2008
SOUTHERN MINNESOTA
REGIONAL
RESEARCH & DEMONSTRATION
SUMMARY

FINAL – April 2009

The University of Minnesota Extension, University of Minnesota Southern Research and Outreach Center (Waseca), University of Minnesota Southwest Research and Outreach Center (Lamberton), Minnesota Soybean Research & Promotion Council, and University Center Rochester, as well as many local cooperators and agribusinesses, collaborated to conduct field trials throughout southern Minnesota.

The majority of these projects are funded through grant dollars, entry fees, and support from our cooperators.

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FIELD TRIALS – 2008

Fritz Breitenbach, SE IPM Specialist
Lisa Behnken, Extension Educator
Ryan Miller, Extension Educator
Jerry Tesmer, Fillmore/Houston Extension Educator
Tom Van der Linden, Winona Extension Educator
Brad Carlson, Steele/Rice Extension Educator
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Tony Gehling, Ag Intern
Louis Kuisle, Ag Intern
Kyle Poss, Ag Intern
Katherine Sheehan, Ag Intern
Sarah Stellpflug, Ag Intern
Ceara Suther, Ag Intern
Amanda Welter, Ag Intern
Matthew White, Ag Intern

- **Southern Research & Outreach Center**
- **Southwest Research & Outreach Center**
- **University Center Rochester**

ROCK DELL

VARIETY TRIALS

Corn
90-97 Day Maturity
98-106 Day Maturity
Corn Silage
Nitrogen Side-Dress

Soybean
Low-Linolenic
Roundup Ready® (1.2–1.8)
Roundup Ready® (1.9 – 2.5)
Short Season Roundup Ready® Soybean after Peas (0.5 – 1.5)
Short Season Date of Planting
Soybean Cyst Nematode

PRODUCTION TRIALS

Soybean
Insecticide & Fungicide Seed Treatments
Manganese Fertilizer on Soybean
N-Hibit Seed Treatment
Seeding Rate Study in 30-inch rows (50K – 175K population)
Soybean Aphid Insecticide

ROCHESTER

HERBICIDE TRIALS

Corn
Value of BMP rates of Atrazine
Weed Control with Bayer CropScience Herbicide Programs
HPPD Herbicide Comparison
Comparing Kixor, Permit & Yukon Weed Control Programs
Corn Weed Management

Oat
Broadleaf Weed Control in Oat with Post Emergence Herbicides

Soybean
Broadleaf Herbicide Tank Mix Partners for Glyphosate
Liberty Link Performance
Evaluation of Prefix
Weed Management
West Central Adjuvant Trial with Post Grass Herbicides
West Central Adjuvant Trial for Control of Volunteer Corn in Soybean

PRODUCTION TRIALS

Corn Nematode
Cruiser & Cruiser Maxx Alfalfa Seed Treatments for PLH Management
Soybean Aphid IPM
Soybean Cyst Nematode Strip Trial
Soybean Rust/Aphid Sentinel Plot
Liberty Link Soybean Variety Trial
White Mold

RICE COUNTY
Tillage Plot

HOPE
Waxy Corn
Food Grade & Special Use Soybean

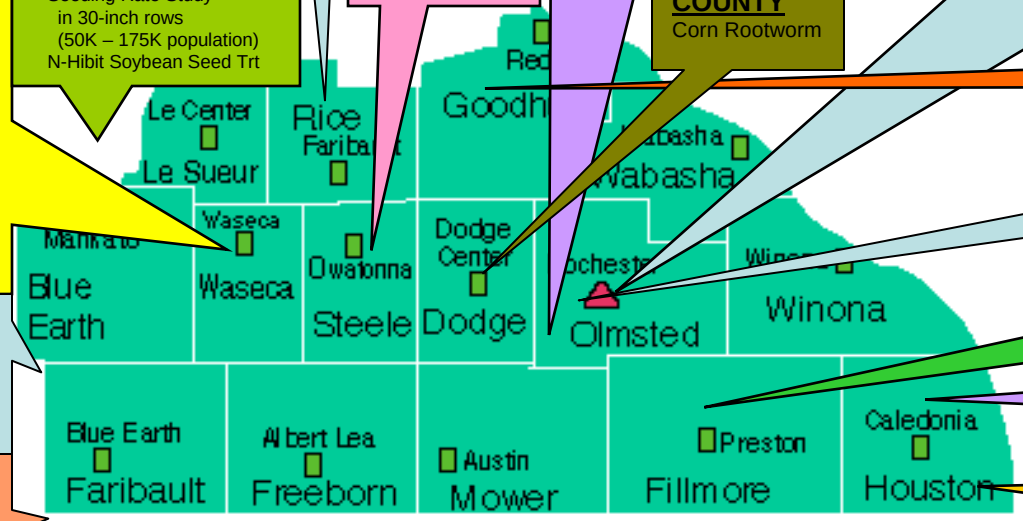
GAYLORD (Sibley Co.)
Low-Linolenic Soybean
Seeding Rate Study in 30-inch rows (50K – 175K population)
N-Hibit Soybean Seed Trt

DODGE COUNTY
Corn Rootworm

WASECA
Waxy Corn
90-97 Day Corn
98-106 Day Corn
Roundup Ready® Soybean (1.2 – 1.8)
Roundup Ready® Soybean (1.9 – 2.5)
Short Season Roundup Ready® Soybean after Peas (0.5 – 1.5)
Food Grade & Special Use Soybean
Low-Linolenic Soybean
Seeding Rate Study in 30-inch rows (50K – 175K population)
Short Season Date of Planting
Soybean Rust/Aphid Sentinel Plot
Soybean Cyst Nematode

LAMBERTON (Redwood Co.)
Low-Linolenic Soybean
Seeding Rate Study in 30-inch rows (50K – 175K population)
Short Season Date of Planting

JACKSON (Jackson Co.)
Low-Linolenic Soybean
N-Hibit Seed Treatment



GOODHUE COUNTY
Soybean Rust/Aphid Sentinel Plot

HIGH FOREST
Soybean Cyst Nematode
N-Hibit Seed Treatment

FOUNTAIN
Roundup Ready® Soybean (1.2 – 1.8)
Roundup Ready® Soybean (1.9 – 2.5)
Insecticide & Fungicide Seed Trt

HOUSTON COUNTY
Soybean Rust/Aphid Sentinel Plot

LeCRESCENT
Corn Silage

2008 Southeast Minnesota Regional Research and Demonstration Summary

I want to thank our many partners in making this research report possible. University of Minnesota Extension and the research team including Faculty from Extension, the Southern Research and Outreach Center and the Campus, have worked to ensure these field research trials are directly applied and adapted to the local region and address the complex needs of Southern Minnesota production agriculture. The regional producers, industry sponsors and state and county partners who have provided land, financial contributions and expertise to make these research trials possible are very much appreciated.

Crop Management Tours, such as those conducted in Waseca and Rochester, provide hands-on events that bring meaning and an applied perspective to the crop trials. These tours give producers and industry professionals the opportunity to ask questions and have one-on-one time with University of Minnesota researchers and Extension Educators.

The many student interns involved in this project are our workforce of the future! Their summer academic experience provides opportunities to accelerate their own professional careers and give them hands-on experiences working with Minnesota agriculture. We are actively promoting future projects and collaboration that will provide additional experiences with University of Minnesota Extension for students and future leaders of Minnesota.

Extension is committed to providing Minnesotans working in production agriculture with faster and more comprehensive access to the research and resources of the University through specialized educators at our Regional Offices.

This report is exemplary of the University's commitment of providing timely and relevant research results. Again, congratulations to all partners involved!

Together, you and Extension continue to make a difference in Minnesota.

Respectfully,

Dr. LuAnn Hiniker
Campus Regional Director

TABLE OF CONTENTS

Check These Web Sites:

http://www.extension.umn.edu
http://appliedweeds.cfans.umn.edu
http://sroc.cfans.umn.edu/index.html
http://www.soybeans.umn.edu/home.htm
http://www.extension.umn.edu/forages
http://www.mnipm.umn.edu/BugWeb/
http://www.roch.edu

For More Information, Call or E-Mail:

University of Minnesota Extension Regional Office, Rochester, (507) 280-2863 or (888) 241-4536
Fritz R. Breitenbach, IPM Extension Specialist, (507) 280-2870, breit004@umn.edu
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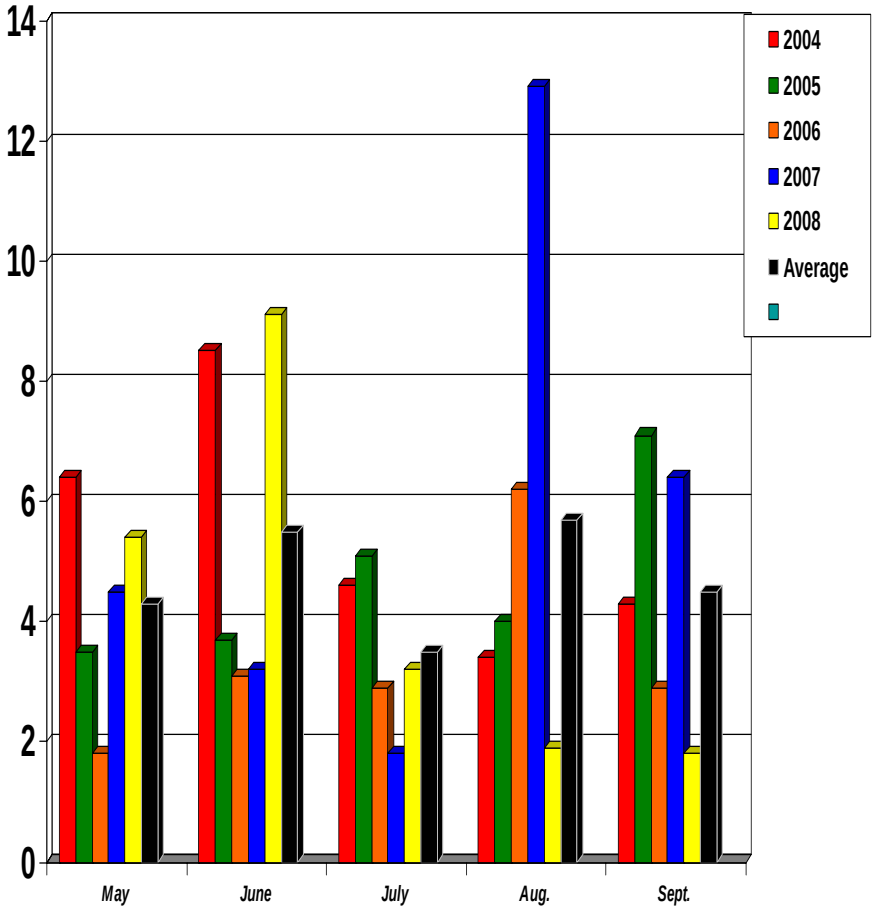
Mary Jane Stearns, Executive Office & Administrative Specialist, (507) 536-6310, mstearns@umn.edu

Contact Fritz, Lisa, Ryan, or Mary Jane if interested in receiving the "Crops Connection" Newsletter sent via e-mail

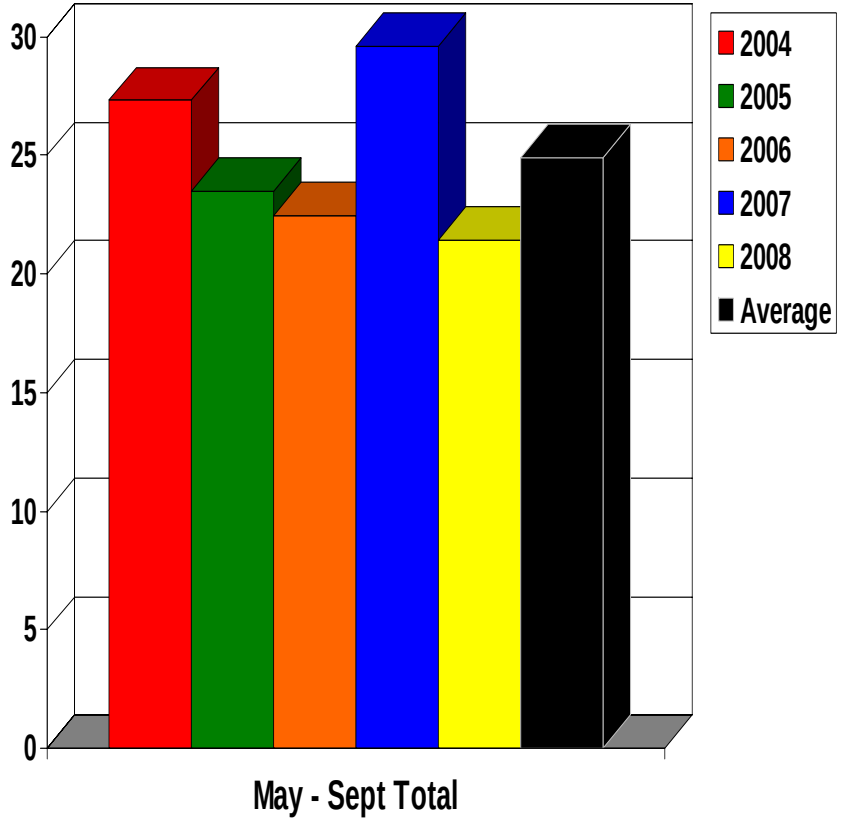
Monthly Rainfall Totals

(inches)
Comparison by Month
2004 - 2008



Monthly Rainfall

(inches)
Season Totals
2004 - 2008



Rainfall totals are obtained from National Weather Service measurements at the Rochester International Airport.

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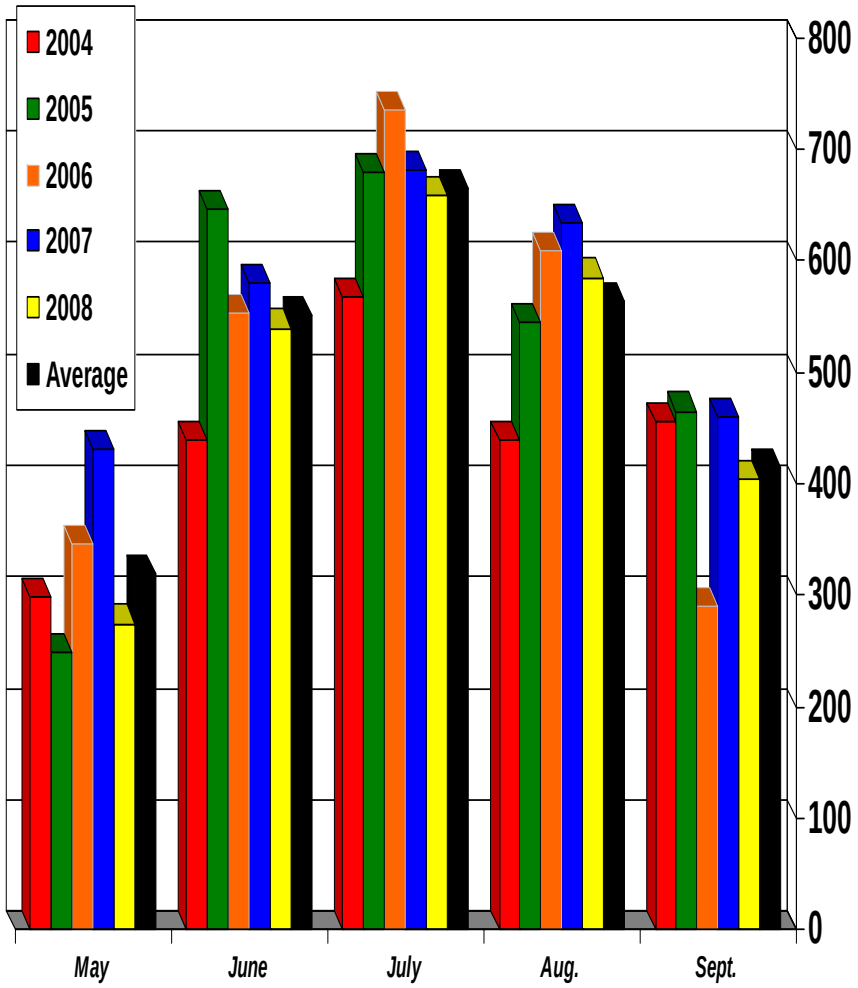
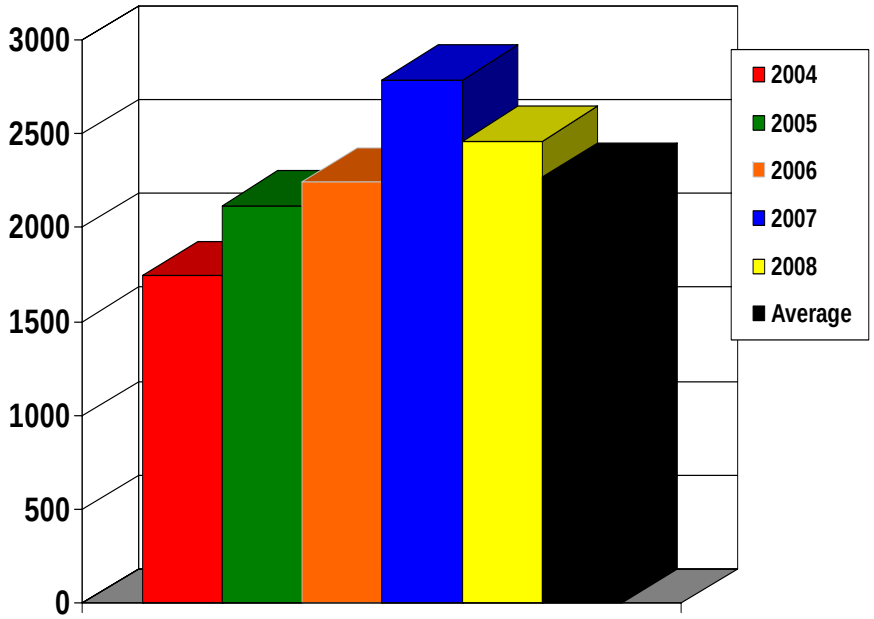
Growing Degree Days

Comparison by Month
2004 - 2008



Growing Degree Days

Season Totals
2003 - 2007



May - September Total

A corn growing degree day (GDD) is an index used to express and track crop development through maturity. The index is calculated by subtracting a base temperature of 50°F from the average of the maximum and minimum temperatures for the day.

If the maximum temperature is greater than 86°F, then 86 is used in the equation. If the minimum temperature is less than 50°F, then 50 is used in the equation. These substitutions indicate that no appreciable growth takes place with temperatures greater than 86°F or lower than 50°F.

GDD = ((Maximum temp + Minimum temp) / 2) - 50

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Extension and Research Team Members

Extension Specialists

Lisa Behnken	Extension Educator, Crops, Rochester
Fritz Breitenbach	Extension Integrated Pest Management Specialist, Southeast
Jeff Coulter	Extension Agronomist, Crops, St. Paul
Jeff Gunsolus	Extension Agronomist, Weed Scientist, St. Paul
Dan Kaiser	Extension Nutrient Management Specialist, St. Paul
John Lamb	Extension Soil Scientist, St. Paul
Ian MacRae	Research Entomologist, Crookston
Dean Malvick	Research Plant Pathologist, St. Paul
Krishona Martinson	Extension Educator, Crops, Andover
Ryan Miller	Extension Educator, Crops, Rochester
Seth Naeve	Extension Agronomist, Soybean, St. Paul
Dave Nicolai	Extension Educator, Crops, Hutchinson
Ken Ostlie	Extension Entomologist, St. Paul
Paul Peterson	Extension Agronomist, Forages, St. Paul
Craig Sheaffer	Research Agronomist, St. Paul
Lizabeth Stahl	Regional Extension Educator, Crops, Worthington
Mary Jane Stearns	Executive Office & Administrative Specialist, Rochester
Doug Swanson	Scientist, Agronomy & Plant Genetics, St. Paul

County Extension Educators

Brad Carlson	Rice and Steele Counties
Jerry Tesmer	Fillmore and Houston Counties
Tom Van der Linden	Winona County
Dan Martens	Benton, Morrison and Stearns Counties

SROC (Southern Research & Outreach Center – Waseca)

Paul Adams	Senior Research Plot Technician
Matt Bickell	Assistant Scientist, Agronomy
Senyu Chen	Research Nematologist
Tom Hoverstad	Scientist, Agronomy
Cathy Johnson	Senior Lab Technician
Gregg Johnson	Research Agronomist, Weed Management
Gyles Randall	Soil Scientist
Jeff Vetsch	Assistant Scientist, Soils

Agricultural Interns

Brent Breitenbach	Ag Intern, Rochester
Tony Gehling	Ag Intern, Rochester
Louis Kuisle	Ag Intern, Rochester
Kyle Poss	Ag Intern, Rochester
Katherine Sheehan	Ag Intern, Rochester
Sarah Stellpflug	Ag Intern, Rochester
Ceara Suther	Ag Intern, Rochester
Amanda Welter	Ag Intern, Rochester
Matt White	Ag Intern, Rochester

SWROC (Southwest Research & Outreach Center)

Jodie Getting	Scientist, Agronomy
Bruce Potter	Research Entomologist
Steve Quiring	Scientist, Agronomy

Minnesota Crop Improvement Association

Roger Wippler	Manager

SECTION A

CORN

VARIETY TRIALS

2008 Minnesota Hybrid Corn Silage Performance Trials

Prepared by the corn silage hybrid testing consortium: C.C. Sheaffer, P.R. Peterson, D.R. Swanson, T.R. Hoverstad, M.D. Bickell, L.M. Behnken, F.R. Breitenbach, D.L. Holen, V.W. Crary, and D.C. Martens; University of Minnesota Agricultural Experiment Station and Extension.

The Minnesota Hybrid Corn Silage Evaluation Program evaluates the silage potential of corn hybrids in Minnesota. The goal of the program is to provide unbiased forage yield and quality information for educational and marketing programs. The program is financed in part by entry fees from private seed companies that chose to enter hybrids for testing. These companies are listed in this publication. Results presented are from corn silage performance trials in regions of extensive corn silage use: southeastern, central, and west-central Minnesota. The locations are in important dairy regions of Minnesota.

TEST SITES

Silage hybrids entered in the southeast or central region trials were tested at two sites within each region. Hybrids entered in the west-central region were tested at one site. Sites within regions were as follows:

Southeast Dairy Region
LaCrescent, MN (Houston County)
Rochester, MN (Olmsted County)

Central Dairy Region
Paynesville, MN (Stearns County)
Melrose, MN (Stearns County)

West-central Dairy Region
Ottertail, MN (Otter Tail County)

TEST PROCEDURES

Southeast and Central

Design: Plots were established at LaCrescent, Rochester, Paynesville and Melrose in randomized complete block designs with 4 replications. Hybrids were planted at 33,000 seed per acre with 30-inch row spacing on May 3 at the SE sites (LaCrescent and Rochester) and May 7 at the Central MN sites (Paynesville and Melrose). Plant nutrients as manure or inorganic fertilizer were applied according to University of Minnesota recommendation. Cultivation and herbicides applied by University of Minnesota recommendation were used to control weeds.

Harvesting: Plots were harvested and whole-plant herbage sampled for dry matter and forage quality analysis at each site. Each test site was harvested when the average whole-plant moisture across entries was estimated to be 65%. In 2008, harvest dates at LaCrescent, Rochester, Paynesville and Melrose were September 9, September 16, September 23 and September 26, respectively.

West-central

Design: Plots were established May 8 near Ottertail, MN under center pivot irrigation in a randomized complete block design with 3 replications. Hybrids were planted at 35,700 seeds per acre with 30-inch row spacing. Fertilizer was fall applied liquid manure at 8000 gallons per acre plus 25 gallons per acre 28% in July. Pre-emergent herbicide was applied to control weeds.

Harvesting: Plots were harvested and whole-plant herbage sampled for yield and forage quality analysis on September 24.

RESULTS PROVIDED

Tables 1-5 summarize hybrid yield and forage quality results from LaCrescent, Rochester, Paynesville, Melrose and Ottertail, respectively. Moisture content, whole-plant dry matter (DM) yield and silage yield are listed, and hybrids are ranked in descending order of milk yield per acre (Milk Yield, lb/acre). Genetic trait information is supplied by companies entered in the hybrid corn silage performance trial.

Whole-plant forage quality traits listed include crude protein (CP), neutral detergent fiber (NDF), 48-hour *in vitro* digestibility (IVD), 48-hour neutral detergent fiber digestibility (NDFD), and starch concentration. With the exception of NDFD, all forage quality traits are expressed as a percent of dry matter. NDFD is expressed as a percent of NDF.

Milk production potentials per ton (lb milk/ton forage) and per acre (lb milk/acre forage) of forage were calculated using the MILK2006 spreadsheet developed by the University of Wisconsin. MILK2006 approximates animal performance based on a standard cow weight and milk production level (1350 lb body weight and 90 lb/day at 3.8% fat). Field values for moisture and DM yield at harvest; laboratory values for CP, NDF, NDFD, starch, oil and ash concentration; and book values for NDFCP (1.3%) were used for spreadsheet calculations. For MILK2006 predictions, we assumed that kernel processing occurred.

HOW TO USE RESULTS

NDF is a negative indicator of forage intake potential; higher NDF concentration generally implies lower animal performance potential. IVD provides an estimate of forage dry matter digestibility, and NDFD estimates digestibility of the fiber fraction. Starch concentration is positively associated with digestibility because it is assumed to be 100% digestible. Relatively higher IVD, NDFD and/or starch concentrations generally imply greater animal performance potential. Milk yield per acre represents the combined effects of yield and quality.

Corn hybrids differed in yield, forage quality, and milk production potential at all sites. Means and least significant difference (LSD) values at the 10% probability level are shown for each parameter at each site. Where the difference between two hybrids for a particular yield or quality trait is greater than the LSD value, there is a 90% probability that there is a statistically significant difference between the two hybrids for that parameter (i.e. moisture, yield, quality concentration, or milk production).

PARTICIPATING COMPANIES

Crop Production Services (VIGORO), 220 Bottemiller Dr., Wadena Industrial Park, Wadena, MN 56482	www.cropproductionservices.com
Dairyland Seed Co, Inc. P O Box 958, West Bend, WI 53095	www.dairylandseed.com
DeKalb (Monsanto Co) 800 N Lindberg Blvd., St Louis, MO 63167	www.dekalb.com
Fielder's Choice Direct, 306 North Main, P O Box 898, Monticello, IN 47960	www.fielderschoicedirect.com
Garst Seed Company, 2369 330th St, Slater, IA 50244	www.garst.seed
Gold Country Seed, Inc., 16506 Hwy 15 North, P O Box 604, Hutchinson, MN 55350	www.goldcountryseed.com
Golden Harvest Seeds, Inc., 100 JC Robinson Blvd, P O Box 307, Waterloo, NE 68069	www.goldenharvestseeds.com
Heartland Hybrids, 850 1st St North, P O Box J, Dassel, MN 55325	www.heartlandhybrids.com
Hyland Seeds, 2 Hyland Drive, Blenheim, Ontario, Canada N0P 1A0	www.hylandseeds.com
La Coop Federee (ELITE), 9001 Blvd de L' Acadia, Bureau 200, Montreal, Quebec, Canada H4N 3H7	www.coopfed.qc.ca
Legacy Seeds, Inc., 210 Pine Street, Waupaca, WI 54981	www.legacyseeds.com
Mycogen Seeds, 9330 Zionsville Rd, Indianapolis, IN 46268	www.mycogen.com
Nu Tech Seed Co., 307 3rd Street, Alice, ND 58031	www.yieldleader.com
Pioneer Hi-Bred, Int'l., 7000 NW 62nd Ave, Johnston, IA 50131	www.pioneer.com
Producers Hybrids, P.O. Box C, Battle Creek, NE 68715	www.producershybrids.com
Renk Seed Co., 6800 Wilburn Road, Sun Prairie, WI 53590	www.renkseed.com
Trelay Seeds, 11623 State Road 80N, Livingston, WI 53554	www.trelay.com
Wensman Seed Co., Box 190, Wadena, MN 56482	www.wensmanseed.com

Table 1. *Relative maturity (RM), whole-plant moisture (Moist), dry matter and silage yield and quality traits for corn hybrids planted at LaCrescent, MN (Houston County) in 2008.*

Brand/ Hybrid entry	Traits [1]	RM	Moist	Yield [2]		Quality (concentration) [3]					Milk Yield [4]	
				DM	silage	CP	NDF	IVD	NDFD	Starch	Ton	Acre
			%	- ton/ acre -		%					lb/ ton	lb/ acre
DeKalb/ DKC61-69	Bt,CRW,GLY	111	67.6	11.1	34.4	8.6	41	77	39	34	3,440	38,300
Producers Hybrids/ 7325VT3	Bt,CRW,GLY	113	69.1	10.9	35.2	8.6	44	77	44	31	3,490	38,000
Midwest Seed Genetic/ 76126VT3	Bt,CRW,GLY	105	66.0	10.8	31.7	8.6	45	73	43	31	3,470	37,400
DeKalb/ DKC57-43	Bt,CRW,GLY	107	69.2	11.1	35.9	8.5	47	70	40	28	3,250	36,000
Pioneer Brand/ 34A89	Bt,CRW,GLY,LL	110	67.8	10.7	33.3	8.9	46	72	42	29	3,360	36,000
Crow's/ 4822B	Bt	107	67.2	10.5	31.9	8.6	44	74	41	31	3,400	35,600
Crow's/ 3848VT3	Bt,CRW,GLY	105	65.5	10.4	30.2	8.4	47	75	43	30	3,400	35,500
Mycogen/ TMF 2Q716	Bt,CRW,GLY	110	69.0	10.1	32.6	8.8	45	74	44	31	3,470	35,100
Renk/ RK844VT3	Bt,CRW,GLY	112	69.4	10.3	33.5	9.0	45	74	44	30	3,420	35,100
Nu Tech Seed/ 3T-310 VT3	Bt,CRW,GLY	110	68.0	10.3	32.1	8.5	46	70	41	30	3,370	34,600
Legacy Seeds/ L-5350 CBLLGT	Bt,GLY,LL	104	66.7	10.2	30.7	9.0	43	74	40	31	3,340	34,200
Mycogen/ TMF 2W587	Bt,CRW	105	68.0	9.9	30.8	9.3	45	70	46	31	3,470	34,200
Renk/ RK829VT3	Bt,CRW,GLY	112	68.6	10.4	33.1	8.4	47	71	40	28	3,250	33,800
G2 Genetics/ 1X-911 HXT/LL	Bt,CRW,LL	111	70.8	10.1	34.4	9.6	46	72	43	27	3,350	33,600
Gold Country Seed/ 100-11 SSVT3	Bt,CRW,GLY,Lf	100	65.9	9.8	28.8	8.6	45	76	42	30	3,380	33,200
Midwest Seed Genetic/ 76865VT3	Bt,CRW,GLY	109	69.4	9.9	32.4	8.8	44	73	40	31	3,350	33,200
Fielders Choice/ NG 6720	Bt,CRW,GLY	108	67.4	10.2	31.3	7.6	46	73	38	29	3,220	32,800
Midwest Seed Genetic/ 76996VT3	Bt,CRW,GLY	109	67.1	9.8	29.9	8.6	47	70	42	29	3,330	32,800
Renk/ RK692CBLLRW	Bt,CRW,LL	105	63.4	9.4	25.8	8.7	43	74	45	34	3,470	32,700
Trelay/ 7T231	Bt,CRW,GLY	111	69.8	9.9	32.7	9.1	46	72	41	31	3,320	32,700
Crow's/ 4354VT3	Bt,CRW,GLY	107	68.3	9.7	30.6	8.2	44	69	39	30	3,320	32,200
Legacy Seeds/ L-6600 HX	Bt,LL	110	72.6	10.2	37.1	9.1	50	68	41	24	3,130	31,900
DeKalb/ DKC52-59	Bt,CRW,GLY	102	68.9	9.7	31.3	8.8	47	71	42	28	3,260	31,800
Trelay/ 6T226	Bt,CRW,GLY	106	68.1	10.0	31.2	8.7	50	71	41	26	3,180	31,700
Renk/ RK698RRYGRW	CRW,GLY	104	65.9	9.0	26.4	8.3	43	74	42	33	3,460	31,100
Fielders Choice/ NG 6686	Bt,CRW,GLY	107	67.2	9.4	28.5	8.3	49	74	42	28	3,300	30,800
Dairyland/ HiD.F.-3104		104	68.6	9.8	31.1	7.8	49	71	40	25	3,140	30,600
Midwest Seed Genetic/ 76485VT3	Bt,CRW,GLY	107	69.6	9.3	30.5	9.0	47	68	41	28	3,270	30,400
Gold Country Seed/ 98-11 SSRR	GLY,Lf	98	66.3	9.2	27.3	8.1	45	76	40	29	3,280	30,200
Pioneer Brand/ 34B41	Bt,CRW,GLY,LL	110	69.7	10.1	33.5	8.5	50	71	37	23	2,980	30,200

Table 1. *Relative maturity (RM), whole-plant moisture (Moist), dry matter and silage yield and quality traits for corn hybrids planted at LaCrescent, MN (Houston County) in 2008.*

Brand/ Hybrid entry	Traits [1]	RM	Moist	Yield [2]		Quality (concentration) [3]					Milk Yield [4]	
				DM	silage	CP	NDF	IVD	NDFD	Starch	Ton	Acre
			%	- ton/ acre -				%			lb/ ton	lb/ acre
Dairyland/ HiD.F.-3110-6	GLY	110	69.7	10.2	33.7	8.2	51	68	37	22	2,940	30,000
DeKalb/ DKC55-82	GLY	105	69.7	9.3	30.7	9.2	50	73	42	27	3,200	29,800
Dairyland/ HiD.F.-3008-4	CRW,GLY	108	69.8	9.4	31.3	8.4	49	73	40	26	3,120	29,500
Crow's/ 1928R	GLY	99	65.4	9.0	26.1	8.5	46	73	40	29	3,260	29,400
Jung Seed Genetics/ HDS 76V78		107	66.9	9.5	28.8	7.7	48	72	37	25	3,060	29,200
DeKalb/ DKC50-44	Bt,CRW,GLY	100	69.9	9.0	30.0	8.9	49	71	41	28	3,190	28,800
DeKalb/ DKC55-24	Bt,CRW,GLY	105	67.8	9.3	28.9	9.0	51	70	40	24	3,060	28,500
DeKalb/ DKC54-49	Bt,CRW,GLY	104	69.9	9.3	30.8	8.4	50	69	39	25	3,060	28,400
Crow's/ 2123VT3	Bt,CRW,GLY	101	70.2	8.8	29.5	8.4	50	72	42	25	3,210	28,300
G2 Genetics/ 1X-716 HXT/LL	Bt,CRW,LL	116	73.3	9.0	33.6	9.1	50	72	40	23	3,120	28,000
Midwest Seed Genetic/ 70006R	GLY	99	67.8	8.8	27.3	8.5	48	71	39	27	3,140	27,600
Nu Tech Seed/ 0C-413 YGCB	Bt,CRW	113	69.5	8.8	28.9	8.2	49	70	39	26	3,130	27,600
Jung Seed Genetics/ HDS 7113QRR/YGP	Bt,CRW,GLY	113	70.2	8.9	29.7	8.5	51	72	41	23	3,090	27,400
Jung Seed Genetics/ HDS 66W46		104	65.6	8.8	25.6	8.3	51	70	40	27	3,080	27,200
Producers Hybrids/ 6634VT3	Bt,CRW,GLY	106	68.0	9.2	28.6	9.0	52	71	39	24	2,970	27,200
Renk/ RK770VT3	Bt,CRW,GLY	108	72.8	8.6	31.8	9.5	50	71	41	26	3,140	27,100
Jung Seed Genetics/ HDS 7105VT3	Bt,CRW,GLY	109	70.6	8.2	28.0	8.8	49	70	41	26	3,170	26,100
DeKalb/ DKC53-17	Bt,CRW,GLY	103	70.2	7.5	25.2	9.1	50	72	40	23	3,060	22,900
mean			**68.5**	**9.7**	**30.8**	**8.6**	**47**	**72**	**41**	**28**	**3,250**	**31,400**
LSD(0.10)			**2.5**	**1.1**	**3.4**	**0.6**	**5**	**4**	**3**	**5**	**ns**	**5,300**
CV			**3.1**	**9.7**	**9.6**	**6.8**	**9.7**	**5.0**	**7.8**	**16.5**	**8.1**	**14.5**

[1] Bt, CRW, GLY, LL, Lf traits contain genes for European corn borer tolerance, corn rootworm tolerance, and glyphosate, Liberty Link ® (glufosinate-ammonium) herbicide resistance, and leafy trait, respectively.

[2] **DM** yield is whole-plant corn yield at 100% dry matter; **Silage** yield is whole-plant corn yield at harvest moisture.

[3] Quality concentration expressed as a % of DM, except NDFD which is expressed as a % of NDF. Refer to *Results Provided* text for additional information.

[4] Milk production was estimated using spreadsheet MILK2006 developed at the University of Wisconsin. Refer to *Results Provided* text for additional information.

Table 2. *Relative maturity (RM), whole-plant moisture (Moist), dry matter and silage yield and quality traits for corn hybrids planted at Rochester, MN (Olmsted County) in 2008.*

Brand/ Hybrid entry	Traits [1]	RM	Moist	Yield [2]		Quality (concentration) [3]					Milk Yield [4]	
				DM	silage	CP	NDF	IVD	NDFD	Starch	Ton	Acre
			%	- ton/ acre -		%					lb/ ton	lb/ acre
Legacy Seeds/ L-5350 CBLLGT	Bt,GLY,LL	104	64.6	10.2	28.7	8.7	40	78	44	38	3,600	36,600
Producers Hybrids/ 7325VT3	Bt,CRW,GLY	113	69.9	10.1	33.6	9.1	42	77	45	33	3,530	35,700
Renk/ RK829VT3	Bt,CRW,GLY	112	67.5	9.7	29.8	8.9	43	76	44	33	3,460	33,600
Trelay/ 7T231	Bt,CRW,GLY	111	66.4	9.2	27.3	8.6	42	76	43	34	3,520	32,400
Legacy Seeds/ L-6600 HX	Bt,LL	110	69.4	9.7	31.7	8.9	45	74	42	31	3,320	32,300
Dairyland/ HiD.F.-3008-4	CRW,GLY	108	67.1	9.5	29.0	8.8	44	74	43	33	3,370	32,100
G2 Genetics/ 1X-716 HXT/LL	Bt,CRW,LL	116	68.4	9.2	29.0	9.6	42	77	44	34	3,510	32,100
Pioneer Brand/ 34A89	Bt,CRW,GLY,LL	110	65.7	9.3	27.1	9.0	43	75	43	32	3,440	31,900
DeKalb/ DKC57-43	Bt,CRW,GLY	107	68.5	9.3	29.7	8.7	44	75	42	33	3,400	31,700
Midwest Seed Genetic/ 76485VT3	Bt,CRW,GLY	107	66.0	8.8	25.8	9.3	42	77	45	37	3,540	31,100
Crow's/ 2123VT3	Bt,CRW,GLY	101	66.5	9.0	26.7	8.6	43	75	43	36	3,460	31,000
Renk/ RK844VT3	Bt,CRW,GLY	112	67.9	8.8	27.4	9.5	42	77	45	35	3,520	30,900
Crow's/ 3848VT3	Bt,CRW,GLY	105	65.3	9.1	26.2	8.5	46	74	42	32	3,300	30,000
DeKalb/ DKC55-82	GLY	105	68.6	9.0	28.6	8.7	46	74	43	32	3,340	30,000
Crow's/ 4354VT3	Bt,CRW,GLY	107	68.0	8.6	27.0	9.3	44	76	44	33	3,450	29,800
DeKalb/ DKC61-69	Bt,CRW,GLY	111	67.8	8.9	27.5	8.8	45	74	43	31	3,360	29,800
G2 Genetics/ 1X-911 HXT/LL	Bt,CRW,LL	111	69.2	9.1	29.4	9.1	46	74	43	29	3,290	29,800
DeKalb/ DKC52-59	Bt,CRW,GLY	102	63.3	8.6	23.4	8.3	42	76	43	36	3,440	29,500
Trelay/ 6T226	Bt,CRW,GLY	106	64.9	8.6	24.4	8.5	44	75	43	35	3,420	29,400
Crow's/ 1928R	GLY	99	65.1	8.2	23.4	8.8	40	77	43	37	3,550	29,000
Producers Hybrids/ 6634VT3	Bt,CRW,GLY	106	66.1	8.6	25.2	8.9	43	75	42	34	3,380	28,900
Crow's/ 4822B	Bt	107	67.5	9.0	27.7	8.8	47	73	42	28	3,190	28,700
Nu Tech Seed/ 0C-413 YGCB	Bt,CRW	113	66.1	8.3	24.5	8.6	44	75	43	32	3,380	28,100
DeKalb/ DKC55-24	Bt,CRW,GLY	105	65.2	8.5	24.3	8.8	46	73	43	33	3,300	27,900
Fielders Choice/ NG 6720	Bt,CRW,GLY	108	66.4	8.4	25.0	8.6	46	73	41	34	3,290	27,600
Midwest Seed Genetic/ 76126VT3	Bt,CRW,GLY	105	64.1	8.2	22.9	8.2	45	74	42	33	3,350	27,600
Dairyland/ HiD.F.-3104		104	69.9	8.2	27.4	8.8	45	74	42	31	3,310	27,300
Renk/ RK692CBLLRW	Bt,CRW,LL	105	67.1	7.9	23.9	10.0	44	76	45	35	3,470	27,300
Dairyland/ HiD.F.-3110-6	GLY	110	71.1	8.5	29.4	8.8	48	73	43	25	3,190	27,100
DeKalb/ DKC50-44	Bt,CRW,GLY	100	66.7	8.6	25.7	8.5	48	72	41	30	3,160	27,100

Table 2. *Relative maturity (RM), whole-plant moisture (Moist), dry matter and silage yield and quality traits for corn hybrids planted at Rochester, MN (Olmsted County) in 2008.*

Brand/ Hybrid entry	Traits [1]	RM	Moist	Yield [2]		Quality (concentration) [3]					Milk Yield [4]	
				DM	silage	CP	NDF	IVD	NDFD	Starch	Ton	Acre
			%	- ton/ acre -				%			lb/ ton	lb/ acre
Fielders Choice/ NG 6686	Bt,CRW,GLY	107	66.4	8.7	25.8	8.3	49	71	41	29	3,130	27,100
Midwest Seed Genetic/ 76996VT3	Bt,CRW,GLY	109	62.8	8.1	21.9	8.2	45	74	43	33	3,330	27,100
Renk/ RK698RRYGRW	CRW,GLY	104	65.4	8.0	23.0	8.7	44	74	42	34	3,350	26,700
Renk/ RK770VT3	Bt,CRW,GLY	108	69.1	7.8	25.3	10.0	45	75	44	32	3,390	26,500
Mycogen/ TMF 2Q716	Bt,CRW,GLY	110	69.7	8.6	28.5	8.3	51	70	42	24	3,060	26,400
Mycogen/ TMF 2W587	Bt,CRW	105	66.5	7.9	23.6	9.4	48	74	45	29	3,330	26,300
Jung Seed Genetics/ HDS 76V78		107	68.8	8.6	27.7	8.6	51	70	40	25	2,990	25,800
Jung Seed Genetics/ HDS 7105VT3	Bt,CRW,GLY	109	70.0	8.0	26.5	9.0	48	73	44	27	3,240	25,800
Nu Tech Seed/ 3T-310 VT3	Bt,CRW,GLY	110	66.0	7.8	22.9	8.4	45	74	42	31	3,300	25,700
Jung Seed Genetics/ HDS 66W46		104	66.5	8.2	24.5	8.2	48	71	40	29	3,080	25,300
Midwest Seed Genetic/ 76865VT3	Bt,CRW,GLY	109	68.3	7.6	24.1	8.9	45	74	42	31	3,310	25,300
Jung Seed Genetics/ HDS 7113QRR/YGP	Bt,CRW,GLY	113	70.4	7.6	25.6	8.7	46	73	43	28	3,260	24,700
Gold Country Seed/ 100-11 SSVT3	Bt,CRW,GLY,Lf	100	66.0	7.8	23.0	8.0	49	71	40	28	3,070	24,000
Gold Country Seed/ 98-11 SSRR	GLY,Lf	98	68.5	7.8	24.7	8.4	50	70	40	27	3,040	23,600
Midwest Seed Genetic/ 70006R	GLY	99	67.8	6.9	21.5	8.7	44	75	43	33	3,370	23,300
DeKalb/ DKC53-17	Bt,CRW,GLY	103	66.0	7.3	21.5	8.7	49	72	42	30	3,140	23,000
DeKalb/ DKC54-49	Bt,CRW,GLY	104	67.5	7.3	22.5	8.4	49	71	41	28	3,120	22,900
mean			**67.2**	**8.5**	**26.1**	**8.8**	**45**	**74**	**43**	**32**	**3,330**	**28,400**
LSD(0.10)			**2.4**	**1.3**	**4.1**	**0.5**	**4**	**3**	**2**	**5**	**260**	**5,400**
CV			**3.0**	**13.1**	**13.3**	**5.4**	**8.9**	**4.1**	**4.9**	**13.4**	**6.6**	**16.3**

[1] Bt, CRW, GLY, LL, Lf traits contain genes for European corn borer tolerance, corn rootworm tolerance, and glyphosate, Liberty Link ® (glufosinate-ammonium) herbicide resistance, and leafy trait, respectively.

[2] **DM** yield is whole-plant corn yield at 100% dry matter; **Silage** yield is whole-plant corn yield at harvest moisture.

[3] Quality concentration expressed as a % of DM, except NDFD which is expressed as a % of NDF. Refer to *Results Provided* text for additional information.

[4] Milk production was estimated using spreadsheet MILK2006 developed at the University of Wisconsin. Refer to *Results Provided* text for additional information.

Table 3. *Relative maturity (RM), whole-plant moisture (Moist), dry matter and silage yield and quality traits for corn hybrids planted at Paynesville, MN (Stearns County) in 2008.*

Brand/ Hybrid entry	Traits [1]	RM	Moist	Yield [2]		Quality (concentration) [3]					Milk Yield [4]	
				DM	silage	CP	NDF	IVD	NDFD	Starch	Ton	Acre
			%	- ton/ acre -				%			lb/ ton	lb/ acre
Fielders Choice/ NG 6720	Bt,CRW,GLY	108	64.2	10.8	30.1	8.5	40	76	41	37	3,530	38,000
DeKalb/ DKC55-24	Bt,CRW,GLY	105	65.4	10.1	29.3	9.0	42	76	44	35	3,530	35,700
Crow's/ 2155VT3	Bt,CRW,GLY	102	64.5	9.9	28.0	9.1	41	76	41	38	3,480	34,500
Pioneer Brand/ 35F40	Bt,GLY,LL	107	66.0	9.8	28.9	9.5	42	76	43	36	3,490	34,300
Hyland Seeds/ HL SR59	RR	101	68.8	9.9	31.7	9.1	44	74	42	32	3,390	33,600
Producers Hybrids/ 6634VT3	Bt,CRW,GLY	106	66.4	9.7	28.8	8.9	43	75	41	36	3,430	33,200
G2 Genetics/ 5H-501 RR/HX	Bt,GLY,LL	101	66.8	9.1	27.4	9.2	41	77	44	39	3,620	32,900
Hyland Seeds/ HL B337	Bt	105	68.6	9.3	29.7	9.3	41	76	42	36	3,500	32,700
Renk/ RK692CBLLRW	Bt,CRW,LL	105	65.6	9.3	26.9	9.1	41	76	43	36	3,510	32,500
NuTech Seed/ 3T-302 VT3	Bt,CRW,GLY	102	66.1	9.2	27.1	9.2	42	76	43	37	3,530	32,400
DeKalb/ DKC50-44	Bt,CRW,GLY	100	64.8	9.4	26.6	8.3	43	75	41	36	3,430	32,100
Legacy Seeds/ L-5350 CBLLGT	Bt,GLY,LL	104	65.5	9.4	27.2	8.8	43	75	42	36	3,420	32,100
Jung Seed Genetic/ HDS 7105VT3	Bt,CRW,GLY	109	69.6	9.7	31.9	9.4	48	73	43	29	3,280	31,800
Pioneer Brand/ 34A89	Bt,CRW,GLY,LL	110	69.1	9.6	31.0	9.9	46	74	43	31	3,320	31,800
DeKalb/ DKC54-49	Bt,CRW,GLY	104	67.7	9.4	28.9	9.0	45	74	42	34	3,370	31,600
DeKalb/ DKC55-82	GLY	105	69.6	9.3	30.5	9.6	44	75	43	33	3,420	31,600
Midwest Seed Genetic/ 70505VT3	Bt,CRW,GLY	101	65.7	8.7	25.3	8.8	40	77	43	38	3,610	31,400
Hyland Seeds/ HL S067		103	67.5	9.5	29.2	9.1	46	73	40	31	3,280	31,100
Gold Country Seed/ 100-11 SSVT3	Bt,CRW,GLY,Lf	100	65.9	9.3	27.2	8.8	45	74	42	33	3,340	31,000
Trelay/ 6T226	Bt,CRW,GLY	106	66.0	9.2	26.9	8.7	46	73	42	33	3,370	30,800
NuTech Seed/ 3T-500A VT3	Bt,CRW,GLY	100	63.3	9.0	24.5	8.8	43	75	41	36	3,380	30,400
Hyland Seeds/ HL B49R	Bt,GLY	100	67.0	8.9	26.9	9.6	45	74	43	35	3,410	30,300
Crow's/ 1928R	GLY	99	65.6	9.0	26.2	9.4	45	74	42	35	3,350	30,100
Hyland Seeds/ HL CVR64	Bt,CRW,GLY	97	64.2	8.8	24.5	9.1	43	75	42	36	3,410	30,000
Midwest Seed Genetic/ 69805VT3	Bt,CRW,GLY	98	62.6	8.9	23.7	8.5	42	75	40	38	3,390	30,000
Dairyland/ HiD.F.-3000-6	GLY	100	67.1	8.9	27.0	9.1	46	74	43	32	3,340	29,700
Fielders Choice/ NG 6520	Bt,CRW,GLY	98	65.0	9.1	26.1	8.2	45	73	40	35	3,260	29,700
DeKalb/ DKC52-59	Bt,CRW,GLY	102	65.1	9.1	26.2	8.6	45	73	39	36	3,230	29,600
Renk/ RK698RRYGRW	CRW,GLY	104	63.1	8.7	23.5	8.5	42	76	41	37	3,410	29,500
DeKalb/ DKC50-19	Bt,CRW,GLY	100	64.8	8.3	23.6	8.9	42	76	44	38	3,520	29,200

Table 3. *Relative maturity (RM), whole-plant moisture (Moist), dry matter and silage yield and quality traits for corn hybrids planted at Paynesville, MN (Stearns County) in 2008.*

Brand/ Hybrid entry	Traits [1]	RM	Moist	Yield [2]		Quality (concentration) [3]					Milk Yield [4]	
				DM	silage	CP	NDF	IVD	NDFD	Starch	Ton	Acre
			%	- ton/ acre -				%			lb/ ton	lb/ acre
DeKalb/ DKC38-89	Bt,CRW,GLY	89	61.4	8.6	22.4	8.9	44	75	42	38	3,360	29,000
Jung Seed Genetic/ HDS 66W46		104	67.1	8.9	27.1	9.2	47	72	41	30	3,230	28,700
Mycogen/ TMF 2W587	Bt,CRW	105	67.1	8.1	24.5	9.9	43	77	45	34	3,550	28,600
DeKalb/ DKC45-79	Bt,CRW,GLY	95	64.2	8.4	23.5	8.8	44	74	41	37	3,380	28,500
Fielders Choice/ NG 6686	Bt,CRW,GLY	107	67.3	8.5	25.9	9.2	46	74	44	32	3,360	28,500
Hyland Seeds/ HL SVT50	Bt,CRW,GLY	101	71.3	8.7	30.3	8.9	47	73	43	28	3,280	28,500
Jung Seed Genetic/ HDS 76V78		107	69.0	8.8	28.4	9.2	48	72	42	29	3,220	28,500
Wensman Seed/ W 7143VT3	Bt,CRW,GLY	93	64.3	8.3	23.1	9.1	45	74	42	35	3,320	27,400
DeKalb/ DKC41-60	Bt,CRW,GLY	91	61.6	8.5	22.2	8.4	46	73	41	35	3,200	27,300
DeKalb/ DKC53-17	Bt,CRW,GLY	103	67.2	7.9	24.0	9.1	45	74	43	34	3,400	26,800
Renk/ RK632RRYGPL	Bt,CRW,GLY	102	65.2	8.7	24.9	8.4	49	71	40	29	3,080	26,700
DeKalb/ DKC43-27	Bt,CRW,GLY	93	63.0	7.8	21.0	9.0	42	76	42	38	3,410	26,500
Producers Hybrids/ 5624VT3	Bt,CRW,GLY	96	60.7	8.0	20.4	8.6	43	74	41	39	3,300	26,500
Renk/ RK616VT3	Bt,CRW,GLY	102	65.0	8.2	23.5	8.4	47	72	40	33	3,220	26,500
Gold Country Seed/ 98-11 SSRR	GLY,Lf	98	67.3	8.4	25.7	8.4	48	71	39	30	3,150	26,400
Wensman Seed/ W 7107VT3	Bt,CRW,GLY	90	59.6	8.7	21.5	8.6	48	71	39	35	3,020	26,200
DeKalb/ DKC48-46	Bt,CRW,GLY	98	62.5	8.6	22.9	7.9	47	71	38	30	3,030	26,000
Hyland Seeds/ HL S047		99	64.4	7.9	22.1	8.7	46	73	41	32	3,260	25,700
Trelay/ 6T672	Bt,CRW,GLY	107	67.1	8.1	24.7	8.3	48	71	39	30	3,150	25,600
Mycogen/ TMF 2N422	GLY	94	61.8	8.2	21.3	9.0	49	71	40	32	3,050	24,900
Jung Seed Genetic/ HDS 6098QVTRW/R	CRW,GLY	98	68.3	7.8	24.7	8.9	50	71	42	28	3,130	24,500
mean			**65.6**	**8.9**	**26.1**	**8.9**	**45**	**74**	**42**	**34**	**3,350**	**29,800**
LSD(0.10)			**2.7**	**1.2**	**3.2**	**0.7**	**4**	**3**	**2**	**5**	**250**	**5,200**
CV			**3.6**	**12.1**	**10.5**	**6.8**	**8.9**	**3.8**	**4.9**	**13.8**	**6.3**	**14.9**

[1] Bt, CRW, GLY, LL, Lf traits contain genes for European corn borer tolerance, corn rootworm tolerance, and glyphosate, Liberty Link ® (glufosinate-ammonium) herbicide resistance, and leafy trait, respectively.

[2] **DM** yield is whole-plant corn yield at 100% dry matter; **Silage** yield is whole-plant corn yield at harvest moisture.

[3] Quality concentration expressed as a % of DM, except NDFD which is expressed as a % of NDF. Refer to *Results Provided* text for additional information.

[4] Milk production was estimated using spreadsheet MILK2006 developed at the University of Wisconsin. Refer to *Results Provided* text for additional information.

Table 4. *Relative maturity (RM), whole-plant moisture (Moist), dry matter and silage yield and quality traits for corn hybrids planted at Melrose, MN (Stearns County) in 2008.*

Brand/ Hybrid entry	Traits [1]	RM	Moist	Yield [2]		Quality (concentration) [3]					Milk Yield [4]	
				DM	silage	CP	NDF	IVD	NDFD	Starch	Ton	Acre
			%	- ton/ acre -		%					lb/ ton	lb/ acre
DeKalb/ DKC55-24	Bt,CRW,GLY	105	66.6	9.2	27.6	9.2	42	76	44	39	3,610	33,300
Pioneer Brand/ 35F40	Bt,GLY,LL	107	66.4	8.7	25.8	9.7	42	77	44	40	3,590	31,100
Trelay/ 6T226	Bt,CRW,GLY	106	65.5	9.0	26.0	9.1	45	74	43	35	3,440	30,900
Gold Country Seed/ 98-11 SSRR	GLY,Lf	98	68.2	9.3	29.2	9.2	47	72	41	34	3,290	30,500
Pioneer Brand/ 34A89	Bt,CRW,GLY,LL	110	69.6	9.0	29.5	9.2	44	74	41	32	3,400	30,500
DeKalb/ DKC50-19	Bt,CRW,GLY	100	67.0	8.6	26.0	9.8	45	75	45	38	3,530	30,400
Midwest Seed Genetic/ 70505VT3	Bt,CRW,GLY	101	67.0	8.8	26.8	9.3	44	74	42	36	3,440	30,400
Renk/ RK632RRYGPL	Bt,CRW,GLY	102	65.9	8.6	25.1	9.6	43	76	43	39	3,530	30,200
Fielders Choice/ NG 6686	Bt,CRW,GLY	107	65.5	8.6	24.8	8.8	44	75	44	34	3,510	30,000
Dairyland/ HiD.F.-3000-6	GLY	100	68.0	8.4	26.1	10.0	45	76	47	34	3,570	29,900
Jung Seed Genetic/ HDS 66W46		104	68.1	9.0	28.4	9.5	47	72	41	34	3,260	29,500
Legacy Seeds/ L-5350 CBLLGT	Bt,GLY,LL	104	68.4	9.0	28.5	9.4	47	72	40	34	3,270	29,500
Crow's/ 2155VT3	Bt,CRW,GLY	102	66.3	8.9	26.3	9.2	47	72	41	33	3,280	29,100
Renk/ RK698RRYGRW	CRW,GLY	104	63.8	8.5	23.5	9.3	43	75	41	39	3,410	29,100
Jung Seed Genetic/ HDS 6098QVTRW/R	CRW,GLY	98	66.8	8.7	26.1	8.9	45	73	40	35	3,340	29,000
DeKalb/ DKC43-27	Bt,CRW,GLY	93	63.6	8.5	23.4	9.4	44	74	41	40	3,370	28,700
G2 Genetics/ 5H-501 RR/HX	Bt,GLY,LL	101	67.3	8.1	24.8	9.2	42	76	43	37	3,530	28,700
Gold Country Seed/ 100-11 SSVT3	Bt,CRW,GLY,Lf	100	66.9	8.8	26.6	8.7	46	72	40	32	3,260	28,700
DeKalb/ DKC55-82	GLY	105	70.0	8.8	29.4	9.2	48	72	41	31	3,230	28,600
DeKalb/ DKC52-59	Bt,CRW,GLY	102	67.5	8.4	25.8	9.1	44	74	41	38	3,410	28,500
Mycogen/ TMF 2W587	Bt,CRW	105	68.1	8.4	26.4	9.0	46	74	42	32	3,380	28,400
DeKalb/ DKC48-46	Bt,CRW,GLY	98	65.7	8.7	25.5	8.7	48	71	40	34	3,230	28,200
Crow's/ 1928R	GLY	99	68.1	8.4	26.4	9.6	46	73	41	35	3,320	27,900
DeKalb/ DKC50-44	Bt,CRW,GLY	100	68.3	8.3	26.2	8.9	45	73	41	34	3,370	27,900
DeKalb/ DKC54-49	Bt,CRW,GLY	104	69.2	8.2	26.7	9.0	46	73	41	33	3,340	27,500
Producers Hybrids/ 5624VT3	Bt,CRW,GLY	96	67.1	8.0	24.4	8.4	45	74	42	37	3,400	27,300
Mycogen/ TMF 2N422	GLY	94	65.3	8.3	24.0	9.6	49	72	42	34	3,260	27,100
DeKalb/ DKC38-89	Bt,CRW,GLY	89	66.7	8.5	25.5	9.1	49	71	41	31	3,170	27,000
Fielders Choice/ NG 6520	Bt,CRW,GLY	98	66.7	8.0	24.1	8.8	45	73	40	37	3,320	26,600
Renk/ RK692CBLLRW	Bt,CRW,LL	105	68.3	7.5	23.6	9.7	43	76	45	37	3,550	26,500

Table 4. *Relative maturity (RM), whole-plant moisture (Moist), dry matter and silage yield and quality traits for corn hybrids planted at Melrose, MN (Stearns County) in 2008.*

Brand/ Hybrid entry	Traits [1]	RM	Moist	Yield [2]		Quality (concentration) [3]					Milk Yield [4]	
				DM	silage	CP	NDF	IVD	NDFD	Starch	Ton	Acre
			%	- ton/ acre -				%			lb/ ton	lb/ acre
DeKalb/ DKC53-17	Bt,CRW,GLY	103	68.8	8.0	25.6	8.6	47	72	41	34	3,300	26,400
Hyland Seeds/ HL B49R	Bt,GLY	100	66.9	7.6	23.0	8.7	44	75	42	37	3,470	26,400
DeKalb/ DKC45-79	Bt,CRW,GLY	95	67.2	7.5	22.7	9.0	43	75	42	38	3,510	26,200
Midwest Seed Genetic/ 69805VT3	Bt,CRW,GLY	98	67.9	7.9	24.5	9.4	46	73	41	34	3,330	26,200
Hyland Seeds/ HL CVR64	Bt,CRW,GLY	97	65.1	7.8	22.3	9.6	46	73	41	36	3,350	26,100
Jung Seed Genetic/ HDS 7105VT3	Bt,CRW,GLY	109	71.8	8.2	29.1	9.5	48	71	40	29	3,180	26,100
DeKalb/ DKC41-60	Bt,CRW,GLY	91	64.0	7.7	21.5	9.0	46	72	40	37	3,320	25,700
Hyland Seeds/ HL SR59	RR	101	70.7	7.9	26.8	8.6	46	72	41	29	3,260	25,700
Renk/ RK616VT3	Bt,CRW,GLY	102	66.9	7.5	22.8	9.8	45	74	42	37	3,380	25,500
NuTech Seed/ 3T-500A VT3	Bt,CRW,GLY	100	67.5	8.0	24.6	8.7	49	71	40	32	3,180	25,400
Wensman Seed/ W 7107VT3	Bt,CRW,GLY	90	63.4	7.7	21.1	9.4	45	74	41	36	3,280	25,400
Hyland Seeds/ HL S067		103	69.7	8.4	27.6	8.4	51	68	38	26	2,980	24,900
Producers Hybrids/ 6634VT3	Bt,CRW,GLY	106	68.5	7.7	24.6	8.6	46	72	39	32	3,190	24,600
NuTech Seed/ 3T-302 VT3	Bt,CRW,GLY	102	68.9	7.1	22.7	8.8	44	75	44	32	3,450	24,400
Trelay/ 6T672	Bt,CRW,GLY	107	67.1	7.4	22.4	8.5	45	72	38	33	3,230	23,900
Hyland Seeds/ HL B337	Bt	105	71.5	7.3	25.6	10.0	48	72	42	29	3,240	23,600
Jung Seed Genetic/ HDS 76V78		107	70.3	7.3	24.7	8.5	48	70	39	27	3,100	22,700
Wensman Seed/ W 7143VT3	Bt,CRW,GLY	93	66.2	6.5	19.3	9.4	43	75	42	37	3,460	22,600
Hyland Seeds/ HL SVT50	Bt,CRW,GLY	101	71.0	7.0	24.1	9.1	48	72	41	28	3,200	22,400
Hyland Seeds/ HL S047		99	66.4	7.3	21.6	9.3	52	69	40	30	3,080	22,300
Fielders Choice/ NG 6720	Bt,CRW,GLY	108	69.6	6.8	22.3	8.7	49	70	38	28	3,060	20,800
mean			**67.5**	**8.2**	**25.1**	**9.1**	**46**	**73**	**41**	**34**	**3,340**	**27,200**
LSD(0.10)			**2.3**	**1.2**	**4.0**	**ns**	**4**	**3**	**3**	**5**	**230**	**4,900**
CV			**2.9**	**13.1**	**13.6**	**8.3**	**8.5**	**3.9**	**6.4**	**12.8**	**6.0**	**15.5**

[1] Bt, CRW, GLY, LL, Lf traits contain genes for European corn borer tolerance, corn rootworm tolerance, and glyphosate, Liberty Link ® (glufosinate-ammonium) herbicide resistance, and leafy trait, respectively.

[2] **DM** yield is whole-plant corn yield at 100% dry matter; **Silage** yield is whole-plant corn yield at harvest moisture.

[3] Quality concentration expressed as a % of DM, except NDFD which is expressed as a % of NDF. Refer to *Results Provided* text for additional information.

[4] Milk production was estimated using spreadsheet MILK2006 developed at the University of Wisconsin. Refer to *Results Provided* text for additional information.

Table 5. *Relative maturity (RM), whole-plant moisture (Moist), dry matter and silage yield and quality traits for corn hybrids planted at Ottertail, MN (Otter Tail County) in 2008.*

Brand/ Hybrid entry	Traits [1]	RM	Moist	Yield [2]		Quality (concentration) [3]					Milk Yield [4]	
				DM	silage	CP	NDF	IVD	NDFD	Starch	Ton	Acre
			%	- ton/ acre -		%					lb/ ton	lb/ acre
DeKalb/ DKC50-42	Bt,CRW,GLY	100	69.0	7.7	25.0	9.2	42	79	51	31	3,310	25,700
Pioneer Brand/ 38P43	Bt,CRW,GLY,LL	94	66.1	7.8	23.0	8.5	43	77	47	31	3,180	24,700
Pioneer Brand/ 37N16	Bt,CRW,GLY,LL	97	69.2	7.6	24.6	8.7	45	76	46	30	3,070	23,300
Elite/ MATRIX		98	71.0	7.7	26.4	8.1	44	76	46	26	2,990	23,000
Hyland Seeds/ HL SR35	GLY,Lf	89	68.1	7.0	22.1	9.2	45	76	47	32	3,110	21,900
Crop Production Service/ V3640		94	66.7	7.4	22.2	8.2	46	74	44	28	2,960	21,900
DeKalb/ DKC45-79	Bt,CRW,GLY	95	68.9	7.9	25.3	8.6	51	72	45	25	2,760	21,700
Pioneer Brand/ 35F37	GLY	107	64.4	7.0	19.7	8.8	46	76	47	32	3,060	21,500
DeKalb/ DKC42-91	Bt,CRW,GLY	92	68.5	7.0	22.1	8.6	45	76	47	29	3,070	21,400
NuTech Seed/ 3U-997	CRW,GLY,Lf	97	66.9	7.0	21.1	9.4	48	75	48	28	3,000	21,000
Hyland Seeds/ HL S038	Bt,GLY	89	69.8	6.7	22.0	9.4	45	76	48	29	3,080	20,500
Dairyland/ HiDF-3094-6	GLY	94	71.3	7.5	26.2	8.1	48	72	42	22	2,690	20,200
NuTech Seed/ 3A-306	GLY,Lf	106	65.9	6.8	20.0	8.8	47	74	44	28	2,930	20,000
Dairyland/ HiDF-3098		98	68.2	6.7	21.1	8.7	46	75	45	26	2,970	19,900
Hyland Seeds/ HL SR42	GLY,Lf	95	67.9	6.9	21.6	8.8	50	71	43	25	2,730	18,900
NuTech Seed/ 5H-298	Bt,CRW,GLY	96	69.3	6.5	21.2	8.9	49	74	46	26	2,920	18,900
mean			**68.2**	**7.2**	**22.7**	**8.8**	**46**	**75**	**46**	**28**	**2,990**	**21,500**
LSD(0.10)			**1.4**	**0.5**	**1.5**	**0.6**	**2**	**2**	**2**	**3**	**180**	**2,100**
CV			**1.5**	**5.2**	**4.8**	**5.1**	**4.5**	**1.9**	**3.9**	**8.0**	**4.3**	**6.9**

[1] Bt, CRW, GLY, LL, Lf traits contain genes for European corn borer tolerance, corn rootworm tolerance, and glyphosate, Liberty Link ® (glufosinate-ammonium) herbicide resistance, and leafy trait, respectively.

[2] **DM** yield is whole-plant corn yield at 100% dry matter; **Silage** yield is whole-plant corn yield at harvest moisture.

[3] Quality concentration expressed as a % of DM, except NDFD which is expressed as a % of NDF. Refer to *Results Provided* text for additional information.

[4] Milk production was estimated using spreadsheet MILK2006 developed at the University of Wisconsin. Refer to *Results Provided* text for additional information.

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Comparison of early maturity (90 to 99 day RM) corn hybrids, at Rock Dell and Waseca, MN, in 2008.

Breitenbach, Fritz R., Lisa M. Behnken, Ryan P. Miller, Thomas R. Hoverstad, and Jerry A. Tesmer.

The objective of these studies was to compare the performance of early maturity (90 to 99 day relative maturity) corn hybrids in southern Minnesota. The trials were located at Rock Dell and Waseca, MN. Field histories are reported in Table 1. The trials were planted with a 4-row John Deere 7000 planter equipped with cone units. The seeding rate was 35,000 seeds per acre planted at a depth of 1.5 inches. The plots were four rows wide. A randomized complete block design was implemented and replicated four times at Waseca and six times at Rock Dell. The two center rows of each plot were machine harvested with moisture and grain weight recorded at all sites. In general, grain yield is still the best indicator of hybrid performance. However, grain moisture is important when looking at gross dollar return. Due to drought conditions at Rock Dell, the grain yield was quite variable and resulted in no significant (NS) yield difference among varieties. (University of Minnesota Extension Regional Office, Rochester, and Southern Research and Outreach Center, Waseca, MN).

Formula for calculating gross dollar return

Harvested bushels per acre times $4.00 per bushel minus drying cost per acre, which was calculated using local elevator charges to dry to 14% moisture.

Table 1. Research site field history for early maturity corn hybrid varieties.

	Rock Dell	Waseca
Planting Date	May 8, 2008	May 8, 2008
Soil Type	Kenyon loan	Nicolette/Webster clay loam
Fertilizer	148-61-90-24 (N-P-K-S)	150# AA + Nserve
Herbicide (Pre/Post)	Harness PRE / Accent + Callisto POST	Lumax PRE
Harvest Date	November 4, 2008	October 25, 2008
Tillage	Conventional	Field cultivated twice
Previous Crop	soybean	soybean

Table 2. Early maturity corn hybrid moisture content and grain yield (15.5%) at Rock Dell and Waseca, MN, and the average of both sites in 2008.

Entry Name	Traits	Description	Rock Dell		Waseca			
90-97 Day Relative Maturity		Relative Maturity (Days)	Moisture (%)	Yield (bu/A)	Moisture (%)	Yield (bu/A)	Ave. Moisture (%)	Ave. Yield (bu/A)
AgriGold A6189VT3	VT3	93	14.9	214	16.0	197	15.4	206
AgriGold A6225VT3	VT3	97	16.4	209	17.1	225	16.7	216
AgVenture 5480	RR2CB	93	16.3	199	17.2	223	16.7	209
AgVenture 5677	RR2CB	97	16.7	214	18.2	220	17.4	217
Croplan 3114VT3	VT3	91	14.7	198	16.8	221	15.6	208
Croplan 3724VT3	VT3	96	17.2	210	17.5	221	17.3	215
Crows 1685VT3	VT3	92	15.3	207	16.6	202	15.9	205
Crows 1725VT3	VT3	95	16.1	202	17.9	224	16.9	212
Dahlman R48-07VT3	RR/Bt/CRW	93	15.5	215	16.9	227	16.1	220
Dahlman R48-25VT3	RR/Bt/CRW	95	15.2	181	17.8	214	16.4	196
DeKalb DKC43-27	VT3	93	15.2	208	16.3	189	15.7	200
DeKalb DKC46-60	VT3	96	14.8	192	17.1	199	15.8	195
DynaGro DG54V78	VT3	97	15.0	194	16.0	217	15.4	204
Gold Country 94-04VT3	VT3	93	15.8	199	16.4	193	16.0	196
Gold Country 98-10	VT3	97	16.1	208	16.6	221	16.3	214
Jung 7362VT3	VT3	94	16.8	204	16.3	197	16.6	201
Jung 7426VT3	VT3	96	15.6	208	15.8	221	15.7	214
LG Seeds 2426	VT3	93	14.5	188	16.4	221	15.3	202
LG Seeds 2496	VT3	99	16.5	213	16.0	212	16.3	212
Midwest Seed 69205VT3	Bt-CB/Bt-RW/RR	92	15.2	207	16.5	203	15.8	206
Midwest Seed 69575VT3	Bt-CB/Bt-RW/RR	95	16.8	222	19.4	219	18.0	221
Mycogen 2J337	Triple VT3	92	14.5	204	16.0	205	15.1	205
Mycogen 2J463	Triple VT3	96	14.7	190	17.4	214	15.9	201
NuTech 3T-098 VT3 **	VT3	98	16.0	201	17.6	212	16.7	206
NuTech 3T-799 VT3 **	VT3	99	16.7	199	17.9	230	17.2	212
Pioneer 38H08	HX1/LL/RR2	92	14.9	207	15.8	225	15.3	215
Producers 5314VT3	YGVT3	93	14.4	196	15.9	200	15.1	198
Producers 5624VT3	YGVT3	96	15.7	203	16.0	208	15.8	205
Renk 438RRYGPL	RRYGPL	92	14.8	191	16.1	175	15.4	184
Renk RK570VT3	YGVT3	95	15.3	207	16.6	207	15.9	207
Trelay 2R144	VT3	90	14.3	184	16.0	206	15.0	194
Trelay 4T722	VT3	97	15.4	187	16.2	205	15.7	195
Viking WBR7299VT3	VT3	95	15.8	198	17.6	205	16.6	201
Wensman W7107VT3	VT3	90	14.3	191	16.1	199	15.1	194
Wensman W7267VT3	VT3	97	15.8	186	17.0	218	16.3	200
LSD (P=0.10)			**1.0**	**NS**	**0.9**	**18**	**1.0**	**NS**

Table 3. Early maturity corn hybrid moisture content and grain yield (15.5%) averaged over both locations, and gross dollar return, ranked by gross dollar return in southern MN in 2008.

Entry Name	Traits	Description	Ave. Moisture (%)	Ave. Yield (bu/A)	Gross Dollar Return
90-97 Day Relative Maturity		Relative Maturity (Days)			
Dahlman R48-07VT3	RR/Bt/CRW	93	16.1	220	$ 858
Midwest Seed 69575VT3	Bt-CB/Bt-RW/RR	95	18.0	221	$ 852
AgriGold A6225VT3	VT3	97	16.7	216	$ 844
AgVenture 5677	RR2CB	97	17.4	217	$ 841
Pioneer 38H08	HX1/LL/RR2	92	15.3	215	$ 839
Croplan 3724VT3	VT3	96	17.3	215	$ 835
Gold Country 98-10	VT3	97	16.3	214	$ 834
Jung 7426VT3	VT3	96	15.7	214	$ 833
LG Seeds 2496	VT3	99	16.3	212	$ 828
Crows 1725VT3	VT3	95	16.9	212	$ 827
NuTech 3T-799 VT3 **	VT3	99	17.2	212	$ 824
AgVenture 5480	RR2CB	93	16.7	209	$ 816
Croplan 3114VT3	VT3	91	15.6	208	$ 812
Renk RK570VT3	YGVT3	95	15.9	207	$ 808
AgriGold A6189VT3	VT3	93	15.4	206	$ 805
NuTech 3T-098 VT3 **	VT3	98	16.7	206	$ 803
Midwest Seed 69205VT3	Bt-CB/Bt-RW/RR	92	15.8	206	$ 802
Producers 5624VT3	YGVT3	96	15.8	205	$ 801
Crows 1685VT3	VT3	92	15.9	205	$ 799
Mycogen 2J337	Triple VT3	92	15.1	205	$ 799
DynaGro DG54V78	VT3	97	15.4	204	$ 797
LG Seeds 2426	VT3	93	15.3	202	$ 790
Viking WBR7299VT3	VT3	95	16.6	201	$ 785
Jung 7362VT3	VT3	94	16.6	201	$ 784
Mycogen 2J463	Triple VT3	96	15.9	201	$ 782
Wensman W7267VT3	VT3	97	16.3	200	$ 781
DeKalb DKC43-27	VT3	93	15.7	200	$ 778
Producers 5314VT3	YGVT3	93	15.1	198	$ 771
Gold Country 94-04VT3	VT3	93	16.0	196	$ 766
Dahlman R48-25VT3	RR/Bt/CRW	95	16.4	196	$ 763
DeKalb DKC46-60	VT3	96	15.8	195	$ 761
Trelay 4T722	VT3	97	15.7	195	$ 761
Wensman W7107VT3	VT3	90	15.1	194	$ 757
Trelay 2R144	VT3	90	15.0	194	$ 757
Renk 438RRYGPL	RRYGPL	92	15.4	184	$ 716
LSD (P=0.10)			**1.0**	**NS**	

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Comparison of late maturity (98 to 107 day RM) corn hybrids, at Rock Dell and Waseca, MN, in 2008.

Breitenbach, Fritz R., Lisa M. Behnken, Ryan P. Miller, Thomas R. Hoverstad, and Jerry A. Tesmer

The objective of these studies was to compare the performance of early maturity (98 to 107 day relative maturity) corn hybrids in southern Minnesota. The trials were located at Rock Dell and Waseca, MN. Field histories are reported in Table 1. The trials were planted with a 4-row John Deere 7000 planter equipped with cone units. The seeding rate was 35,000 seeds per acre planted at a depth of 1.5 inches. The plots were four rows wide. A randomized complete block design was implemented and replicated four times at Waseca and six times at Rock Dell. The two center rows of each plot were machine harvested with moisture and grain weight recorded at all sites. In general, grain yield is still the best indicator of hybrid performance. However, grain moisture is important when looking at gross dollar return. Due to drought conditions at Rock Dell, the grain yield was quite variable. (University of Minnesota Extension Regional Office, Rochester, and Southern Research and Outreach Center, Waseca, MN).

Formula for calculating gross dollar return

Harvested bushels per acre times $4.00 per bushel minus drying cost per acre, which was calculated using local elevator charges to dry to 14% moisture.

Table 1. Research site field history for late maturity corn hybrid varieties.

	Rock Dell	Waseca
Planting Date	May 8, 2008	May 8, 2008
Soil Type	Kenyon loan	Nicolette/Webster clay loam
Fertilizer	148-61-90-24 (N-P-K-S)	150# AA + Nserve
Herbicide (Pre/Post)	Harness PRE / Accent + Callisto POST	Lumax PRE
Harvest Date	November 4, 2008	October 25, 2008
Tillage	Conventional	Field cultivated twice
Previous Crop	soybean	soybean

Table 2. Late maturity corn hybrid moisture content and grain yield (15.5%) at Rock Dell and Waseca, MN, and the average of both sites in 2008.

Entry Name	Traits	Maturity	Rock Dell		Waseca			
98-105 Day Relative Maturity		Day	Moisture (%)	Yield (bu/A)	Moisture (%)	Yield (bu/A)	Ave. Moisture (%)	Ave. Yield (bu/A)
Agri Gold A6279 VT3	VT3	101	19.9	234	19.8	210	19.9	223
Agri Gold A6325 VT3	VT3	105	20.6	224	19.7	222	20.0	223
Ag Venture 6323	RR2/CB	101	17.8	219	18.2	212	18.1	216
Ag Venture 6608	RR2/CB	102	20.1	217	20.1	213	20.1	215
Croplan 421 VT3	VT3	101	16.5	218	16.3	198	16.4	209
Croplan 5338 VT3	VT3	104	18.9	219	20.4	227	20.0	223
Crow's 1807 VT3	VT3	98	16.3	223	16.9	213	16.8	219
Crow's 3848 VT3	VT3	105	20.4	207	22.5	235	21.9	220
Dahlman R48-28 VT3	RR/Bt/CRW	98	16.9	200	17.9	194	17.6	197
DeKalb DKC 50-44	VT3	100	18.3	237	20.5	212	19.9	226
DeKalb DKC 57-79	RR2/YGPL	107	21.0	236	21.7	224	21.5	231
DynaGro 55V18	VT3	100	16.8	211	18.1	189	17.7	201
DynaGro 55V71	VT3	104	17.7	207	19.4	224	18.9	215
Gold Country 100-07 VT3	VT3	100	17.2	203	17.1	194	17.1	199
Gold Country 106-04 VT3	VT3	102	19.4	228	19.7	213	19.6	221
Jung 7454 VT3	VT3	98	16.3	214	16.7	201	16.6	208
Jung 7514 VT3	VT3	102	19.8	232	20.4	210	20.2	222
LG Seeds 2507	VT3	101	18.5	232	18.8	215	18.7	224
LG Seeds 2532	VT3	105	20.5	204	19.6	221	19.8	211
Midwest Seed 70006R	Bt+CB/Bt+RW/RR	99	17.0	224	17.0	221	17.0	223
Midwest Seed 76126 VT3	RR	105	19.7	191	21.9	214	21.3	201
Mycogen 2M495	Triple VT3	99	16.1	190	17.0	205	16.7	197
Mycogen 2W587	XT	105	19.8	235	20.4	210	20.2	224
NuTech 3P006 RR/YGPL	RR/YGPL	106	20.9	223	20.3	194	20.4	210
NuTech 1X-201 HXT/LL	HXT/LL	101	19.0	210	20.8	219	20.3	214
Pioneer 37Y14	HXX/LL/RR2	99	17.1	209	19.6	205	18.9	207
Pioneer 35F40	HXX/LL/RR2	104	20.8	222	21.9	227	21.6	224
Producers 5734 VT3	YGVT3	98	16.2	200	17.3	219	17.0	209
Producers 6464 VT3	YGVT3	104	19.4	207	19.0	211	19.1	209
Renk RK618 VT3	YGVT3	100	17.0	211	17.6	195	17.4	204
Renk RK670 VT3	YGVT3	103	17.7	215	17.6	216	17.6	215
Trelay 5T429	VT3	101	20.0	230	20.4	211	20.3	222
Trelay 6T226	VT3	106	20.1	209	21.3	223	21.0	215
Viking WBR7809 VT3	VT3	98	17.3	224	18.1	193	17.8	211
Viking WBR6919 VT3	VT3	103	18.8	225	20.9	213	20.3	220
Wensman W7309 VT3	VT3	101	17.9	219	18.4	203	18.3	212
Wensman W7455 VT3	VT3	107	22.6	226	25.4	231	24.6	228
LSD (P=0.10)			**1.3**	**24**	**1.3**	**18**	**0.9**	**16**

Table 3. Late maturity corn hybrid moisture content and grain yield (15.5%) averaged over both locations, and gross dollar return, ranked by gross dollar return in southern MN in 2008.

