94	2	10	8	0.84	27	29	1.00	4.8	1060
Brewer	.....	50	92	2	14	7	0.48	34	33	0.92	5.9	960
LC8601910YZ	X93L001	52	93	2	16	8	0.53	38	35	0.91	5.8	939
LC00600917RZ	X95L005	51	93	2	13	8	0.65	34	30	0.94	4.6	934
LC8601942YZ	X93L004	53	95	2	17	8	0.50	35	30	0.90	5.8	913
LC01600556RZ	.....	51	93	2	12	4	0.38	38	30	0.80	4.1	879
LC01601685YZ	X93L001	53	93	2	15	11	0.74	38	34	0.91	5.8	806
LC01600513RZ	.....	51	95	2	15	8	0.55	30	32	1.00	4.1	698
LC01601709YZ	X93L033	57	98	2	18	14	0.78	37	37	0.97	5.2	646
Grand Mean		52	93	2	14	8	0.60	34	31	0.94	5.1	946
C.V. (%)		1	1	8	19	26	30	12	8	7		15
LSD ($\alpha=0.05$)		1	2	0	4	3	0	6	4	0		206

Planting date 4/28/03. Harvest date 8/8/03.

Pod height was measured at the green pod stage and at harvest maturity. Pod height index was determined by dividing pod height at harvest maturity by the green pod height.

Plant height was measured at the green plant stage and at harvest maturity. Plant height index was determined by dividing plant height at harvest maturity by the green plant height.

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

Table 30. Agronomic Data for the Preliminary Lentil Screening Nursery, 2003 (0355)

Page 1 of 4

Cultivar	Origin	Days to Flower	Days to Maturity	Pods/ Peduncle	Pod Ht (green) ..cm..	Pod Ht (mature) ..cm..	Pod Ht Index	Plant Ht (green) ..cm..	Plant Ht (mature) ..cm..	Plant Ht Index	Weight 100 Seed ..g..	Mean Seed Yield ..kg..
<i>Laird Type</i>												
LC02600104L	X97L086	48	88	2	17	12	0.71	33	33	1.00	6.2	1645
LC0160691L	X97L086	49	88	3	16	11	0.69	37	36	0.97	6.5	1631
LC0160692L	X97L086	50	88	2	20	10	0.50	39	36	0.92	5.9	1605
LC02600095L	X97L086	55	88	2	21	13	0.62	39	33	0.85	7.3	1541
LC02600016L	X98L002	52	88	2	16	9	0.56	35	33	0.94	5.8	1529
LC02600106L	X97L086	49	88	2	18	11	0.61	39	31	0.79	6.4	1514
LC02600488L	X97L086	54	88	2	24	9	0.38	42	38	0.90	6.8	1507
LC02600487L	X97L086	54	88	2	15	13	0.87	37	32	0.86	7.8	1497
LC02600531L	X98L012	48	88	2	14	11	0.79	36	35	0.97	6.5	1495
LC02600102L	X97L086	49	88	2	19	11	0.58	34	29	0.85	6.5	1490
LC02600793L	X95L240	47	90	2	11	11	1.00	44	33	0.75	7.2	1480
LC02601124L	X98L039	53	88	3	21	14	0.67	43	38	0.88	5.8	1450
LC02600492L	X97L086	55	88	2	22	13	0.59	40	36	0.90	7.0	1421
LC0160719L	X98L010	49	88	2	15	15	1.00	33	31	0.94	6.3	1406
LC0160698L	X97L086	51	88	2	18	13	0.72	39	35	0.90	7.3	1395
LC02600094L	X97L086	50	88	3	20	19	0.95	39	28	0.72	7.3	1389
LC02600950L	X97L039	52	88	2	22	14	0.64	41	36	0.88	7.1	1381
LC02600770L	X95L235	49	90	2	22	8	0.36	43	37	0.86	7.6	1374
LC02600327L	X98L024	50	88	3	23	14	0.61	38	28	0.74	6.2	1363
LC02600778L	X95L235	48	90	2	18	15	0.83	48	27	0.56	7.1	1354
LC02600523L	X98L012	49	88	2	15	4	0.27	36	33	0.92	6.8	1347
LC0160724L	X98L010	49	88	2	18	10	0.56	35	31	0.89	6.5	1344
LC02600945L	X97L035	47	88	2	19	12	0.63	43	36	0.84	7.8	1342
LC0160808L	X98L015	50	88	3	18	11	0.61	35	30	0.86	6.0	1342
LC02600934L	X97L008	49	90	2	18	1	0.06	41	25	0.61	7.4	1334
LC0160758L	X97L109	51	88	3	17	17	1.00	31	30	0.97	6.5	1332
LC02600938L	X97L008	50	90	2	24	8	0.33	42	31	0.74	7.3	1304
LC0160717L	X98L010	48	88	2	15	12	0.80	31	29	0.94	6.5	1294
LC02600738L	X95L093	47	88	2	22	16	0.73	45	32	0.71	7.8	1285
LC02600740L	X95L220	51	90	2	23	19	0.83	44	40	0.91	8.0	1265
LC02600166L	X97L109	54	88	2	17	11	0.65	33	30	0.91	7.4	1250
LC02600916L	X96L110	50	88	2	21	15	0.71	40	39	0.98	7.5	1243
LC02600197L	X98L014	53	88	3	19	14	0.74	38	35	0.92	6.3	1233
LC0160695L	X97L086	48	88	2	11	11	1.00	38	38	1.00	6.7	1228
LC02600772L	X95L235	49	90	2	21	8	0.38	49	36	0.73	7.0	1225
LC0160933L	X98L023	50	88	2	14	9	0.64	30	30	1.00	7.7	1216
LC0160761L	X97L109	49	88	2	18	11	0.61	38	35	0.92	6.4	1183
LC02600168L	X97L109	51	90	3	21	17	0.81	33	30	0.91	6.7	1178
LC02600225L	X98L016	49	88	3	12	5	0.42	30	27	0.90	6.5	1178
LC02600440L	X98L004	48	88	2	15	1	0.07	32	30	0.94	7.4	1168
LC02600954L	X97L051	49	88	2	19	11	0.58	42	36	0.86	6.9	1154
LC02600300L	X98L021	48	88	3	19	15	0.79	31	28	0.90	6.8	1149
LC02600218L	X98L016	55	88	3	18	16	0.89	35	30	0.86	6.4	1055
LC02600753L	X95L223	48	90	2	22	15	0.68	41	36	0.88	6.8	1027
LC02600223L	X98L016	50	88	2	18	11	0.61	31	24	0.77	6.9	1025

Table 30. Agronomic Data for the Preliminary Lentil Screening Nursery, 2003 (0355) Continued

Page 2 of 4

Cultivar	Origin	Days to Flower	Days to Maturity	Pods/ Peduncle	Pod Ht (green) ..cm..	Pod Ht (mature) ..cm..	Pod Ht Index	Plant Ht (green) ..cm..	Plant Ht (mature) ..cm..	Plant Ht Index	Weight 100 Seed ..g..	Mean Seed Yield ..kg/ha..
LC02600077L	X98L006	55	88	2	19	11	0.58	31	28	0.90	6.9	985
LC02600747L	X95L221	47	90	2	18	9	0.50	41	34	0.83	7.8	971
LC02600801L	X95L241	49	90	2	24	14	0.58	42	32	0.76	8.0	922
LC02600716L	X95L089	48	90	2	19	13	0.68	38	34	0.89	7.9	921
LC02600768L	X95L230	50	90	2	15	12	0.80	40	32	0.80	7.3	884
LC02600555L	X98L016	54	88	3	17	12	0.71	32	28	0.88	6.7	877
LC02600469L	X98L006	50	88	3	19	12	0.63	30	30	1.00	6.4	874
LC02600212L	X98L015	54	88	2	23	16	0.70	36	31	0.86	6.5	874
LC0160686L	X97L086	52	88	2	19	13	0.68	36	30	0.83	7.1	847
LC0160715L	X98L010	49	88	2	17	9	0.53	35	23	0.66	6.7	838
LC02600502L	X98L010	47	88	3	14	12	0.86	29	29	1.00	5.7	801
LC0160799L	X97L092	49	88	2	12	6	0.50	25	25	1.00	6.1	734
LC02600714L	X95L089	48	90	2	20	12	0.60	37	31	0.84	7.9	573
<i>Sub Mean – Laird</i>		50	88	2	18	12	0.65	37	32	0.87	6.9	1229
Castilian Type												
LC02600026C	X97L083	51	88	3	20	12	0.60	37	30	0.81	6.5	1468
LC02600010C	X98L002	47	88	2	15	7	0.47	35	26	0.74	6.8	1358
LC02600320C	X98L023	53	88	2	18	12	0.67	35	31	0.89	7.5	1211
<i>Sub Mean – Castilian</i>		50	88	2	18	10	0.58	36	29	0.81	6.9	1346
Richlea Type												
LC02601118R	X98L039	52	88	3	19	19	1.00	40	39	0.98	5.3	2112
LC02601171R	X98L049	48	88	2	17	11	0.65	41	37	0.90	4.5	1752
LC02601116R	X98L039	49	88	2	19	19	1.00	45	38	0.84	3.9	1682
LC02601120R	X98L039	54	88	3	19	19	1.00	41	39	0.95	5.1	1650
LC02601112R	X98L037	49	88	2	16	11	0.69	35	33	0.94	4.5	1616
LC0160828R	X97L093	49	88	2	17	11	0.65	36	35	0.97	4.8	1593
LC02601169R	X98L049	49	88	3	18	15	0.83	40	39	0.98	5.1	1536
LC02601125R	X98L039	54	88	3	19	12	0.63	39	33	0.85	5.1	1531
LC0160667R	X98L007	49	88	2	13	11	0.85	31	26	0.84	4.5	1426
LC02600193R	X98L014	48	88	2	17	13	0.76	36	31	0.86	5.1	1410
LC02600372R	X98L030	53	88	2	17	12	0.71	35	29	0.83	4.8	1373
LC02601126R	X98L039	53	88	3	16	11	0.69	37	36	0.97	5.2	1371
LC02600563R	X97L093	54	88	2	20	14	0.70	34	31	0.91	5.9	1363
LC0160892R	X98L019	49	88	2	17	7	0.41	36	26	0.72	4.5	1317
LC02600524R	X98L012	53	88	3	19	14	0.74	40	36	0.90	5.7	1316
LC02600261R	X98L018	48	88	2	18	14	0.78	40	30	0.75	4.1	1211
LC02600206R	X97L092	54	88	2	19	16	0.84	35	30	0.86	4.7	1163
LC02601132R	X98L041	55	88	2	18	12	0.67	30	30	1.00	4.7	1106
LC02601130R	X98L039	56	88	3	21	14	0.67	38	31	0.82	4.0	1095
LC02601108R	X98L037	50	88	2	20	13	0.65	31	31	1.00	5.5	1032
LC02601137R	X98L041	51	88	2	14	12	0.86	34	25	0.74	4.0	986
LC02601138R	X98L041	53	88	2	11	10	0.91	34	28	0.82	4.1	985
LC02601134R	X98L041	54	90	3	17	14	0.82	30	28	0.93	4.6	941
LC0160711R	X98L010	49	88	2	10	10	1.00	33	30	0.91	6.7	650
<i>Sub Mean - Richlea</i>		51	88	2	17	13	0.77	36	32	0.89	4.9	1342

Table 30. Agronomic Data for the Preliminary Lentil Screening Nursery, 2003 (0355) Continued

Page 3 of 4

Cultivar	Origin	Days to Flower	Days to Maturity	Pods/ Peduncle	Pod Ht (green) ..cm..	Pod Ht (mature) ..cm..	Pod Ht Index	Plant Ht (green) ..cm..	Plant Ht (mature) ..cm..	Plant Ht Index	Weight 100 Seed ..g..	Mean Seed Yield ..kg/ha..
Pardina Type												
LC02600397P	X98L033	53	88	3	15	15	1.00	34	33	0.97	3.9	1726
LC02600962P	X93L018	47	88	2	15	9	0.60	38	30	0.79	4.1	1638
LC02600682P	X98L031	50	88	2	16	10	0.63	36	31	0.86	3.6	1621
LC02600377P	X98L031	51	88	2	14	11	0.79	30	30	1.00	4.3	1549
LC02601144P	X98L044	50	88	2	10	10	1.00	33	33	1.00	4.0	1534
LC02600677P	X98L031	51	88	2	15	13	0.87	33	27	0.82	3.7	1243
LC02601264P	X97L106	54	88	2	19	12	0.63	38	33	0.87	3.6	1188
LC02600041P	X98L003	47	88	2	12	10	0.83	25	22	0.88	5.2	1047
PI_432028	.....	50	88	2	17	7	0.41	25	22	0.88	3.5	790
<i>Sub Mean - Pardina</i>		50	88	2	15	11	0.75	32	29	0.90	4.0	1371
Eston Type												
LC02600147E	X98L011	54	88	2	17	16	0.94	36	34	0.94	3.8	1806
LC02600698E	X98L032	54	88	3	14	14	1.00	34	33	0.97	3.1	1601
LC0160830E	X98L017	52	88	3	18	10	0.56	39	31	0.79	3.4	1527
LC02600692E	X98L032	54	88	3	20	15	0.75	39	36	0.92	3.3	1494
LC02601191E	X98L055	50	88	2	15	9	0.60	36	30	0.83	3.6	1465
LC02600694E	X98L032	55	90	2	13	12	0.92	36	35	0.97	3.1	1450
LC02600565E	X98L017	50	88	2	14	10	0.71	31	28	0.90	3.4	1405
LC02600395E	X98L032	51	90	2	19	12	0.63	37	36	0.97	3.8	1388
LC0160736E	X98L011	54	88	3	15	15	1.00	35	33	0.94	3.7	1358
LC02600508E	X98L011	49	88	3	21	15	0.71	41	33	0.80	4.3	1353
LC02600666E	X98L034	48	88	2	12	7	0.58	30	30	1.00	3.3	1336
LC02601183E	X98L054	49	88	2	10	9	0.90	35	32	0.91	3.8	1302
LC0160735E	X98L011	53	88	3	13	13	1.00	32	30	0.94	3.8	1285
LC02600518E	X98L011	50	88	2	17	13	0.76	33	29	0.88	3.4	1225
LC0160743E	X98L011	53	88	2	18	9	0.50	35	30	0.86	3.6	1221
LC02600394E	X98L032	54	90	3	16	16	1.00	39	30	0.77	3.1	1210
LC02601155E	X98L045	49	88	2	13	13	1.00	33	25	0.76	2.9	1154
LC02600253E	X98L018	49	88	2	15	11	0.73	32	25	0.78	3.7	1126
LC02600667E	X98L034	49	88	2	14	13	0.93	34	27	0.79	3.4	1075
LC02601153E	X98L045	51	88	2	13	9	0.69	31	29	0.94	2.6	1059
LC0160682E	X98L007	49	88	2	14	10	0.71	25	25	1.00	3.9	807
LC02600345E	X98L025	50	88	2	10	9	0.90	28	26	0.93	3.3	790
LC0160728E	X98L011	49	88	2	8	8	1.00	30	25	0.83	4.1	728
LC0160734E	X98L011	49	88	3	14	14	1.00	33	32	0.97	4.0	728
PI_431624	.....	50	88	2	11	6	0.55	26	22	0.85	3.3	721
LC02600970E	X94L033	51	88	2	17	14	0.82	36	29	0.81	3.5	664
LC02600393E	X98L032	57	95	3	17	17	1.00	31	31	1.00	3.4	528
LC0160858E	X97L094	49	88	2	12	8	0.67	30	29	0.97	3.9	435
LC02601156E	X98L045	49	88	2	8	8	1.00	30	30	1.00	3.2	412
<i>Sub Mean - Eston</i>		51	88	2	14	12	0.81	33	30	0.90	3.5	1126
Zero Tannin Type – Yellow Cot												
LC02601249YZ	X00L031	51	88	2	17	16	0.94	39	38	0.97	5.2	1603

Table 30. Agronomic Data for the Preliminary Lentil Screening Nursery, 2003 (0355) Continued

Page 4 of 4

Cultivar	Origin	Days to Flower	Days to Maturity	Pods/ Peduncle	Pod Ht (green) ..cm..	Pod Ht (mature) ..cm..	Pod Ht Index	Plant Ht (green) ..cm..	Plant Ht (mature) ..cm..	Plant Ht Index	Weight 100 Seed ..g..	Mean Seed Yield ..kg/ha..
LC02601247YZ	X00L031	50	88	2	14	12	0.86	37	34	0.92	5.4	1452
LC02601251YZ	X00L031	52	90	2	17	10	0.59	38	38	1.00	6.3	1406
<i>Sub Mean – Zero Tannin, Y</i>		51	89	2	16	13	0.80	38	37	0.96	5.6	1487
<i>Zero Tannin Type – Red Cot</i>												
LC02600977RZ	X95L004	50	90	2	9	8	0.89	35	30	0.86	4.7	963
<i>Turkish Red Type</i>												
LC02601008T	X95L061	49	88	2	12	8	0.67	33	32	0.97	3.8	1601
LC02601066T	X96L067	52	88	3	13	11	0.85	30	30	1.00	3.9	1504
LC02601009T	X95L061	49	88	2	14	14	1.00	29	28	0.97	3.7	1495
LC02600449T	X97L084	54	88	3	20	18	0.90	34	32	0.94	4.2	1472
LC02601148T	X98L044	49	88	2	11	6	0.55	32	27	0.84	3.5	1324
LC02601276T	X97L108	53	88	2	13	12	0.92	36	35	0.97	3.8	1289
LC02601275T	X97L108	55	90	2	16	13	0.81	35	32	0.91	3.3	1216
LC02601273T	X97L107	55	90	2	17	10	0.59	33	33	1.00	2.9	1060
LC02601271T	X97L107	54	88	2	15	13	0.87	34	34	1.00	3.4	1025
LC02601209T	X98L062	49	88	2	8	6	0.75	30	23	0.77	3.8	961
LC02600544T	X97L090	53	88	2	15	14	0.93	32	28	0.88	3.7	921
LC02600412T	X97L107	56	90	3	21	18	0.86	34	32	0.94	3.0	780
LC02600633T	X97L098	52	88	2	13	13	1.00	30	28	0.93	5.1	507
LC02600679T	X98L031	50	88	2	20	9	0.45	35	32	0.91	3.9	373
LC02600655T	X97L100	52	88	2	13	13	1.00	35	24	0.69	3.7	148
<i>Sub Mean – Turkish Red</i>		52	88	2	15	12	0.81	33	30	0.91	3.7	1045
Grand Mean		51	88	2	17	12	0.73	35	31	0.88	5.3	1223

Planting date 5/1/03. Harvest date 8/7/03.

Pod height was measured at the green pod stage and at harvest maturity. Pod height index was determined by dividing pod height at harvest maturity by the green pod height.

Plant height was measured at the green plant stage and at harvest maturity. Plant height index was determined by dividing plant height at harvest maturity by the green plant height.

Agronomic and yield data are one replication at Pullman, WA.

