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Colorado
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Knowledge to Go Places

Agricultural Experiment Station

College of
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Department of
Soil and Crop Sciences

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MAKING BETTER
DECISIONS

2005 Dry Bean Variety Performance Trials

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2005 COLORADO DRY BEAN PERFORMANCE TRIAL

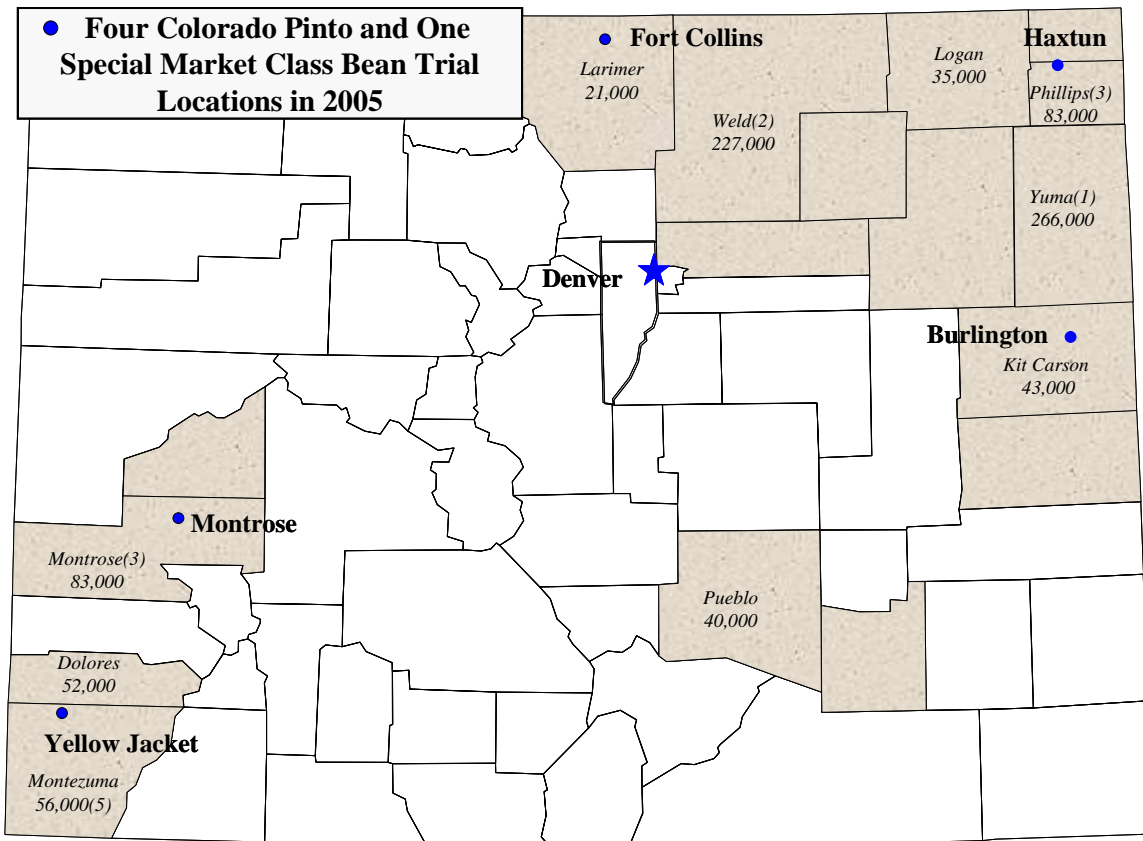
Introduction

Colorado producers annually spend millions of dollars on pinto bean seed which makes variety selection important. Making better variety decisions can increase dry bean yields by 10 to 20%. Colorado State University's Crops Testing program, bean breeding program, bean pathology research, and agricultural research stations collaborate to conduct uniform variety trials annually to provide unbiased and reliable performance results from uniform variety trials to help Colorado dry bean producers' make more informed variety decisions. The uniform variety trial serves a dual purpose of screening experimental lines from CSU's bean breeding program or from bean seed companies, and to compare commercial variety performance for making variety recommendations to Colorado bean producers. The uniform variety trial is made possible by funding received from Colorado dry bean producers and handlers via the Colorado Dry Bean Administrative Committee.

