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THE NORTHARVEST RESEARCH ISSUE

VOLUME 18, ISSUE 2 WWW.NORTHARVESTBEAN.ORG SPECIAL EDITION

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VOLUME 18 ISSUE 2

Mapping Our Future Through Research

When traveling, we like to punch in the address into the GPS unit. The voice on the GPS navigation system gives us turn-by-turn directions, until we reach our final destination. I like to think about research in the same way.

The Northarvest Bean Growers Association has always emphasized the importance of research. That's evident with the investment we've made in our research priorities. This research serves as a roadmap to our future. The information gathered in research plots and laboratories, provides a strategic path for our industry. There are always a few bumps in the road, but ultimately, this information helps us reach our agronomic goals.

In this edition of *BeanGrower*, you'll find updates on dry bean diseases, the management of root rot in dry beans, herbicides and residual weed control and pinto bean responses to tillage systems, row spacings and the placement of starter fertilizer. These are production issues that will enhance the success of dry edible beans on your farm.

In Northarvest, we have a tremendous team of university researchers. The new world-class greenhouse facility at North Dakota State University will only add to their future abilities. You heard from many of those experts during the recent Bean Day program.

There is no substitute for quality research. U.S. Commerce Secretary John Bryson recently presented a report to Congress on the importance of basic research, saying the competitive position of the United States in the world has eroded because of its failure to invest in research, infrastructure and education. Despite the current budget challenges, Bryson encouraged Congress to make research a higher priority issue. The Northarvest Bean Growers Association supports research. It is a priority for our future success.

Finally, spring will be here soon. It was a dry and open fall season. It'll be interesting to see what Mother Nature has in store for us in the months ahead. Regardless, keep your fingers crossed for good weather and a great crop.

Thanks,

Brian Love, Research Committee Chair
Northarvest Bean Growers Association

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ADM Edible Bean Specialties, Inc.	P.O. Box 249, 1804 Front Street Casselton, ND 58012	**Ph:** 701-347-5321 **FAX:** 701-347-5552 **Email:** thomas.stadler@adm.com	Pinto, Navy
ADM Edible Bean Specialties, Inc.	9451 Hwy. 18, P.O. Box 676 Cavalier, ND 58220	**Ph:** 701-265-8385 **FAX:** 701-265-4804 **Email:** richard.dinger@adm.com	Pinto, Navy
ADM Edible Bean Specialties, Inc.	PO Box 98, 108 MN Ave. W. Galesburg, ND 58035	**Ph:** 701-488-2214 **FAX:** 701-488-2538 **Email:** larry.erickson@adm.com	Pinto, Navy
ADM Edible Bean Specialties, Inc.	PO Box 25, 77 East 3rd St. Grafton, ND 58237	**Ph:** 701-352-1030 **FAX:** 701-352-3430 **Email:** randy.olson@adm.com	Pinto
ADM Edible Bean Specialties, Inc.	P.O. Box 437, Bean Road Northwood , ND 58267	**Ph:** 701-587-5900 **FAX:** 701-587-5927 **Email:** jeff.ellingson@adm.com	Pinto, Navy
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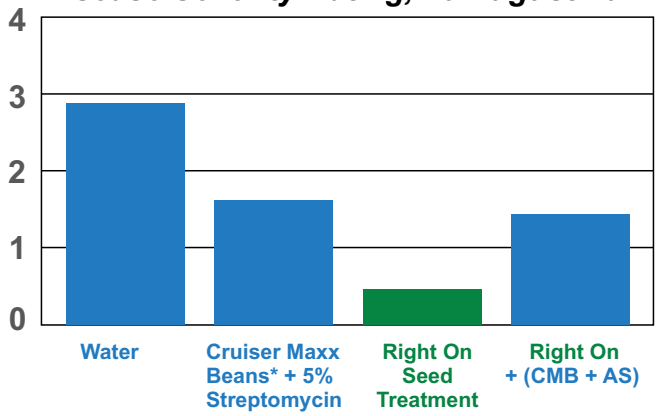
2011 White Mold Trial, Pinto Beans,
Dr. Michael Harding, Innovotech, Brooks AB Canada:

Disease Severity Rating, 25 August 2011



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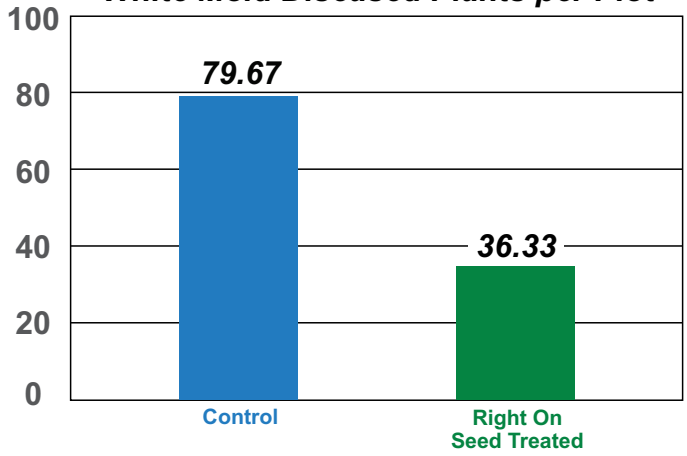
2011 Soybean White Mold Trial,
Iowa State University, Dr. XB Yang:

Average Means, Number of White Mold Diseased Plants per Plot



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B T R Farmers Co-op	6001 60th Ave NE Leeds, ND 58346	**Ph:** 701-466-2281 **FAX:** 701-466-2022 **Email:** btr@gondtc.com **Web:** btrfarmerscoop.com	Pinto
Barlow Grain	260 Elevator Road Carrington, ND 58421	**Ph:** 701-984-2617 **FAX:** 701-984-2616 **Email:** barlowgrain@daktel.com, dholz@warthbarlowgrain.com **Web:** www.barlowgrain.com	Pinto
Bird Island Bean Co. LLC	P.O. Box 249 81591 East Hwy 212 & 400th St Bird Island, MN 55310	**Ph:** 320-365-3070 **FAX:** 320-365-3811 **Email:** larryserbus@hotmail.com **Web:** www.bibcllc.com	Navy
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C and F Foods/Valley Bean Inc.	404 1st Ave E., P.O. Box 250 Oslo, MN 56744	**Ph:** 218-695-2201 **FAX:** 218-695-3006 **Email:** valley@invisimax.com **Web:** www.cnffoods.com	Black, Pinto, Pink, Small Red
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Cavalier Bean Co.	P.O. Box 297, 308 Industrial Park Cavalier, ND 58220	**Ph:** 701-265-8495 **FAX:** 701-265-8576 **Email:** cbc@polarcomm.com	Pinto
Central Valley Bean Cooperative	401 Broadway, P.O. Box 162 Buxton, ND 58218	**Ph:** 701-847-2622 **FAX:** 701-847-2623 **Email:** gary@centralvalleybean.com **Web:** www.centralvalleybean.com	Pinto
Chippewa Valley Bean Co., Inc.	N2960 730th St. Menomonie, WI 54751	**Ph:** 715-664-8342 **FAX:** 715-664-8344 **Email:** cbrown@cvbean.com **Web:** www.cvbean.com	Dark Red Kidney, Light Red Kidney
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Engstrom Bean & Seed	6131 57th Ave NE Leeds, ND 58346	**Ph:** 701-466-2398 **FAX:** 701-466-2076 **Email:** ebas@gondtc.com	Black, Pinto
Falkirk Farmers Elevator Co.	101 Main St. Washburn, ND 58577	**Ph:** 701-462-8572 **FAX:** 701-462-8574 **Email:** ronh@falkirkelevator.com **Web:** www.falkirkelevator.com	Pinto
Farmers Elevator Co. of Honeyford	2472 30th St. NE Gilby, ND 58235-9711	**Ph:** 701-869-2466 **FAX:** 701-869-2456 **Email:** fechoney@polarcomm.com **Web:** www.honeyford.com	Navy
Fessenden Coop Assn.	P.O. Box 126, 900 Railway St. Fessenden, ND 58438	**Ph:** 701-547-3354 **FAX:** 701-547-3574 **Email:** bstevens@fesscoop.com **Web:** www.fesscoop.com	Black, Pinto
Forest River Bean Co., Inc.	P.O. Box 68, 600 Carpenter Ave Forest River, ND 58233	**Ph:** 701-248-3261 **FAX:** 701-248-3766 **Email:** brians@invisimax.com	Black, Pinto, Dark Red Kidney, Light Red Kidney, Pink, Small Red
Grafton Farmers Co-op Grain Company	129 E 6th Street Grafton, ND 58237	**Ph:** 701-352-0461 **FAX:** 701-352-0280	Pinto
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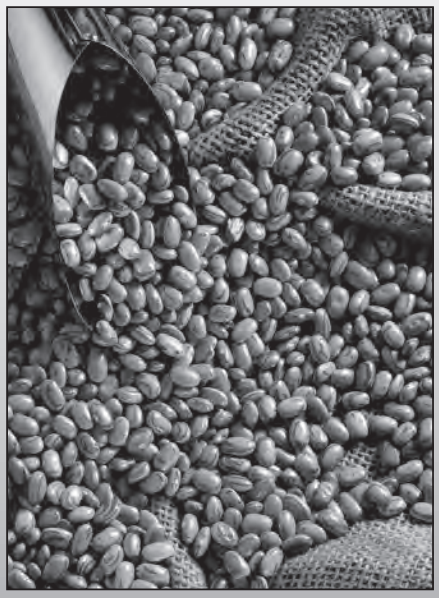

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Nate Berdal: 701-426-5570

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Green Valley Bean	58473 St., Hwy 34 Park Rapids, MN 56470	**Ph:** 218-573-3400 **FAX:** 218-573-3434 **Email:** mhgvbllc@arvig.net	Dark Red Kidney, Light Red Kidney, Pink, White Kidney
Haberer Foods	41591 180th Street Morris, MN 56267	**Ph:** 320-795-2468 **FAX:** 320-795-2986 **Email:** randy@runestone.net	Black, Dark Red Kidney, Light Red Kidney
JM Grain Inc.	12 N Railroad Street PO Box 248 Garrison, ND 58540-0248	**Ph:** 701-463-7261 **FAX:** 612-435-4868	Pinto
Johnstown Bean Co.	PO Box 5 Gilby, ND 58235	**Ph:** 701-869-2680 **FAX:** 701-869-2692 **Email:** jbc@polarcomm.com	Black, Pinto
Joliette Ag Systems Inc	15866 Highway 5 Pembina, ND 58271	**Ph:** 701-454-6226 **FAX:** 701-454-6244 **Email:** jwarner@polarcomm.com	Black, Pinto
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Kelley Bean Company	131 7th Ave. NE, P.O. Box 253 Perham, MN 56573	**Ph:** 218-346-2360 **FAX:** 218-346-2369 **Email:** dmitchell@kelleybean.com **Web:** www.kelleybean.com	Dark Red Kidney, Light Red Kidney, Pink

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Miller Elevator Company	Box 844, 149 4th St. NE Valley City, ND 58072	**Ph:** 701-845-2013	Pinto
Northwood Bean Co. Inc.	301 Potato Road Northwood, ND 58267	**Ph:** 701-587-5206 **FAX:** 701-587-5650 **Email:** nbc@polarcomm.com	Black, Pinto
O'Brien Seed, Inc.	P.O. Box 505, 945 3rd St. S.E. Mayville, ND 58257	**Ph:** 701-788-9118 **FAX:** 701-788-9119 **Email:** larry@obrienseed.com	Black, Pinto, Pink, Small Red
Red River Bean of Oslo	P.O. Box 227, 105 Oak Street Oslo, MN 56744	**Ph:** 218-695-3040 **FAX:** 218-695-1305 **Email:** redriverbean@invisimax.com	Black, Pinto, Small Red
Saskcan Pulse Trading	St. Joseph, Manitoba, ROG 2C0	**Ph:** 204-737-2625 **FAX:** 204-737-2248 **Email:** trade@saskcan.com **Web:** www.saskan.com, www.uspulses.com	Black, Pinto, Dark Red Kidney, Light Red Kidney, Navy

2012 Northarvest Resource Directory

Seed Bean Suppliers & Commercial Buyers

COMPANY NAME	ADDRESS	PH / FAX / EMAIL / WEBSITE	BEANS
SK Food International, Inc.	4666 Amber Valley Parkway Fargo, ND 58104	**Ph:** 701-356-4106 **FAX:** 701-356-4102 **Email:** skfood@skfood.com **Web:** www.skfood.com	Black, Pinto, Cranberry, Dark Red Kidney, Great Northern, Light Red Kidney, Navy, Small Red
SRS Commodities	411 2nd Avenue NE, PO Box 386 Mayville, ND 58257	**Ph:** 701-786-3402 **FAX:** 701-786-3374 **Email:** rick@srscommodities.com	Black, Pinto
St. Hilaire Seed Co.	PO Box 85, 415 Hwy 32 S. St. Hilaire, MN 56754	**Ph:** 218-964-5407 **FAX:** 218-964-5415 **Email:** craig@drybean.com or julie@drybean.com **Web:** www.drybean.com	Black, Pinto, Cranberry, Dark Red Kidney, Great Northern
Star of the North Bean Inc	2489 380th Street Gary, MN 56545	**Ph:** 218-356-8300	Dark Red Kidney, Light Red Kidney
Star of the West Milling Co.	4082 22nd Ave, NE Larimore, ND 58251	**Ph:** 701-397-5261 **FAX:** 701-397-5783 **Email:** sotwbean@polarcomm.com **Web:** www.staroftheWest.com	Black, Pinto, Navy
Stony Ridge Foods Inc.	715 Atlantic Avenue Benson, MN 56215	**Ph:** 320-842-3401 **FAX:** 320-842-3403 **Email:** joe-jessica@stonyridgefoods.com or dhughes@stonyridgefoods.com	Black, Dark Red Kidney, Light Red Kidney, Navy

