Cooperative Extension
Colorado State University

MAKING BETTER DECISIONS

2002 Dry Bean Variety Performance Trials

Agricultural Experiment Station

Colorado State University

Knowledge to Go Places

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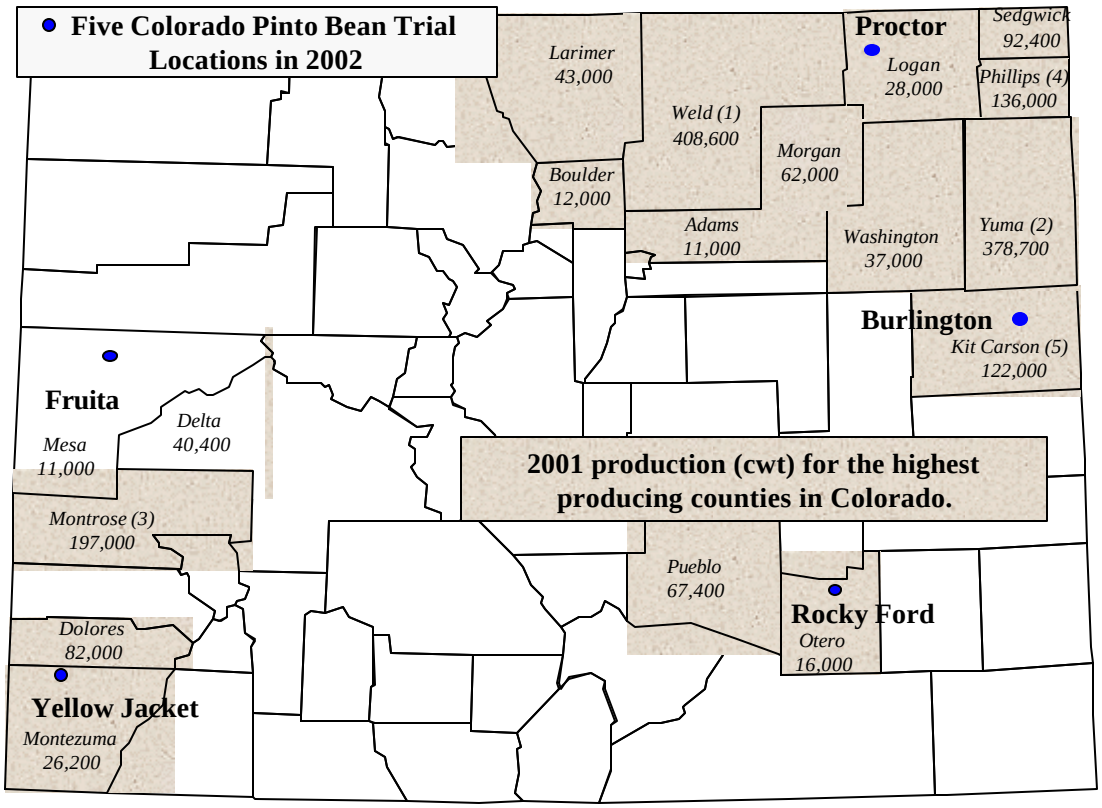

ACKNOWLEDGMENTS

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Technical Report TR 02-9

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2002 COLORADO DRY BEAN PERFORMANCE TRIALS

Introduction

There has been declining dry bean acreage and production in Colorado over the last ten years. In 2002, Colorado was the seventh largest producer of dry beans with the lowest product since 1921. Colorado producers annually spend over $5 million on pinto bean seed to plant which means that the bean variety decision is extremely important. The average yield performance over multiple locations is a powerful tool and unbiased, reliable performance results from a uniform variety trial help Colorado dry bean producers make better variety decisions.

2002 was the fourth year that the uniform variety trial was planted at six locations. It was planted at four eastern Colorado trial locations: Proctor (Platte River Valley), Fort Collins (Front Range), Burlington (Golden Plains), and Rocky Ford, (Arkansas River Valley) and it was also planted at two western Colorado locations: Fruita and Yellow Jacket. The Fort Collins trial was planted late, had poor emergence, and suffered from soil compaction and high temperatures which resulted in low and variable yields and the results were not reported. The Burlington trial results reported here could not be interpreted due to stunted plant growth resulting from a combination of soil compaction, residual herbicide effects, and severe high temperature stress.

The uniform variety trial serves a dual purpose of screening new CO lines emerging from CSU's pinto bean breeding program, allowing fast and reliable selection of promising new, high yielding and disease resistant lines. The uniform variety trial is made possible by funding received from Colorado dry bean producers via the Colorado Dry Bean Administrative Committee.

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. All trials were situated in commercial bean fields or on CSU research stations. Seed yields, in pounds per acre, were adjusted to 14% moisture content. Disease pressure was low at all test sites during 2002.

Table 1. Cultural conditions for pinto trials in 2002.

	Burlington	Fruita	Proctor	Rocky Ford	Yellow Jacket
Soil Type	Kuma Rich silt loam	Glenton very fine sandy loam	Norka Ulysses loam	silty clay loam	silty clay loam
Previous Crop	Wheat	Corn	Corn	Sorghum	Spring Wheat
Fertilization					
N acre $^{-1}$	100	0	40	80	0
P_2O_5 acre $^{-1}$	50	0	15	75	0
Zn acre $^{-1}$	1	0	0	0	0
S acre $^{-1}$	15	0	0	0	0
Herbicide	Dual II Sonalan	Outlook Eptam	Eptam Sonalan	Treflan Eptam Basagran	Frontier Raptor
Bactericide	None	None	None	None	Cooper
Insecticide	Orthene	None	None	None	None
Irrigation	Sprinkler	Furrow	Furrow	Furrow	Sprinkler

Pinto Bean Varietal Descriptions:

Bill Z A medium maturity (95 d) variety release by Colorado State University in 1985. It has a vine growth habit with resistance to bean common mosaic virus and moderate tolerance to bacterial brown spot. It is a productive variety, however it is susceptible to white mold and rust.