Table 31. Agronomic Data for the Canadian and Australian Lentil Observation Nursery, 2003 (0307L)

Cultivar	Days to Flower	Days to Maturity	Pods/ Peduncle	Pod Ht (Green)	Pod Ht (Mature)	Pod Ht Index	Plant Ht (Green)	Plant Ht (Mature)	Plant Ht Index	Weight 100 Seed	Seed Yield
				..cm..	..cm..		..cm..	..cm..		..g..	..kg/ha...
95-003L*96G6-98H007	50	87	2	16	11	0.69	38	31	0.82	3.5	2083
1145-3-6	54	94	2	19	12	0.63	37	37	1.00	3.7	1976
1119-2-7	52	88	2	17	14	0.82	37	37	1.00	3.6	1962
1207D-13	53	94	2	17	15	0.88	40	31	0.78	4.5	1959
1211-41	55	94	2	18	17	0.94	41	41	1.00	4.5	1907
1208D-35	54	94	2	17	14	0.82	43	25	0.58	4.8	1860
1119-2-3	52	87	2	17	13	0.76	36	28	0.78	3.4	1813
1254S-1	54	94	3	21	16	0.76	37	36	0.97	4.3	1734
1076-13	49	87	2	11	10	0.91	30	30	1.00	3.8	1707
95-002L*96G3-98H002	49	94	2	12	6	0.50	28	27	0.96	3.7	1636
94-009L*97H5	48	87	2	5	5	1.00	25	21	0.84	4.4	1593
Cassab	48	87	2	10	2	0.20	25	21	0.84	5.0	1544
95-013L*96G1-98H007	49	87	2	11	8	0.73	29	29	1.00	3.2	1458
94-003L*97H26	47	87	2	10	5	0.50	28	25	0.89	5.1	1386
Aldinga	48	87	1	8	5	0.63	26	18	0.69	4.9	1292
Pennell [†]	53	89	3	20	14	0.74	32	28	0.90	6.3	1291
94-002L*97H29	48	87	2	15	7	0.47	32	28	0.88	2.8	1275
Nugget	48	87	2	8	7	0.88	28	26	0.93	4.6	1268
1110-13RY-5	55	87	3	22	15	0.68	37	28	0.76	3.1	1262
1125-1-5	54	87	2	18	15	0.83	31	31	1.00	2.9	1260
94-004L*97H11	48	87	2	11	5	0.45	32	29	0.91	6.3	1258
Digger	48	87	1	8	7	0.88	24	22	0.92	4.9	1257
Northfield	49	87	2	8	6	0.75	27	22	0.81	3.0	1257
95-003L*96G1-97H7	49	87	2	16	13	0.81	32	30	0.94	2.8	1232
94-004L*97H10	48	87	2	7	3	0.43	32	28	0.88	5.3	1181
Matilda	48	87	2	7	7	1.00	24	20	0.83	3.0	1094
ILL7220	48	87	1	5	3	0.60	25	21	0.84	3.4	1089
Cobber	48	87	2	10	7	0.70	23	22	0.96	4.5	1075
I94S160L*97H10	47	87	2	9	1	0.11	23	18	0.78	4.8	1060
1038L-18	54	87	3	15	15	1.00	31	29	0.94	4.5	1030
1218D-13	54	87	2	19	16	0.84	34	31	0.91	2.7	956
1218D-18	54	87	3	18	7	0.39	31	28	0.90	3.1	954
94-009L*98H069	47	87	2	7	5	0.71	27	22	0.81	4.0	941
1211M-16	54	87	2	19	15	0.79	30	29	0.97	3.9	938
1162-27	53	87	2	20	13	0.65	32	30	0.94	4.6	843
1193-2-21	52	87	2	15	13	0.87	24	24	1.00	3.0	801
1190S-101	51	87	3	10	10	1.00	28	25	0.89	2.7	753
1153-11	55	87	2	11	11	1.00	28	26	0.93	2.8	712
1194-3	54	87	2	13	13	1.00	27	23	0.85	2.5	680
901-1-28RS	52	87	3	17	9	0.53	31	26	0.84	2.4	617
Cumra	47	87	2	5	2	0.40	25	19	0.76	4.3	590
Grand Mean	51	88	2	13	10	0.71	30	27	0.88	3.9	1283

[†]Values are the average of 12 check plots

Planting date 5/2/03. Harvest date 8/8/03.

Pod height was measured at the green pod stage and at harvest maturity. Pod height index was determined by dividing pod height at harvest maturity by the green pod height.

Plant height was measured at the green pod stage and at harvest maturity. Plant height index was determined by dividing plant height at harvest maturity by the green plant height.

Agronomic and yield data are one replication at Pullman, WA

Table 32. Western Regional Lentil Yield Trial, Walla Walla, WA, 2003 (0398)

Cultivar	Seed Yield ..kg/ha...
LC00600831E	1181
LC9960	1175
LC2712T	1119
Merrit	1100
Castillian	1018
LC99602724T	1003
LC00600812P	976
Pennell	842
LC99602075L	771
LC00600854E	734
LC860359L	665
LC99600273L	573
Grand Mean	930
C.V. (%)	17
LSD _($\alpha=0.05$)	217

Planting date 4/29/03. Harvest date 7/30/03

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

Winter Lentil Trial Results

Sixteen selections were included in the red cotyledon winter lentil nursery in 2002-2003 and were grown at two locations, the Russ Zenner farm near Genesee and on the Joe Schmitz farm near Rosalia (Table 33). Winter hardy lentil lines are being targeted for direct seeding in standing wheat or barley stubble in order to aid in control of soil erosion. It is also expected that seed yield will be increased up to 50% over traditional spring types. Average seed yield at the Genesee site was 2128 kg/ha (1915 lb/a) while at the Rosalia site yields averaged 1682 kg/ha (1514 lb/a). Morton, the recently released winter lentil, had an average yield of 2540 kg/ha (2286 lb/a) across the two locations. Morton is relatively small seeded and has red cotyledons and is expected to fit well into markets in South Asia.

Morton and LC9976079, a yellow cotyledon winter lentil, were included with the two winter pea selections described previously in a study to determine adaptation to direct seeding systems (Table 33). Preliminary results indicate that winter pea and lentil have potential to provide producers with a viable alternative cropping system to spring sown legume crops. Direct sowing into standing stubble offers many advantages including control of soil erosion, snow capture and greater protection of small seedlings from harsh winter conditions.

Table 33. Agronomic and Yield Data for the Advanced Red Cotyledon Winter Lentil Yield Trial, 2003 (0341F)

Cultivar	Origin	Pods/ Peduncle	Mean Pod Ht (green) ..cm..	Pod Ht (mature) ..cm..	Pod Ht Index	Mean Plant Ht (green) ..cm..	Plant Ht (mature) ..cm..	Plant Ht Index	Mean Stand Count	Weight 100 Seed ..g..	Seed Yld Genesee .kg/ha.	Seed Yld Rosalia .kg/ha.	Seed Yld Mean .kg/ha.
LC9979065T	X92L043	2	17	11	0.80	37	38	0.94	16	3.3	2872	2798	2835
LC9978057T	X92L040	2	16	6	0.35	42	38	0.87	19	3.6	2693	2400	2546
Morton	X92L043	3	15	18	0.92	38	39	0.97	14	3.5	2489	2592	2540
LC9979062T	X92L043	2	21	11	0.61	42	36	0.82	18	3.7	2786	2030	2408
LC9979120T	X92L043	3	20	14	0.53	38	40	0.97	20	2.9	2400	2292	2346
LC9978094T	X92L040	2	23	3	0.22	44	34	0.76	18	3.3	2804	1796	2300
WA8649041	.....	3	23	18	0.73	47	42	0.86	16	3.2	1659	2157	1908
LC0160879c	X98L018	2	18	12	0.65	41	34	0.79	12	3.8	2083	1389	1736
LC9976079T	X92L035	2	18	14	0.78	41	39	0.88	15	...	2055	1286	1671
LC0160873c	X98L018	2	15	7	0.36	41	32	0.72	14	3.8	2009	1183	1596
LC0160869c	X98L018	3	16	6	0.27	39	27	0.65	11	3.7	1821	1304	1563
LC0160957T	X98L025	2	15	6	0.54	42	28	0.69	12	3.7	1974	1136	1555
LC0160872c	X98L018	3	15	6	0.45	40	30	0.68	16	3.6	1630	1370	1500
LC9440070r	X92L001	2	17	8	0.52	45	35	0.73	10	6.0	1407	1583	1495
LC0160887T	X97L095	3	17	10	0.47	42	38	0.87	15	4.0	1940	731	1336
LC0160641T	X97L084	3	16	9	0.40	43	38	0.89	13	4.7	1425	861	1143
Grand Mean		2	17	10	0.54	41	35	0.82	15	3.8	2128	1682	1905
C.V. (%)		22	18	35	42	7	13	14	22		15	13	14
LSD ($\alpha=0.05$)		1	4	5	0	4	6	0	4		432	306	311

Planting date Genesee 10/9/02. Harvest date Genesee 7/23/03. Planting date Rosalia 10/10/02. Harvest date Rosalia 7/31/03.

Pod height was measured at the green pod stage and at harvest maturity.

Pod height index was determined by dividing the pod height at harvest maturity by the green pod height at Rosalia.

Plant height was measured at the green pod stage and at harvest maturity.

Plant height index was determined by dividing the canopy height at harvest maturity by the total plant height at Rosalia.

Agronomic data are means of three replications at Rosalia, WA. Means data are means of three replications over two locations, Genesee, ID and Rosalia, WA.

Yield data are means of three replications at each location, across two locations.

Field Evaluation of Lentil Cultivars for Resistance to *Sclerotinia sclerotiorum*

Field and greenhouse experiments were conducted in 2003 to identify sources of resistance to *Sclerotinia* white mold in pea, chickpea and lentil. Twelve lentils cultivars were evaluated in the field at three locations, Pullman and Prosser, WA and Corvallis, OR. The weather conditions in the 2003 growing season were extremely dry in the Palouse region with only 2.20 inches of rain during the months of May, June, July and August. Minimum development of white mold was observed in the field plots at the Pullman and Prosser locations. However at the Corvallis location, moderate levels of white mold developed. The cultivars that developed least amount of disease include Athena (9%), Pennell (25%), Richlea (10%), Sovereign (5%) and Crimson (20%). The most susceptible cultivars include Brewer (62%), Pardina (78%), and Merrit (80%). The data have a good correlation with those we observed in 2002. In 2002, we observed that Pennell was among the resistant and Pardina among the susceptible. However, cultivar Merrit was considered as resistant but showed high levels of incident in the 2003 field trial.

In the greenhouse we completed screened part of the core collection of lentil. There are about 280 accessions in the lentil core collection. Two hundred of them were screened in the greenhouse using colonized oat kernels as inoculum. Inoculated plants started to wilt three days after inoculation. The number of plants wilted out of total inoculated plants was recorded at three-day intervals. Most of the lentil accessions screened so far are susceptible to white mold. A few accessions were observed to be resistant. The resistant accessions include ILL 669, ILL 1878 and Precoz. These resistant accessions remained green and no signs of wilting 12 days after inoculation. In comparison, the susceptible lines like Giza 9 and RedChief were wilted three days after inoculation. The difference is believed to be physiological because signs of infection at the base of the plants was observed three days after inoculation in all inoculated plants. The identified resistant accessions are being used in crosses with susceptible lines in order to study the inheritance pattern of the resistance to white mold in lentil.

Chickpea Trial Results

Fifteen selections and five check varieties were included in the advanced large Kabuli chickpea yield trials conducted at Genesee, ID, Pullman, WA and Walla-Walla, WA in 2003 (Tables 35, 36 and 37). Mean yields of the trials were relatively low and a reflection of the unusually hot and dry season in 2003. Check varieties included the newly released 'Sierra' as well as 'Dwelley', 'Sanford', 'Evans' and 'Xena' from Canada. Yields at all three sites were below normal. Selections that had been promising in the past two seasons (CA9990I604C, CA9990I875W and CA9890233W) had disappointing yields. These three selections have the fern leaf structure; however, the expected improved yield potential was not realized because of the hot and dry 2003 season. We expect that in a more normal moisture year, that these three selections will show improved yield over the unifoliolate varieties currently in use. Of these three selections, CA9990I604C was the highest yielding in 2003 and has excellent seed size and quality. CA9990I875W is a large seeded Spanish White type selection with excellent size and quality. Both selections have good resistance to ascochyta blight. We will continue to test these selections in 2004 and make a decision on a possible variety release after the season. Several of the higher yielding selections in the trial were somewhat small seeded. They were included based on their very good resistance to ascochyta blight.

The 2003 preliminary yield trial conducted at Pullman, WA for large Kabuli chickpeas had 13 entries and 3 check lines (Table 38). Check lines included Dwelley, Sanford, and Sierra. Spanish White type selections in the Preliminary trial were chosen for large seed size and good resistance to ascochyta blight. Three of the selections (CA0190B110C, CA0190B777C and CA0190B775C) had higher yields when compared to Sierra with considerably lower blight scores. However, those selections had significantly smaller seed size. Based on the high resistance of CA0190B110C, we will use that line as a parent in the crossing program with the goal to increase seed size of the selection or to transfer the high level of resistance to other lines in the breeding program.

The preliminary screening nursery had 61 entries of mostly Café types that were being evaluated for the first time (Table 39). The 61 lines were evaluated for plant type, habit, leaf type, and earliness to flower and resistance to ascochyta blight. The most promising selections will be advanced to the preliminary yield trial in spring of 2004.

An observation trial of breeding lines from Canada and Australia was conducted at Pullman (Table 40). The lines were evaluated in an unreplicated trial to observe the characteristics and disease resistance of material from other programs. The location of the trial was quite variable and it is therefore difficult to draw conclusions concerning the performance of the lines.

Disease screening:

Recent results of disease screening in the greenhouse has indicated that the newly released variety Sierra has resistance to pathotypes 1 and 2 of the blight pathogen while Dwelley, Sanford and Evans only have resistance to pathotype 1. This finding

explains what appears to be a breakdown of disease resistance of these earlier released varieties and the apparent improved performance of Sierra that appears to have resistance to both pathotypes. Newly introduced germplasm from ICARDA is expected to have resistance to pathotypes 1, 2 and 3 and the incorporation of that germplasm into the breeding program will be important to improved resistance in future selections.

The ascochyta blight nursery established annually at Spillman Farm continues to be an excellent method of screening for resistance. More than 1800 lines and selections from the breeding program and other sources were screened for resistance in 2003. Infected chickpea debris from infected plants was gathered for use in 2004 to inoculate the nursery. The infected debris is spread among the newly emerging plants in the nursery each spring. Irrigation water is applied to the nursery at regular intervals, usually at night, to ensure good spread of the disease and to promote the pod infection phase. In addition to inoculation using infected plant debris, we also inoculated the trial with laboratory-produced inoculum of isolates of the two pathotypes. That inoculum was prepared from several isolates of the pathogen that representing pathotypes 1 and 2. Scores for infection were made bi-weekly for seven weeks and selections were made based on the blight scores and also on plant habit and pod setting. Chickpea lines with low scores, indicating resistance, were retained for further evaluations while the plant rows with scores exceeding the checks were discarded.

To introduce additional sources of disease resistance, yield traits and quality into the breeding program we evaluated germplasm from several wide ranging sources. These introductions included material from ICARDA in Syria, ICRISAT in India, Turkey and Mexico as well as from collaborators in Canada and Australia. Germplasm receiving low blight scores indicating good resistance or with improved yield or quality traits were chosen for use as parents in the crossing program.

Selection criteria:

Crosses were made in the field and in the greenhouse to transfer ascochyta blight resistance to large seeded Spanish White types and to the large seeded Café types. The resulting hybrids are currently being increased in the greenhouse and selected for size, shape and color of the seeds. Advanced single plant selections in the F_4 , F_5 , and F_6 were grown in the greenhouse and harvested. Seed of these plants will be planted in single plant rows in the blight nursery in 2004 and evaluated for resistance to blight and other traits. The primary criteria in the selection process are large seeds of each type as well as earliness to flower and mature. In addition to the crossing and selection program, Spanish White and Café types were selected from existing breeding populations. Those selections were screened in the blight nursery and evaluated in the preliminary screening nursery.

Early flowering and early maturity:

In addition to the work on resistance to blight, we have identified earlier flowering and earlier maturing germplasm lines. These lines have been crossed and intercrossed to our blight resistant material. The delayed maturity of most of the chickpea varieties appears to be related to late flowering and a high degree of abortion of the first flowers on the plants. This seems related to cold temperature sensitivity in varieties where pod setting is observed to begin only when the mean daily temperature is above a critical point. It also appears that pod setting ceases when mean daily temperatures rise above a critical high temperature point. To alleviate this problem, we are in the process of widening this temperature range of adaptation. Progeny lines are selected for earlier onset of flowering, non-abortion of flowers after the onset of flowering, an extended flowering period, and tolerance to high temperatures during the pod set and seed set stages of development. It is expected as a result of this approach that flower set, pod set and seed development will begin at lower temperatures and continue at higher temperatures. The adaptation allowing widening of the temperature range for flowering, podding, and seed set will advance maturity, improve seed quality and increase yield potential.

Potential Variety Releases:

We will propose two large seeded Kabuli type selections for preliminary release. The two lines, CA9990I604C and CA9990I875W, have performed well for resistance to blight in the blight screening trial and they have excellent seed quality traits. Both lines are fern leaf types. CA9990I604C has larger seed size when compared to Sierra and the seeds are lighter. CA9990I875W is exceptionally large and white. A final decision on these two selections will be made in the winter of 2005.

Table 35. Mean Yields (kg/ha) of the Advanced Large Kabuli Chickpea Yield Trial over Locations, 2003 (0381)

Cultivar	Origin	Leaf Type	Seed Type	Genesee	Pullman	Walla Walla	Mean Seed Yield
CA0090B383C	X96C019	S	C	929	1273	1051	1084
CA0090B347C	X96C004	S	C	687	1418	1136	1080
CA9990B1579C	X92C016	S	C	923	1204	1033	1053
CA9990B1895C	X94C003	C	C	898	1090	1149	1046
Sierra	.....	S	C	832	1141	998	990
Sanford	.....	S	C	867	1123	969	986
Evans	.....	S	C	725	1272	943	980
CA9783163C	X92C017	C	C	799	1127	1014	980
CA9990B1514C	X92C016	S	C	774	1067	1074	971
CA9990I604C	X94C080	C	C	901	870	1079	950
CA0090B659D	X96C026	S	D	818	1097	931	949
Dwelly	.....	S	C	864	952	990	935
CA0090B015W	X94C005	C	W	730	1076	994	933
CA9890169W	X94C005	C	W	803	1045	945	931
CA9990I861W	X94C005	C	W	690	1043	1006	913
CA9890234W	X94C005	C	W	617	1170	886	891
CA9890233W	X94C005	C	W	588	997	1009	864
CDC_Xena	.....	S		583	914	1002	833
CA9890239W	X94C005	C	W	653	963	802	806
CA9990I875W	X94C005	C	W	582	1029	726	779
Grand Mean				763	1094	987	948
C.V. (%)				15	13	9	13
LSD ($\alpha=0.05$)				160	203	122	112
Planting Date				4/21/03	5/2/03	4/29/03	
Harvest Date				8/14/03	8/25/03	8/13/03	

Leaf type; C = compound leaf, S = simple leaf type. Seed type; W = white seed type, C = café seed type, D = desi

Yield data are means of three replications at each location, over three locations.

Table 36. Agronomic Data for the Advanced Large Kabuli Chickpea Yield Trial, 2003 (0381)

Cultivar	Origin	Ascochyta Blight	Days to Flower	Days to Maturity	Pods/ Peduncle	Mean Pod Ht (green) ..cm..	Mean Pod Ht (mature) ..cm..	Mean Pod Ht Index	Mean Plant Ht (green) ..cm..	Mean Plant Ht (mature) ..cm..	Mean Plant Ht Index	Weight 100 Seed ..g..
CA0090B383C	X96C019	4	53	93	1	20	16	0.77	37	33	0.95	38.3
CA0090B347C	X96C004	4	54	93	1	19	13	0.63	41	33	0.81	42.7
CA9990B1579C	X92C016	4	53	98	1	20	15	0.76	38	33	0.90	51.5
CA9990B1895C	X94C003	5	55	98	1	20	18	0.85	48	38	0.76	43.4
Sierra	.....	5	54	96	1	25	15	0.74	41	33	0.84	52.2
Sanford	.....	4	56	97	1	24	19	0.86	43	40	0.95	43.4
Evans	.....	4	53	96	1	24	19	0.86	47	40	0.89	45.1
CA9783163C	X92C017	4	55	98	1	23	17	0.90	37	34	0.96	58.2
CA9990B1514C	X92C016	5	54	97	1	21	17	0.71	40	33	0.80	51.1
CA9990I604C	X94C080	5	49	98	1	11	12	0.87	34	31	0.89	53.7
CA0090B659D	X96C026	3	55	95	1	23	17	0.75	50	44	0.86	27.0
Dwelley	.....	5	56	96	1	21	19	0.88	44	37	0.83	48.9
CA0090B015W	X94C005	5	54	96	1	18	14	0.71	36	29	0.78	54.4
CA9890169W	X94C005	5	53	98	1	14	13	0.97	30	29	0.95	52.8
CA9990I861W	X94C005	5	55	97	1	18	18	0.90	35	32	0.88	52.2
CA9890234W	X94C005	3	54	97	1	17	12	0.76	34	27	0.85	55.1
CA9890233W	X94C005	4	54	98	1	18	12	0.74	36	29	0.83	55.1
CDC_Xena	.....	5	54	97	1	15	11	0.78	37	32	0.86	47.1
CA9890239W	X94C005	3	54	97	1	16	13	0.86	33	28	0.80	56.8
CA9990I875W	X94C005	3	54	97	1	19	13	0.69	34	29	0.83	56.3
Grand Mean		4	54	97	1	19	15	0.80	38	33	0.86	49.3
C.V. (%)		23	1	2		17	18	14	9	7	9	
LSD ($\alpha=0.05$)		2	1	2		4	3	0	4	3	0	

Leaf type; C = compound leaf, S = simple leaf type. Seed type; W = white seed type, C = café seed type.