The 2005 uniform variety trials were planted at four locations. The two eastern Colorado locations were Haxtun (Platte River Valley), and Idalia (Golden Plains). The two western Colorado locations were Montrose and Yellow Jacket. Varieties tested in 2005 are described in the following tables. A randomized complete block field design with three replicates was used in all trials. The seeding rate was approximately 85,120 seeds per acre with plots consisting of four 30-inch rows and 36 feet long. Trials were in commercial bean fields or on CSU research stations. Seed yields, in pounds per acre, are adjusted to 14% moisture content.

Summary of the 2005 Dry Bean Growing Season

The hot, dry period during July affected plant and disease development in much of the state. Some areas and fields with other stresses (soil compaction, insufficient moisture) sustained significant loss of blossoms and pods, resulting in average to below average yields. Other fields that flowered before or after this period, generally yielded average to above average. Soilborne disease pressure (root rots) was severe in many stressed fields throughout the state. White mold was sporadic, and did cause some losses to fields with a history of the disease, and good canopy cover and adequate moisture. The bacterial blight disease complex (halo blight, bacterial brown spot, common bacterial blight) was also sporadic, especially in eastern Colorado. Common bacterial blight was probably the most severe bacterial disease observed, especially in fields with some storm damage and in response to the warmer temperatures during 2005. There were also some scattered reports of bacterial wilt in some irrigated regions of Colorado and western Nebraska. Rust occurred late in western Nebraska on susceptible varieties, but did not cause any significant damage; and the disease was not detected in eastern Colorado.



2004 production (cwt) for the highest producing counties in Colorado.

Table 1. Cultural conditions for trials in 2005.

	Fort Collins	Burlington	Haxtun	Montrose	Yellow Jacket
Soil Type	Fort Collins silt loam	Keith silt loam	Haxtun loam sandy	Clay loam	Wetherill clay loam
Previous Crop	Millet	Corn	Corn	Pinto bean	Alfalfa
Fertilization					
N acre ⁻¹	30	50	45	10.2	50
P ₂ O ₅ acre ⁻¹		35	15	30.8	
S acre ⁻¹			10	2.50	13.5
Herbicide	Outlook, Basagran, Raptor, Select	Sonalan Eptam, Cougar LS942	Dual RT, Master II/Raptor, Blasagram	Lasso, Micro Tech, Sonalan	Pursuit
Bactericide	None	Nucop	Nucop		Kocide DF
Insecticide	None	None	Asana x 1	Dimethoate	None
Irrigation	Sprinkler	Sprinkler	Sprinkler	Furrow	Sprinkler

Pinto Bean Varietal Descriptions:

- 00185** An experimental line from ProVita, Inc. (a private bean seed company in Idaho).
- 00218** An experimental line from ProVita, Inc. (a private bean seed company in Idaho).
- 00211** An experimental line from ProVita, Inc. (a private bean seed company in Idaho).
- 01223** An experimental line from ProVita, Inc. (a private bean seed company in Idaho).
- 03222** An experimental line from ProVita, Inc. (a private bean seed company in Idaho).
- 99195** An experimental line from ProVita, Inc. (a private bean seed company in Idaho).
- 99236** An experimental line from ProVita, Inc. (a private bean seed company in Idaho).
- Bill Z** A medium maturity (95-97 d) variety released by Colorado State University in 1985. It has a vine Type III growth habit with resistance to bean common mosaic virus and moderate tolerance to bacterial brown spot. It is a very productive variety with good seed quality. However, it is susceptible to white mold, common bacterial blight and rust.
- Buckskin** An early season (87-91 d) variety released by Rogers/Syngenta Seeds, Inc. (RNK101). It is a vine Type III growth habit with resistance to bean common mosaic virus, but susceptible to white mold, rust, and bacterial brown spot.