2012 Northarvest Resource Directory

Seed Bean Suppliers & Commercial Buyers

COMPANY NAME	ADDRESS	PH / FAX / EMAIL / WEBSITE	BEANS
The Bean Mill	42631 450th Ave. Perham, MN 56573	**Ph:** 218-346-2151	Dark Red Kidney, Light Red Kidney, Pink
Thompsons USA Limited	PO Box 374, 41703 Highway 2 SW East Grand Forks, MN 56721	**Ph:** 218-773-8834 **FAX:** 218-773-9809 **Email:** jvrolyk@thompsonslimited.com	Pinto, Dark Red Kidney, Navy
TMT Bean & Seed Farm	3718 67th Ave SE Cleveland, ND 58424	**Ph:** 701-763-6544 **FAX:** 701-763-6545 **Email:** terrytmtfarms@daktel.com	Pinto
Tronson Grain Co.	115 W. 1st St. Doyon, ND 58327-2807	**Ph:** 701-398-3512 **FAX:** 701-398-3609	Pinto
Walhalla Bean Co.	P.O. Box 67, 1920 Hwy. 32 N. Walhalla, ND 58282	**Ph:** 701-549-3721 **FAX:** 701-549-3725 **Email:** wbc@utma.com **Web:** www.walhallabean.com	Black, Pinto
Walhalla Bean Company - Merrifield	7400 55th Street South Grand Forks, ND 58201	**Ph:** 701-775-3317 **FAX:** 701-775-3289 **Email:** wbcm@gfwireless.com	Black, Pinto, Small Red
Walton Ag Services	106 First Avenue/Englevale or Mail P.O. Box 9 Lisbon, ND 58054	**Ph:** 701-683-5743 **FAX:** 701-683-5957 **Email:** waltonag@drtel.net	Black, Pinto

2012 Northarvest Resource Directory

Bean Organizations

Company Name	Address	Phone/Fax
United States Dry Bean Council (Headquarters)	PO Box 1026 Pierre, SD 57501	Ph: 605-494-0280
United States Dry Bean Council (Gov't Affairs Office)	1850 M Street NW, Suite 400 Washington, DC 20036	Ph: 202-466-4500
California Bean Shippers Association (CBSA)	1521 I Street Sacramento, CA 95814	Ph: 916-441-2514
California Dry Bean Advisory Board (CDBAB)	531-D, N-Alta Dinuba, CA 93618	Ph: 559-591-4866
Colorado Dry Bean Administrative Committee (CDBAC)	31221 Northwoods Buena Vista, CO 81211	Ph: 303-903-2004
Idaho Bean Commission (IBC)	821 W State Street, Boise, ID 83720-0015	Ph: 208-334-3520
Michigan Bean Commission (MBC)	1031 S. U.S. 27, St. Johns, MI 48879	Ph: 989-224-1361
Michigan Bean Shippers Association (MBSA)	1501 North Shore Drive, Suite A East Lansing, MI 48823	Ph: 517-336-0226
Minnesota Dry Bean Research & Promotion Council	50072 E. Lake Seven Road Frazee, MN 56544-8963	Ph: 218-334-6351
Nebraska Dry Bean Commission (NeDBC)	4502 Avenue, Scottsbluff, NE 69361	Ph: 308-632-1258
New York State Bean Shippers Assn. (NYSBSA)	Seneca Castle, NY 14547	Ph: 585-526-5427
North Central Bean Dealers Assn. (NCBDA)	PO Box 391, Thompson, ND 58278-0391	Ph: 701-261-4157
North Dakota Dry Edible Bean Seed Growers Assn.	PO Box 5607, Fargo, ND 58105	Ph: 701-231-8067
Northarvest Bean Growers Assn. (NHBGA)	50072 E. Lake Seven Road Frazee, MN 56544-8963	Ph: 218-334-6351
North Dakota Dry Bean Council	50072 E. Lake Seven Road Frazee, MN 56533-8963	Ph: 218-334-6351
Rocky Mountain Bean Dealers Assn. (RMBDA)	1178 Huron St., Suite 200 Denver, CO 80234	Ph: 303-646-8883
Washington Bean Dealers Assn. (WaBDA)	PO Box 215, Quincy, WA 98848	Ph: 509-787-1544
Western Bean Dealers Assn. (WBDA)	PO 641, Buhl, ID 83316	Ph: 208-731-1702

North Dakota Certified Bean Seed Growers

For a list of certified bean seed growers in North Dakota, visit **www.nd.gov/seed**, then click on "Field Seed Directory" on the top bar, then click on 2011 Field Bean.

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NORTHARVEST BEAN GROWERS ASSOCIATION

2012 Dry Bean Research Update

MINNESOTA
NORTHARVEST BEANS
NORTH DAKOTA

DRY BEAN IMPROVEMENT FOR THE NORTHERN PLAINS

Investigators: Juan M. Osorno, Project Leader; Research Specialists: Albert J. Vander Wal and Sarah Gegner. Graduate Students: Angela Linares and Raphael Colbert.

Project Goal: The objective of the dry bean breeding program at NDSU is to develop high yielding, high quality dry bean genotypes adapted to the northern Great Plains. This involves many characteristics of dry beans and different disciplines of research (e.g. genetics, pathology, physiology, soils, nutrition, etc.). The main priority is to improve pinto, navy, and black bean market classes, but also Great Northern, kidney, red and pink beans. Crosses involve adapted cultivars grown in the northern Plains, breeding lines developed at NDSU, and germplasm possessing desirable traits from other breeding programs. Each year, the breeding program evaluates material from around the world as possible sources of resistance to white mold, rust, root rot, anthracnose, virus, and bacterial blights, among others.

As shown in the 2011 growers survey, almost 50% of the MINN-DAK region planted with pinto beans used NDSU varieties (Lariat, Stampede, ND-307, and Maverick). Also, 78% of the black bean acreage was planted with 'Eclipse', which was released by NDSU in 2004. In addition, 15% of the navy bean area was planted either with 'Norstar' or 'Avalanche', which were released in 1991 and 2008, respectively.

With a state average seed yield of 15.5 cwt per acre and an average price of $40 per cwt across all market classes for 2010, dry bean varieties from NDSU helped to contribute $108 million to the state's economy in 2010 alone.

2011 SEASON

Similar as in the previous year, the growing season started with a cool and wet spring. The early rains during May and June flooded several trials. Most of them had a successful recovery with the exception of the trials planted at Prosper, which were lost due to flooding. High moisture also produced high pressure of bacterial diseases, especially bacterial brown spot. Seed corn maggots destroyed several trials at Hatton during emergence and establishment. Trials at Carrington were significantly affected

Continued on Page 24

Table 1. Summary of 2011 trials and locations for the NDSU dry bean breeding program.

TRIAL	# OF ENTRIES / TRT
Carrington, ND: 8.5 Acres (6.4 Dryland, 2.1 Irrigated)	
BAYT	22
GNAYT	18
NAYT	16
PAYT	22
RPAYT	16
PPYT	64
RVT	11
Drought - Dryland	33
Drought - Irrigated	33
F4 Plant Rows (pinto)	548
F4 Plant Rows (great northern)	116
F4 Plant Rows (reds & pinks)	162
F4 Plant Rows (navy)	120
F4 Plant Rows (black)	347
F6 Plant Rows (pinto)	315
F6 Plant Rows (great northern)	37
F6 Plant Rows (reds & pinks)	80
BeanCAP-Drought	100
BeanCAP-DURANGO - Irrigated	200
BeanCAP-MESO - Irrigated	108
Forest River, ND: 2.4 Acres	
PVT	38
NVT	26
MVT	16
RVT	16
Hatton, ND: 2.8 Acres	
PVT	45
NVT	27
MVT	30
RVT	16
Hatton, ND (Nursery): 15.3 Acres	
PAYT	22
RPAYT	16
GNAYT	18
NAYT	16
BAYT	22
PPYT	64
RPPYT	15
NPYT	40
GNPYT	17
BPYT	48
SLOW DARKENING	18
MRPN	24
F2 Spaced Plants (pinto)	11

TRIAL	# OF ENTRIES / TRT
Hatton, ND (Nursery): 15.3 Acres (Continued)	
F2 Spaced Plants (navy)	82
F2 Spaced Plants (black)	61
F4 Plant Rows (pinto)	548
F4 Plant Rows (great northern)	116
F4 Plant Rows (reds & pinks)	162
F4 Plant Rows (navy)	120
F4 Plant Rows (black)	347
F6 Plant Rows (pinto)	315
F6 Plant Rows (great northern)	37
F6 Plant Rows (reds & pinks)	80
Observation Rows	171
Johnstown, ND: 4.5 Acres	
PAYT	22
RPAYT	16
GNAYT	18
NAYT	16
BAYT	22
PPYT	64
RPPYT	15
NPYT	40
GNPYT	17
BPYT	48
Prosper, ND: 4.6 Acres	
PVT	34
NVT	24
MVT	22
PAYT	22
RPAYT	16
GNAYT	18
NAYT	16
BAYT	22
SLOW DARKENING	18
Park Rapids, MN: 3.7 Acres	
MVT	48
KAYT	13
BeanCAP-ANDEAN	49
F4 Plant Rows (kidney)	248
Staples, MN: 2.8 Acres	
MVT	23
KAYT	13
SEED TREATMENT	15
F4 Plant Rows (kidney)	248
TOTAL ENTRIES: 44.6 Acres	**6167**

* PPYT= Pinto Preliminary Yield Trial; NPYT= Navy Preliminary Yield Trial; BPYT= Black Preliminary Yield Trial; GNPYT= Great Northern Preliminary Yield Trial; RPPYT= Red/Pink Preliminary Yield Trial; PAYT= Pinto Advanced Yield Trial; NAYT= Navy Advanced Yield Trial; BAYT= Black Advanced Yield Trial; GNAYT= Great Northern Advanced Yield Trial; RPAYT= Red/Pink Advanced Yield Trial; KAYT= Kidney Advanced Yield Trial; PVT= Pinto Variety Trial; NVT= Navy Variety Trial; MVT= Miscellaneous Variety Trial; RVT= Red Variety Trial; MRPN= Midwest Regional Performance Nursery.

by hail in two instances. Nonetheless, plants survived and seed yields were not affected significantly. Harvest season was very dry which allowed a good steady harvest activity. Seed coat darkening was not as critical as in previous years. Overall seed yield in the trials was on average. However, variability of results within and across locations was higher (as deducted from the high coefficients of variation from each trial). For the first time, we had trials at Staples, MN in replacement of Perham. Yield trials at this location were very good, but root rot pressure was not enough to allow a consistent evaluation. We are still on the search for a suitable site for root rot testing in 2012.

2011 RESEARCH ACTIVITIES

Locations and Trials: During 2010, a total of 83 experiments, including early-generation breeding material, were planted at five locations in North Dakota, and two locations in Minnesota. Total area in all these trials was around 45 acres accounting for a total of 6167 individual plots. In addition, several variety trials were planted at most of the NDSU Research and Extension Centers (REC) across the state. Most NDSU varieties released recently were also included in the Cooperative Dry Bean Nursery (CDBN), planted at 11 locations across the U.S. and Canada.

Disease Testing: During 2010, screening for resistance to bean rust (including both old and new races) was made at NDSU greenhouse facilities and it is one of the most important components of the program. Additional screening with other diseases is underway and expected to be completed during this year. Breeding lines with some degree of resistance/tolerance to white mold that were discovered in 2009 were also evaluated in the greenhouse. Two lines are showing promising results and research will be conducted in order to understand the genetic control observed in these lines. Additional funding has been obtained from the National Sclerotinia Initiative. Purification of the rust resistance (Ur-11 gene) found in Stampede pinto bean allowed us to increase the resistance frequency from 50% to 90%. Breeder seed was increased at Washing-

ton state during the summer but unfortunately, outcrossing was detected and additional purification for genetic uniformity will be needed before it can be released.

Canning Quality: All advanced breeding lines from the breeding program were evaluated for canning quality using a new shared facility in conjunction with the Northern Crops Institute (NCI). This facility will allow the screening of hundreds of lines for the development of varieties with superior canning quality.

Winter Nurseries: In the winter of 2011, a total of 218F1 lines and a seed increase of the improved version of Stampede were grown in New Zealand. Simultaneously, a total of 2198 early-generation lines were grown in Puerto Rico. Although more expensive than the Puerto Rico site, New Zealand has many advantages over the Puerto Rico nursery in that disease-free seed is produced, and the seed returned from this site has been of excellent quality and quantity. The amount of genetic recombination at the F1 generation is maximized at New Zealand given its high seed return. Contrastingly, the nursery at Puerto Rico is cheaper but plants are under more stress. Nonetheless, this place allows advancing generations and production of enough seed for yield trials in North Dakota and Minnesota.

Crossing block: A total of 240 crosses (parental combinations) were made across different market classes. Crosses were made among several advanced breeding lines, commercial varieties and germplasm with traits of interest. A special effort continues to have additional crosses to improve for slow darkening in pintos and white mold.

Training & Education: Students are an important component of the project because it allows a relation of mutual benefit since they help in the routine activities and at the same time, they learn about the management and genetic principles involved in a breeding program. This is of key significance in order to guarantee the future generation of plant breeders. Most of the funding for student training is made through federal grants and other sources. However, the Northarvest Bean Growers Association this year supported the last year of salary for our Ph.D. student Angela Linares so she could complete her program and current research on drought tolerance. Raphael Colbert (originally from Haiti) started his Ph.D. program

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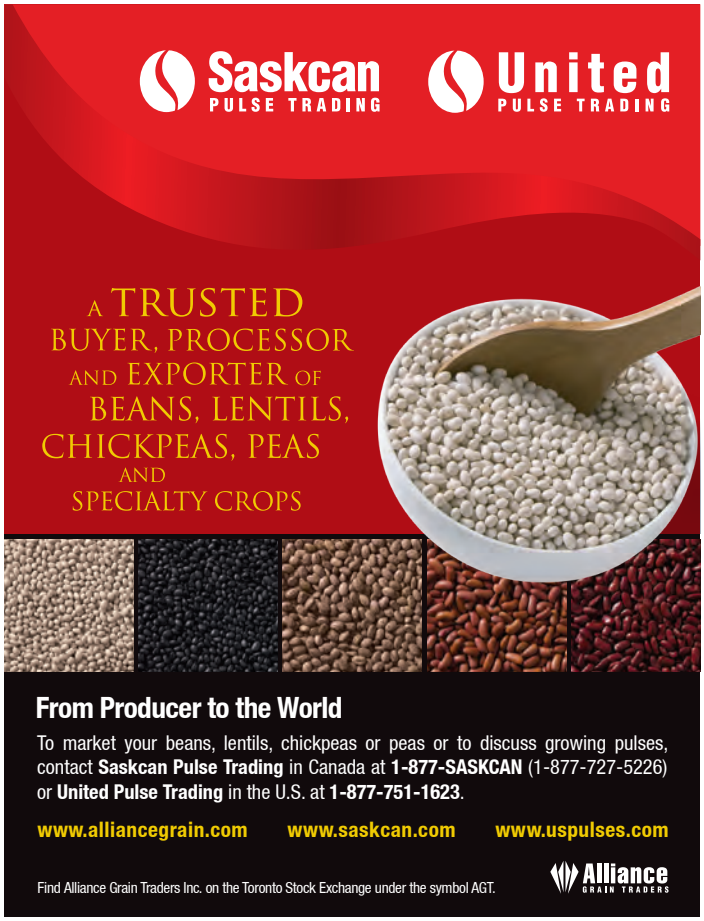

during the spring. His project is funded by the National Science Foundation (NSF) and will focus on aspects related to genotype by environment interaction. In addition, undergraduate and high school students have been working in the project as part of the BeanCAP project, which is a national research, extension, and education program funded by USDA-NIFA.

2011 MILESTONES

- According to the 2011 growers survey, almost 50% of the MINN-DAK region planted with pinto beans used NDSU varieties (Lariat, Stampede, ND-307, and Maverick). Also, 78% of the black bean acreage was planted with 'Eclipse', which was released by NDSU in 2004. In addition, 15% of the navy bean area was planted either with 'Norstar' or 'Avalanche', which were released in 1991 and 2008, respectively. With a state average seed yield of 15.5 cwt per acre and an average price of $40 per cwt across all market classes for 2010, dry bean varieties from NDSU helped to contribute $108 million to the state's economy that year alone.
- Two breeding lines have been identified to have some level of resistance or tolerance to white mold. This is an important discovery as sources of resistance are scarce and usually have poor agronomic performance which makes it more difficult to make progress. The lines recently discovered offer good levels of resistance combined with an improved agronomic performance.
- All advanced breeding lines from the program were evaluated for canning quality using a new shared facility in conjunction with the Northern Crops Institute (NCI). This facility will allow the screening of hundreds of lines for the development of varieties with superior canning quality.

ACKNOWLEDGEMENTS

The support from the Northarvest Bean Growers Association, NDSU, and the North Dakota Dry Edible Bean Seed Growers Association (NDDEBSGA) has been fundamental for the success of the dry bean breeding program at NDSU and the growers of the Northarvest region. We also want to thank the following growers for allowing us to do trials on their farms: Paul Johannig (Park Rapids-MN), Jim Karley (Johnstown-ND), Brian Schanilec (Forest River-ND), Tim and Glen Skjoiton (Hatton-ND), and Mark Sletten (Hatton-ND).

DRY BEAN PERFORMANCE WITH TILLAGE SYSTEMS, PLACEMENT OF STARTER FERTILIZER AND FOLIAR FUNGICIDE

Investigators: Greg Endres and Paul Hendrickson.

Project Goal: A field study was conducted in 2007 and 2009-11 at the NDSU Carrington Research Extension Center to examine dry bean response to tillage systems (with emphasis on strip till), starter fertilizer and foliar fungicide. The previous crop was wheat and fall standing stubble was 6- to 12-inches tall. The dryland study was established on a loam soil with 3.6 to 4% organic matter, 6.3 to 7.6 pH, and a medium level of phosphorus (9 to 10 ppm) in 2009-10 and low level of phosphorus in 2011 (7 ppm). Strip-till treatments were established in the fall (October or November) using a Yetter strip-till unit producing 5- to 6-inch deep and 8- to 10-inch wide tilled strips. Conventional-till treatments were placed at a 3- to 4-inch depth in the fall and spring to establish residue levels less than 30% after planting. 'Lariat' pinto bean was planted with a John Deere 71 4-row flex planter in 30-inch rows (and 22-inch rows in 2011) during late May. Liquid 10-34-0 was applied at 4 gal/acre in 2010, and 6 gal/acre in 2009 and 2011 during planting as in-furrow, 2- by 0-inch (from seed) band and mid-row band. Headline fungicide at 6 fl oz/acre + nonionic surfactant was applied at early reproductive (R1-4) plant stages with a hand-boom sprayer. Plants were hand-pulled and windrowed, and seeds harvested with a plot combine.

Table 1 indicates seed yield response to tillage systems. Averaged across the four years, seed yield was similar with conventional and strip-till, and tended to be less with no-till (direct seeded). Averaged across three years, in-furrow fertilizer reduced plant stand 14% compared to the untreated check (Table 2). However, in-furrow and 2- by 0-inch banded fertilizer provided higher average yield compared to the mid-row banded fertilizer and untreated check. Foliar fungicide did not increase yield compared to the untreated check (Table 3).

The study will be continued in 2012.

Table 1. Dry bean yield with tillage systems, Carrington, 2007 and 2009-11.

Tillage system	2007	2009	2010	2011	4-year average
			lb/acre		
conventional	1820	2533	2949	2066	2342
no-till	1886	2074	2824	1993	2194
strip till	2129	2286	3069	1844	2332
LSD (0.05)	**209**	**306**	**NS**	**217**	**X**

Table 2. Strip till dry bean response to placement of starter fertilizer, Carrington, 2009-11.

	3-year average			
Fertilizer placement[1]	Plant emerge	Stand	Days to flower	Seed yield
	Jday	plants/acre	Jday	lb/acre
untreated check	157	45,290	200	2230
in-furrow	158	39,020	201	2440
2x0 inch band	157	50,045	200	2400
mid-row band	157	48,065	200	2138

[1]10-34-0 applied at 4-6 gal/acre.

Table 3. Dry bean response to foliar fungicide, Carrington, 2009-11.

	2009		2010		2011	3-yr average
Treatment[1]	PM	Yield	PM	Yield	Yield	Yield
	Jday	lb/acre	Jday	lb/acre	lb/acre	lb/acre
fungicide	250	2168	243	2943	1864	2325
untreated check	249	2216	243	2972	1956	2381
C.V. (%)	**0.2**	**11.7**	**0.9**	**8.7**	**17.3**	**x**
LSD (0.05)	**NS**	**NS**	**NS**	**NS**	**NS**	**x**

[1]Headline = 6 fl oz/acre + NIS to R1-4 stage plants.

IDENTIFICATION OF RESISTANCE IN DRY BEAN TO SOYBEAN CYST NEMATODE

Investigators: Dr. Berlin D. Nelson, Dept. Plant Pathology, NDSU, P.O. Box 5012, Fargo, ND 58105, and Dr. Rubella Goswami, formerly at NDSU, but now with DuPont Crop Protection, Newark, DE.

Project Goal: Identify resistance to soybean cyst nematode in dry bean germplasm.

Project Duration: Three year project initiated in July 2009.

Soybean cyst nematode (SCN; *Heteroderaglycines*) is a pathogen of dry bean roots and will eventually become established in bean production fields in this region. All the research conducted thus far indicates that SCN will cause yield loss in dry bean under certain conditions. SCN is slowly spreading into bean production areas of North Dakota and northern Minnesota. This research is focused on finding sources of resistance to SCN in common bean germplasm. This information could then be used in breeding efforts to incorporate resistance into commercial dry bean types. Conducting this research now, before SCN is a major problem, will ensure that resistance is available if and when management of SCN is required for bean production.

During this past year the emphasis of the research has been on screening the core collection of *Phaseolus vulgaris* for resistance to SCN. This collection was obtained from the USDA Plant Introduction Station in Pullman,WA. The core collection consists of a wide variety of genotypes from around the world that provide a broad sample of the genetic variation that exists in *P. vulgaris*. The screening using HG type 0 SCN is conducted in the greenhouse with plants growing in sand heated to 27 C to favor activity of the nematode. SCN females are counted on the roots after 30 days plant growth and the results are compared to those from the susceptible soybean Lee 74. A female index (FI) which measures reproduction of SCN on roots is calculated for each dry bean entry. FI's of 10 or less are considered highly resistant while FI's from 11-30 are moderately resistant. Our focus is on identifying highly resistant germplasm, but we record all germplasm with FI's of 30 and less.

We completed screening 416 of the 422 PI accessions in the core collection. Six PI's did not grow and could not be tested. Of the 416 PI's, 86 had FI's of less than10, 136 had FI's between 10 to 20 and 80 had FI's between 20 to 30. Therefore, there appears to be high levels of resistance in the core collection. Most of these resistant PI's are from Mexico and Central America. We are currently testing many of these again to verify resistance and then will be evaluating their resistance against a different virulence type of SCN to see if the resistance is effective against different populations of SCN. Dr. Juan Osorno, the dry bean breeder, and Dr. Nelson are cooperating in a study to determine the genetics of resistance in several of these PI's.

MANAGEMENT OF ROOT ROT IN DRY BEANS

Investigators: Rubella Goswami, Juan Osorno and Michael Wunsch

Project Goal: *Fusarium sp.* has been found to be a major cause of dry bean root rot in North Dakota. Recent surveys conducted by our group across the state have shown that *F. solani* is a major root rot pathogen in dry beans. There are some sources of partial resistance but there are no commercial cultivars with complete resistance to root rot in the region. Therefore, integration of chemical control in a disease management program is essential for reduction of this disease under current conditions. Studies under laboratory, greenhouse and field conditions are in progress to evaluate the efficacy of seed treatments in controlling root rots in dry beans. Fungicide seed treatments were used, both individually and in combination. Initial results from these studies indicate that under laboratory and greenhouse conditions few treatments are capable of reducing growth of the pathogen and root rot, respectively. An increase in root mass was also observed in a few cases under greenhouse conditions. The first year of inoculated trials conducted in Carrington showed a reduction in root rot in early ratings; however, the trial was destroyed due to unforeseen circumstances, thereby limited data was collected. No significant difference was observed in root rot or plant stand under natural disease pressure in growers' fields. We hope to be able to repeat the trails next year to obtain more complete results.

DRY BEAN DESICCANTS

Investigators: Zollinger, Richard K., Jerry L. Ries, and Angela J. Kazmierczak.

Project Goal: An experiment was conducted near Hatton, ND, to evaluate dry bean dessication. 'Avalanche' navy dry beans were planted on June 10, 2011. Dessication treatments were applied on September 8 at 10:45 am with 83 F air, 85 F soil surface, 51% relative humidity, 0% cloud cover, 1 to 3 mph SE wind, dry soil, mature crop and no dew present. DEB was in natural dessication, 40 to 70% leaf drop/dry, 0 to 10 % vine dessication, 5 to 20% green pods, 60 to 75% yellow pods, and 0 to 5% brown pods. Treatments were applied to the center 6.7 by 30 foot plots with a backpack-type plot sprayer delivering 17 gpa at 40 psi through 11002 Turbo Tee-Jet nozzles for dessication treatments. The experiment had a randomized complete block design with three replicates per treatment.

Weather conditions were favorable for desiccation, breezy to windy, mostly sunny, and little rainfall. *(Department of Plant Sciences, North Dakota State University, Fargo).*

Table 1: Dry Bean Desiccants

		3 DAT					7 DAT					10 DAT					14 DAT				
		Leaf[1]	Vine[2]	Green[3]	Yellow[4]	Brown[5]	Leaf	Vine	Green	Yellow	Brown	Leaf	Vine	Green	Yellow	Brown	Leaf	Vine	Green	Yellow	Brown
Treatment	**Rate (product/A)**	**% Control**					**% Control**					**% Control**					**% Control**				
Valor SX+ Soy-Stik+AMS	1.5oz+1qt+ 2.5lb	92	22	4	22	68	97	38	0	27	73	99	93	0	0	99	99	99	0	0	99
Valor SX+RUPM+ Soy-Stik+AMS	1.5oz+22fl oz+ 1qt+2.5lb	93	15	4	25	71	96	28	2	33	61	98	92	0	0	99	98	98	0	0	99
RUPM	22fl oz	75	5	15	80	5	80	17	10	47	43	90	57	7	15	78	95	77	5	13	82
Gramoxone Inteon+R-11	2pt+ 0.25% v/v	91	18	8	38	53	97	38	5	38	67	99	87	0	5	95	99	97	0	0	99
Sharpen+ Soy-Stik+AMS	1fl oz+ 2% v/v+2.5lb	90	35	1	10	89	99	72	0	7	93	99	99	0	0	99	99	99	0	0	99
Sharpen+ Soy-Stik+AMS	2fl oz+ 2% v/v+2.5lb	92	47	0	8	92	99	77	0	0	99	99	99	0	0	99	99	99	0	0	99
Scythe+ Soy-Stik+AMS	9% v/v+ 1% v/v+2.5lb	84	8	13	75	12	85	12	12	75	13	89	33	10	42	48	91	58	5	5	63
Scythe+ Soy-Stik+AMS	7% v/v+ 1% v/v+2.5lb	80	7	12	82	7	81	10	8	78	12	88	28	13	48	43	90	53	10	10	53
Scythe+ Soy-Stik+AMS	5% v/v+ 1% v/v+2.5lb	78	5	17	78	5	82	7	13	78	8	91	23	12	52	37	92	48	10	10	53
Scythe+Vida+ Soy-Stik+AMS	5% v/v+3fl oz+ 1% v/v+2.5lb	83	8	17	70	13	85	17	13	72	18	92	38	7	40	53	94	57	5	5	62
Scythe+Vida+ Soy-Stik+AMS	3% v/v+3fl oz+ 1% v/v+2.5lb	86	5	15	72	13	87	13	12	75	73	93	35	8	43	48	94	57	5	5	63
Untreated		**72**	**1**	**13**	**82**	**5**	**78**	**12**	**7**	**78**	**25**	**85**	**32**	**7**	**17**	**77**	**94**	**47**	**5**	**15**	**80**
LSD (0.05)		**3**	**5**	**5**	**4**	**5**	**3**	**5**	**4**	**10**	**11**	**4**	**3**	**4**	**4**	**5**	**2**	**4**	**2**	**3**	**4**

[1]Leaf = % leaf desiccation and leaf drop. [2]Vine = % vine desiccation. [3]Green = % green pods. [4]Yellow = % yellow pods. [5]Brown = % brown/dry pods.

PERMIT AND SPARTAN CHARGE IN DRY BEANS

Investigators: Zollinger, Richard K., Jerry L. Ries, and Angela J. Kazmierczak.