Entry Name 98-105 Day Relative Maturity	Traits	Maturity Day	Ave. Moisture (%)	Ave. Yield (bu/A)	Gross Dollar Return
Midwest Seed 70006R	Bt-CB/Bt-RW/RR	99	17.0	223	$ 869
DeKalb DKC 57-79	RR2/YGPL	107	21.5	231	$ 865
LG Seeds 2507	VT3	101	18.7	224	$ 857
DeKalb DKC 50-44	VT3	100	19.9	226	$ 856
Crows 1807VT3	VT3	98	16.8	219	$ 853
AgriGold A6325VT3	VT3	105	20.0	223	$ 846
AgriGold A6279VT3	VT3	101	19.9	223	$ 846
Mycogen 2W587	XT	105	20.2	224	$ 845
Croplan 5338VT3	VT3	104	20.0	223	$ 845
Jung 7514VT3	VT3	102	20.2	222	$ 839
Gold Country 102-04VT3	VT3	102	19.6	221	$ 838
Trelay 5T429	VT3	101	20.3	222	$ 836
Pioneer 35F40	HX1/LL/RR2	104	21.6	224	$ 836
Wensman W7455VT3	VT3	107	24.6	228	$ 832
Renk RK670VT3	YGVT3	103	17.6	215	$ 832
AgVenture 6323	RR2/CB	101	18.1	216	$ 830
Viking WBR6919VT3	VT3	103	20.3	220	$ 830
Crows 3848VT3	VT3	105	21.9	220	$ 820
DynaGro 55V71	VT3	104	18.9	215	$ 820
Croplan 421VT3	VT3	101	16.4	209	$ 816
Wensman W7309VT3	VT3	101	18.3	212	$ 814
Producers 5734VT3	YGVT3	98	17.0	209	$ 814
AgVenture 6608	RR2/CB	102	20.1	215	$ 813
Viking WBR7809VT3	VT3	98	17.8	211	$ 813
Jung 7454VT3	VT3	98	16.6	208	$ 812
Trelay 6T226	VT3	106	21.0	215	$ 809
NuTech 1X-201 HXT/LL	HXT/LL	101	20.3	214	$ 807
LG Seeds 2532	VT3	105	19.8	211	$ 801
Producers 6464VT3	YGVT3	104	19.1	209	$ 794
NuTech 3P006 RR/YGPL	RR/YGPL	106	20.4	210	$ 794
Pioneer 37Y14	HXX/LL/RR2	99	18.9	207	$ 791
Renk RK618VT3	YGVT3	100	17.4	204	$ 790
DynaGro 55V18	VT3	100	17.7	201	$ 777
Gold Country 100-07VT3	VT3	100	17.1	199	$ 773
Mycogen 2M495	Triple VT3	99	16.7	197	$ 766
Dahlman R48-28VT3	RR/Bt/CRW	98	17.6	197	$ 762
Midwest Seed 76126VT3	RR	105	21.3	201	$ 752
LSD (P=0.10)			**0.9**	**16**	

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Comparison of waxy corn hybrids at Hope and Waseca, MN, in 2008.

Miller, Ryan P. , Fritz R. Breitenbach, Lisa M. Behnken, and Thomas R. Hoverstad

The objective of this study was to evaluate the performance and grain yields of waxy corn hybrids in southern Minnesota. The trials were located at Hope and Waseca, MN. Field histories are located in Table 1. The trials were planted with a 4-row John Deere 7000 planter equipped with cone units. The seeding rate was 35,000 seeds per acre planted at a depth of 1.5 inches. The plots were four rows wide by 25 feet in length. A randomized complete block design was implemented and replicated four times. The two center rows of each plot were machine harvested at Waseca and eight feet of the center two rows was hand harvested at Hope. (University of Minnesota Extension Regional Center, Rochester, MN)

Table 1. Field history for waxy corn hybrid research sites.

	Hope	Waseca
Planting Date	May 16, 2008	May 8, 2008
Harvest Date	October 23, 2008	October 27, 2008
Soil Type	Biscay Loam	Nicollet/Webster Clay Loam
Fertilizer		150 lbs N/A as anhydrous ammonia
Herbicide Pre/Post		Lumax – PRE
Tillage	Conventional	Field cultivated twice
Previous Crop	Soybean	Soybean

Table 2. Waxy corn moisture content and grain yields (15.5%) at Hope and Waseca, average of the two sites, and test weight at Hope, MN in 2008.

Entry Name	Maturity	Hope		Waseca		Average		Hope
	Day	Moisture (%)	Yield (bu/A)	Moisture (%)	Yield (bu/A)	Moisture (%)	Yield (bu/A)	Test Weight (lbs/bu)
AgriGold A6333WX	104	29.2	227	23.0	185	26.1	206	49.5
AgriGold A6395WXBt	107	30.2	234	23.8	188	27.0	211	48.4
AgriGold 6323CL	103	24.3	234	21.0	210	22.6	222	51.8
Cappel 3130 WX	96	19.9	146	18.0	165	19.0	156	55.1
Cappel 2350 WX	105	26.3	206	21.8	163	24.0	184	52.6
Cappel 2150 WX	107	25.7	208	21.9	172	23.8	190	51.7
Cappel 2247	102	23.3	167	20.2	163	21.7	165	54.4
Pioneer 35F36	105	23.7	197	22.3	203	23.0	200	54.2
Pioneer 34A12	108	25.4	237	25.0	211	25.2	224	52.6
Prairie Hybrid 579	98	19.6	179	18.7	181	19.1	180	53.4
Viking 60-01N	100	22.3	197	19.8	200	21.1	198	54.3
Viking 40-09N	109	23.2	210	22.0	198	22.6	204	54.5
LSD (P=0.10)		**1.1**	**24**	**0.8**	**18**	**0.7**	**15**	**1.1**

SECTION B

CORN

HERBICIDE TRIALS

New Corn Herbicides for 2009 found in the 2008 Reports

1. ***Halex GT* =** s-metolachlor (*Dual II*) + glyphosate + mesotrione (*Callisto*) [SYNGENTA]
2. ***Kixor* (family) –** BAS 78102 and BAS 80004 [BASF]
3. ***Gowan 3041*** [GOWAN]
4. ***Gowan 3124*** [GOWAN]
5. ***Balance Flexx* =** isoxaflutole (*Balance*) + safener [BAYER]
6. ***Corvus* =** isoxaflutole (*Balance*) + thiencarbazone-methyl + safener [BAYER]
7. ***Capreno* =** tembotrione (*Laudis*) + thiencarbazone-methyl + safener [BAYER]
8. ***Resolve Q* =** rimsulfuron + thifensulfuron + isoxadifen-ethyl [DuPONT]
9. ***Require Q* =** rimsulfuron + dicamba + isoxadifen-ethyl [DuPONT]
10. ***Steadfast Q* =** rimsulfuron + nicosulfuron + isoxadifen-ethyl [DuPONT]

Comparison of the impact of BMP rates of atrazine tank mixed with several broadleaf herbicides in field corn at Rochester, MN, in 2007 and 2008.

Behnken, Lisa M., Fritz R. Breitenbach, Ryan P. Miller, Jeffrey L. Gunsolus, Anthony D. Gehling, and Katherine M. Sheehan.

The Minnesota Department of Agriculture has developed voluntary Best Management Practices (BMP) for the use of atrazine in areas where it is frequently detected in ground and surface waters. The purpose of these BMPs is to prevent the degradation of water resources while maintaining atrazine's effectiveness as part of an integrated weed management program. The objectives of this trial were: 1) To evaluate weed control of herbicide programs with and without atrazine applied at BMP rates, 2) To evaluate performance of herbicides used as replacements for atrazine and 3) To evaluate crop safety and economics of potential replacements in field corn in southeastern Minnesota.

In 2007, the research site was a Lawler loam series with a pH of 7.0 and soil test P and K levels of 16 ppm and 160 ppm, respectively. Spring fertilizer was broadcast ahead of planting on April 13, at a rate of 99-23-60-24 (N-P-K-S). The area was side dressed with an additional 30 lb/A of N on June 7. The field was spring disked twice and field cultivated once prior to planting. The corn hybrid, Pioneer 38H65, was planted on April 27, 2007 at a depth of 1.5 inches in 30 inch rows at 32,000 seeds per acre. Evaluations of the plots were taken on May 30, June 4, June 11, and June 28 and August 10, 2007. In 2008, the research site was a Lawler loam series with a pH of 6.7, organic matter 3.2%, and soil test P and K levels of 22 ppm and 126 ppm, respectively. Spring fertilizer was broadcast ahead of planting on April 16, at a rate of 120-36-86-28 (N-P-K-S). The area was side dressed with an additional 35 b/A of N on June 25. The field was fall chisel plowed, spring disked once and field cultivated once prior to planting. The corn hybrid, DeKalb DKC50-19 101RM, was planted on May 9, 2008, at a depth of 2.0 inches in 30 inch rows at 35,000 seeds per acre. Evaluations of the plots were taken on June 9, 18, July 1 and 30, 2008.

A randomized complete block design was used with four replications. Preemergence (PRE) and postemergence (POST) treatments were applied with a tractor-mounted sprayer delivering 20 gpa at 32 psi using Turbo Tee 11002 nozzles. Application dates, environmental conditions, and weed stages are listed below in Tables 1 and 2. The center two rows of each plot were machine harvested on September 26, 2007 and on November 3, 2008.

CONCLUSIONS

In 2007, soil applied atrazine (Bicep Lite II Mag) applied at recommended BMP rates for SE Minnesota resulted in no improvement of broadleaf weed control compared to the no atrazine control of Dual II Mag (data not shown). Postemergence programs that included atrazine at 0.5 lb/A, which is lower than the BMP rate of 0.8 ln/A for SE Minnesota, significantly improved postemergence weed control.

In 2007 and 2008, giant ragweed control was improved when postemergence treatments included atrazine. In 2008, Callisto + either Buctril or Clarity provided similar giant ragweed control as Callisto + atrazine;.however, Callisto + Buctril resulted in 20% injury to corn. Hornet + atrazine or Callisto at the reduced rate of 1 oz/A provided significantly greater giant ragweed control than Hornet applied alone. Hornet + Callisto provided greater control than Hornet + atrazine, 97% compared to 91%, respectively. In 2008, Clarity + Callisto provided weed control equivalent to Clarity + atrazine.

In 2007 and 2008, common waterhemp and common lambsquarters control were similar for Callisto and Callisto plus atrazine. Hornet + atrazine and Clarity + atrazine provided greater control of common waterhemp and common lambsquarters control in 2007. In 2008, common waterhemp control was improved significantly with the addition of the BMP rate of atrazine or Callisto to Hornet, as compared to Hornet alone. Also, common waterhemp control with Hornet + Callisto at 1 oz/A was significantly greater than with atrazine, 94 compared to 80%, respectively.

Corn grain yields were greater for both Callisto + atrazine and Hornet + atrazine when compared to their non-atrazine partners in 2007. Due to plot variability in 2008, corn yields were not significantly different at the P≤ 0.10.

BMP rates of atrazine can improve the effectiveness of Callisto, Hornet and Clarity on certain weeds and increase grain yields. The data from 2008 would indicate that Buctril, Callisto, and Clarity may be potential replacements for atrazine. However more research is necessary and crop safety is a concern with Buctril. (University of Minnesota Extension, Regional Office – Rochester).

Table 1. Application dates, conditions and plant stages in 2007.

Date	April 27	May 23
Treatment	PRE	POST
Temperature (F)		
Air	71	70
soil	62.1	69.4
Relative Humidity (%)	34	70
Wind (mph)	10	23
Soil moisture	adequate	excessive
Corn		
stage	--	3 collar
height (inch)	--	4.0
Giant Ragweed		
weed density (ft^2)	--	24.9
height (inch)	--	1.6
Common Lambsquarters		
weed density (ft^2)	--	4
height (inch)	--	1.1
Common Waterhemp		
weed density (ft^2)	--	3.5
height (inch)	--	1.1
Giant Foxtail		
weed density (ft^2)	--	1.5
height (inch)	--	1.3
Velvetleaf		
weed density (ft^2)	--	1.5
height (inch)	--	2.0
Rainfall after each application (inch)		
week 1	0.52	2.04
week 2	0.52	1.28
week 3	0.34	0.38

Table 2. Application dates, conditions and plant stages in 2008.

Date	5/9	6/2
Treatment	PRE	POST I
Temperature (F)		
air	61	72
soil	61	62
Relative Humidity (%)	32	57
Wind (mph)	9	8
Soil moisture	Adequate	Excessive
Corn		
stage		V1-V2
height (inch)		3.5
Giant Ragweed		
weed density (ft^2)		1.8
height (inch)		2.6
Common Lambsquarters		
weed density (ft^2)		21.5
height (inch)		1.3
Common Waterhemp		
weed density (ft^2)		89.4
height (inch)		0.7
Giant Foxtail		
weed density (ft^2)		3
height (inch)		1.7
Rainfall after each application (inch)		
week 1	1.07	4.79
week 2	0.08	3.52
week 3	2.15	0.00

Table 3. Performance of herbicide systems for giant ragweed control in field corn on May 30, June 4, 11, 28, and August 10 at Rochester, MN in 2007.

Treatment	Rate	Giant Ragweed Control					Yield
		5/30	6/4	6/11	6/28	8/10	15.5%
	(rate/A)	(%)					(bu/A)
PRE							
Dual II Mag	1 pt	0	0	0	0	0	5
Bicep Lite II Mag	2.3 pt	0	0	0	0	0	4
PRE / POST I							
Dual II Mag / Callisto + COC + 28% UAN	1 pt / 3 fl oz + 1% v/v + 2.5% v/v	73	88	82	87	84	124
Dual II Mag / Callisto + Aatrex + COC + 28% UAN	1 pt / 3 fl oz + 16 fl oz + 1% v/v + 2.5% v/v	95	96	94	96	95	159
Dual II Mag / Hornet + COC + 28% UAN	1 pt / 3 oz + 1% v/v + 2.5% v/v	76	78	73	89	81	109
Dual II Mag / Hornet + Aatrex + COC + 28% UAN	1 pt / 3 oz + 16 fl oz + 1% v/v + 2.5% v/v	92	93	90	92	93	142
Dual II Mag / Clarity + 28% UAN	1 pt / 1 pt + 2.5% v/v	76	85	79	77	74	97
Dual II Mag / Clarity + Aatrex + 28% UAN	1 pt / 1 pt + 16 fl oz + 2.5% v/v	93	94	88	90	86	120
	LSD (P=0.10)	**4**	**3**	**3**	**3**	**3**	**25**

Table 4. Performance of herbicide systems for giant ragweed control in field corn on June 9, 18, July 1 and 30 at Rochester, MN, in 2008.

Treatment	Rate	Giant Ragweed Control				Yield
		6/9	6/18	7/1	7/30	
	(rate/A)	(%)				(bu/A)
PRE / POST I						
Dual II Mag / Callisto + COC + 28% UAN	1 pt / 3 fl oz + 1% v/v + 2.5% v/v	71	84	86	86	187
Dual II Mag / Callisto + Aatrex + COC + 28% UAN	1 pt / 3 fl oz + 16 fl oz + 1% v/v + 2.5 % v/v	90	96	96	98	227
Dual II Mag / Callisto + Buctril + COC + 28% UAN	1 pt / 3 fl oz + 6 fl oz + 1% v/v + 2.5% v/v	95	96	96	96	234
Dual II Mag / Callisto + Clarity + COC + 28% UAN	1 pt / 3 fl oz + 4 fl oz + 1% v/v + 2.5% v/v	78	96	96	99	234
Dual II Mag / Hornet + COC + 28% UAN	1 pt / 3 oz wt + 1% v/v + 2.5% v/v	75	83	92	86	194
Dual II Mag / Hornet + Aatrex + COC + 28% UAN	1 pt / 3 oz wt + 16 fl oz + 1% v/v + 2.5% v/v	90	95	96	91	216
Dual II Mag / Hornet + Callisto + COC + 28% UAN	1 pt / 3 oz wt + 1 fl oz + 1% v/v + 2.5% v/v	80	92	92	97	212
Dual II Mag / Clarity + 28% UAN	1 pt / 1 pt + 2.5% v/v	72	92	89	92	209
Dual II Mag / Clarity + Aatrex + 28% UAN	1 pt / 1 pt + 16 fl oz + 2.5% v/v	91	97	95	97	230
Dual II Mag / Clarity + Callisto + COC + 28% UAN	1 pt / 1 pt + 1 fl oz + 1% v/v + 2.5% v/v	78	97	95	97	218
	LSD (P=0.10)	**4**	**4**	**5**	**3**	**NS**

Table 5. Performance of herbicide systems for common lambsquarters control in field corn on May 3, June 4, 11, 28, and August 10 at Rochester, MN in 2007.

Treatment	Rate	Common Lambsquarters Control					Yield
		5/30	6/4	6/11	6/28	8/10	15.5%
	(rate/A)			(%)			(bu/A)
PRE							
Dual II Mag	1 pt	30	40	0	0	0	5
Bicep Lite II Mag	2.3 pt	36	40	0	0	0	4
PRE / POST I							
Dual II Mag / Callisto + COC + 28% UAN	1 pt / 3 fl oz + 1% v/v + 2.5% v/v	85	93	99	99	99	124
Dual II Mag / Callisto + Aatrex + COC + 28% UAN	1 pt / 3 fl oz + 16 fl oz + 1% v/v + 2.5% v/v	99	99	99	99	99	159
Dual II Mag / Hornet + COC + 28% UAN	1 pt / 3 oz + 1% v/v + 2.5% v/v	70	78	70	71	68	109
Dual II Mag / Hornet + Aatrex + COC + 28% UAN	1 pt / 3 oz + 16 fl oz + 1% v/v + 2.5% v/v	98	99	99	99	99	142
Dual II Mag / Clarity + 28% UAN	1 pt / 1 pt + 2.5% v/v	75	73	77	81	74	97
Dual II Mag / Clarity + Aatrex + 28% UAN	1 pt / 1 pt + 16 fl oz + 2.5% v/v	97	98	99	99	99	120
	LSD (P=0.10)	**4**	**6**	**4**	**4**	**3**	**25**

Table 6. Performance of herbicide systems for common lambsquarter control in field corn on June 9, 18, July 1 and 30 at Rochester, MN, in 2008.

Treatment	Rate	Common Lambsquarter Control				Yield
		6/9	6/18	7/1	7/30	
	(rate/A)		(%)			(bu/A)
PRE / POST I						
Dual II Mag / Callisto + COC + 28% UAN	1 pt / 3 fl oz + 1% v/v + 2.5% v/v	81	99	99	98	187
Dual II Mag / Callisto + Aatrex + COC + 28% UAN	1 pt / 3 fl oz + 16 fl oz + 1% v/v + 2.5 % v/v	96	99	99	99	227
Dual II Mag / Callisto + Buctril + COC + 28% UAN	1 pt / 3 fl oz + 6 fl oz + 1% v/v + 2.5% v/v	97	99	99	97	234
Dual II Mag / Callisto + Clarity + COC + 28% UAN	1 pt / 3 fl oz + 4 fl oz + 1% v/v + 2.5% v/v	80	99	99	99	234
Dual II Mag / Hornet + COC + 28% UAN	1 pt / 3 oz wt + 1% v/v + 2.5% v/v	76	95	97	98	194
Dual II Mag / Hornet + Aatrex + COC + 28% UAN	1 pt / 3 oz wt + 16 fl oz + 1% v/v + 2.5% v/v	94	99	99	98	216
Dual II Mag / Hornet + Callisto + COC + 28% UAN	1 pt / 3 oz wt + 1 fl oz + 1% v/v + 2.5% v/v	78	99	99	99	212
Dual II Mag / Clarity + 28% UAN	1 pt / 1 pt + 2.5% v/v	74	95	96	99	209
Dual II Mag / Clarity + Aatrex + 28% UAN	1 pt / 1 pt + 16 fl oz + 2.5% v/v	92	99	99	99	230
Dual II Mag / Clarity + Callisto + COC + 28% UAN	1 pt / 1 pt + 1 fl oz + 1% v/v + 2.5% v/v	81	99	99	99	218
	LSD (P=0.10)	**5**	**2**	**2**	**NS**	**NS**

Table 7. Performance of herbicide systems for common waterhemp control in field corn on May 30, June 4, 11, 28, and August 10 at Rochester, MN in 2007.

Treatment	Rate	Common Waterhemp Control					Yield
		5/30	6/4	6/11	6/28	8/10	15.5%
	(rate/A)			(%)			(bu/A)
PRE							
Dual II Mag	1 pt	40	70	0	0	0	5
Bicep Lite II Mag	2.3 pt	40	73	0	0	0	4
PRE / POST I							
Dual II Mag / Callisto + COC + 28% UAN	1 pt / 3 fl oz + 1% v/v + 2.5% v/v	96	92	97	90	94	124
Dual II Mag / Callisto + Aatrex + COC + 28% UAN	1 pt / 3 fl oz + 16 fl oz + 1% v/v + 2.5% v/v	99	99	99	98	98	159
Dual II Mag / Hornet + COC + 28% UAN	1 pt / 3 oz + 1% v/v + 2.5% v/v	81	91	78	82	70	109
Dual II Mag / Hornet + Aatrex + COC + 28% UAN	1 pt / 3 oz + 16 fl oz + 1% v/v + 2.5% v/v	87	95	86	83	86	142
Dual II Mag / Clarity + 28% UAN	1 pt / 1 pt + 2.5% v/v	83	92	84	87	73	97
Dual II Mag / Clarity + Aatrex + 28% UAN	1 pt / 1 pt + 16 fl oz + 2.5% v/v	96	94	87	88	88	120
	LSD (P=0.10)	**4**	**5**	**4**	**4**	**4**	**25**

Table 8. Performance of herbicide systems for common waterhemp control in field corn on June 9, 18, July 1 and 30 at Rochester, MN, in 2008.

Treatment	Rate	Common Waterhemp Control				Yield
		6/9	6/18	7/1	7/30	
	(rate/A)			(%)		(bu/A)
PRE / POST I						
Dual II Mag / Callisto + COC + 28% UAN	1 pt / 3 fl oz + 1% v/v + 2.5% v/v	83	99	98	93	187
Dual II Mag / Callisto + Aatrex + COC + 28% UAN	1 pt / 3 fl oz + 16 fl oz + 1% v/v + 2.5 % v/v	92	99	98	94	227
Dual II Mag / Callisto + Buctril + COC + 28% UAN	1 pt / 3 fl oz + 6 fl oz + 1% v/v + 2.5% v/v	97	99	98	95	234
Dual II Mag / Callisto + Clarity + COC + 28% UAN	1 pt / 3 fl oz + 4 fl oz + 1% v/v + 2.5% v/v	78	99	97	95	234
Dual II Mag / Hornet + COC + 28% UAN	1 pt / 3 oz wt + 1% v/v + 2.5% v/v	63	71	50	41	194
Dual II Mag / Hornet + Aatrex + COC + 28% UAN	1 pt / 3 oz wt + 16 fl oz + 1% v/v + 2.5% v/v	81	87	84	80	216
Dual II Mag / Hornet + Callisto + COC + 28% UAN	1 pt / 3 oz wt + 1 fl oz + 1% v/v + 2.5% v/v	74	99	98	94	212
Dual II Mag / Clarity + 28% UAN	1 pt / 1 pt + 2.5% v/v	76	97	92	91	209
Dual II Mag / Clarity + Aatrex + 28% UAN	1 pt / 1 pt + 16 fl oz + 2.5% v/v	96	99	94	92	230
Dual II Mag / Clarity + Callisto + COC + 28% UAN	1 pt / 1 pt + 1 fl oz + 1% v/v + 2.5% v/v	86	99	96	92	218
	LSD (P=0.10)	**7**	**2**	**2**	**3**	**NS**

Table 9. Corn injury on June 9 and additional cost per acre over base herbicide program at Rochester, MN, in 2008.

Treatment	Rate (rate/A)	Injury 6/9	Economics[1] ($/A additional cost over base program)
PRE / POST I			
Dual II Mag / Callisto + COC + 28% UAN	1 pt / 3 fl oz + 1% v/v + 2.5% v/v	0	
Dual II Mag / Callisto + Aatrex + COC + 28% UAN	1 pt / 3 fl oz + 16 fl oz + 1% v/v + 2.5 % v/v	1	**+ 1.50**
Dual II Mag / Callisto + Buctril + COC + 28% UAN	1 pt / 3 fl oz + 6 fl oz + 1% v/v + 2.5% v/v	20	**+ 3.40**
Dual II Mag / Callisto + Clarity + COC + 28% UAN	1 pt / 3 fl oz + 4 fl oz + 1% v/v + 2.5% v/v	0	**+ 3.30**
Dual II Mag / Hornet + COC + 28% UAN	1 pt / 3 oz wt + 1% v/v + 2.5% v/v	0	
Dual II Mag / Hornet + Aatrex + COC + 28% UAN	1 pt / 3 oz wt + 16 fl oz + 1% v/v + 2.5% v/v	0	**+1.50**
Dual II Mag / Hornet + Callisto + COC + 28% UAN	1 pt / 3 oz wt + 1 fl oz + 1% v/v + 2.5% v/v	0	**+5.00**
Dual II Mag / Clarity + 28% UAN	1 pt / 1 pt + 2.5% v/v	0	
Dual II Mag / Clarity + Aatrex + 28% UAN	1 pt / 1 pt + 16 fl oz + 2.5% v/v	0	**+1.50**
Dual II Mag / Clarity + Callisto + COC + 28% UAN	1 pt / 1 pt + 1 fl oz + 1% v/v + 2.5% v/v	0	**+6.20**
	LSD (P=0.10)	**1**	

1. Aatrex @ 16 oz = $1.50, Buctril @ 6 oz = $3.40, Callisto @ 1 oz/A = $5.00, Clarity @ 4 oz = $3.30.

Table 10. Performance and comparison of herbicide systems with and without atrazine in field corn at Rochester, MN, in 2007 and 2008

Treatment	Rate(s)	Injury[1]	Giant Ragweed[1]		Common Waterhemp[1]		Common Lambsquarters[1]		Yield	
		(%)	---------- % control ----------						Bu/A	
POSTEMERGENCE[2]	**(rate/A)**	**2008**	**2007**	**2008**	**2007**	**2008**	**2007**	**2008**	**2007**	**2008**
Callisto	3 fl oz	0	84	86	94	93	99	98	124	187
Callisto + atrazine	3 fl oz + 16 fl oz	1	95	98	98	94	99	99	159	227
Callisto + Buctril	3 fl oz + 6 fl oz	20	---	96	---	95	---	97	---	234
Callisto + Clarity	3 fl oz + 4 fl oz	0	---	99	---	95	---	99	---	234
Hornet	3 oz	0	81	86	70	41	68	98	109	194
Hornet + atrazine	3 oz + 16 fl oz	0	93	91	86	80	99	98	142	216
Hornet + Callisto	3 oz + 1 fl oz	0	---	97	---	94	---	99	---	212
Clarity	1 pt	0	74	92	73	91	74	99	97	209
Clarity + atrazine	1 pt + 16 fl oz	0	86	97	88	92	99	99	120	230
Clarity + Callisto	1 pt + 1 fl oz	0	---	97	---	92	--	99	---	218
	LSD (P=.10)	1	3	3	4	3	3	NS	25	NS

1. Injury only occurred in 2008. Injury rating taken on 6/9/2008. Weed control rating 8/10/2007 and 7/30/2008.
2. All treatments had Dual II Magnum applied preemergence at 1 pt per acre.

Evaluation of BMP rates of atrazine tank mixed with broadleaf herbicides at Lamberton, MN, in 2008.

Getting, Jodie K., Lisa M. Behnken, Fritz R. Breitenbach, Jeffrey L. Gunsolus, Tom Hoverstad and Ryan Miller.

The objective of this study was to evaluation corn herbicide combinations for annual grass and annual broadleaf weed control in corn. This study was conducted on a Ves loam soil containing 4.3% organic matter, pH 6.7, and soil test P and K levels of 24 and 326 lb/A, respectively. A randomized complete block design with four replications and a plot size of 10 x 30 ft was used. The site was planted to soybeans in2007 and was fall chiseled. The area was fertilized with 160-60-60 lbs of N, P, and K, respectively. On May 15, 2008, Pioneer "37N16' glyphosate resistant field corn was planted in 30-inch rows at a seeding rate of 33,000 seeds/A. All treatments were applied with a tractor-mounted sprayer delivering 30 gpa at a pressure of 40 psi. The sprayer was equipped with 8002 flat-fan nozzles spaced 15 inches apart on the boom. Application dates, environmental conditions, plant sizes and rainfall data are listed below. (Southwest Research and Outreach Center, University of Minnesota, Lamberton, MN).

Table 1. Application dates, conditions and plant stages in 2008.

Date	**May 14**	**June 9**
Treatment	PRE	POST
Temperature (F)		
air	66	63
soil	66	60
Relative Humidity (%)	30	7056
Wind (mph)	Calm	W 2
Sky	Clear	Clear
Soil moisture	dry	moist
Corn		
leaf no.	--	V3
height (inch)	--	5.0
Green Foxtail		
leaf no.		2 to 4
height (inch)	--	2 to 4
No./ft^2		25
Common Lambsquarters		
leaf no.	--	3 to 5
height (inch)		1 to 3
No./ft^2	--	2
Tall Waterhemp		
leaf no.	--	2 to 4
height (inch)	--	1 to 3
No./ft^2		2
Rainfall after each application (inch)		
week 1	0.10	1.05
week 2	0.18	0.00
week 3	0.87	0.61

Table. Evaluation of BMP rates of atrazine tank-mixed with broadleaf herbicides at Lamberton, MN in 2008 (Getting, Behnken, Breitenbach, Gunsolus, Hoverstad, and Miller).

		Green foxtail				Common lambsquarters				Tall waterhem				
Treatment[a]	Rate	Jun 9	Jun 20	Jul 10	Aug 19	Jun 9	Jun 20	Jul 10	Aug 19	Jun 9	Jun 20	Jul 10	Aug 19	Yield[b]
Preemergence/POST (2 to 4-inch weeds)	(oz/A, pt/A, qt/A, lb/A or %)					----------(% control)----------								(bu/A)
Dual II Magnum / Callisto + COC + 28%N	1 pt / 3 oz + 1% + 2.5%	69 ab	81 bc	79 ab	74 ab	66 bc	97 a	98 a	98 a	90 a	98 a	98 a	98 a	132 de
Dual II Magnum / Callisto + Aatrex + COC + 28%N	1 pt / 3 oz + 1 pt + 1% + 2.5%	71 ab	88 a	81 a	78 a	68 bc	98 a	98 a	98 a	90 a	98 a	98 a	98 a	140 cd
Dual II Magnum / Callisto + Buctril + COC + 28%N	1 pt / 3 oz + 6 oz + 1% + 2.5%	75 a	80 c	74 b-d	70 b	71 ab	98 a	98 a	98 a	88 ab	98 a	98 a	98 a	143 b-d
Dual II Magnum / Callisto + Clarity + COC + 28%N	1 pt / 3 oz + 4 oz + 1% + 2.5%	65 b	75 c	69 d	70 b	76 a	98 a	98 a	98 a	89 ab	98 a	98 a	98 a	139 c-e
Dual II Magnum / Hornet + COC + 28%N	1 pt / 3 oz + 1% + 2.5%	71 ab	65 d	59 e	58 c	61 c	85 b	98 a	98 a	89 ab	98 a	98 a	98 a	123 e
Dual II Magnum / Hornet + Aatrex + COC + 28%N	1 pt / 3 oz + 1 pt + 1% + 2.5%	69 ab	74 c	71 cd	71 ab	65 bc	98 a	98 a	98 a	89 ab	98 a	98 a	98 a	159 ab
Dual II Magnum / Hornet + Callisto + COC + 28%N	1 pt / 3 oz + 1 oz + 1% + 2.5%	71ab	78 c	75 a-d	73 ab	69 a-c	97 a	98 a	98 a	86 b	98 a	98 a	98 a	153 a-c
Dual II Magnum / Clarity + 28%N	1 pt / 1 pt + 2.5%	71ab	78 c	71 cd	70 b	73 ab	96 a	98 a	98 a	90 a	98 a	98 a	98 a	142 cd
Dual II Magnum / Clarity + Aatrex + 28%N	1 pt / 1 pt + 1 pt + 2.5%	70 ab	86 ab	78 a-c	74 ab	73 ab	98 a	98 a	98 a	89 ab	98 a	98 a	98 a	160 a
Dual II Magnum / Clarity + Callisto + COC + 28%N	1 pt / 1 pt + 3 oz + 1% + 2.5%	68 b	79 c	76 a-c	75 ab	70 ab	98 a	98 a	98 a	89 ab	98 a	98 a	98 a	151 a-c
Checks														
Weedy check		0 c	0 e	0 f	0 d	0 d	0 c	0 b	0 b	0 c	0 b	0 b	0 b	31 f
	LSD (0.10)	7.1	6.8	7.1	6.6	8.5	3.9	ns	ns	ns	ns	ns	ns	16.7

[a] COC = crop oil concentrate; 28%N = an aqueous solution of urea and ammonium nitrate.

[b] Yield adjusted to 15.5% moisture.

Evaluation of the performance of BAS 78102 , BAS 80004, Gowan 3041 and Gowan 3124 for weed control in field corn at Rochester, MN, in 2008.

Breitenbach, Fritz R., Lisa M.Behnken, Ryan P. Miller, Jeffrey L. Gunsolus, Ceara L. Suther, and Anthony D. Gehling

The objectives of this trial were to: 1) Evaluate weed control performance of BAS 78102 and BAS 80004 herbicide, 2) evaluate weed control of Gowan 3041 and Gowan 3124 herbicides, and 3) evaluate residual weed control of Yukon and Permit tank mixed with glyphosate herbicide in field corn in southeastern Minnesota. The research site was a Lawler loam series with a pH of 7.3, organic matter of 2.6% and soil test P and K levels of 64 ppm and 226 ppm, respectively. Spring fertilizer was broadcast ahead of planting on April 16, at a rate of 120-36-86-28 (N-P-K-S). The area was side dressed with an additional 35 b/A of N on June 25. The field was fall chisel plowed and spring disked once and field cultivated once prior to planting. The corn hybrid, Pioneer 37Y14, was planted on May 12, 2008, at a depth of 2.0 inches in 30 inch rows at 35,000 seeds per acre. A randomized complete block design was used with four replications. Preemergence (PRE) and postemergence (POST) treatments were applied with a tractor-mounted sprayer delivering 20 gpa at 32 psi using Turbo Tee 11002 nozzles. Evaluations of the plots were taken on June 4, 9, 23, 30, and July 30. Application dates, environmental conditions, and weed stages are listed below. The center two rows of each plot were machine harvested on November 3, 2008.

Date	**5/12**	**6/10**
Treatment	PRE	POST I
Temperature (F)		
Air	51	65
soil	67	60
Relative Humidity (%)	41	67
Wind (mph)	21	12
Soil moisture	Adequate	Excessive
Corn		
stage		V4
height (inch)		6.0
Giant Ragweed		
weed density (ft^2)		9.9
height (inch)		4.0
Common Lambsquarters		
weed density (ft^2)		2.8
height (inch)		1.4
Common Waterhemp		
weed density (ft^2)		3.0
height (inch)		1.0
Grass		
weed density (ft^2)		7.0
height (inch)		1.8
Rainfall after each application (inch)		
week 1	0.24	3.52
week 2	0.19	0.00
week 3	2.29	0.76

CONCLUSIONS

Weather conditions following pre-emergence applications did not allow for immediate activation of the soil applied herbicides. Only 0.24 inches of precipitation was recorded within one week of application, and only 0.43 inches following 2 weeks of application. A significant rainfall event occurred during the third week with 2.72 inches recorded for the 3 week total.

Preemergence giant ragweed control was generally poor, although the Lumax treatment did reach back and ultimately provided 90% control (6/9 rating).

Preemergence common lambsquarters control also exhibited a large degree of reach back which occurred in all treatments. Statistically, the best common lambsquarters control was provided by Lumax and Harness + Aatrex, 98 and 95% control, respectively, (6/9 rating).

Reach back was also observed for preemergence common waterhemp control for all treatments. Statistically, the best common waterhemp control was provided by Lumax and Harness + Aatrex, 98 and 94% control, respectively, (6/9 rating).

Reach back was less evident for giant foxtail. Statistically, the best giant foxtail control was provided by BAS 80004 + Outlook + Aatrex (low rate) and BAS 78102 (high rate), 81and 78% control, respectively, (6/9 rating).

Sequential PRE/POST applications: All of the treatments provided excellent control of giant ragweed with no statistical differences. Control ranged from a low of 92% to a high of 96% (7/30 rating).

Statistical differences were evident with common lambsquarters control. Statistically, the best treatments were BAS 80004 + Outlook + Aatrex followed by Roundup PowerMax and Harness + Aatrex followed by Roundup PowerMax, 97 and 95% control, respectively. The lowest control was provided by BAS 78102 followed by PowerMax, 83%, (7/30 rating). All of the treatments provided excellent control of common waterhemp with no statistical differences. Control ranged from 93% to 96% (7/30 rating). All of the treatments provided very good control of giant foxtail with no statistical differences. Control ranged from a low of 87% to a high of 92% (7/30 rating).

POST I applications: Statistically, all of the treatments were similar except for the Roundup PowerMax treatment which provided only 88% control of giant ragweed (7/30 rating). Common lambsquarters and common waterhemp control mirrored giant ragweed with all treatments being statistically similar. Only the Roundup PowerMax treatment providing lower control of common lambsquarters, 83%, and common waterhemp, 84%, (7/30 rating). Statistical differences were evident with giant foxtail control. Statistically, the best treatment was Status + Roundup PowerMax, 88% control. The weakest treatments were GWN-3041 + GWN-3124 + Roundup PowerMax, 81%, Permit + Roundup PowerMax, 82%, Yukon + Roundup PowerMax, 82%, and Roundup PowerMax, 82%, (7/30 rating). (University of Minnesota Extension, Regional Office – Rochester).

Table 1. Giant ragweed control with BASF and Gowan herbicides in field corn on June 4, 9, 23, and 30 and July 30 at Rochester, MN, in 2008.

Treatment	Rate	Giant Ragweed Control					Yield
		6/4	6/9	6/23	6/30	7/30	
	(rate/A)	(%)					(bu/A)
Untreated Check		0	0	0	0	0	0
PRE							
BAS 78102	20 fl oz	51	58	58	55	45	27
BAS 80004 + Outlook + Aatrex	3 fl oz + 21 fl oz + 24 fl oz	41	53	56	58	48	29
Lumax	2.5 qt	74	90	96	91	90	144
PRE/POST I							
BAS 78102/ Roundup PowerMax + NIS + AMS	13 fl oz/ 22 fl oz + 0.25% v/v + 3.4 lb	45	49	97	94	93	169
BAS 80004 + Outlook + Aatrex/ Roundup PowerMax + NIS + AMS	2.5 fl oz + 12 fl oz + 24 fl oz/ 22 fl oz + 0.25% v/v + 3.4 lb	48	68	97	95	96	173
Harness + Aatrex/ Roundup PowerMax + NIS + AMS	24 fl oz + 24 fl oz/ 22 fl oz + 0.25% v/v + 3.4 lb	49	51	96	93	92	172
BAS 78102/ Roundup PowerMax + Status + NIS + AMS	13 fl oz/ 22 fl oz + 2.5 oz wt + 0.25% v/v + 3.4 lb	38	43	97	95	94	170
POST I							
Permit + Roundup PowerMax + NIS + AMS	0.67 oz wt + 22 fl oz + 0.125% v/v + 3.4 lb	0	0	99	98	96	169
GWN-3041 + GWN-3124 + Roundup PowerMax + NIS + AMS	0.67 oz wt + 0.083 oz wt + 22 fl oz + 0.125% v/v + 3.4 lb	0	0	99	98	95	162
Yukon + Roundup PowerMax + NIS + AMS	4 oz wt + 22 fl oz + 0.125% v/v + 3.4 lb	0	0	99	97	97	171
Yukon + Roundup PowerMax + NIS + AMS	3 oz wt + 22 fl oz + 0.125% v/v + 3.4 lb	0	0	98	98	96	188
Status + Roundup PowerMax + NIS + AMS	5 oz wt + 22 fl oz + 0.125% v/v + 3.4 lb	0	0	99	96	94	180
Roundup PowerMax + NIS + AMS	22 fl oz + 0.125% v/v + 3.4 lb	0	0	96	93	88	161
	LSD (P=0.10)	**8**	**6**	**2**	**3**	**4**	**28**

Table 2. Common lambsquarters control with BASF and Gowan herbicides in corn on June 4, 9, 23, and 30 and July 30 at Rochester, MN, in 2008.

Treatment	Rate	Common Lambsquarter Control					Yield
		6/4	6/9	6/23	6/30	7/30	
	(rate/A)	(%)					(bu/A)
Untreated Check		0	0	0	0	0	0
PRE							
BAS 78102	20 fl oz	24	78	50	58	48	27
BAS 80004 + Outlook + Aatrex	3 fl oz + 21 fl oz + 24 fl oz	29	68	59	65	58	29
Lumax	2.5 qt	76	98	99	99	98	144
PRE/POST I							
BAS 78102/ Roundup PowerMax + NIS + AMS	13 fl oz/ 22 fl oz + 0.25% v/v + 3.4 lb	23	68	97	94	83	169
BAS 80004 + Outlook + Aatrex/ Roundup PowerMax + NIS + AMS	2.5 fl oz + 12 fl oz + 24 fl oz/ 22 fl oz + 0.25% v/v + 3.4 lb	31	86	99	99	97	173
Harness + Aatrex/ Roundup PowerMax + NIS + AMS	24 fl oz + 24 fl oz/ 22 fl oz + 0.25% v/v + 3.4 lb	38	95	99	99	95	172
BAS 78102/ Roundup PowerMax + Status + NIS + AMS	13 fl oz/ 22 fl oz + 2.5 oz wt + 0.25% v/v + 3.4 lb	21	78	99	91	92	170
POST I							
Permit + Roundup PowerMax + NIS + AMS	0.67 oz wt + 22 fl oz + 0.125% v/v + 3.4 lb	0	0	98	96	96	169
GWN-3041 + GWN-3124 + Roundup PowerMax + NIS + AMS	0.67 oz wt + 0.083 oz wt + 22 fl oz + 0.125% v/v + 3.4 lb	0	0	99	98	95	162
Yukon + Roundup PowerMax + NIS + AMS	4 oz wt + 22 fl oz + 0.125% v/v + 3.4 lb	0	0	99	96	95	171
Yukon + Roundup PowerMax + NIS + AMS	3 oz wt + 22 fl oz + 0.125% v/v + 3.4 lb	0	0	99	99	97	188
Status + Roundup PowerMax + NIS + AMS	5 oz wt + 22 fl oz + 0.125% v/v + 3.4 lb	0	0	99	93	95	180
Roundup PowerMax + NIS + AMS	22 fl oz + 0.125% v/v + 3.4 lb	0	0	98	89	83	161
	LSD (P=0.10)	**8**	**4**	**1**	**4**	**4**	**28**

Table 3. Common waterhemp control with BASF and Gowan herbicides in field corn on June 4, 9, 23, and 30 and July 30 at Rochester, MN, in 2008.

Treatment	Rate	Common Waterhemp Control					Yield
		6/4	6/9	6/23	6/30	7/30	
	(rate/A)	(%)					(bu/A)
Untreated Check		0	0	0	0	0	0
PRE							
BAS 78102	20 fl oz	70	90	86	94	74	27
BAS 80004 + Outlook + Aatrex	3 fl oz + 21 fl oz + 24 fl oz	53	84	76	75	65	29
Lumax	2.5 qt	78	98	98	97	99	144
PRE/POST I							
BAS 78102/ Roundup PowerMax + NIS + AMS	13 fl oz/ 22 fl oz + 0.25% v/v + 3.4 lb	40	81	99	94	94	169
BAS 80004 + Outlook + Aatrex/ Roundup PowerMax + NIS + AMS	2.5 fl oz + 12 fl oz + 24 fl oz/ 22 fl oz + 0.25% v/v + 3.4 lb	58	92	98	95	93	173
Harness + Aatrex/ Roundup PowerMax + NIS + AMS	24 fl oz + 24 fl oz/ 22 fl oz + 0.25% v/v + 3.4 lb	48	94	99	98	96	172
BAS 78102/ Roundup PowerMax + Status + NIS + AMS	13 fl oz/ 22 fl oz + 2.5 oz wt + 0.25% v/v + 3.4 lb	48	84	99	93	94	170
POST I							
Permit + Roundup PowerMax + NIS + AMS	0.67 oz wt + 22 fl oz + 0.125% v/v + 3.4 lb	0	0	98	94	90	169
GWN-3041 + GWN-3124 + Roundup PowerMax + NIS + AMS	0.67 oz wt + 0.083 oz wt + 22 fl oz + 0.125% v/v + 3.4 lb	0	0	99	87	89	162
Yukon + Roundup PowerMax + NIS + AMS	4 oz wt + 22 fl oz + 0.125% v/v + 3.4 lb	0	0	99	94	90	171
Yukon + Roundup PowerMax + NIS + AMS	3 oz wt + 22 fl oz + 0.125% v/v + 3.4 lb	0	0	93	94	87	188
Status + Roundup PowerMax + NIS + AMS	5 oz wt + 22 fl oz + 0.125% v/v + 3.4 lb	0	0	97	93	90	180
Roundup PowerMax + NIS + AMS	22 fl oz + 0.125% v/v + 3.4 lb	0	0	91	84	84	161
	LSD (P=0.10)	**8**	**4**	**3**	**3**	**4**	**28**

Table 4. Giant foxtail control with BASF and Gowan herbicide systems in field corn on June 4, 9, 23, and 30 and July 30 at Rochester, MN, in 2008.

Treatment	Rate	Giant foxtail Control					Yield
		6/4	6/9	6/23	6/30	7/30	
	(rate/A)			(%)			(bu/A)
Untreated Check		0	0	0	0	0	0
PRE							
BAS 78102	20 fl oz	70	78	60	74	64	27
BAS 80004 + Outlook + Aatrex	3 fl oz + 21 fl oz + 24 fl oz	61	74	60	73	63	29
Lumax	2.5 qt	69	74	83	73	70	144
PRE/POST I							
BAS 78102/ Roundup PowerMax + NIS + AMS	13 fl oz/ 22 fl oz + 0.25% v/v + 3.4 lb	60	68	99	98	87	169
BAS 80004 + Outlook + Aatrex/ Roundup PowerMax + NIS + AMS	2.5 fl oz + 12 fl oz + 24 fl oz/ 22 fl oz + 0.25% v/v + 3.4 lb	64	81	98	98	90	173
Harness + Aatrex/ Roundup PowerMax + NIS + AMS	24 fl oz + 24 fl oz/ 22 fl oz + 0.25% v/v + 3.4 lb	66	73	99	98	92	172
BAS 78102/ Roundup PowerMax + Status + NIS + AMS	13 fl oz/ 22 fl oz + 2.5 oz wt + 0.25% v/v + 3.4 lb	64	69	99	98	89	170
POST I							
Permit + Roundup PowerMax + NIS + AMS	0.67 oz wt + 22 fl oz + 0.125% v/v + 3.4 lb	0	0	99	97	82	169
GWN-3041 + GWN-3124 + Roundup PowerMax + NIS + AMS	0.67 oz wt + 0.083 oz wt + 22 fl oz + 0.125% v/v + 3.4 lb	0	0	99	98	81	162
Yukon + Roundup PowerMax + NIS + AMS	4 oz wt + 22 fl oz + 0.125% v/v + 3.4 lb	0	0	99	98	84	171
Yukon + Roundup PowerMax + NIS + AMS	3 oz wt + 22 fl oz + 0.125% v/v + 3.4 lb	0	0	96	97	82	188
Status + Roundup PowerMax + NIS + AMS	5 oz wt + 22 fl oz + 0.125% v/v + 3.4 lb	0	0	98	98	88	180
Roundup PowerMax + NIS + AMS	22 fl oz + 0.125% v/v + 3.4 lb	0	0	96	98	82	161
	LSD (P=0.10)	**5**	**5**	**1**	**2**	**4**	**28**

Table 5. Corn Injury with BASF and Gowan herbicide systems in corn on June 4 at Rochester, MN, in 2008.

Treatment	Rate	Injury 6/4	Yield
	(rate/A)	(%)	(bu/A)
Untreated Check		0	0
PRE			
BAS 78102	20 fl oz	0	27
BAS 80004 + Outlook + Aatrex	3 fl oz + 21 fl oz + 24 fl oz	0	29
Lumax	2.5 qt	0	144
PRE/POST I			
BAS 78102/ Roundup PowerMax + NIS + AMS	13 fl oz/ 22 fl oz + 0.25% v/v + 3.4 lb	0	169
BAS 80004 + Outlook + Aatrex/ Roundup PowerMax + NIS + AMS	2.5 fl oz + 12 fl oz + 24 fl oz/ 22 fl oz + 0.25% v/v + 3.4 lb	0	173
Harness + Aatrex/ Roundup PowerMax + NIS + AMS	24 fl oz + 24 fl oz/ 22 fl oz + 0.25% v/v + 3.4 lb	0	172
BAS 78102/ Roundup PowerMax + Status + NIS + AMS	13 fl oz/ 22 fl oz + 2.5 oz wt + 0.25% v/v + 3.4 lb	0	170
POST I			
Permit + Roundup PowerMax + NIS + AMS	0.67 oz wt + 22 fl oz + 0.125% v/v + 3.4 lb	0	169
GWN-3041 + GWN-3124 + Roundup PowerMax + NIS + AMS	0.67 oz wt + 0.083 oz wt + 22 fl oz + 0.125% v/v + 3.4 lb	0	162
Yukon + Roundup PowerMax + NIS + AMS	4 oz wt + 22 fl oz + 0.125% v/v + 3.4 lb	0	171
Yukon + Roundup PowerMax + NIS + AMS	3 oz wt + 22 fl oz + 0.125% v/v + 3.4 lb	0	188
Status + Roundup PowerMax + NIS + AMS	5 oz wt + 22 fl oz + 0.125% v/v + 3.4 lb	0	180
Roundup PowerMax + NIS + AMS	22 fl oz + 0.125% v/v + 3.4 lb	0	161
	LSD (P=0.10)	**0**	**28**

Evaluation of the performance of Balance Flexx, Corvus and Capreno herbicide programs for weed control in field corn at Rochester, MN, in 2008.

Breitenbach, Fritz R., Lisa M. Behnken, Ryan P. Miller, Jeffrey L. Gunsolus, Louis E. Kuisle, and Kyle J. Poss.

The objective of this trial was to evaluate the performance of Balance Flexx, Corvus and Capreno programs for weed control in corn in southeastern Minnesota. The research site was a Lawler loam series with a pH of 7.2 and soil test P and K levels of 81 ppm and 204 ppm, respectively. Spring fertilizer was broadcast ahead of planting on April 16, at a rate of 120-36-86-28 (N-P-K-S). The area was side dressed with an additional 35 b/A of N on June 25. The field was spring disked and field cultivated once prior to planting. The corn hybrid, NK N41C-3000GT 98 RM, was planted on May 5, 2008, at a depth of 2.0 inches in 30 inch rows at 35,000 seeds per acre. A randomized complete block design was used with four replications. Preemergence (PRE) and postemergence (POST) treatments were applied with a tractor-mounted sprayer delivering 20 gpa at 32 psi using Turbo Tee 11002 nozzles. Evaluations of the plots were taken on May 22, 27, and 30, June 9, 18, and 30, and July 21. Application dates, environmental conditions, and weed stages are listed below. The center two rows of each plot were machine harvested on November 3, 2008.

Date	**5/5**	**5/22**	**6/2**	**6/10**
Treatment	PRE	POST I	POST II	POST III
Temperature (F)				
Air	75	64	72	70
soil	57.2	66.5	64	71
Relative Humidity (%)	34	34	57	52
Wind (mph)	17	12	8	22
Soil moisture	Adequate	Inadequate	Excessive	Adequate
Corn				
stage		V1-V2	V4	V5
height (inch)		2.0	4.5	9.5
Giant Ragweed				
weed density (ft^2)		6.1	6.1	6.1
height (inch)		1.5	4	4.5
Common Lambsquarters				
weed density (ft^2)		7.6	7.6	7.6
height (inch)		0.5	1.4	3.0
Common Waterhemp				
weed density (ft^2)		12.3	12.3	12.3
height (inch)		0.3	1.2	2.25
Wooly Cupgrass				
weed density (ft^2)		12.1	12.1	12.1
height (inch)		0.25	1.6	2.25
Rainfall after each application (inch)				
week 1	1.89	1.99	4.79	3.52
week 2	0.24	2.06	3.52	0.00
week 3	0.19	6.57	0.00	0.76

CONCLUSIONS

Weather conditions following preemergence applications allowed for excellent activation of the herbicides with 1.89 inches of precipitation falling within one week of application.

Preemgence control of giant ragweed was poor with no treatments rated higher than 41% (5/22 rating). In dramatic contrast, preemergence common lambsquarters control was excellent for all soil applied treatments resulting in 99% control (5/22 rating). No rating data for soil applied herbicides was collected for common waterhemp. Soil applied treatments provided poor control of woolly cupgrass with the best treatment, Harness Xtra, achieving only 65% control. The remaining treatments ranged between 25% to 46% control (5/22 rating).

Weather conditions prior to POST I, II & III applications were favorable due to abundant moisture conditions and moderate temperatures.

Sequential PRE/POST III applications consistently provided very good to excellent giant ragweed control. All treatments with the exception of Harness Xtra followed by Roundup PowerMax, 92% control, provided better than 98% control (7/21 rating).

POST I applications provided very good to excellent control of giant ragweed, 96% or better. Only the Balance Flexx 5 oz rate + Aatrex offered slightly less control at 93% (7/21 rating).

POST II applications provided very good to excellent giant ragweed control as well with all treatments at 94% control or better (7/21 rating).

Common lambsquarters control was excellent throughout the duration of the trial and no treatment provided less than 97% control regardless of application timing or rating date.

All sequential PRE/POST II applications provided excellent common waterhemp control with no treatment providing less that 95% control.

POST I applications of Corvus + Aatrex, although offering very good control at 88%, did show some weakness when compared to the other POST I treatments for common waterhemp control.

POST II treatments provided very good to excellent control for common waterhemp. Statistically, the best treatments included Halex GT, 99%, and Capreno + Aatrex + MSO, 98%, (7/21 rating). All other treatments provided at least 92% control of common waterhemp.

All sequential PRE/POST III applications provided very good woolly cupgrass control with the exception of the sequential Lumax treatment, 61%, and the Balance Flexx Capreno +Aatrex treatment, 77%. The remainder of the treatments provided at least 90% control of woolly cupgrass (7/21 rating).

POST I applications provided a wider range of woolly cupgrass control. Statistically, the best treatments were Balance Flexx 5 oz rate + Aatrex, 84%, and both rates of Corvus + Aatrex, 83% and 79% control, respectively (7/21 rating). The weakest treatment was Lumax at 58% control (7/21 rating).

POST II applications all provided good to very good control of woolly cupgrass. Statistically the best treatments were Halex GT, 92%, Capreno + Roundup PowerMax, 89%, Capreno + Ignite, 89%, Capreno + Aatrex, 87%, and Laudis + Ignite + Aatrex, 88% (7/21 rating). The weakest treatment was Laudis + Aatrex at 81% control (7/21 rating). (University of Minnesota Extension, Regional Office – Rochester).

Table 1. Performance of herbicide systems for giant ragweed control in field corn on May 22, June 9, 18, and 30, and July 21 at Rochester, MN, in 2008.

Treatment	Rate	Giant Ragweed Control					Yield
		5/22	6/9	6/18	6/30	7/21	
	(rate/A)			(%)			(bu/A)
Untreated Check		0	0	0	0	0	2
PRE / POST III							
Balance Flexx / Laudis + MSO + 28% UAN	4 fl oz / 3 fl oz + 1% v/v + 1.5 qt	32	69	94	99	99	112
Balance Flexx / Laudis + MSO + 28% UAN	5 fl oz / 3 fl oz + 1% v/v + 1.5 qt	41	66	96	99	99	123
Balance Flexx / Ignite 280 + Laudis + AMS	3 fl oz / 22 fl oz + 2 fl oz + 17 lbs/100 gal	33	71	97	95	98	96
Balance Flexx / Ignite 280 + Aatrex + AMS	3 fl oz / 22 fl oz + 1 pt + 17 lbs/100 gal	40	78	98	97	98	81
Balance Flexx / Capreno + Aatrex + COC + UAN	3 fl oz / 3 fl oz + 1 pt + 1 % v/v + 1.5 qt	30	69	98	99	99	91
Balance Flexx / Capreno + MSO + UAN	3 fl oz / 3 fl oz + 1% v/v + 1.5 qt	26	58	78	99	99	119
Corvus / Laudis + MSO + UAN	3.3 fl oz / 3 fl oz + 1% v/v + 1.5 qt	38	79	92	98	99	102
Corvus / Laudis + MSO + UAN	4.5 fl oz / 3 fl oz + 1% v/v + 1.5 qt	35	78	93	95	99	109
Corvus / Ignite 280 + Laudis + AMS	3 fl oz / 22 fl oz + 2 fl oz + 17 lbs/100 gal	39	81	98	98	99	112
Corvus / Laudis + Aatrex + COC + UAN	2.5 fl oz / 2 fl oz + 1 pt + 1 % v/v + 1.5 qt	35	66	99	97	99	117
Corvus / Laudis + Aatrex + MSO + UAN	2.5 fl oz / 2 fl oz + 1 pt + 1 % v/v + 1.5 qt	31	71	98	98	99	94
Harness Xtra / Roundup PowerMax + AMS	1.3 qt / 22 fl oz + 17 lbs/100 gal	23	20	97	94	92	109
Lumax / Lumax + NIS	1.5 qt / 1.5 qt + 0.25% v/v	40	88	99	99	99	84
POST I							
Balance Flexx + Aatrex	4 fl oz + 1 pt	0	98	96	94	96	91
Balance Flexx + Aatrex	5 fl oz + 1 pt	0	94	94	93	93	90
Corvus + Aatrex	3.3 fl oz + 1 pt	0	96	94	96	96	103
Corvus + Aatrex	4.5 fl oz + 1 pt	0	95	94	94	97	94
Lumax + NIS	2.5 qt + 0.25% v/v	0	94	94	94	97	47
POST II							
Laudis + Ignite 280 + Aatrex + AMS	2 fl oz + 22 fl oz + 1 pt + 17 lbs/100 gal	0	97	95	95	95	108
Laudis + Aatrex + Roundup PowerMax + AMS	3 fl oz + 1 pt + 11 fl oz + 17 lbs/100 gal	0	95	95	94	95	114
Laudis + Aatrex + MSO + UAN	3 fl oz + 1 pt + 1% v/v + 1.5 qt	0	96	96	95	94	112
Capreno + Aatrex + COC + UAN	3 fl oz + 1 pt + 1% v/v + 1.5 qt	0	95	95	97	98	97
Capreno + Aatrex + MSO + UAN	3 fl oz + 1 pt + 1% v/v + 1.5 qt	0	96	96	96	99	81
Capreno + Ignite 280 + AMS	3 fl oz + 22 fl oz + 17 lbs/100 gal	0	95	95	96	97	82
Capreno + Ignite 280 + Aatrex + AMS	3 fl oz + 22 fl oz + 1 pt + 17 lbs/100 gal	0	96	96	94	96	100
Capreno + Roundup PowerMax + AMS	3 fl oz + 22 fl oz + 17 lbs/100 gal	0	94	95	95	94	93
Halex GT + NIS + AMS	3.6 pts + 0.25% v/v + 17lbs/100 gal	0	95	93	92	96	113
	LSD (P=0.10)	**6**	**6**	**3**	**3**	**3**	**39**

Table 2. Performance of herbicide systems for common lambsquarters control in field corn on May 22, June 9, 18, and 30, and July 21 at Rochester, MN, in 2008.

Treatment	Rate	Common Lambsquarters Control					Yield
		5/22	6/9	6/18	6/30	7/21	
	(rate/A)			(%)			(bu/A)
Untreated Check		0	0	0	0	0	2
PRE / POST III							
Balance Flexx / Laudis + MSO + 28% UAN	4 fl oz / 3 fl oz + 1% v/v + 1.5 qt	99	99	99	99	99	112
Balance Flexx / Laudis + MSO + 28% UAN	5 fl oz / 3 fl oz + 1% v/v + 1.5 qt	99	99	99	99	99	123
Balance Flexx / Ignite 280 + Laudis + AMS	3 fl oz / 22 fl oz + 2 fl oz + 17 lbs/100 gal	99	98	99	99	99	96
Balance Flexx / Ignite 280 + Aatrex + AMS	3 fl oz / 22 fl oz + 1 pt + 17 lbs/100 gal	99	98	99	99	99	81
Balance Flexx / Capreno + Aatrex + COC + UAN	3 fl oz / 3 fl oz + 1 pt + 1 % v/v + 1.5 qt	99	97	99	99	99	91
Balance Flexx / Capreno + MSO + UAN	3 fl oz / 3 fl oz + 1% v/v + 1.5 qt	99	98	99	99	99	119
Corvus / Laudis + MSO + UAN	3.3 fl oz / 3 fl oz + 1% v/v + 1.5 qt	99	99	99	99	99	102
Corvus / Laudis + MSO + UAN	4.5 fl oz / 3 fl oz + 1% v/v + 1.5 qt	99	98	99	99	99	109
Corvus / Ignite 280 + Laudis + AMS	3 fl oz / 22 fl oz + 2 fl oz + 17 lbs/100 gal	99	99	99	99	99	112
Corvus / Laudis + Aatrex + COC + UAN	2.5 fl oz / 2 fl oz + 1 pt + 1 % v/v + 1.5 qt	99	99	99	99	99	117
Corvus / Laudis + Aatrex + MSO + UAN	2.5 fl oz / 2 fl oz + 1 pt + 1 % v/v + 1.5 qt	99	98	99	99	99	94
Harness Xtra / Roundup PowerMax + AMS	1.3 qt / 22 fl oz + 17 lbs/100 gal	99	99	99	99	97	109
Lumax / Lumax + NIS	1.5 qt / 1.5 qt + 0.25% v/v	99	99	99	99	99	84
POST I							
Balance Flexx + Aatrex	4 fl oz + 1 pt	0	99	99	99	99	91
Balance Flexx + Aatrex	5 fl oz + 1 pt	0	99	99	99	99	90
Corvus + Aatrex	3.3 fl oz + 1 pt	0	99	99	99	99	103
Corvus + Aatrex	4.5 fl oz + 1 pt	0	99	99	98	99	94
Lumax + NIS	2.5 qt + 0.25% v/v	0	99	99	99	99	47
POST II							
Laudis + Ignite 280 + Aatrex + AMS	2 fl oz + 22 fl oz + 1 pt + 17 lbs/100 gal	0	99	99	99	99	108
Laudis + Aatrex + Roundup PowerMax + AMS	3 fl oz + 1 pt + 11 fl oz + 17 lbs/100 gal	0	98	99	99	99	114
Laudis + Aatrex + MSO + UAN	3 fl oz + 1 pt + 1% v/v + 1.5 qt	0	98	99	99	99	112
Capreno + Aatrex + COC + UAN	3 fl oz + 1 pt + 1% v/v + 1.5 qt	0	99	99	99	99	97
Capreno + Aatrex + MSO + UAN	3 fl oz + 1 pt + 1% v/v + 1.5 qt	0	99	99	99	99	81
Capreno + Ignite 280 + AMS	3 fl oz + 22 fl oz + 17 lbs/100 gal	0	99	99	99	99	82
Capreno + Ignite 280 + Aatrex + AMS	3 fl oz + 22 fl oz + 1 pt + 17 lbs/100 gal	0	99	99	99	99	100
Capreno + Roundup PowerMax + AMS	3 fl oz + 22 fl oz + 17 lbs/100 gal	0	99	99	99	99	93
Halex GT + NIS + AMS	3.6 pts + 0.25% v/v + 17lbs/100 gal	0	99	99	99	99	113
	LSD (P=0.10)	**0**	**1**	**0**	**1**	**1**	**39**

Table 3. Performance of herbicide systems for common waterhemp control in field corn on May 22, June 9, 18, and 30, and July 21 at Rochester, MN, in 2008.

Treatment	Rate	Common Waterhemp Control					Yield
		5/30	6/9	6/18	6/30	7/21	
	(rate/A)			(%)			(bu/A)
Untreated Check		0	0	0	0	0	2
PRE / POST III							
Balance Flexx / Laudis + MSO + 28% UAN	4 fl oz / 3 fl oz + 1% v/v + 1.5 qt	94	94	99	99	99	112
Balance Flexx / Laudis + MSO + 28% UAN	5 fl oz / 3 fl oz + 1% v/v + 1.5 qt	92	96	99	98	98	123
Balance Flexx / Ignite 280 + Laudis + AMS	3 fl oz / 22 fl oz + 2 fl oz + 17 lbs/100 gal	93	87	99	98	97	96
Balance Flexx / Ignite 280 + Aatrex + AMS	3 fl oz / 22 fl oz + 1 pt + 17 lbs/100 gal	92	91	99	96	95	81
Balance Flexx / Capreno + Aatrex + COC + UAN	3 fl oz / 3 fl oz + 1 pt + 1 % v/v + 1.5 qt	93	89	99	97	97	91
Balance Flexx / Capreno + MSO + UAN	3 fl oz / 3 fl oz + 1% v/v + 1.5 qt	93	93	98	98	99	119
Corvus / Laudis + MSO + UAN	3.3 fl oz / 3 fl oz + 1% v/v + 1.5 qt	91	92	99	99	99	102
Corvus / Laudis + MSO + UAN	4.5 fl oz / 3 fl oz + 1% v/v + 1.5 qt	92	94	99	98	99	109
Corvus / Ignite 280 + Laudis + AMS	3 fl oz / 22 fl oz + 2 fl oz + 17 lbs/100 gal	95	94	99	98	98	112
Corvus / Laudis + Aatrex + COC + UAN	2.5 fl oz / 2 fl oz + 1 pt + 1 % v/v + 1.5 qt	94	88	99	96	98	117
Corvus / Laudis + Aatrex + MSO + UAN	2.5 fl oz / 2 fl oz + 1 pt + 1 % v/v + 1.5 qt	97	93	99	98	99	94
Harness Xtra / Roundup PowerMax + AMS	1.3 qt / 22 fl oz + 17 lbs/100 gal	98	98	98	96	95	109
Lumax / Lumax + NIS	1.5 qt / 1.5 qt + 0.25% v/v	98	99	99	99	99	84
POST I							
Balance Flexx + Aatrex	4 fl oz + 1 pt	96	99	88	90	94	91
Balance Flexx + Aatrex	5 fl oz + 1 pt	96	99	92	92	93	90
Corvus + Aatrex	3.3 fl oz + 1 pt	97	95	83	86	88	103
Corvus + Aatrex	4.5 fl oz + 1 pt	96	97	85	87	88	94
Lumax + NIS	2.5 qt + 0.25% v/v	92	99	97	97	99	47
POST II							
Laudis + Ignite 280 + Aatrex + AMS	2 fl oz + 22 fl oz + 1 pt + 17 lbs/100 gal	0	99	96	90	95	108
Laudis + Aatrex + Roundup PowerMax + AMS	3 fl oz + 1 pt + 11 fl oz + 17 lbs/100 gal	0	93	89	85	93	114
Laudis + Aatrex + MSO + UAN	3 fl oz + 1 pt + 1% v/v + 1.5 qt	0	86	96	90	94	112
Capreno + Aatrex + COC + UAN	3 fl oz + 1 pt + 1% v/v + 1.5 qt	0	86	99	95	95	97
Capreno + Aatrex + MSO + UAN	3 fl oz + 1 pt + 1% v/v + 1.5 qt	0	84	98	94	98	81
Capreno + Ignite 280 + AMS	3 fl oz + 22 fl oz + 17 lbs/100 gal	0	99	95	88	93	82
Capreno + Ignite 280 + Aatrex + AMS	3 fl oz + 22 fl oz + 1 pt + 17 lbs/100 gal	0	99	92	88	93	100
Capreno + Roundup PowerMax + AMS	3 fl oz + 22 fl oz + 17 lbs/100 gal	0	99	97	91	92	93
Halex GT + NIS + AMS	3.6 pts + 0.25% v/v + 17lbs/100 gal	0	99	99	96	99	113
	LSD (P=0.10)		**4**	**4**	**4**	**3**	**39**

Table 4. Performance of herbicide systems for woolly cupgrass control in field corn on May 22, June 9, 18, and 30, and July 21 at Rochester, MN, in 2008.

Treatment	Rate	Woolly Cupgrass Control					Yield
		5/22	6/9	6/18	6/30	7/21	
	(rate/A)			(%)			(bu/A)
Untreated Check		0	0	0	0	0	2
PRE / POST III							
Balance Flexx / Laudis + MSO + 28% UAN	4 fl oz / 3 fl oz + 1% v/v + 1.5 qt	31	79	97	95	94	112
Balance Flexx / Laudis + MSO + 28% UAN	5 fl oz / 3 fl oz + 1% v/v + 1.5 qt	35	75	98	95	92	123
Balance Flexx / Ignite 280 + Laudis + AMS	3 fl oz / 22 fl oz + 2 fl oz + 17 lbs/100 gal	30	70	99	95	91	96
Balance Flexx / Ignite 280 + Aatrex + AMS	3 fl oz / 22 fl oz + 1 pt + 17 lbs/100 gal	39	88	99	95	93	81
Balance Flexx / Capreno + Aatrex + COC + UAN	3 fl oz / 3 fl oz + 1 pt + 1 % v/v + 1.5 qt	28	80	96	94	93	91
Balance Flexx / Capreno + MSO + UAN	3 fl oz / 3 fl oz + 1% v/v + 1.5 qt	25	64	81	83	77	119
Corvus / Laudis + MSO + UAN	3.3 fl oz / 3 fl oz + 1% v/v + 1.5 qt	31	69	93	94	90	102
Corvus / Laudis + MSO + UAN	4.5 fl oz / 3 fl oz + 1% v/v + 1.5 qt	38	76	94	93	90	109
Corvus / Ignite 280 + Laudis + AMS	3 fl oz / 22 fl oz + 2 fl oz + 17 lbs/100 gal	36	78	99	96	94	112
Corvus / Laudis + Aatrex + COC + UAN	2.5 fl oz / 2 fl oz + 1 pt + 1 % v/v + 1.5 qt	33	69	94	95	92	117
Corvus / Laudis + Aatrex + MSO + UAN	2.5 fl oz / 2 fl oz + 1 pt + 1 % v/v + 1.5 qt	31	65	96	94	92	94
Harness Xtra / Roundup PowerMax + AMS	1.3 qt / 22 fl oz + 17 lbs/100 gal	65	93	99	96	91	109
Lumax / Lumax + NIS	1.5 qt / 1.5 qt + 0.25% v/v	46	68	66	56	61	84
POST I							
Balance Flexx + Aatrex	4 fl oz + 1 pt	0	68	74	67	73	91
Balance Flexx + Aatrex	5 fl oz + 1 pt	0	88	86	83	84	90
Corvus + Aatrex	3.3 fl oz + 1 pt	0	94	88	87	83	103
Corvus + Aatrex	4.5 fl oz + 1 pt	0	91	84	85	79	94
Lumax + NIS	2.5 qt + 0.25% v/v	0	71	63	51	58	47
POST II							
Laudis + Ignite 280 + Aatrex + AMS	2 fl oz + 22 fl oz + 1 pt + 17 lbs/100 gal	0	97	94	91	88	108
Laudis + Aatrex + Roundup PowerMax + AMS	3 fl oz + 1 pt + 11 fl oz + 17 lbs/100 gal	0	92	89	87	85	114
Laudis + Aatrex + MSO + UAN	3 fl oz + 1 pt + 1% v/v + 1.5 qt	0	76	88	86	81	112
Capreno + Aatrex + COC + UAN	3 fl oz + 1 pt + 1% v/v + 1.5 qt	0	88	92	90	87	97
Capreno + Aatrex + MSO + UAN	3 fl oz + 1 pt + 1% v/v + 1.5 qt	0	85	93	90	87	81
Capreno + Ignite 280 + AMS	3 fl oz + 22 fl oz + 17 lbs/100 gal	0	96	96	92	89	82
Capreno + Ignite 280 + Aatrex + AMS	3 fl oz + 22 fl oz + 1 pt + 17 lbs/100 gal	0	94	93	86	86	100
Capreno + Roundup PowerMax + AMS	3 fl oz + 22 fl oz + 17 lbs/100 gal	0	95	95	90	89	93
Halex GT + NIS + AMS	3.6 pts + 0.25% v/v + 17lbs/100 gal	0	97	98	92	92	113
	LSD (P=0.10)	**7**	**6**	**4**	**4**	**5**	**39**

Evaluation and comparison of HPPD weed control systems in field corn at Rochester, MN, in 2008.

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The objective of this trial was to evaluate and compare weed control performance of Callisto, Impact, Laudis, Halex GT, Steadfast Q, Resolve Q and Require Q in corn in southeastern Minnesota. The research site was a Lawler loam series with a pH of 7.1 and soil test P and K levels of 51 ppm and 185 ppm, respectively. Spring fertilizer was broadcast ahead of planting on April 26, at a rate of 120-36-86-28 (N-P-K-S). The area was side dressed with an additional 30lb/A of N on June 26. The field was spring disked and field cultivated once prior to planting. The corn hybrid, NK 41C-4000GT 98RM, was planted on May 5, 2008, at a depth of 1.5 inches in 30 inch rows at 35,000 seeds per acre. A randomized complete block design was used with four replications. Preemergence (PRE) and postemergence (POST) treatments were applied with a tractor-mounted sprayer delivering 20 gpa at 32 psi using Turbo Tee 11002 nozzles. Evaluations of the plots were taken on May 24 and 30, June 9 and 20, July 1 and 28. Application dates, environmental conditions, and weed stages are listed below. The center two rows of each plot were machine harvested on November 3, 2008.

Date	**5/6**	**6/2**	**6/10**	**6/18**	**6/23**
Treatment	PRE	POST I	POST II	POST III	POST IV
Temperature (F)					
Air	75	66	70	74	78
soil	57.6	61	64	75	85
Relative Humidity (%)	34	70	56	38	38
Wind (mph)	17	6	20	10	5
Soil moisture	Adequate	Excessive	Excessive	Adequate	Inadequate
Corn					
stage		V4	5 Collar		V7
height (inch)		3.5	9.5	13	15.5
Giant Ragweed					
weed density (ft^2)		17.3	17.3	17.3	17.3
height (inch)		4.3	4.5	5.5	5.6
Common Lambsquarters					
weed density (ft^2)		10.7	10.7	10.7	10.7
height (inch)		1.6	1.8	1.5	2.0
Common Waterhemp					
weed density (ft^2)		3.0	3.0	3.0	3.0
height (inch)		0.4	1.1	2.75	3.5
Giant Foxtail					
weed density (ft^2)		0.9	0.9	0.9	0.9
height (inch)		1.9	4.0	6.0	2.5
Rainfall after each application (inch)					
week 1	1.22	4.79	3.52	0.00	0.76
week 2	0.11	3.52	0.00	0.76	0.87
week 3	0.19	0.00	0.76	0.87	0.92

CONCLUSIONS

Weather conditions following pre-emergence applications allowed for excellent activation of the herbicides with 1.22 inches of precipitations falling within one week of application.

The best preemgence early season control of giant ragweed was provided by both the 2 qt and 1.5 quart rates of Lumax, 92% and 90%, respectively. SureStart also provided very good giant ragweed control, 86%l. Harness Xtra and Bicep Lite II Magnum offered poor control of giant ragweed, 40% and 23%, respectively. No preemergence giant ragweed control was detected with the Dual II Magnum or Aatrex treatments (5/30 rating).

For preemergence common lambsquarters control, both Lumax rates, Bicep Lite II Magnum, Harness Xtra, and SureStart all provided 99% control. The Dual II Magnum treatments provide control that ranged between 73% and 76%, and Aatrex offered 79% control of common lambsquarters (5/30 rating).

All soil applied treatments provided excellent control of common waterhemp providing at least 98% control (5/30 rating).

All soil applied treatments provided excellent control of giant foxtail providing at least 95% control, with the exception of Aatrex which offered virtually no giant foxtail control 4% (5/30 rating).

Weather conditions prior to POST I and POST II applications were favorable due to abundant moisture. Subsequent applications were more challenging due to drier than normal conditions.

Sequential PRE/POST applications consistently provided very good to excellent giant ragweed control. Statistically, the best treatments included Dual II Magnum followed by Laudis, 95%, Lumax followed by Touchdown Total, 97%, Lumax followed by Halex GT, 99%, Bicep Lite II Magnum followed by Halex GT, 97%, and Aatrex followed by Halex GT, 96%. Weaker treatments included both the Dual II Magnum followed by Impact + Aatrex, 78%, and the Dual II Magnum followed by Status, 83%, (7/28 rating).

Total POST treatments for giant ragweed were more variable. Statistically, the best treatments included Touchdown Total + Callisto, 95%, Touchdown Total + Laudis, 95%, Halex GT, 96%, Halex GT + Aatrex, 92%, NorthStar + Halex GT, 95%, Steadfast Q + Impact + Aatrex, 94%, and the sequential two-pass Roundup PowerMax treatment, 98%. Weaker treatments included the single pass of Roundup PowerMax, 69%, and Roundup PowerMax + Impact, 75%, (7/28 rating).

All sequential PRE/POST applications provided excellent common lambsquarters control with no treatment providing less that 95% control.

On the whole, postemergence applications for common lambsquarters was very good to excellent. Statistically, the best treatments included Touchdown Total + Callisto, 98%, Touchdown Total + Laudis, 98%, Halex GT, 99%, Halex GT + Aatrex, 99%, SureStart + Durango, 97%, Roundup PowerMax + Laudis, 99%, NorthStar + Halex GT, 99%, NorthStar + Sequence, 99%, Steadfast Q + Impact + Aatrex, 99%, Resolve Q + Aatrex + Roundup PowerMax , 99%, and Require Q + Aatrex + Roundup PowerMax, 99%, and the sequential 2-pass Roundup PowerMax treatment, 97%. Only the single pass Roundup PowerMax treatment performed poorly at 74% control (7/28 rating).

All sequential PRE/POST applications provided excellent common waterhemp control with no treatment providing less that 95% control.

On the whole, postemergence applications for common waterhemp was very good to excellent. Statistically, the best treatments included Touchdown Total + Callisto, 97%, Touchdown Total + Status, 96%, Halex GT, 99%, Halex GT + Aatrex, 95%, Roundup PowerMax + Status, 97%, NorthStar + Halex GT, 97%, and the sequential two-pass Roundup PowerMax treatment, 98%. Only the single pass Roundup PowerMax treatment performed poorly at 75% control (7/28 rating).

All sequential PRE/POST applications provided excellent giant foxtail control with no treatment providing less that 94% control.

On the whole, postemergence applications for giant foxtail was very good to excellent. Statistically, the best treatments included Halex GT, 97%, SureStart + Durango, 96%, NorthStar + Sequence, 97%, Steadfast Q + Impact + Aatrex, 95%, Resolve Q + Aatrex + Roundup PowerMax, 97%, Require Q + Aatrex + Roundup PowerMax, 96%, and the sequential two-pass Roundup PowerMax treatment, 99%. Only the single pass Roundup PowerMax treatment provided reduced control at 81% (7/28 rating). (University of Minnesota Extension, Regional Office – Rochester).

