

Technical Report

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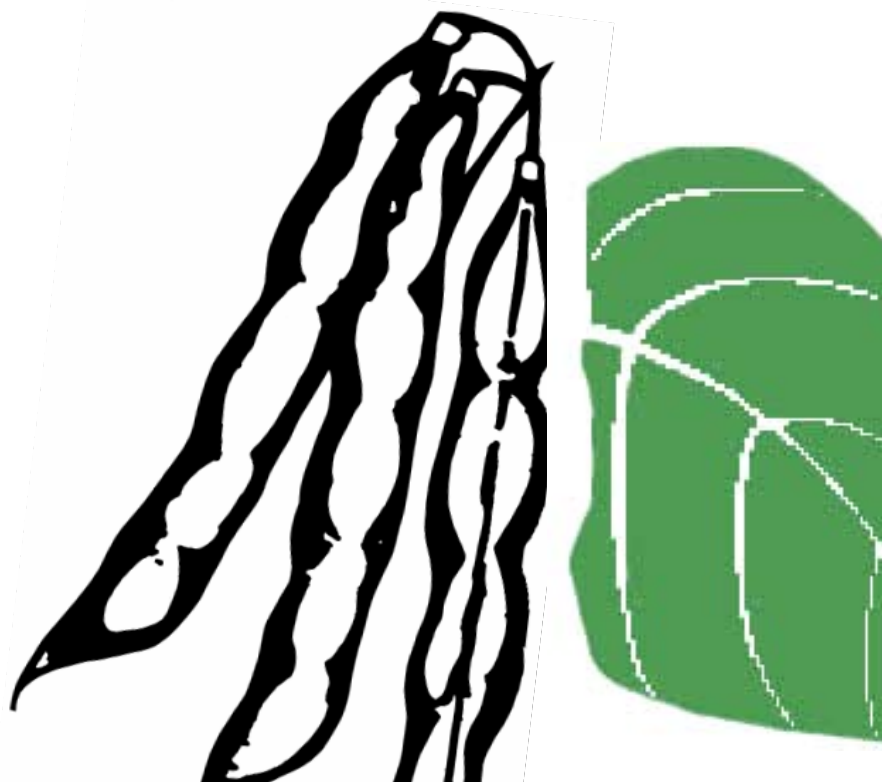
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MAKING BETTER
DECISIONS

2004 Dry Bean Variety Performance

Acknowledgments

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Funded by the Colorado State University Crops Testing Program, Colorado Dry Bean Administrative Committee, and Colorado Bean Network

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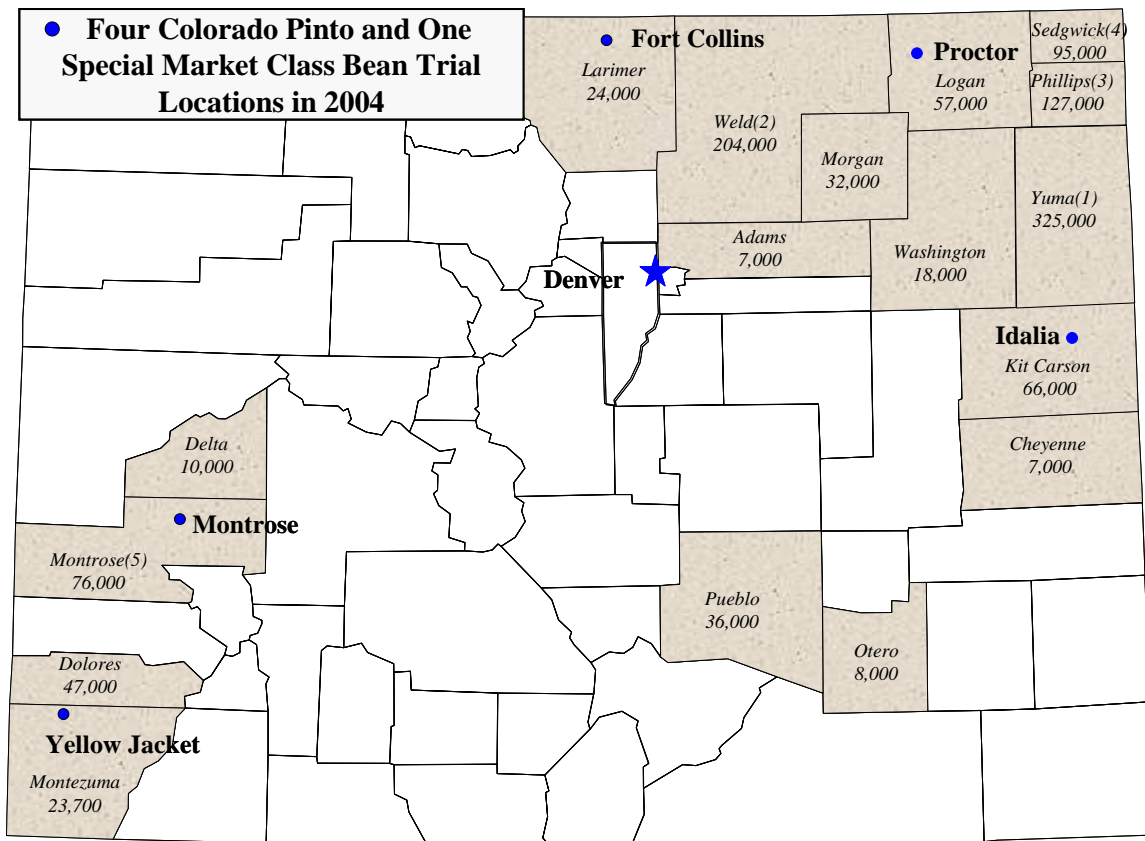
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2003 production (cwt) for the highest producing counties in Colorado.