Project Goal: An experiment was conducted near Mayville, ND, to evaluate crop response and weed efficacy to PRE programs in dry edible beans. 'La-Paz' pinto and 'Eclipse' black dry edible beans were planted on May 26, 2011, followed by the application of PRE treatments at 9:15 am with 66 F air, 52 F soil at a four inch depth, 31% relative humidity, 10% cloud cover, 5 to 7 mph SE wind, dry soil surface, and moist subsoil. Soil characteristics were: 65% sand, 10% silt, 25% clay, sandy clay loam texture, 2.7% OM and 6.4 pH. The entire study was sprayed with a POST application of Assure II at 8 fl oz/A plus Herbimax at 1.5pt/A to control grasses. Treatments were applied to the center 6.7 feet of the 10 by 40 foot plots with a backpack-type plot sprayer delivering 17 gpa at 40 psi through 11002 Turbo TeeJet nozzles for PRE treatments and 8.5 gpa at 40 psi through 11001 Turbo TeeJet nozzles for the POST applied Assure II application. The experiment had a randomized complete block design with three replicates per treatment.

No pinto or black bean injury observed at 7, 14, 28, and 60 DAE (days after emergence, data not shown). 60 DAE weed efficacy ratings generally were the same as 28 DAE, (data not shown). Yields were quite variable due to the weed variability in some plots. *(Department of Plant Sciences, North Dakota State University, Fargo).*

Table 1: Permit and Spartan Charge in dry beans.

Treatment	Rate	14 DAT				28 DAT				Yield	
		Rrpw	Colq	Corw	Ebns	Rrpw	Colq	Corw	Ebns	Pinto	Black
	(product/A)	% Control				% Control				cwt/A	
Permit	0.67oz	92	95	78	48	82	83	92	58	22.8	19.1
Permit+Spartan Charge	0.67oz+4.75fl oz	99	99	88	99	99	98	92	99	25.8	26.1
Permit+Spartan Charge	0.5oz+4.75fl oz	99	90	70	99	99	88	72	99	27.4	19.5
Permit+Spartan Charge	0.5oz+5.75fl oz	85	85	83	99	90	85	90	99	25	22.1
Permit+Spartan Charge	0.67oz+5.75fl oz	99	99	88	99	99	99	95	99	32.1	26
Spartan Charge	5.75fl oz	70	70	20	99	53	60	20	50	5.4	5
Prowl H2O+Pursuit Plus	1.25pt+20fl oz	99	99	38	99	99	99	32	99	16.8	10.8
Untreated		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**1.5**
LSD (0.05)		**16**	**18**	**7**	**2**	**10**	**8**	**8**	**2**	**4.8**	**4.9**

EPTAM AND PERMIT BASED WEED CONTROL IN DRY BEAN

Investigators: Zollinger, Richard K., Jerry L. Ries, and Angela J. Kazmierczak.

Project Goal: An experiment was conducted near Mayville, ND, to evaluate weed efficacy and crop response to PPI and EPOST programs in dry edible beans. PPI treatments were double incorporated with a field cultivator at a depth of 2 to 3 inches and were applied on May 26 at 9:15 am with 64 F air, 52 F soil at a four inch depth, 31% relative humidity, 10% cloud cover, 5 to 7 mph SE wind, dry soil surface, and moist subsoil, followed by the planting of 'Black' pinto and 'T-39' black dry edible beans. Soil characteristics were: 65% sand, 10% silt, 25% clay, sandy clay loam, 2.7% OM, and 6.4 pH. E-POST treatments were applied on June 24 at 11:00 am with 73 F air, 84 F soil surface, 50% relative humidity, 20% cloud cover, 1 to 3 mph SW wind, moist soil surface, moist subsoil and no dew present to V2 to V3 pinto and V1 to V2 black dry edible beans. Weeds present at the time of EPOST were: 2 to 4 inch (5 to 10/ft2) common lambsquarters; 3 to 5 inch (5 to 10/ft2) common ragweed; 2 to 4 inch (1to 5/ft2) redroot pigweed; 6 to 8 inch, T2 (1 to 5/ft2) volunteer wheat and green and yellow foxtail. Treatments were applied to the center 6.7 feet of the 10 by 40 foot plots with a backpack-type plot sprayer delivering 17 gpa at 40 psi through 11002 Turbo Tee-Jet nozzles for PPI treatments and 8.5 gpa at 40

Table 1: Eptam and Permit based weed control in dry bean.

		14 DAE	7 DAT -EPOST		14 DAT-EPOST		14 DAT -POST					60 DAT -EPOST		60 DAT -EPOST					YIELD	
		Corw	Pinto	Black	Pinto	Black	Fxtl	V Wht	Rrpw	Colq	Corw	Pinto	Black	Fxtl	V Wht	Rrpw	Colq	Corw	Pinto	Black
Treatment	Rate (product/A)	% Control	% Injury		% Injury		% Control					% Injury		% Control					cwt/A	
PPI																				
Eptam+Sonalan	3pt+3pt	72	0	0	0	0	99	99	99	98	70	0	0	99	99	99	98	62	20.4	39.2
Eptam+Sonalan	3pt+2pt	77	0	0	0	0	99	99	98	96	75	0	0	99	99	98	96	63	22.3	30.6
Eptam+Sonalan+ Permit	3pt+2pt+0.67oz	77	0	0	0	0	99	99	99	98	87	0	0	99	99	99	98	87	25	20.9
PPI/EPOST																				
Eptam+Sonalan/Permit+ Herbimax+28%	3pt+2pt/0.67oz +1pt+2% v/v	94	0	0	0	0	99	99	99	98	95	0	0	99	99	99	98	85	23	23.7
EPOST																				
Permit+	0.67oz+	-																		
R-11+28%	0.25% v/v+2% v/v	-	0	0	0	0	0	0	40	20	67	0	0	0	0	40	20	73	6.4	9.4
Herbimax+28%	1pt+2% v/v	-	5	5	0	0	0	0	50	20	83	0	0	0	0	50	20	82	7.1	9.4
Basagran+Herbimax+28%	1pt+1pt+2% v/v	-	0	0	0	0	0	0	50	20	78	0	0	0	0	50	20	85	10.9	10.7
Raptor+Basagran+ Herbimax+28%	2fl oz+1pt+1pt +2% v/v	-	0	0	10	10	57	50	80	52	85	10	10	57	50	80	52	87	26.4	25.2
Rezult B+Rezult G+ Herbimax+28%	0.8pt+0.8pt +1pt+2% v/v	-	0	10	8	8	70	67	57	40	83	8	8	70	67	57	40	88	24.6	18.3
Raptor+Reflex+Basagran+ Herbimax+28%	2fl oz+8fl oz +1pt+1pt+2% v/v	-	10	15	10	10	70	67	95	95	95	10	10	70	67	95	95	96	24.4	23.6
Raptor+Reflex+ Herbimax+28%	2fl oz+8fl oz +1pt+2% v/v	-	5	5	10	10	73	68	95	87	95	10	10	73	68	95	82	97	27.8	27.3
Reflex+Herbimax+28%	8fl oz+1pt+2% v/v	-	5	5	8	8	50	13	99	73	85	8	8	20	13	99	77	95	9.1	10
Raptor+Basagran+ Herbimax+28%	2fl oz+1pt+1pt+ 2% v/v	-	5	5	5	5	78	50	75	73	80	5	5	85	85	75	73	83	26.8	28.9
Untreated		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**4.1**	**8.1**
LSD (0.05)		**2**	**1**	**2**	**2**	**2**	**5**	**4**	**8**	**5**	**7**	**2**	**2**	**4**	**4**	**8**	**4**	**5**	**4.6**	**6.8**

psi through 11001 Turbo TeeJet nozzles for EPOST treatments. The experiment had a randomized complete block design with three replicates per treatment.

No injury observed at 14 DAE (days after emergence) and 99% control of green and yellow foxtail (Fxtl), volunteer wheat, redroot pigweed, and common lambsquarters (data not shown). The lower the volunteer wheat control the higher the yield loss, volunteer wheat hurt yield more than the high populations of common ragweed. Depending on weed population, yield varied greatly per plot. *(Department of Plant Sciences, North Dakota State University, Fargo).*

EPTAM BASED WEED CONTROL IN DRY BEANS

Investigators: Zollinger, Richard K., Jerry L. Ries, and Angela J. Kazmierczak.

Project Goal: An experiment was conducted near Mayville, ND, to evaluate weed efficacy to PRE Eptam programs in dry edible beans. A PPI treatment was double incorporated with a field cultivator to a depth of 2 to 3 inches on May 26, 2011 at 9:00 am with 64 F air, 52 F soil at a four inch depth, 31% relative humidity, 10% cloud cover, 5 to 7 mph SE wind, dry soil surface, and moist subsoil followed by the planting of 'Stampede' pinto and 'Montcalm' dark red kidney dry edible beans, followed by PRE applications at 9:10 am with 64 F air, 52 F soil at a four inch depth, 31% relative humidity, 10% cloud cover, 5 to 7 mph SE wind, dry soil surface, and wet subsoil Soil characteristics were: 65% sand, 10% silt, 25% clay, sandy clay loam texture, 2.7% OM, and 6.4 pH. Treatments were applied to the center 6.7 feet of the 10 by 40 foot plots with a backpack-type plot sprayer delivering 17 gpa at 40 psi through 11002 Turbo TeeJet nozzles for PPI and PRE treatments. The experiment had a randomized complete block design with three replicates per treatment.

No crop injury on both dry bean types on June 9 (14 DAP {days after planting} or 7 DAE {days after emergence) (data not shown), dry beans were in unifoilate stage. Dark red kidney bean emergence was variable in some parts of the study. No crop injury at all other ratings (data not shown). The lower the wheat control the higher the yield loss, volunteer wheat hurt yield more than the high populations of common ragweed. Depending on weed population, yields varied considerably. *(Department of Plant Sciences, North Dakota State University, Fargo).*

Table 1: Eptam based weed control in dry beans.

		14 DAE					28 DAE					Yield	
Treatment	Rate	Fxtl[1]	V Wht	Rrpw	Colq	Corw	Fxtl	V Wht	Rrpw	Colq	Corw	Pinto	Kidney
	(product/A)	% Control					% Control					cwt/A	
PRE													
Eptam	4pt	99	99	98	98	83	99	99	82	85	84	8.7	6.8
Eptam+Soalan	3.5pt+2pt	99	99	99	99	83	99	99	98	98	85	10.2	7.7
Eptam+Soalan	3pt+3pt	99	99	99	99	73	99	99	99	98	77	10.2	6.2
Eptam+Dual Magnum	3.5pt+1.4pt	99	98	93	90	75	99	98	93	80	87	15.1	10.8
Dual Magnum	1.67pt	83	25	72	62	22	83	53	72	62	38	7.7	2.8
PPI/PRE													
Prowl H2O+Outlook	3pt+14fl oz	99	78	87	87	25	99	80	87	80	50	10	7.3
Untreated		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0.9**	**0.5**
LSD (0.05)		**2**	**5**	**5**	**5**	**10**	**2**	**8**	**10**	**8**	**9**	**6.5**	**7.5**

[1]Fxtl = a combination of green and yellow foxtail.

DRY BEAN RESPONSE TO ZIDUA AND WARRANT

Investigators: Zollinger, Richard K., Jerry L. Ries, and Angela J. Kazmierczak.

Project Goal: An experiment was conducted near Hatton, ND, to evaluate weed efficacy and crop tolerance to POST programs in dry edible beans. 'Stampede' pinto and 'Eclipse' black dry edible beans were planted on June 10, 2011 followed by a PRE application (see table below) of Outlook at 18 fl oz/A at 9:35 am with 64 F air, 55 F soil at a four inch depth, 36% relative humidity, 100% cloud cover, dry soil surface, and moist subsoil. Soil characteristics were: 62.5% sand, 10% silt, 27.5% clay, sandy clay loam texture, 2.7% OM, and 6.6 pH. POST treatments were applied on July 11 at 9:45 pm with 77 F air, 80 F soil surface, 65% relative humidity, 0% cloud cover, 5 to 10 mph NW wind, moist soil surface, wet subsoil, fair crop vigor and no dew present to V3 pinto and V1 to V2 black dry edible beans. Weeds present at the time of POST were: 1 to 5 inch, T1 (5 to 10/yd2) yellow foxtail; 1 to 2 inch (1/yd2) common ragweed; 1 to 4 inch (5 to 10/yd2) wild mustard; 1 to 4 inch (15 to 25/yd2) hairy nightshade; 1 to 3 inch (3 to 5/yd2) easternblack nightshade; 1 to 3 inch (3 to 5/yd2) common lambsquarters; and 1 to 2 inch (3 to 5/yd2) redroot pigweed. Weeds noted in plots that received an Outlook herbicide PRE treatment at the time of POST applications were: 1 to 3 inch (1/yd2) common ragweed; 0.5 to 1 inch (3 to 5/yd2) wild mustard; 0.5 to 1.5 inch (5 to 15/yd2) hairy nightshade; and 0.5 to 1 inch (1 to 2/yd2) eastern black nightshade. Treatments were applied to the center 6.7 feet of the 10 by 40 foot plots with a backpack-type plot sprayer delivering 17 gpa at 40 psi through 11002 Turbo TeeJet nozzles for PRE Outlook application and 8.5 gpa at 40 psi through 11001 Turbo TeeJet nozzles for POST treatments. The experiment had a randomized complete block design with three replicates per treatment.

Warrant, an encapsulated formulation of acetochlor, was registered for EPOST application in soybean for residual control of small-seeded broadleaf weeds and glyphosate resistant weeds like waterhemp. Degradation of Warrant and Dual is rapid and up to 4 weeks residual control is usually observed. Zidua (pyroxasulfone) is the same mode of action as Warrant and Dual but of a different chemistry, and residual weed control has been observed for 8 to 12 weeks. Warrant and Dual does not have any POST weed control activity but Zidua can kill small emerged weeds as shown in the POST treatments. On July 18, all injury was leaf burn, presumably from the added oil adjuvant. Dry bean plants were not stunted or yellow except at the high injury ratings. July 25 injury was stunting and slight leaf burn. At 60 DAT, generally the crop response decreased slightly, and the weed control ratings decreased, (data not shown).

Table 1: Dry bean response to Zidua and Warrant.