Buckskin A variety from released by Syngenta Seeds, Inc. (RNK101). It is a vine Type III growth habit with resistance to bean common mosaic virus, susceptible to white mold and rust, with medium maturity (95 d).

CO75495 An experimental line from Colorado State University.

CO75563 An experimental line from Colorado State University.

CO75619 An experimental line from Colorado State University.

CO75965 An experimental line from Colorado State University.

CO83778 An experimental line from Colorado State University.

CO83777 An experimental line from Colorado State University.

CO83783 An experimental line from Colorado State University.

CO84975 An experimental line from Colorado State University.

CO96731 An experimental line from Colorado State University.

CO96737 An experimental line from Colorado State University.

CO96753 An experimental line from Colorado State University.

CO96775 An experimental line from Colorado State University.

Grand Mesa A medium maturity (94 d) from Colorado State University (CO 75511) released in 2001, with resistance to rust, bean common mosaic virus and semi-upright architecture. It has field tolerance 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.

Montrose A medium maturity (95 d) variety released from Colorado State University in 1999 (CO 51715) with resistance to rust, bean common mosaic. It has high yield potential and excellent seed quality. It has prostrate vine type growth habit and is highly susceptible to white mold.

Poncho A medium maturity (96 d) variety from Syngenta Seeds, Inc. with resistance to bean common mosaic and has high yield potential and excellent seed quality. It has semi upright type growth habit and is susceptible rust.

Rally A full season (98 to 102) variety from Gentec Seed Co. with resistance to rust and upright architecture. It has some field tolerance to white mold.

USPT-72 An experimental line from USDA-ARS, Prosser, WA, with resistance to rust, bean common mosaic and high yield potential.

USPT-73 An experimental line from USDA-ARS, Prosser, WA, with resistance to rust, bean common mosaic and high yield potential.

USPT-74 An experimental line from USDA-ARS, Prosser, WA, with resistance to rust, bean common mosaic and high yield potential.

Table 2. Average pinto bean performance over four Colorado locations in 2002.

Variety*	Location				
	Fruita	Proctor	Rocky Ford	Yellow Jacket	Average
	----------Yield (lb/ac)----------				
Bill Z	2190	1875	4260	2125	2613
Montrose	2148	1772	4071	2352	2586
USPT 72	2350	1870	3751	2266	2559
USPT-73	2468	2138	3260	1629	2374
Poncho	1859	1754	3647	2225	2371
CO83783	2387	1229	3778	1972	2342
Grand Mesa	2053	1776	3412	2073	2329
CO83778	2259	1415	3385	2034	2273
CO96753	2192	1139	3642	2000	2243
CO75965	1919	990	3695	2291	2224
Buckskin	2211	1603	3004	1917	2184
Rally	1770	1141	3566	2060	2134
CO96731	2112	1126	3525	1711	2119
CO96775	1656	1470	3330	1884	2085
CO75619	2099	1402	2886	1933	2080
CO75495	2062	1293	2983	1955	2073
CO83777	1973	1283	3478	1511	2061
CO84975	1782	1268	3138	1872	2015
GTS-900	1732	1123	3401	1702	1989
CO75563	1513	1377	3185	1829	1976
CO96737	1758	985	3330	1745	1954
USPT 74	1753	1464	2235	2097	1887
Average	**2011**	**1431**	**3407**	**1963**	**2203**

*Varieties ranked by the average yield over four locations in 2002.

http://www.csuag.com

Table 3. Pinto bean performance trial at Burlington[1] in 2002.

Variety	Yield	Moisture	Test Weight	Seed/lb
	lb/ac	%	lb/bu	No.
Bill Z	1137	13.0	54.5	1328
CO96753	1026	21.1	53.0	1244
CO96731	977	13.9	55.7	1294
Poncho	944	12.1	55.4	1271
CO75619	902	13.1	54.6	1364
Montrose	900	12.7	54.7	1278
CO84975	870	11.2	55.7	1376
Grand Mesa	820	12.1	54.2	1376
CO96775	809	15.4	54.7	1194
CO75563	792	12.3	52.9	1244
Rally	789	14.3	55.3	1162
CO75495	772	12.8	55.3	1283
Buckskin	609	13.1	55.3	1267
USPT-73	577	15.1	54.1	1246
CO83778	575	14.6	55.3	1214
USPT 74	574	12.6	55.4	1410
CO83783	561	16.9	26.7	1305
USPT 72	539	12.9	54.3	1208
GTS-900	536	14.9	54.8	1189
CO75965	521	15.7	56.4	1326
CO83777	475	16.4	54.1	1280
CO96737	460	17.1	54.5	1230
Average	**735**	**14.2**	**53.5**	**1277**

[1]Trial conducted on the Ryan Weaver farm; seeded 5/21 and harvested 9/12.
*Due to excessive variation, yield statistics for this trial are not reported.

Table 4. Pinto bean performance trial at Fruita[1] in 2002.

Variety[2]	Yield[3]	Seed/lb
	lb/ac	No.
USPT-73	2468	1257
CO83783	2387	1308
USPT 72	2350	1417
CO83778	2259	1317
Grand Mesa + Myconate +	2214	1374
Buckskin	2211	1344
CO96753	2192	1147
Bill Z	2190	1502
Montrose	2148	1328
CO96731	2112	1257
CO75619	2099	1532
CO75495	2062	1368
Grand Mesa	2053	1543
CO83777	1973	1191
CO75965	1919	1328
Poncho	1859	1335
Grand Mesa + Myconate -	1817	1248
CO84975	1782	1636
Rally	1770	1464
CO96737	1758	1315
USPT 74	1753	1459
GTS-900	1732	1192
CO96775	1656	1492
CO75563	1513	1415
Average	**2011**	**1365**
$LSD_{(0.30)}$	340	

[1]Trial conducted on the Western Colorado Research Center; seeded 6/12 and harvested 10/9.
[2]Myconate® is a new agricultural product developed by researchers at Michigan State University. Myconate® is a signal compound put out by plant roots in times of stress that encourages beneficial fungus (mycorrhizae) to colonize them. The fungus extends the plants root system and helps it take up nutrients and water, and fight off disease. Previous research has shown significant yield increases on a number of crops in a variety of locations. This simple compound is non-toxic, is quickly broken down in the soil, and is effective in very small quantities. It is water soluble and easy to apply to seeds or soil. Myconate® is a trademark product of VAMTech, L.L.C., commercially available for enhancing mycorrhizal colonization.
[3]Some yield variation resulted from herbicide damage in parts of the trial with sandy soil.