- Canyon** ADM Edible Bean Specialties, Inc.
- CO12531** An experimental pinto line from Colorado State University.
- CO12613** An experimental pinto line from Colorado State University.
- Grand Mesa** A medium maturity (96 d) variety from Colorado State University released in 2001. Grand Mesa combines resistance to rust, bean common mosaic virus, semi-upright Type II plant architecture and field tolerance to white mold, but is susceptible to common bacterial blight and bacterial brown spot. It has moderate yield potential and good seed quality.
- Montrose** A medium maturity (97 d) variety released by Colorado State University in 1999. It has resistance to rust and bean common mosaic virus. It has high yield potential and excellent seed quality. Because it has very prostrate vine Type III growth habit, it is highly susceptible to white mold.
- Poncho** A medium maturity (97 d) variety released by Rogers/Syngenta Seeds, Inc. in 1998 with resistance to bean common mosaic, high yield potential and excellent seed quality. It has Type III growth habit. It is susceptible to rust and bacterial brown spot.

Table 2. Average pinto bean performance over four Colorado locations.

Variety*	Location				Average
	Burlington	Haxtun	Montrose	Yellow Jacket	
	-----Yield (lb/ac)-----				
Poncho	2940	3272	1146	3345	2676
00211	2669	3049	1605	3193	2629
00218	2850	2704	1737	2939	2557
99236	2756	2983	1401	2818	2490
Bill Z	2603	3103	1195	2915	2454
Montrose	2958	2509	1484	2846	2449
Myconate-Non-Treated	3197	2069	1509	2995	2442
Buckskin	2374	2790	1697	2853	2428
Canyon	2466	2701	1554	2947	2417
01223	2528	3202	1266	2555	2388
99195 MR	2694	2257	1716	2828	2374
Myconate-Treated	2552	2198	1665	2844	2315
Grand Mesa	2457	2987	1002	2614	2265
00185	2434	2822	1253	2438	2237
CO12531	2595	2664	1059	2583	2225
CO12613	2006	2782	815	2637	2060
03222	2239	2505	677	2042	1866
Average	2607	2741	1340	2788	2369

*Varieties ranked by the average yield over four locations in 2005.

Table 3. Average pinto bean performance over two eastern Colorado locations.

Variety*	Locations		Average
	Burlington	Haxtun	
	-----Yield (lb/ac)-----		
Poncho	2940	3272	3106
99236	2756	2983	2870
01223	2528	3202	2865
00211	2669	3049	2859
Bill Z	2603	3103	2853
00218	2850	2704	2777
Montrose	2958	2509	2734
Grand Mesa	2457	2987	2722
Myconate-Non-Treated	3197	2069	2633
CO12531	2595	2664	2629
00185	2434	2822	2628
Canyon	2466	2701	2583
Buckskin	2374	2790	2582
99195 MR	2694	2257	2476
CO12613	2006	2782	2394
Myconate-Treated	2552	2198	2375
03222	2239	2505	2372
Average	2607	2741	2674

*Varieties ranked by the average yield over two locations in 2005.

Summary of Pinto Bean Variety Performance in Colorado Variety Trials from 1996-2005

Every year CSU personnel conduct pinto bean variety performance trials in different locations. Both varieties and locations change from year to year so a straight-forward, statistical comparison of variety performance is not possible. However, it is useful to summarize yield performance over years to take stock of what we have learned over the last ten years. In the following table, yield performance by variety has been averaged over locations within each of ten years. Entries reported are public and commercial named varieties common to all trials for a year. Public and private experimental lines were not included in this summary. The number of locations per year varied from three to six. The trial average (at bottom of each year's yield column) is a simple average of the yields of reported varieties for that year. The

second column is the yield for each reported variety expressed as a percent of the trial average for each year. Average yield over years and average percent of trial average are shown in the columns at the extreme right.