Table 1. Performance of herbicide systems for giant ragweed control in field corn on May 22 and 30, June 9 and 20, and July 1 and 28 at Rochester, MN, in 2008.

Treatment	Rate	Giant Ragweed Control						Yield
		5/22	5/30	6/9	6/20	7/1	7/28	
	(rate/A)	(%)						(bu/A)
Untreated Check		0	0	0	0	0	0	4
PRE / POST II								
Dual II Mag / Callisto + Aatrex + COC + AMS	1 pt / 3.0 fl oz + 8 fl oz + 1% v/v + 8.5 lb/100gal	0	0	91	89	87	85	105
Dual II Mag / Impact + Aatrex + COC + AMS	1 pt / 0.5 fl oz + 8 fl oz + 1% v/v + 8.5 lb/100 gal	0	0	85	82	75	78	83
Dual II Mag / Laudis + Aatrex + COC + AMS	1 pt / 3 fl oz + 8 fl oz + 1% v/v + 8.5 lb/100 gal	0	0	93	97	97	95	108
Dual II Mag / Status + COC + AMS	1 pt / 5 oz wt + 1% v/v + 8.5 lb/100 gal	0	0	91	88	86	83	108
Lumax / Touchdown Total + AMS	2 qt / 24 fl oz + 1% w/v	83	92	94	90	98	97	118
Lumax / Halex GT + NIS + AMS	1.5 qt / 3.6 pt + 0.25% v/v + 1% w/v	76	90	95	89	98	99	144
Bicep Lite II Magnum / Halex GT + NIS + AMS	1 qt / 3.6 pt + 0.25% v/v + 1% w/v	20	23	97	98	98	97	124
Aatrex / Halex GT + NIS + AMS	26 fl oz / 3.6 pt + 0.25% v/v + 1% w/v	11	0	97	97	97	96	149
Harness Xtra / Roundup PowerMAX + AMS	1.25 qt / 22 fl oz + 1% w/v	41	40	96	90	84	89	111
SureStart / Durango DMA + AMS	1.75 pt / 24 fl oz + 1% w/v	77	86	83	96	95	93	136
POST I								
Touchdown Total + Callisto + AMS	24 fl oz / 3 fl oz + 8.5 lb/100 gal	0	0	95	97	97	95	123
Touchdown Total + Impact + AMS	24 fl oz / 0.5 fl oz + 8.5 lb/100 gal	0	0	93	89	80	83	83
Touchdown Total + Laudis + AMS	24 fl oz / 3 fl oz + 8.5 lb/100 gal	0	0	93	97	96	95	119
Touchdown Total + Status + AMS	24 fl oz / 2.4 oz wt + 8.5 lb/100 gal	0	0	94	90	82	83	90
Halex GT + NIS + AMS	3.6 pt + 0.25% v/v + 1% w/v	0	0	95	96	96	96	112
Halex GT + Aatrex + NIS + AMS	3.6 pt + 1 pt + 0.25% v/v + 1% w/v	0	0	92	95	93	92	118
Roundup PowerMAX + AMS	22 fl oz + 1% w/v	0	0	92	83	73	69	75
SureStart + Durango DMA + AMS	1.75 pt + 24 fl oz + 1% w/v	0	0	95	94	93	89	159
Roundup PowerMAX + Laudis + AMS	22 fl oz + 3 fl oz + 1% w/v	0	0	93	96	97	97	140
Roundup PowerMAX + Status + AMS	22 fl oz + 2.5 oz wt + 1% w/v	0	0	92	89	79	80	98
Roundup PowerMAX + Impact + AMS	22 fl oz + 0.5 fl oz + 1% w/v	0	0	91	85	78	75	89
NorthStar + Halex GT + NIS + AMS	2.5 oz + 3.6 pt + 0.25% v/v + 1% w/v	0	0	93	96	96	95	142
NorthStar + Sequence + AMS	3 oz + 2.5 pt + 1% w/v	0	0	93	92	89	87	135
Steadfast Q (Rimsulfuron + Nicosulfuron + Isoxadifen-ethyl) + Impact + Aatrex + MSO + AMS	(0.75 oz wt + 0.5 oz wt + 0.25 oz wt) + 0.5 fl oz + 8.9 oz wt + 1% v/v + 1% w/v	0	0	92	94	94	94	132
Resolve Q (Rimsulfuron + Thifensulfuron + Isoxadifen-ethyl) + Aatrex + Roundup PowerMAX + AMS	(0.92 oz wt + 0.1 oz wt + 0.25 oz wt) + 8.9 oz wt + 22 fl oz + 1% w/v	0	0	87	95	90	90	123
Require Q (Rimsulfuron + Dicamba + Isoxadifen-ethyl) + Aatrex + Roundup PowerMAX + AMS	(1 oz wt + 2.75 oz wt + 0.25 oz wt) + 8.9 oz wt + 22 fl oz + 1% w/v	0	0	95	96	94	95	116
POST I / POST III								
Roundup PowerMAX + AMS / Roundup PowerMAX + AMS	22 fl oz + 1% w/v / 22 fl oz + 1% w/v	0	0	93	83	99	98	135
	LSD (P=0.10)	**3**	**1**	**3**	**3**	**3**	**4**	**26**

Table 2. Performance of herbicide systems for common lambsquarters control in field corn on May 22 and 30, June 9 and 20, and July 1 and 28 at Rochester, MN, in 2008.

Treatment	Rate	Common Lambsquarters Control						Yield
		5/22	5/30	6/9	6/20	7/1	7/28	
	(rate/A)	(%)						(bu/A)
Untreated Check		0	0	0	0	0	0	4
PRE / POST II								
Dual II Mag / Callisto + Aatrex + COC + AMS	1 pt / 3.0 fl oz + 8 fl oz + 1% v/v + 8.5 lb/100gal	64	74	99	99	99	99	105
Dual II Mag / Impact + Aatrex + COC + AMS	1 pt / 0.5 fl oz + 8 fl oz + 1% v/v + 8.5 lb/100 gal	70	73	99	98	99	95	83
Dual II Mag / Laudis + Aatrex + COC + AMS	1 pt / 3 fl oz + 8 fl oz + 1% v/v + 8.5 lb/100 gal	68	75	99	99	99	99	108
Dual II Mag / Status + COC + AMS	1 pt / 5 oz wt + 1% v/v + 8.5 lb/100 gal	66	76	97	96	95	95	108
Lumax / Touchdown Total + AMS	2 qt / 24 fl oz + 1% w/v	99	99	99	99	99	99	118
Lumax / Halex GT + NIS + AMS	1.5 qt / 3.6 pt + 0.25% v/v + 1% w/v	99	99	99	99	99	99	144
Bicep Lite II Magnum / Halex GT + NIS + AMS	1 qt / 3.6 pt + 0.25% v/v + 1% w/v	99	99	99	99	99	99	124
Aatrex / Halex GT + NIS + AMS	26 fl oz / 3.6 pt + 0.25% v/v + 1% w/v	99	79	99	99	99	99	149
Harness Xtra / Roundup PowerMAX + AMS	1.25 qt / 22 fl oz + 1% w/v	99	99	99	99	98	98	111
SureStart / Durango DMA + AMS	1.75 pt / 24 fl oz + 1% w/v	99	99	96	99	99	97	136
POST I								
Touchdown Total + Callisto + AMS	24 fl oz / 3 fl oz + 8.5 lb/100 gal	0	0	99	99	99	98	123
Touchdown Total + Impact + AMS	24 fl oz / 0.5 fl oz + 8.5 lb/100 gal	0	0	99	98	96	95	83
Touchdown Total + Laudis + AMS	24 fl oz / 3 fl oz + 8.5 lb/100 gal	0	0	99	99	98	98	119
Touchdown Total + Status + AMS	24 fl oz / 2.4 oz wt + 8.5 lb/100 gal	0	0	99	97	90	87	90
Halex GT + NIS + AMS	3.6 pt + 0.25% v/v + 1% w/v	0	0	99	99	99	99	112
Halex GT + Aatrex + NIS + AMS	3.6 pt + 1 pt + 0.25% v/v + 1% w/v	0	0	99	99	99	99	118
Roundup PowerMAX + AMS	22 fl oz + 1% w/v	0	0	98	94	77	74	75
SureStart + Durango DMA + AMS	1.75 pt + 24 fl oz + 1% w/v	0	0	99	99	98	97	159
Roundup PowerMAX + Laudis + AMS	22 fl oz + 3 fl oz + 1% w/v	0	0	99	99	99	99	140
Roundup PowerMAX + Status + AMS	22 fl oz + 2.5 oz wt + 1% w/v	0	0	99	98	92	91	98
Roundup PowerMAX + Impact + AMS	22 fl oz + 0.5 fl oz + 1% w/v	0	0	99	97	90	91	89
NorthStar + Halex GT + NIS + AMS	2.5 oz + 3.6 pt + 0.25% v/v + 1% w/v	0	0	99	99	99	99	142
NorthStar + Sequence + AMS	3 oz + 2.5 pt + 1% w/v	0	0	99	99	99	99	135
Steadfast Q (Rimsulfuron + Nicosulfuron + Isoxadifen-ethyl) + Impact + Aatrex + MSO + AMS	(0.75 oz wt + 0.5 oz wt + 0.25 oz wt) + 0.5 fl oz + 8.9 oz wt + 1% v/v + 1% w/v	0	0	99	99	99	99	132
Resolve Q (Rimsulfuron + Thifensulfuron + Isoxadifen-ethyl) + Aatrex + Roundup PowerMAX + AMS	(0.92 oz wt + 0.1 oz wt + 0.25 oz wt) + 8.9 oz wt + 22 fl oz + 1% w/v	0	0	99	99	99	99	123
Require Q (Rimsulfuron + Dicamba + Isoxadifen-ethyl) + Aatrex + Roundup PowerMAX + AMS	(1 oz wt + 2.75 oz wt + 0.25 oz wt) + 8.9 oz wt + 22 fl oz + 1% w/v	0	0	99	99	99	99	116
POST I / POST III								
Roundup PowerMAX + AMS / Roundup PowerMAX + AMS	22 fl oz + 1% w/v / 22 fl oz + 1% w/v	0	0	99	97	99	97	135
	LSD (P=0.10)	**5**	**3**	**1**	**1**	**2**	**3**	**26**

Table 3. Performance of herbicide systems for common waterhemp control in field corn on May 30, June 9 and 20, and July 1 and 28 at Rochester, MN, in 2008.

Treatment	Rate	Common Waterhemp Control					Yield
		5/30	6/9	6/20	7/1	7/28	
	(rate/A)			(%)			(bu/A)
Untreated Check		0	0	0	0	0	4
PRE / POST II							
Dual II Mag / Callisto + Aatrex + COC + AMS	1 pt / 3.0 fl oz + 8 fl oz + 1% v/v + 8.5 lb/100gal	88	99	98	98	99	105
Dual II Mag / Impact + Aatrex + COC + AMS	1 pt / 0.5 fl oz + 8 fl oz + 1% v/v + 8.5 lb/100 gal	87	98	98	98	95	83
Dual II Mag / Laudis + Aatrex + COC + AMS	1 pt / 3 fl oz + 8 fl oz + 1% v/v + 8.5 lb/100 gal	90	99	99	98	97	108
Dual II Mag / Status + COC + AMS	1 pt / 5 oz wt + 1% v/v + 8.5 lb/100 gal	88	99	98	96	96	108
Lumax / Touchdown Total + AMS	2 qt / 24 fl oz + 1% w/v	99	98	99	99	99	118
Lumax / Halex GT + NIS + AMS	1.5 qt / 3.6 pt + 0.25% v/v + 1% w/v	99	99	99	99	99	144
Bicep Lite II Magnum / Halex GT + NIS + AMS	1 qt / 3.6 pt + 0.25% v/v + 1% w/v	95	99	99	99	99	124
Aatrex / Halex GT + NIS + AMS	26 fl oz / 3.6 pt + 0.25% v/v + 1% w/v	0	99	99	99	99	149
Harness Xtra / Roundup PowerMAX + AMS	1.25 qt / 22 fl oz + 1% w/v	99	99	99	97	98	111
SureStart / Durango DMA + AMS	1.75 pt / 24 fl oz + 1% w/v	99	99	99	98	97	136
POST I							
Touchdown Total + Callisto + AMS	24 fl oz / 3 fl oz + 8.5 lb/100 gal	0	99	99	98	97	123
Touchdown Total + Impact + AMS	24 fl oz / 0.5 fl oz + 8.5 lb/100 gal	0	99	94	83	84	83
Touchdown Total + Laudis + AMS	24 fl oz / 3 fl oz + 8.5 lb/100 gal	0	99	98	94	93	119
Touchdown Total + Status + AMS	24 fl oz / 2.4 oz wt + 8.5 lb/100 gal	0	99	92	82	96	90
Halex GT + NIS + AMS	3.6 pt + 0.25% v/v + 1% w/v	0	98	98	98	99	112
Halex GT + Aatrex + NIS + AMS	3.6 pt + 1 pt + 0.25% v/v + 1% w/v	0	98	97	95	95	118
Roundup PowerMAX + AMS	22 fl oz + 1% w/v	0	98	89	73	75	75
SureStart + Durango DMA + AMS	1.75 pt + 24 fl oz + 1% w/v	0	99	97	94	92	159
Roundup PowerMAX + Laudis + AMS	22 fl oz + 3 fl oz + 1% w/v	0	96	98	94	92	140
Roundup PowerMAX + Status + AMS	22 fl oz + 2.5 oz wt + 1% w/v	0	97	96	82	97	98
Roundup PowerMAX + Impact + AMS	22 fl oz + 0.5 fl oz + 1% w/v	0	97	92	80	92	89
NorthStar + Halex GT + NIS + AMS	2.5 oz + 3.6 pt + 0.25% v/v + 1% w/v	0	98	99	98	97	142
NorthStar + Sequence + AMS	3 oz + 2.5 pt + 1% w/v	0	99	98	84	86	135
Steadfast Q (Rimsulfuron + Nicosulfuron + Isoxadifen-ethyl) + Impact + Aatrex + MSO + AMS	(0.75 oz wt + 0.5 oz wt + 0.25 oz wt) + 0.5 fl oz + 8.9 oz wt + 1% v/v + 1% w/v	0	83	95	84	82	132
Resolve Q (Rimsulfuron + Thifensulfuron + Isoxadifen-ethyl) + Aatrex + Roundup PowerMAX + AMS	(0.92 oz wt + 0.1 oz wt + 0.25 oz wt) + 8.9 oz wt + 22 fl oz + 1% w/v	0	95	96	84	82	123
Require Q (Rimsulfuron + Dicamba + Isoxadifen-ethyl) + Aatrex + Roundup PowerMAX + AMS	(1 oz wt + 2.75 oz wt + 0.25 oz wt) + 8.9 oz wt + 22 fl oz + 1% w/v	0	98	97	89	86	116
POST I / POST III							
Roundup PowerMAX + AMS / Roundup PowerMAX + AMS	22 fl oz + 1% w/v / 22 fl oz + 1% w/v	0	97	91	99	98	135
	LSD (P=0.10)	**2**	**2**	**2**	**3**	**5**	**26**

Table 4. Performance of herbicide systems for giant foxtail control in field corn on May 22 and 30, June 9 and 20, and July 1 and 28] at Rochester, MN, in 2008.

Treatment	Rate	Giant Foxtail Control						Yield
		5/24	5/30	6/9	6/20	7/1	7/28	
	(rate/A)	(%)						(bu/A)
Untreated Check		0	0	0	0	0	0	4
PRE / POST II								
Dual II Mag / Callisto + Aatrex + COC + AMS	1 pt / 0.5 fl oz + 8 fl oz + 1% v/v + 8.5 lb/100gal	98	96	99	98	97	95	105
Dual II Mag / Impact + Aatrex + COC + AMS	1 pt / 0.5 fl oz + 8 fl oz + 1% v/v + 8.5 lb/100 gal	98	95	99	98	98	95	83
Dual II Mag / Laudis + Aatrex + COC + AMS	1 pt / 3 fl oz + 8 fl oz + 1% v/v + 8.5 lb/100 gal	98	96	99	99	99	99	108
Dual II Mag / Status + COC + AMS	1 pt / 5 oz wt + 1% v/v + 8.5 lb/100 gal	98	96	99	98	98	94	108
Lumax / Touchdown Total + AMS	2 qt / 24 fl oz + 1% w/v	99	96	98	93	99	99	118
Lumax / Halex GT + NIS + AMS	1.5 qt / 3.6 pt + 0.25% v/v + 1% w/v	99	96	98	94	99	99	144
Bicep Lite II Magnum / Halex GT + NIS + AMS	1 qt / 3.6 pt + 0.25% v/v + 1% w/v	99	97	99	99	99	99	124
Aatrex / Halex GT + NIS + AMS	26 fl oz / 3.6 pt + 0.25% v/v + 1% w/v	0	4	99	99	99	96	149
Harness Xtra / Roundup PowerMAX + AMS	1.25 qt / 22 fl oz + 1% w/v	99	98	99	99	99	96	111
SureStart / Durango DMA + AMS	1.75 pt / 24 fl oz + 1% w/v	99	98	98	99	99	98	136
POST I								
Touchdown Total + Callisto + AMS	24 fl oz / 3 fl oz + 8.5 lb/100 gal	0	0	99	95	94	89	123
Touchdown Total + Impact + AMS	24 fl oz / 0.5 fl oz + 8.5 lb/100 gal	0	0	99	96	97	93	83
Touchdown Total + Laudis + AMS	24 fl oz / 3 fl oz + 8.5 lb/100 gal	0	0	99	97	97	92	119
Touchdown Total + Status + AMS	24 fl oz / 2.4 oz wt + 8.5 lb/100 gal	0	0	99	98	97	94	90
Halex GT + NIS + AMS	3.6 pt + 0.25% v/v + 1% w/v	0	0	99	99	97	97	112
Halex GT + Aatrex + NIS + AMS	3.6 pt + 1 pt + 0.25% v/v + 1% w/v	0	0	99	99	98	94	118
Roundup PowerMAX + AMS	22 fl oz + 1% w/v	0	0	99	95	93	81	75
SureStart + Durango DMA + AMS	1.75 pt + 24 fl oz + 1% w/v	0	0	99	99	98	96	159
Roundup PowerMAX + Laudis + AMS	22 fl oz + 3 fl oz + 1% w/v	0	0	99	98	98	94	140
Roundup PowerMAX + Status + AMS	22 fl oz + 2.5 oz wt + 1% w/v	0	0	99	96	95	92	98
Roundup PowerMAX + Impact + AMS	22 fl oz + 0.5 fl oz + 1% w/v	0	0	99	94	93	88	89
NorthStar + Halex GT + NIS + AMS	2.5 oz + 3.6 pt + 0.25% v/v + 1% w/v	0	0	99	99	98	94	142
NorthStar + Sequence + AMS	3 oz + 2.5 pt + 1% w/v	0	0	99	99	98	97	135
Steadfast Q (Rimsulfuron + Nicosulfuron + Isoxadifen-ethyl) + Impact + Aatrex + MSO + AMS	(0.75 oz wt + 0.5 oz wt + 0.25 oz wt) + 0.5 fl oz + 8.9 oz wt + 1% v/v + 1% w/v	0	0	98	97	97	95	132
Resolve Q (Rimsulfuron + Thifensulfuron + Isoxadifen-ethyl) + Aatrex + Roundup PowerMAX + AMS	(0.92 oz wt + 0.1 oz wt + 0.25 oz wt) + 8.9 oz wt + 22 fl oz + 1% w/v	0	0	99	97	97	97	123
Require Q (Rimsulfuron + Dicamba + Isoxadifen-ethyl) + Aatrex + Roundup PowerMAX + AMS	(1 oz wt + 2.75 oz wt + 0.25 oz wt) + 8.9 oz wt + 22 fl oz + 1% w/v	0	0	98	99	98	96	116
POST I / POST III								
Roundup PowerMAX + AMS / Roundup PowerMAX + AMS	22 fl oz + 1% w/v / 22 fl oz + 1% w/v	0	0	99	95	99	99	135
	LSD (P=0.10)	**1**	**2**	**1**	**3**	**2**	**4**	**26**

Weed Management in field corn at Rochester, MN, in 2008.

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The objective of this trial was to evaluate herbicide systems for weed control in field corn in southeastern Minnesota. The research site was a Lawler loam series with a pH of 7.3, organic matter of 2.6% and soil test P and K levels of 64 ppm and 226 ppm, respectively. Spring fertilizer was broadcast ahead of planting on April 16, at a rate of 120-36-86-28 (N-P-K-S). The area was side dressed with an additional 35 b/A of N on June 25. The field was fall chisel plowed and spring disked once and field cultivated once prior to planting. The corn hybrid, Pioneer 37Y14LLRR2, was planted on May 12, 2008, at a depth of 2.0 inches in 30 inch rows at 35,000 seeds per acre. A randomized complete block design was used with four replications. Preemergence (PRE) and postemergence (POST) treatments were applied with a tractor-mounted sprayer delivering 20 gpa at 32 psi using Turbo Tee 11002 nozzles. Evaluations of the plots were taken on June 4, 9, 23, July 1, and August 4. Application dates, environmental conditions, and weed stages are listed below. The center two rows of each plot were machine harvested on November 3, 2008. (University of Minnesota Extension, Regional Office – Rochester, Southern Research and Outreach Center – Waseca, and Southwest Research and Outreach Center – Lamberton, MN).

Date	**5/12**	**6/2**	**6/10**	**6/23**
Treatment	PRE	POST I	POST II	POST III
Temperature (F)				
Air	61	28	65	78
soil	57	61	62	85
Relative Humidity (%)	42	84	67	40
Wind (mph)	18	7	12	3
Soil moisture	Adequate	Excessive	Excessive	Inadequate
Corn				
stage		V3	4-Collar	7-collar
height (inch)		3.5	8.0	16.6
Giant Ragweed				
weed density (ft^2)		9.9	9.9	9.9
height (inch)		2.5	5.8	4.6
Common Lambsquarters				
weed density (ft^2)		2..8	2.8	2.8
height (inch)		1.0	1.6	2.1
Common Waterhemp				
weed density (ft^2)		3.0	3.0	3.0
height (inch)		0.3	1.0	2.5
Giant foxtail				
weed density (ft^2)		7.0	7.0	7.0
height (inch)		0.9	2.1	2.8
Rainfall after each application (inch)				
week 1	0.24	4.79	3.52	0.76
week 2	0.19	3.52	0.00	0.87
week 3	2.29	0.00	0.76	0.92

Table 1. Performance of herbicide systems for giant ragweed control in field corn on June 4, 9, 23, July 1 and August 4 at Rochester, MN, in 2008.

Treatment	Rate	Giant Ragweed Control					Yield
		6/4	6/9	6/23	7/1	8/4	
	(rate/A)			(%)			(bu/A)
PRE							
Corvus	5.6 oz	6	25	46	45	43	48
PRE/POST I							
Dual II Magnum/ Halex GT + Atrazine + NIS + N-Pa-K AMS	1 pt/ 3.6 pt + 16 oz + 0.25% v/v + 3 qt	1	94	98	98	96	125
PRE/POST II							
Balance Flexx/ Laudis + MSO + 28% N	3 oz/ 3 oz + 1% v/v + 1.5 qt	3	23	99	99	88	147
Harness/ Ignite + N-Pa-K AMS	1.75 pt/ 22 oz + 2 qt	11	11	94	90	96	117
Harness/ Laudis + MSO + 28% N	1.75 pt/ 3 oz +1% v/v + 1.5 qt	10	5	98	99	83	113
BreakFree/ Resolve Q (Rimsulfuron + Thifensulfuron + isoxadifen) + Atrazine + Roundup PowerMax + N-Pa-K AMS	1 pt/ 1.25 oz (0.92 oz + 0.1 oz + 0.23 oz) + 16 oz + 22 oz + 3 qt	8	2	98	97	97	123
Harness/ Roundup WeatherMax + N-Pa-K AMS	1.25 pt/ 22 oz + 3 qt	5	2	97	93	96	133
Lumax/ Touchdown Total + N-Pa-K AMS	3 pt/ 24 oz + 3 qt	39	86	97	96	96	130
SureStart/ Durango + N-Pa-K AMS	1.75 pt/ 24 oz + 3 qt	18	36	97	95	94	133
SureStart/ Durango + N-Pa-K AMS	2 pt/ 24 oz + 3 qt	23	40	96	93	94	128
SureStart + Atrazine/ Durango + N-Pa-K AMS	2 pt + 2 pt/ 24 oz + 3 qt	44	80	95	93	97	145
Outlook/ Roundup WeatherMax + N-Pa-K AMS	12 oz/ 22 oz + 3 qt	0	0	96	93	93	123
Outlook/ Roundup WeatherMax + Status + N-Pa-K AMS	12 oz/ 22 oz + 2.5 oz + 3 qt	1	4	97	96	95	115
Harness/ Impact + Atrazine + MSO + 28% N	1.75 pt/ 0.5 oz + 24 oz + 1% v/v + 2.5% v/v	13	13	99	97	93	125
Harness/ Impact + Atrazine + Roundup WeatherMax + N-Pa-K AMS	1.25 pt/ 0.5 oz + 16 oz + 22 oz + 3 qt	5	8	98	96	95	127
POST I							
SureStart + Durango + N-Pa-K AMS	1.75 pt + 24 oz + 3 qt	0	95	94	88	97	119
Halex GT + Atrazine + NIS + N-Pa-K AMS	3.6 pt + 16 oz + 0.25% v/v + 3 qt	0	92	96	96	95	121
POST I/POST III							
Roundup WeatherMax + N-Pa-K AMS/ Roundup WeatherMax + N-Pa-K AMS	22 oz + 3 qt/ 22 oz + 3 qt	0	95	82	99	98	132
POST II							
Require Q (Rimsulfuron + Dicamba + Isoxadifen-ethyl) + Atrazine + Roundup PowerMax + N-Pa-K AMS	4 oz (1 oz + 2.75 oz + 0.25 oz) + 16 oz + 22 oz + 3 qt	0	0	99	99	96	108
Resolve Q (Rimsulfuron + Thifensulfuron + Isoxadifen-ethyl) + Callisto + Roundup PowerMax + N-Pa-K AMS	1.25 oz (0.92 oz + 0.1 oz + 0.23 oz) + 1 oz + 16 oz + 3 qt	0	0	99	98	98	128
Steadfast Q (Rimsulfuron + Nicosulfuron + Isoxadifen-ethyl) + Impact + Atrazine + MSO + N-Pa-K	1.5 oz (0.75 oz + 0.5 oz + 0.25 oz) + 0.5 oz + 16 oz + 1% v/v + 3 qt	0	0	98	95	93	100
Resolve Q ((Rimsulfuron + Thifensulfuron + Isoxadifen-ethyl) + Atrazine + Roundup PowerMax + N-Pa-K AMS	1.25 oz (0.92 oz + 0.1 oz + 0.23 oz) + 16 oz + 22 oz + 3 qt	0	0	98	97	96	137
Weedy Check		0	0	0	0	0	11
Weed Free		100	100	100	100	100	143
	LSD (P=0.10)	**9**	**7**	**2**	**2**	**3**	**43**

Table 2. Performance of herbicide systems for common lambsquarter control in field corn on June 4, 9, 23, July 1 and August 4] at Rochester, MN, in 2008.

Treatment	Rate	Common Lambsquarter Control					Yield
		6/4	6/9	6/23	7/1	8/4	
	(rate/A)	(%)					(bu/A)
PRE							
Corvus	5.6 oz	16	60	56	59	50	48
PRE/POST I							
Dual II Magnum/ Halex GT + Atrazine + NIS + N-Pa-K AMS	1 pt/ 3.6 pt + 16 oz + 0.25% v/v + 3 qt	3	99	99	99	99	125
PRE/POST II							
Balance Flexx/ Laudis + MSO + 28% N	3 oz/ 3 oz + 1% v/v + 1.5 qt	5	41	99	98	97	147
Harness/ Ignite + N-Pa-K AMS	1.75 pt/ 22 oz + 2 qt	20	0	94	89	87	117
Harness/ Laudis + MSO + 28% N	1.75 pt/ 3 oz +1% v/v + 1.5 qt	14	0	99	97	92	113
BreakFree/ Resolve Q (Rimsulfuron + Thifensulfuron + isoxadifen) + Atrazine + Roundup PowerMax + N-Pa-K AMS	1 pt/ 1.25 oz (0.92 oz + 0.1 oz + 0.23 oz) + 16 oz + 22 oz + 3 qt	3	0	99	99	99	123
Harness/ Roundup WeatherMax + N-Pa-K AMS	1.25 pt/ 22 oz + 3 qt	9	0	99	95	94	133
Lumax/ Touchdown Total + N-Pa-K AMS	3 pt/ 24 oz + 3 qt	60	99	99	99	99	130
SureStart/ Durango + N-Pa-K AMS	1.75 pt/ 24 oz + 3 qt	19	3	99	98	97	133
SureStart/ Durango + N-Pa-K AMS	2 pt/ 24 oz + 3 qt	25	9	99	98	96	128
SureStart + Atrazine/ Durango + N-Pa-K AMS	2 pt + 2 pt/ 24 oz + 3 qt	81	98	99	99	99	145
Outlook/ Roundup WeatherMax + N-Pa-K AMS	12 oz/ 22 oz + 3 qt	0	0	97	83	85	123
Outlook/ Roundup WeatherMax + Status + N-Pa-K AMS	12 oz/ 22 oz + 2.5 oz + 3 qt	3	0	99	98	95	115
Harness/ Impact + Atrazine + MSO + 28% N	1.75 pt/ 0.5 oz + 24 oz + 1% v/v + 2.5% v/v	16	0	98	98	97	125
Harness/ Impact + Atrazine + Roundup WeatherMax + N-Pa-K AMS	1.25 pt/ 0.5 oz + 16 oz + 22 oz + 3 qt	5	0	99	98	98	127
POST I							
SureStart + Durango + N-Pa-K AMS	1.75 pt + 24 oz + 3 qt	0	99	99	99	98	119
Halex GT + Atrazine + NIS + N-Pa-K AMS	3.6 pt + 16 oz + 0.25% v/v + 3 qt	0	99	99	99	99	121
POST I/POST III							
Roundup WeatherMax + N-Pa-K AMS/ Roundup WeatherMax + N-Pa-K AMS	22 oz + 3 qt/ 22 oz + 3 qt	0	99	79	96	94	132
POST II							
Require Q (Rimsulfuron + Dicamba + Isoxadifen-ethyl) + Atrazine + Roundup PowerMax + N-Pa-K AMS	4 oz (1 oz + 2.75 oz + 0.25 oz) + 16 oz + 22 oz + 3 qt	0	0	99	99	99	108
Resolve Q (Rimsulfuron + Thifensulfuron + Isoxadifen-ethyl) + Callisto + Roundup PowerMax + N-Pa-K AMS	1.2 oz (0.92 oz + 0.1 oz + 0.23 oz) + 1 oz + 16 oz + 3 qt	0	0	99	99	99	128
Steadfast Q (Rimsulfuron + Nicosulfuron + Isoxadifen-ethyl) + Impact + Atrazine + MSO + N-Pa-K	1.5 oz (0.75 oz + 0.5 oz + 0.25 oz) + 0.5 oz + 16 oz + 1% v/v + 3 qt	0	0	99	98	97	100
Resolve Q ((Rimsulfuron + Thifensulfuron + Isoxadifen-ethyl) + Atrazine + Roundup PowerMax + N-Pa-K AMS	1.25 oz (0.92 oz + 0.1 oz + 0.23 oz) + 16 oz + 22 oz + 3 qt	0	0	99	99	97	137
Weedy Check		0	0	0	0	0	11
Weed Free		100	100	100	100	100	143
	LSD (P=0.10)	**10**	**3**	**2**	**2**	**3**	**43**

Table 3. Performance of herbicide systems for common waterhemp control in field corn on June 4, 9, 23, July 1 and August 4 at Rochester, MN, in 2008.

Treatment	Rate	Common Waterhemp Control					Yield
		6/4	6/9	6/23	7/1	8/4	
	(rate/A)	(%)					(bu/A)
PRE							
Corvus	5.6 oz	0	55	58	59	50	48
PRE/POST I							
Dual II Magnum/ Halex GT + Atrazine + NIS + N-Pa-K AMS	1 pt/ 3.6 pt + 16 oz + 0.25% v/v + 3 qt	3	99	99	98	99	125
PRE/POST II							
Balance Flexx/ Laudis + MSO + 28% N	3 oz/ 3 oz + 1% v/v + 1.5 qt	3	0	99	95	95	147
Harness/ Ignite + N-Pa-K AMS	1.75 pt/ 22 oz + 2 qt	23	99	99	96	97	117
Harness/ Laudis + MSO + 28% N	1.75 pt/ 3 oz +1% v/v + 1.5 qt	14	99	99	97	98	113
BreakFree/ Resolve Q (Rimsulfuron + Thifensulfuron + isoxadifen) + Atrazine + Roundup PowerMax + N-Pa-K AMS	1 pt/ 1.25 oz (0.92 oz + 0.1 oz + 0.23 oz) + 16 oz + 22 oz + 3 qt	3	99	99	97	97	123
Harness/ Roundup WeatherMax + N-Pa-K AMS	1.25 pt/ 22 oz + 3 qt	9	99	99	96	96	133
Lumax/ Touchdown Total + N-Pa-K AMS	3 pt/ 24 oz + 3 qt	59	99	99	98	99	130
SureStart/ Durango + N-Pa-K AMS	1.75 pt/ 24 oz + 3 qt	19	99	99	97	96	133
SureStart/ Durango + N-Pa-K AMS	2 pt/ 24 oz + 3 qt	25	99	99	95	96	128
SureStart + Atrazine/ Durango + N-Pa-K AMS	2 pt + 2 pt/ 24 oz + 3 qt	83	94	99	97	98	145
Outlook/ Roundup WeatherMax + N-Pa-K AMS	12 oz/ 22 oz + 3 qt	0	0	99	96	95	123
Outlook/ Roundup WeatherMax + Status + N-Pa-K AMS	12 oz/ 22 oz + 2.5 oz + 3 qt	3	0	99	96	95	115
Harness/ Impact + Atrazine + MSO + 28% N	1.75 pt/ 0.5 oz + 24 oz + 1% v/v + 2.5% v/v	19	99	99	98	96	125
Harness/ Impact + Atrazine + Roundup WeatherMax + N-Pa-K AMS	1.25 pt/ 0.5 oz + 16 oz + 22 oz + 3 qt	5	0	99	96	98	127
POST I							
SureStart + Durango + N-Pa-K AMS	1.75 pt + 24 oz + 3 qt	0	99	99	97	98	119
Halex GT + Atrazine + NIS + N-Pa-K AMS	3.6 pt + 16 oz + 0.25% v/v + 3 qt	0	99	99	98	99	121
POST I/POST III							
Roundup WeatherMax + N-Pa-K AMS/ Roundup WeatherMax + N-Pa-K AMS	22 oz + 3 qt/ 22 oz + 3 qt	0	99	80	99	99	132
POST II							
Require Q (Rimsulfuron + Dicamba + Isoxadifen-ethyl) + Atrazine + Roundup PowerMax + N-Pa-K AMS	4 oz (1 oz + 2.75 oz + 0.25 oz) + 16 oz + 22 oz + 3 qt	0	0	99	98	97	108
Resolve Q (Rimsulfuron + Thifensulfuron + Isoxadifen-ethyl) + Callisto + Roundup PowerMax + N-Pa-K AMS	1.2 oz (0.92 oz + 0.1 oz + 0.23 oz) + 1 oz + 16 oz + 3 qt	0	0	99	97	97	128
Steadfast Q (Rimsulfuron + Nicosulfuron + Isoxadifen-ethyl) + Impact + Atrazine + MSO + N-Pa-K	1.5 oz (0.75 oz + 0.5 oz + 0.25 oz) + 0.5 oz + 16 oz + 1% v/v + 3 qt	0	0	98	94	94	100
Resolve Q ((Rimsulfuron + Thifensulfuron + Isoxadifen-ethyl) + Atrazine + Roundup PowerMax + N-Pa-K AMS	1.25 oz (0.92 oz + 0.1 oz + 0.23 oz) + 16 oz + 22 oz + 3 qt	0	0	99	93	93	137
Weedy Check		0	0	0	0	0	11
Weed Free		100	100	100	100	100	143
	LSD (P=0.10)	**10**	**3**	**2**	**2**	**2**	**43**

Table 4. Performance of herbicide systems for giant foxtail control in field corn on June 4, 9, 23, July 1 and August 4 at Rochester, MN, in 2008.

Treatment	Rate	Grass Control					Yield
		6/4	6/9	6/23	7/1	8/4	
	(rate/A)	(%)					(bu/A)
PRE							
Corvus	5.6 oz	6	63	65	64	54	48
PRE/POST I							
Dual II Magnum/ Halex GT + Atrazine + NIS + N-Pa-K AMS	1 pt/ 3.6 pt + 16 oz + 0.25% v/v + 3 qt	11	99	99	99	98	125
PRE/POST II							
Balance Flexx/ Laudis + MSO + 28% N	3 oz/ 3 oz + 1% v/v + 1.5 qt	10	51	99	97	88	147
Harness/ Ignite + N-Pa-K AMS	1.75 pt/ 22 oz + 2 qt	11	99	99	99	96	117
Harness/ Laudis + MSO + 28% N	1.75 pt/ 3 oz +1% v/v + 1.5 qt	21	99	94	93	83	113
BreakFree/ Resolve Q (Rimsulfuron + Thifensulfuron + isoxadifen) + Atrazine + Roundup PowerMax + N-Pa-K AMS	1 pt/ 1.25 oz (0.92 oz + 0.1 oz + 0.23 oz) + 16 oz + 22 oz + 3 qt	8	99	99	99	97	123
Harness/ Roundup WeatherMax + N-Pa-K AMS	1.25 pt/ 22 oz + 3 qt	5	99	99	99	96	133
Lumax/ Touchdown Total + N-Pa-K AMS	3 pt/ 24 oz + 3 qt	28	60	99	98	96	130
SureStart/ Durango + N-Pa-K AMS	1.75 pt/ 24 oz + 3 qt	8	99	99	99	94	133
SureStart/ Durango + N-Pa-K AMS	2 pt/ 24 oz + 3 qt	13	99	99	98	94	128
SureStart + Atrazine/ Durango + N-Pa-K AMS	2 pt + 2 pt/ 24 oz + 3 qt	41	97	99	99	97	145
Outlook/ Roundup WeatherMax + N-Pa-K AMS	12 oz/ 22 oz + 3 qt	0	0	99	99	93	123
Outlook/ Roundup WeatherMax + Status + N-Pa-K AMS	12 oz/ 22 oz + 2.5 oz + 3 qt	3	0	99	98	95	115
Harness/ Impact + Atrazine + MSO + 28% N	1.75 pt/ 0.5 oz + 24 oz + 1% v/v + 2.5% v/v	10	99	98	96	93	125
Harness/ Impact + Atrazine + Roundup WeatherMax + N-Pa-K AMS	1.25 pt/ 0.5 oz + 16 oz + 22 oz + 3 qt	6	99	99	99	93	127
POST I							
SureStart + Durango + N-Pa-K AMS	1.75 pt + 24 oz + 3 qt	0	99	99	99	98	119
Halex GT + Atrazine + NIS + N-Pa-K AMS	3.6 pt + 16 oz + 0.25% v/v + 3 qt	0	99	99	98	97	121
POST I/POST III							
Roundup WeatherMax + N-Pa-K AMS/ Roundup WeatherMax + N-Pa-K AMS	22 oz + 3 qt/ 22 oz + 3 qt	0	99	80	99	98	132
POST II							
Require Q (Rimsulfuron + Dicamba + Isoxadifen-ethyl) + Atrazine + Roundup PowerMax + N-Pa-K AMS	4 oz (1 oz + 2.75 oz + 0.25 oz) + 16 oz + 22 oz + 3 qt	0	0	99	99	96	108
Resolve Q (Rimsulfuron + Thifensulfuron + Isoxadifen-ethyl) + Callisto + Roundup PowerMax + N-Pa-K AMS	1.2 oz (0.92 oz + 0.1 oz + 0.23 oz) + 1 oz + 16 oz + 3 qt	0	0	99	99	97	128
Steadfast Q (Rimsulfuron + Nicosulfuron + Isoxadifen-ethyl) + Impact + Atrazine + MSO + N-Pa-K	1.5 oz (0.75 oz + 0.5 oz + 0.25 oz) + 0.5 oz + 16 oz + 1% v/v + 3 qt	0	0	96	97	94	100
Resolve Q ((Rimsulfuron + Thifensulfuron + Isoxadifen-ethyl) + Atrazine + Roundup PowerMax + N-Pa-K AMS	1.25 oz (0.92 oz + 0.1 oz + 0.23 oz) + 16 oz + 22 oz + 3 qt	0	0	99	99	96	137
Weedy Check		0	0	0	0	0	11
Weed Free		100	100	100	100	100	143
	LSD (P=0.10)	**12**	**3**	**2**	**2**	**3**	**43**

2008 Corn Herbicide Evaluation - Waseca
Common ragweed Site

Herbicide	Rate	Giant foxtail	Common ragweed	Common lambsquarters	Velvetleaf	Redroot pigweed	H2O	Yield	Cost	Returns
	(product/A)	(% control)					(%)	(bu/A)	($/A)	($/A)
Preemergence										
Corvus	**5.6 oz**	**94**	**99**	**99**	**99**	**99**	**21.9**	**167**	**n/a**	
Preemergence/POST I (V2 corn)										
Dual II Magnum / Halex GT + atrazine + NIS + AMS	1 pt / 3.6 pt + 16 oz + 0.25% + 3 qt	94	97	99	99	99	20.4	184	61.97	623
Preemergence/POST III (V4 corn)										
Balance Flexx / Laudis + MSO + 28%	3 oz / 3 oz + 1% + 1.5 qt	97	99	99	99	99	20.0	177	n/a	
Harness / Ignite + AMS	1.75 pt / 22 oz + 2 qt	96	98	99	99	99	21.1	188	45.60	649
Harness / Laudis + MSO + 28%	1.75 pt / 3 oz + 1% + 1.5 qt	93	95	99	99	99	22.5	184	50.34	615
Breakfree / Resolve Q + atrazine + Roundup PowerMax + AMS	1 pt / 1.25 oz + 16 oz + 22 oz + 3 qt	93	97	99	99	99	20.0	178	54.57	611
Harness / Roundup WeatherMax + AMS	1.25 pt / 22 oz + 3 qt	94	96	99	99	99	21.1	163	49.37	550
Lumax / Touchdown Total + AMS	3 pt / 24 oz + 3 qt	93	99	99	99	99	20.2	174	56.20	592
SureStart / Durango + AMS	1.75 pt / 24 oz + 3 qt	95	98	99	99	99	20.0	177	47.27	617
SureStart / Durango + AMS	2 pt / 24 oz + 3 qt	94	97	99	99	99	19.7	180	49.20	626
SureStart + atrazine / Durango + AMS	2 pt + 2 pt / 24 oz + 3 qt	92	96	98	99	99	22.0	164	51.79	548
Outlook / Roundup WeatherMax + AMS	12 oz / 22 oz + 3 qt	94	95	99	99	99	19.4	171	51.13	594
Outlook / Roundup WeatherMax + Status + AMS	12 oz / 22 oz + 2.5 oz + 3 qt	91	99	99	99	99	21.7	178	54.47	597
Harness / Impact + atrazine + MSO + 28%	1.75 pt / 0.5 oz + 24 oz + 1% + 2.5%	92	93	99	99	99	21.0	161	49.81	544
Harness / Impact + atrazine + Roundup WeatherMax + AMS	1.25 pt / 0.5 oz + 16 oz + 22 oz + 3 qt	95	93	99	99	99	20.3	185	59.95	628
POST I (1" Weeds) / POST IV (4" weeds)										
Roundup WeatherMax + AMS / Roundup WeatherMax + AMS	22 oz + 3 qt / 22 oz + 3 qt	99	99	99	99	99	21.1	171	50.60	581
POST I (V2 corn)										
SureStart + Durango + AMS	1.75 pt + 24 oz + 3 qt	83	85	89	99	99	21.2	169	40.27	582
Halex GT + atrazine + NIS + AMS	3.6 pt + 16 oz + 0.25% + 3 qt	96	97	99	98	99	19.6	178	42.27	625
POST II (V3 corn)										
Require Q + atrazine + Roundup PowerMax + AMS	4 oz + 16 oz + 22 oz + 3 qt	94	98	99	99	99	20.7	184	42.09	638
Resolve Q + Callisto + Roundup PowerMax + AMS	1.25 oz + 1 oz + 16 oz + 3 qt	91	93	99	99	99	20.8	171	39.80	593
Steadfast Q + Impact + atrazine + MSO + AMS	1.5 oz + 0.5 oz + 16 oz + 1% + 3 qt	86	92	99	99	99	20.6	164	n/a	
Resolve Q + atrazine + Roundup PowerMax + AMS	1.25 oz + 16 oz + 22 oz + 3 qt	91	94	99	99	99	20.7	179	38.59	624
Checks										
Weedy Check	-	0	0	0	0	0	22.4	69	0	248
Weed-Free Check	-	100	100	100	100	100	20.8	173	0	642
	LSD (0.10)	**6**	**7**	**5**	**1**	**1**	**ns**	**20**		**74**

2008 Corn Herbicide Evaluation - Waseca
Common cocklebur Site

Herbicide	Rate	Giant foxtail	Common cocklebur	Common ragweed	H2O	Yield	Cost	Returns
	(product/A)		(% control)		(%)	(bu/A)	($/A)	($/A)
Preemergence								
Corvus	5.6 oz	94	72	95	20.3	171	n/a	
Preemergence/POST I (V2 corn)								
Dual II Magnum / Halex GT + atrazine + NIS + AMS	1 pt / 3.6 pt + 16 oz + 0.25% + 3 qt	99	75	98	19.7	178.1	61.97	608
Preemergence/POST III (V4 corn)								
Balance Flexx / Laudis + MSO + 28%	3 oz / 3 oz + 1% + 1.5 qt	99	93	99	20.8	196.5	n/a	
Harness / Ignite + AMS	1.75 pt / 22 oz + 2 qt	99	88	99	19.7	188.4	45.60	663
Harness / Laudis + MSO + 28%	1.75 pt / 3 oz + 1% + 1.5 qt	98	91	99	19.9	186	50.34	647
Breakfree / Resolve Q + atrazine + Roundup PowerMax + AMS	1 pt / 1.25 oz + 16 oz + 22 oz + 3 qt	98	90	94	19.5	190.2	54.57	662
Harness / Roundup WeatherMax + AMS	1.25 pt / 22 oz + 3 qt	99	93	97	20.4	178.3	49.37	615
Lumax / Touchdown Total + AMS	3 pt / 24 oz + 3 qt	98	92	97	19.3	199.8	56.20	698
SureStart / Durango + AMS	1.75 pt / 24 oz + 3 qt	99	98	99	18.5	195	47.27	697
SureStart / Durango + AMS	2 pt / 24 oz + 3 qt	99	91	95	19.2	192.5	49.20	679
SureStart + atrazine / Durango + AMS	2 pt + 2 pt / 24 oz + 3 qt	98	94	95	19.2	178.4	51.79	624
Outlook / Roundup WeatherMax + AMS	12 oz / 22 oz + 3 qt	98	98	96	18.4	197.3	51.13	702
Outlook / Roundup WeatherMax + Status + AMS	12 oz / 22 oz + 2.5 oz + 3 qt	98	90	96	20.6	191.5	54.47	663
Harness / Impact + atrazine + MSO + 28%	1.75 pt / 0.5 oz + 24 oz + 1% + 2.5%	99	97	97	20.1	192.5	49.81	670
Harness / Impact + atrazine + Roundup WeatherMax + AMS	1.25 pt / 0.5 oz + 16 oz + 22 oz + 3 qt	99	96	96	19.1	191.7	59.95	666
POST I (1" Weeds) / POST IV (4" weeds)								
Roundup WeatherMax + AMS / Roundup WeatherMax + AMS	22 oz + 3 qt / 22 oz + 3 qt	99	99	99	18.2	194.6	50.60	695
POST I (V2 corn)								
SureStart + Durango + AMS	1.75 pt + 24 oz + 3 qt	97	91	92	19.1	190.6	40.27	682
Halex GT + atrazine + NIS + AMS	3.6 pt + 16 oz + 0.25% + 3 qt	99	94	99	20.4	191.9	42.27	672
POST II (V3 corn)								
Require Q + atrazine + Roundup PowerMax + AMS	4 oz + 16 oz + 22 oz + 3 qt	98	95	99	18.9	191.3	42.09	684
Resolve Q + Callisto + Roundup PowerMax + AMS	1.25 oz + 1 oz + 16 oz + 3 qt	98	98	92	18.8	192.1	39.80	690
Steadfast Q + Impact + atrazine + MSO + AMS	1.5 oz + 0.5 oz + 16 oz + 1% + 3 qt	95	93	89	20.1	173.2	n/a	
Resolve Q + atrazine + Roundup PowerMax + AMS	**1.25 oz + 16 oz + 22 oz + 3 qt**	**98**	**97**	**92**	**18.9**	**194**	**38.59**	**698**
Checks								
Weedy Check	-	0	0	0	19.0	152.9	0	580
Weed-Free Check	-	100	100	100	19.0	190.8	0	723
	LSD (0.10)	**2**	**13**	**5**	**ns**	**20**		**71**

2008 Corn Herbicide Evaluation - Waseca
Giant ragweed Site

Herbicide	Rate (product/A)	Giant ragweed (% control)	H2O (%)	Yield (bu/A)	Cost ($/A)	Returns ($/A)
Preemergence						
Corvus	5.6 oz	39	18.4	78	n/a	
Preemergence/POST I (V2 corn)						
Dual II Magnum / Halex GT + atrazine + NIS + AMS	1 pt / 3.6 pt + 16 oz + 0.25% + 3 qt	48	18.9	97	61.97	306
Preemergence/POST III (V4 corn)						
Balance Flexx / Laudis + MSO + 28%	3 oz / 3 oz + 1% + 1.5 qt	91	21.3	174	n/a	
Harness / Ignite + AMS	1.75 pt / 22 oz + 2 qt	83	21.1	168	45.60	575
Harness / Laudis + MSO + 28%	1.75 pt / 3 oz + 1% + 1.5 qt	91	21.9	153	50.34	510
Breakfree / Resolve Q + atrazine + Roundup PowerMax + AMS	1 pt / 1.25 oz + 16 oz + 22 oz + 3 qt	85	22.8	159	54.57	518
Harness / Roundup WeatherMax + AMS	1.25 pt / 22 oz + 3 qt	87	21.3	172	49.37	584
Lumax / Touchdown Total + AMS	3 pt / 24 oz + 3 qt	91	19.7	189	56.20	653
SureStart / Durango + AMS	1.75 pt / 24 oz + 3 qt	93	20.6	177	47.27	609
SureStart / Durango + AMS	2 pt / 24 oz + 3 qt	90	20.0	177	49.20	614
SureStart + atrazine / Durango + AMS	2 pt + 2 pt / 24 oz + 3 qt	93	19.6	180	51.79	629
Outlook / Roundup WeatherMax + AMS	12 oz / 22 oz + 3 qt	85	22.6	170	51.13	565
Outlook / Roundup WeatherMax + Status + AMS	12 oz / 22 oz + 2.5 oz + 3 qt	87	23.7	159	54.47	513
Harness / Impact + atrazine + MSO + 28%	1.75 pt / 0.5 oz + 24 oz + 1% + 2.5%	89	21.6	172	49.81	583
Harness / Impact + atrazine + Roundup WeatherMax + AMS	1.25 pt / 0.5 oz + 16 oz + 22 oz + 3 qt	94	22.5	173	59.95	567
POST I (1" Weeds) / POST IV (4" weeds)						
Roundup WeatherMax + AMS / Roundup WeatherMax + AMS	22 oz + 3 qt / 22 oz + 3 qt	99	20.7	176	50.60	603
POST I (V2 corn)						
SureStart + Durango + AMS	1.75 pt + 24 oz + 3 qt	48	20.7	121	40.27	408
Halex GT + atrazine + NIS + AMS	3.6 pt + 16 oz + 0.25% + 3 qt	53	18.9	121	42.27	418
POST II (V3 corn)						
Require Q + atrazine + Roundup PowerMax + AMS	4 oz + 16 oz + 22 oz + 3 qt	95	22.3	174	42.09	590
Resolve Q + Callisto + Roundup PowerMax + AMS	1.25 oz + 1 oz + 16 oz + 3 qt	85	23.1	156	39.80	526
Steadfast Q + Impact + atrazine + MSO + AMS	1.5 oz + 0.5 oz + 16 oz + 1% + 3 qt	79	23.6	139	n/a	
Resolve Q + atrazine + Roundup PowerMax + AMS	1.25 oz + 16 oz + 22 oz + 3 qt	75	22.1	142	38.59	482
Checks						
Weedy Check	-	0	23.3	2	0	7
Weed-Free Check	-	100	20.7	174	0	645
	LSD (0.10)	**11**	**1.7**	**25**		**94**

2008 Corn Herbicide Evaluation - Waseca
Tall waterhemp Site

Herbicide	Rate	Giant foxtail	Tall waterhemp	Common lambsquarters	Velvetleaf	H2O	Yield	Cost	Returns
	(product/A)	(% control)				(%)	(bu/A)	($/A)	($/A)
Preemergence									
Corvus	5.6 oz	81	84	89	96	19.8	175	n/a	
Preemergence/POST I (V2 corn)									
Dual II Magnum / Halex GT + atrazine + NIS + AMS	1 pt / 3.6 pt + 16 oz + 0.25% + 3 qt	97	98	99	98	21.1	202	61.97	682
Preemergence/POST III (V4 corn)									
Balance Flexx / Laudis + MSO + 28%	3 oz / 3 oz + 1% + 1.5 qt	92	94	99	98	20.5	186	n/a	
Harness / Ignite + AMS	1.75 pt / 22 oz + 2 qt	92	86	93	96	20.7	193	45.60	671
Harness / Laudis + MSO + 28%	1.75 pt / 3 oz + 1% + 1.5 qt	82	97	99	98	19.6	191	50.34	670
Breakfree / Resolve Q + atrazine + Roundup PowerMax + AMS	1 pt / 1.25 oz + 16 oz + 22 oz + 3 qt	88	99	99	93	20.3	195	54.57	674
Harness / Roundup WeatherMax + AMS	1.25 pt / 22 oz + 3 qt	94	94	94	92	19.6	204	49.37	718
Lumax / Touchdown Total + AMS	3 pt / 24 oz + 3 qt	90	92	93	97	19.6	189	56.20	654
SureStart / Durango + AMS	1.75 pt / 24 oz + 3 qt	92	92	93	92	20.0	196	47.27	688
SureStart / Durango + AMS	2 pt / 24 oz + 3 qt	91	89	97	95	20.2	182	49.20	630
SureStart + atrazine / Durango + AMS	2 pt + 2 pt / 24 oz + 3 qt	92	95	97	92	19.8	193	51.79	675
Outlook / Roundup WeatherMax + AMS	12 oz / 22 oz + 3 qt	93	97	93	91	20.1	196	51.13	681
Outlook / Roundup WeatherMax + Status + AMS	12 oz / 22 oz + 2.5 oz + 3 qt	90	94	95	96	19.5	203	54.47	710
Harness / Impact + atrazine + MSO + 28%	1.75 pt / 0.5 oz + 24 oz + 1% + 2.5%	92	96	99	90	20.4	202	49.81	704
Harness / Impact + atrazine + Roundup WeatherMax + AMS	1.25 pt / 0.5 oz + 16 oz + 22 oz + 3 qt	91	97	97	97	19.8	188	59.95	645
POST I (1" Weeds) / POST IV (4" weeds)									
Roundup WeatherMax + AMS / Roundup WeatherMax + AMS	22 oz + 3 qt / 22 oz + 3 qt	99	99	99	99	19.9	210	50.60	736
POST I (V2 corn)									
SureStart + Durango + AMS	1.75 pt + 24 oz + 3 qt	94	97	98	92	19.8	212	40.27	757
Halex GT + atrazine + NIS + AMS	3.6 pt + 16 oz + 0.25% + 3 qt	91	99	99	99	20.2	192	42.27	676
POST II (V3 corn)									
Require Q + atrazine + Roundup PowerMax + AMS	4 oz + 16 oz + 22 oz + 3 qt	91	95	99	96	20.7	196	42.09	686
Resolve Q + Callisto + Roundup PowerMax + AMS	1.25 oz + 1 oz + 16 oz + 3 qt	90	84	93	99	20.6	196	39.80	689
Steadfast Q + Impact + atrazine + MSO + AMS	1.5 oz + 0.5 oz + 16 oz + 1% + 3 qt	90	90	99	94	19.6	208	n/a	
Resolve Q + atrazine + Roundup PowerMax + AMS	1.25 oz + 16 oz + 22 oz + 3 qt	90	95	99	99	20.4	198	38.59	701
Checks									
Weedy Check	-	0	0	0	0	19.6	104	0	390
Weed-Free Check	-	100	100	100	100	21.0	195	0	724
	LSD (0.10)	**5**	**8**	**5**	**8**	**ns**	**18**		**74**

2008 Corn Herbicide Evaluation - Lamberton

Herbicide	Rate	Yellow foxtail	Tall waterhemp	Common lambsquarters	H2O	Yield	Cost	Returns
	(product/A)		(% control)		(%)	(bu/A)	($/A)	($/A)
Preemergence								
Corvus	5.6 oz	75	97	98	20.2	187	n/a	
Preemergence/POST I (V2 corn)								
Dual II Magnum / Halex GT + atrazine + NIS + AMS	1 pt / 3.6 pt + 16 oz + 0.25% + 3 qt	90	92	97	20.1	191	61.97	651
Preemergence/POST III (V4 corn)								
Balance Flexx / Laudis + MSO + 28%	3 oz / 3 oz + 1% + 1.5 qt	86	95	97	18.0	188	n/a	
Harness / Ignite + AMS	1.75 pt / 22 oz + 2 qt	91	92	98	20.9	193	45.60	668
Harness / Laudis + MSO + 28%	1.75 pt / 3 oz + 1% + 1.5 qt	91	92	98	19.1	191	50.34	671
Breakfree / Resolve Q + atrazine + Roundup PowerMax + AMS	1 pt / 1.25 oz + 16 oz + 22 oz + 3 qt	88	88	98	18.5	185	54.57	651
Harness / Roundup WeatherMax + AMS	1.25 pt / 22 oz + 3 qt	91	90	97	18.0	174	49.37	619
Lumax / Touchdown Total + AMS	3 pt / 24 oz + 3 qt	90	89	98	20.1	189	56.20	652
SureStart / Durango + AMS	1.75 pt / 24 oz + 3 qt	90	91	98	18.9	184	47.27	651
SureStart / Durango + AMS	2 pt / 24 oz + 3 qt	91	91	97	19.4	176	49.20	616
SureStart + atrazine / Durango + AMS	2 pt + 2 pt / 24 oz + 3 qt	89	92	97	18.0	176	51.79	624
Outlook / Roundup WeatherMax + AMS	12 oz / 22 oz + 3 qt	90	85	97	18.2	179	51.13	634
Outlook / Roundup WeatherMax + Status + AMS	12 oz / 22 oz + 2.5 oz + 3 qt	90	84	97	17.9	184	54.47	653
Harness / Impact + atrazine + MSO + 28%	1.75 pt / 0.5 oz + 24 oz + 1% + 2.5%	93	97	98	17.6	186	49.81	666
Harness / Impact + atrazine + Roundup WeatherMax + AMS	1.25 pt / 0.5 oz + 16 oz + 22 oz + 3 qt	91	93	97	17.6	191	59.95	675
POST I (1" Weeds) / POST IV (4" weeds)								
Roundup WeatherMax + AMS / Roundup WeatherMax + AMS	22 oz + 3 qt / 22 oz + 3 qt	94	98	98	18.2	175	50.60	621
POST I (V2 corn)								
SureStart + Durango + AMS	1.75 pt + 24 oz + 3 qt	89	91	97	18.6	179	40.27	641
Halex GT + atrazine + NIS + AMS	3.6 pt + 16 oz + 0.25% + 3 qt	88	89	98	19.7	182	42.27	644
POST II (V3 corn)								
Require Q + atrazine + Roundup PowerMax + AMS	4 oz + 16 oz + 22 oz + 3 qt	87	83	97	19.2	188	42.09	667
Resolve Q + Callisto + Roundup PowerMax + AMS	1.25 oz + 1 oz + 16 oz + 3 qt	85	88	97	19.0	188	39.80	673
Steadfast Q + Impact + atrazine + MSO + AMS	1.5 oz + 0.5 oz + 16 oz + 1% + 3 qt	81	86	97	19.9	175	n/a	
Resolve Q + atrazine + Roundup PowerMax + AMS	1.25 oz + 16 oz + 22 oz + 3 qt	86	85	97	18.5	189	38.59	683
Checks								
Weedy Check	-	0	0	0	21.9	100	0	367
Weed-Free Check	-	100	100	100	17.2	188	0	730
	LSD (0.10)	**4**	**6**	**1**	**1.8**	**15**		**65**

2008 Corn Herbicide Evaluation - Rochester

Herbicide	Rate	Giant foxtail	Giant ragweed	Tall waterhemp	Common lambsquarters	H2O	Yield	Cost	Returns
	(product/A)			(% control)		(%)	(bu/A)	($/A)	($/A)
Preemergence									
Corvus	5.6 oz	54	43	50	50	19.1	48	n/a	
Preemergence/POST I (V2 corn)									
Dual II Magnum / Halex GT + atrazine + NIS + AMS	1 pt / 3.6 pt + 16 oz + 0.25% + 3 qt	98	96	99	99	19.3	125	61.97	412
Preemergence/POST III (V4 corn)									
Balance Flexx / Laudis + MSO + 28%	3 oz / 3 oz + 1% + 1.5 qt	88	98	95	97	18.9	147	n/a	
Harness / Ignite + AMS	1.75 pt / 22 oz + 2 qt	96	88	97	87	18.3	117	45.60	403
Harness / Laudis + MSO + 28%	1.75 pt / 3 oz + 1% + 1.5 qt	83	98	98	92	19.6	113	50.34	378
Breakfree / Resolve Q + atrazine + Roundup PowerMax + AMS	1 pt / 1.25 oz + 16 oz + 22 oz + 3 qt	97	96	97	99	18.6	123	54.57	415
Harness / Roundup WeatherMax + AMS	1.25 pt / 22 oz + 3 qt	96	91	96	94	19.2	133	49.37	452
Lumax / Touchdown Total + AMS	3 pt / 24 oz + 3 qt	96	94	99	99	18.7	130	56.20	437
SureStart / Durango + AMS	1.75 pt / 24 oz + 3 qt	94	93	96	97	20.0	133	47.27	452
SureStart / Durango + AMS	2 pt / 24 oz + 3 qt	94	91	96	96	19.2	128	49.20	436
SureStart + atrazine / Durango + AMS	2 pt + 2 pt / 24 oz + 3 qt	97	92	98	99	17.8	145	51.79	503
Outlook / Roundup WeatherMax + AMS	12 oz / 22 oz + 3 qt	93	89	95	85	19.2	123	51.13	414
Outlook / Roundup WeatherMax + Status + AMS	12 oz / 22 oz + 2.5 oz + 3 qt	95	94	95	95	19.0	115	54.47	381
Harness / Impact + atrazine + MSO + 28%	1.75 pt / 0.5 oz + 24 oz + 1% + 2.5%	93	96	96	97	19.1	124	49.81	417
Harness / Impact + atrazine + Roundup WeatherMax + AMS	1.25 pt / 0.5 oz + 16 oz + 22 oz + 3 qt	93	95	98	98	19.4	127	59.95	420
POST I (1" Weeds) / POST IV (4" weeds)									
Roundup WeatherMax + AMS / Roundup WeatherMax + AMS	22 oz + 3 qt / 22 oz + 3 qt	98	98	99	94	17.3	132	50.60	458
POST I (V2 corn)									
SureStart + Durango + AMS	1.75 pt + 24 oz + 3 qt	98	87	98	98	18.3	119	40.27	413
Halex GT + atrazine + NIS + AMS	3.6 pt + 16 oz + 0.25% + 3 qt	97	95	99	99	19.6	121	42.27	415
POST II (V3 corn)									
Require Q + atrazine + Roundup PowerMax + AMS	4 oz + 16 oz + 22 oz + 3 qt	96	96	97	99	19.7	107	42.09	363
Resolve Q + Callisto + Roundup PowerMax + AMS	1.25 oz + 1 oz + 16 oz + 3 qt	97	98	97	99	19.9	128	39.80	443
Steadfast Q + Impact + atrazine + MSO + AMS	1.5 oz + 0.5 oz + 16 oz + 1% + 3 qt	94	93	94	97	19.2	100	n/a	
Resolve Q + atrazine + Roundup PowerMax + AMS	1.25 oz + 16 oz + 22 oz + 3 qt	96	96	93	97	19.8	137	38.59	476
Checks									
Weedy Check	-	0	0	0	0	18.8	11	0	2
Weed-Free Check	-	100	100	100	100	18.7	143	0	544
	LSD (0.10)	**3**	**3**	**2**	**3**	**ns**	**43**		**156**

2008 Corn Herbicide Evaluation Across all locations

Herbicide	Rate	Giant foxtail	Yellow foxtail	Common ragweed	Giant ragweed	Common Cocklebur	Tall waterhemp	Common lambsquarters	Velvetleaf	Redroot pigweed	H2O	Yield	Cost	Returns
		----------Number of Locations----------												
	(product/A)	(% control)									(%)	(bu/A)	($/A)	($/A)
Preemergence														
Corvus	5.6 oz	81	75	97	41	72	77	84	97	99	19.9	138	n/a	n/a
Preemergence/POST I (V2 corn)														
Dual II Magnum / Halex GT + atrazine + NIS + AMS	1 pt / 3.6 pt + 16 oz + 0.25% + 3 qt	97	90	97	72	75	96	99	99	99	19.9	163	61.97	547
Preemergence/POST III (V4 corn)														
Balance Flexx / Laudis + MSO + 28%	3 oz / 3 oz + 1% + 1.5 qt	94	86	99	94	93	95	98	99	99	19.9	178	n/a	n/a
Harness / Ignite + AMS	1.75 pt / 22 oz + 2 qt	96	91	99	85	88	92	94	97	99	20.3	175	45.60	605
Harness / Laudis + MSO + 28%	1.75 pt / 3 oz + 1% + 1.5 qt	89	91	97	94	91	95	97	99	99	20.4	170	50.34	582
Breakfree / Resolve Q + atrazine + Roundup PowerMax + AMS	1 pt / 1.25 oz + 16 oz + 22 oz + 3 qt	94	88	95	90	90	94	99	96	99	20.0	172	54.57	589
Harness / Roundup WeatherMax + AMS	1.25 pt / 22 oz + 3 qt	96	91	96	89	93	93	96	95	99	19.9	171	49.37	590
Lumax / Touchdown Total + AMS	3 pt / 24 oz + 3 qt	94	90	98	93	92	93	97	98	99	19.6	178	56.20	614
SureStart / Durango + AMS	1.75 pt / 24 oz + 3 qt	95	90	99	93	98	93	97	96	99	19.6	177	47.27	619
SureStart / Durango + AMS	2 pt / 24 oz + 3 qt	94	91	96	90	91	92	97	97	99	19.6	173	49.20	600
SureStart + atrazine / Durango + AMS	2 pt + 2 pt / 24 oz + 3 qt	95	89	96	92	94	95	98	96	99	19.4	173	51.79	601
Outlook / Roundup WeatherMax + AMS	12 oz / 22 oz + 3 qt	94	90	96	87	98	92	94	95	99	19.6	173	51.13	598
Outlook / Roundup WeatherMax + Status + AMS	12 oz / 22 oz + 2.5 oz + 3 qt	94	90	97	91	90	91	96	98	99	20.4	172	54.47	586
Harness / Impact + atrazine + MSO + 28%	1.75 pt / 0.5 oz + 24 oz + 1% + 2.5%	94	93	95	92	97	96	98	94	99	20.0	173	49.81	597
Harness / Impact + atrazine + Roundup WeatherMax + AMS	1.25 pt / 0.5 oz + 16 oz + 22 oz + 3 qt	94	91	95	95	96	96	98	98	99	19.8	176	59.95	600
POST I (1" Weeds) / POST IV (4" weeds)														
Roundup WeatherMax + AMS / Roundup WeatherMax + AMS	22 oz + 3 qt / 22 oz + 3 qt	99	94	99	98	99	99	97	99	99	19.2	177	50.60	616
POST I (V2 corn)														
SureStart + Durango + AMS	1.75 pt + 24 oz + 3 qt	93	89	88	67	91	95	96	96	99	19.6	165	40.27	580
Halex GT + atrazine + NIS + AMS	3.6 pt + 16 oz + 0.25% + 3 qt	96	88	98	74	94	95	99	99	99	19.7	164	42.27	575
POST II (V3 corn)														
Require Q + atrazine + Roundup PowerMax + AMS	4 oz + 16 oz + 22 oz + 3 qt	95	87	99	96	95	91	99	97	99	20.2	173	42.09	605
Resolve Q + Callisto + Roundup PowerMax + AMS	1.25 oz + 1 oz + 16 oz + 3 qt	94	85	93	91	98	89	97	99	99	20.4	172	39.80	602
Steadfast Q + Impact + atrazine + MSO + AMS	1.5 oz + 0.5 oz + 16 oz + 1% + 3 qt	91	81	90	86	93	90	98	96	99	20.5	160	n/a	n/a
Resolve Q + atrazine + Roundup PowerMax + AMS	1.25 oz + 16 oz + 22 oz + 3 qt	94	86	93	86	97	91	98	99	99	20.1	173	38.59	611
Checks														
Weedy Check	-	0	0	0	0	0	0	0	0	0	20.8	73	0	266
Weed-Free Check	-	100	100	100	100	100	100	100	100	100	19.6	177	0	668
	LSD (0.10)	**2**	**4**	**4**	**6**	**13**	**3**	**2**	**4**	**1**	**0.7**	**10**		**38**

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SECTION C

CORN

PRODUCTION MANAGEMENT

Evaluation of the performance of seed treatments for nematode control in field corn at Rochester, MN, in 2008.

Breitenbach, Fritz R., Lisa M. Behnken, Ryan P. Miller, Gunsolus, Louis E. Kuisle, and Kyle J. Poss.

The objective of this trial was to evaluate the performance of Avicta Complete, and L1460 for nematode control in corn in southeastern Minnesota. The research site was a Lawler loam series with a pH of 6.8 and soil test P and K levels of 52 ppm and 154 ppm, respectively. Spring fertilizer was broadcast ahead of planting on April 16, at a rate of 120-36-86-28 (N-P-K-S). The area was side dressed with an additional 35 b/A of N on June 25. The field was fall chisel plowed, spring disked and field cultivated once prior to planting. Three corn hybrids were planted in the trial; all three were triple stacked hybrids with the Bt gene for rootworm and corn borer control along with glyphosate tolerance. The hybrids will be designated as hybrid 1, hybrid 2 and hybrid 3. All hybrids were planted with a John Deere 7000 planter equipped with cone units on May 9, 2008. Seeding depth was 2.0 inches, row spacing was 30 inches and the seeding rate was 35,000 seeds per acre. A randomized complete block design was used with eight replications. Glyphosate was applied postemergence to control weeds. Eight inch soil samples were taken from the center of each of the control treatments on May 27 to establish baseline nematode populations for the plot. Additional eight inch samples were taken within the row of each plot on June 24 (5 leaf corn). The center two rows of each plot were machine harvested on November 3, 2008. (University of Minnesota Extension, Regional Office – Rochester.)

	Rochester
Planting Date	May 9, 2008
Soil Type	Lawler Loam Series
Fertilizer	120-36-86-28 (N-P-K-S)
Herbicide (Post)	Glyphosate
Harvest Date	November 3, 2008
Tillage	Conventional
Previous Crop	Corn
Nematode Count (Pre)	May 24, 2008
Lesion	244/100 cc of soil
Pin	61/100 cc of soil
Dagger	4/100 cc of soil
Spiral	0/100 cc of soil

CONCLUSIONS

No significant differences were observed for plant population, yield, or nematode population. There were significant differences between hybrids in regard to plant height and grain moisture irrespective of the seed treatment. Moderately high numbers of Lesion and Pin nematodes were present at the onset of the trial, however, nematode numbers declined dramatically throughout the plot regardless of treatment. The decline in nematode numbers is possibly due to increasing soil temperatures and/or decreasing soil moisture in upper soil profile.

Table 1. Plant population, height, grain moisture and yield for field corn at Rochester, MN in 2008.

Treatment	Rate	Date			
		6/19	6/19	11/03	11/03
		Plants/a	**Height Inches**	**Grain Moisture**	**(bu/A)**
Hybrid 1 Cruiser Extreme	0.2639 mga/seed	34440	9.66	17.05	233
Hybid 1 Avicta Complete	0.7139 mga/seed	37571	9.50	17.41	221
Hybrid 2 Cruiser Extreme	0.2639 mga/seed	34440	9.53	16.79	224
Hybid 2 Avicta Complete	0.7139 mga/seed	36754	9.34	16.90	223
Hybrid 3 Maxim XL w/ Poncho 250	3.5 mg/100 kg +0.25mga/seed	36345	10.72	20.24	228
Hybrid 3 Maxim XL w/ Poncho 250 & L1460	3.5 mg/100 kg +0.25mga/seed + NA	35937	10.55	19.89	230
	LSD (P=0.10)	**NS**	**0.71**	**0.68**	**NS**

Table 2. Performance of Seed treatments for nematode control in field corn at Rochester, MN in 2008.

Treatment	Rate	Nematodes/100 cc of soil 06/24/2008			
		Lesion	**Pin**	**Dagger**	**Spiral**
Hybrid 1 Cruiser Extreme	0.2639 mga/seed	60	5	0	1
Hybid 1 Avicta Complete	0.7139 mga/seed	78	27	1	0
Hybrid 2 Cruiser Extreme	0.2639 mga/seed	78	25	3	0
Hybid 2 Avicta Complete	0.7139 mga/seed	59	36	0	2
Hybrid 3 Maxim XL w/ Poncho 250	3.5 mg/100 kg +0.25mga/seed	66	22	3	3
Hybrid 3 Maxim XL w/ Poncho 250 & L1460	3.5 mg/100 kg +0.25mga/seed + NA	48	21	3	0
	LSD (P=0.10)	**NS**	**NS**	**NS**	**NS**

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SECTION D

SOYBEAN

VARIETY TRIALS

Comparison of early maturity glyphosate tolerant (GT) and Roundup Ready® (RR) soybean varieties (1.3 to 1.9 relative maturity) at Rock Dell, Fountain, and Waseca, MN, in 2008.

Breitenbach, Fritz R., Lisa M. Behnken, Ryan P. Miller, Seth L. Naeve, and Jerry A. Tesmer

The objective of these studies was to compare the performance of early maturity GT/RR® soybean varieties (1.3 to 1.9 relative maturities) in southern Minnesota. The trials were located at Rock Dell, Fountain, and Waseca, MN. Field histories are reported in Table 1. At Rock Dell and Fountain, the trials were planted with a 4-row John Deere 7000 planter equipped with cone units. The seeding rate was 150,000 seeds per acre planted at a depth of 1.5 inches. Plots were four 30-inch rows wide by 22 feet in length. At Waseca, plots were planted at 175,000 seeds per acre in 10-inch rows by 12 feet in length. A randomized complete block design was implemented and replicated four times. The center two rows at Rock Dell and Fountain, and the center six rows at Waseca of each plot were machine harvested with grain weight and moisture recorded at all sites. Table 2 provides moisture and yield at all sites and the 3-site average. Table 3 provides the 3-site average moisture and yield and the oil and protein content at Rock Dell, ranked by yield. Table 4 lists soybean variety traits. Table 5 lists the 2007 early maturity GT/RR® trial results. (University of Minnesota Extension Regional Office, Rochester, and Southern Research and Outreach Center, Waseca, MN).

Table 1. Field histories for early maturity GT/RR® soybean variety trials in southern MN in 2008.

	Rock Dell	Fountain	Waseca
Planting Date	May 17, 2008	May 15, 2008	May 28, 2008
Harvest Date	September 30, 2008	October 2, 2008	October 19, 2008
Soil Type	Kenyon loam	Fayette silt loam	Nicollet/Webster clay loam
Tillage	Conventional	Conventional	Field cultivated once, PPI herbicide applied and field cultivated twice
Herbicide	Sequence POST I / Glyphosate + Select POST II	Sequence POST	Treflan+Pursuit, PPI/glyphosate, POST
Insecticide	Warrior	Warrior	Warrior
Previous Crop	Corn	Corn	Corn

Table 2. Early maturity GT/RR® soybean moisture and yield at 13% for Rock Dell, Fountain and Waseca, MN and the 3-site average moisture and yield in 2008.

Entry Name	Description	Rock Dell		Fountain		Waseca		Averages	
								3-site	
1.3 to 1.9 maturities	Relative Maturity	% moisture	bu/A	% moisture	bu/A	% moisture	bu/A	% moisture	bu/A
AgVenture 18X1NRR	1.8	12.2	41.1	11.8	47.3	12.9	62.7	**12.3**	**50.4**
AgVenture 18X2NRR	1.8	12.3	37.9	12.2	52.8	13.5	54.6	**12.6**	**48.4**
Asgrow AG1403	1.4	12.7	42.9	12.5	50.3	13.4	58.7	**12.9**	**50.6**
Asgrow AG1802	1.8	12.6	37.5	12.2	47.7	13.9	62.0	**12.9**	**49.1**
Atlas 5N153NRR	1.5	12.6	36.0	12.3	43.2	13.5	58.6	**12.8**	**46.0**
Atlas 5B171RR	1.7	12.6	37.5	12.5	53.2	13.9	62.4	**13.0**	**51.0**
Croplan RT1692	1.6	12.8	36.5	12.3	47.8	13.7	63.9	**12.9**	**49.4**
Croplan RC1820	1.8	12.7	39.9	12.3	45.6	13.5	60.5	**12.8**	**48.7**
Croplan 1784**	1.7	12.8	44.1	12.4	45.8	13.5	64.5	**12.9**	**51.5**
Crows C1617R	1.5	12.6	42.9	12.3	48.5	13.8	60.3	**12.9**	**50.5**
Crows C1815R**	1.8	12.9	42.8	12.4	46.2	13.5	61.4	**12.9**	**50.1**
Crows C1816R	1.8	13.1	35.8	12.8	41.8	14.3	55.0	**13.4**	**44.2**
Dairyland 1302**	1.3	12.9	40.3	12.5	47.1	14.5	55.3	**13.3**	**47.6**
Dairyland 1601**	1.3	12.9	41.4	12.5	48.4	13.6	58.6	**13.0**	**49.5**
DynaGro 36B14	1.6	12.6	40.6	12.4	45.9	13.7	59.9	**12.9**	**48.8**
Gold Country 1918RR	1.6	13.0	36.7	12.8	41.3	14.2	58.7	**13.3**	**45.6**
Gold Country 2717 NRR	1.8	12.8	42.2	12.4	43.4	13.8	57.5	**13.0**	**47.7**
Jung 8164RR	1.7	12.8	42.6	12.4	51.6	13.6	64.4	**12.9**	**52.9**
Jung 8168NRR	1.6	12.6	39.1	12.1	46.7	13.5	62.3	**12.7**	**49.3**
Kaltenberg KB1609RR	1.6	12.6	39.7	12.4	48.7	13.6	58.1	**12.9**	**48.9**
Kaltenberg KB1809RR	1.8	12.4	39.0	12.4	51.4	13.1	60.7	**12.6**	**50.4**
LG Seeds C1401RR	1.4	12.4	40.3	12.1	52.3	13.8	57.5	**12.8**	**50.0**
Latham L1538R	1.5	12.7	36.4	12.2	41.1	13.8	60.7	**12.9**	**46.1**
Latham L1738R	1.7	12.9	45.7	13.2	53.7	13.1	57.5	**13.1**	**52.3**
Midwest Seed GR1632	1.6	12.7	37.4	12.2	48.6	13.5	64.5	**12.8**	**50.2**
Midwest Seed GR1833	1.8	12.8	30.6	12.9	45.9	14.0	54.3	**13.2**	**43.6**
NK S17-B5	1.7	12.4	41.8	12.4	52.7	13.6	59.9	**12.8**	**51.5**
NK S18-Y3	1.8	12.6	41.7	12.3	51.2	13.5	64.5	**12.8**	**52.5**
NuTech NT-1717RR/SCN	1.7	12.7	41.6	12.4	47.9	13.7	58.0	**12.9**	**49.2**
NuTech NT-1808RR/SCN	1.8	13.0	45.0	13.5	51.2	13.6	64.4	**13.4**	**53.6**
Pioneer 91Y70	1.7	12.6	40.0	12.3	51.7	14.2	64.0	**13.0**	**51.9**
Pioneer 91Y90	1.9	12.5	41.4	12.2	49.9	13.6	61.3	**12.8**	**50.9**
Prairie Brand PB-1607RR	1.6	12.7	40.6	12.4	54.1	13.7	66.1	**12.9**	**53.6**
Prairie Brand PB-1838NRR	1.8	12.6	38.5	12.3	48.5	14.0	55.6	**13.0**	**47.5**
Producers 175NRR	1.7	12.6	42.2	12.3	44.0	13.7	64.8	**12.8**	**50.3**

Table 2. Early maturity GT/RR® soybean moisture and yield at 13% for Rock Dell, Fountain and Waseca, MN and the 3-site average moisture and yield in 2008.