Table 5. Pinto bean performance trial at Proctor[1] in 2002.

Variety	Yield	Moisture	Test Weight	Seed/lb
	lb/ac	%	lb/bu	No.
USPT-73	2138	14.4	61.1	1246
Bill Z	1875	14.6	60.3	1410
USPT 72	1870	14.9	59.9	1342
Grand Mesa	1776	13.2	52.8	1406
Montrose	1772	15.7	60.0	1383
Poncho	1754	15.5	62.1	1288
Buckskin	1603	15.0	61.2	1367
CO96775	1470	18.0	58.7	1354
USPT 74	1464	14.4	60.3	1352
CO83778	1415	18.8	58.7	1296
CO75619	1402	14.4	61.0	1385
CO75563	1377	15.9	60.6	1342
CO75495	1293	14.7	59.2	1323
CO83777	1283	24.5	53.5	1258
CO84975	1268	15.4	59.7	1480
CO83783	1229	18.2	61.4	1261
Rally	1141	22.2	58.2	1311
CO96753	1139	32.1	56.3	1236
CO96731	1126	21.6	56.5	1233
GTS-900	1123	18.3	54.8	1327
CO75965	990	20.9	52.9	1395
CO96737	985	20.8	54.2	1268
Average	**1431**	**17.9**	**58.3**	**1330**
$LSD_{(0.30)}$	226			

[1]Trial conducted on the Bob Duncan farm; seeded 6/11 and harvested 9/21.

Table 6. Pinto bean performance trial at Rocky Ford[1] in 2002.

Variety	Yield	Moisture	Test Weight	Seed/lb
	lb/ac	%	lb/bu	No.
Bill Z	4260	12.2	59.2	1081
Montrose	4071	13.1	61.3	1087
CO83783	3778	13.3	59.8	1011
USPT 72	3751	11.4	59.5	1094
CO75965	3695	13.4	58.9	1133
Poncho	3647	12.5	60.0	1025
CO96753	3642	16.8	58.1	981
Rally	3566	13.6	60.1	1017
CO96731	3525	13.8	59.6	1037
CO83777	3478	13.7	60.1	999
Grand Mesa	3412	11.4	59.2	1230
GTS-900	3401	13.9	59.8	1040
CO83778	3385	12.5	59.0	1012
CO96737	3330	13.8	59.8	1015
CO96775	3330	12.1	59.1	1065
USPT-73	3260	13.1	58.4	1006
CO75563	3185	11.4	58.3	1094
CO84975	3138	11.8	60.4	1196
Buckskin	3004	11.6	58.9	1133
CO75495	2983	11.5	59.9	1059
CO75619	2886	11.4	59.4	1186
USPT 74	2235	12.2	58.8	1162
Average	**3407**	**12.7**	**59.4**	**1076**
$LSD_{(0.30)}$	274			

[1]Trial conducted on the Arkansas Valley Research Center; seeded 6/11 and harvested 9/24.

Table 7. Pinto bean performance at Yellow Jacket[1] in 2002.

Variety	Yield[2]	Seed/lb	Growth Habit[3]	Maturity[4]
	lb/ac	No.		
Montrose	2352	1158	III	ML
CO75965	2291	1129	III	L
USPT-72	2266	1109	II, III	L
Poncho	2225	1071	III	ML
Bill Z	2125	1108	III	ML
USPT-73	2097	1032	III	ML
Grand Mesa	2073	1198	II	ML
Rally	2060	1185	IIb	VL
CO83778	2034	1098	IIb/III	ML/L
CO96753	2000	1024	IIb/III	L
CO83783	1972	1083	IIb/III	L
CO75495	1955	1028	II	ML
CO75619	1933	1104	II	ML
Buckskin	1917	1132	III	ML/L
CO96775	1884	1128	III	L
CO84975	1872	1232	II	ML
CO75563	1829	1030	II/III	ML
CO96737	1745	1135	IIb/III	L
CO96731	1711	1126	IIb/III	L
GTS-900	1702	1176	IIb/III	VL
USPT-74	1629	1144	II, III	L
CO83777	1511	1051	IIb/III	VL
Average	1963			
$LSD_{(0.05)}$	291			

[1]Trial conducted at the Southwestern Colorado Research Center, seeded 6/11/02, cut 9/25/02, and threshed 10/16/02. Notes on growth habit and maturity were taken by Mark Brick on 9/9/02.

[2]The yields were not adjusted for frozen or discolored beans. The weight of frozen or discolored beans in each plot ranges from 3.5 to 8.5% and does not significantly affect the ranking of the entries.

[3]I = determinate; II = indeterminate; IIb = indeterminate, terminal guide possess some climbing ability; III = indeterminate, semi-prostrate or twining. (Singh, S. P. 1982. A key for identification of different growth habits of Phaseolus vulgaris L. Annu. Rep. Bean Improv. Coop. 25:92-95.)

[4]ML = medium late; L = late; VL = very late

Site information

Tillage: Fall moldboard plowed

Seeding rate: Approx. 83,600 seeds/ac (2.5-in. seed spacing on 30-in. rows)

Precipitation: January 2002 thru August 2002: 1.8 inches (long-term average 9.7 inches)

Irrigation: 16 inches (6 sprinkler applications)

'Shiny Crow', a Specialty Black Bean

Mark Brick

'Shiny Crow' black bean was recently released by the Colorado Agricultural Experiment Station to provide growers and processors a black bean variety adapted to the arid conditions in the High Plains. Shiny Crow has shiny black seed coat luster rather than the traditional opaque seed coat luster found in all other black bean varieties grown in the USA. Shiny Crow combines mid-season maturity, high yield potential, resistance to bean common mosaic caused by bean common mosaic virus, and adaptation to the High Plains. Seed shape is somewhat oval compared to traditional commercial opaque black bean varieties that have round seed. Average seed weight varied from 2064 to 2270 seeds/lb. across many test locations.

Shiny Crow is unique among black varieties because it has less pod-shattering and seed-splitting when grown in Colorado. Traditional opaque black varieties have problems with pod shattering and seed splitting when grown in Colorado due to our arid climate and low relative humidity (RH) at harvest. This problem is likely related to the fact that most opaque black bean germplasm originates from lowland tropical climates of Central America where RH is high.

Shiny Crow has also been shown to produce an excellent canned product and has been judged superior in overall canning quality when compared to 'UI 911', 'UI 906' and 'Raven', three commercial opaque black bean varieties. We sent small samples of Shiny Crow to canners throughout the US and every participating canner commented positively on the canned product qualities of this new variety. One canner stated that the texture of the canned product of Shiny Crow was "fabulous" compared to traditional opaque blacks.

Shiny Crow has slow uptake of water by the seed which can cause problems in the canning process because unsaturated beans will not cook thoroughly. Slow water uptake could be most problematic for canners that add the water to the bean in the can just prior to cooking. Pre-soaking Shiny Crow for twelve hours prior to canning and cooking should result in a high quality canned product.

Shiny Crow carries the dominant I gene which confers resistance to all pathogroups of bean common mosaic virus. It is susceptible to the white mold pathogen [*Sclerotinia sclerotiorum* (Lib.) de Bary] and moderately susceptible to rust, caused by *Uromyces appendiculatus* (Pers.:Pers.) Unger.

Shiny Crow seed should never be mixed with traditional opaque black beans. Mixtures of shiny and opaque beans cause seed lots to lose identity and value. Growers should identify a processor and/or buyer for Shiny Crow before planting because the demand for shiny black beans is limited at this time. Foundation seed is maintained by the Colorado Agricultural Experiment Station. Plant variety protection has been filed with the provision that Shiny Crow can only be sold for seed by name as Certified seed. Registered and Certified seed of Shiny Crow can be purchased from Certified seed processors listed in the Colorado Seed Growers Certified Seed Directory, CSGA, Fort Collins, CO (970-491-6202).

Was Dry Bean Weed Control Easier in the Good Ol' Days?

Scott J. Nissen

It is not uncommon to hear growers complain that there are more weeds to contend with these days than 15 or 20 years ago. Dry bean producers and extension specialist across the central high plains appear to be seeing the same thing. It does seem to be more difficult to design a weed management program that provides acceptable weed control at a reasonable cost.

There are definitely new weed species that have become more prevalent. Good examples are toothed spurge (*Euphorbia dentata*), tall water hemp (*Amaranthus rudis*) and common water hemp (*Amaranthus tuberculatus*). These weeds are not controlled by many common weed management strategies and so their numbers have increased. This is called a weed shift and it can happen in two ways. This type of shift is called an inter-specific weed shift, which means there is a

change in the composition of the weed community over time. The second kind of weed shift is called an intra-specific weed shift and this involves an increase in a subpopulation (called a biotype) of a weed species. These biotypes could be resistant to herbicides or could emerge later in the season, avoiding chemical and mechanical control. We are probably seeing the results of both types of weed shifts caused by applying similar selection pressures to weed populations over a long time period. This has resulted in the general observations that there are more weeds to deal with today than 15 or 20 years ago.

There are ways to reduce the selection pressure on weed populations since producers control decisions on crop rotations, cultural practices and herbicide programs. Each crop and cropping system can select for certain weed species so the more complex the rotation the less a single type of selection pressure will be applied. Tillage is an effective method of weed control, but the effects are temporary and may actually cause some weed species to germinate. The failure to control weeds during any part of a crop rotation can have significant long-term impacts. Seeds of many weed species can persist in the soil for 10 years or more making one failure a long-term headache. In Colorado and other western states, herbicide resistant weeds are very common. Field surveys indicate that 60% of kochia (*Kochia scoparia*) populations are resistant to Atrazine (photosynthesis inhibitor) or Raptor (amino acid inhibitor) or both. Producers need to select weed control strategies that combine or alternate herbicide modes of action in order to reduce the potential for intra-specific weed shifts. Herbicides with the same mode of action as Raptor can be used in a variety of crops so selecting alternative modes of action can be difficult.

Any strategy that makes the bean crop more competitive should improve weed control. Combining narrow row spacing with an adapted bean variety is one strategy to improve competitiveness. In this situation, variety selection is critical because narrow rows increase the potential for diseases like white mold. Inter-row ripping is another strategy that has improved bean competitiveness. Ripping improves root growth, reduces root diseases, increases water use efficacy, and improves nutrient utilization.

Producers should also remember that dry beans do not necessarily need to be weed free the entire growing season to provide acceptable net income. Field research examining weed competition in dry beans using time of removal experiments clearly indicates that dry bean yields will not be affected if fields are kept weed free for six weeks after planting. While this rule of thumb may apply to many weeds, most producers would say that for maximum bean quality hairy nightshade must be controlled for the entire growing season.

The difference between providing weed free conditions for six weeks versus weed free conditions for the entire growing season can be a significant amount of money and the extra cost may not increase net income. The best weed control program is one that provides sufficient weed control at the lowest cost and combines as many different control strategies as possible (chemical, mechanical, and cultural).

There have been very few recent changes in chemical weed control for dry beans. Raptor is the most recently registered herbicide for dry bean weed control. Raptor is closely related to Pursuit, but has considerably more grass activity and shorter rotational restrictions than Pursuit. Frontier was replaced by Outlook, a more concentrated formulation of the active isomer dimethenamid-p. Outlook remains the only herbicide that could be used as a layby treatment in dry beans. Layby is defined as a herbicide that is applied post-emergence (POST) to the crop, but pre-emergence (PRE) to the weed. Layby applications of Outlook could provide growers with a strategy to extend weed control later in the growing season. Season long weed control will require a combination of PPI or PRE herbicide applications combined with tillage and/or POST herbicide treatments. Cost per acre for this type of program could exceed $50/ac, while programs designed to provide six weeks of control would cost $17 to $27/ac. Producers need to have some idea about weed spectrum and severity when deciding where to plant dry beans and avoid fields that present a high risk for failure. Some options for chemical control are provided in Table 1.

Table 1: Some options for weed control in dry beans.

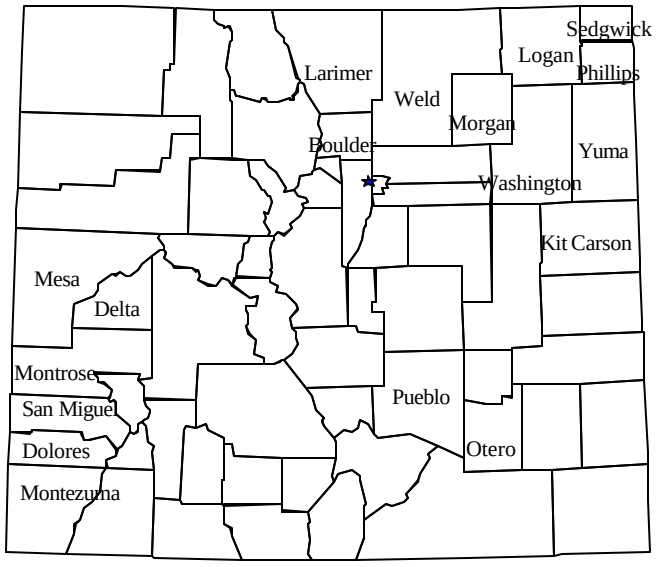
Treatment	Timing	Nightshade Control	General Comments
Sonalan + Eptam **or** Sonalan + Dual Mag **or** Sonalan + Outlook	PPI	Would provide early but not late season nightshade control.	Programs would provide excellent early season weed control.
Eptam + Prowl Eptam + Treflan	PPI	Same	Same
Outlook (band) **or** Dual Magnum (band) + Cultivation	PRE POST	Would protect the crop row from weed competition, and would provide early season nightshade control.	Least expensive program, requires good crop competition.
Outlook (band) **or** Dual Magnum (band) + Cultivation + Outlook	PRE POST LAYBY	Should provide extended nightshade control with layby application.	Band applications reduce herbicide costs, requires very clean cultivation, would not work well for kochia
Sonalan + Eptam **or** Dual Mag or Outlook Raptor + Basagran	PPI **or** PRE POST	Should provide season long control of hairy nightshade.	Expensive treatment that could include tillage before POST application
Sonalan + Eptam **or** Dual Mag **or** Outlook Raptor + Basagran + Outlook **and/or** Select	PPI **or** PRE POST LAYBY POST	Good option for fields with heavy nightshade pressure.	Very expensive treatment. Outlook should be applied no later than third trifoliolate. Should provide excellent grass, proso millet and sandbur control.

Potential Risk of Bean Diseases in Colorado by Geographical Region

Howard F. Schwartz

Region/County	Rust	Bacterial* Disease	White Mold
Northeast			
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
Arkansas Valley			
Pueblo	Moderate	Low	Low
Otero	Moderate	Low	Low
Western Slope			
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, Brown Spot, &/or Common Bacterial Blight.



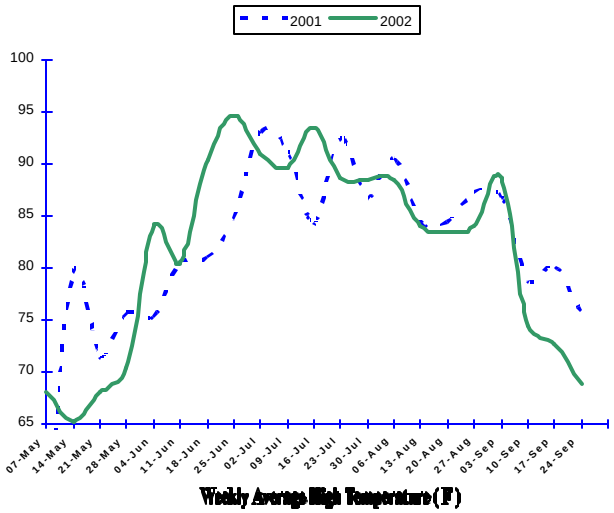
2002 VegNet Summary - Ault, CO

Cumulative Rainfall:

May 1 – 31
2001: 2.64” **2002:** 1.08”
June 1 – 30
2001: 0.97” **2002:** 1.14”
July 1 – 31
2001: 1.06” **2002:** 1.94”
Aug. 1 – 31
2001: 0.13” **2002:** 0.31”
Sept. 1 – 30
2001: 0.37” **2002:** 0.45”
Total: 5.17” 4.92”

[Updated: 09-30-02]

Colorado State University
H. F. Schwartz & M. S. McMillan



2002 VegNet Summary - Dove Creek, CO

Cumulative Rainfall:

May 1 – 31
2001: 0.53” **2002:** 0.16”
June 1 – 30
2001: 0.23” **2002:** 0.01”
July 1 – 31
2001: 0.41” **2002:** 0.82”
Aug. 1 – 31
2001: 2.32” **2002:** 0.29”
Sept. 1 – 30
2001: 0.18” **2002:** 2.03”
Total: 3.67” 3.26”

[Updated: 09-30-02]

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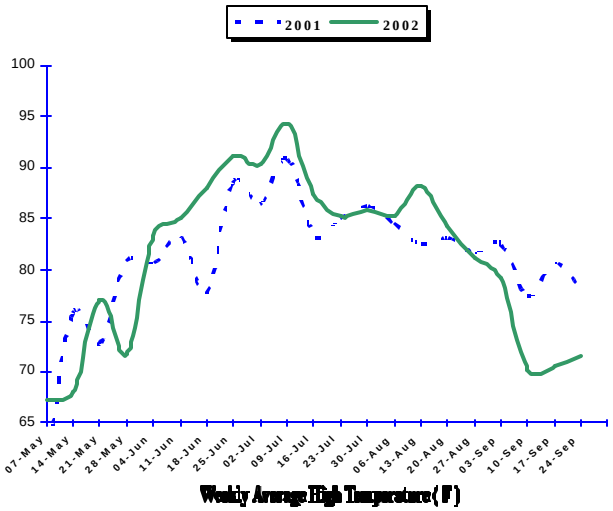

2002 VegNet Summary - Ft. Morgan/ Wiggins, CO

Cumulative Rainfall:

May 1 – 31
2001: 5.13” **2002:** 0.33”
June 1 – 30
2001: 1.08” **2002:** 0.91”
July 1 – 31
2001: 1.80” **2002:** 0.35”
Aug. 1 – 31
2001: 0.71” **2002:** 1.52”
Sept. 1 – 30
2001: 1.25” **2002:** 0.56”
Total: 9.97” 3.67”

[Updated: 09-30-02]

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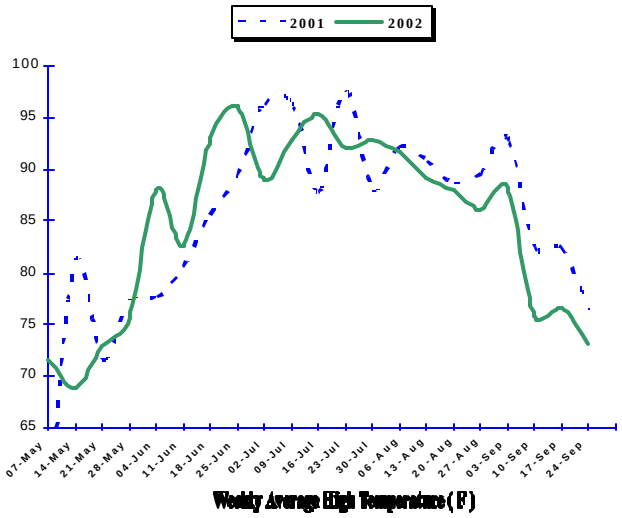

2002 VegNet Summary - Kersey, CO

Cumulative Rainfall:

May 1 – 31
2001: 3.53” **2002:** 1.12”
June 1 – 30
2001: 1.21” **2002:** 0.73”
July 1 – 31
2001: 4.39” **2002:** 0.32”
Aug. 1 – 31
2001: 0.70” **2002:** 1.02”
Sept. 1 – 30
2001: 0.87” **2002:** 0.72”
Total: 10.68” 4.85”

[Updated: 09-30-02]

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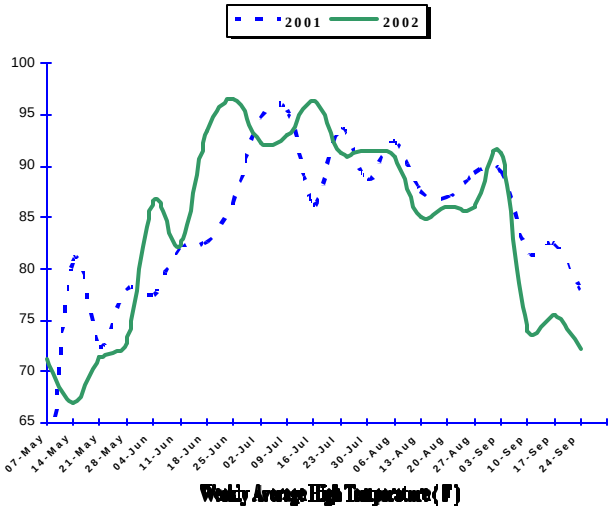

2002 VegNet Summary - Peckham, CO

Cumulative Rainfall:

May 1 – 31
2001: 2.65” **2002:** 1.47”
June 1 – 30
2001: 0.84” **2002:** 0.66”
July 1 – 31
2001: 2.14” **2002:** 1.30”
Aug. 1 – 31
2001: 0.55” **2002:** 0.45”
Sept. 1 – 30
2001: 0.78” **2002:** 0.79”
Total: 6.96” 4.67”

[Updated: 09-30-02]

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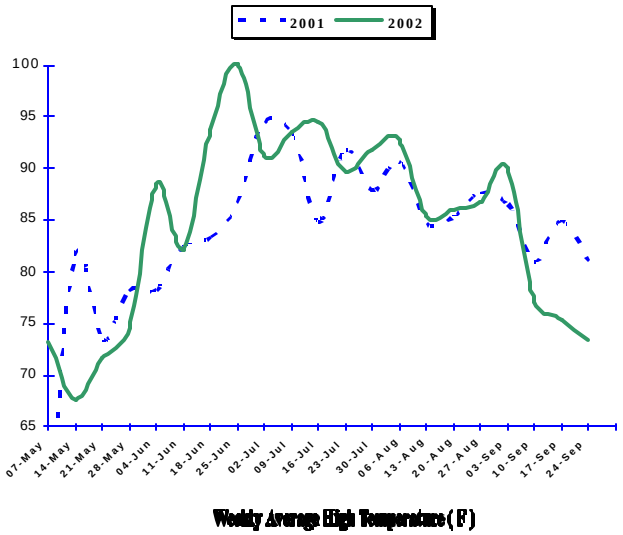

2002 VegNet Summary - Rocky Ford, CO

Cumulative Rainfall:

May 1 – 31
2001: 3.64” **2002:** 0.05”
June 1 – 30
2001: 1.81” **2002:** 0.54”
July 1 – 31
2001: 1.75” **2002:** 0.06”
Aug. 1 – 31
2001: 0.26” **2002:** 0.38”
Sept. 1 – 30
2001: 0.42” **2002:** 0.50”
Total: 7.88” 1.53”

[Updated: 09-30-02]

