

2014 Dry Bean Research Report

*Establishing Dry Bean Acreage in
Non-Traditional Regions within the
State of Michigan*



*Michigan Dry Edible Bean Production
Research Advisory Board*

The Michigan Bean Commission was awarded a grant from the MDARD Specialty Crop Block Grant Program-Farm Bill. The title of this project is "Establishing Dry Bean Acreage in Non-Traditional Regions within the State of Michigan". Main areas of study were Dry Bean Variety, Herbicides and Desiccants, Dry Bean Insect Monitoring and White Mold Disease Control.

Expected outcomes from this project are:

1. Identification of adaptable dry bean cultivars suitable for non-traditional areas and white mold tolerance.
2. Define and recommend a dry bean desiccant system that assures maximum dry down.
3. Recommend to growers specific dry bean white mold disease control strategies including varietal tolerance, biological and chemical fungicides.

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Top Back Cover: Black Bean Variety Strip Trial, Alcona County, Duane Dellar Farms
Bottom Back Cover: Nearly 100% White Mold Infection in Eastern Huron County White Mold Control Trial

**BLACK BEAN VARIETY STRIP TRIAL-15 INCH ROWS
GREENFIELD FARMS INC. PIGEON, MICHIGAN**

VARIETY	YIELD	PICK%	MOISTURE	LODGE	HEIGHT	POPULATION
Zorro	27.3	3.6	19.4	2	23.5	118,956
Eclipse	27.2	4.2	18.7	1.5	23.6	117,674
Zenith	26.9	4.5	19.8	2	23.5	123,652
Shania	24.8	3.4	20.2	2.5	23.9	118,483
Loreto	24.2	3.6	20.7	2.5	22.7	119,236
COOP 06252	18.7	8.5	19.8	2.5	23.9	124,768
COOP 04352	17.3	9.3	19.9	2.5	23.1	129,842

Previous Crop: Corn

Planted: June 5

Harvested: September 26

Lodge rating is 1=erect, 5=flat

Pick %=FM+Pick+SO

Planting Population= 128,000

Fertilization=18 gallons of 28%+2 gallons thiosol (AMS)

Herbicides=PPI 1 pt Treflan+1pt Dual+1 qt. Eptam

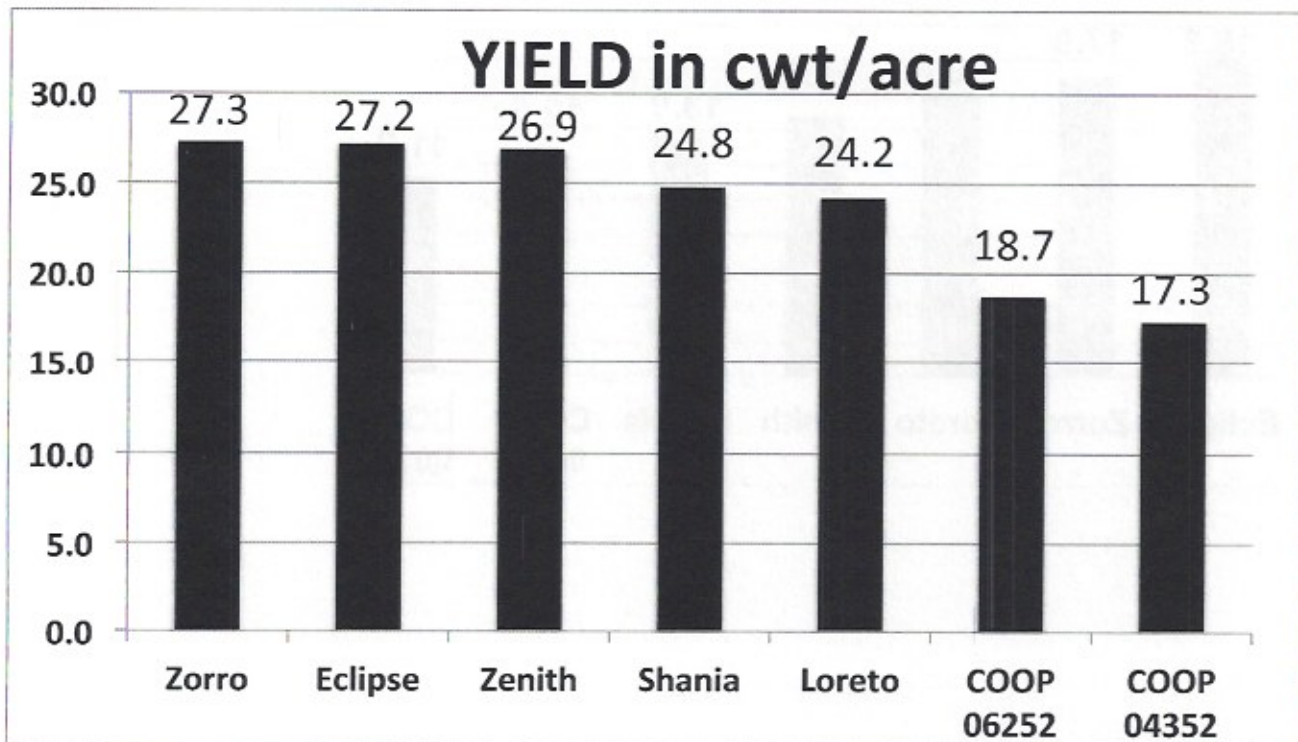
Post= 8 oz Basagran+2 oz Raptor+6 oz Reflex

Fungicides=8 oz Omega

Insecticide=applied with herbicide and fungicide

Harvest Aid=22 oz Roundup

Harvest area=.68 Acres



**BLACK BEAN VARIETY STRIP TRIAL- 22 INCH ROWS
DUANE DELLAR FARM
HARRISVILLE, MICHIGAN**

VARIETY	YIELD	PICK %	MOISTURE	LOGGE	HEIGHT	POPULATION	% WHITE MOLD
Eclipse	18.2	14.5	21.4	1.5	24.6	119,000	80
Zorro	17.0	10.3	22.8	2	24.2	121,000	80
Loreto	16.0	11.9	22.7	2.5	23.4	118,000	85
Zenith	14.7	9.7	21.6	2.5	24.5	131,000	85
Shania	13.9	17.6	22.5	3	25.3	126,000	90
COOP 04352	12.6	17.0	23.3	3	24.5	129,000	85
COOP 06252	11.2	17.6	23.0	3	25.0	134,000	95

Planted: May 29

Harvested: October 23

Lodge rating is 1=erect, 5=flat

Pick %=FM+Pick+SO

Planting Population= 126,000

Fertilization=75 Pounds of 39-5-5/Ac 2x2, 3 gal. High N, 2 gal. Progreen, 5 gal. Sure K

2 qt. Micro 500+2 qt. Enhar Analysis=15 N, 20.5 P, 50.7 K, 7.5 S, 4 Zn, .6 Mn, .25 B, .125 Cu

Herbicide=PPI 1.25 pt. Dual + 1.75 pt Prowl

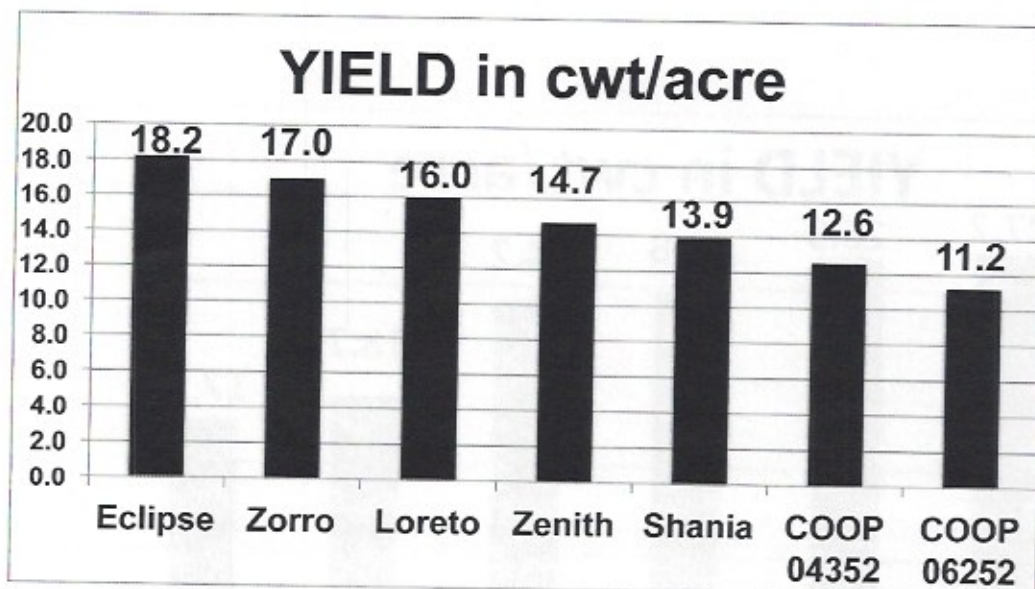
Post= 8 oz Basagran + 12 oz Reflex Later with 8 oz Basagran + 3 oz Raptor

Fungicides=None

Previous Crop: Corn

Harvest Aid=None

Harvest area=1.28 Acres



**BLACK BEAN VARIETY STRIP TRIAL-30 INCH ROWS
TYLER IDALSKI FARM**

HAWKS, MICHIGAN

EXTENSION EDUCATOR-JAMES DEDECKER

VARIETY	YIELD	MOISTURE	FIELD WHITE MOLD	POST-HARVEST W. MOLD
Loreto	10.4	20.8	2	1
Shania	9.4	19.7	4	2
COOP 06252	8.8	19.4	4	2
Eclipse	7.1	20.0	5	4
Zorro	6.6	20.8	5	4
COOP 04352	5.3	20.3	9	5
			(1-10)	(0-5)

Previous Crop:Black BEANS

Planted:June 9

Harvested:October 25

Planting Population= 100,000

Fertilizer=15 gallons of 19-2-4, plus Mn & Zn as starter fertilizer

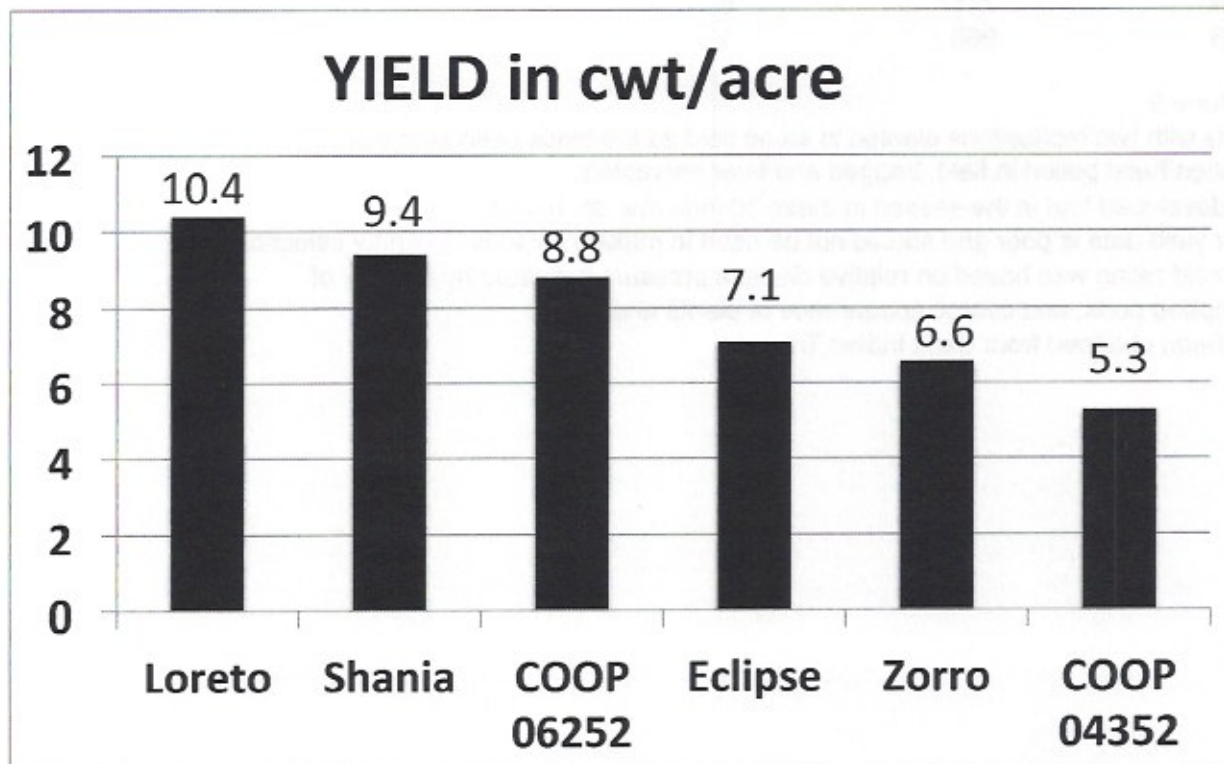
Herbicides=Pre-Plant 22 oz Roundup PowerMAX + 12 oz Outlook + 1.5 pt. Extreme

Post= 12 oz Basagran + 8 oz Reflex + 4 oz Raptor

Fungicides=None

Harvest Aid=2 oz Sharpen

Acres per Variety = 1.5 Acres



DRY BEAN VARIETY OBSERVATION TRIAL-30 INCH ROWS
TYLER IDALSKI FARM **HAWKS, MICHIGAN**
 HAND PLANTED BY EXTENSION EDUCATOR-JAMES DEDECKER

VARIETY-CLASS	YIELD	FIELD WHITE MOLD
ZENITH BLACKS	734	10
ZORRO	714	9
SHANIA	714	9
ECLIPSE	598	4
MSU B12710	598	7
MSU B12724	592	9
MSU B12720	548	8
SAULT (EARLY)	1037	2
MERLIN NAVY	718	5
INDI	713	5
MSU N13140	686	2
MSU N12440	657	7
ALPENA	517	7
MERLOT SMALL RED	620	5
SR 09303	739	6
MONTCALM DRK	712	1
RED HAWK	701	3
RED ROVER	741	6
MSU K11306	968	1

Planted on June 9

Two row plots with two replications planted in same field as the black bean strip trial.

One Replication hand pulled in field, bagged and later harvested.

White Mold developed late in the season in these 30 inch row dry beans.

Reliability for yield data is poor and should not be used in making choices in variety selection.

Field white mold rating was based on relative disease pressure indicated by number of sclerotia, dropped pods, and overall appearance of plants and seed.

Sault Black Bean obtained from Sault Indian Tribe.

2014 White Mold Fungicide Trial
Montcalm Research Center, Entran, Michigan

Treatment	Rate	Application Code	Incidence %infection	Severity %severity	% Pick	YIELD
UTC			70	55	4.2	1618
Proline	5.7 oz	2	48	36	3.1	2192
Proline+Ser Opt	5.7 oz+32 oz	2	48	34	2.5	2201
Pulpulse	8 oz	2	31	20	2.5	2505
Propulse+Ser Opt	8 oz+32 oz	2	32	20	1.9	2707
Endura	8 oz	2	20	12	2.3	2510
Omega	8 oz	2	20	12	2.0	2544
Aproach	12 oz	2	47	33	3.0	2424
Aproach+Endura	12 oz+8 oz	1	31	19	2.7	2517
Aproach+Omega	12 oz+8 oz	1	34	22	4.0	2601
Cruzin+Sun+SN+Bionic	32+26+32+.1 o	2	62	47	4.6	1842
Endura+Omega	8 oz+8 oz	1	33	17	2.8	2458
		LSD .05 =	16	13	1.2	597
		C. V. =	31%	37%	27.5%	17.7%

Application Code:100% or first bloom and 7-10 days after 100% bloom, 1=First Bloom Spray
 Rating Date: % infection "rating" on September 17, % Incidence, %severity
 Merlot Small Red Beans planted in 20" rows. Population of 115,680. Irrigation of two .5 inch per week.
 Planted:June 13 Harvested: September 29, First Spray: August 1, Second Spray: August 8
 Sprayed with 4 row bicycle-wheel CO2 sprayer using 30 gpa at 65 psi.
 Twin-Jet nozzle placed directly over the row. Plot size sprayed was 4 rows by 30 feet.
 Harvest area was middle 2 rows by 15 feet.

2014 Eastern Huron County White Mold Fungicide Trial
Buckley Creek Farms Inc.-Cooperative Elevator Co.-Ruth, MI

Treatment	Rate	Application Code	Incidence %infection	Severity %severity	% Pick	YIELD
UTC			98	94	22.5	222
Proline	5.7 oz	2	91	87	20.3	591
Proline+Ser Opt	5.7 oz+32 oz	2	92	88	20.8	496
Pulpulse	8 oz	2	77	73	9.2	1395
Propulse+Ser Opt	8 oz+32 oz	2	87	84	13.95	627
Endura	8 oz	2	85	82	10.3	830
Omega	8 oz	2	79	71	7.7	1256
Aproach	12 oz	2	92	89	17.3	509
		LSD .05 =	7	12	2.6	331
		C. V. =	6.4%	10.7%	14.3%	21.4%

Ruby (09304) small reds planted in 22 inch rows.
 Planted: June 13, First Spray: July 26, Second Spray: August 6, Harvested: September 26
 Rating Date: % infection "rating" on September 17, % Incidence, %severity

EXPERIMENT 4101 STANDARD NAVY YIELD TRIAL

PLANTING DATE: 6/4/14

Dr. James D. Kelly and Evan Wright, Crops and Soil Sciences, Michigan State University

NAME	PEDIGREE	YIELD CWT 100 SEED DAYS TO DAYS TO LODGING HEIGHT DES.						
		/ACRE	WT. (g)	FLOWER	MATURITY	(1-5)	(cm)	SCORE
N13131	N09175/N08007	40.8	21.7	47.0	94.0	1.0	53.0	5.5
N11264	N08003/MEDALIST	39.9	21.6	46.0	94.0	1.0	48.5	4.0
N12467	N08010/N08007	39.1	17.4	47.0	93.0	1.0	54.5	5.5
N13120	N08003/N05324	39.0	22.7	46.0	94.0	1.5	51.5	5.0
N12447	B09174/N09056	38.9	22.6	46.0	95.0	1.0	55.0	5.8
I14503	OB-1723-03	38.9	18.5	46.0	98.0	2.0	50.5	3.8
N13139	N05324/MEDALIST	38.9	19.9	45.0	94.0	1.5	52.5	4.8
N13142	N08007/N09046	37.7	19.3	48.0	96.0	1.0	52.5	5.5
N12454	B09174/N09056	37.6	21.2	46.0	95.0	1.0	53.0	4.8
N13115	N08003/N05324	37.5	21.1	45.0	94.0	1.5	50.5	5.8
N12457	B09174/N09056	37.1	20.3	46.0	93.0	1.0	49.0	5.3
N11283	MEDALIST/N08003, ALPENA	36.8	19.2	46.0	94.0	1.0	50.5	4.5
N12440	N09056/N09175	36.6	20.6	47.0	95.0	1.0	49.5	5.0
I08902	HYLAND T9905	36.5	22.9	46.0	96.0	1.5	49.5	4.0
I14502	FATHOM	36.1	24.9	41.0	99.0	2.0	49.0	3.0
I14504	OB-4048-03	36.0	19.7	47.0	96.0	2.0	47.5	3.8
N11257	N07009/MEDALIST	35.8	19.2	46.0	93.0	1.0	50.0	5.0
N11298	MEDALIST//B05054/B04588	34.9	21.2	46.0	95.0	1.0	49.5	4.0
I11264	COOP 03019, MERLIN	34.8	20.9	47.0	98.0	2.0	49.5	4.0
N13140	N05324/MEDALIST	34.7	19.3	46.0	94.0	1.0	52.0	4.8
I08958	Mayflower/Avanti, MEDALIST	34.5	19.9	47.0	96.0	1.5	52.5	3.8
N13124	N08007/N05324	34.5	18.9	46.0	94.0	1.0	51.5	5.3
N13122	N08003/N05324	34.4	23.1	45.0	94.0	1.5	51.0	5.0
N12453	N09065/N09050	34.3	21.8	45.0	93.0	1.5	48.5	4.8
N14247	B11343/B11271	33.4	18.9	47.0	95.0	1.0	58.0	5.8
N13135	N10102/N09046	33.3	18.4	48.0	94.0	1.0	50.5	4.8
N12466	N08010/N08007	33.1	17.4	48.0	94.0	1.0	48.0	4.5
N13108	VIGILANT//AVALANCHE/N09054	32.8	21.4	46.0	94.0	1.0	47.5	4.0
N11231	N05311//BMD12/B04587	32.0	17.1	46.0	93.0	1.0	48.0	4.5
I14527	ND070326	31.4	20.9	47.0	94.0	1.0	49.5	4.3
I92002	C-20*3//GTS-0801/Seafarer, VISTA	31.2	19.2	47.0	95.0	2.0	51.0	4.0
I12301	INDI	30.3	18.7	46.0	94.0	1.0	49.0	4.0
N14246	B10238/B11271	30.1	16.9	46.0	93.0	1.0	49.5	5.0
N13136	N10102/B09200	29.2	18.1	43.0	93.0	1.0	48.0	3.8
I13416	ND02-220-01N	28.3	20.4	48.0	93.0	1.5	50.0	2.8
N11277	N08010/N08007	26.2	18.5	48.0	93.0	1.0	50.0	4.0
MEAN (3		34.9	20.1	45.9	94.3	1.3	50.6	4.5
LSD (.05)		4.1	1.0	1.9	1.5	0.6	3.6	0.8
CV (%)		9.9	4.2	2.5	0.9	26.7	4.2	15.7

EXPERIMENT 4103 PRELIMINARY NAVY YIELD TRIAL

PLANTING DATE: 6/4/14

Dr. James D. Kelly and Evan Wright, Crops and Soil Sciences, Michigan State University

NAME	PEDIGREE	YIELD CWT100		SEED DAYS TO FLOWER	DAYS TO MATURITY	LODGING HEIGHT (cm)	DES. SCORE	
		/ACRE	WT. (g)					
N14230	N11275/N11256	45.1	18.4	49.0	95.0	1.7	54.7	6.3
N14231	N11275/N11264	44.0	22.6	46.0	94.0	1.3	53.0	5.3
N14215	N11256/N11292	43.4	20.8	46.0	93.0	1.0	49.0	4.7
N14218	N11256/N11298	42.8	18.9	49.0	94.0	1.0	52.0	5.7
N14202	N11249/N11256	42.7	23.7	48.0	96.0	2.0	54.0	5.7
N14223	N11257/N11256	42.4	18.9	48.0	95.0	2.0	52.7	5.3
N14241	N11283/N11264	42.3	22.2	47.0	93.0	1.3	51.3	4.7
N14209	N11256/N11262	42.2	22.3	46.0	92.0	1.0	52.3	5.3
N14238	N11283/N11249	42.0	20.1	46.0	93.0	1.0	52.7	5.0
I11264	COOP 03019, MERLIN	41.7	21.2	47.0	96.0	1.7	51.3	4.0
N14240	N11283/N11264	41.6	20.3	47.0	93.0	1.3	50.3	4.7
N14208	N11256/N11262	41.6	21.9	45.0	92.0	1.0	51.7	4.7
N14229	N11275/N11256	41.5	18.0	46.0	94.0	1.0	52.7	6.0
N14206	N11256/N11258	41.5	20.0	46.0	93.0	1.0	50.3	5.7
N14212	N11256/N11262	41.3	20.9	47.0	94.0	1.0	50.7	5.7
N14243	N11284/N11277	41.2	19.6	48.0	93.0	1.0	51.7	5.7
N14214	N11256/N11278	40.9	24.2	47.0	94.0	1.7	52.7	3.7
N14217	N11256/N11292	40.8	18.1	47.0	93.0	1.0	52.0	5.7
N14201	N11249/N11256	40.8	19.2	49.0	95.0	1.3	54.7	6.0
N14216	N11256/N11292	40.3	20.0	47.0	93.0	1.0	50.0	5.3
N14205	N11256/N11258	40.2	19.7	46.0	93.0	1.0	50.7	5.3
N14221	N11257/N11249	40.1	20.9	46.0	94.0	1.0	51.7	5.3
N14224	N11257/N11280	40.0	19.2	47.0	93.0	1.0	50.3	5.0
N14210	N11256/N11262	39.9	24.3	46.0	93.0	1.0	52.0	5.3
N14204	N11256/N11249	39.7	17.6	46.0	93.0	1.0	51.0	5.0
N14233	N11277/N11282	39.6	19.9	45.0	92.0	1.0	50.0	4.3
N14219	N11257/N11249	39.5	19.5	45.0	94.0	1.0	52.3	5.3
N14242	N11283/N11282	39.3	20.7	47.0	93.0	1.0	48.7	4.0
N14225	N11257/N11280	39.1	20.8	46.0	94.0	1.3	52.0	5.3
N11283	MEDALIST/N08003, ALPENA	39.0	19.4	47.0	94.0	1.0	51.3	5.0
N14228	N11262/N11257	38.8	20.0	46.0	92.0	1.0	49.7	5.0
N14222	N11257/N11256	38.8	19.1	47.0	93.0	1.0	49.3	5.0
N14239	N11283/N11264	38.5	20.2	46.0	93.0	1.0	50.0	4.7
N14234	N11277/N11284	37.9	21.5	47.0	93.0	1.0	50.0	4.7
N14226	N11258/N11262	37.7	19.9	45.0	93.0	1.0	48.7	5.0
N14237	N11283/N11249	37.5	20.5	47.0	92.0	1.0	49.0	4.3
N14211	N11256/N11262	37.1	17.2	47.0	92.0	1.3	50.3	5.0
N14213	N11256/N11278	37.0	18.7	47.0	93.0	1.0	48.7	5.0
N14232	N11275/N11264	37.0	21.8	47.0	93.0	1.0	51.0	4.3
I08958	Mayflower/Avanti, MEDALIST	36.9	20.5	46.0	95.0	1.3	51.0	4.3
N14235	N11277/MERLIN	36.8	18.2	50.0	93.0	1.0	49.7	5.7
MEAN (48)		39.3	19.9	46.4	93.4	1.1	50.9	5.0
LSD (.05)		3.8	0.8	1.5	0.9	0.3	2.0	0.8
CV (%)		7.1	3.0	1.9	0.7	20.5	2.9	11.0

EXPERIMENT 4102 STANDARD BLACK YIELD TRIAL

PLANTING DATE: 6/4/14

Dr. James D. Kelly and Evan Wright, Crops and Soil Sciences, Michigan State University

NAME	PEDIGREE	YIELD CWT 100 SEED DAYS TO DAYS TO LODGING HEIGHT DES.						
		/ACRE	WT. (g)	FLOWER MATURITY	(1-5)	(cm)	SCORE	
B12720	B09175/Eclipse	46.1	26.7	47.0	94.0	1.0	50.5	5.0
B13218	B09175/I09215	43.7	28.6	47.0	96.0	1.5	53.5	5.0
B12724	B09184/B09135	43.5	22.5	47.0	95.0	1.0	51.5	5.5
B11371	B05055/B04587	42.9	22.1	47.0	95.0	1.0	52.0	5.8
B11363	B04644/B07554	41.3	22.8	48.0	94.0	1.0	51.5	4.8
I14528	ND071206	41.2	23.4	48.0	97.0	2.0	52.0	3.8
B13223	PR0443-151/B09175	41.1	24.4	47.0	96.0	2.0	52.5	5.5
B13225	PR0443-151/B09175	41.0	24.2	47.0	96.0	2.0	53.0	4.8
B12715	Zorro/N09056	40.3	21.0	46.0	93.0	1.0	49.0	4.0
I13436	GTS-1103	39.5	23.7	48.0	96.0	2.0	52.5	4.0
B13204	B09174/VCW54-1	39.2	27.5	47.0	96.0	2.0	51.0	5.0
B13220	B09175/TARS-MST1	38.4	22.5	46.0	94.0	1.5	51.0	5.0
I07116	T-39/Midnight, SHANIA	37.8	20.7	48.0	97.0	2.0	51.0	3.3
I14518	96-148	37.5	25.6	48.0	96.0	1.5	51.0	2.5
B12712	B07554//Jaguar/B07554	37.4	21.2	46.0	93.0	1.5	50.5	4.8
I03390	ND9902621-2, ECLIPSE	37.4	20.9	47.0	93.0	1.0	51.5	4.5
I13419	NDF09304	37.1	19.2	46.0	93.0	1.0	48.5	4.8
B11311	B04587//ZORRO/DPC-1	36.8	20.2	47.0	94.0	1.0	50.0	5.0
B04554	B00103*/X00822, ZORRO	35.5	22.2	48.0	95.0	1.0	53.0	4.5
I14505	COB-83-03	35.2	23.0	47.0	95.0	1.5	49.0	3.5
B11364	B04644/B07554	35.1	22.7	47.0	94.0	1.5	51.0	4.3
B12711	B07554//Jaguar/B07554	35.1	23.7	48.0	93.0	1.0	49.5	4.3
B11312	B04587//B05070/B05044	34.3	21.9	47.0	94.0	1.0	48.5	4.0
B13213	B09175/JAGUAR	34.3	26.0	47.0	93.0	1.0	46.5	3.8
B10244	B04644/ZORRO, ZENITH	34.2	22.0	47.0	92.0	1.0	50.5	4.0
B12710	B07554//Jaguar/B07554	33.0	24.1	47.0	93.0	1.0	46.0	3.8
B12721	B09175/Eclipse	32.8	24.3	47.0	93.0	1.0	49.0	4.5
I81066	SEL-BTS, T-39	30.5	21.3	48.0	96.0	3.0	46.0	2.8
I14506	COB-698-03	28.4	22.5	47.0	94.0	1.5	44.5	3.5
B12713	B07554//Jaguar/B07554	28.2	20.8	47.0	92.0	1.0	46.5	4.0
MEAN (30)		37.3	23.0	46.9	94.2	1.4	50.1	4.3
LSD (.05)		3.3	1.4	1.0	1.9	0.6	3.1	0.7
CV (%)		7.6	5.0	1.3	1.2	24.7	3.6	12.9

EXPERIMENT 4104 PRELIMINARY BLACK YIELD TRIAL

PLANTING DATE: 6/4/14

Dr. James D. Kelly and Evan Wright, Crops and Soil Sciences, Michigan State University

NAME	PEDIGREE	YIELD CWT100 SEED DAYS TO DAYS TO LODGING HEIGHT DES.						
		/ACRE	WT. (g)	FLOWER MATURITY	(1-5)	(cm)	SCORE	
B14311	B11338/B10241	51.3	22.0	47.0	94.0	1.0	51.7	5.7
B14302	B09197/B11334	49.5	19.5	49.0	94.0	1.0	52.0	6.7
B11555	I82054/B07554	49.4	26.4	47.0	97.0	1.3	50.3	3.7
B14303	B09197/B11334	46.1	20.6	48.0	94.0	1.0	52.3	6.0
B14307	B11271/B11343	44.9	25.5	47.0	93.0	2.0	53.7	4.7
B14310	B11338/B10241	44.9	20.7	47.0	93.0	1.0	48.7	5.3
B10244	B04644/ZORRO, ZENITH	43.1	23.6	48.0	93.0	1.0	50.0	4.7
B14308	B11301/B10222	43.0	21.0	51.0	94.0	1.0	52.0	5.7
B11569	I82054/B07554	42.9	23.9	49.0	99.0	2.0	53.3	3.3
B14309	B11338/B10222	42.8	19.1	47.0	94.0	1.0	52.3	5.0
B11551	I82054/B07554	42.6	31.9	49.0	99.0	2.7	49.0	3.3
B11548	I82054/B07554	41.7	24.1	50.0	103.0	2.0	54.7	3.3
B14313	B11343/B09196	41.6	20.2	48.0	93.0	1.0	50.0	5.7
B14312	B11343/B09196	41.6	18.5	47.0	93.0	1.0	49.7	4.7
B11519	I82054/B07554	41.5	22.3	50.0	95.0	1.3	47.3	4.0
B04554	B00103*/X00822, ZORRO	41.4	22.5	47.0	95.0	1.3	50.7	4.7
B14316	I11265/B10202	41.2	18.5	51.0	93.0	1.0	49.3	4.7
I07116	T-39/Midnight, SHANIA	40.7	22.4	49.0	97.0	2.0	52.0	4.0
B95556	B90211/N90616, JAGUAR	40.4	21.1	47.0	92.0	1.0	49.3	4.0
B14304	B10213/B11271	38.0	19.8	50.0	94.0	1.7	52.3	5.7
B11567	I82054/B07554	38.0	24.2	52.0	96.0	2.0	50.3	3.7
B14314	B09197//B10203/I09129	37.6	23.6	49.0	94.0	1.7	51.0	5.0
B14301	N11277/B09197	37.6	21.1	48.0	93.0	1.0	48.0	5.0
B14305	B10213/B11343	36.4	20.1	49.0	92.0	1.0	49.3	4.7
B14315	B09197//B10203/I09129	36.0	20.5	48.0	93.0	2.0	48.3	4.7
I81010	JAPON3/MAGDALENE, BUNSI	34.0	22.4	40.0	98.0	2.7	45.0	3.3
B14306	B10222/B09197	31.2	19.2	51.0	93.0	1.0	51.0	5.0
I07112	R99 NO NOD	28.5	20.1	47.0	95.0	1.3	49.3	3.7
B14318	Zorro*3/R99	13.6	19.1	47.0	101.0	1.3	51.0	3.3
B14324	Zorro*3/R99	12.2	19.2	48.0	100.0	1.3	49.3	3.3
B14323	Zorro*3/R99	10.5	19.8	48.0	100.0	1.0	49.0	3.3
B14319	Zorro*3/R99	10.4	19.3	49.0	101.0	1.0	49.3	3.3
B14320	Zorro*3/R99	10.4	17.8	49.0	101.0	1.3	51.3	3.0
B14317	Zorro*3/R99	10.2	19.6	48.0	97.0	1.0	47.3	3.3
B14321	Zorro*3/R99	10.0	17.9	48.0	99.0	1.0	48.3	3.7
B14322	Zorro*3/R99	8.8	17.8	48.0	101.0	1.0	49.0	3.0
MEAN (3		34.3	21.3	48.0	95.9	1.4	50.2	4.3
LSD (.05)		6.5	1.6	1.1	2.2	0.2	1.6	0.3
CV (%)		14.0	5.5	1.3	1.7	11.0	2.3	5.7

2014 MICHIGAN DRY BEAN TRIALS
 Compiled by Gregory V. Varner, Dry Bean Research Director

COUNTY & COOPERATOR: ALCONA-Duane Dellar Farm; BAY-Schindler Farms
 GRATIOT-Hoard Farms; HURON-D&D Farms; MONTCALM-Andy Porter Farm
 SANILAC-Wadsworth Farms; TUSCOLA-Zimmer Farms

PLANTING DATES											White
VARIETY-NAVY	DAYS	ORIGIN	June 4	June 13	June 9	June 6	June 14	June 5	June 5	2014 AVE	Mold 1st
			ALCONA	BAY	GRATIOT	HURON	MONTCALM	SANILAC	TUSCOLA	7-4 LOC	Lodge 2nd
HMS MEDALIST	100-108	COOP	2091	3408	3336	1494	1997	3028	2541	2556-2618	3-2.3
MERLIN	100-110	COOP	2312	3473	3509	1612	2051	2024	2892	2553-2500	3-2.5
HYLAND T9905	98-105	HYLAND	2211	3404	3390	919	1808	2031	2554	2331-2227	3.6-3.0
INDI	95-105	ADM	2600	3211	2944	1315	1897	1361	2731	2294-2155	2.5-1.3
Alpena	99-105	MSU	2285	3208	2531	1139	1398	2291	2097	2136-2184	3.1-2.3
GTS OB-1723-03	100-110	GTS	2390	3431	3100	1112	1684	2057	2545	2331-2286	3.1-3.0
GTS OB-4048-03	97-107	GTS	1910	3197	3047	895	1679	2696	1770	2271-2140	3.9-3
VIGILANT	97-105	COOP/ADM	2655	3419	3634	1373		1987	2400	2295	4-2.0
REXETER	102-110	OAC-HDC				1291		1592	2799		3.5-2.5
NAUTICA	100-105	OAC-HDC				1428		2302	2653		3-2.5
MIST	100-106	OAC-HDC				2023		2433	3526		1.9-2.5
FATHOM	97-102	OAC-HDC				584		1385	1652		4.3-2.0
COOP 99039-3	99-105	COOP		3576		1263		1543	2657	2260	3.3-3.0
COOP 03036	99-106	COOP		3379		1388		2313	2462	2386	3.6-2.8
COOP 06063	98-106	COOP		3935		1482		1721	2495	2408	3.3-2.5
COOP 07073	97-105	COOP		3200		715		1664	2130	1927	4.3-3.3
COOP 08070	99-107	COOP		3576		2099		2373	3749	2949	3.3-3
COOP 08072	97-105	COOP		2997		1628		2631	2650	2477	3-2.5
COOP 12039	99-105	COOP		3813		1991		2506	2726	2759	3-3.0
COOP 12041	100-108	COOP		3405		1929		3080	3745	3040	2.4-2.0
COOP 12047	100-107	COOP		3226		1933		1931	3557	2662	2.4-2.3
COOP 12051	97-105	COOP		3302		996		2221	2424	2236	4.1-2.5
COOP 12059	100-108	COOP		3694		1121		2023	2963	2450	3.1-2.5
ADM N8118340	99-106	ADM		3413		1402		2504	2527	2462	3.1-1.8
ADM N8120345	100-107	ADM		3443		1284		1840	2443	2253	3.3-2.0
ADM N5023584	99-107	ADM		2748		1596		2083	3336	2441	2-1.8
ADM N8118321	98-105	ADM				1303			2713		2.8-1.5
ADM N8118339	99-105	ADM				1474			2627		3.1-2.0
ADM N9007081	100-105	ADM				1345			2747		2.4-1.0
ADM N9029100	98-104	ADM				1362			2618		2.9-2.3
SEM NAVC6V1200	99-106	SEMINIS				1071		3160	2338		2.9-2.3
MSU N12440	99-105	MSU		3027	3329	555			2022		4-2.8
MSU N13140	99-107	MSU		3496	3391	2146			2978		2-2.3
MSU N11238	96-104	MSU		3075	2446	919			2142		3.9-2.0
			lsd=629	lsd=440	lsd=601	lsd=518	lsd=688	lsd=1267	lsd=606		white
			cv-18.6%	cv-9.3%	cv-13.2%	cv-27.2%	cv-25.9%	cv-41.3%	cv-16.3%	2014 AVE	mold 1st
BLACK	DAYS	ORIGIN	ALCONA	BAY	GRATIOT	HURON	MONTCALM	SANILAC	TUSCOLA	7-4 LOC	Lodge 2nd
ZORRO	99-110	MSU	2100	3701	3173	1205	1968	2682	2103	2419-2423	3.1-2.0
SHANIA	102-110	ADM	2205	3725	3358	1261	1925	3393	2155	2575-2634	3.3-2.8
LORETO	98-110	COOP-PRO	2032	3259	2766	1379		3574	2459	2668	3.5-2.5
ZENITH B10244	97-108	MSU	2374	3484	3530	1344	1585	3461	2372	2593-2665	3.3-1.8
GTS COB-83-03	99-109	GTS	1404	2917	2896	1361	2297	2933	1673	2212	3.5-2.8
GTS COB-698-03	96-104	GTS	1719	2544	2883	600	1386	2323	1576	1962	4-3.3
ECLIPSE	95-104	NDSU	1983			802		2186	2275		3.1-1.5
BL 04352	97-104	PROVITA		3240		807		2912	1945	2226	3.9-2.3
BL 06252	98-106	PROVITA		2727		819		2305	1825	1919	3.8-2.5
BL 11353	96-102	PROVITA		2787		1015		2743	1805	2088	3.6-2.0
BL 11355	97-104	PROVITA		3284		1491		2601	1921	2324	3.4-3.0
BL 12576	98-104	PROVITA		3435		1089		3226	2393	2536	4-2.5
BL 12577	97-103	PROVITA		3062		1401		2879	1976	2330	3.8-1.8
BL 12579	98-104	PROVITA		2986		1217		2871	1950	2256	3.4-2.3
BL 12581	99-105	PROVITA		3268		1134		2413	2002	2204	3.5-2.8
BL 13489	97-103	PROVITA		3373		831		2607	2048	2215	4.4-2.8
BL 13505	97-103	PROVITA		3373		939		1979	1974	2066	4-2.3
BL 13506	99-106	PROVITA		3137		801		2626	2070	2159	3.3-1.8

BLACK continued	DAYS	ORIGIN	ALCONA	BAY	GRATIOT	HURON	MONTCALM	SANILAC	TUSCOLA	2014 AVE	W.M.+lodge
MSU B12710	97-102	MSU	2864	3538		1083		2839	2548	2502	2.8-1.8
MSU B12720	97-103	MSU	2423	3258		1012		3753	2041	2516	3.8-2.0
MSU B12724	98-103	MSU	2123	3483		935		2627	2077	2281	3.5-2.0
ADM B8039279	99-105	ADM		2683		854		2105	1995	1909	3.5-1.3
ADM B8006282	98-104	ADM				1164			1994		3.4-2.0
ADM B8052293	99-106	ADM				1544			2413		2.9-1.8
ADM B8090330	99-105	ADM				1552			2837		2.8-1.8
SEM BKBC6V1312	98-105	SEMINIS				861		1788	2480		3.9-2.3
ND071206	99-104	NDSU				946		3225	2351		3.8-2.0
NDF090303	100-106	NDSU				1796		2429	2454		2.4-2.0
T-39	96-103	CAL	1457	3010		1273			1966		3.9-3.0

lsd=754 lsd=603 lsd=895 lsd=453 lsd=770 lsd=1012 lsd=469
cv-25.3% cv-13.4% cv-19.2% cv-28.8% cv-27.3% cv-26.2% cv-15.7%

SMALL RED

MERLOT	DAYS	ORIGIN	ALCONA	BAY	GRATIOT	HURON	MONTCALM	SANILAC	TUSCOLA	2014 AVE	W.M.+lodge
SR 09303	99-103	PROVITA		3873	3224	1267	1334	1821	2107	2211-1965	3.4-2.8
RUBY SR 09304	98-103	PROVITA		3036		1494		2554	2181	2526	4-3.0
SR 11511	101-108	PROVITA				1495		2045	1801	2094	4.4-3.8
RIO ROJO	90-99	NDSU	3364			1885		2601	2434		2.9-3.0
MSU R12844	95-100	MSU				2587		3392	2636		2-2.5
MSU R12859	94-99	MSU	3127	2463	2765	1835	1330	2385	2830		2.4-2.0
MSU R13526	95-100	MSU				1392		1572	2890	2220-2079	3.4-1.8
MSU R13538	96-100	MSU				1648		2109	2882		3-2.3

lsd=470 lsd=378 lsd=471 lsd=700 lsd=604
cv-11.1% cv-7.9% cv-19.7% cv-21.0% cv-17.5%

PINTO	DAYS	ORIGIN	ALCONA	BAY	GRATIOT	HURON	MONTCALM	SANILAC	TUSCOLA	4 LOC	W.M.+lodge
ELDORADO	103-108	MSU		3272	4242		3315	3339		3542	2.3-2.5
LA PAZ	96-101	PROVITA		3581	3772		1485	2428		2817	4.3-3.0
LARIAT	97-103	NDSU		3071	4231		2290	2645		3059	4.6-3.5
MEDICINE HAT	90-92	SEMINIS		2030	3367		2111	2159		2417	3.1-2.0
MSU P12603	99-104	MSU		2726	2951		1709	2367		2438	3.8-2.8
MSU P11519	99-106	MSU		3000	3630		2287	2587		2876	3.5-2.3
Sem-PIN-DJ091012	94-95	SEMINIS		2705	3232						N/A

lsd=704 lsd=866 lsd=438 lsd=459
cv-16.3% cv-16.0% cv-13.2% cv-11.8%

GREAT NORTHERN

POWDERHORN	DAYS	ORIGIN	ALCONA	BAY	GRATIOT	HURON	MONTCALM	SANILAC	TUSCOLA	W.M.+lodge
MSU G11438	93-94	MSU	2862	2880		1962	1433	2411		3.8-2.0
MSU G13424	93-94	MSU		2795		1790		2338		3-2.0
MSU G13467	95-99	MSU		2798		696		1870		3.5-2.0
				3220		1688		2731		3.5-2.0

lsd=901 lsd=641 lsd=971
cv-26.1% cv-26.1% cv-26.0%

PINK

ROSETTA	DAYS	ORIGIN	ALCONA	BAY	GRATIOT	HURON	MONTCALM	SANILAC	TUSCOLA	W.M.+lodge
MSU S12911	96-103	MSU		2160		2217		2849	2684	2.6-2.5
PK 11544	94-101	MSU				2116		2553	2774	2.5-2.3
	93-100	PROVITA				1989		1822	2423	2.9-3.0

lsd=908 lsd=798 lsd=373
cv-24.9% cv-19.2% cv-8.2%

TEBO

FUJI	DAYS	ORIGIN	ALCONA	BAY	GRATIOT	HURON	MONTCALM	SANILAC	TUSCOLA	W.M.+lodge
MSU G12901	103-105	MSU		1274	2441		844			
GTS OB-543-09	101-109	MSU	2828	1877	2158		1179			
	104-105	GTS		1395	2476		1216			

lsd=901 lsd=1007 lsd=689
cv-26.1% cv-24.7% cv-36.9%

CRANBERRY

ETNA	DAYS	ORIGIN	ALCONA	BAY	GRATIOT	HURON	MONTCALM	SANILAC	TUSCOLA	W.M.+lodge
KRIMSON	89-91	SEMINIS			1767		2446			
CHIANTI vine	92-94	BASIN			1877		1969			
BELLAGIO vine	100-106	SEMINIS			1872		2262			
BRB-DJ091031	102-108	MSU			1518		2124			
BRBCV61261	90-91	SEMINIS			1687		2187			
SEM 08570929	92-95	SEMINIS			1738		2680			
MSU C11266	89-91	SEMINIS			1726		2967			
MSU C11269	91-94	MSU			1870		2318			
	91-93	MSU			1602		2411			

lsd=692 lsd=362
cv-27.3% cv-10.4%

<u>LIGHT RED KIDNEY</u>	DAYS	ORIGIN	BAY	GRATIOT	MONTCALM
CALIF ELRK	91-93	CAL		2285	2448
PINK PANTHER	93-96	SEMINIS		2104	2171
CLOUSEAU	94-96	SEMINIS		2479	3186
INFERNO	108-110	OAC-HDC		4054	2081
MSU K11709	92-94	MSU		2235	2215
MSU K13602	92-95	MSU		2735	1474
GTS-IG-INF	108-110	GTS		4157	1781
LRK 09351	93	PROVITA			2494
LRK 09354	102	PROVITA			1793
LRK 09360	100	PROVITA			2357
LRK 09383	92	PROVITA			2143
LRK 09378	93	PROVITA			2340
ND 061106	95-105	NDSU			1623

2880
 lsd=905
 cv-21.5%
 GRATIOT

<u>DARK RED KIDNEY</u>	DAYS	ORIGIN	BAY	GRATIOT	MONTCALM
RED HAWK	95-102	MSU		2499	2419
MONTCALM	102-105	MSU		2407	1919
RED ROVER	93-94	SEMINIS		2632	2295
DYNASTY	98-104	OAC-HDC		3104	2328
KDD-DJ091013	92-95	SEMINIS		1941	1964
KDD-DJ091030	93-94	SEMINIS		2219	2177
MSU K11306	95-103	MSU		2752	2413
GTS 104	105-106	GTS		2644	2153
ND061210	95-103	NDSU		2669	2287
DRK 09423	104	PROVITA			1474
DRK 09424	106	PROVITA			1822
DRK 09429	106	PROVITA			2111
DRK 09430	106	PROVITA			1971
DRK 09431	104	PROVITA			1577

lsd=740
 cv-20.0%
 GRATIOT

<u>ALUBIA-W. KID.</u>	DAYS	ORIGIN	BAY	GRATIOT	MONTCALM
BELUGA	103-105	MSU	1800	2240	1900
SNOWDON	89-92	MSU	1505	2058	2969
YETI	110-112	OAC-HDC		2615	1723
MSU K11914	93-94	MSU	2250	1943	2379
MSU K11916	93-94	MSU	1452	1853	2460
MSU K13902	94-95	MSU	1847	2253	2983

lsd=625 lsd=895 lsd=761
 cv-22.9% cv-27.5% cv-21.0%

<u>ADZUKI</u>	DAYS	ORIGIN
ERIMO	106	JAPAN

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Maturity days = planting until harvest in 2014
 Direct Cut Lodging Ratings = 1-erect, 5-laying flat on ground.
 White Mold Rating = 1-10% mold, 5-100% mold.
 White Mold Rating from Tuscola, Huron, Montcalm and Alcona Co.
 Alcona, Bay, Huron, Sanilac and Tuscola were direct harvested.
 Gratiot and Montcalm navies, blacks, pintos and sm. reds were direct
 harvested and large colored beans were hand pulled and harvested.

ORIGIN KEY
 MSU=MICHIGAN STATE UNIVERSITY
 GTS=GEN-TEC SEEDS LIMITED
 SEMINIS=SEMINIS SEEDS=MONSANTO
 ADM==ARCHER DANIELS MIDLAND=SEEDWEST
 HYLAND=HYLAND SEEDS, LIMITED
 COOP=COOPERATIVE ELEVATOR-PROVITA
 CAL=UNIVERSITY OF CALIFORNIA-DAVIS
 USDA=UNITED STATES DEPT. OF AGRIC.ARS
 NDSU=NORTH DAKOTA STATE UNIVERSITY
 OAC-HDC UNIV. of GUELPH-HENSALL DISTRICT COOP
 PROVITA=PROVITA SEEDS
 BASIN==BASIN SEED COMPANY
 JAPAN==PURITY FOODS INC.