2004 COLORADO DRY BEAN PERFORMANCE TRIALS

Introduction

Colorado is the seventh largest producer of dry beans in the United States, producing just over 5% of the nation's total dry edible beans. North Dakota is the highest producing state and produces just over a third of the total dry bean production in the country. Colorado dry bean acreage, both planted and harvested, has been well below 100,000 acres from 2002-2004 due primarily to drought and irrigation water uncertainty and shortage.

Colorado producers annually spend millions of dollars on pinto bean seed which makes variety selection important. 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 variety performance results from uniform variety trials to help Colorado dry bean producers' make better 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. Funding from the Colorado Bean Network makes it possible to publish the variety performance results in a quality, Making Better Decisions, report.

The 2004 uniform variety trials were planted at four locations. The two eastern Colorado locations were Proctor (Platte River Valley), and Idalia (Golden Plains). The two western Colorado locations were Montrose and Yellow Jacket. Varieties tested in 2004

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 2004 Dry Bean Growing Season

Based on weekly Colorado Crop Progress reports by the Colorado Agricultural Statistics Service, we can compare on a weekly basis, the evolution of the 2004 dry bean crop season to the 2003 season and to the 5-yr average in terms of percent of acreage planted, acreage emerged, acreage flowered, acreage cut, and acreage harvested. The initial months of May and June 2004 were favorable by comparison to May and June 2003, and the 5-yr average months of May and June, for percent of acreage planted and emerged. However, the cool, overcast weather from mid-June through early August slowed the development of the 2004 dry bean crop relative to other years. Wet and cold September and October field conditions prevented some bean producers from harvesting their bean crops, and dry bean cutting and harvest acreage had not reached 2003 or 5-yr average levels as of October 31, 2004. Even one of our variety trials could not be harvested until late October due to the same weather constraints.

Little rust was observed in Colorado this year though rust was found in western Nebraska. Isolated infestations of bacterial diseases and white mold were problematic in Colorado, but no widespread outbreaks of bean diseases were observed.

Table 1. Cultural conditions for trials in 2004.

	Fort Collins	Idalia	Montrose	Proctor	Yellow Jacket
Soil Type	Fort Collins Clay Loam	Kuma-Kieth Silt Loam	Clay Loam	Norka Ulysses Loam	Wetherill Silty Clay Loam
Previous Crop	Forage Sorghum	Corn	Spring Barley	Wheat	Alfalfa
Fertilization					
N acre ⁻¹	50	8	10.2	50	0
P ₂ O ₅ acre ⁻¹	40	25	30.8		
S acre ⁻¹			2.50		
Herbicide	Outlook	Trifluralin HF Champ	Lasso Micro Tech Sonalan	Sonalan Eptam	Outlook
Bactericide	None	None		Nucop	None
Insecticide	None	None	Dimethoate	Asana, Excel	None
Irrigation	Sprinkler	Flood	Furrow	Sprinkler	Sprinkler

Pinto Bean Varietal Descriptions :

00191	An experimental line from ProVita, Inc. (a private bean seed company in Idaho).	Buster	but susceptible to white mold, rust, and bacterial brown spot. A variety from Seminis Seed Co. released in 1999. It is a semi-erect variety with resistance to rust.
02225	An experimental line from ProVita, Inc. (a private bean seed company in Idaho).	CO12531	An experimental pinto line from Colorado State University.
99230	An experimental line from ProVita, Inc. (a private bean seed company in Idaho).	CO12613	An experimental pinto line from Colorado State University.
99232	An experimental line from ProVita, Inc. (a private bean seed company in Idaho).	CO12786	An experimental pinto line from Colorado State University.
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 excellent seed quality. However, it is susceptible to white mold, common bacterial blight and rust.	CO83783	An experimental pinto line from Colorado State University.
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,	CO96731	An experimental pinto line from Colorado State University.
		CO96753	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.	Othello	A short season (90 d) variety released by the USDA in 1986 with semi-upright growth habit. It is highly susceptible to rust and bacterial diseases, and moderately susceptible to white mold.
GTS-900	A full season (99 to 102 d) variety from Gentec Seed Co. with resistance to rust and upright architecture. It has some field tolerance 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.
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.	Rally	A full season (100 to 105 d) variety from Gentec Seed Co. with resistance to rust and upright architecture. It has some field tolerance to white mold.