Entry Name	Description	Rock Dell		Fountain		Waseca		Averages	
								3-site	
1.3 to 1.9 maturities	Relative Maturity	% moisture	bu/A	% moisture	bu/A	% moisture	bu/A	% moisture	bu/A
Renk RS147RR	1.4	12.9	44.8	12.9	53.7	14.0	61.0	**13.3**	**53.2**
Renk RS179NRR	1.7	12.6	42.4	13.3	52.1	13.3	64.2	**13.1**	**52.9**
Stine 1366-4	1.3	12.6	37.0	12.4	54.1	13.4	59.2	**12.8**	**50.1**
Stine 1568-4	1.5	12.6	42.9	12.5	52.7	13.6	57.2	**12.9**	**50.9**
Trelay 2135RR	1.3	12.6	35.6	12.3	51.1	13.4	56.0	**12.8**	**47.6**
Trelay 2165RR	1.6	12.6	39.2	12.4	43.9	13.7	63.0	**12.9**	**48.7**
Viking 1788NRR	1.7	12.7	42.3	12.4	47.4	13.9	61.1	**13.0**	**50.3**
Wensman W2152NRR	1.5	12.6	46.6	12.3	44.9	13.6	64.0	**12.8**	**51.8**
Wensman W2172NRR	1.7	12.7	43.2	12.3	44.8	13.6	61.3	**12.9**	**49.8**
Ziller Exp 47615NR	1.5	12.6	44.2	12.3	45.2	13.7	60.3	**12.9**	**49.9**
Ziller BT 7186NR	1.8	13.6	37.7	12.5	44.1	12.8	60.0	**13.0**	**47.3**
LSD (P=0.10)			**5.5**		**3.8**		**NS**		**3.4**

Table 3. Early maturity GT/RR® soybean 3-site average moisture and yield at 13% for Rock Dell, Fountain, and Waseca, and average oil and protein content for Rock Dell, MN, ranked by yield in 2008.

Entry Name	Description	Averages			
		3-site		Rock Dell	
1.0 to 1.8 maturities	Relative Maturity	% moisture	bu/A	% oil	% protein
Prairie Brand PB-1607RR	1.6	12.9	53.6	19.7	32.2
NuTech NT-1808RR/SCN	1.8	13.4	53.6	19.4	32.5
Renk RS147RR	1.4	13.3	53.2	19.1	32.6
Renk RS179NRR	1.7	13.1	52.9	19.1	33.8
Jung 8164RR	1.6	12.9	52.9	18.9	32.7
NK S18-Y3	1.8	12.8	52.5	19.4	32.2
Latham L1738R	1.7	13.1	52.3	18.8	34.0
Pioneer 91Y70	1.7	13.0	51.9	20.9	31.0
Wensman W2152NRR	1.5	12.8	51.8	20.1	31.0
NK S17-B5	1.7	12.8	51.5	19.3	31.1
Croplan 1784**	1.7	12.9	51.5	20.4	31.8
Atlas 5B171RR	1.7	13.0	51.0	19.5	32.8
Stine 1568-4	1.5	12.9	50.9	19.4	32.8
Pioneer 91Y90	1.9	12.8	50.9	19.3	32.5
Asgrow AG1403	1.4	12.9	50.6	19.2	31.4
Crows C1617R	1.5	12.9	50.5	20.7	31.1
AgVenture 18X1NRR	1.8	12.3	50.4	21.1	30.0
Kaltenberg KB1809RR	1.8	12.6	50.4	19.5	32.9
Producers 175NRR	1.7	12.8	50.3	20.6	30.6
Viking 1788NRR	1.7	13.0	50.3	20.7	31.0
Midwest Seed GR1632	1.6	12.8	50.2	20.8	30.6
Crows C1815R**	1.8	12.9	50.1	20.5	30.5
Stine 1366-4	1.3	12.8	50.1	19.8	33.4
LG Seeds C1401RR	1.4	12.8	50.0	19.7	33.0
Ziller Exp 47615NR	1.5	12.9	49.9	20.2	31.2
Wensman W2172NRR	1.7	12.9	49.8	20.5	31.0
Dairyland 1601**	1.6	13.0	49.5	19.3	32.8
Croplan RT1692	1.6	12.9	49.4	19.4	32.1
Jung 8168NRR	1.6	12.7	49.3	20.4	31.1
NuTech NT-1717RR/SCN	1.7	12.9	49.2	20.5	30.8
Asgrow AG1802	1.8	12.9	49.1	20.6	31.3
Kaltenberg KB1609RR	1.6	12.9	48.9	19.9	32.0
DynaGro 36B14	1.6	12.9	48.8	20.4	31.1
Trelay 2165RR	1.6	12.9	48.7	20.7	30.9
Croplan RC1820	1.8	12.8	48.7	20.8	30.6

Table 3. Early maturity GT/RR® soybean 3-site average moisture and yield at 13% for Rock Dell, Fountain, and Waseca, and average oil and protein content for Rock Dell, MN, ranked by yield in 2008.

Entry Name	Description	Averages			
		3-site		Rock Dell	
1.0 to 1.8 maturities	Relative Maturity	% moisture	bu/A	% oil	% protein
AgVenture 18X2NRR	1.8	12.6	48.4	19.6	33.8
Gold Country 2717 NRR	1.7	13.0	47.7	22.3	31.6
Dairyland 1302**	1.3	13.3	47.6	18.6	33.5
Trelay 2135RR	1.3	12.8	47.6	20.3	32.1
Prairie Brand PB-1838NRR	1.8	13.0	47.5	20.7	31.5
Ziller BT 7186NR	1.8	13.0	47.3	20.2	30.0
Latham L1538R	1.5	12.9	46.1	20.9	30.4
Atlas 5N153NRR	1.5	12.8	46.0	20.9	31.2
Gold Country 1918RR	1.8	13.3	45.6	19.5	33.1
Crows C1816R	1.8	13.4	44.2	19.9	31.8
Midwest Seed GR1833	1.8	13.2	43.6	19.7	32.6
LSD (P=0.10)			**3.4**	**0.7**	**1.0**

Table 4. Traits of early maturity Roundup Ready® soybean varieties in 2008.

Brand Name	Variety	Maturity Rating	Hilum Color	Flower Color	Pubescence Color	Pod Color
AgVenture	**18X1NRR**	1.8	Black	Purple	Tawny	Brown
AgVenture	**18X2NRR**	1.8	Black	Purple	Gray	Tan
Asgrow	**AG1403**	1.4	Brown	White	Tawny	Tan
Asgrow	**AG1802**	1.8	Imperfect Black	Purple	Gray	Tan
Atlas	**5N153NRR**	1.5	Imperfect Black	Purple	Gray	
Atlas	**5B171RR**	1.7	Tan	White	Tawny	Tan
Croplan	**RT1692**	1.6	Tan	White	Tawny	Tan
Croplan	**RC1820**	1.8	Imperfect Black	Purple	Gray	Tan
Croplan	**RT1784****	1.7	Brown	Purple	Tawny	Tan
Crows	**C1617R**	1.6	Imperfect Black	Purple	Gray	Tan
Crows	**C1815R****	1.8	Imperfect Black	Purple	Gray	Tan
Crows	**C1816R**	1.8	Imperfect Black	Purple	Gray	Brown
Dairyland	**DSR-1302/RRSTS****	1.3	Brown	Purple	Light Tawny	Tan
Dairyland	**DSR-1601/RR**	1.6	Black	Purple	Light Tawny	Tan
DynaGro	**36B14**					
Gold Country	**1918RR**	1.8	Imperfect Black	Purple	Gray	Brown
Gold Country	**2717 NRR**	1.8	Imperfect Black	Purple	Gray	Tan
Jung	**8164RR**	1.6	Tan		Tawny	
Jung	**8168NRR**	1.6	Imperfect Black		Gray	
Kaltenberg	**KB1609RR**	1.6	Tan	White	Tawny	Tan
Kaltenberg	**KB1809RR**	1.8	Brown	Purple	Light Tawny	Brown
LG Seeds	**C1401RR**	1.4	Black	Purple	Light Tawny	Tan
Latham	**L1538R**	1.5	Imperfect Black	Purple	Gray	Tan
Latham	**L1738R**	1.7	Brown	Purple	Light Tawny	Tan
Midwest Seed	**GR1632**	1.6	Black	Purple	Gray	Tan
Midwest Seed	**GR1833**	1.8	Imperfect Black	Purple	Gray	Brown
NK	**S17-B5**	1.7	Black	Purple	Light Tawny	Brown
NK	**S18-Y3**	1.8	Brown	White	Light Tawny	Tan
NuTech	**NT-1717RR/SCN**	1.7	Imperfect Black	Purple	Gray	Tan
NuTech	**NT-1808RR/SCN**	1.8	Black	White	Tawny	Brown
Pioneer	**91Y70**	1.7	Black	Purple	Tawny	Tan
Pioneer	**91Y90**	1.9	Brown	White	Light Tawny	Brown

Table 4. Traits of early maturity Roundup Ready® soybean varieties in 2008.

Brand Name	Variety	Maturity Rating	Hilum Color	Flower Color	Pubescence Color	Pod Color
Prairie Brand	**PB-1607RR**	1.6	Tan	White	Tawny	Tan
Prairie Brand	**PB-1838NRR**	1.8	Imperfect Black	Purple	Gray	Brown
Producers	**175NRR**	1.7	Imperfect Black	Purple	Gray	Tan
Renk	**RS147RR**	1.4	Brown	Purple	Light Tawny	Tan
Renk	**RS179NRR**	1.7	Brown	Purple	Light Tawny	Tan
Stine	**1366-4**	1.3	Black/Brown	Purple	Tawny	
Stine	**1568-4**	1.5	Black	White	Tawny	
Trelay	**2135RR**	1.3	Black	Purple	Tawny	Brown
Trelay	**2165RR**	1.6	Imperfect Black	Purple	Gray	Tan
Viking	**1788NRR**	1.7	Imperfect Black	Purple	Gray	Tan
Wensman	**W2152NRR**	1.5	Imperfect Black	Purple	Gray	Tan
Wensman	**W2172NRR**	1.7	Imperfect Black	Purple	Gray	Tan
Ziller	**Exp 47615NR**	1.5	Imperfect Black	Purple	Gray	Tan
Ziller	**BT 7186NR**	1.8	Black	White	Light Tawny	Brown

Table 5. Early maturity GT/RR® soybean 3-site average moisture and yield at 13% for Rock Dell, Spring Valley, and Waseca, and average oil and protein content for Rock Dell, MN, ranked by yield in 2007.

Entry Name	Description	Averages			
		3-site		Rock Dell	
1.1 to 1.9 maturities	Relative Maturity	% moisture	bu/A	% oil	% protein
Agventure AV18G8NRR	1.8	12.8	58.9	18.7	34.3
Croplan Genetics RT1784	1.7	12.8	57.9	17.9	34.7
Stine 1832-4	1.8	12.9	57.9	19.1	33.8
Crow's Hybrids C 1815R	1.8	13.0	57.7	18.9	33.7
Gold Country 2717NRR	1.7	13.0	57.7	18.7	34.9
Croplan Genetics RC1820	1.8	13.1	57.3	18.5	35.2
Producers Hybrids 175NRR	1.7	12.9	57.3	18.9	34.5
Latham E1538R	1.5	12.9	56.1	18.7	34.9
Latham E1738R	1.7	13.0	55.6	16.8	37.6
Prairie Brand PB-1914RR	1.9	13.1	55.6	18.1	35.2
Trelay 2166RR	1.6	13.1	55.6	17.3	36.3
UAP/DynaGro DG37R17	1.7	12.6	55.5	17.7	34.8
Latham L1838R	1.8	12.8	55.1	18.7	35.5
Anderson 181CNR	1.8	12.6	55.0	18.9	35.0
NuTech NT-1717+RR/SCN	1.7	12.8	54.9	18.9	33.8
DeKalb DKB18-51	1.8	12.9	54.7	17.6	34.9
Kaltenberg KB187RR	1.8	12.9	54.5	18.2	35.7
Prairie Brand PB-1607RR	1.6	12.9	54.5	17.2	36.3
Stine 1108-4	1.1	13.5	54.4	18.0	34.7
NK S17-A1	1.8	12.7	54.2	18.2	35.8
Prairie Brand PB-1754RR	1.7	13.2	54.0	17.2	37.1
NK H-1604RR	1.6	12.8	53.6	18.9	35.6
Midwest Seed Genetics GR1311	1.3	13.2	53.1	17.8	33.9
Asgrow AG1702	1.7	12.8	52.7	18.0	35.7
Atlas 5B170RR	1.7	12.9	52.5	17.5	35.2
Gold Country 8716RR	1.6	12.8	52.4	17.6	34.6
Pioneer 91M51	1.5	13.0	52.4	19.1	34.6
LG Seeds C1401RR	1.4	12.9	51.8	18.4	35.2
Producers Hybrids 163 RR	1.6	13.2	51.7	17.9	35.4
Pioneer 91M80	1.8	13.2	51.3	17.4	37.6
Ziller BT186NR	1.8	12.6	50.2	18.0	35.8
Kaltenberg KB166RR	1.6	12.7	50.1	17.8	36.6
NK S15-E3	1.6	12.7	50.0	17.3	36.4
Midwest Seed Genetics GR1431	1.4	12.7	49.2	18.2	35.9
Ziller BT7156NR	1.5	12.6	49.2	17.9	36.5
UAP/DynaGro DG32K16	1.6	12.4	48.4	17.7	37.3
LSD (P=0.10)			3.3	0.4	1.0

Comparison of late maturity glyphosate tolerant (GT) and Roundup Ready® (RR) soybean varieties (1.9 to 2.5 relative maturity) at Rock Dell, Fountain, and Waseca, MN, in 2008.

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The objective of these studies was to compare the performance of late maturity GT/RR® soybean varieties (1.9 to 2.5 relative maturities) in southern Minnesota. The trials were located at Rock Dell, Fountain, and Waseca, MN. Field histories are reported in Table 1. At Rock Dell and Fountain, the trials were planted with a 4-row John Deere 7000 planter equipped with cone units. The seeding rate was 150,000 seeds per acre planted at a depth of 1.5 inches. Plots were four 30-inch rows wide by 22 feet in length. At Waseca, plots were planted at 175,000 seeds per acre in 10-inch rows by 12 feet in length. A randomized complete block design was implemented and replicated four times. The two center rows at Rock Dell and Fountain, and the center six rows at Waseca of each plot were machine harvested with grain weight and moisture recorded at all sites. Table 2 provides moisture and yield at all sites and the 3-site average. Table 3 provides the 3-site average yield and the oil and protein content at Rock Dell, ranked by yield. Table 4 lists soybean variety traits. Table 5 lists the 2007 late maturity GT/RR® trial results. (University of Minnesota Extension, Regional Office – Rochester).

Table 1. Field histories for late maturity GT/RR® soybean variety trials in southern MN in 2008.

	Rock Dell	Fountain	Waseca
Planting Date	May 17, 2008	May 15, 2008	May 28, 2008
Harvest Date	September 30, 2008	October 2, 2008	October 19, 2008
Soil Type	Kenyon loam	Fayette silt loam	Nicollet/Webster clay loam
Tillage	Conventional	Conventional	Field cultivated once, PPI herbicide applied and field cultivated twice
Herbicide	Sequence POST I / Glyphosate + Select POST II	Sequence POST	Treflan+Pursuit, PPI/glyphosate, POST
Insecticide	Warrior	Warrior	Warrior
Previous crop	Corn	Corn	Corn

Table 2. Late maturity GT/RR® soybean moisture and yield at 13% for Rock Dell, Fountain and Waseca and a combined average moisture and yield for Rock Dell, Fountain, and Waseca, MN, in 2008.

Entry Name	Description	Rock Dell		Fountain		Waseca		3-site Average	
1.9 to 2.5 maturities	Relative Maturity	% moisture	bu/A	% moisture	bu/A	% moisture	bu/A	% moisture	bu/A
AgVenture 20G0NRR	2.0	13.0	39.4	12.2	46.0	12.9	53.2	12.7	46.2
AgVenture 6204NRR	2.0	13.3	40.9	12.1	39.5	13.4	46.9	12.9	42.5
Asgrow AG2002	2.0	13.1	40.0	12.4	45.7	12.9	52.7	12.8	46.2
Asgrow AG2107	2.1	12.9	38.6	11.9	41.4	13.3	52.0	12.7	44.0
Atlas 5B193RR	1.9	12.9	40.3	11.9	46.4	13.1	49.9	12.6	45.5
Atlas 5N203RR	2.1	13.2	39.9	11.7	39.9	13.3	54.3	12.7	44.7
Croplan RT2092	2.0	13.3	39.5	12.6	47.2	13.1	58.9	13.0	48.5
Croplan RC2257	2.2	13.2	42.8	13.0	42.9	13.6	52.3	13.3	46.0
Crows C2115R	2.1	13.2	36.9	12.3	43.2	13.8	51.3	13.1	43.8
Crows C2216R	2.2	13.4	39.8	12.6	45.3	13.3	54.3	13.1	46.5
DynaGro DG31D20	2.1	12.9	39.1	12.3	43.9	12.6	59.3	12.6	47.4
DynaGro DG38G23	2.3	13.3	37.7	14.3	42.1	13.9	53.0	13.8	44.3
Gold Country 2820NRR	2.0	13.4	39.7	12.0	41.2	13.3	47.0	12.9	42.7
Gold Country 8820NRR	2.0	13.2	42.9	12.7	43.8	13.5	50.1	13.2	45.6
Jung 8219RR	2.1	13.3	41.3	11.9	43.9	14.1	45.7	13.1	43.6
Jung 8237NRR	2.3	13.3	41.7	15.0	46.4	13.7	50.4	14.0	46.2
Kaltenberg KB203RR	2.0	12.8	40.5	12.6	47.0	13.3	52.0	12.9	46.5
Kaltenberg KB2309RR	2.3	13.2	40.2	14.4	46.3	13.3	51.6	13.6	46.0
LG Seeds C1945NRR	1.9	13.3	39.7	11.9	40.3	13.6	51.8	12.9	43.9
LG Seeds C2238NRR	2.2	13.3	41.0	13.0	43.8	13.4	54.7	13.2	46.5
Latham E1958R	1.9	13.2	42.1	14.0	46.7	12.9	51.3	13.4	46.7
Latham L2348R	2.3	13.3	39.4	13.5	47.7	13.3	51.5	13.3	46.2
Midwest Seed GR2131	2.1	13.3	39.2	12.5	42.3	13.6	60.0	13.1	47.2
Midwest Seed GR2334	2.3	13.3	40.7	17.3	44.4	13.5	53.7	14.7	46.3
NK S20-P3	2.0	13.0	42.7	12.5	55.1	13.2	51.6	12.9	49.8
NK S23-N7	2.3	13.2	40.6	13.1	50.9	13.1	45.3	13.1	45.6
NK S-21-N6 **	2.1	13.0	44.8	14.7	53.2	13.1	55.3	13.6	51.1
NuTech 7222	2.2	13.3	39.2	12.8	46.4	13.6	53.6	13.2	46.4
NuTech NT-2324RR/SCN	2.3	13.0	39.7	16.6	54.9	12.9	56.9	14.1	50.5
Pioneer 92Y20	2.2	13.0	43.3	12.0	49.5	13.2	53.4	12.7	48.7
Pioneer 92Y30	2.3	13.0	41.8	13.8	53.1	13.4	56.9	13.4	50.6
Prairie Brand PB-2056NRR	2.0	12.9	40.5	11.9	44.8	13.0	56.8	12.6	47.4
Prairie Brand PB-2117NRR	2.1	13.1	42.5	12.2	45.5	13.7	59.0	13.0	49.0
Producers 205NRR	2.0	13.2	40.8	12.0	41.1	13.1	56.7	12.7	46.2
Renk RS204NRR	2.0	13.2	39.4	12.0	41.8	13.2	49.3	12.8	43.5

Table 2. Late maturity GT/RR® soybean moisture and yield at 13% for Rock Dell, Fountain and Waseca and a combined average moisture and yield for Rock Dell, Fountain, and Waseca, MN, in 2008.

Entry Name	Description	Rock Dell		Fountain		Waseca		3-site Average	
1.9 to 2.5 maturities	Relative Maturity	% moisture	bu/A	% moisture	bu/A	% moisture	bu/A	% moisture	bu/A
Renk RS239NRR	2.3	13.0	41.9	16.8	48.6	13.2	56.6	14.3	49.0
Stine 1932-4	1.9	12.8	36.0	11.9	45.0	12.8	50.5	12.5	43.8
Stine 2062-4	2.0	13.3	39.1	12.7	44.6	13.4	55.5	13.1	46.4
Trelay 2214	2.1	12.9	40.0	12.0	50.1	12.9	51.8	12.6	47.3
Trelay 2252	2.5	13.0	41.1	16.2	48.7	13.0	58.1	14.1	49.3
Viking 2090NRR	2.0	12.9	36.6	11.9	47.7	12.6	51.1	12.5	45.1
Viking 2198NRR	2.1	13.1	39.1	12.4	45.8	13.2	47.6	12.9	44.2
Wensman W2200NRR	2.0	12.9	42.5	12.1	48.3	12.9	54.1	12.6	48.3
Wensman W2222NRR	2.2	13.2	37.7	12.8	44.2	13.6	50.0	13.2	44.0
Ziller BT 7208NR	2.0	13.2	39.7	12.0	40.5	13.2	51.2	12.8	43.8
Ziller Exp 67820NR	2.0	13.0	40.0	13.3	49.3	12.9	49.5	13.1	46.3
LSD (P=0.10)		0.3	4.9	1.1	4.5	0.3	7.1		3.2

Table 3. Late maturity GT/RR® soybean 3-site average yield and oil content and protein content for Rock Dell, MN, ranked by yield in 2008.

Entry Name	Relative	3-site Average Yield	Rock Dell	Rock Dell
1.9 to 2.5 maturities	Maturity	bu/A	% oil	% protein
NK S-21-N6 **	2.1	51.1	20.2	29.9
Pioneer 92Y30	2.3	50.6	20.2	30.9
NuTech NT-2324RR/SCN	2.3	50.5	19.9	31.4
NK S20-P3	2.0	49.8	19.4	33.0
Trelay 2252	2.5	49.3	18.8	33.9
Renk RS239NRR	2.3	49.0	19.3	32.3
Prairie Brand PB-2117NRR	2.1	49.0	20.2	31.2
Pioneer 92Y20	2.2	48.7	20.6	30.1
Croplan RT2092	2.0	48.5	19.8	30.9
Wensman W2200NRR	2.0	48.3	19.8	33.0
DynaGro DG31D20	2.1	47.4	19.7	33.0
Prairie Brand PB-2056NRR	2.0	47.4	19.6	33.4
Trelay 2214	2.1	47.3	19.7	32.7
Midwest Seed GR2131	2.1	47.2	20.5	30.4
Latham E1958R	1.9	46.7	20.0	31.5
Kaltenberg KB203RR	2.0	46.5	20.2	29.9
LG Seeds C2238NRR	2.2	46.5	20.0	30.6
Crows C2216R	2.2	46.5	20.3	30.2

Table 3. Late maturity GT/RR® soybean 3-site average yield and oil content and protein content for Rock Dell, MN, ranked by yield in 2008.

Entry Name	Relative	3-site Average Yield	Rock Dell	Rock Dell
1.9 to 2.5 maturities	Maturity	bu/A	% oil	% protein
Stine 2062-4	2.0	46.4	20.3	30.7
NuTech 7222	2.2	46.4	20.4	30.4
Midwest Seed GR2334	2.3	46.3	19.1	32.7
Ziller Exp 67820NR	2.0	46.3	19.4	32.3
Latham L2348R	2.3	46.2	19.0	32.4
AgVenture 20G0NRR	2.0	46.2	19.7	32.6
Producers 205NRR	2.0	46.2	20.3	29.9
Asgrow AG2002	2.0	46.2	19.7	32.7
Jung 8237NRR	2.3	46.2	19.6	32.4
Kaltenberg KB2309RR	2.3	46.0	19.3	31.8
Croplan RC2257	2.2	46.0	20.2	30.8
NK S23-N7	2.3	45.6	19.7	30.8
Gold Country 8820NRR	2.0	45.6	20.3	30.6
Atlas 5B193RR	1.9	45.5	19.8	31.4
Viking 2090NRR	2.0	45.1	19.5	32.7
Atlas 5N203RR	2.1	44.7	20.6	30.7
DynaGro DG38G23	2.3	44.3	20.1	29.8
Viking 2198NRR	2.1	44.2	20.2	30.9
Asgrow AG2107	2.1	44.0	20.2	31.4
Wensman W2222NRR	2.2	44.0	20.2	30.2
LG Seeds C1945NRR	1.9	43.9	20.6	30.4
Stine 1932-4	1.9	43.8	19.8	32.7
Ziller BT 7208NR	2.0	43.8	20.3	30.6
Crows C2115R	2.1	43.8	20.4	30.2
Jung 8219RR	2.1	43.6	20.3	31.3
Renk RS204NRR	2.0	43.5	20.5	30.7
Gold Country 2820NRR	2.0	42.7	20.4	30.9
AgVenture 6204NRR	2.0	42.5	20.9	30.6
LSD (P=0.10)		**3.2**	**0.5**	**0.8**

Table 4. Traits of late maturity GT/RR® soybean varieties in 2008.

Brand Name	Variety	Relative Maturity	Hilum Color	Flower Color	Pubescence Color	Pod Color
AgVenture	**20G0NRR**	2.0				
AgVenture	**6204NRR**	2.0	Black	Purple	Gray	Tan
Asgrow	**AG2002**	2.0	Brown	Purple	Tawny	Tan
Asgrow	**AG2107**	2.1	Brown	Purple	Gray	Brown
Atlas	**5B193RR**	1.9	Tan	White	Tawny	Tan
Atlas	**5N203RR**	2.1	Imperfect Black	Purple	Gray	Tan
Croplan	**RT2092**	2.0	Tan	White	Tawny	Tan
Croplan	**RC2257**	2.2	Imperfect Black & Buff	Purple	Gray	Tan
Crows	**2115R**	2.1	Imperfect Black	Purple	Gray	Tan
Crows	**C2216R**	2.2	Imperfect Black	Purple	Gray	Tan
DynaGro	**DG31D20**	2.1	Black	Purple/White	Tawny	Brown
DynaGro	**DG38G23**	2.3	Imperfect Black	Purple	Gray	Tan
Gold Country	**2820NRR**	2.0	Imperfect Black	Purple	Gray	Tan
Gold Country	**8820NRR**	2.0	Imperfect Black	Purple	Gray	Tan
Jung	**8219RR**	2.1	Buff		Gray	
Jung	**8237NRR**	2.3	Black		Light Tawny	
Kaltenberg	**KB203RR**	2.0	Tan	White	Tawny	Tan
Kaltenberg	**KB2309RR**	2.4	Black	Purple	Tawny	Brown
LG Seeds	**C1945NRR**	1.9	Imperfect Black	Purple	Gray	Tan
LG Seeds	**C2238NRR**	2.2	Imperfect Black & Buff	Purple	Gray	Tan
Latham	**E1958R**	1.9	Brown	Purple	Light Tawny	Brown
Latham	**L2348R**	2.3	Buff	Purple	Gray	Tan
Midwest Seed	**GR2131**	2.1	Black	Purple	Gray	Tan
Midwest Seed	**GR2334**	2.3	Black	White	Light Tawny	Brown
NK	**S20-P3**	2.0	Brown	White	Light Tawny	Tan
NK	**S23-N7**	2.3	Brown	Purple	Light Tawny	Tan
NK	**S21-N6****	2.1	Brown	Purple	Tawny	Brown
NuTech	**7222**	2.2	Buff	Purple	Gray	Tan
NuTech	**NT2324RR/SCN**	2.3	Brown	Purple	Light Tawny	Brown
Pioneer	**92Y20**	2.2	Black	Purple	Tawny	Brown
Pioneer	**92Y30**	2.3	Imperfect Black	Purple	Gray	Brown
Prairie Brand	**PB-2056NRR**	2.0	Black	Mixed	Tawny	Brown
Prairie Brand	**PB-2117NRR**	2.1	Buff	Purple	Gray	Tan
Producers	**205NRR**	2.0	Imperfect Black	Purple	Gray	Tan

Table 4. Traits of late maturity GT/RR® soybean varieties in 2008.

Brand Name	Variety	Relative Maturity	Hilum Color	Flower Color	Pubescence Color	Pod Color
Renk	**RS204NRR**	2.0	Imperfect Black	Purple	Gray	Tan
Renk	**RS239NRR**	2.3	Black	White	Light Tawny	Tan
Stine	**1932-4**	1.9	Black	Purple/White	Gray	
Stine	**2062-4**	2.0	Imperfect Black/Buff	Purple	Gray	
Trelay	**2214**	2.1	Buff	White	Gray	Tan
Trelay	**2252**	2.5	Black	White	Light Tawny	Tan
Viking	**2090NRR**	2.0	Brown	Purple	Tawny	Brown
Viking	**2198NRR**	2.1	Buff	Purple	Gray	Tan
Wensman	**W2200NRR**	2.0	Black	Purple/Whtie	Tawny	Brown
Wensman	**W2222NRR**	2.2	Imperfect Black/Buff	Purple	Gray	Tan
Ziller	**BT 7208NR**	2.0	Imperfect Black	Purple	Gray	Tan
Ziller	**Exp 67820NR**	2.0	Brown	Purp	Light Tawny	Brown

Table 5. Late maturity GT/RR® soybean 3-site average yield and oil content and protein content for Rock Dell, MN, ranked by yield in 2007.

Entry Name	Description	3-site Average Yield	Rock Dell	Rock Dell
1.9 to 2.4 maturities	Relative Maturity	bu/A	% oil	% protein
Trelay 2214RR	2.1	60.8	17.3	36.2
NK S23-Z3	2.3	58.3	18.8	33.0
Kaltenberg KB203RR	2.0	57.8	18.0	35.0
Producers Hybrids 203NRR	2.0	57.5	19.0	34.6
Croplan Genetics RC2020	2.0	57.3	18.6	34.5
Ziller BT7208NR	2.0	57.2	19.2	33.7
Trelay 2233RR	2.3	57.2	17.4	36.1
Latham L2158R	2.1	57.1	18.6	34.7
UAP/DynaGro 37Y21	2.1	57.1	18.2	34.7
AgVenture AV 6204NRR	2.0	56.8	18.8	33.9
Pioneer 92M40	2.4	56.8	17.5	35.6
Prairie Brand PB-2056NRR	2.0	56.4	18.3	34.4
Ziller BT7217NR	2.1	56.3	18.4	34.8
NK S24-J1	2.4	56.1	17.4	36.7
Croplan Genetics RT2092	2.0	56.1	17.8	35.6
Stine 1932-4	1.9	56.1	18.4	34.9
Kaltenberg KB196RR	1.9	56.0	18.0	34.7
UAP/DynaGro DG31D20	2.0	56.0	18.6	34.3
Renk RS223RR	2.2	55.8	18.3	34.1
Stine 1918-4	1.9	55.8	18.0	35.1
Stine 2116-4	2.1	55.8	18.0	35.0
DeKalb DKB22-52	2.2	55.4	17.8	35.0
Prairie Brand PB-2297NRR	2.2	55.4	18.4	33.9
Prairie Brand PB-2147RR	2.1	55.2	17.5	36.9
NK S21-N6	2.1	55.1	18.4	35.0
NK S21-V9	2.1	55.1	17.9	35.3
AgVenture AV 6192RR	1.9	54.8	19.2	33.0
Asgrow AG2002	2.0	54.6	18.2	34.8
AgVenture AV 6212RR	2.1	54.4	17.9	35.8
Pioneer 92M21	2.2	54.3	18.6	34.9
Prairie Brand PB-1916RR	1.9	54.1	17.6	35.0
Latham E2246R	2.2	53.4	17.7	35.4
Atlas 5B193RR	1.9	53.3	17.9	35.6
Producers Hybrids 225RR	2.2	53.0	18.1	36.0
Midwest Seed Genetics GR2231	2.2	51.7	17.0	37.5
Crow's Hybrids C 2215R	2.2	51.2	17.3	36.7
NK H-2181RR	2.1	50.2	17.4	35.5
LSD (P=0.10)		**3.3**	**0.5**	**1.1**

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Comparison of short season glyphosate tolerant (GT) or Roundup Ready® (RR) soybean varieties (0.4 to 1.5 maturity rating) simulating soybean grown after cannery peas at Rock Dell and Waseca, MN, in 2008.

Breitenbach, Fritz R., Lisa M. Behnken, Ryan P. Miller and Seth L. Naeve.

About 80,000 acres of peas are planted in southern MN each year with approximately 40,000 of these acres being double cropped with short season soybean. Minimal variety testing information is available to growers to help them choose varieties for planting after peas. The objective of this trial is to provide agronomic information on short season, 0.4 to 1.5, GT/RR soybean varieties. The trial was located at Rock Dell and Waseca, MN. The trials at Rock Dell were planted with a 4-row John Deere 7000 planter equipped with cone units. At Rock Dell, the seeding rate was 160,000 seeds per acre planted at a depth of 1.5 inches. The plots were four rows wide by 22 feet in length. At Waseca, plots were planted at 175,000 seeds per acre in 10 inch rows by 12 feet in length. A randomized complete block design was implemented and replicated four times. The center two rows at Rock Dell and the center six rows at Waseca of each plot were machine harvested with grain weight and moisture recorded at all sites. Table 1 provides field histories for both locations. Table 2 provides information on moisture, grain yield, average moister and yield over the two sites, and oil and protein content at Rock Dell of short season GT/RR® soybean varieties. Table 3 provides the two-site average moisture, grain yield (13%), gross return and estimated return of short season GT/RR® soybean varieties**.** Table 4 provides details on soybean variety characteristics. Table 5 lists the results from 2007 short season trials.

As cropping systems evolve and pest problems shift across the landscape, additional production issues need to be considered along with the economic returns when deciding to double crop soybeans. Production concerns include 1) Increased likelihood of soil borne diseases and insects, 2) Soybean cyst nematode (SCN) management - double cropping with soybeans may shorten the crop rotation and increase SCN egg numbers in fields, and 3) Glyphosate tolerant or resistant weeds - additional use of glyphosate in the landscape may speed the development of glyphosate resistant weeds. (University of Minnesota Extension, Regional Office, Rochester, and Southern Research and Outreach Center, Waseca, MN)

Table 1. Field histories for short season GT/RR® soybean varieties.

	Rock Dell	Waseca
Planting Date	June 25, 2008	June 24, 2008
Harvest Date	October 29, 2008	October 21, 2008
Soil Type	Kenyon Loam	Nicollet/Webster Clay Loam
Herbicide	Domain PRE / Glyphosate – POST	Glyphosate - POST
Insecticide	Warrior, two applications	Warrior
Tillage	Conventional	Field cultivated once
Previous Crop	Corn	Corn

Table 2. Moisture, grain yield (13%), 2-site averages and oil and protein content (Rock Dell only) of short season GT/RR® soybean varieties simulating soybean grown after cannery peas at Rock Dell and Waseca, MN, in 2008.

Entry Name		Rock Dell		Waseca		2-site average		Rock Dell	
0.5 to 1.5 maturities	Maturity Rating	Moisture (%)	Yield bu/A	Moisture (%)	Yield bu/A	Moisture (%)	Yield bu/A	% oil	% protein
Asgrow AG0808	0.8	12.0	38.7	12.6	41.3	12.3	40.0	18.9	30.8
Asgrow AG0701	0.7	12.0	37.6	12.8	43.9	12.4	40.8	19.2	30.2
Asgrow AG1002	1.0	12.2	37.2	13.9	47.9	13.0	42.6	18.6	32.9
Asgrow AG1403	1.4	12.0	39.9	12.9	50.3	12.5	45.1	18.4	32.3
Crows C0420R	0.4	11.8	34.6	12.4	33.5	12.1	34.1	19.1	31.5
Crows C0620R	0.6	11.9	37.8	12.7	44.4	12.3	41.1	19.0	31.2
Crows C0915R	0.9	12.0	35.2	13.0	40.2	12.5	37.7	18.6	31.4
DynaGro 30B04	0.4	11.7	30.9	12.4	36.8	12.1	33.8	19.6	31.3
Gold Country 2509RR	0.9	12.2	40.6	12.9	45.7	12.5	43.1	18.7	32.3
Latham L1538R	1.5	12.0	42.6	13.3	51.9	12.6	47.3	19.7	31.1
Latham L1553R	1.5	11.9	37.8	13.1	41.5	12.5	39.7	19.6	31.6
Midwest Seed GR0931	0.9	11.8	33.5	13.1	40.1	12.4	36.8	18.7	31.2
Midwest Seed GR1111	1.1	11.8	36.3	12.6	39.9	12.2	38.1	19.6	31.8
Midwest Seed GR1510	1.5	11.9	35.6	12.8	45.7	12.3	40.7	19.6	30.9
Mycogen 5B077RR	0.8	12.1	38.0	13.4	38.2	12.8	38.1	18.5	33.7
Mycogen 5B098RR	0.9	12.0	40.2	13.1	47.0	12.5	43.6	18.8	32.7
Mycogen 5B111RR	1.1	12.2	38.1	13.8	40.2	13.0	39.2	18.4	32.8
NK S08-C3	0.8	12.0	37.3	12.5	46.8	12.2	42.1	19.4	29.8
NK S10-K1	1.0	12.1	42.7	13.2	49.6	12.7	46.2	17.6	33.5
NK S12-P4	1.2	11.9	43.8	13.0	47.9	12.4	45.9	18.7	33.2
Pioneer 90M80	0.8	11.7	41.5	12.6	52.7	12.1	47.1	20.1	28.3
Pioneer 91M20	1.2	12.0	36.9	12.5	40.4	12.2	38.7	18.6	32.6
Renk RS115NRR	1.1	11.7	37.5	12.8	39.3	12.3	38.4	19.2	31.4
Renk RS129NRR	1.2	12.1	39.4	12.8	44.9	12.4	42.1	17.4	34.6
Renk RS147RR	1.4	12.3	39.5	14.0	44.7	13.1	42.1	18.7	32.5
Stine 1108-4	1.1	12.0	36.6	13.7	52.1	12.8	44.4	18.6	32.3
Stine 1366-4	1.3	12.1	39.1	13.3	45.9	12.7	42.5	18.6	33.0
Stine 1423-4	1.4	12.0	40.3	13.2	51.9	12.6	46.1	19.6	29.9
Viking 1585RR	1.5	12.2	42.5	13.3	46.6	12.8	44.5	18.3	33.4
Wensman W2090RR	0.9	12.1	39.4	13.0	44.3	12.6	41.8	19.0	32.6
Wensman W2108RR	1.0	12.1	37.8	13.3	51.4	12.7	44.6	18.5	32.4
Wensman W2126RR	1.2	12.0	36.8	13.2	41.0	12.6	38.9	18.8	32.9
Ziller BT 7131NR	1.3	11.7	37.9	13.0	47.0	12.3	42.4	19.4	31.5
Ziller Exp 47615NR	1.5	12.0	44.5	13.0	51.6	12.5	48.0	19.2	30.3
Ziller BT 7156NR	1.5	11.8	35.3	12.7	55.9	12.2	45.6	19.1	33.0
LSD (P=0.10)		**0.2**	**3.4**	**0.4**	**8.0**		**4.3**	**0.4**	**0.9**

Table 3. Average moisture, yield (13%), gross return and estimated return of short season GT/RR® soybean at Rock Dell and Waseca, MN, in 2008.

Entry Name		2-site average		Gross return[1]			Estimated return[2]		
0.5 to 1.5 maturities	Maturity	Moisture (%)	Yield (bu/A)	$12/bu	$10/bu	$8/bu	$12/bu	$10/bu	$8/bu
Asgrow AG0808	0.8	**12.3**	**40.0**	480	400	320	290	210	130
Asgrow AG0701	0.7	**12.4**	**40.8**	489	408	326	299	218	136
Asgrow AG1002	1.0	**13.0**	**42.6**	511	426	341	321	236	151
Asgrow AG1403	1.4	**12.5**	**45.1**	541	451	361	351	261	171
Crows C0420R	0.4	**12.1**	**34.1**	409	341	273	219	151	83
Crows C0620R	0.6	**12.3**	**41.1**	494	411	329	304	221	139
Crows C0915R	0.9	**12.5**	**37.7**	452	377	302	262	187	112
DynaGro 30B04	0.4	**12.1**	**33.8**	406	338	271	216	148	81
Gold Country 2509RR	0.9	**12.5**	**43.1**	518	431	345	328	241	155
Latham L1538R	1.5	**12.6**	**47.3**	567	473	378	377	283	188
Latham L1553R	1.5	**12.5**	**39.7**	476	397	317	286	207	127
Midwest Seed GR0931	0.9	**12.4**	**36.8**	442	368	295	252	178	105
Midwest Seed GR1111	1.1	**12.2**	**38.1**	457	381	305	267	191	115
Midwest Seed GR1510	1.5	**12.3**	**40.7**	488	407	325	298	217	135
Mycogen 5B077RR	0.8	**12.8**	**38.1**	457	381	305	267	191	115
Mycogen 5B098RR	0.9	**12.5**	**43.6**	523	436	349	333	246	159
Mycogen 5B111RR	1.1	**13.0**	**39.2**	470	392	313	280	202	123
NK S08-C3	0.8	**12.2**	**42.1**	505	421	336	315	231	146
NK S10-K1	1.0	**12.7**	**46.2**	554	462	369	364	272	179
NK S12-P4	1.2	**12.4**	**45.9**	550	459	367	360	269	177
Pioneer 90M80	0.8	**12.1**	**47.1**	566	471	377	376	281	187
Pioneer 91M20	1.2	**12.2**	**38.7**	464	387	309	274	197	119
Renk RS115NRR	1.1	**12.3**	**38.4**	461	384	307	271	194	117
Renk RS129NRR	1.2	**12.4**	**42.1**	505	421	337	315	231	147
Renk RS147RR	1.4	**13.1**	**42.1**	505	421	337	315	231	147
Stine 1108-4	1.1	**12.8**	**44.4**	532	444	355	342	254	165
Stine 1366-4	1.3	**12.7**	**42.5**	510	425	340	320	235	150
Stine 1423-4	1.4	**12.6**	**46.1**	553	461	369	363	271	179
Viking 1585RR	1.5	**12.8**	**44.5**	535	445	356	345	255	166
Wensman W2090RR	0.9	**12.6**	**41.8**	502	418	335	312	228	145
Wensman W2108RR	1.0	**12.7**	**44.6**	535	446	356	345	256	166
Wensman W2126RR	1.2	**12.6**	**38.9**	467	389	311	277	199	121
Ziller BT 7131NR	1.3	**12.3**	**42.4**	509	424	340	319	234	150
Ziller Exp 47615NR	1.5	**12.5**	**48.0**	576	480	384	386	290	194
Ziller BT 7156NR	1.5	**12.2**	**45.6**	547	456	365	357	266	175
LSD (P=0.10)			**4.3**						

1. Gross return equals bushels per acre multiplied by price
2. Estimated return equals gross return minus 2008 projected expenses of $190/acre.

Table 4. Traits of short season Roundup Ready® soybean varieties in 2008.

Brand Name	Variety	Maturity Rating	Hilum Color	Flower Color	Pubescence Color	Pod Color
Asgrow	**AG0808**	0.8	Black	White	Tawny	Brown
Asgrow	**AG0701**	0.7	Black	Purple	Light Tawny	Tan
Asgrow	**AG1002**	1.0	Black	Purple	Light Tawny	Brown
Asgrow	**AG1403**	1.4	Brown	White	Tawny	Tan
Crows	**C0420R**	0.4	Yellow	Purple	Tawny	Brown
Crows	**C0620R**	0.6	Black	Purple	Light Tawny	Tan
Crows	**C0915R**	0.9	Brown	Purple	Gray	Tan
DynaGro	**30B04**					
Gold Country	**2509RR**	0.9	Brown	Purple	Light Tawny	Brown
Latham	**L1538R**	1.5	Imperfect Black	Purple	Gray	Tan
Latham	**L1553R**	1.5	Black	Purple	Light Tawny	Tan
Midwest Seed	**GR0931**	0.9	Brown	Purple	Gray	Tan
Midwest Seed	**GR1111**	1.1	Black	Purple	Light Tawny	Tan
Midwest Seed	**GR1510**	1.5	Black	Purple	Light Tawny	Tan
Mycogen	**5B077R**	0.8	Black	Purple	Light Tawny	Brown
Mycogen	**5B098RR**	0.9	Brown	Purple	Light Tawny	Brown
Mycogen	**5B111RR**	1.1	Brown	Purple	Light Tawny	Brown
NK	**S08-C3**	0.8	Gray	Purple	Gray	Brown
NK	**S10-K1**	1.0	Imperfect Yellow	Purple	Light Tawny	Tan
NK	**S12-P4**	1.2	Brown	Purple	Light Tawny	Tan
Pioneer	**90M80**	0.8	Imperfect Black	Purple	Gray	Tan
Pioneer	**91M20**	1.2	Black	Purple	Light Tawny	Brown
Renk	**RS115NRR**	1.1	Black	Purple	Light Tawny	Tan
Renk	**RS129NRR**	1.2	Black	White	Light Tawny	Brown
Renk	**RS147RR**	1.4	Brown	Purple	Light Tawny	Tan
Stine	**1108-4**	1.1	Brown	Purple	Light Tawny	
Stine	**1366-4**	1.3	Black/Brown	Purple	Light Tawny	
Stine	**1423-4**	1.4	Imperfect Black	Purple	Gray	
Viking	**1585RR**	1.5	Black	White	Tawny	Tan
Wensman	**W2090RR**	0.9	Brown	Purple	Light Tawny	Brown
Wensman	**W2108RR**	1.0	Brown	Purple	Light Tawny	Brown/Tan
Wensman	**W2126RR**	1.2	Black	Purple	Light Tawny	Tan
Ziller	**BT7131NR**	1.3	Black	Purple	Tawny	Brown
Ziller	**Exp 47615NR**	1.5	Imperfect Black	Purple	Gray	Tan
Ziller	**BT7156NR**	1.5	Black	Purple	Tawny	Brown

Table 5. Moisture, grain yield (13%), 2-site averages and oil and protein content (Rock Dell only) of short season GT/RR® soybean varieties simulating soybean grown after cannery peas at Rock Dell and Waseca, MN, in 2007.

Entry Name		Rock Dell		Waseca		2-site average		Rock Dell	
0.5 to 1.5 maturities	Maturity Rating	Moisture (%)	Yield bu/A	Moisture (%)	Yield bu/A	Moisture (%)	Yield bu/A	% oil	% protein
Asgrow AG1102	1.1	13.1	24.9	14.7	32.5	13.9	28.7	15.0	37.5
Asgrow AG1402	1.4	12.9	27.5	14.5	30.5	13.7	29.0	15.1	38.2
Atlas 5N152RR	1.5	12.6	27.6	14.1	29.3	13.4	28.5	15.6	38.6
Crow's 1306	1.3	13.0	29.4	15.6	31.7	14.3	30.6	15.5	37.1
Gold Country 2509RR	0.9	12.9	31.9	14.6	34.5	13.8	33.2	16.5	36.1
LG Seeds C1401RR	1.4	12.8	31.0	14.9	28.9	13.9	30.0	15.8	36.5
Latham 1538R	1.5	12.6	30.8	14.3	36.7	13.5	33.7	16.0	36.6
Midwest Seed Genetics GR0504	0.5	12.4	26.8	13.7	32.4	13.1	29.6	16.5	37.0
Midwest Seed Genetics GR0803	0.8	12.8	30.4	13.4	39.9	13.1	35.1	16.5	36.6
Midwest Seed Genetics GR1111	1.1	12.9	31.1	14.0	32.5	13.5	31.8	15.5	37.1
NK S08-M8	0.8	12.9	31.2	13.6	43.9	13.3	37.6	16.0	35.0
NK S12-P4	1.2	12.4	30.0	14.1	36.4	13.3	33.2	15.7	36.7
NK S13-K2	1.3	13.0	28.5	14.5	32.6	13.8	30.5	15.9	36.5
Pioneer 90M60	0.6	12.9	30.3	14.1	36.3	13.5	33.3	16.3	36.7
Pioneer 90M80	0.8	13.0	28.8	14.5	38.6	13.8	33.7	17.4	34.4
Pioneer 91M41	1.4	12.6	31.8	13.8	43.1	13.2	37.5	17.8	34.8
Prairie Brand PB-0936RR	0.9	12.9	34.0	14.7	41.6	13.8	37.8	15.7	37.0
Prairie Brand PB-1337RR	1.3	12.7	31.4	13.9	38.8	13.3	35.1	14.5	37.8
Producers Hybrids 163RR	1.6	13.0	30.1	14.7	33.3	13.9	31.7	15.5	38.5
Stine 1108-4	1.1	13.1	30.6	15.1	37.3	14.1	33.9	15.4	37.3
Stine 1330-4	1.3	12.7	31.5	14.8	39.1	13.8	35.3	16.3	36.3
Ziller BT7067R	0.6	12.7	29.0	13.9	35.6	13.3	32.3	16.7	36.4
Ziller BT7124R	1.2	13.1	31.4	14.8	34.7	14.0	33.1	14.9	37.3
Ziller BT7156NR	1.5	12.5	29.6	13.6	31.5	13.1	30.5	15.4	38.0
LSD (P=0.10)		**0.4**	**2.4**	**0.7**	**5.0**		**2.7**	**0.6**	**0.7**

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Comparison of short season glyphosate tolerant (GT) or Roundup Ready® (RR) soybean varieties, 0.0 to 1.2, planted weekly from June 25 through July 16 at Lamberton, Rock Dell, and Waseca, MN, in 2008.

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About 80,000 acres of peas are planted in southern MN each year with approximately 40,000 of these acres being double cropped with short season soybean. Minimal variety testing information is available to growers to help them choose varieties for planting soybeans after peas and to determine how late in the season soybeans can be planted and still yield a positive net economic return. The objective of this trial is to provide agronomic information on short season, 0.0 to 1.2, GT/RR soybean varieties, planted weekly from June 25 through July 16, 2008. The trial was located at Lamberton, Rock Dell and Waseca, MN. The trials at Rock Dell and Lamberton were planted with a 4-row John Deere 7000 planter equipped with cone units at a rate of 160,000 seeds per acre with plots four rows wide by 20 feet in length. At Waseca, plots were planted at 175,000 seeds per acre in 10-inch rows by 12 feet in length. A randomized complete block design with four replications was implemented. The center two rows at Lamberton and Rock Dell and the center six rows at Waseca of each plot were machine harvested with grain weight and moisture recorded. Table 1 provides field histories for each location. Table 2 provides details on soybean variety characteristics. Table 3-7 provide information on moisture, grain yield, oil, and protein levels at the four planting dates. Tables 8-11 provide gross and net return at different prices for 2008 and 2007. Only results from planting dates I and II at Lamberton are reported due to immature beans and harvest difficulty.

As cropping systems evolve and pest problems shift across the landscape, additional production issues should be considered along with economic returns, when deciding to double crop soybeans. Production concerns include 1) Increased likelihood of soil borne diseases and insects. 2) Soybean cyst nematode (SCN) management – double cropping with soybeans shortens the crop rotation and may increase SCN egg numbers in fields, and 3) Glyphosate tolerant or resistant weeds - additional use of glyphosate in the landscape may speed the development of glyphosate resistant weeds. (University of Minnesota Extension, Regional Office – Rochester, Southern Research and Outreach Center – Waseca, and Southwest Research and Outreach Center – Lamberton, MN).

Table 1. Field histories for short season GT/RR® soybean varieties.

	Rock Dell	Waseca	Lamberton
Planting Date	June 25, July 2, 9,15.	June 24, July 1, 9, 15	June 24, July 2, 8, 16
Harvest Date	October 29 and 30	October 21, 2008	October 20, 2008
Soil Type	Kenyon Loam	Nicollet/Webster Clay loam	Ves Loam
Herbicide	Domain PRE / Glyphosate – POST	Glyphosate - POST	Glyphosate – POST
Insecticide	Warrior - twice	Warrior	Warrior
Tillage	Conventional	Conventional	Conventional
Previous Crop	Corn	Corn	Corn

Table 2. Traits of short season Roundup Ready® soybean varieties in 2008.

Brand Name	Variety	Maturity Rating	Hilum Color	Flower Color	Pubescence Color	Pod Color
Dyna Gro	**30B04**	0.0				
Asgrow	**AG 0808**	0.8	black	purple	tan	brown
Northrup King	**S08-C3**	0.8	gray	purple	gray	brown
Renk	**115 RR**	1.1	black	purple	light tawny	tan
Northrup King	**S12-P4**	1.2	brown	purple	light tawny	tan

Table 3. Moisture, grain yield (13%), oil and protein content (Rock Dell only) of short season GT/RR® soybean varieties planted at four different dates from June 25 to July 16, at Lamberton, Rock Dell and Waseca, MN, in 2008.

Entry Name	Description	Planting Date[1]	Lamberton[2]		Rock Dell		Waseca		Rock Dell	
0.0 to 1.2 maturities			**% moisture**	**Yield bu/A**	**% moisture**	**Yield bu/A**	**% Moisture[3]**	**Yield bu/A**	**Oil (%)**	**Protein (%)**
DynaGro30B04w/CruiserMaxx Pak	0.0	**I**	12.1	28	10.8	30	11.8	44	20.0	31.7
Asrow AG 0808	0.8	**I**	11.5	35	11.0	41	11.9	50	19.3	31.3
NKS08-03 w/Cruiser Maxx Pak	0.8	**I**	11.0	32	10.9	37	11.6	44	19.5	31.4
Renk 115RR	1.1	**I**	11.1	32	10.8	35	11.9	41	20.0	32.1
NK S12-P4 w/ Cruiser MaxxPak	1.2	**I**	11.5	35	11.1	39	11.7	51	18.5	32.9
Average		**I**		***32***		***36***		***46***	***19.5***	***31.7***
DynaGro30B04w/CruiserMaxx Pak	0.0	**II**	11.3	19	10.2	29	12.0	31	19.7	32.3
Asgrow AG 0808	0.8	**II**	11.7	22	10.5	30	12.0	37	18.6	31.7
NKS08-03 w/Cruiser Maxx Pak	0.8	**II**	12.0	20	10.5	32	11.8	35	19.1	30.8
Renk 115RR	1.1	**II**	12.4	21	10.4	31	12.0	32	19.2	32.5
NK S12-P4 w/ Cruiser MaxxPak	1.2	**II**	14.3	25	10.5	37	12.0	38	18.3	33.9
Average		**II**		***21***		***31***		***35***	***19.0***	***32.2***
DynaGro30B04w/CruiserMaxx Pak	0.0	**III**			10.6	21	15.0	17	18.7	34.0
Asgrow AG 0808	0.8	**III**			10.9	27	15.0	24	18.1	32.4
NKS08-03 w/Cruiser Maxx Pak	0.8	**III**			10.8	25	15.0	29	18.4	31.9
Renk 115RR	1.1	**III**			11.0	27	15.0	24	18.2	33.4
NK S12-P4 w/ Cruiser MaxxPak	1.2	**III**			10.8	27	15.0	38	17.8	33.9
Average		**III**				***26***		***26***	***18.3***	***33.1***
DynaGro30B04w/CruiserMaxx Pak	0.0	**IV**			11.1	17	20.0	17	18.0	35.1
Asgrow AG 0808	0.8	**IV**			13.5	19	20.0	19	17.7	33.3
NKS08-03 w/Cruiser Maxx Pak	0.8	**IV**			11.7	24	20.0	20	17.7	31.8
Renk 115RR	1.1	**IV**			16.8	16	20.0	18	17.9	33.8
NK S12-P4 w/ Cruiser MaxxPak	1.2	**IV**			12.4	20	20.0	32	16.8	35.5
Average		**IV**				***19***		***21***	***17.6***	***33.9***
LSD (P=0.10)			**1.2**	**8**	**1.2**	**6**	**0.2**	**7**	**0.4**	**0.7**

1. Planting date reported in Table 1 for each location.
2. Only results from planting dates I and II at Lamberton are reported because soybean plants did not reach maturity and were extremely difficult to combine.
3. Grain moisture at Waseca was averaged for planting dates III (15%) and IV (20%), due to small soybean sample size.

Table 4. Average soybean grain yield (13%), gross and net return at four planting dates at Lamberton, Rock Dell and Waseca, MN, in 2008.

Entry Name	Description	Planting Date[1]	Average Yield[2]	Gross Return		Net Return[3]	
0.0 to 1.2 maturities			bu/A	$10/bu	$8/bu	$10/bu	$8/bu
DynaGro30B04w/CruiserMaxx Pak	0.0	I	33.7	337	270	147	80
Asgrow AG 0808	0.8	I	41.7	417	333	227	143
NKS08-03 w/Cruiser Maxx Pak	0.8	I	37.5	375	300	185	110
Renk 115RR	1.1	I	35.8	358	286	168	96
NK S12-P4 w/ Cruiser MaxxPak	1.2	I	41.6	416	333	226	143
DynaGro30B04w/CruiserMaxx Pak	0.0	II	26.4	264	211	74	21
Asgrow AG 0808	0.8	II	29.6	296	237	106	47
NKS08-03 w/Cruiser Maxx Pak	0.8	II	28.8	288	230	98	40
Renk 115RR	1.1	II	37.8	278	222	88	32
NK S12-P4 w/ Cruiser MaxxPak	1.2	II	33.3	333	266	143	76
DynaGro30B04w/CruiserMaxx Pak	0.0	III	19.1	191	153	1	(-37)
Asgrow AG 0808	0.8	III	25.5	255	204	65	14
NKS08-03 w/Cruiser Maxx Pak	0.8	III	27.0	270	216	80	26
Renk 115RR	1.1	III	25.3	253	202	63	12
NK S12-P4 w/ Cruiser MaxxPak	1.2	III	32.3	323	258	133	68
DynaGro30B04w/CruiserMaxx Pak	0.0	IV	17.0	170	136	(-20)	(-54)
Asgrow AG 0808	0.8	IV	19.1	191	152	0	(-38)
NKS08-03 w/Cruiser Maxx Pak	0.8	IV	21.9	219	175	29	(-15)
Renk 115RR	1.1	IV	17.1	171	137	(-19)	(-53)
NK S12-P4 w/ Cruiser MaxxPak	1.2	IV	25.9	259	207	69	17

1. Planting dates for all location are listed in Table I.
2. Average yield includes Lamberton, Rock Dell and Waseca for planting dates I and II, and Rock Dell and Waseca for planting dates III and IV.
3. Estimated return equals gross return minus 2008 projected expenses of $190/acre.

Table 5. Soybean moisture, grain yield (13%), oil and protein content for planting date I at Lamberton, Rock Dell and Waseca, MN, in 2008.

Entry Name	Description	Planting Date	Lamberton		Rock Dell		Waseca		Rock Dell	
			% moisture	Yield bu/A	% moisture	Yield bu/A	% moisture	Yield bu/A	Oil (%)	Protein (%)
DynaGro30B04w/CruiserMaxx Pak	0.0	**I**	12.1	28	10.8	30	11.8	44	20.0	31.7
Asgrow AG 0808	0.8	**I**	11.5	35	11.0	41	11.9	50	19.3	31.3
NKS08-03 w/Cruiser Maxx Pak	0.8	**I**	11.0	32	10.9	37	11.6	44	19.5	31.4
Renk 115RR	1.1	**I**	11.1	32	10.8	35	11.9	41	20.0	32.1
NK S12-P4 w/ Cruiser MaxxPak	1.2	**I**	11.5	35	11.1	39	11.7	51	18.5	32.9
Average				***32***		***36***		***46***	***19.5***	***31.7***
LSD (P=0.10)			**0.3**	**3**	**0.4**	**7**	**0.3**	**5**	**0.4**	**0.7**

Table 6. Soybean moisture, grain yield (13%), oil and protein content for planting date II, at Lamberton, Rock Dell and Waseca, MN, in 2008.

Entry Name	Description	Planting Date	Lamberton		Rock Dell		Waseca		Rock Dell	
			% moisture	Yield bu/A	% moisture	Yield bu/A	% moisture	Yield bu/A	Oil (%)	Protein (%)
DynaGro30B04w/CruiserMaxx Pak	0.0	**II**	11.3	19	10.2	29	12.0	31	19.7	32.3
Asgrow AG 0808	0.8	**II**	11.7	22	10.5	30	12.0	37	18.6	31.7
NKS08-03 w/Cruiser Maxx Pak	0.8	**II**	12.0	20	10.5	32	11.8	35	19.1	30.8
Renk 115RR	1.1	**II**	12.4	21	10.4	31	12.0	32	19.2	32.5
NK S12-P4 w/ Cruiser MaxxPak	1.2	**II**	14.3	25	10.5	37	12.0	38	18.3	33.9
Average				***21***		***31***		***35***	***19.0***	***32.2***
LSD (P=0.10)			**1.4**	**NS**	**0.1**	**NS**	**0.3**	**NS**	**0.4**	**0.7**

Table 7. Soybean moisture, grain yield (13%), oil and protein content (Rock Dell only) for planting date III at Rock Dell and Waseca, MN, in 2008.

Entry Name	Description	Planting Date	Rock Dell		Waseca		Rock Dell	
			% moisture	Yield bu/A	% moisture	Yield bu/A	Oil (%)	Protein (%)
DynaGro30B04w/CruiserMaxx Pak	0.0	**III**	10.6	21	15	17	18.7	34.0
Asgrow AG 0808	0.8	**III**	10.9	27	15	24	18.1	32.4
NKS08-03 w/Cruiser Maxx Pak	0.8	**III**	10.8	25	15	29	18.4	31.9
Renk 115RR	1.1	**III**	11.0	27	15	24	18.2	33.4
NK S12-P4 w/ Cruiser MaxxPak	1.2	**III**	10.8	27	15	38	17.8	33.9
Average				***26***		***26***	***18.3***	***33.1***
LSD (P=0.10)			**0.3**	**4**	**0**	**6**	**NS**	**0.7**

Table 8. Soybean moisture, grain yield (13%), oil and protein content (Rock Dell only) for planting date IV at Rock Dell and Waseca, MN, in 2008.

Entry Name	Description	Planting Date	Rock Dell		Waseca		Rock Dell	
			% moisture	Yield bu/A	% moisture	Yield bu/A	Oil (%)	Protein (%)
DynaGro30B04w/CruiserMaxx Pak	0.0	**IV**	11.1	17	20	17	18.0	35.1
Asgrow AG 0808	0.8	**IV**	13.5	19	20	19	17.7	33.3
NKS08-03 w/Cruiser Maxx Pak	0.8	**IV**	11.7	24	20	20	17.7	31.8
Renk 115RR	1.1	**IV**	16.8	16	20	18	17.9	33.8
NK S12-P4 w/ Cruiser MaxxPak	1.2	**IV**	12.4	20	20	32	16.8	35.5
Average				***19***		***21***	***17.6***	***33.9***
LSD (P=0.10)			**1.8**	**5**	**0**	**NS**	**0.6**	**0.6**

Table 9. Soybean average grain yield (13%) gross dollar return and net return, combined over all varieties for planting dates I and II at Lamberton, Rock Dell and Waseca, MN, in 2008.

Planting Date	Average	Gross Dollar Return			Net Return[1] ($)		
	Bu/A	$10/bu	$8/bu	$6/bu	$10/bu	$8/bu	$6/bu
Planting Date I	38.1	381	205	229	191	115	39
Planting Date II	29.0	290	232	174	100	42	(-16)
LSD (P=0.10)	**3.1**						

1. Estimated return equals gross return minus 2008 projected expenses of $190/acre.

Table 10. Soybean average grain yield (13%) gross dollar return and net return, combined over all varieties for planting dates I, II, III, and IV at Rock Dell and Waseca, MN, in 2008.

Planting Date	Average	Gross Dollar Return			Net Return[1] ($)		
	Bu/A	$10/bu	$8/bu	$6/bu	$10/bu	$8/bu	$6/bu
Planting Date I	40.9	490	327	245	300	137	55
Planting Date II	33.1	331	265	199	141	75	9
Planting Date III	25.8	258	206	155	68	16	(-35)
Planting Date IV	20.2	202	162	121	12	(-28)	(-69)
LSD (P=0.10)	**2.8**						

1. Estimated return equals gross return minus 2008 projected expenses of $190/acre.

Table 11. Average soybean grain yield (13%), moisture, gross and net return at four planting dates at Rock Dell and Waseca, MN, in 2007.

Entry Name	Description	Planting Date[1]	2-site average		Gross Dollar Return		Net Return[2]	
			% moisture	Bu/A	$10/bu	$8/bu	$10/bu	$8/bu
DynaGro30B04w/CruiserMaxx Pak	0.0	I	12.1	30.7	$ 307	$ 246	$ 119	$ 58
AsGrow AG0604	0.6	I	12.3	31.7	$ 317	$ 254	$ 129	$ 66
NK S08-03	0.8	I	12.1	29.6	$ 296	$ 237	$ 108	$ 49
NKS08-03 w/Cruiser Maxx Pak	0.8	I	12.1	32.9	$ 329	$ 263	$ 141	$ 75
RS 115RR	1.1	I	12.0	34.1	$ 341	$ 273	$ 153	$ 85
NK S12-P4	1.2	I	12.0	34.4	$ 344	$ 275	$ 156	$ 87
DynaGro30B04w/CruiserMaxx Pak	0.0	II	12.0	25.1	$ 251	$ 201	$ 63	$ 13
AsGrow AG0604	0.6	II	12.3	25.4	$ 254	$ 203	$ 66	$ 15
NK S08-03	0.8	II	12.2	23.9	$ 239	$ 191	$ 51	$ 3
NKS08-03 w/Cruiser Maxx Pak	0.8	II	12.2	28.0	$ 280	$ 224	$ 92	$ 36
RS 115RR	1.1	II	12.0	26.3	$ 263	$ 210	$ 75	$ 22
NK S12-P4	1.2	II	11.9	25.4	$ 254	$ 203	$ 66	$ 15
DynaGro30B04w/CruiserMaxx Pak	0.0	III	12.0	20.3	$ 203	$ 162	$ 15	$ (-26)
AsGrow AG0604	0.6	III	12.1	19.3	$ 193	$ 154	$ 5	$ (-34)
NK S08-03	0.8	III	12.1	20.9	$ 209	$ 167	$ 201	$ (-21)
NKS08-03 w/Cruiser Maxx Pak	0.8	III	12.3	24.4	$ 244	$ 195	$ 56	$ 7
RS 115RR	1.1	III	12.1	21.4	$ 214	$ 171	$ 26	$ (-17)
NK S12-P4	1.2	III	12.0	21.0	$ 210	$ 168	$ 22	$ (-20)
DynaG9o30B04w/CruiserMaxx Pak	0.0	IV	12.1	13.1	$ 131	$ 105	$ (-57)	$ (-83)
AsGrow AG0604	0.6	IV	13.9	14.3	$ 143	$ 114	$ (-45)	$ (-74)
NK S08-03	0.8	IV	12.4	16.2	$ 162	$ 130	$ (-26)	$ (-58)
NKS08-03 w/Cruiser Maxx Pak	0.8	IV	12.2	17.5	$ 175	$ 140	$ (-13)	$ (-48)
RS 115RR	1.1	IV	13.2	17.6	$ 176	$ 141	$ (-12)	$ (-47)
NK S12-P4	1.2	IV	13.1	15.6	$ 156	$ 125	$ (-32)	$ (-63)

1. Planting dates from June 20 through July 12, 2007. 2. Estimated return equals gross return minus 2007 projected expenses of $188/acre.

Table 12. Soybean average grain yield (13%) gross and net return combined over all planting dates at Rock Dell and Waseca, MN, in 2007.

Planting Date[1]	2 site average	Gross Dollar Return			Net Return[2] ($)		
	Bu/A	$10/bu	$8/bu	$6/bu	$10/bu	$8/bu	$6/bu
Planting Date I	32.2	$ 322	$ 258	$ 193	$ 134	$ 70	$ 5
Planting Date II	25.7	$ 257	$ 206	$ 154	$ 69	$ 18	$ (-34)
Planting Date III	21.2	$ 212	$ 170	$ 127	$ 24	$ (-18)	$ (-61)
Planting Date IV	15.7	$ 157	$ 126	$ 94	$ (-31)	$ (-62)	$ (-94)
LSD (P=.10)	1.1						

1. Planting date from June 20 through July 12, 2007. , 2. Estimated return equals gross return minus 2008 projected expenses of $188/acre.

Food Grade and Special Use Soybean Trial at Hope and Waseca, MN, in 2008.

Miller, Ryan P., Fritz R. Breitenbach, Lisa M. Behnken, Thomas R. Hoverstad, and Roger A. Wippler

Interest and demand for soybeans grown for human consumption and other specific purposes has been increasing every year. Food grade or special use soybeans are used in many different markets and can be grown conventionally, organically, or produced and designed as chemical-free. Producers can add income from producing these varieties. However, soybean producers growing for special use markets need to have their production under contract. If done correctly, producers can obtain a premium for their efforts. Producers need to evaluate potential contracts carefully and make sure that the contract will work for their marketing plan. Contracts change from year to year, as do varieties and amounts needed. Producers need to check with local dealers/agents to find a contract that will work for their operation.

Agronomic information about the adaptability of food grade or special use soybeans to southern Minnesota conditions continues to be needed. The objective of this trial is to evaluate the agronomic characteristics of soybean varieties grown in southern Minnesota for special use markets. Trials were conducted in Hope and Waseca in 2008. The trials were planted with a 4-row John Deere 7000 planter equipped with cone units at Hope. The seeding rate was 150,000 seeds per acre planted at a depth of 1.5 inches. The plots were four rows wide by 22 feet in length. At Waseca, plots were planted at 160,000 seeds per acre in 10 inch rows by 12 feet in length. A randomized complete block design was implemented and replicated four times at both sites. The center two rows at Hope and the center six rows at Waseca of each plot were machine harvested with grain weight and moisture recorded at all sites. Field histories are reported in Table 1. Soybean yield and moisture for Hope and Waseca are reported individually and averaged across locations in Table 2. Table 3 lists key traits that some varieties are grown for, average yield, moisture, oil and protein content. Table 4 lists the results from the 2006 trial. (University of Minnesota Extension, Regional Center – Rochester, Southern Research and Outreach Center, Waseca, and Minnesota Crop Improvement Association).

Table 1. Field histories for 2008.

	Hope	**Waseca**
Planting Date	May 16, 2008	May 27, 2008
Harvest Date	October 20, 2008	October 19, 2008
Soil Type	Biscay Loam	Nicollet/Webster clay loam
Herbicide	Domain PRE / Raptor POST, FirstRate POST, Select POST	Treflan + Pursuit, PPI
Tillage	Conventional Till	Field cultivated once. PPI herbicide applied then field cultivated twice
Previous Crop	Corn	Corn

Table 2. Soybean protein, oil, moisture and yield at Hope and moisture and yield at Waseca and the 2-site average in Minnesota in 2008.

Entry	Maturity	Hope				Waseca		Average
		Protein (%)	Oil (%)	Moisture (%)	Yield (bu/A)	Moisture (%)	Yield (bu/A)	Yield (Bu/A)
1010LF	1.8	35.2	16.6	14.0	39.7	13.6	46.7	43.2
Asoyia 2308	2.3	36.2	17.3	14.1	42.2	14.9	54.9	48.6
Kin	1.9	34.6	17.8	14.4	44.5	15.1	53.4	48.9
Lariet	1.6	34.1	19.3	14.3	41.4	14.9	55.3	48.3
Latham E2319	2.3	37.5	17.7	14.4	36.6	15.3	42.6	39.6
Latham E2429	2.4	36.9	17.6	14.1	42.7	14.7	44.7	43.7
MN - 1012SP	1.0	32.7	18.4	14.8	27.2	16.1	34.1	30.6
MN – 1104SP	1.1	34.6	19.2	14.2	36.1	15.6	39.8	38.0
MN – 1203SP	1.2	31.8	18.5	14.9	30.5	17.4	39.4	35.0
MN – 1401BL	1.4	36.3	18.2	13.5	41.5	13.4	50.4	46.0
MN – 1401SP	1.4	34.9	18.6	14.8	41.4	15.3	49.8	45.6
MN - 1410	1.4	33.8	19.3	14.9	48.1	15.7	61.0	54.5
MN- 1505SP	1.5	37.4	18.3	14.9	40.6	15.4	45.7	43.1
MN- 1607	1.6	36.2	18.3	14.0	36.2	14.5	49.4	42.8
MN – 1701CN	1.7	33.4	18.8	14.7	44.9	15.2	53.8	49.4
MN1310SP	1.3	33.5	18.7	14.2	37.9	15.5	42.1	40.0
M02-474385	1.5-1.8	33.8	18.1	14.5	38.6	15.8	53.4	46.0
Northland SurePro	2.0	38.3	17.4	14.7	37.7	15.5	39.5	38.6
Northland NL66	1.5	37.2	16.0	14.7	38.5	15.6	45.2	41.8
Northland NL59	1.4	36.8	16.0	14.9	35.8	15.9	51.5	43.6
SR - EXP22	1.9	30.7	19.9	14.7	51.5	16.4	63.6	57.6
SR - EXP23	2.0	33.7	18.5	14.3	43.4	15.2	61.4	52.4
SR – 08LF	2.0	34.2	18.3	14.2	47.6	14.8	58.1	52.8
SR – 09	0.9	32.6	19.9	13.9	37.8	14.3	41.8	39.8
SR – 11	1.1	34.6	18.8	14.5	40.6	15.0	58.4	49.5
SR – 53	2.3	37.4	17.1	13.8	42.9	14.6	47.9	45.4
SR – 67	2.3	36.9	17.8	14.2	36.3	15.1	47.7	42.0
SRN – 14	1.4	35.0	18.8	14.4	36.8	15.6	39.0	37.9
Stine 1906	1.8	33.3	19.0	14.0	39.3	14.7	50.6	45.0
Viking 0.1898N	1.8	32.5	19.5	14.9	48.6	16.1	63.7	56.2
Viking 0.2022	2.0	32.5	19.3	14.4	47.9	15.9	52.6	50.2
NK S18-Y3	1.8	34.1	18.2	14.3	50.7	14.5	61.9	56.3
LSD (P=0.10)		**0.8**	**0.5**	**0.4**	**5.2**	**0.6**	**13.5**	7.3

Table 3. Soybean 3-site average moisture and yield (13%), and oil and protein content at Rock Dell of food grade, special use soybeans in MN, in 2007.

Entry	Maturity	3-Site Average[1]		Rock Dell	
		% moisture	bu/A	% oil	% protein
Kin	1.9	12.6	41.6	16.4	39.4
Latham E2429	2.4	12.4	38.5	15.9	38.8
Latham E2689	2.6	12.7	33.1	17.4	37.2
MN0804SP	1.4	12.3	34.9	16.4	39.1
MN1101SP	1.1	13.0	36.4	16.2	38.1
MN1103SP	1.2	13.0	33.7	16.9	38.3
MN1104SP	0.9	13.7	41.5	15.6	40.0
MN1203SP	1.2	12.6	35.4	16.8	37.9
MN1401	1.4	12.8	39.5	17.3	37.2
MN1410	1.4	13.1	45.5	16.7	39.4
MN1505SP	1.5	13.4	40.1	16.8	41.2
MN1607SP	1.6	13.0	37.9	16.2	38.1
MN1608SP	1.6	13.0	46.8	16.3	39.0
MN1805SP	1.8	12.8	35.3	16.3	39.2
MN2001SP	2.0	12.8	35.8	16.6	37.6
M00-114140	1.7	12.9	41.9	16.6	38.8
M98-310018	1.3	12.9	33.6	16.6	40.2
M99-333017	1.8	12.5	35.1	15.8	39.7
M99-334021	1.4	12.6	30.1	14.7	41.5
M99-337034	1.5	12.6	38.4	16.0	39.2
Northland WinPro	1.5	12.8	37.0	16.3	38.3
Northland RoyalPro	1.6	11.9	27.1	16.0	38.9
Northland SurePro	1.9	13.0	36.4	16.7	38.4
Pioneer 92B12		12.3	43.6	16.2	39.2
SR-08LF	0.8	12.3	43.1	16.1	39.0
SR-11	1.1	12.7	36.5	16.0	38.2
SRN-14	1.4	12.6	40.9	16.5	39.3
SR-46		12.8	37.7	16.6	37.2
SR-53		12.6	37.4	16.0	39.7
SR-67		12.8	37.7	15.5	40.2
Stine 1906		12.4	48.2	16.8	38.7
NK S19-L7	1.9	11.9	47.8	16.8	38.3
LSD (P=0.10)			**2.7**	**NS**	**NS**

1. 3-site average includes Hope, Potsdam, and Waseca

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The evaluation of Soybean Cyst Nematode (SCN) resistant varieties - performance and impact on SCN egg counts at High Forest, North Waseca, Rock Dell, and Waseca, MN, in 2008.

Miller, Ryan P., Lisa M. Behnken, Fritz R. Breitenbach

The objective of this trial was to evaluate SCN resistant soybean varieties for yield performance and impact on SCN egg counts in southeastern Minnesota. At each site field preparation was conventional tillage and the previous crop was corn. At High Forest, North Waseca, and Rock Dell, the trial was planted with a 4-row John Deere 7000 planter equipped with cone units at a depth of 1.5 inches in 30-inch rows, and a seeding rate of 138,000 seeds/A. At Waseca, plots were planted at 160,000 seeds per acre in 10 inch rows by 12 feet in length. A randomized complete block design with four replications was used at all sites. Initial SCN egg counts were determined for each site by sampling every plot. The initial egg count is an average of the four replications at each site. The initial SCN egg counts for Waseca, Rock Dell, High Forest, and North Waseca were 25, 0, 3744, and 12331 eggs/ 100 cc of soil, respectively (Table 1). Waseca and Rock Dell were considered non-infested and High Forest and North Waseca were considered infested. The SCN population at High Forest was HG type 2.5.7 and the SCN population at North Waseca was HG type 7 (Tables 2 and 3). Final SCN soil samples for egg counts were collected at each infested site after the soybeans had reached the R6 stage; samples were collected from each plot and were bulked by variety across replications. The reproductive index (RI) was calculated for each infested site by dividing the final egg counts for each variety by the initial average egg count (Table 4). Varieties with a RI of less than .5 are generally considered resistant. Yields were adjusted to 13% moisture and results are shown in tables 5 and 6. Varieties were also ranked by yield and RI (Figure 1).
(University of Minnesota Extension, Regional Office - Rochester, MN.)

Table 1. Field histories for Soybean Cyst Nematode (SCN) resistant soybean variety trials in southern Minnesota in 2008.

	High Forest	North Waseca	Rock Dell	Waseca
Planting Date	May 19, 2008	May 20, 2007	May 19, 2008	May 28, 2007
Harvest Date	October 14, 2008	October 2008	October 1, 2008	October 2008
Soil Type	Waukee Loam, Marshan & Skyberg Silt Loams	Canisteo-Glencoe Clay Loam	Kenyon Loam	Nicollet/Webster Clay Loam
Herbicide	Glyphosate, POST	Glyphosate POST	Glyphosate, POST	Glyphosate, POST
Tillage	Conventional	Conventional	Conventional	Conventional
Previous Crop	Corn	Corn	Corn	Corn
Preplant SCN Egg Count (Eggs/100 cc soil)	3,744	12,331	0	25

Table 2. HG Type Results for High Forest in 2008.

Line #	Ind. Line Name	# plants	# cysts	Female/plant	FI (%)	HG Type
1	**PI 548402 (PEKING)**	5	22	4.4	**2.6**	
2	**PI88788**	5	155	31	**18.6**	**2**
3	**PI90763**	5	0	0	**0.0**	
4	**PI437654**	5	0	0	**0.0**	
5	**PI209332**	4	80	20	**12.0**	**5**
6	**PI89772**	5	0	0	**0.0**	
7	**PI548316 (CLOUD)**	4	230	57.5	**34.4**	**7**
8	**LEE**	5	835	167		

Table 3. HG Type Results for North Waseca in 2008.