Colorado State University
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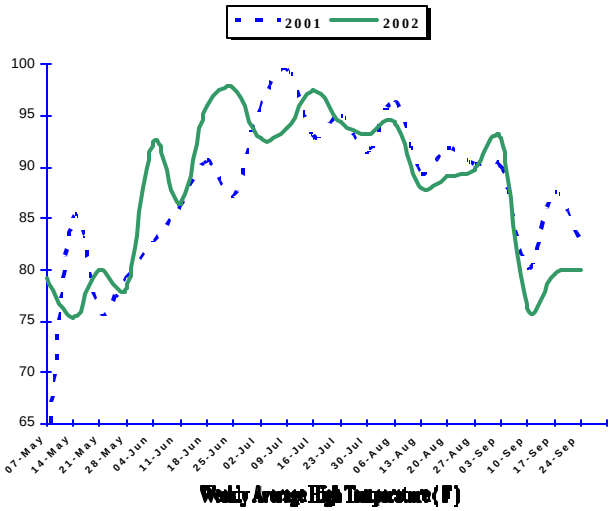

2002 VegNet Summary - Wray, CO

Cumulative Rainfall:

May 1 – 31

2001: 1.50” **2002:** 0.43”

June 1 – 30

2001: 3.27” **2002:** 1.10”

July 1 – 31

2001: 4.66” **2002:** 0.70”

Aug. 1 – 31

2001: 0.98” **2002:** 3.11”

Sept. 1 – 30

2001: 2.23” **2002:** 0.84”

Total: 12.64” 6.18”

[Updated: 09-30-02]

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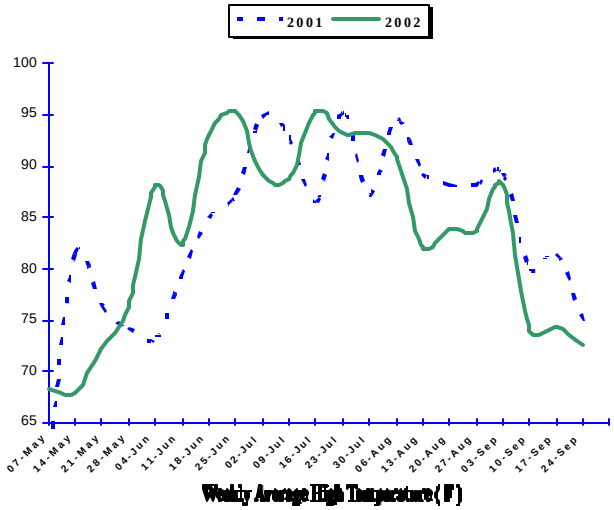

2002 VegNet Summary - Yuma, CO

Cumulative Rainfall:

May 1 – 31

2001: 1.26” **2002:** 0.62”

June 1 – 30

2001: 1.74” **2002:** 1.55”

July 1 – 31

2001: 6.18” **2002:** 0.48”

Aug. 1 – 31

2001: 2.40” **2002:** 4.58”

Sept. 1 – 30

2001: 2.21” **2002:** 1.19”

Total: 13.79” 8.42”

[Updated: 09-30-02]

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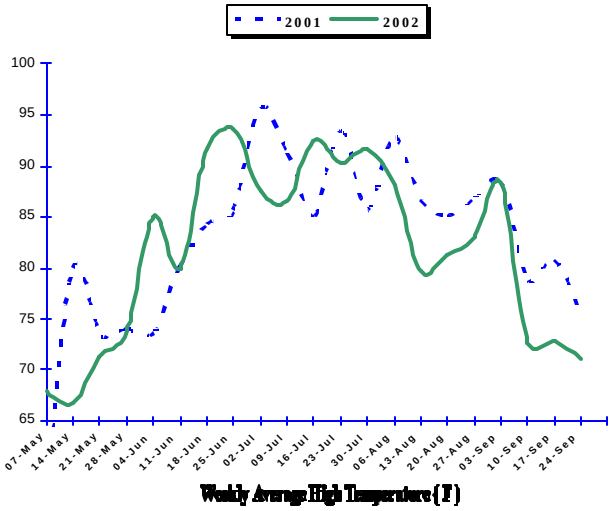
H. F. Schwartz & M. S. McMillan



BEAN ROOT HEALTH

Colorado State University Plant Health Note

Howard Schwartz and Mark Brick

Soil-borne diseases, environmental stresses and production practices can contribute to reduced plant stands, greater soil compaction, and economic losses of dry beans grown in Colorado and the surrounding high plains states. Profitability of pinto beans (and other market classes) has become more difficult in recent years due to declining bean prices and increasing operating costs. Monitor every aspect of the crop to maintain profitability; this may require cutbacks in some inputs with investments in other inputs to increase plant health and net returns. This Plant Health Note provides a brief review of common soil borne diseases, and 9 steps to enhance bean root health, crop productivity, and net return by at least $ 25 – 50/Acre.

Step 1 Soil test prior to planting and carefully plan your fertilizer and *Rhizobium* inoculant needs. In Colorado, the most important nutrients are nitrogen, phosphorus, and zinc.

Step 2 Use crop rotations in 3 – 4 year cycles to minimize the damage caused by plant pathogens, insects, weeds, herbicide carryover, soil compaction and crop residue; avoid back to back cycles of bean – potato – sugar beet, alternate with small grains and corn.

Step 3 Reduce soil compaction and improve drainage by deep chiseling or ripping in the fall, and prior to planting or early post-emergence; avoid all field traffic when the soil is wet.

Step 4 Plant high quality certified seed of a market class and varieties adapted to your farming situation and resources; treat seed with recommended pesticides to reduce seedling damping off and reduced root vigor from soil-borne insects and pathogens.

Step 5 Control weeds by cultivation and the timely use of herbicides formulated to control the weeds specific to your field and soil type. Minimize direct bean plant (growing point) contact with post-emergence herbicides that could stress beans and delay maturity.

Step 6 Plant bean seed 2 – 2.5 inches deep in a firm, weed-free seedbed when the morning soil temperature reaches 60 F at planting depth; generally between May 25 and June 15.

Step 7 Planting rates on 30” wide rows should produce approximately 75000, 85000 and 95000 emerged seedlings/acre for most pinto/great northern, black/navy, and red kidney/yellow beans, respectively.