Table 2. Average pinto bean performance over four Colorado locations in 2004.

Variety*	Location				Average
	Idalia	Proctor	Montrose	Yellow Jacket	
	-----Yield (lb/ac)-----				
Montrose	2917	2912	2022	1731	2395
Poncho	2840	2394	2032	2040	2326
CO12786	2536	2695	2218	1463	2228
Buckskin	2131	2275	1891	1960	2064
Bill Z	3015	2309	1628	1288	2060
Buster	2328	2586	1772	1529	2053
CO96753	2527	2324	1953	1303	2027
Pro Vita 00191	2381	2108	2058	1516	2016
CO83783	2493	2255	1786	1301	1959
CO96731	2053	2112	1888	1426	1870
Pro Vita 99230	2288	2395	1390	1404	1870
Rally	2126	1826	1991	1250	1799
Othello	2249	2465	1238	1222	1793
Pro Vita 99232	1982	1868	1924	1237	1753
Grand Mesa	2055	2387	1292	1171	1726
GTS-900	2321	1720	1926	845	1703
Pro Vita 02225	2189	2325	819	1331	1666
CO12531	1996	1891	1349	1052	1572
CO12613	1592	1793	603	935	1231
Average	2317	2244	1673	1368	1901

*Varieties ranked by the average yield over four locations in 2004.

Summary of Pinto Bean Variety Performance in Colorado Variety Trials from 1995-2004

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 done and to generate a vision of where we are going with regards to pinto bean variety testing. In the following table, yield performance by variety has been averaged over locations within each of eleven 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. Finally, the table was sorted by highest average percent of trial average.

Thirty-nine public and commercial named pinto bean varieties have been tested during this eleven year period. Some varieties were only tested for one year, while Bill Z was tested in all eleven years. Montrose and Chase were tested for seven and eight 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 3. Summary of Pinto Bean Variety Performance in Colorado Variety Trials from 1995-2004.

Variety	1995		1996		1997		1998		1999		2000		2001		2002		2003		2004		Long Term Ave		
	Yield		Yield		Yield		Yield		Yield		Yield		Yield		Yield		Yield		Yield		Yield		
	lb/ac	% ave	lb/ac	% ave	lb/ac	% ave	lb/ac	% ave	lb/ac	% ave	lb/ac	% ave	lb/ac	% ave	lb/ac	% ave	lb/ac	% ave	lb/ac	% ave	lb/ac	% ave	
Montrose					2830	134	2708	118	2821	111	3213	106	2705	104	2586	111	2956	114	2562	120	2798	115	
ROG 179					2396	113															2396	113	
USPT 72															2559	109					2559	109	
Chase	1618	116	2260	103	2417	114	2628	115	2584	101	3049	100									2426	108	
Cisco									2775	109	3280	108									3028	108	
Poncho									2613	103	3332	110	2862	110	2371	101	2826	109	2398	112	2734	108	
UI-129	1458	105																			1458	105	
Arapahoe	1440	104																			1440	104	
Bill Z	1461	105	2459	112	2101	99	2167	95	2617	103	3212	106	2621	101	2613	112	2463	95	2253	106	2397	103	
GTS Cob 502-94											3139	103									3139	103	
Buster										2672	105	3087	102	2654	102				2185	102	2649	103	
ROG 261					2116	100	2368	103													2242	102	
USPT-73							2217	97	2418	95	3230	106	2825	109	2374	102					2613	102	
UI 196	1397	101																			1397	101	
ROG 117					2137	101															2137	101	
Frontier										2542	100										2542	100	
ROG 214							2259	99													2259	99	
Vision					1624	77	2421	106	2604	102			2790	107							2360	98	
NW-410	1349	97																			1349	97	
Othello	1420	102			2158	102			2265	89	3044	100							1936	91	2165	97	
Olathe	1318	95	2174	99																	1746	97	
Elizabeth					2367	112	2281	100	2178	86	2780	92									2402	97	
Apache					2107	100	2166	95													2137	97	
Maverick			2021	92	1911	90	2434	106													2122	96	
Burke			2329	106	2113	100	2066	90	2464	97	2713	89	2426	93							2352	96	
Grand Mesa										2631	103	2902	96	2458	95	2329	100	2283	88	1865	87	2411	95
Buckskin					2008	95			2475	97	2769	91			2184	93	2382	92	2090	98	2318	94	
Kodiak							2066	90	2542	100	2749	91									2452	94	
UI-126	1294	93																			1294	93	
Rally													2312	89	2134	91				1935	91	2127	90
Hatton			1930	88																	1930	88	
UI 320							2000	87													2000	87	
ROG 299					1808	86															1808	86	
GTS-900					1610	76							2339	90						1989	93	1979	86
UI-114	1145	82																			1145	82	
USPT 74															1887	81					1887	81	
Trial Average	1390		2196		2114		2291		2547		3036		2599		2337		2582		2135		2323		

Table 4. Pinto Bean Variety Performance Trial at Idalia¹ in 2004.

Variety	Yield lb/ac	Moisture %	Test	
			Weight lb/bu	Seed/lb No.
Bill Z	3015	16.2	62.2	1115
Montrose	2917	16.2	63.0	1108
Poncho	2840	18.6	63.1	1029
CO12786	2536	19.2	63.3	1170
CO96753	2527	29.4	60.3	1066
CO83783	2493	21.0	61.9	1087
Pro Vita 00191	2381	18.0	62.8	1168
Buster	2328	20.6	62.1	1141
GTS-900	2321	22.0	62.5	1128
Pro Vita 99230	2288	20.3	62.6	1077
Othello	2249	18.0	62.5	1118
Pro Vita 02225	2189	23.4	62.6	1102
Buckskin	2131	15.9	62.5	1097
Rally	2126	23.5	62.5	1096
Grand Mesa	2055	16.3	62.1	1223
CO96731	2053	20.6	62.1	1102
CO12531	1996	19.2	62.2	1123
Pro Vita 99232	1982	18.6	62.6	1160
CO12613	1592	17.7	61.8	1141
Average	2317	19.7	62.4	1118
LSD _(0.30)	132			

¹Trial conducted on the Dennis Towns farm; seeded 5/26 and harvested 9/18.

Table 5. Pinto Bean Variety Performance Trial at Montrose¹ in 2004.

Variety	Yield	Seed/lb
	lb/ac	No.
CO12786	2218	1398
Pro Vita 00191	2058	1506
Poncho	2032	1351
Montrose	2022	1404
Rally	1991	1297
CO96753	1953	1419
GTS-900	1926	1400
Pro Vita 99232	1924	1272
Buckskin	1891	1377
CO96731	1888	1382
CO83783	1786	1338
Buster	1772	1296
Bill Z	1628	1470
Pro Vita 99230	1390	1292
CO12531	1349	1462
Grand Mesa	1292	1527
Othello	1238	1442
Pro Vita 02225	819	1423
CO12613	603	1402
Average	1673	1393
LSD _(0.30)	153	

¹Trial conducted on the Keith Catlin farm; seeded 6/4 and harvested 9/28.



Table 6. Pinto Bean Variety Performance Trial at Proctor¹ in 2004.

Variety	Test			
	Yield	Moisture	Weight	Seed/lb
	lb/ac	%	lb/bu	No.
Montrose	2912	15.7	60.7	1262
CO12786	2695	18.6	61.4	1239
Buster	2586	20.1	60.3	1130
Othello	2465	16.8	61.4	1215
Pro Vita 99230	2395	20.7	60.5	1174
Poncho	2394	16.7	61.5	1228
Grand Mesa	2387	18.8	60.5	1403
Pro Vita 02225	2325	20.6	62.5	1120
CO96753	2324	32.8	57.5	1129
Bill Z	2309	16.5	60.9	1351
Buckskin	2275	14.9	60.6	1198
CO83783	2255	22.1	60.4	1176
CO96731	2112	22.0	60.6	1170
Pro Vita 00191	2108	17.7	61.1	1252
CO12531	1891	19.1	60.3	1327
Pro Vita 99232	1868	20.7	61.7	1238
Rally	1826	24.5	61.1	1127
CO12613	1793	16.3	60.3	1229
GTS-900	1720	24.8	60.0	1153
Average	2244	20.0	60.7	1217
LSD _(0.30)	213			

¹Trial conducted on the Bob Duncan farm; seeded 6/7 and harvested 9/24.

Table 7. Pinto Bean Variety Performance Trial at Yellow Jacket¹ in 2004.

Variety	Yield	Seed/lb	Maturity ²
	lb/ac	No.	
Poncho	2040	1028	L
Buckskin	1960	1018	L
Montrose	1731	1219	L
Buster	1529	1070	L
Pro Vita 00191	1516	1337	L
CO12786	1463	1372	L+
CO96731	1426	1163	L+
Pro Vita 99230	1404	1144	L+
Pro Vita 02225	1331	1031	VL
CO96753	1303	1178	L+
CO83783	1301	1096	VL
Bill Z	1288	1132	M+
Rally	1250	1126	L+
Pro Vita 99232	1237	1044	L
Othello	1222	1109	M
Grand Mesa	1171	1271	L
CO12531	1052	1195	M+
CO12613	935	1122	L+
GTS-900	845	1113	VL
Average	1368	1146	
LSD _(0.05)	260		

¹Trial conducted at the Southwestern Colorado Research Center; seeded 6/10 and harvested 11/16.

²M =medium; L = late; VL = very late

Comments:

The trial was planted on spring moldboard plowed alfalfa ground. The field was pre-irrigated to minimize clods and provide moisture for germination. Slow growth characterized the trial in spite of the pre-irrigation and subsequent irrigations. The trial was damaged by hail on July 23 which resulted in leaf loss and a subsequent delay in maturity of the beans. Row cultivation was delayed until August 1 to allow the beans to put on additional leaves. A cooler than normal summer may have also delayed the maturity of the beans.

A second hail storm on Sept. 4 bruised the pods but did not result in shattering of the beans. The fall season was characterized by very wet weather which delayed harvest until Nov. 16. Bean quality was damaged by the hail and the wet weather.

2004 Dry Bean Disease Observations – CSU Variety Trials in Eastern Colorado

Notes taken by Drs. H. F. Schwartz & M. A. Brick

ENTRY	PROCTOR 09/01/04)	IDALIA (09/01/04)
CO 96753	Trace CBB	Trace CBB
Rally	No CBB	Moderate CBB, Trace BBS
Grand Mesa	Trace CBB & FW	Trace CBB
Montrose	Trace CBB	Trace CBB
Pro Vita 00191	Trace CBB	Trace CBB & BBS
GTS 900	Light CBB	Moderate CBB
CO 12531	Trace CBB	Moderate CBB
Bill Z	Light CBB	Trace CBB
CO 96731	Trace CBB	Moderate CBB, Trace BBS
Buster	Trace CBB	Light CBB
Pro Vita 02225	Light CBB	Trace CBB
Pro Vita 99230	Moderate CBB	Moderate CBB
Othello	Severe CBB	Light CBB, Trace BBS
CO 12786	Severe CBB	Light CBB
CO 12613	Trace CBB	Light CBB, Trace FW
Buckskin	Trace CBB	Trace CBB
Poncho	Trace CBB	Trace CBB, Trace BBS
CO 83783	Trace CBB	Trace CBB, Moderate BBS
Pro Vita 99232	Moderate CBB	Light CBB, Light BBS

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 or white mold infection at either test plot.

CBB = Common Bacterial Blight, FW = Fusarium Wilt, BBS = Bacterial Brown Spot



Special Market Class Varietal Descriptions :

- Beryl** A great northern variety released by Novartis Seed Co. in 1984. It has Type III vine growth habit and resistance to bean common mosaic virus.
- CELRK** A light red kidney bean released in 1989 with resistance to bean common mosaic virus, rust and some root pathogens. It is a bush Type I variety with medium season maturity (93-95 d).
- CO11094** A black seeded experimental line from Colorado State University.
- CO11096** A black seeded experimental line from Colorado State University.
- CO11113** A black seeded experimental line from Colorado State University.
- CO11116** A black seeded experimental line from Colorado State University.
- CO27864** A black seeded experimental line from Colorado State University.
- GTS-1102** A full season black variety from Gen-Tec Seeds, Limited.
- 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 Archer-Daniels-Midland Co. 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.
- Sacramento** The standard for seed quality of light red kidney variety. It was released from Sacramento Valley Milling in 1976. It has resistance to rust and some root rot pathogens. 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 has full season maturity (97-99 d) in Colorado.

Table 8. Black Bean Variety Performance Trial at Fort Collins¹ in 2004.

Variety	Yield lb/ac	Seed/lb No.
Midnight	2476	2768
CO27864	2466	2558
GTS-1102	2358	2674
CO11096	2178	2088
CO11116	1831	2474
Shiny Crow	1796	2346
CO11113	1761	2562
CO11094	1500	2149
Average	2046	2452
LSD _(0.30)	149	

¹Trial conducted at the Agricultural Research, Development and Educational Center; seeded 6/4 and harvested 11/4.

Table 9. Light Red Kidney Bean Variety Performance Trial at Fort Collins¹ in 2004.

Variety	Yield lb/ac	Seed/lb No.
CO28855	1838	893
CO28851	1780	944
CO28850	1488	907
Sacramento	1421	855
CELRK	1410	819
Average	1587	884
LSD _(0.30)	117	

¹Trial conducted at the Agricultural Research, Development and Educational Center; seeded 6/4 and harvested 11/4.

Table 10. Great Northern Variety Performance Trial at Fort Collins¹ in 2004.

Variety	Yield lb/ac	Seed/lb No.
CO26885	3188	1428
CO26716	2599	1390
Beryl	2459	1624
Weihing	2018	1353
Average	2566	1448
LSD _(0.30)	150	

¹Trial conducted at the Agricultural Research, Development and Educational Center; seeded 6/4 and harvested 11/4.

Table 11. Yellow Bean Variety Performance at Fort Collins¹ in 2004.

Variety	Yield lb/ac	Seed/lb No.
Myasi-Mayacoba	2177	1288

¹Conducted at the Agricultural Research, Development and Educational Center; seeded 6/4 and harvested 11/4.