Thirty-one public and commercial named pinto bean varieties have been tested during this ten year period. Some varieties were only tested for one year, while Bill Z was tested in all ten years. Montrose, Grand Mesa and Poncho were tested for nine, seven, and seven years, respectively. Even though rigorous comparisons of performance cannot be made for varieties tested in different years and locations, the Colorado dry bean industry can use the table to gain insight into relative performance of a large number of varieties. Varieties that perform well in one part of the state and not so well in another part would be expected to show up in the middle of the table along with varieties that had mediocre performance over all locations.

Table 4. Summary of Pinto Bean Variety Performance in Colorado Variety Trials from 1996-2005.

Variety	1996		1997		1998		1999		2000		2001		2002		2003		2004		2005		Long Term Ave	
	-----Yield (lb/ac)-----																					
	% ave		% ave		% ave		% ave		% ave		% ave		% ave		% ave		% ave		% ave		% ave	
Apache			2107	100	2166	95															2137	97
Bill Z	2459	112	2101	99	2167	95	2617	103	3212	106	2621	101	2613	112	2463	95	2253	106	2454	100	2496	103
Buckskin			2008	95			2475	97	2769	91			2184	93	2382	92	2090	98	2428	99	2334	95
Burke	2329	106	2113	100	2066	90	2464	97	2713	89	2426	93									2352	96
Buster							2672	105	3087	102	2654	102					2185	102			2649	103
Canyon																			2417	99	2417	99
Chase	2260	103	2417	114	2628	115	2584	101	3049	100											2588	107
Cisco							2775	109	3280	108											3028	109
Elizabeth			2367	112	2281	100	2178	86	2780	92											2402	97
Frontier							2542	100													2542	100
Grand Mesa							2631	103	2902	96	2458	95	2329	100	2283	88	1865	87	2265	93	2390	94
GTS Cob 502-94									3139	103											3139	103
GTS-900			1610	76							2339	90					1989	93			1979	86
Hatton	1930	88																			1930	88
Kodiak					2066	90	2542	100	2749	91											2452	94
Maverick	2021	92	1911	90	2434	106															2122	96
Montrose			2830	134	2708	118	2821	111	3213	106	2705	104	2586	111	2956	114	2562	120	2449	100	2759	113
Olathe	2174	99																			2174	99
Othello			2158	102			2265	89	3044	100							1936	91			2351	96
Poncho							2613	103	3332	110	2862	110	2371	101	2826	109	2398	112	2676	109	2725	108
Rally											2312	89	2134	91			1935	91			2127	90
ROG 117			2137	101																	2137	101
ROG 179			2396	113																	2396	113
ROG 214					2259	99															2259	99
ROG 261			2116	100	2368	103															2242	102
ROG 299			1808	86																	1808	86
UI 320					2000	87															2000	87
USPT 72													2559	109							2559	109
USPT 73					2217	97	2418	95	3230	106	2825	109	2374	102							2613	102
USPT 74													1887	81							1887	81
Vision			1624	77	2421	106	2604	102			2790	107									2360	98
Trial Average	2196		2114		2291		2547		3036		2599		2337		2582		2135		2448		2428	

Table 5. Pinto Bean Variety Performance Trial at Burlington¹.

Variety	Yield	Moisture	Test	
			Weight	Seed/lb
	lb/ac	%	lb/bu	No.
Myconate - Non-Treated	3197	13.7	56.3	1168
Montrose	2958	16.0	56.2	1218
Poncho	2940	13.8	56.6	1070
00218	2850	14.6	57.4	1252
99236	2756	17.4	56.6	1174
99195 MR	2694	17.1	56.8	1317
00211	2669	12.6	56.5	1235
Bill Z	2603	13.8	54.8	1236
CO12531	2595	16.4	56.3	1185
Myconate - Treated	2552	13.8	55.3	1206
01223	2528	14.0	55.9	1285
Canyon	2466	18.2	56.0	1335
Grand Mesa	2457	12.7	55.5	1308
00185	2434	15.7	54.6	1217
Buckskin	2374	12.5	55.7	1221
03222	2239	16.5	56.0	1242
CO12613	2006	13.6	54.5	1171
Average	2607	14.8	55.9	1226
LSD _(0.30)	423			

¹Trial conducted on the Don Sircy farm; seeded 6/07 and harvested 9/15/05.