		7 DAT		14 DAT						28 DAT					
		Pinto	Black	Pinto	Black	Fxtl	Rrpw	Colq	Ebns	Pinto	Black	Fxtl	Rrpw	Colq	Ebns
Treatment	**Rate (product/A)**	**% Injury**		**% Injury**		**% Control**				**% Injury**		**% Control**			
Outlook PRE fb POST (1-3 inch weeds)															
Dual Magnum+ Herbimax+28%	1.33pt+1.5pt+2.5% v/v	2	10	3	12	47	53	53	50	3	18	47	45	45	45
Warrant+Herbimax+28%	1.5qt+1.5pt+2.5% v/v	5	8	3	7	50	50	50	50	5	5	50	50	50	47
Warrant+Herbimax+28%	2qt+1.5pt+2.5% v/v	3	5	0	3	55	67	67	62	3	43	43	43	43	43
Zidua+Herbimax+28%	1.68oz+1.5pt+2.5% v/v	5	10	0	7	65	63	57	53	0	8	67	67	63	53
Zidua+Herbimax+28%	3.36oz+1.5pt+2.5% v/v	10	17	10	10	99	93	93	93	12	12	99	96	96	96
Zidua+Herbimax+28%	5.04oz+1.5pt+2.5% v/v	20	30	10	25	93	93	93	87	5	20	96	95	95	93
POST (1-5 inch weeds)															
Rezult B+Rezult G +Herbimax+28%	1.6pt+1.6pt +1.5pt+2.5% v/v	10	10	0	7	98	95	95	70	7	5	98	95	95	70
Rezult B+Rezult G +Dual Magnum+PO+28%	1.6pt+1.6pt+1.33pt +1.5pt+2.5% v/v	10	12	0	2	99	83	83	70	0	2	72	50	40	50
Rezult B+Rezult G +Warrant+PO+28%	1.6pt+1.6pt+1.5qt +1.5pt+2.5% v/v	10	13	5	7	99	93	88	78	5	7	96	65	68	50
Rezult B+Rezult G +Warrant+PO+28%	1.6pt+1.6pt+2qt +1.5pt+2.5% v/v	12	12	8	7	99	83	78	63	8	12	96	73	65	48
Rezult B+Rezult G +Zidua+PO+28%	1.6pt+1.6pt+1.68oz +1.5pt+2.5% v/v	13	13	5	8	99	93	90	85	5	7	99	93	90	84
Rezult B+Rezult G +Zidua+PO+28%	1.6pt+1.6pt+3.36oz +1.5pt+2.5% v/v	20	22	5	10	99	93	93	82	2	3	99	93	92	78
Rezult B+Rezult G +Zidua+PO+28%	1.6pt+1.6pt+5.04oz +1.5pt+2.5% v/v	22	28	13	20	99	95	95	90	12	17	99	95	95	90
Outlook PRE fb POST (1-3 inch weeds)															
Dual Magnum +Herbimax+28%	1.33pt+1.5pt+2.5% v/v	2	10	3	12	47	53	53	50	3	18	47	45	45	45
Warrant+Herbimax+28%	1.5qt+1.5pt+2.5% v/v	5	8	3	7	50	50	50	50	5	5	50	50	50	47
Warrant+Herbimax+28%	2qt+1.5pt+2.5% v/v	3	5	0	3	55	67	67	62	3	43	43	43	43	43
Zidua+Herbimax+28%	1.68oz+1.5pt+2.5% v/v	5	10	0	7	65	63	57	53	0	8	67	67	63	53
Zidua+Herbimax+28%	3.36oz+1.5pt+2.5% v/v	10	17	10	10	99	93	93	93	12	12	99	96	96	96
Zidua+Herbimax+28%	5.04oz+1.5pt+2.5% v/v	20	30	10	25	93	93	93	87	5	20	96	95	95	93
POST (1-5 inch weeds)															
Rezult B+Rezult G +Herbimax+28%	1.6pt+1.6pt+1.5pt +2.5% v/v	10	10	0	7	98	95	95	70	7	5	98	95	95	70
Rezult B+Rezult G +Dual Magnum+PO+28%	1.6pt+1.6pt+1.33pt +1.5pt+2.5% v/v	10	12	0	2	99	83	83	70	0	2	72	50	40	50
Rezult B+Rezult G +Warrant+PO+28%	1.6pt+1.6pt+1.5qt +1.5pt+2.5% v/v	10	13	5	7	99	93	88	78	5	7	96	65	68	50
Rezult B+Rezult G +Warrant+PO+28%	1.6pt+1.6pt+2qt +1.5pt+2.5% v/v	12	12	8	7	99	83	78	63	8	12	96	73	65	48
Rezult B+Rezult G +Zidua+PO+28%	1.6pt+1.6pt+1.68oz +1.5pt+2.5% v/v	13	13	5	8	99	93	90	85	5	7	99	93	90	78
Rezult B+Rezult G +Zidua+PO+28%	1.6pt+1.6pt+3.36oz +1.5pt+2.5% v/v	20	22	5	10	99	93	93	82	2	3	99	93	92	84
Rezult B+Rezult G +Zidua+PO+28%	1.6pt+1.6pt+5.04oz +1.5pt+2.5% v/v	22	28	13	20	99	95	95	90	12	17	99	95	95	90
LSD (0.05)		**3**	**4**	**6**	**7**	**9**	**12**	**14**	**14**	**7**	**11**	**7**	**11**	**8**	**9**

DRY BEAN DISEASES AND THEIR MANAGEMENT

Investigators: Rubella S. Goswami and Samuel G. Markell

Project Goal: Projects on bacterial blight pathogens and root rots conducted over a period of three years were brought to a completion in 2011. Based on our findings from a foliar survey conducted from 2008-2010, the bacterial diseases (halo blight, brown spot and common blight) appeared to be widespread in the major dry bean growing counties along the Red River Valley as commonly observed, but the disease incidence and most prevalent bacterial pathogen appeared to be affected by weather conditions. Bacterial brown spot was found to be more prevalent in 2009 and 2010 which could potentially have been due to weather conditions in these years that were more suitable for the pathogen associated with the disease. Further evaluation of pathogen variation showed that race 6 and race 8 of the halo blight pathogen *Pseudomonas syringae pv. phaseolicola* (Psp) were the most common in this region. Assessment of collection of common dry bean varieties for identifying sources of resistance to the halo blight pathogen showed that only the kidney bean variety Red Hawk was likely to have partial resistance to some *Psp* isolates. The findings from this research not only give us information about the prevalence of

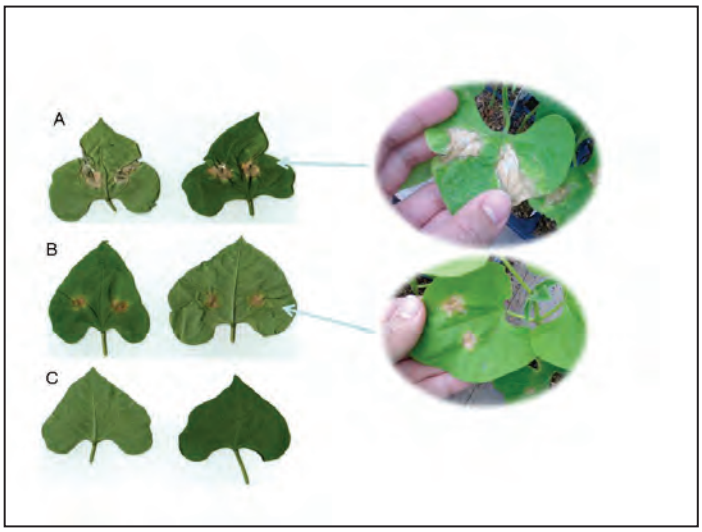

Fig 1. *Pictures of bean leaves inoculated with the Brown spot pathogen (A), Halo blight pathogen (B) and water control (C) under greenhouse conditions.*

the two major bacterial pathogens of dry beans in the region and variability within them, but also suggest that it may be more appropriate to use a collection of *Psp* isolates, preferably from the field in the region for which the varieties are being bred, for disease resistance screening during the breeding process.

Our studies on root rot of dry beans focused primarily on identifying sources of resistance to Rhizoctonia and Fusarium root rot through greenhouse and field evaluations of a set of 11 varieties. According to our findings, the kidney bean varieties such as Red Hawk were found to be susceptible to both pathogens under greenhouse and field conditions. High level of resistance to both pathogens was observed in varieties such as VAX3 and Eclipse. These varieties appeared to have the ability to overcome damage due to root rot as the plants matured, in both inoculated and non-inoculated trials, with disease severity rating at flowering being lower than those at the seedling stage. Overall, the trials suggest that these two varieties, particularly VAX3, could serve as a good source of resistance to both Rhizoctonia and Fusarium root rot and could be incorporated in breeding programs.

MANAGING BEAN RUST WITH FUNGICIDES

Investigators: Sam Markell, Lionel Olson, Andrew Friskop, Rubella Goswami and Robin Lamppa, NDSU Department of Plant Pathology. Michael Wunsch and Blaine Schatz, NDSU Carrington Research Extension Center. Scott Halley, NDSU Langdon Research Extension Center.

In 2011, the third and final year of uniform bean rust fungicide trials was completed in Carrington, Fargo, and Langdon. Unfortunately, the disease level was very low in research trials, and very little data was generated this year. However, some very important management information was generated in the last three years. Below is the summary of what we did over the last three years, and some highlights of the results.

Introduction: With the identification of a new race of rust in 2008, epidemics of bean rust became a threat again. Since the last epidemics of rust that occurred in the mid-1990s, many new fungicides were labeled on beans. In an effort to develop the best management recommendations, it was critical to evaluate these new fungicides for efficacy on bean rust and evaluate new chemistries for the best timing of application.

Objective: Evaluate the efficacy and timing of labeled and experimental fungicides on bean rust.

Materials and Methods: In 2009, 2010, and 2011, fungicide trials were established at the Carrington Research Extension Center, the Langdon Research Extension Center, and the Fargo main station. At each location, efficacy trials (where available fungicides were tested) and timing trials (evaluating the timing of a strobilurin and triazole chemistry) were established. To facilitate an epidemic but not cause disease in commercial fields, an old variety lacking the *Ur-3* resistance gene was planted and inoculated with an old race that does not cause infection on varieties containing *Ur-3* (which is nearly all varieties grown). Once disease was established, plots were rated approximately every two weeks and yield was determined at harvest.

Results: Results have been analyzed every year, but we are currently in the process of evaluating all the data together. Once done, we will provide this information to the Northarvest Bean Growers and intend to create a NDSU Extension publication available to everyone. However, **key findings** of the experiments are below.

Fungicide comparisons:

1) Triazole (FRAC 3 compounds, i.e. Folicur and generics, Proline, etc.) and strobilurin (FRAC 11 compounds, i.e. Headline, Quadris, etc.) tended to be the most effective at managing bean rust.

2) Other fungicides, some of which are often used primarily for white mold (i.e. Topsin and generics, Endura, etc.) still offered some management ability for bean rust, though not usually as good as triazoles or strobilurins.

Fungicide Timing:

Preventative applications with the newer compounds may not be necessary. In the past, preventative applications were recommended. However, with newer chemistries available (particularly FRAC 3) applications may not need to be made preventatively. Good disease management was achieved when fungicides were applied within a week of rust identification or at low rust severity. However, control was insufficient if rust was becoming severe. However, to best manage rust, good results depend on good scouting.

2011 Dry Bean Variety Trials

Selecting Dry Bean Varieties for the 2012 Growing Season

Hans Kandel NDSU Extension Agronomist

Information about dry bean variety performance can be accessed on the Web at www.ag.ndsu.edu/varietytrials/, the site with all variety trial data from all NDSU Research Extension Centers for all crops. The agronomic data presented in this magazine are from replicated North Dakota State University research plots using experimental designs that enable the use of statistical analysis. The LSD (least significant difference) numbers beneath the columns in tables are derived from the statistical analyses and only apply to the numbers in the column in which they appear. If the difference between two varieties exceeds the LSD value, it means that with 95 percent probability, the higher-yielding variety has a significant yield advantage. If the difference between two varieties is less than the LSD value, then the variety yields are considered similar. The abbreviation NS is used to indicate no significant difference for that trait among any of the varieties. The CV is a measure of variability in the trial. The CV stands for coefficient of variation and is expressed as a percentage. Large CVs mean a large amount of variation that could not be attributed to differences in the varieties. In the tables, the "mean" indicates the average of the observations in the column. Only

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2011 Pinto Bean Variety Trial, NDSU - Authors, J. Osorno, J. VanderWal and S. Gegner.

Variety	Days to Flowering (DAP)[1]	Plant Height (inch)	Days to Maturity (DAP)1	100 Seed Weight (gram)	Yield (lb/a)
Forest River (Walsh County)					
AC Island	43	16.5	96	36.4	2,230
Buster	44	13.4	95	35.4	2,420
COB-2824-99	44	15.4	95	37.5	2,450
COB-816-03	47	17.7	101	38.8	2,870
GTS-900	46	15.0	100	35.5	2,450
GTS-904	46	15.0	100	35.1	2,640
GTS-907	45	15.7	95	36.0	2,350
La Paz	52	15.0	103	36.3	2,830
Lariat	48	17.3	100	37.8	2,240
Long's Peak	49	16.1	102	37.0	2,220
Mariah	46	15.7	96	33.4	2,150
Maverick	46	14.6	97	39.5	2,310
Medicine Hat	45	15.0	96	39.3	2,670
ND-307	47	14.6	98	37.8	2,340
Santa Fe	45	15.0	100	41.4	2,980
Sonora	46	16.1	97	33.6	2,490
Stampede	46	18.9	97	38.1	2,470
Windbreaker	45	14.2	98	39.4	2,680
Mean	46	15.6	98	37.1	2,488
CV %	**4**	**10**	**2**	**5.6**	**11.8**
LSD 0.05	**2**	**6**	**3**	**2.9**	**420**

Variety	Days to Flowering (DAP)[1]	Plant Height (inch)	Days to Maturity (DAP)1	100 Seed Weight (gram)	Yield (lb/a)
Hatton (Traill County)					
Apache	44	18.5	98	37.3	3,730
Buster	45	17.3	94	38.7	3,870
COB-2824-99	45	19.7	95	37.2	3,720
COB-816-03	47	24.4	95	36.1	3,610
GTS-900	47	20.1	95	36.8	3,680
GTS-904	46	21.3	95	38.1	3,810
GTS-907	46	17.7	95	38.1	3,810
La Paz	50	17.3	99	36.9	3,690
Lariat	47	20.1	98	41.8	4,180
Long's Peak	50	20.9	102	35.3	3,530
Mariah	45	21.3	90	34.9	3,490
Maverick	47	18.1	94	37.7	3,770
Max	45	18.5	95	40.1	4,010
Medicine Hat	44	17.7	92	38.8	3,880
ND-307	46	20.1	98	38.1	3,810
Odyssey	46	18.1	98	37.5	3,750
Othello	44	16.1	95	36.9	3,690
Santa Fe	44	16.9	94	43.2	4,320
Sequoia	54	22.0	100	32.4	3,240
Sonora	46	18.1	97	31.8	3,180
Stampede	45	20.9	95	36.8	3,680
Windbreaker	44	18.1	97	39.8	3,980
Mean	**46**	**19.2**	**96**	**37.5**	**3,747**
CV %	**6**	**13**	**2**	**4.7**	**26.9**
LSD 0.05	**5**	**NS**	**3**	**2.8**	**NS**

[1]Days after planting.

compare values within the table and look for trends for the desired trait among different experimental sites and years. In the tables, the dry bean varieties are arranged in alphabetical order within market class. Footnotes provide more detailed information about data in the table under which they appear. Characteristics to evaluate for selecting a dry bean variety include marketing class, yield potential in your area, test weight, reaction to problematic diseases and maturity date.