Line #	Ind. Line Name	# plants	# cysts	Female/plant	FI (%)	HG Type
1	**PI 548402 (PEKING)**	5	4	0.8	**0.8**	
2	**PI88788**	5	39	7.8	**7.9**	
3	**PI90763**	5	0	0	**0.0**	
4	**PI437654**	5	0	0	**0.0**	
5	**PI209332**	4	28	7	**7.1**	
6	**PI89772**	5	0	0	**0.0**	
7	**PI548316 (CLOUD)**	5	96	19.2	**19.4**	**7**
8	**LEE**	5	495	99		

Table 4. Reproductive Index for Infested Sites in 2008.

Variety	Resistance Source/Type	High Forest Reproductive Index	North Waseca Reproductive Index	Average Reproductive Index
Pioneer 91Y70	88788	0.42	0.51	0.47
Pioneer 91Y91	Peking	0.41	0.46	0.43
Pioneer 92Y20	Peking	0.25	0.60	0.43
Pioneer 92Y30	88788	0.35	0.95	0.65
Pioneer 91Y90	susceptible	2.60	1.50	2.05
Nutech 7193	88788	0.71	0.58	0.65
Nutech 7186	Peking	0.86	0.86	0.86
Latham 1401	cystx	0.53	0.72	0.62
Latham 1538	88788	0.62	1.04	0.83
Latham 1738	88788	0.51	0.98	0.75
Latham 1983	88788	0.72	0.63	0.67
NK S19L7	88788	0.65	0.47	0.56
NK S21N6	susceptible	3.60	1.91	2.75
NK S17A1	88788	1.13	0.36	0.75
NK S22C5	88788	1.72	0.67	1.19
NK S23N7	88788	1.75	0.87	1.31
PB 2056	88788	0.68	0.67	0.68
GH 1852	88788	0.70	0.51	0.60
Krueger 170	88788	1.06	1.15	1.10
Krueger 201	88788	0.81	0.70	0.75
Asgrow 2002	88788	0.14	0.75	0.45
Asgrow 1906	88788	0.59	0.43	0.51
Asgrow 2110	Peking	0.35	0.39	0.37
Viking 2198NRR	88788	0.67	0.57	0.62
Viking 193 NRR	Hartwig	0.69	0.54	0.61

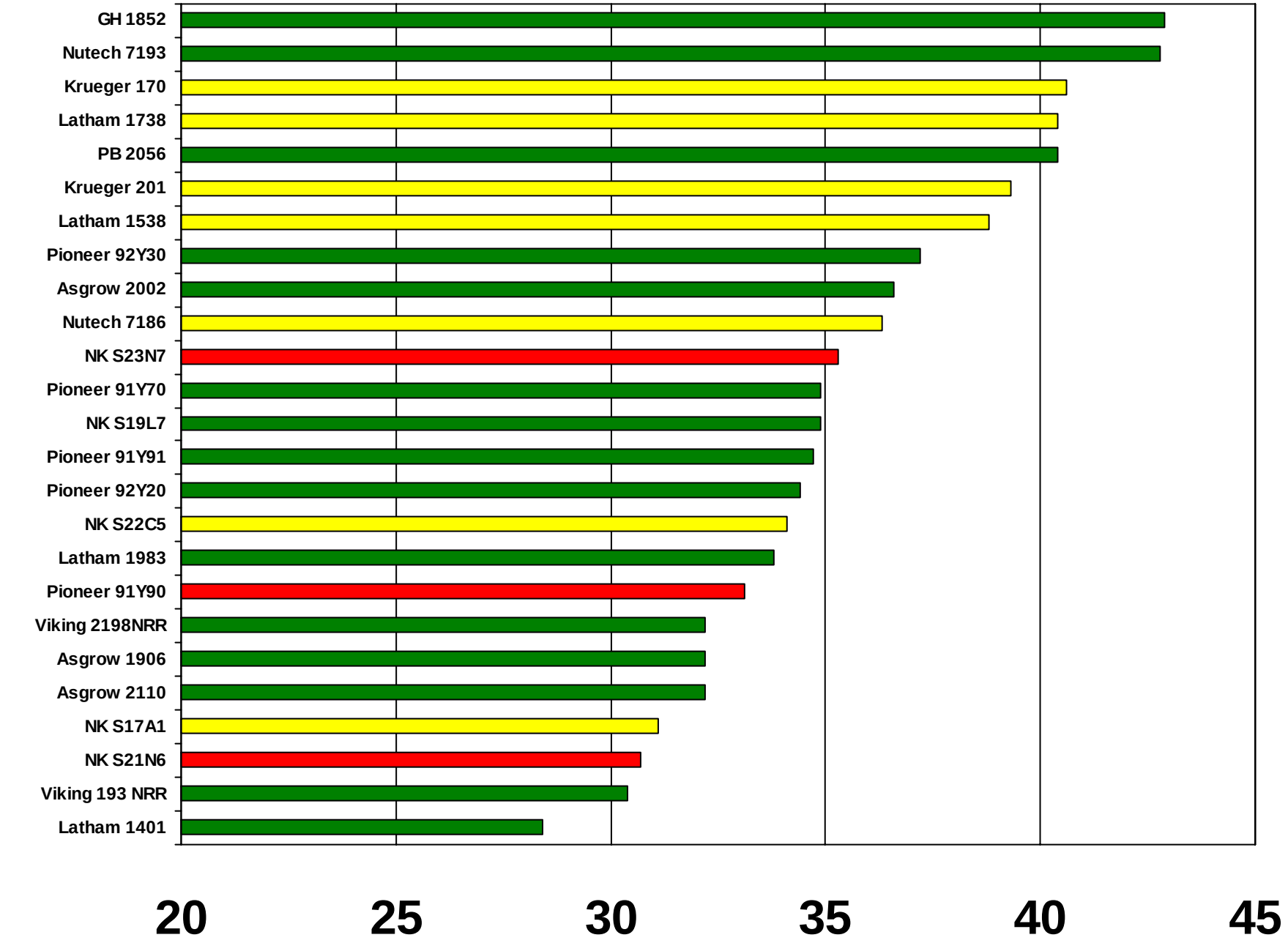
Table 5. SCN Soybean Variety Trial Moisture (%) and Yield (bu/A) at High Forest, North Waseca, Rock Dell, and Waseca in 2008.

Variety	Description		High Forest		North Waseca		Rock Dell		Waseca	
	Maturity	Resistance Source	Soybean Moisture (%)	Soybean Yield (bu/A)	Soybean Moisture (%)	Soybean Yield (bu/A)	Soybean Moisture (%)	Soybean Yield (bu/A)	Soybean Moisture (%)	Soybean Yield (bu/A)
Pioneer 91Y70	1.7	88788	14.4	35.1	11.2	34.6	13.1	44.5	10.0	36.6
Pioneer 91Y91	1.9	Peking	14.3	37.9	11.3	31.4	12.6	41.3	11.1	39.3
Pioneer 92Y20	2.2	Peking	14.0	41.9	11.2	26.9	12.4	43.7	11.6	40.6
Pioneer 92Y30	2.3	88788	14.6	40	11.1	34.4	12.9	41.6	11.8	43.1
Pioneer 91Y90	1.9	susceptible	14.1	36.5	11.3	29.6	12.6	42.2	11.4	43
Nutech 7193	1.9	88788	14.6	45.7	11.2	39.8	12.8	40.9	11.7	51.1
Nutech 7186	1.8	Peking	14.5	40.4	11.3	32.1	12.5	43.9	11.5	49.4
Latham 1401	1.4	cystx	14.9	27.8	11.0	28.9	12.8	31.9	11.7	35.5
Latham 1538	1.5	88788	14.5	38.5	11.2	39	12.9	37.3	11.4	40.6
Latham 1738	1.7	88788	14.6	49	11.3	31.8	12.8	41.8	11.8	45.1
Latham 1983	1.9	88788	14.6	39.7	11.1	27.9	13.1	45.5	11.8	40.9
NK S19L7	1.9	88788	14.4	37.6	11.1	32.1	12.5	36.9	11.2	39.4
NK S21N6	2.1	susceptible	13.9	31.6	11.1	29.7	12.9	48.8	11.9	46
NK S17A1	1.7	88788	13.2	36	11.1	26.2	12.5	41.2	11.6	48.4
NK S22C5	2.2	88788	14.5	34	11.2	34.1	12.7	40.5	11.8	53.4
NK S23N7	2.3	88788	14.2	36.8	11.3	33.8	12.7	44	11.8	45.5
PB 2056	2	88788	14.4	44.3	11.0	36.4	12.4	42.8	11.3	44.9
GH 1852	1.8	88788	14.6	50.1	11.2	35.6	12.6	40.7	11.8	44.1
Krueger 170	1.7	88788	14.5	49.1	11.2	32.1	12.7	46.1	11.6	42.9
Krueger 201	2	88788	14.4	44.4	10.9	34.2	12.6	42.4	11.1	45.5
Asgrow 2002	2	88788	14.6	42.5	11.2	30.6	12.7	41.2	11.6	58.1
Asgrow 1906	1.9	88788	14.4	36.7	11.3	27.6	13.0	40.4	11.8	46.9
Asgrow 2110	2.1	Peking	14.8	42.1	11.3	22.2	12.8	40.9	11.9	46.9
Viking 2198NRR	2.1	88788	14.8	34.8	11.3	29.6	12.9	41.6	11.4	41.5
Viking 193 NRR	1.9	Hartwig	14.3	37	11.2	23.7	12.7	36.1	11.5	49.4
		LSD (P=0.10)	**0.3**	**10.4**	**NS**	**NS**	**0.2**	**3.5**	**NS**	**10.5**

Table 6. Combined Yield Results for Infested and Non infested Sites in 2008.

Variety		Infested			Non infested		
	Resistance Source/Type	H. Forest	North Waseca	Average	Rock Dell	Waseca	Average
		bu/A			bu/A		
Pioneer 91Y70	88788	35.1	34.6	34.9	44.5	36.6	40.6
Pioneer 91Y91	Peking	37.9	31.4	34.7	41.3	39.3	40.3
Pioneer 92Y20	Peking	41.9	26.9	34.4	43.7	40.6	42.2
Pioneer 92Y30	88788	40	34.4	37.2	41.6	43.1	42.4
Pioneer 91Y90	susceptible	36.5	29.6	33.1	42.2	43	42.6
Nutech 7193	88788	45.7	39.8	42.8	40.9	51.1	46.0
Nutech 7186	Peking	40.4	32.1	36.3	43.9	49.4	46.7
Latham 1401	cystx	27.8	28.9	28.4	31.9	35.5	33.7
Latham 1538	88788	38.5	39	38.8	37.3	40.6	39.0
Latham 1738	88788	49	31.8	40.4	41.8	45.1	43.5
Latham 1983	88788	39.7	27.9	33.8	45.5	40.9	43.2
NK S19L7	88788	37.6	32.1	34.9	36.9	39.4	38.2
NK S21N6	susceptible	31.6	29.7	30.7	48.8	46	47.4
NK S17A1	88788	36	26.2	31.1	41.2	48.4	44.8
NK S22C5	88788	34	34.1	34.1	40.5	53.4	47.0
NK S23N7	88788	36.8	33.8	35.3	44	45.5	44.8
PB 2056	88788	44.3	36.4	40.4	42.8	44.9	43.9
GH 1852	88788	50.1	35.6	42.9	40.7	44.1	42.4
Krueger 170	88788	49.1	32.1	40.6	46.1	42.9	44.5
Krueger 201	88788	44.4	34.2	39.3	42.4	45.5	44.0
Asgrow 2002	88788	42.5	30.6	36.6	41.2	58.1	49.7
Asgrow 1906	88788	36.7	27.6	32.2	40.4	46.9	43.7
Asgrow 2110	Peking	42.1	22.2	32.2	40.9	46.9	43.9
Viking 2198NRR	88788	34.8	29.6	32.2	41.6	41.5	41.6
Viking 193 NRR	Hartwig	37	23.7	30.4	36.1	49.4	42.8
	LSD (P=0.10)	**10.4**	**NS**		**3.5**	**10.5**	

Figure 1. Average Yield Ranking and Reproductive Index for Infested Sites in 2008.



1. *Green indicates egg counts decreased over the season (Reproductive Index = 0.0 to 0.7)*
2. *Yellow indicates egg counts remained the same over the season (Reproductive Index = 0.71 to 1.3)*
3. *Red indicates egg counts increased over the season (Reproductive Index =1.31 and greater)*

Management and Use of Low Linolenic (Vistive) Soybean Varieties at Gaylord, Jackson, Lamberton, Rock Dell and Waseca, MN, in 2008.

Nicolai, Dave A., Ryan P. Miller, Fritz R. Breitenbach, Lisa M. Behnken, Lizabeth A.B. Stahl, Jim Orf, and Seth Naeve.

Introduction: Soybean oil is made up of five major fatty acids: palmitic, stearic, oleic, linoleic, and linolenic. For many food applications, traditional soy oil undergoes a process called partial hydrogenation, primarily to improve the natural flavor, stability, and shelf life of the product. Linolenic acid is the fatty acid most responsible for making soybean oil spoil, prompting the use of partial hydrogenation. Partial hydrogenation leads to the formation of trans fat in foods. The U.S. Food and Drug Administration mandate requiring trans fat content to be listed on all retail food nutrition labels beginning Jan. 1, 2006, has spurred many food manufacturers to seek alternatives to ingredients that add trans fat or saturated fat to foods. Excessive levels of trans and saturated fats in diets have been linked by leading medical authorities to coronary heart disease and other health concerns.

Soybeans will typically produce oil that is 6-8% linolenic acid. To address the concerns of health-conscious Americans' increasing demand for foods with improved nutritional profiles, public and private soybean breeders in the United States have released soybean varieties with less than 3% linolenic acid. One variety, Asoyia, has only 1% linolenic acid and is classed as “Ultra Low Linolenic”. Soybeans bred to have low levels of linolenic acid produce soybean oil that is less likely to deteriorate or go rancid, and therefore does not need to be hydrogenated. This will significantly reduce the amount of trans fats in the foods made with these “Low Linolenic” soybean oils and enable food companies to reduce or eliminate trans fat from processed foods. When used in frying applications, low linolenic oil can eliminate the need for partial hydrogenation, resulting in foods with negligible amounts of trans fat absorbed from the frying oil. Low linolenic oil is well suited for many food products consumed on a daily basis, including foodservice frying, snack foods, salad oils, spray oils and some bakery applications.

Low linolenic soybeans are currently accepted by 22 processors and more than 370 elevators across the country. To meet demand, market contracts for 2009 provide a $0.50 to $0.70/bushel premium. Market contracts for Asoyia soybeans currently range from $0.85 - $1.00/bushel premium. Because of these opportunities, growers are asking for performance data. The objective of this study was to evaluate the performance of low linolenic soybean varieties in southern Minnesota. The trial was conducted at five locations, Gaylord, Jackson, Lamberton, Rock Dell and Waseca, MN. The seeding rate was 150,000 seeds per acre planted at a depth of 1.5 inches. A randomized complete block design was implemented and replicated four times at all sites. Plots were machine harvested with grain weight and moisture recorded at all sites. Field histories are reported in Table 1. Soybean yield and moisture for Lamberton, Rock Dell and Waseca are reported in Table 2 and for Gaylord and Jackson in Table 3. Note, the variety Producers 226NRR was planted at Lamberton, Rock Dell and Waseca and the variety Asoyia was planted at Gaylord and Jackson. Table 4 lists the five-site average yield and moisture, and the oil and protein content at Rock Dell. (University of Minnesota Extension, Regional Center, Rochester, Southern Research and Outreach Center, Waseca, Southwestern Research and Outreach Center, Lamberton).

Table 1. Field histories for low linolenic variety trials in southern MN in 2008.

	Gaylord	Jackson	Lamberton	Rock Dell	Waseca
Planting Date	May 17, 2008	May 20, 2008	May 28, 2008	May 17, 2008	May 28, 2008
Harvest Date	October 19, 2008		October 17, 2008	October 28, 2008	October 19, 2008
Soil Type	Glencoe/Nicollet/Webster clay loam		Ves loam	Kenyon loam	Nicollet/Webster clay loam
Herbicide	Pursuit Plus PRE Flexstar POST		Prowl PRE Glyphosate POST	Sequence POST I, Glyphosate + Select POST II	Glyphosate POST
Insecticide	Warrior		Warrior	Warrior	Warrior
Tillage	Conventional	Conventional	Field Cultivation 2X	Conventional	Conventional
Previous Crop	Corn	Corn	Corn	Soybean	Corn

Table 2. Low linolenic soybean variety yield at Lamberton, Rock Dell, and Waseca, three-site average moisture and yield, and percent oil and protein at Rock Dell, Minnesota in 2008.

Entry	Maturity	Lamberton	Rock Dell	Waseca	3-site Average	3-site Average	Rock Dell	
		Yield ----------(bu/A) ----------			Moisture (%)	Yield (Bu/A)	Oil (%)	Protein (%)
Asgrow AG2222	2.2	41.0	40.4	51.1	12.5	44.2	19.3	32.5
Asgrow AG2422	2.4	40.1	38.8	51.6	12.4	43.5	19.2	32.6
Asgrow AG2423	2.4	41.5	40.5	54.4	12.5	45.4	20.2	31.2
Asgrow AG2521	2.5	42.6	39.2	55.2	12.5	45.7	20.1	31.5
AgVenture Exp 1		40.1	36.6	52.6	12.5	43.1	19.4	32.8
AgVenture Exp 2		42.5	40.4	57.4	12.2	46.7	19.3	32.7
AgVenture 22V5	2.2	41.2	37.5	51.0	12.2	43.2	19.1	32.8
AgVenture 24V4	2.4	39.9	38.3	51.4	12.7	43.2	19.1	32.9
Croplan RC2177V	2.1	43.8	40.5	56.9	12.2	47.0	19.0	33.2
DynaGro DG34B22	2.2	41.9	39.7	51.9	12.2	44.5	19.3	32.8
Latham L2238RV	2.2	46.5	41.7	54.7	12.2	47.6	19.1	33.0
Latham L2458RV	2.4	41.1	37.2	53.0	12.6	43.8	19.5	32.8
Producers 226NRR	2.2	41	36.8	54.2	12.0	44.0	19.2	32.9
LSD (P=0.10)		**3.1**	**NS**	**NS**		**2.1**	**0.4**	**0.7**

Table 3. Low linolenic soybean variety yield at Gaylord and Jackson and the two-site average moisture and yield in Minnesota in 2008.

Entry	Maturity	Gaylord	Jackson	Average	Average
		Yield ---------- (bu/A) ----------		Moisture (%)	Yield (Bu/A)
Asgrow AG2222	2.2	56.0	32.3	11.8	44.2
Asgrow AG2422	2.4	49.0	26.9	14.5	37.9
Asgrow AG2423	2.4	54.6	26.2	15.4	40.4
Asgrow AG2521	2.5	61.6	31.7	14.1	46.7
AgVenture Exp 1		52.4	33.0	17.0	42.7
AgVenture Exp 2		53.8	32.2	12.6	43.0
AgVenture 22V5	2.2	52.5	33.5	14.2	43.0
AgVenture 24V4	2.4	53.6	29.4	17.1	41.5
Croplan RC2177V	2.1	47.9	32.5	13.3	40.2
DynaGro DG34B22	2.2	55.2	32.9	14.0	44.0
Latham L2238RV	2.2	60.1	33.5	11.5	46.8
Latham L2458RV	2.4	59.0	33.8	17.9	46.4
Asoyia 2308	2.2	56.1	24.5	16.4	40.3
LSD (P=0.10)		**6.3**	**NS**		**4.5**

Table 4. Low linolenic soybean variety average moisture and yield over five sites and percent protein and oil at Rock Dell, MN, in 2008.

Entry	Maturity	5-Site Average [1]		Rock Dell	
		Moisture (%)	Yield (bu/A)	Oil (%)	Protein (%)
Asgrow AG2222	2.2	12.2	44.2	19.3	32.5
Asgrow AG2422	2.4	13.3	41.3	19.2	32.6
Asgrow AG2423	2.4	13.6	43.4	20.2	31.2
Asgrow AG2521	2.5	13.2	46.1	20.1	31.5
AgVenture Exp 1		14.3	42.9	19.4	32.8
AgVenture Exp 2		12.3	45.3	19.4	32.7
AgVenture 22V5	2.2	13.0	43.1	19.1	32.8
AgVenture 24V4	2.4	14.4	42.5	19.1	32.9
Croplan RC2177V	2.1	12.6	44.3	19.0	33.2
DynaGro DG34B22	2.2	12.9	44.3	19.3	32.8
Latham L2238RV	2.2	11.9	47.3	19.1	33.0
Latham L2458RV	2.4	14.7	44.8	19.5	32.8
LSD (P=0.10)			**2.1**	**0.4**	**0.7**

SECTION E

SOYBEAN

HERBICIDE TRIALS

New Soybean Herbicides for 2009 found in the 2008 Reports

1. ***Ignite 280* =** glufosinate [BAYER]
2. ***Enlite* =** chlorionuron-ethyl (*Classic*) + flumioxazin (*Valor*) + thifensulfuron (*Harmony GT*) [DuPONT]
3. ***Authority Assist* =** sulfentrazone (*Authority*) + imadethapyr (*Pursuit*) [FMC]
4. ***Cadet* =** fluthiacet-methyl [FMC]

Liberty Link in soybean at Rochester, MN, in 2008.

Breitenbach, Fritz R., Lisa M. Behnken, Ryan P. Miller, Sarah A. Stellpflug, Louis E Kuisle and Brent R. Breitenbach

The objective of this trial was to evaluate the performance of Ignite 280 systems for weed control in glufosinate tolerant soybean. The research site was a Lawler loam series with a pH of 6.7 and soil test P and K levels of 19 ppm and 142 ppm, respectively. The field was spring disked and field cultivated prior to planting. The soybean variety, Liberty Link Soybean, was planted on May 22, 2008, at a depth of 1.5 inches in 30 inch rows at 150,000 seeds per acre. A randomized complete block design was used with four replications. Preemergence (PRE) and postemergence (POST I, POST II, and POST III) treatments were applied with a tractor-mounted sprayer delivering 20 gpa at 32 psi using Turbo Tee 11002 nozzles. Evaluations of the plots were taken on June 23 and 30 and July 7 and 14. Application dates, environmental conditions, and weed stages are listed below. The plot was destroyed prior to harvest on July 22, 2008.

Date	**5/22**	**6/23**	**6/30**	**7/8**
Treatment	**PRE**	**POST I**	**POST II**	**POST III**
Temperature (F)				
Air	70	78	76	80
soil	70	79	87	85
Relative Humidity (%)	41	40	32	46
Wind (mph)	8	3	12	15
Soil moisture	Inadequate	Inadequate	Adequate	Adequate
Bean				
stage		V2	V3	R1
height (inch)		4.7	6.75	12.0
Velvetleaf				
weed density (ft^2)		1.5	1.5	
height (inch)		2.2	3.9	1.1
Common Lambsquarters				
weed density (ft^2)		3.6	3.6	
height (inch)		2.5	3.5	1.9
Common Waterhemp				
weed density (ft^2)		13.1	13.1	
height (inch)		1.8	3.9	1.0
Giant Foxtail				
weed density (ft^2)		6.6	6.6	
height (inch)		3.1	9.5	1.3
Rainfall after each application (inch)				
week 1	1.99	0.76	0.87	0.92
week 2	2.06	0.87	0.92	0.60
week 3	6.57	0.92	0.59	0.03

CONCLUSIONS

Weather conditions following pre-emergence applications allowed for excellent activation of the herbicides with 1.99 inches of precipitations falling within one week of application.

The best preemergence velvetleaf control was provided by the FirstRate, Gangster, and Sonic treatments with 99% control for all treatments (6/23 rating). Valor SX and Valor SX + Sencor provided very good velvetleaf control, 90 and 95%, respectively. Prefix offered poor control at 39%.

Valor SX (98%), Valor + Sencor (99%), Firstrate (98%), Gangster (99%), and Sonic (99%) preemergence provided excellent common lambsquarters control (6/23 rating). Prefix provided poor control at 46%.

Valor SX (98%), Valor + Sencor (99%), and Gangster (99%), pre-emergence provided excellent common waterhemp control. Very good control of common waterhemp was provided by Prefix (88%), and Sonic (86%). FirstRate provided poor control at 35% (6/23 rating).

Excellent preemergence giant foxtail control was achieved with Prefix (97%). Very good foxtail control was provided by the Valor SX (88%), Valor SX + Sencor (93%), and Gangster (90%) treatments. Sonic offered good control at 83%. FirstRate provided fair control of giant foxtail with 64% (6/23 rating).

Weather conditions prior to all POST applications were challenging due to drier than normal conditions and inadequate soil moisture. Despite these adverse conditions, all herbicide treatments provided very good to excellent weed control.

All treatments provided at least 98% control of velvetleaf, except the Prefix followed by Ignite which offered 90% control of velvetleaf, 7/14 rating. Common lambsquarters control was similar, with all treatments proving at least 96% control; again with the exception of the Prefix followed by Ignite treatment which provided 88% control (7/14 rating). Common waterhemp control with FirstRate, Gangster, Prefix, and Sonic all followed by Ignite, 7/14 rating, and the sequential Ignite treatment (7/7 rating) provided at least 96% control (7/14 rating). Valor SX and Valor SX + Sencor both followed by Ignite provide 95% common waterhemp control (7/14 rating).

Valor SX, Valor SX + Sencor, FirstRate, and Prefix all followed by Ignite, and the sequential Ignite treatment all provided at least 95% control of giant foxtail, (7/14 rating). Gangster and Sonic both followed by Ignite provide 93% control of giant foxtail (7/14 rating). (University of Minnesota Extension, Regional Office – Rochester).

Table 1. Performance of herbicide systems for velvetleaf control in soybean on June 23 and 30, and July 7 and 14 at Rochester, MN, in 2008.

		Velvetleaf control			
		6/23	6/30	7/7	7/14
	(rate/A)			**(%)**	
Untreated		0	0	0	0
PRE / POST II					
Valor SX/ Ignite 280 + AMS	2 oz wt / 22 fl oz + 1.7 lb	90	91	98	98
FirstRate/ Ignite 280 + AMS	0.75 oz wt / 22 fl oz + 1.7 lbs	99	99	98	99
Gangster FR + Gangster V/ Ignite 280 + AMS	0.3 oz wt + 1.5 oz wt / 22 fl oz + 1.7 lbs	99	99	99	99
Valor SX + Sencor/ Ignite 280 + AMS	2 oz wt + 4.6 oz wt / 22 fl oz +1.7 lbs	95	97	98	98
Prefix/ Ignite 280 + AMS	1.5 pt / 22 fl oz + 1.7 lbs	39	40	94	90
Sonic/ Ignite 280 + AMS	2.25 oz wt / 22 fl oz +1.7 lbs	99	99	91	98
POST I / POST III					
Ignite 280 + AMS/ Ignite 280 + AMS	22 fl oz + 1.7lbs / 22 fl oz + 1.7 lbs	0	98	98	NR
	LSD (P=0.10)	**4**	**3**	**2**	**1**

Table 2. Performance of herbicide systems for common lambsquarters control in soybean on June 23 and 30, and July 7 and 14 at Rochester, MN, in 2008.

		Common Lambsquarters control			
		6/23	6/30	7/7	7/14
	(rate/A)			**(%)**	
Untreated		0	0	0	0
PRE / POST II					
Valor SX/ Ignite 280 + AMS	2 oz wt / 22 fl oz + 1.7 lb	98	99	99	98
FirstRate/ Ignite 280 + AMS	0.75 oz wt / 22 fl oz + 1.7 lbs	98	96	99	99
Gangster FR + Gangster V/ Ignite 280 + AMS	0.3 oz wt + 1.5 oz wt / 22 fl oz + 1.7 lbs	99	99	99	98
Valor SX + Sencor/ Ignite 280 + AMS	2 oz wt + 4.6 oz wt / 22 fl oz +1.7 lbs	99	99	98	96
Prefix/ Ignite 280 + AMS	1.5 pt / 22 fl oz + 1.7 lbs	46	44	86	88
Sonic/ Ignite 280 + AMS	2.25 oz wt / 22 fl oz +1.7 lbs	99	97	63	99
POST I / POST III					
Ignite 280 + AMS/ Ignite 280 + AMS	22 fl oz + 1.7lbs / 22 fl oz + 1.7 lbs	0	99	99	NR
	LSD (P=0.10)	**3**	**3**	**3**	**3**

Table 3. Performance of herbicide systems for common waterhemp control in soybean on June 23 and 30, and July 7 and 14 at Rochester, MN, in 2008.

		Common Waterhemp control			
		6/23	6/30	7/7	7/14
	(rate/A)			**(%)**	
Untreated		0	0	0	0
PRE / POST II					
Valor SX/ Ignite 280 + AMS	2 oz wt / 22 fl oz + 1.7 lb	98	94	98	95
FirstRate/ Ignite 280 + AMS	0.75 oz wt / 22 fl oz + 1.7 lbs	35	60	98	96
Gangster FR + Gangster V/ Ignite 280 + AMS	0.3 oz wt + 1.5 oz wt / 22 fl oz + 1.7 lbs	99	94	99	97
Valor SX + Sencor/ Ignite 280 + AMS	2 oz wt + 4.6 oz wt / 22 fl oz +1.7 lbs	99	97	99	95
Prefix/ Ignite 280 + AMS	1.5 pt / 22 fl oz + 1.7 lbs	88	95	98	97
Sonic/ Ignite 280 + AMS	2.25 oz wt / 22 fl oz +1.7 lbs	86	99	89	98
POST I / POST III					
Ignite 280 + AMS/ Ignite 280 + AMS	22 fl oz + 1.7lbs / 22 fl oz + 1.7 lbs	0	74	98	NR
	LSD (P=0.10)	**6**	**4**	**3**	**3**

Table 4. Performance of herbicide systems for giant foxtail control in soybean on June 23 and 30, and July 7 and 14 at Rochester, MN, in 2008.

		Giant Foxtail Control			
		6/23	6/30	7/7	7/14
	(rate/A)			**(%)**	
Untreated		0	0	0	0
PRE / POST II					
Valor SX/ Ignite 280 + AMS	2 oz wt / 22 fl oz + 1.7 lb	88	89	97	96
FirstRate/ Ignite 280 + AMS	0.75 oz wt / 22 fl oz + 1.7 lbs	64	55	97	96
Gangster FR + Gangster V/ Ignite 280 + AMS	0.3 oz wt + 1.5 oz wt / 22 fl oz + 1.7 lbs	90	88	94	93
Valor SX + Sencor/ Ignite 280 + AMS	2 oz wt + 4.6 oz wt / 22 fl oz +1.7 lbs	93	90	97	95
Prefix/ Ignite 280 + AMS	1.5 pt / 22 fl oz + 1.7 lbs	97	93	98	98
Sonic/ Ignite 280 + AMS	2.25 oz wt / 22 fl oz +1.7 lbs	83	99	88	93
POST I / POST III					
Ignite 280 + AMS/ Ignite 280 + AMS	22 fl oz + 1.7lbs / 22 fl oz + 1.7 lbs	0	60	96	NR
	LSD (P=0.10)	**6**	**4**	**2**	**3**

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Evaluation of Prefix as a component of a weed control program in soybean at Rochester, MN, in 2008.

Behnken, Lisa M., Fritz R. Breitenbach, Ryan P. Miller, Amanda J. Welter, and Brent R. Breitenbach.

The objective of this trial was: To evaluate Prefix herbicide programs for weed control in soybean. The research site was a Lawler loam series with a pH of 6.9 and soil test P and K levels of 19 ppm and 112 ppm, respectively. The field was spring disked and field cultivated prior to planting. The soybean variety, Asgrow AG2107, was planted on May 23, 2008, at a depth of 1.5 inches in 30 inch rows at 150,000 seeds per acre. A randomized complete block design was used with four replications. Preemergence (PRE) and postemergence (POST I, POST II, and POST III) treatments were applied with a tractor-mounted sprayer delivering 20 gpa at 32 psi using Turbo Tee 11002 nozzles. Evaluations of the plots were taken on June 23 and 30, July 14 and 28, and September 19, 2008. Application dates, environmental conditions, and weed stages are listed below. The center two rows of each plot were machine harvested on October 10, 2008.

Date	**5/23**	**6/26**	**6/30**	**7/21**
Treatment	**PRE**	**POST I**	**POST II**	**POST III**
Temperature (F)				
air	66	75	76	77
soil	70	82	84	72
Relative Humidity (%)	43	55	32	61
Wind (mph)	15	3	12	7
Soil moisture	Inadequate	Inadequate	Adequate	Adequate
Soybean				
stage		V3	V4	R2
height (inch)		4.4	6.5	19
Giant Ragweed				
weed density (ft^2)		3.8	3.8	3.8
height (inch)		5.9	8.3	6.0
Common Lambsquarters				
weed density (ft^2)		3.6	3.6	3.6
height (inch)		1.6	2.4	5.6
Common Waterhemp				
weed density (ft^2)		46.0	46.0	46.0
height (inch)		1.6	2.1	6.3
Velvetleaf				
weed density (ft^2)		1.4	1.4	1.4
height (inch)		0.0	3.3	5.1
Giant Foxtail				
weed density (ft^2)		2.6	2.6	2.6
height (inch)		3.1	6.9	5.8
Rainfall after each application (inch)				
week 1	2.15	0.76	0.87	0.04
week 2	2.61	1.33	0.92	0.81
week 3	5.86	0.91	0.59	0.07

CONCLUSIONS

Weather conditions following pre-emergence applications allowed for excellent activation of the herbicides with 2.15 inches of precipitation falling within one week of application.

The best pre-emergence giant ragweed control (6/30 rating) was provided by the Enlite and Sonic treatments at 88 and 85 percent, respectively. Prefix at the higher 2 pt rate provided good control at 81 percent, with the 1.5 pt rate slipping to 73 percent. Valor provided very little giant ragweed control.

Valor, Enlite, and Sonic pre-emergence treatments provided excellent common lambsquarters control (6/30 rating). Prefix at the higher 2 pt rate provided very good control at 88 percent, with the 1.5 pt rate slipping to 68 percent.

Prefix at both rates and Enlite provided excellent pre-emergence control of common waterhemp (6/30 rating). Sonic and Valor also provided very good control with 94 and 90 percent control, respectively.

Valor, Enlite, and Sonic all provided excellent velvetleaf control; 98 percent (6/30 rating). Both Prefix applications slipped, providing only 61 and 63 percent control.

Both Prefix treatments provided excellent giant foxtail control; 98 percent (6/30 rating). Very good control was also achieved with the Valor and Enlite treatments, 94 and 91 percent control, respectively. Sonic provide good giant foxtail control at 84 percent.

Weather conditions prior to all POST applications was challenging due to drier than normal conditions and inadequate soil moisture. Sequential weed control programs (PRE/POST II, or POST I/POST II) provided statistically better weed control than the single POST I glyphosate application of Touchdown Total for all weed species except common lambsquarters. The control differences were dramatic with common waterhemp, velvetleaf, and giant foxtail.

Excellent giant ragweed control was achieved with Prefix followed by Touchdown Total and the sequential POST I and POST II Touchdown Total application. All three of the treatments provided 98 percent control (9/19 rating). Valor, Enlite, and Sonic followed by Touchdown Total also offered very good control of giant ragweed with 95 percent (9/19 rating). The single POST I application of Touchdown Total provided only 90 percent control of giant ragweed (9/19 rating).

Excellent common lambsquarters control was achieved with Valor (96% control), Enlite (98% control), Sonic (99% control), all followed by Touchdown Total and the sequential POST I and POST II Touchdown Total applications (99% control) (9/19 rating). Both Prefix treatments followed by Touchdown Total provided very good common lambsquarters control of 93 and 90 percent, respectively (9/19 rating). The single POST I application of Touchdown Total provided only 95 percent control of common lambsquarters (9/19 rating).

Excellent common waterhemp control was achieved with Prefix (97% and 96%), Sonic (99%), all followed by Touchdown Total, and the sequential POST I and POST II Touchdown Total applications (99%) (9/19 rating). Valor and Enlite, followed by Touchdown Total, also offered very good control of common waterhemp with 87 and 92 percent control, respectively (9/19 rating). The single POST I application of Touchdown Total provided only 70 percent control of common waterhemp (9/19 rating).

Excellent velvetleaf control was achieved with Prefix (low rate) (98%) Enlite (99%) and Sonic (98%) all followed by Touchdown Total and the sequential POST I and POST II Touchdown Total applications (98%) (9/19 rating). Prefix (high rate) and Valor, followed by Touchdown Total also offered very good control of velvetleaf with 92 and 90 percent control, respectively (9/19 rating). The single POST I application of Touchdown Total provided only 78 percent control of velvetleaf (9/19 rating).

Excellent giant foxtail control was achieved with Prefix (96% and 97%), followed by Touchdown Total, and the sequential POST I and POST II Touchdown Total applications (99%) (9/19 rating). Valor, Enlite, and Sonic, followed by Touchdown Total, also offered very good control of giant foxtail with 89, 91, and 90 percent control, respectively (9/19 rating). The single POST I application of Touchdown Total provided only 73 percent control of giant foxtail (9/19 rating). (University of Minnesota Extension, Regional Office – Rochester).

Table 1. Performance of herbicide systems for giant ragweed control in soybean on June 23 and 30, July 14 and 28, and September 19 at Rochester, MN, in 2008.

Treatment	Rate	Giant Ragweed Control					Yield
		6/23	6/30	7/14	7/28	9/19	
	(rate/A)			(%)			(bu/A)
Untreated		0	0	0	0	0	3
PRE/POST II							
Prefix/ AMS + Touchdown Total	1.5 pt/ 2% w/v + 24 fl oz	74	73	98	99	98	24
Prefix/AMS + Touchdown Total	2 pt/ 2% w/v + 24 fl oz	79	81	98	99	98	23
Valor SX/ AMS + Touchdown Total	2 oz wt/ 2% w/v + 24 fl oz	13	0	92	94	95	22
Enlite/ AMS + Touchdown Total	2.8 oz wt/ 2% w/v + 24 fl oz	86	88	96	98	95	25
Sonic/ AMS + Touchdown Total	3 oz wt/2% w/v + 24 fl oz	84	85	95	99	95	24
POST I							
AMS + Touchdown Total	2% w/v + 24 fl oz	0	50	96	96	90	23
POST I/POST III							
AMS + Touchdown Total/ AMS + Touchdown Total	2% w/v + 24 fl oz/2% w/v + 24 fl oz	0	50	94	99	99	24
	LSD (P=0.10)	**2**	**3**	**1**	**1**	**4**	**4**

Table 2. Performance of herbicide systems for common lambsquarters control in soybean on June 23 and 30, July 14 and 28, and September 19 at Rochester, MN, in 2008.

Treatment	Rate	Common Lambsquarters Control					Yield
		6/23	6/30	7/14	7/28	9/19	
	(rate/A)			(%)			(bu/A)
Untreated		0	0	0	0	0	3
PRE/POST II							
Prefix/ AMS + Touchdown Total	1.5 pt/ 2% w/v + 24 fl oz	91	68	96	98	93	24
Prefix/AMS + Touchdown Total	2 pt/ 2% w/v + 24 fl oz	95	88	97	98	90	23
Valor SX/ AMS + Touchdown Total	2 oz wt/ 2% w/v + 24 fl oz	99	99	99	99	96	22
Enlite/ AMS + Touchdown Total	2.8 oz wt/ 2% w/v + 24 fl oz	99	99	99	99	98	25
Sonic/ AMS + Touchdown Total	3 oz wt/2% w/v + 24 fl oz	99	99	99	99	99	24
POST I							
AMS + Touchdown Total	2% w/v + 24 fl oz	0	50	98	98	95	23
POST I/POST III							
AMS + Touchdown Total/ AMS + Touchdown Total	2% w/v + 24 fl oz/2% w/v + 24 fl oz	0	50	97	99	99	24
	LSD (P=0.10)	**2**	**3**	**2**	**1**	**3**	**4**

Table 3. Performance of herbicide systems for common waterhemp control in soybean on June 23 and 30, July 14 and 28, and September 19 at Rochester, MN, in 2008.

Treatment	Rate	Common Waterhemp Control					Yield
		6/23	6/30	7/14	7/28	9/19	
	(rate/A)			(%)			(bu/A)
Untreated		0	0	0	0	0	3
PRE/POST II							
Prefix/ AMS + Touchdown Total	1.5 pt/ 2% w/v + 24 fl oz	99	97	98	97	97	24
Prefix/AMS + Touchdown Total	2 pt/ 2% w/v + 24 fl oz	99	98	97	96	96	23
Valor SX/ AMS + Touchdown Total	2 oz wt/ 2% w/v + 24 fl oz	99	90	93	94	87	22
Enlite/ AMS + Touchdown Total	2.8 oz wt/ 2% w/v + 24 fl oz	99	96	97	97	92	25
Sonic/ AMS + Touchdown Total	3 oz wt/2% w/v + 24 fl oz	99	94	99	98	99	24
POST I							
AMS + Touchdown Total	2% w/v + 24 fl oz	0	50	80	87	70	23
POST I/POST III							
AMS + Touchdown Total/ AMS + Touchdown Total	2% w/v + 24 fl oz/2% w/v + 24 fl oz	0	50	80	98	99	24
	LSD (P=0.10)	**0.2**	**3**	**2**	**1**	**4**	**4**

Table 4. Performance of herbicide systems for velvetleaf control in soybean on June 23 and 30, July 14 and 28, and September 19 at Rochester, MN, in 2008.

Treatment	Rate	Velvetleaf Control					Yield
		6/23	6/30	7/14	7/28	9/19	
	(rate/A)			(%)			(bu/A)
Untreated		0	0	0	0	0	3
PRE/POST II							
Prefix/ AMS + Touchdown Total	1.5 pt/ 2% w/v + 24 fl oz	70	61	97	99	98	24
Prefix/AMS + Touchdown Total	2 pt/ 2% w/v + 24 fl oz	70	63	97	98	92	23
Valor SX/ AMS + Touchdown Total	2 oz wt/ 2% w/v + 24 fl oz	99	98	97	98	90	22
Enlite/ AMS + Touchdown Total	2.8 oz wt/ 2% w/v + 24 fl oz	98	98	99	99	99	25
Sonic/ AMS + Touchdown Total	3 oz wt/2% w/v + 24 fl oz	99	98	99	99	98	24
POST I							
AMS + Touchdown Total	2% w/v + 24 fl oz	0	50	95	97	78	23
POST I/POST III							
AMS + Touchdown Total/ AMS + Touchdown Total	2% w/v + 24 fl oz/2% w/v + 24 fl oz	0	50	97	99	98	24
	LSD (P=0.10)	**3**	**3**	**3**	**1**	**6**	**4**

Table 5. Performance of herbicide systems for giant foxtail control in soybean on June 23 and 30, July 14 and 28, and September 19 at Rochester, MN, in 2008.

Treatment	Rate	Giant Foxtail Control					Yield
		6/23	6/30	7/14	7/28	9/19	
	(rate/A)			(%)			(bu/A)
Untreated		0	0	0	0	0	3
PRE/POST II							
Prefix/ AMS + Touchdown Total	1.5 pt/ 2% w/v + 24 fl oz	99	98	98	99	96	24
Prefix/AMS + Touchdown Total	2 pt/ 2% w/v + 24 fl oz	99	98	99	99	97	23
Valor SX/ AMS + Touchdown Total	2 oz wt/ 2% w/v + 24 fl oz	66	91	96	98	89	22
Enlite/ AMS + Touchdown Total	2.8 oz wt/ 2% w/v + 24 fl oz	90	94	97	98	91	25
Sonic/ AMS + Touchdown Total	3 oz wt/2% w/v + 24 fl oz	88	84	98	99	90	24
POST I							
AMS + Touchdown Total	2% w/v + 24 fl oz	0	50	89	92	73	23
POST I/POST III							
AMS + Touchdown Total/ AMS + Touchdown Total	2% w/v + 24 fl oz/2% w/v + 24 fl oz	0	50	92	99	99	24
	LSD (P=0.10)	**3**	**4**	**2**	**2**	**3**	**4**

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Evaluation of West Central adjuvant systems with glyphosate for weed control in soybean at Rochester, MN, in 2008.

Behnken, Lisa M., Fritz R. Breitenbach, Ryan P. Miller, Matthew M. White and Ceara L. Suther.

The objective of this trial was to evaluate West Central adjuvant systems with glyphosate for weed control in soybeans. The research site was a Lawler loam series with a pH of 6.7 and soil test P and K levels of 36 ppm and 146 ppm, respectively. The field was spring disked and field cultivated prior to planting. The soybean variety, NK S12-P4 with Cruiser Max, was planted on June 10, 2008, at a depth of 1.5 inches in 30 inch rows at 150,000 seeds per acre. A randomized complete block design was used with four replications. Postemergence treatments were applied with a tractor-mounted sprayer delivering 20 gpa at 32 psi using Turbo Tee 11002 nozzles. Evaluations of the plots were taken on July 18 and 30, 2008. Application dates, environmental conditions, and weed stages are listed below. (University of Minnesota Extension, Regional Office – Rochester).

Date	**7/2**
Treatment	**POST I**
Temperature (F)	
Air	80
soil	91
Relative Humidity (%)	39
Wind (mph)	13
Soil moisture	Inadequate
Bean	
stage	V1-V2
height (inch)	4.0
Velvetleaf	
weed density (ft^2)	1.0
height (inch)	3.0
Common Lambsquarters	
weed density (ft^2)	3.8
height (inch)	1.1
Common Waterhemp	
weed density (ft^2)	5.3
height (inch)	2.2
Giant Ragweed	
weed density (ft^2)	0.25
height (inch)	4.0
Grass	
weed density (ft^2)	0.25
height (inch)	4.0
Winter Annuals	
weed density (ft^2)	5.0
height (inch)	2.0
Rainfall after each application (inch)	
week 1	0.87
week 2	0.92
week 3	0.60

Table 1. Performance of adjuvants systems with glyphosate for velvetleaf control in soybeans on July 18 and 30 at Rochester, MN in 2008.

Treatment	Rate	Velvetleaf Control	
		7/18	7/30
	(rate/A)	(%)	
POST I			
Buccaneer Plus + Premium AMS	16 fl oz + 1 lb	61	54
Buccaneer Plus + N-Tense	16 fl oz + 0.5% v/v	63	55
Buccaneer Plus + N-Tense + Sedate	16 fl oz + 0.5% v/v + 1 pt/100 gal	60	48
Buccaneer Plus + WC073	16 fl oz + 0.75% v/v	61	49
Buccaneer Plus + N-Tense	16 fl oz + 0.25% v/v	60	48
Buccaneer Plus + WC073	16 fl oz + 0.5% v/v	59	45
Buccaneer Plus + WC073	16 fl oz + 1.0% v/v	61	50
	LSD (P=0.10)	**3**	**4**

Table 2. Performance of adjuvants with glyphosate for giant ragweed control in soybeans on July 18 and 30 at Rochester, MN in 2008.

Treatment	Rate	Giant Ragweed Control	
		7/18	7/30
	(rate/A)	(%)	
POST I			
Buccaneer Plus + Premium AMS	16 fl oz + 1 lb	59	49
Buccaneer Plus + N-Tense	16 fl oz + 0.5% v/v	64	53
Buccaneer Plus + N-Tense + Sedate	16 fl oz + 0.5% v/v + 1 pt/100 gal	61	55
Buccaneer Plus + WC073	16 fl oz + 0.75% v/v	60	51
Buccaneer Plus + N-Tense	16 fl oz + 0.25% v/v	63	54
Buccaneer Plus + WC073	16 fl oz + 0.5% v/v	60	49
Buccaneer Plus + WC073	16 fl oz + 1.0% v/v	64	54
	LSD (P=0.10)	**5**	**6**

Table 3. Performance of adjuvants with glyphosate for common waterhemp control in soybeans on July 18 and 30 at Rochester, MN in 2008.

Treatment	Rate	Common Waterhemp Control	
		7/18	7/30
	(rate/A)	(%)	
POST I			
Buccaneer Plus + Premium AMS	16 fl oz + 1 lb	64	55
Buccaneer Plus + N-Tense	16 fl oz + 0.5% v/v	71	61
Buccaneer Plus + N-Tense + Sedate	16 fl oz + 0.5% v/v + 1 pt/100 gal	70	59
Buccaneer Plus + WC073	16 fl oz + 0.75% v/v	64	58
Buccaneer Plus + N-Tense	16 fl oz + 0.25% v/v	61	51
Buccaneer Plus + WC073	16 fl oz + 0.5% v/v	63	49
Buccaneer Plus + WC073	16 fl oz + 1.0% v/v	63	54
	LSD (P=0.10)	**9**	**11**

Evaluation of West Central adjuvant systems for control of volunteer corn in soybean at Rochester, MN, in 2008.

Fritz R. Breitenbach, Lisa M. Behnken, Ryan P. Miller, Kyle J. Poss and Matthew M. White

The objective of this trial was: To evaluate WestCentral adjuvant systems for control of volunteer corn in soybean. The research site was a Lawler loam series with a pH of 6.7 and soil test P and K levels of 36 ppm and 146 ppm, respectively. The field was spring disked and field cultivated prior to planting. The soybean variety, NK S12-P4 with Cruiser Max, was planted on June 10, 2008, at a depth of 1.5 inches in 30 inch rows at 150,000 seeds per acre. A randomized complete block design was used with four replications. Postemergence treatments were applied with a tractor-mounted sprayer delivering 20 gpa at 32 psi using Turbo Tee 11002 nozzles. Evaluations of the plots were taken on July 11, 18, and 25. Application dates, environmental conditions, and weed stages are listed below. (University of Minnesota Extension, Regional Office – Rochester).

Date	**7/2**
Treatment	**POST I**
Temperature (F)	
Air	80
soil	91
Relative Humidity (%)	39
Wind (mph)	13
Soil moisture	Inadequate
Bean	
stage	V1-V2
height (inch)	4.0
Volunteer Corn	
weed density (ft^2)	7.5
height (inch)	10.5
Rainfall after each application (inch)	
week 1	0.87
week 2	0.92
week 3	0.60

Treatment	**Rate**	**Volunteer Corn Control**		
	(rate/A)	**(%)**		
POST I		**7/11**	**7/18**	**7/25**
Buccaneer Plus + Volunteer + N-Tense	16 fl oz + 3 fl oz + 0.5% v/v	77	80	82
Buccaneer Plus + Volunteer + WCO73	16 fl oz + 3 fl oz + 0.75% v/v	74	82	81
Buccaneer Plus + Volunteer + N-Tense + Trophy Gold	16 fl oz + 3 fl oz + 0.25% v/v + 0.25% v/v	85	91	94
Buccaneer Plus + Premium AMS	16 fl oz + 1 lb	18	13	18
Buccaneer Plus + N-Tense	16 fl oz + 0.5% v/v	24	45	33
	LSD (P=0.10)	**5**	**5**	**7**

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Evaluation of weed control strategies for Roundup Ready soybean in a hypothetical glyphosate resistant weed situation in soybean at Rochester, MN, in 2007 and 2008.

Miller, Ryan P., Fritz R. Breitenbach, Lisa M. Behnken, Jeffrey L. Gunsolus, Louis E. Kuisle, and Sarah A. Stellpflug.

INTRODUCTION AND BACKGROUND

According to the 2008 Minnesota Integrated Pest Management Assessment, 31% of the Minnesota farmers surveyed believe they have glyphosate resistant weeds on their farm. In addition, 63% choose to manage weed resistance by tank mixing additional herbicides with glyphosate. In 2009 preliminary survey results (SE data only), 35% believe they have glyphosate resistant weeds on their farm and 54% of growers choose to manage by tank mixing additional herbicides with glyphosate while only 26% choose a sequential (pre followed by postemergence) program.

Glyphosate is a valuable tool. It provides broad-spectrum weed control, is low in cost and has excellent crop safety. Glyphosate also controls larger weeds, has no soil residual and low environmental and human health risks. Diversification of weed management systems has been in decline in Midwestern corn and soybean production since the adoption of glyphosate-resistant crops over ten years ago. A high percentage of Minnesota acres are planted to glyphosate tolerant crops. For soybeans, approximately 98% of acres are treated with glyphosate with minimal use of preemergence herbicides. For corn, approximately 85% of acres are treated with glyphosate, and less than 50% of acres use a preemergence grass herbicide at the "glyphosate rate" (~1/2 of label rate). For sugar beet, the first year of introduction (2008) approximately 15% of acres in southern MN and approximately 50% of acres in northwestern MN were treated with glyphosate. This is expected to increase to 80% of MN sugar beet acres in 2009, with minimal use of preemergence herbicides.

In 2008, we experienced an increase in the number of fields with poor glyphosate performance, especially in soybean. The following weeds were most frequently reported: giant ragweed, common ragweed, tall waterhemp, common lambsquarters, barnyardgrass, and wild buckwheat. The most likely cause for the increase in glyphosate's lack of performance is an area of uncertainty. It may be due to poor application technique; poor timing; environment; weed spectrum with extended or delayed emergence patterns, and/or inherent tolerance to glyphosate; or repeated use of the same herbicide resulting in selection for resistance.

The following species have demonstrated resistance to glyphosate at 4 to 8 X rates: giant ragweed (south central and west central MN), common ragweed (central and northwest MN), tall waterhemp (couth central, southwest, and west central MN). Note there are indicators that some of these biotypes could also be resistant to ALS herbicides. Field with the highest frequency to glyphosate resistant giant and common ragweed are associated with lack of crop rotation, no-till, total postemergence weed control practices, one or two applications per year, lack of chemical rotation, continuous glyphosate applications in corn and soybean rotation.

Tank mixing a second herbicide with glyphosate can reduce convenience, increase costs and the risk of crop injury, as well as limit the window of application for other herbicide (s) in the tank mix. Management of glyphosate resistant weeds in glyphosate tolerant crops will a major problem facing the farmers in Minnesota.

The good news, there is still time to adopt good management practices, limit the selection of additional glyphosate resistant weeds, and extend the benefit of glyphosate and Roundup-Ready crop technology. Strategies to adopt include:

1. Increase chemical diversity in corn and soybean acres to help delay herbicide resistance development. Consider alternating Roundup Ready crops with Liberty Link technology or a conventional herbicide program. Consider in which crop you could most easily substitute other herbicides for glyphosate or consider in which crop you are most dependent upon the effectiveness of glyphosate. Also, don't forget to consider the influence of herbicide selection on crop rotation interval.

2. Utilize other modes of action by using a preemergence herbicide or tank-mix partners.
3. Increase the use of residual herbicides
4. Scout fields soon after herbicide applications to detect escapes and take timely action.
5. Avoid multiple glyphosate applications

OBJECTIVE

The objective of this trial was to evaluate weed control strategies for glyphosate tolerant soybean in a hypothetical glyphosate resistant weed situation in soybean in southeastern Minnesota. The intent of this study was to determine how we could improve weed control above and beyond glyphosate by itself. The glyphosate rate used in this study would be considered ½ X (half rate) of the suggested labeled use rate. Comparisons were made to the one-pass glyphosate treatment

METHOD

In 2007, the research site was a Lawler loam series with a pH of 6.8 and soil test P and K levels of 12 ppm and 171 ppm, respectively. The field was spring disked and field cultivated prior to planting. The soybean variety, Dairyland DSR 199, was planted on May 17, 2007, at a depth of 1.5 inches in 30-inch rows at 150,000 seeds per acre. A randomized complete block design was used with four replications. preemergence (PRE) and postemergence (POST I, POST II, and POST III) treatments were applied with a tractor-mounted sprayer delivering 20 gpa at 32 psi using Turbo Tee 11002 nozzles. Evaluations of the plots were taken on June 6, 14, 20, 28, July 6, 18, and September 14. The center two rows of each plot were machine harvested on October 4, 2007.

In 2008, the research site was a Lawler loam series with a pH of 6.9 and soil test P and K levels of 19 ppm and 112 ppm, respectively. The field was spring disked and field cultivated prior to planting. The soybean variety, Dairyland DSR 1302, was planted on May 23, 2008, at a depth of 1.5 inches in 30-inch rows at 150,000 seeds per acre. A randomized complete block design was used with four replications. Preplant incorporated (PPI), preemergence (PRE) and postemergence (POST I and POST II) treatments were applied with a tractor-mounted sprayer delivering 20 gpa at 32 psi using Turbo Tee 11002 nozzles. Evaluations of the plots were taken on June 23 and 30, July 7, 16, 28, and September 19, 2008. Application dates, environmental conditions, crop and weed stages are listed in Tables 1 and 2. The center two rows of each plot were machine harvested on October 10, 2008.

CONCLUSIONS

Tables 3 - 7 provide the herbicide results by weed species for 2008. Tables 8 – 11, provide performance details of herbicide tank mix partners and preemergence sequential programs in 2007 and 2008 for the control of giant ragweed, common lambsquarters common waterhemp and velvetleaf (2008 only).

Tank-Mix Partners: No one tank-mix partner provided 90% or better control of all four weed species evaluated. The addition of FirstRate as a tank mix partner, gave 90% control of giant ragweed in 2007 but only 80% control in 2008. Harmony GT and Pursuit as tank mix partners gave 94% and 96% , respectively, control of common lambsquarters in 2007, but only Harmony GT resulted in 90% control in 2008. For common waterhemp, Flexstar was the only tank mix partner that resulted in 90% control and this only occurred in 2008. For velvetleaf, the addition of Cadet resulted in 95% control in 2008.

Sequential, Preemergence Systems: The sequential programs provided many more options that resulted in 90% or more control of all four weed species. In addition, Gangster provided over 90% control of all four species in 2007 and 2008. Preemergence programs with Prefix resulted in over 90% control of giant ragweed, common lambsquarters, and common waterhemp in 2007 and 2008, but only 74% control of velvetleaf. Enlite, Valor, Sonic, Authority MTZ and Authority Assist provided over 90% control of common lambsquarters, common waterhemp and velvetleaf. The only sequential program that resulted in poor control of all weed species was Prowl, applied PPI. (University of Minnesota Extension Regional Office – Rochester)

Table 1. 2007 Application dates, environmental conditions, crop, and weed stages.

Date	**5/18**	**6/15**	**6/20**	**7/6**
Treatment	PRE	POST I	POST II	POST III
Temperature (F)				
Air	69	82	86	79
soil	--	79	81.7	79
Relative Humidity (%)	48	50	30	50
Wind (mph)	12	8	15	3
Soil moisture	Inadequate	Adequate	Adequate	Inadequate
Bean				
stage	--	V2	V3	R1
height (inch)	--	5.0	8.5	13.0
Giant Ragweed				
weed density (ft^2)	--	11.4	11.4	11.4
height (inch)	--	6.8	9.7	5.3
Common Lambsquarters				
weed density (ft^2)	--	5.4	5.4	5.4
height (inch)	--	1.6	4.2	4.1
Common Waterhemp				
weed density (ft^2)	--	13.8	13.8	13.8
height (inch)	--	2.4	2.9	4.0
Giant Foxtail				
weed density (ft^2)	--	20.3	20.3	20.3
height (inch)	--	2.4	6.6	2.9
Rainfall after each application (inch)				
week 1	2.41	2.97	2.09	0.66
week 2	1.25	0.52	0.21	0.50
week 3	0.44	0.21	0.66	

Table 2. 2008 Application dates, environmental conditions, crop, and weed stages.

Date	**5/23**	**5/23**	**6/30**	**7/8**
Treatment	**PPI**	**PRE**	**POST I**	**POST II**
Temperature (F)				
Air	67	67	77	80
soil	68	68	76	84
Relative Humidity (%)	45	45	32	46
Wind (mph)	14	14	7	15
Soil moisture	Inadequate	Inadequate	Adequate	Adequate
Soybean				
stage			V2	R1
height (inch)			8.0	12.0
Giant Ragweed				
weed density (ft^2)			4.0	4.0
height (inch)			8.0	13.5
Common Lambsquarters				
weed density (ft^2)			3.7	3.7
height (inch)			2.1	3.3
Common Waterhemp				
weed density (ft^2)			77.1	77.1
height (inch)			1.9	7.5
Giant Foxtail				
weed density (ft^2)			7.7	7.7
height (inch)			5.9	3.3
Velvetleaf				
weed density (ft^2)			1.6	1.6
height (inch)			2.0	3.0
Rainfall after each application (inch)				
week 1	2.15	2.15	0.87	0.92
week 2	2.61	2.61	0.92	0.60
week 3	5.86	5.86	0.59	0.03

Table 3. Performance of herbicide systems for giant ragweed control in soybean on June 23, July 7, 16, 28 and September 19 at Rochester, MN in 2008.

Treatment	Rate	Giant Ragweed Control					Yield
		6/23	7/7	7/16	7/28	9/19	
	(rate/A)			(%)			(bu/A)
Untreated		0	0	0	0	0	3
PPI/POST I							
Prowl H2O/ Roundup Original + NIS + AMS	3 pt/ 16 fl oz + 0.25% v/v + 2 lb	0	75	70	75	65	15
PRE/POST I							
Valor/ Roundup Original + NIS + AMS	2.5 oz wt/ 16 fl oz + 0.25% v/v + 2 lb	24	85	82	89	79	21
Valor/ Cobra + Roundup Original + COC + AMS	2.5 oz wt/ 6 fl oz + 16 fl oz + 1.25% v/v + 2 lb	19	89	83	92	89	21
Sonic/ Roundup Original + NIS + AMS	3 oz wt/ 16 fl oz + 0.25% v/v + 2 lbs	86	88	83	89	83	18
Prefix/ Roundup Original + NIS + AMS	1.75 pt/ 16 fl oz + 0.25% v/v + 2 lbs	80	92	92	97	95	16
Authority MTZ/ Roundup Original + NIS + AMS	10 oz wt / 16 fl oz + 0.25% v/v + 2 lbs	13	61	70	79	72	14
Authority Assist/ Roundup Original + NIS + AMS	12 fl oz/ 16 fl oz + 0.25% v/v + 2 lbs	72	81	80	88	79	21
PRE/POST II							
Gangster V + Gangster FR/ Roundup Original + NIS + AMS	2.5 oz wt + 0.5 oz wt/ 16 fl oz + 0.25% v/v + 2 lb	94	91	97	97	96	20
Enlite/ Roundup Original + NIS + AMS	2.8 oz wt/ 16 fl oz + 0.25% v/v + 2 lb	80	86	89	92	87	20
POST I							
Roundup Original + NIS + AMS	16 fl oz + 0.25% v/ + 2 lbs	0	76	71	81	71	12
FlexStar + Roundup Original + NIS + AMS	12 fl oz + 16 fl oz + 0.25% v/ + 2 lbs	0	85	82	83	80	16
Cobra + Roundup Original + NIS + AMS	6 fl oz + 16 fl oz + 0.25% v/ + 2 lbs	0	85	79	84	77	12
Resource + Roundup Original + NIS + AMS	4 fl oz + 16 fl oz + 0.25% v/ + 2 lbs	0	81	68	71	55	14
Cadet + Roundup Original + NIS + AMS	0.4 fl oz + 16 fl oz + 0.25% v/ + 2 lbs	0	76	66	76	56	11
FirstRate + Roundup Original + NIS + AMS	0.3 oz wt +16 fl oz + 0.25% v/ + 2 lbs	0	73	78	84	80	12
Synchrony XP + Roundup Original + NIS + AMS	0.375 oz wt + 16 fl oz + 0.25% v/ + 2 lbs	0	77	74	78	64	16
Classic + Roundup Original + NIS + AMS	0.5 oz wt + 16 fl oz + 0.25% v/ + 2 lbs	0	76	74	79	69	15
Harmony GT + Roundup Original + NIS + AMS	0.33 oz wt + 16 fl oz + 0.25% v/ + 2 lbs	0	74	71	74	64	12
Pursuit + Roundup Original + NIS + AMS	4 fl oz + 16 fl oz + 0.25% v/ + 2 lbs	0	76	74	73	68	10
	LSD (P=0.10)	**3**	**5**	**3**	**5**	**4**	**4.6**

Table 4. Performance of herbicide systems for common lambsquarters control in soybean on June 23, July 7, 16, 28 and September 19 at Rochester, MN in 2008.

Treatment	Rate	Common Lambsquarters Control					Yield
		6/23	7/7	7/16	7/28	9/19	
	(rate/A)			(%)			(bu/A)
Untreated		0	0	0	0	0	3
PPI/POST I							
Prowl H2O/ Roundup Original + NIS + AMS	3 pt/ 16 fl oz + 0.25% v/v + 2 lb	65	53	91	93	66	15
PRE/POST I							
Valor/ Roundup Original + NIS + AMS	2.5 oz wt/ 16 fl oz + 0.25% v/v + 2 lb	99	99	96	98	92	21
Valor/ Cobra + Roundup Original + COC + AMS	2.5 oz wt/ 6 fl oz + 16 fl oz + 1.25% v/v + 2 lb	99	99	98	95	93	21
Sonic/ Roundup Original + NIS + AMS	3 oz wt/ 16 fl oz + 0.25% v/v + 2 lbs	99	98	99	97	99	18
Prefix/ Roundup Original + NIS + AMS	1.75 pt/ 16 fl oz + 0.25% v/v + 2 lbs	88	98	94	96	93	16
Authority MTZ/ Roundup Original + NIS + AMS	10 oz wt / 16 fl oz + 0.25% v/v + 2 lbs	99	99	99	97	99	14
Authority Assist/ Roundup Original + NIS + AMS	12 fl oz/ 16 fl oz + 0.25% v/v + 2 lbs	99	99	99	98	99	21
PRE/POST II							
Gangster V + Gangster FR/ Roundup Original + NIS + AMS	2.5 oz wt + 0.5 oz wt/ 16 fl oz + 0.25% v/v + 2 lb	99	99	99	99	99	20
Enlite/ Roundup Original + NIS + AMS	2.8 oz wt/ 16 fl oz + 0.25% v/v + 2 lb	99	99	99	99	99	20
POST I							
Roundup Original + NIS + AMS	16 fl oz + 0.25% v/ + 2 lbs	0	43	64	87	76	12
FlexStar + Roundup Original + NIS + AMS	12 fl oz + 16 fl oz + 0.25% v/ + 2 lbs	0	90	84	89	80	16
Cobra + Roundup Original + NIS + AMS	6 fl oz + 16 fl oz + 0.25% v/ + 2 lbs	0	46	79	82	73	12
Resource + Roundup Original + NIS + AMS	4 fl oz + 16 fl oz + 0.25% v/ + 2 lbs	0	30	85	86	63	14
Cadet + Roundup Original + NIS + AMS	0.4 fl oz + 16 fl oz + 0.25% v/ + 2 lbs	0	39	81	88	79	11
FirstRate + Roundup Original + NIS + AMS	0.3 oz wt +16 fl oz + 0.25% v/ + 2 lbs	0	51	75	85	73	12
Synchrony XP + Roundup Original + NIS + AMS	0.375 oz wt + 16 fl oz + 0.25% v/ + 2 lbs	0	51	77	88	75	16
Classic + Roundup Original + NIS + AMS	0.5 oz wt + 16 fl oz + 0.25% v/ + 2 lbs	0	56	82	87	86	15
Harmony GT + Roundup Original + NIS + AMS	0.33 oz wt + 16 fl oz + 0.25% v/ + 2 lbs	0	70	90	81	90	12
Pursuit + Roundup Original + NIS + AMS	4 fl oz + 16 fl oz + 0.25% v/ + 2 lbs	0	50	83	86	84	10
	LSD (P=0.10)	**2**	**6**	**4**	**4**	**4**	**4.3**

Table 5. Performance of herbicide systems for common waterhemp control in soybean on June 23, July 7, 16, 28 and September 19 at Rochester, MN in 2008.

Treatment	Rate	Common Waterhemp Control					Yield
		6/23	7/7	7/16	7/28	9/19	
	(rate/A)			(%)			(bu/A)
Untreated		0	0	0	0	0	3
PPI/POST I							
Prowl H2O/ Roundup Original + NIS + AMS	3 pt/ 16 fl oz + 0.25% v/v + 2 lb	71	85	86	87	65	15
PRE/POST I							
Valor/ Roundup Original + NIS + AMS	2.5 oz wt/ 16 fl oz + 0.25% v/v + 2 lb	99	98	94	96	91	21
Valor/ Cobra + Roundup Original + COC + AMS	2.5 oz wt/ 6 fl oz + 16 fl oz + 1.25% v/v + 2 lb	93	99	99	97	99	21
Sonic/ Roundup Original + NIS + AMS	3 oz wt/ 16 fl oz + 0.25% v/v + 2 lbs	99	99	98	93	97	18
Prefix/ Roundup Original + NIS + AMS	1.75 pt/ 16 fl oz + 0.25% v/v + 2 lbs	99	98	95	97	95	16
Authority MTZ/ Roundup Original + NIS + AMS	10 oz wt / 16 fl oz + 0.25% v/v + 2 lbs	99	99	96	94	99	14
Authority Assist/ Roundup Original + NIS + AMS	12 fl oz/ 16 fl oz + 0.25% v/v + 2 lbs	99	99	99	97	99	21
PRE/POST II							
Gangster V + Gangster FR/ Roundup Original + NIS + AMS	2.5 oz wt + 0.5 oz wt/ 16 fl oz + 0.25% v/v + 2 lb	99	86	96	99	99	20
Enlite/ Roundup Original + NIS + AMS	2.8 oz wt/ 16 fl oz + 0.25% v/v + 2 lb	99	96	99	99	99	20
POST I							
Roundup Original + NIS + AMS	16 fl oz + 0.25% v/ + 2 lbs	0	40	55	77	65	12
FlexStar + Roundup Original + NIS + AMS	12 fl oz + 16 fl oz + 0.25% v/ + 2 lbs	0	95	92	90	90	16
Cobra + Roundup Original + NIS + AMS	6 fl oz + 16 fl oz + 0.25% v/ + 2 lbs	0	95	88	87	85	12
Resource + Roundup Original + NIS + AMS	4 fl oz + 16 fl oz + 0.25% v/ + 2 lbs	0	53	70	70	63	14
Cadet + Roundup Original + NIS + AMS	0.4 fl oz + 16 fl oz + 0.25% v/ + 2 lbs	0	51	59	76	56	11
FirstRate + Roundup Original + NIS + AMS	0.3 oz wt +16 fl oz + 0.25% v/ + 2 lbs	0	41	59	77	56	12
Synchrony XP + Roundup Original + NIS + AMS	0.375 oz wt + 16 fl oz + 0.25% v/ + 2 lbs	0	48	69	81	65	16
Classic + Roundup Original + NIS + AMS	0.5 oz wt + 16 fl oz + 0.25% v/ + 2 lbs	0	50	75	80	63	15
Harmony GT + Roundup Original + NIS + AMS	0.33 oz wt + 16 fl oz + 0.25% v/ + 2 lbs	0	50	75	86	64	12
Pursuit + Roundup Original + NIS + AMS	4 fl oz + 16 fl oz + 0.25% v/ + 2 lbs	0	43	67	81	58	10
	LSD (P=0.10)	**2**	**4**	**5**	**6**	**5**	**4.3**

Table 6. Performance of herbicide systems for velvetleaf control in soybean on June 23, July 7, 16, 28 and September 19 at Rochester, MN in 2008.

Treatment	Rate	Velvetleaf Control					Yield
		6/23	7/7	7/16	7/28	9/19	
	(rate/A)			(%)			(bu/A)
Untreated		0	0	0	0	0	3
PPI/POST I							
Prowl H2O/ Roundup Original + NIS + AMS	3 pt/ 16 fl oz + 0.25% v/v + 2 lb	50	41	74	90	54	15
PRE/POST I							
Valor/ Roundup Original + NIS + AMS	2.5 oz wt/ 16 fl oz + 0.25% v/v + 2 lb	99	96	99	99	98	21
Valor/ Cobra + Roundup Original + COC + AMS	2.5 oz wt/ 6 fl oz + 16 fl oz + 1.25% v/v + 2 lb	99	99	97	98	95	21
Sonic/ Roundup Original + NIS + AMS	3 oz wt/ 16 fl oz + 0.25% v/v + 2 lbs	99	97	96	98	93	18
Prefix/ Roundup Original + NIS + AMS	1.75 pt/ 16 fl oz + 0.25% v/v + 2 lbs	55	56	86	98	74	16
Authority MTZ/ Roundup Original + NIS + AMS	10 oz wt / 16 fl oz + 0.25% v/v + 2 lbs	98	99	98	99	99	14
Authority Assist/ Roundup Original + NIS + AMS	12 fl oz/ 16 fl oz + 0.25% v/v + 2 lbs	99	99	99	99	99	21
PRE/POST II							
Gangster V + Gangster FR/ Roundup Original + NIS + AMS	2.5 oz wt + 0.5 oz wt/ 16 fl oz + 0.25% v/v + 2 lb	99	99	99	99	99	20
Enlite/ Roundup Original + NIS + AMS	2.8 oz wt/ 16 fl oz + 0.25% v/v + 2 lb	99	98	98	99	97	20
POST I							
Roundup Original + NIS + AMS	16 fl oz + 0.25% v/ + 2 lbs	0	67	64	90	61	12
FlexStar + Roundup Original + NIS + AMS	12 fl oz + 16 fl oz + 0.25% v/ + 2 lbs	0	93	87	92	69	16
Cobra + Roundup Original + NIS + AMS	6 fl oz + 16 fl oz + 0.25% v/ + 2 lbs	0	87	81	92	64	12
Resource + Roundup Original + NIS + AMS	4 fl oz + 16 fl oz + 0.25% v/ + 2 lbs	0	98	94	97	83	14
Cadet + Roundup Original + NIS + AMS	0.4 fl oz + 16 fl oz + 0.25% v/ + 2 lbs	0	97	96	98	95	11
FirstRate + Roundup Original + NIS + AMS	0.3 oz wt +16 fl oz + 0.25% v/ + 2 lbs	0	83	80	92	61	12
Synchrony XP + Roundup Original + NIS + AMS	0.375 oz wt + 16 fl oz + 0.25% v/ + 2 lbs	0	81	78	92	64	16
Classic + Roundup Original + NIS + AMS	0.5 oz wt + 16 fl oz + 0.25% v/ + 2 lbs	0	73	73	88	60	15
Harmony GT + Roundup Original + NIS + AMS	0.33 oz wt + 16 fl oz + 0.25% v/ + 2 lbs	0	79	80	95	65	12
Pursuit + Roundup Original + NIS + AMS	4 fl oz + 16 fl oz + 0.25% v/ + 2 lbs	0	66	78	93	66	10
	LSD (P=0.10)	**2**	**10**	**3**	**3**	**4**	**4.3**

Table 7. Performance of herbicide systems for giant foxtail control in soybean on June 23, July 7, 16, 28 and September 19 and soybean injury on July 16 at Rochester, MN in 2008.

Treatment	Rate	Giant Foxtail Control				Injury	Yield
		6/23	7/7	7/16	7/28	7/16	
	(rate/A)			(%)			(bu/A)
Untreated		0	0	0	0	0	3
PPI/POST I							
Prowl H2O/ Roundup Original + NIS + AMS	3 pt/ 16 fl oz + 0.25% v/v + 2 lb	81	94	98	99	0	15
PRE/POST I							
Valor/ Roundup Original + NIS + AMS	2.5 oz wt/ 16 fl oz + 0.25% v/v + 2 lb	78	97	92	99	0	21
Valor/ Cobra + Roundup Original + COC + AMS	2.5 oz wt/ 6 fl oz + 16 fl oz + 1.25% v/v + 2 lb	76	93	93	97	21	21
Sonic/ Roundup Original + NIS + AMS	3 oz wt/ 16 fl oz + 0.25% v/v + 2 lbs	66	94	88	98	0	18
Prefix/ Roundup Original + NIS + AMS	1.75 pt/ 16 fl oz + 0.25% v/v + 2 lbs	98	99	98	99	0	16
Authority MTZ/ Roundup Original + NIS + AMS	10 oz wt / 16 fl oz + 0.25% v/v + 2 lbs	76	95	98	99	0	14
Authority Assist/ Roundup Original + NIS + AMS	12 fl oz/ 16 fl oz + 0.25% v/v + 2 lbs	94	99	99	99	0	21
PRE/POST II							
Gangster V + Gangster FR/ Roundup Original + NIS + AMS	2.5 oz wt + 0.5 oz wt/ 16 fl oz + 0.25% v/v + 2 lb	92	86	99	99	0	20
Enlite/ Roundup Original + NIS + AMS	2.8 oz wt/ 16 fl oz + 0.25% v/v + 2 lb	85	91	99	99	0	20
POST I							
Roundup Original + NIS + AMS	16 fl oz + 0.25% v/ + 2 lbs	0	90	97	98	0	12
FlexStar + Roundup Original + NIS + AMS	12 fl oz + 16 fl oz + 0.25% v/ + 2 lbs	0	92	94	99	16	16
Cobra + Roundup Original + NIS + AMS	6 fl oz + 16 fl oz + 0.25% v/ + 2 lbs	0	90	96	99	25	12
Resource + Roundup Original + NIS + AMS	4 fl oz + 16 fl oz + 0.25% v/ + 2 lbs	0	88	97	99	11	14
Cadet + Roundup Original + NIS + AMS	0.4 fl oz + 16 fl oz + 0.25% v/ + 2 lbs	0	89	96	99	14	11
FirstRate + Roundup Original + NIS + AMS	0.3 oz wt +16 fl oz + 0.25% v/ + 2 lbs	0	88	97	99	0	12
Synchrony XP + Roundup Original + NIS + AMS	0.375 oz wt + 16 fl oz + 0.25% v/ + 2 lbs	0	90	97	99	0	16
Classic + Roundup Original + NIS + AMS	0.5 oz wt + 16 fl oz + 0.25% v/ + 2 lbs	0	89	96	99	0	15
Harmony GT + Roundup Original + NIS + AMS	0.33 oz wt + 16 fl oz + 0.25% v/ + 2 lbs	0	89	97	98	0	12
Pursuit + Roundup Original + NIS + AMS	4 fl oz + 16 fl oz + 0.25% v/ + 2 lbs	0	89	98	99	11	10
	LSD (P=0.10)	**5**	**4**	**3**	**1**	**3**	**4.3**

Table 8. Performance comparison of glyphosate tank mix partners to one-pass glyphosate in 2007 and 2008.

Postemergence	Giant Ragweed		Common Lambsquarters		Common Waterhemp		Velvetleaf	
Tank Mix partners	2007	2008	2007	2008	2007	2008	2007	2008
Flexstar	84	80	63	80	88	90	NR	69
Cobra	82	77	56	73	86	85	NR	64
Resource	66	55	75	63	73	63	NR	83
Cadet	NR	56	NR	79	NR	56	NR	95
FirstRate	90	80	70	73	78	56	NR	61
Classic (0.25 oz)	73	NR	63	NR	64	NR	NR	NR
Classic (0.5 oz)	80	69	68	86	69	63	NR	60
Synchrony XP	78	64	71	75	71	65	NR	64
Harmony GT	75	64	94	90	65	64	NR	65
Pursuit	86	68	96	84	60	58	NR	66
One Pass Glyphosate	78%	71%	60%	76%	73%	65%	NR	61%

Table 9. Performance comparison of sequential soil applied herbicides to one-pass glyphosate in 2007 and 2008.

SEQUENTIALS	Giant Ragweed		Common Lambsquarters		Common Waterhemp		Velvetleaf	
Preemergence / Postemergence	2007	2008	2007	2008	2007	2008	2007	2008
Prowl	NR	65	NR	66	NR	65	NR	54
Gangster	93	96	99	99	99	99	NR	99
Gangster / Glyphosate + Cobra	96	NR	96	NR	99	NR	NR	NR
Enlite	NR	87	NR	99	NR	99	NR	97
Valor	84	79	96	92	99	91	NR	98
Valor / Glyphosate + Cobra	88	89	97	93	98	99	NR	95
Sonic	88	83	99	99	94	97	NR	93
Prefix	97	95	92	93	99	95	NR	74
Authority MTZ	77	72	99	99	97	99	NR	99
Authority Assist	NR	79	NR	99	NR	99	NR	99
One Pass Glyphosate	78%	71%	60%	76%	73%	65%	NR	61%

Table 10. Performance comparison of glyphosate tank mix partners to one-pass glyphosate in 2007 and 2008.

Postemergence	Giant Ragweed		Common Lambsquarters		Common Waterhemp		Velvetleaf	
Tank Mix partners	2007	2008	2007	2008	2007	2008	2007	2008
Flexstar	+	+	=	=	+	++	NR	+
Cobra	=	+	=	=	+	+	NR	=
Resource	-	-	+	-	=	=	NR	+
Cadet	NR	-	NR	=	NR	-	NR	++
FirstRate	++	+	+	=	=	-	NR	=
Classic (0.25 oz)	=	NR	=	NR	-	NR	NR	NR
Classic (0.5 oz)	=	=	+	+	=	=	NR	=
Synchrony XP	=	-	+	=	=	=	NR	=
Harmony GT	=	-	++	++	-	=	NR	=
Pursuit	+	=	++	+	-	-	NR	+
One Pass Glyphosate	78%	71%	60%	76%	73%	65%		61%

Table 11. Performance comparison of sequential soil applied herbicides to one-pass glyphosate in 2007 and 2008.