Table 6. Pinto Bean Variety Performance Trial at Haxtun¹.

Variety	Yield	Moisture	Test	
			Weight	Seed/lb
	lb/ac	%	lb/bu	No.
Poncho	3272	11.4	55.4	1136
01223	3202	12.2	55.2	1337
Bill Z	3103	10.3	53.9	1240
00211	3049	11.2	55.4	1123
Grand Mesa	2987	10.6	54.1	1238
99236	2983	12.6	55.6	1258
00185	2822	11.6	55.3	1318
Buckskin	2790	10.1	54.0	1185
CO12613	2782	10.2	53.3	1240
00218	2704	12.3	56.2	1268
Canyon	2701	12.1	55.7	1280
CO12531	2664	11.6	54.3	1199
Montrose	2509	11.4	55.0	1220
03222	2505	11.8	55.6	1326
99195 MR	2257	12.1	56.5	1400
Myconate - Treated	2198	11.2	54.7	1226
Myconate - Non-Treated	2069	11.1	54.8	1246
Average	2741	11.4	55.0	1249
LSD _(0.30)	205			

¹Trial conducted on the Steve Smith farm; seeded 6/07 and harvested 9/20/05.

Table 7. Pinto Bean Variety Performance Trial at Montrose¹.

Variety	Yield Seed/lb	
	lb/ac	No.
00218	1737	1271
99195 MR	1716	1356
Buckskin	1697	1330
Myconate - Treated	1665	1230
00211	1605	1211
Canyon	1554	1336
Myconate - Non-Treated	1509	1320
Montrose	1484	1323
99236	1401	1395
01223	1266	1369
00185	1253	1327
Bill Z	1195	1300
Poncho	1146	1180
CO12531	1059	1228
Grand Mesa	1002	1432
CO12613	815	1243
03222	677	1510
Average	1340	1315
LSD _(0.30)	220	

¹Trial conducted on the Keith Catlin farm; seeded 6/03 and harvested 10/03/05.

Table 8. Pinto Bean Variety Performance Trial at Yellow Jacket¹.

Variety	Yield Seed/lb	
	lb/ac	No.
Poncho	3345	1098
00211	3193	1043
Myconate-Non-Treated	2995	1227
Canyon	2947	1200
00218	2939	1146
Bill Z	2915	1166
Buckskin	2853	1182
Montrose	2846	1254
Myconate-Treated	2844	1198
99195MR	2828	1501
99236	2818	1411
CO12613	2637	1077
Grand Mesa	2614	1212
CO12531	2583	1059
01223	2555	1340
00185	2438	1211
'03222	2042	1307
Average	2788	
LSD _(0.05)	327	

¹Trial conducted at the Southwestern Colorado Research Center; seeded 6/13, cut 10/15, threshed 11/03/05.

2005 Dry Bean Disease Observations – CSU Variety Trials in Eastern Colorado

Notes taken by Dr. H. F. Schwartz, Colorado State University

ENTRY	HAXTUN	BURLINGTON
	08/16/05 (09/13/05)	08/16/05
CO 99236	- (24.0 % WM)	Lt F/FW
Buckskin	Tr CBB (2.7 % WM)	Lt CBB, Lt F/FW
Bill Z	Tr CBB (26.7 % WM)	Lt CBB, Tr F/FW
CO 12531	Lt CBB (28.7 % WM)	Tr CBB
00218	Tr CBB (32.0 % WM)	Lt CBB, Lt F/FW
03222	- (13.0 % WM)	-
Poncho	Lt CBB (18.0 % WM)	Lt CBB, Lt F/FW
Montrose	- (64.3 % WM)	-
Grand Mesa	Lt CBB (15.0 % WM)	Lt CBB
CO 12613	Lt CBB (18.7 % WM)	Lt CBB, Tr Bronzing
Canyon	Lt CBB (35.7 % WM)	Tr F/FW
01223	Lt CBB (1.3 % WM)	Lt F/FW
00211	Lt CBB (8.0 % WM)	Lt CBB, Lt F/FW
99195	Lt CBB (47.3 % WM)	-
00185	Lt CBB (15.3 % WM)	Tr F/FW