DRY BEAN CHARACTERISTICS

Greg Varner, Michigan Dry Edible Bean Production Research Advisory Board														
Variety	Class	Plant Type	Maturity	Origin	BCMV	73	Anthracoze	Canning Quality	White Mold	Halo Blight	Common Blight	Rust	Air Pollution	Direct Cut-Rating
Medalist	N	USV	F	COOP/ADM	R-I	S	R	3	2	R	S	T	T	2
Vigilant	N	USV	F	COOP/ADM	R-I	S	R	3	2	R	S	T	T	2
Hyland T9605	N	USV	M	HYLAND	R-I	S	R	2	2	R	S	T	T	2
Merlin	N	USV	M-F	COOP/ADM	R-I	S	R	3	2	R	S	T	T	2
Incl	N	USV	M-F	ADM	R-I	S	R	3	2	R	S	T	T	1
Othello	P	V	E	USDA	R	S	S	4	3	T	S	S	S	5
Buster	P	USV	M	SEMINIS	R-I	S	S	2	3	T	S	R	T	3
La Paz	P	USV	M	ADM	R	S	S	3	2	T	S	R	T	2
Larial	P	USV	M	NDSU	R	S	S	3	3	T	S	R	T	3
Eldorado	P	USV	F	MSU	R	S	S	3	1	T	S	R	T	2
T-39	B	SV	F	UCD	R-I	S	S	3	3	R	S	T	T	4
Jaguar	B	USV	F	MSU	R-I	R	R	5	2	R	S	T	T	3
Black Velvet	B	USV	F	SEMINIS	R-I	S	R	4	3	R	S	T	T	2
Zorro	B	USV	F	MSU	R-I	S	R	5	2	R	S	T	T	2
Eclipse	B	USV	M	NDSU	R-I	S	R	4	2	R	S	T	T	2
Shania	B	USV	F	ADM	R-I	S	?	3	3	R	S	T	T	2
Lovelo	B	USV	F	COOP/ADM	R-I	R	R	3	2	R	S	T	T	2
Chinook 2000	LRK	B	F	MSU	R-I	R	R	3	2	R	S	T	T	6
Calif ELRK	LRK	B	E	UCD	R-I	R	S	3	2	S	S	T	T	6
Clouseau	LRK	B	M	SEMINIS	R-I	R	S	3	2	S	S	T	T	6
Pink Panther	LRK	B	M	SEMINIS	R-I	R	S	3	2	S	S	T	T	6
Montcalm	DRK	B	F	MSU	R-I	R	S	4	2	R	T	T	T	6
Red Hawk	DRK	B	F	MSU	R-I	R	R	4	2	T	S	T	T	6
Red Rover	DRK	B	F	SEMINIS	R-I	R	R	4	2	S	S	T	T	6
Etha	C	B	E	SEMINIS	R-I	R	S	2	2	S	S	T	T	6
Chiantl	C	SV	M	SEMINIS	R-I	S	S	5	3	S	S	T	T	6
Bellagio	C	SV	F	MSU	R-I	R	S	5	3	S	S	T	T	6
Capri	C	B	M	MSU	R-I	R	S	3	3	S	S	T	T	6
Menot	SR	USV	M	MSU/USDA	R	S	S	4	2	R	S	T	T	2
Ruby 09304	SR	USV	M	COOP/ADM	R	S	S	2	4	R	S	T	T	3
Rosetta	PK	USV	M	MSU	R-I	S	S	3	3	R	S	T	T	3
Tebo	W	B	M	JAPAN	S	R	S	2	3	T	S	S	S	4
Fuji Tebo	W	B	M	MSU	R-I	R	S	3	3	T	S	S	S	4
Beluga	WK-AL	B	F	MSU	R-I	R	S	3	3	S	S	T	T	6
Snowdon	WK-AL	B	E	MSU	R-I	R	S	3	3	S	S	T	T	6
Aurora	SW	SV	M	CUNY	R-I	S	S	3	3	R	S	R	S	4

Plant Type: B=Bush, SV=Short Vine, USV=Upright Short Vine, V=Vine

Maturity: E=Early (less than 88 days), M=Mid-Season (89-95 days), F=Full Season (96-102 days), L=Late Full Season (greater than 102 days)

Canning Quality: 1=Fair, 2=Good, 3=Excellent

White Mold: 1=Less than 10% infection, 2=Less than 20% infection, 3=20-40% infection, 4=40-60% infection, 5=Greater than 60% infection

Direct Cut Rating: 1=Very erect, 2=lodging, pods off ground, 3=lodging, pods close to ground, 4=high yield loss, 5=severe yield loss, 6=not recommended

JAN-2015

Harvest aid effects on black bean desiccation and yield with early planting

Amanda Goffnett and Christy Sprague, Michigan State University

Location: Richville (SVREC)	Tillage: Conventional
Planting Date: June 5, 2014	Variety: Zorro, Zenith and Eclipse black bean
Replicated: 4 times	Population: 106,000 seeds/A
Soil Type: Clay loam, 3% OM, pH 7.6 (SVREC)	Row width: 30-inch

Table 1. Effect of preharvest treatment on black bean desiccation 3 and 7 days after treatment (DAT) and yield for early planting.

Treatment	Desiccation				Yield ^a	
	%				cwt/A	
	3 DAT ^b		7 DAT		Early	Late
Early	Late	Early	Late			
Gramoxone (2 pt/A) + NIS	79 A ^c	98 A	97 A	99 A	20.4 B	25.5 A
Sharpen (2 fl oz/A) + MSO + AMS	77 A	98 A	98 A	99 A	9.5 C	21.9 B
Roundup (22 fl oz/A) + AMS	68 B	95 B	88 B	99 A	21.2 B	22.1 B
Untreated	60 C	94 C	75 C	97 B	25.8 A	26.9 A

^a Yield obtained by direct harvest

^b Days after treatment

^c Means within a column with different letters are significantly different from each other

Summary: This study was conducted to evaluate the effects of preharvest herbicide applications on black bean desiccation and yield with two application timings at an early planting date. Desiccation treatments of Gramoxone, Sharpen, and Roundup were applied to three varieties: ‘Zorro’, ‘Zenith’, and ‘Eclipse’ at an early application timing (50% of pods were yellow), and a standard application timing (80% of pods were yellow). The early application was to evaluate differences in treatments and simulate green areas in a field that may be present during standard applications of harvest aids. **Growers should not make preharvest applications at this earlier timing.** Data were averaged over all varieties. Differences in black bean desiccation between the application timings was greatest 3 DAT, with Gramoxone and Sharpen demonstrating the quickest desiccation at the early timing. By 7 DAT, desiccation for preharvest treatments were at acceptable levels, except for Roundup, which took up to 14 DAT for maximum desiccation. Lower yields were observed with all preharvest herbicides at the early application timing and with Sharpen and Roundup at the standard timing. The lowest yield was observed with early applications of Sharpen, which may be due the quicker speed of activity halting dry bean development, **again preharvest treatments should never be made this early.** Overall, the speed of desiccation and yield were influenced by application timing and desiccation treatment. Beans from this trial will be canned and evaluated for color retention. This research was supported by MSU Project GREEN, Michigan Dry Bean Commission, and the Michigan Department of Agriculture Specialty Crops Grant.

Harvest aid effects on black bean desiccation and yield with late planting

Amanda Goffnett and Christy Sprague, Michigan State University

Location: Richville (SVREC)	Tillage: Conventional
Planting Date: June 27, 2014	Variety: Zorro, Zenith and Eclipse black bean
Replicated: 4 times	Population: 106,000 seeds/A
Soil Type: Clay loam, 3% OM, pH 7.6 (SVREC)	Row width: 30-inch

Table 1. Effect of preharvest treatment on black bean desiccation 3 and 7 days after treatment (DAT) and yield for late planting.

Treatment	Desiccation				Yield ^a	
	%				cwt/A	
	3 DAT ^b		7 DAT		Early	Late
	Early	Late	Early	Late	Early	Late
Gramoxone (2 pt/A) + NIS	88 B ^c	96 A	99 A	99 A	18.0 AB	19.6 A
Sharpen (2 fl oz/A) + MSO + AMS	91 A	95 A	99 A	99 A	15.1 C	17.0 B
Roundup (22 fl oz/A) + AMS	76 C	96 A	98 B	99 A	17.2 B	17.9 B
Untreated	68 D	92 B	97 C	98 B	19.0 A	20.0 A

^a Yield obtained by direct harvest

^b Days after treatment

^c Means within a column with different letters are significantly different from each other

Summary: This study was conducted to evaluate the effects of preharvest herbicide applications on black bean desiccation and yield with two application timings at a later planting date. Desiccation treatments of Gramaxone, Sharpen, and Roundup were applied to three varieties: ‘Zorro’, ‘Zenith’, and ‘Eclipse’ at an early application timing (50% of pods were yellow), and a standard application timing (80% of pods were yellow). The early application was to evaluate differences in treatments and simulate green areas in a field that may be present at the standard application timing. **Growers should not make preharvest herbicide applications to dry beans when less than 80% of the pods are yellow.** Data were averaged over all varieties. Similar to the earlier planting date, the greatest difference in black bean desiccation between application timings were observed at 3 DAT, with Sharpen demonstrating rapid desiccation at the early application timing. By 7 DAT, desiccation for all preharvest treatments was above 95%. Lower yields were observed with Sharpen and Roundup, with early applications of Sharpen having the greatest impact. This may be due to the quick activity of Sharpen halting the continued development of the dry bean. **Again preharvest treatments should never be made this early.** Overall, the speed of desiccation and yield for the later planted dry beans were influenced by application timing and desiccation treatment. Beans from this trial will be canned and evaluated for color retention. This research was supported by MSU Project GREEN, The Michigan Dry Bean Commission, and the Michigan Department of Agriculture Specialty Crops Grant.

Evaluation of Ultra Blazer as a possible herbicide in dry edible beans

Christy Sprague and Gary Powell, Michigan State University

Location: E. Lansing	Tillage: Conventional
Planting Date: June 16, 2014	Variety: 'Zorro' black beans
Row width: 7.5-inch	Planting population: 105,000 seeds/A
POST application timing: V3 dry bean	POST application date: July 17
Soil Type: Loam	Replicated: 4 times

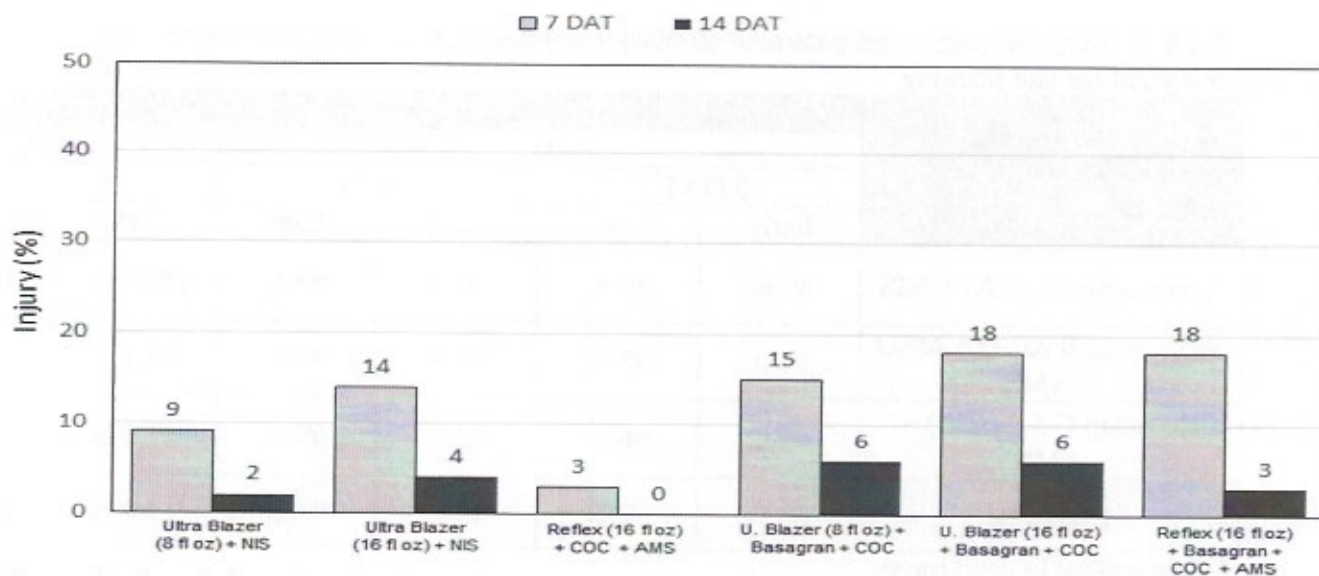


Figure 1. Crop injury 3 and 7 days after treatment (DAT) from Ultra Blazer.