When selecting a high-yielding and good-quality variety, use data that summarize several years and locations. Choose a high-quality variety that, on average, performs the best at multiple locations near your farm during several years. Variety trials were planted at Prosper but had to be abandoned due to flooding, and no data is reported from this site in this publication. A navy bean trial at Hatton was also lost due to flooding. The CV's at Oakes were above 20% and this data is therefore also not included in this article. The names of the researchers conducting the trials are indicated on the top of the tables. For additional information for each location contact the Research and Extension Centers. We want to express our thanks to dry bean growers who assisted with the on-farm variety testing. Research specialists and technicians helped with the field work and data compilation. The assistance given by many secretaries in typing respective portions of the tables is very much appreciated.

2011 Navy Bean Variety Trial, NDSU - Authors, J. Osorno, J. VanderWal and S. Gegner.

Variety	Days to Flowering (DAP)[1]	Plant Height (inch)	Days to Maturity (DAP)1	100 Seed Weight (gram)	Yield (lb/a)
Forest River (Walsh County)					
Avalanche	45	17.7	94	20.2	2,530
Ensign	45	17.7	94	22.0	2,610
GTS-544	46	18.1	96	20.3	2,590
GTS-564	48	18.9	96	16.6	2,370
HMS Medalist	46	18.1	96	18.3	2,910
Indi	47	18.5	96	18.8	2,570
Mayflower	46	18.1	96	19.3	2,800
Navigator	46	18.1	94	19.7	2,500
Norstar	44	17.3	94	18.4	2,380
OB-1419-06	46	18.1	95	17.0	2,310
OB-5551-99	47	18.5	101	21.5	2,440
Octane	48	18.9	102	17.3	2,050
Skyline	44	17.3	93	17.7	1,610
T9905	47	18.5	95	20.1	2,960
Viscount	47	18.5	97	17.9	2,920
Vista	47	18.5	97	17.9	2,670
Mean	**46**	**18.2**	**96**	**18.9**	**2,514**
CV %	**3**	**9**	**2**	**3.7**	**10.0**
LSD 0.05	**2**	**5**	**3**	**1.0**	**360**

[1]Days after planting.

2011 Dry Bean Variety Trial, NDSU - Authors, J. Osorno, J. VanderWal and S. Gegner.

Variety	Market Class	Days to Flowering (DAP)[1]	Plant Height (inch)	Days to Maturity (DAP)[1]	100 Seed Weight (gram)	Yield (lb/a)
Forest River (Walsh County)						
GTS-1103	Black	49	16.5	97	20.9	2,920
Eclipse	Black	47	17.3	93	19.3	2,900
Loreto	Black	46	17.3	96	20.2	2,440
Shania	Black	46	16.5	96	18.0	2,530
T-39	Black	48	15.4	95	19.2	2,110
Zorro	Black	46	18.9	93	19.8	2,310
Mean		**47**	**17.0**	**95**	**19.6**	**2,535**
CV %		**2**	**12**	**1.0**	**4.5**	**14.3**
LSD 0.05		**1**	**NS**	**1**	**1.4**	**500**
Hatton (Traill County)						
CDC Jet	Black	48	20.9	93	20.4	1,950
CDC Super Jet	Black	46	19.7	93	20.4	2,260
Eclipse	Black	46	22.4	88	20.5	2,190
GTS-1103	Black	51	18.1	98	20.1	2,100
Loreto	Black	46	20.1	94	20.3	2,190
Shania	Black	47	20.9	95	18.9	2,430
T-39	Black	49	20.1	95	19.6	2,460
Zorro	Black	48	22.4	94	20.8	2,510
Coyne	Gr. Northern	48	22.4	98	35.6	1,980
Gemini	Gr. Northern	41	23.6	90	37.4	1,750
Matterhorn	Gr. Northern	45	18.9	88	31.9	1,720
Orion	Gr. Northern	45	13.4	91	33.9	2,290
Sedona	Pink	53	18.5	100	35.5	1,980
Mean		**47**	**20.1**	**94**	**25.8**	**2,139**
CV %		**6**	**10**	**2.0**	**7.6**	**22.6**
LSD 0.05		**5**	**9.0**	**4**	**3.5**	**NS**

[1]Days after planting.

2011 Dry Bean Variety Trial, NDSU - Authors, J. Osorno, J. VanderWal and S. Gegner.

Variety	Market Class	Days to Flowering (DAP)[1]	Plant Height (inch)	Days to Maturity (DAP)[1]	100 Seed Weight (gram)	Yield (lb/a)
Park Rapids (Hubbard County)						
GTS-1103	Black	49	16.9	96	20.8	1,820
Loreto	Black	48	16.1	98	18.7	1,820
Bellagio	Cranberry	45	15.0	102	49.1	910
GTS-104	Dk. Red Kidney	43	16.1	99	42.1	1,330
GTS-106	Dk. Red Kidney	43	15.7	96	40.2	1,530
Majesty	Dk. Red Kidney	47	15.0	94	46.9	1,180
Montcalm	Dk. Red Kidney	43	13.8	91	39.4	980
Redhawk	Dk. Red Kidney	41	16.9	94	42.7	1,540
Red Rover	Dk. Red Kidney	42	20.1	93	48.3	1,580
Blush	Lt. Red Kidney	50	18.1	106	48.0	790
CeIrk	Lt. Red Kidney	41	13.0	86	38.2	910
Clouseau	Lt. Red Kidney	42	20.9	91	47.7	1,690
Foxfire	Lt. Red Kidney	40	13.4	83	40.4	920
OAC Inferno	Lt. Red Kidney	42	18.5	95	43.0	1,820
Pink Panther	Lt. Red Kidney	41	12.6	85	28.7	370
GTS-544	Navy	48	16.5	98	19.3	1,650
GTS-564	Navy	51	13.4	97	17.1	1,820
HMS Medalist	Navy	48	18.5	95	17.0	1,930
OB-1419-06	Navy	50	16.5	100	17.2	2,080
OB-5551-99	Navy	47	15.4	102	26.8	1,500
Octane	Navy	44	13.8	100	14.8	1,130
Skyline	Navy	47	11.0	90	17.7	830
Viscount	Navy	52	17.3	100	12.5	1,870
Silvercloud	White Kidney	49	15.4	106	52.6	830
Mean		**46**	**16**	**96**	**33**	**1,368**
CV %		**5**	**11**	**3**	**15.3**	**29.8**
LSD 0.05		**3**	**6**	**4**	**8.1**	**530**

[1]Days after planting.
[2]Erimo (*Vigna angularis*) from SK Foods.

2011 Dry Bean Variety Trial, NDSU - Authors, J. Osorno, J. VanderWal and S. Gegner.

Variety	Market Class	Days to Flowering (DAP)[1]	Plant Height (inch)	Days to Maturity (DAP)[1]	100 Seed Weight (gram)	Yield (lb/a)
Staples (Todd County)						
Erimo2	Adzuki	58	19.3	107	12.8	2,510
GTS-1103	Black	55	22.4	98	19.4	1,680
Loreto	Black	52	22.0	98	17.4	1,740
GTS-104	Dk. Red Kidney	51	21.3	101	42.3	950
GTS-106	Dk. Red Kidney	50	21.3	103	43.0	990
Montcalm	Dk. Red Kidney	48	18.5	103	46.1	1,050
Redhawk	Dk. Red Kidney	49	20.5	99	45.4	1,250
Red Rover	Dk. Red Kidney	49	21.3	96	44.8	1,370
Blush	Lt. Red Kidney	52	21.3	103	49.0	770
CeIrk	Lt. Red Kidney	48	15.4	92	47.2	840
Clouseau	Lt. Red Kidney	48	18.9	99	50.7	1,350
Foxfire	Lt. Red Kidney	48	18.1	88	40.3	1,080
Pink Panther	Lt. Red Kidney	49	19.3	90	45.2	990
GTS-544	Navy	53	20.9	97	18.3	1,240
GTS-564	Navy	54	21.3	94	15.5	1,760
HMS Medalist	Navy	53	22.8	96	16.9	1,440
OB-1419-06	Navy	54	20.1	97	16.9	1,660
OB-5551-99	Navy	53	22.8	101	21.3	1,640
Octane	Navy	51	18.9	103	17.1	1,570
Skyline	Navy	48	15.7	89	14.8	810
Viscount	Navy	54	22.8	101	17.4	1,640
Hime	Otebo	51	17.7	95	22.9	660
Silvercloud	White Kidney	52	22.8	103	49.9	670
Mean		**51**	**20.2**	**98**	**31.1**	**1,290**
CV %		**4**	**8**	**2.0**	**8.7**	**24.1**
LSD 0.05		**3**	**6.0**	**3**	**4.6**	**430**

[1]Days after planting.
[2]Erimo (*Vigna angularis*) from SK Foods.

2011 Dry Bean Variety Trial - Dryland - Carrington - Authors, B. Schatz, S. Schaubert and T. Indergaard.

Variety	Market Class	Maturity	Growth Habit[1]	100 Seed Weight	Seeds/ Pound	Test Weight	Seed Yield 2011	Seed Yield 3-yr. Avg.
		(DAP)[2]	(1-9)	(gram)	(seeds)	(lb/bu)	(lb/a)	
Erimo[3]	Adzuki	115	8.0	13.1	3,473	62.8	1,773	--
Eclipse	Black	107	6.0	22.8	1,988	61.3	1,393	2,139
GTS-1103	Black	113	5.8	25.1	1,811	62.8	2,169	--
Jaguar	Black	110	5.5	21.6	2,100	61.9	1,398	2,053
Loreto	Black	116	5.5	22.7	1,999	61.2	1,532	--
Shania	Black	113	6.3	22.2	2,048	61.8	1,426	--
Zorro	Black	107	4.5	22.5	2,018	60.9	934	--
Avalanche	Navy	112	6.0	24.5	1,856	64.0	1,356	2,126
Ensign	Navy	113	4.3	24.9	1,823	63.2	1,707	2,339
GTS-544	Navy	116	4.8	23.9	1,899	63.4	2,163	--
GTS-564	Navy	111	4.8	21.3	2,150	64.3	1,403	--
HMS Medalist	Navy	112	7.0	20.1	2,262	63.5	1,619	--
Lightning	Navy	111	5.5	22.6	2,005	62.3	1,000	2,042
OB-5551-99	Navy	118	6.8	23.9	1,902	63.6	1,724	--
Octane	Navy	117	6.5	20.5	2,216	65.5	1,596	1,829
Rexeter	Navy	116	6.5	21.6	2,107	64.4	1,543	--
Skyline	Navy	105	3.8	20.3	2,245	64.8	898	1,600
Viscount	Navy	114	5.5	21.0	2,160	64.4	1,617	--
Vista	Navy	114	5.5	21.6	2,101	63.6	1,558	2,297
Hime	Otebo	108	2.3	28.9	1,574	64.0	886	1,837
Sedona	Pink	114	3.8	45.1	1,008	58.3	1,934	2,312
AC Island	Pinto	106	2.8	45.3	1,003	59.8	1,767	--
COB-2824-99	Pinto	103	4.3	40.8	1,119	57.2	1,193	--
COB-816-03	Pinto	109	4.5	41.6	1,094	60.1	1,876	--
Galeena	Pinto	115	4.8	35.7	1,278	60.4	2,055	--
GTS-904	Pinto	109	4.5	45.9	994	57.3	1,694	--
GTS-907	Pinto	104	4.5	43.6	1,045	57.5	1,336	--
La Paz	Pinto	110	5.3	41.5	1,094	60.9	1,772	2,730
Lariat	Pinto	115	5.5	47.7	952	58.7	2,242	2,757
Maverick	Pinto	107	2.8	40.9	1,119	57.8	1,660	2,548
Medicine Hat	Pinto	103	3.3	40.5	1,123	56.5	1,095	2,279
ND-307	Pinto	112	5.5	47.7	953	57.4	2,038	2,573
Santa Fe	Pinto	108	2.0	38.5	1,207	55.6	923	2,040
Sonora	Pinto	110	5.0	35.5	1,278	59.7	1,718	--
Stampede	Pinto	107	4.0	45.5	999	57.0	1,665	2,370
Windbreaker	Pinto	106	4.5	46.0	989	57.9	1,707	2,592
Merlot	Small Red	117	4.5	41.8	1,088	60.2	1,578	2,304
Mean		**111**	**4.9**	**31.6**	**1,624**	**61**	**1,566**	**2,251**
CV %		**1.4**	**16.6**	**6.0**	**5.3**	**0.9**	**14.8**	**--**
LSD 0.05		**2.1**	**1.1**	**2.7**	**119**	**0.8**	**327**	**--**

Planted: May 25. Harvested: Sept. 27. Previous crop: spring wheat. Trial was impacted by a hail storm on July 24, plant damage and subsequent yield loss was influenced by plant stature and growth stage.