SEQUENTIALS	Giant Ragweed		Common Lambsquarters		Common Waterhemp		Velvetleaf	
Preemergence / Postemergence	2007	2008	2007	2008	2007	2008	2007	2008
Prowl	NR	-	NR	-	NR	=	NR	-
Gangster	++	++	++	++	++	++	NR	++
Gangster / Glyphosate + Cobra	++	NR	++	NR	++	NR	NR	NR
Enlite	NR	+	NR	++	NR	++	NR	++
Valor	+	+	++	++	++	++	NR	++
Valor / Glyphosate + Cobra	+	+	++	++	++	++	NR	++
Sonic	+	+	++	++	++	++	NR	++
Prefix	++	++	++	++	++	++	NR	+
Authority MTZ	=	=	++	++	++	++	NR	++
Authority Assist	NR	+	NR	++	NR	++	NR	++
One Pass Glyphosate	78%	71%	60%	76%	73%	65%	NR	61%

(++) is 90% or better control
(+) is significantly higher control than one-pass glyphosate, but less than 90%
(=) is the same control as one-pass glyphosate
(-) is significantly lower control than one-pass glyphosate
NR = Not rated or treatment not included

Weed Management in soybean at Rochester, MN, in 2008.

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The objective of this trial was to evaluate herbicide systems for weed control effectiveness and economics in soybean. The research site was a Lawler loam series with a pH of 6.9 and soil test P and K levels of 71 ppm and 224 ppm, respectively. The field was spring disked and field cultivated prior to planting. The soybean variety, Pioneer 91M92 RR STS, was planted on May 22, 2008, at a depth of 1.5 inches in 30 inch rows at 150,000 seeds per acre. A randomized complete block design was used with four replications. Preemergence (PRE) and postemergence (POST I, POST II, POST III and POST IV) treatments were applied with a tractor-mounted sprayer delivering 20 gpa at 32 psi using Turbo Tee 11002 nozzles. Evaluations of the plots were taken on June 23, July 1, 7, 18, 28, and September 23. Application dates, environmental conditions, and weed stages are listed below. The center two rows of each plot were machine harvested on October 10, 2008. (University of Minnesota Extension, Regional Office – Rochester, Southern Research and Outreach Center – Waseca, and Southwest Research and Outreach Center – Lamberton, MN).

Date	**5/22**	**6/23**	**6/26**	**6/30**	**7/21**
Treatment	**PRE**	**POST I**	**POST II**	**POST III**	**POST IV**
Temperature (F)					
Air	66	78	74	77	74
soil	70	86	80	80	73
Relative Humidity (%)	40	38	57	32	66
Wind (mph)	7	5	6	7	7
Soil moisture	Inadequate	Inadequate	Inadequate	Adequate	Adequate
Bean					
stage		V2	V3	V3-V4	R2
height (inch)		4.5	5.0	8.0	18.0
Giant Ragweed					
weed density (ft^2)		11.2	11.2	11.2	11.2
height (inch)		4.8	7.6	4.4	6.5
Common Lambsquarters					
weed density (ft^2)		23.6	23.6	23.6	23.6
height (inch)		2.2	3.3	3.1	4.1
Common Waterhemp					
weed density (ft^2)		9.7	9.7	9.7	9.7
height (inch)		1.1	1.8	3.0	5.3
Giant foxtail					
weed density (ft^2)		3.2	3.2	3.2	3.2
height (inch)		1.8	2.2	5.0	3.6
Velvetleaf					
weed density (ft^2)		5.0	5.0	5.0	5.0
height (inch)		2.0	2.2	2.3	3.8
Rainfall after each application (inch)					
week 1	1.99	0.76	0.76	0.87	0.04
week 2	2.06	0.87	1.33	0.92	0.81
week 3	6.57	0.92	0.91	0.59	0.07

Table 1. Performance of herbicide systems for giant ragweed control in soybean on June 23, July 1, 7, 18, and 28, and September 23 at Rochester, MN in 2008.

Treatment	Rate	Giant Ragweed Control						Yield
		6/23	7/1	7/7	7/18	7/28	9/23	
	(rate/A)	(%)						(bu/A)
PRE / POST I								
Boundary / Flexstar + Fusion + Harmony GT + MSO + 28% N	1.5 pt / 16 oz + 8 oz + 0.125 oz + 1% v/v + 2.5% v/v	0	99	95	93	96	89	21
PRE / POST II								
Authority First / Roundup OriginalMax + N-Pa-K AMS	3.2 oz / 22 oz + 3 qt	85	73	89	92	97	93	27
Authority Assist / Roundup OriginalMax + N-Pa-K AMS	5 oz / 22 oz + 3 qt	16	80	94	92	96	91	26
IntRRo / Roundup WeatherMax + N-Pa-K AMS	2 qt / 22 oz + 3 qt	0	76	95	95	94	91	25
Gangster V + Gangster FR / Roundup OriginalMax + N-Pa-K AMS	2 oz + 0.4 oz / 22 oz + 3 qt	90	89	94	96	99	97	27
Prefix / Touchdown Total + N-Pa-K AMS	1 qt / 24 oz + 3 qt	85	80	97	93	99	97	29
Boundary / Touchdown Total + N-Pa-K AMS	1.5 pt / 24 oz + 3 qt	0	76	93	93	94	89	27
Valor / Roundup OriginalMax + N-Pa-K AMS	2 oz / 22 oz + 3 qt	16	80	97	94	98	95	31
Valor SX + Python / Roundup OriginalMax + N-Pa-K AMS	1.5 oz + 0.5 oz / 22 oz + 3 qt	71	71	92	94	97	96	32
Valor SX + Sencor / Roundup OriginalMax + N-Pa-K AMS	1.75 oz + 4 oz / 22 oz + 3 qt	23	84	98	92	94	93	32
Sonic / Durango DMA + N-Pa-K AMS	4.5 oz / 24 oz + 3 qt	88	81	91	94	98	96	32
Enlite (clorimuron + thifensulforun + flumioxazin)/ Roundup PowerMax + N-Pa-K AMS	2.8 oz (0.33 oz + 0.5 oz + 2 oz) / 22 oz + 3 qt	79	71	93	95	98	96	34
Enlite (clorimuron + thiefensulorun + flumioxazin) / Roundup PowerMax + Harmony GT + N-Pa-K AMS	2.8 oz (0.33 oz + 0.5 oz + 2 oz) / 22 oz + 0.125 oz + 3 qt	80	70	92	94	98	94	29
POST I / POST III								
Roundup WeatherMax + N-Pa-K AMS / Roundup WeatherMax + N-Pa-K AMS	22 oz + 3 qt / 22 oz + 3 qt	0	94	97	94	98	99	27
Durango DMA + FirstRate + N-Pa-K AMS / Durango DMA + N-Pa-K AMS	24 oz + 0.3 oz + 3 qt / 24 oz + 3 qt	0	95	98	97	99	99	30
Touchdown Total + N-Pa-K AMS / Touchdown Total + N-Pa-K AMS	24 oz + 3 qt / 24 oz + 3 qt	0	93	98	97	99	99	26
POST II								
Classic + Roundup PowerMax + N-Pa-K AMS	0.33 oz + 22 oz + 3 qt	0	78	95	94	95	94	24
Harmony GT + Roundup PowerMax + N-Pa-K AMS	0.5 oz + 22 oz + 3 qt	0	79	96	93	94	91	23
Harmony GT + Classic + Roundup PowerMax + N-Pa-K AMS	0.5 oz + 0.33 oz + 22 oz + 3 qt	0	76	95	93	95	93	24
Roundup OriginalMax + Resource + NIS + N-Pa-K AMS	22 oz + 2 oz + 0.25% v/v + 3 qt	0	79	78	85	82	79	17
Roundup OriginalMax + Cadet + NIS + N-Pa-K AMS	22 oz + 0.4 oz + 0.25% v/v + 3 qt	0	78	74	87	84	81	17
Roundup WeatherMax + N-Pa-K AMS	22 oz + 3 qt	0	75	96	95	92	88	22
Weedy Check		0	0	0	0	0	0	2
Weed Free		100	100	100	100	100	100	32
	LSD (P=0.10)	**2**	**4**	**3**	**3**	**3**	**4**	**7**

Table 2. Performance of herbicide systems for common lambsquarters control in soybean on June 23, July 1, 7, 18, and 28, and September 23 at Rochester, MN in 2008.

Treatment	Rate	Common Lambsquarters Control						Yield
		6/23	7/1	7/7	7/18	7/28	9/23	
	(rate/A)	(%)						(bu/A)
PRE / POST I								
Boundary / Flexstar + Fusion + Harmony GT + MSO + 28% N	1.5 pt / 16 oz + 8 oz + 0.125 oz + 1% v/v + 2.5% v/v	71	99	97	88	92	88	21
PRE / POST II								
Authority First / Roundup OriginalMax + N-Pa-K AMS	3.2 oz / 22 oz + 3 qt	98	99	99	99	99	99	27
Authority Assist / Roundup OriginalMax + N-Pa-K AMS	5 oz / 22 oz + 3 qt	98	99	99	99	99	99	26
IntRRo / Roundup WeatherMax + N-Pa-K AMS	2 qt / 22 oz + 3 qt	66	98	98	90	90	94	25
Gangster V + Gangster FR / Roundup OriginalMax + N-Pa-K AMS	2 oz + 0.4 oz / 22 oz + 3 qt	99	99	99	96	99	96	27
Prefix / Touchdown Total + N-Pa-K AMS	1 qt / 24 oz + 3 qt	72	74	99	95	98	94	29
Boundary / Touchdown Total + N-Pa-K AMS	1.5 pt / 24 oz + 3 qt	92	99	98	91	96	86	27
Valor / Roundup OriginalMax + N-Pa-K AMS	2 oz / 22 oz + 3 qt	98	99	99	91	97	92	31
Valor SX + Python / Roundup OriginalMax + N-Pa-K AMS	1.5 oz + 0.5 oz / 22 oz + 3 qt	99	99	99	97	99	95	32
Valor SX + Sencor / Roundup OriginalMax + N-Pa-K AMS	1.75 oz + 4 oz / 22 oz + 3 qt	99	99	99	91	97	90	32
Sonic / Durango DMA + N-Pa-K AMS	4.5 oz / 24 oz + 3 qt	99	99	99	99	99	99	32
Enlite (clorimuron + thifensulforun + flumioxazin)/ Roundup PowerMax + N-Pa-K AMS	2.8 oz (0.33 oz + 0.5 oz + 2 oz) / 22 oz + 3 qt	99	99	99	97	98	97	34
Enlite (clorimuron + thiefensulorun + flumioxazin) / Roundup PowerMax + Harmony GT + N-Pa-K AMS	2.8 oz (0.33 oz + 0.5 oz + 2 oz) / 22 oz + 0.125 oz + 3 qt	99	99	99	98	99	97	29
POST I / POST III								
Roundup WeatherMax + N-Pa-K AMS / Roundup WeatherMax + N-Pa-K AMS	22 oz + 3 qt / 22 oz + 3 qt	0	98	96	91	99	99	27
Durango DMA + FirstRate + N-Pa-K AMS / Durango DMA + N-Pa-K AMS	24 oz + 0.3 oz + 3 qt / 24 oz + 3 qt	0	97	92	86	99	99	30
Touchdown Total + N-Pa-K AMS / Touchdown Total + N-Pa-K AMS	24 oz + 3 qt / 24 oz + 3 qt	0	96	97	89	99	98	26
POST II								
Classic + Roundup PowerMax + N-Pa-K AMS	0.33 oz + 22 oz + 3 qt	0	98	95	88	97	87	24
Harmony GT + Roundup PowerMax + N-Pa-K AMS	0.5 oz + 22 oz + 3 qt	0	97	98	92	98	91	23
Harmony GT + Classic + Roundup PowerMax + N-Pa-K AMS	0.5 oz + 0.33 oz + 22 oz + 3 qt	0	96	98	96	99	93	24
Roundup OriginalMax + Resource + NIS + N-Pa-K AMS	22 oz + 2 oz + 0.25% v/v + 3 qt	0	96	92	85	86	80	17
Roundup OriginalMax + Cadet + NIS + N-Pa-K AMS	22 oz + 0.4 oz + 0.25% v/v + 3 qt	0	98	96	85	86	82	17
Roundup WeatherMax + N-Pa-K AMS	22 oz + 3 qt	0	95	92	78	88	80	22
Weedy Check		0	0	0	0	0	0	2
Weed Free		100	100	100	100	100	100	32
	LSD (P=0.10)	**4**	**2**	**3**	**5**	**3**	**4**	**7**

Table 3. Performance of herbicide systems for common waterhemp control in soybean on June 23, July 1, 7, 18, and 28, and September 23 at Rochester, MN in 2008.

Treatment	Rate	Common Waterhemp Control						Yield
		6/23	7/1	7/7	7/18	7/28	9/23	
	(rate/A)	(%)						(bu/A)
PRE / POST I								
Boundary / Flexstar + Fusion + Harmony GT + MSO + 28% N	1.5 pt / 16 oz + 8 oz + 0.125 oz + 1% v/v + 2.5% v/v	99	99	99	98	98	99	21
PRE / POST II								
Authority First / Roundup OriginalMax + N-Pa-K AMS	3.2 oz / 22 oz + 3 qt	99	96	99	99	98	98	27
Authority Assist / Roundup OriginalMax + N-Pa-K AMS	5 oz / 22 oz + 3 qt	99	99	99	97	98	95	26
IntRRo / Roundup WeatherMax + N-Pa-K AMS	2 qt / 22 oz + 3 qt	99	99	98	86	93	84	25
Gangster V + Gangster FR / Roundup OriginalMax + N-Pa-K AMS	2 oz + 0.4 oz / 22 oz + 3 qt	99	99	99	99	98	99	27
Prefix / Touchdown Total + N-Pa-K AMS	1 qt / 24 oz + 3 qt	99	99	99	99	99	99	29
Boundary / Touchdown Total + N-Pa-K AMS	1.5 pt / 24 oz + 3 qt	98	99	99	93	96	89	27
Valor / Roundup OriginalMax + N-Pa-K AMS	2 oz / 22 oz + 3 qt	99	99	99	94	98	94	31
Valor SX + Python / Roundup OriginalMax + N-Pa-K AMS	1.5 oz + 0.5 oz / 22 oz + 3 qt	99	99	99	97	98	96	32
Valor SX + Sencor / Roundup OriginalMax + N-Pa-K AMS	1.75 oz + 4 oz / 22 oz + 3 qt	97	99	99	93	96	92	32
Sonic / Durango DMA + N-Pa-K AMS	4.5 oz / 24 oz + 3 qt	99	99	99	99	98	99	32
Enlite (clorimuron + thifensulforun + flumioxazin)/ Roundup PowerMax + N-Pa-K AMS	2.8 oz (0.33 oz + 0.5 oz + 2 oz) / 22 oz + 3 qt	99	99	99	99	99	99	34
Enlite (clorimuron + thiefensulorun + flumioxazin) / Roundup PowerMax + Harmony GT + N-Pa-K AMS	2.8 oz (0.33 oz + 0.5 oz + 2 oz) / 22 oz + 0.125 oz + 3 qt	99	99	99	99	98	98	29
POST I / POST III								
Roundup WeatherMax + N-Pa-K AMS / Roundup WeatherMax + N-Pa-K AMS	22 oz + 3 qt / 22 oz + 3 qt	0	9999	97	86	99	99	27
Durango DMA + FirstRate + N-Pa-K AMS / Durango DMA + N-Pa-K AMS	24 oz + 0.3 oz + 3 qt / 24 oz + 3 qt	0	99	99	92	99	99	30
Touchdown Total + N-Pa-K AMS / Touchdown Total + N-Pa-K AMS	24 oz + 3 qt / 24 oz + 3 qt	0	99	99	89	99	99	26
POST II								
Classic + Roundup PowerMax + N-Pa-K AMS	0.33 oz + 22 oz + 3 qt	0	99	99	95	96	92	24
Harmony GT + Roundup PowerMax + N-Pa-K AMS	0.5 oz + 22 oz + 3 qt	0	99	99	94	97	94	23
Harmony GT + Classic + Roundup PowerMax + N-Pa-K AMS	0.5 oz + 0.33 oz + 22 oz + 3 qt	0	99	99	96	97	94	24
Roundup OriginalMax + Resource + NIS + N-Pa-K AMS	22 oz + 2 oz + 0.25% v/v + 3 qt	0	99	99	90	86	85	17
Roundup OriginalMax + Cadet + NIS + N-Pa-K AMS	22 oz + 0.4 oz + 0.25% v/v + 3 qt	0	99	98	89	86	88	17
Roundup WeatherMax + N-Pa-K AMS	22 oz + 3 qt	0	99	98	82	88	81	22
Weedy Check		0	0	0	0	0	0	2
Weed Free		100	100	100	100	100	100	32
	LSD (P=0.10)	**1**	**1**	**1**	**3**	**2**	**3**	**7**

Table 4. Performance of herbicide systems for giant foxtail control in soybean on June 23, July 1, 7, 18, and 28, and September 23 at Rochester, MN in 2008.

Treatment	Rate	Giant foxtail Control						Yield
		6/23	7/1	7/7	7/18	7/28	9/23	
	(rate/A)	(%)						(bu/A)
PRE / POST I								
Boundary / Flexstar + Fusion + Harmony GT + MSO + 28% N	1.5 pt / 16 oz + 8 oz + 0.125 oz + 1% v/v + 2.5% v/v	99	99	98	95	99	90	21
PRE / POST II								
Authority First / Roundup OriginalMax + N-Pa-K AMS	3.2 oz / 22 oz + 3 qt	66	66	98	94	97	89	27
Authority Assist / Roundup OriginalMax + N-Pa-K AMS	5 oz / 22 oz + 3 qt	60	99	98	92	96	83	26
IntRRo / Roundup WeatherMax + N-Pa-K AMS	2 qt / 22 oz + 3 qt	99	99	98	88	96	87	25
Gangster V + Gangster FR / Roundup OriginalMax + N-Pa-K AMS	2 oz + 0.4 oz / 22 oz + 3 qt	89	75	98	90	97	89	27
Prefix / Touchdown Total + N-Pa-K AMS	1 qt / 24 oz + 3 qt	99	94	99	98	99	96	29
Boundary / Touchdown Total + N-Pa-K AMS	1.5 pt / 24 oz + 3 qt	99	99	99	94	98	91	27
Valor / Roundup OriginalMax + N-Pa-K AMS	2 oz / 22 oz + 3 qt	63	99	97	88	93	84	31
Valor SX + Python / Roundup OriginalMax + N-Pa-K AMS	1.5 oz + 0.5 oz / 22 oz + 3 qt	64	66	98	91	98	90	32
Valor SX + Sencor / Roundup OriginalMax + N-Pa-K AMS	1.75 oz + 4 oz / 22 oz + 3 qt	65	99	98	89	97	84	32
Sonic / Durango DMA + N-Pa-K AMS	4.5 oz / 24 oz + 3 qt	63	60	98	91	97	90	32
Enlite (clorimuron + thifensulforun + flumioxazin)/ Roundup PowerMax + N-Pa-K AMS	2.8 oz (0.33 oz + 0.5 oz + 2 oz) / 22 oz + 3 qt	76	74	99	90	98	90	34
Enlite (clorimuron + thiefensulorun + flumioxazin) / Roundup PowerMax + Harmony GT + N-Pa-K AMS	2.8 oz (0.33 oz + 0.5 oz + 2 oz) / 22 oz + 0.125 oz + 3 qt	81	76	99	94	99	91	29
POST I / POST III								
Roundup WeatherMax + N-Pa-K AMS / Roundup WeatherMax + N-Pa-K AMS	22 oz + 3 qt / 22 oz + 3 qt	0	99	98	89	99	99	27
Durango DMA + FirstRate + N-Pa-K AMS / Durango DMA + N-Pa-K AMS	24 oz + 0.3 oz + 3 qt / 24 oz + 3 qt	0	99	98	96	99	99	30
Touchdown Total + N-Pa-K AMS / Touchdown Total + N-Pa-K AMS	24 oz + 3 qt / 24 oz + 3 qt	0	99	97	86	99	98	26
POST II								
Classic + Roundup PowerMax + N-Pa-K AMS	0.33 oz + 22 oz + 3 qt	0	99	98	90	96	83	24
Harmony GT + Roundup PowerMax + N-Pa-K AMS	0.5 oz + 22 oz + 3 qt	0	99	98	90	96	82	23
Harmony GT + Classic + Roundup PowerMax + N-Pa-K AMS	0.5 oz + 0.33 oz + 22 oz + 3 qt	0	99	97	92	97	87	24
Roundup OriginalMax + Resource + NIS + N-Pa-K AMS	22 oz + 2 oz + 0.25% v/v + 3 qt	0	99	98	87	88	76	17
Roundup OriginalMax + Cadet + NIS + N-Pa-K AMS	22 oz + 0.4 oz + 0.25% v/v + 3 qt	0	99	97	87	90	75	17
Roundup WeatherMax + N-Pa-K AMS	22 oz + 3 qt	0	99	97	88	97	77	22
Weedy Check		0	0	0	0	0	0	2
Weed Free		100	100	100	100	100	100	32
	LSD (P=0.10)	**4**	**4**	**1**	**5**	**2**	**7**	**7**

Table 5. Performance of herbicide systems for velvetleaf control in soybean on June 23, July 1, 7, 18, and 28, and September 23 at Rochester, MN in 2008.

Treatment	Rate	Velvetleaf Control						Yield
		6/23	7/1	7/7	7/18	7/28	9/23	
	(rate/A)	(%)						(bu/A)
PRE / POST I								
Boundary / Flexstar + Fusion + Harmony GT + MSO + 28% N	1.5 pt / 16 oz + 8 oz + 0.125 oz + 1% v/v + 2.5% v/v	71	99	96	84	92	85	21
PRE / POST II								
Authority First / Roundup OriginalMax + N-Pa-K AMS	3.2 oz / 22 oz + 3 qt	97	97	96	95	97	93	27
Authority Assist / Roundup OriginalMax + N-Pa-K AMS	5 oz / 22 oz + 3 qt	88	96	98	93	97	94	26
IntRRo / Roundup WeatherMax + N-Pa-K AMS	2 qt / 22 oz + 3 qt	50	89	97	90	95	88	25
Gangster V + Gangster FR / Roundup OriginalMax + N-Pa-K AMS	2 oz + 0.4 oz / 22 oz + 3 qt	98	99	98	94	99	94	27
Prefix / Touchdown Total + N-Pa-K AMS	1 qt / 24 oz + 3 qt	55	59	87	93	98	93	29
Boundary / Touchdown Total + N-Pa-K AMS	1.5 pt / 24 oz + 3 qt	70	92	96	89	96	85	27
Valor / Roundup OriginalMax + N-Pa-K AMS	2 oz / 22 oz + 3 qt	96	99	98	95	97	93	31
Valor SX + Python / Roundup OriginalMax + N-Pa-K AMS	1.5 oz + 0.5 oz / 22 oz + 3 qt	99	99	99	98	99	98	32
Valor SX + Sencor / Roundup OriginalMax + N-Pa-K AMS	1.75 oz + 4 oz / 22 oz + 3 qt	98	99	98	93	97	95	32
Sonic / Durango DMA + N-Pa-K AMS	4.5 oz / 24 oz + 3 qt	99	99	99	94	98	94	32
Enlite (clorimuron + thifensulforun + flumioxazin)/ Roundup PowerMax + N-Pa-K AMS	2.8 oz (0.33 oz + 0.5 oz + 2 oz) / 22 oz + 3 qt	98	99	97	92	96	91	34
Enlite (clorimuron + thiefensulorun + flumioxazin) / Roundup PowerMax + Harmony GT + N-Pa-K AMS	2.8 oz (0.33 oz + 0.5 oz + 2 oz) / 22 oz + 0.125 oz + 3 qt	97	99	98	94	99	95	29
POST I / POST III								
Roundup WeatherMax + N-Pa-K AMS / Roundup WeatherMax + N-Pa-K AMS	22 oz + 3 qt / 22 oz + 3 qt	0	86	96	87	98	97	27
Durango DMA + FirstRate + N-Pa-K AMS / Durango DMA + N-Pa-K AMS	24 oz + 0.3 oz + 3 qt / 24 oz + 3 qt	0	93	97	93	99	98	30
Touchdown Total + N-Pa-K AMS / Touchdown Total + N-Pa-K AMS	24 oz + 3 qt / 24 oz + 3 qt	0	90	98	93	99	98	26
POST II								
Classic + Roundup PowerMax + N-Pa-K AMS	0.33 oz + 22 oz + 3 qt	0	85	95	90	95	85	24
Harmony GT + Roundup PowerMax + N-Pa-K AMS	0.5 oz + 22 oz + 3 qt	0	84	96	92	94	85	23
Harmony GT + Classic + Roundup PowerMax + N-Pa-K AMS	0.5 oz + 0.33 oz + 22 oz + 3 qt	0	84	96	92	96	90	24
Roundup OriginalMax + Resource + NIS + N-Pa-K AMS	22 oz + 2 oz + 0.25% v/v + 3 qt	0	96	94	86	90	85	17
Roundup OriginalMax + Cadet + NIS + N-Pa-K AMS	22 oz + 0.4 oz + 0.25% v/v + 3 qt	0	99	98	94	92	91	17
Roundup WeatherMax + N-Pa-K AMS	22 oz + 3 qt	0	85	96	90	95	87	22
Weedy Check		0	0	0	0	0	0	2
Weed Free		100	100	100	100	100	100	32
	LSD (P=0.10)	**2**	**3**	**3**	4	**3**	**4**	**7**

Table 6. Evaluation of herbicide injury to soybean on June 23, July 1, 7, and 18 at Rochester, MN in 2008.

Treatment	Rate	Injury				Yield
		6/23	7/1	7/7	7/18	
	(rate/A)			(%)		(bu/A)
PRE / POST I						
Boundary / Flexstar + Fusion + Harmony GT + MSO + 28% N	1.5 pt / 16 oz + 8 oz + 0.125 oz + 1% v/v + 2.5% v/v	0	41	10	2.5	21
PRE / POST II						
Authority First / Roundup OriginalMax + N-Pa-K AMS	3.2 oz / 22 oz + 3 qt	0	0	0	0	27
Authority Assist / Roundup OriginalMax + N-Pa-K AMS	5 oz / 22 oz + 3 qt	0	0	0	0	26
IntRRo / Roundup WeatherMax + N-Pa-K AMS	2 qt / 22 oz + 3 qt	0	0	0	0	25
Gangster V + Gangster FR / Roundup OriginalMax + N-Pa-K AMS	2 oz + 0.4 oz / 22 oz + 3 qt	0	0	0	0	27
Prefix / Touchdown Total + N-Pa-K AMS	1 qt / 24 oz + 3 qt	0	0	0	0	29
Boundary / Touchdown Total + N-Pa-K AMS	1.5 pt / 24 oz + 3 qt	0	0	0	0	27
Valor / Roundup OriginalMax + N-Pa-K AMS	2 oz / 22 oz + 3 qt	0	0	0	0	31
Valor SX + Python / Roundup OriginalMax + N-Pa-K AMS	1.5 oz + 0.5 oz / 22 oz + 3 qt	0	0	0	0	32
Valor SX + Sencor / Roundup OriginalMax + N-Pa-K AMS	1.75 oz + 4 oz / 22 oz + 3 qt	0	0	0	0	32
Sonic / Durango DMA + N-Pa-K AMS	4.5 oz / 24 oz + 3 qt	0	0	0	0	32
Enlite (clorimuron + thifensulforun + flumioxazin)/ Roundup PowerMax + N-Pa-K AMS	2.8 oz (0.33 oz + 0.5 oz + 2 oz) / 22 oz + 3 qt	0	0	0	0	34
Enlite (clorimuron + thiefensulorun + flumioxazin) / Roundup PowerMax + Harmony GT + N-Pa-K AMS	2.8 oz (0.33 oz + 0.5 oz + 2 oz) / 22 oz + 0.125 oz + 3 qt	0	0	0	0	29
POST I / POST III						
Roundup WeatherMax + N-Pa-K AMS / Roundup WeatherMax + N-Pa-K AMS	22 oz + 3 qt / 22 oz + 3 qt	0	0	0	0	27
Durango DMA + FirstRate + N-Pa-K AMS / Durango DMA + N-Pa-K AMS	24 oz + 0.3 oz + 3 qt / 24 oz + 3 qt	0	0	0	0	30
Touchdown Total + N-Pa-K AMS / Touchdown Total + N-Pa-K AMS	24 oz + 3 qt / 24 oz + 3 qt	0	0	0	0	26
POST II						
Classic + Roundup PowerMax + N-Pa-K AMS	0.33 oz + 22 oz + 3 qt	0	0	0	0	24
Harmony GT + Roundup PowerMax + N-Pa-K AMS	0.5 oz + 22 oz + 3 qt	0	0	0	0	23
Harmony GT + Classic + Roundup PowerMax + N-Pa-K AMS	0.5 oz + 0.33 oz + 22 oz + 3 qt	0	0	0	0	24
Roundup OriginalMax + Resource + NIS + N-Pa-K AMS	22 oz + 2 oz + 0.25% v/v + 3 qt	0	30	14	0	17
Roundup OriginalMax + Cadet + NIS + N-Pa-K AMS	22 oz + 0.4 oz + 0.25% v/v + 3 qt	0	40	15	0	17
Roundup WeatherMax + N-Pa-K AMS	22 oz + 3 qt	0	0	0	0	22
Weedy Check		0	0	0	0	2
Weed Free		100	0	0	0	32
	LSD (P=0.10)	**0**	**1**	**1**	**1**	**7**

2008 Soybean Herbicide Evaluation - Waseca
Common ragweed site

Herbicide	Rate	Giant foxtail	Common ragweed	Common lambsquarters	Velvetleaf	Redroot pigweed	Yield	Cost	Returns
	(pt/A)	----------(% control)----------					(bu/A)	----($/A)-----	
Preemergence/ POST I (4-inch weeds)									
Boundary / Flexstar + Fusion + Harmony GT + MSO + 28%	1.5 pt / 16 oz + 8 oz + 0.125 oz + 1% + 2.5%	93	89	98	92	98	56.1	59.05	446
Preemergence/ POST II (6-inch weeds)									
Authority First / Roundup Original Max + AMS	3.2 oz / 22 oz + 3 q	97	99	99	97	99	55.9	46.89	456
Authority Asist / Roundup Original Max + AMS	5 oz / 22 oz + 3 q	97	88	99	97	98	51.6	46.21	418
IntRRo / Roundup WeatherMax + AMS	4 pt / 22 oz + 3 q	98	85	91	97	89	51.5	47.71	416
Gangster / Roundup Original Max + AMS	2.4 oz / 22 oz + 3 q	99	98	99	98	97	55.9	49.70	454
Prefix / Touchdown Total + AMS	2 pt / 24 oz + 3 q	97	84	89	91	87	50.8	46.09	411
Boundary / Touchdown Total + AMS	1.5 pt / 24 oz + 3 q	99	96	93	99	93	56.2	48.37	457
Valor SX / Roundup Original Max + AMS	2 oz / 22 oz + 3 q	99	92	98	94	89	56.9	44.90	467
Valor SX + Python / Roundup Original Max + AM	1.5 oz + 0.5 oz / 22 oz + 3 q	99	97	99	99	99	59.8	47.28	491
Valor SX + Sencor / Roundup Original Max + AMS	1.75 oz + 4 oz / 22 oz + 3 q	99	93	99	99	97	56.7	47.72	463
Sonic / Durango + AMS	4.5 oz / 24 oz + 3 q	99	99	99	99	99	60.8	49.80	497
Enlite / Roundup PowerMax + AMS	2.8 oz / 22 oz + 3 q	99	95	99	99	99	59.6	47.79	488
Enlite / Roundup PowerMax + Harmony + AM	2.8 oz / 22 oz + 0.125 oz + 3 q	99	97	99	99	99	59.5	50.29	486
POST I (4-inch weeds)/POST III(Canopy)									
Roundup WeatherMax + AMS	22 oz + 3 qt /	99	99	99	99	99	57.1	50.60	463
Roundup WeatherMax + AMS	22 oz + 3 qt								
Durango DMA + First Rate + AMS	24 oz + 0.3 oz + 3 qt	99	99	99	99	99	55.1	51.82	444
Durango DMA + AMS	24 oz + 3 qt								
Touchdown Total + AMS	24 oz + 3 qt /	99	99	99	99	99	57.7	48.57	471
Touchdown Total + AMS	24 oz + 3 qt								
POST II (6-inch weeds)									
Classic + Roundup PowerMax + AMS	0.33 oz / 22 oz + 3 q	99	87	89	97	91	49.4	33.36	411
Harmony GT + Roundup PowerMax + AMS	0.5 oz + 22 oz + 3 q	98	86	86	99	79	46.2	38.78	377
Harmony GT + Classic + Roundup PowerMax + AMS	0.5 oz + 0.33 oz + 22 oz + 3 q	98	89	86	96	96	53.3	43.35	437
Resource + Roundup Original Max + NIS + AMS	2 oz + 22 oz + 0.25% + 3 q	99	70	88	76	81	49.2	32.27	411
Cadet + Roundup Original Max + NIS + AMS	0.4 oz + 22 oz + 0.25% + 3 q	99	70	82	98	79	46.8	32.99	388
Roundup WeatherMax+AMS	22 oz + 3 qt	97	86	79	97	74	46.8	30.30	391
Checks									
Weedy Check	-	0	0	0	0	0	17.7	0	159
Weed Free	-	100	100	100	100	100	58.9	0	530
	LSD(0.10)	**2**	**8**	**9**	**7**	**10**	**5.3**		**48**

2008 Soybean Herbicide Evaluation - Waseca
Common cocklebur site

Herbicide	Rate	Giant foxtail	Common cocklebur	Common ragweed	Tall waterhemp	Yield	Cost	Returns
	(pt/A)		----------(% control)----------			(bu/A)	----($/A)-----	
Preemergence/ POST I (4-inch weeds)								
Boundary / Flexstar + Fusion + Harmony GT + MSO + 28%	1.5 pt / 16 oz + 8 oz + 0.125 oz + 1% + 2.5%	99	87	96	99	41.1	59.05	311
Preemergence/ POST II (6-inch weeds)								
Authority First / Roundup Original Max + AMS	3.2 oz / 22 oz + 3 qt	99	99	99	99	41.1	46.89	323
Authority Asist / Roundup Original Max + AMS	5 oz / 22 oz + 3 qt	99	99	96	99	41.3	46.21	325
IntRRo / Roundup WeatherMax + AMS	4 pt / 22 oz + 3 qt	99	99	99	99	49.6	47.71	399
Gangster / Roundup Original Max + AMS	2.4 oz / 22 oz + 3 qt	99	99	99	99	45.8	49.70	363
Prefix / Touchdown Total + AMS	2 pt / 24 oz + 3 qt	99	99	99	99	46.1	46.09	369
Boundary / Touchdown Total + AMS	1.5 pt / 24 oz + 3 qt	99	99	99	99	39.4	48.37	307
Valor SX / Roundup Original Max + AMS	2 oz / 22 oz + 3 qt	99	99	99	99	42.0	44.90	333
Valor SX + Python / Roundup Original Max + AMS	1.5 oz + 0.5 oz / 22 oz + 3 q	99	99	99	99	42.4	47.28	335
Valor SX + Sencor / Roundup Original Max + AMS	1.75 oz + 4 oz / 22 oz + 3 q	99	98	99	99	47.1	47.72	376
Sonic / Durango + AMS	4.5 oz / 24 oz + 3 qt	99	99	99	99	47.4	49.80	377
Enlite / Roundup PowerMax + AMS	2.8 oz / 22 oz + 3 qt	99	98	99	99	47.3	47.79	378
Enlite / Roundup PowerMax + Harmony + AMS	2.8 oz / 22 oz + 0.125 oz + 3 q	99	99	99	99	44.7	50.29	352
POST I (4-inch weeds)/POST III(Canopy)								
Roundup WeatherMax + AMS	22 oz + 3 qt /	99	99	99	99	45.0	50.60	354
Roundup WeatherMax + AMS	22 oz + 3 qt							
Durango DMA + First Rate + AMS	24 oz + 0.3 oz + 3 qt	99	99	99	99	41.3	51.82	320
Durango DMA + AMS	24 oz + 3 qt							
Touchdown Total + AMS /	24 oz + 3 qt /	99	99	99	99	42.0	48.57	329
Touchdown Total + AMS	24 oz + 3 qt							
POST II (6-inch weeds)								
Classic + Roundup PowerMax + AMS	0.33 oz / 22 oz + 3 qt	99	97	94	90	40.9	33.36	335
Harmony GT + Roundup PowerMax + AMS	0.5 oz + 22 oz + 3 qt	99	99	97	96	43.6	38.78	354
Harmony GT + Classic + Roundup PowerMax + AMS	0.5 oz + 0.33 oz + 22 oz + 3 q	99	99	97	97	42.9	43.35	342
Resource + Roundup Original Max + NIS + AMS	2 oz + 22 oz + 0.25% + 3 q	99	97	79	93	43.4	32.27	358
Cadet + Roundup Original Max + NIS + AMS	0.4 oz + 22 oz + 0.25% + 3 q	99	99	81	80	46.4	32.99	385
Roundup WeatherMax+AMS	22 oz + 3 qt	99	99	89	93	48.1	30.30	403
Checks								
Weedy Check	-	0	0	0	0	19.6	0	176
Weed Free	-	100	100	100	100	45.2	0	407
	LSD(0.10)	**1**	**2**	**4**	**6**	**6.8**		**61**

2008 Soybean Herbicide Evaluation - Waseca
Tall waterhemp site

Herbicide	Rate	Giant foxtail	Tall waterhemp	Giant ragweed	Common lambsquarters	Yield	Cost	Returns
	(pt/A)	----------(% control)----------				(bu/A)	----($/A)-----	
Preemergence/ POST I (4-inch weeds)								
Boundary / Flexstar + Fusion + Harmony GT + MSO + 28%	1.5 pt / 16 oz + 8 oz + 0.125 oz + 1% + 2.5%	81	95	75	79	43.8	59.05	335
Preemergence/ POST II (6-inch weeds)								
Authority First / Roundup Original Max + AMS	3.2 oz / 22 oz + 3 qt	97	99	99	99	50.3	46.89	406
Authority Asist / Roundup Original Max + AMS	5 oz / 22 oz + 3 qt	97	98	96	99	48.4	46.21	389
IntRRo / Roundup WeatherMax + AMS	4 pt / 22 oz + 3 qt	99	92	96	76	50.7	47.71	408
Gangster / Roundup Original Max + AMS	2.4 oz / 22 oz + 3 qt	99	89	99	99	47.8	49.70	380
Prefix / Touchdown Total + AMS	2 pt / 24 oz + 3 qt	99	99	98	95	48.5	46.09	390
Boundary / Touchdown Total + AMS	1.5 pt / 24 oz + 3 qt	96	97	91	86	49.9	48.37	401
Valor SX / Roundup Original Max + AMS	2 oz / 22 oz + 3 qt	96	92	89	94	51.7	44.90	420
Valor SX + Python / Roundup Original Max + AMS	1.5 oz + 0.5 oz / 22 oz + 3 q	98	92	99	95	48.7	47.28	391
Valor SX + Sencor / Roundup Original Max + AMS	1.75 oz + 4 oz / 22 oz + 3 q	96	93	95	92	49.2	47.72	395
Sonic / Durango + AMS	4.5 oz / 24 oz + 3 qt	98	99	99	99	46.9	49.80	372
Enlite / Roundup PowerMax + AMS	2.8 oz / 22 oz + 3 qt	97	89	87	96	44.8	47.79	356
Enlite / Roundup PowerMax + Harmony + AMS	2.8 oz / 22 oz + 0.125 oz + 3 q	95	91	96	93	52.4	50.29	421
POST I (4-inch weeds)/POST III(Canopy)								
Roundup WeatherMax + AMS	22 oz + 3 qt /	99	99	98	99	47.1	50.60	373
Roundup WeatherMax + AMS	22 oz + 3 qt							
Durango DMA + First Rate + AMS	24 oz + 0.3 oz + 3 qt	99	98	99	99	51.2	51.82	409
Durango DMA + AMS	24 oz + 3 qt							
Touchdown Total + AMS /	24 oz + 3 qt /	99	98	99	99	49.8	48.57	400
Touchdown Total + AMS	24 oz + 3 qt							
POST II (6-inch weeds)								
Classic + Roundup PowerMax + AMS	0.33 oz / 22 oz + 3 qt	99	74	96	99	46.9	33.36	389
Harmony GT + Roundup PowerMax + AMS	0.5 oz + 22 oz + 3 qt	96	74	86	86	45.1	38.78	367
Harmony GT + Classic + Roundup PowerMax + AMS	0.5 oz + 0.33 oz + 22 oz + 3 q	96	77	71	80	41.3	43.35	329
Resource + Roundup Original Max + NIS + AMS	2 oz + 22 oz + 0.25% + 3 q	96	56	58	82	40.5	32.27	333
Cadet + Roundup Original Max + NIS + AMS	0.4 oz + 22 oz + 0.25% + 3 q	99	53	67	83	31.4	32.99	250
Roundup WeatherMax+AMS	22 oz + 3 qt	99	71	86	75	36.8	30.30	301
Checks								
Weedy Check	-	0	0	0	0	14.9	0	134
Weed Free	-	100	100	100	100	48.7	0	438
	LSD(0.10)	**5**	**12**	**12**	**16**	**4.3**		**38**

2008 Soybean Herbicide Evaluation - Lamberton

Herbicide	Rate	Yellow foxtail	Tall waterhemp	Common lambsquaters	Yield	Cost	Returns
	(pt/A)	----------(% control)----------			(bu/A)	----($/A)-----	
Preemergence/ POST I (4-inch weeds)							
Boundary / Flexstar + Fusion + Harmony GT + MSO + 28%	1.5 pt / 16 oz + 8 oz + 0.125 oz + 1% + 2.5%	91	99	100	45.8	59.05	354
Preemergence/ POST II (6-inch weeds)							
Authority First / Roundup Original Max + AMS	3.2 oz / 22 oz + 3 qt	91	100	100	50.9	46.89	411
Authority Asist / Roundup Original Max + AMS	5 oz / 22 oz + 3 qt	96	100	100	49.0	46.21	395
IntRRo / Roundup WeatherMax + AMS	4 pt / 22 oz + 3 qt	95	100	100	48.9	47.71	393
Gangster / Roundup Original Max + AMS	2.4 oz / 22 oz + 3 qt	94	100	100	48.7	49.70	389
Prefix / Touchdown Total + AMS	2 pt / 24 oz + 3 qt	95	100	100	49.1	46.09	396
Boundary / Touchdown Total + AMS	1.5 pt / 24 oz + 3 qt	97	100	100	47.2	48.37	377
Valor SX / Roundup Original Max + AMS	2 oz / 22 oz + 3 qt	96	100	100	49.6	44.90	401
Valor SX + Python / Roundup Original Max + AM	1.5 oz + 0.5 oz / 22 oz + 3 q	95	100	100	49.4	47.28	398
Valor SX + Sencor / Roundup Original Max + AM	1.75 oz + 4 oz / 22 oz + 3 q	93	100	100	48.4	47.72	388
Sonic / Durango + AMS	4.5 oz / 24 oz + 3 qt	95	100	100	48.1	49.80	383
Enlite / Roundup PowerMax + AMS	2.8 oz / 22 oz + 3 qt	96	100	100	48.6	47.79	390
Enlite / Roundup PowerMax + Harmony + AM	2.8 oz / 22 oz + 0.125 oz + 3 q	95	99	100	48.8	50.29	389
POST I (4-inch weeds)/POST III(Canopy)							
Roundup WeatherMax + AMS	22 oz + 3 qt /	98	100	100	46.4	50.60	367
Roundup WeatherMax + AMS	22 oz + 3 qt						
Durango DMA + First Rate + AMS	24 oz + 0.3 oz + 3 qt /	98	100	100	46.4	51.82	366
Durango DMA + AMS	24 oz + 3 qt						
Touchdown Total + AMS /	24 oz + 3 qt /	98	100	100	45.7	48.57	363
Touchdown Total + AMS	24 oz + 3 qt						
POST II (6-inch weeds)							
Classic + Roundup PowerMax + AMS	0.33 oz / 22 oz + 3 qt	96	100	100	48.4	33.36	402
Harmony GT + Roundup PowerMax + AMS	0.5 oz + 22 oz + 3 qt	94	100	100	47.8	38.78	392
Harmony GT + Classic + Roundup PowerMax + AMS	0.5 oz + 0.33 oz + 22 oz + 3 q	97	100	100	46.9	43.35	379
Resource + Roundup Original Max + NIS + AMS	2 oz + 22 oz + 0.25% + 3 q	94	99	100	48.6	32.27	405
Cadet + Roundup Original Max + NIS + AMS	0.4 oz + 22 oz + 0.25% + 3 q	96	98	98	49.2	32.99	410
Roundup WeatherMax+AMS	22 oz + 3 qt	95	100	100	43.5	30.30	361
Checks							
Weedy Check	-	0	0	0	8.1	0	73
Weed Free	-	100	100	100	47.9	0	431
	LSD(0.10)	**3**	**1**	**1**	**3.0**		**27**

2008 Soybean Herbicide Evaluation - Rochester

Herbicide	Rate	Giant foxtail	Giant ragweed	Common lambsquarters	Tall waterhemp	Velvetleaf	Yield	Cost	Returns
	(pt/A)	----------(% control)----------					(bu/A)	----($/A)-----	
Preemergence/ POST I (4-inch weeds)									
Boundary / Flexstar + Fusion + Harmony GT + MSO + 28%	1.5 pt / 16 oz + 8 oz + 0.125 oz + 1% + 2.5%	90	89	88	99	85	20.7	59.05	127
Preemergence/ POST II (6-inch weeds)									
Authority First / Roundup Original Max + AMS	3.2 oz / 22 oz + 3 q	89	93	99	98	93	27.4	46.89	200
Authority Asist / Roundup Original Max + AMS	5 oz / 22 oz + 3 q	83	91	99	95	94	26.4	46.21	191
IntRRo / Roundup WeatherMax + AMS	4 pt / 22 oz + 3 q	87	91	84	84	88	24.9	47.71	176
Gangster / Roundup Original Max + AMS	2.4 oz / 22 oz + 3 q	89	97	96	99	94	27.4	49.70	197
Prefix / Touchdown Total + AMS	2 pt / 24 oz + 3 q	96	97	94	99	93	29.4	46.09	219
Boundary / Touchdown Total + AMS	1.5 pt / 24 oz + 3 q	91	89	86	89	85	26.9	48.37	194
Valor SX / Roundup Original Max + AMS	2 oz / 22 oz + 3 q	84	95	92	94	93	30.9	44.90	233
Valor SX + Python / Roundup Original Max + AM	1.5 oz + 0.5 oz / 22 oz + 3 q	90	96	95	96	98	31.9	47.28	240
Valor SX + Sencor / Roundup Original Max + AMS	1.75 oz + 4 oz / 22 oz + 3 q	84	93	90	92	95	31.5	47.72	235
Sonic / Durango + AMS	4.5 oz / 24 oz + 3 q	90	96	99	99	94	31.9	49.80	237
Enlite / Roundup PowerMax + AMS	2.8 oz / 22 oz + 3 q	90	96	97	99	91	33.5	47.79	253
Enlite / Roundup PowerMax + Harmony + AM	2.8 oz / 22 oz + 0.125 oz + 3 q	91	94	97	98	95	29.3	50.29	213
POST I (4-inch weeds)/POST III(Canopy)									
Roundup WeatherMax + AMS	22 oz + 3 qt /	99	99	99	99	97	26.7	50.60	190
Roundup WeatherMax + AMS	22 oz + 3 qt								
Durango DMA + First Rate + AMS	24 oz + 0.3 oz + 3 qt	99	99	99	99	98	29.9	51.82	217
Durango DMA + AMS	24 oz + 3 qt								
Touchdown Total + AMS	24 oz + 3 qt /	98	99	98	99	98	25.9	48.57	185
Touchdown Total + AMS	24 oz + 3 qt								
POST II (6-inch weeds)									
Classic + Roundup PowerMax + AMS	0.33 oz / 22 oz + 3 q	83	94	87	92	85	23.9	33.36	181
Harmony GT + Roundup PowerMax + AMS	0.5 oz + 22 oz + 3 q	82	91	91	94	85	22.7	38.78	165
Harmony GT + Classic + Roundup PowerMax + AMS	0.5 oz + 0.33 oz + 22 oz + 3 q	87	93	93	94	90	24.3	43.35	175
Resource + Roundup Original Max + NIS + AMS	2 oz + 22 oz + 0.25% + 3 q	76	79	80	85	85	17.0	32.27	120
Cadet + Roundup Original Max + NIS + AMS	0.4 oz + 22 oz + 0.25% + 3 q	75	81	82	88	91	16.8	32.99	118
Roundup WeatherMax+AMS	22 oz + 3 qt	77	88	80	81	87	22.2	30.30	169
Checks									
Weedy Check	-	0	0	0	0	0	1.9	0	17
Weed Free	-	100	100	100	100	100	31.7	0	285
	LSD(0.10)	**7**	**4**	**4**	**3**	**4**	**7.1**		**64**

2008 Soybean Herbicide Evaluation - Across locations

Herbicide	Rate	Giant foxtail	Yellow foxtail	Common ragweed	Giant ragweed	Common Cocklebur	Common lambsquarters	Tall waterhemp	Velvetleaf	Redroot pigweed	Yield	Cost	Returns
		----------Number of Locations----------											
	(pt/A)	----------(% control)----------									(bu/A)	----($/A)-----	
Preemergence/ POST I (4-inch weeds)													
Boundary / Flexstar + Fusion + Harmony GT + MSO + 28%	1.5 pt / 16 oz + 8 oz + 0.125 oz + 1% + 2.5%	91	91	92	82	87	91	98	88	98	41.5	59.05	315
Preemergence/ POST II (6-inch weeds)													
Authority First / Roundup Original Max + AMS	3.2 oz / 22 oz + 3 qt	96	91	99	96	99	99	99	95	99	45.1	46.89	359
Authority Asist / Roundup Original Max + AMS	5 oz / 22 oz + 3 qt	94	96	92	93	99	99	98	95	98	43.3	46.21	344
IntRRo / Roundup WeatherMax + AMS	4 pt / 22 oz + 3 qt	96	95	92	93	99	88	94	93	89	45.1	47.71	358
Gangster / Roundup Original Max + AMS	2.4 oz / 22 oz + 3 qt	96	94	99	98	99	98	97	96	97	45.1	49.70	357
Prefix / Touchdown Total + AMS	2 pt / 24 oz + 3 qt	98	95	91	98	99	94	99	92	87	44.8	46.09	357
Boundary / Touchdown Total + AMS	1.5 pt / 24 oz + 3 qt	96	97	97	90	99	91	96	92	93	43.9	48.37	347
Valor SX / Roundup Original Max + AMS	2 oz / 22 oz + 3 qt	94	96	96	92	99	96	96	94	89	46.2	44.90	371
Valor SX + Python / Roundup Original Max + AMS	1.5 oz + 0.5 oz / 22 oz + 3 qt	96	95	98	97	99	97	97	99	99	46.4	47.28	371
Valor SX + Sencor / Roundup Original Max + AMS	1.75 oz + 4 oz / 22 oz + 3 qt	94	93	96	94	98	95	96	97	97	46.6	47.72	371
Sonic / Durango + AMS	4.5 oz / 24 oz + 3 qt	97	95	99	98	99	99	99	97	99	47.0	49.80	373
Enlite / Roundup PowerMax + AMS	2.8 oz / 22 oz + 3 qt	96	96	97	92	98	98	97	95	99	46.8	47.79	373
Enlite / Roundup PowerMax + Harmony + AMS	2.8 oz / 22 oz + 0.125 oz + 3 qt	96	95	98	95	99	97	97	97	99	46.9	50.29	372
POST I (4-inch weeds)/POST III(Canopy)													
Roundup WeatherMax + AMS / Roundup WeatherMax + AMS	22 oz + 3 qt / 22 oz + 3 qt	99	98	99	99	99	99	99	98	99	44.5	50.60	349
Durango DMA + First Rate + AMS / Durango DMA + AMS	24 oz + 0.3 oz + 3 qt / 24 oz + 3 qt	99	98	99	99	99	99	99	98	99	44.8	51.82	351
Touchdown Total + AMS / Touchdown Total + AMS	24 oz + 3 qt / 24 oz + 3 qt	99	98	99	99	99	99	99	98	99	44.2	48.57	349
POST II (6-inch weeds)													
Classic + Roundup PowerMax + AMS	0.33 oz / 22 oz + 3 qt	95	96	90	95	97	94	89	91	91	41.9	33.36	344
Harmony GT + Roundup PowerMax + AMS	0.5 oz + 22 oz + 3 qt	94	94	92	89	99	91	91	92	79	41.1	38.78	331
Harmony GT + Classic + Roundup PowerMax + AMS	0.5 oz + 0.33 oz + 22 oz + 3 qt	95	97	93	82	99	90	92	93	96	41.7	43.35	332
Resource + Roundup Original Max + NIS + AMS	2 oz + 22 oz + 0.25% + 3 qt	92	94	74	68	97	88	83	80	81	39.7	32.27	325
Cadet + Roundup Original Max + NIS + AMS	0.4 oz + 22 oz + 0.25% + 3 qt	93	96	76	74	99	86	80	94	79	38.1	32.99	310
Roundup WeatherMax+AMS	22 oz + 3 qt	93	95	87	87	99	83	86	92	74	39.5	30.30	325
Checks													
Weedy Check	-	0	0	0	0	0	0	0	0	0	12.4	0	112
Weed Free	-	100	100	100	100	100	100	100	100	100	46.5	0	418
	LSD(0.10)	**2**	**3**	**4**	**6**	**2**	**5**	**3**	**4**	**10**	**2.4**		**22**

SECTION F

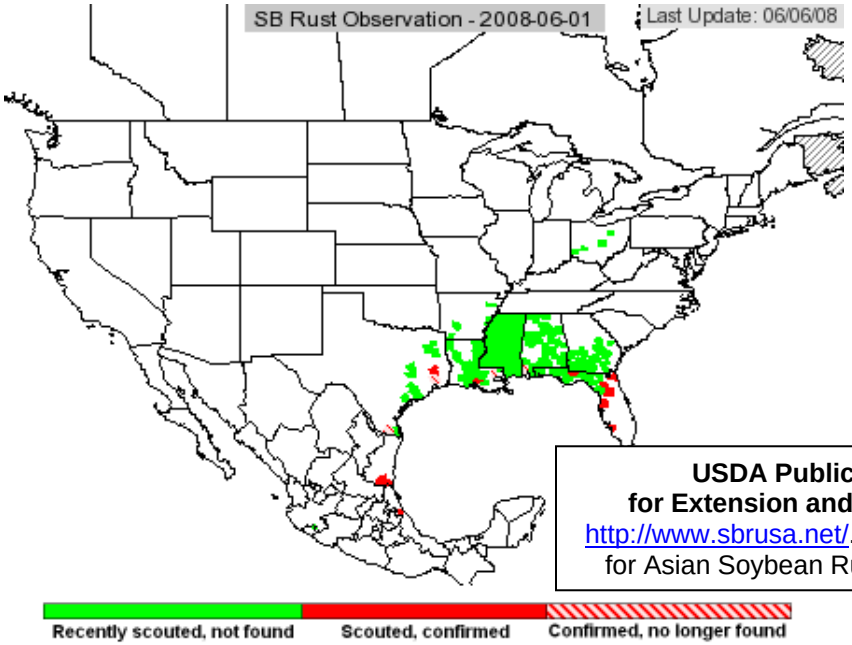
SOYBEAN

PRODUCTION MANAGEMENT

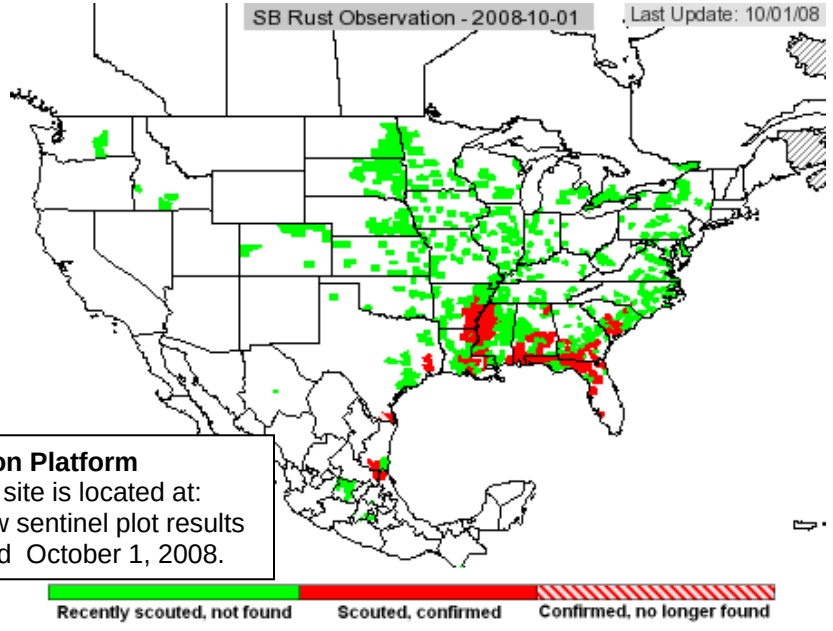
Sentinel Plot Results – Disease Findings June 1 through October 2008

Behnken, Lisa. M, Fritz R. Breitenbach, Ryan P. Miller, Brent Breitenbach, Anthony Gehling, Louis Kuisle, Kyle Poss, Katherine Sheehan, Sarah Stellpflug, Ceara Suther, Amanda Welter, and Matthew White.

We participated in the National Sentinel Plot project by monitoring three soybean fields and one spore trap throughout the summer of 2008 in southeastern Minnesota. The fields were located in Houston, Goodhue, and Olmsted counties. The procedure for the JB spore collectors was the same as in past years, with filters changed and evaluated each week. The procedure for the sentinel plot scouting was similar to 2007. Sentinel plot observers in the southeastern states in 2005 found that it was extremely difficult to detect low levels of soybean rust in the fields, even with scouting by trained observers. Therefore, in 2006, 2007 and 2008, a thorough lab analysis of plant samples was conducted on all leaves collected from the Minnesota sentinel plots. We collected 100 random soybean leaves (trifoliolates) from the lower canopy each week. Samples were sent to the University of Minnesota Plant Diagnostics Lab for examination and diagnosis. Leaves with symptoms that could have been possible soybean rust were set aside, examined a second time, then sectioned and placed in a moisture chambers (Petri dish with filter paper) and incubated. After incubation for 24 to 48 hours, the sectioned samples were examined, first with a stereoscope, then wet mounts were made and samples and mounts were examined with a bright field microscope. Pathogens were identified whenever possible. Each sample was recorded on the APHIS web page (http://sbr.ipmpipe.org) and information on pathogens that were identified and pertinent field information was included. The absence of soybean rust was recorded for each sample examined. The University of Minnesota Diagnostics Laboratory examined approximately 20,800 trifoliolates, or 624,000 individual soybean leaves. JB filters collected from the field throughout the summer and up to the end of August have been processed and to date. *Phakospora pachyrhiz* spores have not been detected. A summary of the Minnesota locations are reported below. (University of Minnesota Extension Regional Office – Rochester, MN).



USDA Public Pest Information Platform for Extension and Education web site is located at: http://www.sbrusa.net/. The maps show sentinel plot results for Asian Soybean Rust on June 1 and October 1, 2008.



Sentinel Plots 2008

County	Date of observation	Variety	Vegetative st	Field observations	Laboratory analysis
Blue Earth	6/24/2008	Asgrow 2002	NA		Negative for rust
Blue Earth	7/7/2008	Asgrow 2002	R1		negative for rust
Blue Earth	7/14/2008	Asgrow 2002	R1		Neg. rust, Septoria
Blue Earth	7/21/2008	Asgrow 2002	R2	Aphids-close to threshold (5)	Neg. rust, Septoria, Bacteria Blight
Blue Earth	7/29/2008	Asgrow 2002	R3	sprayed for aphids	Neg. rust
Blue Earth	8/11/2008	Asgrow 2002	R4	Aphids	Neg. Rust, Fusarium, Alternaria
Blue Earth	8/18/2008	Asgrow 2002	R5	low level Aphids	Neg. Rust, bacteria, Fusarium
Blue Earth	8/25/2008	Asgrow 2002	R5		Neg. Rust, Bacterial Blight
Blue Earth	9/3/2008	Asgrow 2002	R6	Aphids	Neg. Rust, Alternaria, Fusarium
Blue Earth	9/10/2008	Asgrow 2002	R6		Neg. Rust, Alternaria
Blue Earth	9/18/2008	Asgrow 2002	R7	aphids, last sample	Neg. Rust, septoria, Bacteria Blight
Blue Earth	9/24/2008	Asgrow 2002	R7-R8	last sample - very few green leaves	Neg. Rust, Alternaira Fusarium
Clay	7/7/2008	Pioneer 91M51	NA		negative for rust
Clay	7/15/2008	Pioneer 91M51	R2	aphids, severity Index #2	Neg. rust, Bacteria Blight
Clay	7/21/2008	Pioneer 91M51	R2	aphid index #3	Neg. rust, Septoria, Bacteria Blight
Clay	7/28/2008	Pioneer 91M51	R3	Threshold aphids	Neg. rust, Alternaria, Bacteria Blight
Clay	8/18/2008	Pioneer 91M51	R5	low level Aphids	Neg. Rust, bacteria
Clay	8/26/2008	Pioneer 91M51	R6	low level Aphids	Neg. Rust, Alternaria, Fusarium, Bacteria blight
Clay	9/18/2008	Pioneer 91M51	R8	60% defoliated-last sample	Neg. Rust, Septoria, Bacteria Blight, V
Dakota	7/9/2008	Asgrow 2002	V3		cultured, not yet examined
Dakota	7/16/2008	Asgrow 2002	V6	hail damage	Neg. rust
Dakota	7/23/2008	Asgrow 2002	R1		Neg. rust, Septoria, Bacteria Blight
Dakota	7/30/2008	Asgrow 2002	R3	Aphids	Neg. rust, Fusarium, Alternaria
Dakota	8/13/2008	Asgrow 2002	R5		Neg. Rust, Alternaria
Dakota	8/20/2008	Asgrow 2002	R6		Neg. Rust, Fusarium, Alternaria, Bacterial Blight
Dakota	8/28/2008	Asgrow 2002	R6	Aphids	Neg. Rust, Alternaria
Dakota	9/3/2008	Asgrow 2002	R6		Neg. Rust, Alternaria
Dakota	9/10/2008	Asgrow 2002	R7		Neg. Rust, Alternaria, Septoria
Dakota	9/18/2008	Asgrow 2002	R7		Neg. Rust, Bacteria Blight, Alternaria
Dakota	9/24/2008	Asgrow 2002	R7-R8	Aphids	Neg. Rust, Alternaria

Sentinel Plots 2008

County	Date of observation	Variety	Vegetative st	Field observations	Laboratory analysis
Goodhue	6/27/2008	NA	V3		Negative for rust
Goodhue	7/7/2008	Asgrow 2107	R1		negative for rust
Goodhue	7/14/2008	Asgrow 2107	R1	slight hail damage	Neg. rust
Goodhue	7/20/2008	Asgrow 2107	R2		Neg. rust
Goodhue	7/29/2008	Asgrow 2107	R2		Neg rust, Fusarium
Goodhue	8/11/2008	Asgrow 2107	R4		Neg Rust, Downy Mildew
Goodhue	8/18/2008	Asgrow 2107	R4-R5		Neg. Rust, Downy Mildew
Goodhue	8/22/2008	Asgrow 2107	R5		Neg. Rust, Bacteria Blight, Alternaria
Goodhue	9/2/2008	Asgrow 2107	R6	Aphids	Neg. Rust, Alternaria , Fusarium, Bacterial Blight
Goodhue	9/8/2008	Asgrow 2107	R6-R7	Aphids, BSR	Neg. Rust, Alternaria
Houston	6/24/2008	NA	V2		Negative for rust
Houston	7/7/2008	S-19-V2	R1		negative for rust
Houston	7/14/2008	S-19-V2	R1		Neg. rust, Bacteria Blight
Houston	7/23/2008	S-19-V2	R2		Neg. rust
Houston	7/29/2008	S-19-V2	R3		Neg rust, Fusarium
Houston	8/11/2008	S-19-V2	R4		Neg. Rust, Fusarium
Houston	8/19/2008	S-19-V2	R5	Aphids	Neg Rust Fusarium
Houston	8/25/2008	S-19-V2	R6	Aphids	Neg Rust, Septoria, Fusarium, Bacteria Blight
Houston	9/2/2008	S-19-V2	R6		Neg. Rust, Septoria, Bacterial Blight
Houston	9/10/2008	S-19-V2	R7	BSR, Aphids, white mold	Neg. Rust, Bacterial Blight
Jackson	6/18/2008	Galena	V1		Negative for rust
Jackson	7/7/2008	Galena	V5-R1		cultured, not yet examined
Jackson	7/22/2008	Galena	R2	low level aphid	Neg. rust, Alternaria
Jackson	7/30/2008	Galena	R3	Aphids	Neg. rust, Septoria, Alternaria, Fusarium
Jackson	8/11/2008	Galena	R5		Neg. Rust, Downy Mildew, Septoria
Jackson	8/21/2008	Galena	R5	threshold Aphids	Neg. Rust, Downey Mildew, Bacteria Blight
Jackson	8/28/2008	Galena	R6	Aphids	Neg. Rust, Bacterial Blight
Jackson	9/3/2008	Galena	R5		Neg. Rust, Bacteria Blight, Fusarium, Alternaria
Jackson	9/9/2008	Galena	R6	field lodging	Neg. Rust, Alternaria, Bacteria Blight
Jackson	9/19/2008	Galena	R7-R8	last sample completely defoliated	Neg. Rust, Alternaria

Sentinel Plots 2008

County	Date of observation	Variety	Vegetative st	Field observations	Laboratory analysis
Marshall	7/17/2008	Mycogen 5A009RR	R1	aphid count low-below threshold	not yet examined
Marshall	7/22/2008	Mycogen 5A009RR	R2	Aphids-close to threshold (5)	Neg. rust, Bacteria Blight
Marshall	7/29/2008	Mycogen 5A009RR	R3		Neg. rust, Bacteria Blight
Marshall	8/11/2008	Mycogen 5A009RR	R4		Neg. Rust, Bacteria Blight, Alternaria, Septoria
Marshall	8/19/2008	Mycogen 5A009RR	R6	low level Aphids	Neg. Rust, Septoria, Alternaria, Downy Mildew, Fusarium, Bacterial Blight
Marshall	8/28/2008	Mycogen 5A009RR	R6	low level Aphids	Neg. Rust, Alternaria, Septoria, Bacterial blight
Marshall	9/1/2008	Mycogen 5A009RR	R7		Neg. Rust, Septoria, Bacterial Blight
Marshall	9/10/2008	Mycogen 5A009RR	R7	field drying down	Neg. Rust, Alternaria, Fusarium
McLeod	7/3/2008	Pioneer 92M21	V3		negative for rust
McLeod	7/9/2008	Pioneer 92M21	R1		cultured, not yet examined
McLeod	7/16/2008	Pioneer 92M21	R2		Neg. rust
McLeod	7/22/2008	Pioneer 92M21	R2	low level aphid	Neg. rust, Septoria, Bacteria Blight
McLeod	7/29/2008	Pioneer 92M21	R2	Aphids increasing	Neg. Rust, Septoria, Alternaria, bacteria
McLeod	8/12/2008	Pioneer 92M21	R4		Neg. Rust, Bacteria Blight, Alternaria
McLeod	8/20/2008	Pioneer 92M21	R5	low level Aphids	Neg. Rust, Septoria, Alternaria, bacteria
McLeod	8/26/2008	Pioneer 92M21	R5	low level Aphids	Neg. Rust, Alternaria, Septoria, bacteria
McLeod	9/3/2008	Pioneer 92M21	R5	low level Aphids	Neg. Rust, Alternaria, Bacterial Blight, Fusarium
McLeod	9/10/2008	Pioneer 92M21	R6	field yellowing	Neg. Rust, Alternaria, bacteria
McLeod	9/18/2008	Pioneer 92M21	R7	last sample, aphids	Neg. Rust, Septoria, Bacteria Blight, Alternaria
Nobles	6/20/2008	DynaGrow33x19	NA		Negative for rust
Nobles	7/9/2008	DynaGrow33x19	V6		cultured, not yet examined
Nobles	7/21/2008	DynaGrow33x19	V7-R2		Neg. rust, Septoria
Nobles	7/30/2008	DynaGrow33x19	R3	Aphids	Neg. rust, Fusarium, Alternaria
Nobles	8/13/2008	DynaGrow33x19	R5	moderate level - Aphids	Neg. Rust, Alternaria, Fusarium
Nobles	8/22/2008	DynaGrow33x19	R5		Neg. Rust, Alternaria, Bacteria Blight
Nobles	8/27/2008	DynaGrow33x19	R5(almost 6)		Neg. Rust, Alternaria, Bacteria
Nobles	9/2/2008	DynaGrow33x19	R6		Neg. Rust, Alternaria, Bacteria Blight
Nobles	9/9/2008	DynaGrow33x19	R6		Neg. Rust, Alternaria, Fusarium
Nobles	9/16/2008	DynaGrow33x19	R6	leaves dropping, senescing	Neg. Rust, Bacteria Blight

Sentinel Plots 2008

County	Date of observation	Variety	Vegetative st	Field observations	Laboratory analysis
Norman	6/30/2008	Pioneer90M60	V3		Negative for rust
Norman	7/7/2008	Pioneer90M60	V4		negative for rust
Norman	7/15/2008	Pioneer90M60	R1	aphid count low-below threshold	Neg. rust
Norman	7/23/2008	Pioneer90M60	R2		Neg. rust, Bacteria Blight
Norman	7/29/2008	Pioneer90M60	R3	Aphids	Neg rust, Fusarium
Norman	8/12/2008	Pioneer90M60	R4		Neg. Rust, Bacteria Blight, Alternaria
Norman	8/19/2008	Pioneer90M60	R4-R5	low level Aphids	Neg. Rust, Bacteria Blight, Downy Mildew
Norman	8/26/2008	Pioneer90M60	R5-R6		Neg. Rust, Alternaria, Septoria, bacterial blight
Norman	9/3/2008	Pioneer90M60	R6-R7		Neg. Rust, Downy Mildew, Septoria
Norman	9/9/2008	Pioneer90M60	R7		Neg. Rust, Alternaria
Norman	9/16/2008	Pioneer90M60	R7-R8	some green leaves remain, aphids	Neg. Rust, Bacteria Blight, Septoria
Norman	9/23/2008	Pioneer90M60	R7-R8	last sample - almost completely defoliated	Neg. Rust, Bacteria blight
Olmsted	6/24/2008	NA	V1-V2		Negative for rust
Olmsted	7/7/2008	NA	V6-R1		negative for rust
Olmsted	7/14/2008	NKS21-N6	R1		Neg. rust, bacteria
Olmsted	7/21/2008	NKS21-N6	R2		Neg. rust, Bacteria Blight
Olmsted	7/29/20008	NKS21-N6	R3		Neg rust, Fusarium
Olmsted	8/11/2008	NKS21-N6	R4		Neg Rust, Downy Mildew
Olmsted	8/18/2008	NKS21-N6	R5	Aphids	Neg. Rust, Downy Mildew, bacteria
Olmsted	8/25/2008	NKS21-N6	R5	Aphids	Neg. Rust, Bacterial Blight
Olmsted	9/2/2008	NKS21-N6	R6		Neg. Rust, Alternaria , Bacterial Blight
Olmsted	9/8/2008	NKS21-N6	R6	BSR aphids light,	Neg. Rust, Alternaria, Downy Mildew, Bacteria Blight, Septoria
Olmsted	9/17/2008	NKS21-N6	R6	BSR aphids light,	Neg. Rust, Bacteria Blight
Olmsted	9/24/2008	NKS21-N6	R6		Neg. Rust
Ottertail	6/26/2008	Syngenta S08-M8	V1		Negative for rust
Ottertail	7/7/2008	Syngenta S08-M8	V4		negative for rust
Ottertail	7/14/2008	Syngenta S08-M8	R1	light hail damage	Neg. rust
Ottertail	7/21/2008	Syngenta S08-M8	R1		Neg. rust, Bacteria Blight, Fusarium spores
Ottertail	7/28/2008	Syngenta S08-M8	R3		Neg. rust, Bacteria Blight, Alternaria
Ottertail	8/11/2008	Syngenta S08-M8	R4		Neg Rust, Bacteria Blight, Alternaria, Septoria
Ottertail	8/18/2008	Syngenta S08-M8	R5	low level Aphids	Neg. Rust, Alternaria
Ottertail	8/27/2008	Syngenta S08-M8	R5-R6	low level Aphids	Neg. Rust, Alternaria, Bacterial Blight, Fusarium
Ottertail	9/3/2008	Syngenta S08-M8	R6	low level Aphids	Neg. Rust, Bacterial Blight, Alternaria, Septoria
Ottertail	9/9/2008	Syngenta S08-M8	R6	field beginning to yellow	Neg. Rust, Downy Mildew, Bacteria Blight

Sentinel Plots 2008

County	Date of observation	Variety	Vegetative st	Field observations	Laboratory analysis
Pipestone	6/23/2008	NKH-1852	NA		Negative for rust
Pipestone	7/7/2008	NKH-1852	V6		negative for rust
Pipestone	7/14/2008	NKH-1852	R1		Neg. rust
Pipestone	7/23/2008	NKH-1852	R2	low level aphid	Neg. rust, Alternaria
Pipestone	7/29/2008	NKH-1852	R2	Aphids increasing	Neg. rust, Septoria, Alternaria
Pipestone	8/11/2008	NKH-1852	R4		Neg Rust, Alternaria, Fusarium, Septoria
Pipestone	8/18/2008	NKH-1852	R5		Neg. Rust
Pipestone	8/25/2008	NKH-1852	R5		Neg. Rust, Septoria, Downey Mildew
Pipestone	9/4/2008	NKH-1852	R6		Neg. Rust, Alternaria, Septoria, Fusarium
Pipestone	9/10/2008	NKH-1852	R7	Aphids, few green leaves	Neg. Rust, Alternaria, Septoria
Pipestone	9/17/2008	NKH-1852	R7	Aphids, few green leaves, 60-70%defoliate	Neg. Rust, Bacteria Blight
Pipestone	9/22/2008	NKH-1852	R8	last sample-aphids, 95% defoliated	Neg. Rust, Alternaria
Polk	6/26/2008	Wenman 20074	V2		Negative for rust
Polk	7/2/2008	Wenman 20074	V5		not yet examined
Polk	7/9/2008	Wensman 2007	R1		cultured, not yet examined
Polk	7/16/2008	Wensman 2007	R3		Neg. rust, Septoria, Bacteria Blight
Polk	7/23/2008	Wensman 2007	R3		Neg. rust
Polk	7/30/2008	Wensman 2007	R5		Neg. rust, bacteria
Polk	8/13/2008	Wensman 2007	R6	threshold aphids	Neg. Rust, Alternaria, Bacteria Blight
Polk	8/21/2008	Wensman 2007	R6	high level Aphids	neg. Rust, Alternaria, Septoria, Fusarium
Polk	8/27/2008	Wensman 2007	R6	Aphids	Neg. Rust, Septoria, Alternaria, Downey Mildew
Polk	9/3/2008	Wensman 2007	R7	Aphids	Neg. Rust, Septoria, Alternaria
Polk	9/11/2008	Wensman 2007	R8	Aphids	Neg. Rust, Bacteria, Fusarium
Polk	9/17/2008	Wensman 2007	filter only		
Polk	9/25/2008	Wensman 2007	R8	no leaf sample-filter only	

Sentinel Plots 2008

County	Date of observation	Variety	Vegetative st	Field observations	Laboratory analysis
Ramsey	6/24/2008	NKS17-A1	V2		Negative for rust
Ramsey	7/1/2008	NKS17-A1	V4		Negative for rust
Ramsey	7/8/2008	NKS17-A1	V4		negative for rust
Ramsey	7/15/2008	NKS17-A1	R1	insect damage`	Neg. rust
Ramsey	7/22/2008	NKS17-A1	R2	low level aphid	Neg. rust
Ramsey	7/28/2008	NKS17-A1	R2	Aphids Index #2	Neg. rust, Bacteria blight
Ramsey	8/12/2008	NKS17-A1	R4-R5	low level Aphids	Neg. Rust, Alternaria, BSR, bacteria
Ramsey	8/19/2008	NKS17-A1	R4-R5	low level Aphids	Neg Rust
Ramsey	8/26/2008	NKS17-A1	R5-R6	low level Aphids	Neg. Rust, Downey Mildew Bacterial Blight
Ramsey	9/2/2008	NKS17-A1	R6	low level aphids	Neg. Rust, Septoria, Bacterial blight
Ramsey	9/9/2008	NKS17-A1	R7	field beginning to senesce	Neg. Rust, Bacteria Blight Alternaria, Septoria
Ramsey	9/16/2008	NKS17-A1	R8	mostly lodged and defoliated	Neg. Rust, Bacteria Blight, Septoria
Ramsey	9/23/2008	NKS17-A1	R8	mostly defoliated	Neg. Rust, Alternaria, Fusarium, Septoria
Redwood	6/25/2008	AG2002	V2		Negative for rust
Redwood	7/3/2008	AG2002	V3		negative for rust, Alternaria
Redwood	7/9/2008	AG2002	V5		cultured, not yet examined
Redwood	7/15/2008	AG2002	V6		Neg. rust
Redwood	7/23/2008	AG2002	R2		Neg. rust, Bacteria Blight
Redwood	7/30/2008	AG2002	R3	Bacteria Blight	Neg. rust, Septoria
Redwood	8/13/2008	AG2002	R5		Neg. Rust, Fusarium, Septoria, bacteria
Redwood	8/20/2008	AG2002	R5		Neg. Rust, Septoria, Alternaria
Redwood	8/26/2008	AG2002	R6	high level Aphids	Neg. Rust, Alternaria, Septoria, Downey Mildew, Bacterial Blight
Redwood	9/3/2008	AG2002	R6	Aphids	Neg. Rust, Alternaria, Fusarium, Bacterial Blight
Redwood	9/10/2008	AG2002	R6	Aphids	Neg. Rust, Alternaria, Downy Mildew
Redwood	9/16/2008	AG2002	R7	Aphids	Neg. Rust, Bacteria Blight
Sibley	6/25/2008	Gold Country	NA		Negative for rust
Sibley	7/7/2008	2814 Gold Country	V2		negative for rust
Sibley	7/21/2008	Gold Country 2814	R1		Neg. rust, Bacteria Blight
Sibley	7/28/2008	Gold Country 2814	R2		Neg. rust, Bacteria Blight
Sibley	8/13/2008	Gold Country 2814	R4	aphids	Neg. Rust, Brown Stem Rot, Alternaria, Downy Mildew, Bacteria Blight
Sibley	8/21/2008	Gold Country 2814	R5		Neg. Rust, Septoria
Sibley	8/27/2008	Gold Country 2814	R5	Aphids	Neg. Rust, Alternaria, Bacteria Blight
Sibley	9/3/2008	Gold Country 2814	R6	Aphids at Threshold	Neg. Rust, Alternaria, Powdery Mildew
Sibley	9/11/2008	Gold Country 2814	R7	low level aphids	Neg. Rust, Alternaria, Septoria
Sibley	9/17/2008	Gold Country 2814	R7	aphids, most leaves dropping, senescing	Neg. Rust
Sibley	9/22/2008	Gold Country 2814	R7-R8	last sample- mostly defoliated	Neg. Rust, Alternaria

Sentinel Plots 2008

County	Date of observation	Variety	Vegetative st	Field observations	Laboratory analysis
Stearns	7/8/2008	RC0900	R1		cultured, not yet examined
Stearns	7/15/2008	RC0900	R2		Neg. rust, Alternaria
Stearns	7/23/2008	RC0900	R1		Neg. rust, Alternaria, Fusarium spores
Stearns	7/30/2008	RC0900	R2	Aphids-moderate	Neg. rust, Septoria
Stearns	8/13/2008	RC0900	R3-R4		Neg Rust, Alternaria, Septoria
Stearns	8/26/2008	RC0900	R5		Neg. Rust, Bacterial Blight
Stearns	9/3/2008	RC0900	R6		Neg. Rust, Septoria, Alternaria, Bacteria
Stevens	6/25/2008	RTO900	V4		Negative for rust
Stevens	7/3/2008	RTO900	V4		negative for rust
Stevens	7/10/2008	RTO900	R1		cultured, not yet examined
Stevens	7/17/2008	RTO900	R1		Neg. rust
Stevens	7/24/2008	RTO900	R2		Neg. rust, Bacteria Blight
Stevens	7/31/2008	RTO900	R3		Neg. rust, Bacteria Blight, Alternaria
Stevens	8/14/2008	RTO900	R4		Neg. Rust, Alternaria,Septoria,
Stevens	8/21/2008	RTO900	R5		Neg. Rust, Bacterial Blight
Stevens	8/28/2008	RTO900	R6	Aphids	Neg. Rust, Bacterial Blight, Alternaria
Stevens	9/3/2008	RTO900	R6		Neg. Rust, Alternaria, Fusarium
Swift	7/8/2008	GoldCountry 2814	R1		cultured, not yet examined
Swift	7/16/2008	GoldCountry 2814	R1	aphid count low-below threshold	Neg. rust
Swift	7/21/2008	GoldCountry 2814	R2	low level aphid	Neg. rust, Alternaria
Swift	7/28/2008	GoldCountry 2814	R2	sprayed for aphids	Neg. rust, Bacteria Blight
Swift	8/19/2008	GoldCountry 2814	R5		Neg. Rust, Bacterial Blight
Swift	8/27/2008	GoldCountry 2814	R5-R6	Aphids	Neg. Rust, Bacterial Blight
Swift	9/7/2008	GoldCountry 2814	R6-R7	senescing leaves	Neg. Rust, Downy Mildew, Alternaria
Swift	9/24/2008	GoldCountry 2814		no leaf sample, filter only	

The effect of manganese sulfate fertilizer on soybean yield at Rock Dell, MN in 2007 and 2008.