Summary: Currently Reflex is the only postemergence Group 14 herbicide that can be used for weed control in dry bean. This herbicide is particularly important to control common ragweed, pigweed, and eastern black nightshade populations that are resistant to ALS-inhibiting (Group 2) herbicides. Unfortunately, there are some longer crop rotation restrictions with Reflex that may not be met with later application dates. For example, the rotation restriction for winter wheat is 4 months, corn is 10 months, and sugarbeet is 18 months. Reflex carryover concerns are also greater the further north you get in Michigan, because of the shorter growing season that decreases the potential breakdown of the herbicide. There is another Group 14 herbicide, Ultra Blazer that has a similar weed control spectrum as Reflex. The potential for crop carryover is much less from this herbicide. Therefore, our objective was to examine dry bean response from applications of Ultra Blazer compared with Reflex and tank-mixtures with Basagran. Ultra Blazer alone either at 8 or 16 fl oz/A caused slightly more injury to dry bean than Reflex alone, 7 DAT. However by 14 DAT there was no difference in dry bean injury. This was also the case when these herbicides were tank-mixed with Basagran. Even though there was significant dry bean injury from Ultra Blazer and tank-mixtures with Basagran, injury was never greater than 20% and by 14 DAT dry bean injury was less than 10%. The use of Ultra Blazer in dry bean may be an alternative option to Reflex in the future. However, additional research will need to be conducted and further discussions would need to happen for the development of a dry bean label for this herbicide. This research was supported by Michigan Dry Bean Commission funding from the Michigan Department of Agriculture Specialty Crops grant.

2014 Western Bean Cutworm Report

Dr. Chris Difonzo, Entomologist, Michigan State University

Western Bean Cutworm (WBC) populations dropped dramatically in Michigan during the 2012 drought year, and with an increase in the level of biological control (predation, parasitism, and pathogen). Larval damage in corn remained low in most of Michigan in 2013 and 2014, but corn growers have transgenic options for WBC management. However, populations remain persistent in dry bean production from Montcalm County, north into the Upper Peninsula. Our research since 2008 gave us an understanding of how WBC should be managed in dry beans – that is, pheromone trap to determine the peak, then scout fields for larval feeding to determine the need and timing of a single spray application of a pyrethroid. Activities now involve education to make growers aware of, and to adopt, the guidelines. In 2014, western bean cutworm was discussed at 10 extension meetings in the central, thumb, and northern counties; an estimated 815 growers and crop consultants attended these meetings. Although all are not dry bean growers, even corn growers have a role to play in WBC management in dry beans, as management of populations in corn reduce the overall level of WBC in an area. Multiple publications were made available in 2014 on the internet, including the extension bulletin 'Managing western bean cutworm in dry beans' on the MSU Field Crops Entomology web site (<http://www.msuent.com/dry-beans/>) and the graduate thesis 'Biology and management of western bean cutworm in Michigan dry beans' (<http://gradworks.umi.com>). Besides this graduate research, I assisted or advised three other students interested in WBC at MSU and the University of Guelph. Finally, a refereed article detailing the impact of WBC damage in dry beans, and giving recommendations for management, was accepted for publication. This article (Impact of western bean cutworm infestation and insecticide treatments on damage and marketable yield of Michigan dry beans by DiFonzo, Chludzinski, Jewett, and Springborn) will appear in the in the Journal of Economic Entomology in 2015.

To: Upper Peninsula dry bean growers
From: Jim Isleib, MSU Extension U.P. Crop Production Educator
Subject: Western Bean Cutworm situation
Today's Date: September 10, 2014

Based on Western Bean Cutworm moth trap counts on 3 Fayette area dry bean farms, the population of moths is moderate this year and damage from Western Bean Cutworm larvae in our area is not expected to be severe.

I inspected 3 dark red kidney bean fields and 2 black bean fields in the Fayette/Garden area yesterday, September 9, and did not find pod feeding. After consulting with MSU Field Crop Entomology professor, Dr. Chris DiFonzo and my extension colleague Fred Springborn, I am not recommending insecticide treatment for Western Bean Cutworm this year.

TABLE 5B -Dry Edible Bean Herbicides – Remarks and Limitations

Dry Edible Beans – Preplant Incorporated Only

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
Annual grasses	EPTC (<i>Eptam</i>)	2.25	1.25 qt 7EC	<ul style="list-style-type: none"> • Apply preplant incorporated only. • Refer to Table 5A for weed control and crop tolerance ratings. • Incorporate immediately after application. • <i>Eptam</i> suppresses common ragweed and wild mustard. • Prowl (pendimethalin), trifluralin, or Sonalan should be tank mixed with <i>Eptam</i> for additional broadleaf control, including lambsquarters. • <i>Pursuit</i> (2 oz) can be added to tank mixes with <i>Prowl</i>, <i>trifluralin</i>, or <i>Sonalan</i> for nightshade control. • <i>Pursuit</i> (2 oz) may also be applied preemergence after preplant incorporated applications of <i>Eptam</i> tank mixed with <i>Prowl</i>, <i>trifluralin</i>, or <i>Sonalan</i>. See remarks for <i>Pursuit</i>. • A postemergence application of <i>Basagran</i>, <i>Pursuit</i> or <i>Raptor</i> may be necessary for additional broadleaf control. • DO NOT use on adzuki beans. • Refer to label and Table 12 for crop rotation restrictions.
Annual grasses Annual broadleaves	alachlor (<i>IntRRo</i>) OR (<i>Micro-Tech</i>)	2	2 qt 4EC OR 2 qt 4ME	<ul style="list-style-type: none"> • Apply preplant incorporated only. • Refer to Table 5A for weed control and crop tolerance ratings. • Alachlor should be incorporated in the top 2 inches of soil to minimize the danger of bean injury. • DO NOT use on sands or sandy loam soils – injury can occur. • Alachlor provides better nightshade and pigweed control than metolachlor products. • <i>Prowl</i>, <i>trifluralin</i> or <i>Sonalan</i> can be tank-mixed for lambs-quarters control. • <i>Pursuit</i> (2 oz) can be tank mixed for nightshade and additional broadleaf control. • A postemergence application of <i>Basagran</i>, <i>Pursuit</i> or <i>Raptor</i> may be necessary for additional broadleaf control. • DO NOT use on adzuki beans. • Refer to label and Table 12 for crop rotation restrictions.
	pendimethalin (<i>Prowl</i>) OR (<i>Prowl H₂O</i>)	0.75	1.8 pt 3.3EC OR 1.6 pt 3.8CS	<ul style="list-style-type: none"> • Apply preplant incorporated only. • Refer to Table 5A for weed control and crop tolerance ratings. • Incorporate immediately after application. • <i>Prowl</i> provides better velvetleaf control than <i>trifluralin</i> or <i>Sonalan</i>. • <i>Prowl</i> should be tank mixed with <i>Eptam</i>. Other measures may need to be taken for additional broadleaf control. • Refer to label and Table 12 for crop rotation restrictions.

(Continued on next page)

Dry Edible Beans – Preplant Incorporated Only (continued)

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
<i>(continued)</i>				
Annual grasses Annual broadleaves	ethalfluralin (Sonalan)	0.75	2 pt 3EC	<ul style="list-style-type: none"> • Apply preplant incorporated only. • Refer to Table 5A for weed control and crop tolerance ratings. • Incorporate immediately after application. • Sonalan should be tank mixed with Eptam. Other measures may need to be taken for additional broadleaf control. • Refer to label and Table 12 for crop rotation restrictions.
	trifluralin (many)	0.5	1 pt 4EC	<ul style="list-style-type: none"> • Apply preplant incorporated only. • Refer to Table 5A for weed control and crop tolerance ratings. • Incorporate immediately after application. • <i>Trifluralin</i> provides better pigweed control than <i>Prowl</i> or <i>Sonalan</i>. • Trifluralin should be tank mixed with Eptam. Other measures may need to be taken for additional broadleaf control. • Refer to label and Table 12 for crop rotation restrictions.

Dry Edible Beans – Soil Applied

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
Annual grasses	s-metolachlor (Dual Magnum) OR (Dual II Magnum, Cinch)	1.27	1.33 pt 7.62EC OR 1.33 pt 7.64EC	<ul style="list-style-type: none"> • May be applied preplant incorporated or preemergence. • Refer to Table 5A for weed control and crop tolerance ratings. • PREPLANT INCORPORATED <i>Dual Magnum</i> minimizes the danger of bean injury. • DO NOT apply if soil is cracking and beans are in the crook stage. • Reduce <i>Dual Magnum</i> rate to 1 pt/A on coarse-textured soils with low organic matter. • Preemergence applications require rainfall for incorporation. Rotary hoe if no rainfall occurs within 7 days. • <i>Dual Magnum</i> provides better yellow nutsedge control than <i>alachlor</i> or <i>Outlook</i>. • <i>Prowl</i>, <i>trifluralin</i> or <i>Sonalan</i> can be tank mixed preplant incorporated for lambsquarters control. • <i>Pursuit</i> (2 oz) can be tank mixed for nightshade and additional broadleaf control. • A postemergence application of <i>Basagran</i>, <i>Pursuit</i> or <i>Raptor</i> may be necessary for additional broadleaf control. • DO NOT apply <i>Dual Magnum</i> within 60 days of harvest. • DO NOT use on adzuki beans. • Refer to label and Table 12 for crop rotation restrictions.

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Dry Edible Beans – Soil Applied (continued)

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
<i>(continued)</i>				
Annual grasses	dimethenamid-P (<i>Outlook</i>)	0.66	14 oz 6L	<ul style="list-style-type: none"> • May be applied preplant incorporated or preemergence. • Refer to Table 5A for weed control and crop tolerance ratings. • PREPLANT INCORPORATED <i>Outlook</i> minimizes the danger of bean injury. • DO NOT apply if soil is cracking and beans are in the crook stage. • Reduce <i>Outlook</i> rate to 12 oz/A on coarse-textured soils with low organic matter. • Navy and black beans are more sensitive to <i>Outlook</i> applications than to <i>Dual Magnum</i>. • Preemergence applications require rainfall for incorporation. Rotary hoe if no rainfall occurs within 7 days. • <i>Outlook</i> provides better pigweed and nightshade control than <i>Dual Magnum</i>. • <i>Prowl</i>, <i>trifluralin</i>, or <i>Sonalan</i> can be tank mixed preplant incorporated for lambsquarters control. • <i>Pursuit</i> (2 oz) can be tank mixed for nightshade and additional broadleaf control. • A postemergence application of <i>Basagran</i>, <i>Pursuit</i>, or <i>Raptor</i> may be necessary for additional broadleaf control. • DO NOT apply <i>Outlook</i> within 70 days of harvest. • DO NOT use on adzuki beans. • Refer to label and Table 12 for crop rotation restrictions.
	metolachlor (<i>Parallel PCS</i>)	1.3	1.33 pt 8EC	<ul style="list-style-type: none"> • May be applied preplant incorporated or preemergence. • <i>Parallel PCS</i> is a mix of the R and S-isomers of metolachlor. Limited research has shown that 1.33 pt/A of these products provide similar activity to s-metolachlor products at 1.33 pt/A. However, <i>Parallel PCS</i> may not provide the consistency, length of control or performance on more difficult to control weeds. Rates would need to be increased to 2.0 pt/A to provide the same amount of s-metolachlor (the more active isomer) in the 1.33 pt/A rate of <i>Dual Magnum</i>/<i>Dual II Magnum</i>/<i>Cinch</i> (s-metolachlor). • Refer to Table 5A for weed control and crop tolerance ratings. • See remarks and limitations for <i>Dual Magnum</i>. • DO NOT use on adzuki beans. • Refer to label and Table 12 for crop rotation restrictions.
	glyphosate + s-metolachlor (<i>Sequence</i>) + ammonium sulfate	1.64	3 pt 2.25L + 17 lb/100 gal	<ul style="list-style-type: none"> • May be applied preplant or preemergence. • <i>Sequence</i> contains 0.9 lb a.e./A of glyphosate and 1.2 pt/A of <i>Dual Magnum</i>. • <i>Sequence</i> is best used to control existing vegetation prior to planting no-till dry beans with the residual control of <i>Dual Magnum</i>. • Refer to Table 5A for residual weed control and crop tolerance ratings. • DO NOT apply to emerged dry bean – severe injury will occur. • DO NOT apply more than 3.5 pt/A on coarse textured soils or 4 pt/A on medium and fine textured soils. • Apply only one application per crop year. • Refer to label and Table 12 for crop rotation restrictions.