[1]Growth Habit : Scored on scale of 1 to 9, with 1 = a vining plant type, pods low to ground, short stature; 9 = very upright plant structure, pods held off ground.

[2]Days after planting.

[3]Erimo (Vigna angularis) from SK Foods.

2011 Dry Bean Variety Trial - Irrigated - Carrington - Authors, B. Schatz, P. Hendrickson and T. Ingebretson.

Variety	Market Class	Maturity	Growth Habit	Seeds/ Pound	100 Seed Weight	Test Weight	Seed Yield 2011	Seed Yield 3-yr. Avg.
		(DAP)[1]	(1-9)[2]	(seeds)	(gram)	(lb/bu)	(lb/a)	
Erimo[3]	Adzuki	117	5.5	5,211	8.8	60.5	234	--
Eclipse	Black	106	6.5	2,539	17.9	60.8	1,386	2,021
GTS-1103	Black	111	5.0	2,363	19.2	62.2	1,945	--
Jaguar	Black	107	5.5	2,707	16.8	61.2	1,148	1,644
Loreto	Black	113	6.0	2,504	18.1	61.2	1,555	--
Shania	Black	109	6.5	2,651	17.1	60.7	1,433	--
Zorro	Black	105	5.3	2,623	17.3	60.0	886	1,679
Avalanche	Navy	109	5.0	2,394	19.0	63.1	1,365	2,092
Ensign	Navy	107	4.8	2,282	19.9	62.1	1,252	2,069
GTS-544	Navy	114	5.0	2,350	19.3	64.4	2,043	--
GTS-564	Navy	111	5.0	2,909	15.6	63.6	1,232	--
HMS Medalist	Navy	110	6.0	2,904	15.7	63.0	1,287	--
Lightning	Navy	108	4.8	2,628	17.3	62.5	1,016	--
OB-5551-99	Navy	117	7.0	2,304	19.7	63.0	1,949	--
Octane	Navy	114	6.5	2,853	15.9	65.3	1,879	1,936
Rexeter	Navy	114	6.3	2,712	16.8	63.8	1,209	--
Skyline	Navy	104	3.3	2,744	16.7	64.5	940	1,527
Viscount	Navy	113	5.5	2,761	16.5	65.1	1,687	--
Vista	Navy	114	6.0	2,567	17.7	63.5	1,997	2,273
Hime	Otebo	104	2.3	2,252	20.3	63.3	814	1,598
Sedona	Pink	110	4.3	1,246	36.5	58.9	1,507	2,074
AC Island	Pinto	106	2.5	1,386	32.8	57.6	1,061	--
COB-2824-99	Pinto	103	3.8	1,398	32.5	56.7	1,221	--
COB-816-03	Pinto	105	5.3	1,323	34.4	59.6	1,451	--
Galeena	Pinto	115	3.8	1,437	31.6	60.9	2,596	--
GTS-904	Pinto	106	4.8	1,259	36.2	57.4	1,571	--
GTS-907	Pinto	103	4.0	1,373	33.2	57.0	1,194	--
La Paz	Pinto	106	6.3	1,359	33.4	60.3	1,830	2,443
Lariat	Pinto	112	6.5	1,191	38.2	58.6	2,144	2,696
Maverick	Pinto	104	2.8	1,306	34.8	59.2	1,389	2,277
Medicine Hat	Pinto	102	3.3	1,398	32.5	56.7	1,000	2,076
ND-307	Pinto	107	5.5	1,294	35.2	56.3	1,464	2,160
Santa Fe	Pinto	107	3.3	1,268	36.0	55.2	1,097	2,063
Sonora	Pinto	105	4.5	1,587	28.6	58.2	1,478	--
Stampede	Pinto	107	5.3	1,211	37.5	56.9	1,592	2,174
Windbreaker	Pinto	105	3.5	1,194	38.1	58.0	1,620	2,349
Merlot	Small Red	113	3.8	1,391	32.9	60.9	1,359	2,129
Mean		**109**	**4.9**	**2,078**	**25.1**	**60.6**	**1,428**	**2,067**
CV %		**1.8**	**17.2**	**6.2**	**5.3**	**1.7**	**19.6**	**--**
LSD 0.05		**2.6**	**1.2**	**177**	**1.9**	**1.4**	**397**	**--**

Planted: May 25. Harvested: Sept. 27. Previous crop: spring wheat. This trial was impacted by a hail storm on July 24, plant damage and subsequent yield loss was influenced by plant stature and growth stage.
[1]Days after planting.
[2]Growth Habit : Scored on scale of 1 to 9. 1 = vining plant, pods low to ground, short stature; to 9 = very upright plant stature, pods held off ground.
[3]Erimo (Vigna angularis) from SK Foods.

2011 Dry Bean Variety Trial - Hettinger - Authors, E. Eriksmoen and R. Olson.

Variety	Market Class	Days to Flowering	Plant Height	100 Seed Weight	Test Weight	Seed Yield 2010	Seed Yield 2011	Seed Yield 3-yr. Avg.
		(DAP)[1]	(inch)	(gram)	(lb/bu)		(lb/a)	
Eclipse	Black	60	22	14.4	57.5	1,784	1,707	1,611
Jaguar	Black	60	23	15.4	50.7	1,768	1,833	1,647
Loreto	Black	60	25	18.0	48.4	1,227	1,502	--
Zorro	Black	60	24	18.0	56.0	2,043	1,573	1,676
Avalanche	Navy	55	25	17.4	55.8	1,556	1,549	1,526
Ensign	Navy	55	25	16.4	55.1	1,380	1,401	1,329
HMS Medalist	Navy	55	23	15.0	59.0	1,447	1,253	--
Skyline	Navy	57	22	16.6	56.8	--	1,326	--
Vista	Navy	60	20	19.0	57.0	1,611	1,370	1,461
Sedona	Pink	60	22	26.8	--	838	612	751
Galeena	Pinto	55	25	22.4	56.8	--	1,958	--
La Paz	Pinto	60	23	25.1	53.9	1,995	1,916	1,933
Lariat	Pinto	55	18	24.0	54.8	2,122	2,068	1,910
Maverick	Pinto	53	21	22.9	52.2	1,987	1,791	1,862
Medicine Hat	Pinto	53	26	20.8	53.7	1,532	1,799	--
Santa Fe	Pinto	55	24	20.8	53.7	1,295	2,150	--
Sonora	Pinto	54	23	19.9	53.9	2,076	1,999	--
Stampede	Pinto	55	22	25.1	53.7	1,559	1,914	1,739
Windbreaker	Pinto	54	27	27.5	52.2	1,942	1,645	--
Merlot	Small Red	56	21	21.7	48.5	1,589	1,496	1,253
Mean		**57**	**23**	**20.4**	**54.2**	**1653**	**1643**	**1558**
CV %		**1.6**	**23**	**9.7**	**3.3**	**6.1**	**7.5**	**--**
LSD 0.05		**1**	**NS**	**28**	**2.5**	**165**	**177**	**--**

Planted: May 26. Harvested: Sept. 12. Previous crop: oat. Seeding Rate: 100,000 live seeds/acre (approx. 60 lb/a). [1]Days after planting.

2011 Dry Bean Variety Trial - Langdon - Authors, B. Hanson and R. Wilhelmi.

Variety	Market Class	Maturity	100 Seed Weight	Disease	Seed Yield 2009	Seed Yield 2010	Seed Yield 2011	Seed Yield 2-yr. Avg.	Seed Yield 3-yr. Avg.
		(DAP)[1]	(gram)	(1-9)[2]			(lb/a)		
GTS-907	Pinto	95	39.2	3	--	2,780	3,120	2,950	--
La Paz	Pinto	100	36.2	5	3,213	3,100	3,172	3,136	3,162
Lariat	Pinto	97	39.4	4	2,607	3,208	3,124	3,166	2,980
Medicine Hat	Pinto	95	39.7	4	--	2,804	3,024	2,914	--
ND-307	Pinto	97	41.3	1	2,465	2,520	2,428	2,474	2,471
Sante Fe	Pinto	99	47.1	4	--	2,384	3,461	2,923	--
Stampede	Pinto	96	39.2	2	2,408	2,384	3,032	2,708	2,608
Windbreaker	Pinto	95	38.7	3	2,894	2,880	3,076	2,978	2,950
Avalanche	Navy	97	22.3	5	1,824	3,020	2,868	2,944	2,571
Ensign	Navy	99	23.9	2	2,001	2,816	3,472	3,144	2,763
HMS Medalist	Navy	100	18.8	1	--	3,512	3,268	3,390	--
Lightning	Navy	99	24.0	5	--	3,172	3,168	3,170	--
Vista	Navy	98	19.3	4	2,142	3,052	2,564	2,808	2,586
Eclipse	Black	98	22.2	4	1,819	3,016	3,664	3,340	2,833
Zorro	Black	98	22.2	7	--	3,336	3,080	3,208	--
Merlot	Small Red	98	34.8	7	2,402	2,896	2,700	2,798	2,666
Sedona	Pink	100	40.3	5	2,394	2,856	2,628	2,742	2,626
Mean		98	32.3	4	2,379	2,926	3,050	2,988	2,747
CV %		1.2	4.3	76.3	11.1	8.2	14.3	--	--
LSD 0.05		2.0	2.3	NS	429	385	NS	--	--

Planted: June 2. Harvested: Sept. 22. [1]Days after planting. [2]Disease: White Mold, 1 = no disease, 9 = most disease.

2011 Dry Bean Variety Trial - Pembina Co. - Cavalier - (Langdon REC) - Authors, B. Hanson and R. Wilhelmi.

Variety	Market Class	Maturity	100 Seed Weight	Yield 2011
		(DAP)[1]	(gram)	(lb/a)
Avalanche	Navy	94	22.5	2,514
Ensign	Navy	92	24.0	2,544
GTS-544	Navy	93	22.1	3,137
GTS-564	Navy	93	18.3	2,696
HMS Medalist	Navy	93	20.0	2,760
Lightning	Navy	92	22.7	2,351
OB-5551-99	Navy	95	27.0	2,820
Rexeter	Navy	94	20.6	2,806
Skyline	Navy	93	21.9	2,266
Viscount	Navy	94	18.4	2,733
Vista	Navy	94	20.2	2,641
Eclipse	Black	92	20.5	2,458
GTS-1103	Black	93	23.0	2,419
Jaguar	Black	92	20.9	2,768
Loreto	Black	94	21.8	2,878
Zorro	Black	92	21.6	2,559
Mean		**93**	**21.6**	**2,647**
C.V. %		**1.6**	**4.9**	**12.0**
LSD 5%		**NS**	**1.8**	**NS**

Variety	Market Class	Maturity	100 Seed Weight	Yield 2011
		(DAP)[1]	(gram)	(lb/a)
COB-2824-99	Pinto	90	40.7	2,751
COB-816-03	Pinto	94	38.8	2,836
Galeena	Pinto	93	34.7	2,516
GTS-904	Pinto	92	43.5	2,981
GTS-907	Pinto	93	40.9	2,829
La Paz	Pinto	91	38.8	2,505
Lariat	Pinto	93	40.8	3,112
Maverick	Pinto	91	40.3	2,902
Medicine Hat	Pinto	91	41.5	2,815
ND-307	Pinto	93	41.1	2,990
Santa Fe	Pinto	91	43.3	2,996
Sonora	Pinto	92	35.5	2,629
Stampede	Pinto	93	40.8	2,983
Windbreaker	Pinto	91	44.6	2,883
Merlot	Small Red	92	39.0	2,260
Sedona	Pink	93	36.6	2,672
Mean		**92**	**40.1**	**2,791**
C.V. %		**2.0**	**5.4**	**17.0**
LSD 5%		**NS**	**3.6**	**NS**

Planted: June 3. Harvested: Sept. 27.
[1]Days after planting.

2011 Pinto Bean Variety Trial - Dryland - Williston - Authors, G. Bradbury and S. Loomer.

Variety	Days to Flowering	Plant Height	Test Weight	Seed Yield 2009	Seed Yield 2011	Seed Yield 3-yr. Avg.
	(DAP)[1]	(inch)	(lb/bu)		(lb/a)	
La Paz	46	18.3	60.0	--	834	--
Lariat	44	16.1	59.0	643	870	756
Maverick	43	15.6	59.5	617	703	660
Medicine Hat	42	14.9	58.3	--	699	--
ND-307	44	15.7	57.0	474	659	567
Santa Fe	44	15.4	58.4	--	671	--
Stampede	45	16.4	57.8	615	812	713
Windbreaker	43	16.8	56.9	--	584	--
Mean	**44**	**16.2**	**58.4**	**587**	**729**	**674**
CV %	**1.9**	**10.5**	**1.5**	**24**	**13**	**--**
LSD 0.05	**1.2**	**NS**	**NS**	**NS**	**141**	**--**

Planted May 2 into tilled soybean cover crop stubble. Harvested Sept. 22. Data from 2010 not included due to hail damage to plots.
[1]Days after planting.

2011 Navy and Black Bean Variety Trial - Dryland - Williston - Authors, G. Bradbury and S. Loomer.

Variety	Market Class	Days to Flowering (DAP)[1]	Plant Height (inch)	Test Weight (lb/bu)	Seed Yield 2009 (lb/a)	Seed Yield 2011 (lb/a)	Seed Yield 2-yr. Avg.
Eclipse	Black	46	16.8	62.2	--	750	--
Zorro	Black	44	12.8	62.3	--	776	--
Avalanche	Navy	46	13.8	62.3	559	642	600
HMS Medalist	Navy	46	16.0	62.3	--	789	--
Lightning	Navy	45	12.9	62.2	--	729	--
Vista	Navy	46	17.5	62.0	432	758	595
Mean		**45**	**15.0**	**62.2**	**495**	**741**	**598**
CV %		**1.4**	**10.6**	**0.5**	**20.3**	**13.5**	**--**
LSD 0.05		**1.0**	**2.4**	**NS**	**NS**	**NS**	**--**

Planted: May 2. Harvested: Sept. 22. Previous crop: soybean cover crop. 2010 yields not available due to hail damage.
[1]Days after planting.