From Howard's Desk, Bean Disease IPM Strategies for 2005:

1. Rotate out of dry beans for at least 2 years.
2. Eliminate bean debris and sources of volunteer beans during the fall of 2004 and spring of 2005.
3. Plant high quality, certified, treated seed of disease resistant varieties, if available and suitable for your market needs.
4. Follow recommended production practices to avoid stress from extremes of moisture, temperature, and soil compaction.
5. Manage water and fertilizer inputs to provide adequate, but not excess components for the crop need to avoid excess canopy development.
6. Carefully scout fields to detect foliar infection as early as possible, get confirmation of disease diagnosis from appropriate experts.
7. Monitor reports on weather patterns, disease forecasts, and confirmed sightings in your region via the CSU VegNet.
8. When infection is confirmed in or near your field, implement a timely program of fungicides and bactericides with protectant and systemic modes of action. Rotate appropriate fungicide chemistry, apply labeled rates, and stay within recommended spray and harvest intervals.
9. Adjust combine at harvest to maximize seed quality, and reduce loss of seed which can germinate next spring to produce volunteer plants.
10. Thoroughly incorporate each season's crop debris + pathogens to reduce carryover and potential disease pressure the following season. Rely upon cultivation and herbicide in next year's rotation crop to reduce volunteer bean emergence and possible infection by pathogens which can then be spread to next year's host crop of beans.

CoAgMet Weather Data Summary, 2002-04

Howard F. Schwartz and Mark S. McMillan

		TOTAL RAINFALL (IN)					AVERAGE HIGH TEMPERATURE (F)				
		JUN	JUL	AUG	SEP	JUN – SEP TOTAL	JUN	JUL	AUG	SEP	JUN – SEP AVERAGE
NORTHEAST											
Ault	2002	1.14	1.94	0.31	0.45	3.84	87.4	90.3	85.0	76.2	84.7
	2003	1.31	0.04	2.09	0.24	3.68	77.0	90.4	89.3	77.0	83.4
	2004	1.76	0.70	1.84	0.99	5.29	75.7	84.9	82.0	76.8	78.9
Burlington	2002	1.69	0.11	1.48	0.21	3.49	91.2	92.6	87.5	78.2	87.3
	2003	6.17	0.37	0.89	0.64	8.07	77.8	93.9	92.8	80.5	86.3
	2004	1.46	2.87	2.19	2.49	9.01	80.1	85.4	83.4	82.3	82.8
Fort Morgan	2002	0.91	0.35	1.52	0.56	3.34	90.0	92.4	88.8	78.5	87.4
	2003	1.28	2.48	0.67	0.06	4.49	80.7	93.6	91.0	81.2	86.6
	2004	2.61	0.37	1.22	0.48	4.68	78.4	87.2	84.2	81.1	82.7
Kersey	2002	0.73	0.32	1.02	0.72	2.79	89.7	93.0	87.1	78.3	87.0
	2003	0.99	1.59	1.01	0.38	3.97	79.2	93.2	91.3	79.8	85.9
	2004	1.91	0.64	0.81	0.98	4.34	78.1	86.8	84.0	80.0	82.2
Peckham	2002	0.66	1.30	0.45	0.79	3.20	91.2	92.2	87.8	79.0	87.6
	2003	1.23	0.16	2.22	0.29	3.90	80.1	94.1	93.9	80.0	87.0
	2004	1.78	0.48	1.82	1.20	5.28	78.7	90.6	88.3i	83.4i	85.3
Wray	2002	1.10	0.70	3.11	0.84	5.75	89.8	92.0	85.2	77.3	86.1
	2003	1.32	2.05	2.27	0.49	6.13	79.7	92.9	92.0	81.4	86.5
	2004	2.74	3.63	1.82	1.88	10.07	79.4	84.3	83.7	81.8	82.3
Yuma	2002	1.55	0.48	4.58	1.19	7.80	87.6	89.7	83.1	76.2	84.1
	2003	2.39	1.19	0.67	0.19	4.44	77.9	89.9	88.3	78.7	83.7
	2004	2.53	4.58	1.99	2.33	11.43	78.0	83.6	80.9	78.9	80.4
WEST SLOPE											
Delta	2002	0.00	0.60	0.54	3.02	4.16	92.7	92.3	88.0	76.4	87.3
	2003	0.19	0.00	0.23	1.63	2.05	87.4	96.5	93.2	81.0	89.5
	2004	0.00	0.21	0.05	1.58	1.84	87.1	91.5	87.6	77.7	86.0
Dove Creek	2002	0.01	0.82	0.29	2.03	3.15	87.0	88.7	84.8	72.9	83.3
	2003	0.20	0.21	0.57	2.07	3.05	82.1	90.7	86.2	75.4	83.6
	2004	0.38	0.37	0.92	2.66	4.33	81.3	80.0i	82.4	71.9	78.9
Grand Junction	2002	0.04	0.14	1.63	1.62	3.43	91.5	94.8	89.4	77.4	88.3
	2003	0.22	0.12	1.19	1.38	2.91	87.0	99.0	95.9	83.6	91.4
	2004	0.04	0.09	0.87	1.49	2.49	87.0	93.9	89.4	78.4	87.2

* i – incomplete

The Current Status of Dry Bean Weed Management

Dr. Scott Nissen

It is probably no surprise to most producers that Roundup Ready technology has had a significant impact on the development and introduction of new herbicides into the market place. The standard procedure was to develop herbicides for the corn, rice, wheat and soybean markets first, and then companies would expand those products into other crops like dry beans. Since the development of new products for the major markets has essentially dried up, there is very little potential for new herbicides to be available for dry bean producers.

Herbicides that have crop safety in dry beans, but are not labeled through conventional means, can still make it to the market place through several other routes. First a residue tolerance must be established for dry beans, which means establishing what the maximum allowable pesticide residue is for that commodity at harvest. Once a tolerance has been established, the state can work with the EPA to label the herbicide as a Section 18 Emergency or Crisis Exemption or a Special Local Need 24c label. Colorado received a Section 18 label for the herbicide **Reflex**[®] (fomesafen, Syngenta) in dry beans for the 2004 growing season. Reflex has had a similar label in Nebraska for several years mainly for the purpose of controlling herbicide-resistant waterhemp (*Amaranthus rudis*). A high percentage of common waterhemp populations in Nebraska and Kansas are resistant to herbicides like Pursuit and Raptor. Since weeds are spread so easily, herbicide resistant water hemp is starting to appear in eastern Colorado.

Very few producers took advantage of this new product according to the Colorado Department of Agriculture. Because this is a Section 18 Exemption, growers are required to

contact the CDA for a permit number and special labeling prior to making a Reflex application. Is this lack of interest in Reflex due to a lack of herbicide-resistant common waterhemp in eastern Colorado or is it due to the fact that growers were not made aware of this new technology?

The purpose of this article is to provide producers with some basic information about Reflex that will allow them to make informed decisions about the advantages and disadvantages of using this product. First, producers should have some reason to suspect that they are having a problem with herbicide-resistant common waterhemp. Since common waterhemp can also be resistant to atrazine, it is possible that weed populations could be increasing in other parts of the crop rotation. Common waterhemp can be confused with pigweed so it is important to make sure you identify the plant correctly. A guide to identifying common waterhemp and other related species can be found online at www.oznet.ksu.edu/library/crpsl2/s80.pdf. If producers have been using post-emergence herbicides such as Raptor or Pursuit and still have significant populations of large common waterhemp plants at the end of the field season, this could be a good indication that there is a resistance problem.

The spectrum of weeds controlled by Reflex is not as broad as with Raptor. Reflex controls weeds by a different mechanism (a different mode of action) and will control weeds that are resistant to Raptor or Pursuit. The primary weed species that would be controlled with Reflex, that is not controlled by Raptor, is common water hemp (Table 1). Therefore, Reflex would not be used as the primary broadleaf herbicide, but must be tank mixed with other herbicides to broaden the weed control spectrum. One advantage to Raptor is that it has significant grass activity and will control barnyardgrass, fall panicum, crabgrass and green foxtail.

Table 1. Comparison of control with Raptor and Reflex for several important broadleaf weeds in dry beans.

Herbicide	Kochia*	Velvetleaf	Nightshade	Lambsquarters	Pigweed	Waterhemp
Raptor	E	E	E	G	E	nc
Reflex	nc	F	E	nc	E	E

*control of nonherbicide resistant kochia only

E=excellent control, greater than 90%

G=good control, between 80-89%

F=fair control, between 70-79%

nc=no control

Rotational restrictions are another difficult issue when planning weed management strategies in a diverse cropping system. Pursuit is an excellent broadleaf herbicide for dry beans, but the restrictions for replanting to sugar beet and a number of other crops limits its use primarily to corn/dry bean

rotations. Raptor has significantly shorter replant restrictions to sugar beets and potatoes, but these crops are still restricted to 18-26 and 9 months, respectively, following application. Reflex also has the potential of injury to rotational crops. In many cases, Raptor and Reflex have similar “plant back” restrictions.

Table 2. Number of months required between application of Raptor or Reflex and planting to these rotational crops.

Herbicide	Corn*	Wheat**	Proso	Potato	Canola	Beets	Sunflower	Alfalfa
Raptor	8.5	3	18	9	18	18-26	9	9
Reflex	10	4	18	18	18	18	18	18

*includes field, pop and sweet corn

**includes winter and spring wheat

Reflex has been evaluated for weed control and crop safety at CSU, and has preformed well realizing that the weed spectrum is somewhat limited. Tank mixes with Select, Raptor, and Basagran have been compared and as expected tank mixes with a grass-only herbicide like Select did not result in optimum weed control, while tank mixes with Raptor and Basagran provided excellent weed control throughout the growing season. The major issue with Reflex appears to be rate relative to performance and pricing. In Nebraska, many growers were reluctant to use 16 oz of product and only used 12 oz to save

money; however, herbicide performance suffered at the lower application rate. If the problem is sufficient to consider using Reflex then it appears that the 16 oz rate is necessary.