Dry Edible Beans – Soil Applied (continued)

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
Annual broadleaves	halosulfuron (Permit/Sandea)	0.023	0.67 oz 75DG	<ul style="list-style-type: none"> • May be applied preplant incorporated or preemergence. • Refer to Table 5A for weed control and crop tolerance ratings. • Reduce the rate of <i>Permit/Sandea</i> to 0.5 oz/A on lighter textured soils with low organic matter. • <i>Permit/Sandea</i> can cause injury under cool and wet growing conditions. • Delayed maturity may result from applications of <i>Permit/Sandea</i>. • Dry bean varieties and classes vary in their tolerance to <i>Permit/Sandea</i>. From MSU research, CAUTION should be taken when applying <i>Permit/Sandea</i> to kidney and black beans. • <i>Permit/Sandea</i> can be tank mixed with <i>Eptam</i> for grass and additional lambsquarters control. • <i>Permit/Sandea</i> can be tank mixed with metolachlor products or <i>Outlook</i> for annual grass control. • <i>Permit/Sandea</i> will not control ALS-resistant weed species. • DO NOT plant SUGAR BEETS within 21 months of a <i>Permit/Sandea</i> application. • Refer to label and Table 12 for crop rotation restrictions.
	imazethapyr (Pursuit)	0.031	2 oz 2L	<ul style="list-style-type: none"> • May be applied preplant incorporated or preemergence. • Refer to Table 5A for weed control and crop tolerance ratings. • DO NOT use on sands or loamy sand soils. • DO NOT apply <i>Pursuit</i> if cold and/or wet conditions are present or predicted to occur within 1 week of application. • Delayed maturity may result from applications of <i>Pursuit</i>. DO NOT apply if planting is delayed and frost is likely to occur prior to maturity. • On heavy soils with greater than 2% organic matter and heavy weed pressure, 3 oz of <i>Pursuit</i> may be applied. • <i>Pursuit</i> can be tank mixed and applied preplant incorporated with <i>Eptam</i> plus <i>trifluralin</i>, <i>Prowl</i>, or <i>Sonalan</i>; or alachlor, <i>Dual Magnum</i> or <i>Outlook</i>; or preemergence with <i>Dual Magnum</i> or <i>Outlook</i>. <i>Pursuit</i> in these mixes will control eastern black nightshade. • Preemergence applications require rainfall for incorporation. Rotary hoe if no rainfall occurs within 7 days. • <i>Pursuit</i> will NOT control common ragweed. • Dry bean varieties vary in their sensitivity to <i>Pursuit</i>. Use ONLY on navy, black turtle, pinto, kidney, and cranberry beans. DO NOT use on DOMINO black or OLATHE pinto beans. • DO NOT apply within 60 days of harvest. • DO NOT use if SUGAR BEETS, CUCUMBERS, CANOLA or TOMATOES are in the rotation; requires 40 months and a soil bioassay. • Refer to label and Table 12 for crop rotation restrictions.

(Continued on next page)

Dry Edible Beans – Soil Applied (continued)

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
<i>(continued)</i>				
Annual broadleaves	fomesafen (<i>Reflex</i>)	0.25	1 pt 2L	<ul style="list-style-type: none"> • May be applied preplant surface or preemergence. • Refer to Table 5C for weed control and crop tolerance ratings. • <i>Reflex</i> will provide 4-5 weeks of control and/or suppression of broadleaf weeds. • Rainfall that splashes treated soil onto newly emerged seedlings can cause temporary crop injury. • Tank mixtures or sequential herbicide applications are needed to broaden the spectrum of weed control. • <i>Reflex</i> can be applied only in the Lower Peninsula of Michigan. • DO NOT apply <i>Reflex</i> to the same field in CONSECUTIVE years. • The maximum use rate of <i>Reflex</i> per field is 1 pint per acre. • Refer to Table 12 for crop rotation restrictions.

Dry Edible Beans – Postemergence

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
Grasses	quizalofop-P-ethyl (<i>Assure II/Targa</i>) + crop oil concentrate OR surfactant	0.044	7 oz 0.88L + 1% OR 0.25%	<ul style="list-style-type: none"> • Refer to Table 5A for weed control and crop tolerance ratings. • Treat actively growing grasses (annual grasses up to 4 inches). • DO NOT apply to grasses under stress — poor weed control will result. • DO NOT cultivate within 5 days prior to and 7 days following application. • Allow 30 days between <i>Assure II/Targa</i> application and dry bean harvest. • <i>Assure II/Targa</i> can be tank mixed with <i>Basagran</i> for foxtails and barnyardgrass. Increase the <i>Assure II/Targa</i> rate by 2 oz. • Tank mixes with <i>Pursuit</i> and <i>Raptor</i> are not recommended — grass antagonism will occur. • <i>Assure II/Targa</i> (10 oz/A) plus crop oil concentrate (1% v/v) or nonionic surfactant (0.25% v/v) will control quackgrass 6-10 inches tall. A sequential application of 7 oz/A may be needed 14-21 days later. • Refer to label and Table 12 for crop rotation restrictions.
	fluazifop-P-butyl (<i>Fusilade DX</i>) + crop oil concentrate	0.188	12 oz 2L + 1%	<ul style="list-style-type: none"> • Refer to Table 5A for weed control and crop tolerance ratings. • Apply 6 oz/A of <i>Fusilade DX</i> to control volunteer corn. • Allow 60 days between <i>Fusilade DX</i> application and dry bean harvest. • Two applications 7-14 days apart are usually needed for control of perennial grasses. • Tank mixes with <i>Pursuit</i> and <i>Raptor</i> are not recommended — grass antagonism will occur. • DO NOT apply more than 48 oz/A of <i>Fusilade DX</i> per season. • Refer to label and Table 12 for crop rotation restrictions.

(Continued on next page)

Dry Edible Beans — Postemergence (continued)

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
<i>(continued)</i>				
Grasses	sethoxydim (Poast)	0.19	1 pt 1.5SC	<ul style="list-style-type: none"> • Refer to Table 5A for weed control and crop tolerance ratings. • Reduced rates of <i>Poast</i> (12 oz/A) may be used when barnyardgrass, green and giant foxtail, and fall panicum are less than 4 inches tall and the target species. • DO NOT apply to grasses under stress — poor weed control will result. • DO NOT cultivate within 5 days prior to and 7 days following application. • Allow 30 days between <i>Poast</i> application and dry bean harvest. • <i>Poast</i> is generally less effective than other postemergence grass herbicides for perennial grass control. • Tank mixes with <i>Pursuit</i> and <i>Raptor</i> are not recommended — grass antagonism will occur. • Refer to label and Table 12 for crop rotation restrictions.
	+		+	
	crop oil concentrate		1 qt	
	+			
	ammonium sulfate		2.5 lb	
	clethodim (Select/Arrow)	0.094	6 oz 2EC	<ul style="list-style-type: none"> • Refer to Table 5A for weed control and crop tolerance ratings. • Reduced rates of <i>Select/Arrow</i> (4-5 oz/A) or <i>Select Max</i> (6-8 oz/A) may be used when some grass species are small. • The addition of ammonium sulfate at 2.5 to 4 lb/A has been shown to improve control of difficult to control weeds, e.g., quackgrass, rhizome Johnsongrass, volunteer cereals, and volunteer corn. • DO NOT apply to grasses under stress — poor weed control will result. • DO NOT cultivate within 7 days prior to and 7 days following application. • Allow 30 days between application and dry bean harvest. • <i>Select/Arrow</i> or <i>Select Max</i> can be tank mixed with <i>Basagran</i>. Increase the <i>Select/Arrow</i> rate to 8-10 oz/A and the <i>Select Max</i> rate to 12 oz/A and apply with crop oil concentrate (1% v/v). • Tank mixes with <i>Pursuit</i> and <i>Raptor</i> are not recommended — grass antagonism will occur. • <i>Select/Arrow</i> (8-16 oz/A) plus crop oil concentrate (1% v/v) plus ammonium sulfate (2.5 lb/A) will control quackgrass 4-12 inches tall. A sequential application of 8 oz/A may be needed 14-21 days later. Sequential applications of <i>Select Max</i> (12 + 12 oz/A) are needed to control 4 to 12 inch quackgrass. • Refer to label and Table 12 for crop rotation restrictions.
	+		+	
crop oil concentrate			1%	
	OR		OR	
	(Select Max)	0.068	9 oz 0.97EC	
	+		+	
	surfactant		0.25%	
	+		+	
	ammonium sulfate		2.5 lb	

Dry Edible Beans – Postemergence (continued)

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
Annual Broadleaves	bentazon (Basagran/Broadloom)	0.75	1.25 pt 4L	<ul style="list-style-type: none"> • Refer to Table 5A for weed control and crop tolerance ratings. • Most effective on small weeds. Check dry bean label for specific rate and proper weed growth stage. • Beans MUST HAVE one fully expanded trifoliolate before application. • Use a minimum of 20 gal. water/A for adequate coverage. • DO NOT apply if dry beans are under stress from herbicide injury, cold or dry weather, or hail damage. • For improved velvetleaf control 28% liquid nitrogen (2-4 qt/A) or ammonium sulfate (2.5 lb/A) can be used INSTEAD OF crop oil concentrate. However, if common ragweed and common lambsquarters are present, a crop oil concentrate must also be included. • Split applications of (1 pt + 1 pt) plus crop oil concentrate (1 pt + 1 pt) can be used for more consistent common ragweed and lambsquarters control. Make the first application when weeds are less than 1 inch tall, and make second application 10-14 days later. • For CANADA THISTLE and YELLOW NUTSEDGE control, apply sequential applications of (1.5 pt + 1.5 pt) plus crop oil concentrate (1 qt + 1 qt) when Canada thistle is 6-8 inches tall and yellow nutsedge is 4-6 inches. Make second application 7-10 days later. • Allow 30 days between application and dry bean harvest. • DO NOT use on adzuki beans. • Refer to label and Table 12 for crop rotation restrictions.
	+		+	
	crop oil concentrate			
	halosulfuron (Permit)	0.023	0.67 oz 75WG	<ul style="list-style-type: none"> • Refer to Table 5A for weed control and crop tolerance ratings. • Most effective on small weeds (less than 2 inches). • Apply when beans have 1-3 trifoliolate leaves. • DO NOT apply if dry beans have begun to flower. • Permit can be tank-mixed with other herbicides for additional broadleaf and grass control. • Dry bean varieties and classes vary in their tolerance to Permit. From MSU research, CAUTION should be taken when applying to kidney and black beans. Under adverse conditions maturity of the treated crop can be delayed which can affect harvest date, yield, and quality. • DO NOT use on adzuki beans. • DO NOT plant SUGARBEETS within 21 months of Permit application. • Refer to Table 12 for crop rotation restrictions.
	+		+	
	surfactant		0.25%	

(Continued on next page)

Dry Edible Beans – Postemergence (continued)

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
<i>(continued)</i>				
Annual Broadleaves	imazethapyr (Pursuit)	0.031	2 oz 2L	<ul style="list-style-type: none"> • Refer to Table 5A for weed control and crop tolerance ratings. • Most effective on small weeds (less than 2 inches). • Beans MUST HAVE one fully expanded trifoliate before application. • DO NOT apply if dry beans have begun to flower. • Apply Pursuit with non-ionic surfactant (0.25% v/v). • DO NOT add 28% liquid nitrogen (2.5% v/v) or ammonium sulfate (2.5 lb/A) unless at least 8 oz of Basagran is added to "safen" this application. • Increase the rate of Basagran (16 oz) when tank mixed with Pursuit to control common cocklebur and jimsonweed. • Delayed maturity may result from applications of Pursuit. DO NOT apply if planting is delayed and frost is likely to occur prior to maturity. • DO NOT tank mix with postemergence grass herbicides — grass antagonism will occur. • Dry bean varieties vary in their sensitivity to Pursuit. Use ONLY on navy, black turtle, pinto, kidney, and cranberry beans. DO NOT use on DOMINO black or OLATHE pinto beans. • DO NOT apply within 60 days of harvest. • DO NOT use if sugar beets, cucumbers, canola or tomatoes are in the rotation; requires 40 months and a soil bioassay. • DO NOT use on adzuki beans. • Refer to label and Table 12 for crop rotation restrictions.
	+		+	
	surfactant		0.25%	
	imazamox (Raptor)	0.032	4 oz 1L	<ul style="list-style-type: none"> • Refer to Table 5A for weed control and crop tolerance ratings. • Most effective on small weeds (less than 2 inches). • Beans MUST HAVE one fully expanded trifoliate before application. • DO NOT apply if dry beans have begun to flower. • DO NOT apply if planting is delayed and frost is likely to occur prior to maturity. • Apply Raptor with crop oil concentrate (1% v/v) or a non-ionic surfactant (0.25% v/v). • At least 8 fl oz of Basagran must be tank mixed with Raptor, if ammonium sulfate (12-15 lb/100 gal) or 28% liquid nitrogen (2.5% v/v) are added. Basagran "safens" this application. • Increase the rate of Basagran (16 oz) when tank mixed with Raptor to control common cocklebur and jimsonweed, and to provide good control of common lambsquarters (less than 2 inch tall). • DO NOT tank mix with postemergence grass herbicides — grass antagonism will occur. • DO NOT apply within 60 days of harvest. • DO NOT use the combination of Raptor + Basagran on adzuki beans. Basagran causes significant injury to adzuki beans. • Refer to label and Table 12 for crop rotation restrictions.
	+		+	
	bentazon (Basagran)	0.25	8 oz 4L	
	+		+	
	crop oil concentrate		1%	
	+		+	
	ammonium sulfate		2.5 lb	

(Continued on next page)

Dry Edible Beans – Postemergence (continued)

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
<i>(continued)</i>				
Annual Broadleaves	fomesafen (<i>Reflex</i>) + surfactant	0.25	1 pt 2L + 0.25%	<ul style="list-style-type: none"> • Refer to Table 5A for weed control and crop tolerance ratings. • Most effective on small weeds; common ragweed 4-inches or less and eastern black nightshade 2-inches or less. • Common ragweed less than 4-inches will be controlled with 0.5 pt/A of <i>Reflex</i>. • Beans MUST HAVE one fully expanded trifoliate before application. • A non-ionic surfactant at 0.25-0.5% v/v or a crop oil concentrate at 0.5-1.0% v/v must be included for effective control. • <i>Reflex</i> can be tank-mixed with <i>Basagran</i>, <i>Raptor</i>, or <i>Pursuit</i>. Include a COC when tank-mixing <i>Reflex</i> + <i>Basagran</i>. ONLY include a non-ionic surfactant when tank-mixing with <i>Raptor</i> or <i>Pursuit</i>. DO NOT add AMS or 28%N. • <i>Reflex</i> can be applied only in the Lower Peninsula of Michigan. • DO NOT apply <i>Reflex</i> to the same field in CONSECUTIVE years. • DO NOT apply within 45 days of harvest. • Refer to Table 12 for crop rotation restrictions.