2011 Pinto Bean Variety Trial - Irrigated - Williston - Authors, T. Tjelde and C. Wahlstrom.

Variety	Days to Flowering (DAP)[1]	Plant Height (inch)	100 Seed Weight (gms)	Seeds/ Pound (seeds)	Test Weight (lb/bu)	Yield 2011 (lb/a)
COB-2824-99	42	14.2	34.9	1,302	61.2	2,292
COB-816-03	45	15.5	32.9	1,379	62.5	2,812
Galeena	44	14.1	32.3	1,405	62.4	2,466
GTS-904	44	14.3	36.5	1,244	61.1	2,753
GTS-907	42	14.2	33.9	1,340	61.4	2,180
La Paz	45	16.7	32.8	1,384	62.6	2,293
Lariat	42	14.2	36.0	1,260	61.3	2,697
Maverick	45	11.7	37.3	1,218	60.7	2,531
Medicine Hat	42	15.7	36.8	1,234	61.0	1,795
ND-307	42	14.6	37.2	1,219	59.1	2,471
Santa Fe	42	15.3	36.6	1,240	59.9	1,795
Sonora	44	15.2	29.3	1,552	62.2	2,026
Stampede	44	18.2	33.5	1,355	61.2	2,371
Windbreaker	42	13.8	36.4	1,248	60.3	2,348
Mean	**43**	**14.8**	**34.7**	**1,313**	**61.2**	**2,345**
CV %	**--**	**11.0**	**3.2**	**--**	**0.5**	**16**
LSD 0.05	**--**	**2.3**	**2.4**	**--**	**0.7**	**536**

Planted: June 6. Harvested: Sept. 22. Previous crop: barley.
[1]Days after planting.

2011 Navy Bean Variety Trial - Irrigated - Williston - Authors, T. Tjelde and C. Wahlstrom.

Variety	Days to Flowering (DAP)[1]	Plant Height (inch)	100 Seed Weight (gms)	Seeds/ Pound (seeds)	Test Weight (lb/bu)	Yield 2011 (lb/a)
Avalanche	44	17.3	18.6	2,442	64.6	1,958
Ensign	45	16.6	23.4	1,941	64.5	2,058
GTS-544	44	14.9	17.4	2,609	65.0	1,946
GTS-564	45	16.0	14.8	3,058	65.1	1,791
HMS Medalist	44	19.3	16.9	2,694	64.5	1,800
OB-5551-99	44	16.6	19.8	2,297	65.1	1,892
Octane	45	17.5	17.0	2,668	64.3	1,606
Skyline	45	14.3	17.6	2,575	65.9	1,308
Viscount	45	18.0	15.4	2,950	65.5	1,943
Vista	44	17.3	15.7	2,892	64.8	1,500
Mean	**45**	**16.8**	**17.7**	**2,613**	**64.9**	**1,780**
CV %	**--**	**5.5**	**7.3**	**--**	**0.5**	**11**
LSD 0.05	**--**	**1.3**	**2.9**	**--**	**0.8**	**278**

Planted: June 6. Harvested: Sept. 22. Previous crop: barley.
[1]Days after planting.

2011 Dry Bean Variety Trial - Irrigated - Williston - Authors, T. Tjelde and C. Wahlstrom.

Variety	Market Class	Days to Flowering (DAP)1	Plant Height (inch)	100 Seed Weight (gms)	Seeds/ Pound (seeds)	Test Weight (lb/bu)	Yield 2011 (lb/a)
Eclipse	Black	45	17.7	17.4	2,603	63.7	2,423
GTS-1103	Black	47	16.5	18.1	2,510	65.4	2,267
Jaguar	Black	45	17.7	15.7	2,893	64.9	1,893
Loreto	Black	47	15.8	16.6	2,740	65.2	2,284
Zorro	Black	45	18.9	17.1	2,659	64.3	2,226
Sedona	Pink	45	14.8	27.6	1,649	60.2	2,390
Merlot	Small Red	48	15.2	33.5	1,355	61.5	2,035
Mean		**46**	**16.7**	**20.8**	**2,344**	**63.6**	**2,217**
CV %		**0.7**	**10.1**	**17.6**	**--**	**0.2**	**13**
LSD 0.05		**0.5**	**2.5**	**9.0**	**--**	**0.3**	**414**

Planted: June 6. Harvested: Sept. 22. Previous crop: barley.
1Days after planting.

Pinto Bean Variety Descriptions.

Class and Cultivar	Origin	RM[1]	Plant Type[2]	Blight Common	Blight Halo[3]	BCMV Type	BCMV NY15[4]	Fusarium Root Rot	White Mold
PINTO									
AC Island	Ag. Can	ME	V	-	-	-	-	-	-
Apache	Idaho Seed Bean	-	-	-	-	-	-	-	-
Baja	Provita	E	V	-	-	-	-	-	-
Bill-Z	CSU	M	V	-	T	R	R	-	S
Buster	Seminis	ME	UV	S	T	R	R	-	S
Croissant	CSU	L	V	-	-	-	-	-	-
Durango	Provita	E	V	-	-	-	-	-	-
Galeena	Provita	L	V	-	-	-	-	-	-
GTS-900	GenTec	L	UV	S	T		-	-	A
GTS-903	GenTec	L	UV	-	-	-	-	-	-
GTS-904	GenTec	L	UV	-	-	-	-	-	-
GTS-907	GenTec	M	UV	-	-	-	-	-	-
Kimberly	U. Idaho	M	V	-	-	-	-	-	-
La Paz	Rogers	L	USV	-	-	-	-	-	-
Lariat	NDSU	L	USV	-	-	R	R	-	A
Long's Peak	CSU	-	-	-	-	-	-	-	-
Mariah	Seminis	ME	UV	-	-	-	-	-	-
Maverick	NDSU	ME	V	S	T	S	S	-	A
Max	Idaho Seed Bean	E	V	-	-	-	-	-	-
Medicine Hat	Seminis	ME	UV	-	-	-	-	-	-
Montrose	CSU	E	V	-	T	R	R	-	S
ND-307	NDSU	M	UV	-	-	R	R	-	-
Odyssey	Idaho Seed Bean	ME	V	-	-	-	-	-	-
Othello	USDA-Prosser	E	V	S	T	R	R	-	S
Pinata	Idaho Seed Bean	VE	V	-	-	R	R	-	A
Quincy	WSU/USDA	M	V	-	-	-	-	-	-
Rally	GenTec	L	UV	-	-	-	-	-	A
Remington	Rogers	ME	UV	S	T	-	-	-	A
Santa Fe	MSU	M	USV	-	-	-	-	-	A
Sequoia	Idaho Seed Bean	ML	USV	-	-	-	-	-	-
Shoshone	U. Idaho	ML	V	S	-	-	-	-	S
Sinaloa	Provita	-	-	-	-	-	-	-	-
Sonora	Provita	E	V	S	-	-	-	-	S
Stampede	NDSU	M	USV	-	-	R	R	-	A
Topaz	Rogers	E	V	S	T	R	R	-	S
Topaz R	Rogers	E	V	S	-	-	-	-	S
Winchester	Rogers	ME	UV	VS	-	-	-	-	A
Windbreaker	Seminis	M	UV	-	-	-	-	-	-
NAVY									
Avalanche	NDSU	ME	USV	-	-	R	R	-	A
CDC Whitecap	U. Sask	M	USV	S	-	-	-	-	S
Cirrus	Hyland	ME	USV	-	-	-	-	-	S
Envoy	GenTec	M	B	-	-	R	R	-	S
Ensign	Roger	M	USV	-	-	R	R	-	-
GTS-544	GenTec	M	USV	-	-	-	-	-	-
GTS-564	GenTec	M	USV	-	-	-	-	-	-

Pinto Bean Variety Descriptions.

Class and Cultivar	Origin	RM[1]	Plant Type[2]	Blight Common	Blight Halo[3]	BCMV Type	BCMV NY15[4]	Fusarium Root Rot	White Mold
NAVY (Continued)									
HMS Medalist	Provita	M	UV	-	-	-	-	-	-
HY 4181	Hyland	-	-	-	-	-	-	-	-
Indi	ADM-Seedwest	M	USV	-	-	-	-	-	-
Lightning	U. of Guelph	M	UV	-	-	-	-	-	-
Mayflower	MSU	ML	USV	-	T	R	R	T	T
Navigator	Rogers	M	USV	-	-	R	R	-	T
Norstar	NDSU	ME	USV	S	T	R	R	-	T
Octane	United Pulse	-	-	-	-	-	-	-	-
Premiere	Ag. Can.	M	UV	S	-	R	R	-	-
Regent	Ag. Can.	ME	UV	S	-	R	R	-	-
Reliant	GenTec	-	-	-	-	-	-	-	-
Rexeter	U. of Guelph	-	USV	-	-	-	-	-	-
ROG 331	Rogers	M	UV	S	-	R	R	-	A
Schooner	Rogers	ML	USV	-	-	R	R	-	S
Seabiskit	ADM	ME	USV	-	-	-	-	-	-
Seahawk	MSU	ML	USV	S	-	R	R	-	T
Skyline	United Pulse	-	-	-	-	-	-	-	-
T9903	Hyland	ME	USV	-	-	-	-	-	-
T9905	Hyland	ME	USV	-	-	-	-	-	-
Viscount	GenTec	-	-	-	-	-	-	-	-
Vista	Ag. Can.	ML	USV	-	-	R	R	-	T
SMALL RED									
AC Earlired	Ag. Can	E	V	S	-	-	-	-	S
AC Scarlet	Ag. Can	ME	USV	S	S	-	-	S	S
Cajun	Rogers	E	UV	-	-	-	-	-	-
Carman	Idaho Seed Bean	E	V	-	-	R	-	-	S
Garnet	Rogers	M	V	-	-	R	R	-	S
Merlot	MSU	ME	USV	S	S	R	R	T	S
Ryder	Rogers	M	USV	-	-	MR	-	-	-
UI-259	U. Idaho	M	V	-	-	-	-	-	S
BLACK									
Black Jack	GenTec	ML	USV	-	-	R	R	-	-
Black Magic	GenTec	L	USV	S	T	R	R	T	T
Black Velvet	Seminis	-	USV	-	-	-	-	-	-
Blackhawk	MSU	L	USV	S	T	R	R	T	T
CDC Jet	U. Sask.	ME	USV	R	-	-	-	T	T
CDC Super Jet	U. Sask.	ME	USV	-	-	-	-	-	-
Condor	MSU	ML	USV	S	S	-	R	R	T
Domino	MSU	L	USV	S	T	R	R	T	T
Eclipse	NDSU	M	USV	-	-	R	R	T	T
GTS-1103	GenTec	-	USV	-	-	-	-	-	-
Jaguar	MSU	M	USV	-	-	R	R	-	T
Loreto	Provita	M	USV	-	-	-	-	-	-
Shania	ADM-Seed West	-	-	-	-	-	-	-	-
T-39	U. Calif.	M	USV	S	T	R	R	T	T
Zorro	MSU	L	USV	-	-	-	-	-	-

Pinto Bean Variety Descriptions.

Class and Cultivar	Origin	RM[1]	Plant Type[2]	Blight Common	Blight Halo[3]	BCMV Type	BCMV NY15[4]	Fusarium Root Rot	White Mold
PINK									
Alberta Pink	U. Alberta	E	V	S	-	S	S	-	S
Flamingo	Idaho Seed Bean	E	V	-	-	-	-	-	S
Floyd	Rogers	ML	V	-	-	-	-	-	S
ROG 922	Rogers	M	V	-	-	R	R	-	S
Rosalee	U. Sask.	E	V	S	-	-	-	-	S
Sedona	MSU/ARS	M	USV	S	-	R	-	R	A
UI-537	U. Idaho	E	V	-	-	R	R	-	S
Viva	USDA-Prosser	M	V	-	-	-	-	R	S
LT RED KIDNEY									
Blush	WSU/USDA	ML	B	-	-	-	-	-	-
California Early (Celrk)	U. Calif.	E	B	S	S	R	R	S	S
Chinook 2000	MSU	M	B	-	T	R	R	S	-
Clouseau	Seminis	M	B	-	-	-	-	-	-
Foxfire	Rogers	ME	B	T	R	R	R	T	T
OAC Inferno	U. of Guelph	-	-	-	-	-	-	-	-
OAC Lyrik	U. of Guelph	ME	B	-	-	-	-	-	-
Pink Panther	Seminis	M	B	-	-	-	-	-	-
Sacramento	Agri-Sales	E	B	S	S	S	S	S	S
DK RED KIDNEY									
Cabernet	Rogers	ML	B	VS	S	R	R	MR	S
Drake	Seminis	M	B	S	S	R	R	S	T
GTS-104	GenTec	M	B	-	-	-	-	-	-
GTS-106	GenTec	M	B	-	-	-	-	-	-
Majesty	Ag. Can.	-	-	-	-	-	-	-	-
Montcalm	MSU	ML	B	TV	TV	R	R	S	T
Redhawk	MSU	M	B	S	T	R	R	-	T
Red Rover	Seminis	ME	B	-	-	-	-	-	-
WHITE KIDNEY									
Beluga	MSU	M	B	S	T	R	R	S	S
Lassen	Agri-Sales	E	B	S	S	R	R	S	S
Silvercloud	WSU/USDA	-	-	-	-	-	-	-	-
GREAT NORTHERN									
Beryl	Rogers	M	V	S	S	-	-	-	S
Gemini	Provita	E	-	-	-	-	-	-	-
Hungerford	U. Idaho	M	V	-	-	-	-	-	-
Matterhorn	MSU	ME	USV	S	T	R	R	-	A
Orion	Provita	E	V	-	-	-	-	-	-
Sawtooth	U. Idaho	L	V	-	-	-	-	-	-
UI-465	U. Idaho	M	V	S	-	R	R	T	S
CRANBERRY									
Bellagio	-	-	-	-	-	-	-	-	-
OTEBO									
Fuji	MSU	E	B	-	-	R	R	-	-
Hime	SK Foods	ME	B	-	-	S	S	-	-

Not all entries appear in the table due to lack of information. [1]RM = Relative Maturity; E = Early; ME = Medium Early; M = Medium; ML = Medium Late; L = Late. [2]V = Vine; UV = Upright Vine; USV = Upright Short Vine. [3]Disease reactions based upon field observations in North Dakota. VS = Very Susceptible; S = Susceptible; T = Tolerant; R = Resistant; MS = Moderately Susceptible; MR = Moderately Resistant: A = Avoidance. [4]BCMV = Bean Common Mosaic Virus reaction with two strains (Type and NY15).

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The Northarvest Bean Growers Association wishes you a successful 2012 growing season.