Ascochyta Blight Resistance Scores: 1 = Highly Resistant, 3 = Resistant, 5 = Tolerant, 7 = Susceptible and 9 = Highly Susceptible

Pod height was measured at the green pod stage and at harvest maturity. Pod height index was determined by dividing pod height at harvest maturity by the green pod height.

Plant height was measured at the green plant stage and at harvest maturity. Plant height index was determined by dividing plant height at harvest maturity by the green plant height.

Agronomic data are means of three replications at Pullman, WA. Means data are means of three replications over 2 locations, Genesee and Pullman.

Table 37. Mean Yields (kg/ha) of Chickpea Lines in the Advanced Large Kabuli Chickpea Yield Trial, 1999 - 2003

Cultivar	Origin	Leaf Type	Seed Type	1999	2000	2001	2002	2003
CA0090B383C	X96C019	S	C	....	....	....	....	1084
CA0090B347C	X96C004	S	C	....	....	....	....	1080
CA9990B1579C	X92C016	S	C	....	....	....	1517	1053
CA9990B1895C	X94C003	C	C	....	....	....	1438	1046
Sierra	.....	S	C	1167	1761	1731	1383	990
Sanford	.....	S	C	957	1503	1545	1181	986
Evans	.....	S	C	956	1467	1636	1156	980
CA9783163C	X92C017	C	C	....	1875	1855	1331	980
CA9990B1514C	X92C016	S	C	....	....	....	1411	971
CA9990I604C	X94C080	C	C	....	....	....	1559	950
CA0090B659D	X96C026	S	D	....	....	....	....	949
Dwellely	.....	S	C	1053	1701	1595	1360	935
CA0090B015W	X94C005	C	W	....	....	....	....	933
CA9890169W	X94C005	C	W	....	....	1647	1478	931
CA9990I861W	X94C005	C	W	....	....	....	1382	913
CA9890234W	X94C005	C	W	....	....	1807	1213	891
CA9890233W	X94C005	C	W	....	....	1788	1236	864
CDC_Xena	.....	S		....	....	....	....	833
CA9890239W	X94C005	C	W	....	....	1739	1357	806
CA9990I875W	X94C005	C	W	....	....	....	1300	779
Grand Mean				978	1555	1784	1307	948
LSD ($\alpha=0.05$)				137	176	140	336	112

Leaf type; C = compound leaf, S = simple leaf type. Seed type; W = white seed type, C = café seed type, D = desi
Yield data are mean of three replications at each location, over three locations. 1999 Yield data are means of three replications at each location, over two locations

Table 38. Agronomic Data for the Preliminary Large Kabuli Chickpea Yield Trial, 2003 (0383)

Cultivar	Origin	Leaf Type	Seed Type	Ascochyta Blight	Days to Flower	Days to Maturity	Pods/ Peduncle	Pod Ht (Green)	Pod Ht (Mature)	Pod Ht Index	Plant Ht (Green)	Plant Ht (Mature)	Plant Ht Index	Weight 100 Seed	Seed Yield
								..cm..	..cm..		..cm..	..cm..		..g..	..kg/ha..
CA0190B110C	X96C004	C	C	2	53	97	1	16	10	0.64	39	35	0.91	34.0	1626
CA0190B777C	X96C020	C	C	4	49	97	1	21	15	0.83	43	39	0.91	42.6	1549
CA0190B775C	X96C020	C	C	3	50	97	1	25	11	0.54	40	36	0.91	43.1	1546
Sierra	.....	S	C	5	54	97	1	17	17	0.83	45	36	0.80	51.0	1540
CA0190B052C	X96C003	C	C	3	49	97	1	19	15	0.77	41	38	0.92	40.6	1522
CA0190B015C	X95C012	C	C	5	55	97	1	21	21	0.82	45	37	0.84	43.3	1508
CA0190B723C	X96C011	S	C	3	54	97	1	24	18	0.65	50	40	0.79	39.0	1503
CA0190B539W	X96C144	C	W	4	56	97	1	31	23	0.82	56	45	0.83	40.4	1443
Sanford	.....	S	C	3	55	97	1	33	20	0.58	57	45	0.78	44.5	1438
Dwelley	.....	S	C	4	56	97	1	25	19	0.74	41	38	0.92	49.5	1437
CA0190B773C	X96C020	S	C	5	54	97	1	29	25	0.89	55	49	0.90	42.8	1376
CA0190B418C	X96C020	S	C	5	49	97	1	30	21	0.8	56	44	0.77	41.0	1346
CA0190B839C	X96C031	S	C	5	53	97	1	30	19	0.68	51	45	0.90	55.8	1238
CA0190B474C	X96C036	C	C	3	54	97	1	24	17	0.73	48	39	0.83	32.5	1186
CA0190B783C	X96C023	S	C	4	52	97	1	21	16	0.82	43	33	0.78	40.8	1165
CA0190B598C	X98C012	C	C	4	54	97	1	25	18	0.71	51	37	0.73	44.3	985
Grand Mean				4	53	97	1	24	18	0.74	47	40	0.84	42.8	1400
C.V. (%)				22	1			20	18	14	9	8	11		5
LSD ($\alpha=0.05$)				1	1			6	4	0	6	4	0		87

Pullman planting date was 5/2/03. Pullman harvest date was 8/25/03.

Leaf type; C = compound leaf, S = simple leaf type. Seed type; W = white seed type, C = café seed type.

Ascochyta Blight Resistance Scores: 1 = Highly Resistant, 3 = Resistant, 5 = Tolerant, 7 = Susceptible and 9 = Highly Susceptible

Pod height was measured at the green pod stage and at harvest maturity. Pod height index was determined by dividing pod height at harvest maturity by the green pod height.

Plant height was measured at the green pod stage and at harvest maturity. Plant height index was determined by dividing plant height at harvest maturity by the green plant height.

Agronomic data are means of three replications at Pullman, WA.

Table 39. Agronomic Data for the Preliminary Large White Kabuli Chickpea Screening Nursery, 2003 (0385)

Page 1 of 3

Cultivar	Origin	Leaf Type	Seed Type	Ascochyta Blight	Days to Flower	Days to Maturity	Pods/ Peduncle	Pod Ht (Green)	Pod Ht (Mature)	Pod Ht Index	Plant Ht (Green)	Plant Ht (Mature)	Plant Ht Index	Weight 100 Seed	Seed Yield
								..cm..	..cm..		..cm..	..cm..		..g..	..kg/ha..
CA0290B822C	X98C010	C	C	4	53	101	1	19	16	0.84	45	45	1.00	36.2	2729
CA0290B005C	X98C010	C	C	3	54	108	1	22	20	0.91	48	44	0.92	33.0	2364
CA0290B748C	X96C128	S	C	4	56	108	1	29	25	0.86	62	53	0.85	50.1	2129
CA0290B003C	X98C010	S	C	4	54	108	1	31	17	0.55	52	49	0.94	34.3	2077
CA0290B660C	X96C003	C	C	4	53	97	1	20	15	0.75	43	38	0.88	41.9	1998
CA0290B662C	X96C003	C	C	2	54	97	1	20	17	0.85	48	42	0.88	41.9	1932
CA0290B815C	X98C010	C	C	2	55	108	1	22	15	0.68	50	42	0.84	42.7	1890
CA0290B663C	X96C003	C	C	3	55	97	1	22	18	0.82	41	37	0.90	42.6	1887
CA0290B820C	X98C010	S	C	3	54	101	1	32	24	0.75	45	38	0.84	44.2	1883
CA0290B734C	X96C081	S	C	4	54	101	1	29	26	0.90	49	39	0.80	52.1	1880
CA0290B938C	X94C003	C	C	2	50	97	1	28	22	0.79	56	42	0.75	38.6	1836
CA0290B730C	X96C081	S	C	4	54	101	1	23	21	0.91	49	37	0.76	50.6	1799
CA0290B698C	X96C019	S	C	4	53	97	1	23	15	0.65	53	42	0.79	39.7	1793
CA0290B798D	X96C026	C	D	4	56	101	1	19	18	0.95	55	55	1.00	31.0	1771
CA0290B725C	X96C081	S	C	5	55	97	1	28	24	0.86	50	39	0.78	51.1	1766
CA0290B723C	X96C081	S	C	6	54	101	1	25	19	0.76	47	41	0.87	52.5	1726
CA0290B932C	X94C003	C	C	2	53	97	1	29	25	0.86	53	45	0.85	40.1	1719
CA0290B689C	X96C019	S	C	5	53	97	1	21	18	0.86	49	44	0.90	39.1	1717
CA0290B720C	X96C081	C	C	3	55	108	1	21	19	0.90	46	42	0.91	57.0	1717
CA0290B860C	X98C020	S	C	4	55	97	1	35	26	0.74	51	47	0.92	39.7	1710
CA0290B670C	X96C004	C	C	3	49	97	1	19	16	0.84	48	38	0.79	38.9	1682
CA0290B767C	X96C006	C	C	3	54	97	1	25	18	0.72	47	39	0.83	46.9	1660
CA0290B659C	X96C003	C	C	4	50	97	1	20	19	0.95	46	39	0.85	40.2	1657
CA0290B783C	X96C008	S	C	6	55	97	1	20	12	0.60	40	38	0.95	41.8	1630
CA0290B697C	X96C019	S	C	6	53	97	1	21	13	0.62	48	40	0.83	38.4	1630
CA0290B858C	X98C020	C/S	C	5	56	97	1	30	23	0.77	50	46	0.92	40.5	1628
CA0290B930C	X94C003	S	C	2	54	97	1	29	23	0.79	57	44	0.77	36.1	1608
CA0290B782C	X96C008	S	C	5	56	97	1	27	18	0.67	42	37	0.88	39.5	1581

Table 39. Agronomic Data for the Preliminary Large White Kabuli Chickpea Screening Nursery, 2003 (0385)

Page 2 of 3

Cultivar	Origin	Leaf Type	Seed Type	Ascochyta Blight	Days to Flower	Days to Maturity	Pods/ Peduncle	Pod Ht (Green) ..cm..	Pod Ht (Mature) ..cm..	Pod Ht Index	Plant Ht (Green) ..cm..	Plant Ht (Mature) ..cm..	Plant Ht Index	Weight 100 Seed ..g..	Seed Yield ..kg/ha..
CA0290B708C	X96C019	S	C	3	54	97	1	26	25	0.96	52	45	0.87	42.9	1556
CA0290B695C	X96C019	S	C	4	54	97	1	24	16	0.67	49	44	0.90	39.1	1542
CA0290B892C	X96C006	S	C	4	55	97	1	27	24	0.89	47	40	0.85	35.6	1541
CA0290B682C	X96C011	S	C	4	55	97	1	21	21	1.00	52	42	0.81	44.7	1531
CA0290B902C	X96C008	C	C	3	54	97	1	17	17	1.00	42	38	0.90	48.3	1526
CA0290B790C	X96C024	C/S	C	3	54	97	1	25	18	0.72	55	41	0.75	42.6	1524
CA0290B023C	X98C013	S	C	5	54	108	1	34	26	0.76	57	52	0.91	36.1	1519
CA0290B799C	X96C026	C	C	3	49	97	1	14	13	0.93	49	35	0.71	44.4	1480
CA0290B883C	X96C004	C	C	4	54	97	1	26	20	0.77	54	48	0.89	39.8	1460
CA0290B688C	X96C019	S	C	5	53	97	1	29	16	0.55	51	39	0.76	38.5	1453
CA0290B824C	X98C010	S	C	6	55	101	1	30	23	0.77	45	41	0.91	33.3	1421
CA0290B789C	X96C024	C/S	C	4	52	97	1	21	16	0.76	54	36	0.67	42.4	1416
CA0290B862C	X98C021	C	C	4	53	101	1	24	15	0.63	56	47	0.84	41.1	1401
CA0290B007C	X98C010	C	C	3	56	108	1	30	23	0.77	43	41	0.95	33.7	1398
CA0290B859C	X98C020	S	C	5	56	101	1	33	30	0.91	55	47	0.85	38.4	1393
CA0290B737C	X96C128	S	C	5	56	108	1	36	20	0.56	60	53	0.88	51.9	1386
CA0290B054C	X96C036	C	C	2	55	97	1	21	14	0.67	40	33	0.83	38.7	1371
CA0290B923C	X94C003	C	C	2	56	97	1	30	19	0.63	47	36	0.77	36.2	1356
CA0290B854C	X98C020	C	C	3	57	101	1	33	27	0.82	53	47	0.89	39.4	1351
CA0290B749C	X96C128	S	C	4	57	97	1	39	31	0.79	53	50	0.94	46.3	1346
CA0290B882C	X96C004	S	C	4	56	97	1	30	23	0.77	62	48	0.77	38.4	1326
CA0290B805C	X96C084	C	C	4	52	101	1	20	12	0.60	49	46	0.94	42.4	1317
CA0290B850C	X98C016	C	C	4	58	108	1	34	28	0.82	46	46	1.00	44.2	1299
CA0290B888C	X96C005	S	C	5	55	97	1	25	19	0.76	47	35	0.74	38.9	1263
CA0290B677C	X96C010	C	C	6	54	97	1	25	21	0.84	50	38	0.76	41.9	1215
CA0290B865C	X98C021	S	C	5	56	97	1	34	34	1.00	51	49	0.96	34.6	1211
CA0290B055C	X96C036	C	C	3	56	101	1	14	14	1.00	44	40	0.91	37.7	1193
CA0290B874C	X98C024	S	C	4	54	97	1	36	21	0.58	48	46	0.96	38.5	1181
CA0290B877C	X98C024	S	C	4	55	97	1	34	20	0.59	58	45	0.78	36.7	1171

Table 39. Agronomic Data for the Preliminary Large White Kabuli Chickpea Screening Nursery, 2003 (0385)

Page 3 of 3

Cultivar	Origin	Leaf Type	Seed Type	Ascochyta Blight	Days to Flower	Days to Maturity	Pods/ Peduncle	Pod Ht (Green) ..cm..	Pod Ht (Mature) ..cm..	Pod Ht Index	Plant Ht (Green) ..cm..	Plant Ht (Mature) ..cm..	Plant Ht Index	Weight 100 Seed ..g..	Seed Yield ..kg/ha..
CA0290B904C	X96C008	C	C	4	55	97	1	17	16	0.94	49	40	0.82	42.7	1169
CA0290B870C	X98C024	S	C	6	56	97	1	31	28	0.90	63	51	0.81	42.1	1132
CA0290B028C	X98C025	S	C	4	56	97	1	22	2	0.09	60	44	0.73	37.1	958
CA0290B912C	X96C011	S	C	4	54	97	1	17	13	0.76	54	43	0.80	42.4	818
Grand Mean				4	54	99	1	26	20	0.78	50	43	0.85	41.2	1568

Pullman planting date was 5/2/03. Pullman harvest date was 8/27/03.

Leaf type; C = compound leaf, S = simple leaf type. Seed type; W = white seed type, C = café seed type, D = desi

Ascochyta Blight Resistance Scores: 1 = Highly Resistant, 3 = Resistant, 5 = Tolerant, 7 = Susceptible and 9 = Highly Susceptible

Pod height was measured at the green pod stage and at harvest maturity. Pod height index was determined by dividing pod height at harvest maturity by the green pod height. Plant height was measured at the green pod stage and at harvest maturity. Plant height index was determined by dividing plant height at harvest maturity by the green plant height.

Agronomic and yield data are one replication at Pullman, WA.

Table 40. Agronomic Data for the Canadian and Australian Chickpea Observation Nursery, 2003 (0307C)

Cultivar	Ascochyta Blight	Days to Flower	Days to Maturity	Pods/ Peduncle	Pod Ht (Green)	Pod Ht (Mature)	Pod Ht Index	Plant Ht (Green)	Plant Ht (Mature)	Plant Ht Index	Weight 100 Seed	Seed Yield
					..cm..	..cm..		..cm..	..cm..		..g..	..kg/ha..
S95342	4	50	101	1	26	15	0.58	46	37	0.80	39.8	2977
ICCV96836	4	51	97	1	24	13	0.54	38	36	0.95	18.1	2293
S95362	4	49	97	1	15	15	1.00	35	34	0.97	30.2	2293
Sona*98PBC4019	4	48	97	1	18	18	1.00	47	39	0.83	20.8	2159
CDC-Nika	3	48	88	1	20	13	0.65	36	36	1.00	28.5	1757
95NN-12	2	54	97	1	20	18	0.90	40	32	0.80	28.3	1746
CDC-Diva	4	54	97	1	27	18	0.67	40	34	0.85	45.0	1724
CDC-Chichi	2	54	97	1	23	16	0.70	37	35	0.95	36.0	1625
92073-40	2	48	88	1	24	14	0.58	47	36	0.77	28.4	1611
Sierra [†]	5	54	96	1	27	21	0.79	44	39	0.91	52.2	1590
FLIP94-90C	5	48	97	1	23	15	0.65	36	29	0.81	31.5	1561
FLIP94-92C	5	48	97	1	31	10	0.32	45	35	0.78	36.0	1557
CDC-Chico	3	49	88	1	30	10	0.33	41	38	0.93	24.1	1534
CDC-Xena	5	54	97	1	23	14	0.61	38	34	0.89	46.0	1534
BS1-43	2	54	87	1	14	13	0.93	38	32	0.84	25.0	1529
CDC-Yuma	7	54	97	1	36	27	0.75	51	43	0.84	42.6	1430
FLIP-94508C	5	48	87	1	23	17	0.74	36	31	0.86	16.1	1356
CDC-Desiray	2	52	88	1	18	15	0.83	37	35	0.95	18.7	1295
CDC-Anna	2	52	97	1	18	11	0.61	34	30	0.88	18.8	1255
CDC-Frontier	2	54	97	1	23	20	0.87	37	35	0.95	31.5	1213
Sona*98CZH4009	3	49	97	1	21	13	0.62	45	28	0.62	19.5	1195
304-40	2	56	97	1	19	17	0.89	44	33	0.75	18.4	1069
SONA-4028	3	49	88	1	31	17	0.55	55	45	0.82	20.7	1032
304-22	4	52	97	1	15	7	0.47	35	28	0.80	19.3	1011
Barwon-MR	4	49	87	1	14	13	0.93	33	27	0.82	14.9	1001
242-1	5	55	97	1	18	7	0.39	39	32	0.82	34.0	822
97-INDIAN2-11	3	49	97	1	28	17	0.61	40	35	0.88	33.8	806
304-31	4	52	88	1	10	9	0.90	27	27	1.00	17.7	733
SB2000-2	5	52	87	1	11	9	0.82	23	22	0.96	12.6	227
Grand Mean	4	51	94	1	22	15	0.70	39	34	0.86	27.0	1446

[†]Values are the average of 8 check plots

Planting date 5/2/03. Harvest date 8/27/03.

Pod height was measured at the green pod stage and at harvest maturity. Pod height index was determined by dividing pod height at harvest maturity by the green pod height.

Plant height was measured at the green pod stage and at harvest maturity. Plant height index was determined by dividing plant height at harvest maturity by the green plant height.

Agronomic and yield data are one replication at Pullman, WA

Chickpea Disease Experimental Results

Field evaluation of seed treatment fungicides for control of root rot and damping-off on chickpea, 2003.

Chickpea seeds, particularly large kabuli seed type, are always treated before planting to control damping-off and root rot. The traditional seed treatment includes Apron for controlling Oomycete pathogens, and Mertect for controlling *Fusarium* spp. and *Rhizoctonia solani* that cause damping-off and root rot. In 2002 we observed elevated levels of root rot of chickpea showing symptoms resembling *Rhizoctonia* root rot in cultivar Spanish White in the Waitsburg-Walla Walla area, and isolated *R. solani* from diseased plants. In 2003, we evaluated the effectiveness of six fungicide treatments for their effectiveness in controlling damping-off and root rot caused *Fusarium* spp. and *Rhizoctonia solani*. The treatments included: Standard treatment (Apron XL LS, 0.16 fl oz and Mertect LSP, 6 fl oz per 100 lb); Maxim (standard treatment plus Maxim, 0.04 fl oz per 100 lb); Double Maxim (standard treatment plus Maxim, 0.08 fl oz per 100 lb); Protégé (standard treatment plus Protégé, 0.375 fl oz per 100 lb); Blocker (standard treatment plus Blocker 10G, 18 lb per A), and Kodiak (Captan 400, 2.5 fl oz, Allegiance, 0.75 fl oz, and Kodiak, 0.125 oz per 100 lb). In the Kodiak treatment, Captan and Allegiance replaced Apron and Mertect in the standard treatment. All the treatments except Blocker 10G were coated onto the seeds less than one week before planting. The Blocker 10G in pellet form was mixed with standard-treated seeds at planting. Exactly 200 seeds were planted onto each plot (5 ft by 12 ft) on 29 April 2003 on a farm near Waitsburg, WA using a completely randomized block design with four replications. Plant stands were counted on 29 May 2003, disease symptoms were evaluated on 16 June 2003, and plots were harvested on 13 August 2003.

The weather was generally warm and dry, and no obvious damping-off and root rot symptoms developed. The stand counts averaged from 153 to 169 per plot and no significant difference was observed among the treatment means. No obvious disease symptoms were observed on 16 June 2003. However, analysis of variance indicated that there were significant differences ($P = 0.053$) in mean yield among the treatments. The mean yield of the Kodiak treatment was significantly higher than that of treatments with Maxim, Double Maxim and Protégé. The increase in yield may be due to growth promotion by the *Bacillus* spp. in the Kodiak formulation, although the effect of Captan and Allegiance cannot be ruled out.

Table 41. Chickpea Seed Treatment Study, Walla Walla, 2003 (0393)

Treatment (per 100 lb seed)	Stand count (out of 200 seeds)	Yield (grams per plot)
Standard (Apron XL LS, 0.16 fl oz and Mertect LSP, 6 fl oz)*	169a**	1002ab
Maxim (standard plus Maxim 0.04 fl oz)	168a	881a
Double Maxim (standard plus Maxim 0.08 fl oz)	169a	911a
Protégé (standard plus Protégé 0.375 fl oz)	167a	928a
Blocker 10 G (standard plus Blocker 10 G, 18 lb/A)	160a	1034ab
Kodiak (Captan 400, 2.5 fl oz, Allegiance 0.75 fl oz and Kodiak 0.125 oz)	153a	1142b

*The standard treatment is currently used by growers.

**Treatment means of four replications followed by the same letter in the same column are not significant different at $P = 0.053$.

Field evaluation of fungicides in controlling *Ascochyta* blight of chickpea, 2003.

The effectiveness of five fungicides in controlling *Ascochyta* blight of chickpea was evaluated at two locations. The five fungicides and their applied rates were BAS500 00F (10.4 fl oz/A), BAS510 UG F (0.43 lb/A), BAS516 04F, (0.54 lb/A), Bravo Weather Stik (1.4 pt/A), and Quadris SC (9.2 fl oz/A). These fungicides were applied three times on two chickpea cultivars Dwelley (resistant) and Spanish White (susceptible) with four replications. Water was sprayed as a control. The split plots were arranged with a randomized complete block design with fungicides on main plots and cultivars on split plots, and the main plot size was 8 ft wide by 12 ft long with 4 ft alley between plots. The same experimental design and plot size were used at the Spillman Experimental Farm of Washington State University in Pullman, WA and on a farm near Genesee, ID. Fields at both locations had been planted to chickpeas previously and inoculum of *Ascochyta rabiei* was abundant. The first spray was on 2 June at the Pullman location and 3 June at the Genesee Location, and the second and third sprays were on 13 June and 25 June, respectively, on both locations. Disease severity data were recorded on four dates (6 June, 9 June, 12 June and 18 June at the Pullman location, and 6 June, 13 June, 25 June and 16 July at the Genesee location). Disease severity was recorded based on a 1-to-9 scale: 1 = no lesions visible, no signs of disease, healthy plants; 2 = lesions visible but must look closely at the plants to see them; 3 = A few lesions visible, can be seen easily; 4 = many lesions visible, but lesions have not caused irreparable damage to the plants; 5 = large lesions on stems or leaves, some stem girding; 6 = many large lesions on stems and leaves, moderate stem girding and breakage; 7 = many large lesions on stems and leaves, stem girding and breakage common; 8 = most of the plants died, only few green leaves left; 9 = plants completely died, virtually no greens left. Two center rows of each split plot were harvested manually on 15 August. After drying plants were threshed and yield data were taken as ounces per harvested area (24 sq ft).

The weather condition in May was conducive to the disease and *Ascochyta* blight started to develop in late May. Signs of disease were observed on the first rating (6 June) at both locations. Disease severity ratings were higher at Pullman location than at the Genesee location. The susceptible cultivar Spanish White at the Pullman location already developed considerable amount of disease at first rating. However, there was practically no rain in June, July and August. The dry weather prevented further development of the disease. Generally very little disease progress was observed after the first rating at both locations. At the Pullman location where moderate disease pressure was initially present, applications of the five fungicides increased the yield on the susceptible cultivar Spanish White, although they did not have appreciable effect on disease. Similarly on resistant cultivar Dwelley, all fungicide applications, except BAS 500, increased yield, despite no visible effect on disease. At the Genesee location where the disease pressure was very low in 2003, application of BAS 500 did reduce disease compared to the control on the susceptible cultivar Spanish White, but the yield of all fungicide treatments did not differ from the control. On resistant cultivar Dwelley, application of fungicides did not affect disease development. However, fungicide BAS 500 did increase yield compared to the control. The susceptible cultivar Spanish White

yielded better than the resistant cultivar Dwelley at low disease pressure. When the disease pressure is low (disease rating <4), the benefit of fungicide application is negligible. When disease pressure is moderate or high (disease rating 4 or above), fungicide application can increase yield. The relative efficacy of the fungicides against *Ascochyta* blight can be evaluated only under high disease pressure.

Table 42. Fungicide Trail of Chickpea, 2003 (0395)

Pullman location	<u>Dwelley (resistant)</u>					<u>Spanish White (susceptible)</u>				
	Disease severity				Yield**	Disease severity				Yield**
	6 June	9 June	12 June	18 June		6 June	9 June	12 June	18 June	
Control.....	2.5a*	2.8a	3.0a	4.0a	1.7a	5.0a	5.0a	5.3ab	5.8a	Nil a
BAS500 00F (10.4 fl oz).....	3.0a	2.8a	3.0a	3.0b	2.5a	5.0a	5.5ab	4.8a	5.3a	1.3b
BAS510 UG F (0.43 lb/A).....	3.0a	2.8a	3.3a	3.8a	3.5b	5.8a	5.5ab	5.5ab	5.8a	1.0b
BAS516 04 F (0.54 lb/A).....	3.0a	3.0a	3.3a	3.8a	3.1b	5.8a	6.0b	6.0b	6.0a	1.0b
Bravo Weather Stik (1.4 pt)....	3.0a	3.0a	3.3a	3.8a	3.6b	5.5a	5.5ab	5.3a	5.3a	1.3b
Quadris (9.2 fl oz).....	3.0a	3.0a	3.0a	3.8a	4.8b	5.3a	5.5ab	5.3a	5.5a	1.1b

Genesee location	<u>Dwelley (resistant)</u>					<u>Spanish White (susceptible)</u>				
	Disease severity				Yield**	Disease severity				Yield**
	6 June	13 June	25 June	16 July		6 June	13 June	25 June	16 July	
Control.....	1.0a	2.0a	2.0a	2.2a	3.7ab	1.7a	2.5a	3.5a	3.7b	4.8ab
BAS500 00F (10.4 fl oz).....	1.1a	1.8a	2.0a	1.9a	4.9c	1.0a	2.3a	3.0b	2.9a	5.4b
BAS510 UG F (0.43 lb/A)....	1.3a	1.8a	2.3a	2.4a	3.3a	1.8a	2.5a	3.3ab	3.7b	5.2b
BAS516 04 F (0.54 lb/A).....	1.1a	1.8a	1.8a	1.5a	3.7ab	1.4a	2.3a	2.8b	2.7a	4.8ab
Bravo Weather Stik (1.4 pt)...	1.0a	2.0a	2.0a	2.3a	4.5bc	1.6a	2.5a	3.5a	3.0ab	5.4b
Quadris (9.2 fl oz).....	1.2a	2.0a	2.0a	1.8a	3.4a	1.2a	2.5a	3.3a	3.1ab	4.3a

*Values are means of 4 plots. Means followed by the same letter in the same column in same location are not significantly different at $P = 0.05$ following a Fisher's protected least significant difference test.

**Yields are expressed as ounces per harvested area (24 sq ft).

Lupin Evaluations

The variety evaluation for lupin included 28 lines (Table 43). The higher yielding lupin lines were F6-RF and E1 at 663 and 633 kg/ha, respectively. Based on the rather poor yields in the trials, we will discontinue evaluation of lupin lines. Lupin may have promise as a feed legume crop but it appears that moisture will be a limiting factor for lupin in the Pacific Northwest.

Table 43. Agronomic Data for the Advanced Lupin Yield Trial, 2003 (0392)

Cultivar	Days to First Flower	Weight 100 Seed	Mean Seed Yield
		...g...	...kg/ha...
F6-RF	53	9.9	663
E1	54	8.8	633
E32-2	53	8.4	564
E30	54	8.6	562
E33	54	8.7	508
E6	53	8.6	487
Quilinock	51	9.2	481
W12WS	55	10.3	473
G52	55	10.4	465
GB-69	52	10.6	451
Prima	51	9.9	436
E8	51	9.1	398
G6-9	55	7.8	391
P12-1	53	9.9	384
Yorrel	51	11.0	378
G24	51	9.3	371
Belara	50	11.2	355
G28	51	10.6	333
Gungurru	52	9.9	326
Tallerack	52	11.5	323
E2-2	50	8.2	320
HP39	55	8.4	297
Danja	52	12.0	285
G12-12	51	11.6	204
F8-8RF	51	10.7	200
G16-3	51	10.0	195
F7-7	50	9.2	86
G10-7	51	12.0	45
Grand Mean	52	9.9	379
C.V. (%)	1		21
LSD _($\alpha=0.05$)	1		110

Planting date 5/2/03. Harvest date 9/12/03.

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

Western Regional

Dry Pea, Lentil and Chickpea Yield Trials

Table 44. 2003 Chickpea Variety Trial at Yellow Jacket, CO
Data from Abdel Berrada, Colorado State University

Entry No.	Entry Name	Seed Source	LSMEAN lb/a	50% Bloom	80% pod maturity
18	XX19	Local	1099.2	7/9/2003	8/20/2003
15	X97129	Local	997.0	7/5/2003	8/20/2003
17	X97217	Local	961.1	7/5/2003	8/20/2003
16	X97130	Local	960.4	7/5/2003	8/20/2003
13	CA188587	Local	957.2	7/7/2003	9/15/2003
12	CA99901895C	Western Regional	931.8	7/8/2003	9/10/2003
20	UC27	Local	900.3	7/7/2003	8/20/2003
14	XX8737	Local	898.3	7/6/2003	8/15/2003
11	CA9990B1579C	Western Regional	852.7	7/14/2003	9/20/2003
7	CA99901604C	Western Regional	844.7	7/7/2003	9/2/2003
19	Sanford	Local	826.0	7/9/2003	9/17/2003
1	CA1888359	Western Regional	758.8	7/6/2003	9/15/2003
2	CA9783152C	Western Regional	753.7	7/6/2003	9/16/2003
10	CA9990B1514C	Western Regional	725.7	7/5/2003	9/16/2003
8	CA99901861W	Western Regional	590.5	7/7/2003	9/19/2003
4	CA9890169W	Western Regional	547.8	7/10/2003	9/20/2003
3	CA9783163C	Western Regional	354.3	7/9/2003	Late
5	CA9890233W	Western Regional	327.6	7/6/2003	9/22/2003
9	CA99901875W	Western Regional	225.6	7/6/2003	Late
6	CA9890239W	Western Regional	193.3	7/8/2003	9/24/2003
Average			735.3		
LSD _{.05}			166.2		

Planting date: 5/22/03. Planted with Monosem Planter in 30-in. rows and 5.5 in. seed spacing.

Harvest date: 8/20/03 to 9/25/03, depending on the entry

Previous crop: Fallow ground

Precipitation:

1 Jan. to 21 May: 4.8 in.

22 May to 20 Aug.: 1.0 in.

22 May to 31 Aug.: 1.8 in.

22 May to 15 or 30 Sep.: 4.0 in.

Comments:

Entries 3, 4, 5, 6, 8, and 9 do not appear to be well adapted to our environment. They are generally late and have poor pod set.

Leaves (fern-type) stay green for a long time.

Entry no. 12 had the best appearance in the field (upright architecture, good pod set).

Table 45. Green spring pea performance data for Nezperce, 2003
Data from Stephen Guy and Ying Wu, University of Idaho

Variety or Selection	Seed Yield ..lb/acre..	Seed Weight ..g/100..	Vine Length ..in..	Canopy Height ..in..
Ariel	1205	14.7	18	18
Bluebird	1367	17.1	16	16
Columbia	1153	17.1	31	19
Cruiser	1228	16.0	21	21
Journey	1053	13.0	29	21
Karita	1147	19.8	18	18
Sterling	939	17.1	14	14
Stratus	1242	18.1	15	15
Supra	776	26.1	16	16
Toledo	1212	20.1	21	21
Ceb 1170	1213	20.9	23	23
Ceb 1080	1121	18.2	14	14
Ceb 1081	878	20.9	17	17
PS 710048	1339	18.7	19	19
PS 710909	638	23.7	18	15
PS 810162	1167	18.9	17	17
Pro 3172	1062	17.8	20	20
Pro 98106	1172	16.4	15	15
SW 98692	1055	17.2	18	18
Average	1104	18.5	19	18
LSD (0.10)	154	0.9	2	2
CV (%)	12	4.1	8	9

Table 46. Yellow spring pea performance data for Nezperce, 2003
Data from Stephen Guy and Ying Wu, University of Idaho

Variety or Selection	Seed Yield ...lb/acre...	Seed Weight ...g/100...	Vine Length ...in...	Canopy Height ...in...
Badminton	1192	16.5	17	16
Fallon	1083	18.2	15	15
Maribu	1343	18.2	17	17
Midas	831	16.8	19	19
Rex	1234	19.8	17	17
Shawnee	1231	17.7	34	15
Swing	1149	18.0	19	19
Topeka	1201	17.7	16	16
Universal	1172	18.4	20	20
FDP007	1115	19.5	21	21
SW 995848	1129	19.8	21	21
Average	1153	18.2	20	18
LSD (0.10)	154	0.9	2	2
CV (%)	12	4.1	8	9

Table 47. Green spring pea performance data for Moscow, 2003
Data from Stephen Guy and Ying Wu, University of Idaho

Variety or Selection	Seed Yield ...lb/acre...	Seed Weight ...g/100...	Vine Length ...in...	Canopy Height ...in...
Ariel	1880	17.6	19	19
Bluebird	2330	23.9	15	15
Columbia	1634	19.7	28	17
Cruiser	1829	18.8	21	21
Journey	1468	15.5	26	16
Karita	2408	24.5	21	21
Sterling	1378	20.2	14	14
Stratus	2423	23.4	16	16
Supra	1499	31.4	16	15
Toledo	2208	24.7	20	20
Ceb 1170	2036	26.2	20	20
Ceb 1080	2223	22.9	14	14
Ceb 1081	2327	24.4	18	18
PS 710048	2212	22.3	17	17
PS 710909	1671	29.8	13	13
PS 810162	2150	21.7	16	16
Pro 3172	1883	21.8	19	19
Pro 98106	1920	24.5	15	15
SW 98692	1833	20.5	19	19
Average	1964	22.8	18	17
LSD (0.10)	240	1.8	3	3
CV (%)	10	6.7	14	12

Table 48. Yellow spring pea performance data for Moscow, 2003
Data from Stephen Guy and Ying Wu, University of Idaho

Variety or Selection	Seed Yield ...lb/acre...	Seed Weight ...g/100...	Vine Length ...in...	Canopy Height ...in...
Badminton	2343	23.4	16	16
Fallon	1767	22.4	17	17
Maribu	2120	22.0	17	16
Midas	1473	21.3	22	22
Rex	1996	24.7	19	18
Shawnee	2333	22.2	24	15
Swing	2271	23.2	19	19
Topeka	2241	23.5	16	16
Universal	1872	23.0	19	19
FDP007	1907	23.9	21	21
SW 995848	1988	23.6	21	21
Average	2028	23.0	19	18
LSD (0.10)	240	1.8	3	3
CV (%)	10	6.7	14	12

Table 49. Combined green pea performance data for Nezperce and Moscow, 2003
Data from Stephen Guy and Ying Wu, University of Idaho

Variety or Selection	Seed Yield			Seed Weight			Vine Length	Canopy Height
	Nezperce	Moscow	Average	Nezperce	Moscow	Average		
	lb/acre.....			g/100.....			...in...	...in...
Ariel	1205	1880	1543	14.7	17.6	16.2	19	19
Bluebird	1367	2330	1849	17.1	23.9	20.5	16	16
Columbia	1153	1634	1394	17.1	19.7	18.4	30	18
Cruiser	1228	1829	1529	16.0	18.8	17.4	21	21
Journey	1053	1468	1261	13.0	15.5	14.3	28	19
Karita	1147	2408	1778	19.8	24.5	22.2	20	20
Sterling	939	1378	1159	17.1	20.2	18.7	14	14
Stratus	1242	2423	1833	18.1	23.4	20.8	16	16
Supra	776	1499	1138	26.1	31.4	28.8	16	16
Toledo	1212	2208	1710	20.1	24.7	22.4	21	21
Ceb 1170	1213	2036	1625	20.9	26.2	23.6	22	22
Ceb 1080	1121	2223	1672	18.2	22.9	20.6	14	14
Ceb 1081	878	2327	1603	20.9	24.4	22.7	18	18
PS 710048	1339	2212	1776	18.7	22.3	20.5	18	18
PS 710909	638	1671	1155	23.7	29.8	26.8	16	14
PS 810162	1167	2150	1659	18.9	21.7	20.3	17	17
Pro 3172	1062	1883	1473	17.8	21.8	19.8	20	20
Pro 98106	1172	1920	1546	16.4	24.5	20.5	15	15
SW 98692	1055	1833	1444	17.2	20.5	18.9	19	19
Average	1104	1964	1534	18.5	22.8	20.7	19	17
LSD (0.10)	154	240	197	0.9	1.8	1.4	2	2
CV (%)	12	10	--	4.1	6.7	--	--	--

Table 50. Combined yellow pea performance data for Nezperce and Moscow, 2003
Data from Stephen Guy and Ying Wu, University of Idaho

Variety or Selection	Seed Yield			Seed Weight			Vine Length	Canopy Height
	Nezperce	Moscow	Average	Nezperce	Moscow	Average		
	lb/acre.....			g/100.....			...in...	...in...
Badminton	1192	2343	1768	16.5	23.4	20.0	17	16
Fallon	1083	1767	1425	18.2	22.4	20.3	16	16
Maribu	1343	2120	1732	18.2	22.0	20.1	17	17
Midas	831	1473	1152	16.8	21.3	19.1	21	21
Rex	1234	1996	1615	19.8	24.7	22.3	18	18
Shawnee	1231	2333	1782	17.7	22.2	20.0	29	15
Swing	1149	2271	1710	18.0	23.2	20.6	19	19
Topeka	1201	2241	1721	17.7	23.5	20.6	16	16
Universal	1172	1872	1522	18.4	23.0	20.7	20	20
FDP007	1115	1907	1511	19.5	23.9	21.7	21	21
SW 995848	1129	1988	1559	19.8	23.6	21.7	21	21
Average	1153	2028	1591	18.2	23.0	20.6	19	18
LSD (0.10)	154	240	139	0.9	1.8	1.0	2	2
CV (%)	12	10	--	4.1	6.7	--	--	--

Table 52. No-Till spring pea performance data for Genesee, 2003
Data from Stephen Guy and Ying Wu, University of Idaho

Variety or Selection	Seed Yield	Seed Weight	Vine Length	Canopy Height	Erect Index
	..lb/acre..	..g/100..	..in..	..in..	..0.0-1.0..
Ariel	1380	17.2	18	18	1.0
Bluebird	1568	22.1	14	14	1.0
Columbia	982	18.8	27	13	0.5
Cruiser	1248	18.9	19	19	1.0
Joel	1611	19.1	30	13	0.4
Karita	1200	24.2	17	17	1.0
Sterling	1124	19.6	13	13	1.0
Stratus	1784	23.5	14	14	1.0
Supra	657	30.7	14	14	1.0
Toledo	1479	24.6	20	20	1.0
Pro 98106	1727	19.7	14	14	1.0
SW98692	950	19.9	16	16	1.0
Badminton	1402	21.6	14	14	1.0
Fallon	1362	21.2	14	14	1.0
Maribu	1386	21.2	15	15	1.0
Rex	1022	22.4	17	17	1.0
Shawnee	1768	20.5	30	11	0.4
Swing	1687	21.9	18	18	1.0
Topeka	1785	22.7	15	15	1.0
Universal	1406	21.7	17	17	1.0
Average	1376	21.6	18	15	0.9
LSD (0.10)	154	0.5	2	1	--
CV (%)	9	2.0	10	6	--

Table 53. No-Till spring pea performance data for Moscow, 2003
Data from Stephen Guy and Ying Wu, University of Idaho

Variety or Selection	Seed Yield	Seed Weight	Vine Length	Canopy Height	Erect Index
	..lb/acre..	..g/100..	..in..	..in..	..0.0-1.0..
Ariel	1366	17.1	21	21	1.0
Bluebird	1568	21.9	15	15	1.0
Columbia	742	20.0	20	14	0.7
Cruiser	1325	18.0	20	20	1.0
Joel	2135	21.3	36	17	0.5
Karita	1786	23.1	19	18	0.9
Sterling	1087	19.7	12	12	1.0
Stratus	1620	21.4	15	14	0.9
Supra	1114	32.9	14	14	1.0
Toledo	1672	22.3	21	21	1.0
Pro 98106	1701	18.3	14	13	0.9
SW98692	1462	19.1	17	17	1.0
Badminton	1297	21.6	15	15	1.0
Fallon	1381	22.2	15	15	1.0
Maribu	1527	21.2	16	16	1.0
Rex	1489	24.0	17	17	1.0
Shawnee	1807	20.2	30	12	0.4
Swing	1800	20.9	19	19	1.0
Topeka	1520	22.8	18	17	0.9
Universal	1330	21.7	19	18	0.9
Average	1486	21.5	19	16	0.9
LSD (0.10)	191	0.7	3	3	--
CV (%)	11	2.8	11	13	--

Table 54. Combined no-till spring pea performance data for Genesee and Moscow, 2003
Data from Stephen Guy and Ying Wu, University of Idaho

Variety or Selection	Seed Yield			Seed Weight			Vine Length	Canopy Height
	Genesee	Moscow	Average	Genesee	Moscow	Average		
	lb/acre.....			g/100.....			..in..	..in..
Ariel	1380	1366	1373	17.2	17.1	17.2	20	20
Bluebird	1568	1568	1568	22.1	21.9	22.0	15	15
Columbia	982	742	862	18.8	20.0	19.4	24	14
Cruiser	1248	1325	1287	18.9	18.0	18.5	20	20
Joel	1611	2135	1873	19.1	21.3	20.2	33	15
Karita	1200	1786	1493	24.2	23.1	23.7	18	18
Sterling	1124	1087	1106	19.6	19.7	19.7	13	13
Stratus	1784	1620	1702	23.5	21.4	22.5	15	14
Supra	657	1114	886	30.7	32.9	31.8	14	14
Toledo	1479	1672	1576	24.6	22.3	23.5	21	21
Pro 98106	1727	1701	1714	19.7	18.3	19.0	14	14
SW98692	950	1462	1206	19.9	19.1	19.5	17	17
Badminton	1402	1297	1350	21.6	21.6	21.6	15	15
Fallon	1362	1381	1372	21.2	22.2	21.7	15	15
Maribu	1386	1527	1457	21.2	21.2	21.2	16	16
Rex	1022	1489	1256	22.4	24.0	23.2	17	17
Shawnee	1768	1807	1788	20.5	20.2	20.4	30	12
Swing	1687	1800	1744	21.9	20.9	21.4	19	19
Topeka	1785	1520	1653	22.7	22.8	22.8	17	16
Universal	1406	1330	1368	21.7	21.7	21.7	18	18
Average	1376	1486	1431	21.6	21.5	21.5	18	16
LSD (0.10)	154	191	122	0.5	0.7	0.4	2	1
CV (%)	9	11	--	2.0	2.8	--	--	--

Table 55. Seed yield and seed weight for NT spring pea tested for three years in northern Idaho
Data from Stephen Guy and Ying Wu, University of Idaho

Variety or Selection	Seed Yield				Seed Weight			
	2001	2002	2003	Average	2001	2002	2003	Average
	lb/acre.....				g/100.....			
Ariel	2483	1424	1373	1760	20.2	17.1	17.2	18.2
Columbia	2231	1582	862	1558	20.8	19.2	19.4	19.8
Cruiser	2311	1281	1287	1626	21.7	19.2	18.5	19.8
Joel	2403	1515	1873	1930	22.5	18.8	20.2	20.5
Karita	2527	1358	1493	1793	27.0	23.5	23.7	24.7
Sterling	2502	1107	1106	1572	22.3	18.4	19.7	20.1
Supra	2002	1203	886	1364	33.8	34.0	31.8	33.2
Toledo	2621	1613	1576	1937	26.3	23.0	23.5	24.3
Pro 98106	2472	1460	1714	1882	20.8	18.2	19.0	19.3
Badminton	2649	1518	1350	1839	25.1	21.7	21.6	22.8
Fallon	2644	1365	1372	1794	25.5	21.1	21.7	22.8
Rex	2722	1493	1256	1824	26.5	24.4	23.2	24.7
Shawnee	2207	1656	1788	1884	22.8	19.7	20.4	21.0
Swing	2698	1776	1744	2073	24.1	20.4	21.4	22.0
Average	2462	1454	1406	1774	24.2	21.3	21.5	22.4
LSD (0.10)	179	147	122	--	0.8	1.6	0.4	--

Table 56. Seed yield averages for green and yellow peas tested for three years in northern Idaho
Data from Stephen Guy and Ying Wu, University of Idaho

Variety or Selection	2001	2002	2003	Average
.....lb/acre				
Green Pea				
Ariel	2290	1972	1543	1935
Bluebird	3258	3083	1849	2730
Columbia	2432	2188	1394	2005
Cruiser	2466	2185	1529	2060
Journey	2230	2060	1261	1850
Karita	2680	2112	1778	2190
Stratus	2987	2798	1833	2539
Supra	2374	1645	1138	1719
Toledo	2697	2565	1710	2324
Ceb 1170	2395	2490	1625	2170
Sterling	2529	2479	1159	2056
Average	2576	2325	1529	2143
LSD (0.10)	171	172	139	--
Yellow Pea				
Badminton	2566	2484	1768	2273
Fallon	2314	2259	1425	1999
Rex	2832	2317	1615	2255
Shawnee	2601	2180	1782	2188
Swing	2637	2824	1710	2390
Average	2590	2413	1660	2221
LSD (0.10)	171	172	139	--

Table 57. Spring lentil performance data for Nezperce and Moscow, 2003
Data from Stephen Guy and Ying Wu, University of Idaho

Variety or Selection	Seed Yield			Seed Weight			Plant Height		
	Nezperce	Moscow	Average	Nezperce	Moscow	Average	Nezperce	Moscow	Average
	lb/acre.....			g/100.....			in.....		
Brewer	873	1697	1285	4.7	6.3	5.5	14	13	14
Crimson	934	1213	1074	2.8	3.7	3.3	13	12	13
Eston	900	1557	1229	2.7	3.4	3.1	13	13	13
Mason	1034	1560	1297	5.4	7.4	6.4	13	12	13
Merrit	864	1705	1285	5.3	6.9	6.1	14	13	14
Pardina	1047	1804	1426	3.1	4.0	3.6	12	11	12
Pennell	587	1928	1258	5.8	6.8	6.3	13	13	13
Richlea	954	1897	1426	4.0	5.3	4.7	15	13	14
LC 860359L	632	2233	1433	5.4	7.0	6.2	15	14	15
LC 99600273L	615	2091	1353	5.7	6.9	6.3	16	14	15
LC 99602075L	755	2179	1467	6.3	7.9	7.1	15	15	15
LC 760209C (L)	749	1717	1233	5.7	7.4	6.6	14	14	14
LC 99602427P	919	1738	1329	3.7	5.0	4.4	13	13	13
LC 99602724T	931	1444	1188	3.1	4.0	3.6	12	11	12
Average	842	1769	1306	4.6	5.9	5.2	14	13	13
LSD (0.10)	173	335	180	0.2	0.2	0.1	1	1	1
CV (%)	17	16	--	3.4	2.2	--	6	6	--

Table 58. Spring chickpea performance data for Moscow, 2003
Data from Stephen Guy and Ying Wu, University of Idaho

Variety or Selection	Seed Yield	Seed Weight	Plant Height
	...lb/acre...	...g/100...	...in...
Dwellely	1181	44.6	17
Evans	1250	38.6	19
Myles	1437	16.0	15
Sanford	1287	40.9	18
Sierra	1389	41.6	17
Spanish White	1381	45.7	13
UC 27	1476	33.7	13
CA 9890233W	1153	42.0	15
CA 99901604C	1401	45.4	13
CA 99101875W	848	41.1	13
Average	1280	39.0	15
LSD (0.10)	184	2.0	2
CV (%)	12	4.4	9

Table 59. Seed yield for lentil and chickpea varieties tested for three years in northern Idaho
 Data from Stephen Guy and Ying Wu, University of Idaho

Variety or Selection	2001	2002	2003	Average
.....lb/acre.....				
Lentil				
Brewer	2374	1522	1285	1727
Crimson	1921	1407	1074	1467
Eston	2259	1516	1229	1668
Mason	2000	1594	1297	1630
Merrit	2468	1557	1285	1770
Pardina	2299	1688	1426	1804
Pennell	2015	1590	1258	1621
Richlea	2301	1532	1426	1753
Average	2205	1551	1285	1680
LSD (0.10)	120	100	180	--
Chickpea				
Dwelley	2094	2070	1181	1782
Evans	2173	1870	1250	1764
Myles	2517	2180	1437	2045
Sanford	2225	1750	1287	1754
Sierra	2361	2420	1389	2057
Spanish White	2184	2050	1381	1872
UC 27	2710	2520	1476	2235
Average	2323	2123	1244	1930
LSD (0.10)	195	200	184	--

Table 60. Western Regional Lentil Yield Trial - Kalispell, 2003
Data from Louise Strang and Duane Johnson, Montana State University

Cultivar	Type	Cotyledon color	First Bloom day after seeding	Maturity day	Height in	Yield lbs/a	Seed Size #/lb
Pennell	Laird	yellow	54.8	93.0	10.3	311.0	6716
LC860359L	Laird	yellow	58.8	95.3	12.0	432.2	7482
LC9960273L	Laird	yellow	60.8	94.8	13.5	458.7	6929
LC99602075L	Laird	yellow	55.5	94.3	12.8	404.0	6211
Merrit	Brewer	yellow	52.0	89.5	12.0	384.8	7294
LC760209C	Crimson	red	53.8	88.3	11.8	528.9	6610
LC99602712T	Turkish	red	52.5	86.8	9.5	668.0	12330
LC99602724T	Turkish	red	53.0	85.5	9.5	742.6	12786
LC00600831E	Eston	yellow	55.3	87.0	11.0	686.6	11318
LC00600854E	Eston	yellow	63.0	93.3	11.0	378.8	13165
LC99602427P	Pardina	yellow	52.5	86.3	10.5	702.4	9707
LC00600812P	Pardina	yellow	53.0	86.5	9.3	654.6	10857
Mean			55.4	90.0	11.1	529.4	9284
LSD(0.05)			2.3	2.0	1.3	115.0	773

Seeding date: 4/24/03

Table 61. Western Regional Dry Pea Yield Trial - Kalispell, 2003
Data from Louise Strang and Duane Johnson, Montana State University

Cultivar	Color	Leaf Type	Days to first bloom	Nodes to first bloom	Days to Maturity	Height inches	Yield lbs/a	SeedWt #/lb
PS9910140	yellow	afila	57.0	13.0	80.8	17.5	1761	2617
PS9910188	yellow	afila	54.5	13.9	81.3	17.3	1678	1928
PS810240	green	afila	56.5	15.1	84.3	21.5	1615	2447
PS9910592	green	afila	53.8	12.2	81.8	15.3	1506	2497
PS810162	green	afila	48.0	9.2	79.8	16.3	1404	2300
PS810191	green	afila	54.3	14.6	81.7	14.7	1386	2757
PS9910346	green	afila	48.0	10.7	80.5	17.3	1319	2549
PS610152	green	afila	51.8	9.8	83.0	16.5	1202	2597
PS710048	green	afila	54.5	12.8	82.8	16.0	1037	2427
PS710909	green	vine	55.0	12.9	87.5	16.0	961	1907
PS99101364	green	vine	52.8	12.4	86.3	19.0	900	1694
PS99101381	green	vine	51.3	12.3	84.0	17.8	895	1728
Mean			53.1	12.4	82.8	17.1	1305	2287
LSD(0.05)			0.9	2.0	2.2	3.2	407	130

Table 62. 2003 Winter Lentil/Dry Pea line evaluations at Moccasin
Data from Karnes Neill and Dave Wichman, Montana State University

Selection	Survival ^{1/}	Yield	Height
	...rating...	...lbs/acre...	...cm...
LC9979065	4.7	1,097 ^a	30.0
LC9979010	4.6	1,031 ^a	28.0
LC9978057	4.8 ^{ns}	889 ^a	28.3
LC9979062	4.6	861	33.3
LC9979120	4.7	764	30.0
LC9976079	4.7	581	33.0
WA8649041	4.6	328	36.0 ^a
LC9978094	4.4	147	36.3 ^a
Mean (n=24)	4.6	712	31.9
LSD (0.05 by t)	0.4	230	2.3
CV% (s/mean)	5.0	18.5	4.0
F-Value	0.59 ^{ns}	19.6	19.3

Selection	Survival ^{1/}	Yield	Height
	...rating...	...lbs/acre...	...cm...
PS0230F113	3.5	1177.4	39.0
PS0230F082	3.0	1089.4	38.0
PS0230F169	3.5	1079.7	46.0
PS0230F058	3.5	1020.7	47.0
PS0230F070	3.0	995.5	38.0
PS0230F076	2.5	960.0	35.0
PS0230F015	2.5	855.8	43.0
PS0230F064	2.0	853.9	32.0
PS0230F021	0.5		
PS0230F190	0.5		
Mean (n=10)	2.5	1004.0	39.8

^{1/} - Visual observation of spring stand: 5 - no visible stand reduction (0% winter-kill); 3 - moderate stand reduction (50% winter-kill); 0 - complete stand reduction (100% winter-kill)

Table 63. 2003 Uniform/Western Regional Chickpea Performance Trial –Agronomic summary. – Exp. 890703. Central Ag. Research Center, Moccasin, MT
Data from Karnes Neill and Dave Wichman, Montana State University

Selection	Flower	Plant Height	Yield	Kernel Weight
	...date...	...in...	...lbs/acre...	...g/1,000...
Myles	6/29 ^u	12.5	1028^a	187
Amit (B-90)	7/2	12.9	662	231
CDC Anna	6/30	12.4	585	159
CA99901614C	7/1	11.2	244	402^a
CA9990B1514C	7/4	12.9	180	341
CA9990B1579C	7/3	13.1	167	360 ^a
Sierra	7/3	13.2	164	343
CDC Yuma	7/2	14.5^a	140	295
CA9890169W	7/3	11.3	129	356
CA9990B1895C	7/5	13.0	37	279
CA9901861W	7/7	12.0	63	358 ^a
CA9890233W	7/5	11.2	38	371
CA9890239W	7/9	11.7	25	368 ^a
Dwelley	7/5	12.8	17	374 ^a
Mean (56)	7/3	12.5	251	316
LSD (0.05 by t)		0.9	158	45
CV% (s/mean)		5.0	44.1	9.9
F-Value		8.51	29	22.87

^a – Denotes values equal highest value (in **bold**) based on LSD _(0.05).

ⁿ – Denotes not statistically significant at 0.05 level.

Table 64. 2003 Western Regional Dry Pea Trial –Agronomic summary. – Exp. 810703. Central Ag. Research Center, Moccasin, MT
Data from Karnes Neill and Dave Wichman, Montana State University

Selection	Flower	Grain Harvest				
		Plant Ht	Yield	Test	Moisture	1,000 Kernel
PS9910346	6/27	10.7	583ⁿ	62.2	11.3	153
PS610152	6/29	11.1	580	63.0	11.6	142
PS810162	6/26	10.6	535	61.4	11.5	165
PS9910592	6/30	10.5	532	63.2ⁿ	11.8 ^a	152
PS810191	7/3	10.7	530	60.8	12.0^a	141
PS710048	7/3	11.3	518	60.1	11.8 ^a	153
PS9910188	7/2	12.5	513	60.7	11.9 ^a	182^a
PS9910140	7/3	11.9	499	58.2	11.6	146
Majoret	7/3	14.4^a	425	54.1	11.6	151
PS810240	7/4	13.8 ^a	409	56.0	11.8 ^a	140
Mean (n=40)	7/1	11.8	512	60.0	11.7	153
LSD (0.05 by t)		1.5	161	6.8	0.2	10
CV% (s/mean)		8.6	21.6	7.8	1.3	4.7
F-Value		7.39	1.06 ⁿ	1.64 ⁿ	7.27	12.83

^a – Denotes values equal highest value (in **bold**) based on LSD _(0.05).

ⁿ – Denotes not statistically significant at 0.05 level.

Table 65. 2003 Western Regional Lentil Trial – Lentil agronomic summary. – Exp. 860703. Central Ag. Research Center, Moccasin, MT
Data from Karnes Neill and Dave Wichman, Montana State University

Selection	Flower	Plant Height	Yield	Test	1,000 Kernels
LC99602712T	7/1	9.0	474.2a	64.9	28.2
LC00600812P	6/30	9.5	460.1a	63.4	30.7
LC00600831E	7/2	9.6	430.7a	32.5	31.4
LC99602427P	7/1	9.9	424.1a	32.3	35.2
LC99602724T	7/1	8.9	407.1a	65.0u	27.0
Merrit	6/29u	11.3	350.0	64.9	46.6
LC760209C	7/1	11.5a	298.0	x	56.4a
LC99602075L	7/2	11.4a	251.4	56.4	56.8a
Pennell	7/4	10.9	116.1	54.8	57.5a
LC00600854E	7/1	10.1	63.7	x	32.5
LC9960273L	7/5	12.2a	60.3	x	54.6a
LC860359L	7/5	10.8	37.2	x	50.7
Mean (56)	7/1	10.4	281.1	61.8	42.3
LSD (0.05byt)		0.8	82.9		3.7
CV% (s/mean)		5.51	20.49		6.10
F-Value		14.15	34.72		93.46

^a – Denotes values equal highest value (in **bold**) based on LSD _(0.05).