Table 5C – Preharvest Treatments in Dry Edible Beans

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
Preharvest	glyphosate (many) + ammonium sulfate	0.75 lb a.e.	See Table 10 + 17 lb/100gal	<ul style="list-style-type: none"> • Glyphosate should ONLY be used to control weeds that hinder harvest. • Not all glyphosate products are labeled for Preharvest application in dry edible beans. Consult product labels for legal applications. Roundup branded products, <i>Duramax</i>, <i>Durango DMA</i>, <i>Touchdown Total</i> and <i>Traxion</i> are some glyphosate products that are currently labeled. • DO NOT use glyphosate for vine desiccation — residues of glyphosate have been found in harvested beans if applications are made too early. • Glyphosate should be applied when beans are in the hard dough stage (30% moisture or less). • Glyphosate applications should be made at least 7 days before harvest. • ONLY one application should be made per year. • DO NOT apply glyphosate to beans grown for seed. • DO NOT feed treated vines and hay from these crops to livestock.
	paraquat (<i>Gramoxone SL 2.0</i>) + surfactant	0.3-0.5	1.2-2 pt 2SL + 0.25%	<ul style="list-style-type: none"> • <i>Gramoxone SL 2.0</i> is a restricted-use pesticide. • Apply when crop is mature, at least 80% of the pods are yellowing and mostly ripe and no more than 40% (bush-type beans) or 30% (vine-type beans) of the leaves are still green. • Always add a non-ionic surfactant at 0.25% v/v or a crop oil concentrate at 1% v/v. • Apply by air in 5 gal water/A or by ground in 20-40 gal of water/A. • If growth is lush and vigorous, make either a single application of the higher rate of <i>Gramoxone SL 2.0</i>; or split applications at the lower rates. Split applications may improve vine coverage. DO NOT exceed 2.0 pt/A of <i>Gramoxone SL 2.0</i>. • Do not harvest within 7 days of application.
	paraquat (<i>Parazone</i>) + surfactant	0.5	1.33 pt 3SL + 0.25%	<ul style="list-style-type: none"> • <i>Parazone</i> is a restricted-use pesticide. • <i>Parazone</i> contains the same active ingredient as <i>Gramoxone SL 2.0</i> (paraquat), but is at a different concentration. • See the Remarks and Limitation section for <i>Gramoxone SL 2.0</i>.
	saflufenacil (<i>Sharpen</i>) + methylated seed oil + ammonium sulfate	0.023	1 oz 2.85L + 1% + 17 lb/100 gal	<ul style="list-style-type: none"> • Apply when crop is mature – at least 80% of the pods are yellowing and mostly ripe and no more than 40% (bush-type beans) or 30% (vine-type) beans of the leaves are still green. • <i>Sharpen</i> can be applied at rates up to 2 oz/A. • Dry beans can be harvested 2 days after application. However, it generally takes 7 days to reach maximum desiccation activity. • <i>Sharpen</i> is an effective desiccant. • DO NOT apply to beans grown for seed. • DO NOT graze or feed desiccation-treated hay or straw to livestock. • Refer to label and Table 12 for crop rotation restrictions.

(Continued on next page)

Preharvest Treatments in Dry Edible Beans *(continued)*

Weed Controlled	Herbicide	Rate lb/A a.i.	Formulation/A	Remarks and Limitations
<i>(continued)</i>				
Preharvest	flumioxazin (<i>Valor</i>) + methylated seed oil	0.05	1.5 oz 51WG + 1 qt	<ul style="list-style-type: none"> • Apply when crop is mature – at least 80% of the pods are yellowing and mostly ripe and no more than 40% (bush-type beans) or 30% (vine-type beans) of the leaves are still green. • <i>Valor</i> can be applied at rates up to 2 oz/A. • Dry beans can be harvested 5 days after <i>Valor</i> application. However, it generally takes 7 to 14 days to reach maximum desiccation activity. • Dry bean desiccation is similar to that from <i>Gramaxone</i> and glyphosate; however, the spectrum of weed control is not as broad. • <i>Valor</i> provides residual activity that may reduce winter annual growth. • Follow sprayer clean-up instructions — residues of <i>Valor</i> can be trapped in poly-tanks and hoses if not adequately cleaned. • Crop rotation restrictions are dependent on rainfall, <i>Valor</i> use rate and tillage. • Rotation restrictions for 2 oz or less of <i>Valor</i> are 1 month with 1 inch of rain for corn and winter wheat. Dry bean and barley may be planted after 3 months, and alfalfa, oats and sugar beets may be planted after 4 months if the ground is tilled prior to planting or 8 months if no tillage is performed. Note: In Michigan research trials, planting sugar beet no-till the spring following a <i>Valor</i> preharvest treatment resulted in major sugar beet stand reduction. Tillage reduced the effect of <i>Valor</i> on sugar beet; however, slight injury may occur on sandier soils. • Refer to label and Table 12 for crop rotation restrictions.

TABLE 5A –Weed Response to Herbicides in Dry Edible Beans*

	SITE OF ACTION	CROP TOLERANCE**	ANNUAL BROADLEAVES								ANNUAL GRASSES							PERENNIALS						
			COCKLEBUR	JINSONWEED	LAMBSQUARTERS	NIGHTSHADE (E. BLACK)	PIGWEEED	RAGWEED (COMMON)	SMARTWEED	VELVETLEAF	WILD MUSTARD	BARNYARDGRASS	CRABGRASS	GIANT FOXTAIL	GREEN FOXTAIL	YELLOW FOXTAIL	FALL PANICUM	WITCHGRASS	SANDBUR	BINDWEED (FIELD)	BINDWEED (HEDGE)	CANADA THISTLE	QUACKGRASS	YELLOW NUTSEDEGE
Preplant Incorporated																								
DUAL MAGNUM/PARALLEL	15	2	N	N	P	F	G	P	P	N	P	E	E	E	E	E	G	G	F	N	N	N	N	G
EPTAM	8	2	P	P	G	F	F	F	F	F	F	E	E	E	E	E	E	E	G	N	N	N	F	F
INTRRO	15	3	N	N	P	G	G	P	P	N	P	E	E	E	E	E	G	G	F	N	N	N	N	F
OUTLOOK	15	3 ^a	N	N	P	G	G	P	P	N	P	E	E	E	E	E	G	G	P	N	N	N	N	F
PROWL H ₂ O/PROWL	3	1	N	N	G	P	F	P	P	F	P	E	E	E	E	E	E	E	G	N	N	N	N	N
PURSUIT	2	3	F	F	P	E	E	P	F	F	G	P	P	F	F	F	P	P	P	N	N	N	N	F
SONALAN	3	1	N	N	G	F	G	P	P	N	P	E	E	E	E	E	E	E	G	N	N	N	N	N
TRIFLURALIN	3	1	N	N	G	N	G	N	P	N	P	E	E	E	E	E	E	E	G	N	N	N	N	N
Preemergence																								
DUAL MAGNUM/PARALLEL	15	2	N	N	P	F	G	P	P	N	P	E	E	E	E	E	G	G	F	N	N	N	N	F
OUTLOOK	15	3 ^a	N	N	P	G	G	P	P	N	P	E	E	E	E	E	G	G	P	N	N	N	N	F
PERMIT/SANDEA	2	3	F	F	F	P	E	G	P	G	E	N	N	N	N	N	N	N	N	N	N	N	N	F
PURSUIT	2	3	P	P	P	E	E	P	F	P	G	P	P	F	F	F	P	P	P	N	N	P	N	F
REFLEX	14	2	P	P	G	E	E	G	G	P	E	N	N	N	N	N	N	N	N	N	N	N	N	N
SEQUENCE ^b	9/15	2	N	N	P	F	G	P	P	N	P	E	E	E	E	E	G	G	F	N	N	N	N	F
Postemergence																								
ASSURE IV/TARGA	1	1	N	N	N	N	N	N	N	N	N	G	G	E	E	G	E	E	E	N	N	N	E	N
BASAGRAN/BROADLOOM ^c	6	2	E	G	F	P	P	F	E	G	E	N	N	N	N	N	N	N	N	N	N	G	N	G
FUSILADE DX	1	1	N	N	N	N	N	N	N	N	N	E	G	E	E	E	E	E	E	N	N	N	G	N
PERMIT	2	3	E	G	N	P	E	G	F	G	E	N	N	N	N	N	N	N	N	P	P	P	N	E
POAST	1	1	N	N	N	N	N	N	N	N	N	E	G	E	E	E	E	E	E	N	N	N	F	N
PURSUIT ^d	2	3	F	P	P	E	E	P	F	F	E	P	P	F	P	P	P	P	P	N	N	P	N	F
PURSUIT ^d + BASAGRAN	2/6	2	E	G	F	E	E	F	G	G	E	P	P	F	P	P	P	P	P	N	N	G	N	G
RAPTOR ^d	2	3	F	F	F	E	E	P	F	G	E	F	P	F	P	P	P	P	P	N	N	P	N	P
RAPTOR ^d + BASAGRAN (8 oz)	2/6	2	G	F	F/ G	E	E	F	G	G	E	F	P	F	P	P	P	P	P	N	N	F	N	F
RAPTOR ^{de} + BASAGRAN (16 oz)	2/6	2	E	G	G	E	E	F	E	G	E	P	P	F	P	P	P	P	P	N	N	G	N	F
REFLEX	14	2	P	F	P	G	G	E	P	P	E	N	N	N	N	N	N	N	N	N	N	N	N	N
REFLEX + BASAGRAN	6/14	2	E	G	F/ G	G	G	E	E	G	E	N	N	N	N	N	N	N	N	N	N	F	N	G
REFLEX + RAPTOR ^e	2/14	3	F	F	F	E	E	E	F	G	E	F	P	F	P	P	P	N	N	N	N	P	N	P
SELECT/SELECT MAX/ARROW	1	1	N	N	N	N	N	N	N	N	N	E	G	E	E	E	E	E	E	N	N	N	G	N

Herbicide Site of Action: The site of action key is located on pages 15-16.

Herbicide Effectiveness: P = Poor; F = Fair; **G** = Good; **E** = Excellent; N = None

*The above ratings are a relative comparison of herbicide effectiveness. Weather conditions greatly influence the herbicide's effectiveness, and weed control may be better under favorable conditions or poorer under unfavorable conditions.

** Crop Tolerance: 1 = Minimal risk of crop injury; 2 = Crop injury can occur under certain conditions (soil applied – cold, wet; foliar applied – hot, humid); 3 = Severe crop injury can occur. Follow precautions under Remarks and Limitations and on the label; 4 = Risk of severe crop injury is high.

^a Crop tolerance for navy and black beans = 3. For other bean classes, crop tolerance = 2. Preplant incorporation will increase tolerance of navy and black beans to *Outlook*.

^b Sequence is a premixture of *Dual Magnum* and glyphosate and should be used to control existing vegetation prior to planting dry beans. See Remarks and Limitations section.

^c Control of **hairy nightshade** is good.

^d Control of **hairy nightshade** with *Pursuit* and *Raptor* is excellent.

^e **Common lambsquarters** will be controlled with this tank mixture **if** the weeds are less than 2 inches tall and **not** under drought stress.



Top: Alcona County Black Bean Strip Trial, Duane Dellar Farm, (Page 2)
Below: Eastern Huron County White Mold Trial, Buckley Creek Farms (Page 5)