Step 8 Irrigate when approximately 50% of the available soil moisture has been depleted; irrigate early and often to avoid stress to plant roots and to refill the root zone (12 – 24” depth) as needed throughout the season.

Step 9 Inspect bean fields weekly to detect and quickly manage problems associated with soil compaction, nutrient deficiencies, moisture deficiency, salinity, insects, diseases and other factors before they reduce yields.

Dry Dean Variety Disease Descriptions, Eastern Colorado & Western Nebraska

Drs. H.F. Schwartz, J.J. Johnson & M.A. Brick - Colorado State University (12/01)

Variety	Origin/Year[1]	Habit[2]	Maturity[3]	Seed Quality Observation[4]	Disease Resistance[5]
Pinto's					
Apache	ISB-96	V	M	**	BC1 / BC2 / CT / RU
Bill Z	CSU-87	V	L	*	BC1 / BC2 / CT
Buckskin	Novartis-94	SU	L	*	BC1 / BC2 / CT / HB / BBS
Burke	USDA-98	SU/V	L		BC1/ BC2 / CT /RU / HB
Buster	Seminis-99	V	L		RU / CT
Chase	UN-93	V	L	**	RU / WM / HB / BBS
Cisco	Novartis-98	V	L	*	BC1 / BC2
Elizabeth	Fox-97	V	L	**	RU
Frontier	NDSU-97	SU	F	*	RU / WM
Grand Mesa	CSU-01	SU	M	*	BC1 / BC2 / CT / RU / WM
GTS 900	Gentec-98	V	F		BC1 / BC2 / RU / WM
Hatton	NDSU-95	V	L		BC1 / BC2
Kodiak	MSU-98	SU	F	**	BC1 / BC2 / RU
Maverick	NDSU-95	SU	F	*	RU
Montrose	CSU-98	V	M	*	BC1 / BC2 / CT / RU
Othello	USDA-86	SU	E	*	BC1 / BC2 / CT / FR
Poncho	Novartis-98	V	L	*	BC1 / BC2 / HB / BBS
UI 320	U. Idaho-98	V	L	*	BC1 / BC2 / RU
Vision	Seminis-96	SU	F	*	RU / FR
Winchester	Novartis-95	V	F	*	BC1 / BC2 / RU
Kidney Types					
Enola (yellow)	Proctor-98	B	M		RU / WM
CE-LRK	C-89	B	M		BC1 / BC2 / RU / WM
Foxfire	Novartis-92	B	M		BC / RU / WM / CB / HB
Sacramento	UC-75	B	M		RU / WM
Black's					
Midnight	SUNY-80	U	F		BC1 / BC2 / FR / PY
Shadow	Novartis-95	U	F		BC1 / BC2 / RU
Shiny Crow	CSU-98	V	L		BC
UI 911	UI-93	U	L		BC1 / BC2
Great Northern's					
Beryl	Novartis-84	V	L		BC1 / BC2 / CT / CB
Harris	UN-80	V	L		BC1 / BC2 / BY / CB / HB
Ivory	Novartis-83	V	M		BC1 / BC2 / CT / HB
Marquis	Novartis-92	V	L		BC1 / BC2 / WM / CB / HB
Matterhorn	MSU-98	U	L		BC1 / BC2 / RU
UI 425	UI-84	V	L		BC1 / BC2 / CT
Weihing	UN-98	V	F		RU / CB

Note 1: CSU = Colorado State University, Fox = Fox Bean of Idaho, Gentec = Gentec Seeds of Canada, ISB = Idaho Seed Beans, MSU = Michigan State University, NDSU = North Dakota State University, Novartis = Novartis Seeds of Idaho, Proctor = Red Beard Bean of Colorado, Seminis = Seminis Seeds of Idaho, SUNY = Cornell University of New York, UC = Univ. of California at Davis, UI = Univ. of Idaho, UN = Univ. of Nebraska, USDA = USDA of Prosser Idaho.

Note 2: Growth Habit = V (vine), SU (semi-upright), U (upright), B (bush). Suggested plant populations: V = 75 – 80000, SU = 80 – 85000, U = 85 – 90000, B = 90 – 100000/acre. Adjust fertility levels in relation to adjusted plant populations for each growth habit; for example, a common suggestion for low fertility soils for vine growth habits at 75000 plants is 75 lb N + 40 lb P/acre.

Note 3: Maturity Classification = Days from planting to vine cutting in our region; E (Early, 85-89 days), M (Medium, 90-94 days), F (Full Season, 95-99 days), L (Late, 100 or more days).

Note 4: Seed Quality observations from dry bean industry and/or university personnel reflect the general appearance of seed of varieties that is generally light enough for most markets (*) or which may exhibit premature darkening and/or yellowing (**) during the 1st year after harvest.

Note 5: Disease Resistance as defined by the variety release statement, and may range from immunity to tolerance to disease avoidance in our region: BBS = Bacterial Brown Spot, BC1 = Bean Common Mosaic Virus – NY Strain, BC2 = Bean Common Mosaic Virus – Type Strain, BY = Bean Yellow Mosaic Virus – Pea Strain, CB = Common Bacterial Blight, CT = Curly Top Virus, HB = Halo Blight, FR = Fusarium Root Rot, PY = Pythium, RU = Rust, WM = White Mold.

Entry Forms for 2003 Trials

Entry forms for 2003 trials may be obtained from the Department of Soil and Crop Sciences, Colorado State University, Cynthia Johnson, C-03 Plant Science Building, Fort Collins, CO 80523-1170; Telephone (970) 491-1914; Fax (970) 491-2758; e-mail *cjohnson@agsci.colostate.edu* or web site *http://www.colostate.edu/Depts/SoilCrop/extension/CropVar/index.html*

Additional copies of this report may be ordered from the Department of Soil and Crop Sciences, Colorado State University, Cynthia Johnson, C-03 Plant Science Building, Fort Collins, CO 80523-1170; Telephone (970) 491-1914; Fax (970) 491-2758; or e-mail *cjohnson@agsci.colostate.edu*.