^u – Denotes unreplicated, not analyzed data

x – Denotes not enough sample was available for this analysis

Table 66. 2003 Nebraska Grain Pea Yields, Yield Lbs/acre
 Data from David Baltensperger and Glen Frickel, University of Nebraska

	Mean	Irrigated Mean	Dry Land Mean	Sidney Irr	Box Butte Irr	Sidney Dry	Box Butte Dry
Salute	2170	3141	1320	3538	2611	1397	1244
PS9910188	2089	2834	1344	3317	2351	1219	1469
PS810240	2008	2617	1311	3003	2232	1300	1326
Majoret	2006	2747	1265	3177	2316	1177	1352
PS610152	1981	2723	1331	2932	2567	1187	1476
PS810162	1910	2519	1377	2967	1921	1179	1576
PS810191	1908	2621	1283	2752	2446	1182	1385
Carneval	1883	2516	1249	2691	2342	1134	1364
Cruiser	1864	2415	1312	2597	2234	1212	1412
PS9910592	1802	2363	1241	2673	2054	1066	1417
PS9910346	1772	2251	1293	2753	1749	1101	1485
PS9910140	1756	2395	1198	3349	1679	1110	1286
PS710048	1722	2312	1131	2462	2163	1131	1131
Journey	1495	1898	1092	2347	1450	1059	1126
PS99101381	1310	1914	705	2757	1070	658	753
PS99101364	1250	1859	716	2399	1455	684	749
PS710909	1238	1836	716	2211	1336	760	671
Mean	1774	2410	1170	2819	1999	1091	1248
LSD	189	581	191	594	371	193	273
Plant Date				4/11/03	4/14/03	4/11/03	4/14/03
Harvest Date				7/25/03	7/31/03	7/21/03	7/31/03

Table 67. 2003 Nebraska Chickpea Trials
 Data from David Baltensperger and Glen Frickel, University of Nebraska

Entry	Sidney Irrigated		Sidney Dryland		Box Butte Co Irrigated		Box Butte Co Dry land		Scottsbluff Co Irrigated	
	Yield	Seed Weight	Yield	Seed Weight	Yield	Seed Weight	Yield	Seed Weight	Yield	Seed Weight
	Lbs/Acre	(grams)	Lbs/Acre	(grams)	Lbs/Acre	(grams)	Lbs/Acre	(grams)	Lbs/Acre	(grams)
Wyo 202	2960	0.22	160	0.17	1540	0.19	740	0.19	1210	0.22
Wyo 201	2950	0.21	180	0.18	680	0.19	560	0.19	420	0.21
PI 17256	2710	0.30	...	...	2040	0.32	...	...	1350	0.33
PI Bulk	2670	0.25	200	0.20	2020	0.25	430	0.23	1980	0.26
CA9990I861W	2560	0.39	230	0.30	1220	0.44	980	0.44	700	0.32
CA9990I604C	2440	0.48	240	0.32	880	0.40	810	0.52	1100	0.43
B90	2420	0.25	240	0.21	2320	0.26	460	0.25	1020	0.23
CA9783163C	2380	0.50	200	0.30	680	0.38	840	0.43	650	0.29
Dwelley	2310	0.44	200	0.30	790	0.39	870	0.45	660	0.32
CA9890233W	2260	0.44	170	0.31	1160	0.43	770	0.46	390	0.37
CA9990B1514C	2160	0.44	320	0.31	1500	0.46	890	0.47	950	0.37
Sierra	2080	0.47	390	0.31	1330	0.46	850	0.46	1610	0.41
CA9890169W	2020	0.38	270	0.28	750	0.37	850	0.46	340	0.30
CA9990B1579C	2000	0.48	320	0.30	1230	0.48	800	0.46	990	0.38
CA9990B1895C	1960	0.39	290	0.28	2100	0.43	1140	0.38	1030	0.30
CA9990I875W	1470	0.44	150	0.27	940	0.41	850	0.52	360	0.40
CA9890239W	1430	0.47	160	0.26	840	0.40	740	0.46	260	0.31
Average	2280	0.39	230	0.27	1300	0.37	790	0.40	880	0.32
LSD (.05)	607	0.04	67	0.03	335	0.04	303	0.03	570	0.06
Plant Date	4/29/03		4/22/03		4/22/03		4/22/03		4/29/03	
Harvest Date	9/16/03		9/15/03		9/16/03		9/16/03		9/25/03	

Table 68. 2003 Nebraska Lentil Trials
 Data from David Baltensperger and Glen Frickel, University of Nebraska

Entry	<u>Sidney Dryland</u>		<u>Box Butte Dryland</u>		<u>Box Butte Irrigated</u>	
	Yield	Seed Weight	Yield	Seed Weight	Yield	Seed Weight
	Lbs/Acre	(grams)	Lbs/Acre	(grams)	Lbs/Acre	(grams)
LC00600812P	420	0.04	440	0.05	1540	0.05
LC99602427P	390	0.05	580	0.05	1560	0.05
LC00600854E	190	0.04	310	0.04	1400	0.04
LC00600831E	410	0.04	460	0.04	1480	0.05
LC99602724T	300	0.04	460	0.04	1530	0.04
LC99602712T	440	0.04	390	0.04	1580	0.04
LC760209C	410	0.07	530	0.07	1360	0.07
Merrit LC460266B	410	0.06	530	0.06	1270	0.06
LC99602075L	290	0.06	470	0.07	1180	0.07
LC9960273L	130	0.06	280	0.06	1180	0.07
LC860359L	320	0.06	220	0.06	1150	0.06
Pennell LC460197L	410	0.06	400	0.07	1580	0.07
Average	340	0.05	420	0.05	1400	0.06
LSD (.05)	141	0.004	151	0.01	305	0.003

Table 69. Pea variety at Williston Research Extension Center, 2003
Data from Neil Riveland, North Dakota State University

Cultivar	Type	Flower First ..days ..	Plant Height ..cm..	Plant Height ..in..	Test Weight ..lbs/b..	1000 Kwt ..gms..	Seed Protein ..%..	Seed Yield ..lbs/a..	Seed Yield ..bus/a..	Harvest Ease ..0-9*..
CDC Mozart	(Y)	53.3	47.8	18.8	64.8	224.8	20.9	2824.1	47.07	3.3
Carneval	(Y)	54.8	62.0	24.4	64.3	224.0	21.4	2120.7	35.34	2.3
DS Admiral	(Y)	54.5	60.5	23.8	64.0	246.6	21.5	2177.2	36.29	2.0
Majoret	(G)	54.0	56.3	22.1	64.3	250.6	23.4	2140.7	35.68	2.8
Cruiser	(G)	54.5	55.3	21.8	63.4	228.6	23.8	2425.5	40.42	2.8
SW Salute	(Y)	53.5	58.0	22.8	64.3	235.6	22.0	2942.6	49.04	1.0
Eclipse	(Y)	54.0	49.8	19.6	65.3	226.7	23.4	2586.6	43.11	2.5
CDC Minuet	(Y)	56.3	56.8	22.3	64.4	194.0	21.1	2677.0	44.62	2.0
CDC Striker	(G)	55.3	59.	3.2	65.0	240.9	23.6	2415.3	40.26	2.0
Atomic	(G)	54.0	55.8	21.9	64.5	284.4	22.1	2180.0	36.33	4.0
Scuba	(G)	52.0	54.5	21.5	64.0	228.3	20.4	1938.4	32.31	2.5
Integra	(Y)	53.0	60.3	23.7	63.9	274.9	22.7	2379.8	39.66	1.5
Delta	(Y)	54.0	50.3	19.8	65.4	243.2	22.4	2949.3	49.15	1.5
Lifter		54.0	54.0	21.3	63.2	218.9	24.1	2410.8	40.18	7.8
Toledo	(G)	51.3	56.5	22.2	63.3	273.8	21.8	2416.5	40.27	3.0
PS610152		50.0	41.8	16.4	63.9	216.9	22.0	2596.3	43.27	3.0
PS99102238		56.5	55.3	21.8	63.5	237.7	21.1	2481.0	41.35	2.0
PS0010128		55.3	54.8	21.6	63.9	243.0	21.5	2456.8	40.95	2.5
PS0010792		51.8	54.5	21.5	64.4	268.5	22.2	2635.4	43.92	3.8
PS0010803		52.8	52.3	20.6	64.8	267.7	19.4	2643.0	44.05	3.3
PS0010804		53.5	53.5	21.1	63.8	255.1	19.9	2536.2	42.27	4.3
PS0010836		53.8	46.8	18.4	64.5	264.4	23.0	2831.7	47.19	3.3
PS0010902		52.3	66.5	26.2	64.0	248.7	22.7	2686.3	44.77	3.5
PS0010971		53.0	57.5	22.6	64.8	260.1	19.0	2704.9	45.08	2.3
PS0010973		52.5	51.3	20.2	64.7	265.1	19.0	2658.5	44.31	3.3
PS0010993		54.0	50.5	19.9	65.0	244.7	22.2	2573.2	42.89	3.8
PS0110135		52.0	51.0	20.1	65.2	249.5	22.0	2515.2	41.92	2.8
PS0110519		52.3	51.5	20.3	65.1	227.7	21.8	2412.6	40.21	4.5
PS0110682		54.0	50.8	20.0	64.2	230.9	22.3	2475.2	41.25	4.5
PS0110745		52.0	45.0	17.7	64.3	223.2	21.4	2393.5	39.89	5.3
PS01102958		54.8	48.0	18.9	64.2	245.3	22.1	2639.0	43.98	3.3
Nitouche	(G)	55.3	58.8	23.1	63.5	277.6	22.7	2725.2	45.42	1.8
HIGH MEAN		56.5	66.5	26.2	65.4	284.4	24.1	2949.3	49.15	7.8
LOW MEAN		50.0	41.8	16.4	63.2	194.0	19.0	1938.4	32.31	1.0
EXP MEAN		53.6	53.9	21.2	64.3	244.4	21.8	2517.1	41.95	3.0
C.V. %		1.2	11.1	11.1	.7	2.0	4.0	8.3	8.34	30.2
LSD 5%		.9	8.4	3.3	.7	6.9	1.8	294.8	4.91	1.3
LSD 1%		1.2	11.2	4.4	.9	9.2	2.4	390.7	6.51	1.7
# OF REPS		4	4	4	4	4	2	4	4	4
F-TRT		20.9	3.0	3.0	6.3	71.3	4.2	5.1	5.05	8.0

Harvest Ease scores; 0-9 0 = all plants upright to 9 = all plants flat \$ - (Y)=yellow cotyledon. (G)=green cotyledon.

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

Planted: April 28 on Fallow. Applied Fertilizer in lbs/a: 0N:0P2O5:0K:

Soil Test to two feet in lbs/a: 65N:17P:350K:108S 1.9 OM pH-6.4

Soil Type: Williams-Bowbells Loam

Harvested: July 31 Harvested Area: 56 ft²

Grain protein percentages reported on a oven dry moisture basis.

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

Table 70. Chickpea variety on fallow at Williston Research Extension Center, 2003
Data from Neil Riveland, North Dakota State University

Cultivar*		Flower Date	Plant Height	Plant Height	Test Weight	1000 Kwt	Seed Yield
		..fr plting..	..cm..	..in..	..lbs/b..	..gms..	..lbs/a..
Desiray	(D)	42.7	33.0	13.0	60.6	188.7	1495.6
Nika	(D)	43.7	33.7	13.3	62.6	310.9	1616.1
Myles	(D)	44.3	35.3	13.9	58.4	189.3	1614.2
Anna	(D)	46.0	32.3	12.7	63.0	202.7	1745.1
Amit	(SK) B-90	48.7	36.0	14.2	62.7	253.1	1510.3
Chico	(SK)	45.0	36.7	14.4	62.0	226.3	1474.8
ChiChi	(K)	47.0	30.0	11.8	59.3	352.9	1295.4
Evans	(K)	47.0	42.3	16.7	60.8	412.6	1072.1
Sanford	(K)	49.3	32.7	12.9	61.6	400.4	1263.0
Diva	(K)	45.3	30.3	11.9	61.1	444.5	1106.5
Xena	(K)	45.7	32.0	12.6	61.8	453.9	1230.7
Dwelley	(K)	50.0	37.3	14.7	60.1	485.1	1224.6
Sierra	(K)	50.0	36.3	14.3	60.8	451.0	823.9
Verano	(K)	44.3	29.3	11.5	60.4	507.8	1037.6
Yuma	(K)	48.0	39.7	15.6	61.6	377.9	1317.5
CA9890169W		49.0	31.7	12.5	59.9	375.8	1264.9
CA9890233W		49.7	32.3	12.7	53.8	395.1	870.4
CA9890239W		49.0	27.7	10.9	57.3	464.1	904.6
CA99901604C		45.7	31.7	12.5	56.8	439.5	1240.8
CA99901861W		50.0	33.7	13.3	58.5	428.3	1288.0
CA9990B1514C		50.0	33.7	13.3	59.4	458.1	1104.1
CA9990B1579C		49.3	40.7	16.0	58.8	451.6	1055.6
CA9990B1895C		50.0	40.3	15.9	63.0	394.3	1519.7
HIGH MEAN		50.0	42.3	16.7	63.0	507.8	1745.1
LOW MEAN		42.7	27.7	10.9	53.8	188.7	823.9
EXP MEAN		47.4	34.3	13.5	60.2	376.7	1264.1
C.V. %		1.8	12.9	12.9	2.8	8.8	15.0
LSD 5%		1.4	7.3	2.9	2.7	54.6	312.4
LSD 1%		1.9	9.7	3.8	3.6	73.0	417.2
# OF REPS		3	3	3	3	3	3
F-TRT		22.9	2.3	2.3	5.5	26.9	5.2

* (D)=Desi; (K)=Kabuli; (SK)=Small Kabuli

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

Planted: May 15 on fallow Applied Fertilizer in lbs/a: 50N:0P2O5:0K:

Soil Test to two feet in lbs/a: 65N:17P:350K:108S 1.9 OM pH-6.4

Table 71. Lentil variety at Williston Research Extension Center, 2003
Data from Neil Riveland, North Dakota State University

Cultivar	Flower Date	Plant Height	Plant Height	Test Weight	1000 Kwt	Seed Yield
	..fr plting..	..cm..	..in..	..lbs/b..	..gms..	..lbs/a..
Merrit	53.0	29.0	11.4	58.4	63.6	1380.3
Laird	54.8	31.5	12.4	59.4	52.2	1161.2
Crimson	54.8	21.5	8.5	62.2	35.8	1299.3
Pennell	56.0	28.8	11.3	59.2	65.3	1167.0
CDC Richlea	55.3	27.0	10.6	60.7	47.4	1578.8
Red Chief	53.5	29.3	11.5	57.9	59.1	576.5
CDC Sovereign	58.8	31.5	12.4	60.3	59.7	1058.8
CDC Milestone	53.3	25.5	10.0	62.1	35.7	1417.8
Red Robin	54.3	20.8	8.2	63.3	28.5	1063.2
Pardina	53.8	20.3	8.0	63.4	41.5	1303.7
LC 860359L	56.5	30.0	11.8	60.2	64.1	1266.2
LC 9960273L	58.5	32.8	12.9	57.9	66.9	1181.8
LC 99602075L	54.5	32.3	12.7	57.8	75.4	1097.1
LC 760209C	53.3	29.5	11.6	59.3	70.6	1356.5
LC 99602712T	53.8	20.3	8.0	62.8	38.9	797.8
LC 99602724T	54.5	16.3	6.4	62.9	39.9	842.9
LC 00600831E	53.0	23.5	9.3	61.9	40.9	1534.2
LC 00600854E	59.8	25.5	10.0	61.4	37.1	1059.9
LC 99602427P	53.3	22.5	8.9	62.3	49.5	1204.6
LC 00600812P	54.0	21.0	8.3	62.8	43.7	906.4
HIGH MEAN	59.8	32.8	12.9	63.4	75.4	1578.8
LOW MEAN	53.0	16.3	6.4	57.8	28.5	576.5
EXP MEAN	54.9	25.9	10.2	60.8	50.8	1162.7
C.V. %	2.0	12.3	12.3	1.1	2.9	10.5
LSD 5%	1.5	4.5	1.8	1.0	2.1	175.3
LSD 1%	2.0	6.0	2.4	1.3	2.7	234.3
# OF REPS	4	4	4	4	4	4
F-TRT	13.7	9.4	9.4	33.9	358.4	16.6

Relative efficiency = 101%

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

Planted: April 29 on Fallow. Applied Fertilizer in lbs/a:35N:0P2O5:0K:

Soil Test to two feet in lbs/a: 65N:17P:350K:108S 1.9 OM pH-6.4

Soil Type: Williams-Bowbells Loam

Harvested: August 11 Harvested Area: 56 ft2

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

Trial Design: 4 x 5 Rectangular Lattice

Table 72. Blue Lupin Performance Test, Carrington Research Extension Center, 2003
Data from Blaine Schatz and Steve Zwinger, North Dakota State University

Obs	Variety	Emerged Plant Stand per ft ²	Days to Bloom	Bloom Duration	Days To PM	Seed Shatter 0 - 9	Plant Lodge 0 - 9	Plant Height cm	Seeds/ Pound	Test Weight lbs/bu	Seed Yield bu/ac
1	Belara	3.0	39.0	28.7	82.7	0.7	2.3	17.6	2304	59.9	34.0
2	Danja	4.2	39.3	27.0	85.0	0.7	3.3	18.9	2066	60.2	29.5
3	Dikaf96-1	3.9	44.7	22.7	84.7	3.7	1.7	18.6	2452	59.7	31.3
4	Dikaf96-2	4.0	44.3	23.3	84.3	3.0	1.7	20.2	2529	59.5	36.6
5	Dikaf96-3	4.2	44.3	24.0	86.3	2.3	1.0	19.4	2410	59.6	36.0
6	Dikaf96-4	3.2	44.7	22.3	83.0	1.7	3.0	16.5	2759	60.0	17.1
7	E1	4.0	45.7	18.7	83.3	0.3	1.3	18.6	2690	61.0	34.3
8	E33	4.9	44.0	20.0	82.0	0.7	3.0	18.6	2993	59.9	31.6
9	F6-RF	6.0	43.7	25.7	86.0	0.0	2.3	19.4	2372	59.5	42.6
10	G52	6.2	46.3	22.3	86.0	0.0	0.3	21.8	2467	60.5	44.7
11	Gungurru	4.4	38.7	26.3	82.3	1.3	0.3	15.2	2356	59.9	31.1
12	Juno	2.7	49.3	19.7	86.0	0.3	1.7	18.1	2779	60.9	12.2
13	Kalya	3.9	39.7	25.7	82.7	1.0	3.3	17.1	2246	59.4	42.4
14	Ladney-96-1	2.7	43.7	24.0	85.7	2.0	2.0	16.5	2495	59.5	19.2
15	Ladney-96-2	3.9	45.3	22.7	84.7	2.7	1.0	17.8	2008	59.4	40.7
16	Ladney-96-3	3.2	44.7	22.3	85.7	1.0	2.3	15.7	2598	59.9	16.8
17	Ladney-96-4	1.9	44.7	22.3	84.3	3.3	2.3	16.5	2421	59.9	16.7
18	Merrit	3.5	41.3	24.7	86.0	0.7	0.7	15.2	2318	59.6	30.9
19	Myallie	3.7	41.0	27.7	86.7	0.7	2.7	17.6	2152	59.3	25.5
20	P12-1	4.1	42.0	24.0	82.7	0.7	1.0	18.1	2613	59.8	43.8
21	Quilinock	3.1	41.7	26.0	85.3	0.3	1.7	17.1	2123	59.3	32.5
22	Tallerack	3.9	40.7	28.3	87.0	0.3	1.7	20.2	2149	59.6	36.3
23	Tanjil	3.9	41.3	26.0	84.3	0.7	1.7	16.3	2478	59.7	33.3
24	Yorrel	4.4	39.3	35.7	90.3	0.3	2.0	17.3	1891	59.6	19.3
	MEAN	3.9	42.9	24.6	84.9	1.2	1.8	17.9	2408	59.8	30.6
	C.V. %	27.4	1.4	5.2	1.4	53.4	40.2	10.1	6.4	0.5	16.9
	LSD .05	1.7	1.0	2.1	1.9	1.0	1.2	3.0	254	0.4	8.5
	LSD .01	2.3	1.3	2.8	2.5	1.4	1.6	3.9	339	0.5	11.4
	# REPS	3	3	3	3	3	3	3	3	3	3

Planting Date = May 21 ; Harvest Date = September 4 ; Previous Crop = Durum

Yield based on 60 lb bushel

** Seed shatter score, apparent and recorded on JDAY 246; a score of 4 equates to 6 to 8 seeds per square foot, score of 3 equates to 4 to 6, score of 2 equates to 1 to 3, and 1 equates to a limited seed fall. *** Most seed shatter is associated with the 'Dikaf' and 'Ladney' lineages.

** On JDAY 188, as on 180 thru 183, the blue lupin varieties have not exhibited any symptoms of anthracnose as have the white lupin lines.

** Yorrel may be considered "too late" of a variety for this region. ** Danja and especially Yorrel, have a "stay green" tendency while the pods are harvest ready.

Table 73. Western Regional Field Pea Nursery - Advanced , NDSU Carrington Research Extension Center 2003
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	Canopy Ht at Harvest cm	Lodging at PM 0-9	Harvest Ease 0-9	Powdery Mildew 0-9	Test Weight lbs/bu	Seed Yield bu/ac
1	Delta	5.9	44.0	22.0	80.7	14.0	3.3	4.0	4.7	62.3	65.7
2	Integra	5.7	42.7	22.3	79.0	18.6	1.7	2.3	6.0	61.6	73.4
3	Lifter	5.7	45.7	29.3	87.0	6.3	7.3	8.7	0.3	62.7	37.4
4	PS0010128	4.6	45.0	24.0	85.3	9.3	6.3	7.7	0.0	62.0	58.7
5	PS0010792	3.7	42.3	27.0	88.3	15.5	5.3	6.0	0.0	63.4	65.4
6	PS0010803	6.1	43.7	20.3	80.7	8.0	5.7	6.7	2.0	61.9	65.1
7	PS0010804	5.7	43.7	21.0	80.7	8.4	6.7	7.7	1.7	61.9	67.3
8	PS0010836	5.5	43.7	23.0	84.0	5.9	6.3	7.7	0.7	62.1	66.2
9	PS0010902	3.4	43.0	27.0	87.7	17.6	5.0	5.7	0.0	62.0	58.7
10	PS0010971	5.5	43.7	21.0	81.7	8.4	5.3	7.0	1.3	62.4	70.2
11	PS0010973	5.7	43.3	22.3	80.0	6.0	6.7	8.3	1.3	61.1	56.6
12	PS0010993	5.7	45.0	20.3	81.0	8.8	5.0	6.7	1.7	61.8	79.5
13	PS0110135	3.5	44.0	25.3	84.0	10.0	6.0	6.7	3.0	62.7	52.2
14	PS01102958	5.7	45.0	24.3	86.0	10.5	6.3	6.7	1.3	62.5	76.9
15	PS0110519	3.6	42.7	27.0	85.3	13.9	4.3	5.0	3.0	61.4	50.7
16	PS0110682	3.9	43.7	23.7	85.7	6.4	6.7	8.3	2.0	61.8	62.1
17	PS0110745	3.8	42.3	21.3	82.0	7.7	6.3	7.7	2.0	62.7	64.0
18	PS610152	6.0	42.0	26.7	85.3	6.6	6.7	8.0	0.3	62.6	60.8
19	PS99102238	3.8	47.3	23.0	86.7	21.1	2.0	2.7	0.7	62.4	62.8
20	Toledo	5.2	42.0	22.7	80.0	17.3	2.3	2.7	6.7	61.2	76.8
MEAN		4.9	43.7	23.7	83.6	11.0	5.3	6.3	1.9	62.1	63.5
C.V.%		11.9	1.9	4.8	1.4	23.6	13.8	12.4	46.2	0.8	10.6
LSD.05		0.95	1.3	1.9	2.0	4.3	1.2	1.3	1.5	0.8	11.1
LSD.01		1.3	1.8	2.5	2.6	5.7	1.6	1.7	2.0	1.1	14.9
#REPS		3	3	3	3	3	3	3	3	3	3

Planting Date = May 22; Harvest Date = September 2 ; Previous Crop = Spring Wheat

Powdery Mildew scores; 0 = no symptoms present to 9 = heavy disease pressure.

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

Table 74. Western Regional Field Pea Nursery , NDSU Carrington Research Extension Center 2003
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	Canopy Ht at Harvest cm	Lodging at PM 0-9	Harvest Ease 0-9	Powdery Mildew 0-9	Seeds/ Pound	1000 KWT gms	Test Weight lbs/bu	Seed Yield bu/ac
1	PS610152	5.4	40.0	29.7	86.3	7.5	6.0	7.0	1.0	2424	187	62.7	60.6
2	PS710048	4.7	44.7	20.3	86.0	9.2	5.0	5.7	0.7	2001	227	63.7	52.2
3	PS810162	5.2	38.0	23.7	84.3	13.3	4.3	4.7	0.3	2192	208	62.0	62.1
4	PS810191	5.5	44.7	27.0	88.3	6.0	6.7	7.7	0.3	2572	177	63.2	53.3
5	PS810240	5.4	46.0	24.0	87.3	12.6	5.3	6.0	2.0	2517	182	63.8	56.1
6	PS9910140	6.6	44.0	28.0	85.3	8.3	6.7	7.7	1.0	2236	205	61.8	56.8
7	PS9910188	6.8	43.0	27.7	87.3	11.0	6.3	6.3	0.0	1822	249	62.6	58.9
8	PS9910346	5.8	37.7	32.3	80.7	8.8	6.0	6.7	1.0	2866	159	61.2	43.5
9	PS9910592	5.0	43.7	30.3	86.7	4.9	8.0	9.0	0.0	2760	165	62.5	43.4
MEAN		5.6	42.4	27.0	85.8	9.1	6.0	6.7	0.7	2377	195	62.6	54.5
C.V. %		18.2	0.9	5.1	1.9	25.2	13.6	13.4	49.3	7.9	7.0	0.6	11.3
LSD.05		NS	0.7	2.4	2.8	4.0	1.4	1.6	0.6	323	24	0.7	10.8
LSD.01		NS	0.9	3.3	3.8	5.4	1.9	2.2	0.8	445	33	0.9	14.9
#REPS		3	3	3	3	3	3	3	3	3	3	3	3

Planting Date = May 22; Harvest Date = September 2 ; Previous Crop = Spring

Wheat

Powdery Mildew scores; 0 = no symptoms present to 9 = heavy disease pressure.

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

Table 75. Western Regional Chickpea Nursery , NDSU Carrington Research Extension Center 2003
Data from Blaine Schatz and Steve Zwinger, North Dakota State University

Obs	Variety	Market Class	Emerged Plant Stand per ft ²	Days to Flower	1000 KWT gms	Seeds / Pound	Seeds > 9 mm %	Seeds > 8 mm %	Seed > 7 mm %	Test Weight lbs/bu	Seed Yield lbs/ac
1	CA9890169W	Kabuli	3.7	44.3	415	1096	51	29	13	52.3	938
2	CA9890233W	Kabuli	3.9	46.0	440	1032	64	25	7	53.6	1006
3	CA9890239W	Kabuli	3.9	45.7	461	985	66	23	8	53.5	1016
4	CA99901604W	Kabuli	3.9	44.7	442	1048	59	26	9	55.0	1361
5	CA99901861W	Kabuli	4.1	45.0	477	989	64	25	8	55.5	1736
6	CA9990B1514C	Kabuli	3.7	45.0	524	866	71	20	6	55.3	1580
7	CA9990B1579C	Kabuli	3.9	45.0	462	995	62	27	8	58.8	1986
8	CA9990B1895C	Kabuli	3.5	43.7	449	1011	60	24	10	56.1	1432
9	Dwelley	Kabuli	3.6	43.0	458	992	62	24	9	56.7	1193
10	Sierra	Kabuli	3.5	44.7	529	858	75	17	5	55.6	1622
MEAN			3.8	44.7	987	466	8	24	64	55.2	1387
C.V. %			12.5	3.0	11.5	10.8	24.0	22.9	11.2	3.6	20.4
LSD.05			NS	NS	NS	NS	3	NS	12	3.4	484
LSD.01			NS	NS	NS	NS	5	NS	NS	NS	663
#REPS			3	3	3	3	3	3	3	3	3

Planting Date = May 22 ; Harvest Date = October 9 ; Previous Crop = Spring Wheat

** Seed size data represents the portion of seed remaining on top of each sieve during sizing operation.

** Seed size data listed is not accumulative. Example; Dwelley has 86% of seed larger than 8 mm, not just 24%.

Table 76. Western Regional Lentil Nursery – 0398, NDSU Carrington Research Extension Center 2003
Data from Blaine Schatz and Steve Zwinger, North Dakota State University

Obs	Variety	Cotyledon Color	Market Type	Emerged Plant Stand per ft ²	Days to Bloom	1000 KWT gms	Seeds / Pound	Test Weight lbs/bu	Seed Yield lb/ac
1	LC00600812P	Yellow	Pardina	2.3	42.3	36.7	12414	59.7	484
2	LC00600831E	Yellow	Eston	5.1	42.7	37.4	12135	59.9	1060
3	LC00600854E	Yellow	Eston	3.0	45.0	31.2	14671	59.1	433
4	LC760209C	Yellow	Castilian	4.5	42.0	65.3	6957	57.0	757
5	LC860359L	Yellow	Laird	3.1	44.3	58.8	7727	58.8	912
6	LC99602075L	Yellow	Laird	3.8	43.3	71.1	6385	56.7	588
7	LC99602427P	Yellow	Pardina	2.8	40.7	41.8	10874	59.8	458
8	LC99602712T	Red	Turkish Red	3.7	41.7	34.1	13355	60.2	276
9	LC99602724T	Red	Turkish Red	3.6	41.7	32.2	14194	na	172
10	LC9960273L	Yellow	Laird	4.6	44.3	65.0	6982	57.2	930
11	Merrit	Yellow	Brewer	3.9	41.0	60.6	7497	58.2	779
12	Pennell	Yellow	Laird	3.5	42.3	63.7	7140	58.3	833
MEAN				3.7	42.6	49.8	10028	58.6	625
C.V.%				18.8	1.9	2.9	5.8	1.5	19.5
LSD.05				1.2	1.4	2.5	983	1.5	228
LSD.01				1.6	1.9	3.4	1336	2.0	312
#REPS				3	3	3	3	3	3

Planting Date = May 22 ; Harvest Date = September 2 ; Previous Crop = Spring Wheat

Table 77. 2003 McPhee Field Pea Trial NCREC – Minot
Data from Mark Halvorson, North Dakota State University

Variety	Protein %	Days to Flower (10%)	Days to Maturity	Vine Length in	Lodge ^a (1-9)	Seed Weight g/1000	Test Weight lb/bu	Seed Yield 2003 ---lb/A---
Delta	22	56	87	23.3	0.0	229.8	64.4	5363
Integra	22	55	86	24.7	0.0	266.9	63.5	4624
Lifter	24	59	92	26.0	8.0	213.4	63.0	3452
Toledo	22	53	86	23.3	0.0	273.8	62.8	4205
PS610152	22	52	87	27.7	4.7	214.0	64.0	4341
PS99102238	19	60	90	23.3	0.0	214.7	63.6	3951
PS0010128	21	57	87	26.0	5.0	229.4	63.3	4370
PS0010792	22	55	90	24.0	3.0	267.4	63.6	4748
PS0010803	18	57	87	24.7	3.3	247.2	64.6	4876
PS0010804	18	57	88	25.3	4.7	232.9	64.2	4474
PS0010836	22	57	88	29.7	2.0	262.0	63.5	4428
PS0010902	22	57	88	26.0	2.7	257.6	63.3	4321
PS0010971	19	56	88	24.7	2.3	254.8	64.5	4529
PS0010973	18	56	88	26.7	5.7	261.8	65.0	4954
PS0010993	21	58	86	24.0	4.3	237.1	64.4	4922
PS0110135	21	56	86	22.0	2.3	236.9	65.4	4460
PS0110519	21	54	87	24.7	3.3	206.6	64.4	3651
PS0110682	24	58	91	25.7	2.7	235.4	63.3	4452
PS0110745	20	54	87	25.7	3.0	216.9	65.0	4660
PS01102958	21	58	89	23.3	3.3	263.5	65.3	4715
LSD 5%	2	2	3	5.4	2.5	19.0	0.7	740
C.V.%	4.5	2.5	1.9	13.1	50.9	3.8	0.6	10.0
Mean	21	56	88	25.0	3.0	241.1	64.1	4475

^aLodging score based on scale 1-9. (1=upright, 9=flat)

Table 78. Field Pea- Western Regional North Central Research Extension Center—Minot
Data from Mark Halvorson, North Dakota State University

Variety	Days to Flower (10%)	Vine Length in	Days to Maturity	Lodge ^a (1-9)	Test Weight lb/bu	Seed Yield ---lb/A---
Majoret	58.5	28	88.8	0.3	65	4481
Mozart	56.3	26	88.3	1.5	65	5348
PS610152	51.5	23	87.5	2.8	65	4916
PS710048	57.3	22	88.0	3.5	65	4225
PS810162	51.0	23	88.5	0.8	64	4580
PS810191	58.5	22	90.3	5.0	65	4762
PS810240	58.0	21	89.0	3.0	66	4645
PS9910346	51.8	23	88.3	5.8	64	4303
PS9910592	56.0	22	87.8	9.0	65	3740
PS9910140	57.8	24	88.8	7.3	64	4923
PS9910188	55.8	25	90.3	7.0	65	4613
LSD 5%	1.5	4	1.9	1.4	0	297
C.V.%	1.8	10.8	1.5	22.7	0	4
Mean	55.7	23	88.7	4.2	65	4594

Table 79. Chickpea Varieties Western Regional Trial 2003
Data from Mark Halvorson, North Dakota State University

Variety	Days to Flower 10%	Days to Flower 90%	Plant Height in	Kernel Weight g/1000	Test Weight lb/bu	Seed Yield
Dwelle (CA188359)	49	95	16	416.4	58.7	3535
Sierra (CA9783152C)	51	95	15	418.7	59.7	3065
CA9890169W	50	96	16	441.8	58.0	3022
CA9890233W	49	97	17	464.8	57.2	2544
CA9890239W	49	97	17	389.6	56.7	2655
CA99901604C	49	95	14	513.0	57.5	3260
CA99901861W	50	96	16	438.3	60.0	3145
CA9990B1514C	51	94	17	487.6	59.1	3142
CA9990B1579C	51	95	17	454.3	58.8	3434
CA9990B1895C	50	95	19	385.3	61.6	3448
LSD 5%	1	1	2	81.11	1.0	421
C.V.% a	2	1	9	8.13	1.2	9.24
Mean	49.7	95.2	16.2	440.96	58.7	3125.0

Table 80. Western Regional Trial North Central Research Extension Center—Minot
Data from Mark Halvorson, North Dakota State University

Variety	Days to Flower	Vine Length in	Days to Maturity	Lodge ^b 1-9	Seed Weight g/1000	Test Weight lb/bu	Yield 2003
Pennell (LC460197L)	59.0	13.0	101.5	0	68.5	58.8	1871.0
LC860359L	60.8	15.5	103.0	0	65.8	60.5	1430.6
LC9960273L	60.5	15.0	103.3	0	71.5	58.0	1656.0
LC99602075L	59.8	14.5	103.5	0	74.8	58.5	1120.5
Merritt (LC460266B)	59.3	13.5	102.8	0	66.4	59.6	1597.7
LC760209C	58.3	15.0	102.8	0	73.0	59.0	1561.7
LC99602712T	60.0	10.5	100.8	0	46.1	63.1	819.0
LC99602724T	60.8	11.0	100.5	0	43.4	61.9	753.9
LC00600831E	60.5	11.0	102.8	0	42.7	61.8	1549.7
LC00600854E	61.3	13.0	102.5	0	39.3	61.4	1005.1
LC99602427P	59.5	13.0	99.0	0	47.4	62.5	1724.5
LC00600812P	58.8	9.8	101.5	0	43.9	62.9	1287.3
LSD 5%	1.4	1.7	1.6		3.45	0.3	266.4
C.V.%	1.6	8.9	1.1		2.75	0.3	13.4
Mean	59.9	12.9	102.0	0.0	56.88	60.7	1364.8

Table 81. 2003 Field Pea Nursery, Hettinger, North Dakota
Data from Eric Eriksmoen, North Dakota State University

Entry #	Accession	Days o First Flower	Duration of Bloom days	Days o Mature	Plant Ht. at Harvest cm	Lodg. 0 - 9*	1000 Seed Weight grams	Test Weight lbs/bu	Yield bu/ac
1	PS960007	59	12	83	45	0.3	197	66.2	33.7
2	PS960005	58	11	83	60	0.0	222	63.1	41.9
3	PS510718	60	13	87	30	8.0	188	63.4	25.4
4	PS960003	58	12	84	60	0.0	207	61.8	39.3
5	PS610152	56	15	85	44	4.0	176	64.4	40.6
6	PS99102238	61	11	86	57	1.7	187	64.4	29.4
7	PS0010128	59	12	85	37	7.7	181	64.9	40.7
8	PS0010792	58	12	87	44	4.3	201	64.6	39.3
9	PS0010803	58	11	84	35	7.7	199	65.2	39.8
10	PS0010804	59	10	84	47	7.3	200	65.2	37.6
11	PS0010836	59	11	83	51	2.3	227	64.8	38.3
12	PS0010902	58	12	85	51	5.7	197	64.2	34.4
13	PS0010971	58	11	84	40	5.7	186	64.8	35.9
14	PS0010973	57	12	83	25	8.7	181	62.6	32.4
15	PS0010993	58	12	82	43	4.3	206	65.2	37.2
16	PS0110135	58	12	83	43	3.3	205	64.3	39.1
17	PS0110519	58	14	84	56	3.3	167	64.0	34.1
18	PS0110682	60	12	88	51	2.0	196	64.0	32.0
19	PS0110745	58	12	84	46	0.3	189	64.7	32.6
20	PS01102958	60	10	86	44	0.7	201	64.8	30.0
Trial Mean		58	12	85	45	3.9	196	64.3	35.7
C.V. %		1.0	5.1	1.3	14.0	34.0	8.3	1.1	9.0
LSD .05		1	1	2	10	2.2	27	1.1	5.3
LSD .01		1	1	2	14	2.9	36	1.5	7.1

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

Planting Date: April 21, 2003

Harvest Date: July 23, 2003

Seeding Rate: 7 seeds/sq. ft

Previous Crop: Barley

Plot size: 55.4 sq ft

Harvest size: 46.7 sq ft

Regional Legume Trials, OSU, CBARC, Pendleton

Twelve lines of chickpea, peas, and lentils were grown at two sites, Columbia Basin Agricultural Research Center (CBARC) in Pendleton (45°N, 118° West, elevation 1440 ft) and Moro (45°N, 121° West, elevation 1835 ft). Soils at both stations are Walla Walla silt loams that are 4 to 6 feet deep. Moro and Pendleton received 8.82 and 15.42 inches of rain, respectively (2002-03 crop-year, when these crops were evaluated). Chickpeas, peas, and lentils were planted on May 16 in Pendleton and on May 17 in Moro at a seeding rate of 3, 7, and 20 seeds/ft², respectively. Data obtained are presented below.

Table 82. Grain yield and grain size of Western Regional Chickpeas lines (0399) evaluated at Moro and Pendleton in the Spring of 2003
Data from Stephen Machado, Oregon State University

Entry No.	Accession No	Grain yield (lb/a)		% grade A		% grade B		% grade C		% feed grade	
		Pendleton	Moro	Pendleton	Moro	Pendleton	Moro	Pendleton	Moro	Pendleton	Moro
1	CA188357	926.4bdc	962.0abcc	84.5cde	75.2e	11.2bc	19.1b	3.3bc	4.5ab	1.0ab	1.3b
2	CA9783152C	1155.8ab	914.2abcd	84.6cde	80.0de	12.0bc	14.9c	2.8bc	4.0abc	0.6b	1.1b
3	CA9783163C	989.1abcd	939.5abcc	86.3abcde	84.3bcd	9.0cd	9.1def	3.1bc	3.2bcd	1.6ab	3.4a
4	CA9890169W	1190.9a	866.2bcde	87.0abcd	82.8bcd	9.8cd	12.4cde	2.5bc	3.4bc	0.7ab	1.4b
5	CA9890233W	889.5cd	622.5e	85.4cde	86.1abc	9.3cd	8.4ef	3.5bc	3.2bcd	1.7a	2.3ab
6	CA9890239W	970.7abcd	711.5de	90.0abc	86.6ab	6.5de	9.0def	2.3bc	2.8cd	1.2ab	1.9ab
7	CA99901604C	1121.7abc	857.1bcde	91.6a	86.1abc	5.5e	9.0def	1.7c	2.9cd	1.2ab	2.1ab
8	CA99901861W	1043.2abc	986.2abcd	81.1e	81.0cd	13.4b	13.5c	4.2b	3.9abc	1.4ab	1.6b
9	CA99901875W	759.3d	768.0cde	91.3ab	89.7a	5.5e	6.4f	2.2c	2.0d	1.0ab	1.9ab
10	CA9990B1514C	1115.2abc	1021.5abc	84.0de	83.0bcd	11.7bc	13.0cd	3.1bc	2.8cd	1.2ab	1.2b
11	CA9990B1579C	1105.0abc	1063.4ab	85.8bcde	82.7bcd	10.44bc	13.0cd	2.5bc	3.1cd	1.3ab	1.2b
12	CA9990B1895C	1056.0abc	1162.7a	67.6f	67.9f	25.4a	25.3a	6.2a	5.0a	1.0ab	1.9ab

Table 83. Grain yield and height of Western Regional Dry Pea lines (0397) evaluated in 2003
Data from Stephen Machado, Oregon State University

Entry No.	Accession No.	Pendleton		Moro	
		Grain yield	Plant height	Grain yield	Plant height
		..lb/a..	..in..	..lb/a..	..in..
1	PS610152	1162.8ab	9.6ab	475.1bcde	8.1ab
2	PS710048	1027.3abcde	9.8ab	482.6bcd	8.1ab
3	PS810162	735.5e	9.8ab	370.4def	7.5bc
4	PS810191	1122.0abc	10.4a	431.0cdef	8.3ab
5	PS810240	1243.8ab	9.4b	718.8a	7.0c
6	PS9910346	1001.7abcde	9.8ab	574.1abc	7.9ab
7	PS9910592	977.0bcde	9.9ab	431.0cdef	8.3ab
8	PS710909	801.7cde	9.9ab	311.9def	8.1ab
9	PS99101364	793.6ed	10.4a	287.2f	8.4a
10	PS99101381	835.2cde	10.0ab	308.3ef	7.9ab
11	PS9910140	1066.4abcd	9.9ab	646.8ab	7.9ab
12	PS9910188	1319.0a	10.3a	679.3a	7.5bc

Table 84. Grain yield and height of Western Regional Lentil lines (0398) evaluated in 2003
Data from Stephen Machado, Oregon State University

Entry No.	Accession No.	Pendleton		Moro	
		Grain yield	Plant height	Grain yield	Plant height
		..lb/a..	..in..	..lb/a..	..in..
1	LC460197L	356.2ab	12.8def	362.4a	9.3a
2	LC860359L	366.9ab	15.5ab	350.6a	9.4a
3	LC9960273L	247.2b	15.13abc	244.8b	9.6a
4	LC99602075L	352.3ab	16.3a	251.9b	9.3a
5	LC460266B	470.1a	13.6bcde	197.0cbd	9.3a
6	LC760209C	397.6ab	14.3bcd	148.7cde	9.4a
7	LC99602712T	318.3ab	10.6g	117.6de	9.6a
8	LC99602724T	334.4ab	10.6g	132.1cde	9.4a
9	LC00600831E	347.7ab	12.3efg	212.9bc	9.5a
10	LC00600854E	256.6b	13.4cde	176.7bcde	9.6
11	LC99602427P	429.8ab	10.6g	120.7de	9.6a
12	LC00600812P	478.7a	11.4fg	103.0e	9.4a

Winter Legume Grain Yields

Two lines of winter pea and four lines of winter lentils were grown at the Columbia Basin Agricultural Research Center (CBARC) in Pendleton (45°N, 118° West, elevation 1440 ft) and at Moro (45°N, 121° West, elevation 1835 ft). Soils at both stations are Walla Walla silt loams that are 4 to 6 feet deep. Moro and Pendleton received 8.82 and 15.42 inches of rain, respectively (2002-03 crop-year, when these crops were evaluated). The peas and lentils were grown at two planting dates and two seeding rates. Data obtained are presented below

There was a significant interaction between site, planting date and variety on grain yield (Table 85). Grain yields were higher when all varieties were planted in November largely due to better plant establishment at Pendleton (Table 85a). At this site seeds were dusted in October and planted into moist soil in November. Soil moisture effects on plant establishment and grain yield were not so pronounced at Moro (Table 85b). Grain yields at Moro were affected by field mice and weeds. Seeding rates (5 and 7 seeds/ft²) had no effect on grain yield at both sites. PS9430706 appears better adapted to eastern Oregon conditions than PS9530726.