Disease Notes: the following diseases were present in the variety plots at that location, and were indicative of a susceptible-type reaction. Absence of a note could indicate an escape, not necessarily a resistant reaction. There was no rust at either test plot.

Tr = trace, Lt = light (infestation), CBB = Common Bacterial Blight, F/FW = Fusarium and/or Fusarium Wilt, WM = % incidence of plants killed by White Mold (ave. of 50 plants each in 3 reps).

Special Market Class Varietal Descriptions:

- Beryl** A great northern variety released by Rogers/Syngenta Seeds, Inc. in 1984. It has Type III vine growth habit and resistance to bean common mosaic virus, but is susceptible to rust and bacterial diseases.
- CO11113** A black seeded experimental line from Colorado State University.
- CO27862** A black seeded experimental line from Colorado State University.
- CO27864** A black seeded experimental line from Colorado State University.
- CO27857** A black seeded experimental line from Colorado State University.
- CO27859** A black seeded experimental line from Colorado State University.
- CO29116** A black seeded experimental line from Colorado State University.
- LRK7** A light red kidney bean from ADM Edible Bean Specialties, Inc.
- LRK33** A light red kidney bean from ADM Edible Bean Specialties, Inc.
- Midnight** A variety of black bean released from Cornell University in 1980. It has excellent seed type for opaque black beans. It is an upright Type II variety that is long season (99 or > d) with resistance to bean common mosaic virus.
- Myasi** A yellow bean variety released by ADM Edible Bean Specialties, Inc. It is a bush Type I variety with medium season maturity (95 d). It is susceptible to endemic races of common bacterial blight and bean common mosaic virus.
- Myasi 2** A yellow bean variety released by ADM Edible Bean Specialties, Inc.

- Sacramento** The standard for seed quality of a light red kidney variety. It was released by Sacramento Valley Milling in 1976. It has resistance to rust and some root rot pathogens, but is susceptible to bean common mosaic virus and bacterial diseases. It is a bush Type I variety with medium season maturity (90 d).
- Shiny Crow** A shiny black seeded line from Colorado State University released in 1998. It has a prostrate Type III growth habit, and is susceptible to white mold. It is resistant to bean common mosaic virus. It was released as a specialty bean specifically for the dry-pack shiny black bean market. It should not be grown for the commercial opaque or dull seed black bean market or mixed with opaque black beans.
- Weihing** A great northern variety released by the University of Nebraska in 1998. It has upright Type II growth habit and resistance to rust and common bacterial blight. Seed quality is excellent and it has full season maturity (97-99 d) in Colorado.

Table 9. Black Bean Variety Performance Trial at Fort Collins¹.

Variety	Yield	Flowering ²	Seed/lb
	lb/ac	date	No.
CO27862	1485	195	2139
Midnight	1259	200	2247
CO10886	1232	197	2032
CO29116	1105	202	2207
CO11113	1092	201	2250
CO27857	1080	201	2143
CO27859	922	197	2131
CO27864	872	195	2236
Shiny Crow	750	194	2487
Average	1089	198	2208
LSD _(0.30)	223		

¹Trial conducted at the Agricultural Research, Development and Educational Center; seeded 5/25 and harvested 9/15/05.

²Julian date.

Table 10. Light Red Kidney Bean Variety Performance Trial at Fort Collins¹.

