

# Colorado Bean News

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## In Memory of *DERMOT P. COYNE*

Prepared by Howard Schwartz – Colorado State University, Shree Singh – Univ. of Idaho, and Jim Steadman – Univ. of Nebraska; with input from Ann Coyne.

Dermot P. Coyne, 72, the George Holmes professor emeritus of horticulture at the University of Nebraska-Lincoln, died late Friday, 12 April 2002, after suffering complications from a steroid treatment of a non-viral form of hepatitis, family members said. Born in Dublin, Ireland, on July 4, 1929, Coyne arrived in the United States in 1954 at the age of 25 to embark on his life-long fascination with plant genetics, breeding and beans. Dermot had a distinguished and illustrious career as an educator, researcher, and benefactor of humankind.

Despite his retirement from UNL in June 2001, Coyne was working one-quarter time until he was hospitalized two weeks before his death. Dermot was the bean breeder at Nebraska for the last 30 years, and released many popular dry bean varieties in support of the Nebraska and High Plains Bean industry. His most recent releases included the pinto 'Chase' and great northern 'Weihing'.

Coyne achieved many professional and technical successes throughout his career, developing several varieties of pinto, pompadour and great northern beans that were resistant to bean common mosaic virus, rust, common bacterial blight and other bacterial diseases, with architectural escape from white mold. Those developments helped feed people in such countries as the Dominican Republic, which has since developed self-sufficiency in bean production thanks in part to Coyne's work. Moreover, his disease-resistant germplasm releases and varieties are parents of numerous bean varieties grown in hundreds of thousands of hectares in the Americas, Africa, Asia, and Europe.

His latest recognition by the international bean community occurred at the 2001 Bean Improvement Committee Annual Meeting in Fargo, North Dakota last November where he was the inaugural recipient of the Frazier - Zaumeyer Distinguished Lectureship. Dr. Coyne presented the keynote address entitled, "Breeding and Genetics of Great Northern and Pinto Dry Beans for Multiple Disease Resistance, Adaptation, Seed Quality, Yield, and Plant Architecture." The BIC community is very grateful that they had this opportunity to honor their dear friend who has imparted his experiences and wisdom over the past forty years.



Dermot Coyne evaluating dry beans near Tenerife, Colombia.

### MAILING LABEL UPDATE

Please send changes to:  
Dr. H.F. Schwartz, CBN Editor  
E207 Plant Science Building  
Colorado State University  
Fort Collins, CO 80523-1177

See DERMOT on page 3



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The **Colorado Bean News** is supported in part by your voluntary check-off dollars administered by the **Colorado Dry Bean Administrative Committee**, 31221 Northwoods Circle, Buena Vista Colorado 81211. Phone 800.318.8049

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**COLORADO DRY BEAN ADMINISTRATIVE  
COMMITTEE UPDATE**

Minutes by Robert Schork, CDBAC Manager



**Regional Bean Newsletter Draft Rejected:**

Late last year, CBN Editor H. Schwartz prepared a draft to merge the Colorado (Colorado Bean News) and Nebraska (The Bean Bag) newsletters to form a new Central High Plains Bean Report in response to inquiries from some bean industry personnel in the region. Major justifications included to: unify state/industry newsletter style and input, reduce duplication of resources and content, increase economy of scale, enhance our regional bean identity/unity, and attract more national attention from advertisers and marketing/promotion groups associated with the dry bean industry.

After a great deal of review and feedback from the Nebraska and Colorado bean industry and grower groups, it was apparent that both states feel that their current newsletter format is valuable for direct communications with their clientele, i.e., growers and dealers in Nebraska and/or Colorado, represents one of the most positive and visible signs of each state's check-off activity and feedback, and that a merged newsletter would not provide any appreciable or detectable cost-savings. Both states agreed that they are very interested in continuing to cooperate with each other, share information and resources for the benefit of growers and industry personnel in the region, and pursue ways to improve our regional and national recognition.

**Specialty Center Grant Denied:**

Earlier this year, Colorado growers, dealers and research/extension personnel at the urging of the Colorado Dept. of Agriculture and the CDBAC submitted a grant to the Colorado State University Specialty Crops Center for funds to investigate pathology and agronomic practices for new specialty beans (i.e., black, yellow, and new pinto varieties) in Colorado.

See GRANT on page 3

**CDBAC Budget as of March 31, 2002**

	BUDGET		
	YTD	vs	
BUDGET	ACTUAL	ACTUAL	
Assessments	93,000	24,646	(68,354)
Interest	3,000	407	(2,593)
<b>Total Income</b>	<b>96,000</b>	<b>25,052</b>	<b>(70,948)</b>
Research	41,500	41,500	0
Administrative	3,000	750	2,250
Promotional	5,000	2,031	2,969
Meetings & Travel	14,400	567	13,833
Dues	27,500	0	27,500
Magazine	8,000	4,000	4,000
Accounting and legal fees	2,500	0	2,500
Refund of assessments	2,500	142	2,358
Telephone, postage, supplies	2,500	766	1,734
<b>Total Expenses</b>	<b>106,900</b>	<b>49,755</b>	<b>57,145</b>
<b>Excess (Shortage)</b>	<b>(10,900)</b>	<b>(24,703)</b>	<b>(13,803)</b>

[Dues include membership in the National Dry Bean Council & American Dry Bean Board]

DERMOT from page 1

“He was a very caring person,” said his wife Ann. “His motivation for science was that he knew it would help people.” Hundreds of colleagues nationwide elected Coyne the first Nebraskan to be president of the American Society for Horticultural Science in 1985.

Jim Steadman, 30-year long friend, professor and acting head of the Plant Pathology Department at UNL, said Coyne, while on his deathbed, was still worrying about getting a green card for a former graduate student and finding funding for bean projects. That was typical of Dermot,” Steadman said. “He was so dedicated to people.”

Ann Coyne said her husband’s experience made him forever sensitive to the lives of foreign students. “He understood how confused they were—the culture shock,” she said. In his spare time, Coyne loved to read such poets as W.B. Yates and tell Irish myths and legends to his children and grandchildren, but his wife said he was atypical as an Irishman.

“He wasn’t a loud Irishman,” she said. “He couldn’t tell a joke if his life depended on it. He was into the cleverness of language...He had that dry wit.”