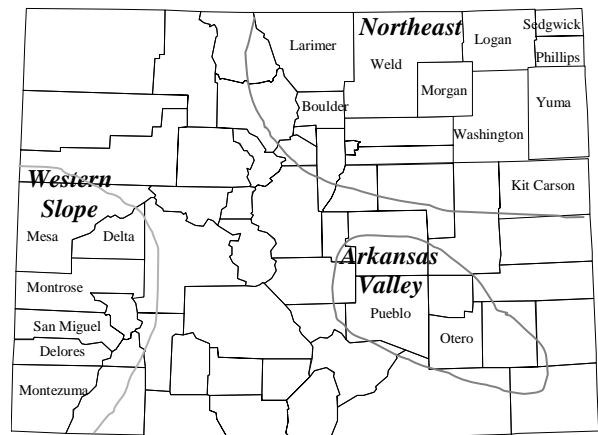
Reflex provides growers with a technology to manage herbicide-resistant common waterhemp. Since weeds do not recognize state boundaries, it is only a matter of time before common waterhemp becomes a significant problem in eastern Colorado. With support from the CDBAC, the search will continue for new weed management options for Colorado dry bean producers.

Potential Risk of Bean Diseases in Colorado by Geographical Region

Dr. Howard F. Schwartz

Region/County	Rust	Bacterial* Disease	White Mold
<i>Northeast</i>			
Boulder	Low	Low	Moderate
Larimer	Low	Low	Moderate
Weld	Moderate	Moderate	High
Morgan	Moderate	Moderate	Moderate
Washington	High	High	Moderate
Logan	High	Moderate	Moderate
Sedgwick	High	High	High
Phillips	High	High	High
Yuma	High	High	High
Kit Carson	High	High	Moderate
<i>Arkansas Valley</i>			
Pueblo	Moderate	Low	Low
Otero	Moderate	Low	Low
<i>Western Slope</i>			
Mesa	Low	Low	Moderate
Delta	Low	Low	Moderate
Montrose	Low	Low	Moderate
San Miguel	Low	Low	Low
Dolores	Low	Low	Low
Montezuma	Low	Low	Low

*Complex of Halo Blight, Bacterial Brown Spot, &/or Common Bacterial Blight.

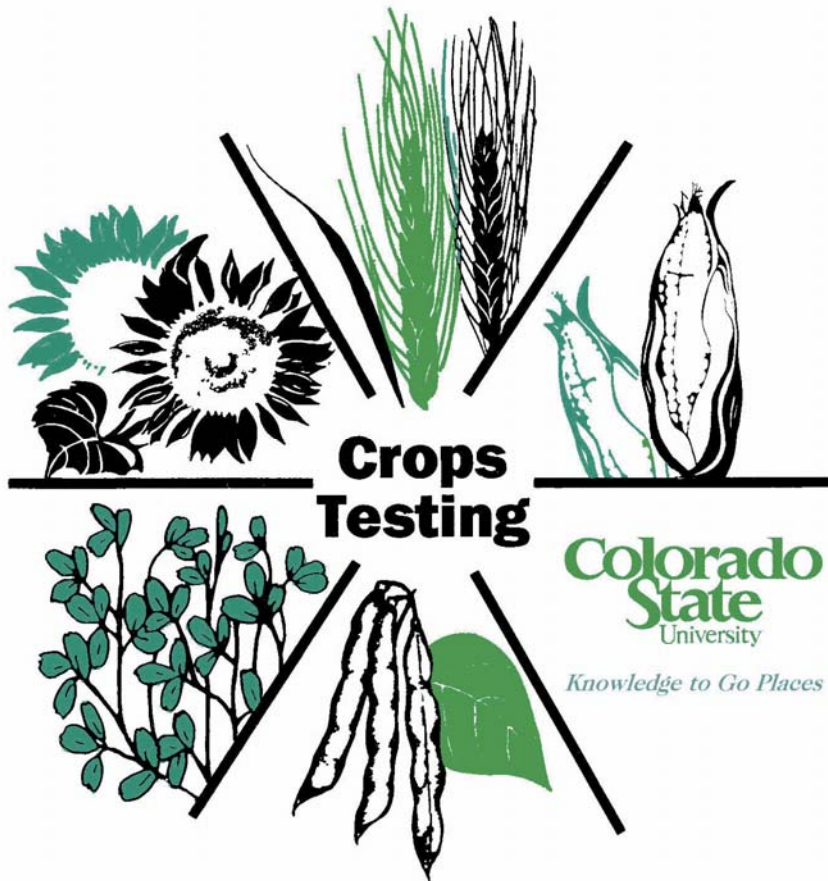


<http://www.csuag.com>

Entry Forms for 2005 Trials

Entry forms for 2005 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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Putting Knowledge to Work

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