Lamb, John P., Lisa M. Behnken, Fritz R. Breitenbach, and Ryan P. Miller.

The objective of this trial was to evaluate the effect of manganese sulfate fertilizer on soybean yield in southeastern Minnesota. The research site was a Kenyon loam and the previous crop was soybean in 2007 and corn in 2008. The site was field cultivated twice before planting. The trial was planted with a 4-row John Deere 7000 planter. In 2007, the soybean variety Producers 153RR was planted on June 5 at a depth of 1.5 inches in 30-inch rows and at a population of 150,000 seeds/A. In 2008, the soybean variety Producers 203 NRR was planted on May 21 at a depth of 1.5 inches in 30-inch rows and at a population of 150,000 seeds/A. The herbicide program consisted of Sequence applied POST I and glyphosate + Select applied POST II. A randomized complete block design with four replications was used. The center two rows were harvested on October 24, 2007 and October 1, 2008.

Foliar applied Mn	***July 23, 2007***	***July 21, 2008***
Temperature (F)		
Air	76	70
soil	--	--
Relative Humidity (%)	76	78
Wind (mph)	8	3
Soil moisture	dry	Adequate
Bean		
stage	R2	R2
height (inch)	19.7	23.0

Table. Soybean yield response to manganese sulfate fertilizer at Rock Dell, MN in 2007 and 2008.

Treatment	Application Time	Soybean Moisture	Soybean yield	Soybean Moisture	Soybean yield
		2007		2008	
		(%)	(bu/A)	(%)	(bu/A)
Manganese at 5 lb	Broadcast, Pleplant	12.3	46.2	12.9	38.1
Manganese at 10 lb	Broadcast, Preplant	12.4	44.3	12.9	37.3
Manganese at Foliar	Postemergence at R2 soybean	12.4	42.5	12.9	37.1
Untreated		12.2	43.4	12.8	37.9
	LSD (P=0.10)	**0.2**	**2.1**	**NS**	**NS**

Research was also conducted near Morris, MN, and Lamberton, MN in 2007. The Morris and Lamberton locations have calcareous subsoils, while the Rock Dell site was near neutral. At the Morris and Lamberton locations the treatments included three variety/herbicide programs and Mn soil applied rates of 0, 2.5, 5, 7.5, and 10 pounds per acre before the final tillage operation. A 0.5 pound Mn per acre foliar treatment was applied at 6 to 8 days after the glyphosate herbicide was applied. The variety/herbicide program treatments were a conventional soybean variety (not glyphosate tolerant) with conventional herbicides, a glyphosate tolerant variety (similar to the conventional variety) with conventional herbicides (no glyphosate), and a glyphosate tolerant variety with glyphosate herbicide program. At the Rock Dell site, the treatments were different. The soil applied Mn treatments were applied at 0, 5, and 10 pounds per acre and a foliar 0.5 pound Mn per acre was applied with the glyphosate application. Only one variety was used at Rock Dell, a glyphosate tolerant variety with a glyphosate herbicide program.

At the Morris and Lamberton sites, soybean yields were not significantly affected by any of the treatments. There were significant periods of drought at both sites in 2007 that contributed to some variability in the yield results and possibly to the lack of grain yield response.

The results at Rock Dell were a little different. The application of 5 pounds Mn per acre significantly increased soybean grain yield greater than the check soybean grain yield (Table 1) in 2007, however, there were no significant differences in soybean yield in 2008. The study will be repeated in 2009.

The current take home message on Mn application to soybean is as follows:

1. Mn uptake and metabolism in soybean has been reported to be affected by glyphosate application.
2. Under high yielding conditions in Kansas, Mn application increased grain yields for glyphosate tolerant varieties up to the check yields for conventional varieties.
3. There was no grain yield response to Mn application in Illinois research.
4. There was no grain yield response to Mn application at Morris and Lamberton, Minnesota in 2007.
5. A small grain yield response to a 5 pound Mn per acre application occurred near Rock Dell, Minnesota in 2007.
6. No yield differences were found with the MN treatments at Rock Dell, Minnesota in 2008.

(University of Minnesota Extension Regional Office, Rochester, MN)

The effect of seeding rate and use of a seed treatment on soybean emergence, population and yield in Southern MN in 2008.

Stahl, Lizabeth A.B., Lisa M. Behnken, Fritz R. Breitenbach, Ryan P. Miller, David Nicolai, and Seth L. Naeve

The objective of this trial was to evaluate the effect of seeding rate and use of a seed treatment on soybean population and yield in southern Minnesota. Field trials were located at Gaylord, Lamberton, Rock Dell, and Waseca in 2008. Field histories are reported in Table 1. Treatments were planted in four row plots in a randomized complete block design with four replications. The same variety, NK Brand S19-L7 (a 1.9 maturity soybean variety), was used for all treatments at all locations. Five planting populations (50,000, 75,000, 100,000, 125,000, 150,000, and 175,000 seeds/acre) were evaluated. Untreated seed was compared to seed treated with Cruiser Maxx at three populations (50,000, 100 000, and 150,000 seeds/acre). Wet conditions delayed planting at many of the sites, with conditions being particularly wet at planting at the Waseca site. Plant stands were taken early in the season after emergence and later in the season prior to harvest. The two center rows of each plot were machine harvested and grain weight and moisture were recorded at all sites. ANOVA was used for statistical analysis and means compared using Fisher's Protected LSD at the 0.10 significance level.

Table 2 provides the moisture and yield of treatments at each site and the average across all four sites. Tables 3 and 4 show plant stands early in the season, harvest populations, and the percent difference of harvest populations compared to planting rates at each site and averaged across all sites.

Yields were optimized at seeding rates of at least 125,000 seeds/ac when averaged across all sites. This corresponded to a final population of 103,000 to 123,000 plants/acre. Location was significant, with planting population having no effect on yield at Lamberton or Waseca. At Gaylord, yields were optimized at a planting population of 100,000 seeds/acre or greater, which corresponded to final stands of 83,000 to 132,000 plants/acre. At Rock Dell, yields were optimized at a planting population of 125,000 seeds/acre or greater, which corresponded to final stands of 105,000 to 140,000 plants/acre.

Although plant stands were occasionally greater with treated seed versus untreated seed at the same planting population, this did not translate to a yield increase. No differences in yield were observed between treated or untreated seed at the same planting population.

Poor seedbed conditions at planting at the Waseca site likely contributed to this location having the highest percent losses when comparing target populations to final harvest stands, with losses ranging from 27 to 51 percent. Averaged across all sites, the percent difference between target and final populations ranged from 16 to 31.3 percent. These results illustrate the potential impact of seedbed conditions at planting on harvest populations.

This study demonstrates that low planting populations may result in optimal yields at a given site in a particular year. Conversely, low planting populations may result in significantly lower yields compared to higher populations. In summary, this study supports current University of MN recommendations that final stands of 100,000 plants/acre should be targeted to optimize yield. In order to achieve this harvest stand, current U of MN recommendations suggest targeting a planting population of 140,000 live seeds/acre in Southern MN. (University of Minnesota Extension, Regional Office – Rochester, Southern Research and Outreach Center – Waseca, and Southwest Research and Outreach Center – Lamberton, MN).

Table 1. Field histories for soybean seeding rate trials in southern MN in 2008.

	Gaylord	Lamberton	Rock Dell	Waseca
Planting Date	May 17, 2008	May 28, 2008	May 17, 2008	June 2, 2008
Harvest Date	October 19, 2008	October 17, 2008	October 1, 2008	October 19, 2008
Soil Type	Glencoe/Nicollet/Webster clay loam	Ves loam	Kenyon loam	Nicollet/Webster clay loam
Herbicide	Pursuit Plus – PRE Flexstar - POST	Prowl PRE/Glyphosate POST	Sequence POST I, Glyphosate + Select POST II	Glyphosate - POST
Insecticide	Warrior	Warrior	Warrior	Warrior
Tillage	Conventional	Field Cultivation 2X	Conventional	Conventional
Previous Crop	Corn	Corn	Soybean	Corn

Table 2. Soybean moisture and yield at 13% for Gaylord, Lamberton, Rock Dell, and Waseca and the 4-site average in MN in 2008.

		Gaylord		Lamberton		Rock Dell		Waseca		Average for 4-sites	
Population (seeds/ac)	**Seed Treatment**	**Moisture (%)**	**Yield (bu/A)**	**Moisture (%)**	**Yield (bu/A)**	**Moisture (%)**	**Yield (bu/A)**	**Moisture (%)**	**Yield (bu/A)**	**Moisture (%)**	**Yield (bu/A)**
50000	None	11.4	47.6	11.0	37.6	12.4	37.6	12.0	34.0	11.7	39.2
50000	CRUSIERMAXX	11.8	46.5	11.2	38.2	12.5	39.8	12.2	37.1	11.9	40.4
75000	none	11.4	51.4	11.2	38.8	12.4	40.4	12.0	40.4	11.7	42.8
100000	none	11.5	52.5	11.2	40.2	12.3	37.2	12.0	39.0	11.7	42.2
100000	CRUSIERMAXX	11.7	55.6	11.1	38.8	12.3	38.4	12.0	42.2	11.8	43.8
125000	none	11.3	57.4	11.1	40.5	12.4	41.0	12.1	41.7	11.7	45.2
150000	none	11.5	59.2	11.2	41.0	12.4	41.5	12.0	41.8	11.8	45.9
150000	CRUSIERMAXX	11.6	62.2	10.9	42.1	12.3	42.3	12.0	42.7	11.7	47.3
175000	none	11.4	55.6	11.1	40.8	12.3	41.2	12.0	40.8	11.7	44.6
LSD (P=0.10)			**8.8**		**NS**		**2.6**		**NS**		**3.0**

Table 3: Soybean Population Counts early in the season and prior to harvest and percent difference of harvest populations compared to target populations at Gaylord and Lamberton in 2008.

		Gaylord			Lamberton		
		6/18/2008	9/22/2008		6/16/2008	10/16/2008	
Population (seeds/ac)	Seed Treatment	Early Population Counts (ppa)	Final Population Counts (ppa)	% Difference (Harvest vs Target Population)	Early Population Counts (ppa)	Final Population Counts (ppa)	% Difference (Harvest vs Target Population)
50000	none	37000	41000	-18.0	48000	43000	-14.0
50000	CRUSIERMAXX	42000	44000	-12.0	51000	44000	-12.0
75000	none	62000	64000	-14.7	66000	54000	-28.0
100000	none	77000	77000	-23.0	81000	64000	-36.0
100000	CRUSIERMAXX	81000	83000	-17.0	98000	77000	-23.0
125000	none	93000	93000	-25.6	126000	99000	-20.8
150000	none	116000	111000	-26.0	138000	101000	-32.7
150000	CRUSIERMAXX	127000	116000	-22.7	129000	100000	-33.3
175000	none	144000	132000	-24.6	157000	115000	-34.3
	LSD(P=0.10)	**11000**	**16000**		**9000**	**8000**	

Table 4: Soybean Populations early in the season and prior to harvest and percent difference of harvest populations compared to target populations at Rock Dell and Waseca, and the average of all 4 sites (Gaylord, Lamberton, Rock Dell, and Waseca) in 2008.

		Rock Dell			Waseca			Average		
		6/20/2008	9/25/2008		7/2/2008					
Population (seeds/ac)	Seed Treatment	Early Population Counts (ppa)	Final Population Counts (ppa)	% Difference (Harvest vs Target Population)	Early Population Counts (ppa)	Final Population Counts (ppa)	% Difference (Harvest vs Target Population)	Early Population Counts (ppa)	Final Population Counts (ppa)	% Difference (Harvest vs Target Population)
50000	None	44000	43000	-14.0	36000	27000	-46.0	41000	39000	-22.0
50000	CRUSIERMAXX	47000	46000	-8.0	41000	35000	-30.0	45000	42000	-16.0
75000	None	66000	69000	-8.0	60000	49000	-34.7	63000	59000	-21.3
100000	none	91000	86000	-14.0	74000	49000	-51.0	81000	69000	-31.0
100000	CRUSIERMAXX	102000	94000	-6.0	86000	73000	-27.0	92000	81000	-19.0
125000	none	113000	105000	-16.0	105000	78000	-37.6	109000	94000	-24.8
150000	none	136000	122000	-18.7	120000	79000	-47.3	127000	103000	-31.3
150000	CRUSIERMAXX	146000	131000	-12.7	127000	102000	-32.0	132000	112000	-25.3
175000	none	151000	140000	-20.0	138000	104000	-40.6	148000	123000	-29.7
	LSD(P=0.10)	**10000**	**8000**		**11000**	**13000**		**5000**	**6000**	

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The effect of seeding rate on soybean emergence, harvest population and yield in Southern MN in 2007.

Behnken, Lisa M., Fritz R. Breitenbach, Ryan P. Miller, David Nicolai, Lizabeth Stahl and Seth L. Naeve.

The objective of this trial was to evaluate the effect of seeding rate on soybean emergence, harvest population, and yield in southern Minnesota. Field trials were located at Lamberton, Rochester, Rock Dell, Rosemount, and Spring Valley. Field histories are reported in Table 1. The trials were planted with a 4-row John Deere 7000 planter equipped with cone units. A randomized complete block design with four replications was used. Conditions were extremely dry in July at all sites. The two center rows were machine harvested with grain weight and moisture recorded at all sites. Table 2 provides moisture and yield of the varieties at all sites and the combined average. Table 3 provides the oil and protein content of the varieties at Rock Dell and Spring Valley and the 2-site average. Table 4 and 5 provide plant populations for all treatments at sites. The final harvest population and grain yield at all locations are reported in Table 6. Table 7 is the average population and yield over all sites.

At the Lamberton location, planting at 50,000 seeds/acre resulted in a lower yield, 32.6 bu/a, than all other seeding rates. The Lamberton site also resulted in the lowest final harvest population (36,754) compared to the same seeding rate (50,000) at the other locations. There was no difference in soybean grain yield when combined across all locations for each seeding rate. However, research results from numerous universities recommend a final harvest population of 100,000 plants per acre to optimize soybean yield. *These results also suggest that a planted population of 50,000 would be too low to optimize final harvest population and yield at several locations*. (University of Minnesota Extension, Regional Centers at Rochester, Rosemount, and Worthington, MN)

Table 1. Field histories for soybean seeding rate trials in southern MN in 2007.

	Lamberton	Rochester	Rock Dell	Rosemount	Spring Valley
Planting Date	May 31, 2007	May 14, 2007	May 9, 2007	May 10, 2007	May 10, 2007
Harvest Date	October 12, 2007	October 4,2007	October 24, 2007	October 13, 2007	September 28, 2007
Soil Type	Ves/Normania loam	Lawler loam	Kenyon loam	Waukegan silt loam	Kasson silt loam
Herbicide	Prowl fb Glyphosate	Glyphosate	Glyphosate	Glyphosate	Glyphosate
Tillage	Conventional	Conventional	Conventional	Conventional	Conventional
Previous Crop	Corn	Corn	Soybean	Corn	Corn

Table 2. Soybean moisture and yield at 13% for Lamberton, Rochester, Rock Dell, Rosemount, and Spring Valley and the 5-site average in MN in 2007.

Entry Name	Treatment	Lamberton		Rochester		Rock Dell		Rosemount		Spring Valley		Averages 5-site	
	Planting rate	% moisture	bu/A	% moisture	bu/A	% moisture	bu/A	% moisture	bu/A	% moisture	bu/A	% moisture	bu/A
NK Brand S19-L7	50,000	13.4	32.6	13.2	48.1	12.0	47.1	14.6	33.9	11.6	57.7	13.0	43.9
NK Brand S19-L7	75,000	13.4	38.7	13.2	48.6	12.0	49.5	14.5	36.3	11.8	58.6	13.0	46.3
NK Brand S19-L7	100,000	13.5	38.0	13.3	49.2	11.9	48.3	14.6	30.5	11.9	60.6	13.0	45.3
NK Brand S19-L7	125,000	13.3	39.2	13.2	48.9	11.9	50.0	14.2	35.6	12.0	59.9	12.9	46.7
NK Brand S19-L7	150,000	13.3	39.5	13.2	47.2	12.0	48.3	14.4	32.3	12.0	62.0	13.0	45.9
LSD (P=0.10)		**NS**	**3.5**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**0.2**	**NS**		**NS**

Table 3. Soybean protein and oil content for Rock Dell and Spring Valley and the 2-site average of protein and oil content in MN in 2007.

Entry Name	Treatment	Rock Dell		Spring Valley		Averages	
	Planting					2-site	
	Rate	% protein	% oil	% protein	% oil	% Protein	% oil
NK Brand S19-L7	50,000	35.1	17.9	35.1	17.0	35.1	17.5
NK Brand S19-L7	75,000	35.5	17.4	35.5	16.7	35.5	17.1
NK Brand S19-L7	100,000	35.4	17.8	35.6	16.8	35.5	17.3
NK Brand S19-L7	125,000	35.7	17.2	35.7	16.8	35.7	17.0
NK Brand S19-L7	150,000	35.6	17.7	35.7	16.7	35.7	17.2
LSD (P=0.10)		**NS**	**NS**	**0.4**	**NS**		

Table 4. Soybean populations (first assessment) at Lamberton, Rochester, Rock Dell, Rosemount, and Spring Valley and the 5-site average in MN in 2007.

Entry Name	Treatment	Lamberton	Rochester	Rock Dell	Rosemount	Spring Valley	Average
	Planting	August 15	June 5	June 5	July 20	June 13	5-site
	Rate	seeds/A	seeds/A	seeds/A	seeds/A	seeds/A	seeds/A
NK Brand S19-L7	50,000	37,298	44,105	47,644	51,728	47,010	45,557
NK Brand S19-L7	75,000	63,434	70,513	70,785	72,936	71,330	197,213
NK Brand S19-L7	100,000	84,125	90,387	99,099	93,110	99,916	93,327
NK Brand S19-L7	125,000	102,638	132,586	134,492	116,523	130,136	123,275
NK Brand S19-L7	150,000	115,979	150,554	158,722	143,476	163,008	146,348
LSD (P=0.10)		**13,458**	**7757**	**10,100**	**10,622**	**8423**	

Table 5. Soybean harvest populations for Lamberton, Rochester, Rock Dell, Rosemount, and Spring Valley and the 5-site average in MN in 2007.

Entry Name	Treatment	Lamberton	Rochester	Rock Dell	Rosemount	Spring Valley	Average
	Planting	October 11	September 20	September 28	September 28	September 27	
	Rate	seeds/A	seeds/A	seeds/A	seeds/A	seeds/A	seeds/A
NK Brand S19-L7	50,000	36,754 e	44,649 e	52,000 e	48,733 e	47,372 e	45,902
NK Brand S19-L7	75,000	58,806 d	75,141 d	68,879 d	68,063 d	67,518 d	67,681
NK Brand S19-L7	100,000	81,131 c	90,931 c	96,921 c	88,481 c	96,104 c	90,714
NK Brand S19-L7	125,000	101,822 b	122,513 b	130,680 b	109,172 b	122,513 b	117,340
NK Brand S19-L7	150,000	115,434 a	138,847 a	150,010 a	129,591 a	150,554 a	136,887
LSD (P=0.10)		**13,065**	**9885**	**10,097**	**10,036**	**7711**	

Table 6. Soybean harvest population and yield at 13% for Lamberton, Rochester, Rock Dell, Rosemount, and Spring Valley, MN, in 2007.

Entry Name	Treatment	Lamberton		Rochester		Rock Dell		Rosemount		Spring Valley	
	Planting Rate	population	bu/A	population	bu/A	population	bu/A	population	bu/A	population	bu/A
NK Brand S19-L7	50,000	36,754	32.6	44,649	48.1	52,000	47.1	48,733	33.9	47,372	57.7
NK Brand S19-L7	75,000	58,806	38.7	75,141	48.6	68,879	49.5	68,063	36.3	67,518	58.6
NK Brand S19-L7	100,000	81,131	38.0	90,931	49.2	96,921	48.3	88,481	30.5	96,104	60.6
NK Brand S19-L7	125,000	101,822	39.2	122,513	48.9	130,680	50.0	109,172	35.6	122,513	59.9
NK Brand S19-L7	150,000	115,434	39.5	138,847	47.2	150,010	48.3	129,591	32.3	150,554	62.0
LSD (P=0.10)		**13,065**	**3.5**	**9885**	**NS**	**10,097**	**NS**	**10,036**	**NS**	**7711**	**NS**

Table 7. Soybean planting rate, average population and yield at 13% for Lamberton, Rochester, Rock Dell, Rosemount, and Spring Valley, MN, in 2007.

Entry Name	Description	Averages	
		5-site[1]	
	Planting Rate	population	bu/A
NK Brand S19-L7	50,000	45,902	43.9
NK Brand S19-L7	75,000	67,681	46.3
NK Brand S19-L7	100,000	90,714	45.3
NK Brand S19-L7	125,000	117,340	46.7
NK Brand S19-L7	150,000	136,887	45.9
LSD (P=0.10)			**NS**

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Soybean aphid insecticide evaluation at Rock Dell, MN, in 2008.

Behnken, Lisa M., Fritz R. Breitenbach, Ryan P. Miller.

The objective of this trial was to evaluate the effect of insecticides on soybean aphid population dynamics and soybean yield in southeastern Minnesota. The research site was a Kenyon loam soil with a pH of 6.5, soil test P of 30 ppm and soil test K of 200 ppm. The previous crop was corn. The field was chisel plowed in the fall and filed cultivated in the spring. The trial was planted with a 4-row John Deere 7100 planter. The soybean variety, Pioneer 91M30, was planted on June 25, 2008 at a depth of 1.5 inches in 30-inch rows. Seeding rate was 150,000 seeds/A. A randomized complete block design with four replications was used. Pretreatment aphid counts were taken one day before treatment from the untreated checks on July 28. Soybean aphid were counted at three, seven, fourteen and twenty days after the insecticide treatments were made. The center four rows were harvested on October 29, 2008.

Date	July 29
Temperature (F)	
Air	79
soil	--
Relative Humidity (%)	76
Wind (mph)	12
Soil moisture	dry
Bean	
stage	R1
Nodes	8
Rainfall after application (inch)	
week 1	0.81
week 2	0.88
week 3	1.46

CONCLUSIONS

All insecticide treatments provided excellent soybean aphid control as measured by the 3, 7, 14, and 20 day post treatment counts (Table 1). Aphid numbers were significantly lower than the untreated check on all post treatment counts.

When the untreated check was excluded from analysis; differences between insecticide treatments became evident in the 3, 7, and 14 day post treatment counts; however, there was no statistical difference between insecticide treatments for the 20 day post treatment counts.

The largest degree of separation between treatments occurred in the 14 day post treatment counts. Statistically, Cobalt had the highest soybean aphid counts 14 days after treatment. Lorsban, the low rate of Endigo, and the low rate of Leverage had statistically lower soybean aphid counts than Cobalt, however, the soybean aphid numbers were statistically higher than the remaining treatments.

Yield data and quality parameters are presented in Table 2. Lorsban and the low rate of Endigo provided yields which were not statistically different from the untreated check. The remaining insecticide treatments provided yields which were statically higher than the untreated check. There were no differences in grain moisture or soybean oil content. There were differences in protein content, with the untreated check providing statistically higher protein than the insecticide treatments.

Table 1. Number of soybean aphids per plant at pretreatment, three, seven, fourteen, and twenty days after treatment at Rock Dell, MN, 2008.

Treatment	Rate	Pretreatment count July 28	3 days post treatment Aug 01	7 days post treatment Aug 05	14 days post treatment Aug 12	20 days post treatment Aug 18
Untreated		226.5	121.4	224.4	1076.4	1396.6
Leverage +NIS	3.8 fl oz +0.125% v/v	--	0.2	2.3	17.2	50.8
Leverage +NIS	5.0 fl oz +0.125% v/v	--	0.0	2.1	11.3	33.5
Endigo	2.05 fl oz	--	0.2	0.8	23.8	34.4
Endigo	2.75 fl oz	--	0.0	0.1	10.3	54.8
Warrior	1.53 fl oz	--	0.1	0.7	8.4	34.1
Cobalt	15.0 fl oz	--	0.0	1.4	35.6	79.9
Hero	5.0 fl oz	--	0.1	0.8	12.5	42.5
Lorsban	16.0 fl oz	--	0.2	6.2	24.4	63.5
Ultor + MSO + AMS	4 fl oz + 0.25 % v/v + 2 lb	--	0.5	2.7	2.9	30.9
Ultor + MSO + AMS	6 fl oz + 0.25 % v/v + 2 lb	--	1.4	2.5	5.5	16.7
Ultor + Baythroid + MSO + AMS	4 fl oz + 2.43 fl oz + 0.25 % v/v + 2 lb	--	0.1	1.0	3.3	27.4
	LSD (P=0.10)		**0.62***	**2.62***	**11.2***	**348.2**

***LSD calculated by excluding the untreated check**

Table 2. Soybean grain yield and quality parameters at Rock Dell, MN in 2008.

Treatment	Rate		Soybean Moisture (%)	Soybean yield (bu/A)	Oil Content (%)	Protein Content (%)
Untreated			11.7	16.6	19.8	32.8
Leverage +NIS	3.8 fl oz +0.125% v/v		11.8	29.2	19.7	31.9
Leverage +NIS	5.0 fl oz +0.125% v/v		11.8	26.4	19.8	31.5
Endigo	2.05 fl oz		11.9	22.2	20.0	31.4
Endigo	2.75 fl oz		11.7	27.9	19.8	31.0
Warrior	1.53 fl oz		11.9	27.5	20.0	31.5
Cobalt	15.0 fl oz		11.9	28.6	20.0	31.2
Hero	5.0 fl oz		12.0	28.6	19.6	32.0
Lorsban	16.0 fl oz		11.9	20.2	19.7	31.7
Ultor + MSO + AMS	4 fl oz + 0.25 % v/v + 2 lb		12.0	25.0	19.8	31.2
Ultor + MSO + AMS	6 fl oz + 0.25 % v/v + 2 lb		11.8	28.7	19.7	31.0
Ultor + Baythroid + MSO + AMS	4 fl oz + 2.43 fl oz + 0.25 % v/v + 2 lb		11.9	31.0	19.5	31.2
	LSD (P=0.10)		**NS**	**7.5**	**NS**	**0.7**

Evaluation of Syngenta seed treatments on soybean emergence, insect populations and yield at Rock Dell and Fountain, MN in 2008.

Behnken, Lisa M., Fritz R. Breitenbach, Ryan P. Miller.

The objective of this trial was to evaluate Syngenta seed treatments on soybean emergence, insect populations and yield at Rock Dell and Fountain, Minnesota. The research site at Rock Dell was a Kenyon loam soil with a pH of 6.5, soil test P of 30 ppm and soil test K of 200 ppm. The field was chisel plowed in the fall and field cultivated in the spring. The research site at Fountain was a Fayette silt loam, with a pH of 6.3 and a soil test P of 26 ppm and soil test K of 202 ppm. The previous crop was corn at both locations. The soybean variety NK S21-N6 was planted with a John Deere 7000 planter equipped with cone units on May 17 at Rock Dell and May 15 at Fountain. Plots were eight rows wide and soybeans were planted 1.5 inches deep at 150,000 seeds/A in 30-inch rows. Warrior insecticide was applied to all treatments at Rock Dell at a rate of 3.2 oz/A on August 19. A randomized complete block design with four replications was implemented. Two subsamples were harvested out of the center six rows on October 1, 2008 at Rock Dell and on October 2, 2008 at Fountain.

CONCLUSIONS

Rock Dell: The untreated check had the lowest plant population on June 10, (130,271plants/A) and more aphids/plant on July 21 compared to the other treatments. However, there were no differences in aphids/plant among treatments on August 4. There were also no differences in soybean plant height, oil and protein content, or yield among the treatments.

Fountain: There were no differences in plant population, plant height, or aphids/plant on either date among treatments. However, the soybean treated with STP15142 + STP15199 + STP15255 resulted in a lower yield, 53.0 bu/A, compared to the other seed treatments. In addition the untreated soybean yield was statistically no different than and of the seed treatments at 55.1 bu/A.

Combined: The combined analysis resulted in no difference in population, but there was a difference in yield. Treatments 2 and 4 had the highest combined yield over sites at 52.4 and 52.2 bu/A, respectively. Treatment 3 and the untreated check resulted in the lowest yield combined over sites, 50.1 and 50.5 bu/A, respectively. (University of Minnesota Extension Regional Office - Rochester, MN).

Table 1. Plant population, yield, oil and protein content of untreated and treated soybean at Rock Dell and Fountain, MN in 2008.

Seed Treatment	Rate	Soybean Population[1]			Soybean Yield[1]			Oil	Protein
	Grams ai / 100 kg of seed	Rock Dell 6/10	Fountain 6/19	Average	Rock Dell	Fountain	Average	Rock Dell	
		Plants/A			(bu/A)			(%)	
Untreated Check		130,272 c	111,895	121,083	45.9	55.1 ab	50.5 b	20.5	30.1
A14379 (fludioxonil + metalaxyl + thiamethoxam)	56.25	137,078 ab	112,712	124,895	47.3	57.5 a	52.4 a	20.7	29.9
STP15142 + STP15199 + STP 15255	4 + 5 + 62.5	141,570 a	106,994	124,282	47.2	53.0 b	50.1 b	20.7	29.9
A14379 + Cruiser 5FS (fludioxonil + metalaxyl+ thiamethoxam) + thiamethoxam	56.25 + 50	136,261 ab	111,895	124,078	47.0	57.4 a	52.2 a	20.5	29.8
A14379 (fludioxonil + metalaxyl + thiamethoxam)	0.0852 mg/A	134,900 bc	116,250	125,575	45.1	57.4 a	51.3 ab	20.8	29.5
	LSD (P=0.10)	**5,822**	**NS**	**NS**	**NS**	**2.4**	**1.5**	**NS**	**NS**

1. Means followed by same letter do not significantly differ (P=0.10, LSD)

Table 2. Soybean plant height, aphids/plant, average population and yield for untreated and treated soybeans at Rock Dell and Fountain, MN in 2008.

Seed Treatment	Rate	Plant Height (in)		------Soybean Aphids per plant[1] -----				2-site Average[1]	
	Grams ai / 100 kg of seed	Rock Dell	Fountain	Rock Dell		Fountain		Population	Yield
		6/10	6/19	7/21	8/4	7/22	8/8	(Plants/A)	(bu/A)
Untreated Check		2.9	4.3	12 a	42	2	17	121,084	50.5 b
A14379 (fludioxonil + metalaxyl + thiamethoxam)	56.25	2.9	4.3	4 b	56	1	13	124,895	52.4 a
STP15142 + STP15199 + STP 15255	4 + 5 + 62.5	2.9	4.3	6 b	48	1	28	124,282	50.1 b
A14379 + Cruiser 5FS (fludioxonil + metalaxyl+ thiamethoxam) + thiamethoxam	56.25 + 50	2.9	4.4	3 b	44	0	13	124,078	52.2 a
A14379 (fludioxonil + metalaxyl + thiamethoxam)	0.0852 mg/A	2.7	4.3	5 b	61	0	38	125,575	51.3 ab
	LSD (P=0.10)	**NS**	**NS**	**4**	**NS**	**NS**	**NS**	**NS**	**1.5**

1. Means followed by same letter do not significantly differ (P=0.10, LSD)

Evaluation of Bayer CropScience seed treatments on soybean emergence, aphid population and yield at Rock Dell and Fountain, MN in 2008.

Behnken, Lisa M., Fritz R. Breitenbach, Ryan P. Miller.

The objective of this trial was to evaluate Bayer CropScience seed treatments on soybean emergence, insect populations and yield at Rock Dell and Fountain, Minnesota. The research site at Rock Dell was a Kenyon loam soil with a pH of 6.5, soil test P of 30 ppm and soil test K of 200 ppm. The field was chisel plowed in the fall and field cultivated in the spring. The research site at Fountain was a Fayette silt loam, with a pH of 6.3 and a soil test P of 26 ppm and soil test K of 202 ppm. The previous crop was corn at both locations. The soybean variety NK S19-L7 was planted with a John Deere 7000 planter equipped with cone units on May 17 at Rock Dell and May 15 at Fountain. Plots were eight rows wide and soybeans were planted 1.5 inches deep at 150,000 seeds/a in 30-inch rows. Warrior insecticide was applied to all treatments at Rock Dell at a rate of 3.2 oz/A on August 19. A randomized complete block design with four replications was used. Two subsamples were harvested out of the center six rows on October 1, 2008 at Rock Dell and on October 2, 2008 at Fountain.

CONCLUSIONS No differences were found among treatments in plant population, soybean yield, oil or protein content or plant height at Rock Dell. At Fountain, there was no difference in plant height, however, plant population and soybean yield was reduced when seed was treated with Trilex 6000. There was also no difference in soybean aphid numbers among treatments at either site. The two-site average for population and yield also resulted in no difference among treatments. (University of Minnesota Extension Regional Office - Rochester).

Table 1. Soybean population, yield, oil and protein content for untreated and treated soybean at Rock Dell and Fountain, MN in 2008.

Seed Treatment	Rate	Soybean Population [1]			Soybean Yield [1]			Oil	Protein
	Grams ai/ 100 kg of seed	Rock Dell 6/10	Fountain 6/19	Average	Rock Dell	Fountain	Average	Rock Dell	
		Plants/A			(bu/A)			(%)	
Untreated Check		132,177	109,717 a	120,947	40.6	45.5 a	43.0	20.0	32.6
Trilex 5000 (trifloxystobin + metalaxyl + bacillus pumilus + celgard)	5 + 4 + 62.5 + 130 ml	134,219	112,439 a	123,329	41.9	45.2 a	43.6	19.7	32.6
Trilex 6000 (trifloxystobin + metalaxyl + bacillus pumilus + Gaucho + celgard)	5+ 4 + 62.5 + 62.5 + 130 ml	139,800	95,832 b	117,816	40.3	41.8 b	41.0	19.7	32.5
CriuserMaxx (thiamethoxam)	56.25	139,800	103,727ab	121,764	39.2	45.5 a	42.4	19.5	32.9
	LSD (P=0.10)	**NS**	**10,241**	**NS**	**NS**	**2.1**	**NS**	**NS**	**NS**

1. Means followed by same letter do not significantly differ (P=0.10, LSD)

Table 2. Soybean plant height, aphids/plant, average population and yield for untreated and treated soybeans at Rock Dell and Fountain, MN in 2008.

Seed Treatment	Rate	Plant Height (in)		---------- Soybean Aphids per plant ----------				2-site Average	
	Grams ai / 100 kg of seed	Rock Dell	Fountain	Rock Dell		Fountain		Population	Yield
		6/10	6/19	7/21	8/4	7/22	8/8	(plant/A)	(bu/A)
Untreated Check		2.5	3.4	71	63	2	72	120,947	43.1
Trilex 5000 (trifloxystobin + metalaxyl + bacillus pumilus + celgard)	5 + 4 + 62.5 + 130 ml	2.5	3.6	16	157	1	69	123,329	43.6
Trilex 6000 (trifloxystobin + metalaxyl + bacillus pumilus + Gaucho + celgard)	5+ 4 + 62.5 + 62.5 + 130 ml	2.5	3.6	25	211	1	105	117,816	41
CriuserMaxx (thiamethoxam)	56.25	2.4	3.6	15	74	0	78	121,764	42.4
	LSD (P=0.10)	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**

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The Effect of EBC-352 Seed Treatment on Soybean Yield and Soybean Cyst Nematode Populations in Southern Minnesota in 2008.

Miller, Ryan P., Lisa M. Behnken, Fritz R. Breitenbach, Dave Nicolai, and Lizabeth Stahl

The objective of this trial was to evaluate EBC-352 (N-Hibit) seed treatment for yield performance and impact on SCN egg counts in southern Minnesota. At each site, field preparation was conventional tillage and the previous crop was corn. Testing locations include: Gaylord, Jackson, Rock Dell, Waseca, North Waseca, and High Forest. Gaylord, North Waseca, and High Forest were infested with SCN. At Gaylord, Jackson, Rock Dell, North Waseca, and High Forest soybean was planted at a depth of 1.5 inches in four 30-inch rows. At Waseca, plots were planted in 10-inch rows. A randomized complete block design with four replications was used at all sites. Initial SCN egg counts were determined from a bulk sample that was created by sampling every plot. The initial SCN egg counts for Jackson, Rock Dell, Waseca, North Waseca, and High Forest were 525, 0, 25, 12331, and 3744 eggs/ 100 cc of soil, respectively (Table 1).

Final SCN soil samples for egg counts were collected at each site after the soybeans had reached the R6 stage. Samples were collected from each plot and bulked by treatment across replications (Table 2). The reproductive index (RI) was calculated for each site by dividing the final egg counts for each variety by the initial average egg count (Table 3). Yields were adjusted to 13% moisture and results are shown in Tables 4 and 5. (University of Minnesota Extension Regional Office, Rochester, MN.)

Table 1. Field histories for Soybean Cyst Nematode N-Hibit trials in southern Minnesota, 2008.

	Gaylord	Jackson	Rock Dell	Waseca	North Waseca	High Forest
Planting Date	May 17, 2008	NA	May 19, 2008	May 28, 2007	May 20, 2007	May 19, 2008
Harvest Date	October 19, 2008	NA	October 1, 2008	October 2008	October 2008	October 14, 2008
Soil Type	Nicollet/Webster Clay Loam	NA	Kenyon Loam	Nicollet/Webster Clay Loam	Canisteo-Glencoe Clay Loam	Waukee Loam, Marshan & Skyberg Silt Loams
Herbicide	Pursuit Plus PRE Flexstar POST	NA	Glyphosate, POST	Glyphosate, POST	Glyphosate POST	Glyphosate, POST
Tillage	Conventional	Conventional	Conventional	Conventional	Conventional	Conventional
Previous Crop	Corn	Corn	Corn	Corn	Corn	Corn
Preplant SCN Egg Count (Eggs/100 cc soil)	Not Available	525	0	25	12,331	3,744

Table 2. Final SCN Egg Counts/ 100 cc of Soil

Treatment	Resistance Source/Type	Gaylord	Jackson	Rock Dell	Waseca	North Waseca	High Forest
DKB 22-52 UTREATED	Susceptible	11,525	11,000	0	4,575	20,050	9,500
DKB 22-52 W/EBC-352	Susceptible	13,400	11,700	0	588	19,650	10,150
AG2002 UNTREATED	88788	3,950	3,300	0	175	10,550	1,450
AG2002 W/EBC-352	88788	2,750	1,425	0	113	7,450	3,400

Table 3. Reproductive Index

Treatment	Resistance Source/Type	Gaylord	Jackson	Rock Dell	Waseca	North Waseca	High Forest
DKB 22-52 UTREATED	Susceptible	NA	20.95	0	183	1.63	2.54
DKB 22-52 W/EBC-352	Susceptible	NA	22.29	0	23.52	1.59	2.71
AG2002 UNTREATED	88788	NA	6.29	0	7	0.86	0.39
AG2002 W/EBC-352	88788	NA	2.71	0	4.52	0.60	0.91

Table 4. Yield in Bushels per Acre Adjusted to 13% moisture

Treatment	Resistance Source/Type	Gaylord	Jackson	Rock Dell	Waseca	North Waseca	High Forest	6 Site Average
DKB 22-52 UTREATED	Susceptible	60.2	26.9	38.9	51.7	25.4	37.4	40.08
DKB 22-52 W/EBC-352	Susceptible	51.2	32.25	41.2	52.1	28.9	29.2	39.14
AG2002 UNTREATED	88788	63.1	33.23	40.7	53.1	28.4	45.3	43.97
AG2002 W/EBC-352	88788	60.6	31.33	41.5	53	31.4	42.4	43.37
	LSD (P =0.10)	**8**	**NS**	**1.77**	**NS**	**NS**	**NS**	

The effect of tillage and seed treatment in soybean in rotation with strip-tillage corn (2006-2008).

Stahl, Lizabeth A.B., Jodi DeJong-Hughes, and Dean Malvick

INTRODUCTION AND OBJECTIVES

Research previously conducted on strip tillage in corn has shown that residue levels are significantly influenced by the tillage system used in prior years (DeJong-Hughes and Vetsch, 2007). Previous research on strip-tillage in Minnesota has often focused on comparing tillage systems in corn but not in the common rotational crop of soybean. This study was implemented to evaluate the influence of tillage used in soybean when in rotation with strip-tilled corn. It has also been suggested that in reduced tillage systems, soybeans could benefit from use of a seed treatment. This study also evaluated the effect of using a seed treatment in soybean. Specifically, the objective of this trial was to evaluate the effect of three tillage systems in soybean when rotated with strip-tilled corn, on population, percent residue cover, soil temperature, and yield for both soybean and corn. The effect of a soybean seed treatment on soybean population and yield was also evaluated.

MATERIALS AND METHODS

This on-farm trial was established near Jeffers, MN in the fall of 2005. The previous cropping and tillage history was a corn/soybean rotation where fall strip-tillage was conducted on ground to be planted to corn and soybean were no-tilled into corn stubble. Farm-scale equipment was used for all field operations. Tillage treatments were established in the fall for the soybean plot. Harvested plot length varied by year, ranging from 544 feet in 2008 (soybean) to 1,852 feet in 2007 (soybean). Soybean tillage treatments included no-tillage (NT), chisel plow (CP-fall chisel plow followed by spring field cultivation), strip-tillage with no stalk chopping (ST1), and strip-tillage with corn stalks chopped (ST2, added the fall of 2006). Treatments were arranged in a randomized complete block design in a split-plot arrangement with three replications, with tillage as the whole plot treatment and soybean seed treatment as the split plot treatment. Corn plots were planted over the previous year's soybean plot. Corn and soybean plots were rotated after the establishment year. A 12-row John Deere 7200 MaxEmerge 2 planter was used in 2006, and a 30-foot Kinze 2600 twin-row planter was used in 2007 and 2008, where the distance between the twin rows was 6 inches and the distance between the center of row pairs was 30 inches. Soybean data was collected in 2006, 2007, and 2008, and corn data was collected in 2007 and 2008. The corn plot was accidently bulk harvested in 2008 and corn yield data was lost this year.

Field histories are reported in Table 1. The same herbicide program was used across all treatments within the soybean or corn plots in a given year. The same fertilizer program, which included a starter application of 4 gal/A of 10-34-0 at planting for the corn, was used across the corn plot each year. Soil temperature at a 2-inch soil depth was collected within each tillage treatment immediately before planting in 2006 and 200, and immediately after planting in 2008 in the crop row (all tillage treatments) as well as between crops rows (strip-tillage only). Surface residue was determined within each tillage treatment using the standard line intersect method. Stand counts were taken when corn and soybean were from the V2 to V4 stage. At harvest, plot weights were measured by using a weigh wagon. Grain moisture was determined by using a hand-held Dickey John moisture tester for soybean and by using the local elevator's moisture tester for corn. ANOVA was used for statistical analysis and means compared using Fisher's Protected LSD at the 0.05 and 0.10 significance levels.

RESULTS AND DISCUSSION

Table 2 shows the effect of tillage used prior to soybean on soil temperature in-the-row immediately before planting (2006 and 2007) and immediately after planting soybean (2008). Soil temperature in-the-row was recorded for corn only in 2007. Tables 3 and 4 show the effect of tillage used in soybean on percent residue cover and plant population, respectively, for soybean and corn. Tables 5 and 6 show the effect of tillage used in soybean on soybean yield and corn yield and harvest moisture the following year, respectively. Tables 7 and 8 show the effect of a soybean seed treatment averaged across tillage treatments on soybean population and yield, respectively. Tables 9 and 10 show the effect of the seed treatment by tillage interaction on soybean population and yield, respectively.

Averaged over 3 years (2006-2008), strip tillage and chisel plow resulted in higher soil temperatures around planting time in soybean than no-tillage (Table 2). Tillage conducted in soybean the previous year had no effect on soil temperature in corn in 2007. Over the three years of the study, percent residue cover in soybean was consistently higher in no-tillage compared to chisel plow (Table 3). Residue cover in the strip-tillage was similar to no-tillage in 2006 but significantly lower than no-tillage in 2007 and 2008. In 2008, percent residue cover in chisel plow plot was lower than all the other tillage treatments. Chopping corn stalks versus not chopping did not influence residue cover in soybean after planting. Tillage used in soybean did not influence percent residue cover in corn the following year in this trial. It should be noted that the chisel plow used in this study was not very aggressive, which may have contributed to the lack of differences observed in the corn.

Tillage used in soybean had no effect on soybean plant population (averaged across seed treatment) or corn population (Table 4). Yields averaged over 2006-2008 were 1.8 and 2.5 bu/A lower in no-tillage than in chisel plow and strip-tillage, respectively (Table 5). The yield trend was similar across years and no significant tillage x year interaction was observed. Yield differences observed, however, would need to be weighted with expected reductions in input costs in determining net returns among the tillage systems evaluated. In 2007, the only year corn yields were successfully collected, no differences were observed based on tillage conducted in soybean the previous year (Table 6).

Use of a soybean seed treatment resulted in significantly lower populations averaged across tillage treatments in 2006 and in the long term average (2006-2008, Table 7). It is hypothesized that less treated seed was dropped per acre than untreated seed in 2006, although this was not measured at the time. To determine if seed drop was similar across treated and untreated seed in 2007 and 2008 (different planter than in 2006), planter boxes were leveled prior to planting and then compared after planting. No visual differences were observed either year. Although populations differed between treated and untreated seed in 2006, yield was not affected (Table 8). In 2007, however, yields were significantly lower in the treated versus untreated plots, averaged across tillage treatments. In 2008, no difference was observed in population or yield between treated and untreated seed, averaged across tillage treatments. No significant interaction between seed treatment and tillage was observed on soybean population (Table 9) or yield (Table 10).

CONCLUSIONS

Although soybean yields were lower in the no-tillage treatments, it is likely that reduced input costs would offset this when calculating net returns. Tillage system influenced percent residue coverage in soybean, with NT consistently having the highest residue coverage percent. It should be noted that all tillage systems resulted in residue coverage well above 30% after planting, which is the minimum for a system to be considered conservation tillage. Regarding effects on corn, the tillage system used in soybean had no effect on percent residue coverage or population (2007-2008), or yield (2007).

No advantage was recorded in this study for using a seed treatment in reduced tillage, and negative impacts were actually observed, ranging from lower plant populations averaged over the 3 years, to a negative impact on yield in 2007 (which could not be explained by the authors).

REFERENCES

DeJong-Hughes, J. and J. Vetsch. 2007. On-farm comparison of conservation tillage systems for corn following soybeans. U of MN Extension publication B-08483. (University of Minnesota Extension Regional Office – Rochester, Southern Research and Outreach Center – Waseca, and Southwest Research and Outreach Center – Lamberton).

Table 1. Field histories for soybean and corn plots at Jeffers, MN, 2006 - 2008.

	Soybean 2006	Soybean 2007	Soybean 2008	Corn 2007	Corn 2008
Planting Date	5/10/06	5/17/07	5/20/08	4/30/07	5/16/08
Planting Population	142,000 seeds/A	160,000 seeds/A	160,000 seeds/A	36,000 seeds/A	36,000 seeds/A
Harvest Date	10/5/06	10/4/07	10/10/08	10/24/07	N/A
Variety/Hybrid	NK S24-K4	NK S21-N6	Legend 2042	DKC-5242	LR 9800VT3
Soybean Seed Trmt	ApronMaxx	Trilex	Cruiser	--	--
Previous Crop	Corn	Corn	Corn	Soybean	Soybean

Table 2. Effect of tillage used prior to soybean on soil temperature in-the-row for soybean and corn immediately before planting (2006 and 2007) and immediately after planting (2008) by year and averaged across years at Jeffers, MN.

	Soybean				Corn
	2006	2007	2008	Average (2006 - 08*)	2007
Tillage	Temperature (F)				
Chisel Plow	57.7	69.1	57.6	61.5	64.2
No-tillage	55.8	64.9	59.8	60.2	64.4
Strip-tillage-1 (no chopped stalks)	58.9	71.3	60.5	63.6	64.7
Strip-tillage-2 (stalks chopped)		71.7	60.7		62.4
p value	**0.0647**	**0.0649**	**0.4829**	**0.0360**	**0.3082**
LSD (P=0.05)	**NS**	**NS**	**NS**	**2.5**	**NS**
LSD (P=0.10)	**1.9**	**4.2**	**NS**	**2.1**	**NS**

***Note:** 2006 - 2008 average does not include strip-tillage-2 as this treatment was added in 2007**.**

Table 3. Effect of tillage used prior to soybean percent residue cover in soybean and corn three to four weeks after planting, by year and averaged across years (2006 – 2008) at Jeffers, MN.

	Soybean				Corn		
	2006	2007	2008	Average (2006 - 08*)	2007	2008	Average (2007-08)
Tillage	Residue (%)						
Chisel Plow	48.7	61.0	58.5	56.1	53.0	47.8	50.4
No-tillage	67.7	69.5	82.8	73.3	61.0	49.5	55.3
Strip-tillage-1 (no chopped stalks)	61.7	54.8	69.7	62.1	56.3	51.8	54.1
Strip-tillage-2 (stalks chopped)		57.3	66.8		58.8	55.5	57.2
p value	**0.0175**	**0.0518**	**0.0009**	**0.0000**	**0.4108**	**0.7794**	**0.2567**
LSD (P=0.05)	**10.5**	**NS**	**7.1**	**4.4**	**NS**	**NS**	**NS**
LSD (P=0.10)	**8.1**	**8.1**	**5.6**	**3.6**	**NS**	**NS**	**NS**

***Note:** 2006 - 2008 average does not include strip-tillage-2 as this treatment was added in 2007.

Table 4. Effect of tillage used prior to soybean on soybean population (averaged over seed treatment) and corn population, by year and averaged across years (2006 – 2008) at Jeffers, MN.

Tillage	Soybean				Corn		
	2006	2007	2008	Average (2006 - 08*)	2007	2008	Average (2007-08)
	Population (plants/A)						
Chisel Plow	170854	135278	145442	150524	28500	32917	30708
No-tillage	172062	140118	145200	152460	29917	32917	31417
Strip-tillage-1 (no chopped stalks)	170366	130196	150040	150201	29750	33417	31583
Strip-tillage-2 (stalks chopped)		134552	147620		30083	33500	31792
p value	0.6673	0.1253	0.8260	0.5304	0.2382	0.7794	0.2392
LSD (P=0.05)	NS	NS	NS	NS	NS	NS	NS

***Note:** 2006 - 2008 average does not include strip-tillage-2 as this treatment was added in 2007.

Table 5. Effect of tillage used prior to soybean on soybean yield (averaged over seed treatment) by year and averaged across years (2006 – 2008) at Jeffers, MN.

Tillage	Soybean			
	2006	2007	2008	Average (2006 - 08*)
	Yield (bu/A)			
Chisel Plow	50.3	47.2	43.9	47.1
No-tillage	47.8	46.8	41.6	45.3
Strip-tillage-1 (no chopped stalks)	50.7	47.9	44.6	47.8
Strip-tillage-2 (stalks chopped)		49.7	43.7	
p value	0.3362	0.0341	0.1041	0.0110
LSD (P=0.05)	NS	1.9	NS	1.5

***Note:** 2006 - 2008 average does not include strip-tillage-2 as this treatment was added in 2007.

Table 6. Effect of tillage used prior to soybean on corn yield (2007) at Jeffers, MN.

Tillage	Moisture (%)	Yield (bu/A)
Chisel Plow	14.6	175.4
No-tillage	14.4	169.4
Strip-tillage-1 (no chopped stalks)	14.7	167.0
Strip-tillage-2 (stalks chopped)	14.7	170.9
p value	0.7716	0.6827
LSD (P=0.05)	NS	NS

Table 7. Effect of seed treatment on soybean population averaged over tillage treatments, by year and averaged across years (2006 – 2008) at Jeffers, MN.

Seed Treatment	2006	2007	2008	Average (2006 - 08)
	Population (plants/A)			
No	186019	135520	147136	157246
Yes	156171	134552	147015	144877
p value	0.001	0.8052	0.9621	0.0002
LSD (P=0.05)	12327	NS	NS	5475

Table 8. Effect of seed treatment on soybean yield averaged over tillage treatments, by year and averaged across years (2006 – 2008) at Jeffers, MN.

Seed Treatment	2006	2007	2008	Average (2006 - 08)
	Yield (bu/A)			
No	50.0	48.8	43.2	47.1
Yes	50.0	47.0	43.8	46.3
p value	0.9162	0.0061	0.4417	0.1034
LSD (P=0.05)	NS	1.1	NS	NS

Table 9. Effect of the seed treatment x tillage interaction on soybean population, by year and averaged across years (2006 – 2008) at Jeffers, MN.

Tillage	Seed Treatment	2006	2007	2008	Average (2006 - 08*)
		Population (plants/A)			
Chisel Plow	No	182952	136972	141812	153912
Chisel Plow	Yes	158750	133584	149072	147136
No-tillage	No	188278	140360	147136	158591
No-tillage	Yes	155846	139876	143264	146329
Strip-tillage-1 (no chopped stalks)	No	186826	136488	154396	159236
Strip-tillage-1 (no chopped stalks)	Yes	153912	123904	145684	141167
Strip-tillage-2 (stalks chopped)	No		128260	145200	
Strip-tillage-2 (stalks chopped)	Yes		140844	150040	
p value		0.7412	0.2120	0.1783	0.2430
LSD (P=0.05)		NS	NS	NS	NS

***Note:** 2006 - 2008 average does not include strip-tillage-2 as this treatment was added in 2007.

Table 10. Effect of the seed treatment x tillage interaction on soybean yield, by year and averaged across years (2006 – 2008) at Jeffers, MN.

Tillage	Seed Treatment	2006	2007	2008	2006 - 08*
		Yield (bu/A)			
Chisel Plow	No	50.2	48.1	43.5	47.3
Chisel Plow	Yes	50.3	46.3	44.4	47.0
No-tillage	No	48.1	47.9	41.7	45.9
No-tillage	Yes	47.6	45.6	41.5	44.6
Strip-tillage-1 (no chopped stalks)	No	50.3	49.3	44.8	48.1
Strip-tillage-1 (no chopped stalks)	Yes	51.2	46.5	44.5	47.4
Strip-tillage-2 (stalks chopped)	No		49.9	42.8	
Strip-tillage-2 (stalks chopped)	Yes		49.5	44.7	
p value		0.9123	0.4154	0.6825	0.6761
LSD (P=0.05)		NS	NS	NS	NS

***Note:** 2006 - 2008 average does not include strip-tillage-2 as this treatment was added in 2007.

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SMALL GRAINS

OAT

HERBICIDE TRIALS

Oat Herbicide at Rochester, MN, in 2007.

Martinson, Krishona, Lisa M. Behnken, Fritz R. Breitenbach, Ryan P. Miller, Jochum Wiersma, and Beverly R. Durgan

There are approximately 300,000 acres of oat in Minnesota. Oat is considered a multiple use crop, with primary uses being companion crop, livestock feed, and grain. Recently, there has been an increased interest in weed free oat straw as mulch for right-of-way seedings. However, there is a little current data on postemergence broadleaf herbicide efficacy and safety in oat. The objective of this research was to evaluate broadleaf weed control and crop injury using postemergence herbicides in oat. Research plots were established in 2007 at three locations in Minnesota; Crookston, Rochester, and Rosemount (Table 1). The research site at Rochester was a Lawler loam series with a pH of 6.7 and soil test P and K levels of 84 ppm and 170 ppm, respectively. Kame oat was seeded at 96.5 lb/a and sites were fertilized according to soil test recommendations. The experimental design was a randomized complete block design with three replications. Postemergence (POST) herbicides were applied at labeled rates with a tractor-mounted sprayer delivering 20 gpa at 32 psi at Rochester and a backpack sprayer at the other sites. Redroot pigweed (RRPW) was evaluated at all three locations. Common lambsquarter (COLQ) and velvetleaf (VELE) were investigated at Rochester and Rosemount, and common mallow (COMA), wild buckwheat (WIBU) and wild mustard (WIMU) were investigated at Crookston. Additional weeds were investigated at each location, but are not reported. Weed control and crop injury were visually rated at 7, 14 and 21 days after application and prior to oat harvest. Grain yields were measured and are reported at 13% moisture. Data were analyzed with an ANOVA at a p value = 0.05. Application dates, environmental conditions, and weed stages for Rochester are described in Table 2. Results by location are listed in Tables 3, 4 and 5. The research will be repeated in 2008.

Table 1. 2007 planting, herbicide application, and harvest dates for Crookston, Rochester, and Rosemount.

Location	Planting	Herbicide Application	Harvest
Crookston	April 25	May 25	July 25
Rochester	April 21	June 3	July 31
Rosemount	April 25	May 25	July 25

Table 2. Application dates, environmental conditions, and weed stages for Rochester, MN, in 2007.

Date	May 19
Treatment	POST
Temperature (F)	
air	70
soil	61
Relative Humidity (%)	63
Wind (mph)	7
Soil moisture	Excessive
Oat	
stage	4 leaf
height (inch)	11.0
Giant Ragweed (GIRW)	
height (inch)	3.6
Common Lambsquarters (COLQ)	
height (inch)	4.2
Common Waterhemp (COWH)	
height (inch)	0.7
Grass	
height (inch)	12.5

RESULTS AND CONCLUSIONS

- Oat injury was observed with treatment 10 at Crookston. Cool temperatures (30°F) at application likely contributed to the injury. Treatment 10 also reduced oat yield at Crookston (Table 5).
- Minimal, but significant, injury was observed at all locations from treatment 7, but did not result in a yield decrease compared to the untreated check.
- Treatment 1 has minimal efficacy at Crookston and Rochester. (Tables 3 and 5)
- Treatments 3, 5, 6, and 7 had consistently high efficacy at all three locations. All other treatments had moderate efficacy that varied across locations.
- At Crookston, visual weed control of redroot pigweed (RRPW) and common mallow (COMA) was poor with treatments 1, 2, 8, 9, 10, and 11 (Table 5).
- Oat yield varied across treatments and locations. No treatment consistently yielded high or low. The serious drought in 2007 may have contributed to the variation.

Table 3. Oat injury, visual weed control, yield, and cost of eleven postemergence broadleaf oat herbicides at Rochester, MN, in 2007.

Trt	Treatment	Rate (per acre)	21 DAT (%)				Yield Bu/A	Cost $/A[1]
			Oat Injury	RRPW	COLQ	VELE		
1	2,4-D Amine	12 oz	0	80**	80**	73**	66	1.19
2	Clarity	4 oz	0	99	99	99	60	2.88
3	Bronate advanced	12.8 oz	0	99	99	99	66	4.98
4	Buctril	16 oz	0	93	93	66**	57	7.60
5	Curtail M	32 oz	3*	99	99	99	65	11.29
6	Harmony GT XP	0.3 oz	0	93	93	86	55	4.11
7	Huskie	13.5 oz	3*	99	99	99	55	---[2]
8	MCPA Amine	16 oz	0	73**	73**	86	73	1.98
9	MCPA Amine + Clarity	10 oz + 4 oz	0	99	99	99	61	4.12
10	Starane + Salvo	16 oz	3*	99	99	99	65	7.08
11	Widematch	16 oz	0	99	99	99	67	8.07
12	Untreated		0	0	0	0	59	----
	LSD (0.05)		2	7	7	14	4	----

1. Average retail cost of herbicides. 2. No retail price available. *Significant difference from the untreated check. **Significant difference from the highest visual rating

Table 4. Oat injury, visual weed control, yield, and cost of eleven postemergence broadleaf oat herbicides at Rosemount, MN, in 2007

Trt	Treatment	Rate (per acre)	21 DAT				Yield Bu/A	Cost $/A[1]
			Oat Injury	RRPW	COLQ	VELE		
			%--------					
1	2,4-D Amine	12 oz	0	99	99	99	91	1.19
2	Clarity	4 oz	0	99	99	99	89	2.88
3	Bronate advanced	12.8 oz	3*	99	99	99	96	4.98
4	Buctril	16 oz	0	91**	99	99	94	7.60
5	Curtail M	32 oz	0	99	99	99	94	11.29
6	Harmony GT XP	0.3 oz	0	99	93	99	99	4.11
7	Huskie	13.5 oz	3*	99	99	99	85	---[2]
8	MCPA Amine	16 oz	0	99	99	99	104	1.98
9	MCPA Amine + Clarity	10 oz + 4 oz	0	99	99	99	100	4.12
10	Starane + Salvo	16 oz	0	99	99	99	88	7.08
11	Widematch	16 oz	0	99	99	99	101	8.07
12	Untreated		0	0	0	0	88	----
	LSD (0.05)		2	3	NS	NS	5	----

1. Average retail cost of herbicides. 2. No retail price available. *Significant difference from the untreated check. **Significant difference from the highest visual rating

Table 5. Oat injury, visual weed control, yield, and cost of eleven postemergence broadleaf oat herbicides at Crookston, MN, in 2007

Trt	Treatment	Rate (per acre)	21 DAT					Yield Bu/A	Cost $/A[1]
			Oat Injury	RRPW	COMA	WIBU	WIMU		
			%--------						
1	2,4-D Amine	12 oz	3	65**	53**	87**	87**	114	1.19
2	Clarity	4 oz	3	85**	67**	70**	70**	128	2.88
3	Bronate advanced	12.8 oz	3	97	83	97	97	125	4.98
4	Buctril	16 oz	3	93	83	95	95	140	7.60
5	Curtail M	32 oz	3	90	87	88**	88**	107	11.29
6	Harmony GT XP	0.3 oz	3	95	85	93	93	139	4.11
7	Huskie	13.5 oz	8*	95	89	98	98	141	---[2]
8	MCPA Amine	16 oz	0	58**	47**	93	93	113	1.98
9	MCPA Amine + Clarity	10 oz + 4 oz	5	78**	67**	90	90	132	4.12
10	Starane + Salvo	16 oz	23*	82**	78**	95	95	80*	7.08
11	Widematch	16 oz	0	67**	63**	93	93	128	8.07
12	Untreated		0	0	0	0	0	101	----
	LSD (0.05)		5	9	9	9	8	12	----

1. Average retail cost of herbicides. 2. No retail price available. *Significant difference from the untreated check. **Significant difference from the highest visual rating

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Broadleaf Weed Control in Oat with Postemergence Herbicides at Rochester, MN, in 2008.

Martinson, Krishona, Lisa M. Behnken, Fritz R. Breitenbach, and Beverly Durgan

Oat is considered a multiple use crop, with primary uses being companion crop, livestock feed, and grain. There are approximately 300,000 acres of oat in Minnesota. Recently, there has been an increased interest in weed free oat straw as mulch for right-of-way seedings. However, there is a little current data on postemergence broadleaf herbicide efficacy and safety in oat. The objective of this research was to evaluate broadleaf weed control and crop injury using postemergence herbicides in oat.

Research plots were planted at Rochester on xx and sprayed on June 2, 2008. 'Kame' oat was seeded at 2 bu/A and fertilized according to soil test values. The experimental design was a randomized complete block design with three replications. Plot size was 10' x 30'. Herbicides were applied at labeled rates with a tractor type sprayer at 20 gpa. Weed control and crop injury were visually rated at 7, 14 and 21 DAT, and prior to oat harvest. Grain yields were also taken. Data were analyzed with an ANOVA at a p value = 0.05. Oat yield is not reported due to excessive damage birds prior to harvest.

Only the treatment, Starane + Salvo, resulted in significant oat injury, however, that injury was minimal. Common lambsquarters control was excellent, with the exception of the Widematch treatment. 2,4-D Amine 4, Buctril, Curtail M, and Widematch resulted in less redroot pigweed control compared to the other herbicide treatments. Velvetleaf control was less with 2,4-D Amine 4, Buctril, Curtail M, Harmony GT XP, and MPCA Amine + Clarity. Over all, Clarity, Bronate Advanced, Huskie, and MCPA Amine resulted in the best and most consistent control of common lambsquarters, redroot pigweed, and velvetleaf. Based on cost, MPCA Amine and Clarity appear to be the best values for common lambsquarters, redroot pigweed, and velvetleaf control in oat. (University of Minnesota Extension Regional Office – Rochester)

Herbicide	Oat Injury*	Common Lambsquarters Control*	Redroot Pigweed Control*	Velvetleaf Control*	Herbicide Cost per Acre ($)
2,4-D Amine 4	0	96	93**	96**	1.19
Clarity	0	96	99	99	2.88
Bronate Advanced	0	99	99	99	4.98
Buctril	0	99	96**	94**	7.60
Curtail M	0	99	96**	96**	11.29
Harmony GT XP	0	99	99	96**	4.11
Huskie	0	98	98	99	No Label
MCPA Amine	0	99	96	99	1.98
MCPA Amine + Clarity	0	99	99	96**	4.12
Starane + Salvo	2**	99	99	99	7.08
Widematch	0	94**	90**	99	8.07
Untreated Check	0	0	0	0	0
LSD (P=0.10)	**1**	**3**	**2**	**3**	**--**

** visual injury assessed at 21 days after herbicide treatment on June 23, 2008.*

*** significantly less than the highest rating or yield*

SECTION H

INTEGRATED PEST MANAGEMENT ASSESSMENT

2007 and 2008 Pest Management Assessment

University of Minnesota Extension

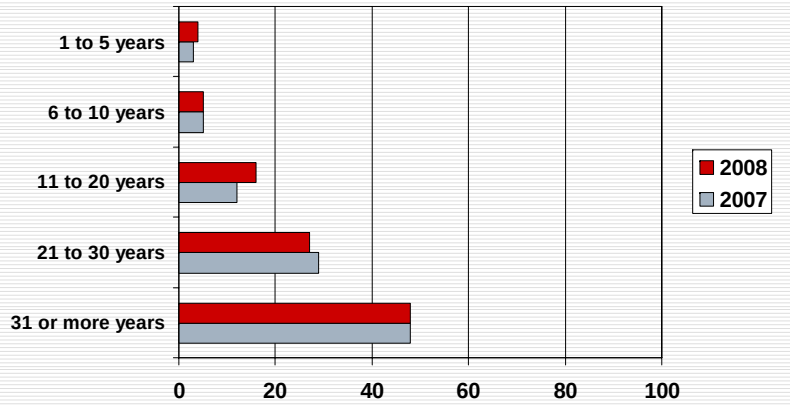
For Field Crops in Southern Minnesota

2007 = ~ 1470 participants responding
2008 = ~ 1170 paper surveys and
~750 turning point participants responding

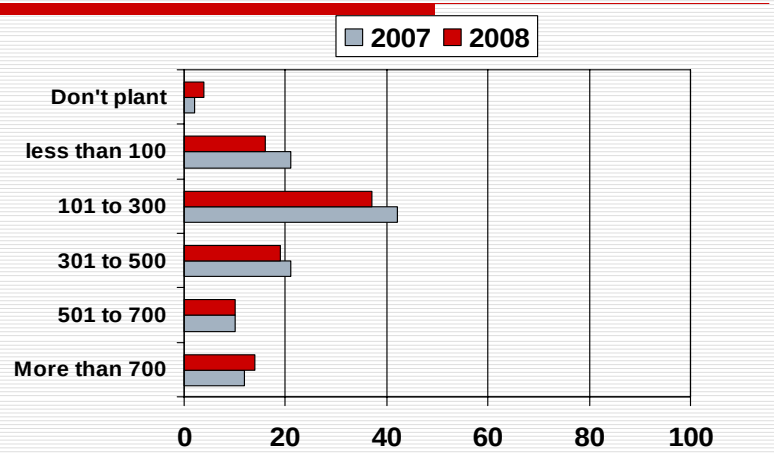
Fritz Breitenbach, IPM Specialist
Lisa M. Behnken, Regional Extension Educator
Ryan Miller, Regional Extension Educator
Liz Stahl, Regional Extension Educator
Dave Nicolai, Regional Extension Educator
Brad Carlson, Rice/Steele County Extension Educator
Jerry Tesmer, Fillmore/Houston County Extension Educator
Tom Van Der Linden, Winona Extension Educator

Adapted from University of Wisconsin Pest Management Assessment for Field Corn (12-6-01-Univ. of Wis.-Madison, IPCM program)

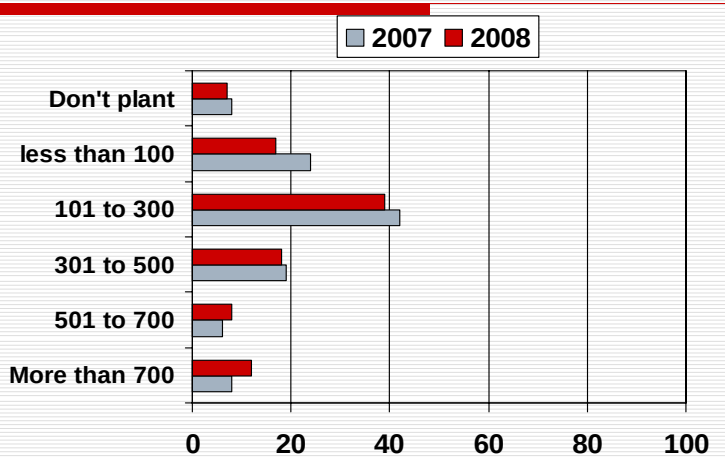
How many years have you been farming?



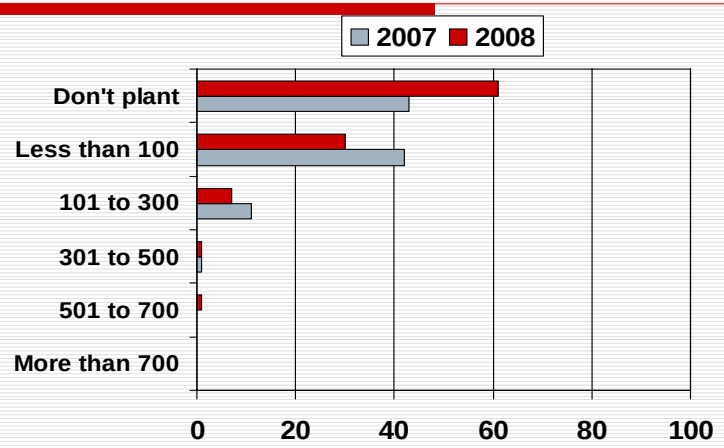
How many acres of Corn do you plant?



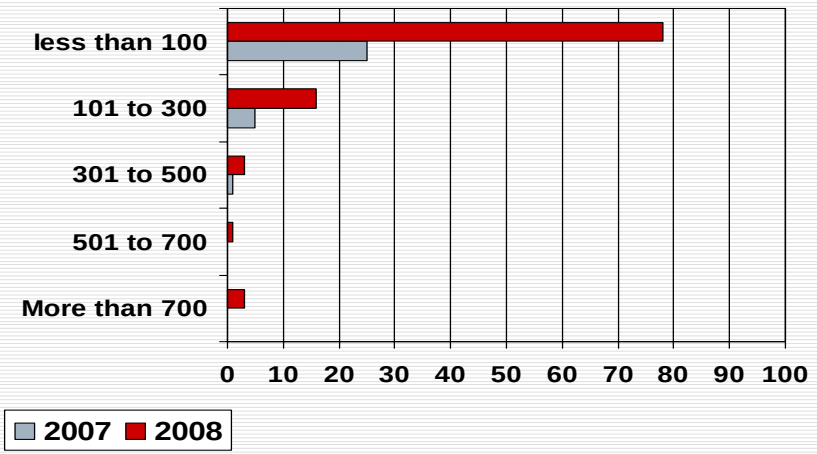
How many acres of Soybeans do you plant?



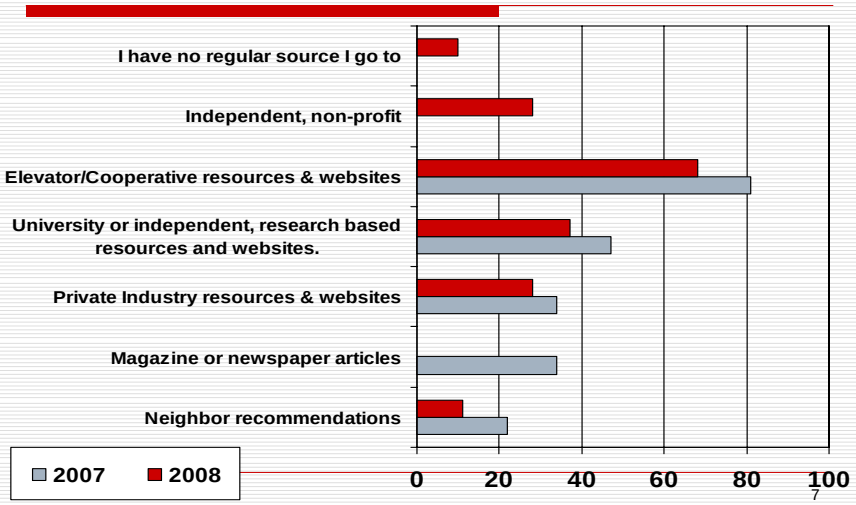
How many acres of Alfalfa do you plant?



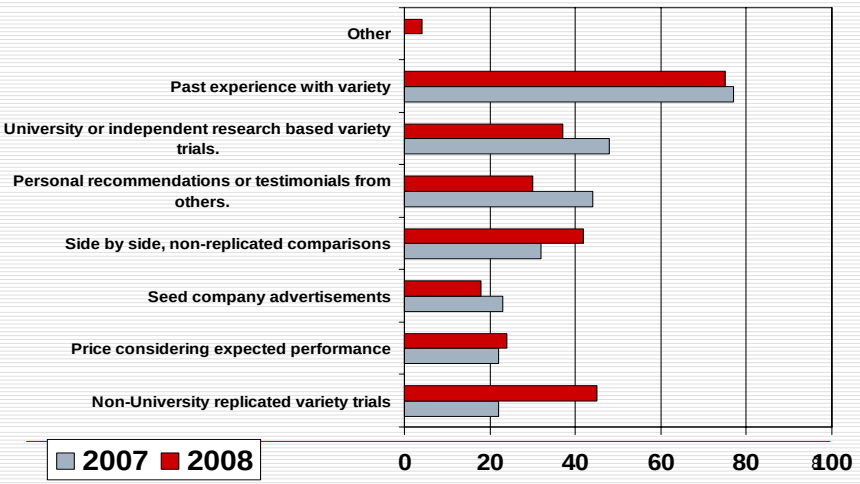
How many acres of Other crops do you plant?



Sources you regularly use (rely on) for pest management information



Sources you value most (strongly consider) when selecting varieties for your farm



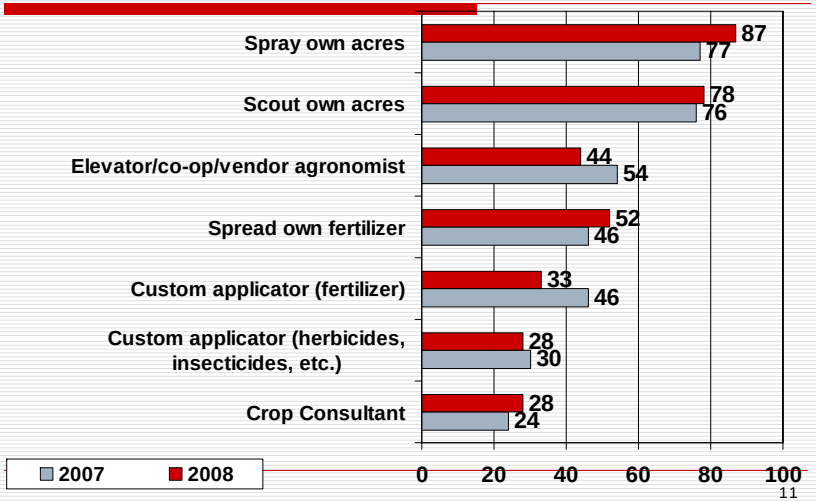
Factors or traits you consider when selecting varieties for your farm

	2007	2008
Maturity	72%	69%
Dealer	67%	49%
Disease Resistance	63%	62%
Price	62%	39%
Herbicide Resistance – GMO	62%	57%
Lodging	58%	54%
Seedling Vigor	55%	48%
Insect Resistance – GMO	54%	47%
Company	49%	40%

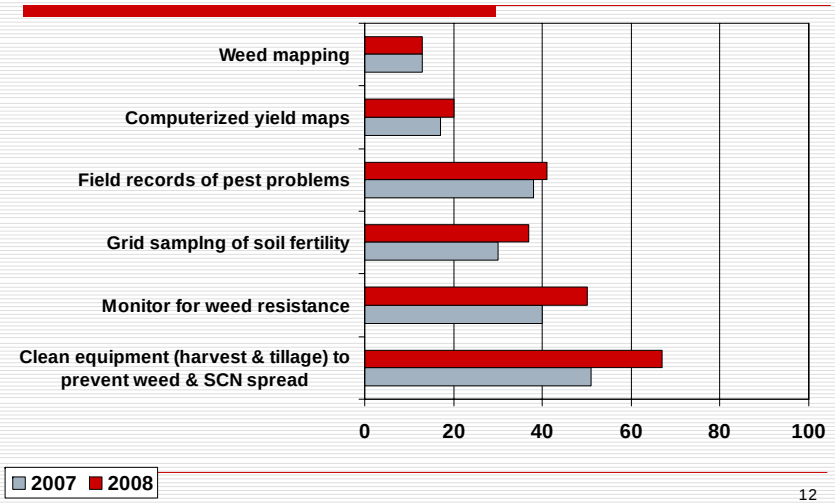
Factors or traits you consider when selecting varieties for your farm (continued)

	2007	2008
SCN Resistance	46%	43%
Iron Chlorosis Tolerance	41%	40%
Seed Size	37%	38%
Cold Tolerance	35%	34%
Tillage System	35%	24%
Seed Treatment	31%	34%
Quality Traits (oil, protein, etc.)	21%	20%
Marketing Program (incentives)	19%	13%
Bulk Availability	14%	22%

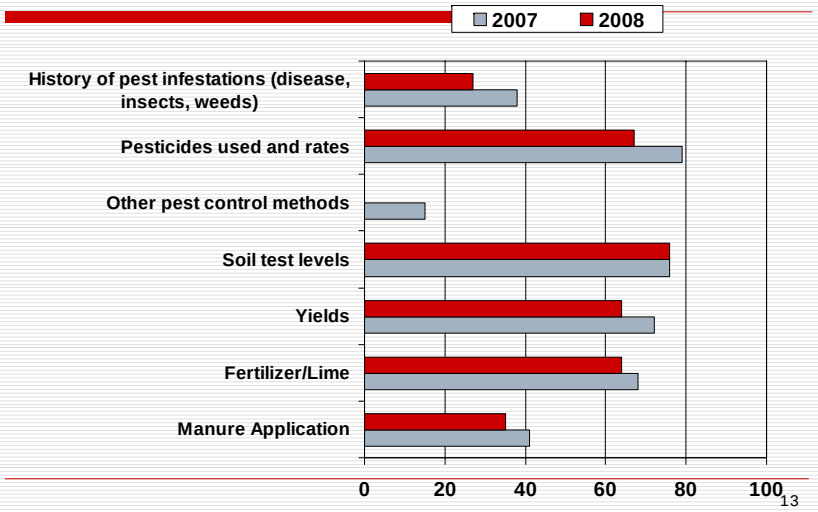
Practices you utilize on your farm



Production practices you utilize in your farming operation



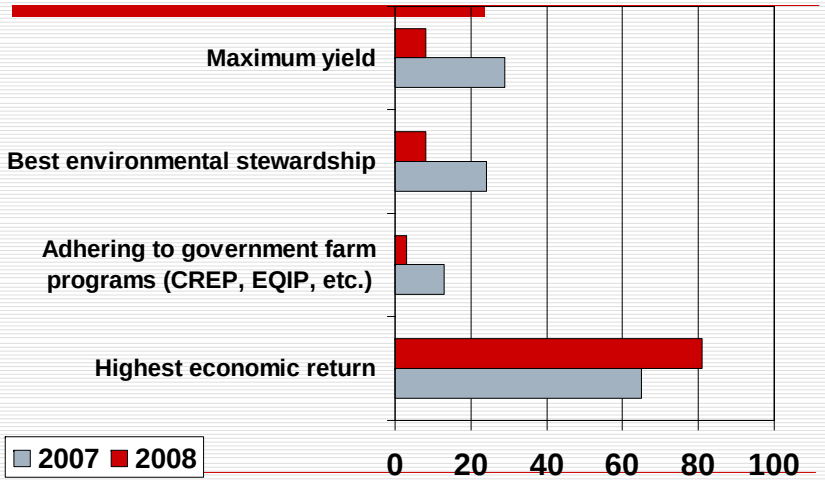
Records you regularly keep for individual farm fields



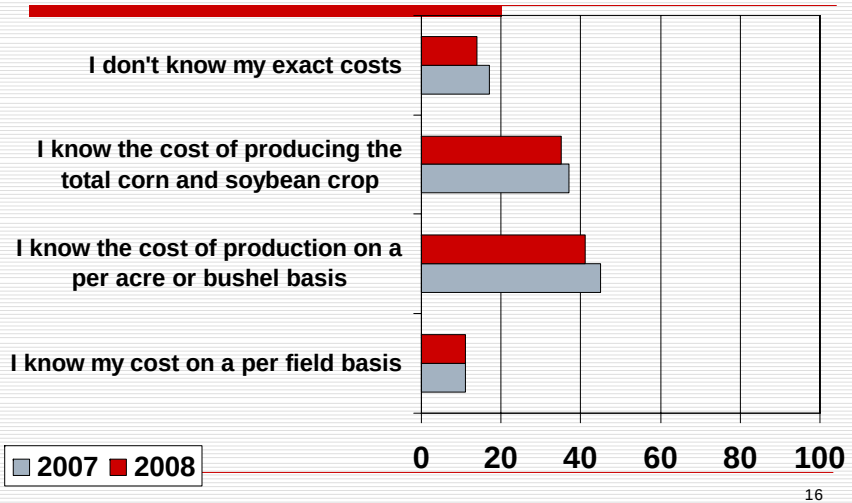
When do you make your Pesticide records? (2008 - 565 responses)

56%	1.	Within 2 weeks
12%	2.	Within a month
5%	3.	When it rains
20%	4.	When I have time
4%	5.	When I get a call from MDA
3%	6.	Don't keep records

What is your crop production goal?