Memorials may be sent to the University of Nebraska Foundation, Dermot P. Coyne Lectureship in Plant Breeding and Genetics, Suite 200, 1111 Lincoln Mall, Lincoln, NE 68508.

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The Center denied the request for funds to: 1) determine if deep soil ripping improves seed quality and yield in specialty dry beans, 2) evaluate the influence of biopesticides on specialty bean root pathogens, and 3) evaluate the influence of inoculants on specialty bean root vigor and nodulation. Apparently these specialty market class beans were not exotic enough for the Center, even though they promise to enhance and expand farmer profitability and Colorado’s bean market share in the near future if last year’s production threats (heat & moisture stress, soil compaction, root rot) can be reduced with critical research and demonstration.


2002 Colorado Agricultural Outlook Forum. Colorado Department of Agriculture Commissioner Don Ament sent a thank you letter to the CDBAC for their help as a sponsor of the 2002 Forum held in February in Denver. The “Colorado-Mexico Connection” drew 335 participants from all facets of Colorado agriculture. Feedback from participants indicates that this year’s Forum was again very successful.

**Board Meeting Excerpts**

(from minutes by Robert Schork, manager):


The CDBAC board meeting was held at 10 am on February 18, 2002 at the Colorado Department of Agriculture (CDA) conference room in Lakewood. Directors present were Steve Brown, Treasurer, Brad Taylor, President, Gary Mulch, Vice President, Jim Fitzgerald, Eldon Reynolds, and Rick Johnson (new

See MEETING on page 5



## Montrose PINTO BEAN

**Montrose combines mid-season maturity, high yield potential, and resistance to the prevalent races of rust and bean common mosaic virus in the High Plains .**



**Your sources for Montrose PINTO BEAN:**

<p><b>Delta Potato Growers</b> Lorren Britain 515 West 7th Delta, CO 81416 Ph 970-874-9737 Fax 970-874-0703</p>	<p><b>Red Beard Bean Co.</b> Larry Proctor 269 State Highway 348 Delta, CO 81416 Ph 970-874-7488 Fax 970-874-9859</p>
<p><b>Montrose Potato Growers</b> Steve Mosher 38 West Main, P.O. Box 65 Montrose, CO 81402 Ph 970-249-5623 Fax 970-249-0426</p>	<p><b>Thunder Mountain Bean Co.</b> Robert Proctor 1588 B Road Delta, CO 81416 Ph 970-874-7737 Fax 970-874-1462</p>

**Yield Performance**

Montrose has performed well in replicated trials in Colorado during the past four years of evaluation by the Colorado Crops Testing Program. The table below shows the average seed yields of the four highest yielding varieties tested in 1997, 1998, 1999 and 2000.

Cultivar	4 Yr. Average*
<b>Montrose</b>	<b>2893</b>
Bill Z	2524
Chase	2670
Vision	2216 (3 yr.)

\*Average of 17 locations-years



**Colorado Bean Network  
EXECUTIVE BOARD**

- Harley Ross, Kelley Bean                      Chairman  
970-463-5468
- Howard Schwartz, CSU                              Secretary  
970-491-6987
- Steve Krosky, Greeley Elevator                      Treasurer  
970-352-2575

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**Advertising Material Deadlines and Rates for the Colorado Bean News**

- Circulation:** . . . . . 3800 Bean Growers and Dealers in Colorado and Adjacent Area
- Publisher:** . . . . . Colorado Bean News
- Editor:** . . . . . Dr. Howard F. Schwartz, (970)491-6987  
. . . . . hfsp@lamar.colostate.edu
- Layout:** . . . . . Mark S. McMillan, (970)491-7846  
. . . . . msmcm@lamar.colostate.edu

**Publication Material Due Dates:**

- Fall Issue            [Market Emphasis]            Sep. 7
- Winter Issue        [Promotion, Nutrition Emphasis]        Dec. 7
- Spring Issue        [Planting, Production Emphasis]        Apr. 7
- Summer Issue        [Pest Mgmt., Harvest Emphasis]        June 7

**Advertising Rates:**

- 1/4 Page (3.5"x4.5")    B/W                      \$100\*
- 1/2 Page (7.0"x4.5")    B/W                      \$180\*
- Full Page (7.0"x9.0")    B/W                      \$350\*
- Back Page                B/W                      \$400\*
- Each Additional Color        \$75

**Art Work Specifications:**

- \*PMT's - 85 lines preferred
- \*Negatives to be stripped in 100 lines

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**BEAN BYTES**



**PL-480 Purchase.** The USDA's Commodity Credit Corporation office in Kansas City has confirmed the purchase of 2,060 MT of pinto and great northern beans. Bought under terms of PL-480 food aid, the beans are for shipment between May 16 - 31 or June 1 - 15. The great northern beans are for shipment to Bulgaria, while the pinto beans are for prepositioning in the port of Lake Charles, Louisiana for use against future aid requirements. Prices paid for the 560 MT of No. 3 or better GNs averaged US \$22.77/cwt on a delivered Gulf Port basis, a strong discount to the No. 1 grade market in Colorado and Nebraska. Average prices paid for the 1,500 MT of pintos were \$32.29.

The CCC office is looking for offers of 7,160 MT of pulses for shipment as food aid during June. Processors in the US were surprised by the latest PL-480 tender's departure from emphasizing lentils and field peas over dry edible beans. This tender included a request for offers of 5,440 MT of pinto, black, and dark red kidney beans. Pinto beans dominate this tender, with the USDA seeking offers of 5,100 MT of product for shipment to Angola and Mozambique.

Trading on dry edible beans was slow to moderate during April of 2002. Pinto prices mostly steady, with CO/NE at \$34.00 - 36.00, ND/MN at \$33.00 - 35.00, and some bright color beans from CO/NE/NM/WY at \$37.00 - 37.50. Grower level mostly steady, CO/NE at \$27.00 - 30.00.

**New Small Red Bean Variety.** USDA plant breeders have developed a new variety of disease-resistant, small red bean intended for use in Latin America markets. 'Rojo Chiquito' is the first Central American market-class small red dry bean bred for production on U.S. soils, notes Philip Miklas, a research geneticist at the Agricultural Research Service's Vegetable and Forage Crops Production Research Unit, Prosser, Washington. Miklas developed the new variety, along with Wash. State Univ. agronomist an Hang and ARS colleagues Matt Silbernagel (retired) and George Hosfield, based in East Lansing, Michigan.

'Rojo Chiquito' is resistant to curly top virus and bean common mosaic virus, has an upright plant architecture which helps reduce white mold

See VARIETY on page 8

**Colorado Dry Bean Administrative Committee  
Variety/Crop Year CWT Summary**

	1988-92	1993-97	1998	1999	2000	2001	Total
Pinto	12,913,340	10,662,542	2,429,440	2,173,581	1,478,961	1,086,303	30,744,167
LRK	240,180	733,012	109,946	119,543	119,300	61,634	1,383,615
GN	41,740	80,955	0	0	6,275	0	128,970
Navy	53,731	25,000	3,089	8,204	0	0	90,024
Blacks	17,028	32,953	0	2,328	6,842	2,105	61,256
Pinks	39,182	7,453	0	0	0	0	46,635
Anasazi	9,034	16,071	0	5,441	0	0	30,546
Sm White	19,629	0	0	0	0	0	19,629
Reds	13,972	7,159	0	0	2,478	453	24,062
Cranberry	0	798	0	0	0	0	798
Yellow	0	275	770	45,417	39,443	1,419	87,324
Total Assessments	13,347,836	11,566,218	2,543,245	2,354,514	1,653,299	1,151,914	32,617,026
Crop Estimate	15,849,000	12,837,000	2,868,000	2,755,000	1,980,000	1,785,000	
% of Estimate	84.22%	90.10%	88.68%	85.46%	83.50%	64.53%	

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director from Loveland, approved by the board at this meeting). Visitors included: Bob Schork – CDBAC administrator, Howard Schwartz – CSU professor, Randy Mathews & Steve Traxler – CDA Inspection, Ron Pickarski – chef and marketing consultant.

A request had been made to the CDBAC by Larry Proctor to not report yellow bean sales in the statistic reports from the committee to the state regarding bean classes and sales. A question was raised whether they should be reported as “other”. The committee unanimously agreed to continue reporting statistics as we have in the past. There was also a discussion about seed beans that are not included in our statistics. It was estimated by H. Schwartz and E. Reynolds that there are approximately 2,500 acres of seed beans produced on the west slope each year; and these beans are already assessed a significant tag fee by the Colorado Seed Growers Association.

Ron Pickarski made a presentation on marketing strategy. He said we should focus on getting to chefs and on educating the public about the nutritional benefit of beans. It is a whole food and not refined. He said that dry beans can be used in many recipes that use soybeans. He also said that he is working with Sysco on adding vegetarian items to their inventory. Steve Brown suggested that Brad should directly contact MS&L (national ad agency for the bean industry) to introduce

Ron to them. Steve also talked about the ADBB’s budget; \$25,000 being spent on their web site this year. Randy and Eldon both made some comments about promoting beans. Ron suggested developing a starter kit for educating chefs. It was discussed that Johnson and Wells and the Colorado Institute of Arts should be contacted. It was decided that funds should be approved to have Ron develop a proposed outline of the program.

Steve, Gary and Jim then discussed the results of the NDBC annual meeting in Washington. There was discussion of money for international promotion, problems with Mexican imports, and the farm program.

Howard presented a booklet (compiled by Mark Brick) with the results of CSU’s 2001 research projects; see excerpts in this issue. The directors then discussed the details of CSU’s 2002 research proposals [\$8,000 to Schwartz for Pathology and Technology Transfer; \$7,500 to Johnson for Variety Trials; \$8,000 to Brick for Bean Breeding; \$2,000 to Berrada for Southwest Colorado Variety Work; \$2,000 to Pearson for Western Colorado Agronomy; \$1,000 to Schweissing for Arkansas Valley Variety Work; \$5,000 to Nissen for Nightshade Work. A budget of \$33,500 had been approved for these projects and the core. There was a general discussion about the importance of Mark Brick’s research to develop new bean varieties and if extra funds would speed up their development. Howard said additional funds could be used to great advantage. Gary said that developing varieties other than pintos that would grow well in Colorado was important because the price of pinto beans is so closely tied to the Mexican market. The details of the 2002 budget were then discussed; see the update in this issue. Additional research funds were allocated to Mark Brick’s breeding project (\$6,000) and Howard Schwartz’s technology project (\$2,000). Steve then made a motion to use the remaining \$1,500 in unallocated marketing funds to fund Ron Pickarski’s starter project for chef’s education.



## WESTERN INTERNATIONAL GRAIN

DRY BEAN RECEIVING &  
PROCESSING

Burlington:	1-800-827-9559
Mobile	(719) 340-1223
Keenesburg:	(303) 732-4241
Milliken:	1-800-635-2326

### *American Dry Bean Board Highlights*

Phil Kimball, Executive Director, Vienna, VA



#### **B.E.A.N.'s in Better Homes & Gardens:**

The Bean Education & Awareness Network has maintained a relationship with the editors of Better Homes & Gardens since 1998 with input from Debi Thomas and MS&L Advertising. “Bringing Out the Best in Beans” was recently published in the February 2002 Issue to showcase the many flavors and varieties of beans and tips on soaking and cooking. It also included an easy recipe for “Beans and Greens.” Better Homes & Gardens has a readership of approximately 18 million.

The American Dry Bean Board has moved to:  
8233 Old Courthouse Road, Suite 210, Vienna, VA 22182  
Web Site: [www.americanbean.org](http://www.americanbean.org)



## BEAN RESEARCH HIGHLIGHTS 2001 CSU Reports

**Southwestern Colorado.** Abdel Berrada and Mark Stack conduct variety and agronomic research in cooperation with campus personnel at the CSU research station near Yellow Jacket. Dryland pinto bean yields in the Yellow Jacket to Dove Creek area ranged from 300 to 400 lbs in 2001. 'Cahone' is still the most common pinto planted in dryland fields, and 'Fisher' is planted only on limited acreage. Fisher's yield does not appear to be as stable as Cahone's under adverse weather conditions.

Irrigated pinto bean acreage continued to decline. Farmers indicate that white mold disease is a major obstacle for them to continue to raise irrigated pinto beans. In addition, low bean prices, lack of irrigated bean equipment, and competition from irrigated alfalfa has led to a decline in irrigated beans production in southwestern Colorado. A 2001 fungicide trial with Topsin fungicide gave a 48 or 67% increase in yield with 1 or 2 sprays at 100% bloom and 10 days later. With \$20/cwt pintos, the net return was \$109 or \$ 137/Acre for 1 or 2 sprays, respectively, according to a report by M. Stack, T. Hooten, H. Schwartz and M. Brick.

Berrada reports that irrigated variety trials showed that late-maturing entries were the lowest yielding in 2001. 'Poncho' again yielded very well, but its semi-vine growth habit makes it susceptible to white mold. 'Grand Mesa' (CO 75511) again looked very good. 'USPT-73' is an early maturing pinto with upright architecture that is adapted to southwestern Colorado. Experimental lines were also evaluated for yield, a few will be tested again in 2002. Other market classes were also tested, and the black bean 'Shiny Crow' appears to be adapted, but may be a little late. Light red kidneys showed promise and need to be evaluated further. Small white entries exhibited severe zinc chlorosis. Specific data are available at the following web site:

<http://www.colostate.edu/Depts/SoilCrop/extension/CropVar/index.html>

The dry bean breeding project of M. Brick & B. Ogg evaluated more than 200 entries in the dryland nursery in 2001. Their goal continues to be to broaden the genetic base, improve drought tolerance, and thus increase yields and market quality. Yields averaged 866 lb/A, probably in response to the previous fallow season and rain in August. Three entries were selected for a plant-to-row nursery to improve uniformity, and two entries were bulked for variety testing in 2002.

**Breeding Beans for Yield and Pest Resistance.** Mark Brick and Barry Ogg conducted bean breeding activities at Fort Collins, Fruita and Yellow Jacket, Colorado during 2001. Fort Collins was the primary site for plant selection, Fruita for seed increase, and Yellow Jacket for evaluation of lines adapted to non-irrigated conditions. At Fort Collins, approximately 300 F1's and 8200 lines composed of early generation material and elite lines were evaluated for root rot, rust, growth habit and adaptation. Yield tests and rust resistance evaluations were conducted on advanced material in the pinto, black, great northern, and light red kidney market classes. Activities at Fruita involved seed increases of 30 advanced lines. The Midwest Regional Performance Nursery, a nursery with advanced pinto and great northern lines submitted by breeders from Colorado, Nebraska, North Dakota and Michigan, was planted at Fort Collins. A new trial, the Western Regional Bean Trial, was also planted there with advanced lines from

See YIELD on page 7

Resource Personnel:	Expertise:	Telephone #:
Howard Schwartz	Plant Pathology	970-491-6987
Mark McMillan	Plant Pathology	970-491-7846
Kristen Otto	Plant Pathology	970-491-0256
Mark Brick	Plant Breeding	970-491-6551
Barry Ogg	Plant Breeding	970-491-6354
Jerry Johnson	Variety Testing	970-491-1454
Cynthia Johnson	Variety Testing	970-491-1914
Jim Hain	Variety Testing	970-345-2259
Jessica Davis	Soil Science	970-491-1913
Scott Nissen	Weed Science	970-491-3489
Frank Peairs	Entomology	970-491-5945
Pat Kendall	Food Sci./Nutrition	970-491-1945
Reg Koll	ARDEC Station	970-491-2405
Frank Schweissing	Arkansas Valley	719-254-6312
Mike Bartolo	Arkansas Valley	719-254-6312
Abdel Berrada	S.W. Colorado	970-562-4255
Mark Stack	S.W. Colorado	970-562-4255
Calvin Pearson	West Slope	970-858-3629
Fred Judson	West Slope	970-858-3629
Jerry Alldredge	Weld Cnty.	970-356-4000 x 4465
Paul Aravis	Boulder Cnty.	303-776-4865
Bruce Bosley	Morgan Cnty.	970-867-2493
Randy Buhler	Logan Cnty.	970-522-3200 x 1308
Wayne Cooley	Montrose Cnty.	970-249-3935
Dan Fernandez	Dolores Cnty.	970-677-2283
Assefa Gebre-Amlak	Phillips Cnty.	970-854-3616
Bill Hancock	Otero Cnty.	719-254-7608
Gary Lancaster	Sedgwick Cnty.	970-474-3479
Tom McBride	Adams Cnty.	303-637-8100
Ron Meyer	Kit Carson Cnty.	719-346-5571
Ken Smith	Montezuma Cnty.	970-565-3123
Frank Sobolik	Pueblo Cnty.	719-583-6566
Brent Young	Delta Cnty.	970-874-2195

**Websites of interest  
to bean growers**

**[www.csuag.com](http://www.csuag.com)**

**[www.coagmet.com](http://www.coagmet.com)**

**[www.colostate.edu/Orgs/VegNet/beanlinks](http://www.colostate.edu/Orgs/VegNet/beanlinks)**

YIELD from page 6

breeders in Washington, Idaho and Colorado. The nation-wide Cooperative Dry Bean Nursery had a diversity of market classes represented, including pinto, black, great northern, pink, small red, cranberry, light and dark red kidney, small white, and yellow beans.

The CSU Crops Testing Program evaluated 11 CSU advanced lines in five locations. One line, CO 75511, now named Grand Mesa, was released in 2001 and approximately 1300 lbs of Foundation Seed was sold to certified seed growers in March 2001. Grand Mesa has shown good yield potential, but does not have yield levels comparable to Montrose or Bill Z in the absence of white mold or rust. It combines rust resistance, good seed quality, semi-upright growth habit (in most environments), and field tolerance to white mold in a pinto line. It has performed well in regions outside of Colorado.

Shiny Crow, the first shiny black seeded variety released in the U. S., was released under a license agreement in 2000. More than 35,000 lbs of Foundation seed was produced in 2000 for distribution to certified seed producers in 2001. Shiny Crow has excellent canning properties based on tests conducted at Michigan State University, and we are in the process of sending more seed to commercial canners to evaluate canning qualities under commercial conditions.

Breeding strategies continue to concentrate on broad-



"The Dry Bean People"

Seed, Field & Receiving  
Support for your Pinto,  
Great Northern and Light  
Red Kidney Bean Needs

Debbi Heid

200 W. 1st Avenue  
P.O. Box 283  
Yuma, CO 80579  
(970) 848-3818

ening the genetic base of pinto bean varieties, and incorporation of new genes that confer resistance to rust and Fusarium wilt. Research on Fusarium wilt resistance continues. Incorporating better resistance to Bean Common Mosaic Virus and white mold also continues.

### 2001 Colorado Dry Bean Performance Trials.

Jerry Johnson coordinated the pinto variety trials in 2001 at 6 locations – Ault, Julesburg, Burlington, Rocky Ford, Fruita, and Yellow Jacket. Fruita suffered from severe and highly variable salt damage, while Burlington suffered severe blossom drop and poor pod-fill that resulted from prolonged high temperatures and water shortage. Results of the 2001 trials are available at: <http://www.colostate.edu/Depts/SoilCrop/extension/CropVar/index.html>

The top yielding commercial varieties (and average yields – lb/A) included: Poncho (2862), USPT-63 (2825), Vision (2790), Montrose (2705), Buster (2654), Bill Z (2621), Grand Mesa (2458), Burke (2426), and Rally (2312).

**Nightshade Management in Dry Beans.** Scott Nissen evaluated weed control strategies that will extend weed control in general and nightshade control specifically late into the growing season. Broadcast applications in general provided good to excellent early-season weed control. Nightshade control was good to excellent with most pre-plant incorporated (PPI) Sonalan treatments. The combination of PPI or pre-emergence (PRE) applications plus cultivation and post-directed (POST) herbicide applications provided excellent weed control across all treatments. POST applications provided somewhat better nightshade and velvetleaf control than PPI treatments alone.

Late-season weed ratings suggest that combinations of PPI or PRE plus LAYBY and/or POST treatments provided better nightshade management than the more traditional Sonalan/Eptam programs. The untreated check yield was 46 – 57% of the herbicide-treated plots, indicating that weed pressure was significant. The added expense of LAYBY and POST treatments did not translate into additional returns in the form of higher yields; which is not uncommon.

Banding herbicides at planting would reduce chemical costs by 66 % and application costs by combining planting and herbicide applications. Dual Magnum performed very well, but is still waiting for a POST label in dry beans. Valor was evaluated as a PRE band application combined with a POST-directed application with excellent crop safety and weed control. This product continues to be evaluated as a dry bean herbicide in Colorado and other western states.

See NIGHTSHADE on page 9

VARIETY from page 4

losses, is compatible with narrow-row production systems, produces small seed, dark, shiny seeds (19 – 21 grams vs 30 – 32 grams for US small reds), retains seed color and firmness during canning, matures in 100 days in the northwest states, and averaged 2,061 pounds per acre in recent field tests.

According to Miklas, 'Rojo Chiquito' is primarily intended as an edible dry bean crop that U. S. farmers can grow for export markets in Honduras, Nicaragua, El Salvador, and other Central American countries. But another potential outlet is North America's multi-billion dollar ethnic foods market.

North American small red bean export volumes to Latin America have been volatile in recent years, with Colombia dominating import demand in recent years. This has favored Canada, which has strong ties to the Colombian import trade and the ability to combine with conventional shipments of small red beans with products such as field peas and lentils for significant savings in shipping costs.

**Irradiation Produces Low-gas Beans.**


www.NewScientist.com reported on 27 March 2002 that food scientists have found a way to eat bean-filled food like curries and salads with far fewer episodes of flatulence. The Indian researchers have discovered that

blasting some beans with gamma rays can help oust most of the chemicals that make people fart. Bacteria in the large intestine produce the accumulation of gas that causes flatulence. When these bugs consume certain types of carbohydrates, called oligosaccharides, they produce a mix of gases that includes methane and certain sulphur-containing gases. On average, adults produce four to five liters of gas a day, and beans are the vegetables most commonly associated with excess wind. This is because up to 60% of their carbohydrates are oligosaccharides.

Using standard food irradiation technology, J. Machaiah and M. Pednekar in the Food Science Lab in Trombay India, irradiated samples of mung bean, chickpea, black-eyed bean and red kidney bean with various intensities of gamma-ray beams. They then gave the beans the typical two-day soaking in cold water that people use before cooking the beans. The researchers report in a paper to be published in the journal Food Chemistry that the initial irradiation slightly reduced levels of oligosaccharides. But the further reduction that occurs naturally with soaking was dramatically accelerated in the irradiated beans, especially black-eyed beans.

After two day's soaking, the low dosage of radiation reduced oligosaccharides in mung beans by 70 %, and the high dose by 80 %, compared with a drop of only 35

See IRRADIATION on page 9



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IRRADIATION from page 8

% in soaked beans that had not been irradiated. Black-eyed beans and chickpeas also showed a marked improvement. Only kidney beans remained unaffected by the treatment, but they have only a fraction of the guilty oligosaccharides anyway.

**Lament From a Bean Widow.** Recently Colorado Bean News received a very poignant letter from Mary Dossey – Hesperus, CO that epitomizes the feelings of many bean families in Colorado, and I wanted to share a few of her comments. ... “You probably are well aware that it is hard to make a living on a dryland bean farm, and now more so than earlier in my life.... Although I own a facility which has a lot of storage room and facilities to clean pinto beans, they long ago ceased being a money-making crop. When we were married in 1947, beans were about the price they are now, but we were able to buy our first tractor and equipment to go out on our own for less than you can buy ANYTHING now.... I hope for the sake of all farmers, and also for the sake of consumers who might find out in the future how valuable farmers were to them, that this situation will change in the future to allow those who farmed because that was what they wanted to do, to farm again. But right now, it seems to me you had better not rely on farming to put food on the table and pay the bills.”

NIGHTSHADE from page 7

99% control of nightshade was achieved with the following treatments (NOTE: confer with your pesticide specialist on labeled treatments for your area): Sonalan + Dual Magnum PPI, Sonalan + Outlook PPI, and Sonalan + Outlook PPI / Raptor + Basagran + Dual Magnum POST, Valor banded PRE.

### 2001 Cooperative Dry Bean Nursery – Fruita.

Calvin Pearson and campus personnel (Jerry Johnson, Mark Brick, Barry Ogg, Cynthia Johnson) evaluated regional nurseries at the Fruita Research Station. Salt damage during the 2001 season resulted in lower yields and increased yield variability. Yields ranged from a high of 2230 lb/A for H9673/87, a black variety, to a low of 285 lb/A for CPC 00125, a small white variety. Yields in the pinto bean trial ranged from a high of 1080 lb/A for USPT-73 to a low of 231 lb/A for CO 75944.

**IPM and Technology Transfer.** Howard Schwartz, Mark McMillan and Kris Otto conducted a series of bean pathology projects throughout the state and region during 2001. They provided plant pathology support to the CSU Bean Breeding project with maintenance of plant pathogen cultures, inoculation of greenhouse and field nurseries, and evaluation of bean germplasm and varieties in a number of trials near campus and in eastern Colorado.

Additional support was used for the VegNet (COAGMET) weather monitoring system and disease forecasting, in addition to maintaining the bean web site links ([www.csuag.com](http://www.csuag.com)). This network helped us communicate with dry bean growers and dealers and crop consultants in the state regarding weather patterns, pest outbreaks, and the timing of Integrated Pest Management strategies. During 2001, our group developed and released 2 extension publications on Fusarium of Bean and Sugarbeet, and Bean Root Health with support from the CDBAC and other sources.

Bean rust fungicide screening (with Kris Otto and Dave Gent) reported good control of the disease when treatments were started at first signs of disease. Maneb, Bravo and Tilt were labeled in 2001, and provided good results; the Tilt Section 18 label is pending for use in Colorado during 2002. Addition of a spreader/sticker with Maneb improved initial coverage and control of rust by 20 – 30%. Experimental fungicides with excellent performance included Quadris, Headline, and Flint.



## DRY BEAN NEWS FROM THE AMERICAS

**Mexico Dry Bean Report** - A report last month from Mexico City from the U. S. agricultural attache said it looks like the 2001-02 fall-winter harvest will end up around 850,000 MT of all classes of dry edible dry beans. Official production statistics from the Mexican agriculture department peg the 2000-01 season's fall and winter harvest at just 629,256 MT. With production rising, Mexico's dry bean producers are already starting to complain about the certainty there will be imports from the United States and Canada over the coming year. To bring this into perspective, it needs to be recalled Mexico's domestic crops have not reached or exceeded domestic consumption levels since the 1998-99 marketing campaign.

More importantly, the country's consumers have proven surprisingly willing to substitute past, poultry and other products for dry edible beans in the diet, with the result domestic consumption has fallen from around 8.6 kilograms per person five years ago to just under 8 kgs today. The implication is clear, Mexico's annual need for beans will shrink. The complaints are more interesting given the fact growers in the country receive more for their beans than their counterparts in the United States. Clearly, import duties are performing the intended task of creating an umbrella under which Mexican growers can operate.

The U. S. agricultural attache said farm gate prices in Zacatecas for Flor de Mayo are between 6.20 - 7.20 pesos per kg (US \$ 0.31-0.36 per pound), considerably higher than a year ago (US \$ 0.21-0.22/lb). At the same time,

## DRY BEAN STATISTICS

Excerpts from USDA National Agr. Statistics & Northharvest Bean Grower (Mar/Apr 2002)  
with contributions by Steve Brown – Jacks Bean Company of Holyoke

Many of the dry bean producing regions in the United States are starting the 2002 growing season with relatively dry soil conditions (varying from adequate to very poor soil moisture), generating some doubts about whether all states will see the kind of bean acreage planted as intended by growers.

Some growers have clearly heeded the caution of some processors and consumer buyers, who believe if seeded area jumps past the two million acre mark in the U.S., new crop prices for most classes of beans will collapse relative to current market values.

Responding to a survey by USDA officials, dry edible bean producers in the U.S. said they would increase planted area 24 % to 1.77 million acres, compared to initial projections plantings could reach 1.98 million acres as growers in the U.S. responded to this year's dramatic improvement in average prices and relatively solid demand.

All classes of dry edible beans should finish the 2001-02 marketing year with lower stocks than was the case last

year, with several of the colored beans close to sold out by the time new crop merchandise becomes available. The implication is supplies available to processors and exporters for the coming season will be limited to what is produced this year.

The biggest increase should be in pinto bean production, as it rises from 549,100 acres last year to 735,400 acres this year. However, with this season's ending stocks standing a chance of dropping to just 1,376 MT, available supplies of pintos will once again be close to prospective demand, with the result ending stocks could remain at under 1 % of demand. The outcome for black beans would be similar.

Wholesale (dealer) dry bean prices have changed from last year as follows:

Pinto - \$26.90, up 30 %

Navy - \$27.35, up 69 %

Great Northern - \$23.35, down 4 %

Black - \$36.75, up 129 %

Light Red Kidney - \$33.15, up 25 %

## DRY BEAN STATISTICS<sup>1,2</sup>

Excerpts from National Agr. Statistics – Lance Fretwell, Colo. Agr. Statistics Service

State	Area Planted (000 acres)			Area Harvested (000 acres)			Yield (lbs/acre)			Production <sup>3,4</sup> (000 cwt)		
	1999	2000	2001	1999	2000	2001	1999	2000	2001	1999	2000	2001
California	135	115	92	132	112	89	1860	1840	1800	2455	2059	1602
<b>Colorado</b>	<b>155</b>	<b>120</b>	<b>115</b>	<b>145</b>	<b>110</b>	<b>105</b>	<b>1900</b>	<b>1800</b>	<b>1700</b>	<b>2755</b>	<b>1980</b>	<b>1785</b>
Idaho	105	90	75	103	88	73	2050	1950	1950	2112	1716	1424
Kansas	22	18	15	21	16	14	1850	1810	1850	387	289	259
Michigan	350	285	215	350	275	130	2100	1500	600	7350	4125	780
Minnesota	205	165	115	165	150	105	1550	1600	1500	2558	2400	1575
Montana	26	40	38	25	35	24	1730	1400	1380	441	486	332
Nebraska	210	165	160	187	156	148	2000	2070	2150	3740	3230	3185
New Mexico	1	11	31	1	11	30	1800	2090	1767	-	-	260
New York	31	25	23	30	24	22	1370	1460	870	414	358	194
North Dakota	630	610	440	570	525	400	1450	1450	1550	8265	7613	6200
Oregon	11	12	10	11	11	9	1610	1800	1810	174	211	172
Texas	50	20	30	47	16	26	1490	950	1320	701	158	348
Utah	7	5	6	6	3	6	800	330	300	53	10	17
Washington	36	32	34	36	32	34	2080	2000	1700	750	640	578
Wisconsin	8	8	6	8	8	6	1550	1800	1800	124	146	110
Wyoming	40	36	24	39	34	21	2020	2240	2140	788	762	450
USA Totals	2023	1758	1429	1877	1607	1243	1763	1643	1572	33,067	26,183	19,271

1. Excludes beans grown for garden seed

2. Summary for all dry edible beans

3. 2001 estimate is 27 % lower than in 2000 and 41 % lower than in 1999 for U. S. total

4. 2001 estimate is 10 % lower than in 2000 and 35 % lower than in 1999 for Colorado

MEXICO from page 9

the price paid for black beans is now at US \$ 0.37/lb, compared to the US \$ 0.13/lb that black beans were selling for last year. These prices are in-line with what would be expected, based on historic relationships between grower and dealer market values in the United States. Prices in the U.S. are at their highest level of the past decade, and once import duties and/or permit costs are taken into account, the beans are landing in Mexico between US \$43/cwt for navy beans to roughly \$57/cwt for black beans and \$51/cwt for pintos - with better quality merchandise arriving in Mexico at higher numbers.

In the United States over the most recent five year period, growers have realized an average of 77% of the FOB trading value for all classes of dry beans trading in that country. During the past month, their share of the market has expanded to 82%.

Without question, there is a huge disparity between the potential income of Mexican and American dry bean growers. Average gross returns per acre in the U.S. have ranged between U.S. \$231 - 358/A since the 1996 crop, with this season's average gross returns per acre at \$348 - the second highest level of the period. To be sure, income levels in some regions and states are well below the national average.

Drastically lower yields in Mexico has slashed gross returns per acre since 1996 to U.S. \$115/A last year to a high of

\$245/A from the 1996 harvest. For the 2001-02 season, they should be looking at almost \$200/A.

Without question Mexican farmers face more problems than their counterparts in Canada or the United States, and low gross returns per acre make it hard to catch up. But, demands for more government support suggest more effort is being spent continuously rediscovering the same short term solution to farm income problems than on the hard work of building a long term solution. Increased productivity will always put more money in the hands of growers and their local communities than legislative protection and the resulting increase in taxes and government involvement in deciding what will be grown.

For the United States in 2002, duty-free access to the Mexican market is set at 63,338 MT. The over-quota tariff is 70.4% for 2002. During 2002, Canada has duty-free access for 1,900 MT of dry beans. The U.S. eliminated its tariff on imported dry beans from Mexico as of January 1, 1994. The immediate phase-out of the U.S. tariff on dry bean imports has had little impact due to the fact that it is relatively small. Some Mexican bean packers might see this as an opportunity to market Mexican bean varieties under their own labels in the U.S. to Hispanic consumers. In any event, the amount of exports would be relatively small.

See MEXICO on page 12



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MEXICO from page 11

**Argentina Dry Bean Note** - An early April notice, indicated that the Argentine government has doubled the export tax for bulk grains and oil seeds, including dry edible beans, and quadrupled the export tax on manufactured farm goods to 20%. The move comes with strong political backing by the Argentine Congress, but is strongly opposed by the country's agriculture industry, which is generally unable to pass the increase in cost to their buyers.

In response to intense protest from the country's agricultural producers, dry beans are now part of the unprocessed category, which also includes fruits, vegetables and rice. These products face a 10 % tax, while meat faces a 5 % tax.

**Canada Pulse Grower Report** - The Saskatchewan Pulse Growers Board is asking pulse growers in that province to support a doubling of the provincial check off from 0.5% to 1% of the settlement value of pulses sold in the province. The levy applies to pulses sold for any purpose, including planting seed, livestock feed, and for human food consumption markets. The change is expected to raise another CDN \$2.5 million annually.

The check-off differs from taxes in two important respects. While the levies are automatically deducted from settlements on purchases, growers have the ability to apply to have the money returned. However, recent changes to Canadian income tax law make it worthwhile to leave the money with the Pulse Growers Board because producers may be eligible for investment tax credits for scientific research.

Canada's federal agriculture minister Lyle Vanclief said the decision recognizes the fact "Research is the driving force behind growth and sustainability in Canada's agriculture and agri-food industry."

**KANSAS CITY - Apr 23/02** - Prospective and actual dry edible bean purchases by the USDA for shipment before the close of the 2001-02 marketing year remain behind year earlier levels. Invitations issued this month by the Commodity Credit Corporation lifted buying interest in dry beans to 14,788 metric tons (MT), well below the 20,165 MT bought during the 2000-01 marketing campaign, but a solid improvement over purchases in prior years. The most important bean bought by the USDA is pinto beans, accounting for 54.3% of this season's purchase activity, slightly ahead of the 53% share enjoyed across the 2000-01 season. Great northern beans occupy the number two spot, with government demand reaching 2,157 MT so far this season, down over a third from the 3,328 MT bought last season. Purchases of canned beans, made from dry edible bean classes, is well below year earlier levels, plunging from 17,420 MT to around 9,684 MT for

delivery this marketing year. Purchases of canned black-eye beans and refried beans were not down as much as the category, while USDA buying interest in other classes has virtually disappeared. It is worth noting experiences with the USDA on domestic markets are completely different from the level of interest shown in purchases of pulses for shipment overseas under the PL-480 food aid program. Purchases of all classes of pulses stand at 142,660 MT for shipment between the beginning of September and end of June. This compares to 98,870 MT bought for delivery during the same period last season and total food aid purchases of 110,460 MT last season and 97,180 MT across the 1999-00 season.

**OTTAWA - Apr 24/02** - Statistics Canada provided little guidance on future seeding prospects for dry edible beans. The only province where growers were asked about their intentions was Manitoba, where growers said they intend to leave colored bean area unchanged at 95,000 acres, while boosting white bean seedings from 105,000 to 150,000 acres. These numbers are surprising and do not match reports from dry edible bean processors in the province, who believe interest in colored beans is stronger than suggested by the seeding

See OTTAWA on page 13

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OTTAWA from page 12

intentions report. Without changes in projected areas for the rest of Canada, colored beans seedings in that country should advance from 207,800 acres last year to around 234,000 acres this year; while land committed to the various classes of white beans leaps from 182,200 to 272,000 acres. Average yields would see colored bean output in Canada advance from 137,600 to 148,000 MT, while white bean output jumps from 116,330 to 196,150 MT. Most of the white beans grown in Canada are navy beans. Seeding intentions reports from the United States suggest navy bean area in that country could jump from 213,300 to 312,700 acres for a potential advance in output from 104,872 to 201,760 MT. If realized, this would see available supplies of new crop navy beans in North America leap from over 210,000 MT at the start of the current marketing campaign to around 380,000 MT in September. This number is causing problems for both current and new crop markets because it is well above the average annual supply of new crop beans. During the previous years, the average opening season supply of new crop navy beans was roughly 320,000 MT, while the 10-year average supply availability was roughly 330,000 MT.



## Romancing the Bean

By Ron Pickarski

Howard Schultz, founder of Starbucks Coffee, used the marketing strategy of "Romancing the Coffee Bean" by approaching it from a perspective of nostalgic memories. While his success has many aspects, the ultimate success is that he connected with his customers in a way that they could understand. His methods have many lessons for us. First, common products such as coffee can become an international success through effective culinary application (he brought over and glamorized Italian Espresso coffee to Americans). Second, he refined the art of buying and roasting coffee beans. Finally, he positioned coffee as an American comfort drink and made it a hip product to see and be seen drinking it.

Dry beans are a common American staple food and every consumer knows of and, at some point in their lives, has consumed them. However, beans still have a mediocre position in the US marketplace and are usually placed in the "ethnic" food section of supermarkets. An exception is the soybean, which is driven by marketing its health and nutrition benefits, especially to women. My contention is that the mediocre attitude towards beans is directly related to its predominant culinary applications. The lack of gourmet, upscale and trendy recipe applications using or featuring beans is directly related to its lack luster retail and foodservice image.

Part of marketing is spinning off consumer trends or cross marketing a product with hot consumer products and trends, which would include seasonal trends. Again,

the soybean comes to mind as a related bean product that is currently in the spotlight as a consumer trend. The American consumer continues to be educated by the soy industry as to the virtues of soy nutrition. Both doctors and dieticians are recommending it for general and specific health reasons. Let the soy industry carry dry bean dishes via utilizing soy in a significant number of bean recipes. An example is Smoked Tofu & Pinto Bean Loaf with Cilantro. The binding agent is a tofu pâté mixture. Utilizing dry beans with seasonal foods like Cranberries during Thanksgiving is a means of cross marketing beans with seasonal and trendy foods.

Having established some basic principles for developing recipe applications for beans in previous articles, the next step is to address specific culinary applications. Here are a few ideas that have potential for using beans in recipes and products development:

- » Beans as a fat-replacer in sauces:
  - › Navy Bean Beurre Blanc
  - › Black Bean Cajun Hollandaise (Fusion Cuisine) to reduce the fat
- » Bean sauces as center of the plate proteins.
- » Beans in Salad Dressings as an emulsifier.
- » Beans as classical center-of-the-plate vegetarian proteins (Bean Meat Loaf, Shepherds Pie, etc.).
- » Creating mixed medium proteins by combing beans with meats to reduce fat and increase fiber.

See ROMANCING on page 14



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ROMANCING from page 13

- » French (Auberge Hanfield), British and Australian meat pies that substitute beans.
- » Beans in pâté, both creamed for the base and whole for texture and to give the appearance of meat and/or fat pieces.
- » Creamed beans for butter spreads.
- » Bean flours used in breads, as a batter for vegetables, and as a breading for vegetarian and plant proteins.
- » Bean Power Bars using bean flours and flakes.
- » Beans used in desserts (Aduki bean desserts are common in Japanese cuisine).

Following is a recipe using beans for a white sauce.

**LEMON BEURRE BLANC** - Yield: About 3/4 cup

- 1/2 cup unsalted butter, melted
- 1/2 cup cooked white navy beans  
(Use Pinto Beans for a Brown Butter Sauce)
- 2 T lemon juice
- 1/4 t salt

1. Place all ingredients in a blender and process until smooth and creamy.

2. Warm in a saucepan before using. To store, place the sauce in a covered container and refrigerate for up to three weeks.

*Try this creamy sauce warm on seafood and vegetables, as well as on grilled chicken and pasta dishes. The navy beans, which are used instead of oil, act as an excellent emulsifier, while keeping the fat content of the sauce low.*

Dry beans have a prominent place in America's diet and romancing the bean with modern culinary recipe applications is the vehicle to that end. Starbucks is a living testament to that strategy.

***From Chippewa Valley Bean Co.  
Menomonie, WI***

**BEAN ARITHMETIC**

A pound of dry beans measures about 2 cups. Beans triple in volume when soaked and cooked. A pound of dry beans yields 6 cups cooked. Use 3 cups of water per cup of dry beans for soaking. Simmer each pound of beans 2 hours after soaking. A pound of dry beans makes about 12 servings of bean soup. A 16-oz can of cooked beans measures about 2 cups.

**BEEF & BEAN LASAGNA**

- 1 lb ground beef
- 1/4 cup chopped onions
- lasagna noodles, cooked & cut in half
- 2 cups grated Monterey Jack cheese
- 1/2 t oregano
- 2 t ground cumin
- green pepper rings
- 1 cup dark red kidney beans
- 1 can 16 oz, tomatoes, undrained, chopped
- 1/2 cup tomato sauce
- 3/4 t salt
- 2 t chili powder
- corn chips
- shredded lettuce
- tomato wedges

Brown ground beef and onions, drain. Stir in tomatoes, tomato sauce and seasonings. Simmer uncovered for 20 minutes, add beans. Arrange 4 lasagna noodle halves in bottom of 10 x 6 x 2" baking dish. Spread with half the meat mixture, sprinkle with half of cheese. Top with remaining noodles, meat mixture and cheese. Place covered in 350 degree oven for 15 minutes. Uncover and place corn chips in a border on top of casserole. Place 2 green pepper rings in center. Heat 10 minutes uncovered. Place individual servings on a bed of shredded lettuce. Garnish with tomato wedges and additional corn chips.

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[ **Editor Note: The following strategy reduces soil compaction, root rot losses and more importantly improves water-use efficiency during periods of low water availability that we may face during 2002** ]

***BEAN ROOT HEALTH***  
***Colorado State University***  
***Plant Health Note***

By Drs. Howard F. Schwartz and Mark A. Brick, Depts. of Bioagricultural Sciences  
& Pest Management and Soil & Crop Sciences, Fort Collins, CO

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 to 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.

[Sponsored in part by the Colorado Dry Bean Administrative Committee and Colorado Bean Network]



**Kelley Bean Company would like to wish all producers a safe and successful 2002 growing season.**

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