Table 85a. Planting date and variety effects
Data from Stephen Machado, Oregon State University

Accession No.	Pendleton							
	Planting date 1 (October 16)				Planting date 2 (November 12)			
	Grain Yield ..lb/a..	Plant/ft ²	Plant height ..in..	Harvest index	Grain Yield ..lb/a..	Plant/ft ²	Plant height ..in..	Harvest index
PS9530726	1094.91b	3.0b	17.7b	0.27a	1580.38b	7.3a	18.2b	0.27a
PS9430706	1900.34a	4.7a	38.3a	0.18b	1966.42a	7.6a	35.4a	0.21b

Table 85b. Planting date and variety effects
Data from Stephen Machado, Oregon State University

Accession No.	Moro							
	Planting date 1 (October 15)				Planting date 2 (November 14)			
	Grain Yield ..lb/a..	Plant/ft ²	Plant height ..in..	Harvest index	Grain Yield ..lb/a..	Plant/ft ²	Plant height ..in..	Harvest index
PS9530726	1112.13a	3.8b	19.4b	0.27a	754.58b	5.8a	19.2b	0.31a
PS9430706	948.16a	6.0a	33.7a	0.22b	1043.45a	6.2a	33.8a	0.24b

Winter lentils

Winter lentil grain yields were influenced by seeding rate (Table 86), site and planting date (Table 87) and site and variety (Table 88) interactions. Increasing seeding rates significantly increased plant counts and grain yields of lentils at both sites (Table 86). Higher grain yields were produced when planting was done in November than in October in Pendleton (Table 87). Planting in October reduced plant stands due to lack of soil moisture (crop dusted in). The opposite was true at Moro (Table 87). Grain yields were reduced when planting was done in November primarily due to grassy weeds. Herbicide (Assure®) application was delayed due to practical problems.

Table 86. Seeding rate effects
Data from Stephen Machado, Oregon State University

Seeding rate	Pendleton			Moro		
	Grain yield	Plant/ft ²	Plant height	Grain yield	Plant/ft ²	Plant height
	..lb/a..		..in..	..lb/a..		..in..
10 seeds/ft ²	434.8b	4.0b	13.1a	256.1b	3.7b	9.8a
20 seeds/ft ²	541.3a	6.4a	13.5a	373.3a	6.9a	9.9a

Table 87. Site and planting date effects
Data from Stephen Machado, Oregon State University

Planting date	Pendleton			Moro		
	Grain yield	Plant/ft ²	Plant height	Grain yield	Plant/ft ²	Plant height
	..lb/a..		..in..	..lb/a..		..in..
October 15-16	360.0b	1.7b	12.1b	410.4a	4.7b	9.7a
November 12-14	616.1a	8.6a	14.5a	219.0b	5.8a	10.0a

Table 88. Site and variety effects
Data from Stephen Machado, Oregon State University

Accession No.	Pendleton			Moro		
	Grain yield	Plant/ft ²	Plant height	Grain yield	Plant/ft ²	Plant height
	..lb/a..		..in..	..lb/a..		..in..
WA8649041	323.9c	5.4a	13.7a	87.7c	4.6a	11.7a
WA8649090	700.4a	5.1a	13.0a	314.4b	5.43a	8.2d
LC9440070	456.1b	5.4a	13.2a	431.2a	5.9a	10.3b
LC9979010	471.7b	4.9a	13.2a	425.5a	5.6a	9.2c

Table 89. SDSU Chickpea Variety Trial – Hayes, South Dakota – 2003
 Data from John Rickertsen, South Dakota State University

Variety	Height inches	Lodging 1-9	Test Wt. lbs/bu	Yield lbs/ac
Dwelly	15	1	56.6	967
Evans	17	1	59.8	1168
Sanford	17	1	59.4	1285
Sierra	16	1	59.2	1228
CDC Diva	15	1	60.2	1309
CDC Yuma	15	1	60.1	1072
CDC Xena	14	1	59.9	1362
B-90	15	1	62.4	1424
Chico	14	1	61.1	1414
CDC Anna	14	1	63.4	1482
CDC Desiray	13	1	59.5	1340
Myles	13	1	57.8	1322
CDC Nika	14	1	62.2	1412
CA9783163C	14	1	55.9	1049
CA9890169W	13	1	56.6	1257
CA9890233W	13	1	55.6	1012
CA9890239W	15	1	54.6	941
CA99901604C	13	1	56.8	1450
CA99901861W	14	1	56.8	1148
CA99901875W	13	1	55	1019
CA9990B1514C	16	1	59.1	1313
CA9990B1579C	16	1	58.6	1295
CA9990B1895C	15	1	60.1	1291
Mean	14.2	1	58.7	1241
LSD (P=.05)	1.92	0	1.47	184
CV	6.49	0	1.77	10.48

Planted: April 10, 2003

Harvested: July 29, 2003

Table 90. SDSU Chickpea Variety Trial – Wall, South Dakota – 2003
 Data from John Rickertsen, South Dakota State University

Variety	Height inches	Lodging 1-9	Test Wt. lbs/bu	Yield lbs/ac
Dwelly	16	1	58.3	824
Evans	18	1	58.6	985
Sanford	16	1	59.0	838
Sierra	16	1	57.6	1116
CDC Diva	15	1	57.9	1108
CDC Yuma	16	1	58.7	1114
CDC Xena	15	1	59.4	1107
B-90	14	1	61.2	1008
Chico	14	1	59.6	1143
CDC Anna	14	1	60.5	1071
CDC Desiray	12	1	56.2	1029
Myles	11	1	54.4	944
CDC Nika	12	1	59.0	1175
CA9783163C	14	1	55.8	879
CA9890169W	13	1	55.1	961
CA9890233W	13	1	54.9	810
CA9890239W	12	1	54.5	743
CA99901604C	12	1	55.5	1237
CA99901861W	13	1	57.0	1000
CA99901875W	14	1	55.0	809
CA9990B1514C	16	1	57.9	1053
CA9990B1579C	17	1	58.1	1024
CA9990B1895C	15	1	59.8	1085
Mean	14.0	1	57.5	1002
LSD (P=.05)	2.78	0	1.73	148.5
CV	9.55	0	2.12	10.47

Planted: April 17, 2003

Harvested: August 4, 2003

Table 91. SDSU Chickpea Variety Trial – Oelrichs, South Dakota – 2003
Data from John Rickertsen, South Dakota State University

Variety	Height inches	Lodging 1-9	Test Wt. lbs/bu	Yield lbs/ac
Dwelly	15	1	58.6	376
Evans	17	1	59.3	543
Sanford	17	1	58.2	448
Sierra	17	1	59.1	551
CDC Diva	15	1	60.2	714
CDC Yuma	16	1	58.6	540
CDC Xena	15	1	59.8	730
B-90	15	1	60.7	499
Chico	15	1	59.6	771
CDC Anna	14	1	59.1	769
CDC Desiray	14	1	57.8	760
Myles	13	1	57.4	607
CDC Nika	16	1	60.6	829
CA9783163C	16	1	55.1	411
CA9890169W	16	1	56.0	516
CA9890233W	16	1	56.7	273
CA9890239W	16	1	55.2	332
CA99901604C	16	1	56.2	708
CA99901861W	17	1	55.4	384
CA99901875W	15	1	55.9	254
CA9990B1514C	16	1	57.9	571
CA9990B1579C	16	1	58.7	587
CA9990B1895C	17	1	61.0	525
Mean	15	1	58.1	552
LSD (P=.05)	1.81	0	1.38	151.6
CV	5.66	0	1.68	19.42

Planted: April 21, 2003

Harvested: September 2, 2003

Table 92. SDSU Dry Pea Variety Trial – Bison, South Dakota – 2003
Data from John Rickertsen, South Dakota State University

Variety	Height inches	Lodging 1-9	Test Wt. lbs/bu	Yield bu/ac
Forage				
4010 Magda	34	7.0	62.6	23.6
Arvika	35	7.5	62.0	21.6
Wyodun	35	7.8	61.9	25.2
Yellow Cotyledon				
Grande	24	1.0	63.0	33.3
Carneval	24	1.0	61.8	30.8
CDC Mozart	18	1.0	63.7	30.8
Eclipse	18	1.0	63.1	32.7
Integra	21	1.0	60.4	27.0
SW Circus	21	1.0	62.4	31.1
SW Midas	21	1.0	61.8	28.3
SW Salute	22	1.0	63.2	31.5
Topeka	18	1.0	62.8	30.7
Green Cotyledon				
Cruiser	20	1.0	62.0	26.6
Journey	29	8.3	61.0	22.5
Majoret	20	1.0	63.0	26.4
Stratus	16	1.0	62.5	37.5
SW Parade	20	1.0	59.9	25.1
Toledo	21	1.0	60.3	25.8
Mean	23.0	2.5	28.4	28.4
LSD (P=.05)	3.0	0.5	1.3	5.0
CV	6.1	13.8	12.5	12.5

Planted: April 9, 2003

Harvested: July 24, 2003

Table 93. SDSU Dry Pea Variety Trial – Hayes, South Dakota – 2003
Data from John Rickertsen, South Dakota State University

Variety	Height inches	Lodging 1-9	Test Wt. lbs/bu	Yield bu/ac
Forage				
4010 Magda	25	7.0	62.9	25.2
Arvika	26	7.5	61.9	22.1
Wyodun	27	7.8	61.7	27.0
Yellow Cotyledon				
Grande	19	2.0	64.2	28.7
Carneval	18	1.0	63.7	27.9
CDC Mozart	16	1.0	64.7	32.2
Eclipse	16	1.0	64.6	29.8
Integra	18	1.0	61.9	25.7
SW Circus	19	1.0	64.8	27.9
SW Midas	17	1.0	64.0	28.5
SW Salute	19	1.0	64.9	28.5
Topeka	15	1.0	65.9	29.1
Green Cotyledon				
Cruiser	19	1.0	63.6	27.7
Journey	26	8.3	62.9	21.3
Majoret	18	1.0	64.4	24.0
Stratus	14	1.0	65.1	32.9
SW Parade	18	1.0	63.5	26.2
Toledo	18	1.0	62.7	24.5
Mean	19.2	2.5	63.8	27.2
LSD (P=.05)	2.2	0.5	0.8	3.5
CV	8.0	13.8	0.9	9.1

Planted: April 10, 2003

Harvested: July 15, 2003

Table 94. SDSU Dry Pea Variety Trial – Wall, South Dakota – 2003
Data from John Rickertsen, South Dakota State University

Variety	Height inches	Lodging 1-9	Test Wt. lbs/bu	Yield bu/ac
Forage				
4010 Magda	27	9.0	63.1	29.4
Arvika	26	9.0	63.0	22.9
Wyodun	25	9.0	62.3	22.6
Yellow Cotyledon				
Grande	16	1.0	62.4	29.8
Carneval	17	1.0	61.7	28.2
CDC Mozart	14	1.0	63.3	27.5
Eclipse	14	1.0	62.7	28.5
Integra	18	1.0	60.0	28.4
SW Circus	15	1.0	61.2	29.6
SW Midas	16	1.0	60.8	28.7
SW Salute	16	1.0	62.7	30.7
Topeka	16	1.0	62.4	33.5
Green Cotyledon				
Cruiser	19	1.0	61.2	27.6
Journey	25	9.0	61.9	22.0
Majoret	19	1.0	62.3	28.0
Stratus	13	1.0	61.4	32.9
SW Parade	16	1.0	61.9	24.2
Toledo	20	1.0	59.6	30.1
Mean	18.3	2.8	61.9	28.0
LSD (P=.05)	2.9	0.0	1.3	4.5
CV	11.4	0.0	1.5	11.3

Planted: April 17, 2003

Harvested: July 21, 2003

Table 95. SDSU Dry Pea Regional Nursery– Wall, South Dakota – 2003
Data from John Rickertsen, South Dakota State University

Variety	Height inches	Lodging 1-9	Test Wt. lbs/bu	Yield bu/ac
CDC Mozart	16	1.0	63.7	33.7
Carneval	19	1.0	61.8	29.0
Victoria	24	8.0	62.0	25.4
PS610152	16	1.0	62.8	25.4
PS710048	18	1.0	63.2	28.9
PS810162	17	1.0	62.2	28.0
PS810191	17	1.0	61.1	24.8
PS810240	18	3.0	63.2	31.3
PS9910346	18	3.0	62.0	24.6
PS9910592	16	4.0	62.8	22.4
PS710909	15	2.5	62.2	17.8
PS99101364	18	2.5	60.9	17.7
PS99101381	19	2.0	61.7	18.2
PS9910140	15	2.0	61.4	27.6
PS9910188	18	1.0	61.8	34.3
Mean	17.4	2.3	62.2	26.0
LSD (P=.05)	4.8	2.8	0.8	3.7
CV	12.9	58.3	0.9	10.0

Planted: April 17, 2003

Harvested: July 21, 2003

Table 96. SDSU Winter Lentil Regional Nursery– Wall, South Dakota – 2003
Data from John Rickertsen, South Dakota State University

Variety	Fall Stand percent	Spring Stand percent	Height inches	Lodging 1-9	Test Wt. lbs/bu	Yield lbs/ac
WA8649041	90	90	11	1.0	65.8	421
LC9976079	90	90	10	1.0	--	339
LC9978057	90	90	10	1.0	66.3	516
LC9978094	90	90	10	1.0	65.7	343
LC9979010	90	90	9	1.0	66.5	847
LC9979062	90	90	10	1.0	65.6	937
LC9979065	90	90	10	1.0	64.8	971
LC9979120	90	90	11	1.0	66.3	899
Grand Mean	90	90	10.1	1.0	65.9	659
LSD (P=.05)	0	0	.	.	1.0	163.3
CV	0	0	.	.	1.0	16.9

Planted: September 30, 2002

Harvested: July 29, 2003

Table 97. SDSU Winter Dry Pea Regional Nursery– Wall, South Dakota - 2003
Data from John Rickertsen, South Dakota State University

Variety	Fall Stand percent	Spring Stand percent	Height inches	Lodging 1-9	Test Wt. lbs/bu	Yield lbs/ac
Delta	90	0			0	0
Shawnee	90	0			0	0
PS9430706	90	81	35	8.3	64.4	15.6
PS7530726	90	76	14	7.7	62.2	17.6
PS9630448	90	89	24	6.0	63.8	21.2
PS9830F009	90	88	29	6.3	63.8	19.8
PS9830F010	90	84	28	6.0	62.7	21.1
PS9830F011	90	88	15	1.3	62.8	19.7
PS9830S358	90	89	14	1.7	63.2	23.0
PS9830S431	90	83	29	8.3	64.4	23.7
Carneval (spring planted)	90	90	18	1.0	65.6	27.3
Mean	90.0	69.7	22.9	5.2	52.1	17.2
LSD (P=.05)	0.0	6.7	4.9	2.2	1.4	6.9
CV	0.0	6.7	14.3	23.9	1.9	27.8

Planted: September 30, 2002

Harvested: July 14, 2003

Table 98. Winter Pea Comparative Yield at Central Washington Grain Growers
Data from Howard Nelson, Central Washington Grain Growers

	3 Year Average	2 Year Average	2003 Yield	2002 Yield	2001 Yield
91208-3 (8444)	2681 (1)	2697 (1)	3564 (1)	1830 (1)	2648 (1)
90105-9			3536 (2)		
90105-13		2386 (2)	3146 (3)	1625 (3)	
91001			2910 (4)		
91208-5 (8445)	2144 (2)	2132 (5)	2880 (5)	1384 (5)	2169 (6)
90119-73 (8503)	2056 (3)	2186 (4)	2789 (7)	1582 (4)	1796 (8)
91002-2		2223 (3)	2771 (6)	1674 (2)	
90139-20 (8422)	1812 (4)	1857 (6)	2644 (8)	1069 (9)	1723 (9)
91113			2390 (9)		
8853-16 (8401)	1740 (5)	1710 (7)	2166 (10)	1254 (6)	1801 (7)

Table 99. Winter Lentil Trials, Torrington, WY 2003
Data from Jim Krall and Jerry Nachtman, University of Wyoming

Variety	Yield
LC9979010	2628
LC9979062	2504
LC9979120	2499
LC9979065	2139
LC9978057	1907
LC9978094	1487
LC9976079	1158
WA8649041	1037
Mean	1920
CV	19

Yield data are 4 replications at Torrington, WY

Table 100. Chickpea Trials, Torrington, WY 2003
Data from Jim Krall and Jerry Nachtman, University of Wyoming

Variety	Yield
WY D202	3263
WY D201	2620
CA9990B1895C	2272
CA9990B1514C	2201
WY K203	2086
CA9990B1597C	1994
Dwelley	1984
CA99901861W	1915
Sierra	1892
CA9783163C	1783
CA99901604C	1643
CA9890233W	1629
CA9890239W	1444
CA9890169W	917
Mean	1974
CV	21

Yield data are 4 replications at Torrington, WY

Table 101. Spring Pea Trials, Torrington, WY 2003
Data from Jim Krall and Jerry Nachtman, University of Wyoming

Variety	Yield
PS9910140	3554
PS9910188	3067
PS710909	2534
PS810162	2515
PS810240	2440
PS610152	2427
PS810191	2377
Forager	2111
PS710048	2071
PS9910592	1986
PS9910346	1470
PS99101381	1410
Carneval	1349
Mean	2255
CV	23

Yield data are 4 replications at Torrington, WY

Table 102. Winter Pea Trials, Torrington, WY 2003
Data from Jim Krall and Jerry Nachtman, University of Wyoming

Variety	Days to Bloom	Yield
PS9430706	37	3022
PS9530726	36	3234
PS9630448	31	3636
PS9830F009	32	4015
PS9830F010	30	3134
PS9830F011	37	3981
PS9830S358	37	3727
PS9830S431	37	3228
Delta	13	1714
Shawnee	13	1289
Mean	30	3106
CV	4	16

Agronomic and yield data are 4 replications at Torrington, WY