Variety	Yield	Flowering ²	Seed/lb
	lb/ac	date	No.
CO28855	1438	193	934
CO28851	1426	193	959
CO28850	1232	193	920
LRK7	987	189	812
Sacramento	887	187	790
LRK33	809	190	845
Average	1130	191	877
LSD _(0.30)	168		

¹Trial conducted at the Agricultural Research, Development and Educational Center; seeded 5/25 and harvested 9/15/05.

²Julian date.

<http://www.csuag.com>



Table 11. Yellow Bean Variety Performance Trial at Fort Collins¹.

Variety	Yield	Flowering ²	Seed/lb
	lb/ac	date	No.
Myasi-2	1113	187	1141
Myasi	1064	187	1104
Average	1089	187	1123
LSD _(0.30)	NS		

¹Trial conducted at the Agricultural Research, Development and Educational Center; seeded 5/25 and harvested 9/15/05.

²Julian date.

Table 12. Great Northern Bean Variety Performance at Fort Collins¹.

Variety	Yield	Flowering ²	Seed/lb
	lb/ac	date	No.
Beryl	1096	193	1839
Weihing	1067	195	1314
CO26342	881	197	1419
Average	1015	195	1524
LSD _(0.30)	NS		

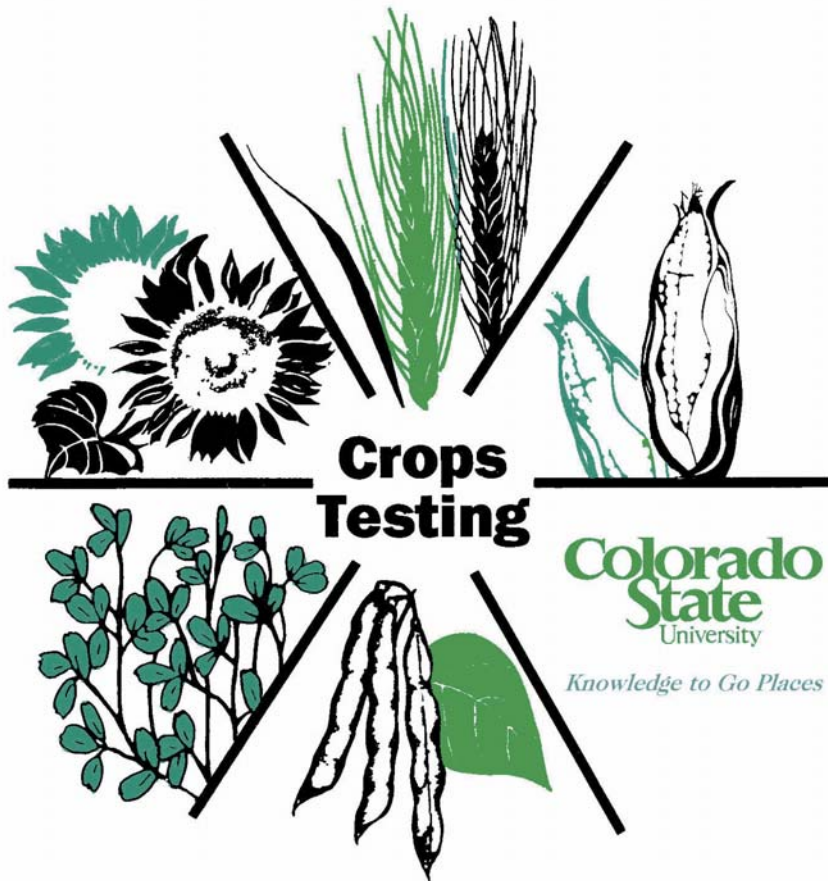
¹Trial conducted at the Agricultural Research, Development and Educational Center; seeded 5/25 and harvested 9/15/05.

²Julian date.

Entry Forms for 2006 Trials

Entry forms for 2006 trials may be obtained from the Department of Soil and Crop Sciences, Colorado State University, Cynthia Johnson, C03 Plant Science Building, Fort Collins, CO 80523-1170; telephone (970) 491-1914; fax (970) 491-2758; e-mail cynthia.johnson@colostate.edu or web site <http://www.csucrops.com>.





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