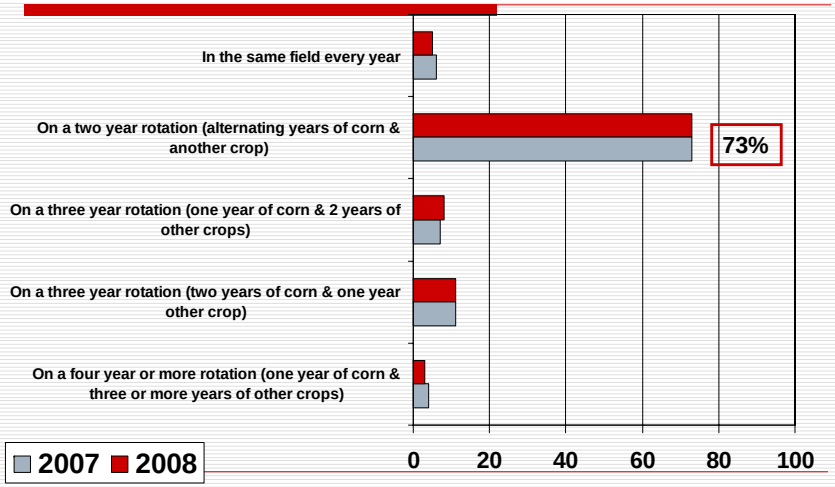


How do you determine the cost of production for your corn and soybean acres?

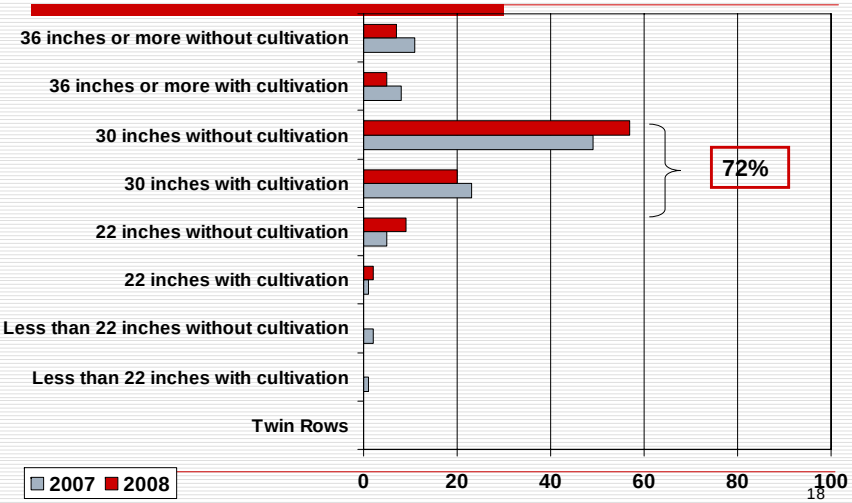


You generally plant CORN

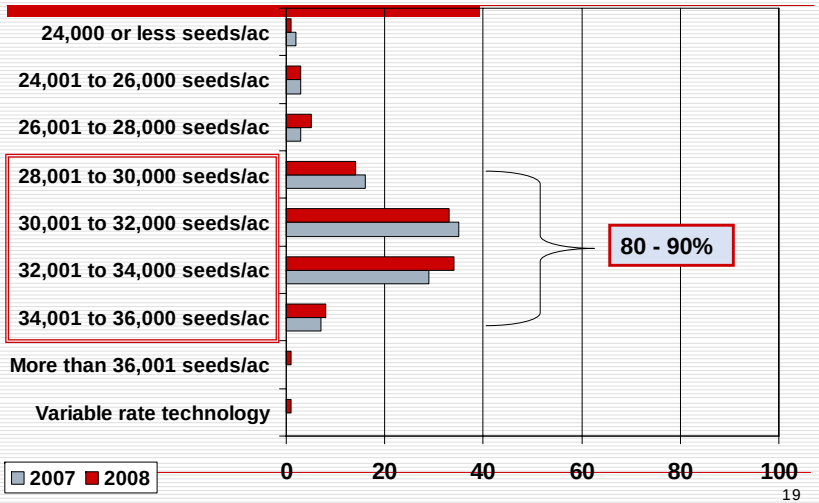
~ 3% don't plant corn in 2008



CORN row spacing and cultivation



CORN seeding rate

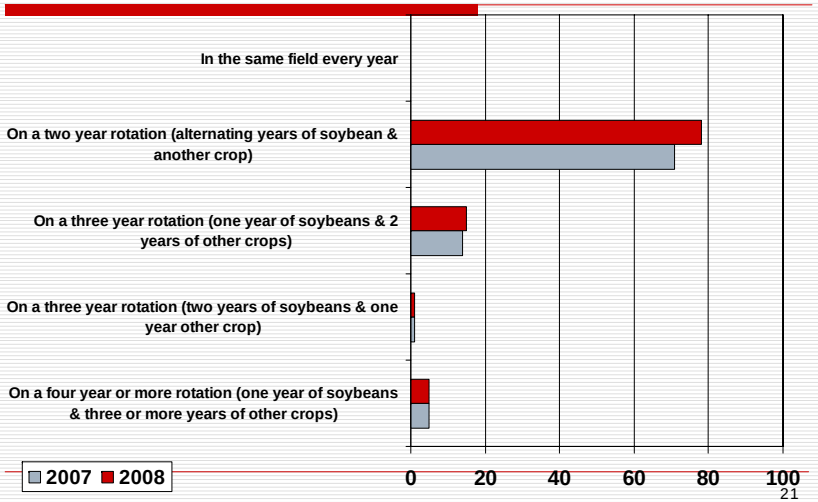


TOP 2 crop production problems in CORN during the past growing season

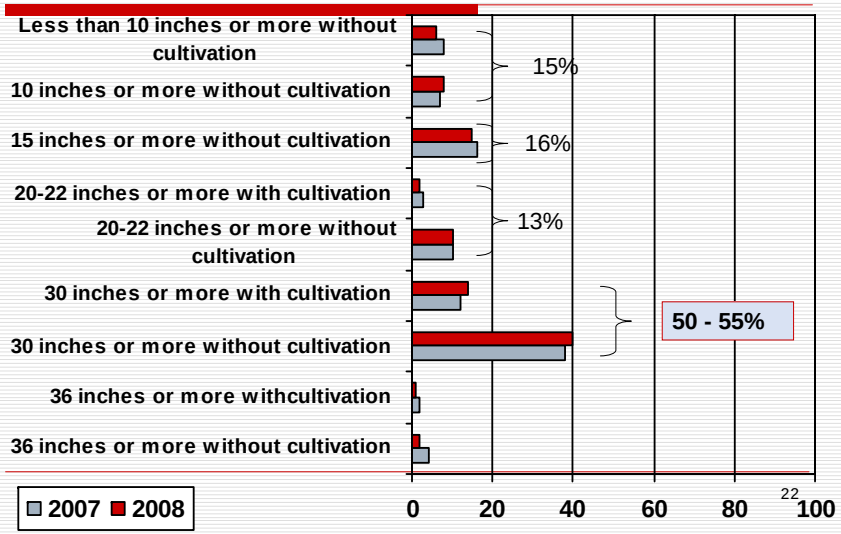
	2007	2008
Weather	69%	62%
Emergence / stand	31%	14%
Weeds	27%	16%
Corn rootworm	14%	26%
Stalk rot	12%	17%
Soil fertility	9%	7%
European corn borer	8%	11%
Labor shortage	7%	5%
Other	4%	2%

You generally plant SOYBEANS

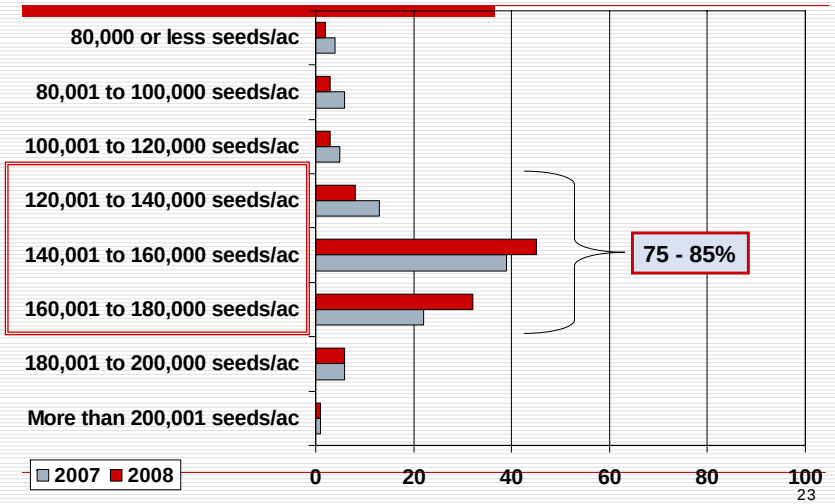
~8% don't plant soybeans in 2008



SOYBEAN row spacing and cultivation



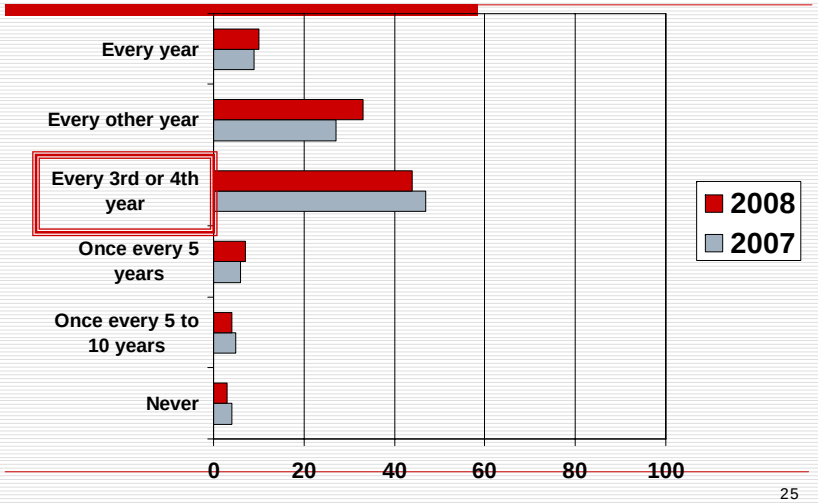
SOYBEAN seeding rate



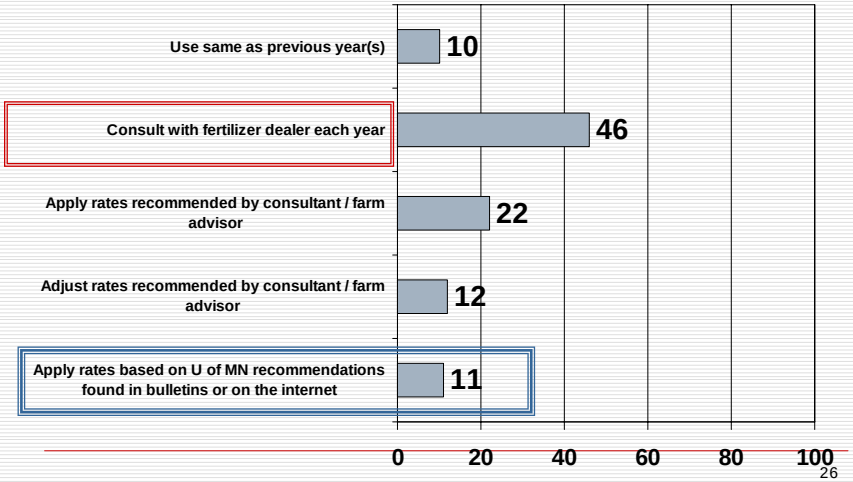
TOP 2 crop production problems in SOYBEAN during the past growing season.

	2007	2008
Soybean aphid	52%	50%
Weather	50%	46%
Weeds	19%	10%
Soybean cyst nematode	19%	25%
Emergence/stand	14%	6%
Other	9%	3%
Sclerotina (white mold)	5%	6%
Spider mites	4%	9%
Brown stem rot	3%	2%
Labor shortage	3%	2%
Seedling diseases	2%	2%
Phytophthora root rot	1%	4%

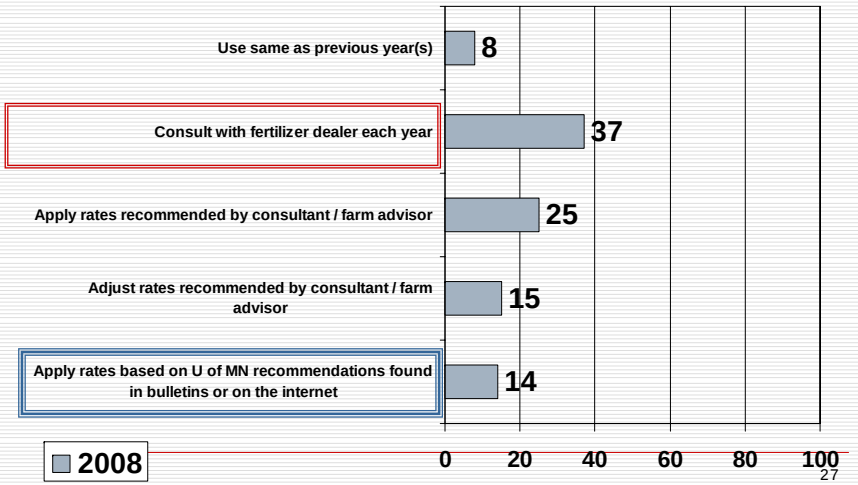
How frequently do you soil test your corn and soybean fields for pH, phosphorus (P) and potassium (K)?



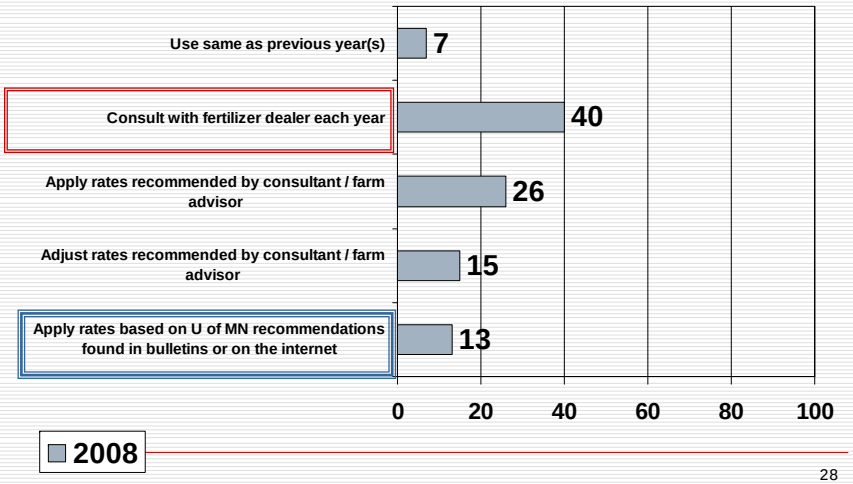
How do you arrive at the nitrogen (N), phosphorus (P), and potassium (K) fertilizer rates you use for CORN on your farm? (2007)



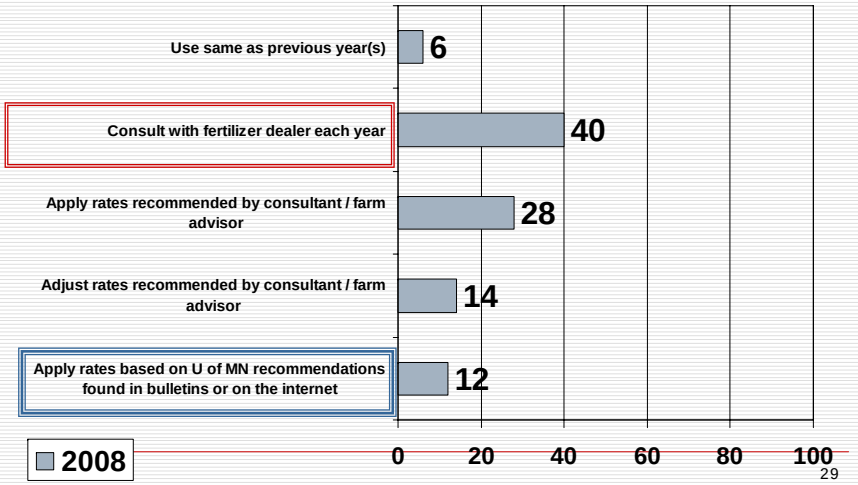
How do you arrive at the nitrogen (N) fertilizer rates you use for CORN on your farm?



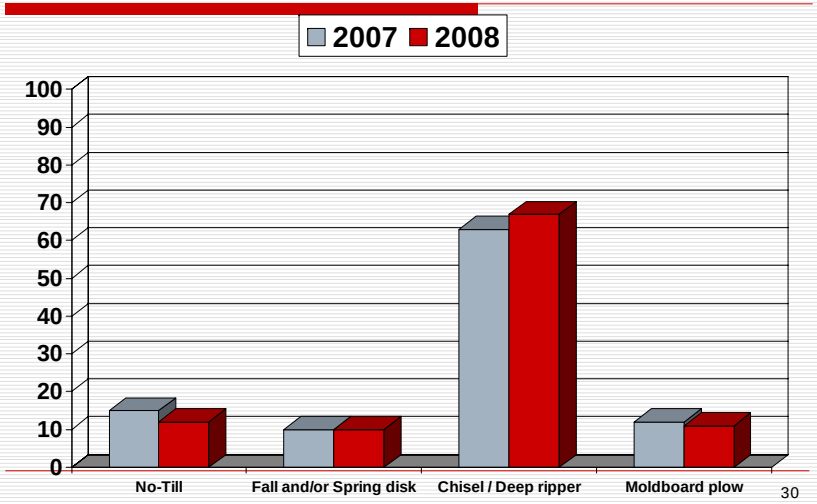
How do you arrive at the phosphorus (P) fertilizer rates you use for CORN on your farm?



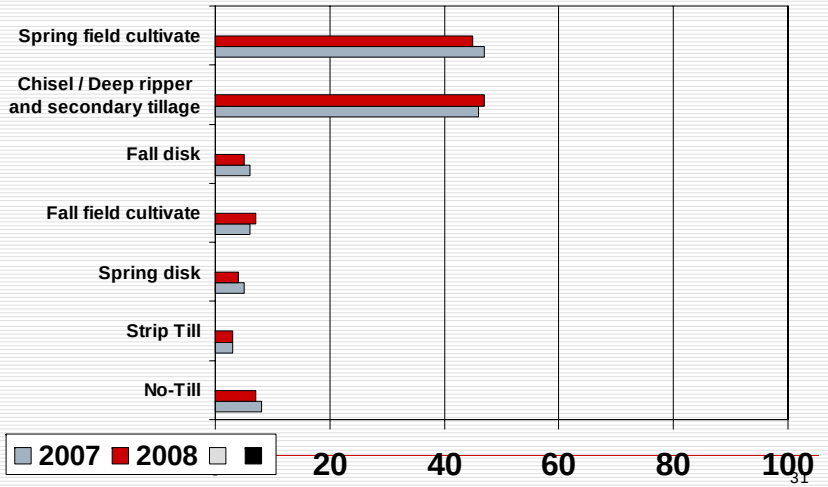
How do you arrive at the potassium (K) fertilizer rates you use for CORN on your farm?



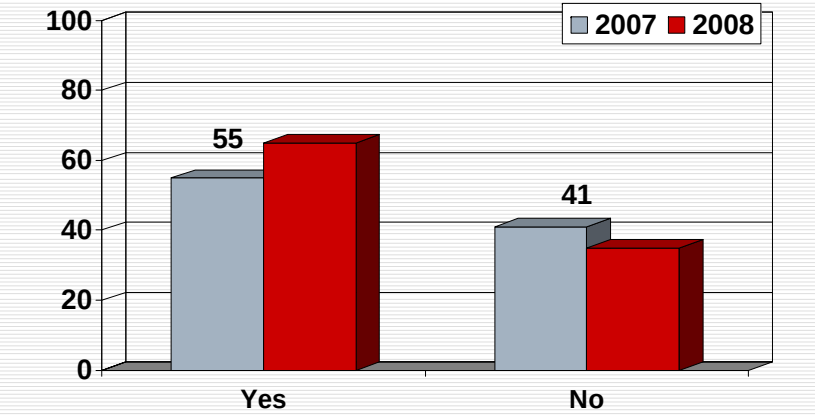
For soybeans after corn, what primary tillage system are you now using for most of your soybean acres?



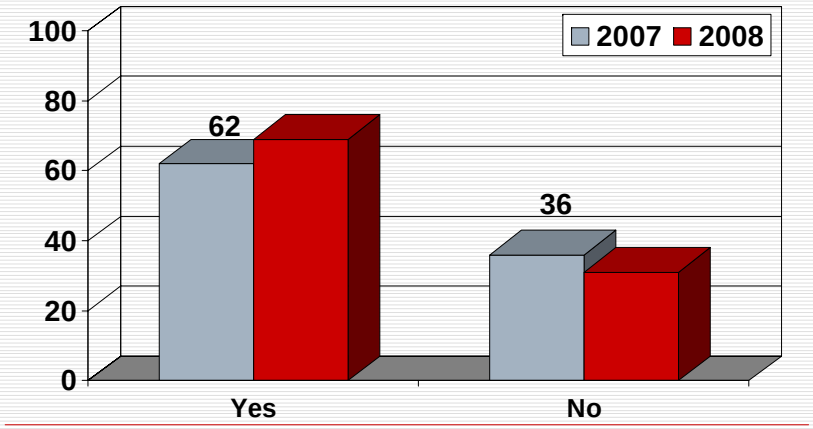
For <u>corn after soybeans</u>, what tillage systems are you typically using for most of your CORN acres?



Do you stalk chop most of your corn acres Before planting CORN next year?



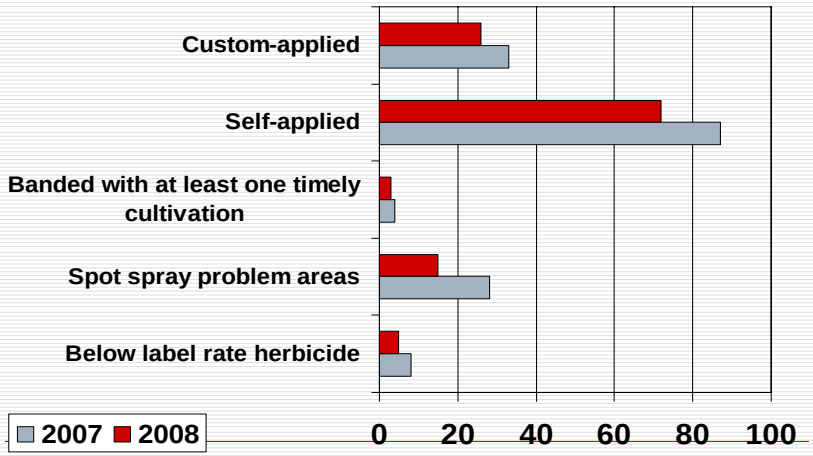
Do you stalk chop most of your corn acres: Before planting SOYBEANS next year?



Reasons for move toward less aggressive tillage systems for corn and soybean in the last 5 years?

	2007	2008
Better weed control systems	57%	40%
Reduced erosion losses	53%	47%
Improved economics	46%	26%
Better tillage equipment	46%	37%
Better planting equipment	45%	41%
Better corn hybrids	44%	33%
Better soybean varieties	36%	28%
Government programs	17%	9%
Have not changed tillage system	14%	15%
Societal pressures	1%	2%
Other	1%	1%

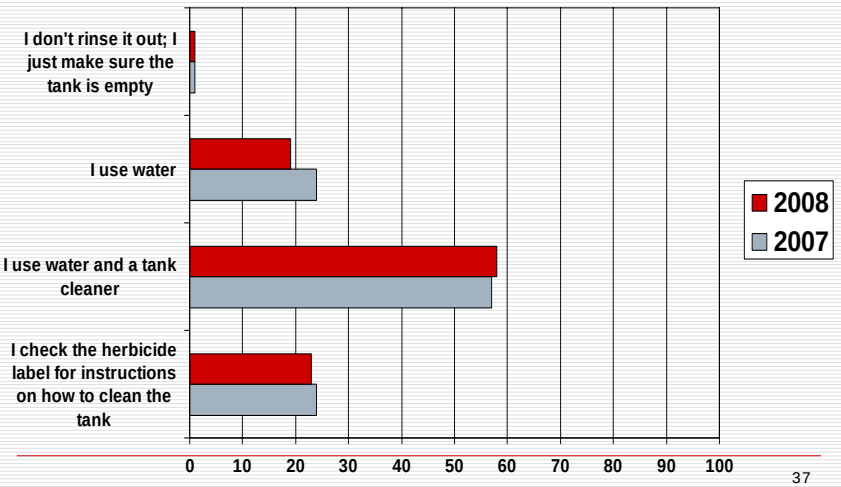
What method of herbicide application do you generally use?



Which herbicide application timings do your currently use?

	2007	2008
Postemergence only	**60%**	**50%**
Sequential (pre/post)	34%	30%
Pre-plant incorporated	31%	25%
Pre-plant surface	21%	18%
Preemergence only	21%	14%
Burndown	16%	11%
Fall applications for control of next season's summer annual weeds	5%	5%
Fall applications for control of perennial and winter annual weeds	2%	2%

When changing from one crop to another, which method best describes how you clean the spray tank?



What type of nozzle do you usually use? (2008 - 363 responses)

56%	1. Flat fan
14%	2. Air induction
8%	3. Flood
5%	4. Cone
15%	5. Chamber/drift reducing
2%	6. Other

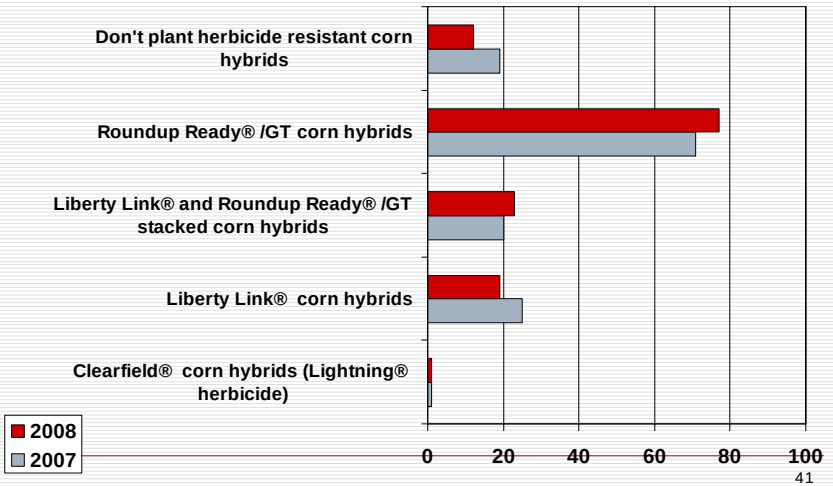
Most troublesome GRASS/SEDGE WEEDS in row crops are:

	2007	2008
Giant foxtail	51%	45%
Woolly cupgrass	27%	29%
Green foxtail	24%	22%
Yellow foxtail	21%	23%
Yellow nutsedge	18%	12%
Wild proso millet	17%	13%
Quackgrass	16%	16%
Crabgrass	10%	10%
Barnyardgrass	5%	5%

Most troublesome BROADLEAF WEEDS in row crops are:

	2007	2008
Common lambsquarters	48%	49%
Waterhemp species	33%	44%
Giant ragweed	31%	28%
Velvetleaf	29%	10%
Common ragweed	17%	17%
Canada thistle	12%	12%
Common cocklebur	12%	8%
Pigweed species	11%	10%
Nightshade species	5%	3%
Smartweed species	4%	-
Wild mustard	2%	-
Kochia	1%	1%
Dandelion	-	3%

Do you plant herbicide resistant CORN hybrids?



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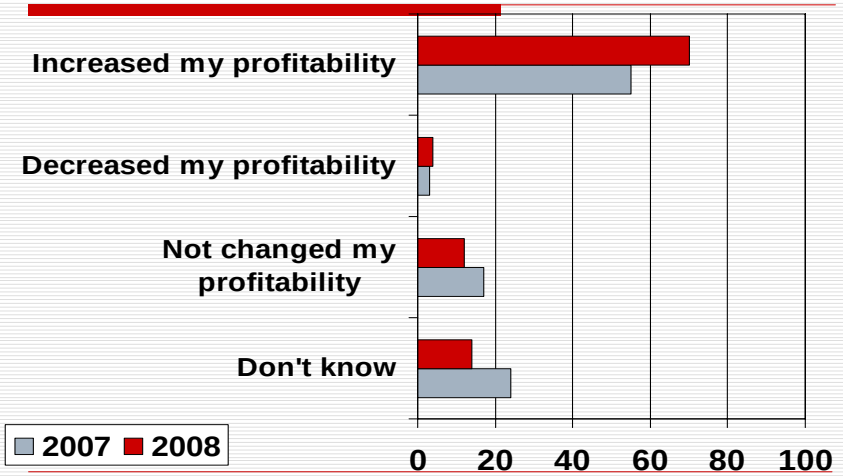
Using herbicide resistant CORN hybrids



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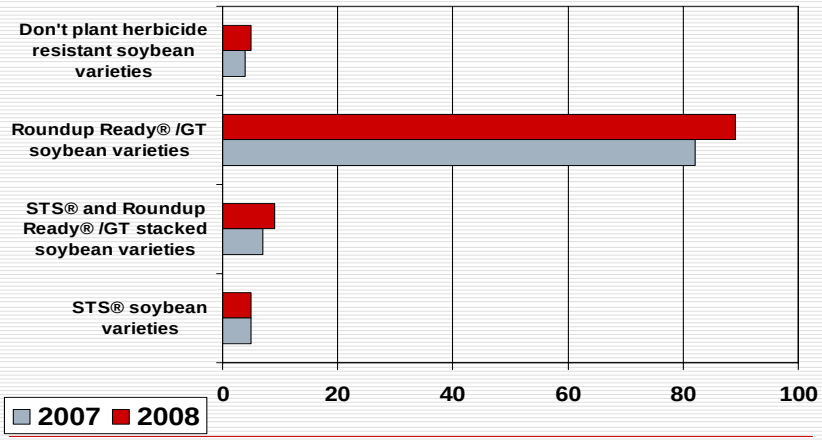
Do you plant herbicide resistant SOYBEAN varieties?



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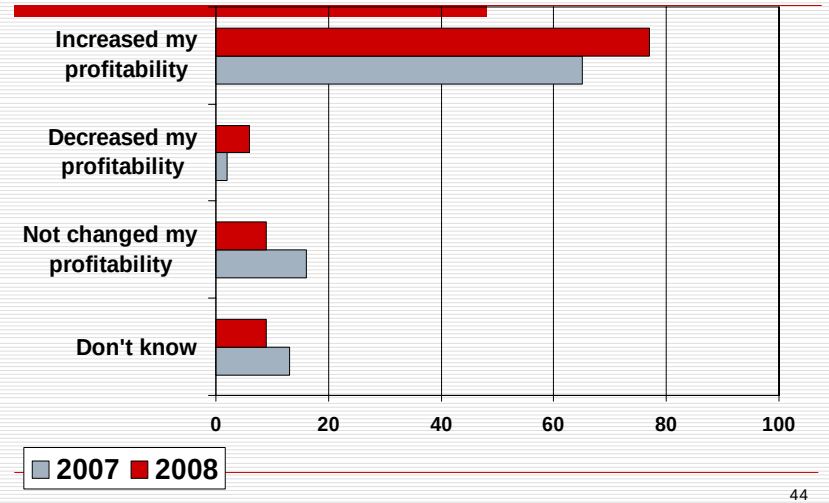
Using herbicide resistant SOYBEAN varieties



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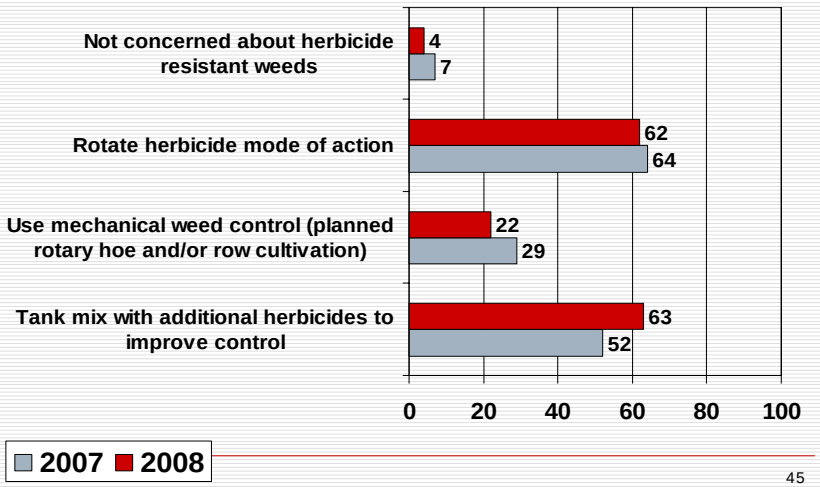
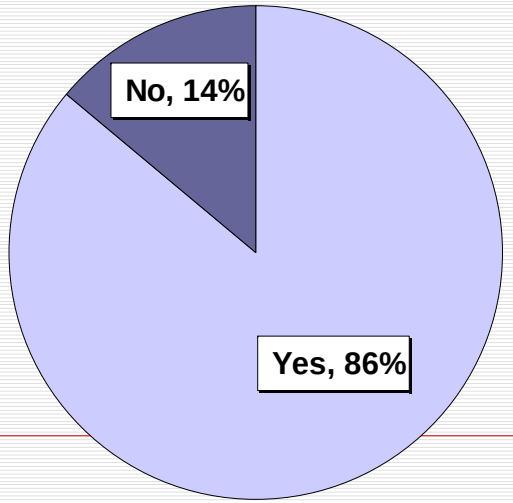
How do you manage herbicide resistant weeds?

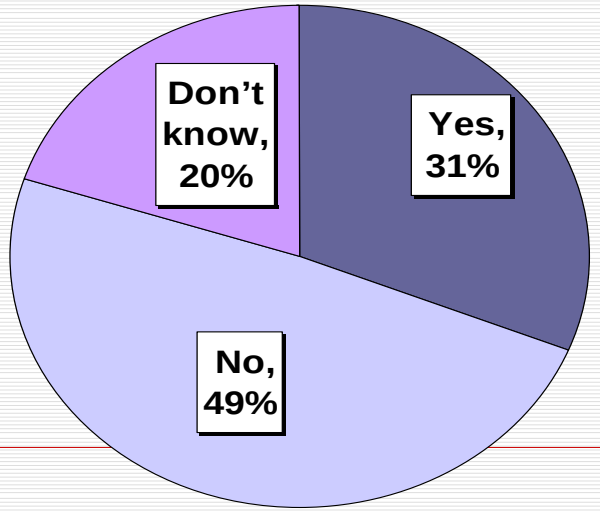


Are you concerned about weed resistance on your farm?

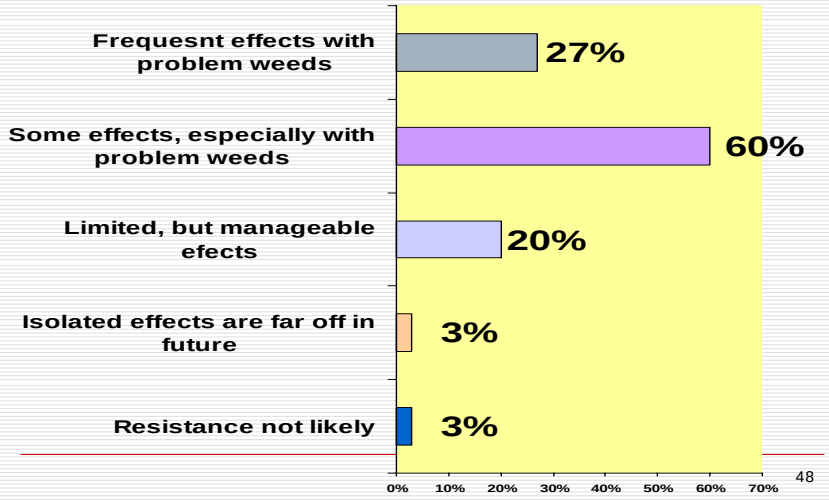
(2008 - 379 responses)



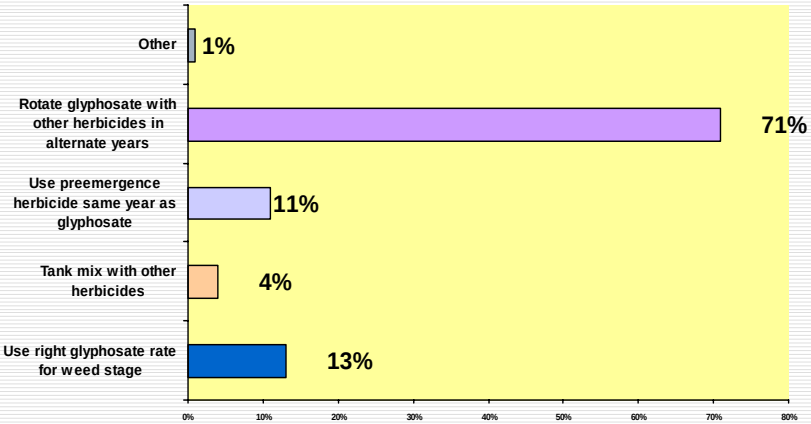
Do you think you have glyphosate resistant weeds on your farm? (2008 - 384 responses)



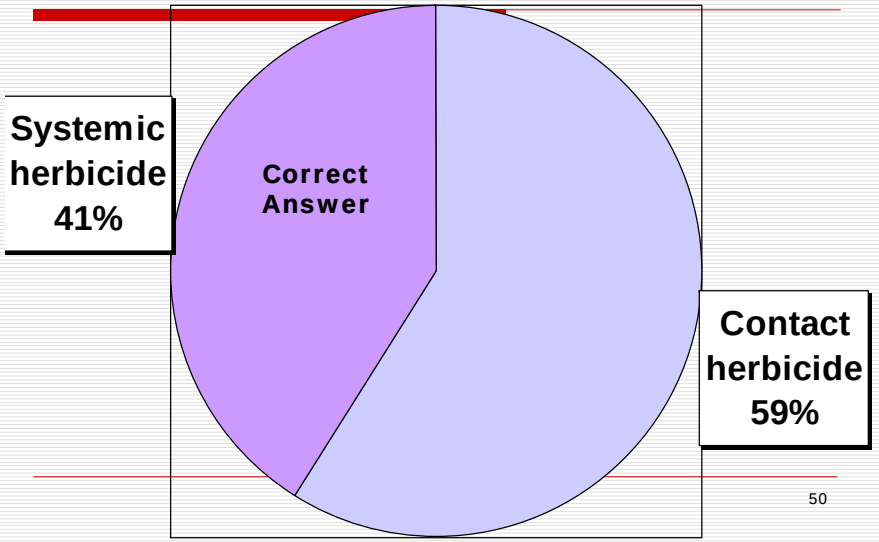
Will Glyphosate resistant weed affect weed management in Minnesota? (2008 - 153 Responses)



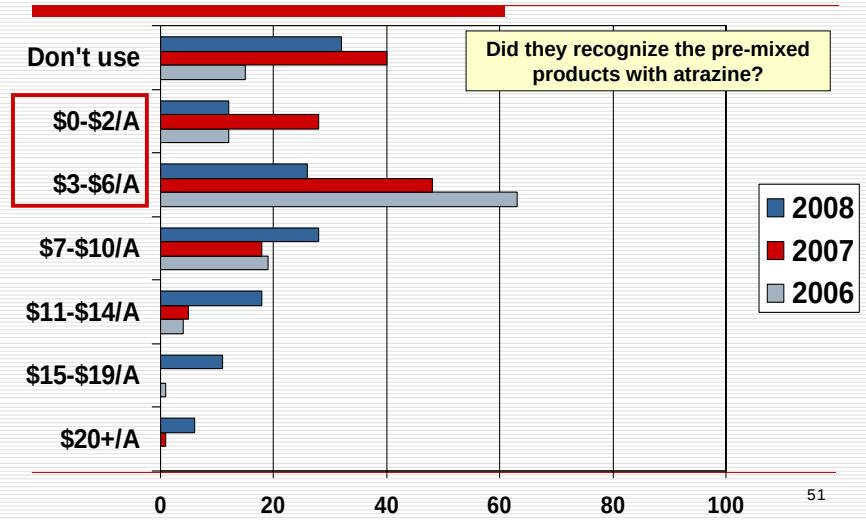
Glyphosate stewardship practice that is the most effective in delaying or preventing resistance ? (2008 - 82 Responses)



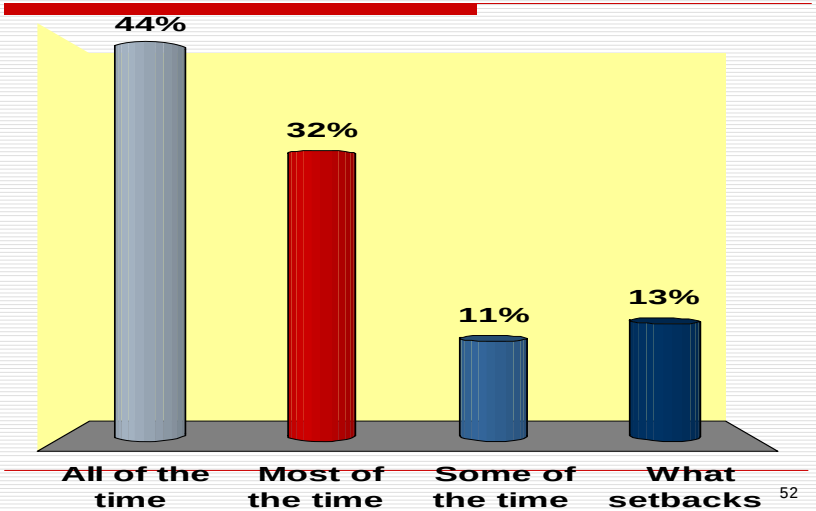
Is Glyphosate (the active ingredient in Roundup) a ..... (2008 - 263 responses)



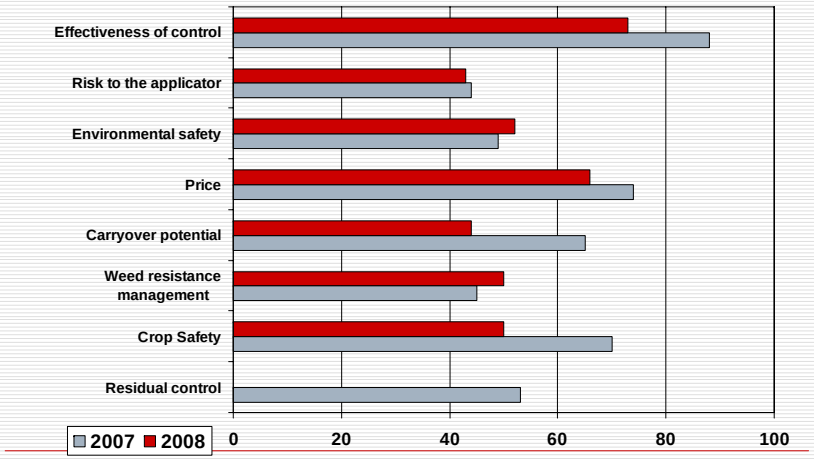
Banning atrazine in Minnesota would increase my corn weed control costs by:



Do you follow the atrazine setbacks? (2008 - 385 responses)



Which of the following do you actually consider when selecting herbicides?



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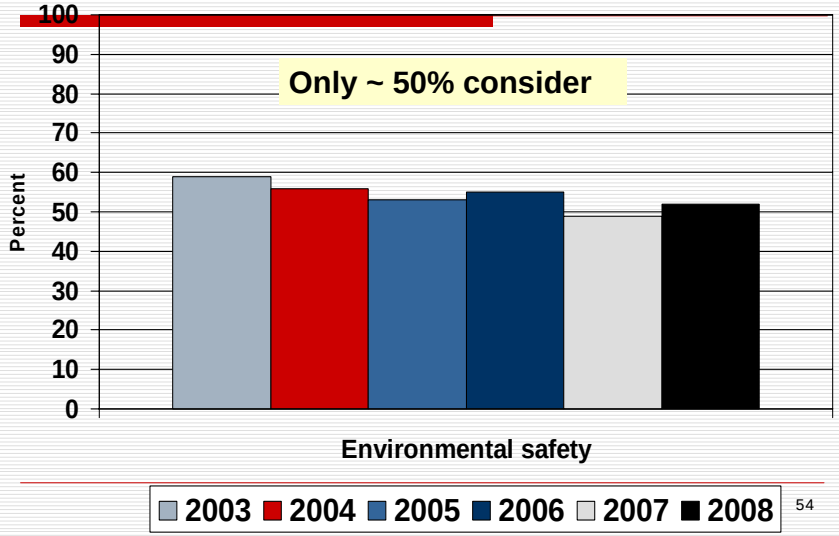
Over 3000 growers asked: Do you consider environmental safety when selecting herbicides?

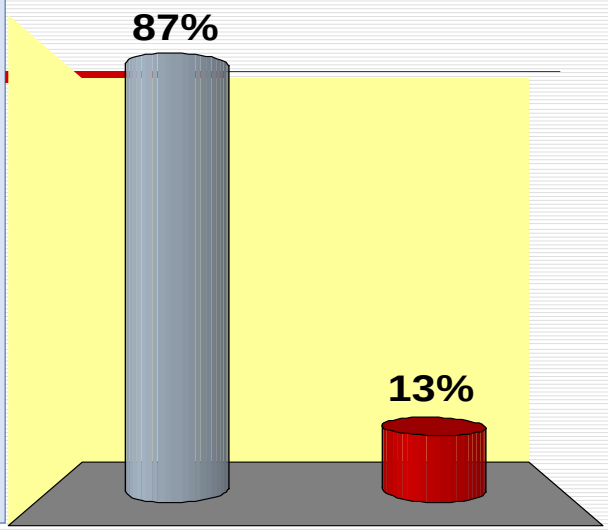


54

Do you consider environmental safety or risks when choosing pesticides?

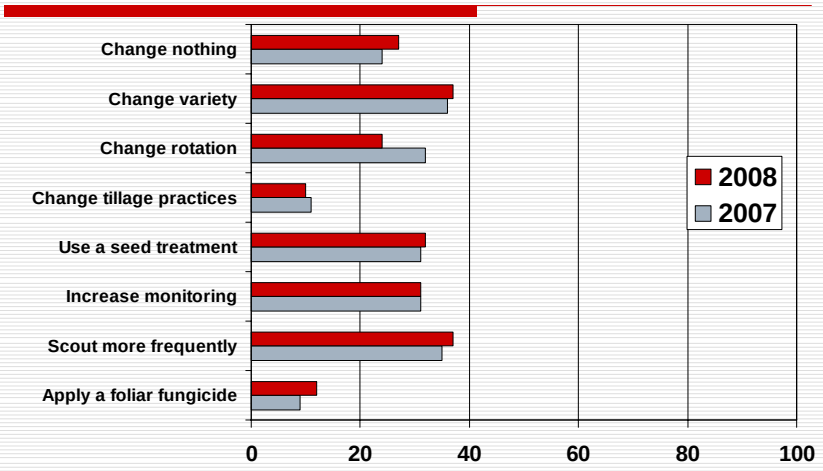
When asked this question as a yes or no answer, the yes response was much greater than when given a list of choices - see previous slides.

{2008 – 335 responses}



55

Based on the incidence of plant disease in the previous year, will you:



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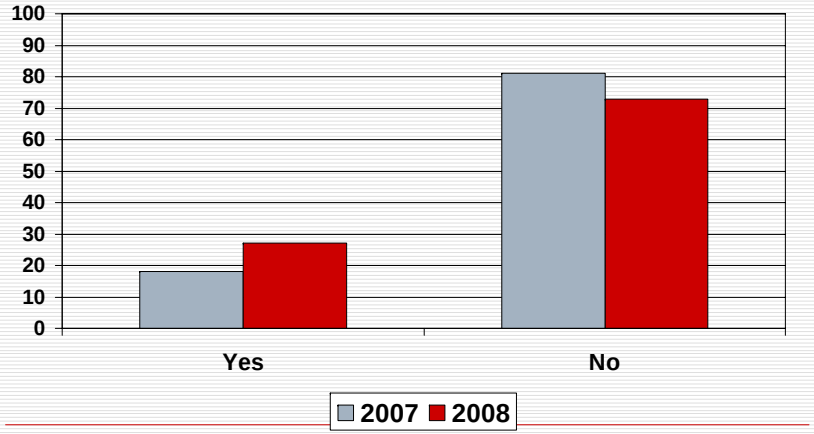
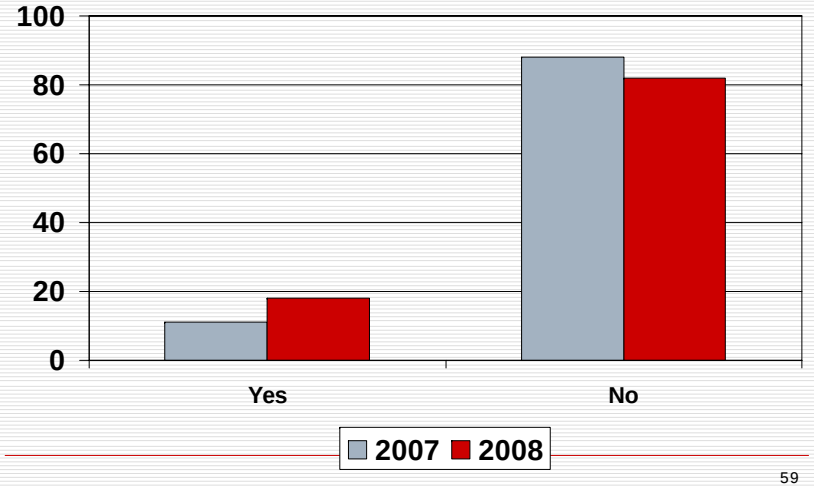
My most troublesome parasitic SOYBEAN diseases

	2007
White mold	58 %
Root rot (Phytophora, Pythium etc.)	27 %
Brown stem rot	22 %
Sudden death syndrome	16 %
Seedling diseases	14 %
Soybean rust	5 %
Septoria brown spot	4 %
Powdery mildew	3 %
Downy mildew	2 %
Other	1 %

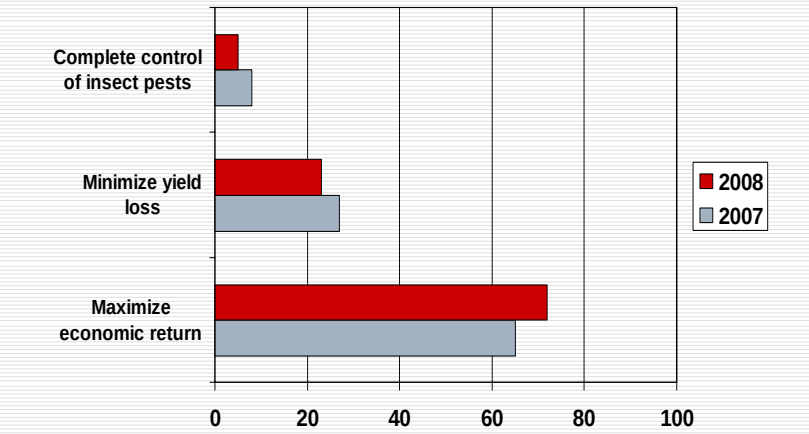
Do you plan on making a fungicide application for SOYBEAN plant health purposes?



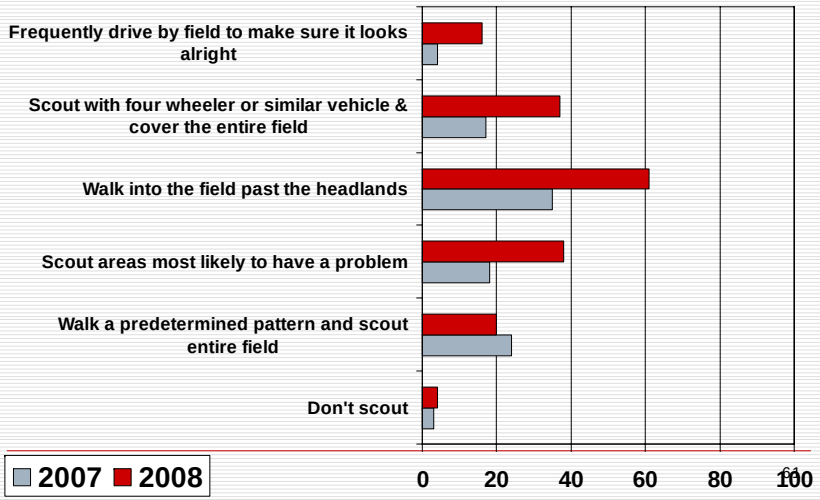
Do you plan on making a fungicide application for CORN plant health purposes?



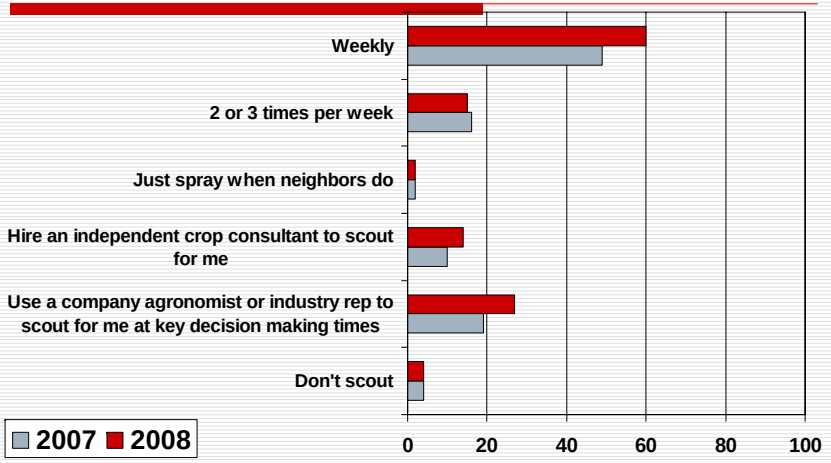
My Pest management strategy is:



HOW do you typically scout for insects & diseases?



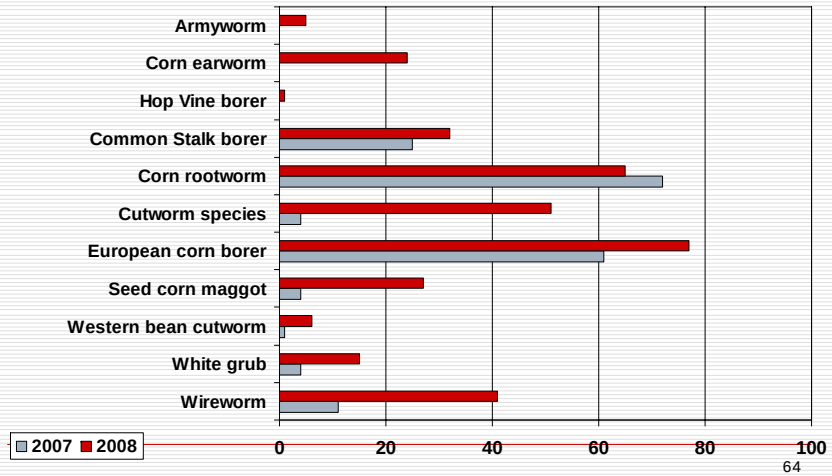
How OFTEN do you scout for insects & diseases?



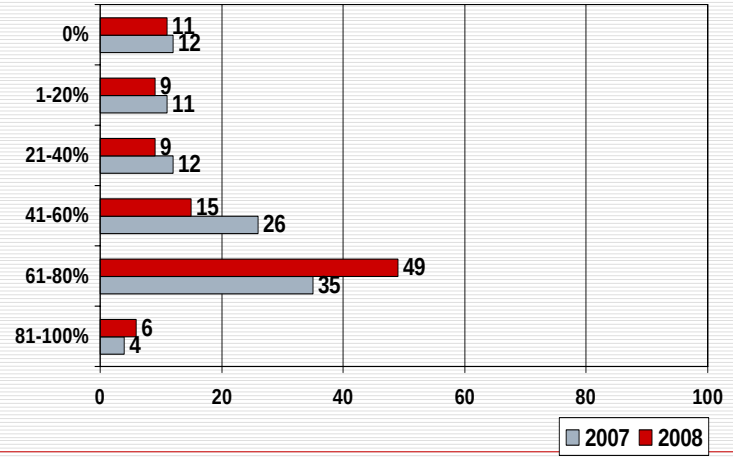
CORN insects you regularly scout for?

	2007	2008
European corn borer	77%	77%
Corn rootworm	64%	65%
Cutworms	43%	51%
Common stalk borer	38%	32%
Wireworm	30%	41%
Seed corn maggot	19%	27%
Corn earworm	16%	24%
White grub	14%	15%
Western bean cutworm	11%	6%
Armyworm	11%	5%
Hop vine borer	4%	1%
Other	1%	3%

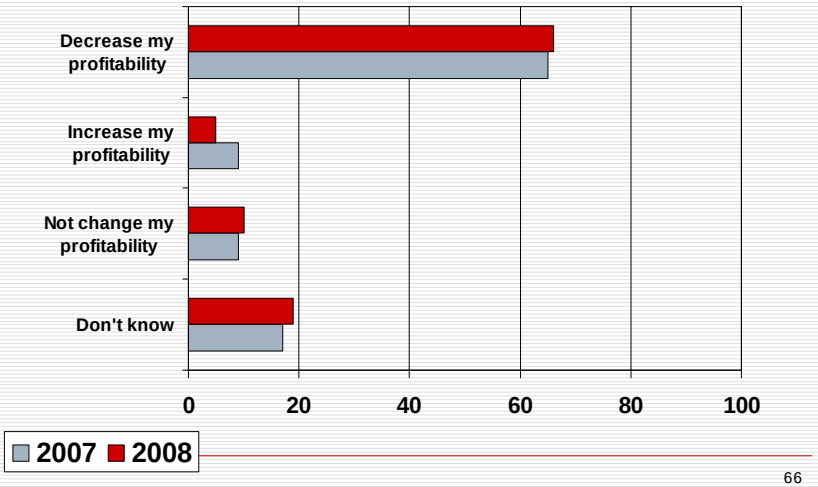
My most troublesome CORN insect pests are:



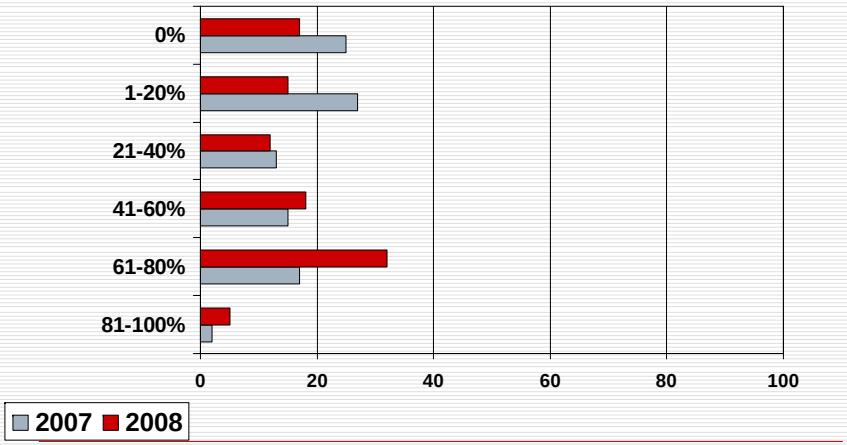
Percentage of your acreage you plant to Bt CORN BORER hybrids.



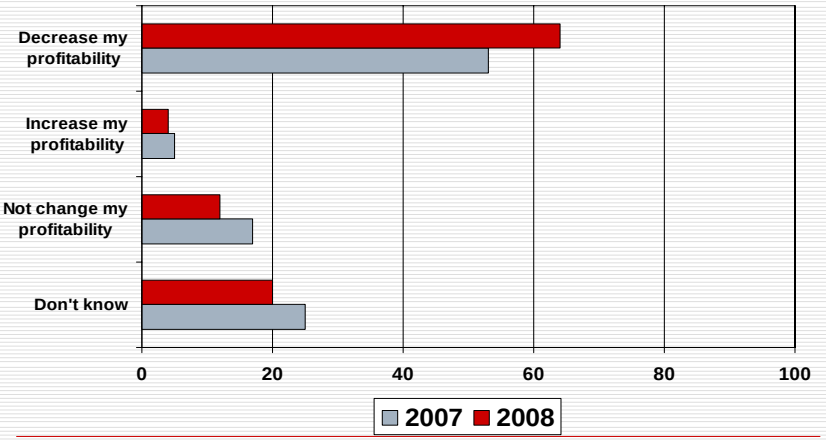
Not using Bt CORN BORER hybrids would:



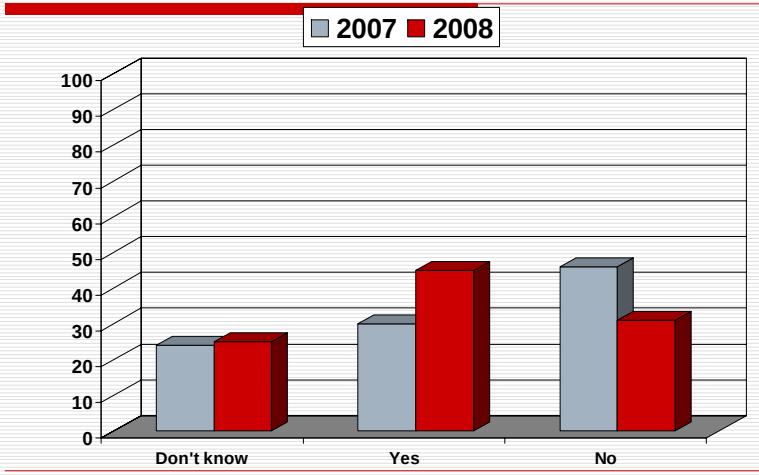
Percentage of your acreage you plant to CORN ROOTWORM (CRW) hybrids.



Not using Bt CRW hybrids would:



Do you have problems with northern corn rootworms in corn following soybeans?



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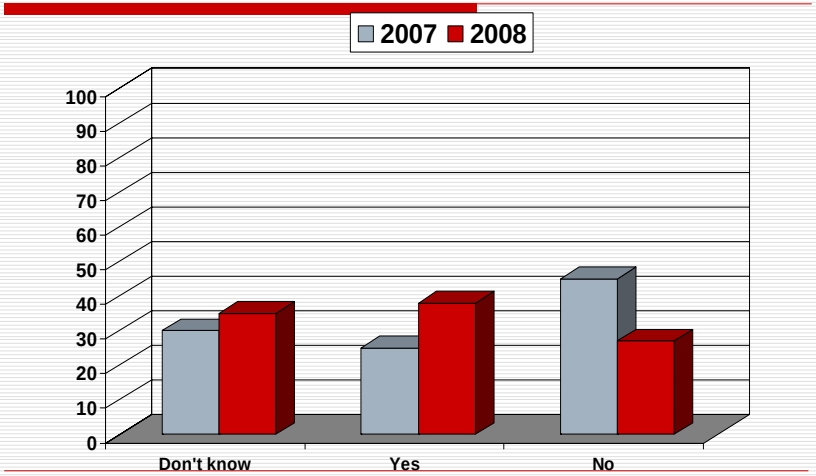
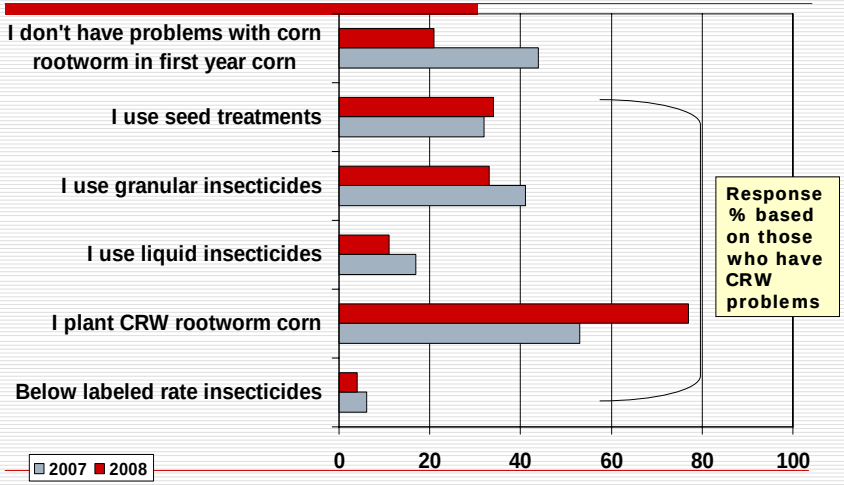
Do you have problems with western corn rootworms in corn following soybeans?



70

How do you manage corn rootworms in first year corn?



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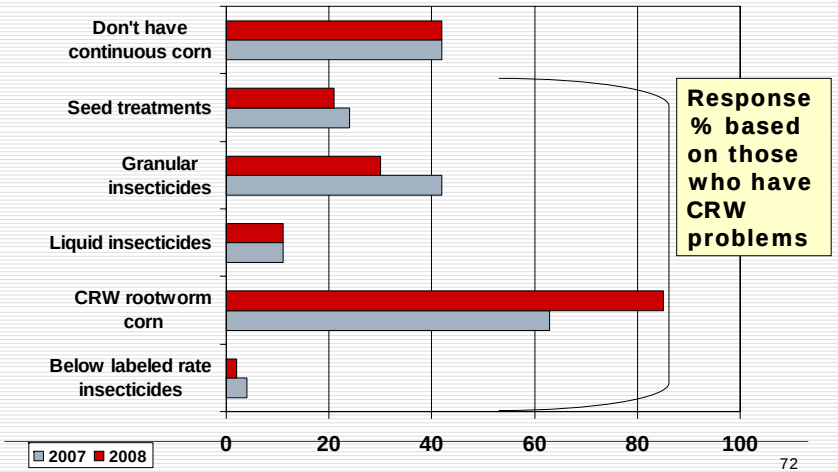
How do you manage corn rootworms in continuous corn?



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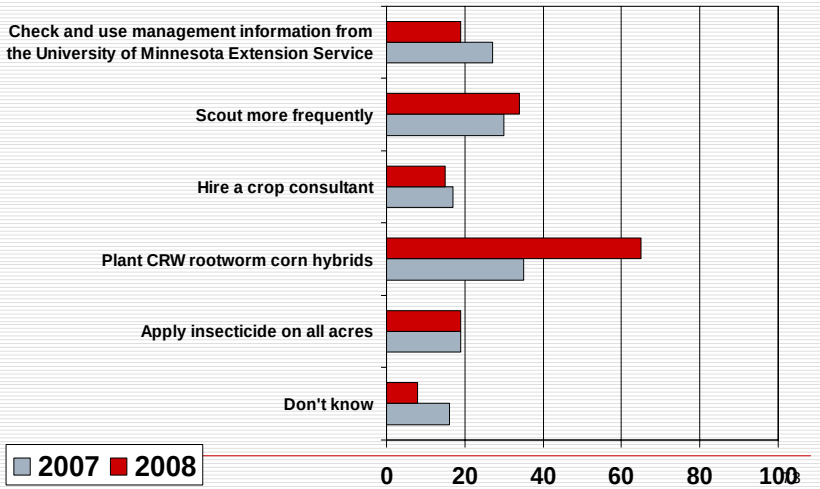
Because of the threat of northern corn rootworm extended diapause, I will:



Most troublesome SOYBEAN insect pests are:

	2007	2008
Soybean aphid	95%	65%
Soybean cyst nematode	47%	46%
Bean leaf beetle	15%	9%
Spider mites	10%	20%
Grasshopper	3%	1%
Potato leafhopper	3%	3%
Stink bug	0%	0%
Seed corn maggot		1%

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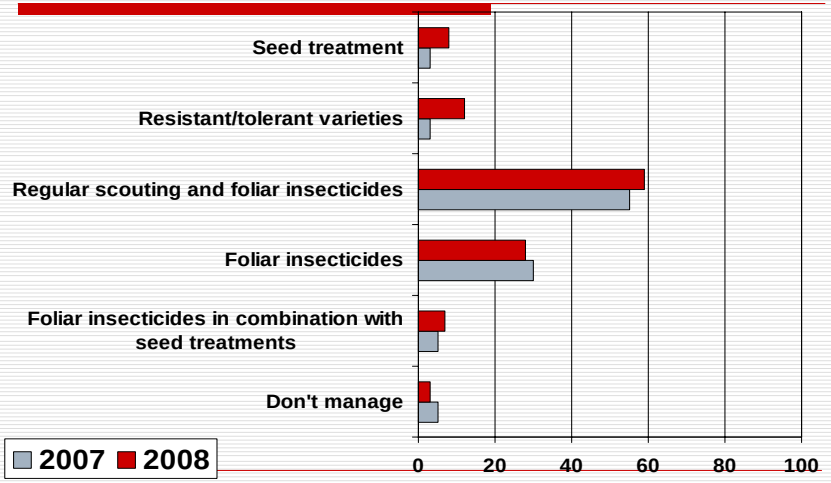
How do you manage soybean aphids?



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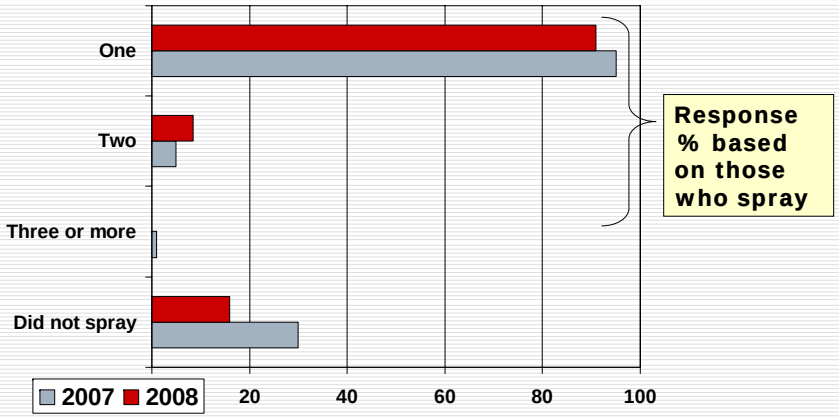
Number of insecticide applications you applied to control soybean aphids in the past season?



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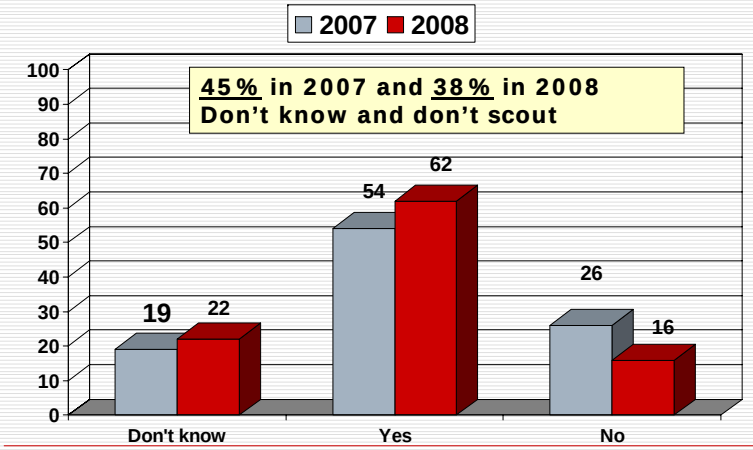
Do you have Soybean Cyst Nematode (SCN) on your farm?



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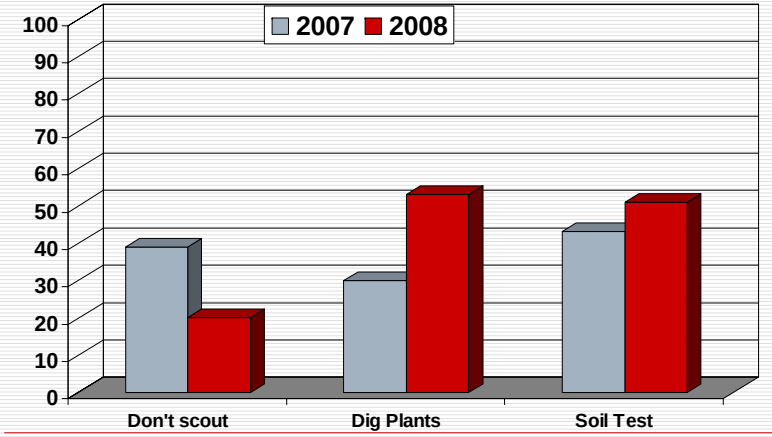
How do you scout for SCN on your farm?



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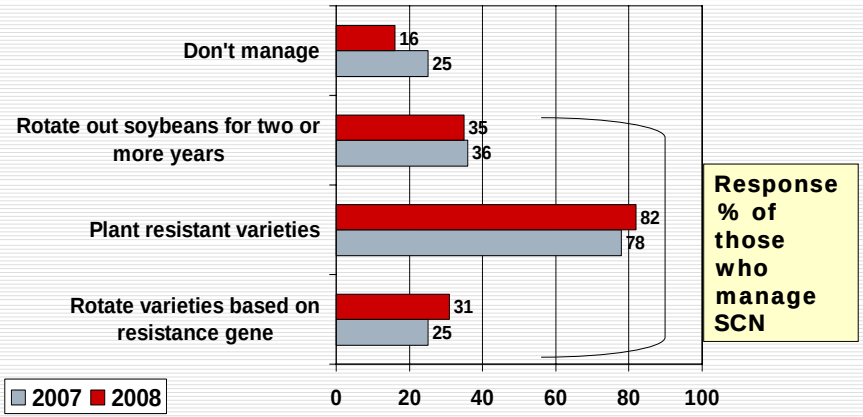
How do you manage SCN on your farm?



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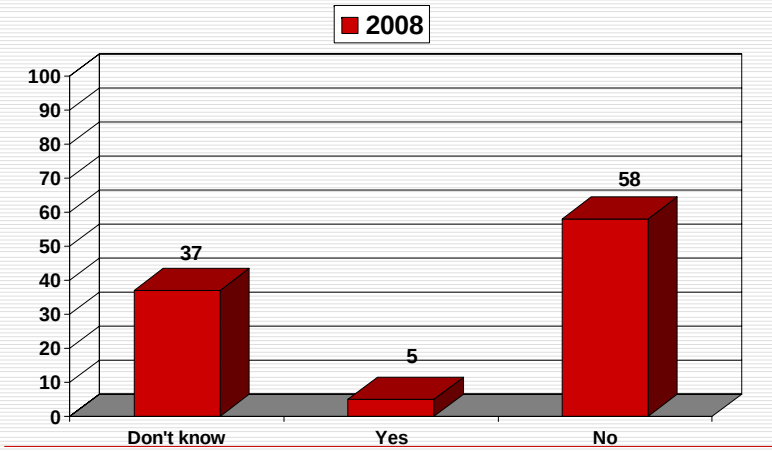
Do you have problems with Corn Nematodes on your farm?



80

What do you usually wear when working with pesticides? (2008 - 710 Responses)

88% 1. Gloves

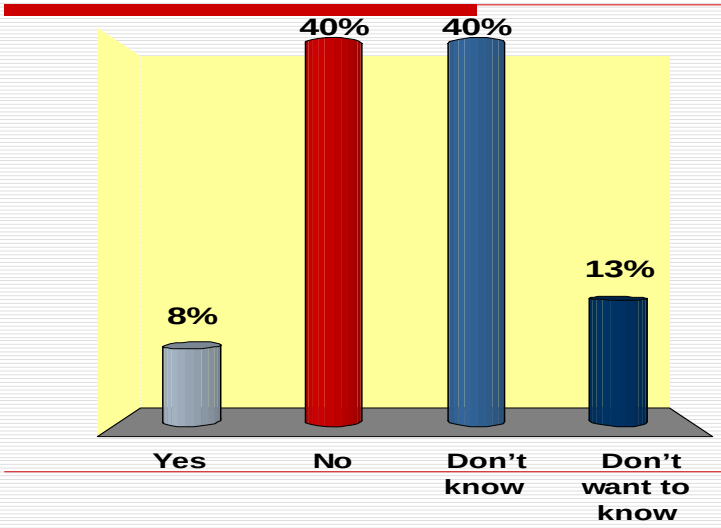
14% 2. Apron – when mixing and loading

58% 3. Eye protection

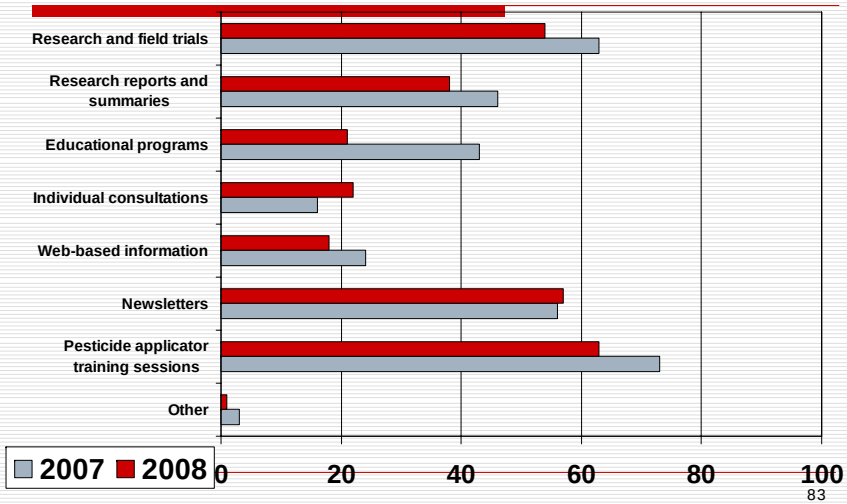
24% 4. Coveralls

7% 5. Don't wear protective equipment

Do you have endangered species on your Farm? (2008 - 354 responses)



I rely on the following University of Minnesota resources to gain IPM related knowledge and practices:



I have *significantly increased* the following in the last five years as a result of University of Minnesota Extension Integrated Pest Management (IPM) training and/or its related information: